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19 route de Courtenay - 45220 – CHUELLES –
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USER'S GUIDE FOR OPEN SYSTEM

OPEN SYSTEM

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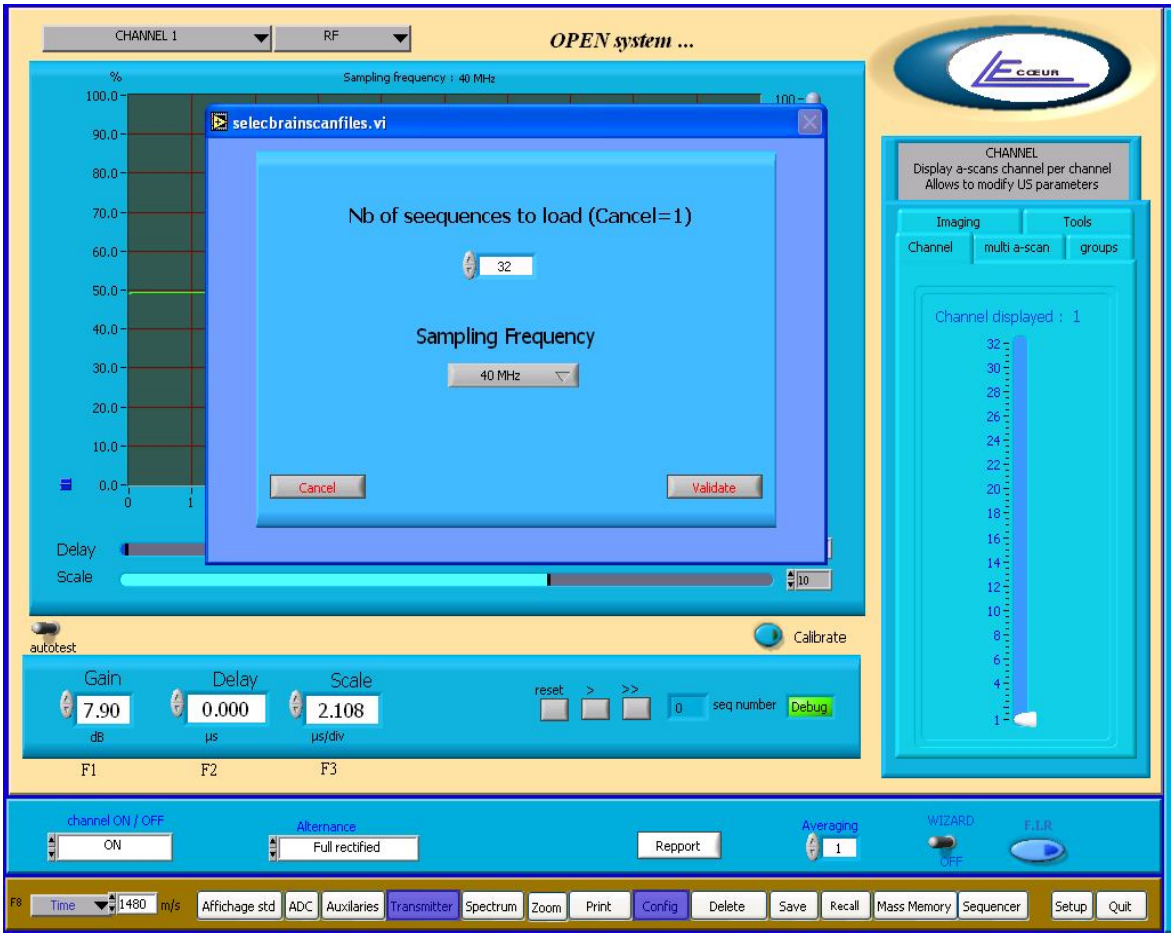
1.1 Setting up the number of sequences



DESCRIPTION:

Each time the application is loaded the first task is to set up the number of sequences to load. The user can enter a number of sequences or hit 'esc' to skip. In this case only 8 sequences are loaded.
The user can also enter the sampling frequency of receivers analogue to digital converters.

FEATURES:

N/A

NOTES: *The sampling frequency will be stored in the current set-up file.*

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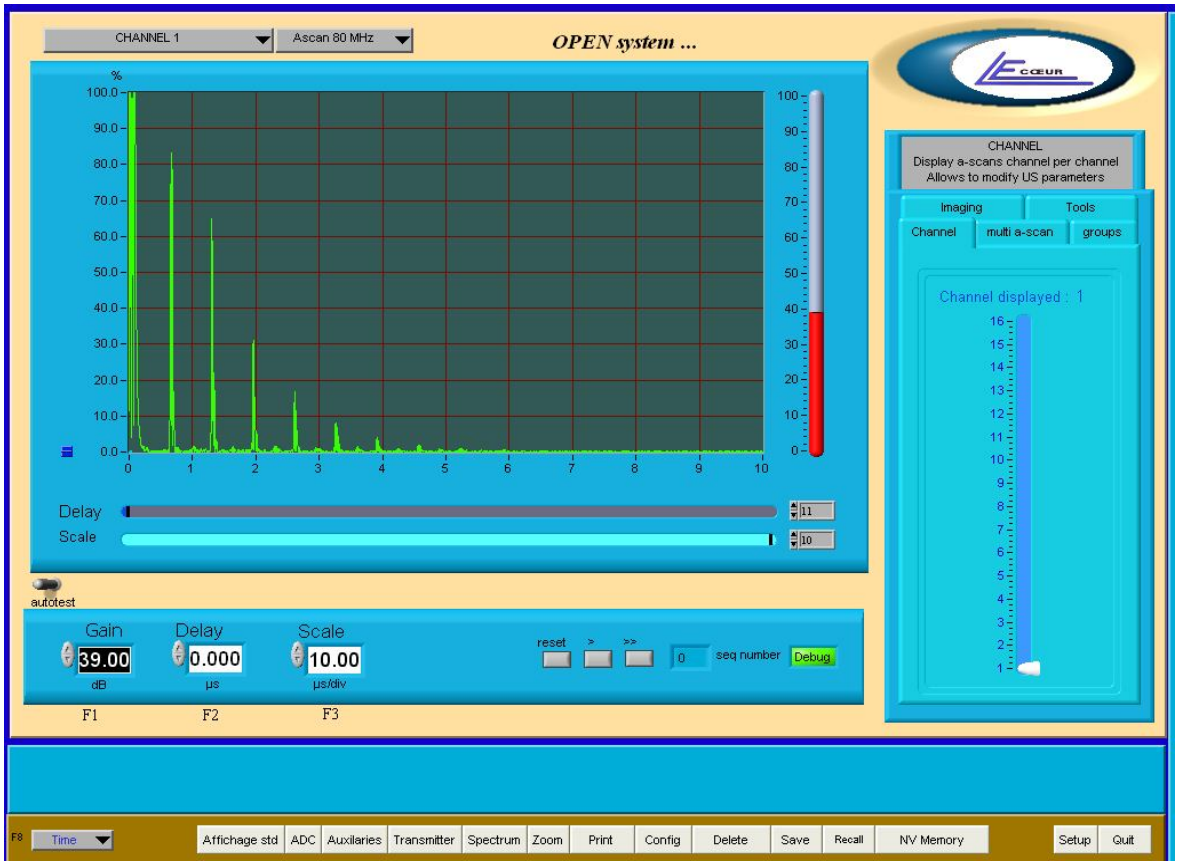
1.2 Gain



DESCRIPTION:

This controller allows the user to enter a gain value for the selected channel.

FEATURES:

Range: 0 to 80 dB
Step: 0.1 dB
Bandwidth: 0.5 MHz to 20 MHz at -6 dB
Linearity: -/+ 0.5 dB.

NOTES:

The reported noise to the input of the receiver is 1 nV/ Sqr(Hz). This value is measured in our laboratories; it doesn't include connectors and external cables.

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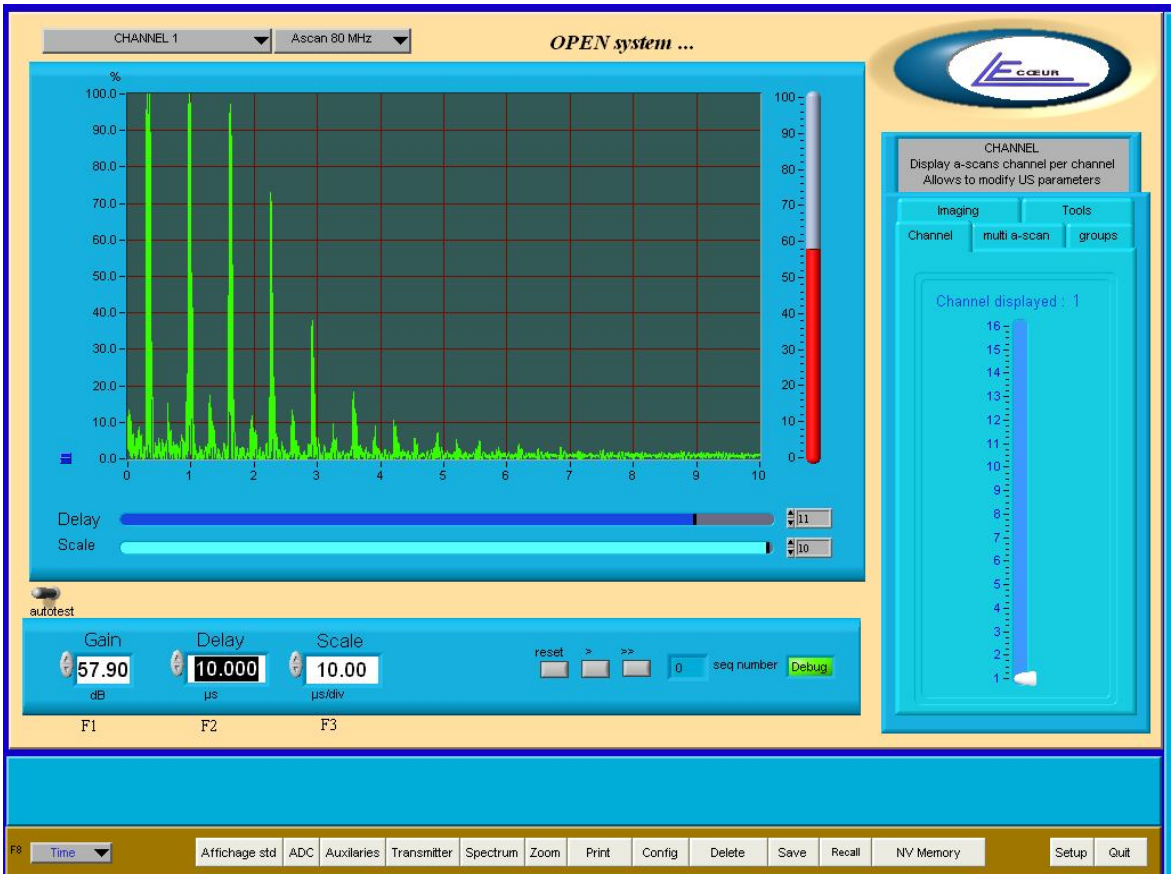
1.3 Delay



DESCRIPTION:

Allows the user to control the delay of the display. IT IS ONLY FOR VISUALISATION. The delays on receivers or transmitter for beam forming are set up in other menu.

FEATURES:

Unit: µS
Range: 0 to 160 µS

NOTES: *N.A*

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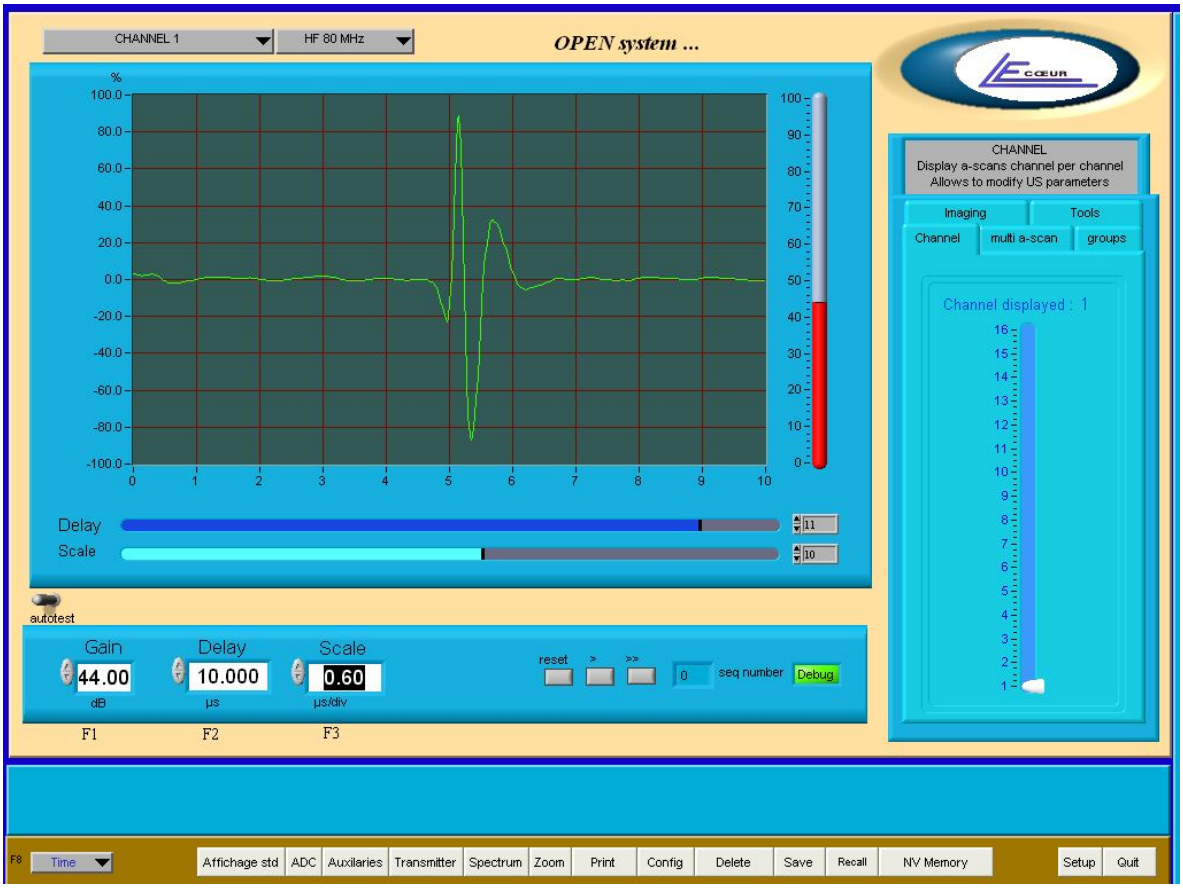
1.4 Scale



DESCRIPTION:

This function allows to modify the scale for the screen display.

FEATURES:

Unit: µS per division
Range:
-For 80 MHz sampling frequency: 0 to 10 µS/Div. max
-For 40 MHz sampling frequency: 0 to 20 µS/Div. max
-For 20 MHz sampling frequency: 0 to 39 µS/Div. max
-For 10 MHz sampling frequency: 0 to 39 µS/Div. max

NOTES:

N.A

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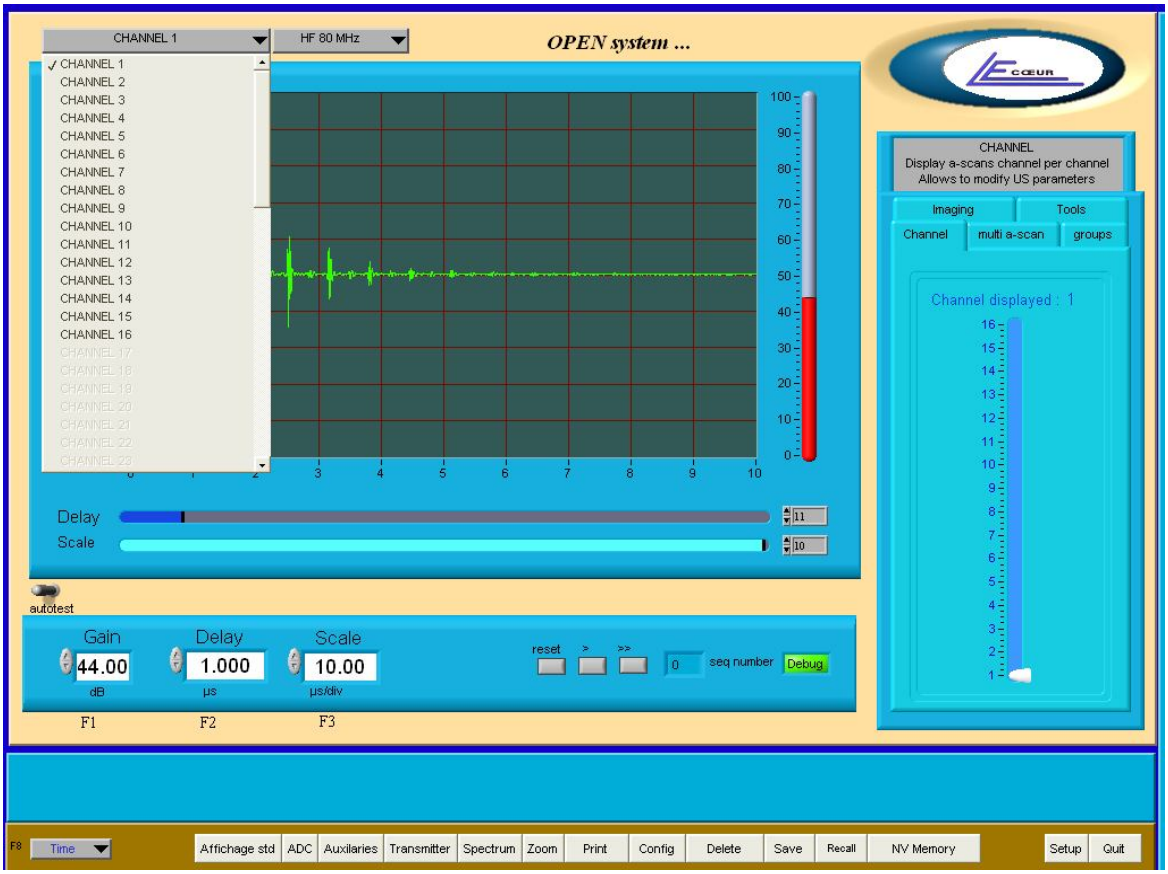
1.5 Selecting a channel



DESCRIPTION:

The scrolling controller selects the channel to be displayed. The maximum value is the number of hardware channels installed

FEATURES:

- Range maximum: Number of channels installed in OPEN

NOTES:

N.A

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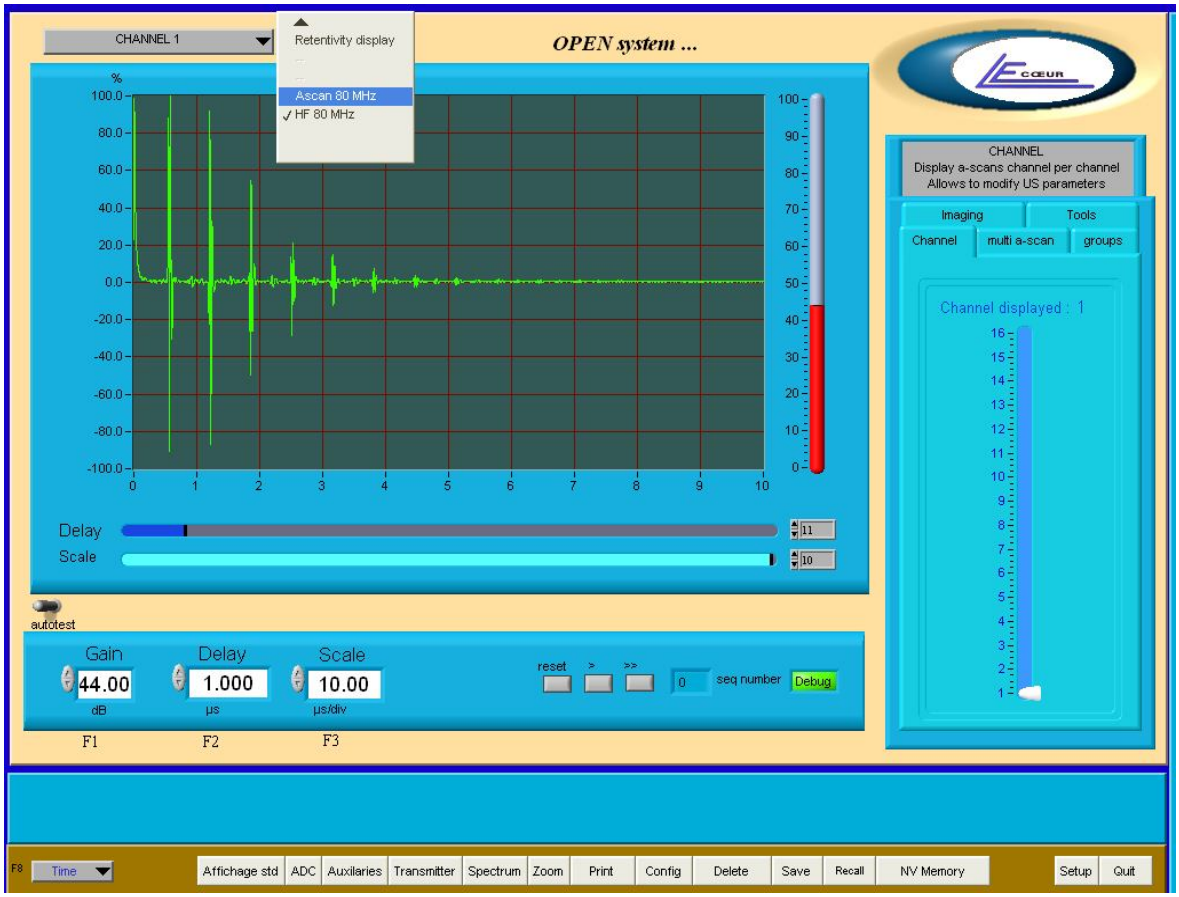
1.6 RF/A-scan



DESCRIPTION:

The menu controls the kind of display High frequency is RF mode, A-scan is rectified mode

FEATURES:

N.A

NOTES:

N.A

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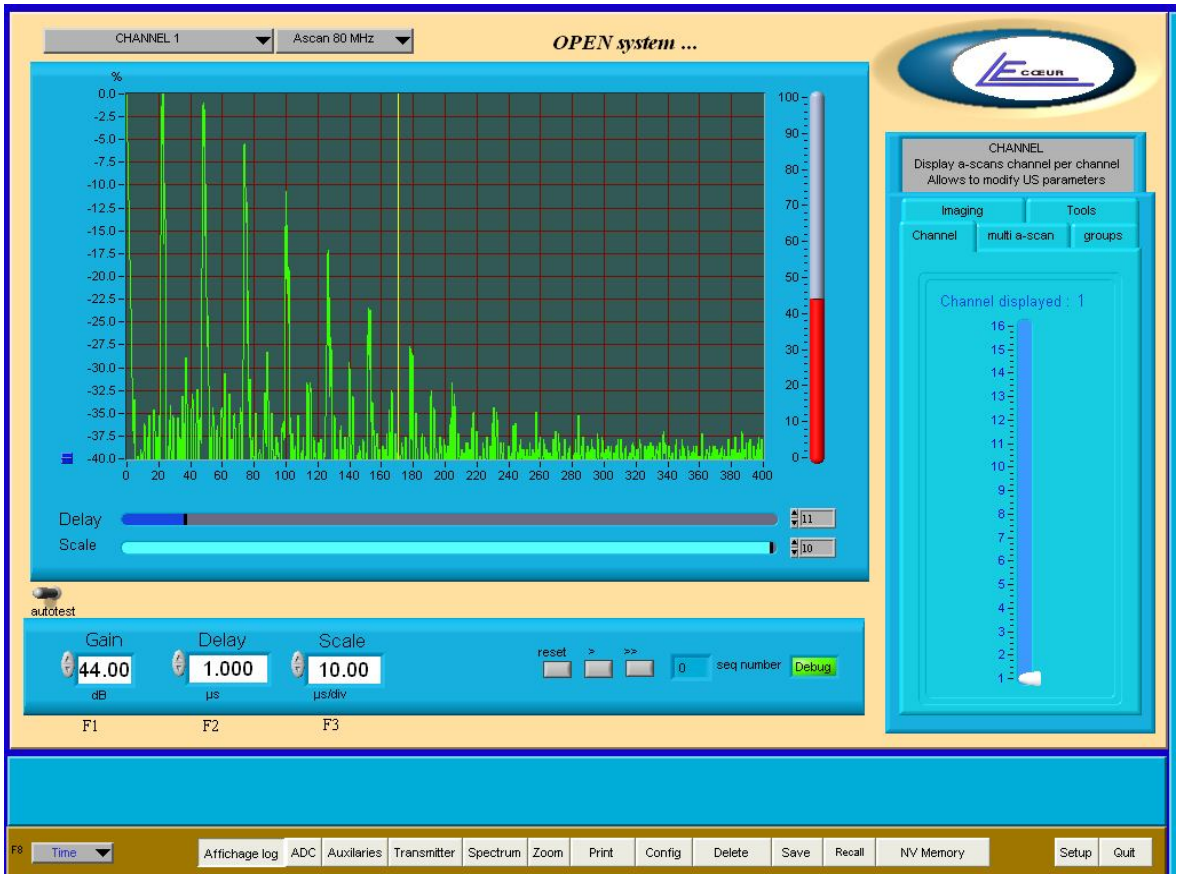
1.7 Lin/log display



DESCRIPTION:

This controller allows the user to display A-scan in linear or logarithmic mode. 0 dB is the maximum amplitude of echo in the screen.

FEATURES:

0 dB is the maximum amplitude of echo in the screen.

NOTES:

N.A

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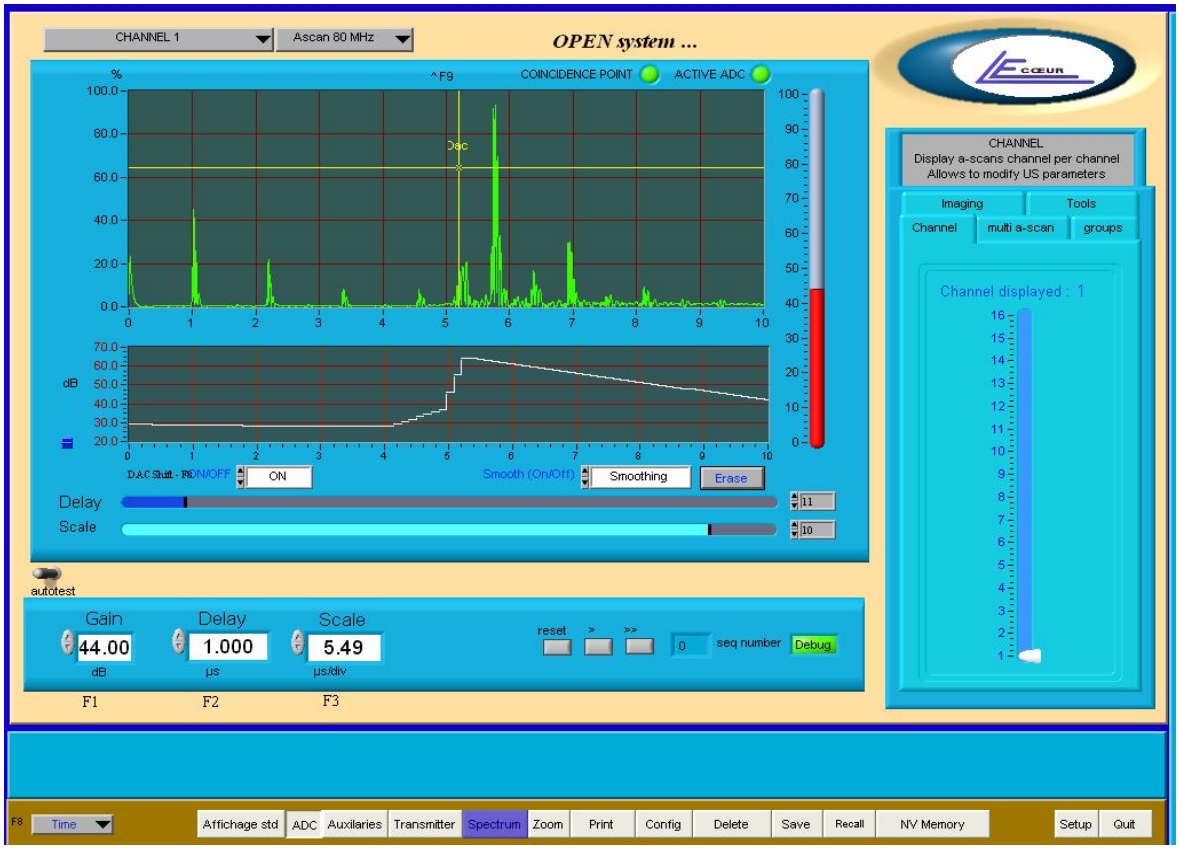
1.8 DAC



DESCRIPTION:

This function is a hardware function. When ON is set up, amplifier is controlled by a time variable tension. It is possible to create any kind of curve to compensate attenuation, or to minimise a selected echo or more.
The smoothing option makes an interpolation between the points

FEATURES:

Range: 0 to 80 dB
Depth: 160 µS
Step: 0.65 µS

NOTES: *OPTION: 1 mS depth*

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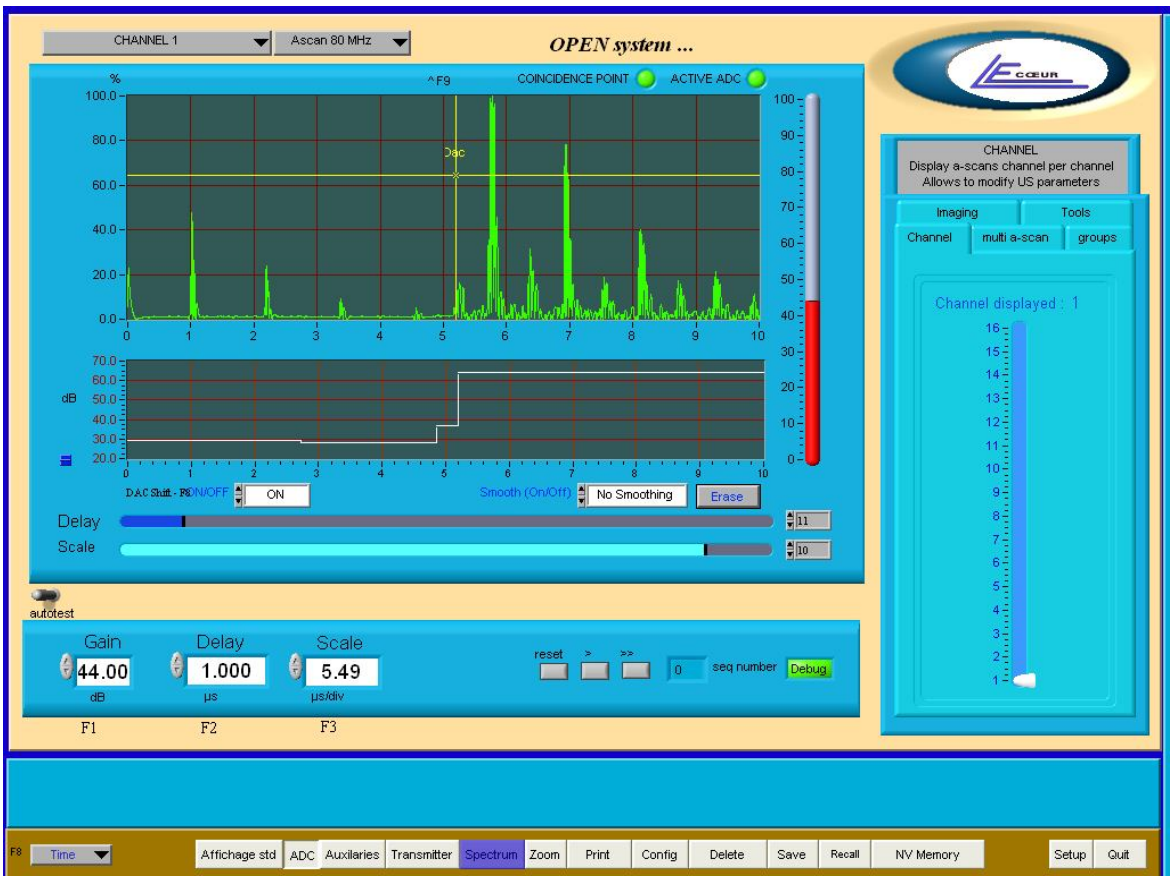

NO SMOOTHING

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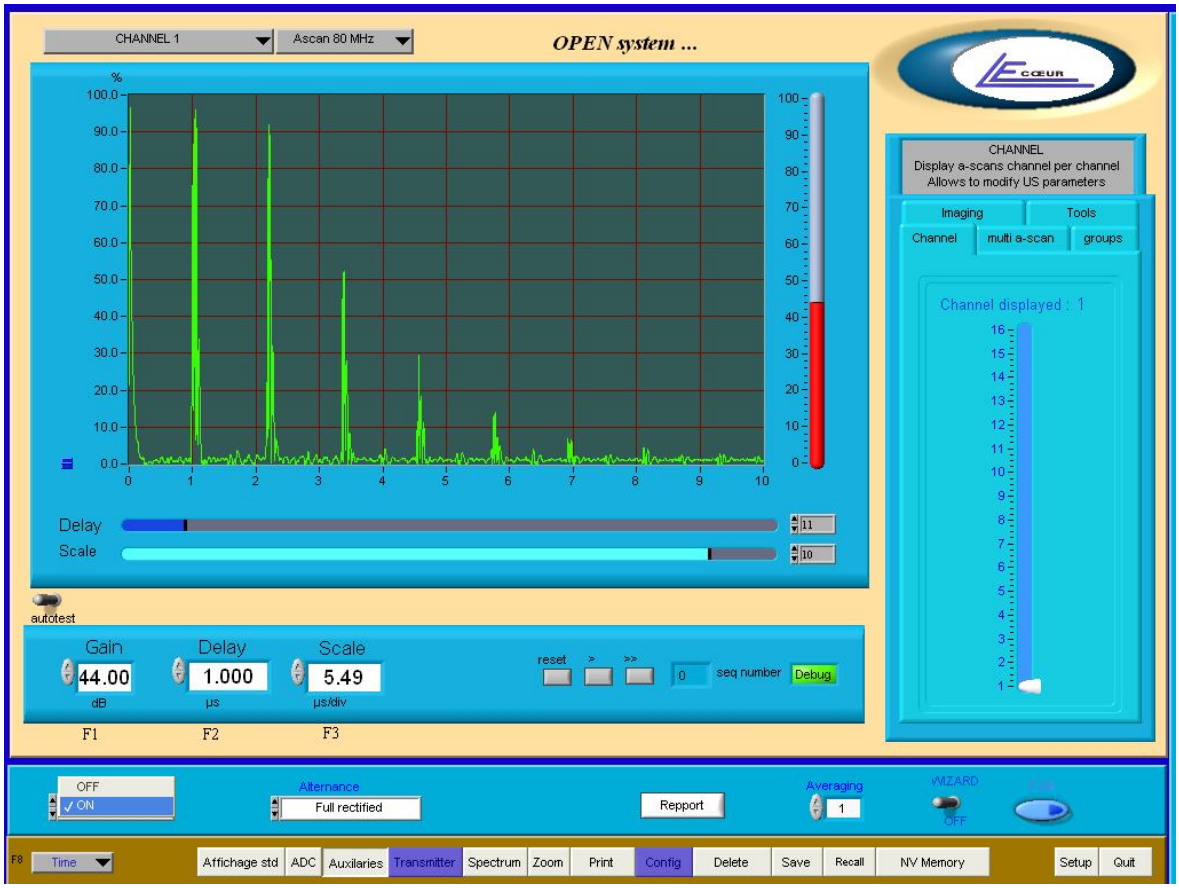
1.9 Channel On Off



DESCRIPTION:

Controls the state of the current channel (On :the channel is activated, OFF : the channel is switched off)

FEATURES:

N.A

NOTES:

This parameter is only active for OPEN with analog pulsers

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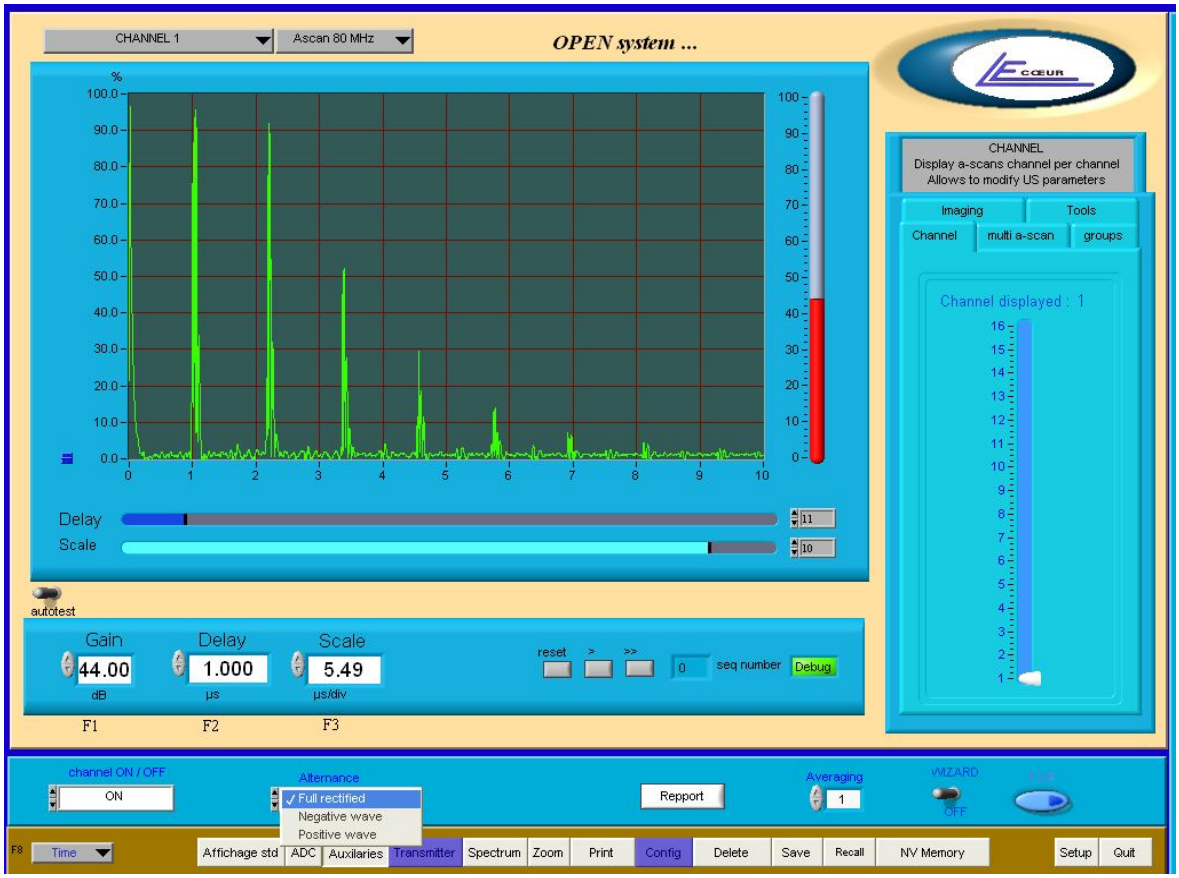
1.10 Rectification mode



DESCRIPTION:

In A-scan mode it is possible to display only the negative wave or positive or both.

FEATURES:

N.A

NOTES:

N.A

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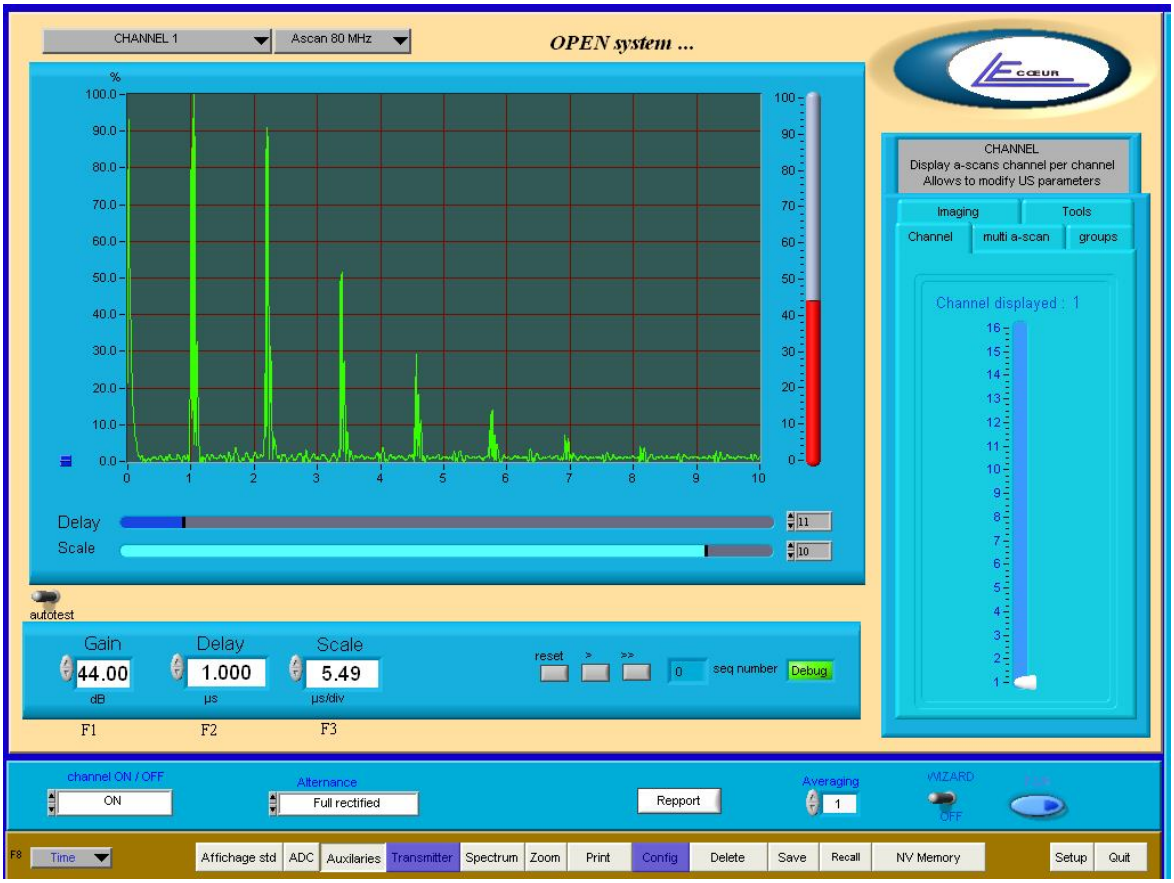
1.11 Report



DESCRIPTION:

This function is a dedicated one. The user can create his own report using Labview tools and can activate it with this button.

FEATURES:

N.A

NOTES:

N.A

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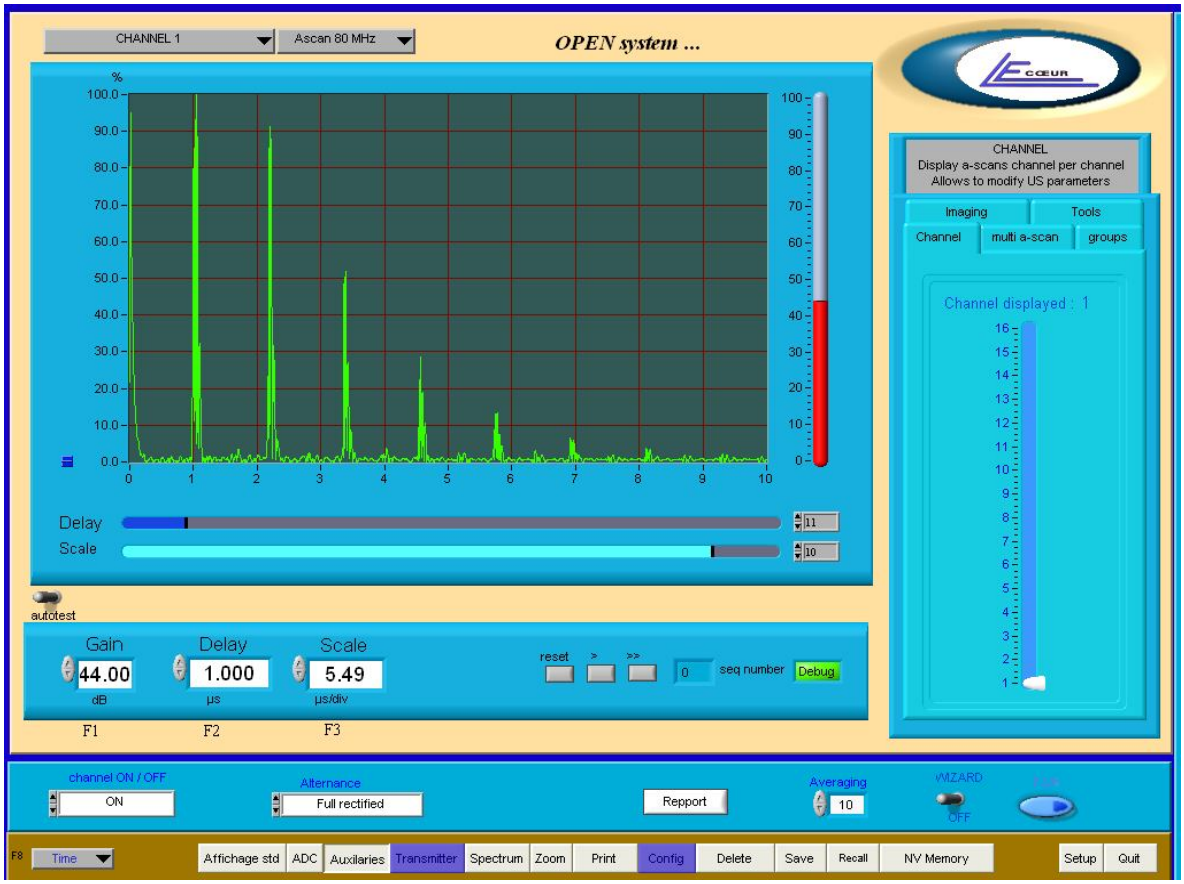
1.12 Averaging



DESCRIPTION:

Averaging makes the arithmetic average of a selected number of A-scan. This number is entered in the controller 'Averring'. This has only effect on the display.

FEATURES:

Range: 1 to 255

NOTES:

OPTION: Hardware averaging 1 to 255, averages signals in real time.

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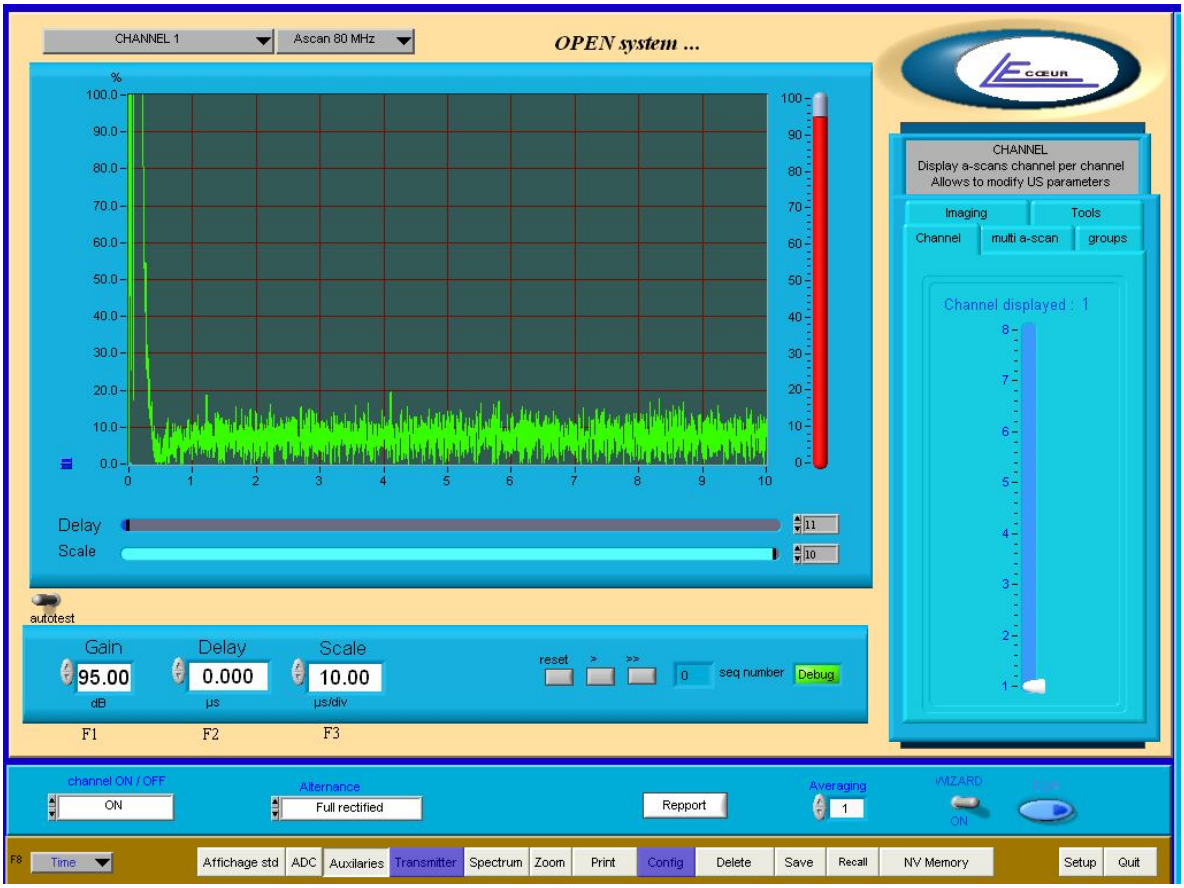
1.13 Wizard



DESCRIPTION:

Switching Wizard ON allows the user to increase gain to 100 dB. The averaging function is controlled by the system to reduce automatically electronic noise. The gain between 80 dB and 100 dB is a numerical gain. This function is a software one.

FEATURES:

N.A

NOTES:

OPTION: Hardware averaging 1 to 255, averages signals in real time.

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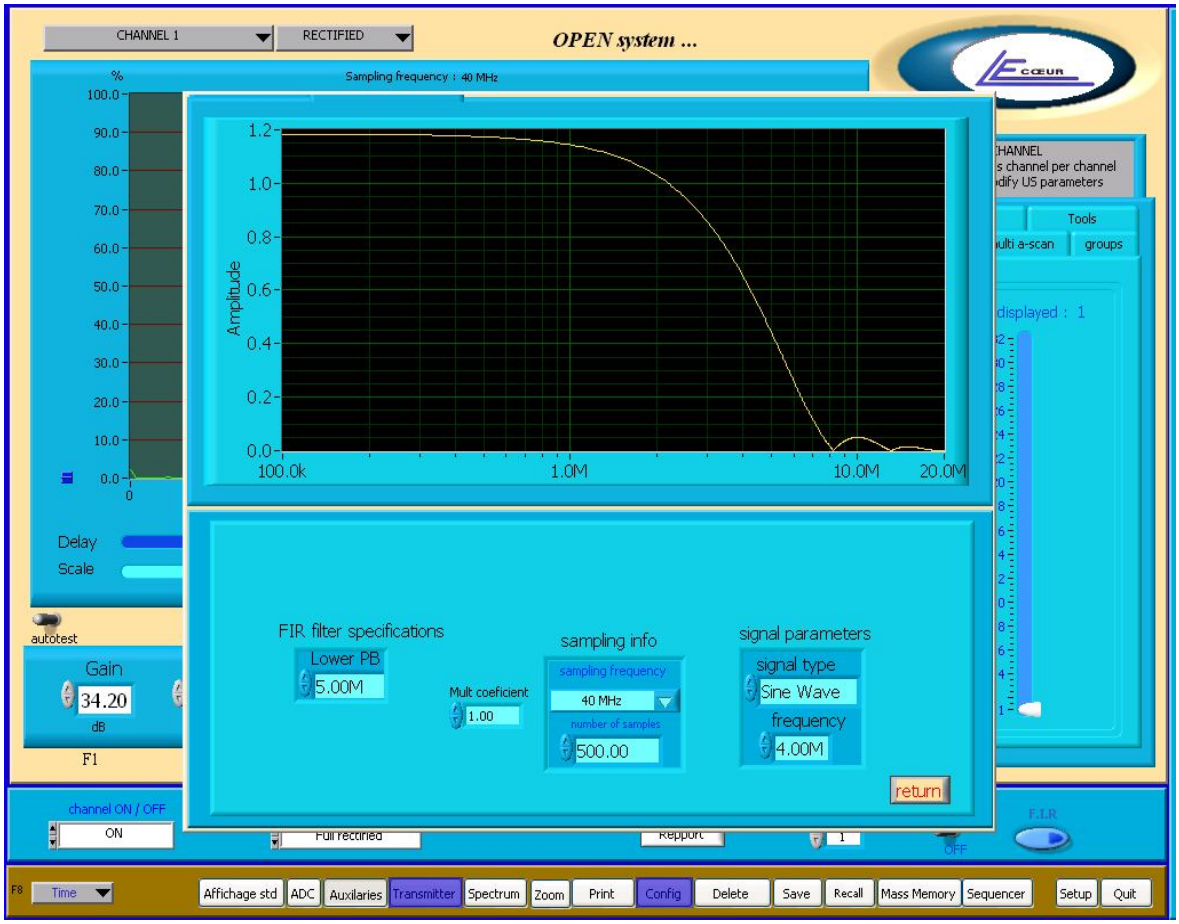
1.14 Fir



DESCRIPTION:

The "FIR" is a hardware digital filter which can be set up with the windows "FIR". It is composed with 8 coefficients. The user must take care of entering the right sampling frequency before adjusting.

FEATURES:

Low Pass filter 8 coefficients FIR

NOTES:*N.A*

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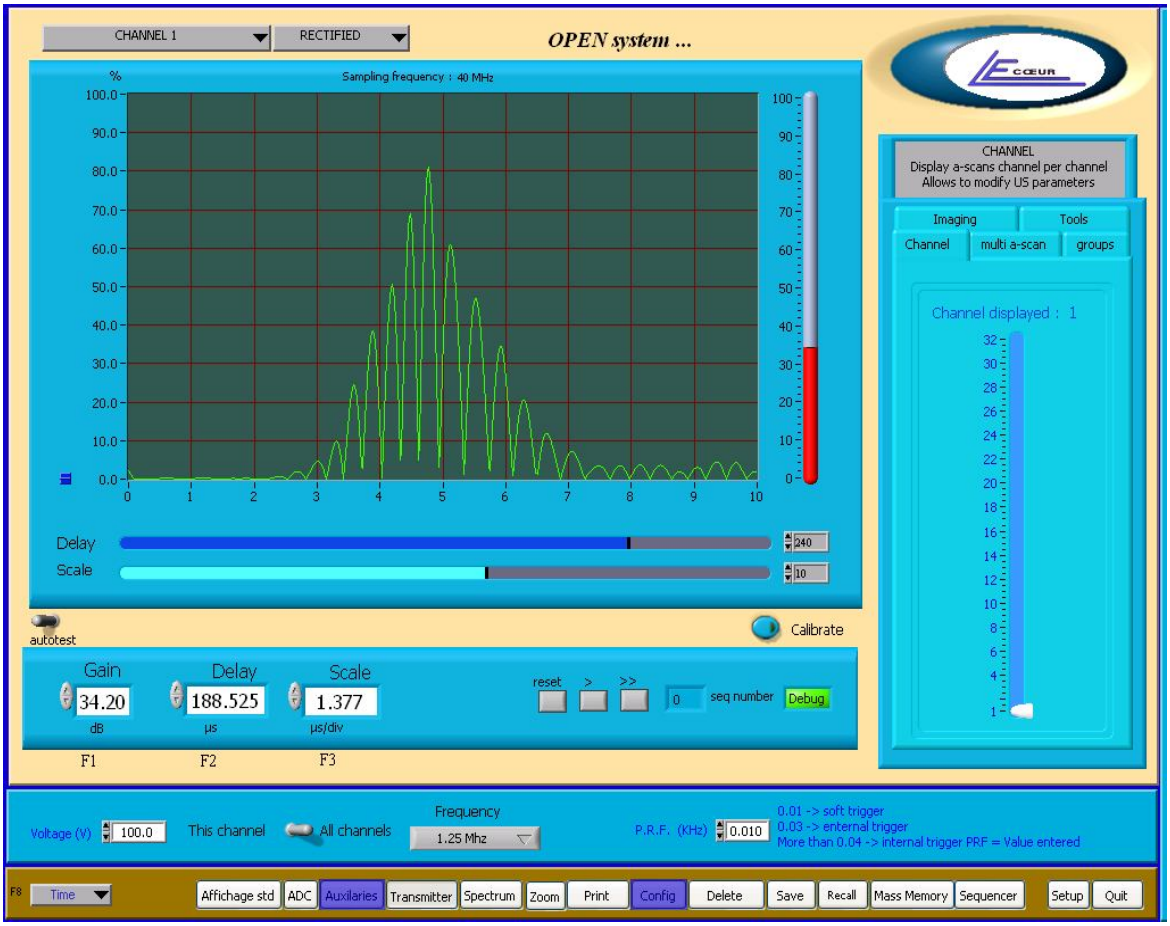
1.15 Transmitter



DESCRIPTION:

The Transmitter can be pulsed or analogue. In case of analogue pulser only P.R.F is active.

Voltage: Can be adjusted from 10 Volts to 230 Volts. This parameter controls the voltage of the pulse generated by the pulser and sent to the probe.

Frequency: This parameter sets up the width of the pulse.

This channel / All channels: When the switch is in position "All channel voltage and Frequency are sent to all boards of OPEN providing the same transmitters parameters.

FEATURES:

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Tests conditions :

- *Single probe selected on the back side of OPEN*
- *50 Ohm load (resistive)*
- *Width measured at 100 Volts CC / at 50 % of amplitude*
- *Falling time at 100 Volts CC / 10 to 90 % of amplitude*

Voltage accuracy

a) Standard transmitters

	Tolérances	
Value	Min	Max
230 V	225 V	235 V
200 V	195 V	205 V
150 V	145 V	155 V
100 V	95 V	105 V
50 V	44 V	56 V
10 V	7 V	14 V

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b) High frequency transmitters (OPTION)

	Tolérances	
Value	Min	Max
230 V	228 V	232 V
200 V	198 V	202 V
150 V	148 V	152 V
100 V	98 V	102 V
50 V	47 V	53 V
10 V	8 V	12 V

Width accuracy

a) Standard transmitters

	Tolérances	
Pulse Width à 100 V Z=50 Ω	Min	Max
15 MHz	26 nS	39 nS
10 MHz	42 nS	58 nS
7,5 MHz	60 nS	72 nS
6 MHz	75 nS	91 nS
5 MHz	90 nS	110 nS
4 MHz	108 nS	132 nS

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b) High frequency transmitters (OPTION)

	Tolérances	
Width voltage compensated	Min	Max
15 MHz	30 nS	36 nS
10 MHz	47 nS	53 nS
7,5 MHz	62 nS	70 nS
6 MHz	80 nS	86 nS
5 MHz	95 nS	105 nS
4 MHz	120 nS	130 nS

Falling time

a) Standard transmitters

- Typical value: 8 nS

b) High frequency transmitters (OPTION)

- Typical value: 4 nS

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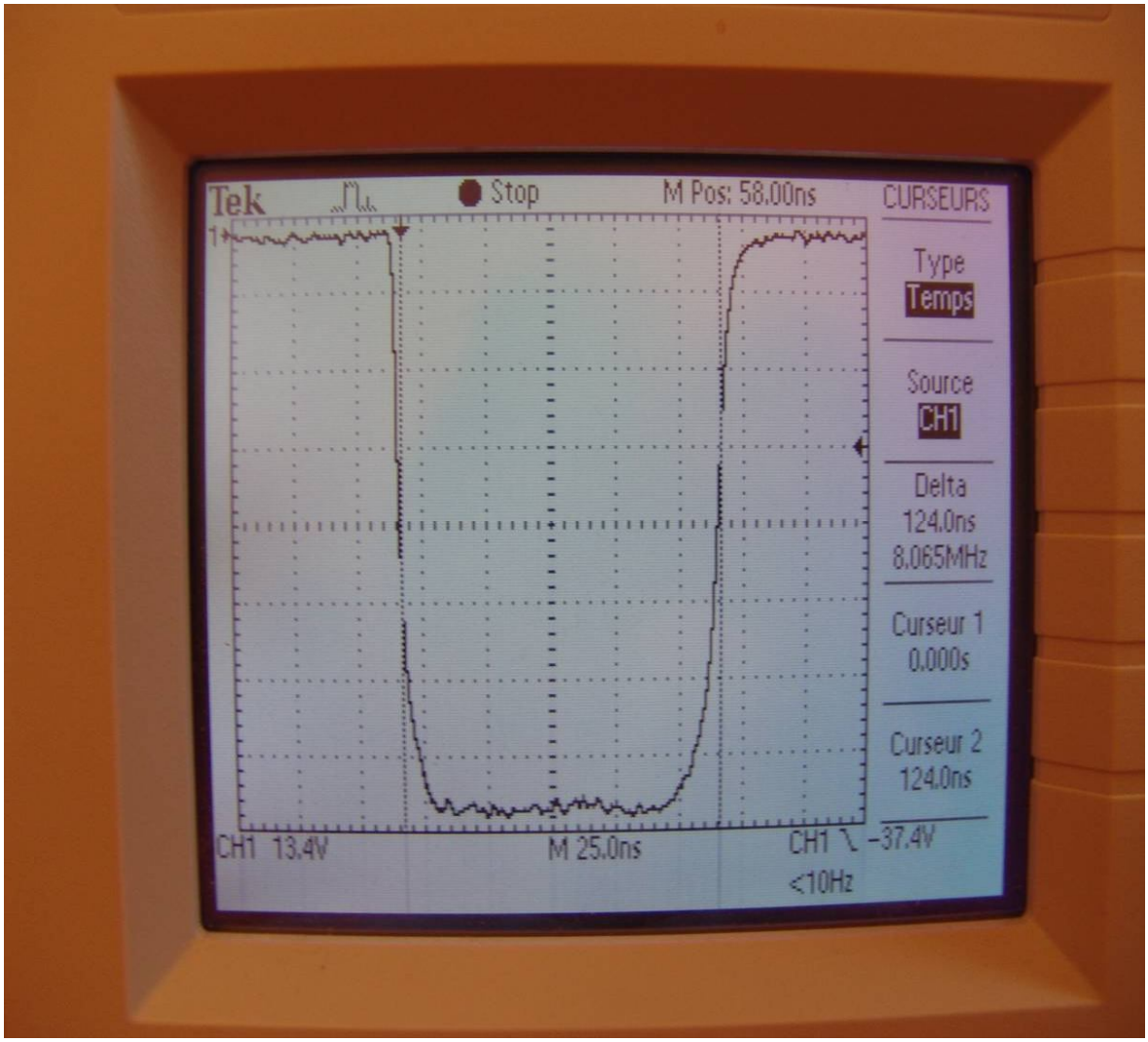
Pulse shape

a) Standard transmitters



4 MHz excitation / 100 Volts

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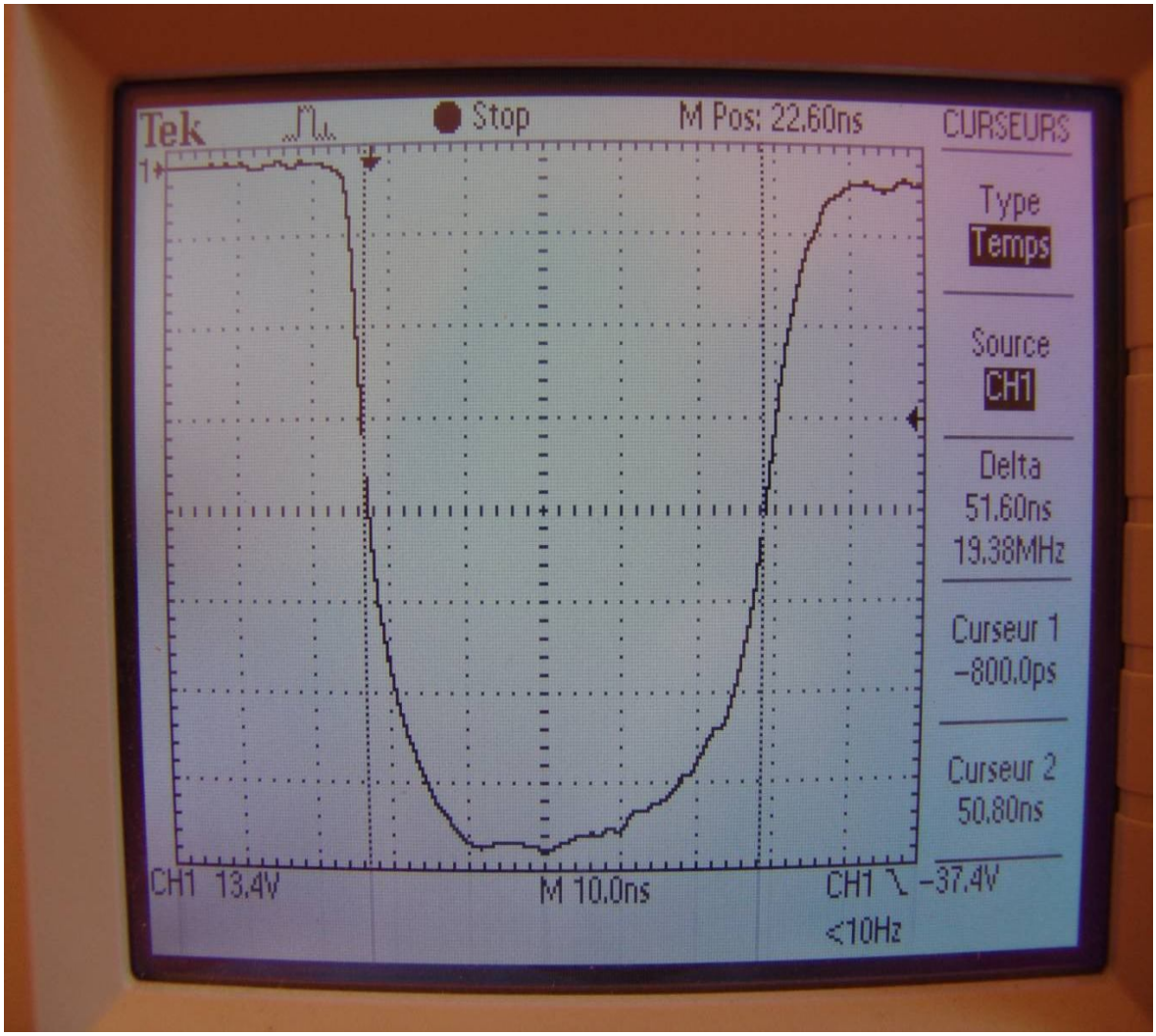

10 MHz excitation / 100 Volts

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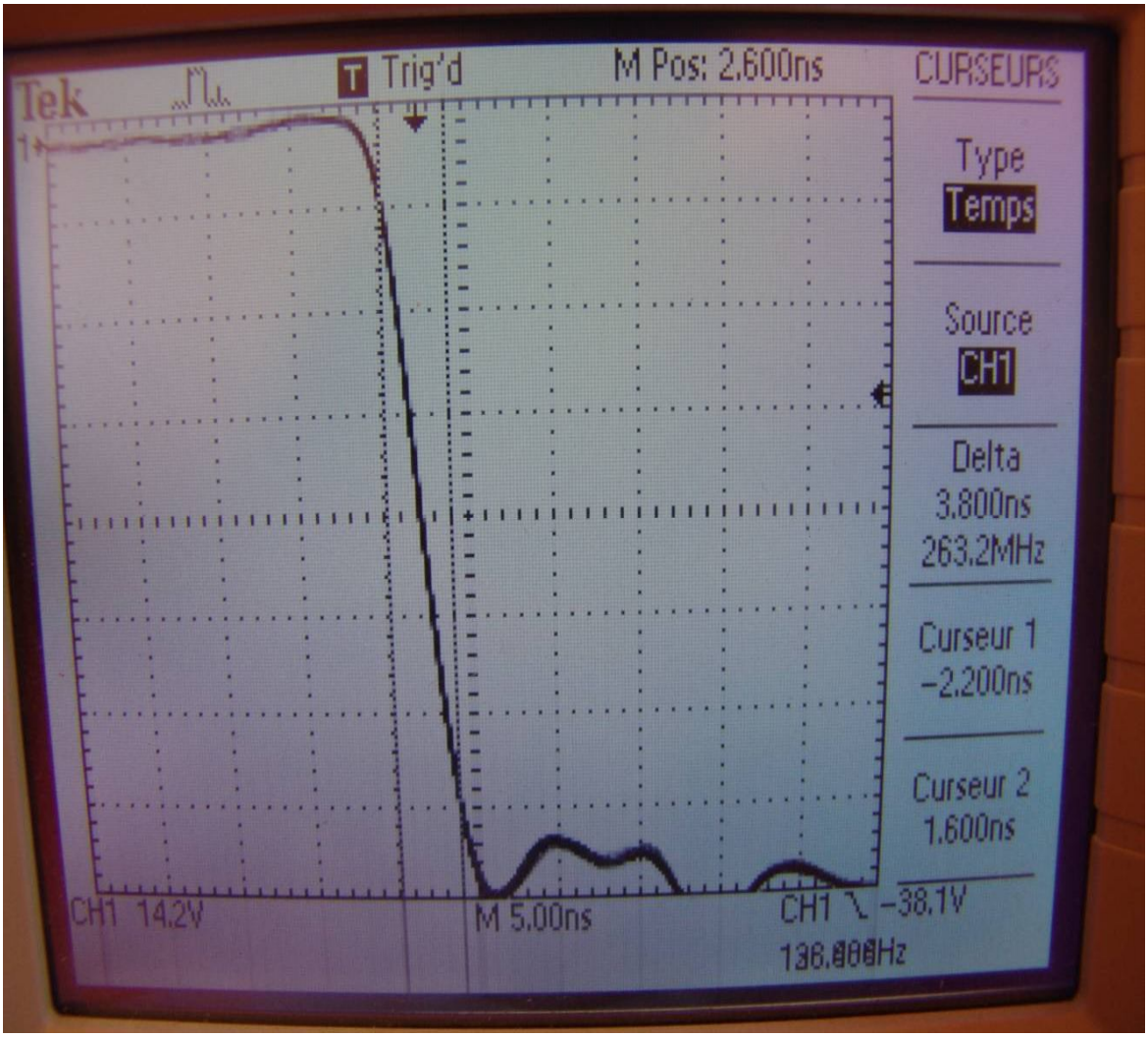
b) High frequency transmitters (OPTION)



Falling edge / 100 Volts

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P.R.F (repetition Frequency): This parameter controls the rate of the pulser. For example setting 1 KHz will generate pulses every millisecond.

- *Entering 0.03 KHz switches the system to the "EXTERNAL TRIGGER" mode. In this mode a TTL 5 Volts pulse must be input in the plus called 'EXTERNAL TRIGGER'. The active edge is positive.*

- *Entering 0.01 KHz switches the system in "SOFT TRIGGER" mode. In this mode the pulser generates pulses only when it is necessary (When a a-scan digitalisation is request). If no request is made on OPEN the pulser is set OFF.*

FEATURES:

Range: 0.3 KHz to 20 KHz depending on scale/delay value

NOTES:

N.A

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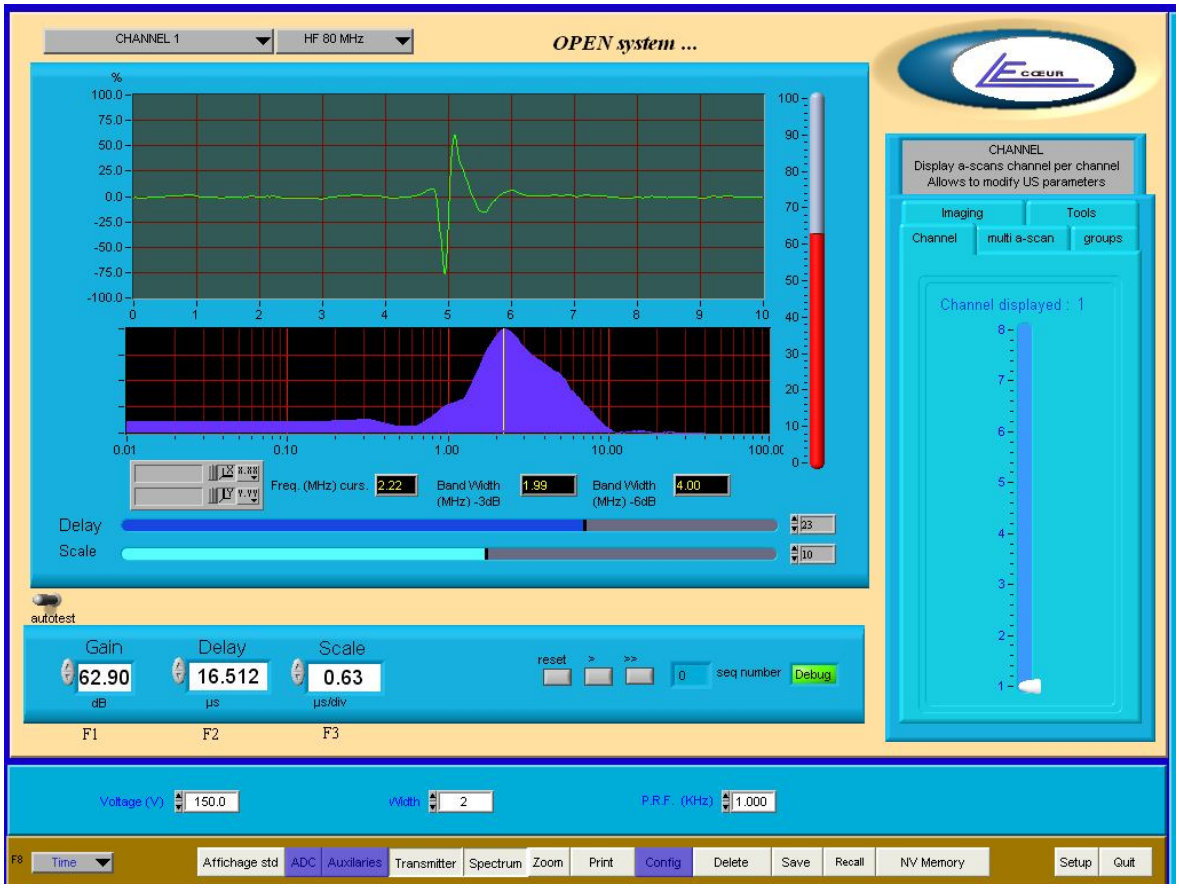
1.16 Spectrum



DESCRIPTION:

Displays the spectrum of the current A-SCAN in the screen

FEATURES:

N.A

NOTES:

N.A

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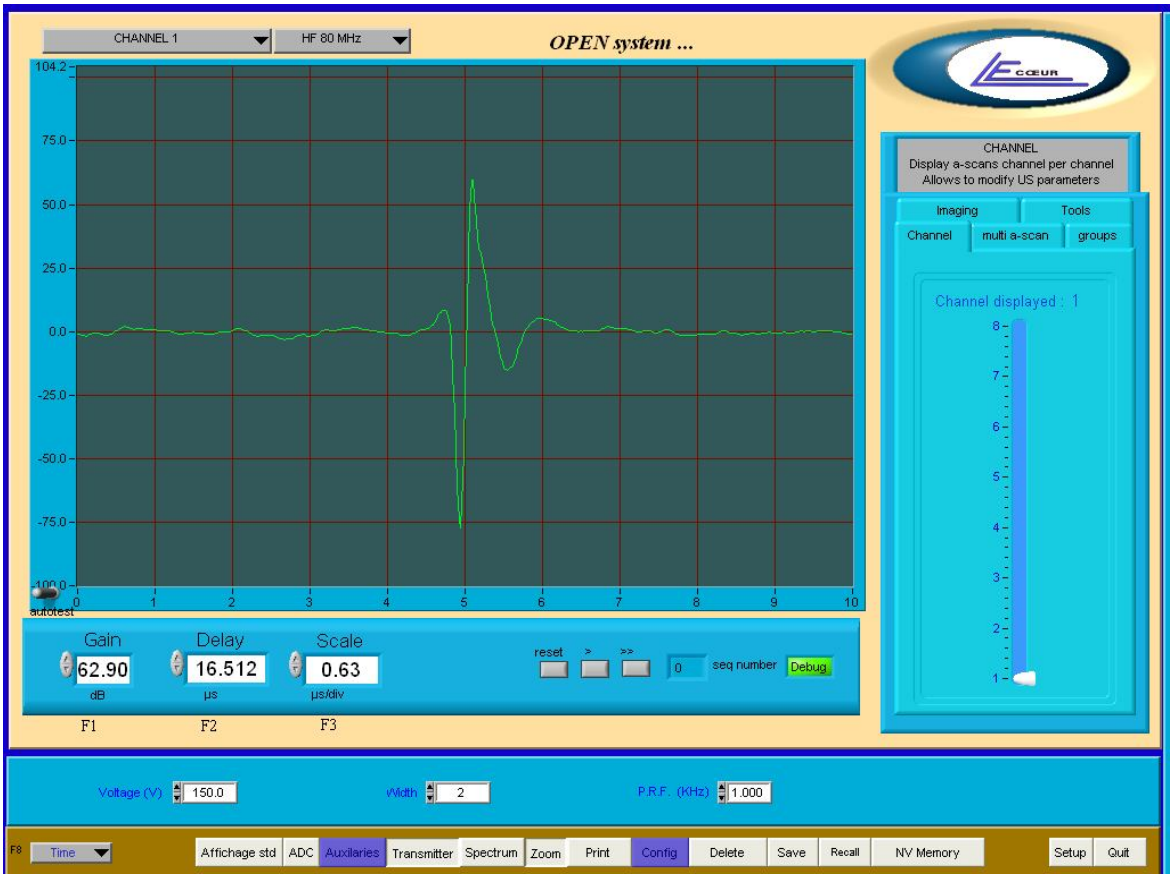
1.17 Zoom



DESCRIPTION:

Provides a larger display of A-SCAN

FEATURES:

N.A

NOTES:

N.A

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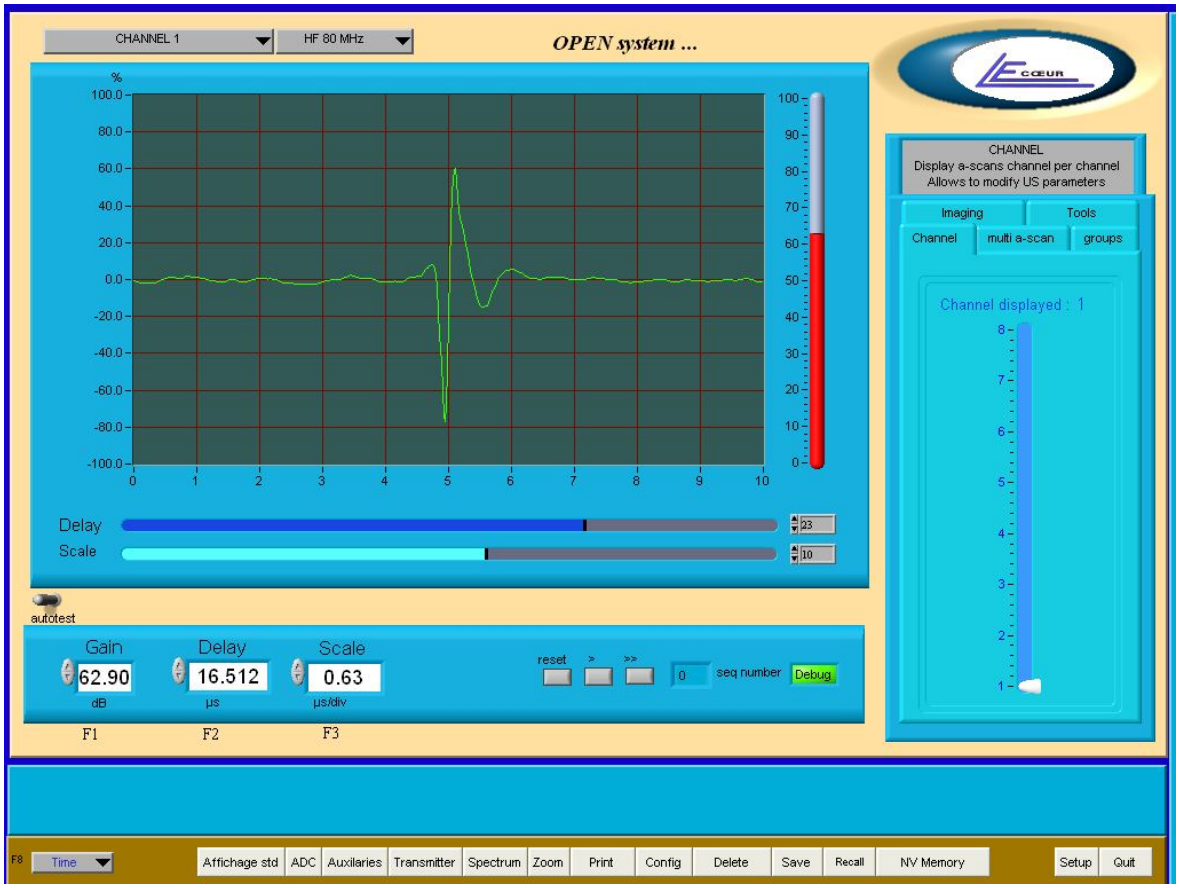
1.18 Print



DESCRIPTIONS:

The Print button transfers the current screen to a printer

FEATURES:

N.A

NOTES:

The black colour is changed to white to reduce ink consumption.

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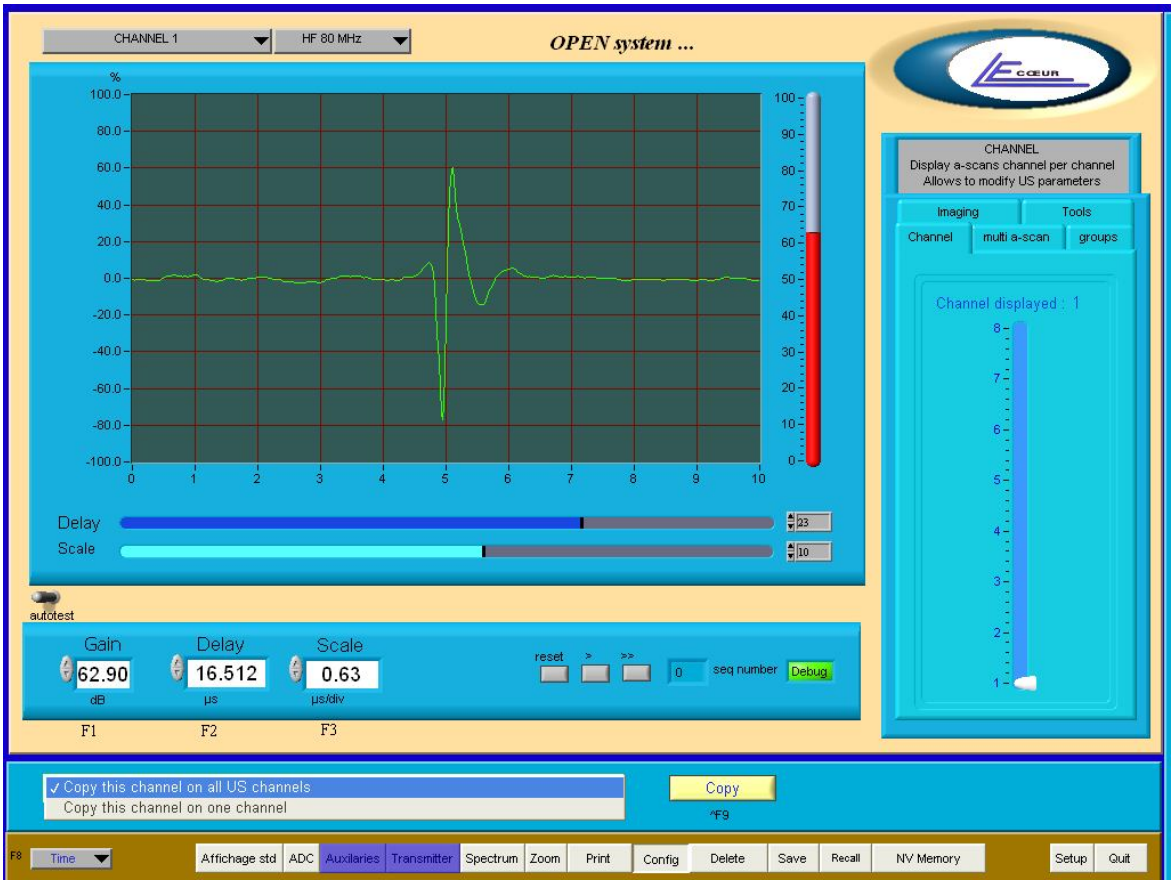
1.19 Config.



DESCRIPTION:

This function allows the user to copy all parameters from one channel to another or on all channels. This will also copy the delays for transmitters and receivers beam-former files.

FEATURES:

N.A

NOTES:

N.A

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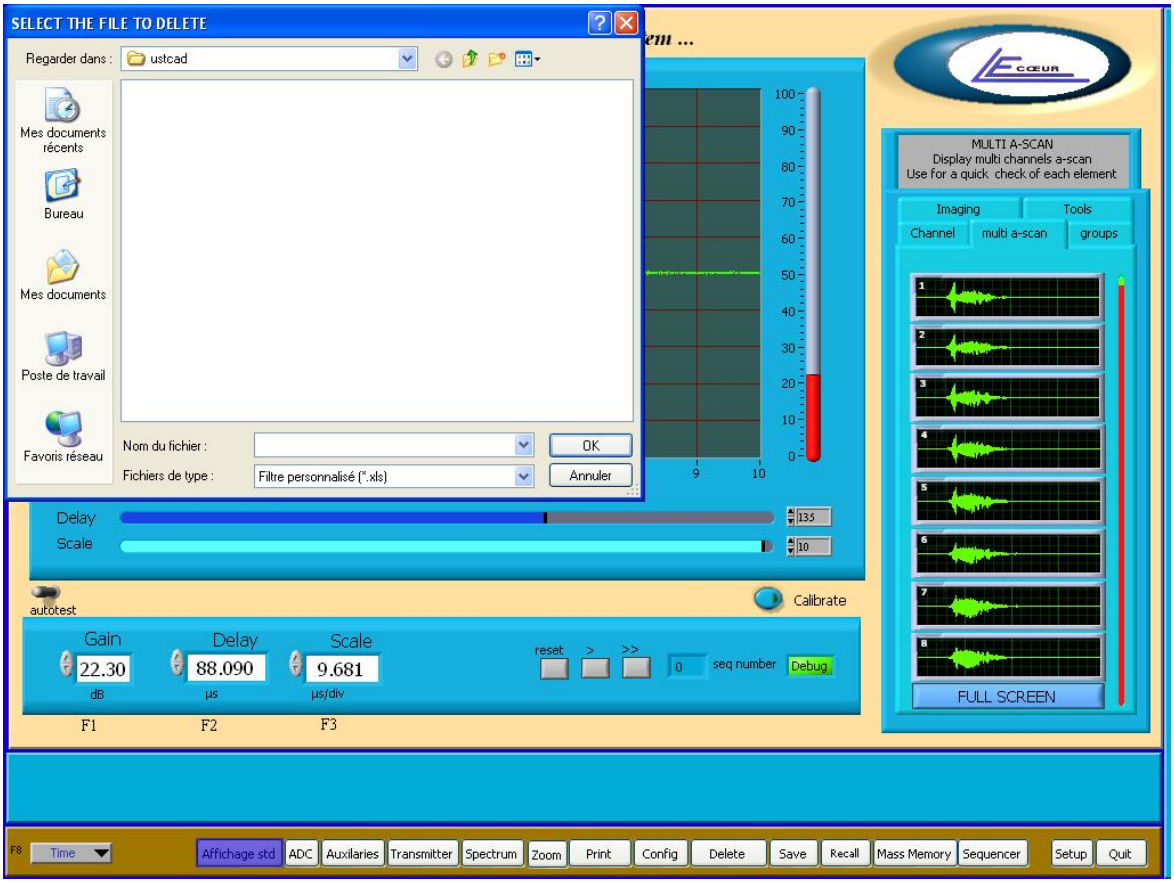
1.20 Delete



DESCRIPTION:

Deletes a set-up file previously stored with save function.

FEATURES:

N.A

NOTES:

N.A

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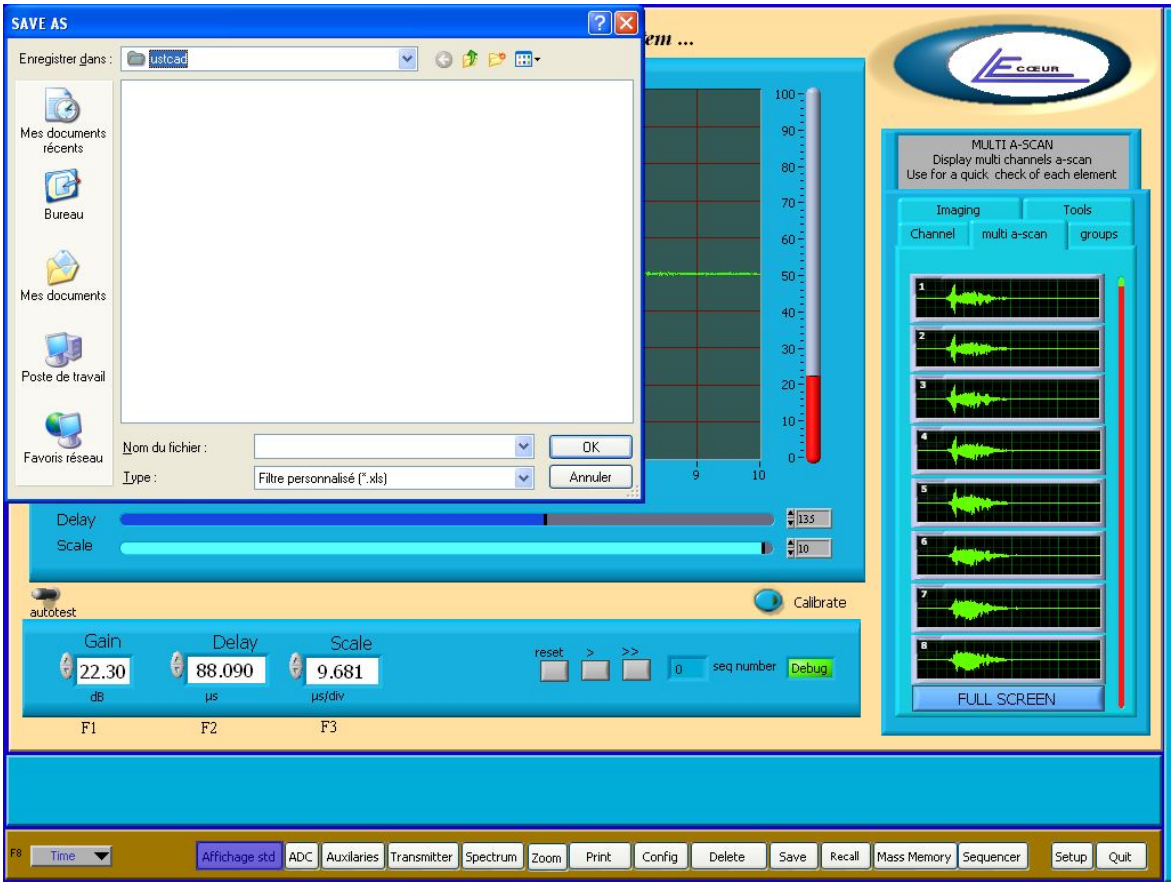
1.21 Save



DESCRIPTION:

Saves a set-up of OPEN into a file in order to recall it using 'RECALL' function.

FEATURES:

N.A

NOTES:

N.A

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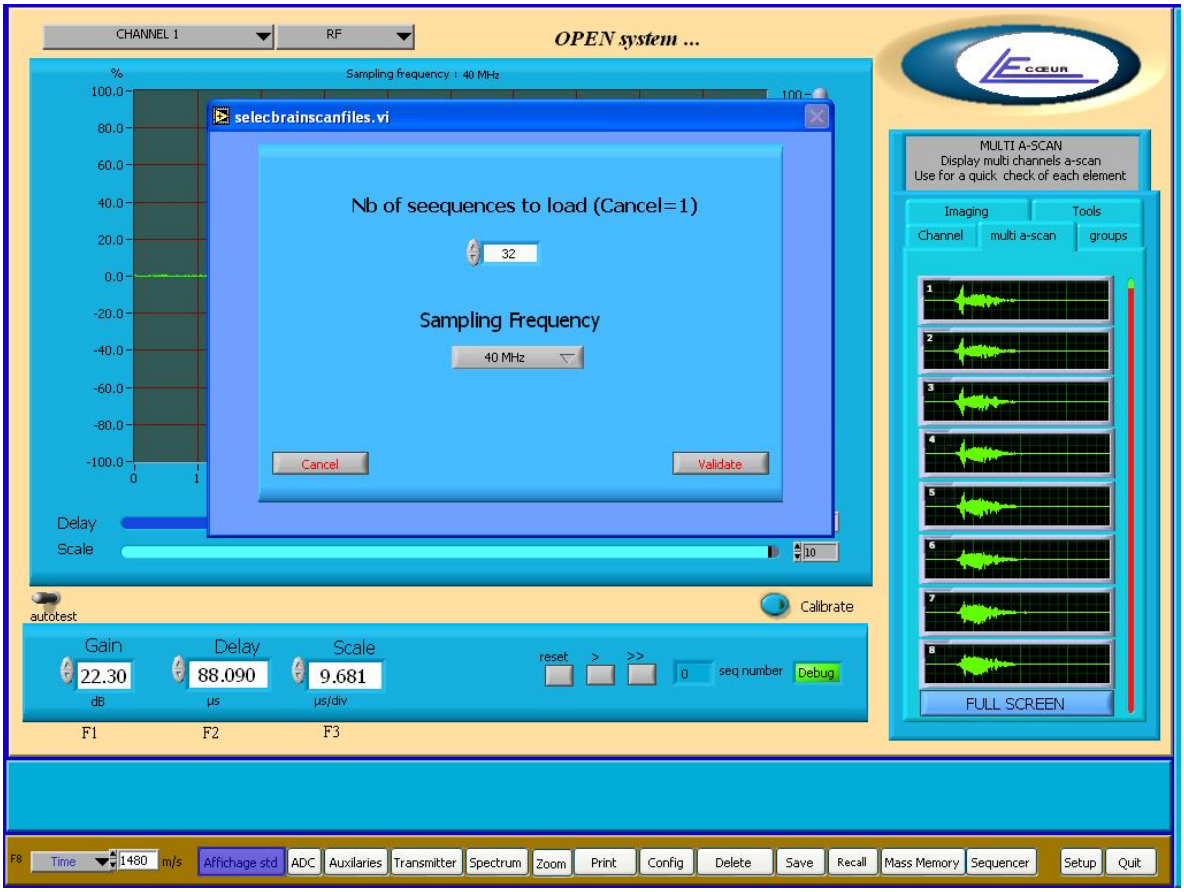
1.22 Recall sampling frequency



DESCRIPTION:

This menu is displayed at the beginning after OPEN is run. The value of sampling frequency can be modified at this time. It will be stored in the set-up file and recalled through the recall function

FEATURES:

N.A

NOTES:

N.A

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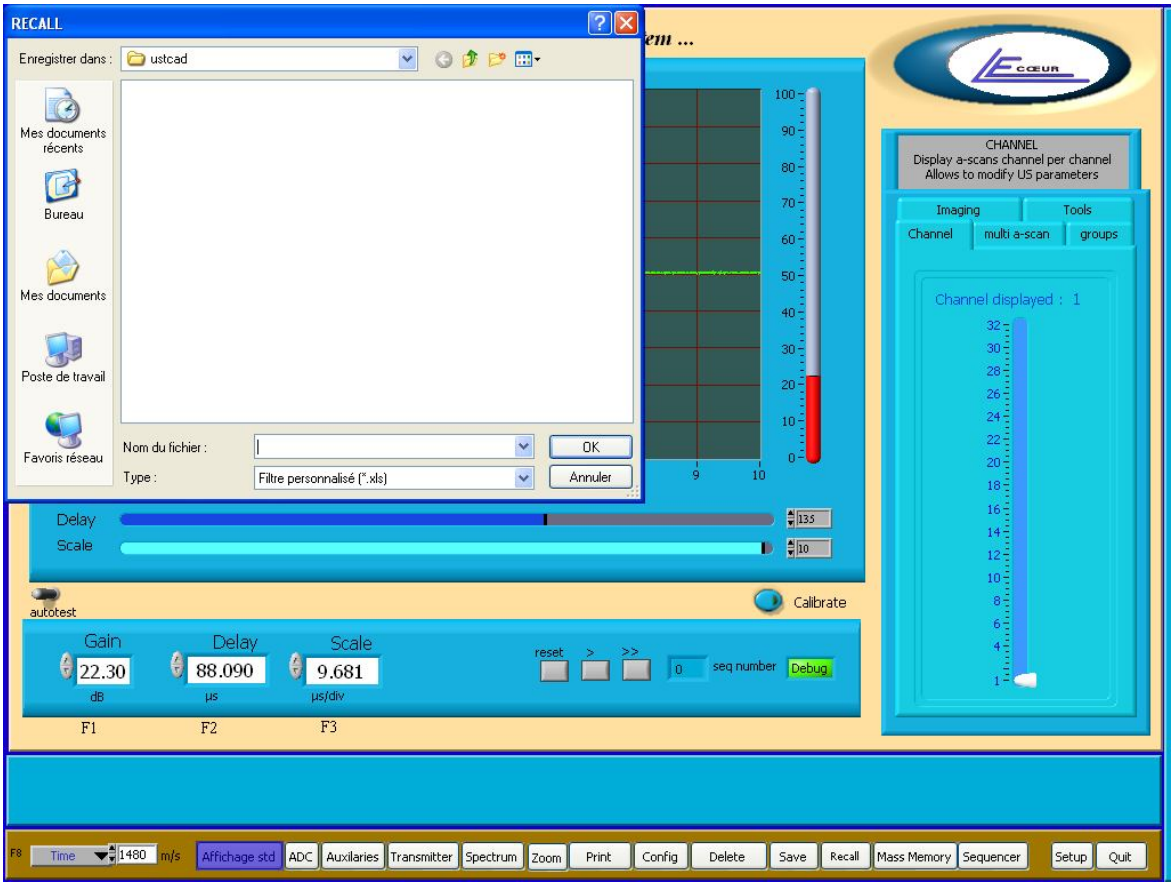
1.23 Recall



DESCRIPTION:

Recalls a previously stored set-up.

FEATURES:

N.A

NOTES:

N.A

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1.24.1 - Mass Memory

DESCRIPTION:

Inits one channel of the mass memory

FEATURES:

NOTES:

Only available with the mass memory hardware option.

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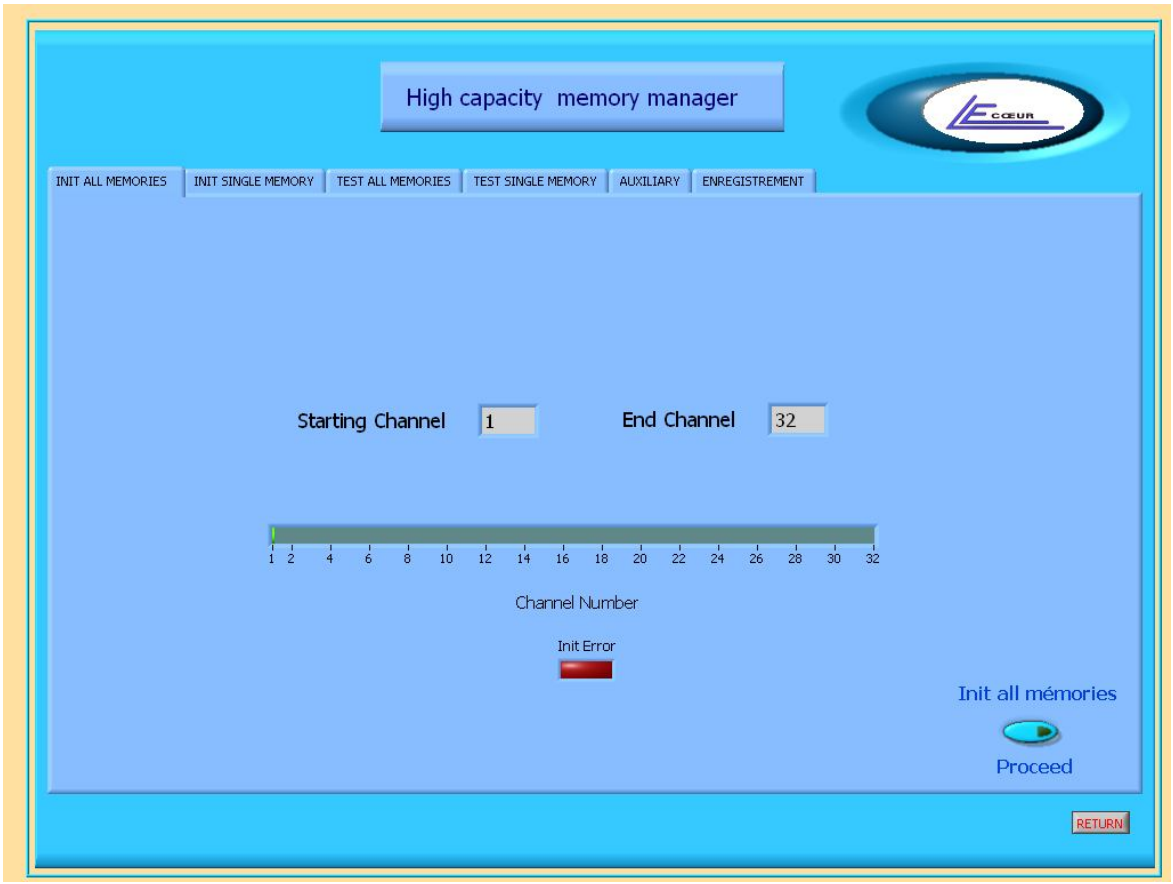
1.24.2 - All Memories



DESCRIPTION:

Inits all channels of mass memory.

FEATURES:

NOTES:

Only available with the mass memory hardware option.

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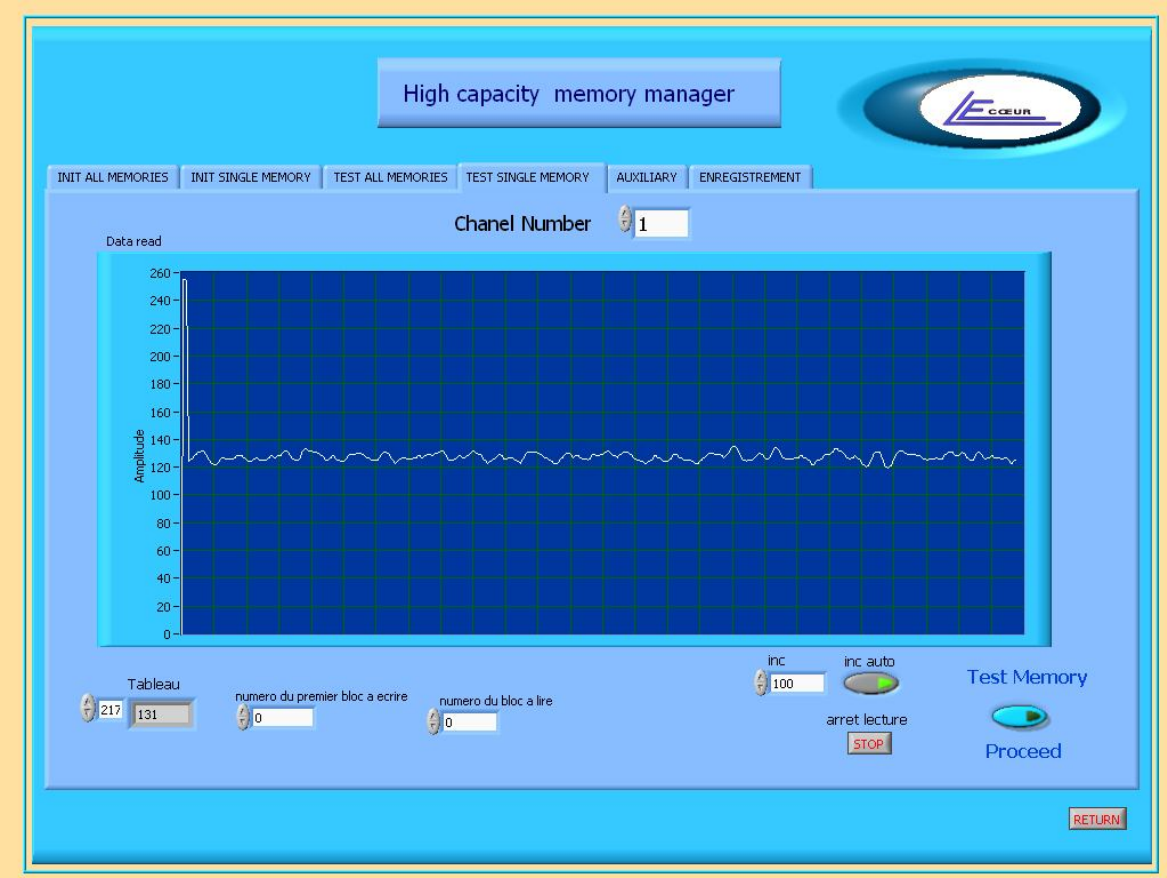
1.24.3 – Test Single Memories



DESCRIPTION:

Tests a single mass memory to check the proper or wrong initialisation of it.

FEATURES:

NOTES:

Only available with the mass memory hardware option.

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1.24.4 – Auxiliary

DESCRIPTION:

Set or rest mass memory manager to record all events.

FEATURES:

NOTES:

Only available with the mass memory hardware option.

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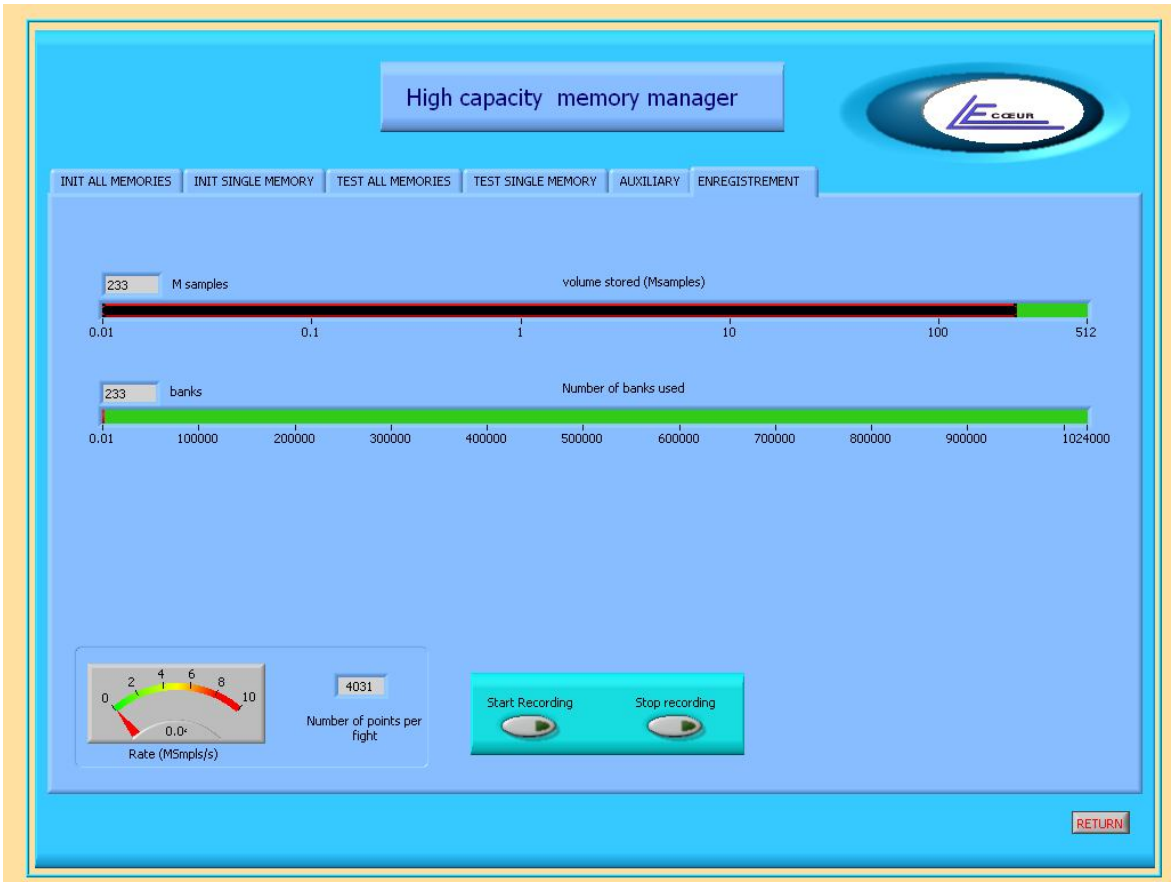
1.24.5 – “Enregistrement” (Reccording)



DESCRIPTION:

Controls the record of data in the mass memory.

FEATURES:

NOTES:

Only available with the mass memory hardware option.

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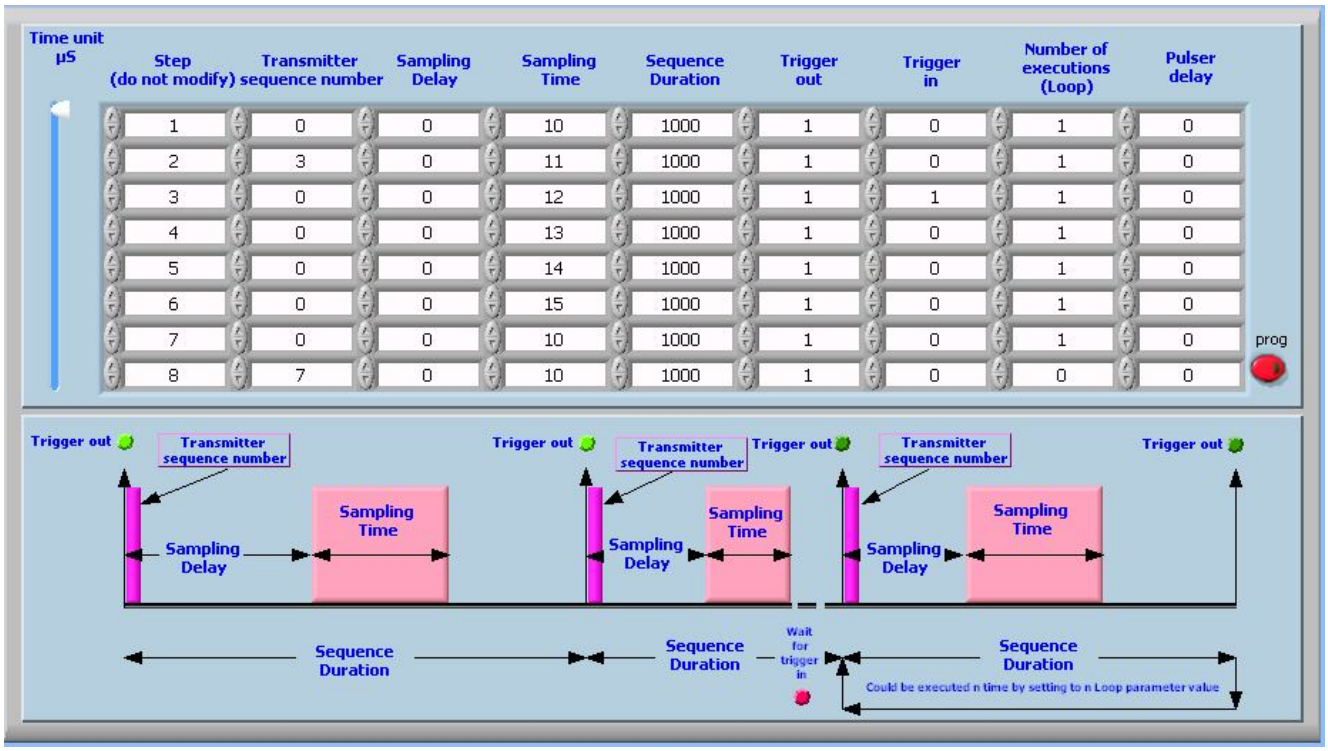
1.25 – Sequencer

This part of the OPEN system is dedicated to user real time applications. Using the micro sequencer allows to program your own emission/ reception/ digitalization/ timings. After setting-up the micro sequencer the 'RUN' command executes the program, outputs external trigger, waits for an input trigger, changes the sequences and stores into the internal memory the samples that are collected during the execution. After the 'RUN 'time; the memory can be read and data downloaded from OPEN.

DESCRIPTION OF THE MICRO SEQUENCER



The micro sequencer works as a processor, a program is up-loaded in open and a run-time executes this program. Each line of the program is an instruction which describes the action to do.

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Transmitter sequence number

This parameter indicates the number of sequence to load before executing the instruction. I f the pulser is analog the sequence indicates a wave form, if the pulser is pulsed it sets up a delay. This parameter has the same value for the 8 channels of the same board.

Sampling delay

This parameter is the time before the digitalization begins. In OPEN standard interface the unit is micro-second. This parameter has the same value for the 8 channels of the same board.

Sampling time

The sampling time is the digitalization duration. During this, the signal of all channels is digitalized and stored in memory. In OPEN standard interface the unit is micro-second. This parameter has the same value for the 8 channels of the same board.

Sequence duration

The sequence duration is the time to wait before executing the next instruction. It is generally called PRF period. In OPEN standard interface the unit is the micro-second.

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Trigger Out

If this parameter is set to one, OPEN system will generate a pulse on the 'trigger-out' output, at the beginning of the instruction. This pulse is a TTL one and the duration of this pulse is 50 nS.

Trigger In

If this parameter is set to one, OPEN system will wait for an input pulse on the 'Trigger in' input before executing the instruction.

Number of Executions

This statement is a loop generator. The instruction will be executed N times. N is the value of the parameter. The minimum value is 1and the maximum is 255

Pulser delay

This parameter is only active with the option 'analog pulser' of OPEN. The waveform is shifted right in the time base. The value of this shift is the parameter value. In the standard interface the unit is micro–second. This parameter has the same value for the 8 channels of the same board.

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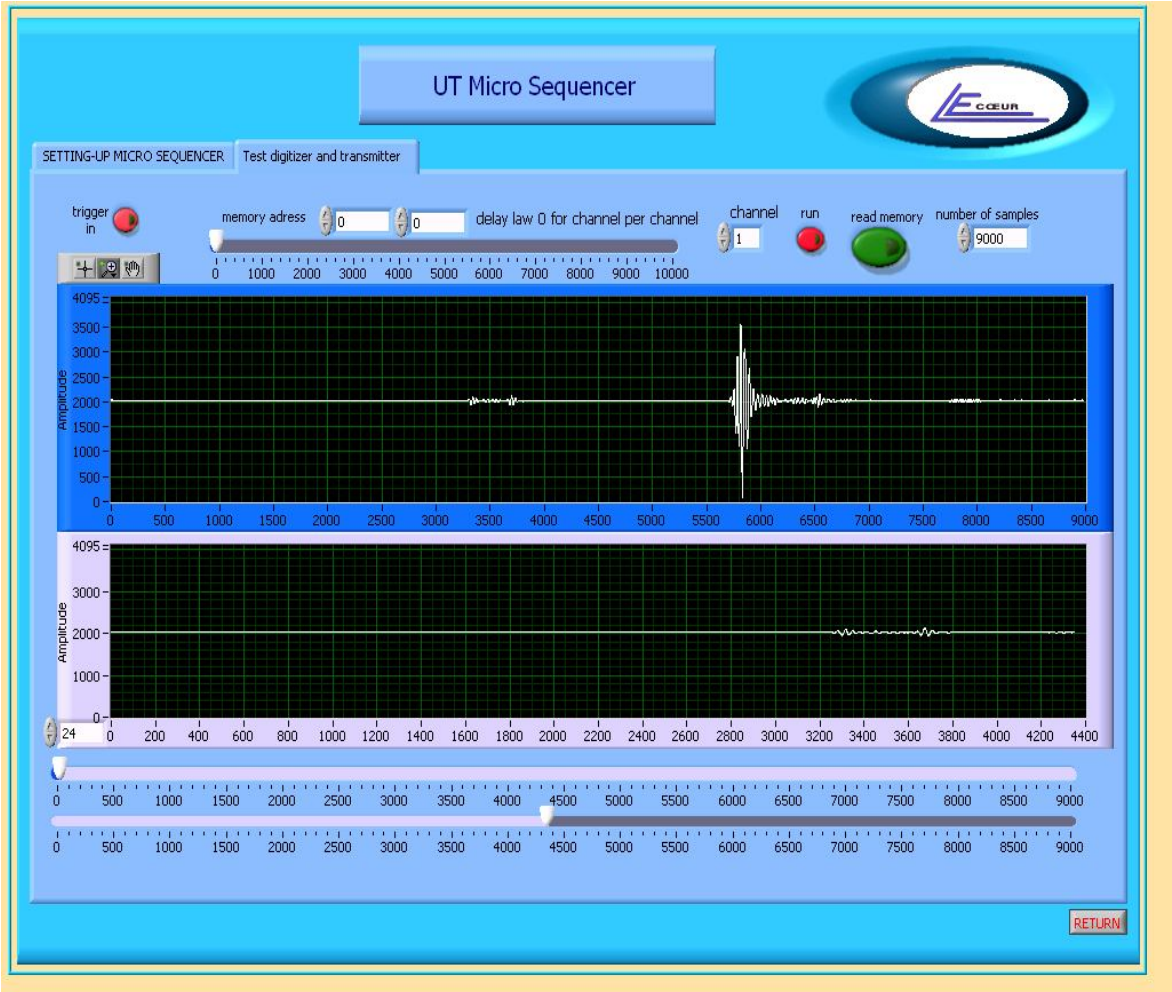
This screen is a test tool of the sequencer.



Trigger in: Simulates a hardware trigger input.

Memory address: Selects the part of the memory in which the samples will be stored.

Delay law: If 0 is entered the samples of the selected channel are displayed. If the value is different than 0 the samples of the eight channel of one board are returned. The value is the sequence number

Run: Executes the program of the sequencer previously up-loaded.

Read memory: Reads the memory beginning at the selected address.

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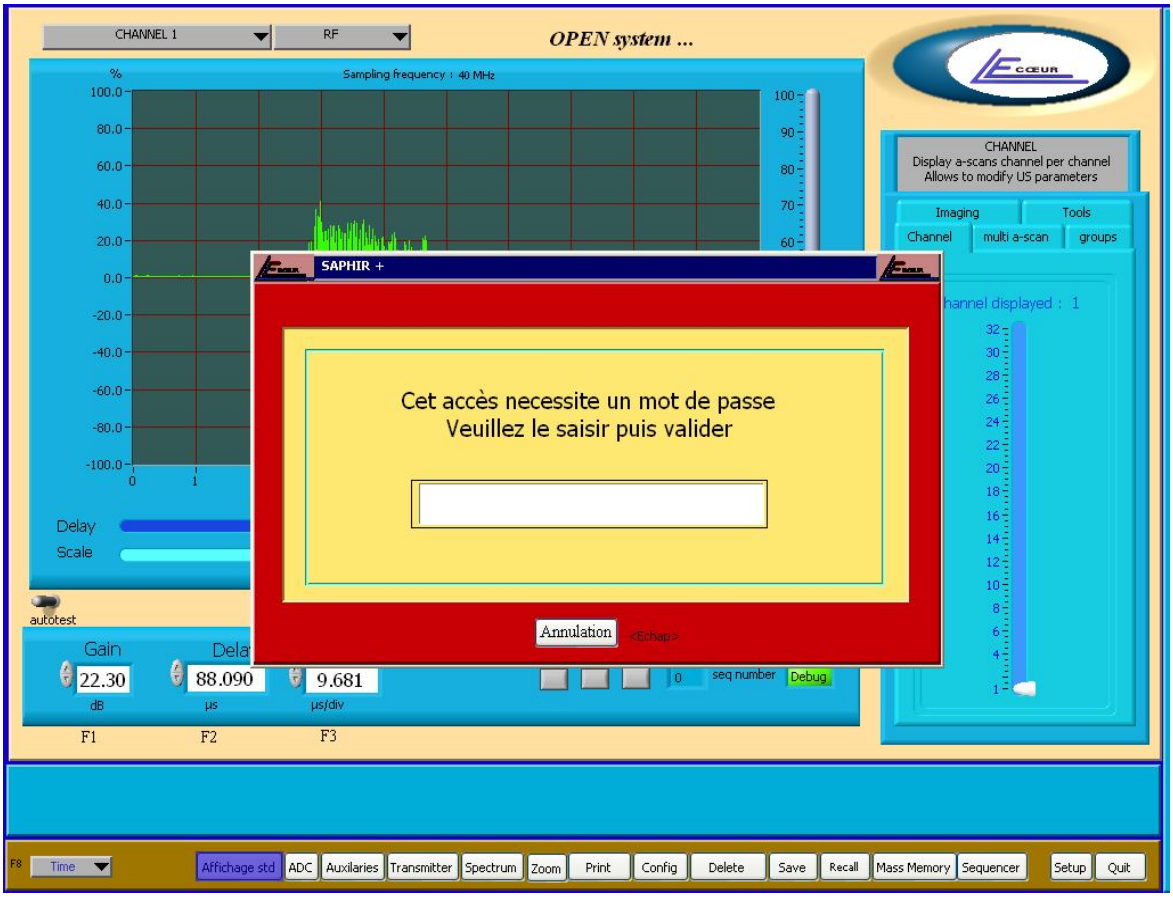
1.26 Setup



DESCRIPTION:

This window is a factory one. In normal conditions the user does not need to use it.

FEATURES:

N.A

NOTES:

N.A

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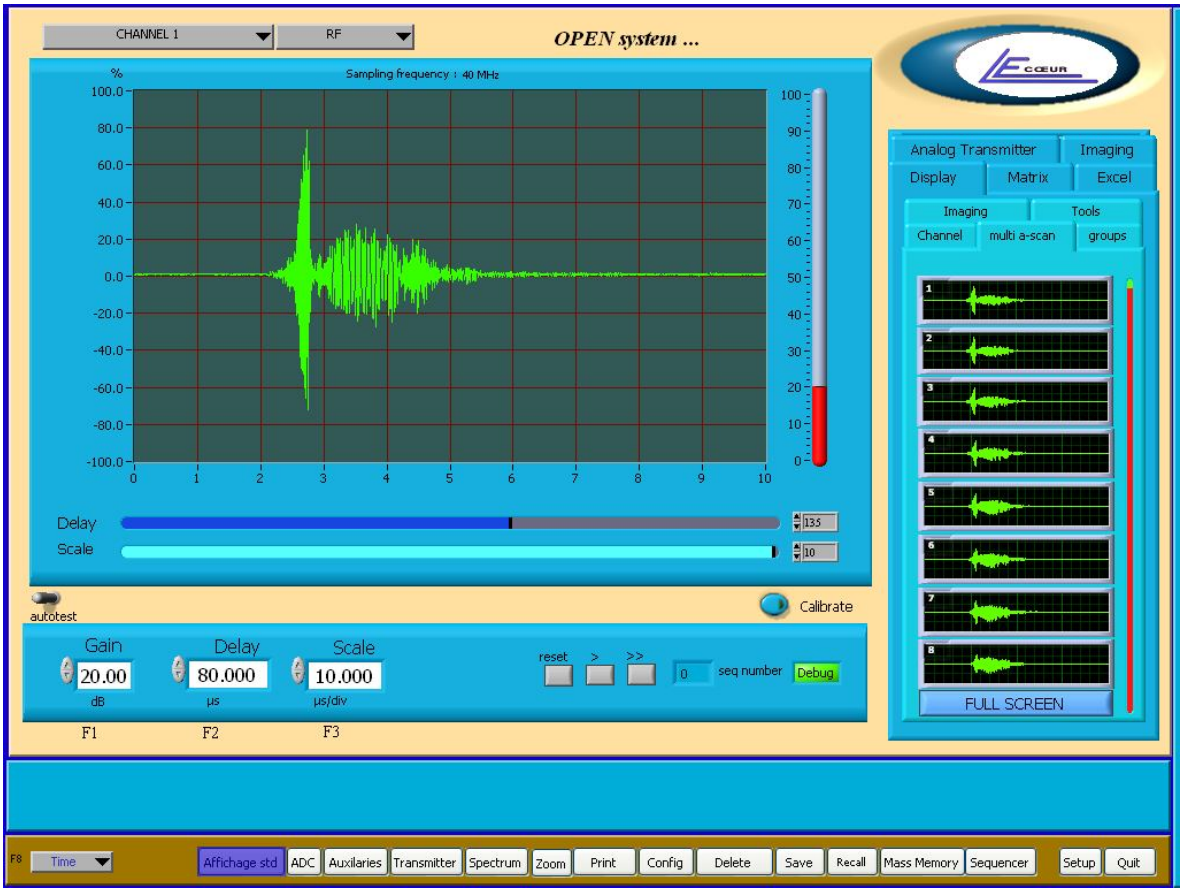
1.2.1 - Multi A Scan



DESCRIPTION:

Displays simultaneously eight a-scans of OPEN system. The slider on the right side; changes the number of the first channel to be displayed

FEATURES:

N.A

NOTES:

N.A

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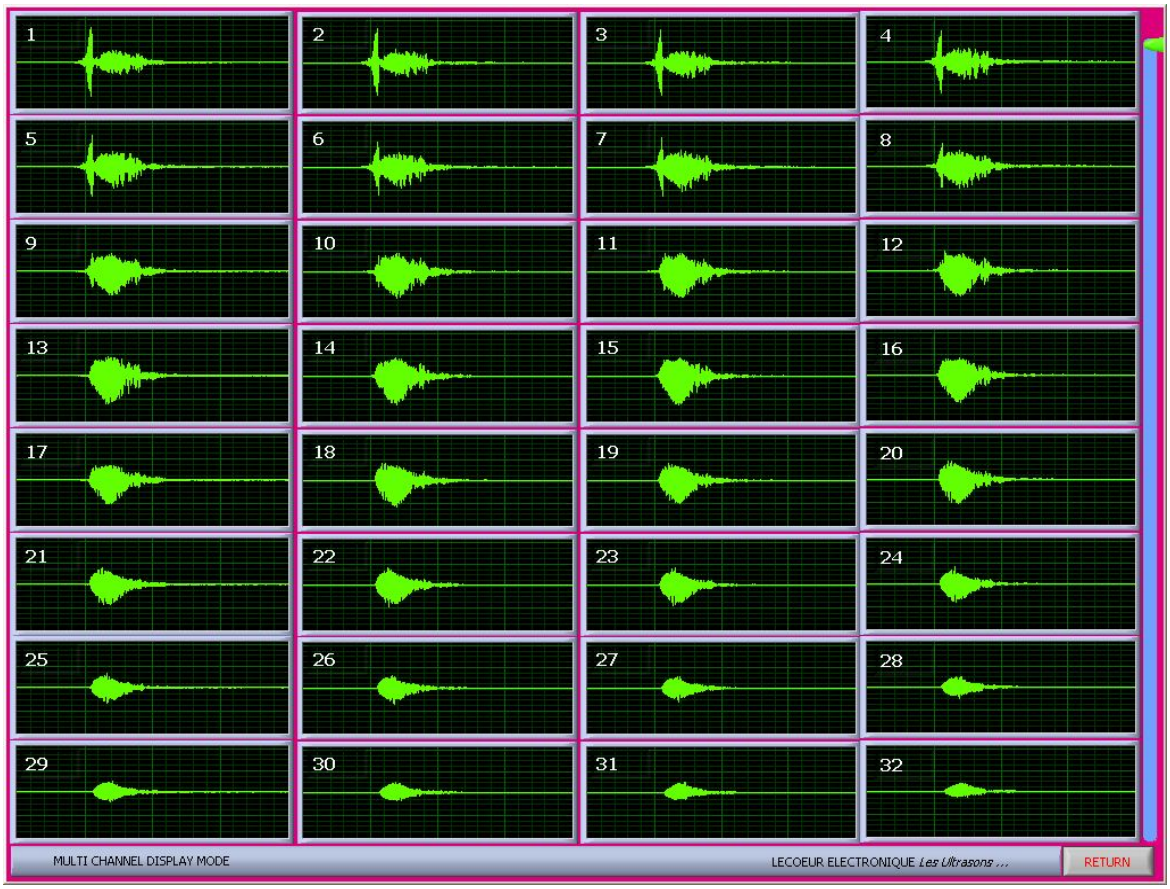
1.2.2 – Full Screen



DESCRIPTION:

Displays simultaneously 32 channels of OPEN. The slider on the right side changes the number of the first channel to be displayed.

FEATURES:

N.A

NOTES:

N.A

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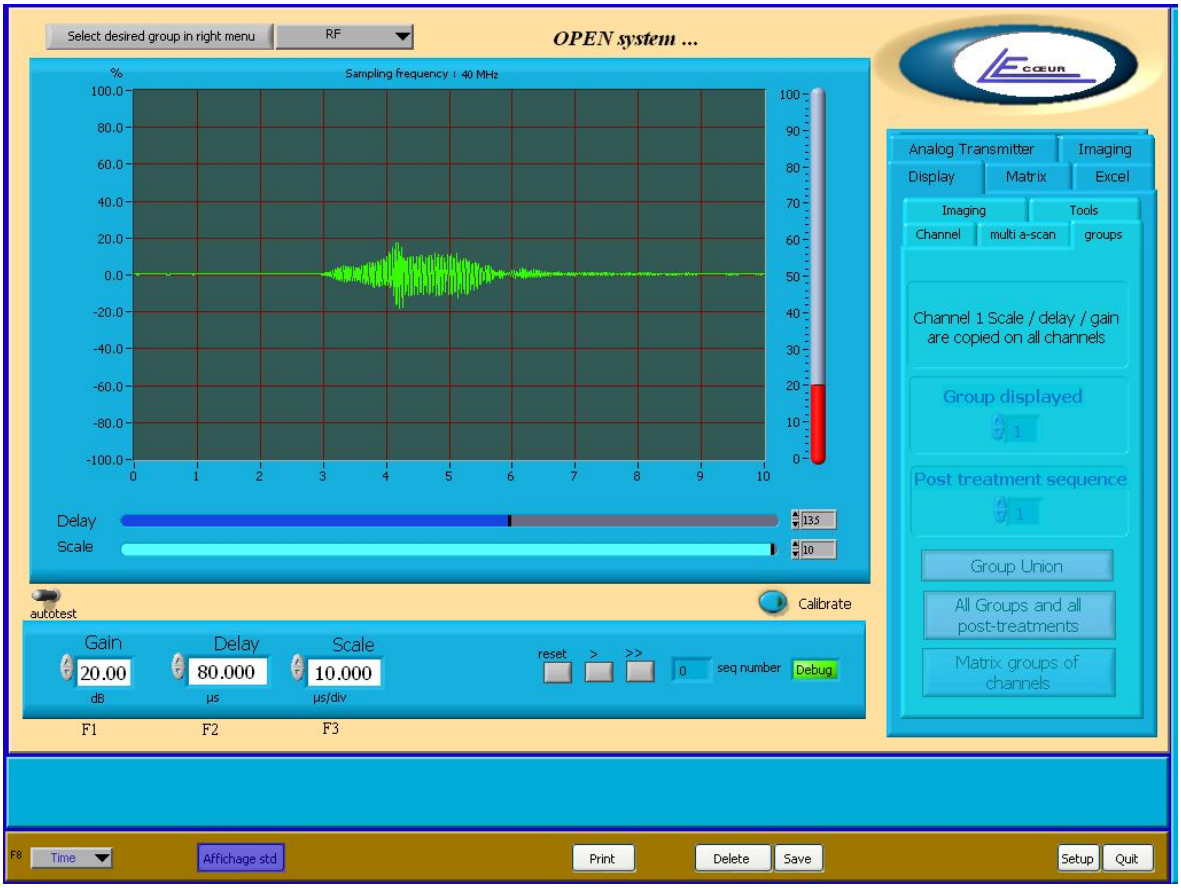
1.3.1 – Group



DESCRIPTION:

Switches the display to 'SUM' display. The signal displayed is the summation of all signals from all channels. Entering this menu will copy automatically GAIN/SCALE/DELAY from channel 1 to all channels. The sequence number can be modified to see the result of summations using different beam forming laws.

FEATURES:

N.A

NOTES: *N.A*

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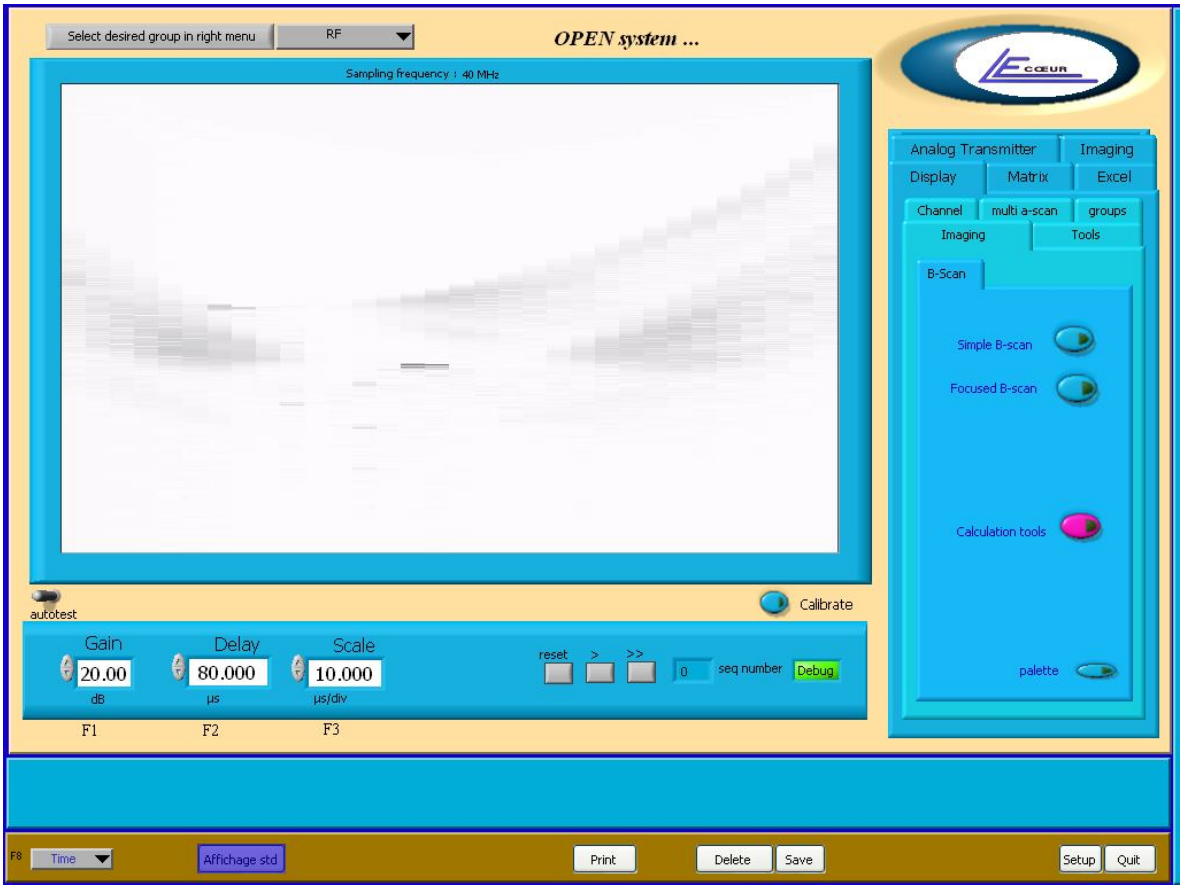
1.4. - Imaging



DESCRIPTION:

Displays a beam formed image composed with the number of active sequences in open.
Allows access to 3 sub-menus:

- *SINGLE B-SCAN*
- *FOCUSED B-SCAN*
- *CALCULATION TOOLS*

FEATURES:

N.A

NOTES:

N.A

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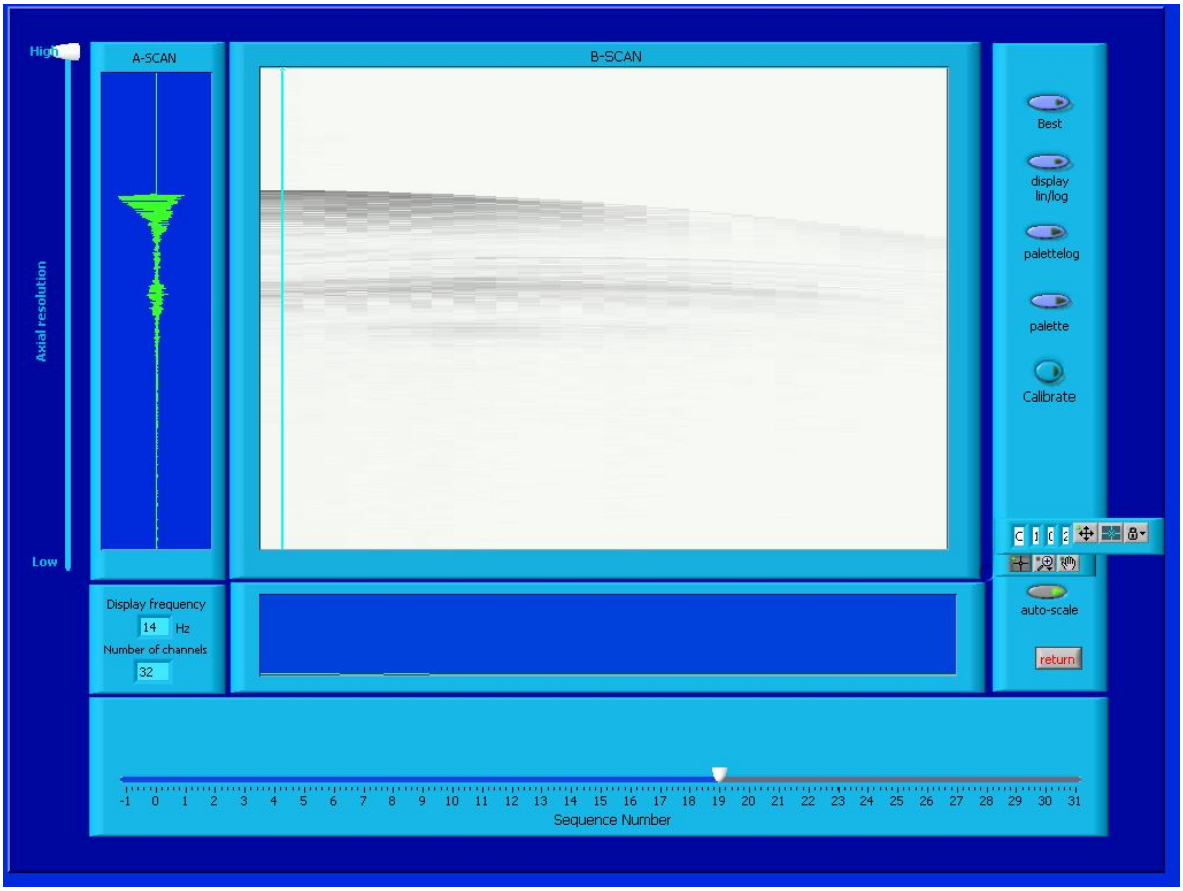
1.4.1 – Simple B-Scan



DESCRIPTION:

Displays all channels simultaneously in colour scale.

FEATURES:

- ***A-SCAN:*** *The signal coming fro the channel pointed by the vertical cursor is displayed*
- ***DISPLAY FREQUENCY:*** *Indicates the refresh rate of the screen.*
- ***NUMBER OF CHANNELS:*** *Number of channels installed in OPEN system.*
- ***AXIAL RESOLUTION:*** *Sets a compression factor on samples coming from OPEN boards.*

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- ***SEQUENCE NUMBER:*** *Number of the sequence to be activated. This is only for pulsers delay sequences.*

- ***BEST:*** *Makes an interpolation between lines.*

- ***DISPLAY LIN/LOG :*** *Sets the display in linear or logarithmic mode.*

- ***PALETTE:*** *Displays the palette used for the B-SCAN. Beginning and final colours can be adjusted to change the visualisation.*

- ***CALIBRATE:*** *Makes a calibration of 0 for all channels.*

- ***AUTOSCALE:*** *Switching off this parameter allows using ZOOM tool located above the auto scale button.*

NOTES:

N.A

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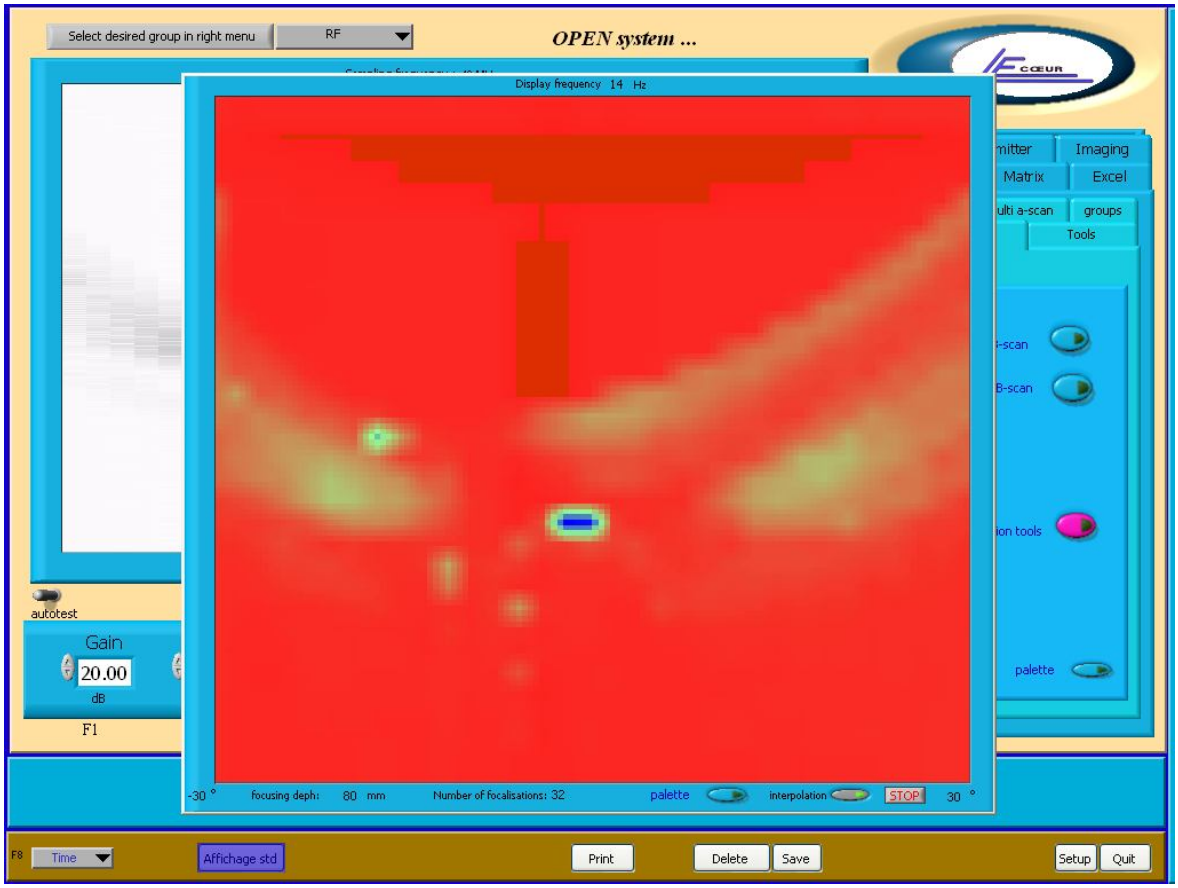
1.4.2 – Focused B-Scan



DESCRIPTION:

Displays focussed B-SCAN composed with the number of active sequences in OPEN.

FEATURES:

- ***FOCUSSING DEPH:*** *Indicates the focused point used when delays laws where calculated with the calculation tool*

- ***PALETTE:*** *Displays the palette used for the B-SCAN. Beginning and final colours can be adjusted to change the visualisation.*

- ***INTERPOLATION:*** *Adds lines to make a better resolution image.*

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- NUMBER OF FOCALISATIONS: *It is the number of sequences used to build the image.*

- ANGLE: *Recalls the values of the angles used when delay laws where calculated.*

NOTES:

N.A

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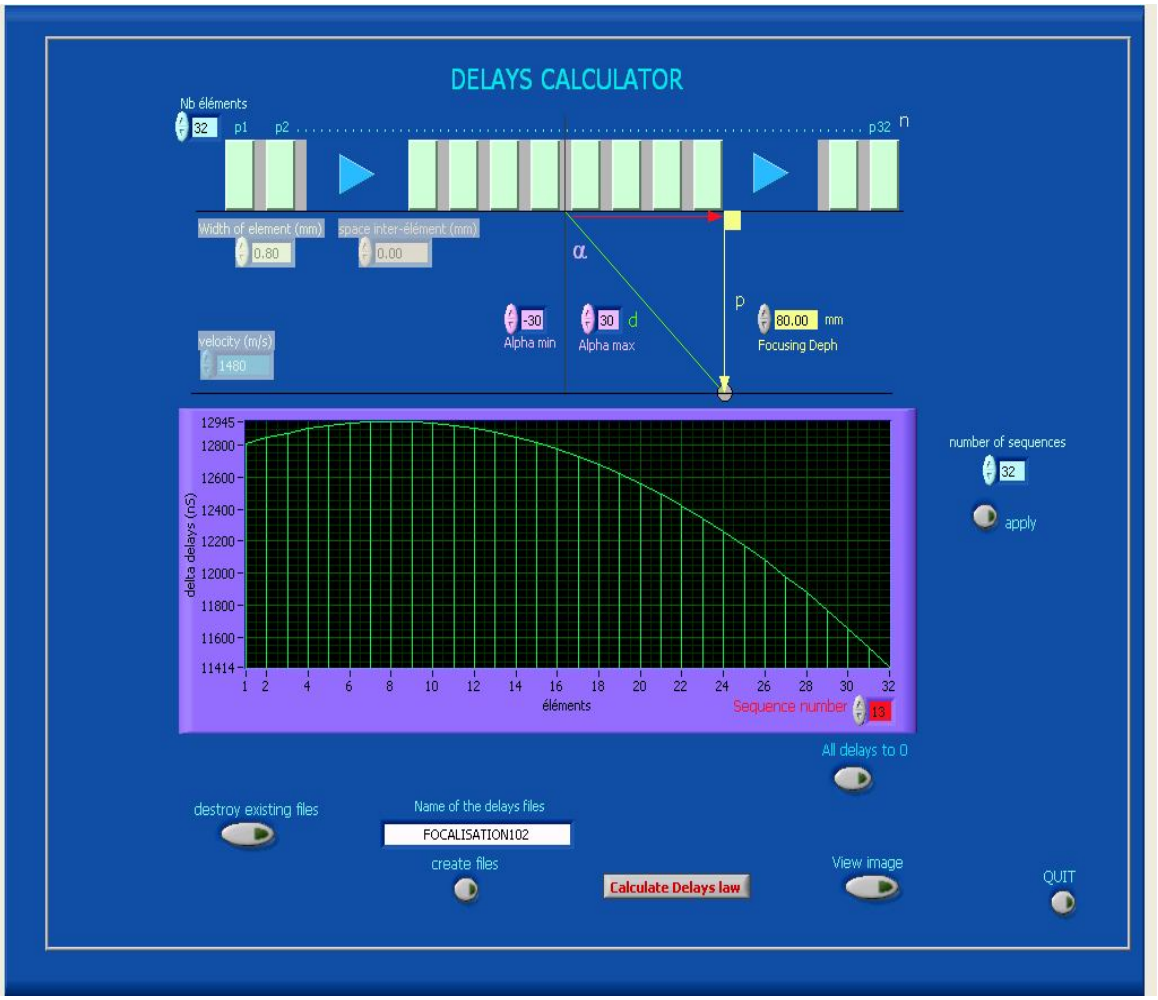
☎ : 02 38 94 28 30– 🖷 : 02 38 94 29 67
💻 : info@lecoeur-electronique.com

1.4.3 – Calculations Tools



DESCRIPTION:

Simple tool to calculate delays to make a beam formed image.

FEATURES:

- ***NUMBER OF ELEMENTS:*** *Number of elements of the probe.*

- ***WIDTH OF ELEMENT:*** *The physical width of each element of the probe (in millimetres).*

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- ***SPACE INTER-ELEMENT:*** *The physical space between of each element of the probe (in millimetres).*

- ***VELOCITY:*** *The velocity of ultrasound in the material.*

- ***ALPHA:*** *the beginning and ending angles for deflexion.*

- ***FOCUSING DEPTH****: The distance of focalisation point.*

- ***NUMBER OF SEQUENCES:*** *Allows changing the number of sequences actives is OPEN. Validates this choice by pushing 'APPLY' button.*

- ***NAME OF THE DELAYS FILES:*** *This controller holds the name of the directories that will be created to store the delays files which contain the pulsers and receiver delays for each sequence. To get more information please refer to the Excel file section. The 'CREATE FILE' button changes the files and directories names.*

- ***DESTROY EXISTING FILES:*** *Destroys the files and directories previously created.*

- ***ALL DELAYS TO ZERO:*** *Creates files filled with delays set to value 0.*

- ***CALCULATE DELAY LAWS:*** *Generates the delays files.*

- ***VIEW IMAGE:*** *Displays the result of the focused image.*

NOTES:

This very simple tool is provided as a test tool.

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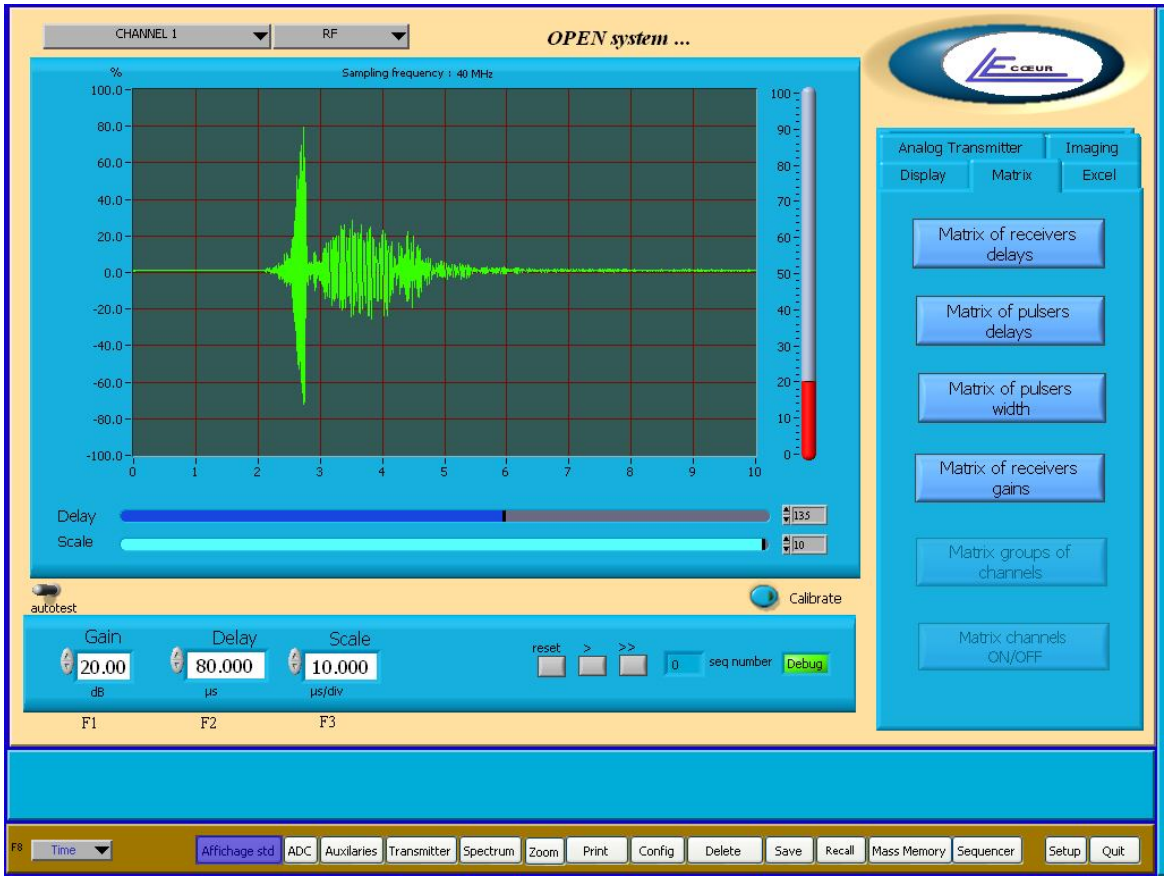
2. - Matrix



DESCRIPTION:

Gets access to matrix menus.

FEATURES:

N.A

NOTES:

N.A

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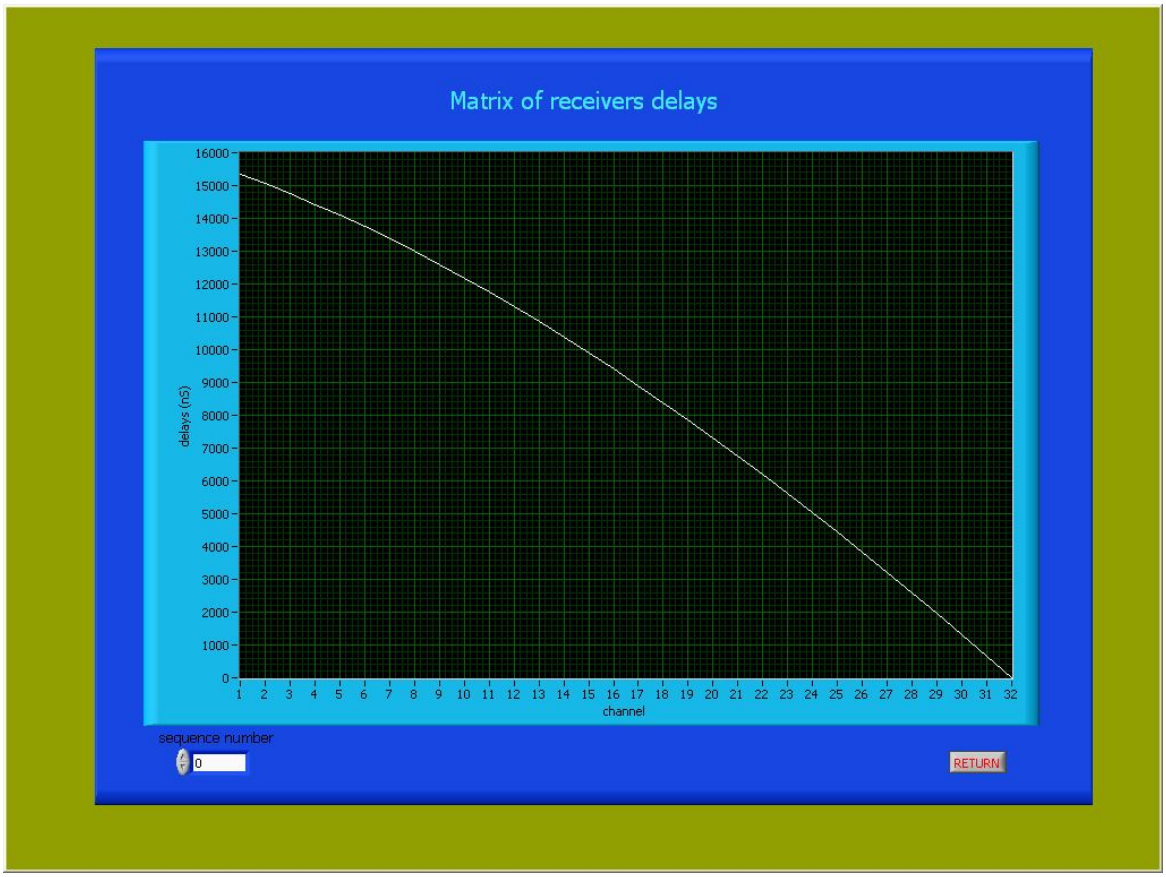
2.1. – Matrix of Receivers Delays



DESCRIPTION:

Displays the value of receivers delays applied on each channel for the selected sequence.

FEATURES:

N.A

NOTES:

N.A

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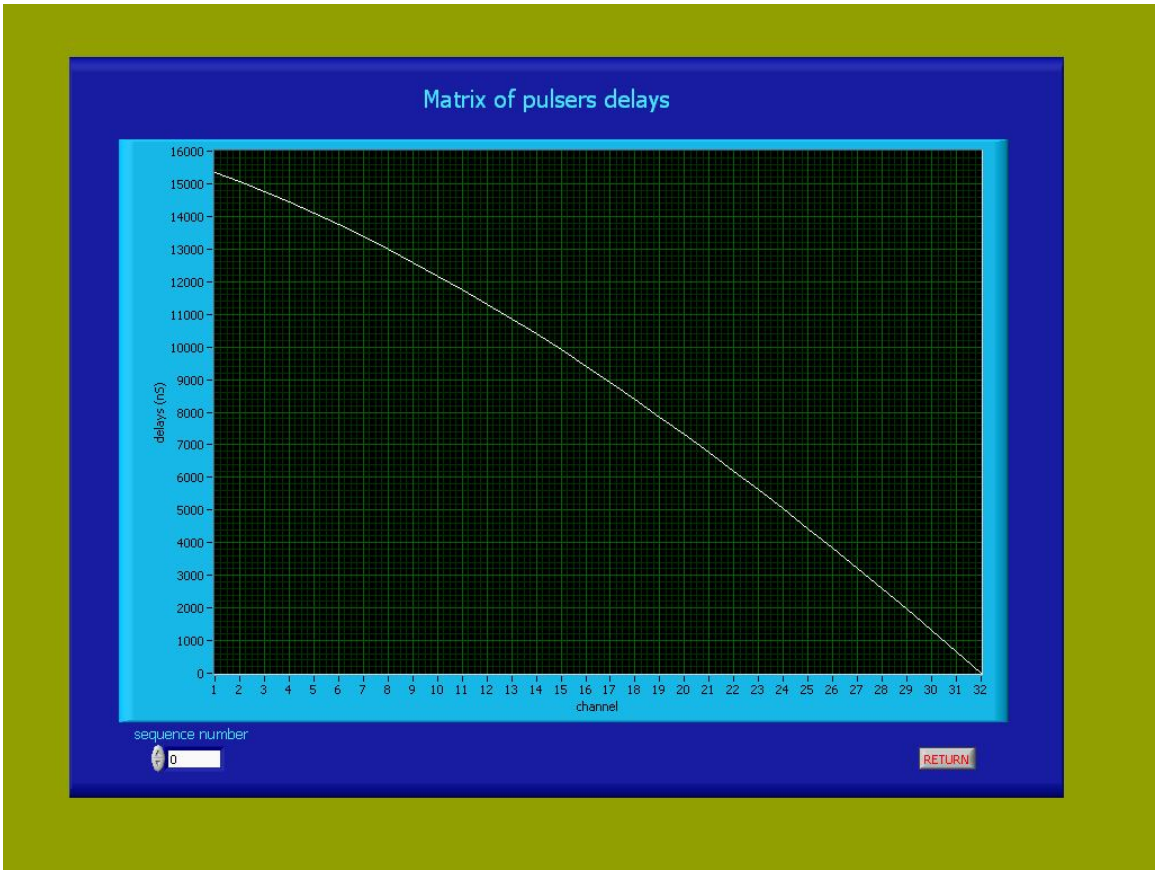
2.2 – Matrix of Pulser Delay



DESCRIPTION:

Displays the value of pulsers delays applied on each channel for the selected sequence.

FEATURES:

N.A

NOTES:

N.A

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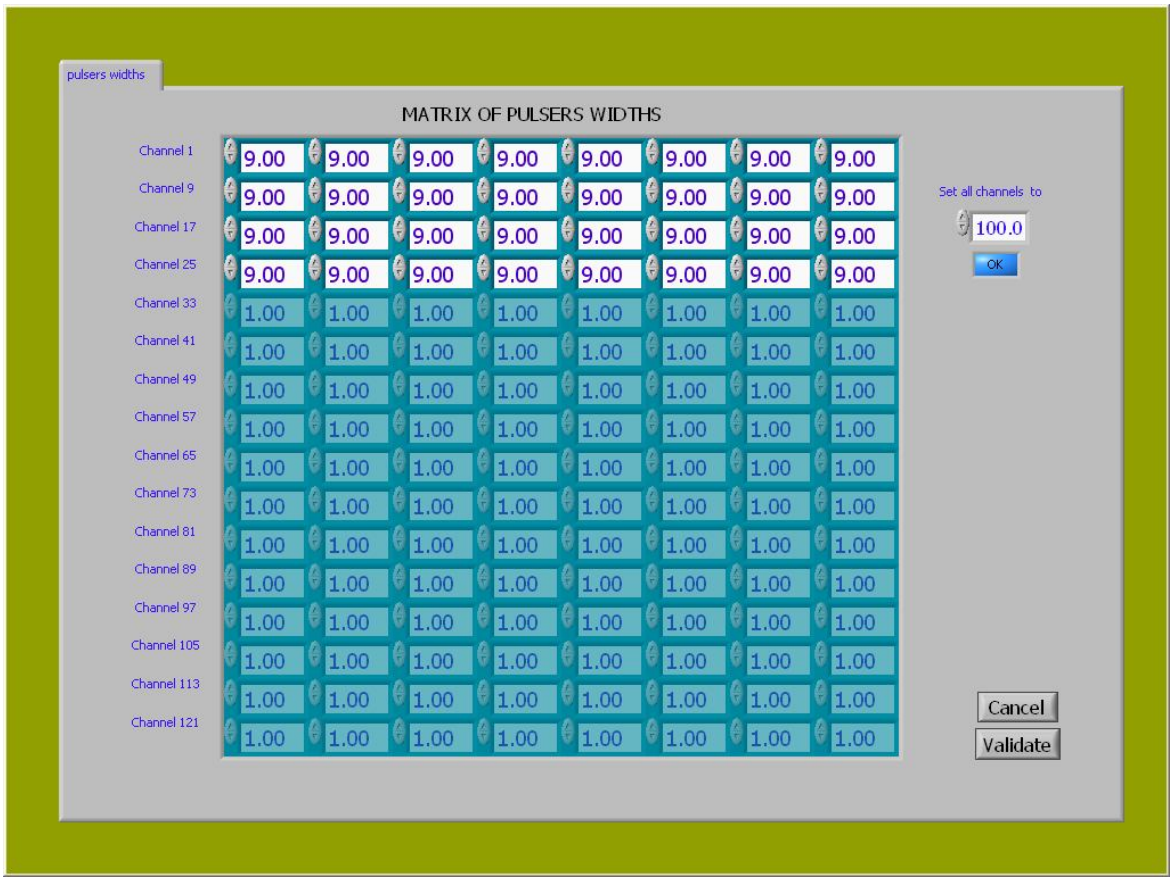
2.3 – Matrix of Pulser Width



DESCRIPTION:

An advanced menu to change the width of pulsers. This menu must not be used before a prior contact with LECOEUR ELECTRONIQUE technical support before.

FEATURES:

N.A

NOTES:

N.A

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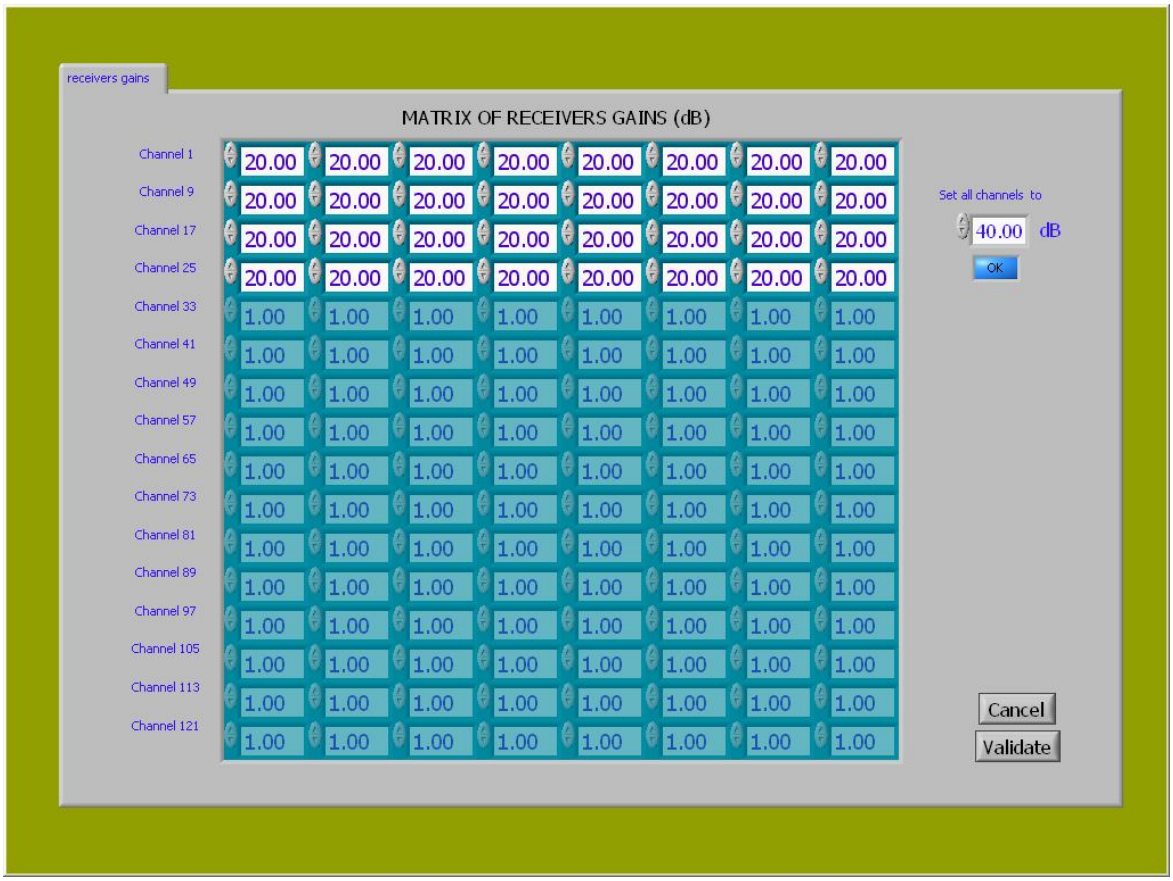
2.4 – Matrix OF Receivers Gain



DESCRIPTION:

Displays and offers the possibility to change the receivers gains.

FEATURES:

N.A

NOTES:

N.A

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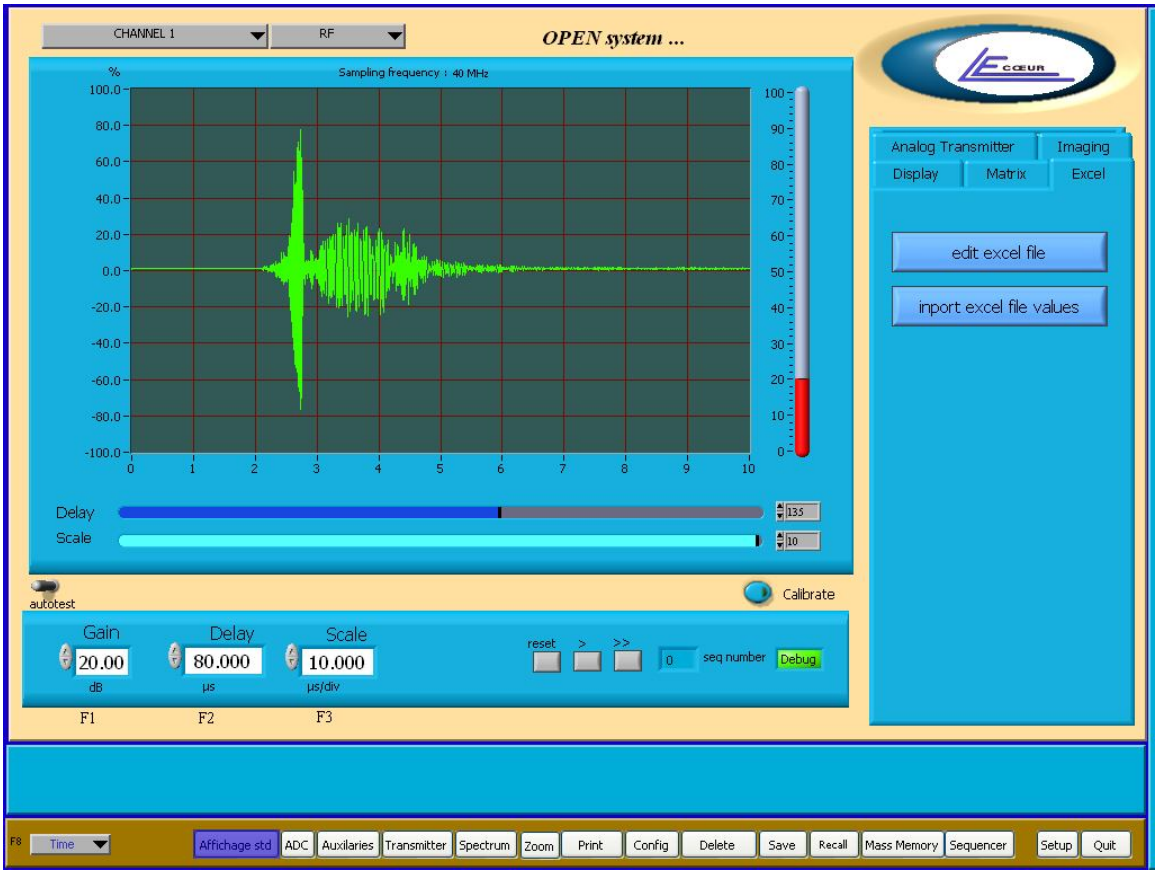
☎ : 02 38 94 28 30– 🖷 : 02 38 94 29 67
💻 : info@lecoeur-electronique.com

3 – Excel



DESCRIPTION:

Gives access to the global set-up file of OPEN.

FEATURES:

N.A

NOTES:

N.A

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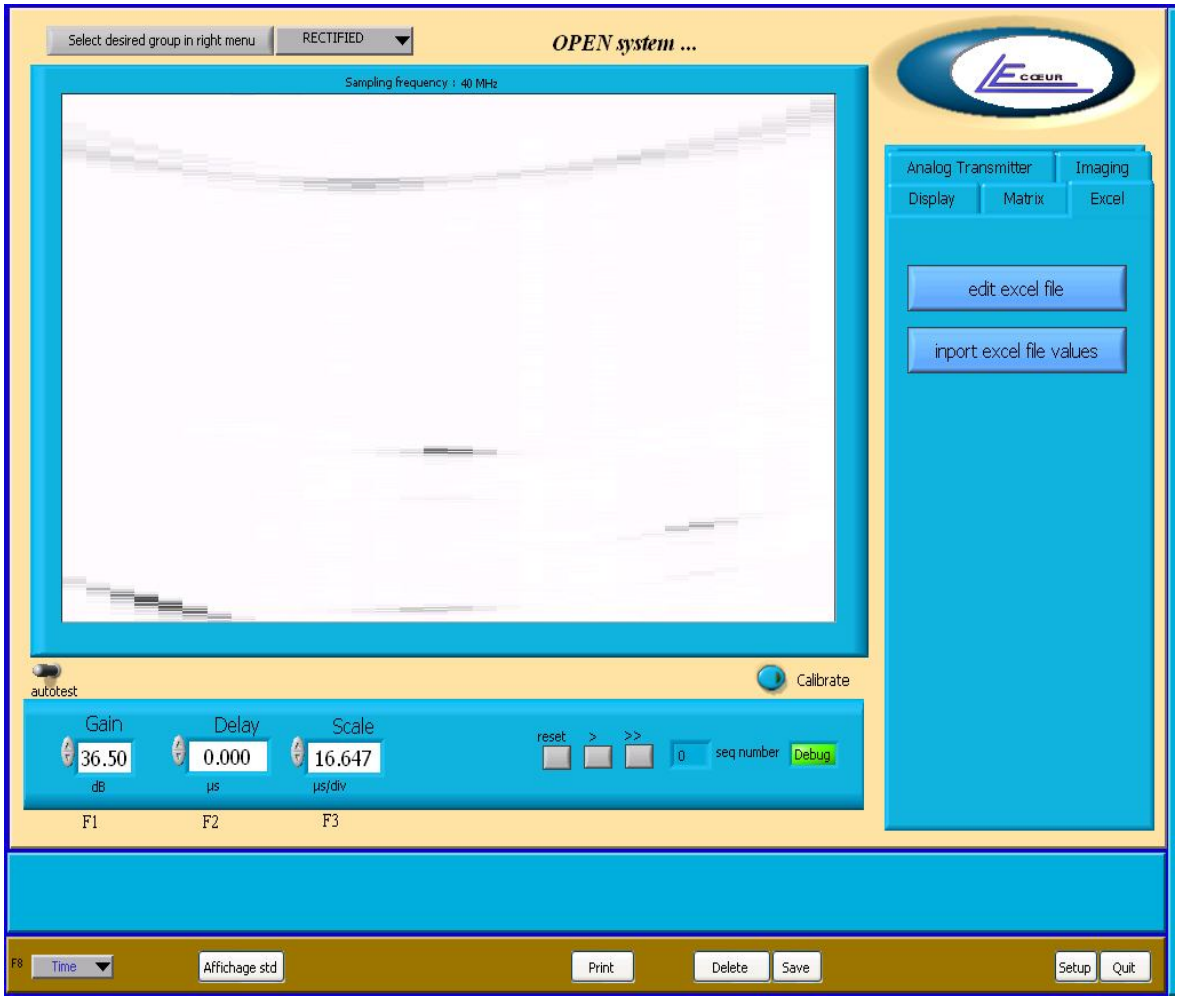
☎ : 02 38 94 28 30– 🖷 : 02 38 94 29 67
💻 : info@lecoeur-electronique.com

3.1 – Edit Excel File



DESCRIPTION:

Global set-up file of OPEN. It contains all information about OPEN set-up. Please read the EXCEL FILE section to understand the use of this file.

FEATURES:

N.A

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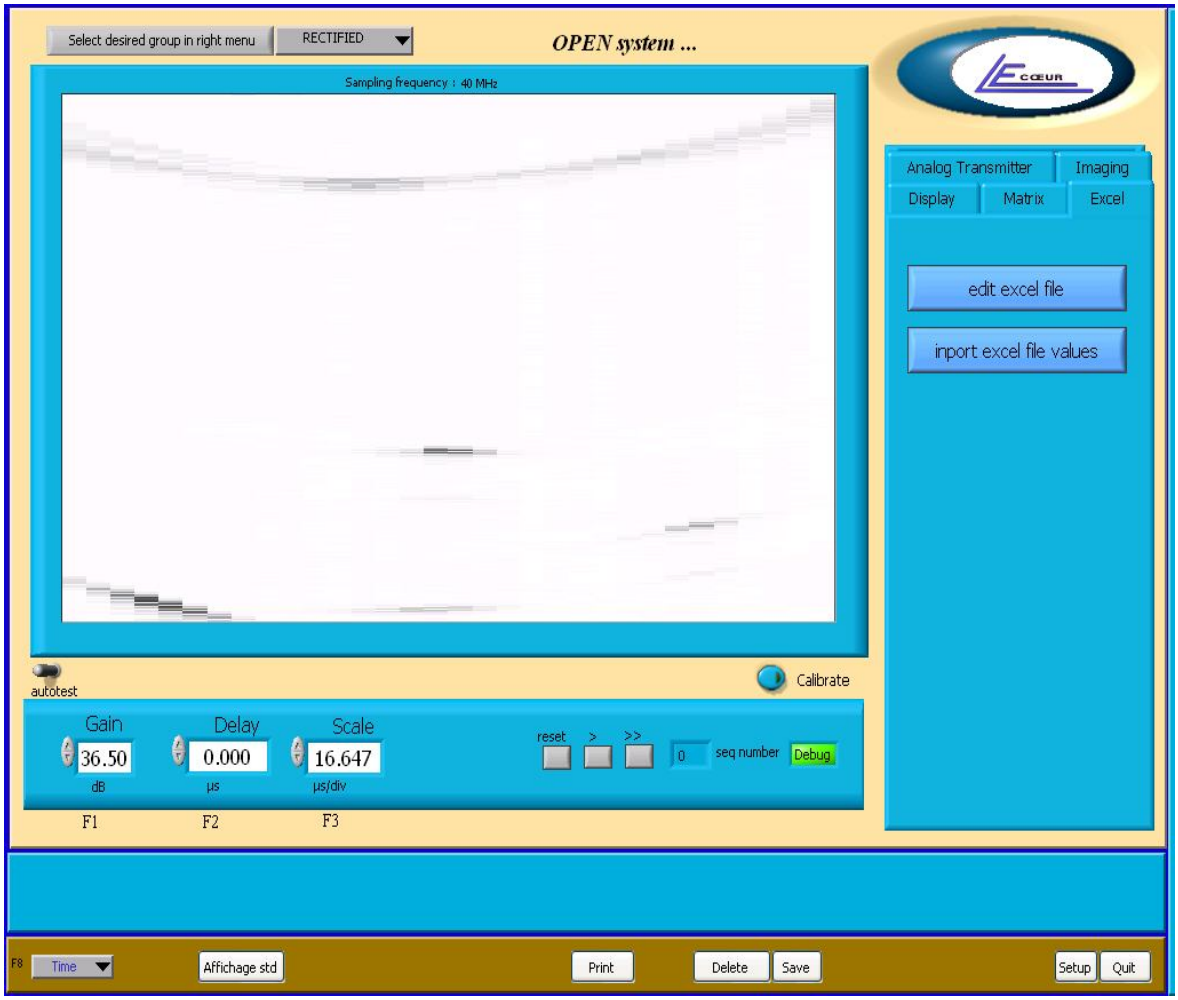
3.1 – Import Excel File Values



DESCRIPTION:

Imports the values contained in excel file and set them active in OPEN.

FEATURES:

NOTES:

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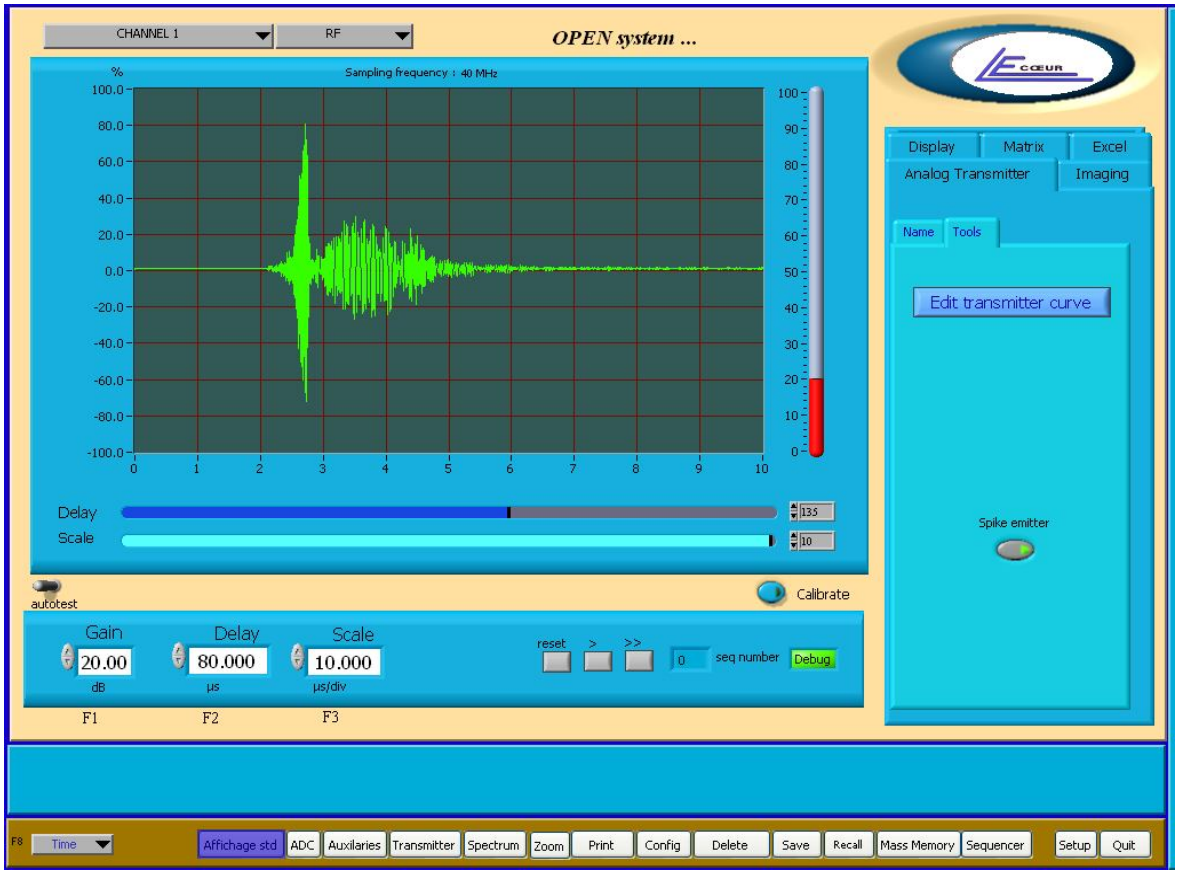
4. – Analog Transmitter



DESCRIPTION:

Gives access to functions for analog transmitter

FEATURES:

N.A

NOTES:

Only active with the option 'analog pulser' of OPEN system.

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☎ : 02 38 94 28 30– 🖷 : 02 38 94 29 67
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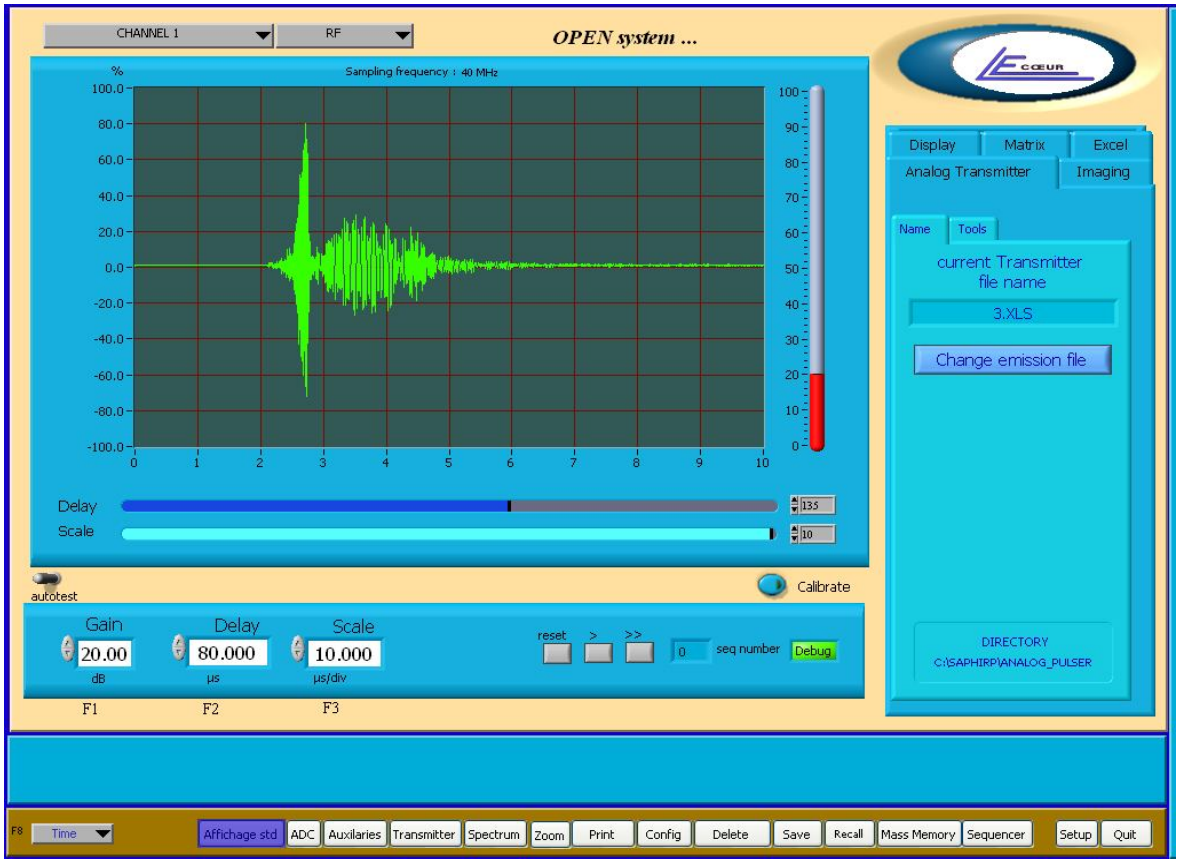
4.1 – Name



DESCRIPTION:

Indicates/Modifies the current active analog pulser waveform for the selected sequence/Channel.

FEATURES:

N.A

NOTES:

Only active with the option 'analog pulser' of OPEN system.

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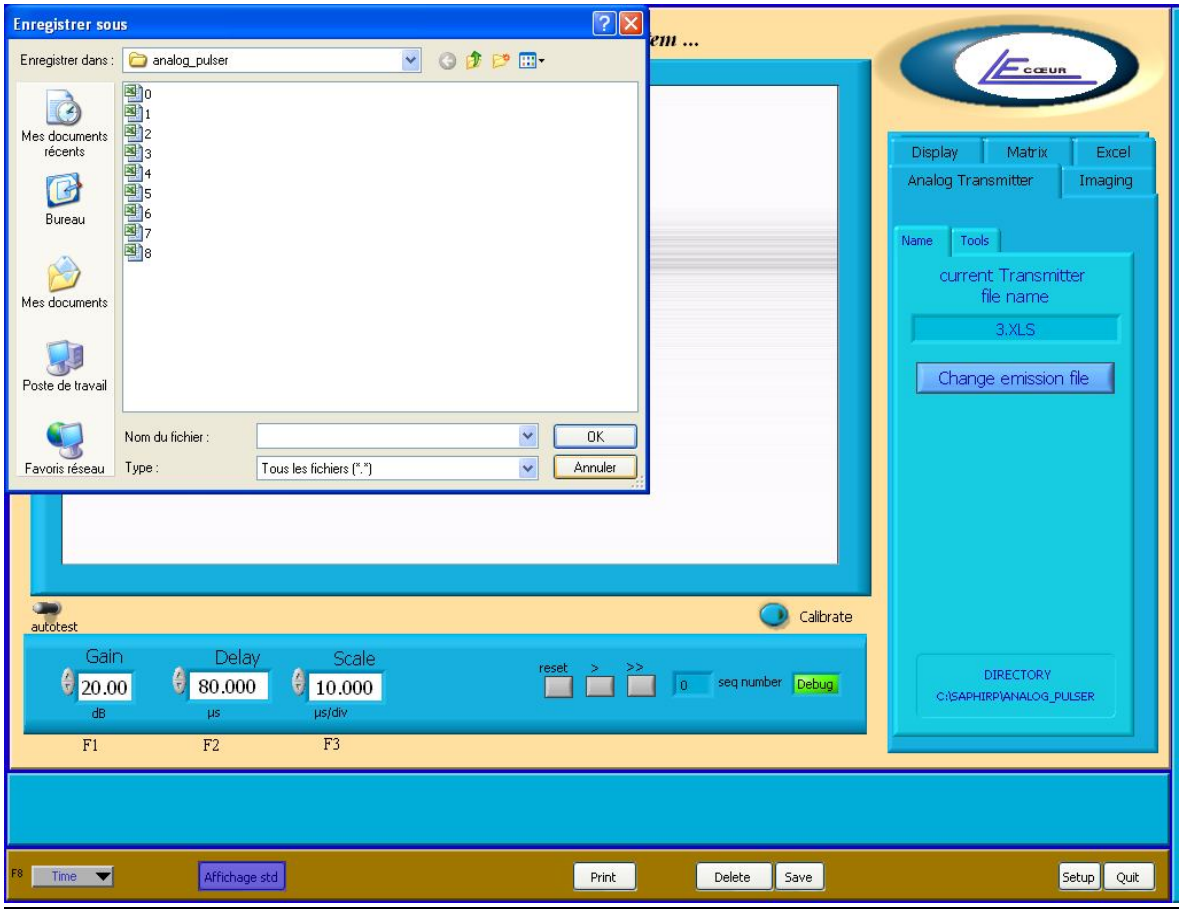
4.1.1 – Change Emission File



DESCRIPTION:

Loads a new waveform for the analog pulser.

FEATURES:

N.A

NOTES:

Only active with the option 'analog pulser' of OPEN system.

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☎ : 02 38 94 28 30– 🖷 : 02 38 94 29 67
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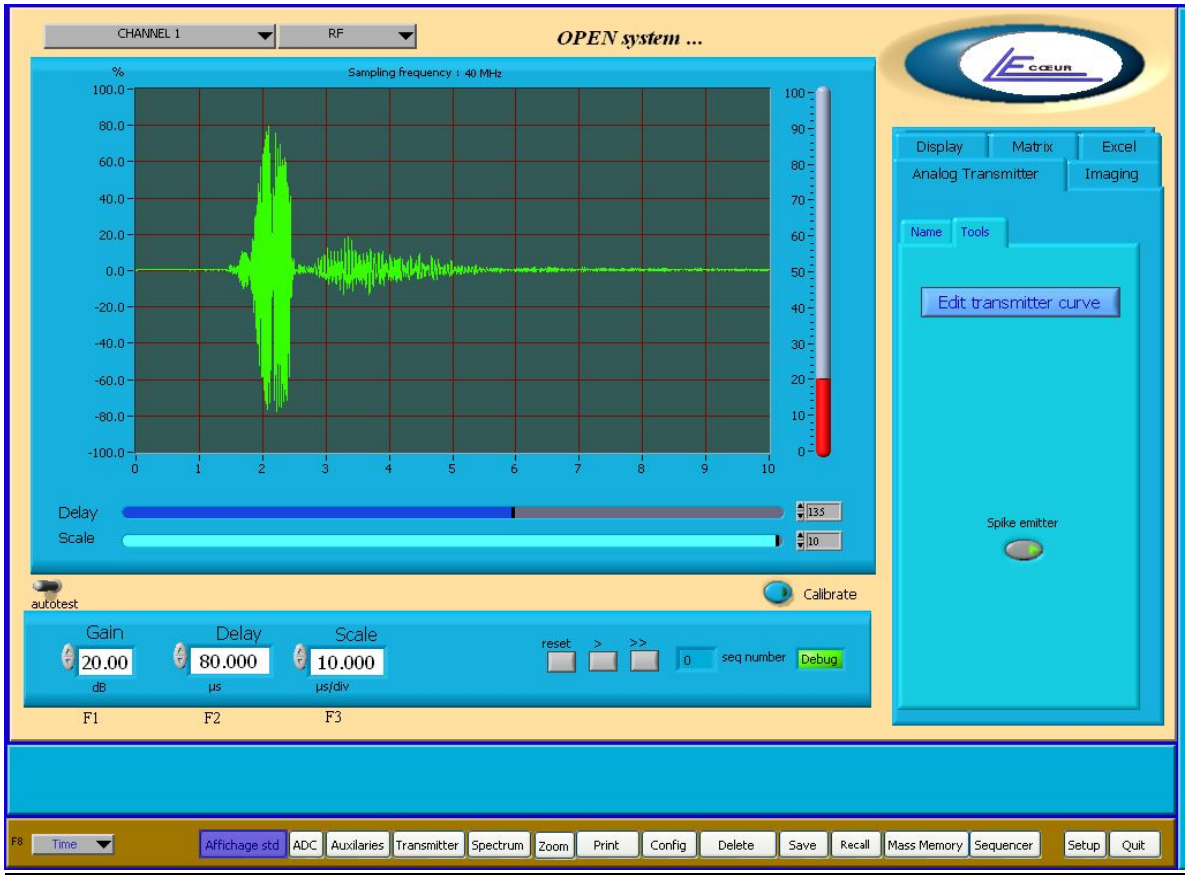
4.2 – Tools



DESCRIPTION:

Gives access to the waveform editor.

FEATURES:

N.A

NOTES:

Only active with the option 'analog pulser' of OPEN system.

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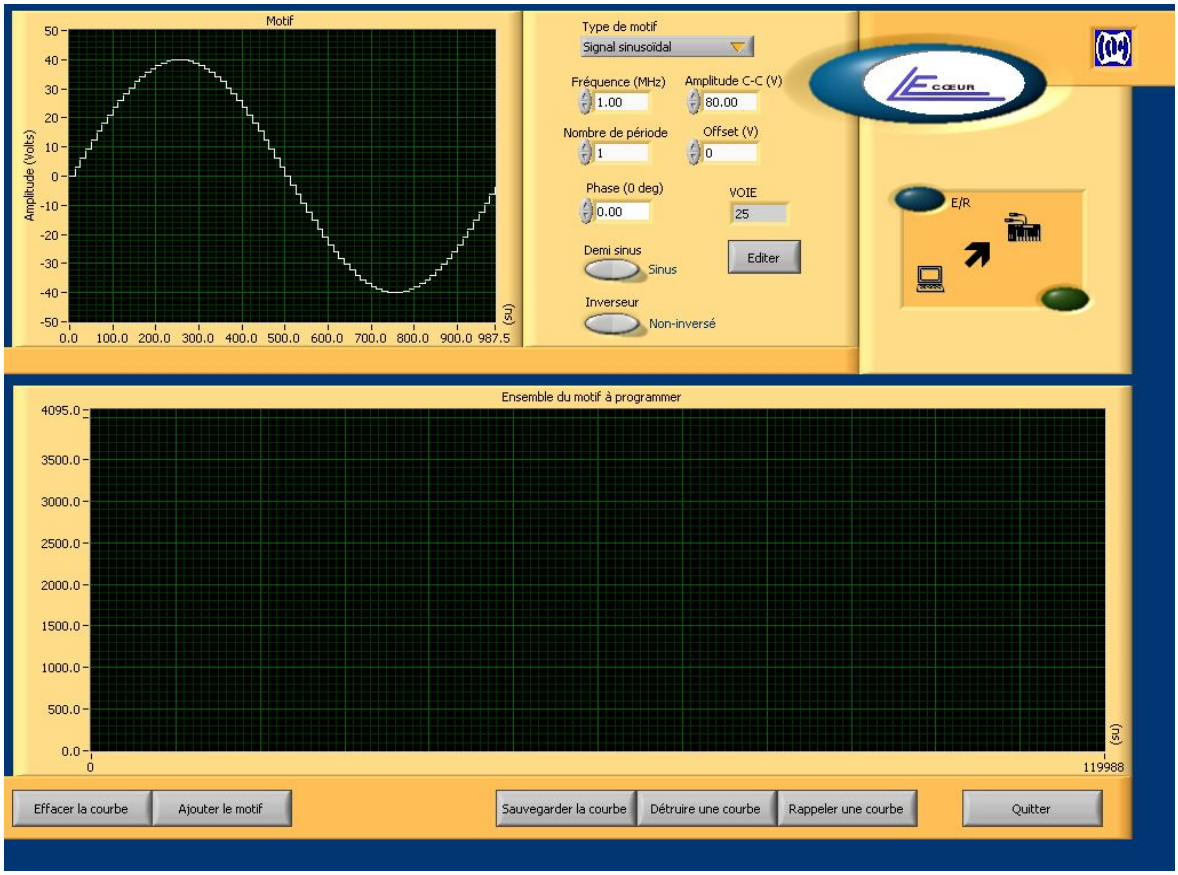
4.2.1 – Edit Transmitter curve



DESCRIPTION:

Provides an advanced tool to edit/ create/ store/recall transmitter waveforms.

FEATURES:

N.A

NOTES:

Only active with the option 'analog pulser' of OPEN system.

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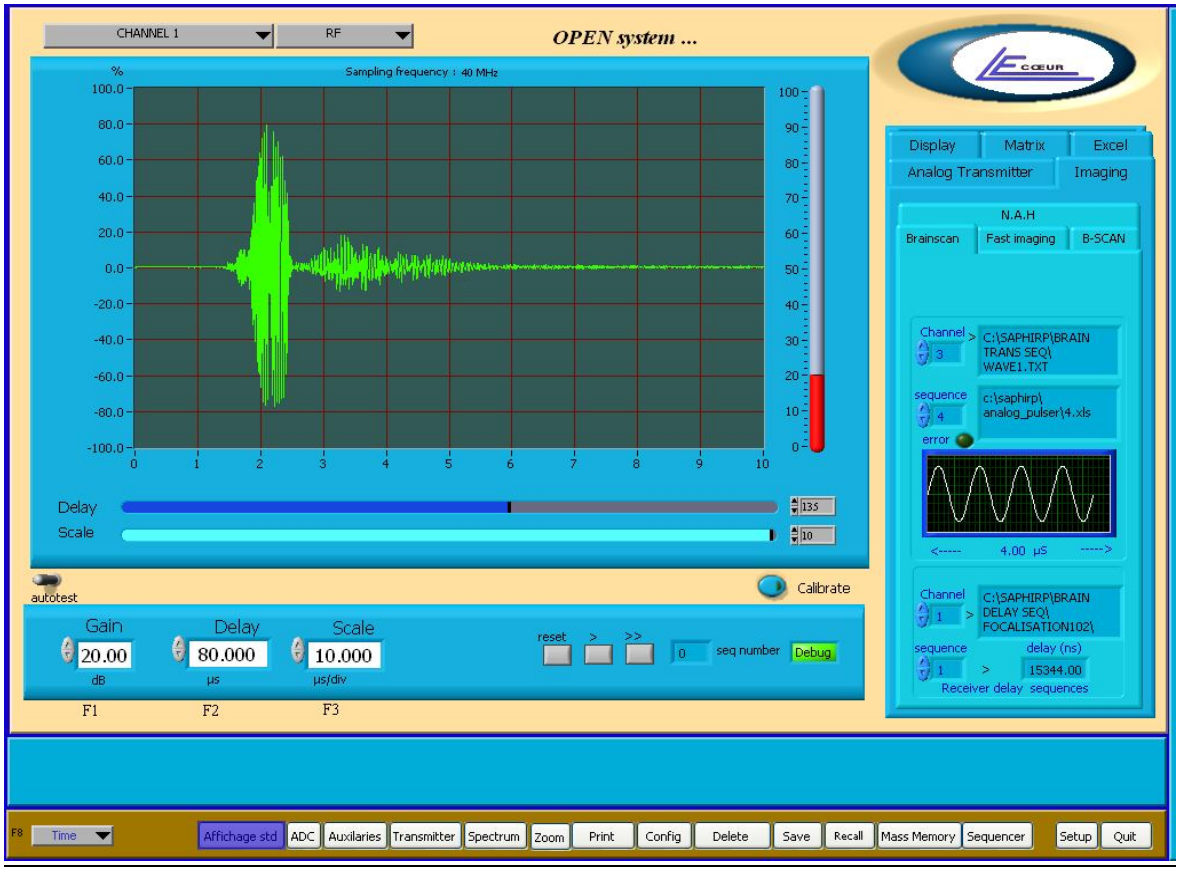
5. – Imaging



DESCRIPTION:

Displays information about the analog transmitter and receiver delays

FEATURES:

NOTES:

Futures up-dates of OPEN software will be located in those menus.

Only active with the option 'analog pulser' of OPEN system.

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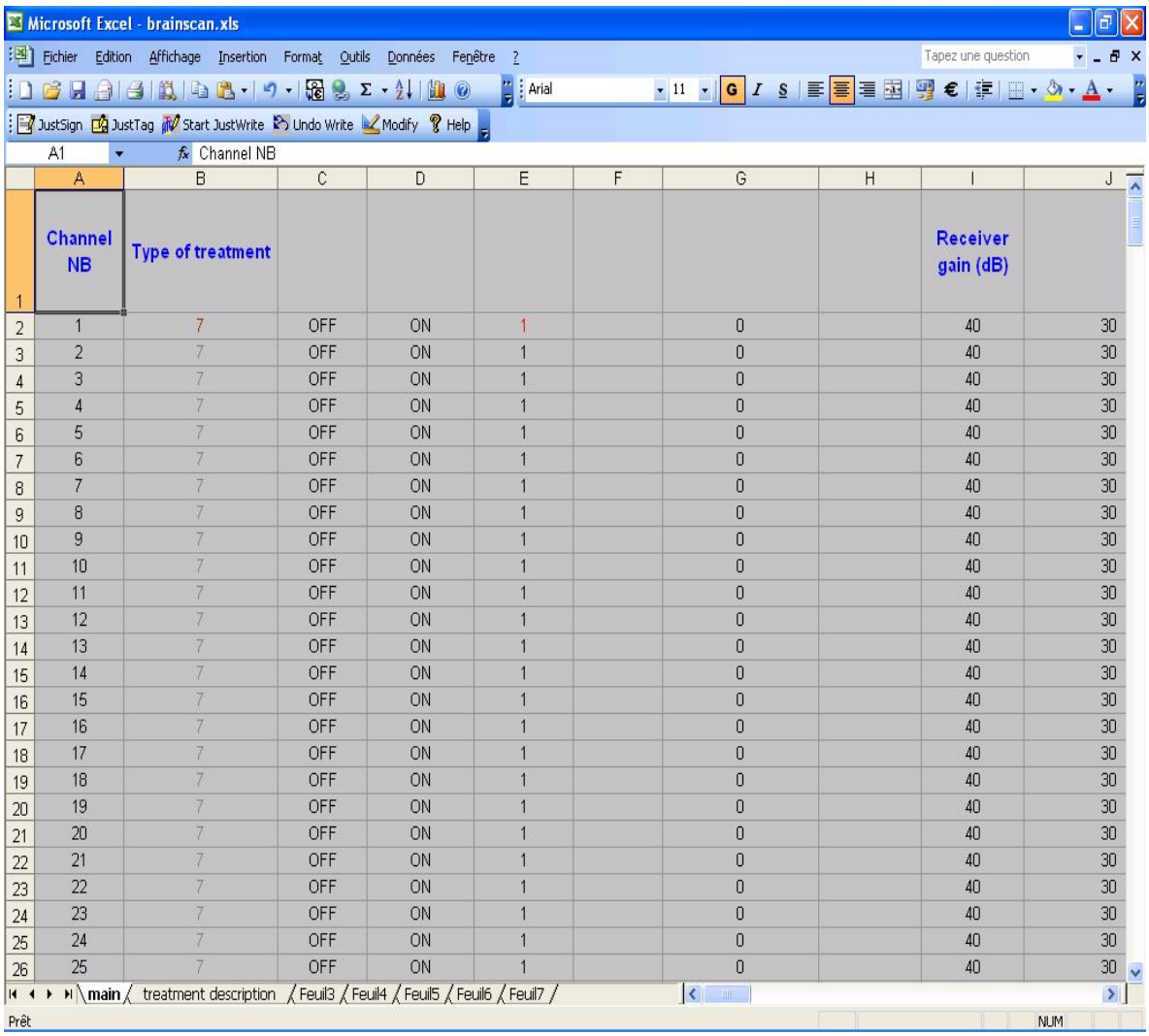
2) Excel global set-up file description

The complete set-up of your OPEN system is contained in an Excel file located in: ***c:\saphirp\brainscan.xls.*** *Below is the description of this file.*

2.1) what's in brainscan.xls file

This section describes the use of parameters inside excel file.



	A	B	C	D	E	F	G	H	I	J
1	Channel NB	Type of treatment							Receiver gain (dB)	
2	1	7	OFF	ON	1		0		40	30
3	2	7	OFF	ON	1		0		40	30
4	3	7	OFF	ON	1		0		40	30
5	4	7	OFF	ON	1		0		40	30
6	5	7	OFF	ON	1		0		40	30
7	6	7	OFF	ON	1		0		40	30
8	7	7	OFF	ON	1		0		40	30
9	8	7	OFF	ON	1		0		40	30
10	9	7	OFF	ON	1		0		40	30
11	10	7	OFF	ON	1		0		40	30
12	11	7	OFF	ON	1		0		40	30
13	12	7	OFF	ON	1		0		40	30
14	13	7	OFF	ON	1		0		40	30
15	14	7	OFF	ON	1		0		40	30
16	15	7	OFF	ON	1		0		40	30
17	16	7	OFF	ON	1		0		40	30
18	17	7	OFF	ON	1		0		40	30
19	18	7	OFF	ON	1		0		40	30
20	19	7	OFF	ON	1		0		40	30
21	20	7	OFF	ON	1		0		40	30
22	21	7	OFF	ON	1		0		40	30
23	22	7	OFF	ON	1		0		40	30
24	23	7	OFF	ON	1		0		40	30
25	24	7	OFF	ON	1		0		40	30
26	25	7	OFF	ON	1		0		40	30

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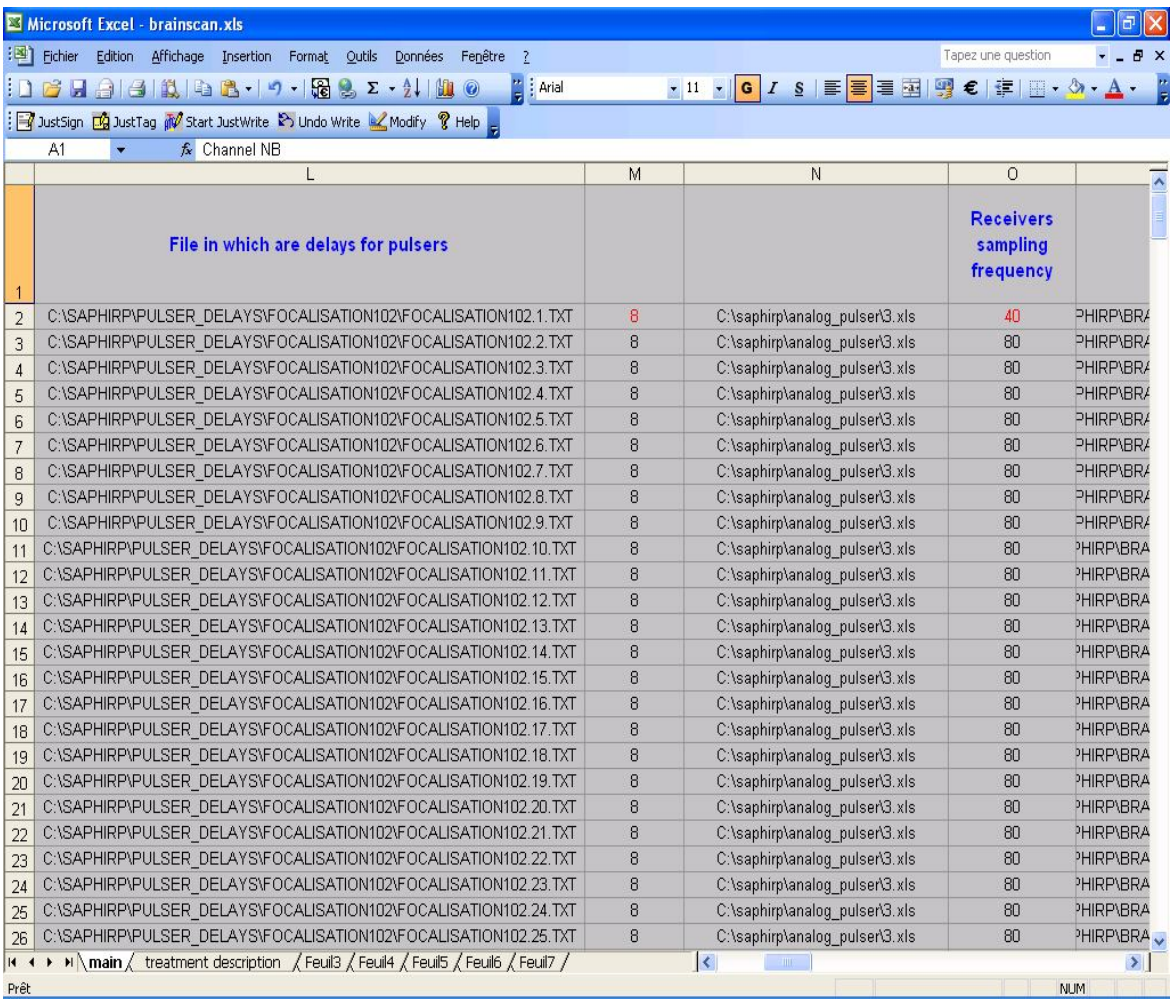
The sheet contains in lines the channel number and in rows the parameters. To simplify the description we will only describe the more important parameters.

Channel number: *The number of the channels in which parameters contained on this line are used to.*

Type of treatment: *OPEN system always work on processing number 7.*

Receiver gain: *Gain of each channel in dB.*



	L	M	N	O
1	File in which are delays for pulsers			Receivers sampling frequency
2	C:\SAPHIRP\PULSER_DELAYS\FOCALISATION102\FOCALISATION102.1.TXT	8	C:\saphirp\analog_pulser\3.xls	40
3	C:\SAPHIRP\PULSER_DELAYS\FOCALISATION102\FOCALISATION102.2.TXT	8	C:\saphirp\analog_pulser\3.xls	80
4	C:\SAPHIRP\PULSER_DELAYS\FOCALISATION102\FOCALISATION102.3.TXT	8	C:\saphirp\analog_pulser\3.xls	80
5	C:\SAPHIRP\PULSER_DELAYS\FOCALISATION102\FOCALISATION102.4.TXT	8	C:\saphirp\analog_pulser\3.xls	80
6	C:\SAPHIRP\PULSER_DELAYS\FOCALISATION102\FOCALISATION102.5.TXT	8	C:\saphirp\analog_pulser\3.xls	80
7	C:\SAPHIRP\PULSER_DELAYS\FOCALISATION102\FOCALISATION102.6.TXT	8	C:\saphirp\analog_pulser\3.xls	80
8	C:\SAPHIRP\PULSER_DELAYS\FOCALISATION102\FOCALISATION102.7.TXT	8	C:\saphirp\analog_pulser\3.xls	80
9	C:\SAPHIRP\PULSER_DELAYS\FOCALISATION102\FOCALISATION102.8.TXT	8	C:\saphirp\analog_pulser\3.xls	80
10	C:\SAPHIRP\PULSER_DELAYS\FOCALISATION102\FOCALISATION102.9.TXT	8	C:\saphirp\analog_pulser\3.xls	80
11	C:\SAPHIRP\PULSER_DELAYS\FOCALISATION102\FOCALISATION102.10.TXT	8	C:\saphirp\analog_pulser\3.xls	80
12	C:\SAPHIRP\PULSER_DELAYS\FOCALISATION102\FOCALISATION102.11.TXT	8	C:\saphirp\analog_pulser\3.xls	80
13	C:\SAPHIRP\PULSER_DELAYS\FOCALISATION102\FOCALISATION102.12.TXT	8	C:\saphirp\analog_pulser\3.xls	80
14	C:\SAPHIRP\PULSER_DELAYS\FOCALISATION102\FOCALISATION102.13.TXT	8	C:\saphirp\analog_pulser\3.xls	80
15	C:\SAPHIRP\PULSER_DELAYS\FOCALISATION102\FOCALISATION102.14.TXT	8	C:\saphirp\analog_pulser\3.xls	80
16	C:\SAPHIRP\PULSER_DELAYS\FOCALISATION102\FOCALISATION102.15.TXT	8	C:\saphirp\analog_pulser\3.xls	80
17	C:\SAPHIRP\PULSER_DELAYS\FOCALISATION102\FOCALISATION102.16.TXT	8	C:\saphirp\analog_pulser\3.xls	80
18	C:\SAPHIRP\PULSER_DELAYS\FOCALISATION102\FOCALISATION102.17.TXT	8	C:\saphirp\analog_pulser\3.xls	80
19	C:\SAPHIRP\PULSER_DELAYS\FOCALISATION102\FOCALISATION102.18.TXT	8	C:\saphirp\analog_pulser\3.xls	80
20	C:\SAPHIRP\PULSER_DELAYS\FOCALISATION102\FOCALISATION102.19.TXT	8	C:\saphirp\analog_pulser\3.xls	80
21	C:\SAPHIRP\PULSER_DELAYS\FOCALISATION102\FOCALISATION102.20.TXT	8	C:\saphirp\analog_pulser\3.xls	80
22	C:\SAPHIRP\PULSER_DELAYS\FOCALISATION102\FOCALISATION102.21.TXT	8	C:\saphirp\analog_pulser\3.xls	80
23	C:\SAPHIRP\PULSER_DELAYS\FOCALISATION102\FOCALISATION102.22.TXT	8	C:\saphirp\analog_pulser\3.xls	80
24	C:\SAPHIRP\PULSER_DELAYS\FOCALISATION102\FOCALISATION102.23.TXT	8	C:\saphirp\analog_pulser\3.xls	80
25	C:\SAPHIRP\PULSER_DELAYS\FOCALISATION102\FOCALISATION102.24.TXT	8	C:\saphirp\analog_pulser\3.xls	80
26	C:\SAPHIRP\PULSER_DELAYS\FOCALISATION102\FOCALISATION102.25.TXT	8	C:\saphirp\analog_pulser\3.xls	80

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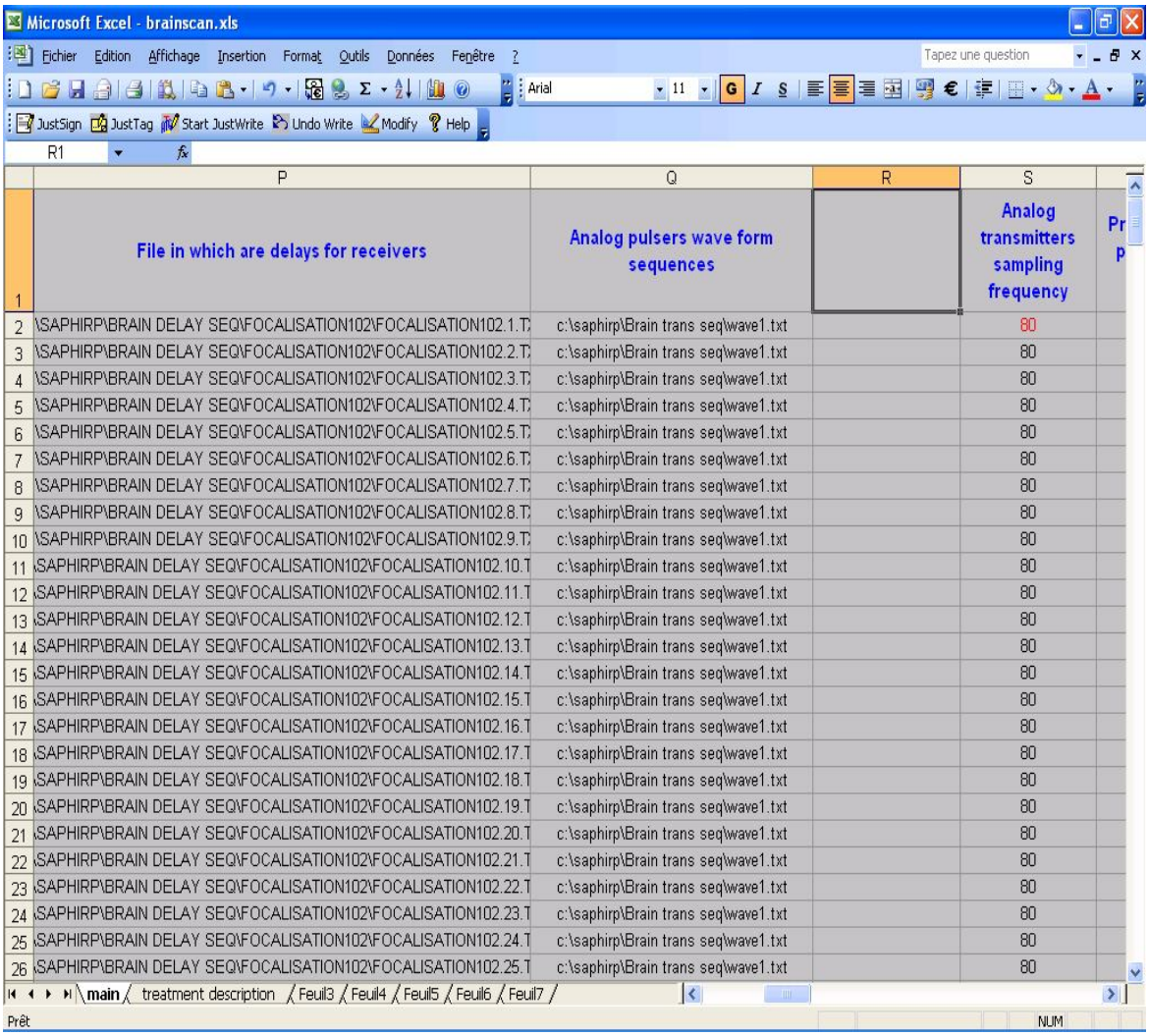
File in which are delays for pulsers: *The file pointed by this cell contains the delays that are applied to pulsers for all sequences. Each channel could have a different pulser delay file.*

Receivers sampling frequency: *Only the first line (in red) is active. The value of this cell is the sampling frequency of all analog to digital converters connected to the receivers. The unit is MHz.*



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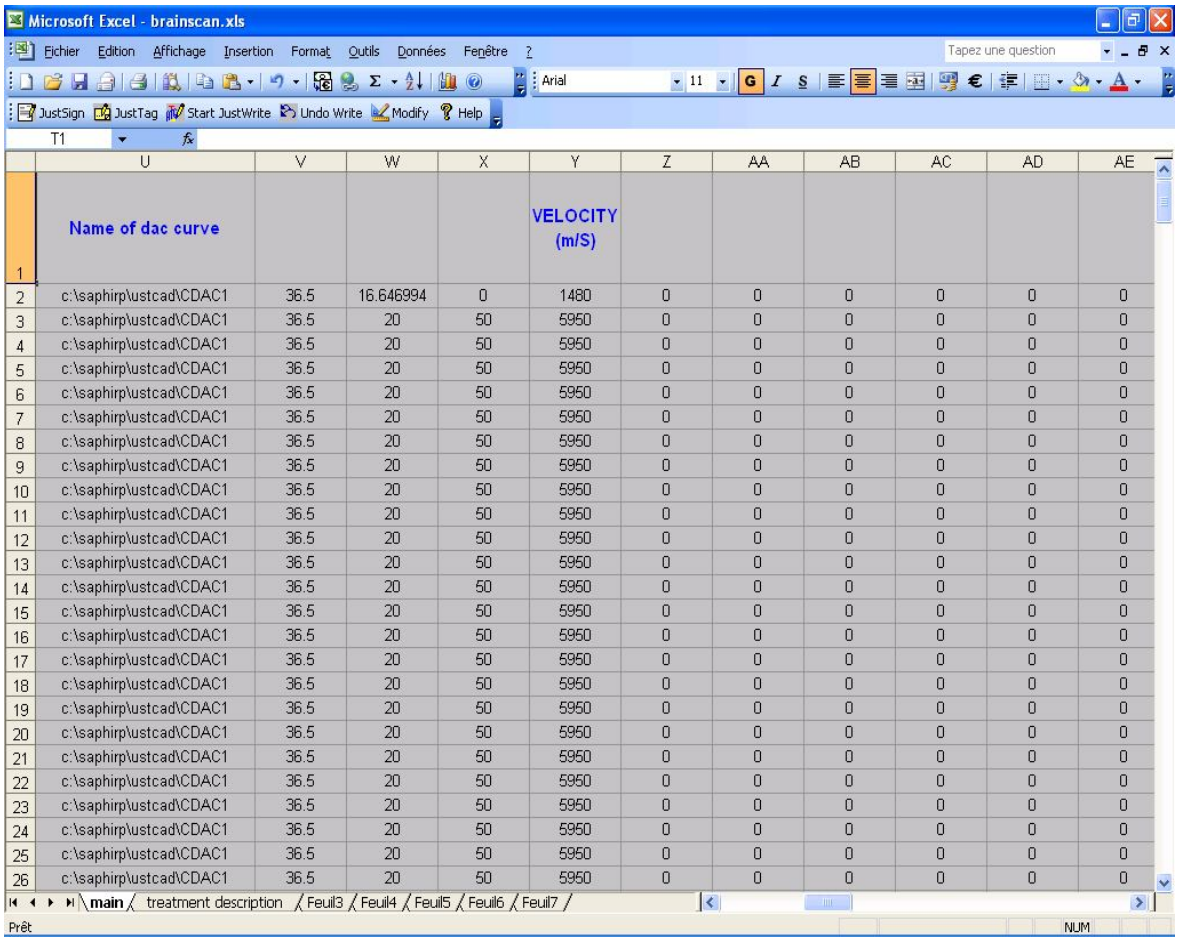
File in which are delay for receivers: *The file pointed by this cell contains the delays that are applied to receivers for all sequences. Each channel could have a different receiver delay file.*

Analog pulser waveform sequences: *The file pointed by this cell contains the name of waveforms that are applied to analog pulsers for all sequences. Each channel could have a different waveform files.*

Analog transmitters sampling frequency: *Only the first line (in red) is active. The value of this cell is the sampling frequency of all digital to analog converters connected to the analog transmitter to generate waveforms. The unit is MHz.*



	U	V	W	X	Y	Z	AA	AB	AC	AD	AE
1	Name of dac curve				VELOCITY (m/S)						
2	c:\saphirp\ustcad\CDAC1	36.5	16.646994	0	1480	0	0	0	0	0	0
3	c:\saphirp\ustcad\CDAC1	36.5	20	50	5950	0	0	0	0	0	0
4	c:\saphirp\ustcad\CDAC1	36.5	20	50	5950	0	0	0	0	0	0
5	c:\saphirp\ustcad\CDAC1	36.5	20	50	5950	0	0	0	0	0	0
6	c:\saphirp\ustcad\CDAC1	36.5	20	50	5950	0	0	0	0	0	0
7	c:\saphirp\ustcad\CDAC1	36.5	20	50	5950	0	0	0	0	0	0
8	c:\saphirp\ustcad\CDAC1	36.5	20	50	5950	0	0	0	0	0	0
9	c:\saphirp\ustcad\CDAC1	36.5	20	50	5950	0	0	0	0	0	0
10	c:\saphirp\ustcad\CDAC1	36.5	20	50	5950	0	0	0	0	0	0
11	c:\saphirp\ustcad\CDAC1	36.5	20	50	5950	0	0	0	0	0	0
12	c:\saphirp\ustcad\CDAC1	36.5	20	50	5950	0	0	0	0	0	0
13	c:\saphirp\ustcad\CDAC1	36.5	20	50	5950	0	0	0	0	0	0
14	c:\saphirp\ustcad\CDAC1	36.5	20	50	5950	0	0	0	0	0	0
15	c:\saphirp\ustcad\CDAC1	36.5	20	50	5950	0	0	0	0	0	0
16	c:\saphirp\ustcad\CDAC1	36.5	20	50	5950	0	0	0	0	0	0
17	c:\saphirp\ustcad\CDAC1	36.5	20	50	5950	0	0	0	0	0	0
18	c:\saphirp\ustcad\CDAC1	36.5	20	50	5950	0	0	0	0	0	0
19	c:\saphirp\ustcad\CDAC1	36.5	20	50	5950	0	0	0	0	0	0
20	c:\saphirp\ustcad\CDAC1	36.5	20	50	5950	0	0	0	0	0	0
21	c:\saphirp\ustcad\CDAC1	36.5	20	50	5950	0	0	0	0	0	0
22	c:\saphirp\ustcad\CDAC1	36.5	20	50	5950	0	0	0	0	0	0
23	c:\saphirp\ustcad\CDAC1	36.5	20	50	5950	0	0	0	0	0	0
24	c:\saphirp\ustcad\CDAC1	36.5	20	50	5950	0	0	0	0	0	0
25	c:\saphirp\ustcad\CDAC1	36.5	20	50	5950	0	0	0	0	0	0
26	c:\saphirp\ustcad\CDAC1	36.5	20	50	5950	0	0	0	0	0	0

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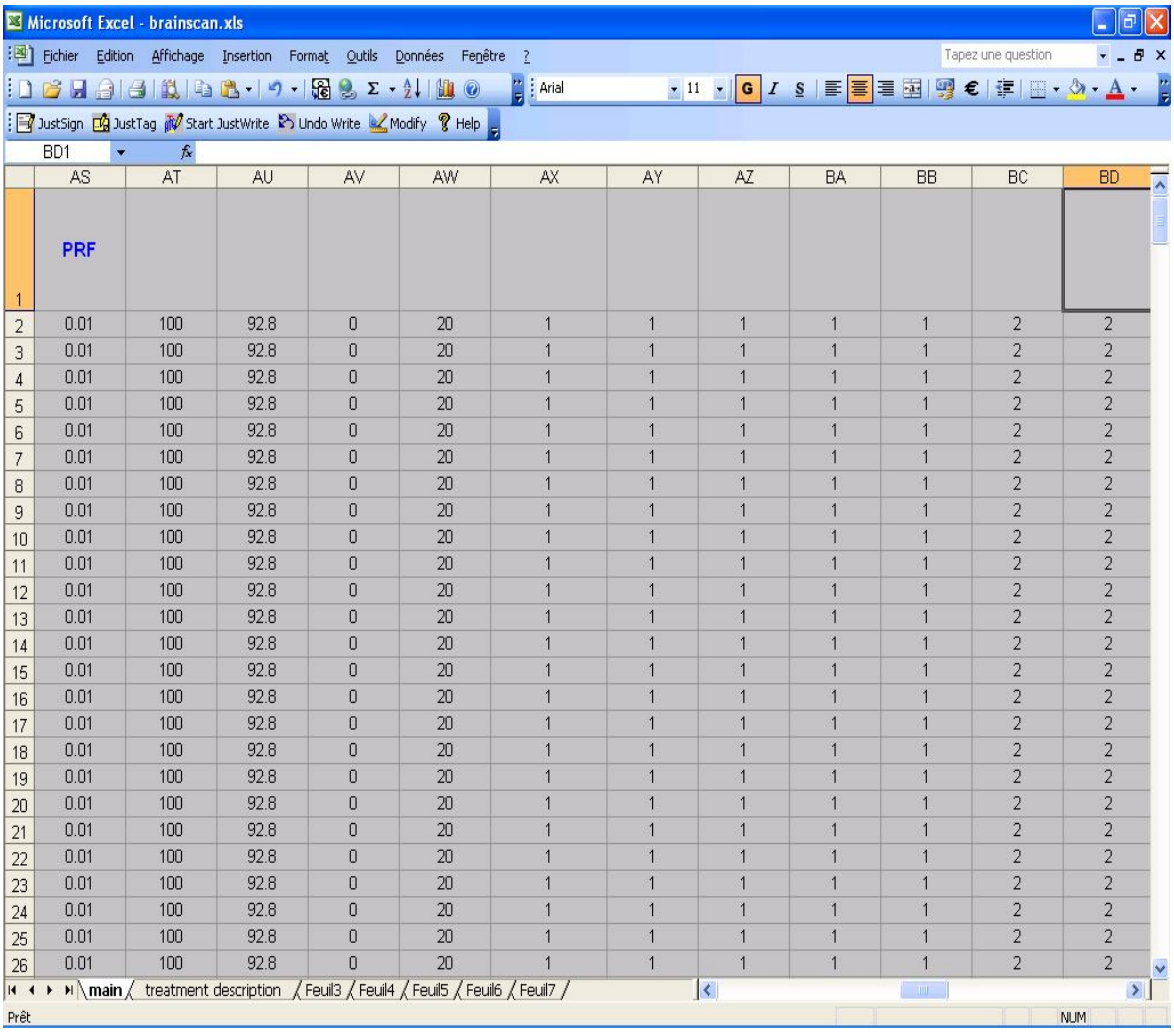
Name of DAC curve: *This cell contains the path to the DAC curve applied on the channel. The DAC curve file is a text file that describes the shape of the gain variations.*

Velocity: *The velocity of ultrasound. This parameter is used to convert time in distance in the OPEN standard interface.*



	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD
1	PRF											
2	0.01	100	92.8	0	20	1	1	1	1	1	2	2
3	0.01	100	92.8	0	20	1	1	1	1	1	2	2
4	0.01	100	92.8	0	20	1	1	1	1	1	2	2
5	0.01	100	92.8	0	20	1	1	1	1	1	2	2
6	0.01	100	92.8	0	20	1	1	1	1	1	2	2
7	0.01	100	92.8	0	20	1	1	1	1	1	2	2
8	0.01	100	92.8	0	20	1	1	1	1	1	2	2
9	0.01	100	92.8	0	20	1	1	1	1	1	2	2
10	0.01	100	92.8	0	20	1	1	1	1	1	2	2
11	0.01	100	92.8	0	20	1	1	1	1	1	2	2
12	0.01	100	92.8	0	20	1	1	1	1	1	2	2
13	0.01	100	92.8	0	20	1	1	1	1	1	2	2
14	0.01	100	92.8	0	20	1	1	1	1	1	2	2
15	0.01	100	92.8	0	20	1	1	1	1	1	2	2
16	0.01	100	92.8	0	20	1	1	1	1	1	2	2
17	0.01	100	92.8	0	20	1	1	1	1	1	2	2
18	0.01	100	92.8	0	20	1	1	1	1	1	2	2
19	0.01	100	92.8	0	20	1	1	1	1	1	2	2
20	0.01	100	92.8	0	20	1	1	1	1	1	2	2
21	0.01	100	92.8	0	20	1	1	1	1	1	2	2
22	0.01	100	92.8	0	20	1	1	1	1	1	2	2
23	0.01	100	92.8	0	20	1	1	1	1	1	2	2
24	0.01	100	92.8	0	20	1	1	1	1	1	2	2
25	0.01	100	92.8	0	20	1	1	1	1	1	2	2
26	0.01	100	92.8	0	20	1	1	1	1	1	2	2

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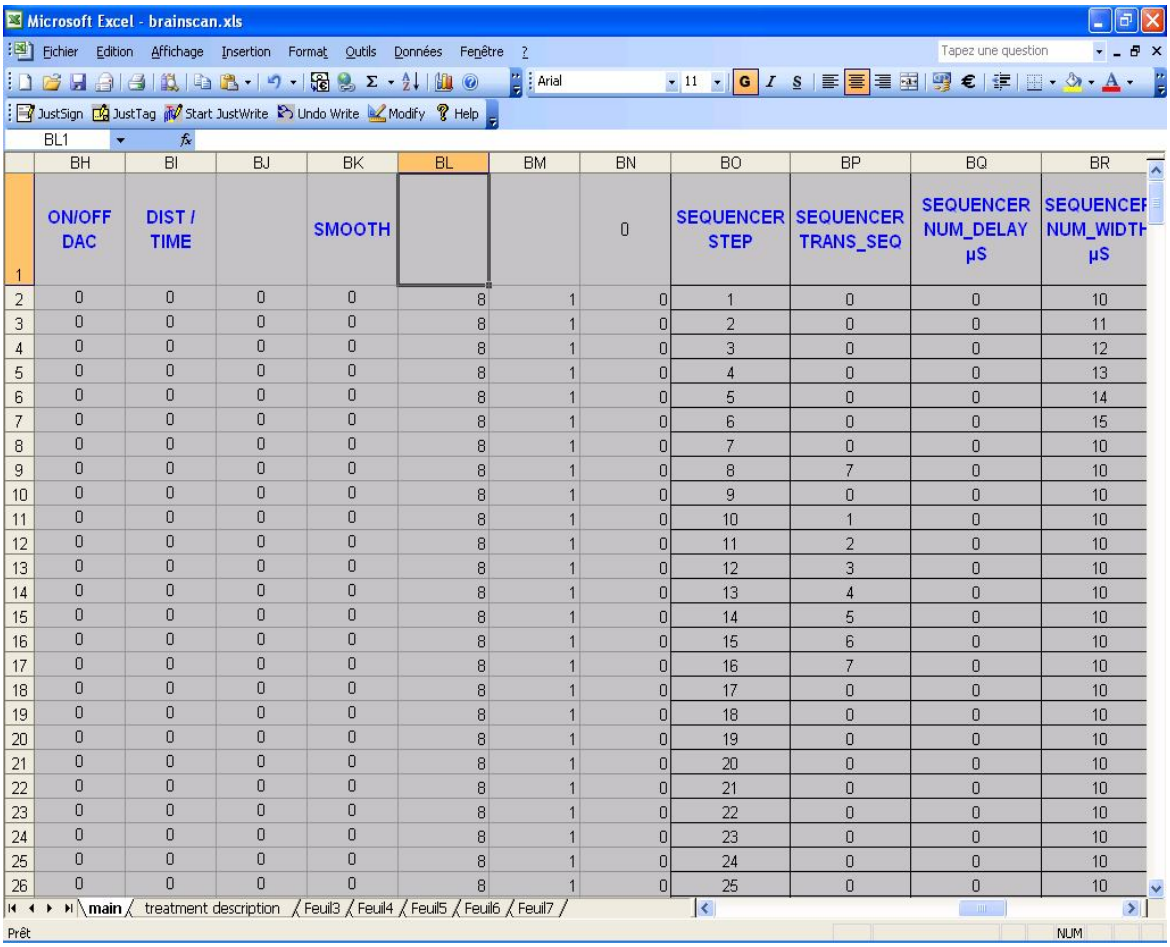
PRF: *The value of repetition pulse frequency P.R.F (repetition Frequency): This parameter controls the rate of the pulser. For example setting 1 KHz will generate pulses every millisecond.*

- *Entering 0.03 KHz switches the system to the "EXTERNAL TRIGGER" mode. In this mode a TTL 5 Volts pulse must be input in the plus called 'EXTERNAL TRIGGER'. The active edge is positive.*

- *Entering 0.01 KHz switches the system to the "SOFT TRIGGER" mode. In this mode the pulser generates pulses only when it is necessary (When a A-Scan digitalisation is requested). If no request is made on OPEN the pulser is set to OFF.*



	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR
1	ON/OFF DAC	DIST / TIME		SMOOTH			0	SEQUENCER STEP	SEQUENCER TRANS_SEQ	SEQUENCER NUM_DELAY µS	SEQUENCER NUM_WIDTH µS
2	0	0	0	0	8	1	0	1	0	0	10
3	0	0	0	0	8	1	0	2	0	0	11
4	0	0	0	0	8	1	0	3	0	0	12
5	0	0	0	0	8	1	0	4	0	0	13
6	0	0	0	0	8	1	0	5	0	0	14
7	0	0	0	0	8	1	0	6	0	0	15
8	0	0	0	0	8	1	0	7	0	0	10
9	0	0	0	0	8	1	0	8	7	0	10
10	0	0	0	0	8	1	0	9	0	0	10
11	0	0	0	0	8	1	0	10	1	0	10
12	0	0	0	0	8	1	0	11	2	0	10
13	0	0	0	0	8	1	0	12	3	0	10
14	0	0	0	0	8	1	0	13	4	0	10
15	0	0	0	0	8	1	0	14	5	0	10
16	0	0	0	0	8	1	0	15	6	0	10
17	0	0	0	0	8	1	0	16	7	0	10
18	0	0	0	0	8	1	0	17	0	0	10
19	0	0	0	0	8	1	0	18	0	0	10
20	0	0	0	0	8	1	0	19	0	0	10
21	0	0	0	0	8	1	0	20	0	0	10
22	0	0	0	0	8	1	0	21	0	0	10
23	0	0	0	0	8	1	0	22	0	0	10
24	0	0	0	0	8	1	0	23	0	0	10
25	0	0	0	0	8	1	0	24	0	0	10
26	0	0	0	0	8	1	0	25	0	0	10

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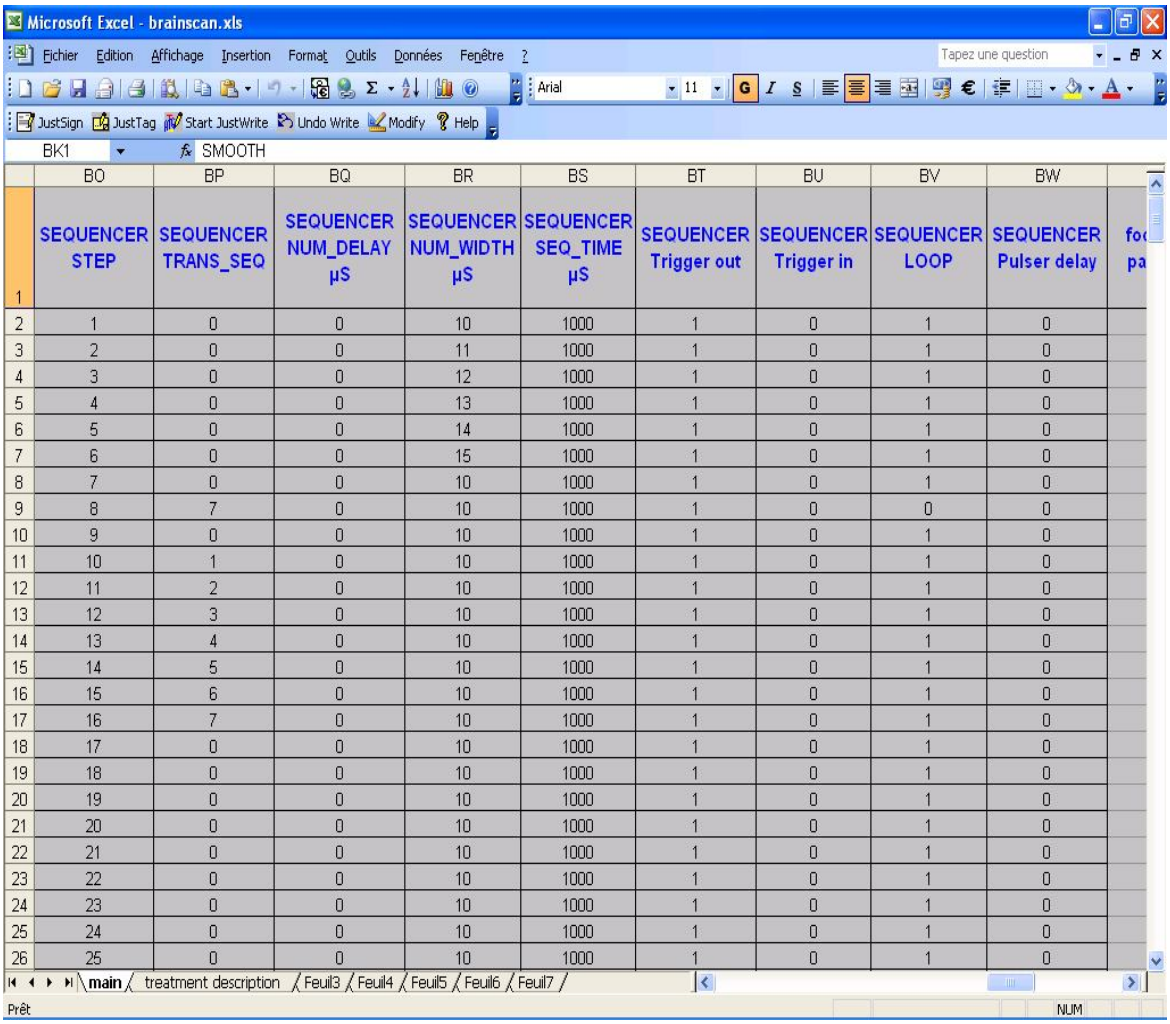
ON/OFF DAC: *Setting this value to 0 switches off the DAC curve. Setting 1 activates it.*

TIME/DIST: *Setting this value to 0 indicates to OPEN standard interface that unit is time. Setting it to 1 validates the unit to millimeters.*

SMOOTH: *Current state of the DAC curve. Smoothed ->1 / not smoothed ->0.*



	BO	BP	BQ	BR	BS	BT	BU	BV	BW	
1	SEQUENCER STEP	SEQUENCER TRANS_SEQ	SEQUENCER NUM_DELAY µS	SEQUENCER NUM_WIDTH µS	SEQUENCER SEQ_TIME µS	SEQUENCER Trigger out	SEQUENCER Trigger in	SEQUENCER LOOP	SEQUENCER Pulser delay	foc pa
2	1	0	0	10	1000	1	0	1	0	
3	2	0	0	11	1000	1	0	1	0	
4	3	0	0	12	1000	1	0	1	0	
5	4	0	0	13	1000	1	0	1	0	
6	5	0	0	14	1000	1	0	1	0	
7	6	0	0	15	1000	1	0	1	0	
8	7	0	0	10	1000	1	0	1	0	
9	8	7	0	10	1000	1	0	0	0	
10	9	0	0	10	1000	1	0	1	0	
11	10	1	0	10	1000	1	0	1	0	
12	11	2	0	10	1000	1	0	1	0	
13	12	3	0	10	1000	1	0	1	0	
14	13	4	0	10	1000	1	0	1	0	
15	14	5	0	10	1000	1	0	1	0	
16	15	6	0	10	1000	1	0	1	0	
17	16	7	0	10	1000	1	0	1	0	
18	17	0	0	10	1000	1	0	1	0	
19	18	0	0	10	1000	1	0	1	0	
20	19	0	0	10	1000	1	0	1	0	
21	20	0	0	10	1000	1	0	1	0	
22	21	0	0	10	1000	1	0	1	0	
23	22	0	0	10	1000	1	0	1	0	
24	23	0	0	10	1000	1	0	1	0	
25	24	0	0	10	1000	1	0	1	0	
26	25	0	0	10	1000	1	0	1	0	

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The parameters from 'SEQUENCER STEP' to 'SEQUENCER pulser delay' are used in the micro sequencer function.

Sequencer step

This parameter indicates the order in which the program will be executed Step 1, Step 2, etc ... This parameter must not be modified.

Sequencer trans seq

This parameter indicates the number of sequences to load before executing the instruction. I f the pulser is analog the sequence indicates a wave form, if the pulser is pulsed it sets up a delay. This parameter has the same value for the 8 channels of the same board.

Sequencer num delay

This parameter is the time before the digitalization begins. In OPEN standard interface the unit is micro-second. This parameter has the same value for the 8 channels of the same board.

Sequencer num width

The sampling time is the digitalization duration. During this, the signal of all channels is digitalized and stored in memory. In OPEN standard interface the unit is micro-second. This parameter has the same value for the 8 channels of the same board.

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Sequencer seq time

The sequence duration is the time to wait before executing the next instruction. It is usually called the PRF period. In OPEN standard interface the unit is micro-second.

Sequencer Trigger Out

If this parameter is set to one, OPEN system will generate a pulse on the 'trigger-out' output, at the beginning of the instruction. This pulse is a TTL one the duration of this pulse is 50 nS.

Sequencer Trigger In

If this parameter is set to one, OPEN system will wait for an input pulse on the 'Trigger in' input before executing the instruction.

Sequencer loop

This statement is a loop generator. The instruction will be executed N times. N is the value of the parameter. The minimum value is 1 and the maximum is 255.

Sequencer pulser delay

This parameter is only active with the option 'analog pulser' of OPEN. The waveform is directly shifted into the time base. The value of this shift is the parameter value. In the standard interface the unit is micro–second. This parameter has the same value for the 8 channels of the same board

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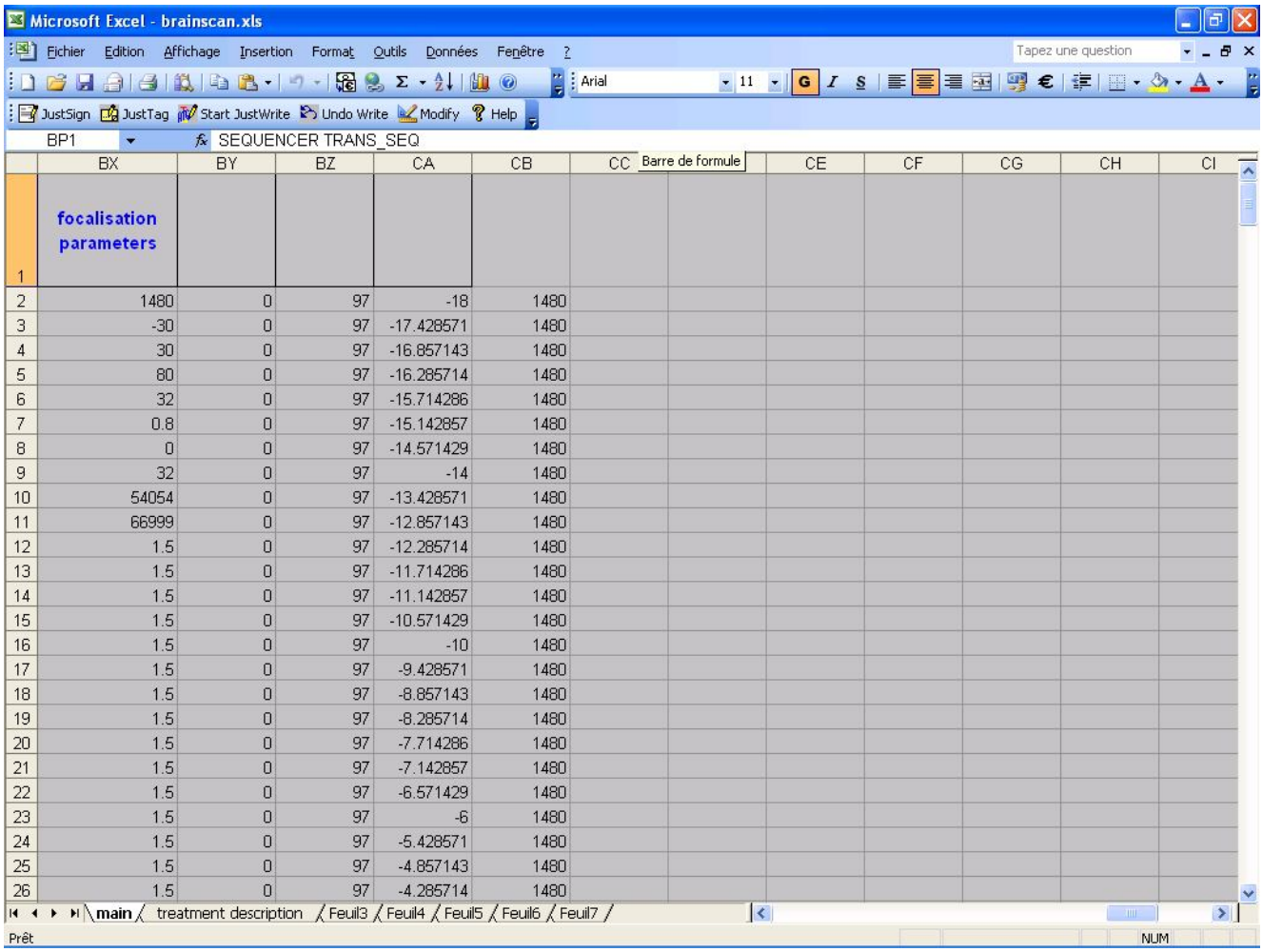

	BX	BY	BZ	CA	CB
1	focalisation parameters				
2	1480	0	97	-18	1480
3	-30	0	97	-17.428571	1480
4	30	0	97	-16.857143	1480
5	80	0	97	-16.285714	1480
6	32	0	97	-15.714286	1480
7	0.8	0	97	-15.142857	1480
8	0	0	97	-14.571429	1480
9	32	0	97	-14	1480
10	54054	0	97	-13.428571	1480
11	66999	0	97	-12.857143	1480
12	1.5	0	97	-12.285714	1480
13	1.5	0	97	-11.714286	1480
14	1.5	0	97	-11.142857	1480
15	1.5	0	97	-10.571429	1480
16	1.5	0	97	-10	1480
17	1.5	0	97	-9.428571	1480
18	1.5	0	97	-8.857143	1480
19	1.5	0	97	-8.285714	1480
20	1.5	0	97	-7.714286	1480
21	1.5	0	97	-7.142857	1480
22	1.5	0	97	-6.571429	1480
23	1.5	0	97	-6	1480
24	1.5	0	97	-5.428571	1480
25	1.5	0	97	-4.857143	1480
26	1.5	0	97	-4.285714	1480

Focalization parameters: *Internal use of OPEN software.*

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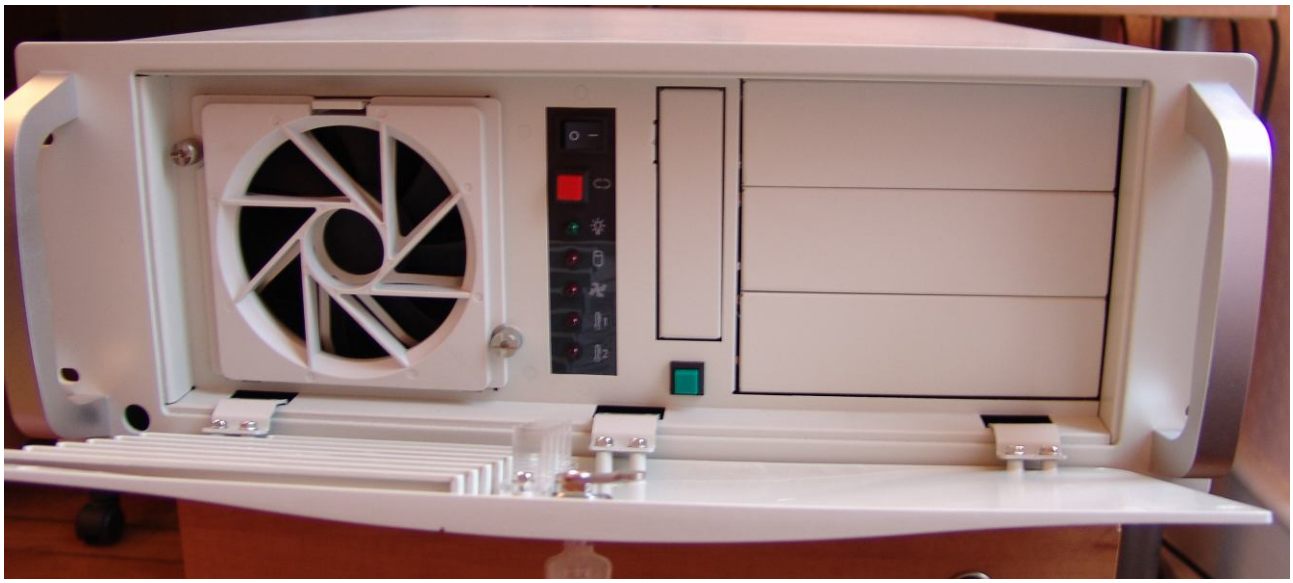
3) Hardware presentation

FRONT VIEW CLOSED

FRONT VIEW OPEN



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The standard OPEN includes no internal computer, an external PC is connected to the OPEN through a USB2 link. It means that the LEDS and switches are not activated.

REAR VIEW

***- Power 110/220 V**: This input is the power supply input. It must be connected to operate.*

***- Trigger in:** This is a TTL input; the maximum voltage is 5 Volts. It is used to synchronize OPEN with external equipments.*

***- Trigger Out:** This is a 5 Volts TTL output to synchronize other equipments from OPEN. It usually generates pulses 0-5 Volts 50 nS width.*

***- Single / dual probe :** This is a switch. In 'dual' probe position the user needs to connect two probes to OPEN: One is the transmitter probe the other*

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one is the receiver. In 'single probe' position only one probe does both transmission and reception.

***- Probes:** Two sockets where probes must be connected. If OPEN works in single probe the probe can be connected in 'TRANSMITTER' or 'RECEIVER'*