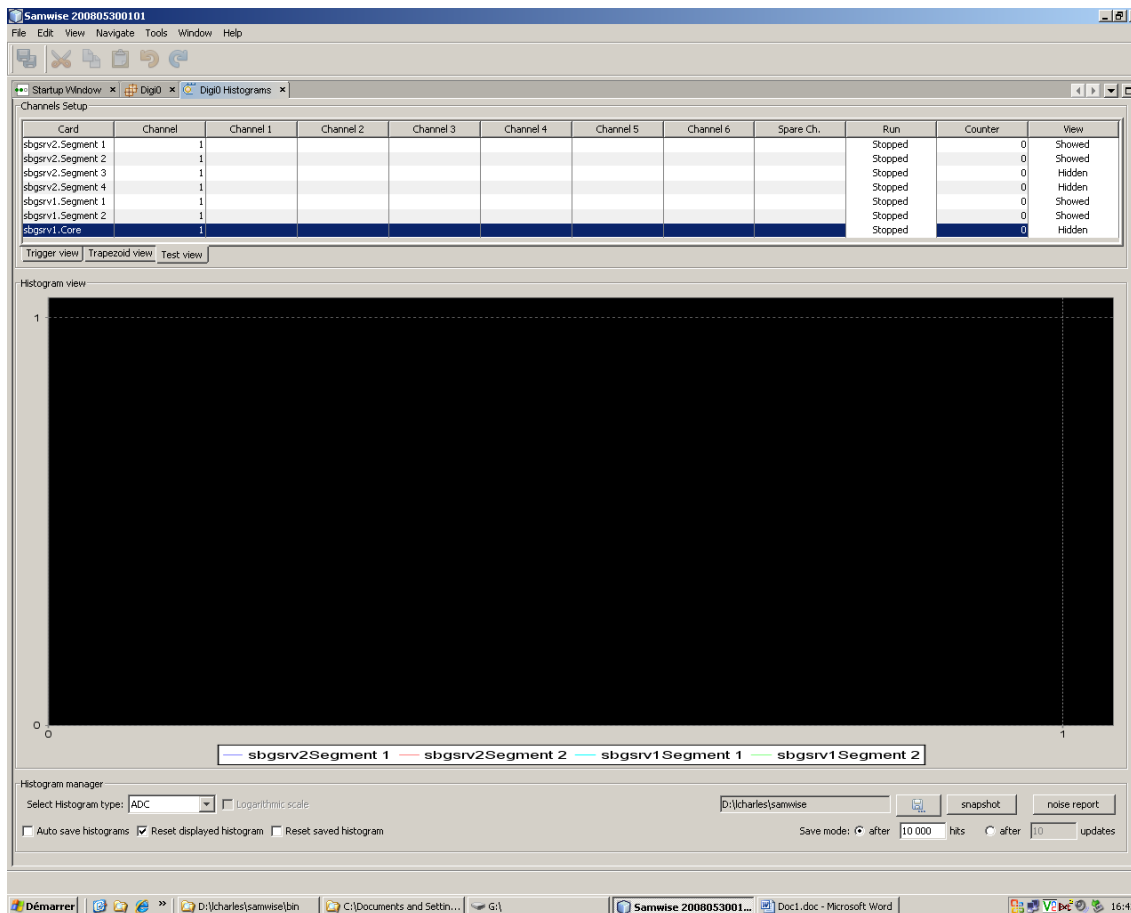


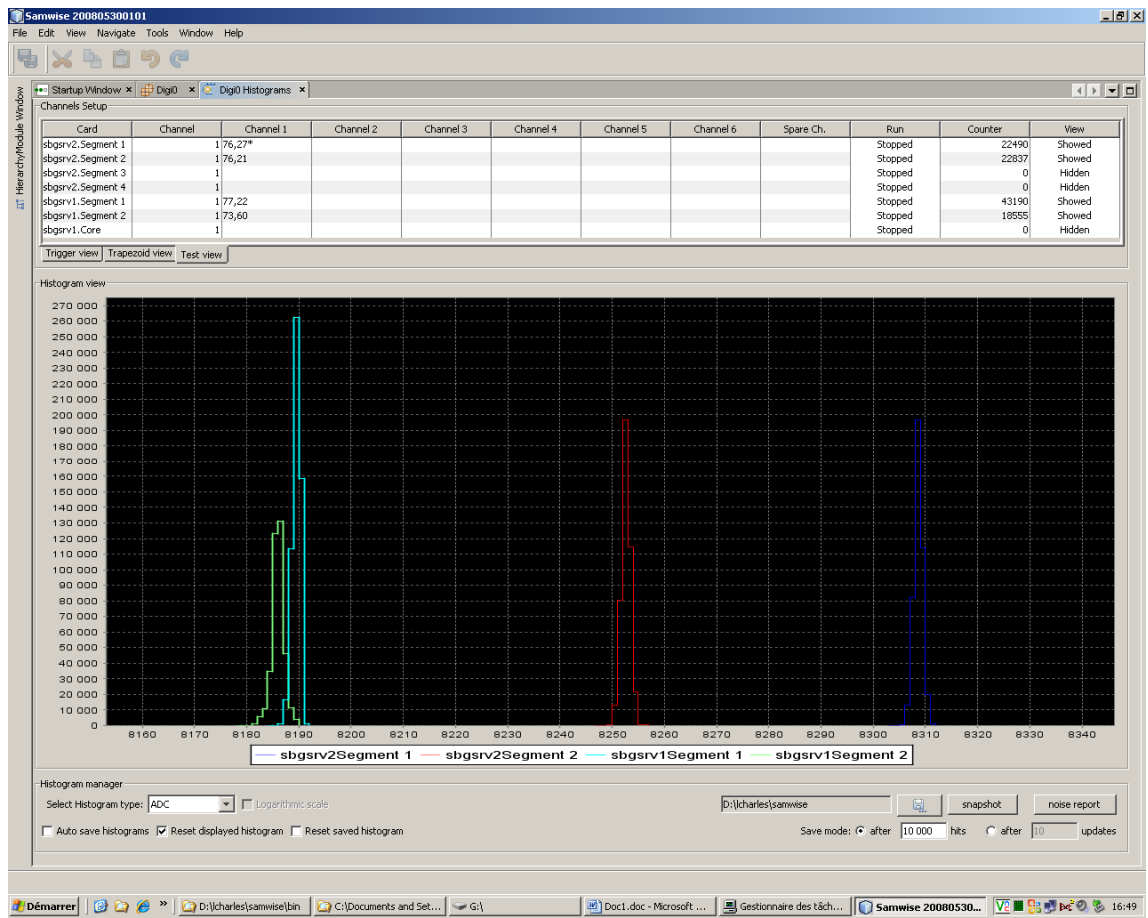
## AGATA DIGITISER NOISE TESTS

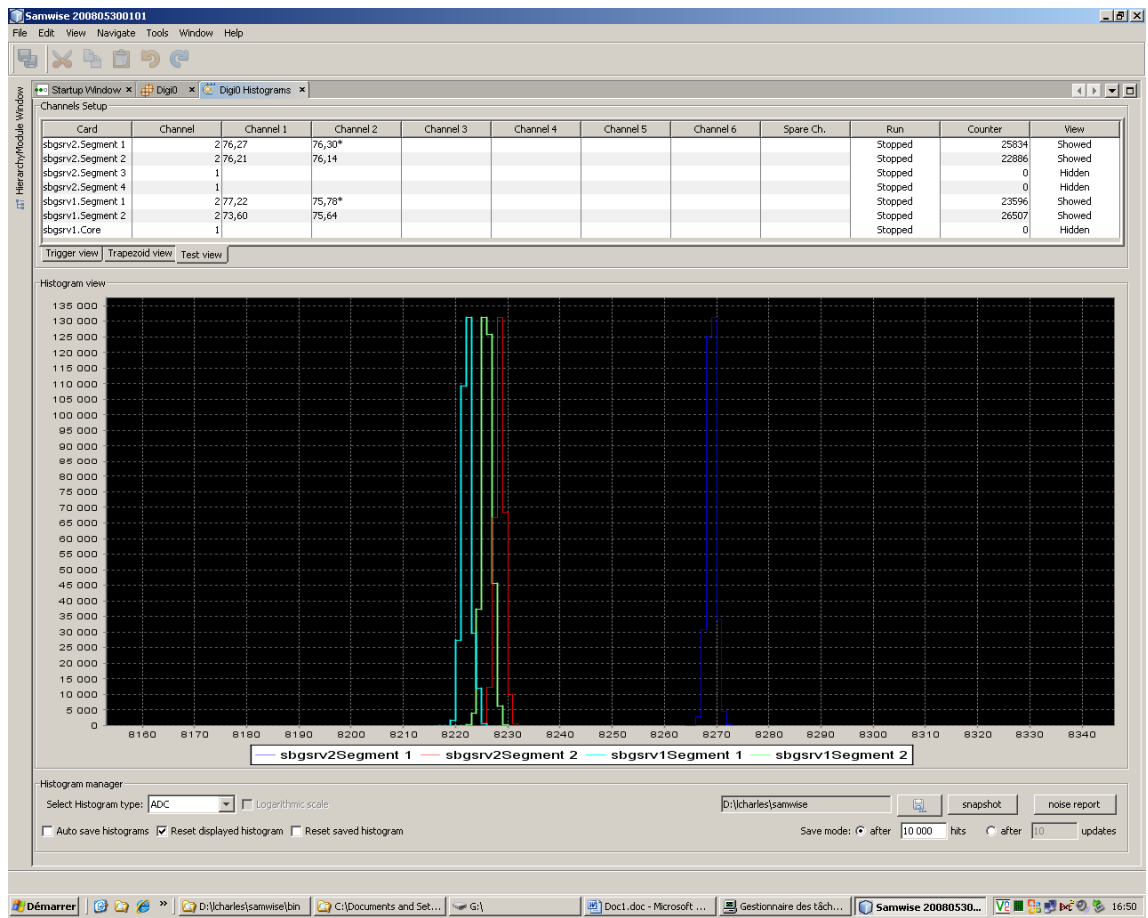
1. Right click on Dig0 and select Show Histogram
2. In the new window, select Test View tab and Select Histogram Type: ADC mode.
3. Short Digitiser inputs to ground.

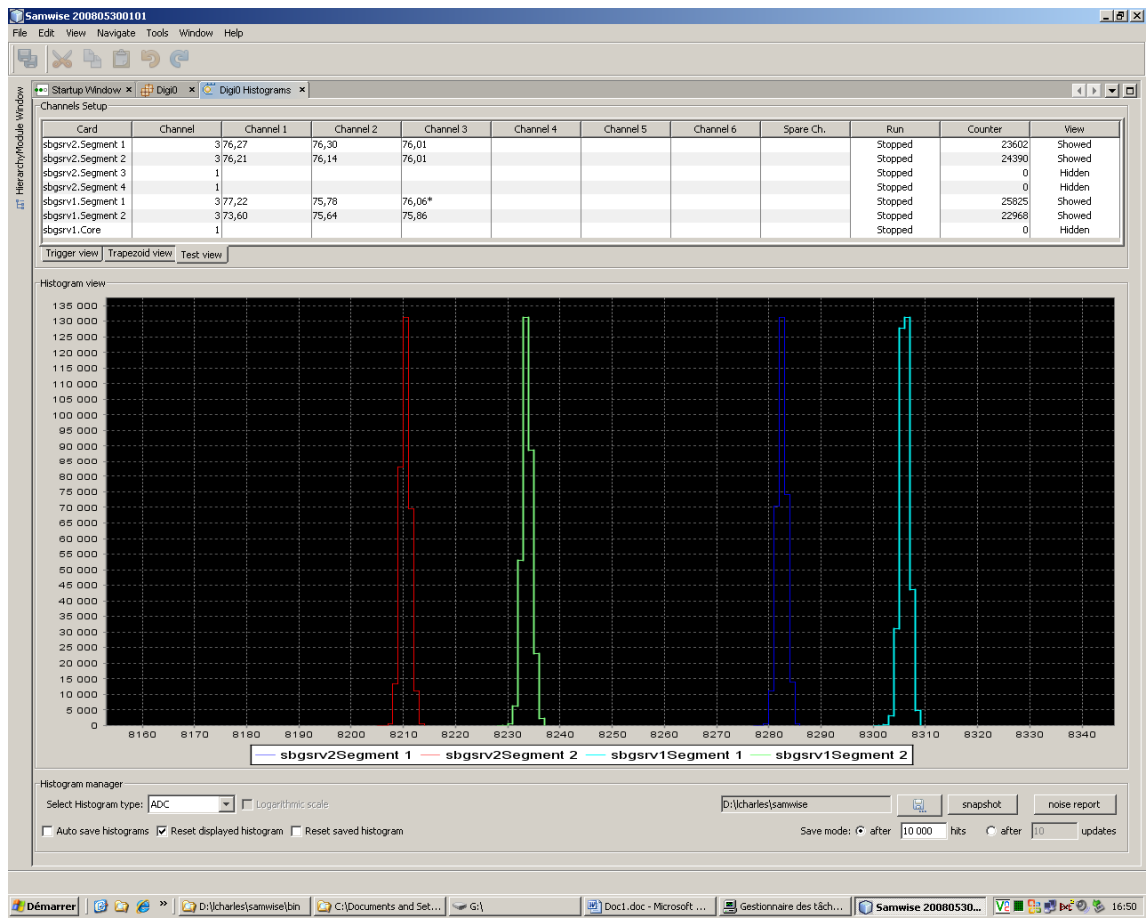


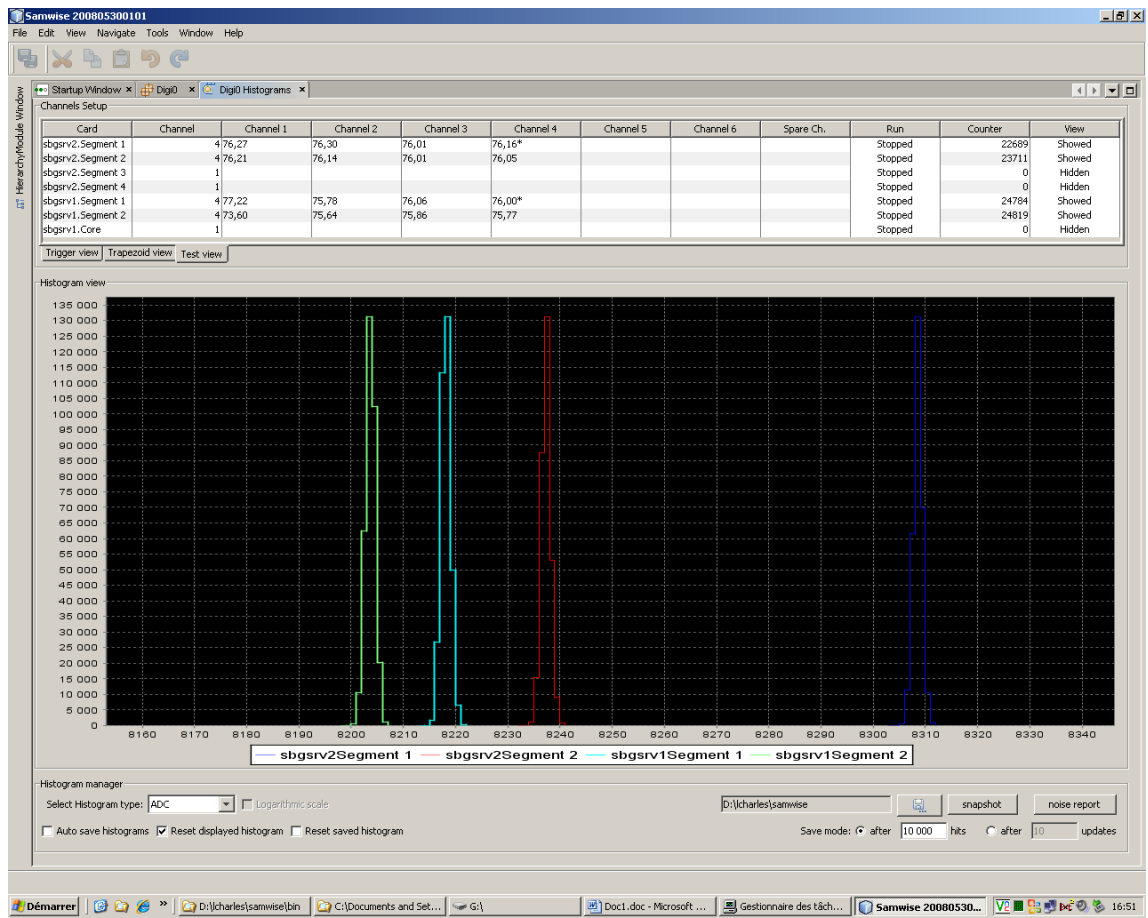
4. To speed up the test collect data from 4 channels at a time (2 from segment and 2 from core)
5. Under "View" column, select "showed" for sbgsrv2.Segment1, sbgsrv2.Segment2, sbgsrv1.Segment1 and sbgsrv1.Segment2 ("hidden" for the rest).

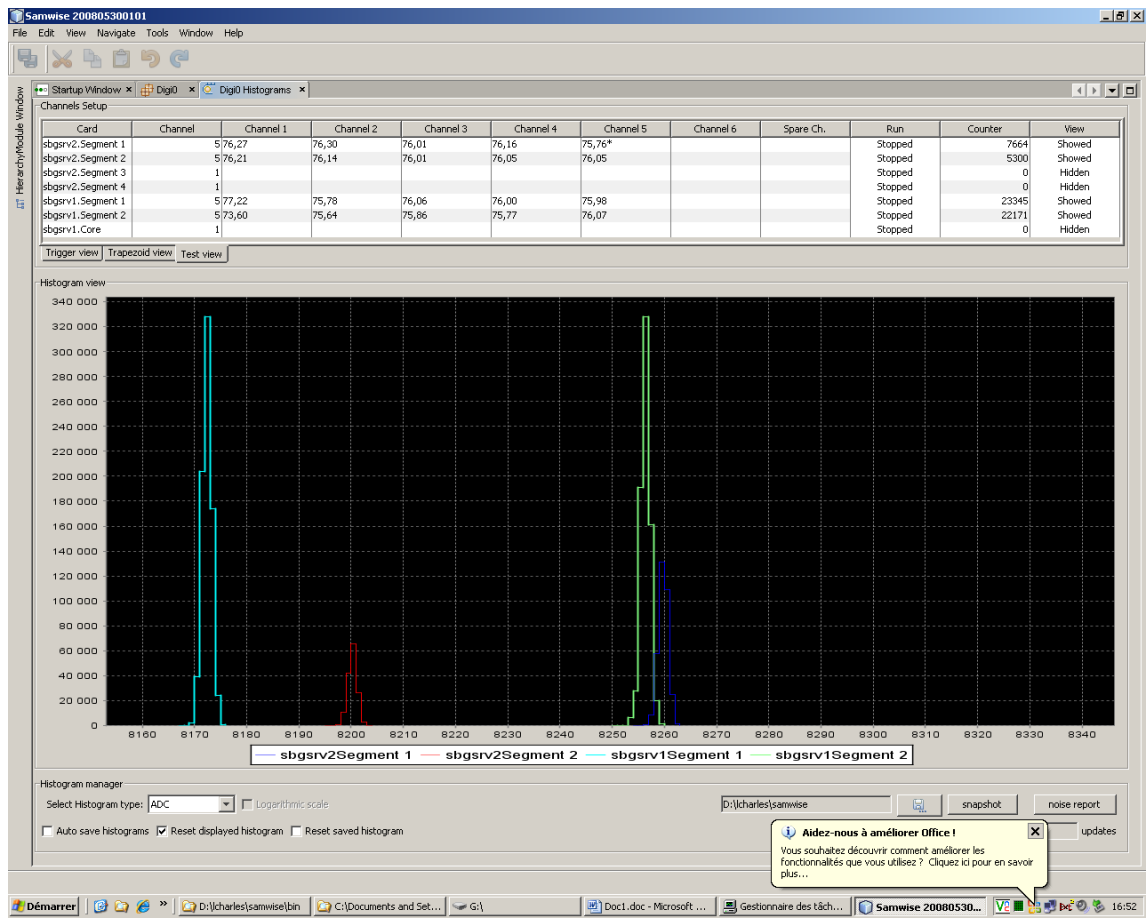
6. Under "Channel" column, select "1" for the above modules.
7. Under "Select Histogram Type", choose "ADC".
8. Under "Run" column, select "running" for the above modules and "stopped" for the rest.
9. Collect 500K-1M samples and then under "Run" column, select "stopped".
10. Verify, visually, that the histograms look Gaussian in shape (zoom in), and that a SNR value is displayed under the corresponding "Channel" column. The "\*" next to the SNR value indicates that samwise is reading data from the digizer. It disappears (not always!), when reading stops.
11. Go back to point 6, each time incrementing the channel No, all 6 channels are complete (see screen shots below).
12. Under "View" column, select "showed" for sbgsrv2.Segment3, sbgsrv2.Segment4, sbgsrv1.Core ("hidden" for the rest).
13. Go back to point 6, each time incrementing the channel No, all 6 channels are complete (see screen shots below).



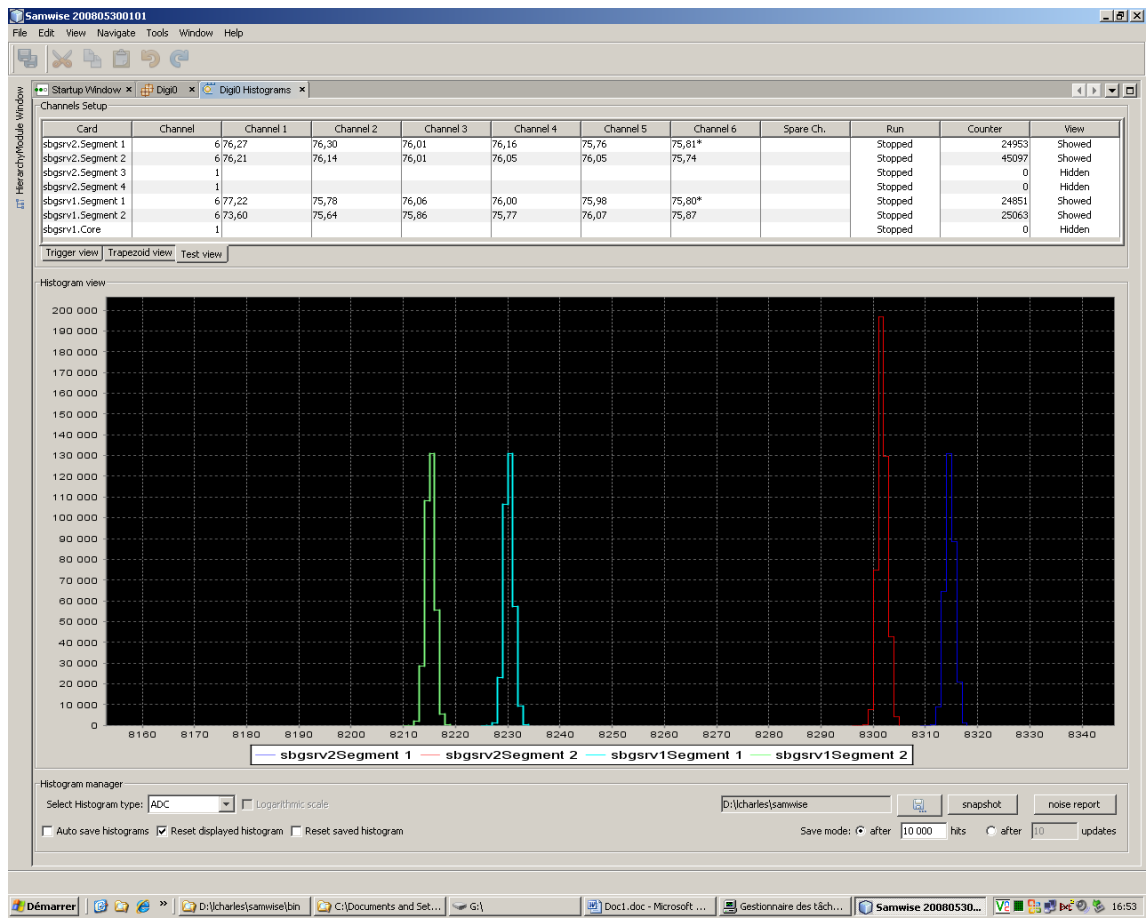


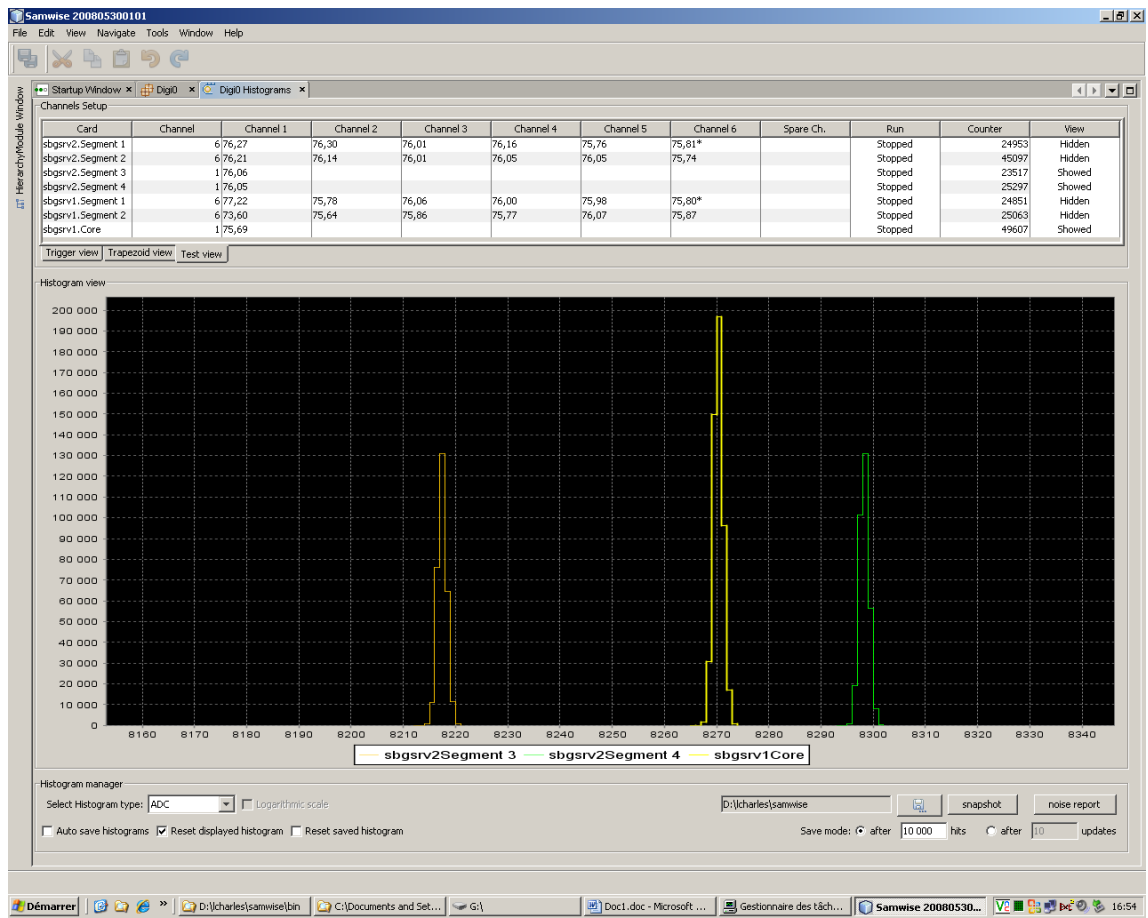


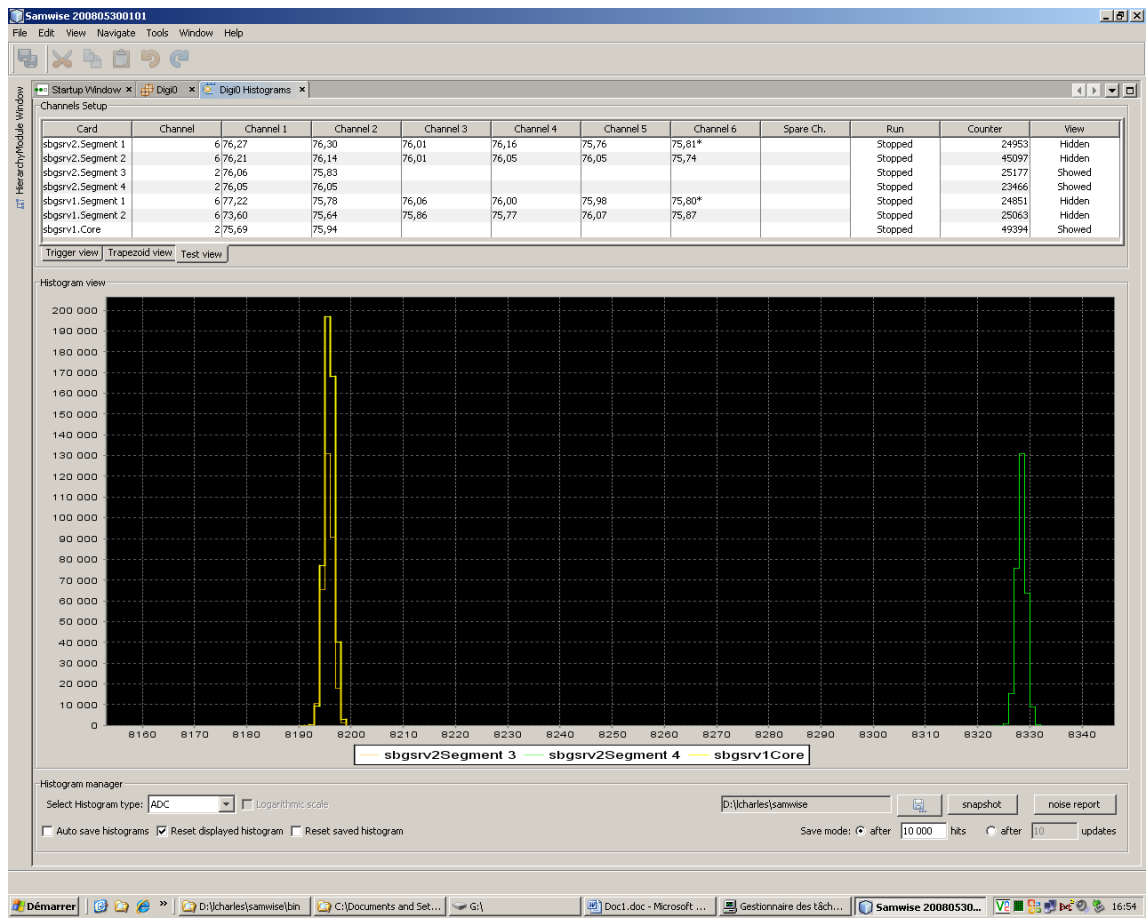


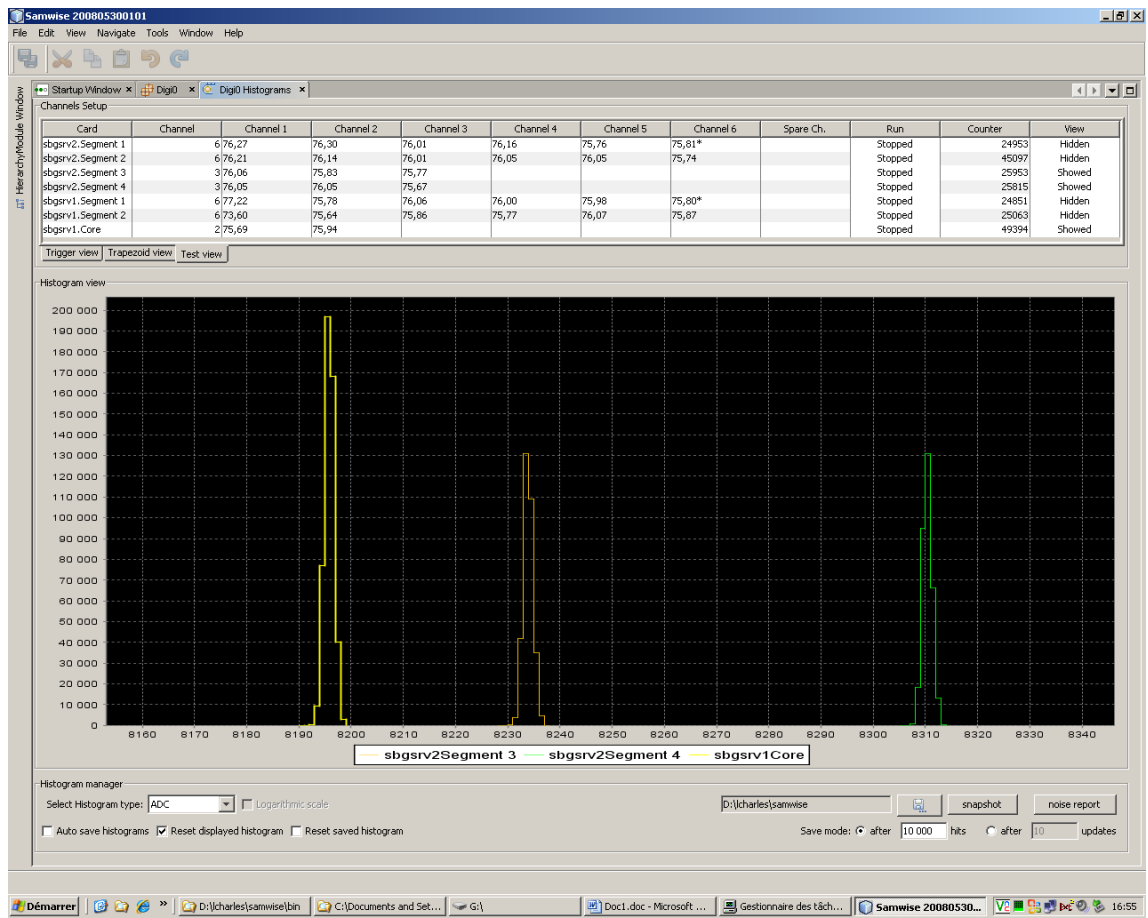


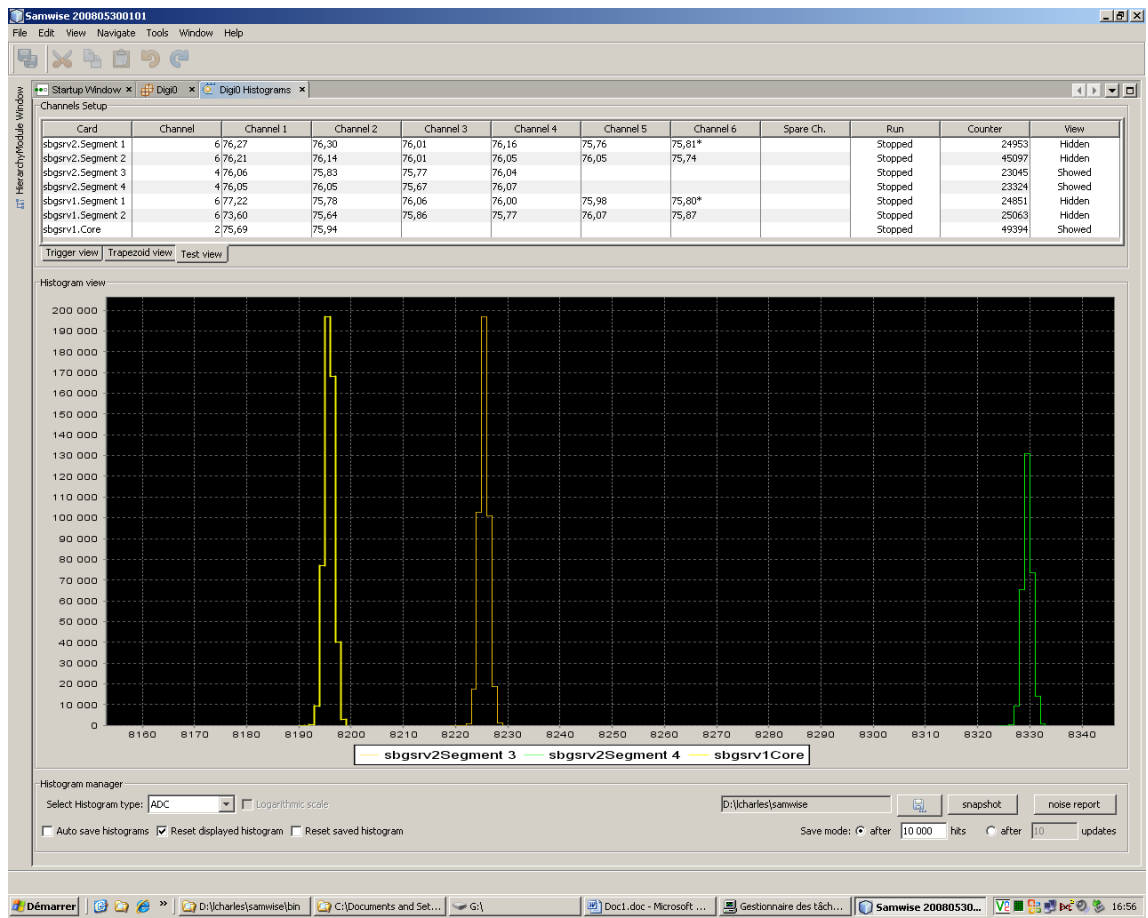


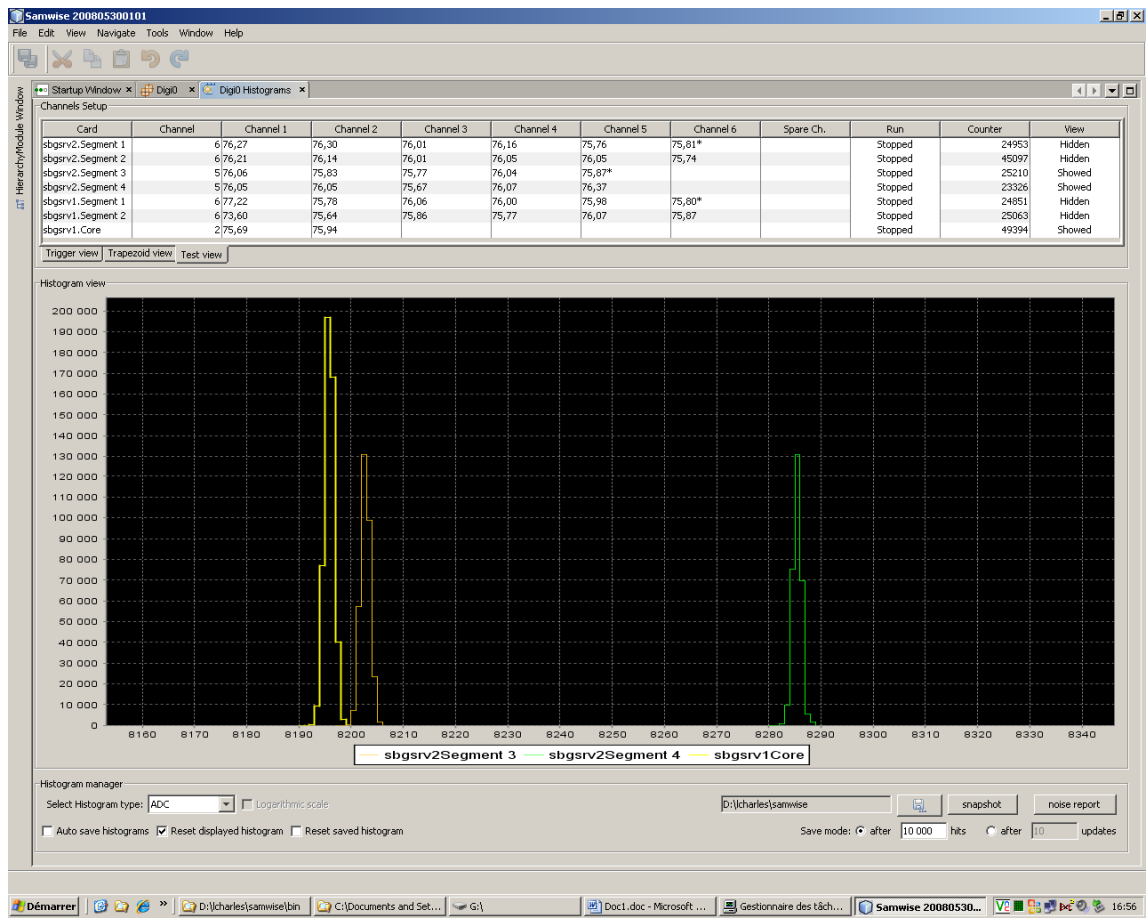












### Spare channel noise measurement

1. In the Dig0 view, select segment Module, segment1, channel 1 choose it to be rooted to the spare channel and send data to card
2. Under "View" column, select ""showed" and in the "Run" column, set "running" for sbgsrv2.Segment1
3. Collect 500K-1M samples and under "Run" column, set "stopped".
4. Go back to Dig0, and select spare channel back to "None".
5. Go back to step 1 and repeat for the rest of the spare channels (total 6)

Samwise 200805300101

File Edit View Navigate Tools Window Help

Startup Window x Digi0 x Digi0 Histograms x

C:\sbgsrv2

T\* monitoring 30s Acquisition Oscillogram Segment 1

Reset FPGA Segment 1 Working directory D:\charles\samwise

Select edited board Segment 1 Segment 2 Segment 3 Segment 4

Save current parameters Load parameters current card only all cards

Channels setup

Channel	ADC Bus	Gain	Offset	Synchro	Readout	Inspection Line	Selection
Spare	On	Regular	0.0°	-	Selected	<input type="checkbox"/> Input	Channel 1
2	On	Regular	0.0°	-	-	<input type="checkbox"/> Analog 1	Channel 1
3	On	Regular	0.0°	-	-	<input type="checkbox"/> Analog 2	Channel 1
4	On	Regular	0.0°	-	-	<input type="checkbox"/> Digital 1	TRIG No Signal
5	On	Regular	0.0°	-	-	<input type="checkbox"/> Digital 2	TRIG No Signal
6	On	Regular	0.0°	-	-		

Ramp  User reset spare channel 1

Trigger setup

Type	Threshold	Differentiation	Integration	Slope	Delay	Gain	Shift	Force Trigger
Simple	0	0	0	-	10	1/2	10	<input type="checkbox"/>

Oscillogram Setup

Data	Total size	Size before Trigger
Raw data	64	32

Energy Computation Setup

Gain	BL corr.	Rise time	Top time	Avg shift	Avg width	PoleZero 1	PoleZero 2	PoleZero 3	X factor	PileupReject
1	0	0	0	0	0	53000	5300	5300	0	yes

Pole Zero mode:  Single pole  Double pole

*Risetime, toptime average shift and length are expressed in ns*

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Samwise 200805300101

File Edit View Navigate Tools Window Help

Startup Window x Digi0 x Digi0 Histograms x

Hierarchy/Module Window

Channels Setup

Card	Channel	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Spare Ch.	Run	Counter	View
sbgsrv2.Segment 1	1,75,00	76,03	76,01	76,16	76,76	76,91	76,08		Stopped	51160	Showed
sbgsrv2.Segment 2	6,76,21	76,14	76,01	76,05	76,05	75,74			Stopped	45097	Hidden
sbgsrv2.Segment 3	6,76,06	75,83	75,77	76,04	75,87	75,45*			Stopped	29294	Hidden
sbgsrv2.Segment 4	6,76,05	76,05	75,67	76,07	76,37	76,45*			Stopped	21318	Hidden
sbgsrv1.Segment 1	6,77,22	75,78	76,06	76,00	75,98	75,80*			Stopped	24851	Hidden
sbgsrv1.Segment 2	6,73,60	75,64	75,86	75,77	76,07	75,87			Stopped	25063	Hidden
sbgsrv1.Core	2,75,69	75,94							Stopped	49394	Hidden

Trigger view Trapezoid view Test view

Histogram view

sbgsrv2Segment 1

Histogram manager

Select Histogram type: ADC  Logarithmic scale

D:\charles\samwise snapshot noise report

Auto save histograms  Reset displayed histogram  Reset saved histogram

Save mode: after 10 000 hits after 10 updates

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File Edit View Navigate Tools Window Help

Startup Window x Digi0 x Digi0 Histograms x

C:\sbgsvr2

T\* monitoring 30s Acquisition Oscillogram Segment 2

Reset FPGA Segment 1 Working directory D:\charles\samwise

Select edited board Segment 1 Segment 2 Segment 3 Segment 4

Save current parameters Load parameters current card only all cards

Channels setup

Channel	ADC Bus	Gain	Offset	Synchro	Readout	Inspection Line	Selection
Spare	On	Regular	0.0°	-	Selected	<input type="checkbox"/> Input	Channel 1
2	On	Regular	0.0°	-	-	<input type="checkbox"/> Analog 1	Channel 1
3	On	Regular	0.0°	-	-	<input type="checkbox"/> Analog 2	Channel 1
4	On	Regular	0.0°	-	-	<input type="checkbox"/> Digital 1	TRIG No Signal
5	On	Regular	0.0°	-	-	<input type="checkbox"/> Digital 2	TRIG No Signal
6	On	Regular	0.0°	-	-		

Ramp  User reset spare channel 1

Trigger setup

Type	Threshold	Differentiation	Integration	Slope	Delay	Gain	Shift	Force Trigger
Simple	0	0	0	-	10	1/2	10	<input type="checkbox"/>

Oscillogram Setup

Data	Total size	Size before Trigger
Raw data	64	32

Energy Computation Setup

Gain	BL corr.	Rise time	Top time	Avg shift	Avg width	PoleZero 1	PoleZero 2	PoleZero 3	X factor	PileupReject
1	0	0	0	0	0	53000	5300	5300	0	yes

Pole Zero mode:  Single pole  Double pole

*Risetime, toptime average shift and length are expressed in ns*

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File Edit View Navigate Tools Window Help

Startup Window x Digi0 x Digi0 Histograms x

Channels Setup

Card	Channel	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Spare Ch.	Run	Counter	View
sbgsrv2.Segment 1	1,76,27	76,30	76,01	76,16	75,76	75,81	75,08		Stopped	51160	Hidden
sbgsrv2.Segment 2	1,75,87	76,14	76,01	76,05	76,05	75,74	75,87		Stopped	54028	Shown
sbgsrv2.Segment 3	6,76,06	75,83	75,77	76,04	75,87	75,45*			Stopped	29294	Hidden
sbgsrv2.Segment 4	6,76,05	76,05	75,67	76,07	76,37	76,45*			Stopped	21318	Hidden
sbgsrv1.Segment 1	6,77,22	75,78	76,06	76,00	75,98	75,80*			Stopped	24851	Hidden
sbgsrv1.Segment 2	6,73,60	75,64	75,86	75,77	76,07	75,87			Stopped	25063	Hidden
sbgsrv1.Core	2,75,69	75,94							Stopped	49394	Hidden

Trigger view Trapezoid view Test view

Histogram view

sbgsrv2Segment 2

Histogram manager

Select Histogram type: ADC  Logarithmic scale

D:\charles\samwise snapshot noise report

Auto save histograms  Reset displayed histogram  Reset saved histogram

Save mode:  after 10 000 hits  after 10 updates

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Samwise 200805300101

File Edit View Navigate Tools Window Help

Startup Window x Digi0 x Digi0 Histograms x

C:\sbgsrv2

T\* monitoring 30s Acquisition Oscillogram Segment 3

Reset FPGA Segment 1 Working directory D:\charles\samwise

Select edited board Segment 1 Segment 2 Segment 3 Segment 4

Save current parameters Load parameters current card only all cards

Channels setup

Channel	ADC Bus	Gain	Offset	Synchro	Readout	Inspection Line	Selection
Spare	On	Regular	0.0°		Selected	<input type="checkbox"/> Input	Channel 1
2	On	Regular	0.0°		-	<input type="checkbox"/> Analog 1	Channel 1
3	On	Regular	0.0°		-	<input type="checkbox"/> Analog 2	Channel 1
4	On	Regular	0.0°		-	<input type="checkbox"/> Digital 1	TRIG No Signal
5	On	Regular	0.0°		-	<input type="checkbox"/> Digital 2	TRIG No Signal
6	On	Regular	0.0°		-		

Ramp  User reset spare channel 1

Trigger setup

Type	Threshold	Differentiation	Integration	Slope	Delay	Gain	Shift	Force Trigger
Simple	0	0	0	-	10	1/2	10	<input type="checkbox"/>

Oscillogram Setup

Data	Total size	Size before Trigger
Raw data	64	32

Energy Computation Setup

Gain	BL corr.	Rise time	Top time	Avg shift	Avg width	PoleZero 1	PoleZero 2	PoleZero 3	X factor	PileupReject
1	0	0	0	0	0	53000	5300	5300	0	yes

Pole Zero mode:  Single pole  Double pole

*Risetime, toptime average shift and length are expressed in ns*

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Samwise 200805300101

File Edit View Navigate Tools Window Help

Startup Window x Digi0 x Digi0 Histograms x

Hierarchy/Module Window

Channels Setup

Card	Channel	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Spare Ch.	Run	Counter	View
sbgsrv2.Segment 1	1,76,27	76,30	76,01	76,16	75,76	75,81	75,08		Stopped	51160	Hidden
sbgsrv2.Segment 2	1,76,21	76,14	76,01	76,05	75,85	75,74	75,87		Stopped	54028	Hidden
sbgsrv2.Segment 3	1,76,24	75,83	75,77	76,04	75,87	75,45	76,24		Stopped	46459	Shown
sbgsrv2.Segment 4	6,76,05	76,05	75,67	76,07	76,37	76,45*			Stopped	21318	Hidden
sbgsrv1.Segment 1	6,77,22	75,78	76,06	76,00	75,98	75,80*			Stopped	24851	Hidden
sbgsrv1.Segment 2	6,73,60	75,64	75,86	75,77	76,07	75,87			Stopped	25063	Hidden
sbgsrv1.Core	2,75,69	75,94							Stopped	49394	Hidden

Trigger view Trapezoid view Test view

Histogram view

sbgsrv2Segment 3

Histogram manager

Select Histogram type: ADC  Logarithmic scale

D:\kcharles\samwise snapshot noise report

Auto save histograms  Reset displayed histogram  Reset saved histogram

Save mode:  after 10 000 hits  after 10 updates

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Samwise 200805300101

File Edit View Navigate Tools Window Help

Startup Window x Digi0 x Digi0 Histograms x

C:\sbgsrv2

T\* monitoring 30s Acquisition Oscillogram Segment 4

Reset FPGA Segment 1 Working directory D:\charles\samwise

Select edited board Segment 1 Segment 2 Segment 3 Segment 4

Save current parameters Load parameters current card only all cards

Channels setup

Channel	ADC Bus	Gain	Offset	Synchro	Readout	Inspection Line	Selection
Spare	On	Regular	0.0°		Selected	<input type="checkbox"/> Input	Channel 1
2	On	Regular	0.0°		-	<input type="checkbox"/> Analog 1	Channel 1
3	On	Regular	0.0°		-	<input type="checkbox"/> Analog 2	Channel 1
4	On	Regular	0.0°		-	<input type="checkbox"/> Digital 1	TRIG No Signal
5	On	Regular	0.0°		-	<input type="checkbox"/> Digital 2	TRIG No Signal
6	On	Regular	0.0°		-		

Ramp  User reset spare channel 1

Trigger setup

Type	Threshold	Differentiation	Integration	Slope	Delay	Gain	Shift	Force Trigger
Simple	0	0	0	-	10	1/2	10	<input type="checkbox"/>

Oscillogram Setup

Data	Total size	Size before Trigger
Raw data	64	32

Energy Computation Setup

Gain	BL corr.	Rise time	Top time	Avg shift	Avg width	PoleZero 1	PoleZero 2	PoleZero 3	X factor	PileupReject
1	0	0	0	0	0	53000	5300	5300	0	yes

Pole Zero mode:  Single pole  Double pole

*Risetime, toptime average shift and length are expressed in ns*

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File Edit View Navigate Tools Window Help

Startup Window x Digi0 x Digi0 Histograms x

Hierarchy/Module Window

Channels Setup

Card	Channel	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Spare Ch.	Run	Counter	View
sbgsrv2.Segment 1	1,76,27	76,30	76,01	76,16	75,76	75,81	75,08		Stopped	51160	Hidden
sbgsrv2.Segment 2	1,76,21	76,14	76,01	76,05	76,05	75,74	75,87		Stopped	54028	Hidden
sbgsrv2.Segment 3	1,76,06	75,83	75,77	76,04	75,87	75,45	76,24		Stopped	46459	Hidden
sbgsrv2.Segment 4	1,75,79	76,05	75,67	76,07	76,37	76,46	75,79		Stopped	51405	Showed
sbgsrv1.Segment 1	6,77,22	75,78	76,06	76,00	75,98	75,80*			Stopped	24851	Hidden
sbgsrv1.Segment 2	6,73,60	75,64	75,86	75,77	76,07	75,87			Stopped	25063	Hidden
sbgsrv1.Core	2,75,69	75,94							Stopped	49394	Hidden

Trigger view Trapezoid view Test view

Histogram view

8320 8321 8322 8324

sbgsrv2Segment 4

Histogram manager

Select Histogram type: ADC  Logarithmic scale

D:\charles\samwise snapshot noise report

Auto save histograms  Reset displayed histogram  Reset saved histogram

Save mode:  after 10 000 hits  after 10 updates

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File Edit View Navigate Tools Window Help

Startup Window x Digi0 x Digi0 Histograms x

sbgsrv1

T\* monitoring 30s Acquisition Oscillogram Segment 1

Reset FPGA Segment 1 Working directory D:\charles\samwise

Select edited board Segment 1 Segment 2 Core

Save current parameters Load parameters current card only all cards

Channels setup

Channel	ADC Bus	Gain	Offset	Synchro	Readout	Inspection Line	Selection
Spare	On	Regular	0.0°	-	Selected	<input type="checkbox"/> Input	Channel 1
2	On	Regular	0.0°	-	-	<input type="checkbox"/> Analog 1	Channel 1
3	On	Regular	0.0°	-	-	<input type="checkbox"/> Analog 2	Channel 1
4	On	Regular	0.0°	-	-	<input type="checkbox"/> Digital 1	TRIG No Signal
5	On	Regular	0.0°	-	-	<input type="checkbox"/> Digital 2	TRIG No Signal
6	On	Regular	0.0°	-	-		

Ramp  User reset spare channel 1

Trigger setup

Type	Threshold	Differentiation	Integration	Slope	Delay	Gain	Shift	Force Trigger
Simple	0	0	0	-	10	1/2	10	<input type="checkbox"/>

Oscillogram Setup

Data	Total size	Size before Trigger
Raw data	64	32

Energy Computation Setup

Gain	BL corr.	Rise time	Top time	Avg shift	Avg width	PoleZero 1	PoleZero 2	PoleZero 3	X factor	PileupReject
1	0	0	0	0	0	53000	5300	5300	0	yes

Pole Zero mode:  Single pole  Double pole

*Risetime, toptime average shift and length are expressed in ns*

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File Edit View Navigate Tools Window Help

Startup Window x Digi0 x Digi0 Histograms x

Hierarchy/Module Window

Channels Setup

Card	Channel	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Spare Ch.	Run	Counter	View
sbgsrv2.Segment 1	1 76,27	76,30	76,01	76,16	75,76	75,81	75,08		Stopped	51160	Hidden
sbgsrv2.Segment 2	1 76,21	76,14	76,01	76,05	76,05	75,74	75,87		Stopped	54028	Hidden
sbgsrv2.Segment 3	1 76,06	75,83	75,77	76,04	75,87	75,45	76,24		Stopped	46459	Hidden
sbgsrv2.Segment 4	1 76,05	76,05	75,67	76,07	76,37	76,46	75,79		Stopped	51405	Hidden
sbgsrv1.Segment 1	1 75,76*	75,78	76,06	76,00	75,98	75,80	75,76		Stopped	47867	Showed
sbgsrv1.Segment 2	6 73,60	75,64	75,86	75,77	76,07	75,87			Stopped	25063	Hidden
sbgsrv1.Core	2 75,69	75,94							Stopped	49394	Hidden

Trigger view Trapezoid view Test view

Histogram view

8243 8244 8245 8246 8247 8248 8249 8250 8251 8252 8253 8254 8255 8256 8257 8258 8259 8260 8261 8262 8263 8264 8265

— sbgsrv1Segment 1

Histogram manager

Select Histogram type: ADC  Logarithmic scale

D:\charles\samwise snapshot noise report

Auto save histograms  Reset displayed histogram  Reset saved histogram

Save mode:  after 10 000 hits  after 10 updates

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Samwise 200805300101

File Edit View Navigate Tools Window Help

Startup Window x Digi0 x Digi0 Histograms x

sbgsrv1

T\* monitoring 30s Acquisition Oscillogram Segment 2

Reset FPGA Segment 1 Working directory D:\charles\samwise

Select edited board Segment 1 Segment 2 Core

Save current parameters Load parameters current card only all cards

Channels setup

Channel	ADC Bus	Gain	Offset	Synchro	Readout	Inspection Line	Selection
Spare	On	Regular	0.0°	-	Selected	<input type="checkbox"/> Input	Channel 1
2	On	Regular	0.0°	-	-	<input type="checkbox"/> Analog 1	Channel 1
3	On	Regular	0.0°	-	-	<input type="checkbox"/> Analog 2	Channel 1
4	On	Regular	0.0°	-	-	<input type="checkbox"/> Digital 1	TRIG No Signal
5	On	Regular	0.0°	-	-	<input type="checkbox"/> Digital 2	TRIG No Signal
6	On	Regular	0.0°	-	-		

Ramp  User reset spare channel 1

Trigger setup

Type	Threshold	Differentiation	Integration	Slope	Delay	Gain	Shift	Force Trigger
Simple	0	0	0	-	10	1/2	10	<input type="checkbox"/>

Oscillogram Setup

Data	Total size	Size before Trigger
Raw data	64	32

Energy Computation Setup

Gain	BL corr.	Rise time	Top time	Avg shift	Avg width	PoleZero 1	PoleZero 2	PoleZero 3	X factor	PileupReject
1	0	0	0	0	0	53000	5300	5300	0	yes

Pole Zero mode:  Single pole  Double pole

*Risetime, toptime average shift and length are expressed in ns*

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Samwise 200805300101

File Edit View Navigate Tools Window Help

Startup Window x Dig0 x Dig0 Histograms x

Hierarchy/Module Window

Channels Setup

Card	Channel	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Spare Ch.	Run	Counter	View
sbgsrv2.Segment 1	1,76,27	76,30	76,01	76,16	75,76	75,01	75,08		Stopped	51160	Hidden
sbgsrv2.Segment 2	1,76,21	76,14	76,01	76,05	76,05	75,74	75,87		Stopped	54028	Hidden
sbgsrv2.Segment 3	1,76,06	75,83	75,77	76,04	75,87	75,45	76,24		Stopped	46459	Hidden
sbgsrv2.Segment 4	1,76,05	76,05	75,67	76,07	76,37	76,45	75,79		Stopped	51405	Hidden
sbgsrv1.Segment 1	1,77,44	75,78	76,06	76,00	75,98	75,80	75,76		Stopped	42030	Hidden
sbgsrv1.Segment 2	1,76,07	75,64	75,86	75,77	76,07	75,87	76,07		Stopped	48870	Showed
sbgsrv1.Core	2,75,69	75,94							Stopped	49394	Hidden

Trigger view Trapezoid view Test view

Histogram view

8194 8198 8198 8200 8202 8204 8206 8208 8210 8212 8214 8216 8218 8220 8222 8224 8226 8228 8230 8232 8234 8236 8238

— sbgsrv1Segment 2

Histogram manager

Select Histogram type: ADC  Logarithmic scale

D:\charles\samwise snapshot noise report

Auto save histograms  Reset displayed histogram  Reset saved histogram

Save mode:  after 10 000 hits  after 10 updates

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1. When measurements for all the channels are made then in dig0Histogram view, select your folder location and then click on “noise report”, to save a detailed report of the measurements. An example is shown below:

sbgsrv1          15-11-2011\_17-05

Segment 1

Channel	Mean	Sigma	ENOB	SNR		Samples
1	8189,12		0,78	12,57	77,44	278829
2	8221,63		0,94	12,30	75,78	311639
3	8305,57		0,91	12,34	76,06	341720
4	8217,67		0,92	12,33	76,00	329254
5	8171,92		0,92	12,33	75,98	771652
6	8229,76		0,94	12,30	75,80	328874
7	8250,70		0,94	12,29	75,76	496055

Segment 2

Channel	Mean	Sigma	ENOB	SNR		Samples
1	8185,54		1,21	11,93	73,60	368006
2	8225,54		0,96	12,27	75,64	350533
3	8233,25		0,93	12,31	75,86	304434
4	8203,19		0,94	12,29	75,77	328153

5	8255,91	0,91	12,34	76,07	735301
6	8214,68	0,93	12,31	75,87	330887
7	8211,52	0,91	12,34	76,07	652890

Core

Channel	Mean	Sigma	ENOB	SNR	Samples
1	8269,83	0,95	12,28	75,69	492949
2	8195,33	0,92	12,32	75,94	494651

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Segment 1

Channel	Mean	Sigma	ENOB	SNR	Samples
1	8308,11	0,89	12,38	76,27	426959
2	8268,54	0,89	12,38	76,30	328204
3	8282,03	0,92	12,33	76,01	301578
4	8308,02	0,90	12,36	76,16	285796
5	8259,27	0,94	12,29	75,76	333522
6	8314,16	0,94	12,30	75,81	315200
7	8279,63	1,02	12,18	75,08	810892

Segment 2

Channel	Mean	Sigma	ENOB	SNR		Samples
1	8252,12		0,90	12,37	76,21	427801
2	8227,99		0,90	12,36	76,14	289540
3	8209,94		0,92	12,33	76,01	309281
4	8236,84		0,91	12,34	76,05	297954
5	8199,77		0,91	12,34	76,05	148285
6	8301,30		0,95	12,29	75,74	456447
7	8278,57		0,93	12,31	75,87	340374

### Segment 3

Channel	Mean	Sigma	ENOB	SNR		Samples
1	8216,97		0,91	12,34	76,06	295808
2	8195,13		0,94	12,30	75,83	316791
3	8233,44		0,94	12,29	75,77	326022
4	8225,01		0,91	12,34	76,04	438033
5	8202,25		0,93	12,31	75,87	319529
6	8151,49		0,98	12,24	75,45	369855
7	8212,86		0,89	12,37	76,24	876373

### Segment 4

Channel	Mean	Sigma	ENOB	SNR		Samples
1	8297,78		0,91	12,34	76,05	317522
2	8327,91		0,91	12,34	76,05	296225
3	8309,87		0,95	12,28	75,67	325237
4	8329,07		0,91	12,34	76,07	295075
5	8284,96		0,88	12,39	76,37	293441
6	8304,10		0,87	12,41	76,45	269124
7	8319,58		0,94	12,30	75,79	994468

Note:

The above measurements