

ATD EPICS Interface

ATD: Analog Threshold Detect
Live Scope with up to NCHAN triggers.

Default personality NCHAN=64
(2xACQ423ELF-32-200)

NCHAN can be 4..192,
Supported on ACQ42x, ACQ53x ACQ465

Definition: **4GUG**: #13.3

EPICS PV's

1.0	\${UUT}:\${S}:ANATRG:\${CC}:M	enum	Mode. none rising falling inside outside	Prms For One Channel set immediate
1.1	\${UUT}:\${S}:ANATRG:\${CC}:H	enum	Hysterisis % 1 2 5 10 20	
1.2	\${UUT}:\${S}:ANATRG:\${CC}:L1	double	Level 1 V	
1.3	\${UUT}:\${S}:ANATRG:\${CC}:L2	double	Level 2 V	
2.0	\${UUT}:\${S}:ANATRG:ALL:M H/L1/L2	enum/ double	Parameters as above	Prms For ALL CH Commit with SET
2.1	\${UUT}:\${S}:ANATRG:ALL:SET	bo	SET all channels to ALL:M H/L1/L2	
3	\${UUT}:\${S}:ANATRG:LIVE:\${CC}	bi	Live State monitor	
4.0	\${UUT}:\${S}:ANATRG:GROUP:\${CC}	bo	Channel \${CC} is part of GROUP	
4.1	\${UUT}:\${S}:ANATRG:GROUP:ALL:SET	bo	Set all channels in Group	
4.2	\${UUT}:\${S}:ANATRG:GROUP:ALL:CLR	bo	Clear all channels from Group	
4.3	\${UUT}:\${S}:ANATRG:GROUP_MODE	enum	CURRENT (active same time) HISTORY (active in period)	
4.4	\${UUT}:\${S}:ANATRG:GROUP:FIRST_N	int	Trigger on first N channels in group.	
5	\${UUT}:\${S}:ANATRG:SCALE	enum	1,2,4,8 : 1:level is -127..+127 <<8, <<7, <<6, <<5 le as scale rises, level is closer to zero and more precise.	
6	\${UUT}:\${S}:ANATRG:RESET	bo	Reset all logic.	
\${UUT} : UUT NAME, \${S} : Site 1..6 \${CC} Channel 01..192				

Event Source Selection

ACQ400_LAUNCHER.opi capture.opi acq400sync.opi acq1102_00

acq1102_009 SYNC SYNC_ROLE master 200000

EXT SYNC BUS [HDMI]

CLK TRG SYNC GPIO

Main Timing Highway Source Routing

	d0	d1
CLK	EXT	MCLK
TRG	EXT	STRIG
SYNC	EXT	EXT

MISync Out Sel

	CLK	d1
CLK	CLK	d1
TRG	TRG	d2
SYNC	SYNC	d2
GPIO		d0

EXT SYNC BUS OUT [HDMI]

CABLE PRESENT

CLK TRG SYNC GPIO DRVEN

Event Bus Source

	d0	d1	d2	d3	d4	d5	d6	d7
	MOD	TRG	TRG	TRG	TRG	TRG	TRG	TRG

From Panel

`#{UUT}:0:SIG:EVENT_SRC:0`
EVT.d0 SRC set MOD (ATD DSP)

`#{UUT}:0:SIG:EVENT_SRC:1`
EVT.d1 SRC set TRG

`#{UUT}:0:SIG:SRC:TRG:1 STRIG`
TRG.d1 SRC set STRIG
(soft-trigger). The ATD Interrupt Routine sets
soft-trigger to drive the system

Controls

anatrgr.opi 100%

acq1102_009:2 Analog Trigger Configuration

CH	Mode	Hysteresis %	Level 1 V	Level 2 V	TRG	Group
01	rising	1	1	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
02	rising	1	2	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
03	rising	1	3	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
04	rising	1	4	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
05	none	1	0	0	<input type="checkbox"/>	<input type="checkbox"/>
06	none	1	0	0	<input type="checkbox"/>	<input type="checkbox"/>
07	none	1	0	0	<input type="checkbox"/>	<input type="checkbox"/>
08	none	1	0	0	<input type="checkbox"/>	<input type="checkbox"/>

CH01-08 CH09-16 CH17-24 CH25-32 Status

ALL none 1 0 0 Group SET Group CLR

Group Mode CURRENT First_N 0 RESET Scale 1

CURRENT|HISTORY FIRST_N

Set M, H, L1, L2 for one channel (Immediate)
 $\${UUT}:\${S}:ANATRGR:\${CC}:M/H/L1/L2$

Select Channel in Group

Status

Set Parameters, then press ALL to set ALL CC

Include Group ALL

Exclude Group ALL

Standard (Direct DSP) Triggers

Live pre-post, lazy update ~1Hz.

343688 Updates so far.

RAPID Post-only update, 50Hz possible.

We set our FG for a BURST mode Sine output, 10Hz repetition rate.

4 triggers enabled and active (all channels same signal), so it will simply trigger on the first detection.

\$(UUT):1:EVENT0:DX = d0
Trigger on EVT.d0 (DSP Direct)

EVT.d1 : no events.

Trigger on EVT.d0: ATD trigger at 10Hz (we have FG with a 10Hz burst set up).

Group Trigger

The screenshot displays the CS-Studio interface. At the top, a menu bar includes File, Edit, Search, CS-Studio, Window, and Help. Below it, a toolbar contains various icons for file operations and acquisition control. The main window is divided into several panes:

- Control Panel (Top Left):** Titled "Capture acq1102_009 Stream Control". It shows a "STOP" button with a timer at 3.35 GiB 0:02:27 [24.4 MiB/s]. A "RUN" button is highlighted in green. Below this, a "sample_cou" field shows 51299429711 and 199774 Hz. A table displays "cope Mod", "RunTime", "Samples", "Rate", and "Live Wf Rate".
- Waveform Plot (Top Right):** A graph showing "Volts" on the y-axis (ranging from -9.99 to 9.99) and "Samples" on the x-axis (ranging from 0 to 3999). A red waveform shows a pulse between samples 2200 and 3000.
- Trigger Configuration (Bottom):** Two panels for "acq1102_009:1 Analog Trigger Configuration" and "acq1102_009:2 Analog Trigger Configuration". Each panel has a table with columns for "CH", "Mode", "Hysterisis %", "Level 1 V", "Level 2 V", "TRG", and "Group". In the second panel, channels 02, 03, 04, and 08 have their "TRG" checkboxes checked.
- Event Configuration (Middle Left):** A table for "EVENT0" and "EVENT1" with fields for "ena...", "d1", "rising", "falling", "find Event ID", "stack", and "RTM_TRANLEN".

Live pre-post, lazy update ~1Hz.

4 triggers enabled and active in the group. Trigger when ALL SET.

`#{UUT}:1:EVENT0:DX = d1`
Trigger on EVT.d1 (SW Interrupt)

EVT.d1 : 10Hz

Group Trigger 2

CS-Studio

File Edit Search CS-Studio Window Help

ACQ400_LAUNCHER.opi capture.opi acq400sync.opi acq1102_009:LIVE acq1102clktree.opi acq1102_009:LIVE acq1102_009:LIVE

100%

Transient Stream BLT Stats DataFlow Slowmon Multi-Event Sync Role HUDP A B D

Capture acq1102_009 Stream Control

STOP 3.64GiB 0:02:39 [24.4MiB/s]

34 RUN

sample_cou 51301627228 199775 Hz

cope Mod	RunTime	Samples	Rate MB/s	Live Wf Rate
pre-post	153	30670848	26	0.000 Hz

aggregator Site 1.2 1 1 Sample Size 128

TRG	ena...	d1	rising	LECT SOFT TR	ULSE SOFT TRG
EVENT0	ena...	d1	rising	find Event 0	IDLE 0 0
EVENT1	disa...	d0	falling	stack 480	none
RGM	OFF	d0	falling	RTM_TRANSLN	0 0 IDLE

9.99

0 200 600 1000 1400 1800 2200 2600 3000 3400 3900

Volts

Samples

Leade Typ SHORT 343271 acq1102_009:2 CH01:08 caldef Mask PAUSE

4 triggers enabled and active.
5 triggers in the group.
Trigger when ALL SET.

acq1102ctr.opi acq1102_009 .atch On PP!

CH	Mode	Hysterisis %	Level 1 V	Level 2 V	TRG	Group
01	rising	1	0	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
02	rising	1	0	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
03	rising	1	0	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
04	rising	1	0	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
05	none	1	0	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
06	none	1	0	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
07	none	1	0	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
08	none	1	0	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ALL	none	1	0	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Group Mode CURRENT First_N 0 RESET Scale 1

acq1102_009

CH	Mode	Hysterisis %	Level 1 V	Level 2 V	TRG	Group
01	rising	1	0	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
02	rising	1	0	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
03	rising	1	0	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
04	rising	1	0	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
05	none	1	0	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
06	none	1	0	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
07	none	1	0	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
08	none	1	0	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ALL	none	1	0	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Group Mode CURRENT First_N 0 RESET Scale 1

EVT.d1 : 0Hz : One Group Trigger isn't happening

Group Trigger 3

CS-Studio

File Edit Search CS-Studio Window Help

acq1102_009:LIVE

acq1102_009:LIVE

acq1102_009:LIVE

Live pre-post, lazy update ~1Hz.

3.88GiB 0:02:49 [24.4MiB/s]

34 RUN

sample_cou 51303624968 199774 Hz

cope Mod RunTime Samples Rate MB/s Live Wf Rate

pre-post 163 32620544 26 1.000 Hz

aggregator Site: 1.2 1 1 Sample Size 128

TRG ena... d1 rising SELECT SOFT_TR ULSE SOFT_TR

EVENT0 ena... d1 rising find Event 0 IDLE 0 0

EVENT1 disa... d0 falling Stack 480 none

RGM OFF d0 falling RTM_TRANSLN 0 0 IDLE

Volts

0 200 600 1000 1400 1800 2200 2600 3000 3400 3999

Samples

acq1102ctr.opi

acq1102_009

atch On PP!

0.000 Hz	1.998E5 H	1.998E5 H	0.000 Hz
0	5E10	5E10	0
EXT C	MB C	S1 C	S2 C
10.000 Hz	10.000 Hz	10.000 Hz	0.000 Hz
2E6	2E6	2E6	0
EXT C	MB C	S1 C	S2 C
10.000 Hz	10.000 Hz	10.000 Hz	0.000 Hz
2E6	2E6	2E6	0
EXT C	MB C	S1 C	S2 C
0.000 Hz	0.000 Hz	0.000 Hz	0.000 Hz
0	0	34	0
EXT C	MB C	S1 C	S2 C

acq1102_009:1 Analog Trigger Configuration

CH	Mode	Hysteresis %	Level 1 V	Level 2 V	TRG	Group
01	none	1	0	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
02	none	1	0	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
03	none	1	0	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
04	none	1	0	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
05	none	1	0	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
06	none	1	0	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
07	none	1	0	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
08	none	1	0	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ALL	none	1	0	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Group Mode CURRENT First_N 4 RESET Scale 1

acq1102_009:2 Analog Trigger Configuration

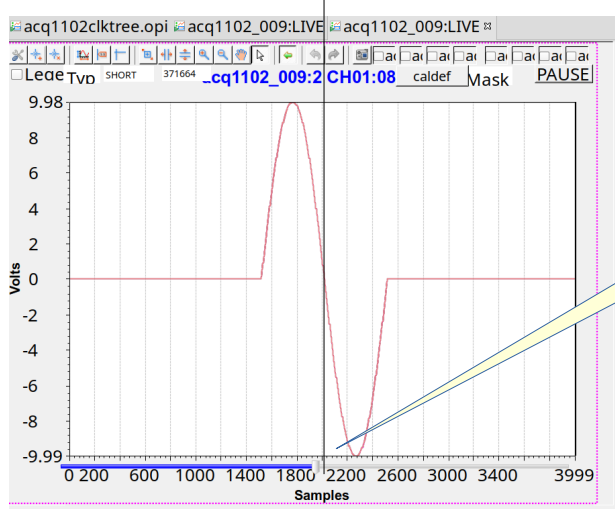
CH	Mode	Hysteresis %	Level 1 V	Level 2 V	TRG	Group
01	rising	1	0	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
02	rising	1	0	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
03	rising	1	0	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
04	rising	1	0	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
05	none	1	0	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
06	none	1	0	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
07	none	1	0	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
08	none	1	0	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ALL	none	1	0	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Group Mode CURRENT First_N 4 RESET Scale 1

EVT.d1 : 10Hz : restored

Set FIRST_N to 4: we have 4 live triggers in the set, so the system triggers.

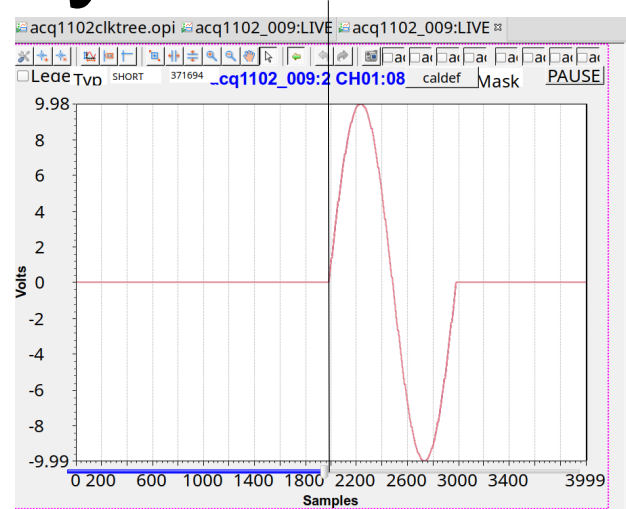
Live Delay Control



PRE=POST

falling

falling



anatrgr.opi

acq1102_009:2 Analog Trigger Configuration

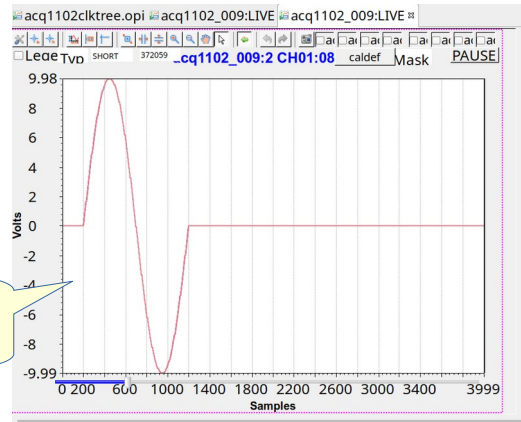
CH	Mode	Hysteresis %	Level 1 V	Level 2 V	TRG	Group
01	falling	1	1	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

anatrgr.opi

acq1102_009:2 Analog Trigger Configuration

CH	Mode	Hysteresis %	Level 1 V	Level 2 V	TRG	Group
01	rising	1	1	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

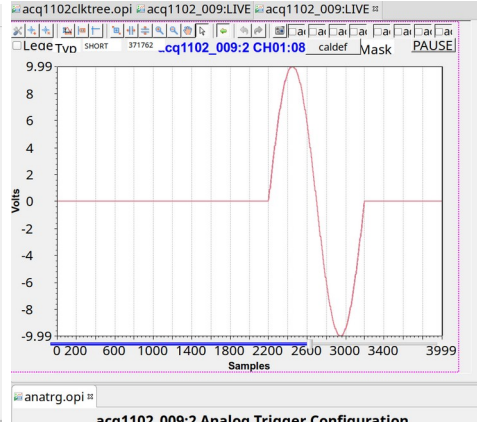
Live Delay adjust: 0..100%
 \${UUT}:LIVE:PREPCT



anatrgr.opi

acq1102_009:2 Analog Trigger Configuration

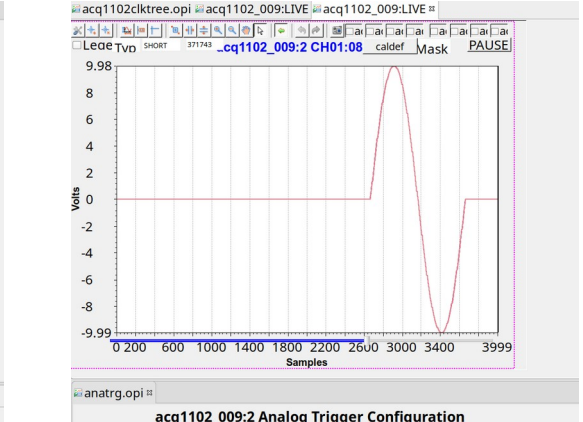
CH	Mode	Hysteresis %	Level 1 V	Level 2 V	TRG	Group
01	falling	1	1	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>



anatrgr.opi

acq1102_009:2 Analog Trigger Configuration

CH	Mode	Hysteresis %	Level 1 V	Level 2 V	TRG	Group
01	falling	1	1	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>



anatrgr.opi

acq1102_009:2 Analog Trigger Configuration

CH	Mode	Hysteresis %	Level 1 V	Level 2 V	TRG	Group
01	rising	1	1	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>