SoundWire

Protocol Analyzer
Traffic Generator

swimmy
Release notes
V1.42

LnK Tools
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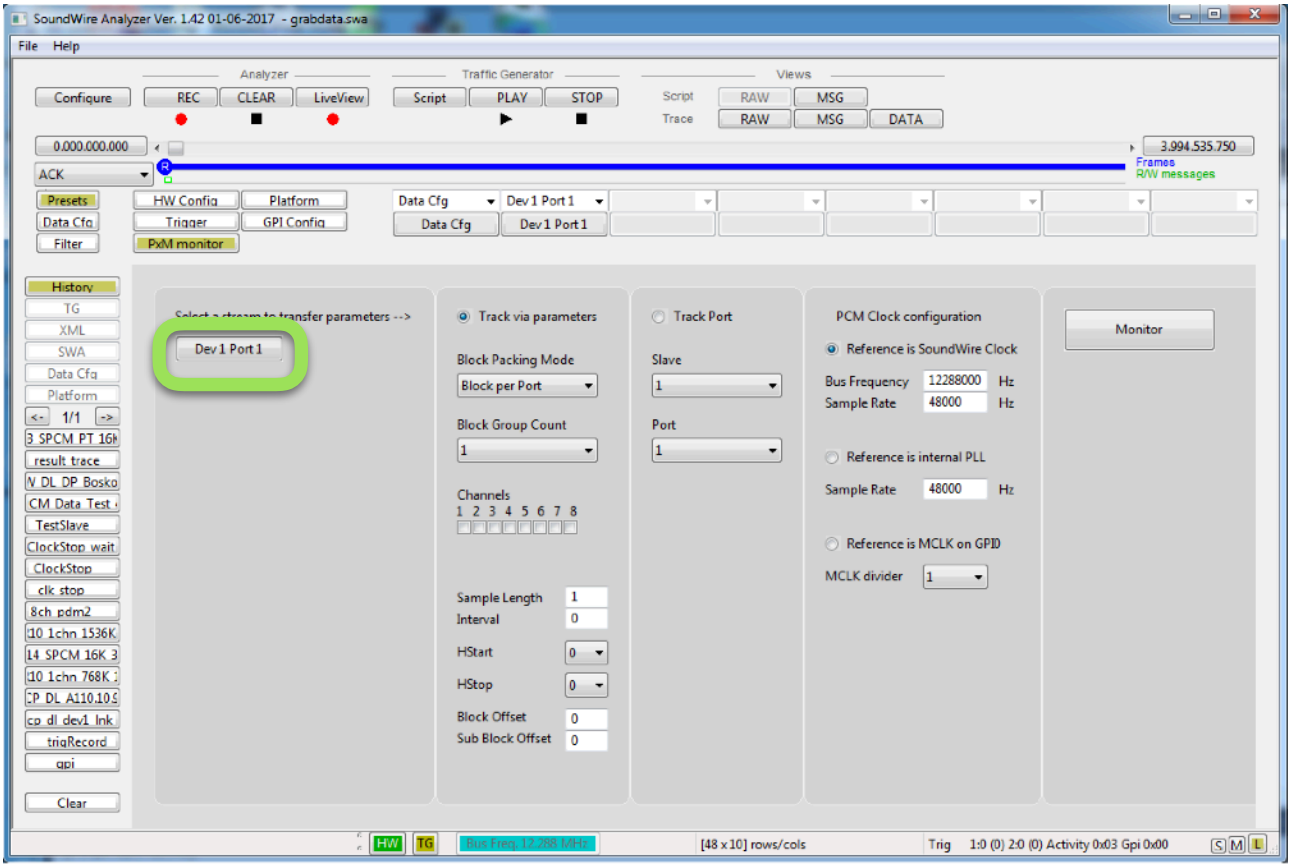
release notes
7 June 2017

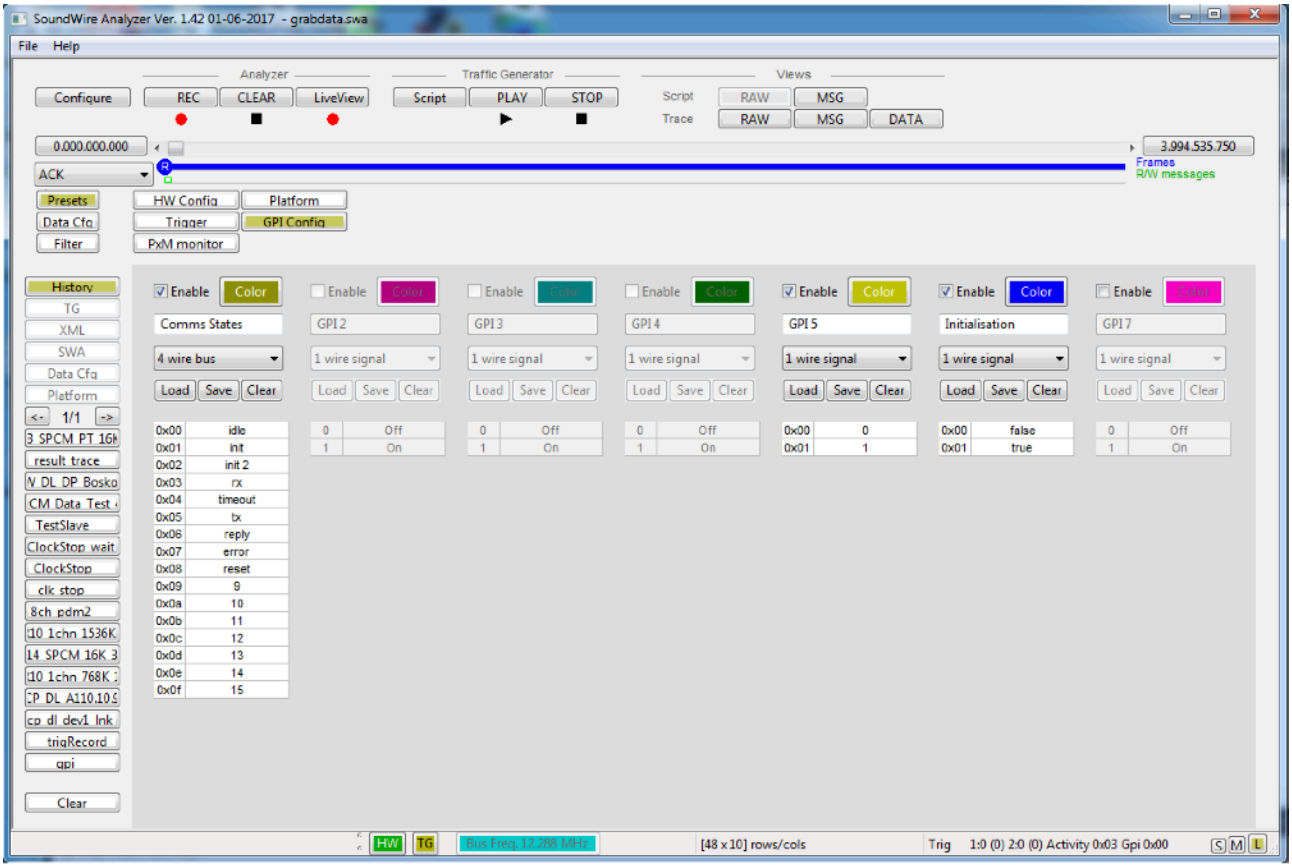
New items (1.42)

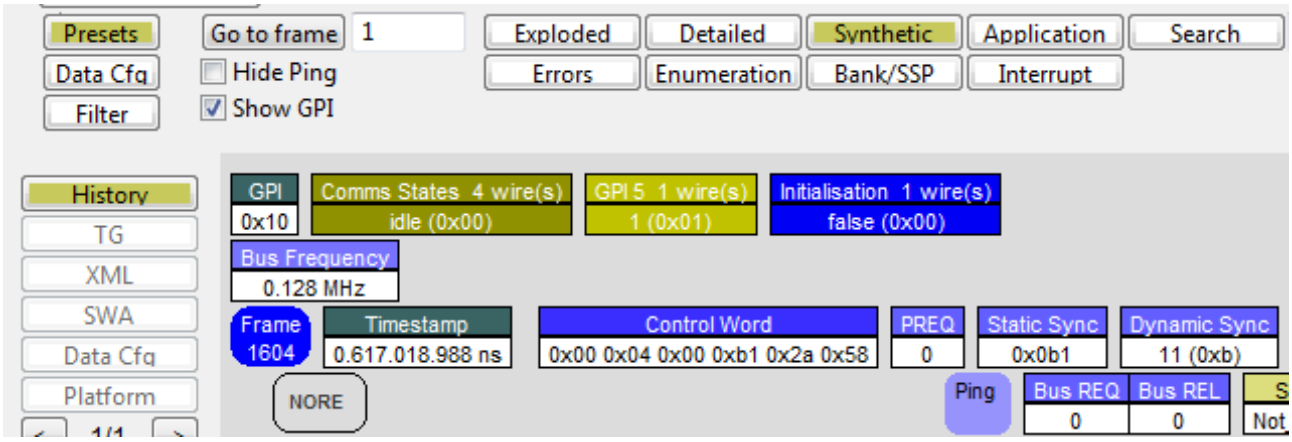
- Implemented clock stop (clock and data line low + restart from external device or bit set by Swimmy), init gear divider at start of TG.

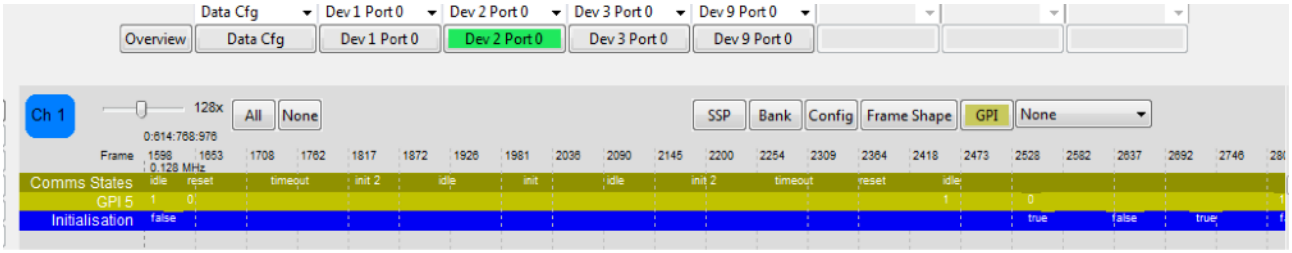
- Implemented PDM and PCM monitoring.
  Detected valid streams will be shown so they can be used directly. No need to know all the data port parameters.



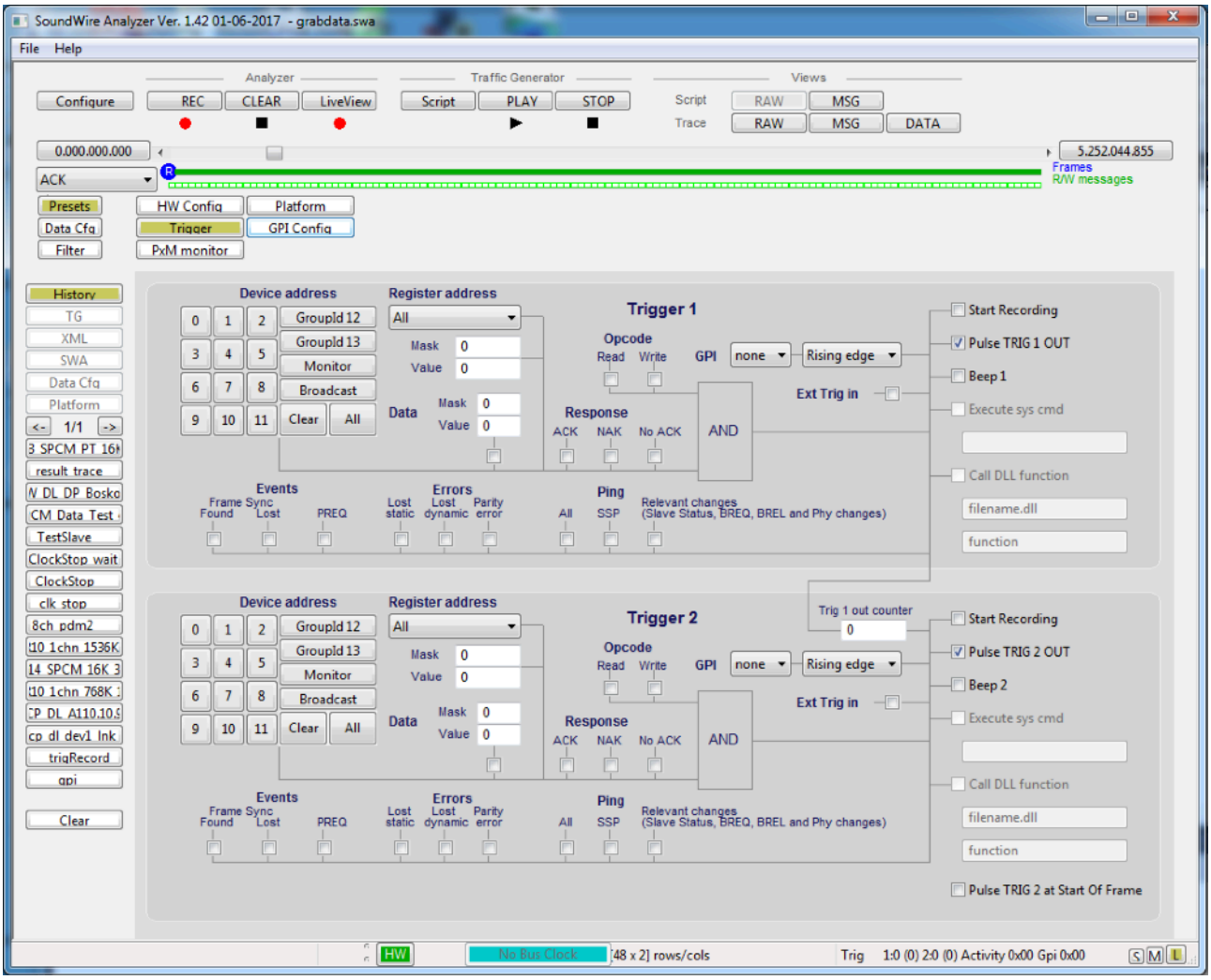
- Implemented GPI labels and busses via config. Preset files can be saved and loaded.



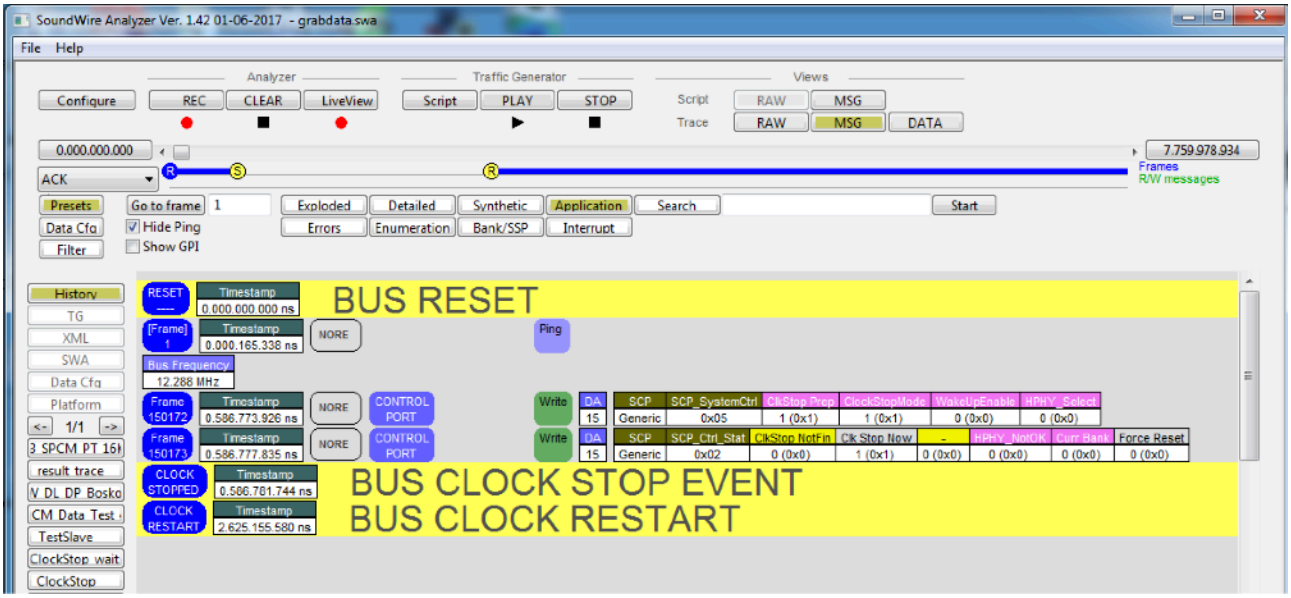




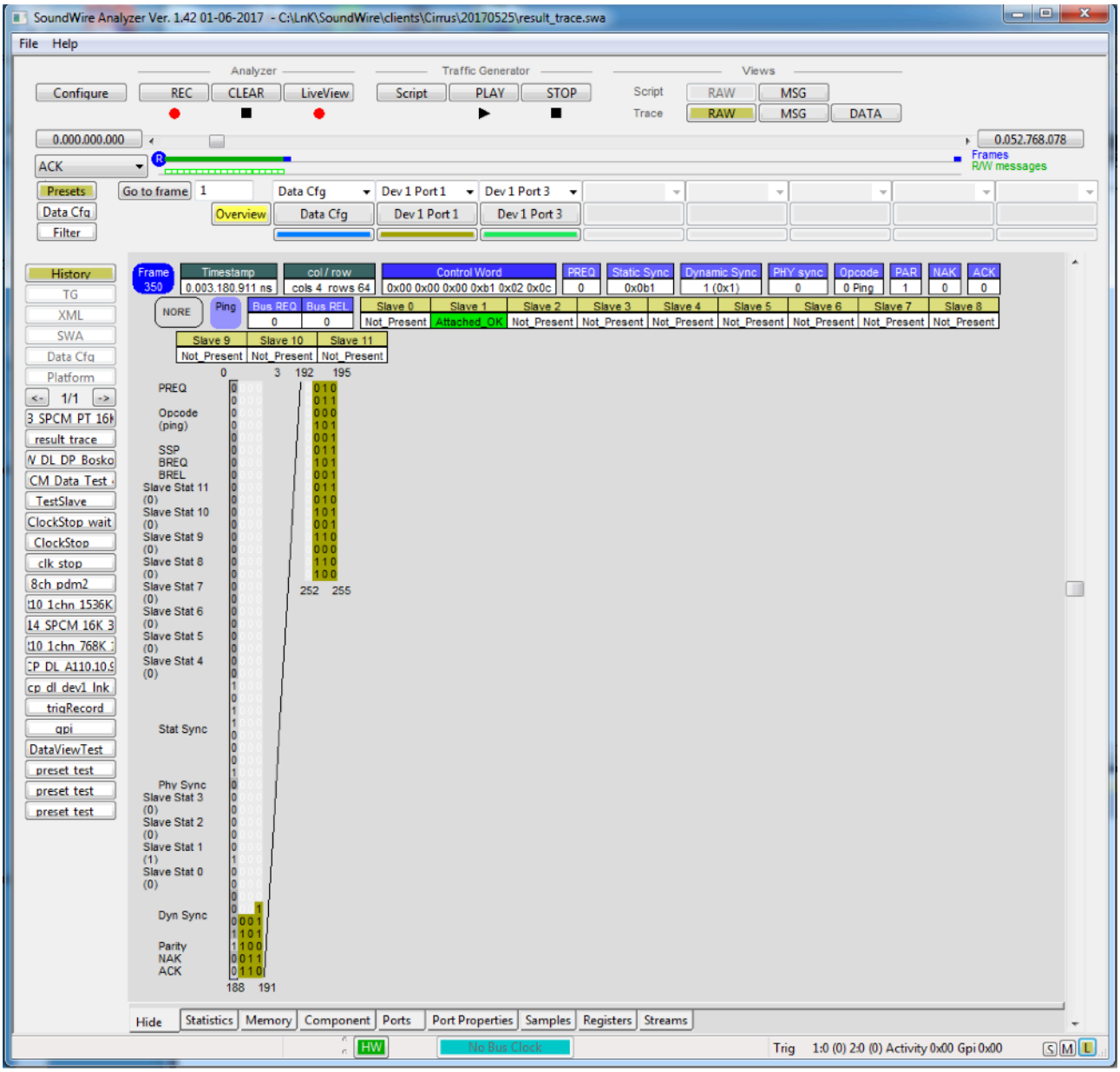
- Implemented trigger functions.



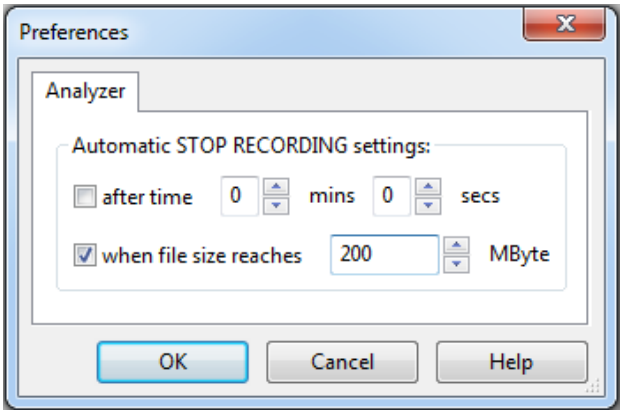
- View have now a Stopping frame and Bus Restart.

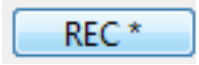


- RAW view has now a clearer view on the used bit slot in the payload.

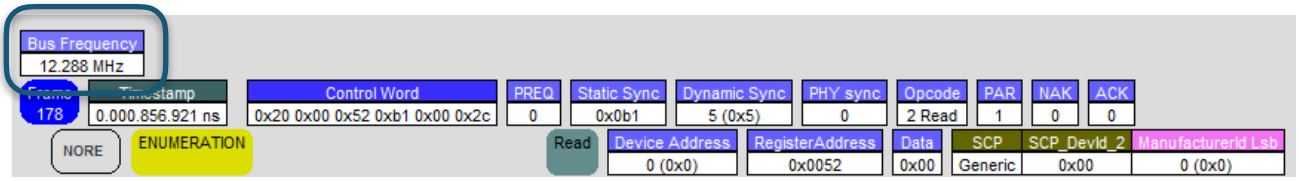


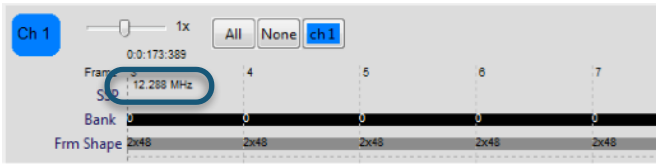
- HiDPI update.
- Stop recording at max size to avoid too big bin file.
- Added configurable size or configurable period recording.
  When a recording size or recording period is defined, the REC button will get an '*'



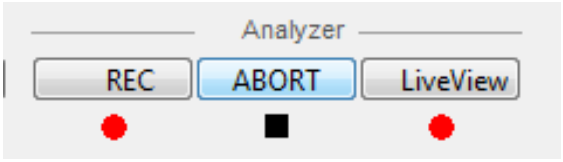


- Changed the filter for LiveView (is not displaying useless Pings)
- Added frequency information the views





- Added possibility to abort loading and decoding.



Solved bugs:

- Once PxM monitoring was enabled the SYS_TEST_REG is not reset again when no PxM is used
- Clear data port registers after a BUS_RESET.
- Solved bug that had the TG button on for always even if the TG had finished.
- Data view: added more resolution in the viewing of the samples when zooming in. In some cases the lower 8 bits were lost in the drawing of the wave when having a sample size of 16 bit and more.
- Data port registers where not swapped to another bank if only a bank switch occurred.
- NextInvertBank located in the DP_PortCtrl register became active immediately and not at the next bank switch, is now ok.

Previous items version 1.41

This was a test release.

Previous items version 1.40

- solved bug that sometimes caused that the analyser software was crashing after 10 to 20 times performing a record/play scenario.
- Soundwire 1.1 add port direction in analyzer memory map
- NAK cell was coloured red on the position of the ACK in the RAW view

- PDM enable was not cleared, so once a pdm/pxm script has read, the flag kept set.
- Indicating Parity error in the script view
- Bug solved that Script running at low clock frequency could have been stopped before the end.
- Added feature to change the SoundWire bus clock frequency at frame boundary. Divider 1 and 2 are operational.

Previous items version 1.39

- solved bug about PCM/PDM interface (see 1.38)
- solved bug that sometimes generated extra data in the TG at the end of a script in case the previous script was larger than the current script.

Previous items version 1.38

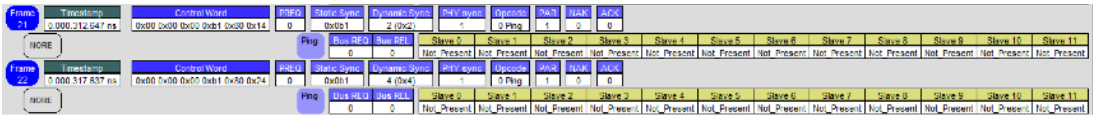
- A recently introduced bug in the IP of the analyzer has the effect that some hardware boxes are failing on doing PDM/PCM I/O via the port on the connector. Therefor this release is mainly the swimmy version1.37 but the IP (bit file) of version 1.34. As soon as this issue is solved there will be another release.

Previous items version 1.37

- solved some issues in the navigation through the views
- added more info in the script view
- added a new Scriptbuilder in the installation package

Previous items version 1.36

- Solved bug with PHY_Sync set in script

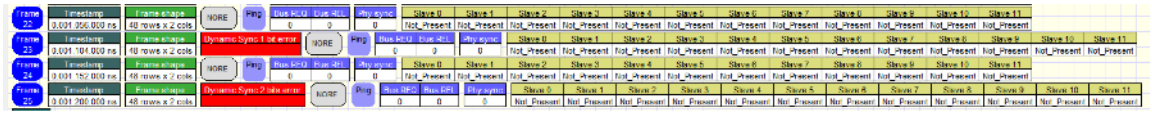


- Implemented the corruption of Dyn sync in the script so the user can choose for a 1 bit or 2 bits corruption of the Dynamic Sync.

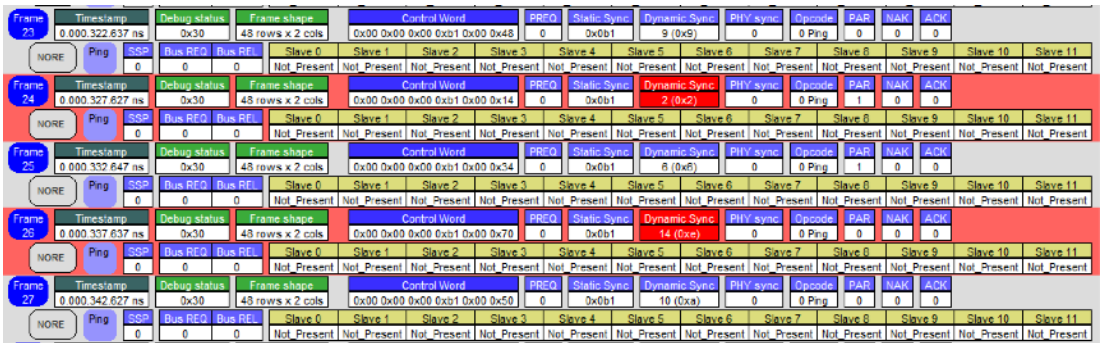
Scriptbuilder:

⊟ 9	E	**Frame Start**	1, ROW=0, COL=0, PREQ=0, SS=0xB1, PHY=0, DS=Invalid...
		Repeat	1
		Row Control (ROW)	0 - 48 Rows
		Column Control (COL)	0 - 2 Columns
		Ping Request (PREQ)	0 - No
		Static Sync (SS)	0xB1
		Select PHY (PHY)	0 - Basic PHY
		Dynamic Sync (DS)	Invalid - 1 bit error
		Parity (P)	Valid
		Negative Acknowledgment (NAK)	0 - No
		Positive Acknowledgment (ACK)	0 - No
⊞ 10		**PING**	SSP=0, BREQ=0, BREL=0
⊞ 11		**Frame Start**	1, ROW=0, COL=0, PREQ=0, SS=0xB1, PHY=0, DS=Valid, ...
⊞ 12		**PING**	SSP=0, BREQ=0, BREL=0
⊟ 13	E	**Frame Start**	1, ROW=0, COL=0, PREQ=0, SS=0xB1, PHY=0, DS=Invalid...
		Repeat	1
		Row Control (ROW)	0 - 48 Rows
		Column Control (COL)	0 - 2 Columns
		Ping Request (PREQ)	0 - No
		Static Sync (SS)	0xB1
		Select PHY (PHY)	0 - Basic PHY
		Dynamic Sync (DS)	Invalid - 2 bit errors
		Parity (P)	Valid
		Negative Acknowledgment (NAK)	0 - No
		Positive Acknowledgment (ACK)	0 - No
⊞ 14		**PING**	SSP=0, BREQ=0, BREL=0

Script view:



Synthetic view of a capture:



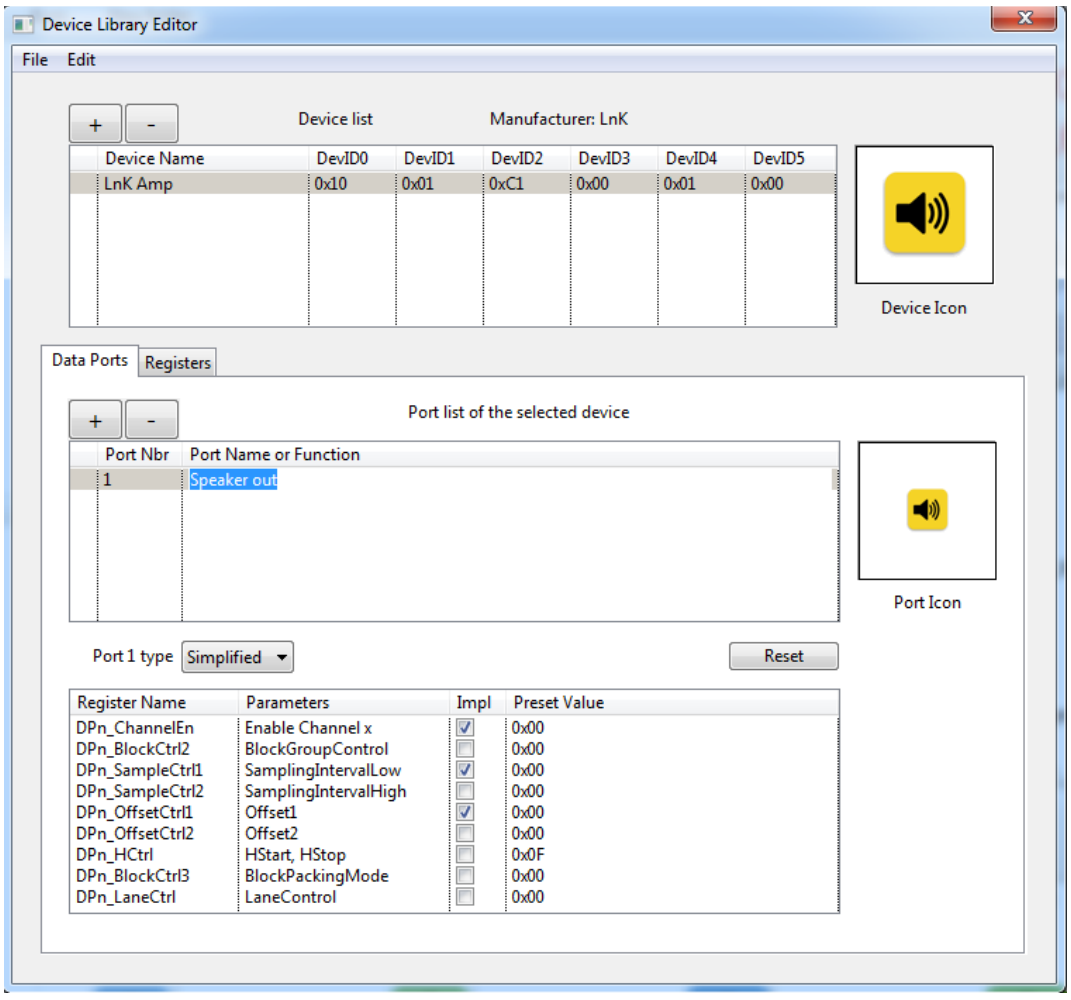
Previous items version 1.35

- solved loss of sync bug after a frame shape change message in the analyzer.

Previous items version 1.34

- Added binary data export.
- Solved bug while looping in the TG.
- Implemented sample decoding according to SSP
- Solved problem showing sample values in the notebook pages
- Solved magnifying problem in the data view.
- Solved the fact that the history was not initialised when reading a .swa file or stopped recording. So it could be that already at the start of the trace some active data channels were shown while they were configured later in the trace.
- Added preset value in the analyzer which are entered by the device library editor in scriptbuilder. (Dev_xxxx_yyyy.xml)

Now it is possible to define preset values for a number of registers in data ports of a device. When a Full, Simplified or Reduced port is defined, the default values will be transferred to the analyzer registers when the device is detected at enumeration. This way the analyzer is aware of the default or preset values so it can decode the samples and show data streams.



example device xml file:

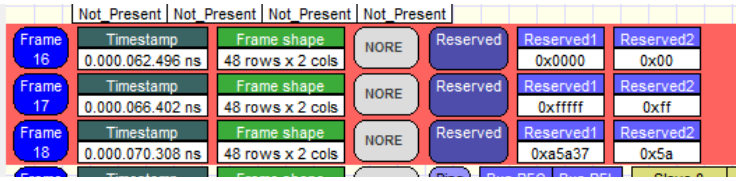
```
<!-- Device/Product Description -->
<!-- Creation date : 26-9-2016 -->
<!-- Creator : ScriptBuilder 1.2.10 -->

<!-- Manufacturer : LnK -->
<Device Name="LnK Amp" DeviceID="0x1001C1000100" IconFile="C:\LnK\SoundWire\libs\spkr1_green_60.gif">
   <Port ID="1" Type="2" Name="Speaker out" IconFile="C:\LnK\SoundWire\libs\spkr1_green_30.gif" >
      <PortReg Name="DPn_ChannelEn" Implemented="1" PresetValue="0x00" />
      <PortReg Name="DPn_BlockCtrl2" Implemented="0" PresetValue="0x00" />
      <PortReg Name="DPn_SampleCtrl1" Implemented="1" PresetValue="0x00" />
      <PortReg Name="DPn_SampleCtrl2" Implemented="0" PresetValue="0x00" />
      <PortReg Name="DPn_OffsetCtrl1" Implemented="1" PresetValue="0x00" />
      <PortReg Name="DPn_OffsetCtrl2" Implemented="0" PresetValue="0x00" />
      <PortReg Name="DPn_HCtrl" Implemented="0" PresetValue="0x0F" />
      <PortReg Name="DPn_BlockCtrl3" Implemented="0" PresetValue="0x00" />
      <PortReg Name="DPn_LaneCtrl" Implemented="0" PresetValue="0x00" />
   </Port>
   <Range StartAddress="0x0007" EndAddress="0x0014" Name="Amp Registers set 1" IconFile="" />
   <Range StartAddress="0x0BB8" EndAddress="0x001E" Name="Amp Registers set 2" IconFile="" />
   <Register Address="0x2000" Attribute="RW" Name="Control" >
      <BitField Name="mute" StartBit="0" StopBit="0" />
   </Register>
   <Register Address="0x2001" Attribute="RW" Name="Gain" >
      <BitField Name="Gain" StartBit="0" StopBit="7" />
   </Register>
   <Register Address="0x2002" Attribute="RW" Name="Status" >
      <BitField Name="overheat protection" StartBit="0" StopBit="0" />
      <BitField Name="current protection" StartBit="1" StopBit="1" />
   </Register>
</Device>
```

- Added USER DEFINED opcode + parameters

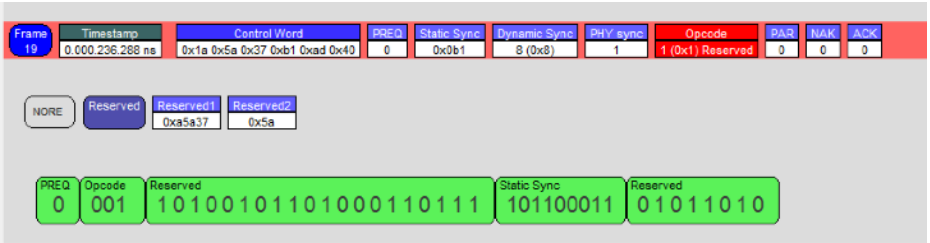
scriptbuilder

⊞ 2	**PING**	SSP=0, BREQ=0, BREL=0
⊟ 3	**USER DEFINED**	CODE=1, RSV1=0, RSV2=0
	Opcode (CODE)	1
	Reserved 1 (RSV1)	0
	Reserved 2 (RSV2)	0
⊟ 4	**USER DEFINED**	CODE=1, RSV1=0xfffff, RSV2=0xff
	Opcode (CODE)	1
	Reserved 1 (RSV1)	0xfffff
	Reserved 2 (RSV2)	0xff
⊟ 5	**USER DEFINED**	CODE=1, RSV1=0xa5a37, RSV2=0x5a
	Opcode (CODE)	1
	Reserved 1 (RSV1)	0xa5a37
	Reserved 2 (RSV2)	0x5a
⊞ 6	**PING**	SSP=0, BREQ=0, BREL=0

script view

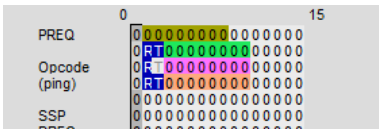


detailed view



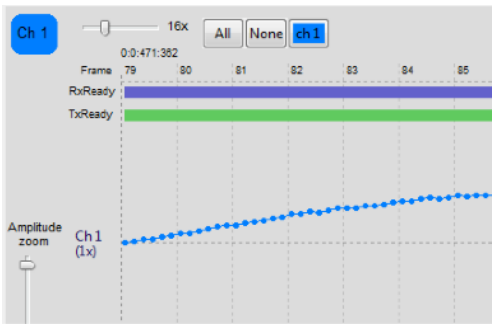
Previous items version 1.32

- Solved bug in data sample extracting that was introduced in version 1.31
- Solved a bug that showed already a channel configuration in the RAW view at the start of the captured trace.
- Added flow control indication in RAW and DATA view



Data samples — 1. Device 1

Frame	Bit Offset	Sample Length	Flow Control	Chan 1
79	58	8	RxReady TxReady	0x00000008
80	58	8	RxReady TxReady	0x0000000e
81	58	8	RxReady TxReady	0x00000015
82	58	8	RxReady TxReady	0x0000001c
83	58	8	RxReady TxReady	0x00000020



Previous items version 1.31

- Added dithering on sine wave in TG PCM streams
- Solved instabilities while recording in full Rec / Liveview
- Solved bugs in data view
- Solved bugs in Time stamp indication in LiveView recording
- Status information updated when recording / decoding grabbed data

Previous items version 1.29 - 1.30

- Added support to host the remote control dll + release of DLL + test app 1.3
- Implemented Clock Stop for the TG
- Correct bug in data decoding. (was seen as a glitch in the data view)
- improved the connection phase in software when connecting the hardware

Previous items version 1.28

- Solved newly introduced Data decoding bug since version 1.27

Previous items version 1.27

- Added PRBS generation in the TG
- Fixed some items in the Block Group Count decoding

Previous items version 1.26

- All views have now the extra info panel
  - Memory viewer has now Component defined registers and areas.
  - Bug solved in showing parity error
- Traffic generator
  - capable to generate a Clock Pause with auto restart
  - has now a 64 MB memory footprint compared to 8MB before
  - a definable number of bits in the source data file.
  - Solved a bug using data files. (Sample size)

- Able to include BRA data

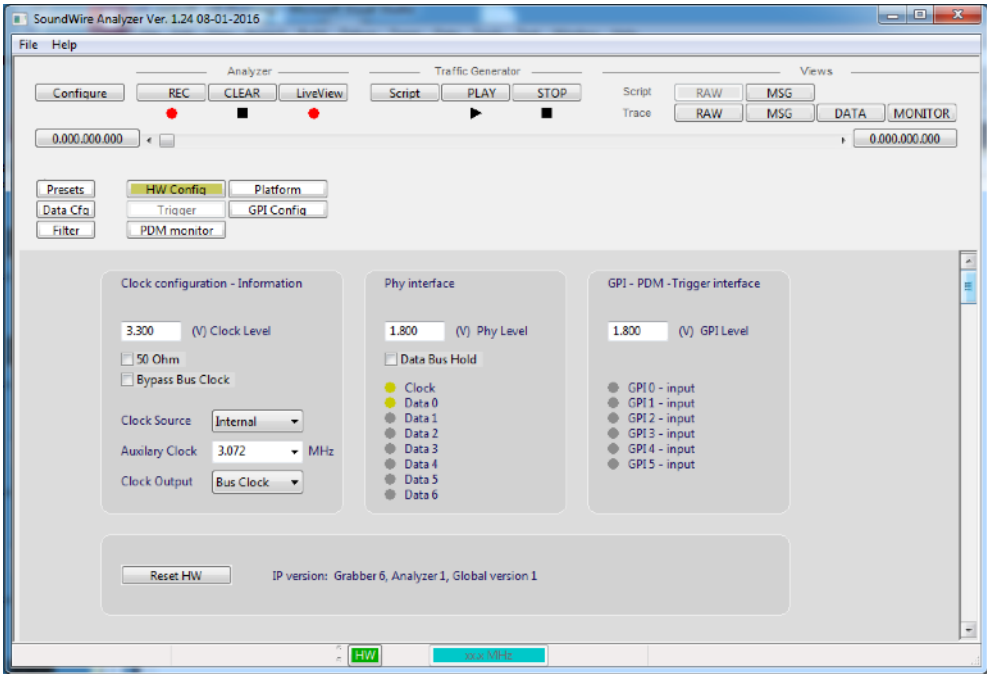
Previous items version 1.24

- Config:
  - updated HW config panel
  - added PDM monitor
- Traffic Generator:
  - hardware looping in script files
  - extra info in script files
- Analyzer capture: new grabber is implemented
  - time stamp
  - parity check
  - long recordings
  - Live View is available.
  - Full recording has also Live View enabled with only Read/Write messages
- Analyzer views:
  - corrected false synchronisation when swapping between views
  - corrected misalignement of SSP counters
  - added Hide Ping check box to remove uninteresting pings
  - added Go To frame functionality
  - improved Search
  - Filter is operational
  - Data Cfg for manual data stream config
- RAW view:
  - corrected the coloured area for each stream
  - added info on the different fields in the Control Word
- Data view:
  - overview of all streams detected
  - improved visualisations
    - easy zoom
    - easy channel selection
    - SSP indication in the trace
    - Bank indication in the trace
    - Config register access in the trace
    - Frame shape indication in the trace
    - Monitoring of data port registers/parameters in the trace
  - configurable data stream parameters for custom data channel monitoring
  - added extra info panels. Showing actual data at the cursor position. (except Bus)
    - Bus panel: statistics (overview of the complete trace)
    - Memory panel: viewer (soon to be functional, now it is in the Monitor view)
    - Component panel: visualisation of detected components and data connections
    - Ports panel: visualisation of detected ports and showing data connections
    - Port Properties panel: showing all actual data port parameters
    - Samples panel: showing all actual data sample values
    - Registers panel: showing all actual registers of the selected device/data port
    - Streams panel: gives an overview of used ports for all devices
    - Scope panel: has an 8 channel analog oscilloscope to show the audio data
    - FFT panel: contains an 8 channel FFT analysis

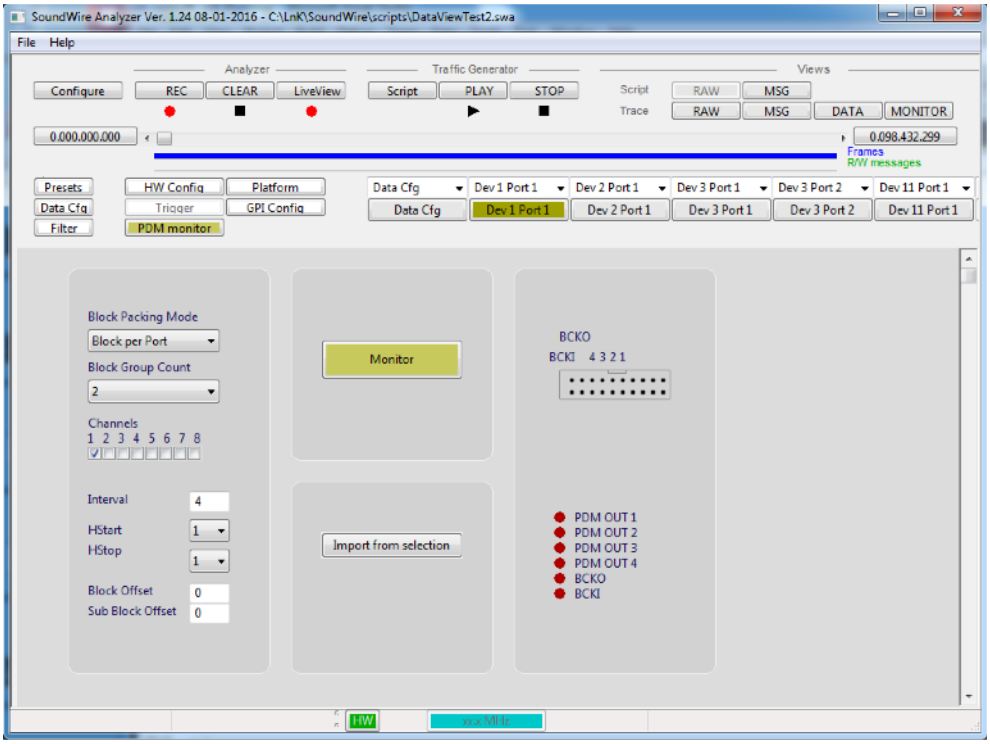
- Export:
  - Message export
    - Frame selection
    - Device selection
    - Opcode selection
    - Detailed message export to CSV file
    - Control Word export to CSV file
    - Synthetic view export to HTML file. (browser and printing)
- Data export
    - Frame selection
    - Stream selection (for all active data ports on each device)
    - Channel selection
    - Frame, bit slot offset, channel, Sample value (hex); to CSV file
    - Frame, bit slot offset, channel, Sample value (decimal); to CSV file
    - Sample value (hex); to CSV file
    - Sample value (decimal); to CSV file

Config

updated HW config panel



added PDM monitor



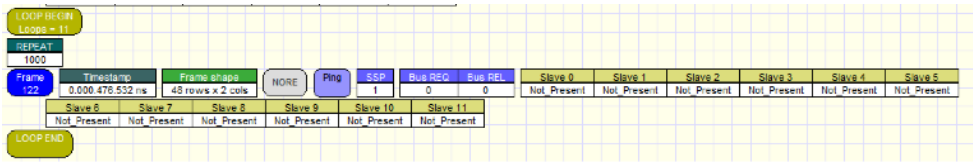
Traffic Generator

hardware looping in script files

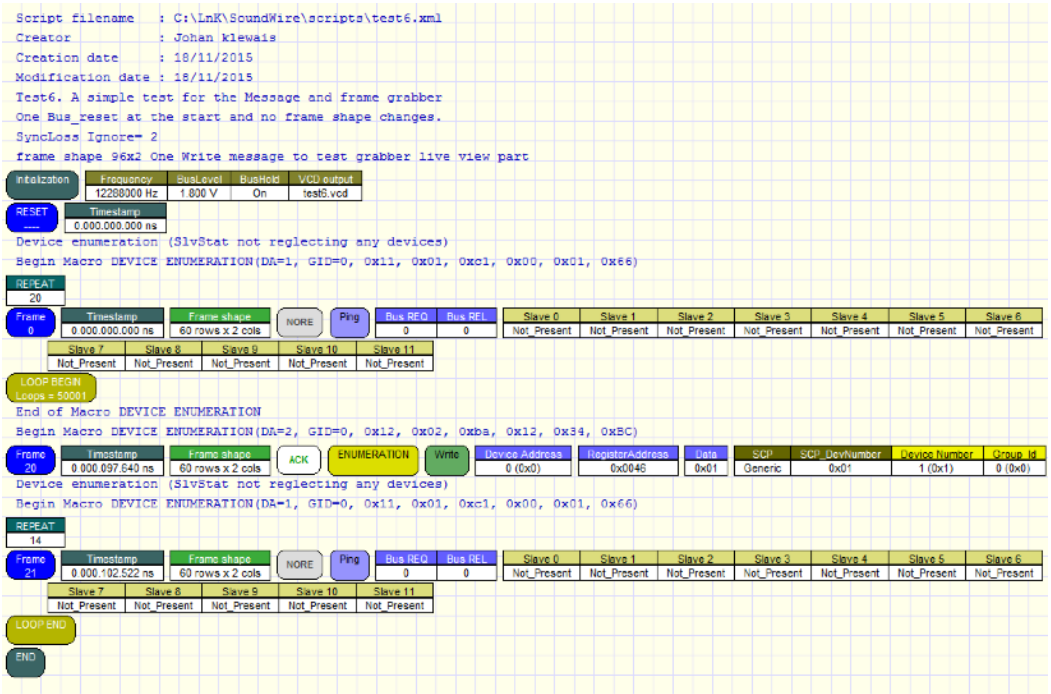
Definition in Scriptbuilder

31	**CONFIGURE CHANNELS**	DA=3, DP=1, BSEL=0, Ch1=0, Ch2=0, Ch3=0, Ch4=0, C...
32	**Loop Begin**	CNT=10
	Repeat (CNT)	10
33	**Frame Start**	1000, ROW=0, COL=0, PREQ=0, SS=0xB1, PHY=0, DS=...
34	**PING**	BREQ=0, SSP=1, BREL=0
35	**Loop End**	
36	**Comment**	Stop the TG stream
37	**Frame Start**	1, ROW=0, COL=0, PREQ=0, SS=0xB1, PHY=0, DS=Vali...

Appearance in the script view



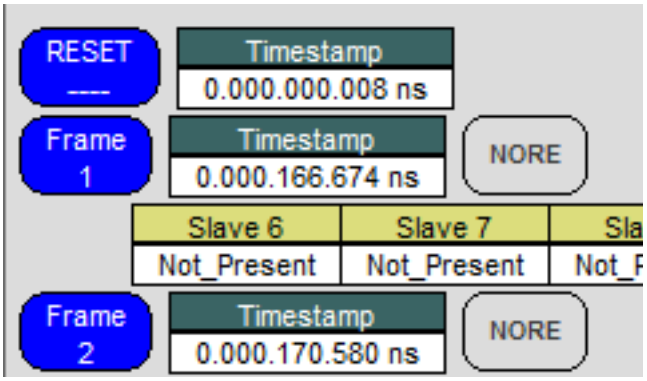
extra info in script files



Analyzer capture

new grabber is implemented

time stamp



parity check

long recordings

Live View is available.

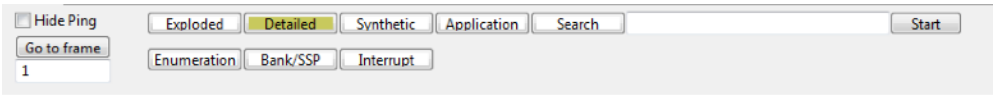
Full recording

has also Live View enabled with only Read/Write messages

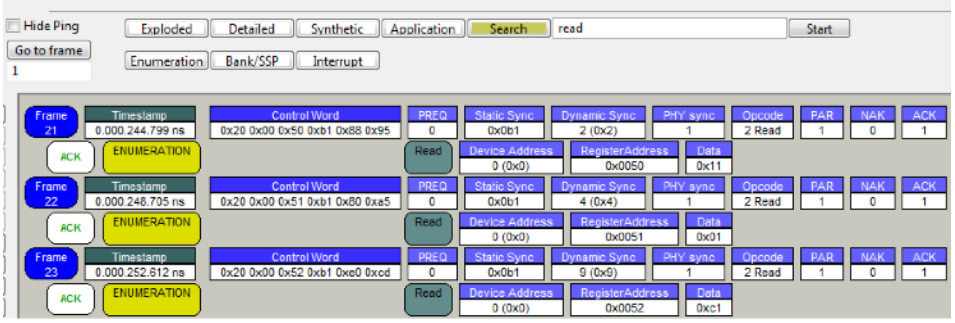
Analyzer views

corrected false synchronisation when swapping between views
corrected misalignment of SSP counters

added Hide Ping check box to remove uninteresting pings
added Go To frame functionality

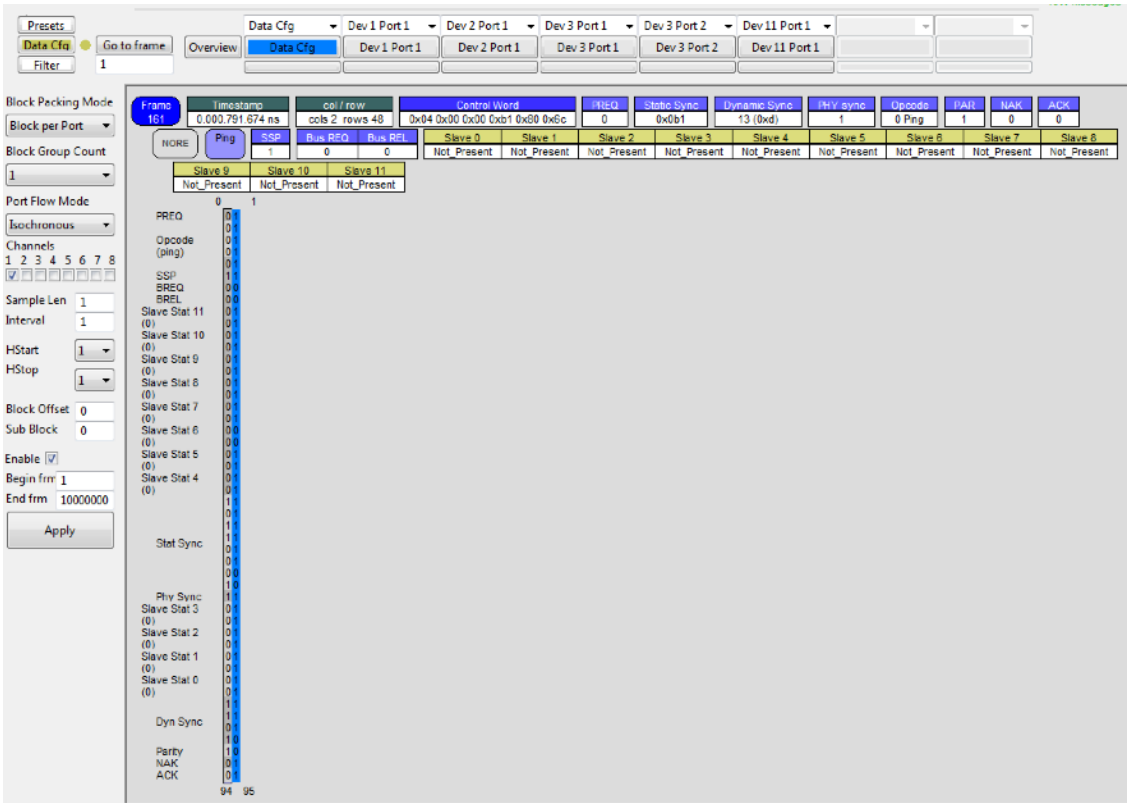


Improved Search



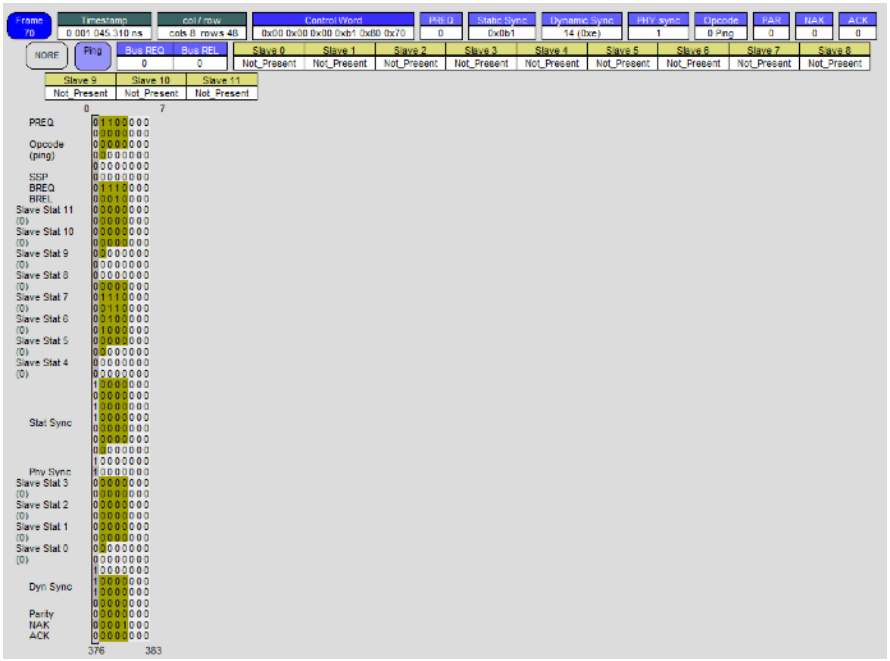
Filter is operational

Data Cfg for manual data stream config



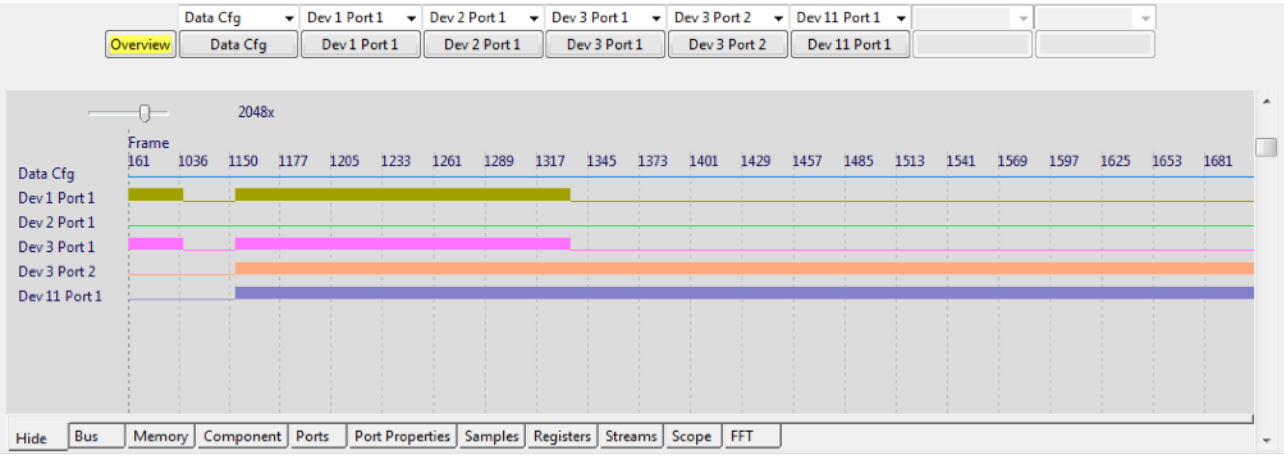
RAW view

corrected the coloured area for each stream
added info on the different fields in the Control Word



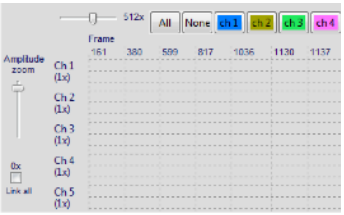
Data view

overview of all streams detected

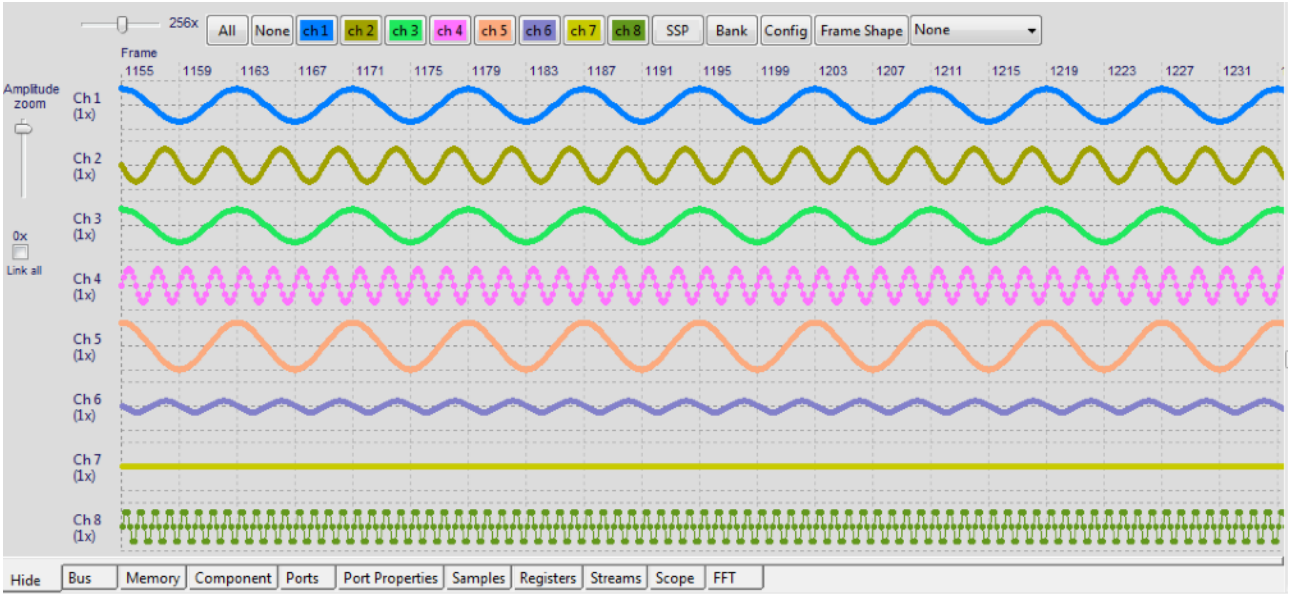


improved visualisations

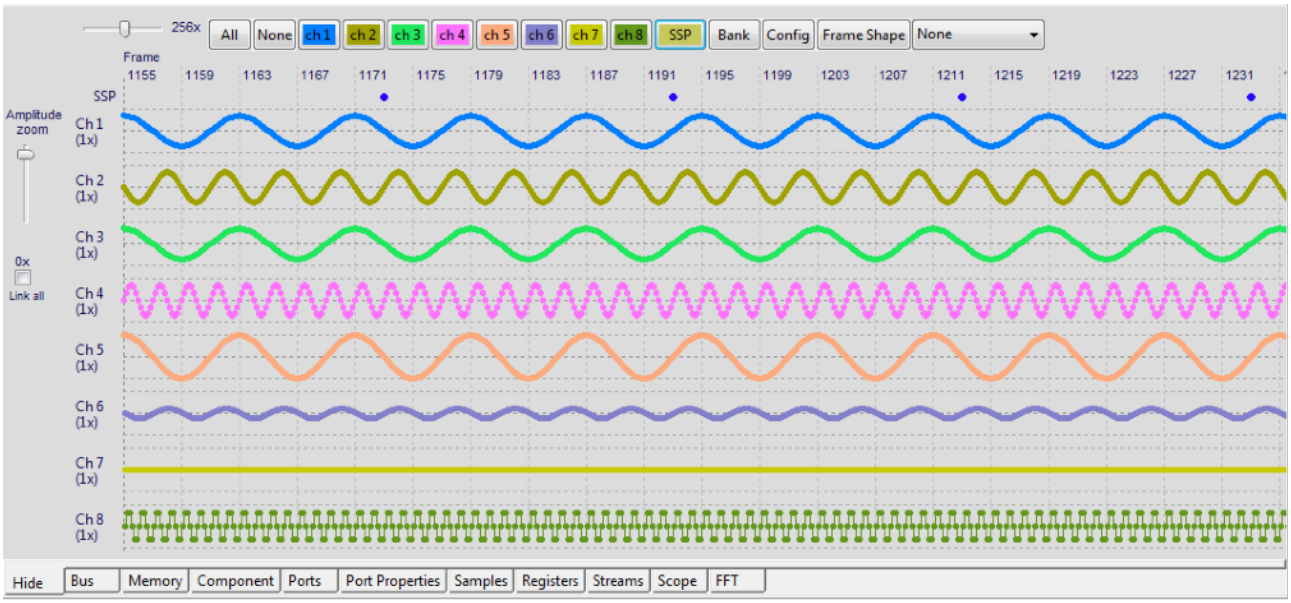
easy zoom



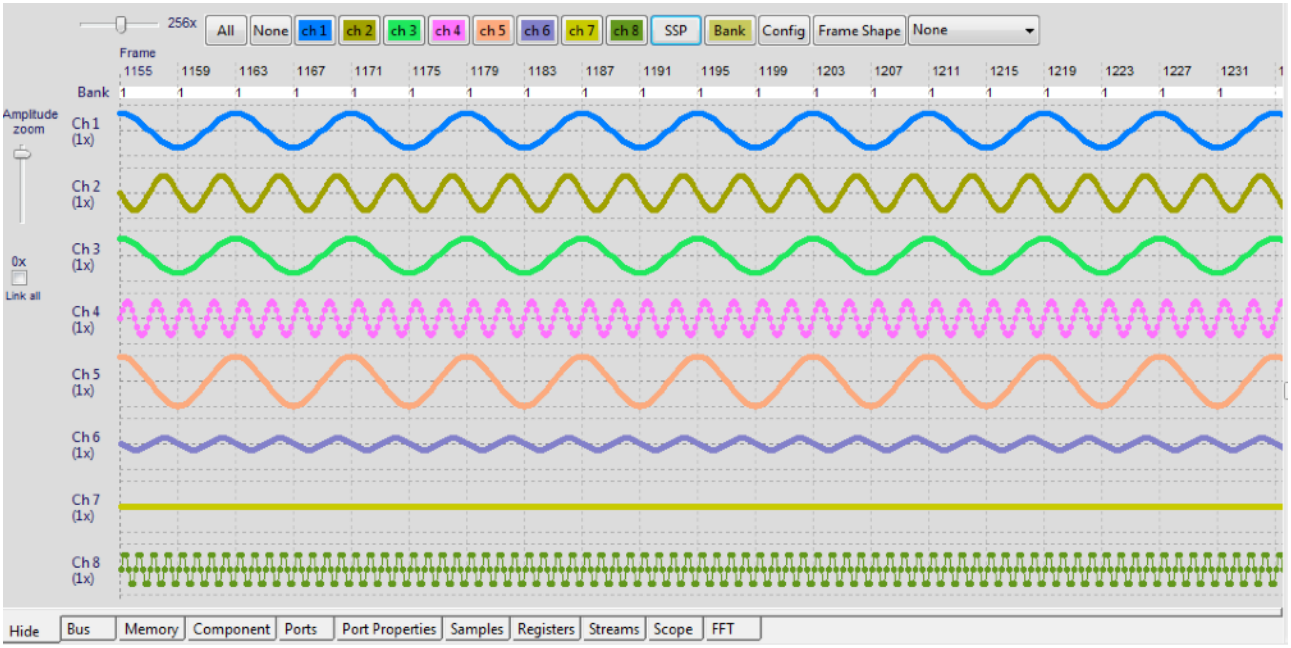
easy channel selection



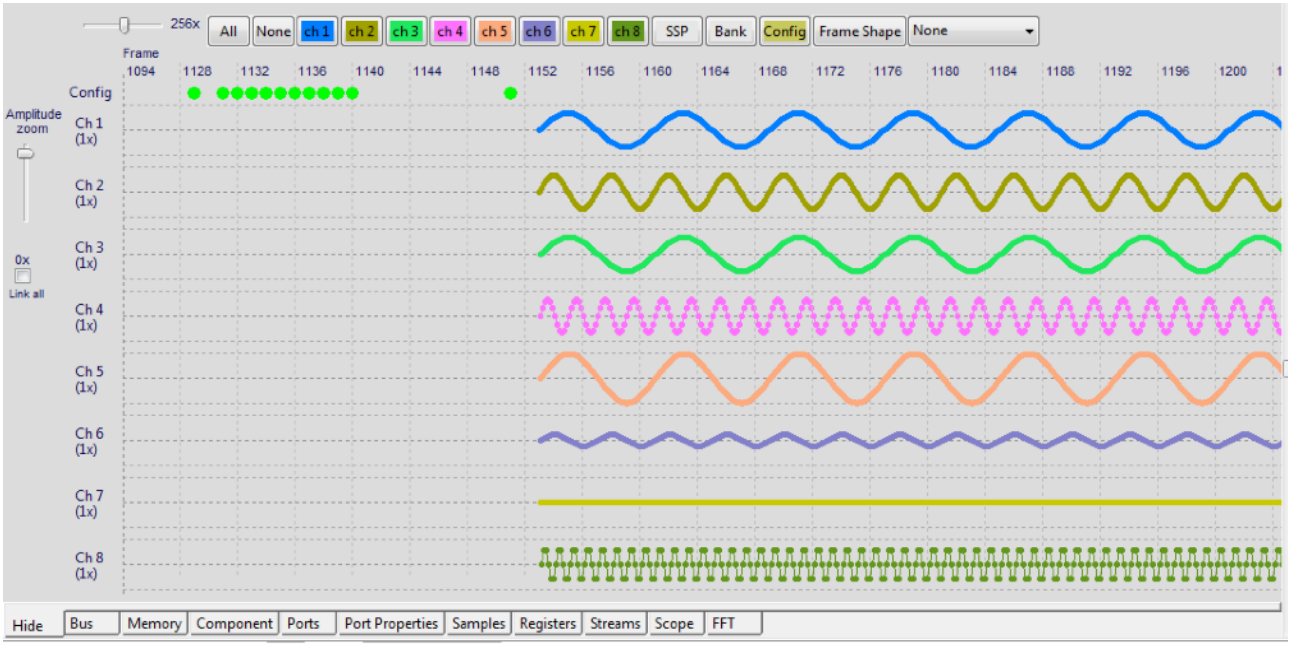
SSP indication in the trace



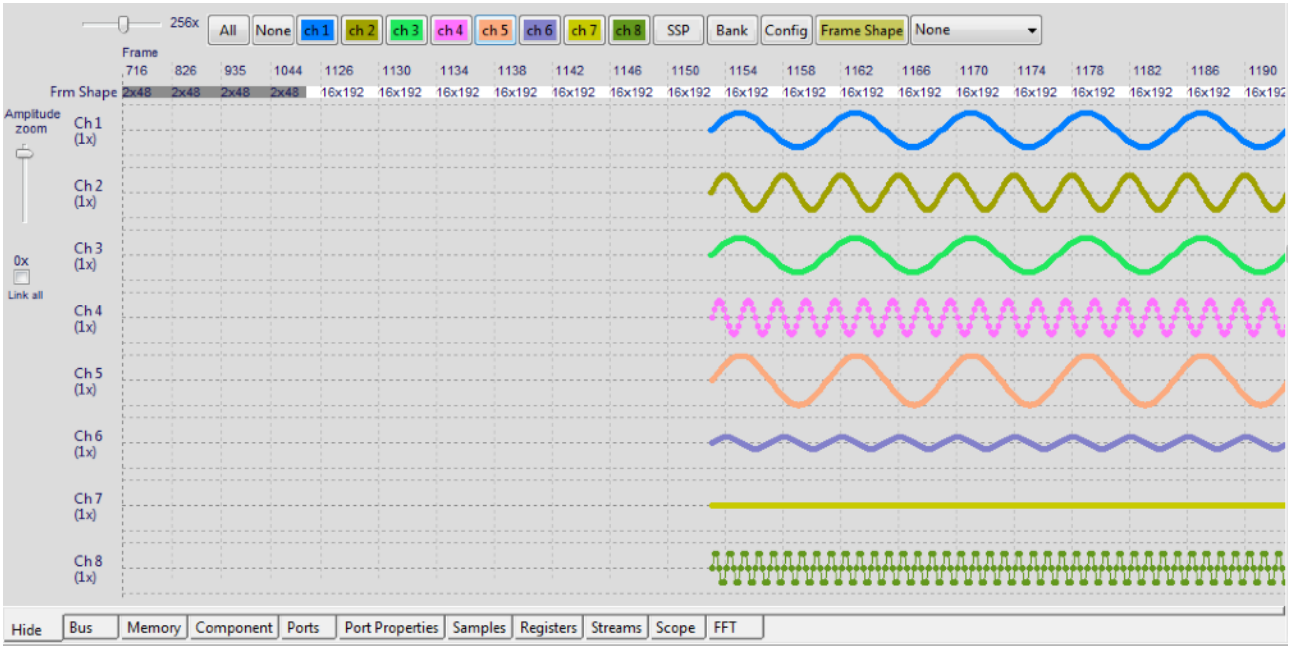
Bank indication in the trace



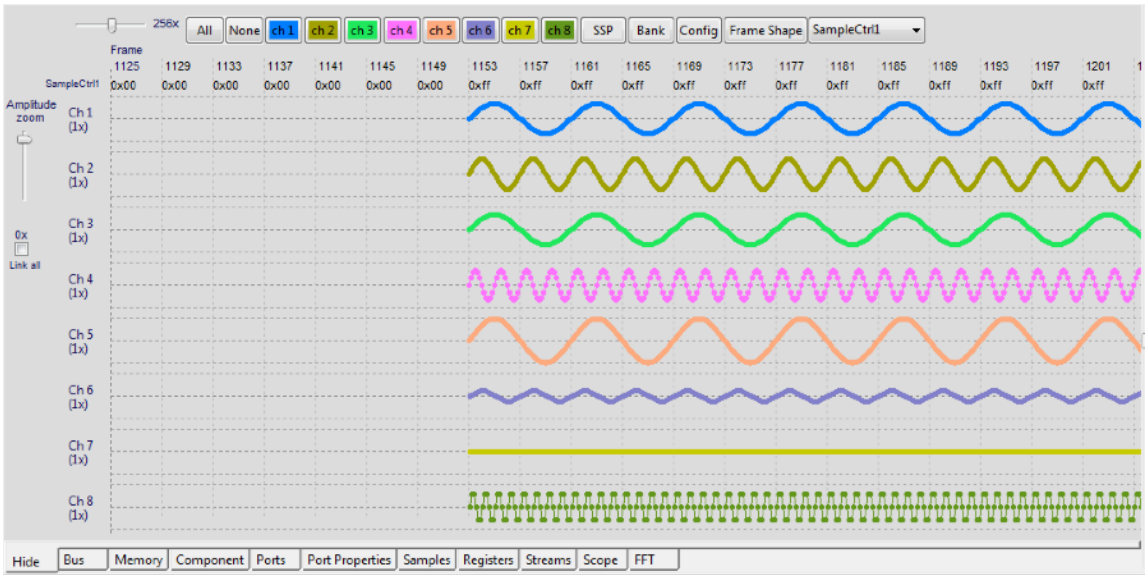
Config register access in the trace



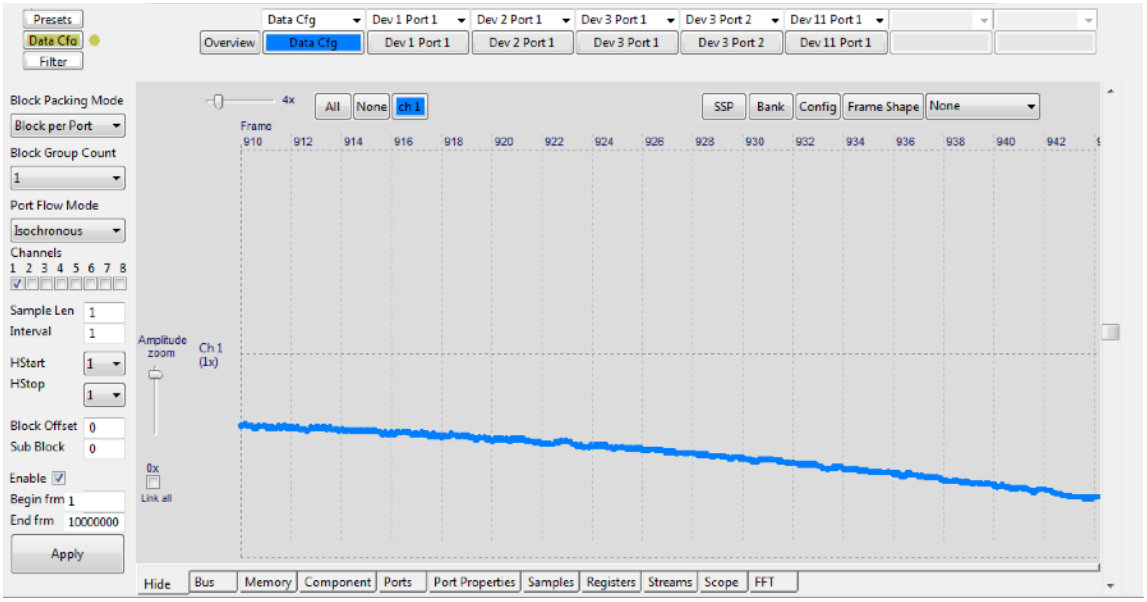
Frame shape indication in the trace

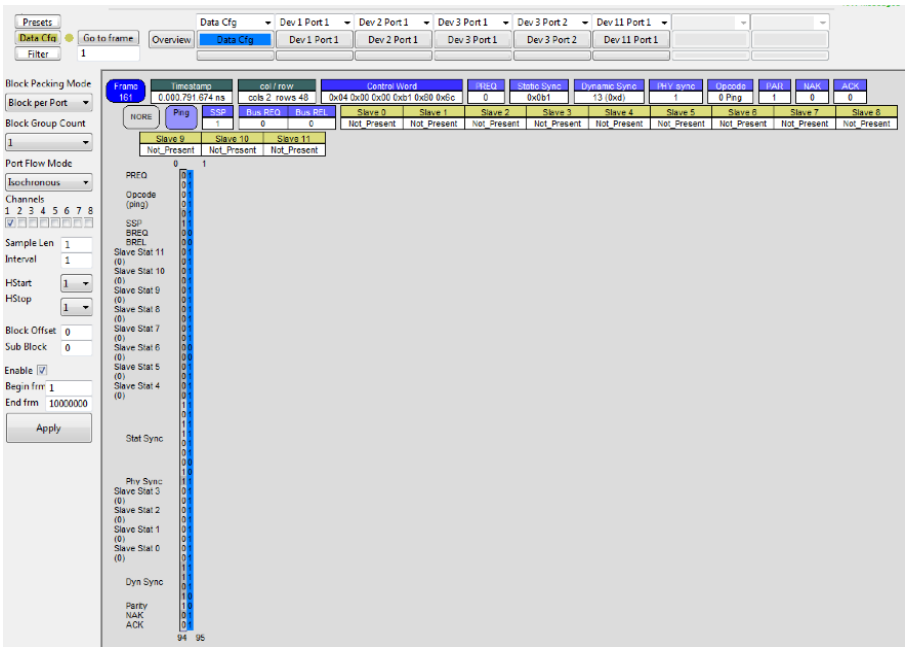


Monitoring of data port registers/parameters in the trace



configurable data stream parameters for custom data channel monitoring

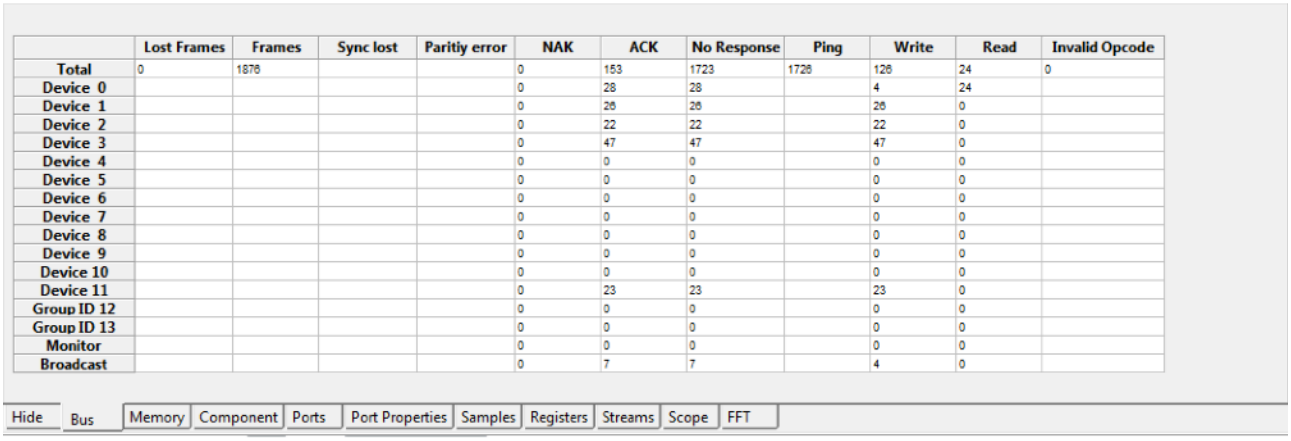




Added extra info panels.

Showing actual data at the cursor position. (except Bus)

Bus panel: statistics (overview of the complete trace)

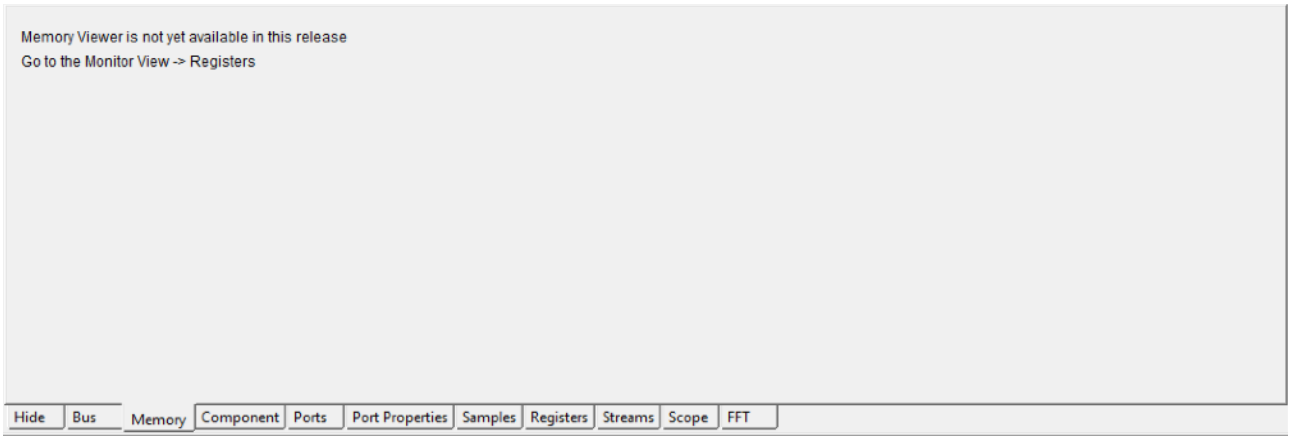


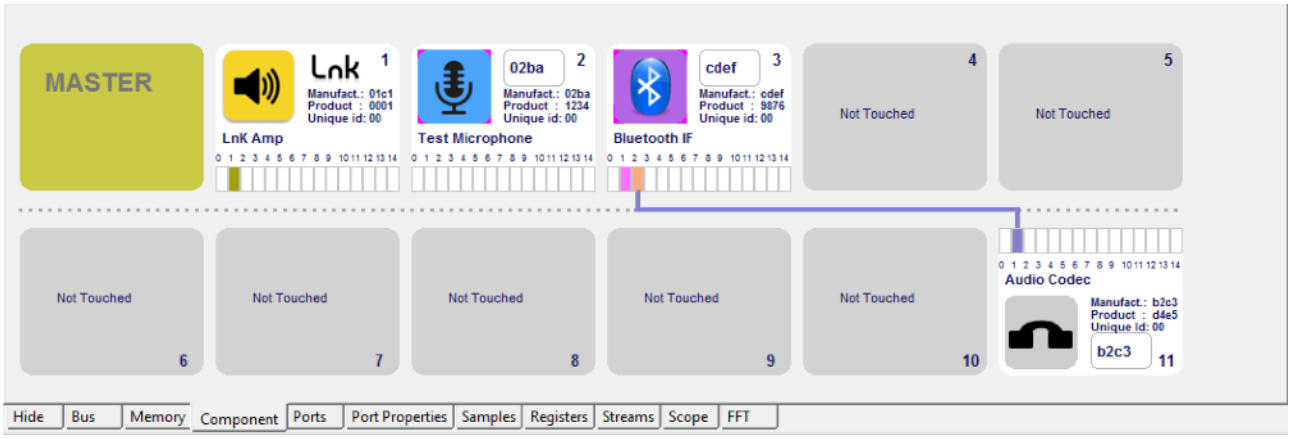
	Lost Frames	Frames	Sync lost	Paritiy error	NAK	ACK	No Response	Ping	Write	Read	Invalid Opcode
Total	0	1876			0	153	1723	1726	126	24	0
Device 0					0	28	28		4	24	
Device 1					0	26	26		26	0	
Device 2					0	22	22		22	0	
Device 3					0	47	47		47	0	
Device 4					0	0	0		0	0	
Device 5					0	0	0		0	0	
Device 6					0	0	0		0	0	
Device 7					0	0	0		0	0	
Device 8					0	0	0		0	0	
Device 9					0	0	0		0	0	
Device 10					0	0	0		0	0	
Device 11					0	23	23		23	0	
Group ID 12					0	0	0		0	0	
Group ID 13					0	0	0		0	0	
Monitor					0	0	0		0	0	
Broadcast					0	7	7		4	0	

Hide | Bus | Memory | Component | Ports | Port Properties | Samples | Registers | Streams | Scope | FFT

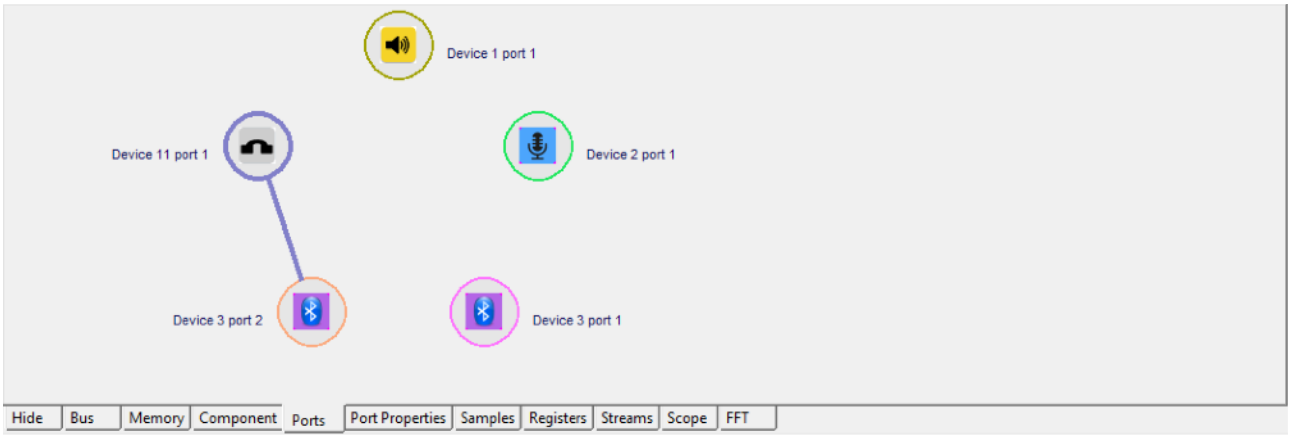
Memory panel: viewer (soon to be functional, now it is in the Monitor view)

Component panel: visualisation of detected components and data connections





Ports panel: visualisation of detected ports and showing data connections



Port Properties panel: showing all actual data port parameters

	Common	Bank 0	Bank 1	Comment
Used Bank	1			Indicated Bank (1) ^ Inverted Bank (0) = Used Bank (1)
Inverted Bank	0			
Port Data Mode	0			Normal operation
Port Flow Mode	0			Normal
BPT Payload Type				Only available on data port 0
Word Length	24 bit(s)			
Block Packing Mode		0	0	Block per Port
Block Grouping Control		1	1	Used BlockGroupCount = 1
Sampling Interval		1 (0x0001)	512 (0x0200)	
Offset		0x0000	0x0000	Offset = 0 (0x0000)
HStart		0	3	
HStop		0	10	
HWidth		1	8	
Sample Rate	-	-	-	Info not available
Channel Enable		--------	87654321	Chan 8 --> Chan 1
Channel Prepare	87654321			Chan 8 --> Chan 1
Channel Ready	--------			Chan 8 --> Chan 1
Lane		0	0	

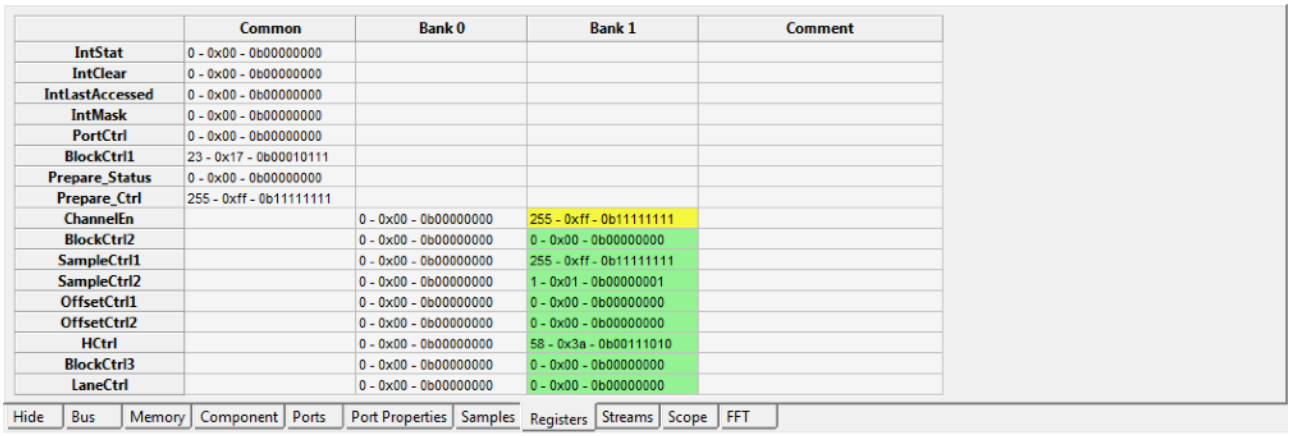
Hide | Bus | Memory | Component | Ports | Port Properties | Samples | Registers | Streams | Scope | FFT

Samples panel: showing all actual data sample values

Frame	Channel	Bit Offset	Sample Length	Sample Value
1292	1	42	24	0x00401370
1292	2	90	24	0x00a56209
1292	3	138	24	0x00401370
1292	4	186	24	0x00000000
1292	5	234	24	0x005a8279
1292	6	282	24	0x00dfd90e
1292	7	330	24	0x00000000
1292	8	378	24	0x00000000
1292	1	554	24	0x00372a06
1292	2	602	24	0x00a8787d
1292	3	650	24	0x00372a06
1292	4	698	24	0x00d2b105
1292	5	746	24	0x004debe4
1292	6	794	24	0x00e0f184
1292	7	842	24	0x00fe6474
1292	8	890	24	0x004e7a06
1292	1	1066	24	0x002d4efb
1292	2	1114	24	0x00b185fa

Hide | Bus | Memory | Component | Ports | Port Properties | Samples | Registers | Streams | Scope | FFT

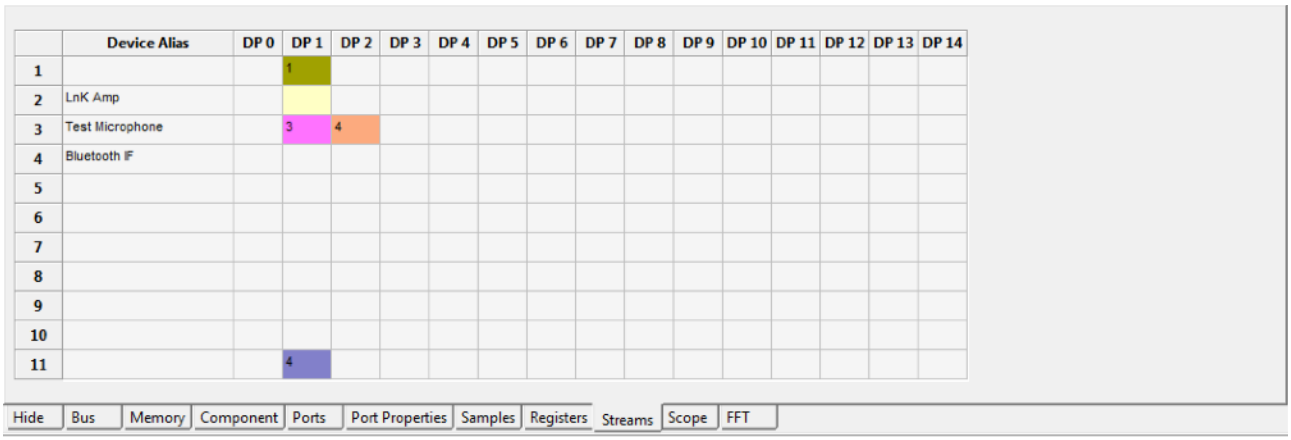
Registers panel: showing all actual registers of the selected device/data port



	Common	Bank 0	Bank 1	Comment
IntStat	0 - 0x00 - 0b00000000			
IntClear	0 - 0x00 - 0b00000000			
IntLastAccessed	0 - 0x00 - 0b00000000			
IntMask	0 - 0x00 - 0b00000000			
PortCtrl	0 - 0x00 - 0b00000000			
BlockCtrl1	23 - 0x17 - 0b00010111			
Prepare_Status	0 - 0x00 - 0b00000000			
Prepare_Ctrl	255 - 0xff - 0b11111111			
ChannelEn		0 - 0x00 - 0b00000000	255 - 0xff - 0b11111111	
BlockCtrl2		0 - 0x00 - 0b00000000	0 - 0x00 - 0b00000000	
SampleCtrl1		0 - 0x00 - 0b00000000	255 - 0xff - 0b11111111	
SampleCtrl2		0 - 0x00 - 0b00000000	1 - 0x01 - 0b00000001	
OffsetCtrl1		0 - 0x00 - 0b00000000	0 - 0x00 - 0b00000000	
OffsetCtrl2		0 - 0x00 - 0b00000000	0 - 0x00 - 0b00000000	
HCtrl		0 - 0x00 - 0b00000000	58 - 0x3a - 0b00111010	
BlockCtrl3		0 - 0x00 - 0b00000000	0 - 0x00 - 0b00000000	
LaneCtrl		0 - 0x00 - 0b00000000	0 - 0x00 - 0b00000000	

Hide | Bus | Memory | Component | Ports | Port Properties | Samples | Registers | Streams | Scope | FFT

Streams panel: gives an overview of used ports for all devices

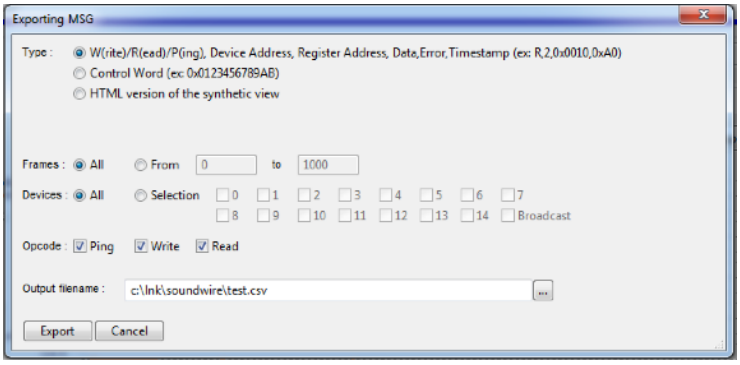


	Device Alias	DP 0	DP 1	DP 2	DP 3	DP 4	DP 5	DP 6	DP 7	DP 8	DP 9	DP 10	DP 11	DP 12	DP 13	DP 14
1			1													
2	LnK Amp															
3	Test Microphone		3	4												
4	Bluetooth IF															
5																
6																
7																
8																
9																
10																
11			4													

Hide | Bus | Memory | Component | Ports | Port Properties | Samples | Registers | Streams | Scope | FFT

Export

Message export



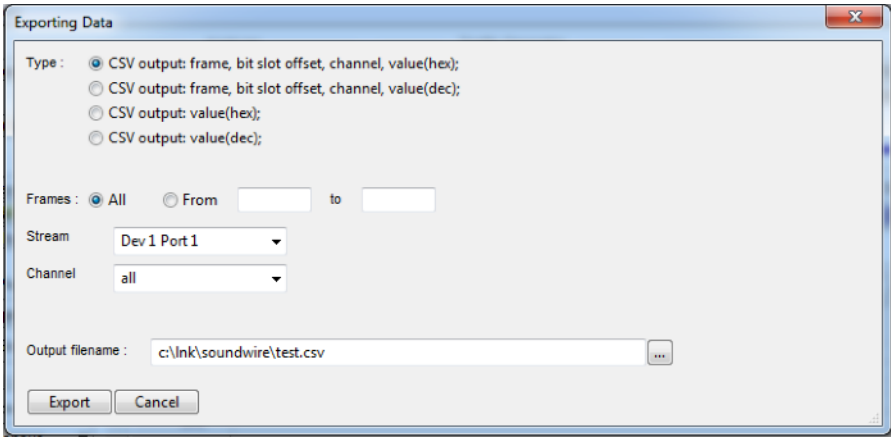
Frame selection
Device selection
Opcode selection

Detailed message export to CSV file

Control Word export to CSV file

Synthetic view export to HTML file. (browser and printing)

Data export



Frame selection
Stream selection (for all active data ports on each device)
Channel selection

Frame, bit slot offset, channel, Sample value (hex); to CSV file

Frame, bit slot offset, channel, Sample value (decimal); to CSV file

Sample value (hex); to CSV file

Sample value (decimal); to CSV file