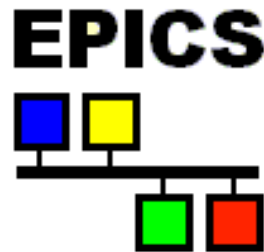


EPICS Device Support for SL1000 Digitizers



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SL1000 Device Support:

- Yokogawa SL1000 series has a variety of modules including waveform digitizers.
- The device support for SL1000 digitizer modules has been developed. They include 100M, 10M, 1M, and 100kS/s digitizers.
- All these modules work properly using exactly the same device support.
- SL1000 employs the VXI-11 protocol.
- In the device support ASYN driver is required.



The *SL1000* Data Acquisition Unit



720210 100MS/s Digitizer Module

SL1000 Device Support:

Digitizer Module List:

Model	Sampling Rate	Resolution	Comments
720210	100MS/s	12bits	Isolation
701250	10MS/s	12bits	Isolation
701251	1MS/s	16bits	Isolation
701255	10MS/s	12bits	non-Isolation
701260	100kS/s	16bits	Isolation

SL1000 Device Support:



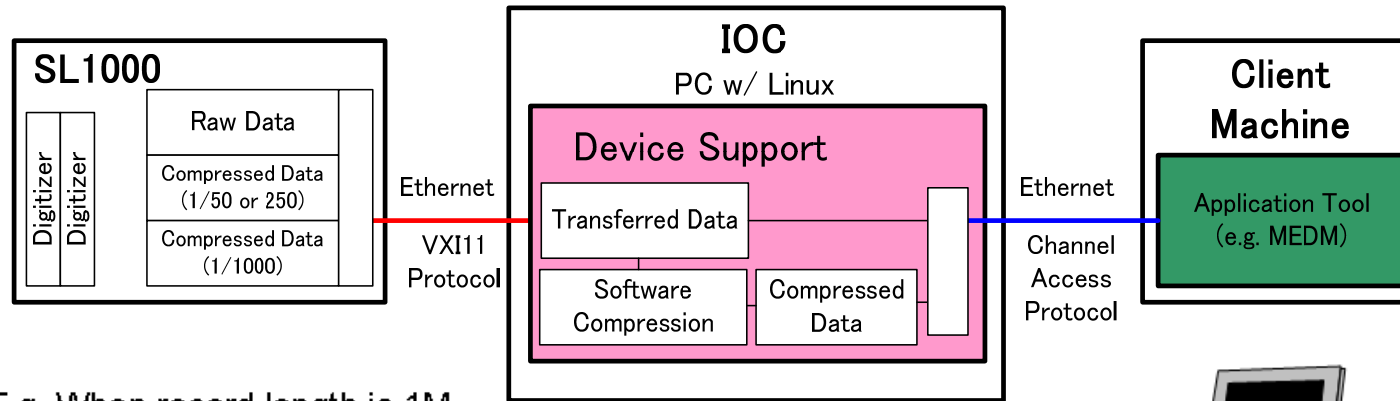
- Basic SL1000 digitizer features are supported by the device support:
 - **Data Compression:**

SL1000 performs (p-p) data compression. The device stores both the raw data and the compressed data in the device memory. The device support is designed to access either of the data.
 - **Historical Waveform Data:**

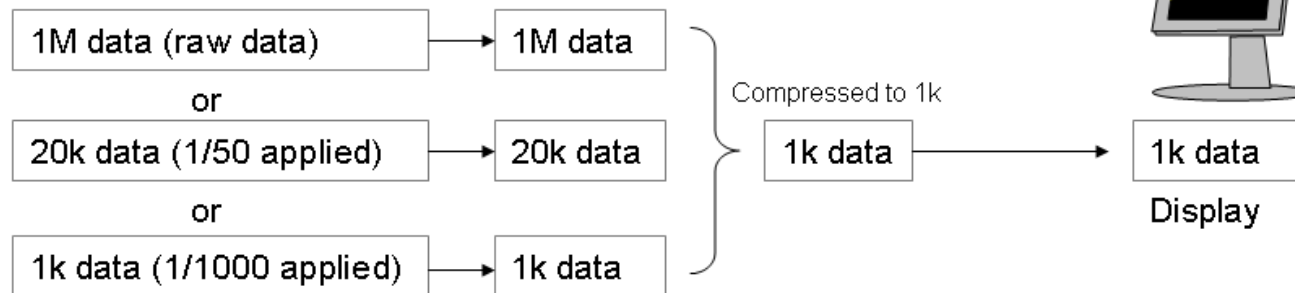
SL1000 stores multiple waveforms in the device memory. The device support can access these data.
 - **SRQ Function:**

Supported. ASYN4.11 or later is required.

Data Compression:



E.g. When record length is 1M



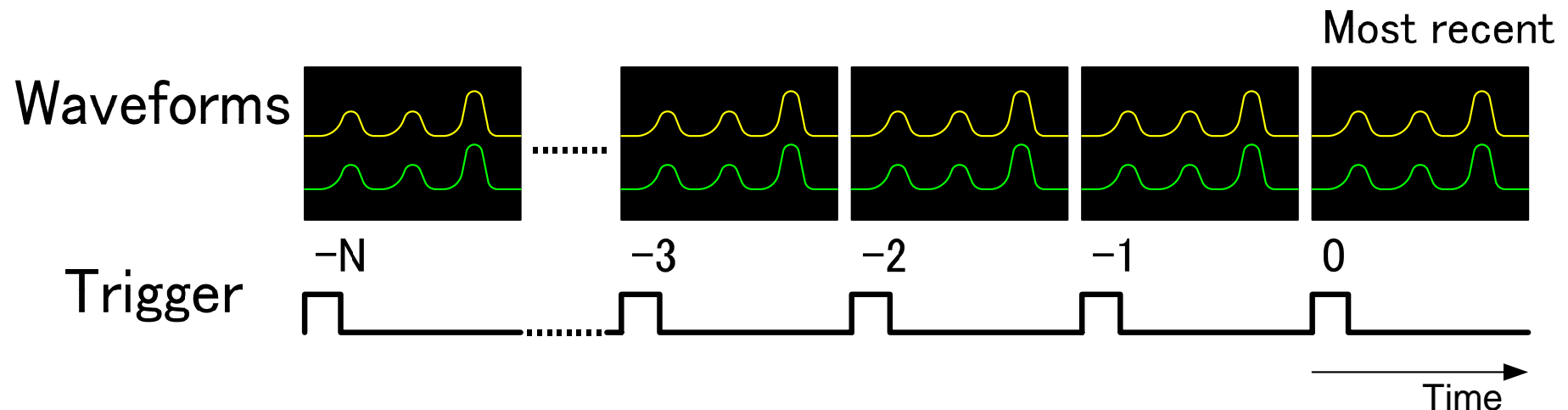
- Device Support can get either of “Raw Data” or “Compressed Data” from SL1000.
- Device Support further performs software data compression if data size is greater than a preset value (e.g. 1000).
- Software-compressed data are for display use.

注意：ここで説明しているディスプレイ用の圧縮データの取り扱いについて、ただ今修正を行っています。ディスプレイ用途を想定していますので、圧縮率選択ではなく、レコード長に関わらず表示用データの点数を固定する方法を検討しています。（09', 3/3 追記）

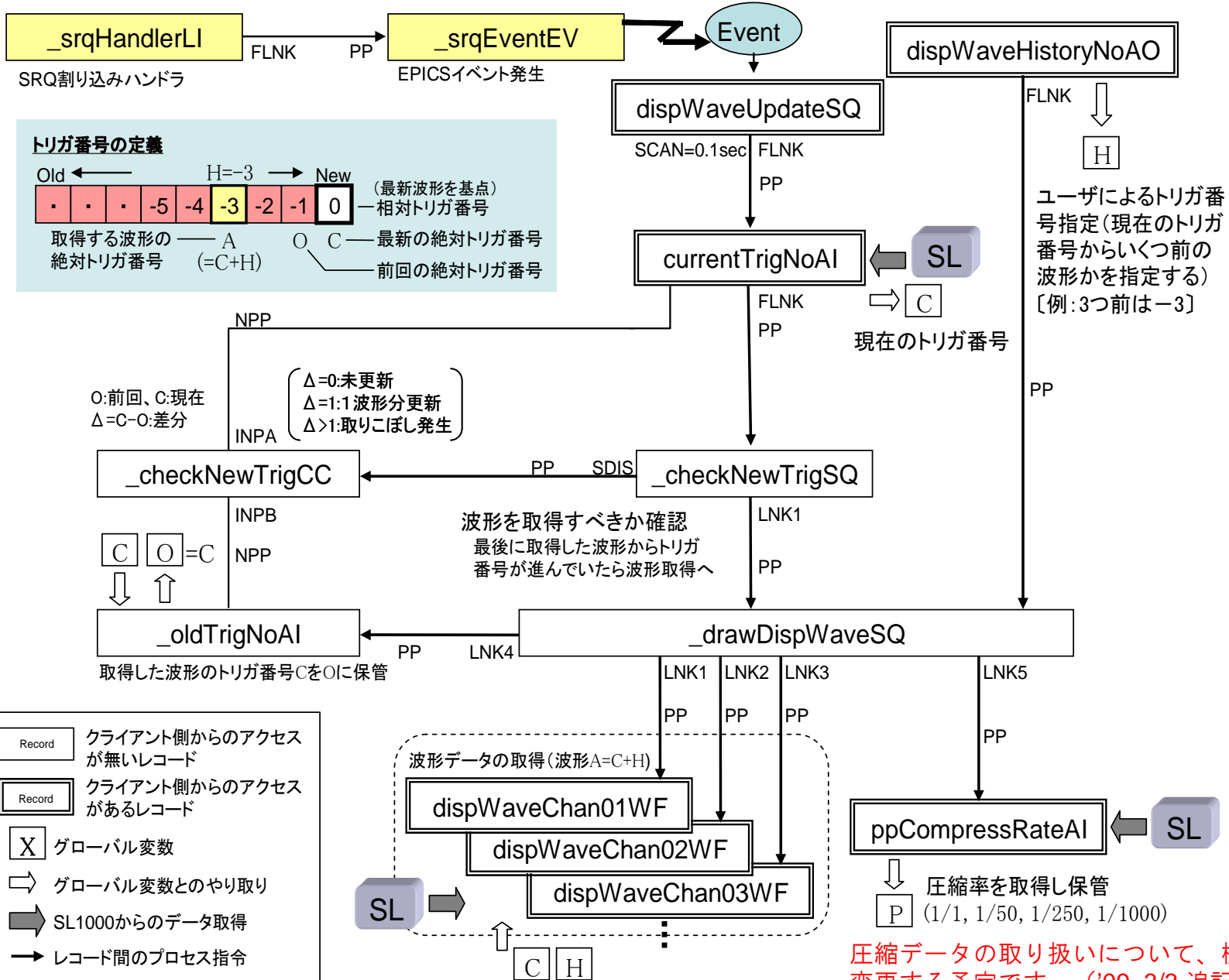
Historical Waveform Data:

- Device Support can read historical waveforms stored in the device memory.
- The maximum number of waveforms stored in the memory depends on the number of channels and the record length.

E.g. When 2 channels are used with the record length of 1M points, at maximum, 63 waveforms can be stored in the device memory.



Block Diagram of Data Processing



Performance:

- Precise studies have not been made, yet.
- At least, the system properly works in the following conditions:

Condition	Sampling Rate	Record Length	No. of Channels	Data Compression
1	100MS/s	1M	6	1/1000
2	10MS/s	100K	8	1/50
3	1MS/s	10K	10	1/50
4	1MS/s	10K	2	1/1

- We continue to study the performance.

Viewer Example 1:

Developed with MEDM: Motif Editor and Display Manager.

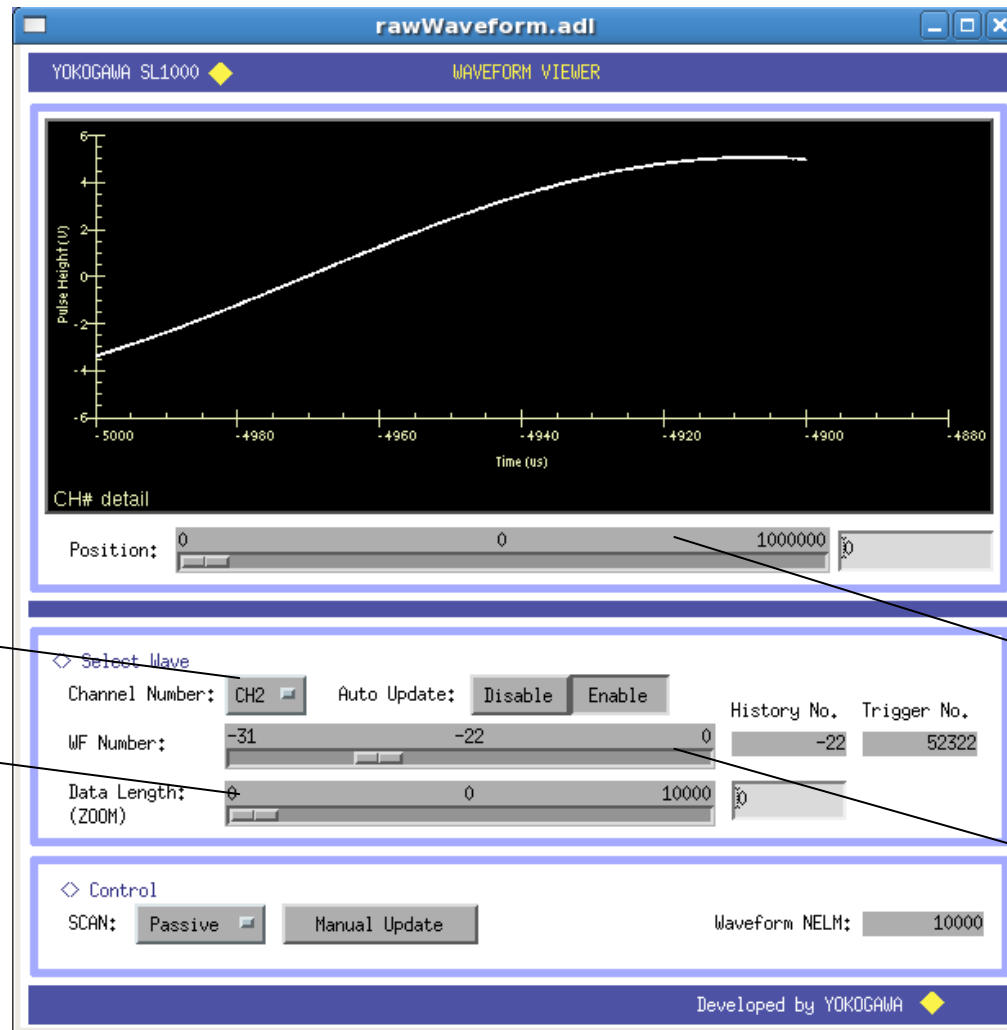
The screenshot displays the YOKOGAWA SL1000 software interface, titled "SL1000_demo_V2.adl (edited)". The main window shows two waveforms: CH1 (Pulse Height (V) vs Time (us)) and CH2 (Pulse Height (V) vs Time (us)). The CH1 waveform shows a single pulse at 0 us, and the CH2 waveform shows a periodic sine wave. The interface includes several control panels:

- Channel Settings:** CH1 is selected, with Module: MODEL 720210, ON/OFF: OFF, V/Div: 1V, CPL: DC, and Probe: 1:1.
- Trigger Parameters:** Source: CH1, Level: 0.000, Slope: FALL.
- Timing Parameters:** Position: 50%, Delay(s): 0.00000000, Hold Off(s): 0.00000000.
- Waveform Monitor:** Module Number: Mod1, Memory Size: 31 WFs, Current Trig. No.: 49398, Displayed WF: 49398.
- Current Value:** CH1: -2.400, CH2: -0.747, CH3: -0.037, CH4: 0.007.
- Data Acquisition:** SRQ Ev.No.: 123, SRQ: Disable Enable Enable, Mode: Repeat Single Repeat, Run Stop SCAN(Passive), Scan Period: Passive, Manual Trigger: M.TRG.
- Sampling Parameters:** Rate: 100 MHz, Length: 1M 1000000 Points.
- Transferred Data Type:** Raw PP Compressed, Auto Off 501250 1000 Auto, SL1000->IOC Compression Rate:(1/ 0).
- DAQ Condition:** ACQ: RUNNING, TRG: WAIT, Transferred WF Interval: 0 10 17.
- MISC:** Init: INIT, Reset: RESET, Panel: Unlock Lock.

The interface is developed by Yokogawa.

圧縮データの取り扱いについて、機能を変更する予定です。（'09, 3/3 追記）

Viewer Example 2:



Channel

Zoom

Position in Waveform

Select Waveform

Summary

- The device support for SL1000 digitizer modules has been developed.
- Digitizer modules of SL1000 Series (100M, 10M, 1M, 100kS/s) work properly with exactly the same device support.
- Basic features of SL1000 Digitizers:
 - Data compression function,
 - Historical data function, and
 - SRQ functionare supported by the device support.

謝辞

SL1000のEPICSデバイスサポート開発に際しましては、
KEK古川さんから貴重な助言を頂きました。
この場をお借りしまして、深くお礼を申し上げます。

また今回の EPICS 向けの開発が少しでもみなさんの
ご参考になれば幸いです。