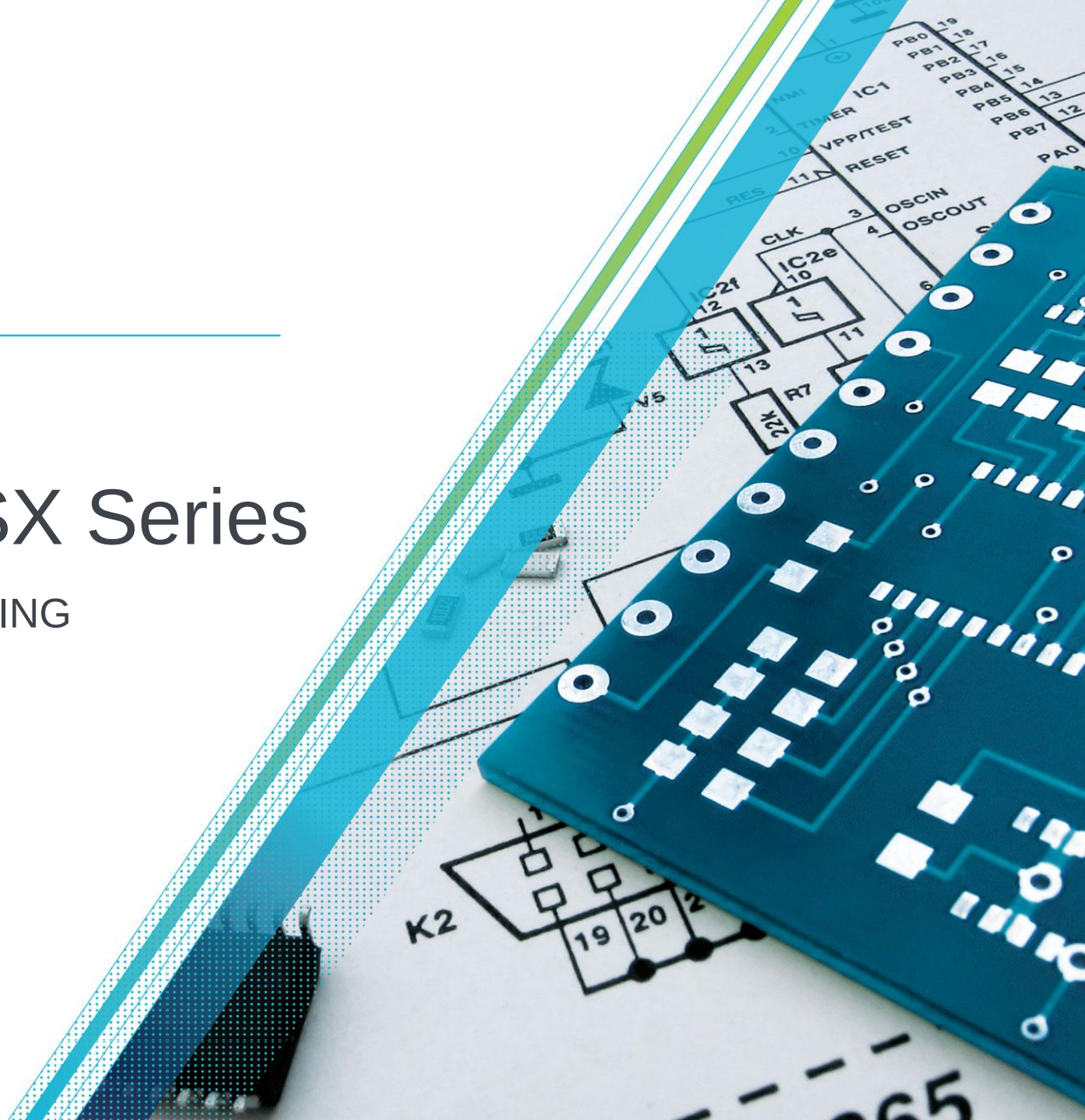
Tektronix

DPO70KSX Series

END USER TRAINING

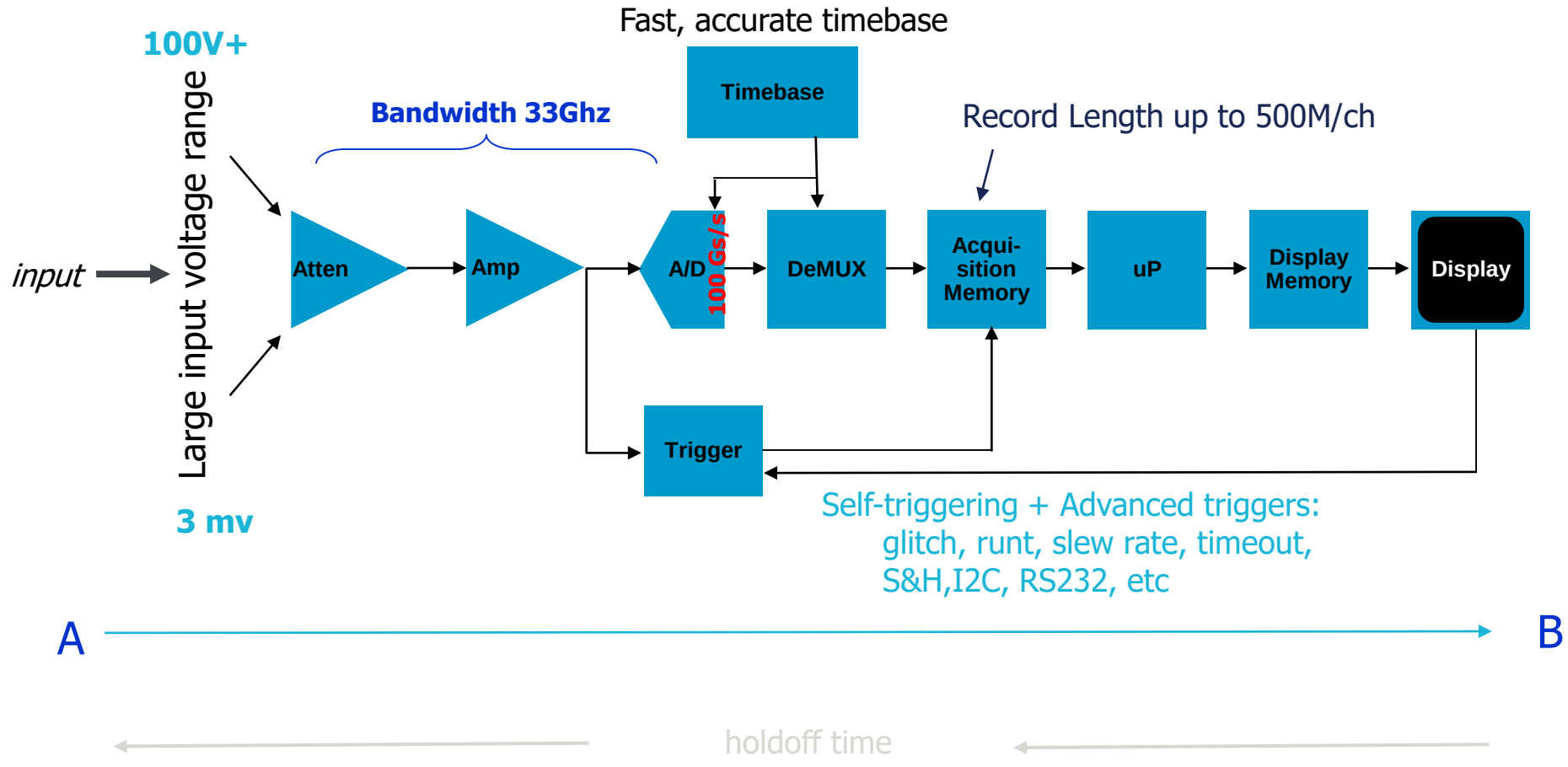
26 MAR 2019



Agenda

- Instrument Topics
  - Front/Rear panel tour (inputs/outputs etc)
  - Internal Architecture (whats inside from 10,000ft view)
  - Basic GUI navigation
  - How to Save: screen shots, settings, waveforms
  - Synchronization with another scope
  - Calibration
  - Documentation
  - Probe Best Practices
- Applications & Measurements
- Discuss/demo built-in scope measurements, histograms etc
- Use of the jitter tool (DPOJET) for eye diagram/jitter and signal integrity analysis
- Other application software of interest
- Your specific requests go here in terms of analysis or measurements – let us know

Real Time Architecture DPO73304SX



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Calibration

INSTRUMENT

- Instrument Self Calibration
  - In Utilities menu: Look for SPC “Signal Path Compensation”
  - Should be performed after 20 minutes warmup whenever a change in environmental conditions occur (move to a different lab or building)
  - No cables or fixtures required, simply disconnect signals from inputs
  - Enable the thermometer to indicate calibration status
    - displayed lower right corner **GREEN** **YELLOW** **RED**
  - There is no recommended or mandatory time interval to do this
  - If you see unusual behavior such as distorted waveforms this is a first step in verifying the instrument is performing correctly.

Calibration

PROBES

- Probes have amplifiers, amplifiers have gain and therefore prove calibration is used to improve amplitude accuracy
- The calibration has no effect on risetime or freq response – it is a procedure to calibrate the gain of the entire signal path (probe tip to ADC)
- Probes have an intelligent interface so the scope will remember if a specific serial numbered probe was calibrated on the channel in use.
- ** probes will be typically within 3-4% accuracy without calibration, the cal procedure improves this to 1.5-2%. Probes have a self-check and will usually report an error if they go out of tolerance.

Calibration

PROBES

- Each probe family will have its own calibration (and deskew) fixture
- Follow the procedures found in the manual (and online help of the scope) to perform the probe calibration
- Calibrator Output (#3)
- Fast Rising Edge (#6)
  - Can be used for deskew

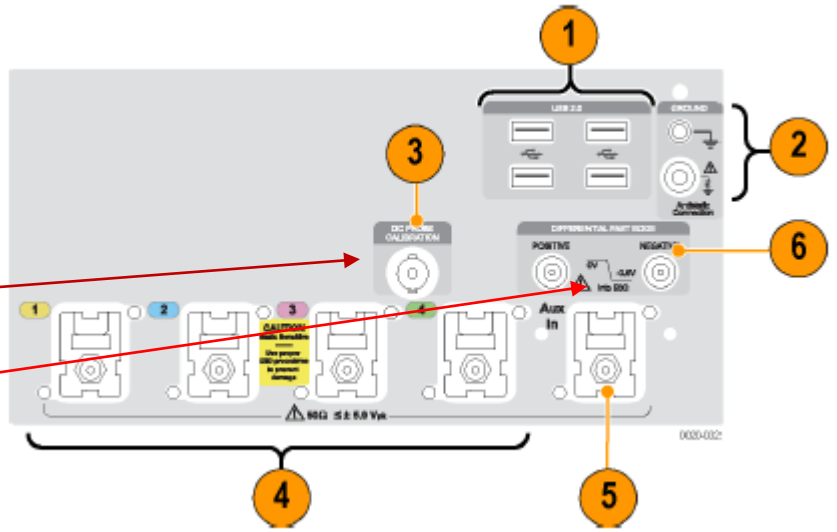
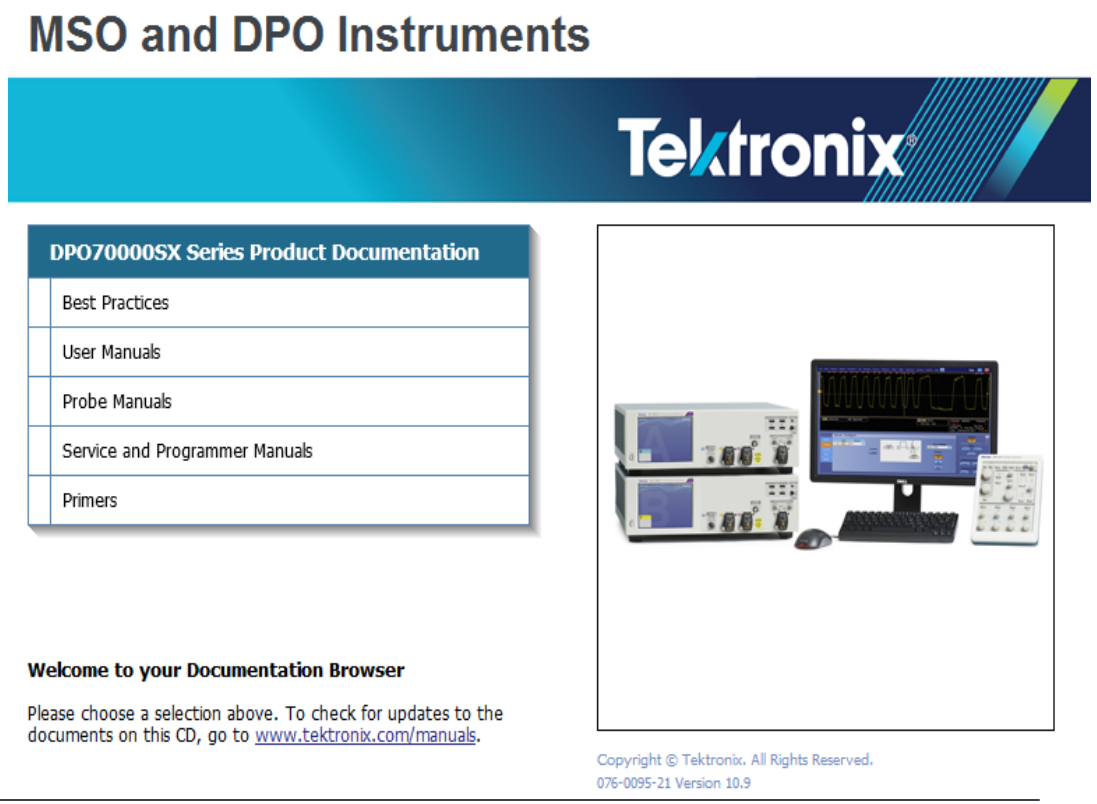


Figure 6: TekConnect channels

Documentation

- Folder on Desktop of instrument contains manuals for instruments, probes, applications……
- www.tek.com also has Search function for manuals
- Context sensitive help available thru the scope user interface via “right-click”



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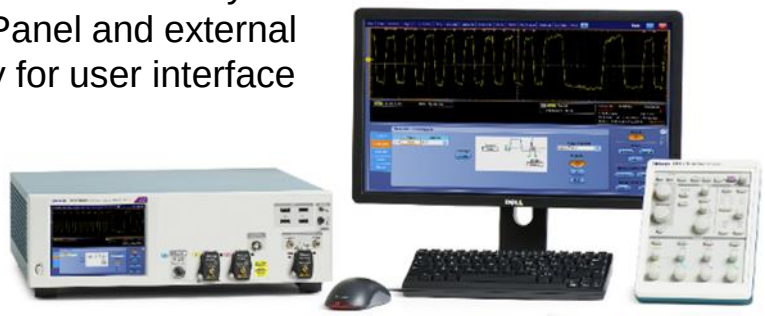
UltraSync Technology

SYNCHRONIZING MULTIPLE INSTRUMENTS

- The DPS73308SX = Qty 2 of DPO73304SX
- Each DPO73304SX is a standalone oscilloscope
- When combined via the UltraSync cable then the 2 units become integrated into 1 instrument.
  - Master – Extension relationship
  - **One** user interface (master) controls all functions, waveform displays, remote control and triggering
- Cables installed when powered off and on powerup the units synchronize automatically
  - Color coded connections make hookup simple
  - Only tool needed is a SMA torque wrench

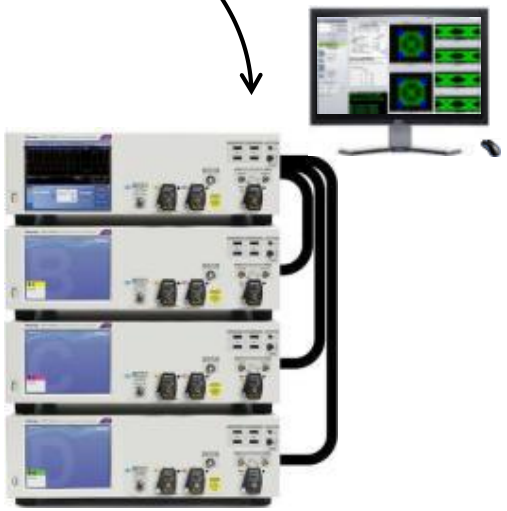
Scalable Performance

Compact 5 ¼” package with optional Auxiliary Front Panel and external display for user interface



Additional performance using multiple units

Configuration flexibility with precisely-synchronized timing



UltraSync High Performance Synchronization & Control bus

- 12.5 GHz Sample Clock Reference
- Coordinated Trigger
- High speed data path

UltraSync Multi-unit Synchronization

1 meter UltraSync cable

- Sample clock synchronization
  - 12.5 GHz system sample clock
- Trigger bus
  - Tight channel-to-channel trigger synchronization among all units
- Control & Data Bus
  - UI, PI, DataStore in Master
  - PCIe Gen 2 x 4 lanes
  - Data processed in each Extension, aggregated in Master
- Configuration Manager software assists in correct connection

Multi-unit configurations

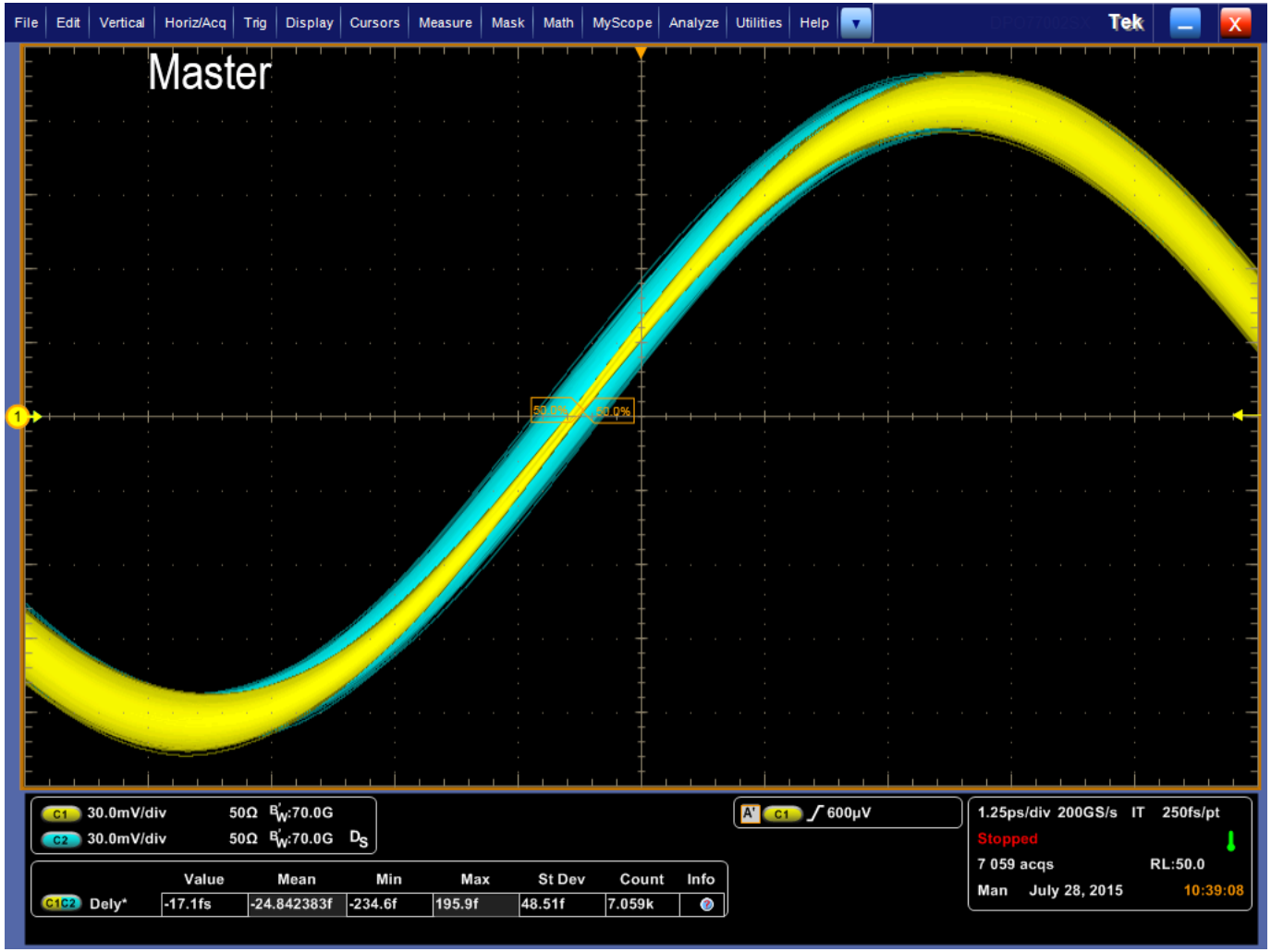
- UltraSync High Performance Synchronization & Control Bus

“Master”

- 12.5 GHz Sample Clock Reference
- Coordinated Trigger
- High speed data path

“Extension”

Channel-to-Channel Skew Stability: 2 stack example



430fs pk-pk, 48.5fs$_{RMS}$, 65GHz sinewave

Matlab?

```
function ICT_example
%clear all variables
delete(instrfind)
clear all
g = visa('ni','TCPIP::169.254.157.154::INSTR');
fopen(g);
fprintf(g,'DATA:SOURCE CH1')
recordLength=query(g,'HORIZONTAL:RECORDLENGTH?','%s\n',
'%d');
fclose(g);
recordLength
 g.InputBufferSize = recordLength;
fopen(g);
fprintf(g,'DATA:START 1');
fprintf(g,['DATA:STOP ' num2str(recordLength)]);
fprintf(g,'DATA:WIDTH 1');
fprintf(g,'DATA:ENC RPB');
fprintf(g,'CURVE?');
data = binblockread(g,'uint8');
ymult = str2num(query(g,'WFMP:YMULT?'));
yoff = str2num(query(g,'WFMP:YOFF?'));
xmult = str2num(query(g,'WFMP:XINCR?'));
xoff = str2num(query(g,'WFMP:PT_OFF?'));
xzero = str2num(query(g,'WFMP:XZERO?'));
ydata = ymult*(data - yoff);
xdata = xmult*((0:length(data)-1)-xoff)+xzero;
%Plot the scaled data.
 plot(xdata,ydata)
 title('Scaled Waveform Data'); ylabel('Amplitude
(V)');
  xlabel('Time (s)')
```