



Slice for Flex PLI

31 March 2008

DTS Data Acquisition Background History

- 1998: TDAS PRO – 90 cm³/channel



Sled and Vehicle Crash



- 2003: TDAS G5 – 3.5 cm³/channel



WorldSID and iDummy



- 2008: Slice – 1.3 cm³/channel



Head and Leg Form

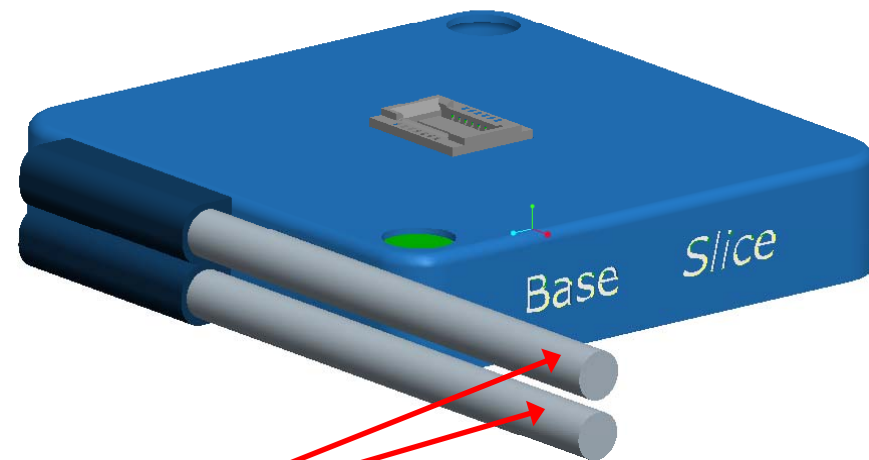


Slice Concepts

- Modular system – build from 3 to 30 channels in 3 channel *Slices*
- Plug multiple *Bridge Slices* onto *Base Slice* to make a *Stack*
- USB daisy-chain between *Stacks* and to PC
- Up to 100 KHz sampling per channel, 16 bit ADC
- Meets all requirements of SAE J211 and ISO 6487
- Up to 8 GB (soon 16 GB) flash memory (for a 6 channel system you could take data for 37 hours! at 10 KHz sampling)
- Almost 2 times smaller than any other competing data acquisition system

Slice Design

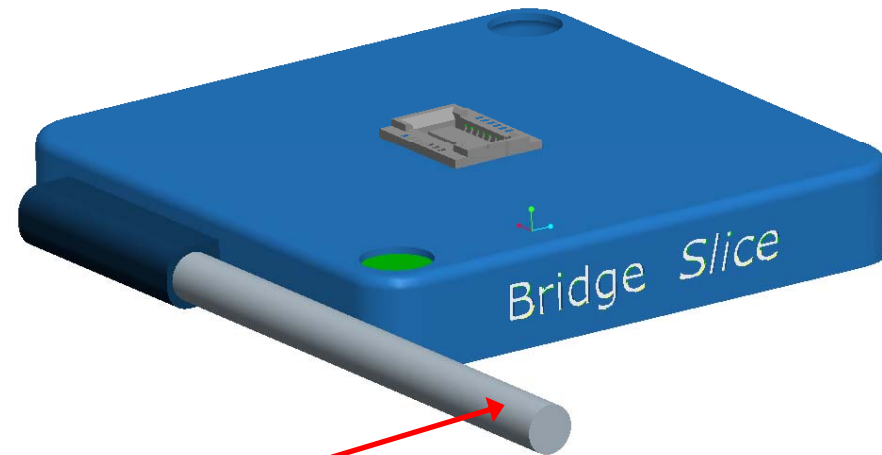
- **Base *Slice***
 - 25 x 25 x 5 mm
 - Contains microprocessor, memory, USB 2.0 port and hub, power, trigger, and control
 - Other *Slices* stack on top of *Base Slice*



- Two redundant connections for daisy-chaining to other *Stacks* and connection to the PC

Slice Design

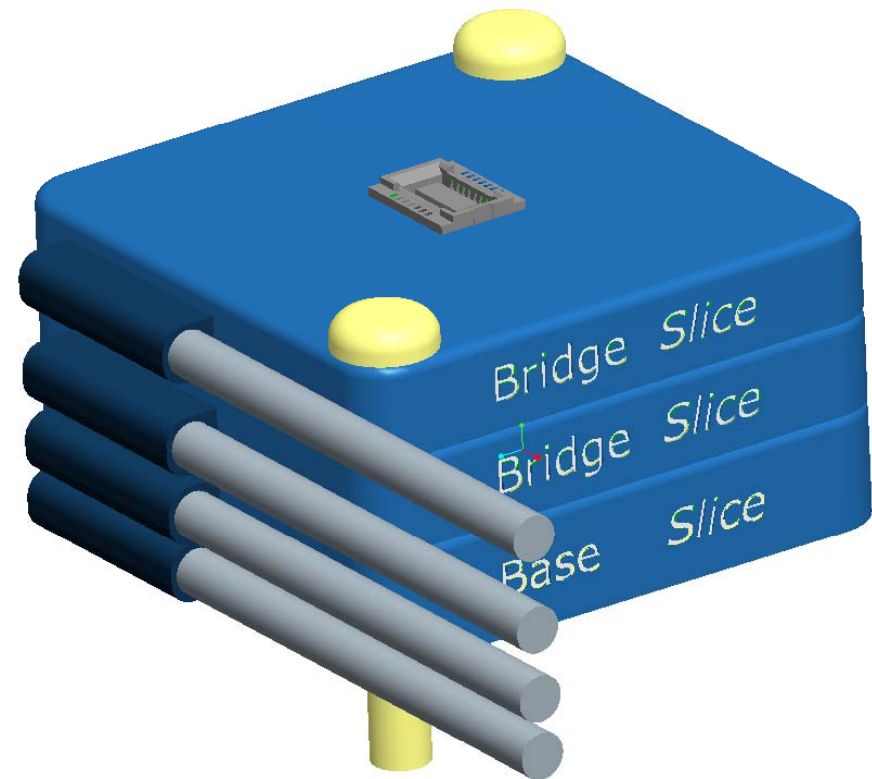
- **Bridge Slice**
 - 25 x 25 x 4 mm
 - 3 channels – independent 16 bit, 100 KHz ADCs
 - Factory settable for 2, 2.5, 3, or 5V sensor excitation
 - Designed to stack onto **Base Slice** or other **Bridge Slices**
 - Accommodates most common dummy sensor types



- Connect to sensors via shielded instrumentation cable

Slice Design

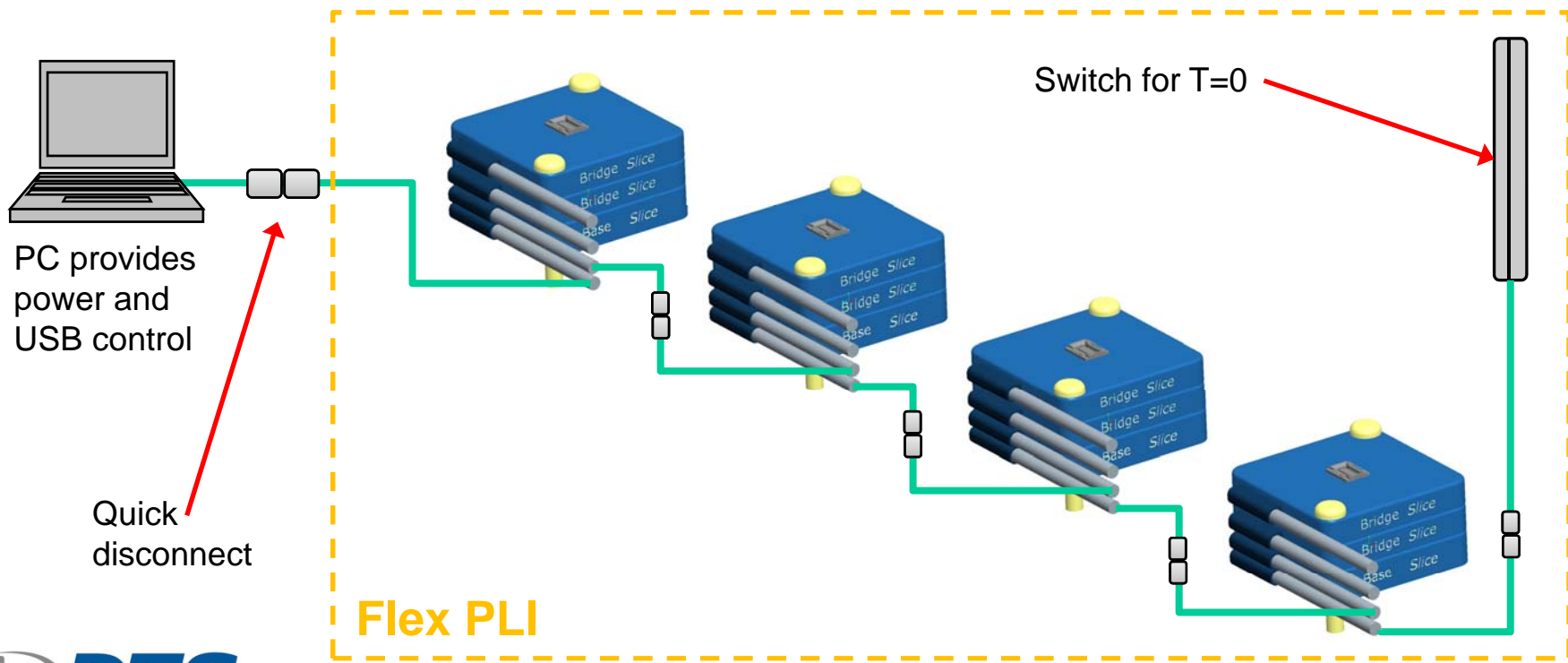
- *Stack*
 - Up to 10 *Slices* can be stacked onto Base *Slice* (30 channels – would be 45 mm high)
 - Two 2.5 mm or 4-40 bolts for connection and mounting



Example 6 channel system: 25 x 25 x 13 mm high

Slice for Flex PLI

- 1 to 4 *Slice Stacks* are mounted on the Flex and chained together
- The end of the chain is connected to T=0 switch
- The beginning of the chain is connected to the off-board PC via a quick disconnect



Slice for Flex PLI

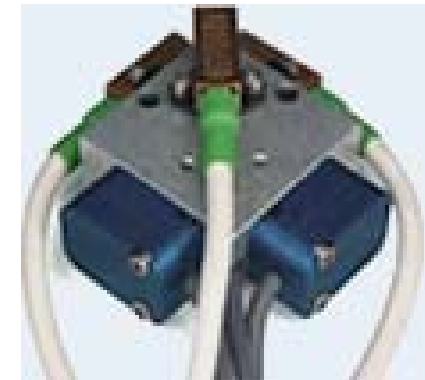
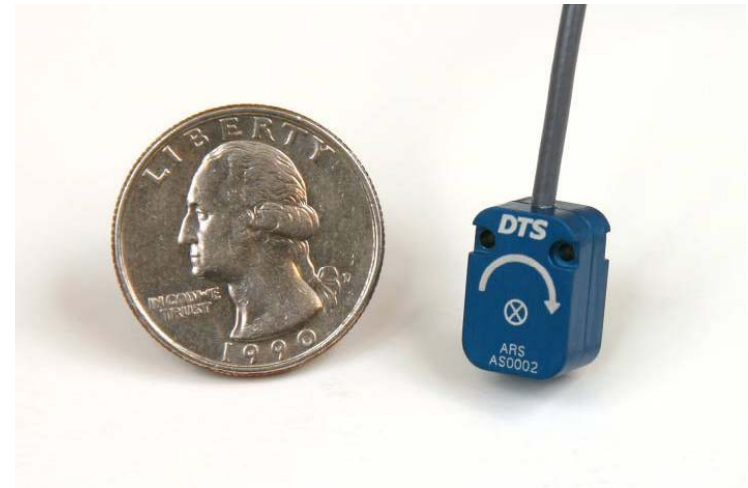
- It is very important to consider the test sequence to assure reliable data collection
- Proposed Test Sequence
 - Position Flex on launch machine.
 - Connect quick disconnect and USB port of PC.
 - Arm *Slice* channels with *Slice* software. Note PC provides power for *Slice* and sensors until launch.
 - Launch Flex.
 - *Slice* automatically starts collecting data at 20 KHz when quick disconnect breaks.
 - Each *Slice Stack* has super capacitor for 5+ seconds of power. Note: super capacitor is recharged within minutes when reconnected to PC for next test.
 - All data stored to flash memory – no power needed to retain memory.
 - T=0 is marked in data when switch on Flex contacts vehicle.
 - After test, reconnect to USB port on PC and download data from *Slice*.
 - *Slice* software allows data viewing and export to ASCII or ISO.

Slice Development Schedule

- Originally designed for US Air Force in contract ending April 2008
- *Slice* design freeze for Flex PLI: March 21
- All drawings provided to FTSS: April 5
- Delivery of two 6 channel *Slice* units to FTSS: July 30
- Assist FTSS with testing: August-September
- Assist users with testing for duration of program
 - DTS has technical support offices in Japan, Germany and Detroit

DTS ARS

- MEMs Device – DC response
- Range – Frequency Response
 - 300 deg/sec – Class 100
 - 1,500 deg/sec – Class 600
 - 12,000 deg/sec – Class 1000
 - 50,000 deg/sec – 10 KHz -3dB
- Input Voltage: 4.95V to 14V
- Output Voltage: $\pm 2V$





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Thank You