

E SERIES

SV6E-X: SoundWire

Mid-Frequency Digital Test Module



Multi-Purpose Protocol Exerciser, Protocol Analyzer, and Real-Time Oscilloscope Enabling High-Performance Testing of SoundWire

The SV6E-X is an all-inclusive solution for mid-frequency digital interface development and test. Featuring its support for MIPI SoundWire®, a protocol commonly used in microphone arrays and stereophonic and surround sound, the SV6E-X module replaces racks of equipment that are typically required for I/O testing. The SV6E-X contains three instruments in one: a **protocol exerciser**, a **protocol analyzer** with fine-resolution timing analysis, and a **real-time oscilloscope**. As a result, the SV6E-X enables high-performance testing of SoundWire.

KEY FEATURES:

- **Configurable Data Rate:** Up to 26Mbps in DDR mode (13MHz Clock Frequency).
- **Configurable Voltage:** Ranging between 0.8V and 3.6V, the SV6E-X supports a wide array of devices under test.
- **Power Saving and Wakeup Capability:** Efficient functionality to save power as peripheral remains idle when not required.
- **Easy to Use:** Pinetree software environment enables interactive operation or full automation.

KEY BENEFITS:

- **Future proof:** Use a single investment in hardware to evolve protocol testing over multiple generations of product development.
- **Flexible:** Programmable voltage levels and input/output timings offer true functional stress testing and characterization capabilities.
- **Automated:** Scripting capability is ideal for debug tasks, verification and full-fledged production screening of devices and system boards.

Typical Application: Testing Multiple SoundWire Peripherals

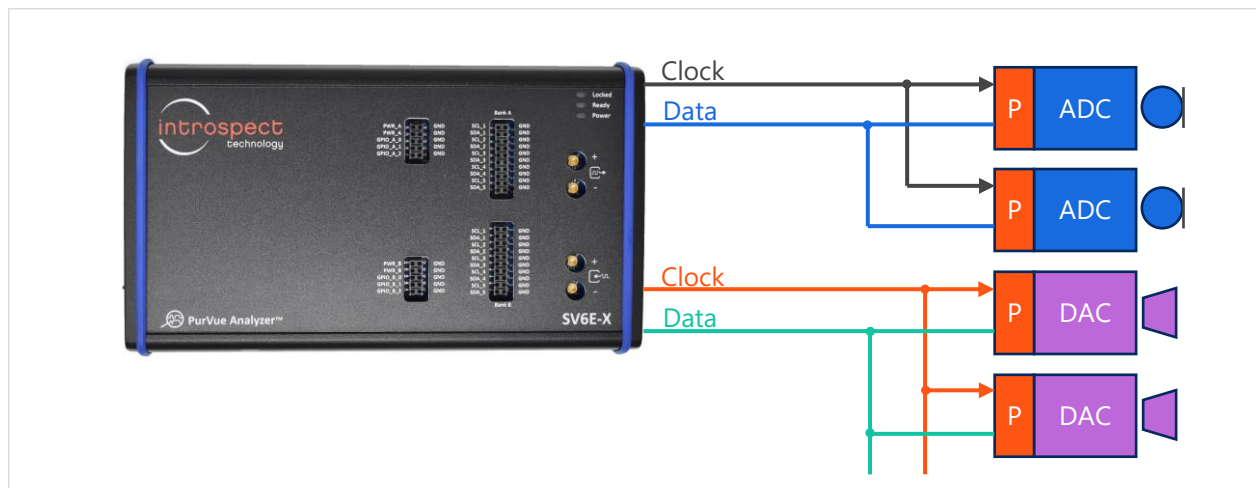


Diagram of the SV6E-X module communicating with multiple DUTs in a multi-Bus configuration.

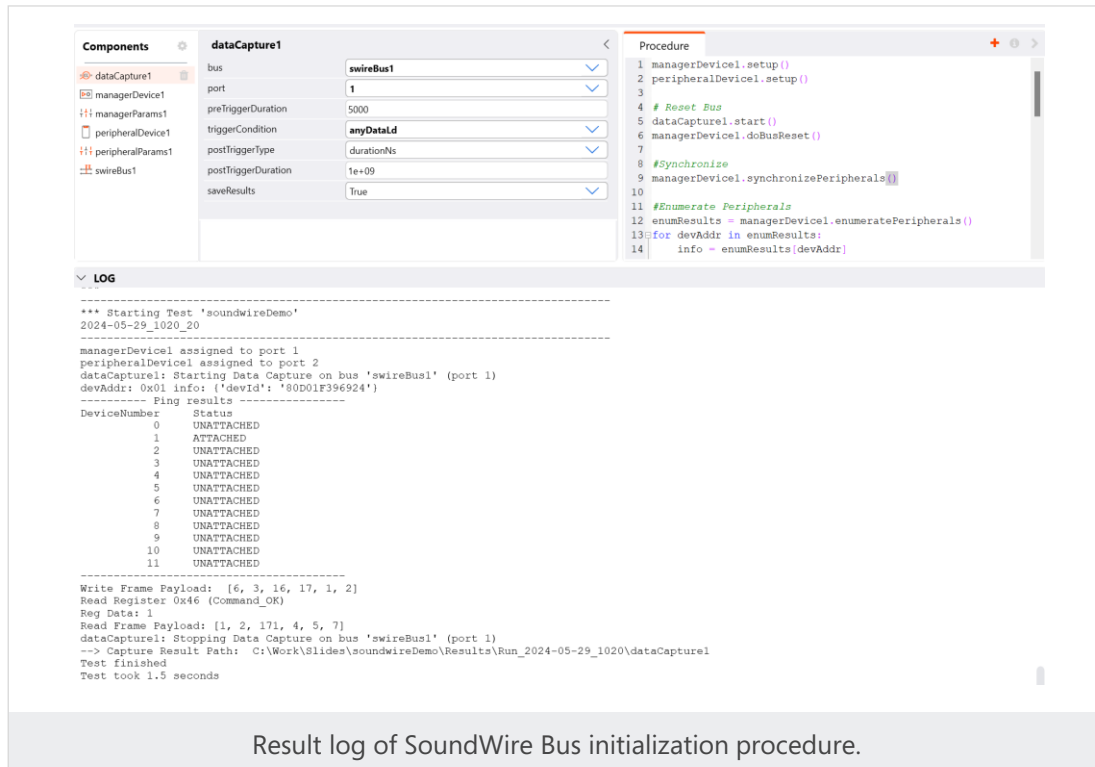
General Specifications

FEATURE	DESCRIPTION	BENEFIT
Number of I/O Channels	2 banks of 8 channels each (Up to 4 Devices per bank)	Emulates the most complex multi-drop protocol situations
Maximum Data Rate	26 Mbps in DDR mode (13 MHz clock frequency)	Provides the flexibility to configure up to the maximum SoundWire frequency
On-Board Memory	1 GByte	Streams to PC for larger memory capacity
Power-Saving Mode	Supports clock stop and in-band wakeup requests	Emulates a real-life device power-saving mode
Status monitoring and In-Band Interrupts	Supports ping requests and peripheral in-band interrupts	Simulates SoundWire status monitoring and Interrupt requests

Electrical Specifications

FEATURE	DESCRIPTION	BENEFIT
Voltage Range	0.8V to 3.6V in 1mV steps	Supports a wide array of devices under test
Timing Resolution	2.5 ns logic, 1 ns analog	Fine and coarse timing control capability based on the parameter being set

Exercising the SoundWire Protocol in Introspect’s Pinetree Software



The screenshot shows the software interface with configuration parameters for 'dataCapture1' and a procedure window. The configuration includes bus 'swireBus1', port 1, preTriggerDuration 5000, triggerCondition 'anyDataLd', postTriggerType 'durationNs', postTriggerDuration '1e+09', and saveResults 'True'. The procedure window contains the following code:

```

1 managerDevice1.setup()
2 peripheralDevice1.setup()
3
4 # Reset Bus
5 dataCapture1.start()
6 managerDevice1.doBusReset()
7
8 #Synchronize
9 managerDevice1.synchronizePeripherals()
10
11 #Enumerate Peripherals
12 enumResults = managerDevice1.enumeratePeripherals()
13 for devAddr in enumResults:
14     info = enumResults[devAddr]
  
```

The log window shows the following output:

```

*** Starting Test 'soundwireDemo'
2024-05-29_1020_20
-----
managerDevice1 assigned to port 1
peripheralDevice1 assigned to port 2
dataCapture1: Starting Data Capture on bus 'swireBus1' (port 1)
devAddr: 0x01 info: ('devId': '80D01F396924')
-----
Ping results
-----
DeviceNumber  Status
0             UNATTACHED
1             ATTACHED
2             UNATTACHED
3             UNATTACHED
4             UNATTACHED
5             UNATTACHED
6             UNATTACHED
7             UNATTACHED
8             UNATTACHED
9             UNATTACHED
10            UNATTACHED
11            UNATTACHED
-----
Write Frame Payload: [6, 3, 16, 17, 1, 2]
Read Register 0x46 (Command_OK)
Reg Data: 1
Read Frame Payload: [1, 2, 171, 4, 5, 7]
dataCapture1: Stopping Data Capture on bus 'swireBus1' (port 1)
--> Capture Result Path: C:\Work\Slides\soundwireDemo\Results\Run_2024-05-29_1020\dataCapture1
Test finished
Test took 1.5 seconds
  
```

Result log of SoundWire Bus initialization procedure.