

PGY-I2C/SPI-EX-PD: I2C/SPI Protocol Exerciser & Analyzer



I2C/SPI Protocol Exerciser & Analyzer

I2C is a two-wire interface to connect low speed devices like micro-controllers, EEPROM's, A/D & D/A converters, I/O interfaces, and other small peripherals in embedded systems. I2C bus is used by many IC's and is simple to implement. Any microcontroller can communicate with I2C buses. I2C bus can communicate in slow devices and can also use high speed modes to transfer large amounts of data.

SPI is one of the widely used interfaces between micro-controller and peripheral IC's such as sensors, ADC's, DAC's, shift registers, SRAM, and others. SPI is synchronous, full-duplex master-slave based interface. Both master and slave can transmit data at the same time. The SPI interface can be a 3 wire or 4-wire

PGY-I2C/SPI-EX-PD is the leading instrument that enables the design and test engineers to test the respective I2C or SPI designs for its specifications by configuring PGY-I2C/SPI-EX-PD as master/slave, generating I2C/SPI traffic and decoding I2C/SPI Protocol decode packets.

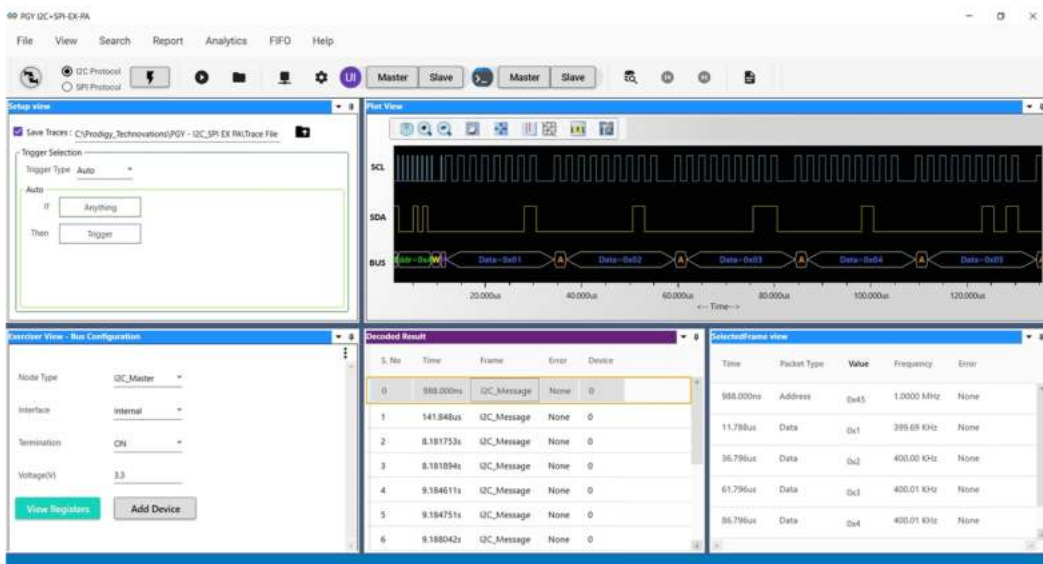
Features

- ◆ Support I2C specifications
- ◆ Support SPI specifications
- ◆ Ability to configure it as Master or Slave
- ◆ Generate different I2C/SPI Packets
- ◆ Variable data speeds.
- ◆ Generate I2C/SPI traffic and Protocol decode of the Bus
- ◆ Timing diagram of Protocol decoded bus
- ◆ Listing view of Protocol activity
- ◆ Ability to write exerciser script to combine multiple data frame generation at different data speeds
- ◆ USB2/3 host computer interface
- ◆ Continuous streaming protocol activity to host system HDD/SSD
- ◆ API support for automation in Python or C#

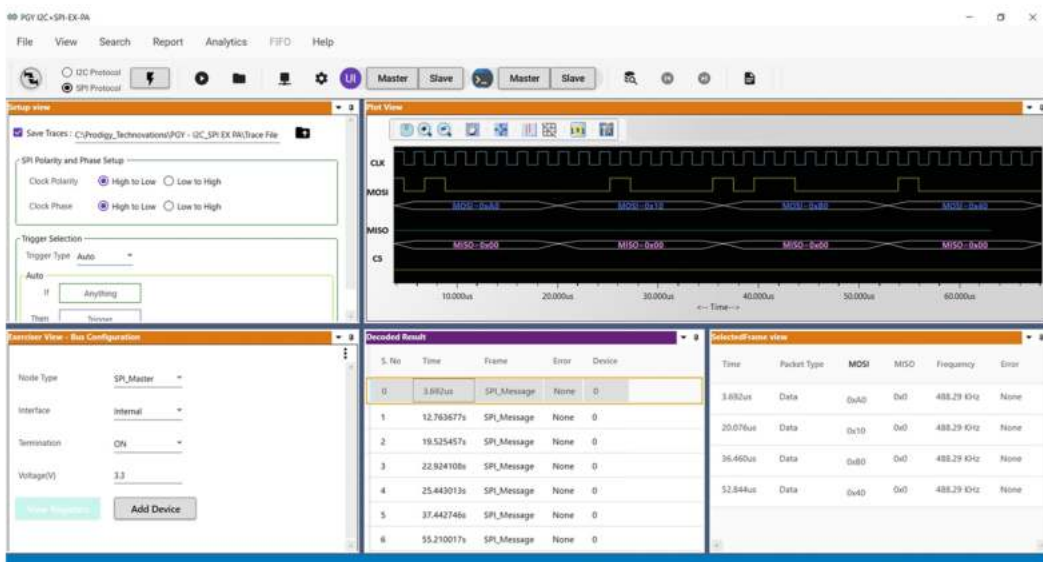
Product Setup



Comprehensive Protocol Analysis using Multi-View



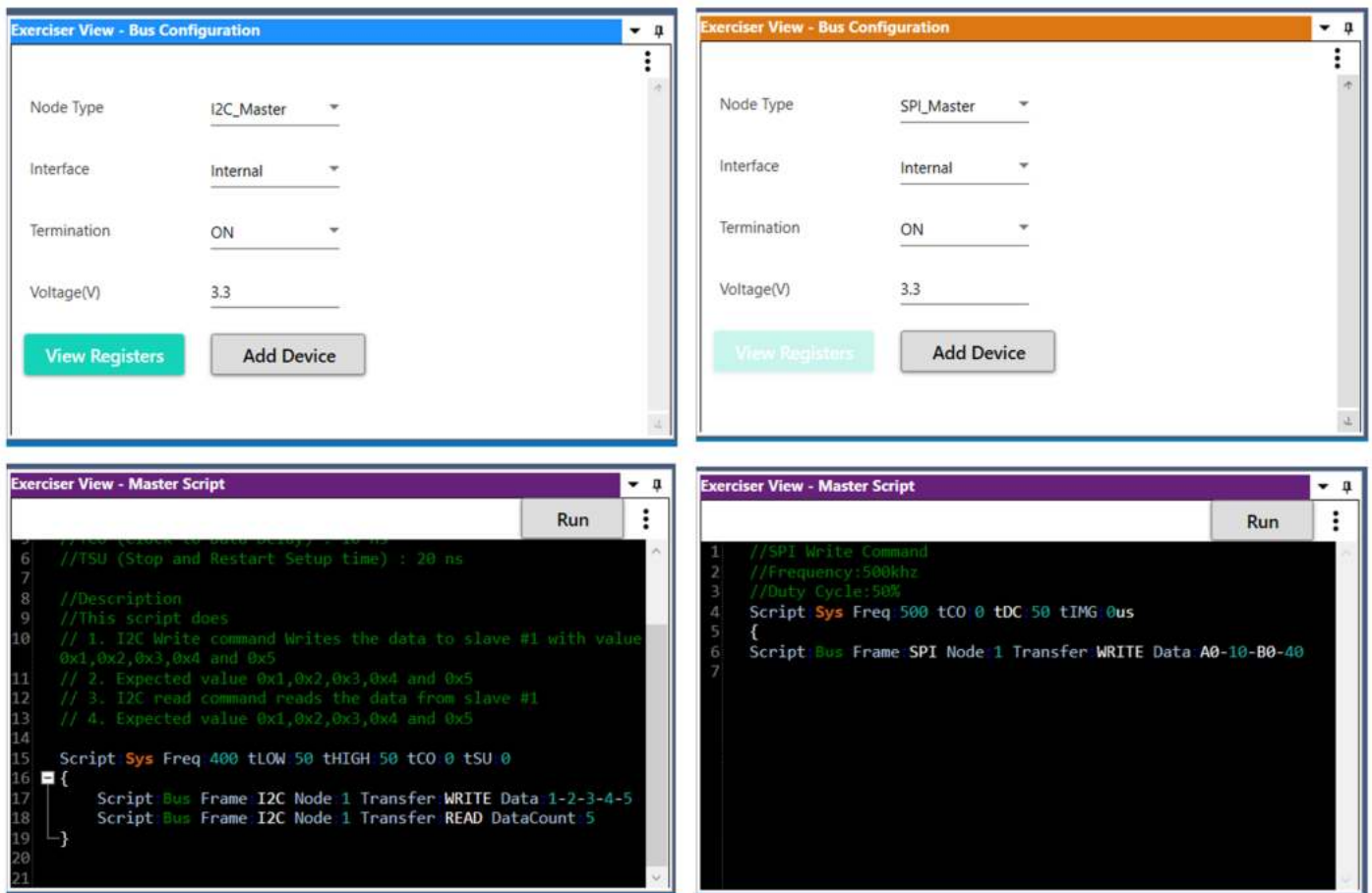
GUI for I2C Protocol



GUI for SPI Protocol

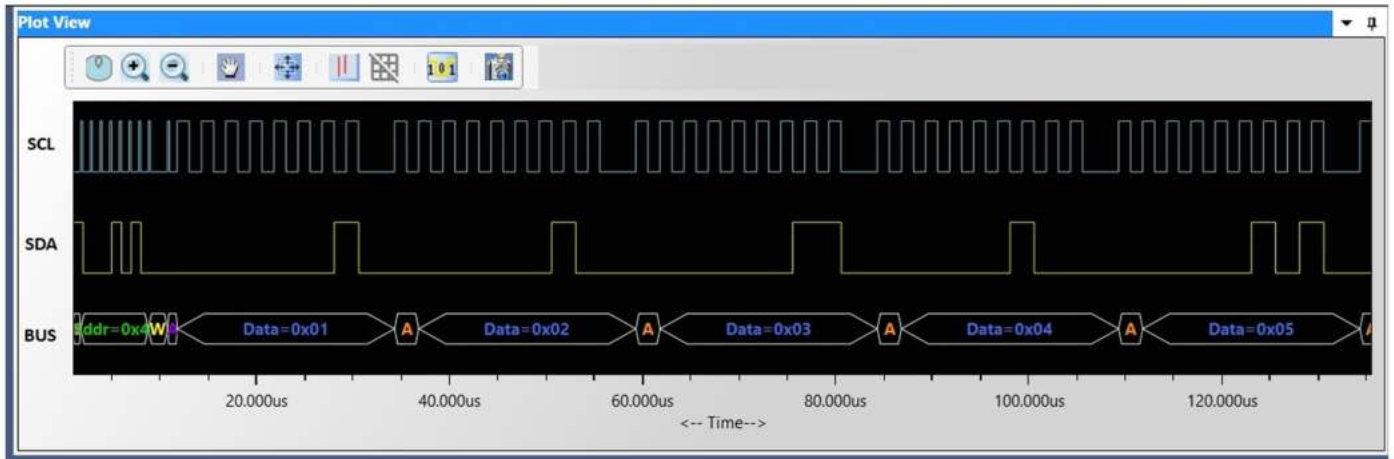
Multidomain View provides the complete view of I2C or SPI Protocol activity in single GUI. User can easily setup the analyser to passively monitor or use the exerciser to generate I2C or SPI traffic using a GUI or script. User can set different trigger conditions from the setup menu to capture Protocol activity at specific event and decode the transition between Master and Slave. The decoded results can be viewed in timing diagram and Protocol listing window with autocorrelation. This comprehensive view of information makes it industry best, offering an easy to use solution to debug the I2C or SPI protocol activity. Continuous streaming protocol activity to host system HDD/SSD ensures seamless roll mode operation without the need to recapture data when DUT/s are set to different states thereby saving test times.

Exerciser

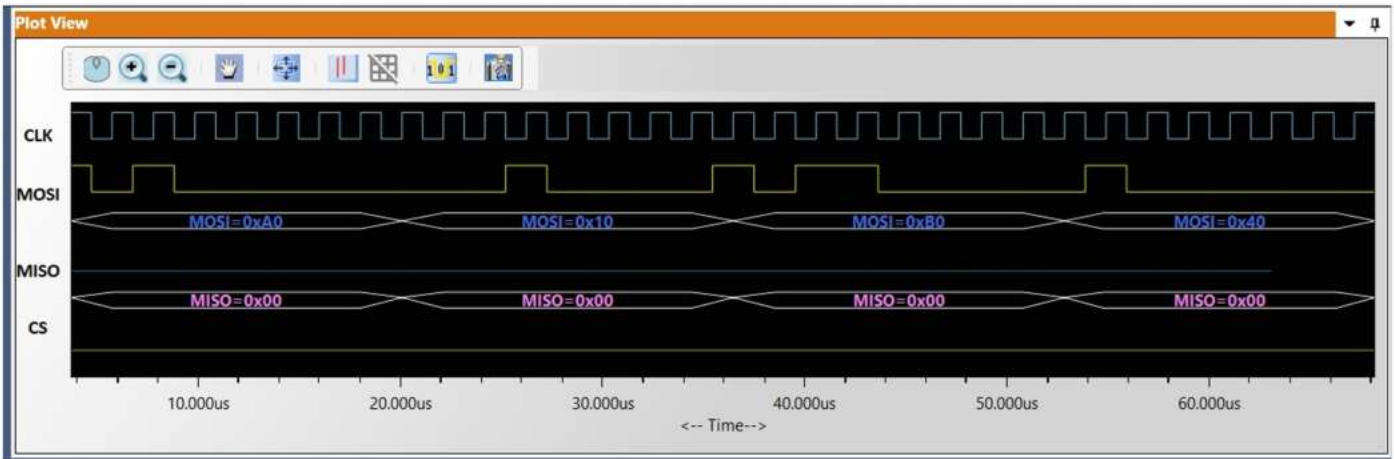


PGY- I2C/SPI -EX-PD supports I2C or SPI traffic generation using GUI and Script. User can generate traffic using the GUI to test the DUT. Script based GUI provides flexibility to emulate the complete expected traffic in real time.

Timing Diagram and Protocol Listing View



Plot View for I2C Protocol



Plot View for SPI Protocol

Timing view provides the plot of Clock and data signals with bus diagram. Overlaying of Protocol bits on the digital timing waveform will help easy debugging of Protocol decoded data. Cursor and Zoom features will make it convenient to analyse Protocol in timing diagram for any timing errors.

Decoded Result					SelectedFrame view				
S. No	Time	Frame	Error	Device	Time	Packet Type	Value	Frequency	Error
0	988.000ns	I2C_Message	None	0	988.000ns	Address	0x45	1.0000 MHz	None
1	141.848us	I2C_Message	None	0	11.788us	Data	0x1	399.69 KHz	None
2	8.181753s	I2C_Message	None	0	36.796us	Data	0x2	400.00 KHz	None
3	8.181894s	I2C_Message	None	0	61.796us	Data	0x3	400.01 KHz	None
4	9.184611s	I2C_Message	None	0	86.796us	Data	0x4	400.01 KHz	None
5	9.184751s	I2C_Message	None	0					
6	9.188042s	I2C_Message	None	0					

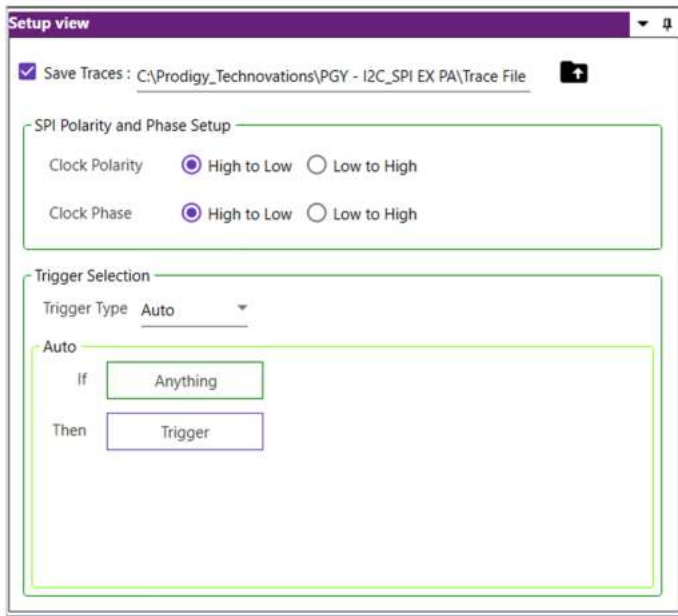
Result View for I2C Protocol

Decoded Result					SelectedFrame view					
S. No	Time	Frame	Error	Device	Time	Packet Type	MOSI	MISO	Frequency	Error
0	3.692us	SPI_Message	None	0	3.692us	Data	0xA0	0x0	488.29 KHz	None
1	12.763677s	SPI_Message	None	0	20.076us	Data	0x10	0x0	488.29 KHz	None
2	19.525457s	SPI_Message	None	0	36.460us	Data	0xB0	0x0	488.29 KHz	None
3	22.924108s	SPI_Message	None	0	52.844us	Data	0x40	0x0	488.29 KHz	None
4	25.443013s	SPI_Message	None	0						
5	37.442746s	SPI_Message	None	0						
6	55.210017s	SPI_Message	None	0						

Result View for SPI Protocol

Protocol window provides the decoded packet information in each state and all packet details. Selected frame in Protocol listing window will be auto correlated in timing view to view the timing information of the packet.

Powerful Trigger Capabilities



Setup view

Save Traces : C:\Prodigy_Technovations\PGY - I2C_SPI EX PA\Trace File

SPI Polarity and Phase Setup

Clock Polarity: High to Low Low to High

Clock Phase: High to Low Low to High

Trigger Selection

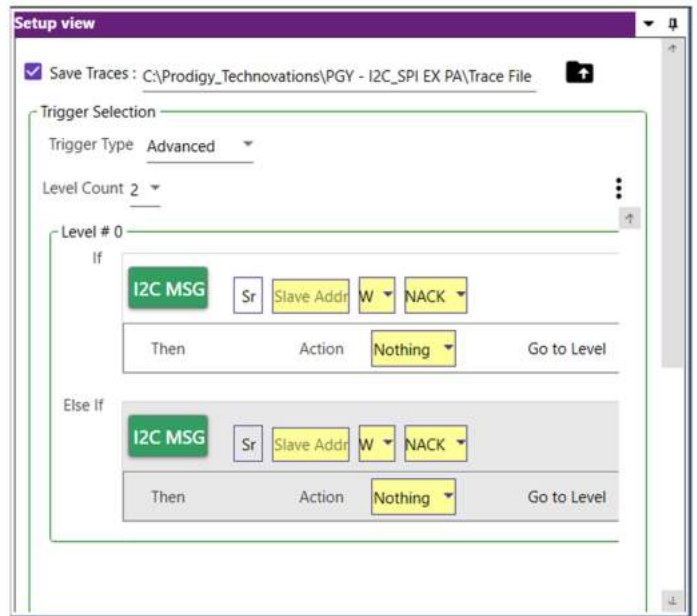
Trigger Type: Auto

Auto

If: Anything

Then: Trigger

Setup View for I2C Protocol



Setup view

Save Traces : C:\Prodigy_Technovations\PGY - I2C_SPI EX PA\Trace File

Trigger Selection

Trigger Type: Advanced

Level Count: 2

Level # 0

If: I2C MSG, Sr, Slave Addr, W, NACK

Then: Action: Nothing, Go to Level

Else If

I2C MSG, Sr, Slave Addr, W, NACK

Then: Action: Nothing, Go to Level

Setup View for SPI Protocol

PGY-I2C/SPI-EX-PD supports simple trigger capabilities. Analyzer can trigger on any of the Protocol packet. Advanced Trigger provides the flexibility to monitor Multiple trigger conditions and can set multiple state trigger machine. User can initiate a timer and trigger on set timer values.

PGY-I2C/SPI-EX-PD Specification	Features	PGY-I2C/SPI-EX-PD
Exerciser:		
Interfaces supported	I2C or SPI	✓
Configurable	1 I2C Master + 3 I2C Slaves OR 1 SPI Master+ 1 SPI Slave	✓
I2C/SPI Traffic Generation	Custom I2C/SPI traffic generation	✓
Clock Frequency	Up to 3.4 MHz for I2C. Variable up to 32 MHz, Fixed Up to 50 MHz for SPI	✓
FIFO Capacity	I2C: Yes, 8K read and 8K write on master & 1K on Slave.	✓
Voltage Drive Level	1V to 3.3V for I2C. 1V to 3.3V for SPI. Variable in steps of 100mV	✓
Command sequence Support	All command sequence is supported	✓
Clock Duty Cycle variation	User Define for I2C. 25%, 50%, or 75% for SPI	✓
Clock & Data Delay	User defined for I2C. User defined for SPI.	✓
Delay between two messages	Customisable Delay	✓
API Support	I2C: Yes. SPI: Yes.	✓
Protocol Analysis:		
Supports	I2C/SPI protocol decode	
Protocol Views	Timing Diagram View Protocol Listing View Bus-Diagram to display Protocol packets with timing diagram plot	✓
Protocol Trigger	I2C Trigger Capabilities: <ul style="list-style-type: none"> • Auto Trigger • Message trigger- Trigger Slave Address for write or read command on NACK and Trigger Slave Address and Data for Write or Read command on ACK. • Advanced multi-level, multiple condition trigger. 	✓
Capture Duration	Continuous streaming Protocol Data	✓
Report Generation	CSV/PDF format	✓
Host Connectivity	USB 3.0 / 2.0 interface	✓
Dimension	157mm x 90.2mm x 26.6mm	
Net Weight	290 gms / 0.63 lbs	
Gross Weight	1.05 kg / 2.31 lbs	

Ordering Information

PGY-I2C/SPI-EX-PD: I2C/SPI Protocol Exerciser and Analyzer (Please mention the specification needed)

Deliverables for PGY-I2C/SPI-EX-PD

- PGY-I2C/SPI-EX-PD Unit
- USB3.0 cable
- PGY-I2C/SPI-EX-PD Software in CD
- 12V DC adopter
- Flying lead probe cable with female connector to connect to DUT

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About Prodigy Technovations Pvt Ltd

Prodigy Technovations Pvt Ltd (www.prodigytechno.com) is a leading global technology provider of Protocol Decode, and Physical layer testing solutions on test and measurement equipment. The company's ongoing efforts include successful implementation of innovative and comprehensive protocol decode and physical Layer testing solutions that span the serial data, telecommunications, automotive, and defence electronics sectors worldwide.