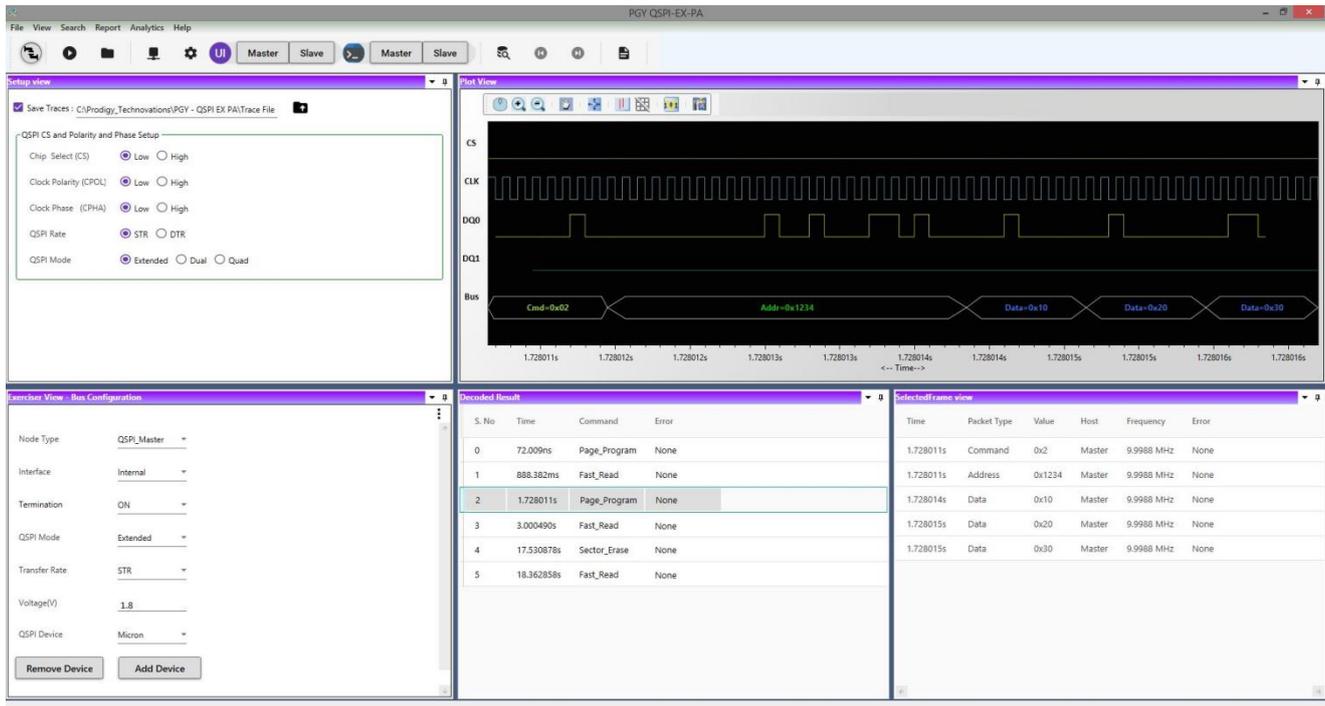# QSPI Protocol Exerciser and Analyzer

QSPI Protocol Exerciser and Analyzer (PGY-QSPI-EX-PD) is a Protocol Exerciser and Analyzer with multiple features to capture and debug the communication between the QSPI host and Device. PGY-QSPI-EX-PD is the only instrument that enables the design and test engineers to test the respective QSPI designs for their specifications by configuring the PGY-QSPI-EX-PD as Master/Slave, generating QSPI traffic, and decoding the QSPI protocol decode packets. PGY-QSPI-EX-PD can be configured only as a sniffer in case the user needs to monitor traffic between the host and device.

PGY-QSPI-EX-PD is the leading instrument that enables the design and test engineers to test the QSPI designs for its specifications by configuring PGY-QSPI-EX-PD as master/slave, generating QSPI traffic with error injection capability and decoding QSPI Protocol packets.
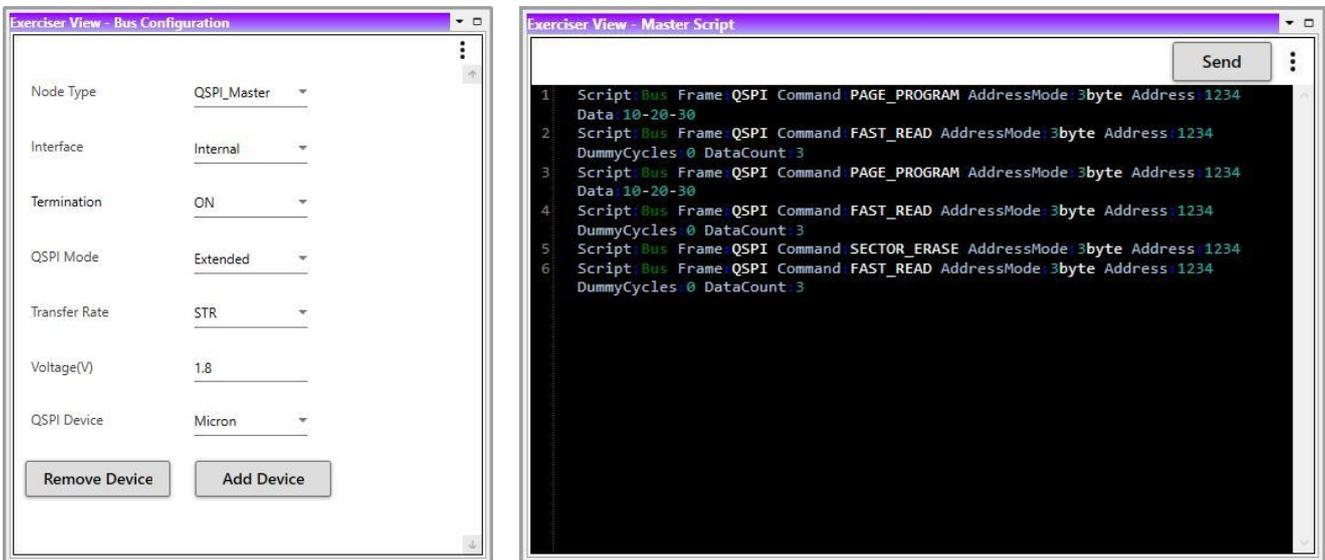
Key Features

- ✧ Supports QSPI speeds of up to 80MHz*
- ✧ Ability to configure it as Master or Slave.
- ✧ Simultaneously generate QSPI traffic and Protocol decode of the Bus.
- ✧ QSPI Master and Slaves.
- ✧ STR and DTR Transfer rates.
- ✧ Extended, Dual, and Quad QSPI Modes Supported.
- ✧ Variable QSPI data speeds and duty cycle.
- ✧ Continuous streaming of protocol data to the host computer provides a large buffer in sniffer mode
- ✧ Timing diagram of the protocol decoded bus.
- ✧ Listing View of Protocol activity.
- ✧ Error Analysis in Protocol Decode.
- ✧ Ability to write exerciser script to combine multiple data frame generation at different data speeds.
- ✧ USB 2.0/3.0 host computer interface.
- ✧ API support for automation in Python

*Refer to Appendix 1

Multi-Domain View

Multi-domain View provides the complete view of QSPI Protocol activity in a single GUI. Users can easily set up the analyzer to generate QSPI traffic using a GUI or script. Users can capture Protocol activity at specific events and decode the transition between Master and Slave. The decoded results can be viewed in the timing diagram and Protocol listing window with autocorrelation. This comprehensive view of information makes it the industry's best, offering an easy-to-use solution to debug the QSPI protocol activity.
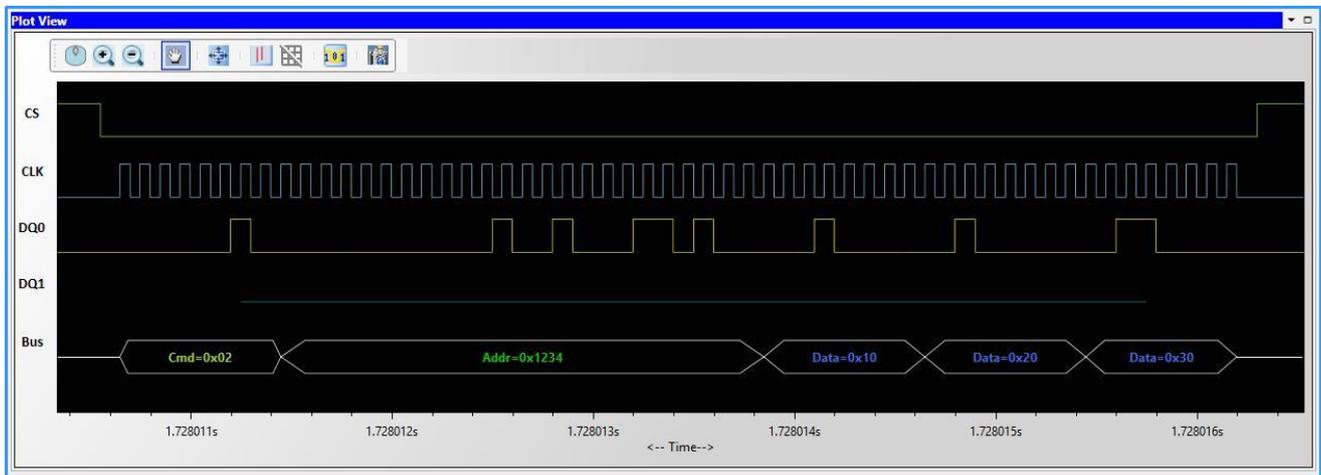
Exerciser

PGY-QSPI-EX-PD supports QSPI traffic generation using GUI and Script. Users can generate simple traffic generation using the GUI to test the DUT. Script-based GUI provides flexibility to emulate the complete expected traffic in the real-world including error injections. In this sample script user can generate QSPI traffic as below:

Script Line #1: PAGE_PROGRAM
Script Line #2: FAST_READ
Script Line #3: PAGE_PROGRAM
Script Line #4: FAST_READ
Script Line #5: SECTOR_ERASE
Script Line #6: FAST_READ

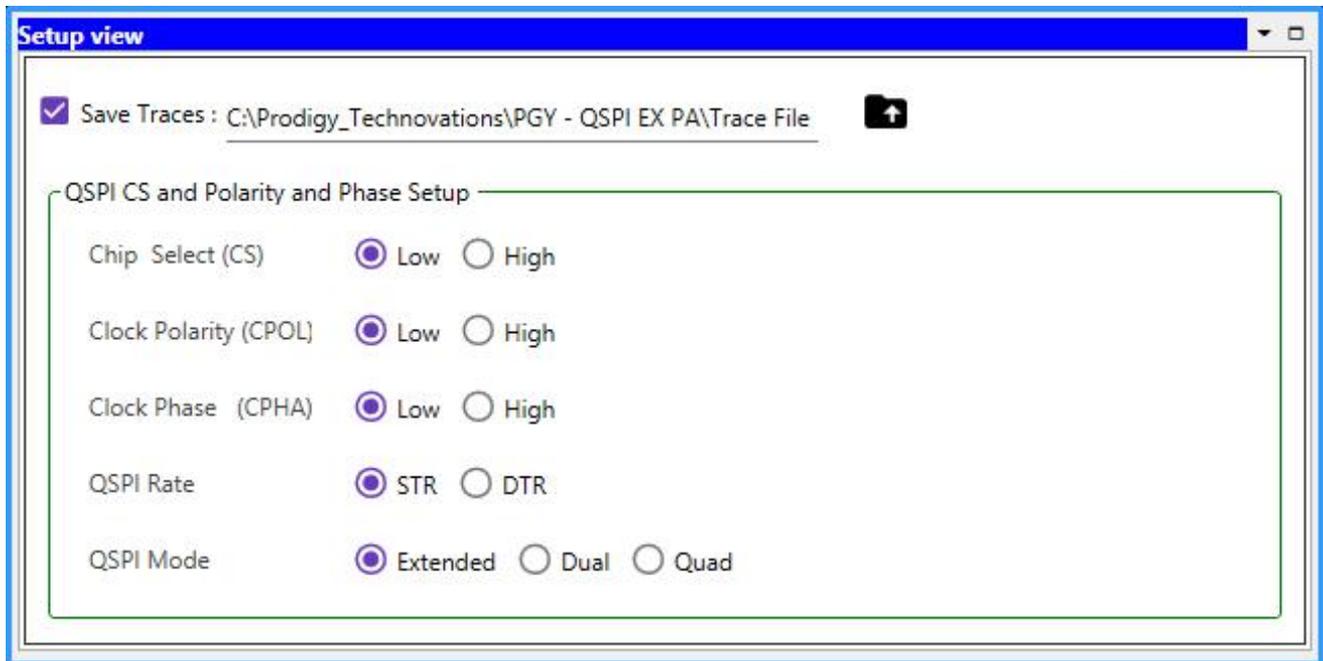## Timing Diagram and Protocol Listing View

The timing view provides the plot of CS, CLK, DQO, and DQ1 signals with a 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 analyze Protocol in the timing diagram for any timing errors.

Decoded Result

S. No	Time	Command	Error
0	72.009ns	Page_Program	None
1	888.382ms	Fast_Read	None
2	1.728011s	Page_Program	None
3	3.000490s	Fast_Read	None
4	17.530878s	Sector_Erase	None
5	18.362858s	Fast_Read	None

SelectedFrame view

Time	Packet Type	Value	Host	Frequency	Error
1.728011s	Command	0x2	Master	9.9988 MHz	None
1.728011s	Address	0x1234	Master	9.9988 MHz	None
1.728014s	Data	0x10	Master	9.9988 MHz	None
1.728015s	Data	0x20	Master	9.9988 MHz	None
1.728015s	Data	0x30	Master	9.9988 MHz	None

The protocol window provides the decoded packet information in each state and all packet details with error info in the packet. The selected frame in the Protocol listing window will be auto correlated in the timing view to view the timing information of the packet.

Setup View

Setup View of PGY-QSPI-EX-PD allows the user to configure the QSPI chip select (CS), Clock Polarity (CPOL), Clock Phase (CHPA), QSPI rate of STR or DTR, and the different modes of QSPI such as Extended, Dual or Quad.

PGY-QSPI-EX-PD Specifications

PGY-QSPI Specifications	Features	PGY-QSPI-EX-PD
Exerciser:		
Configurable	1 Master + 1 Slave	✓
QSPI Traffic Generation	Custom QSPI traffic generation Simulate real-world network traffic	✓
SCL Frequency	100KHz to 80MHz*****	✓
Voltage Drive Level	Fixed 1.8V & 3.3V	✓
SCL Duty Cycle variation	25%, 50% and 75%	✓
SCL & SDA Delay	User-Defined	✓
Delay between two messages	User-Defined	✓
QSPI modes supported	Extended, Dual and Quad	✓
Transfer rate	STR and DTR	
API Support	Support for Automation of operation using Python	✓
Protocol Analysis:		
Supports	QSPI protocol decode	✓
Protocol Views	Timing Diagram View. Protocol Listing View. Bus-Diagram to display Protocol packets with timing diagram plot.	✓
Protocol Error report	Non-standard frame format	✓
Capture Duration	Continuous streaming Protocol Data to host HDD/SSD	✓
Host Connectivity	USB 3.0/2.0 interface	✓

*Refer to Appendix 1

Appendix 1

The PGY-QSPI-EX-PD unit will work for Frequencies up to 80MHz only in the below mentioned configurations. This is also subject to the fact that the QSPI Exerciser and Protocol analyzer is connected to the DUT using a board- to board connection. If you want more information on the same, please contact us at contact@prodigytechno.com

Master	Slave	Max Frequency	Comments
Internal (Prodigy)	External (Customer)	80MHz	The QSPI-EX-PD Master can go up to frequencies of 80MHz if the external slave is capable to support the same. *(Note: This is subject to the fact that a board-to-board connection is used)*
External (Customer)	Internal (Prodigy)	80MHz	The QSPI-EX-PD Slave can go up to frequencies of 80MHz if the external master is capable to support the same. *(Note: This is subject to the fact that a board-to-board connection is used)*
External (Customer)	External (Customer)	48MHz	The QSPI-EX-PD can be used as a sniffer for frequencies up to 48MHz only using our default probe cables.
Internal (Prodigy)	Internal (Prodigy)	32MHz	The QSPI-EX-PD can go up to frequencies of 32MHz only in the internal loopback mode

Ordering Information

PGY-QSPI-EX-PD QSPI Exerciser and Protocol Analyzer

Deliverables for PGY-QSPI-EX-PD

- PGY-QSPI-EX-PD Unit
- USB 3.0 cable
- PGY-QSPI-EX-PD Software in CD
- 12V DC adapter
- Flying lead probe cable with female connector to connect to DUT.

Warranty Information

Hardware Warranty - 2 years

Software and Firmware Warranty - 1 year

Probes (covered under warranty for any manufacturing defect) - 6 months.

Contact Information

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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 defense electronics sectors worldwide.