

# PGY-SMBus

## Exerciser and Protocol Analyzer



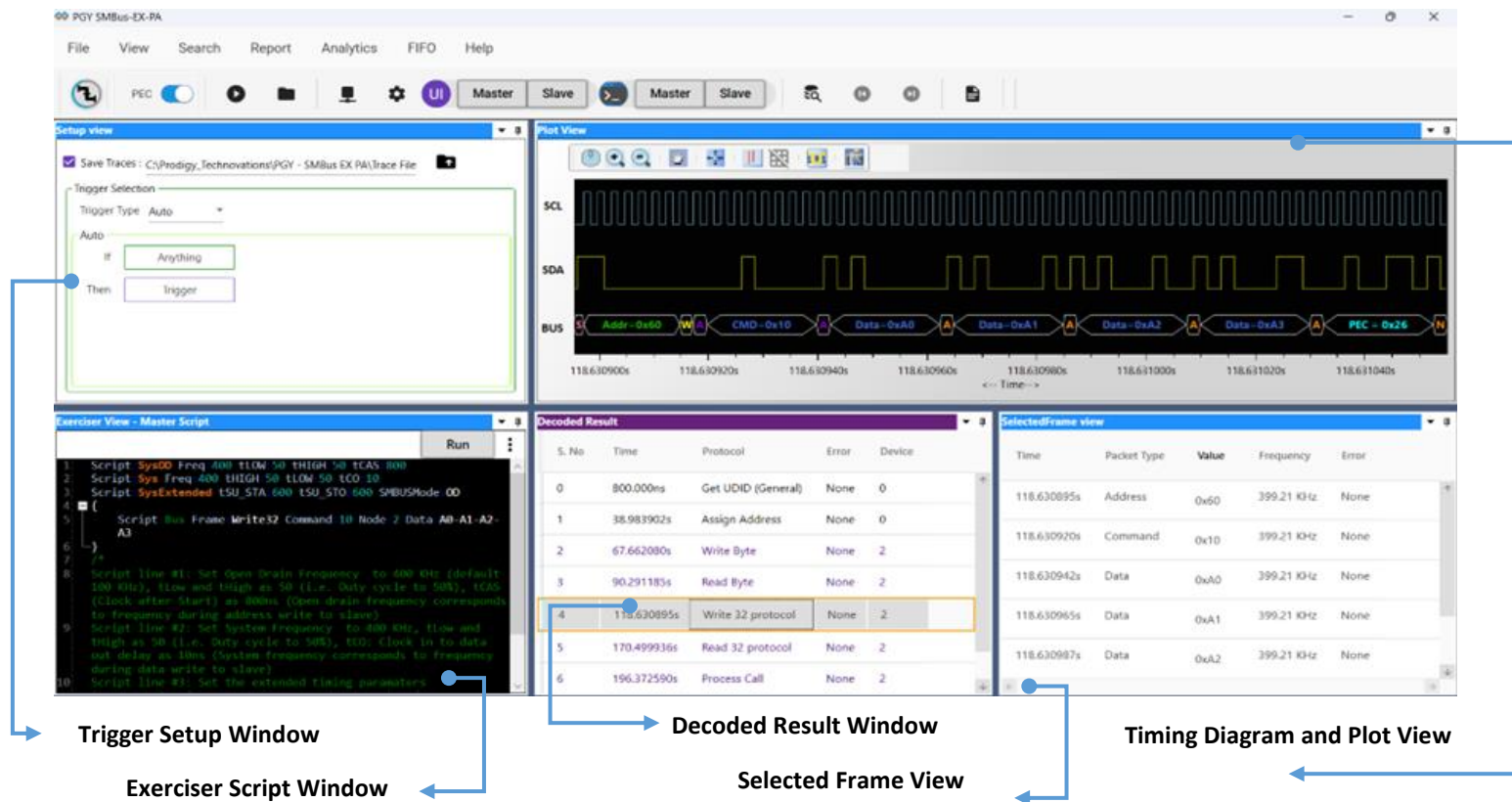
SMBus (System Management Bus) is one of the known low speed serial protocols widely used for communication between various components in computer systems such as motherboards, battery, temperature sensor, power management devices, sideband communication in PCIe, etc.

[PGY-SMBus-EX-PD](#) is the leading SMBus Protocol exerciser and analyzer that enables the design and test engineers to test their SMBus designs against SMBus specifications by configuring PGY-SMBus-EX-PD as master/slave, generating SMBus traffic with error injection capability and decoding SMBus Protocol packets.

### Key Features

- ❖ Supports SMBus protocol (version 3.2) and speed up to 3.4 Mbps.
- ❖ Configure it as Master or Slave. Can work Standalone with internal Master and Slaves (up to 3).
- ❖ Supports all SMBus protocols like Quick Command, Send Byte, Receive Byte, Write Byte / Word, Read Byte/Word, Write 32, Read 32, Write 64, Read 64, Block Write, Block Read, Process Call, Host notify, etc.
- ❖ Support for Address Resolution Protocol (ARP)
- ❖ Ability to generate and receive packets with (or) without PEC (Packet Error Checking) byte.
- ❖ Supports Clock stretching at the slave end.
- ❖ Simultaneously generate SMBus traffic and Protocol decode of the Bus.
- ❖ Ability to configure the bus voltage level from 1V to 3.3V insteps of 50mV.
- ❖ Can define parameters like setup time before repeat start, stop, clock after start, clock to data, etc.
- ❖ Support script to execute same set of commands multiple times (Loop Feature)
- ❖ Continuous streaming of protocol data to host computer to provide a large buffer.
- ❖ Timing diagram of Protocol decoded bus.
- ❖ Error Analysis in Protocol Decode.
- ❖ USB 2.0/3.0 host computer interface.
- ❖ API support for automation in Python or C++.

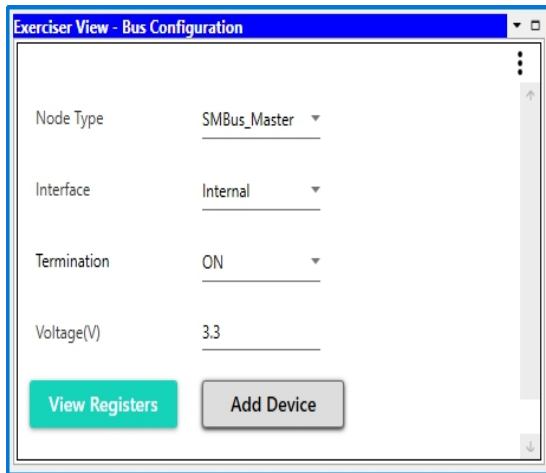
## Multi-Domain View



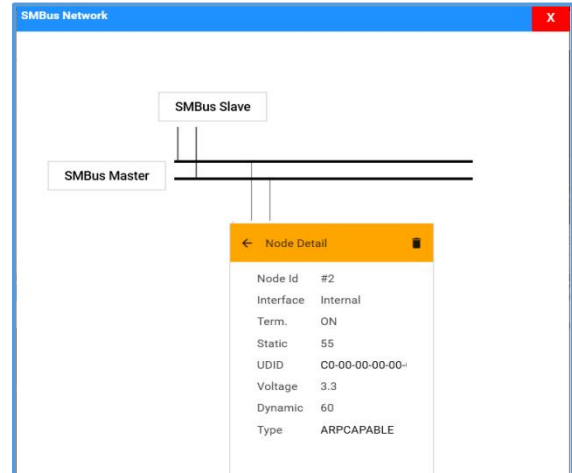
**Figure 1: Snapshot of PGY-SMBus-EX-PA (SMBus Analyzer software)**

Multi-Domain View as in Figure 1 provides the complete view of SMBus Protocol activity in a single GUI. Users can easily setup the analyzer to generate SMBus traffic using the GUI or script. Users can set different trigger conditions from the setup menu to 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 auto correlation. This comprehensive view of information makes it industry's best, offering an easy-to-use solution to debug the SMBus protocol

## Exerciser



**Figure 2: Configure as Internal Master**



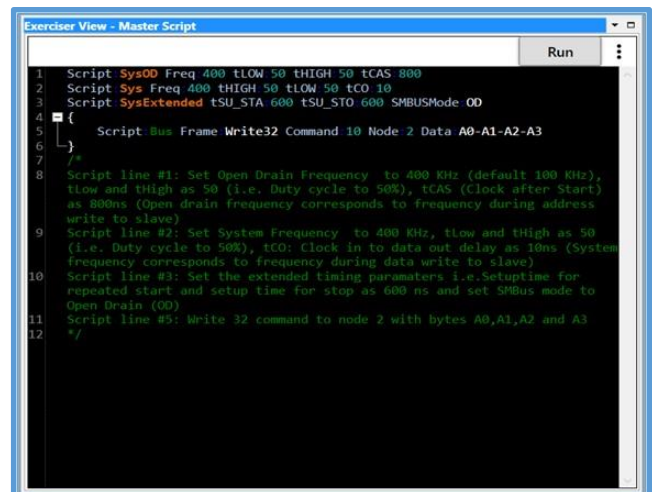
**Figure 3: Configure ARP capable slave with dynamic address assignment of 60h**

PGY-SMBus-EX-PD supports SMBus traffic generation using GUI and Script.

Users can generate simple SMBus using the GUI to test the DUT (Device Under Test).

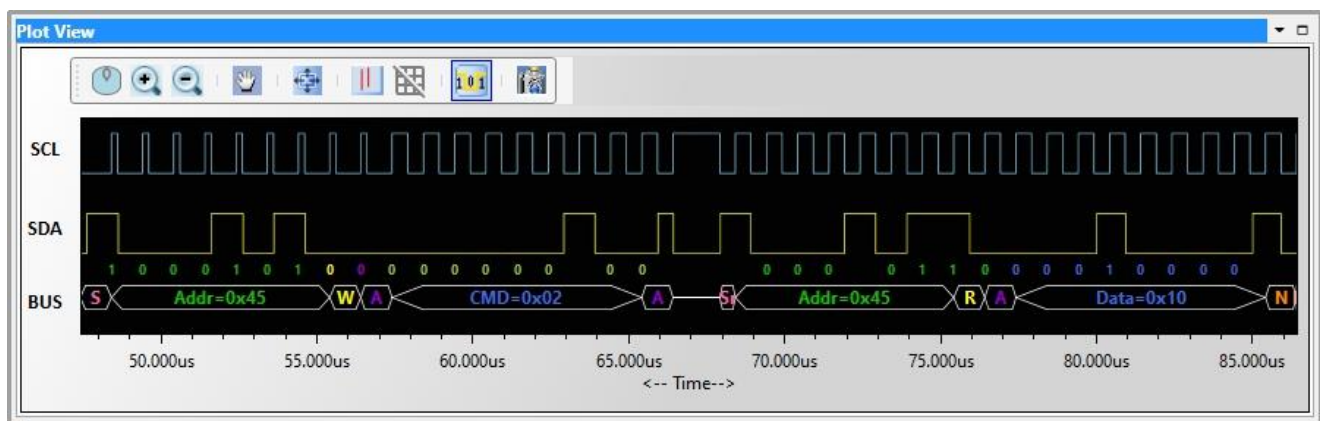
Script based GUI provides flexibility to emulate the complete expected traffic in real world including error injections.

The script in Figure 4 generates SMBus traffic with Write 32 command. The comments are included in the script.



**Figure 4: Sample SMBus Script**

## Timing Diagram and Protocol Listing View



**Figure 5: Timing Diagram and Protocol Listing View**

The timing view as in Figure 5 provides the plot of SMBus Clock and Data signals with a bus diagram. Overlaying of Protocol bits on the digital timing waveform will help easy debugging of the protocol decoded data. Cursor and Zoom features will make it convenient to analyze Protocol in the timing diagram for any timing errors.

Decoded Result					SelectedFrame view				
S. No	Time	Protocol	Error	Device	Time	Packet Type	Value	Frequency	Error
0	12.000ns	Send Byte	None	1	47.412us	Address	0x45	1.0001 MHz	None
1	19.212us	Write Byte	None	1	57.408us	Command	0x2	997.01 KHz	None
2	47.412us	Read Byte	None	1	67.920us	Address	0x45	1.0000 MHz	None
3	6.349610s	Write 32 protocol	None	1	77.420us	Data	0x10	1.0000 MHz	None
4	6.349666s	Read 64 protocol	None	1					
5	12.293398s	Process Call	None	1					
6	22.557313s	Send Byte	None	1					
7	22.557332s	Write Byte	None	1					
8	22.557360s	Read Byte	None	1					

**Figure 6: Decoded result window and details of the Selected Frame**

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

## Powerful Trigger Capabilities

Setup view

Trigger Selection

Trigger Type

Advanced

Level Count

2

Level # 0

If

SMBus MSG

Sr

Slave Addr

W

ACK

Data

01

T

Then

Action

Trigger

Else If

SMBus MSG

Sr

Slave Addr

W

NACK

Then

Action

Nothing

Go to Level

1

**Figure 7: Trigger Setup view**

PGY-SMBus-EX-PD supports Auto, simple and advanced trigger capabilities. The user can set the analyzer to trigger on any of the SMBus Protocol packets. Advanced Trigger provides the flexibility to monitor Multiple trigger conditions and can set multiple state trigger machines.

## PGY-SMBus-EX-PD Specifications

Feature	Details
<b>Exerciser:</b>	
No. of Master and Slaves	Configurable 1 Master + 3 Slaves
SMBCLK Frequency	1KHz to 3.4MHz
Voltage Drive Level	1V to 3.3V in steps of 50mV
SMBCLK Duty Cycle variation	User-Defined (10%-90%)
Timing Parameters	User Configurable timing parameters using scripts (in steps of 5ns) $t_{CAS}$ : Clock delay after Start condition (min: 5ns) $t_{CO}$ : Clock in to data out delay. (min: 5ns) $t_{SU\_STA}$ : Setup time for repeated START (min:10ns) $t_{SU\_STO}$ : Setup time for STOP (min:10ns) $t_{SU\_DAT}$ : Setup time for Data (min:10ns)
Delay between two messages	User-Defined; Supports 3 resolution in $\mu s/ms/s$ (min: 1 $\mu s$ )
Error Injection	ACK/NACK Errors
Packet Error Checking (PEC)	Option to generate and receive SMBus packets with (or) without PEC byte.
Clock Stretching	Supported at the Slave end
SMBus Traffic Generation	Custom SMBus traffic generation using GUI and scripts
Command Scripts	Readily available command scripts that support all SMBus protocols.
API Support	Support for Automation of operation in Python or C++.
<b>Protocol Analysis:</b>	
Protocol Decode	As per SMBus version 3.2
Protocol Views	<ul style="list-style-type: none"> <li>Timing diagram view.</li> <li>Protocol listing view.</li> <li>Bus-Diagram to display protocol packets with timing diagram plot.</li> <li>Cursor support for time measurement.</li> <li>Marker support between messages for time measurement.</li> </ul>
Protocol Trigger	<ul style="list-style-type: none"> <li>Auto (Trigger on any packet).</li> <li>Simple (Trigger on user defined SMBus packet).</li> <li>Advanced (Multistate &amp; Multilevel trigger with timer capability).</li> </ul>
Protocol Error Report	<ul style="list-style-type: none"> <li>ACK/NACK Errors.</li> <li>Non-standard Frames.</li> <li>Error in PEC byte.</li> </ul>
Capture Duration	Continuous streaming of protocol data to host HDD/SSD
Host Connectivity	USB 3.0 / 2.0 interface

## Ordering Information

**PGY-SMBus-EX-PD:** SMBus Exerciser and Protocol Analyzer.

## Deliverables for PGY-SMBus -EX-PD

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

## Warranty Information

- ✓ Hardware Warranty: 1 year
- ✓ Software and Firmware Warranty: 1 year
- ✓ Probes (covered under warranty for any manufacturing defect): 6 months.

## Contact Information



+91-80-42126100



[contact@prodigytechno.com](mailto:contact@prodigytechno.com)



[www.prodigytechno.com](http://www.prodigytechno.com)



**Prodigy Technovations Pvt. Ltd.**

294, 3rd Floor, 7th Cross,  
7th Main BTM II Stage,  
Bangalore 560076.  
Karnataka, India.

## About Prodigy Technovations Pvt Ltd

Prodigy Technovations Pvt Ltd ([www.prodigytechno.com](http://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 the 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.