International
IOR Rectifier
THE POWER MANAGEMENT LEADER

DC-DC

PMBus

Who is using PMBus™?

Designers of Telecom, Datacom, Server, Industrial boards (Figure 1).

What does PMBus™ do for me?

It simplifies configuration, sequencing and monitoring of power supplies and determining and reacting to warnings and faults e.g.

- **During design of the system**
  - Adjust sequencing for reliable start-up
  - Characterize system loading
  - Monitor and capture fault data (Figure 2)
- **During deployment of the system**
  - Monitor system status looking for warning signs of a failure
  - Restart of the system after fault
  - Record fault events that caused a system to shutdown

History

- First released in 2005
- Open standard defined by the System Management Interface Forum (SMIF)
- Command set that layers upon the SMBus™ protocol which uses the physical layer of I2C™ (Inter Integrated Circuit) bus

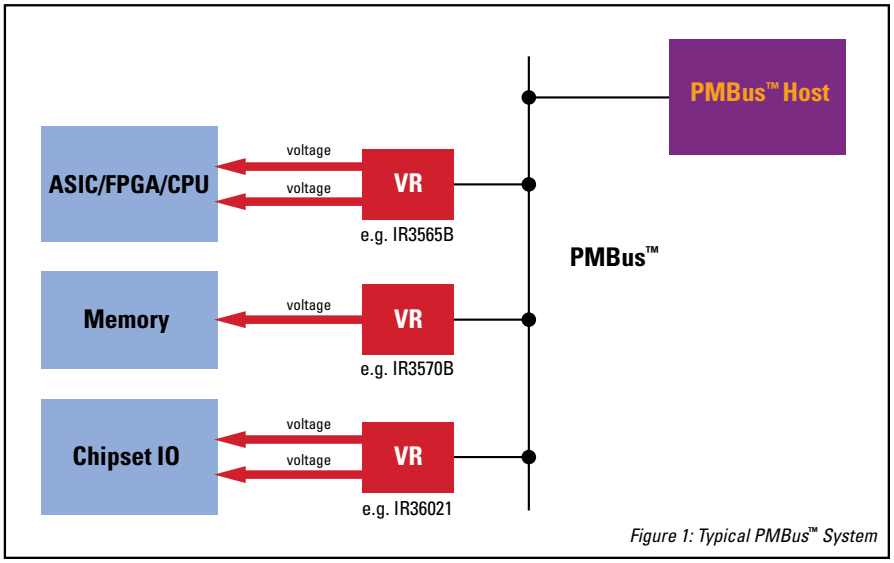

Figure 1: Typical PMBus™ System

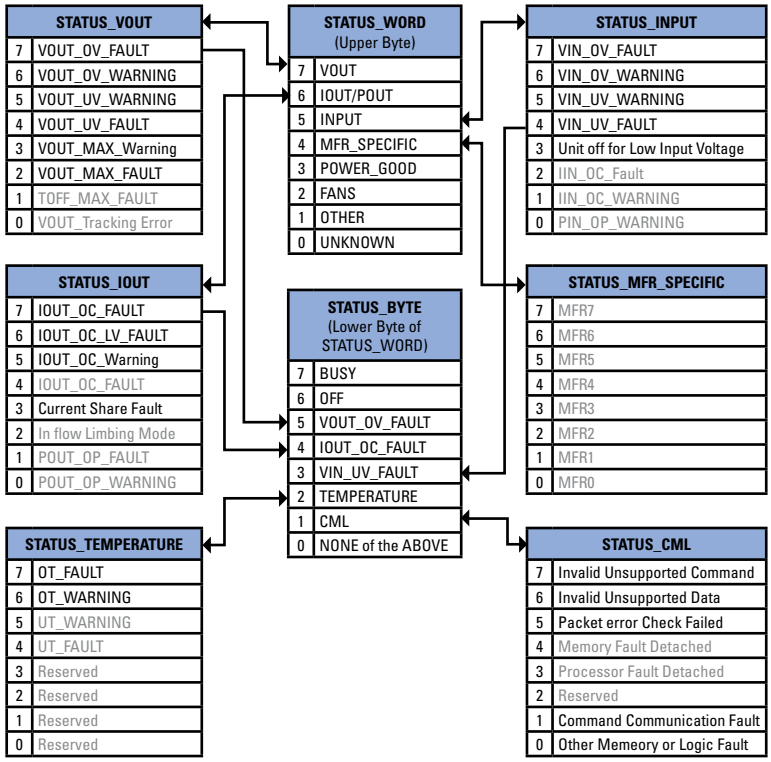

Figure 2: PMBus™ Fault Reporting

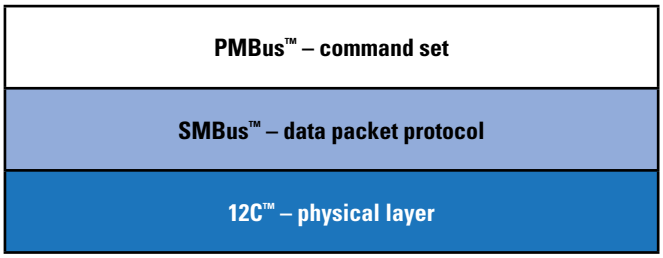

Figure 3: PMBus™ protocol layers

Protocol

- **I2C™ is**
  - Multipoint, two wire bus (clock and data)
  - Generally implemented at around 100kHz
  - Multi master and multi slave
  - Does not define the data protocol
- **SMBus™ is**
  - Defines the data protocols such as "Write Byte/Word"
  - Standardized to ensure compatibility across manufacturers
  - Adds robustness with a bus timeout and Packet Error Checking (PEC)
  - Three wire, (clock, data, alert) for fault handling
- **PMBus™ is**
  - Current version is 1.2 released in 2010
  - Defines the command set
  - Fully standardized communication with power management devices

Command Set

The approximately 200 commands can be loosely categorized as:

Command Category	Example command
MEMORY	*Store_Default_All*
ON/OFF	*On_Off_Config*
OUTPUT VOLTAGE	*Vout_Command*
MARGINING	*Vout_Margin_High*
CONFIGURATION	*Frequency_Switch*
WARNINGS & FAULTS	*Iout_OC_Warn_Limit*
SEQUENCING	*Ton_Rise*
STATUS	*Status_Temperature*
TELEMETRY	*Read_Vout*
INVENTORY	*Mfr_ID*
MANUFACTURER RATINGS	*Mfr_Pout_Max*

Limitations

- Throughput of data with increased devices on the bus

Looking Forward to PMBus™ 1.3

- Up to 1MHz bus speed for increased data throughput
- Fast read/write protocol to multiple devices for increased data throughput
- Floating point number format for a wider range with higher precision
- Relative output voltage thresholds to allow warning/fault limits to track the output voltage
- AVSBus up to 50MHz for an ASIC to dynamically control its own voltage

IR serves yours PMBus™ needs

- **Contact your local Sales Rep to learn more about International Rectifier's PMBus™ enabled DC/DC regulators**