



# Quarterly Newsletter

## Winter 2021

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### *Introduction*

Since this is the last newsletter for 2021, SMIF will take the opportunity wish all of our readers Happy Holidays and Best Wishes in the new year that is quickly approaching. It has been a challenging year with COVID lockdowns, but all things PMBus have continued to march onward.

Many thanks go out to our member companies and their representatives for their support over this last year. A special ‘Thank You’ is in order to Peter Miller of TI, the WG lead, as well as the many other contributors who worked tirelessly to update the PMBus and SMBus specifications.

We look forward to seeing many of you face-to-face again at APEC2022 in just a few month’s. You can read about the event and get other updates in the next newsletter which will be published shortly after the show.

### *Working Group Updates*

The Working Group has finalized the new Power Management (PMBus) Revision 1.4 and System Management (SMBus) Revision 3.2. The SMIF Board of directors approved

the specification by unanimous vote on November 19. The draft documents have been posted on the PMBus website and are available for membership review. Members’ representatives must use their login credentials for access to the adopters area of the website.

Members’ technical representatives have been notified and each member company should send their vote (only one vote is allowed per company) and any comments to [admin@smiforum.org](mailto:admin@smiforum.org) by end of day Friday 07 January 2022. End of day means 24:00 Midnight Pacific Standard Time (UTC - 8h). **The draft specifications are NOT public. Please do not share them except with PMBus adopters.**

As always, the Standards Workgroup is looking for additional participants in their weekly Work Group meetings. If you, or someone in your organization is interested, please reach out to the Workgroup Chairman at [WGChair@smiforum.org](mailto:WGChair@smiforum.org)

### *Membership Updates*

We have added another two members to our ranks. Please welcome RECOM and uPI Semiconductor. Read on for a brief overview of our new members. Total membership is now 47 companies, consisting of 45 Full and 2 Tools members.

The **RECOM** group is a power supply manufacturer headquartered in Austria with over four decades of experience in developing and manufacturing the latest standard and custom power converter technology, from sub-1W to tens of kW.

Customers worldwide have access to a vast selection of DC/DC converters and AC/DC power supplies along with a broad range of switching regulators and LED drivers, all of which comply with international safety standards and carry the latest certifications. <https://recom-power.com/>

**uPI Semiconductor Corp.**, part of uPI Group, based in Tawian, is an IC design house which designs and manufactures analog and mixed-signal power management solutions for hybrid and high power density semiconductors. uPI Semiconductor's vision is to offer customers the total power management solutions of superior quality, performance, service, and cost.

With more than 20 years of analog power and discrete device experiences, uPI offers high performance design services with full technology coverage and process development capability. Excellent wafer processing and deep packaging know-how come standard by working closely with strategic foundries and assembly & testing partners. <https://www.upi-semi.com/>

Interested in joining PMBus? Please refer to the *Adopt PMBus* page of our website for the full details and benefits of membership. Get a detailed description of the System Management Interface Forum and membership benefits by clicking PMBus Organization Overview. Or, just send an email to [admin@smiforum.org](mailto:admin@smiforum.org) to get immediate answers to specific questions.

### ***New Product Announcements***

**ABB** released the GE Power CAR2512TE Front-End rectifier with a power density of 25W/in<sup>3</sup>. The unit provides highly efficient isolated power from worldwide input mains in a compact 1U industry standard form factor. Ideal for applications where mid to light load efficiency is of key importance. This front-end is complemented by the CAR2512DC dc/dc converter designed to convert 48/60Vdc power of telecom central offices. This plug and play approach offers rapid system reconfiguration by simply replacing the power supply.

The high-density, front-to-back airflow is designed for minimal space utilization and is highly expandable for future growth. The industry standard PMBus compliant I2C communications buss offers a full range of control and monitoring capabilities. The SMBAlert signal pin alerts customers automatically of any state change within the power supply. [CAR2512-TE](#)

**Analog Devices** released the ADI Power by Linear<sup>®</sup> LTM2987 16-channel  $\mu$ Module PMBus power-system manager that adds digital control and monitoring to an analog power system. Software-based configuration by Linear Technology enhances reliability of the device, which trims, margins, and monitors supply outputs with  $\pm 0.25\%$  voltage accuracy. It builds in supply sequencing (timed and tracking), supervision, and EEPROM fault-logging, and integrates all basic passive components (low-pass RC filters, and bypass capacitance and pull-up resistors).

Multiple power system managers can be cascaded to sequence and fault-manage more than 16 rails. Over 100 PMBus-compatible commands incorporated into the LTM2897 enhance programming flexibility and provide data readback of the power system. Register configuration comes via the LTpowerPlay development environment. [LTM2987](#)

**Analog Devices** announced the PMBus-compliant LTC@3888/3888-1 dual loop DC/DC synchronous step-down switching regulator controller with eight expandable phases supporting a wide range of master/slave configurations. The controller uses constant frequency current mode architecture to provide excellent transient response and output regulation. Each PWM master is capable of producing output voltages from 0.3V to 3.45V with multiple phase configurations using DrMOS devices that provide an output current monitor.

PMBus configuration and monitoring is supported by LTpowerPlay™ software. Programmable loop compensation and built-in load step emulation facilitate setting bandwidth based on input voltage and output load capacitance. PMBus commands allow read back of input voltage, output voltage and current, and operating status. Operating parameters can be set via PMBus command or stored in internal EEPROM for use at power up. Switching frequency, phase configuration, output voltage (LTC3888), output current limit (LTC3888-1) and device address can also be set using external programming resistors. [LTC3888/3888-1](#)

**Analog Devices** published the new *AnalogDialogue* Volume 55 *I2C Communication Protocol: Understanding I2C Primer, PMBus, and SMBus*. I2C, or Inter-Integrated Circuit, is a commonly used serial communication protocol in establishing communication between devices, especially for two or more different circuits. I2C Primer is the most commonly used I2C.

The article provides the basic features and standards for I2C Primer, primarily to address proper usage during communication implementation. From the fundamentals of I2C, the authors walk through the availability of its variant subsets, System Management Bus (SMBus) and Power Management Bus (PMBus), and their differences. Each of the three has dedicated functions intended to address different customer requirements.

[AnalogDialogue VOL 55](#)

**Intel's** User Guide UG-20215 is available online for their Agilex™ device family which offers smart voltage identification (SmartVID) standard power devices in all speed grades. Fixed-voltage devices are also available, but only in -4 speed grade. All SmartVID standard power devices must be driven by the Power Management BUS (PMBus)-compliant voltage regulator, operating either in the PMBus master or PMBus slave mode.

The user guide describes the power-optimizing features of the Intel® Agilex™ device family, and the power-up and power-down sequencing requirements for the Intel® Agilex™ devices. [UG-20215](#)

**Monolithic Power Systems (MPS)** introduced the MP5479 power management IC (PMIC), a 2.7V to 5.5V PMIC with 4 Buck Converters (2A/2.5A/4.5A/4.5A), 5 LDOs, and Configurable System Settings via the I<sup>2</sup>C and MTP. Full protection features include under-voltage lockout (UVLO) protection, over-current protection (OCP), over-voltage protection (OVP), and thermal shutdown. The MP5479 requires a minimal number of standard external components, and is available in a space-saving QFN-26 (3.5mmx4.5mm) package with wettable flanks.

Constant-on-time (COT) control in the DC/DC converter provides fast transient response. The adjustable switching frequency ( $f_{sw}$ ) (up to 2.75MHz) in continuous conduction mode (CCM) greatly reduces the number of external inductors and capacitors. The output voltage ( $V_{OUT}$ ) can be adjusted via the I<sup>2</sup>C bus or preset via the multiple-time programmable (MTP) memory. The power-on/off sequence can also be configured via the MTP, or it can be controlled via the I<sup>2</sup>C. [MP5479](#)

**NXP** released UM10204, Revision 7.0 of its I2C-bus specification and user manual. The latest version includes an updated table with the assigned twelve-bit manufacturer ID codes. Also included is a new section providing a detailed overview of MIPI I3C. Additionally, the terms "master/slave" have been changed to "controller/target" throughout to align with MIPI I3C specification and NXP's Inclusive Language Project. [UM10204 Rev. 7](#)

**Texas Instruments** published the updated Applications Brief *AN2016: Digital Interfaces for Current Sensing Devices.*, the brief compares and contrasts the most commonly used digital interfaces for current sensing applications, which are I2C, SMBus, PMBus, and SPI. The article also provides an overview of TI's current sense amplifiers along with their compatibility with the various interfaces.

Switching frequency and over-current protection can be programmed to provide a flexible solution for various applications. Output over-voltage, under-voltage, over-current, and thermal shutdown protections help prevent damage to the device during fault conditions. [AN2016](#)

**TDK-Lambda's** User Manual *TPS4K\_APL* is now available online for the TPS4000 4000W Industrial Three Phase Input AC-DC in 2U Package. In addition to covering ratings, specifications and features, the manual describes operating in various configurations as well as programming via the PMBus interface. [tps4k\\_apl](#)

If your company has new products that you would like to be included in our next newsletter, just send an email with the subject line "new product(s)" and the details to [admin@smiforum.org](mailto:admin@smiforum.org). Then watch this space for updates.

### Website Updates

#### Product Page Listings

Over 80% of our members are using dedicated *Products* pages to display their PMBus-compliant items. There are now 700 listings, which include semiconductors, power supplies, application notes, eval boards, articles, reference designs, videos and more.

The dedicated *Products* pages are one of the benefits of PMBus membership. They enable our members to identify and promote all of their PMBus-compliant products. We encourage you to contact us when you are ready to include or update your company's product listings.

You can click [here](#) to see an example of the [Flex Power Products](#) page. Be sure to utilize the "Featured Product", option which includes graphics on your company's page. Please send any request for changes to [admin@simforum.org](mailto:admin@simforum.org)

### Promotional Activities

We invite you to join the [PMBus Group](#) on LinkedIn. In the future we will be utilizing the platform for new product announcements, meeting notifications and other newsworthy items.

### Upcoming Events

Next year's **APEC 2022 Applied Power Electronics Conference & Expo** will be held March 20-24 in Houston, Texas, at the George R. Brown Convention Center. For those attending the show, be sure to visit the **PMBus booth #405**.

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### FAQ

The *Frequently Asked Question* section addresses recent technical inquiries to our PMBus expert(s). This newsletter addresses a question related to the SMBus operation.

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**Question:** *Can you please confirm the responsibilities of master and slave devices when a tTIMEOUT,MIN violation occurs?*

**Answer:** The tTIMEOUT,MIN violation is addressed in Section 4.2.2 of SMBus Revision 3.1, which says:

"It is highly recommended that a slave device release the bus (stop driving the bus and let SMBCLK and SMBDAT float high) when it detects any single clock held low longer than tTIMEOUT,MIN". It further says "Devices that have detected this condition must reset their communication interface and be able to receive a new START condition in no later than tTIMEOUT,MAX."

So, yes, if you always want your target (formerly slave) device to release the bus and reset itself when it detects a tTIMEOUT,MIN violation, then that is compliant to the specification.

As for the controller (formerly master) device the specification does not say what the controller should do when a tTIMEOUT,MIN violation is detected. The cleanest approach would be to wait until the clock line is released and then generate a STOP condition so that all devices on the bus will reset and prepare for a new transaction.



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Have a question about the PMBus or SMBus specifications? SMIF technical consultants provide free answers. Send your question to [techquestions@smiforum.org](mailto:techquestions@smiforum.org) and a PMBus or SMBus consultant will respond.

### *Other Items*

The PMBus name and logo are registered trademarks of SMIF. PMBus adopters who are SMIF members in good standing are allowed free, unlimited commercial use of the PMBus name and logo. Proper usage of the name and logo is important in order to retain our rights. Please encourage your company's marketing communications department to collaborate with SMIF whenever there are publications or questions.

Please remember to use the ® symbol when referencing PMBus and the ™ symbol with

AVSBus in data sheets, press releases or other written material. It should be included in any title or blurb and with the first usage in the main text for articles. The logo graphics for web postings and hi-res print can be downloaded from the [resources](#) section of the PMBus website.

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