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### ***Introduction***

**APEC 2018.** This year’s event in San Antonio, Texas was an astounding success for the PMBus organization. The PMBus booth registered over 100 visitors who viewed our product demonstration.



Advanced Energy’s Excelsys division showed their 600W configurable, 4 output AC/DC power supply being monitored via a PMBus GUI and assisted by a bus analyzer tool provided by Corelis. In addition to representatives of PMBus member

companies, there were visitors from the electronic components industry, test & instrumentation, systems OEMs, academia, press and others.

Thursday morning’s PMBus-sponsored Industry Session (IS20) saw robust attendance by design engineers eager to learn more of the details and advantages offered by PMBus enabled products. There were 6 technical presentations by representatives from our member companies, as outline below:

- System Level Benefits of PMBus Implementation Along the Entire Product Lifecycle – Advanced Energy
- Attaining PMBus Adoption in Spaceborne Power Systems – Cobham Semi
- Server Telemetry: Insight into Platform & Performance with Node Manager and the PMBus Standard - Intel
- PMBus Adaption Over Various Transport Protocols - Artesyn
- Application Profiles for Isolated and Non-Isolated DC-DC Power Modules - Flex
- Leveraging App Profiles Firmware Standardization – Analog Devices

For those who could not attend, or who did but would like to review, the papers can be found on the *Presentations* tab of the PMBus website, and we encourage you to view them by clicking [here](#).

### **SMBus 3.1 Has Been Published.**

As promised in the last newsletter, the much-awaited SMBus specification version 3.1 has

been released. In addition to a change of the ARP definition (Address Resolution Protocol), it includes many typographical corrections and user requested clarifications. The new version is posted under the *Specifications* tab of the PMBus website, and can be viewed by clicking this link: [SMBus 3.1](#)

Anyone having concerns or comments should send a detailed email to the SMBus council at [techquestions@smiforum.org](mailto:techquestions@smiforum.org).

### *Membership Updates*

We are pleased to announce two new members to the PMBus consortium, full member Cobham Semiconductor and tools member Cadence. The latest additions bring the total membership to 44 companies.

**Cobham** is a leading global technology and services innovator, respected for providing solutions to the most challenging problems, from deep space to the depths of the ocean. The Group offers an innovative range of technologies and services to solve challenging problems in harsh environments across commercial, defense and security markets, from deep space to the depths of the ocean, specializing in meeting the growing demand for data, connectivity and bandwidth. Employing more than 10,000 people on five continents, the Group has customers and partners in over 100 countries, with market leading positions in: audio, video and data communications, including satellite communications; defense electronics; air-to-air refueling; aviation services; life support and mission equipment.

**Cadence** enables electronic systems and semiconductor companies to create the innovative end products that are transforming the way people live, work and play. Cadence® software, hardware and semiconductor IP are used by customers to deliver products to market faster. The company's System Design Enablement strategy helps customers develop differentiated products—from chips to boards to systems—in mobile, consumer, cloud datacenter, automotive, aerospace, IoT, industrial and other market segments. Cadence is listed as one of Fortune Magazine's 100 Best Companies to Work For.

Interested in joining PMBus? 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*

**Cadence.** Incorporating the latest protocol updates, the Cadence® Verification IP (VIP) for SMBus provides a complete bus functional model (BFM), integrated automatic protocol checks, coverage model, and compliance tests. The VIP for SMBus is designed for easy integration in testbenches at IP, systems-on-chip (SoC), and system levels, and helps to reduce time to test, accelerate verification closure, and ensure end-product quality. The VIP for SMBus runs on all major simulators and supports SystemVerilog verification language along with associated methodologies, including the

Universal Verification Methodology (UVM) and Open Verification Methodology (OVM).

**Analog Devices** announced the Power by Linear™ LTC7106, a PMBus® I<sup>2</sup>C controlled precision bidirectional current DAC designed to adjust the output voltage of virtually any dc-dc regulator. Through its PMBus compatible interface, the LTC7106 receives a 7-bit serial code and converts it to a bidirectional (source, sink) output current. It operates over an input voltage range of 2.5V to 5.5V and is supported by the easy to use LTpowerPlay® development tool with graphical user interface (GUI).

**Artesyn Embedded Technologies** has announced two new models in its ADO300 series 300W eighth-brick converters, providing single 3.3V or 5V outputs. The digitally-controlled dc-dc converters feature a 95.2% efficiency, pin configuration, enhanced pre-bias start-up capability and for high current applications two converters can be connected in parallel, automatically using droop current sharing. It can handle an input range of 36- to 75-Vdc, delivers up to 60A output current at 3.3V or up to 60A output current at 5V output voltage. The new converters provide flexible and comprehensive digital communication via the PMBus® command protocol with control and monitoring functions for voltage, current, temperature and the reporting of fault conditions.

**Artesyn Embedded Technologies** has unveiled the CSU800AP 800-watt server power supply that follows the Intel Common Redundant Power Supply (CRPS) specification, which is designed for

computing, networking and storage infrastructure in enterprise IT, cloud and hyperscale environments. The compact 1U high enclosure measures just 2.89 x 7.28 inches (73.5 x 185.0 mm), features a universal input range, main 12V output rated for continuous 66.7A and auxiliary 12V output at 3A. The CSU800AP power supply is hot pluggable and compatible with the Artesyn Embedded Technologies universal PMBus graphical user interface, allowing control via an integral I2C interface using the industry-standard PMBus® communications protocol.

**Infineon** released the IR38163/38363 integrated POL (IPOL) regulators offering PMBus®, SVID, and PVID functions for powering Intel CPU POL rails, chipsets, and FPGAs. Housed in 7×7-mm PQFN packages, the regulators achieve up to a 50% space saving compared to alternative external power solutions. Utilizing high-efficiency OptiMOS 5 technology, the IPOL family operates at up to 30 A at high frequency with minimal airflow and provides 3-bit PVID (parallel VID) for powering Intel chipset P<sub>VNN</sub> rails and FPGAs. They can be used for telecom applications requiring constant-frequency operation, as well as NetCom and storage applications that require PMBus, accurate output voltage, and ultra-low ripple.

**Renesas Electronics Corporation** announced two new fully encapsulated digital DC/DC PMBus® POL modules that deliver the highest power density and efficiency in their class. The dual ISL8274M operates from a 5V or 12V power rail, provides two 30A outputs and up to 95.5 percent peak efficiency in a compact 18mm x

23mm<sup>2</sup> footprint. The new ZL9024M operates from a 3.3V rail and outputs 33A of power in a 17mm x 19mm<sup>2</sup> footprint. Both devices are easy-to-use, PMBus-configurable power supplies that include a controller, MOSFETs, inductor and passives encapsulated inside a module that increases available board space and reduces bill of materials (BOM).

**Texas Instruments** announced the TPS53681 multiphase step-down controller with dual channels, built-in non-volatile memory (NVM), and PMBus<sup>®</sup> interface. The TPS53681 is fully compatible with TI's NexFET<sup>™</sup> power stage. Advanced control features such as D-CAP<sup>+</sup><sup>™</sup> architecture with undershoot reduction (USR) provide fast transient response, low output capacitance, and high efficiency. The device also provides novel phase interleaving strategy and dynamic and supports fast dynamic voltage transitions with adjustable slew rate. In addition, the device supports the PMBus communication interface for reporting the telemetry of voltage, current, power, temperature, and fault conditions to the systems. All programmable parameters can be configured by the PMBus interface and can be stored in NVM as the new default values to minimize the external component count.

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*

The number of PMBus listings on our members' *Products* pages has increased to 371 items. In addition to PMBus-compliant products, there is supporting material like evaluation kits, reference designs, article and videos. We encourage you to contact us when you are ready to include or update your company's product listings.

There are now 24 member companies using their *Products* page to highlight offerings. With each calendar quarter we continue to see new additions, attesting to the proliferation of the PMBus protocol. Please continue to contact us to include all of your company's PMBus related items.

You can click [here](#) to see an example of the new [Artesyn Embedded Technologies Products](#) page. And, 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).

### **New Website.**

The SMIF board has selected a website design consultant to assist in the development of our new PMBus website. The graphical 'look and feel' is finalized and development efforts will commence in April. If you have input or suggestions, there is still time to contribute. Members are encouraged to submit any comments to us at [admin@smiforum.org](mailto:admin@smiforum.org).

### *Promotional Activities*

**PMBus Conference & Expo.** As promoted during APEC 2018, SMIF is planning a fall

**Conference & Expo**  
**Sept. 11 -12, 2018**  
**Dallas, TX**

event, the first since the early days of the PMBus' conception. It is a 2-day event for key OEM system implementors to learn about the benefits of the PMBus open standard communications protocol as well 3rd party tools that support product development. The event will be attended by the 40+ PMBus adopter members for open engagement to determine future direction and requirements of the PMBus microcosm.

Participation by systems OEMs is critical to ensure a successful outcome. Therefore, we ask for your help in identifying and reaching out to company contacts in the following industries:

- Servers & Storage
- Networking & Communications
- Medical Device Manufacturers
- Military & Space Equipment Makers
- FPGA Suppliers

Additionally, there will be a small exposition space for vendors of development tools that can support PMBus product development. It is not necessary for these companies to be a formal PMBus member to attend and demo their wares. If you are presently working with tool vendors, please share the details and ask them to be involved!

The hotel venue is being discussed and will be finalized in the next few weeks. At that time, we will contact everyone who has expressed interest in attending. In the interim, so that we can finalize the event planning, we are inviting all interested persons to register now by clicking here [Conference & Expo](#).

### *Upcoming Events*

**Working Group Meeting.** The next face-to-face PMBus Working Group meeting is scheduled for on or June 7-8 at the Infineon facility in Tewksbury, MA. Items on the agenda for discussion include future application profiles, other physical interfaces and data programming files. The WG will also be address planning and organizing for the upcoming September 11-12 PMBus Conference & Expo mentioned in the *Promotional Activities* section of this newsletter.

### *FAQ*

The newsletter's *Frequently Asked Question* section includes a recent question which have been received, along with the detailed answer.

**Question:** *For the Block Write command, if the chip supports Byte Count = 1, then if the host sends the byte count any number other than 1 should the chip reject this command and flag an invalid data fault?*

**Answer:** The BLOCK WRITE transaction is executed differently for PMBus<sup>®</sup> than for SMBus.

For an SMBus BLOCK WRITE transaction the master/host uses the BYTE COUNT to tell

the slave device how many data bytes to expect. If the master sends more, or less, bytes than the BYTE COUNT, there is nothing in the SMBus specification that describes the required response from the slave. Of course, there could be several possibilities for this kind of error, such as:

- The BYTE COUNT was corrupted in transmission and the slave received the wrong value for BYTE COUNT
- The master/host had a higher priority interrupt and had to terminate the SMBUS transaction before it was complete resulting in too few bytes
- The master/host malfunctioned and sent too many bytes

There is no way for the slave device to know the cause of the mismatch between the BYTE COUNT and number of bytes received. It should treat this as a fault, ignore the command, and flush any data bytes received. How it notifies the master/host of the error is really a system specification issue beyond the scope of the SMBus specification.

For a PMBus command that uses the BLOCK WRITE protocol where the slave receives a number of data bytes different than the BLOCK COUNT, then the slave should treat this a “Host Sends Or Reads Too Few Bytes” (Part II, Section 10.8.4) or “Host Sends Too Many Bytes” (Part II, Section 10.8.5) error and respond accordingly.

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

### Other Items

The PMBus logo is a registered trademark 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 does not have to be done for every occurrence, but 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.

### Contacts:

Membership inquires: [admin@smiforum.org](mailto:admin@smiforum.org)  
Tech help: [techquestions@smiforum.org](mailto:techquestions@smiforum.org)  
General: [questions@smiforum.org](mailto:questions@smiforum.org)