

Choosing PoE PSE System Software Solutions



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Power Interface

Power over Ethernet (PoE) solutions offer flexibility to users. System design may be configured to support different features, optimize size and BOM, or offer more control. Texas Instruments (TI) offers various resources, in the form of Evaluation Modules (EVM), Training Videos, and User Guides that can be leveraged for individualized system design. Three different Power Sourcing Equipment (PSE) system software solutions are outlined in this brief.

FirmPSE

The first solution utilizes TI’s system-level firmware solution, FirmPSE. FirmPSE is used to evaluate and create production-ready PSE system firmware code. FirmPSE is popular for multi-port applications as its power supply management features help optimize use of multiple and lower-power power supplies. Port power management (PPM) features can configure a system to power a PoE Powered Device (PD) only if there is enough remaining power and allocate priority (low or high) to ports for structured shutdowns. FirmPSE reduces time to market and saves software resources by excusing users from having to write the code to control PSEs.

Table 1. FirmPSE System Solution Resources

Development Tools		Resource Type	Additional Information
TIDA-050026-23881 Evaluation Module	PSEMCUDAUEVM-082	MCU Daughter Card	<ul style="list-style-type: none"> TIDA-050026-23881 is a Type-4 four-pair 24-port Ethernet switch that can run FirmPSE and be cascaded up to 48 ports TPS23881EVM-083 is Ethernet Alliance Certified
	PSEMTHR24EVM-081	PSE Motherboard	
	TPS23881EVM-083	PSE Daughter Card	
	USB2ANY	USB2ANY Interface Adapter	
	MSP-FET	MSP430™ Flash Emulation Tool	
TIDA-050026-23882 Evaluation Module	PSEMCUDAUEVM-082	MCU Daughter Card	<ul style="list-style-type: none"> TIDA-050026-23882 is a Type-3 two-pair 24-port Ethernet switch that can run FirmPSE and be cascaded up to 48 ports
	PSEMTHR24EVM-081	PSE Motherboard	
	TPS23882EVM-084	PSE Daughter Card	
	USB2ANY	USB2ANY Interface Adapter	
	MSP-FET	MSP430 Flash Emulation Tool	
PSE System Firmware GUI		FirmPSE Software and GUI	<ul style="list-style-type: none"> FirmPSE GUI offers online or offline configuration for real-time communication with the system GUI Training Videos FirmPSE Software and GUI are available on TI's My Secure Software

No Host Controller: Autonomous Mode

TI's TPS23861 device, a four-port PSE solution, and TPS23882, an eight-port PSE solution, support Autonomous Mode. This operating mode is in addition to the existing auto, semi-auto, and manual modes. A significant benefit of autonomous mode is that it does not require host or I²C communication, meaning no software is needed. At a BOM and PCB level this means there can be an absence of the MSP430 daughter card and all signal-related communication components. Furthermore, the FirmPSE GUI is not needed as there is no software to debug. The TPS23882B device is an IEEE802.3bt two-pair compliant solution and the resistance

on the AUTO pin determines either Type 3, Class 4, 30 W per port or Type 3, Class 3, 15.4 W per port. The TPS23861 device only offers 30 W in Autonomous Mode.

This system solution is preferable for lower port counts where PPM features are not required. Power supplies should be able to support full power at all ports. Additionally, predetermined per port power makes autonomous mode an ideal application for PoE midspan injectors. [Table 2](#) references TI's resources to facilitate autonomous mode.

Table 2. Autonomous Mode System Solution Resources

Development Tools		Resource Type	Additional Information
TPS23882B-EVM	BOOST-PSEMTHR8-097	TPS23882 PSE Motherboard	• Has eight two-pair ports (30 W per port)
	TPS23882B1EVM-008	TPS23882B Daughter Card	• TPS23882B autonomous mode passes SIFOS
TPS23881-EVM	BOOST-PSEMTHR-007	TPS2388x IEEE 802.3bt compliant PSE Motherboard	• Has four two-pair ports (30 W per port) and two four-pair ports (90 W per port)
	TPS23881EVM-008	TPS23881 PSE Daughter Card	• TPS23881 cannot completely pass SIFOS without SRAM Patches; however, it is still interoperable with TI's IEEE802.3bt PDs when in autonomous mode
Using the TPS23861 and TPS23882B in Autonomous Mode Features and Benefits		Application Brief	• Includes power supply reference designs for injector solutions

User-Defined MCU

In the case that the MSP430 MCU will be replaced, users can create their own system software. To start development, leverage the MSP430 reference code in [Table 3](#). This system solution is best suited for users that desire more flexibility and configuration control. The following resources also consist of user guides detailing registers in the PSE chips. Register hex values can be used to design the microcontroller. The EVMs can be used to benchmark code.

Table 3. Resources to Create User-Defined MCU

Development Tools		Resource Type	Additional Information
TPS23882-EVM	TPS23882B	Eight-channel two-pair PSE controller	<ul style="list-style-type: none"> • IEEE802.3bt PSE Solutions • Both -008 EVM User Guides detail how to use Code Composer Studio™ to develop source code for the MSP430 LaunchPad™
	BOOST-PSEMTHR8-097	TPS23882 Type-3, 30 W, two-pair, PSE motherboard	
	TPS23882B1EVM-008	TPS23882B Daughter Card	
TPS23881-EVM	TPS23881	Eight-channel four-pair PSE Controller	
	BOOST-PSEMTHR-007	TPS2388x IEEE 802.3bt compliant PSE motherboard	
	TPS23881EVM-008	TPS23881 PSE Daughter Card	
TPS23881 - MSP430 Reference Code TPS23882 - MSP430 Reference Code		MSP430 Reference Code	
MSP-EXP430FR5969		MSP430 LaunchPad	• MCU Development board
USB2ANY		USB2ANY Interface Adapter	

Conclusion

In conclusion, each system design offers different levels of control and functionality. Texas Instruments offers multiple resources to promote solution flexibility. In addition to the previously-mentioned resources, TI's training videos and [E2E™ Forum](#) can help with creating an individual system solution.

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