XDPP1100 Firmware Examples Code

Examples code description is short.

Purpose

Describe presented examples code in short format.

Description

Provided a table with three columns to describe XDPP1100 examples codes briefly.

Table 1

Category	Example code	Description
Basic	Hello World	This example shows how to configure and use the UART module to transmit “Hello World” during initialization. UART module will transmit “Hello World” string when user_drv_init() function is called during initialization.
	Hola Mundo	This example shows how to configure and use the UART module to transmit “Hola Mundo” periodically in regulation state machine. UART module is configured to transmit “Hola Mundo” and then attached to one of the state machine callback function “AT_TARGET_ENABLE” periodically.
	Hallo Welt	This example shows how to configure and use the UART module to transmit “Hallo Welt” via custom PMBus command. UART module is configured to transmit “Hallo Welt” and then attached to PMBus MFR command 0xED MFR_HALLO_WELT. Whenever user set 0xFF to the PMBus data and perform Write, the “Hallo Welt” string will be transmitted out.
Modulation	Adaptive Deadtime Adjustment	In bridge-type power topologies with digital controller, the power efficiency can be further optimized by manipulating deadtimes between the power switches across different operating loads. The following example codes show the operating loads can be divided into four operating regions. Each region will have its own set of deadtimes. Hysteresis zone is introduced in between each operating regions in order to perform smooth deadtimes transition.
	Kickstart Pulse Pre-Startup	XDPP1100 is designed to control isolated bridge power topologies and mainly placed in the secondary-side. In certain situation, it is important to sense the input voltage at the primary-side before the power topologies are started. Due to the isolated nature of the topology, primary side sensing can only be achieved indirectly via secondary side voltage sensing. The following example codes show how some pulses can be injected (“kickstart”) into the power topologies from secondary side to enable indirect primary voltage sensing.

Category	Example code	Description
	Frequency Dithering	Adding certain dithering in the switching frequency helps to randomize quantization error, which in turn gives a perceived smoother regulation performance. This example codes shows how to add frequency dithering in the PWM.
	Deadtime Manipulation	Certain applications requires to use a larger deadtime for startup and a normal set of deadtime when the output voltage is at its target. This example shows how to manipulate by deadtime during different states.
Regulation	Open-loop 3-slopes soft- startup	XDPP1100 is designed to operate in close-loop regulation and configurable via GUI. However, it is also possible to intentionally operate XDPP1100 in open-loop mode. The following example shows how to set the open-loop regulation with XDPP1100 and how to enable soft-startup in open-loop mode.
	Frequency Ramp for Peak Current Mode Control Startup	In order to ensure smooth performance for peak current mode control during startup, the switching frequency can be ramped down from very high starting frequency to the desired frequency, as shown in the following example code.
	Fan Control	Fans are integrated in any switched mode power supply that output very high current. They are used for thermal regulation for blowing the hot air out of the power supply casing. XDPP1100 supports up to two fan controls and it can be controlled via PMBus 0x3A, 0x3B and 0x3C.
	Modifying Transformer Scaling	XDPP1100 is designed to specifically support step-down, buck-kind of power topologies. As a result, the transformer scaling (primary-to-secondary turns ratio) is limited to 1.0. However, certain topologies such as buck-boost requires a transformer scaling to be less than 1.0 (primary turns ratio < secondary turns ratio), as shown in the following example code.
	Active Current Sharing	This example can be useful in terms of XDPP1100 Current Sharing feature modification and debugging. Refer to XDPP1100 datasheet for "*Current Share*" feature clarification.
Telemetry	Using PTC Temperature sensor instead of NTC Temperature sensor	This example code shows how to use PTC (Positive Temperature Coefficient) Temperature sensor instead of NTC (Negative Temperature Coefficient) Temperature sensor for several cases, where PTC is used over NTC sensor. PTC has the opposite behavior from NTC. The resistance increases as temperature increase. However, the relationship is not exactly linear either. For this reason, a lookup table for PTC has to be redefined. N
	Modifying Output Current Scales	XDPP1100 support output current scaling up to 127A. This example codes show how to modify the output current scaling by double, up to 255A.
	Efficiency Look-Up Table and Input Current Correction Look-Up Table	This example code shows how to implement an efficiency Look-Up Table to increase the accuracy of an input current estimation, based on input and output voltages with an output current.
	Input Current Estimation	In order to calculate the input current from the relation between the output power and the input voltage directly, the user can apply this example.

	Telemetry Interrupt	Telemetry interrupt (or Telemetry IRQ) is essential key in the XDPP1100 to trigger certain events to be executed when observed telemetry data exceed/fell down below certain threshold. This example shows how to use the telemetry IRQ for a frequency switch adjust based on the input voltage (VIN) source.
	Telemetry Sense ADC – Custom VDAC with XADDR	XDPP1100 is available to be used for an external resistance decoding to pre-program XDPP1100 settings. For instance, a frequency switch can be tuned by using an external resistor. This example shows how to measure an external resistor at pin XADDR1 with TSADC (VDAC) and how to set an output target voltage according to a measured resistance value with a custom Look-Up Table (LUT).
Faults & Protection	Adding Extra Level of Firmware protection	Some applications require more stringent, multi-layer protections to ensure system reliability. This example codes show how to add extra level for firmware protection for over voltage protection.
	Status Bit Clean	In order to clean up an unwanted fault register, the user can use this example. For instance, the user wants to clear the PMBus STATUS bit “NONE OF THE ABOVE” if it is due to a Power Good fault. The “NONE OF THE ABOVE” should not be cleared if it is due to other trigger. The picture below shows example’s performance.
	Fault Masking	There might be cases, when a certain fault should be masked or hidden. This example shows how to do that.
Communication	Making PMBus stays ON when no regulation	XDPP1100 assumes that there is no need for PMBus reporting when the power converter is off. In certain situation, this behavior is undesirable and there is still a need for PMBus reporting the telemetry. This firmware example codes show how to enable PMBus when the power converter is off.