

Firmware for 50 W 2-coil wireless charger transmitter based on STWBC2-HP

Applications & demonstrations	Host interface	LED indicators	Charging controller
Middleware	Qi Protocol Library	USB-PD Protocol Library	RTOS and Scheduler
Hardware Abstraction	Hardware Abstraction Layer API		
Hardware	STWBC2-HP	STL20N6F7	
	STDES-50W2CWBC		

Features

- Implements Qi v1.2.4 compliant wireless charger transmitter protocol stack
- Controls the synchronous boost DC-DC converter to supply the full bridge
- Controls the full bridge to implement Qi compliant power transmission
- Controls the USB wall-adaptor including USB-PD 3.0
- Implements the amplitude shift keying (ASK) demodulation
- Implements the frequency shift keying (FSK) modulation
- Controls the two coil switching and charging alternatively

Description

The [STSW-50W2CWBC](#) firmware runs on the [STDES-50W2CWBC](#) reference design.

The firmware controls the [STWBC2-HP](#) SoC to implement the Qi v1.2.4 compliant wireless charging transmitter. It can charge the Qi compliant wireless charging receivers in 5 W base power profile (BPP) mode and 15 W extended power profile (EPP) mode. The EPP topology is MP-A2.

Once working with the ST solution based wireless charging receiver, it supports up to 50 W in receiver output based on the ST super charging (STSC) protocol.

The reference design supports two Tx coils to extend the charging area. The firmware can automatically detect the wireless charging receiver existence in either of the two coils and perform charging. The two coils work alternatively.

The firmware supports most of the USB wall adapters. To evaluate the 50 W two-coil wireless charging, it is recommended to apply a USB-PD wall adapter that supports 5, 9, 12, 15, and 20 V PDO.

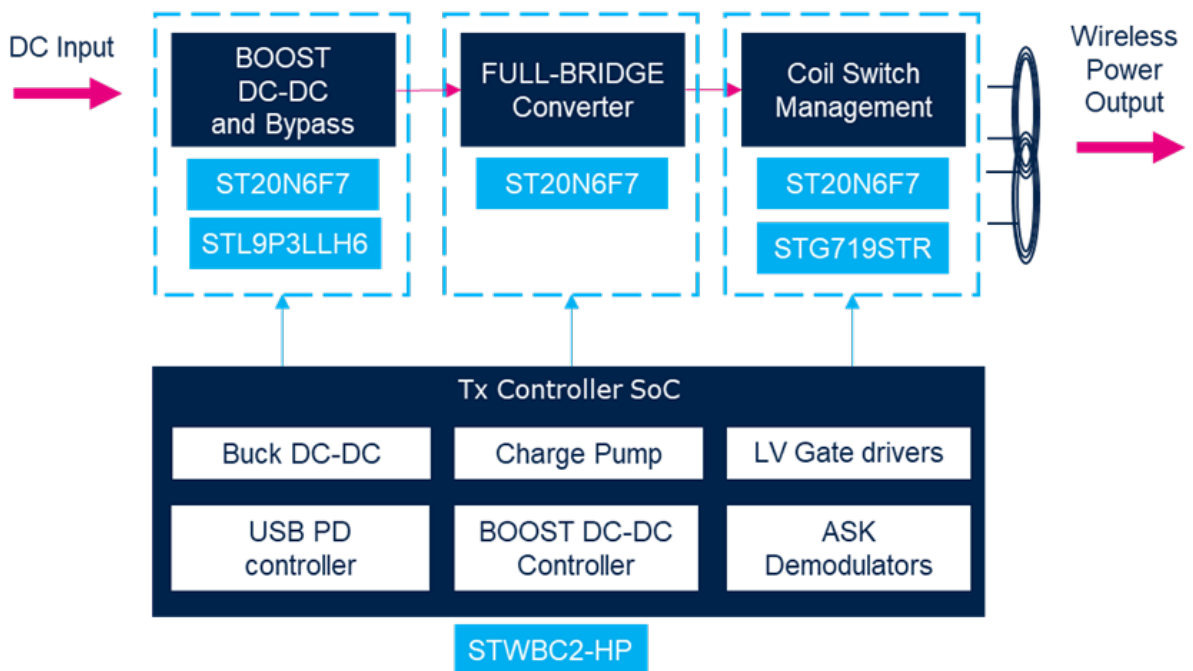
The [STSW-50W2CWBC](#) firmware is a basic reference for evaluation. Contact ST sales and distributors to get the updated firmware for various applications.

Product summary	
Firmware for 50 W two-coil wireless charger transmitter based on STWBC2-HP	STSW-50W2CWBC
50 W two-coil wireless charger transmitter reference design	STDES-50W2CWBC
Digital controller for wireless battery charger transmitters	STWBC2-HP
Applications	Wireless Chargers

1 Block diagram

The **STDES-50W2CWBC** reference design is based on the MP-A2 topology of the WPC Qi standard (v1.2.4). The boost DC-DC regulates the DC input power. Then, the full-bridge converter converts the input power to AC. The coil switcher alternatively connects the full-bridge output to the two coils. The power receiver (PRX) could be any Qi standardized receiver. In particular, the Qi standard covers up to 15 W power through the extended power profile (EPP). When targeting a system power higher than 15 W, you can apply the ST proprietary protocol extension with the ST PRX chipset (for example, the **STWLC98**).

Figure 1. **STDES-50W2CWBC** block diagram



The **STSW-50W2CWBC** firmware runs on the **STWBC2-HP** SoC to:

- control the embedded DC-DC controller and gate driver to implement the boost DC-DC;
- control the embedded PWM generator and gate driver to implement the high-resolution full-bridge PWM control;
- control the embedded USB-PD 3.0 peripheral to implement the USB-PD sink;
- control the embedded ASK demodulator and FSK modulator to implement Qi in-band bidirectional communication;
- control the embedded Q factor evaluator peripheral to perform accurate Q-factor estimation;
- control the external coil switch circuit to manage the two coils working alternatively.

Revision history

Table 1. Document revision history

Date	Revision	Changes
09-Mar-2022	1	Initial release.

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