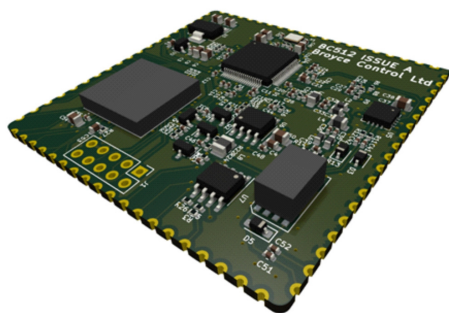




Dims (L x W): 50.8mm x 50.8mm

- Designed specifically for EVSE and compliant with IEC/ISO 15118-3
- Onboard microcontroller
- Suitable for direct interfacing to the Espressif ESP32 microcontroller-based modules
- 5V DC operation
- Optional IEC 61851 Control Pilot PWM generation and voltage monitoring
- Built-in 1:1:1 signal transformer
- Industrial temperature range operation
- Line-driver included resulting in greater noise immunity and allowing longer cable runs
- Low profile, small form factor design utilising single-sided components
- Surface mount assembly suitable for reflow soldering



OVERVIEW

A Green PHY compliant powerline communication (PLC) modem designed for use in Electric Vehicle Supply Equipment (EVSE) in accordance with the IEC/ISO 15118 standard for road vehicle to grid digital communication.

The module consists of a Green PHY transceiver and line driver together with filtering and on board 1:1:1 signal transformer whose primary carries the Control Pilot PWM signal as defined in IEC 61851 (Electric vehicle conductive charging system).

An optional non-isolated zero-cross digital input is provided to allow coexistence with PLC running over mains wiring.

This module can be used in configurations from a simple SPI protocol driven GreenPHY modem with full analogue front end through to acting as the heart of a charge controller with the customer's application running on the onboard microcontroller.

PIN DESCRIPTIONS

Pin	Name	Type	Description
1-21, 26, 60-76	GND	Power	
22, 23	VCC_5	Power	5V DC power input
24	VCC_12P	Power	+12V input if onboard Control Pilot generation is to be used
25	VCC_12N	Power	-12V input if onboard Control Pilot generation is to be used
27	GPIO39	Analogue/Digital In	ESP32 GPIO ¹
28	GPIO02	Digital In/Out	ESP32 GPIO ¹ Must be held low at boot to enter serial bootloader mode
29	GPIO04	Digital In/Out	ESP32 GPIO ¹
30	GPIO05	Digital In/Out	ESP32 GPIO ¹
31	GPIO18	Digital In/Out	ESP32 GPIO ¹
32	GPIO23	Digital In/Out	ESP32 GPIO ¹
33	UART_RX	Data In	ESP32 UART receiver interface
34	UART_TX	Data Out	ESP32 UART transmitter interface
35	ZC_DETECT	Digital In	Non-isolated AC mains zero crossing detect input (3.3v, Optional)
36	FW_UPDATE	Data In	Hold active low on boot to get the ESP32 to enter serial bootloader mode (GPIO02 must also be held low at boot)
37	GPIO35	Analogue/Digital In	ESP32 GPIO ¹
38	GPIO34	Analogue/Digital In	ESP32 GPIO ¹
39	nIRQ	Digital Out	Interrupt to signal external host microcontroller
40	nCS	Digital In	SPI slave control interface enable from external host microcontroller
41	MISO	Data Out	SPI slave control interface data to external host microcontroller
42	MOSI	Data In	SPI slave control interface data from external host microcontroller
43	SCLK	Data In	SPI slave control interface clock from external host microcontroller
44	UC_nRESET	Digital In	Active low reset line for the microcontroller
45	TDI	Data In	JTAG TDI / ESP32 GPIO12 ¹
46	TDO	Data Out	JTAG TDO / ESP32 GPIO15 ¹
47	TCK	Data In	JTAG TCK / ESP32 GPIO13 ¹
48	TMS	Data In	JTAG TMS / ESP32 GPIO14 ¹
49	CP	PWM In	±12V 1kHz PWM Control Pilot signal to modulate GreenPHY onto if generated off board
50	PWM_IN	PWM In	3.3V PWM signal that will be amplified to ±12V and used as a Control Pilot
51	PWM_DETECT	PWM Out	±12V Control Pilot PWM signal output, filtered and attenuated to 0-3V for IEC61851 external charging state detection
52	FLASH_SPI_MISO	Data In	SPI interface for loading transceiver firmware from external SPI Flash ²
53	FLASH_SPI_SCLK	Data Out	SPI interface for loading transceiver firmware from external SPI Flash ²
54	nFLASH_SPI_CS	Digital Out	SPI interface for loading transceiver firmware from external SPI Flash ²
55	FLASH_SPI_MOSI	Data out	SPI interface for loading transceiver firmware from external SPI Flash ²
56	FLASH_I2C_SDA	Data In/Out	I2C Data interface for uploading transceiver firmware to external SPI Flash ²
57	FLASH_I2C_SCL	Data In	I2C Clock interface for uploading transceiver firmware to external SPI Flash ²
58	PE_EXT	Signal	Protective Earth to EV
59	CP_EXT	Signal	Control Pilot out to EV

¹ user configurable, see ESP32[^] documentation

² optional if flashing from microcontroller

[^] Links to Espressif website

TECHNICAL SPECIFICATION

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply voltage:	V _{CC_5}			5.5	V
Supply voltage (optional if generating the CP onboard):	V _{CC_12P} & V _{CC_12N}	-12 ±0.6		12 ±0.6	V
Supply current:	I			500	mA
Ambient operating temp.:	T _A	-40		+85	°C

Operating Characteristics

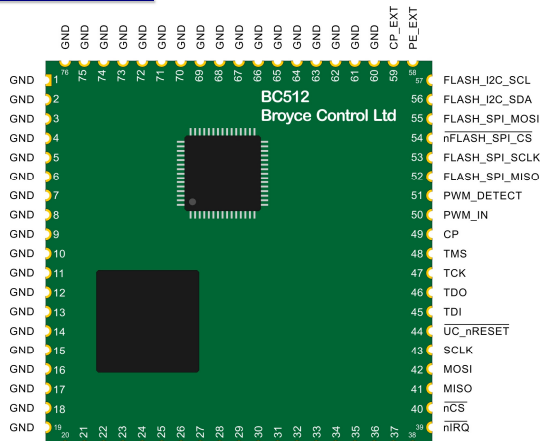
Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply voltage:	V _{CC_5}	4.75	5.00	5.25	V
SPI SCLK frequency:		6		10	MHz

General

Printed Circuit Board

Dimensions:	50.8 mm x 50.8mm
Thickness:	5.5mm
Material:	FR4, UL94-V0
Connections:	19 pins each side, 0.1" (2.54mm) pitch
Approvals:	CE and RoHS Compliant.

PIN DESIGNATIONS



PCB FOOTPRINT

