



DC-BUS Power line Communication Shield for Arduino Uno V3

This information is preliminary and may be changed without notice

1 General

This app note describes the DC-BUS power line communication shield for Arduino Uno V3 board. The DC-BUS shield interfaces with the DC-BUS shield with UNO board via the Arduino UART port. The DC-BUS shield is an UART protocol physical layer for data communication over the powerline.

2 The DC-BUS UNO Shield

The DC-BUS UNO shield consists of on-board 12V to 3.3V supply (LDO), Yamar's DCB/SIG Family powerline transceiver (PLC IC), and optional LIN/RS485 transceiver.

Table 1 describes the UNO to DC-BUS shield digital interface connections.

Table 1 - UNO - DC-BUS Shield digital pins connection

UNO Pin #	Description	Comments
D0	Alternative HDO interface to PLC IC ¹	Connect R9 = 0Ω and disconnect R3 when in use. Default on-board NC.
D1	Alternative HDI interface to PLC IC ¹	Connect R11 = 1kΩ and disconnect R10 when in use. Default on-board NC.
D2	HDC	Data/Command pin. When low it is possible to R/W to/from the device internal registers.
D3	EN_LIN_TRANSC	When on-board LIN/RS485 transceiver is in use, pull this pin high to enable transceiver DATA OUT routing to the PLC IC. Else, Keep this pin low.
D4	NRESET	
D5	SLEEP	
D6	RTR	
D7	EN_RS485 Slave	When RS485 is in use, pull up this pin to enable RS485 DE or pull down for RS485 ~RE enable.
D8	HDO ²	UART UNO RX using SoftSerial lib.
D9	HDI ²	UART UNO TX using SofSerial lib.
VIN	Connected to powerline connectors J4/J2.	Powerline voltage 5V to 12V for UNO VIN supply and for powerline communication.
5V	Output 5V from the UNO board.	NC in the shield board.
3V	Output 3V from the UNO board.	NC in the shield board (3.3V supply of the shield board is provided from on-bard LDO).

¹ Using Serial communication up to 1Mbit/s. Requires unplugging of the DC-BUS shield while programming the UNO V3 board. Arduino Serial monitoring share these pins.

² To allow Arduino Serial monitoring, use this pins to interface the PLC IC UART HDI and HDO pins using Arduino Soft Serial lib, enables UART up to 57.6kbit/s.

2.1 Connectors

Table 2 - J4 – JACK PLUG - DC Power Line

Name	Pin #
GND	1
GND	2
POWRIN (VBAT) ¹	3

Table 3 - J2 - MTA - DC Power Line

Name	Pin #
POWRIN (VBAT) ¹	1
GND	2

¹ VBAT input connects the shield to the DC powerline for communication and power supply for on-board 3.3V LDO and for UNO board VIN supply.

Power supply requirements: 5V to 12V, minimum 250mA.

Table 4 - J5 - LIN Transceiver interface

Name	Pin #
LIN	3
POWRIN (VBAT)	2
GND	1

Table 5 - J6 - RS485 Transceiver interface

Name	Pin #
GND	1
EN_RS485_SLAVE (~RE/DE control).	2
RS485 +	3
RS485 -	4

2.2 Display LEDs

- TX LED - Indicates transmission.
- RX LED - Data output, indicates reception.
- ON LED - Indicates 3.3V power on.

3 PCB Layout

The PCB layout is depicted in Figure 1 and Figure 2.

Top Layer

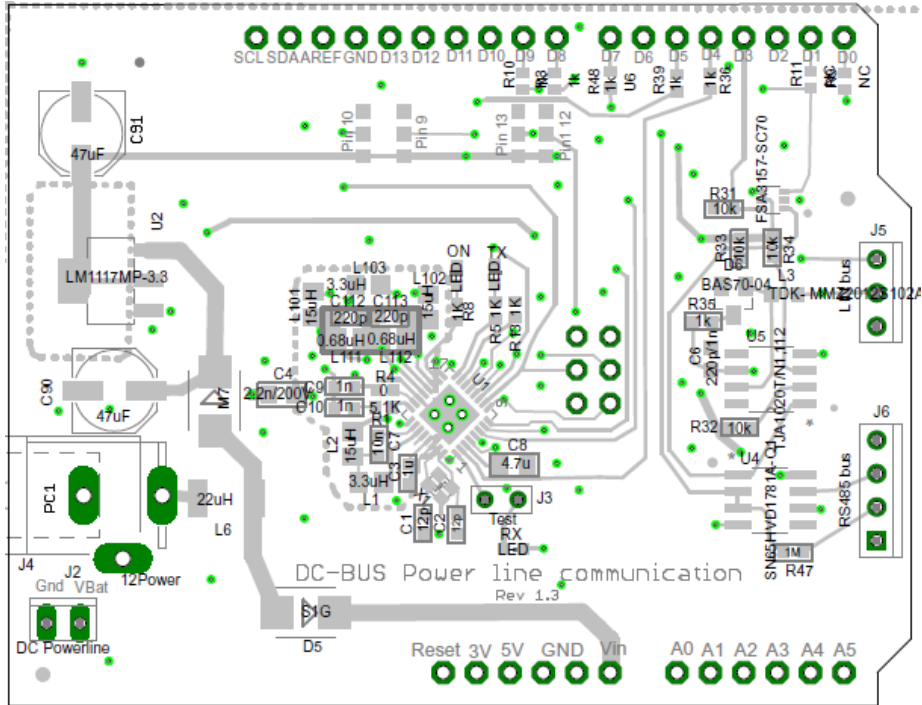


Figure 1 - Top layer

Bottom Layer

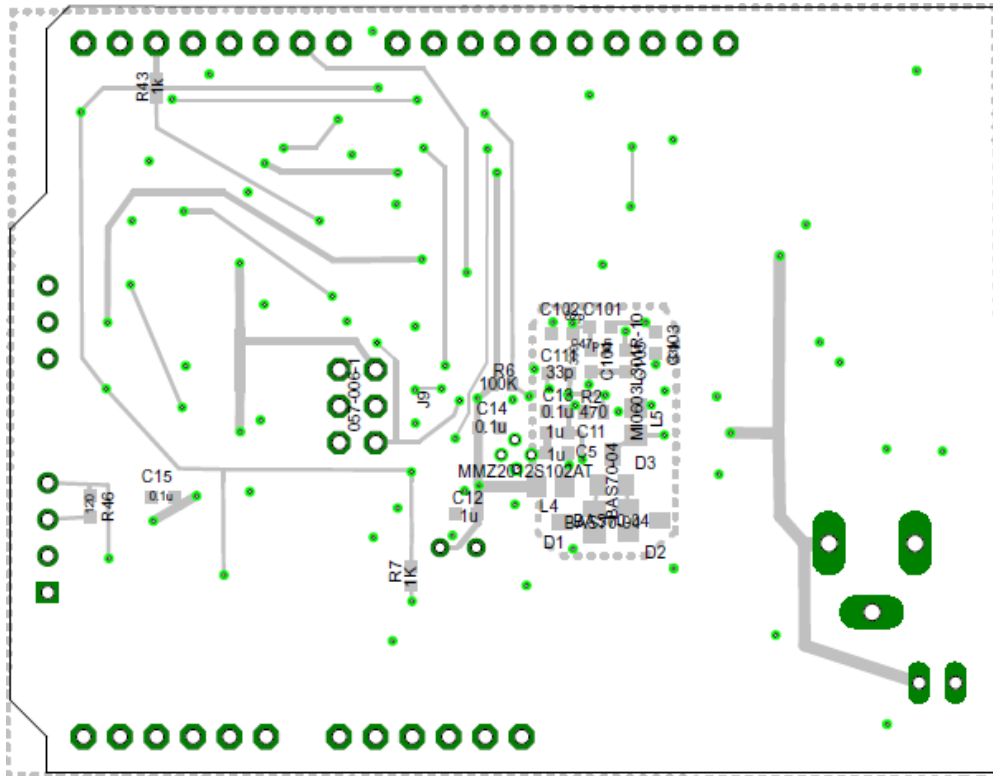


Figure 2 - Bottom layer

4 Schematics

Figure 3 and Figure 4 depict the PCB schematic.

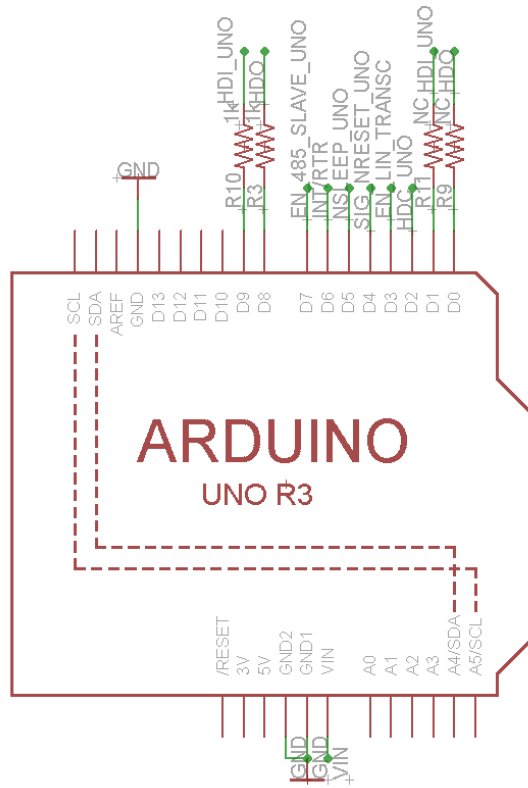


Figure 3 - UNO - DC-BUS shield connections

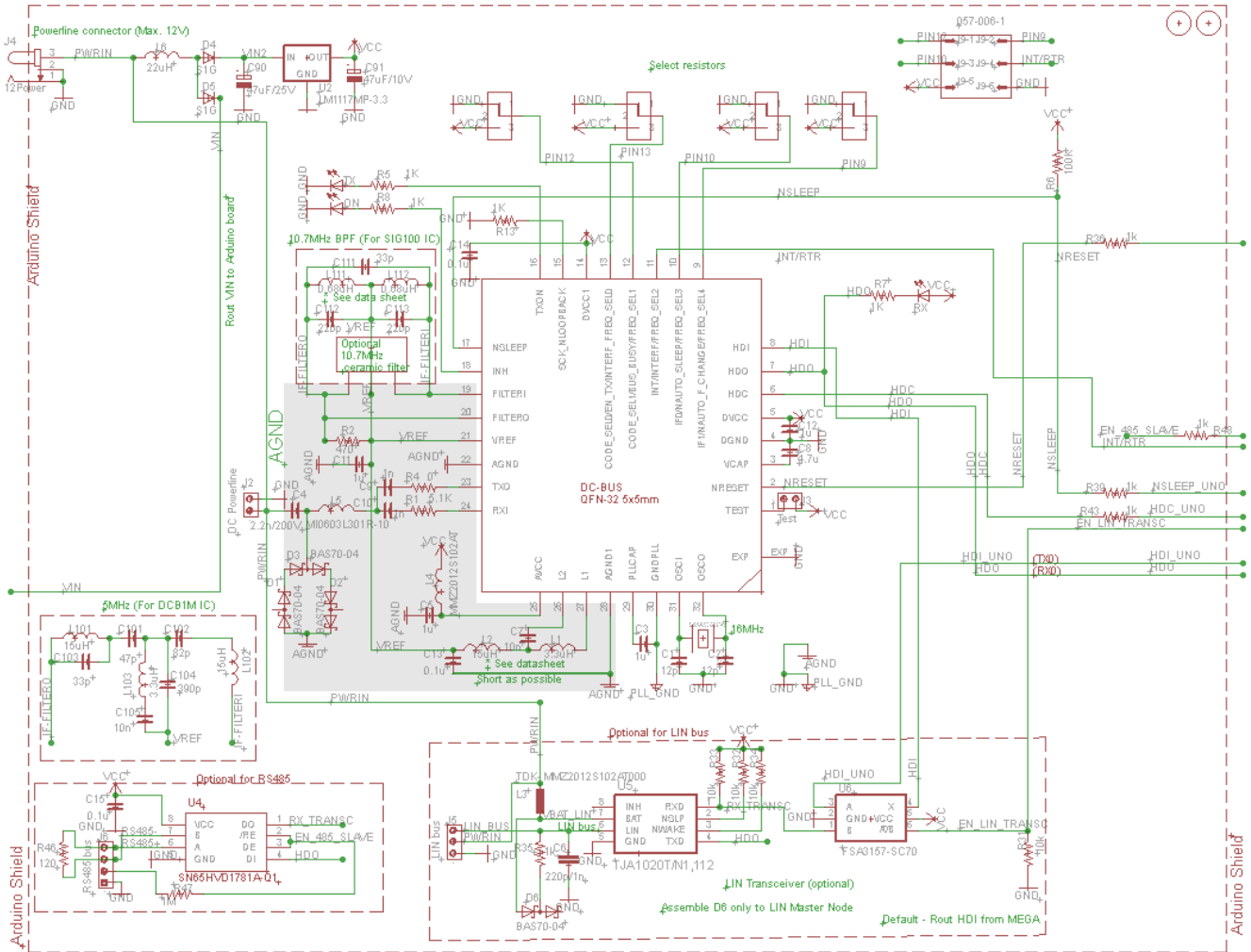


Figure 4 - UNO - DC-BUS schematic