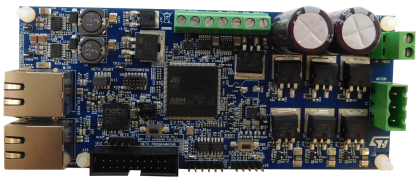
STEVAL-ETH001V1

Data brief

Servo drive solution for multi-axial position control with Ethernet real-time



Features

- Real-time communication via Ethercat protocol
- Three-phase motor drive inverter based on STDRIVE101 gate driver and STH270N8F7-2 power MOSFET
- STM32F767ZI microcontroller Arm®32-bit Cortex®-M7
- NETX90 network controller
- Main supply voltage up to 48 V with a max. overvoltage robustness of 60 V
- Max. power dissipation up to 700 W
- Motor brake dissipative energy circuit
- Digital actuation section for industrial loads
- RS485 interface for digital encoder and host interface
- On-board DC-DC converter and linear regulator

Description

The STEVAL-ETH001V1 servo drive evaluation board has been developed to address three-phase PMSM applications oriented to multi-axial position control and connectivity.

The evaluation board embeds a motor control power stage, a digital actuation section and a power management section.

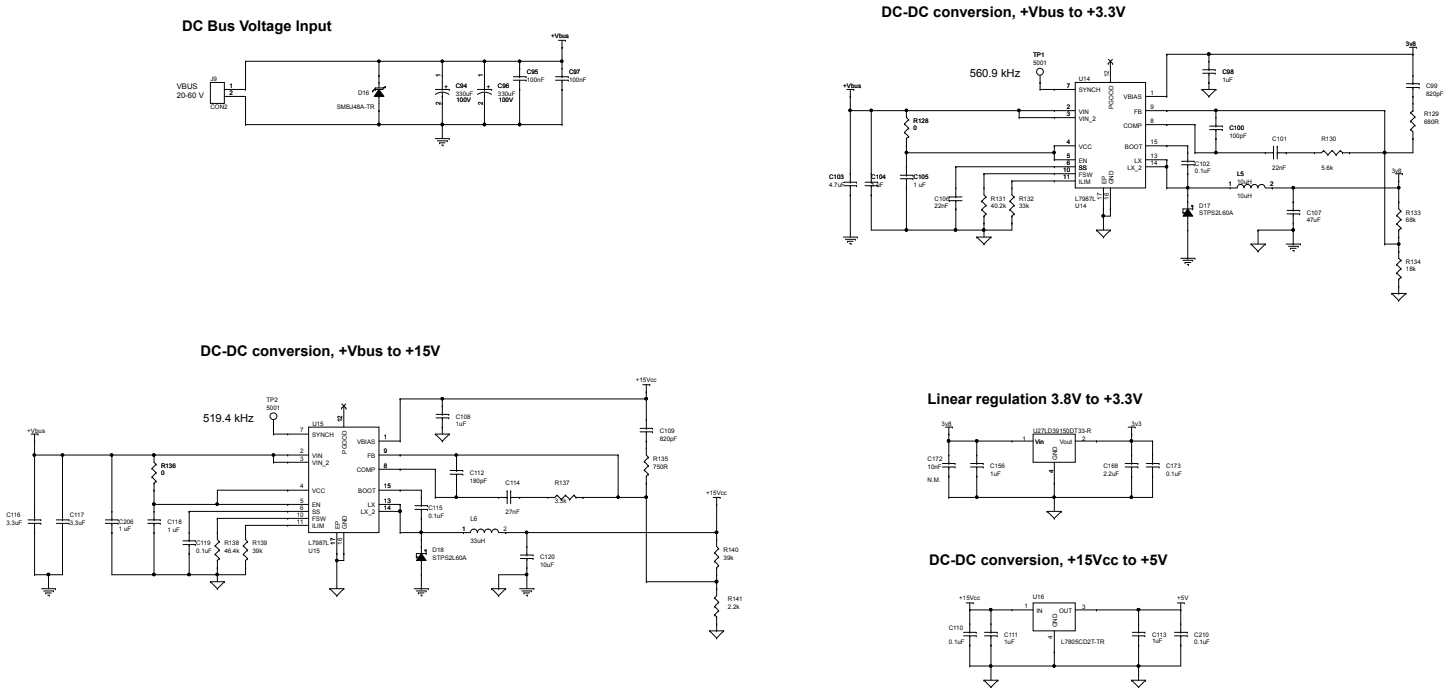
The motor control power stage hosts the STDRIVE101 half-bridge gate driver and six STH270N8F7-2 power MOSFETs, featuring real-time connectivity with Ethercat communication protocol supported by the NETX90 network controller, whereas the digital actuation section hosts an industrial IO management section with CLT03-2Q3 (input) and IPS160H (output). The power management section is powered by L7987, L7805CD2T-TR and LD39150DT33-R devices.

The STEVAL-ETH001V1 is equipped with two RJ45 connectors for daisy chain connection and an RS485 interface for digital encoder or host connection powered by ST3485EI. For a better noise immunity, the PCB is characterized by a 6-layer stack and an insulated track for supply line and ground. A quadrature encoder interface with index is also present.

Product summary	
Servo drive solution for multi-axial position control	STEVAL-ETH001V1
Firmware for servo drive solution enabling motor control position through Ethercat protocol	STSW-ETHDRV01V1
Triple half-bridge gate driver	STDRIVE101
STripFET F7 Power MOSFET	STH270N8F7-2
Arm Cortex-M7 MCU	STM32F767ZI
Applications	3-phase field oriented control Industrial servo drives

1 Schematic diagrams

Figure 1. STEVAL-ETH001V1 circuit schematic (1 of 10)



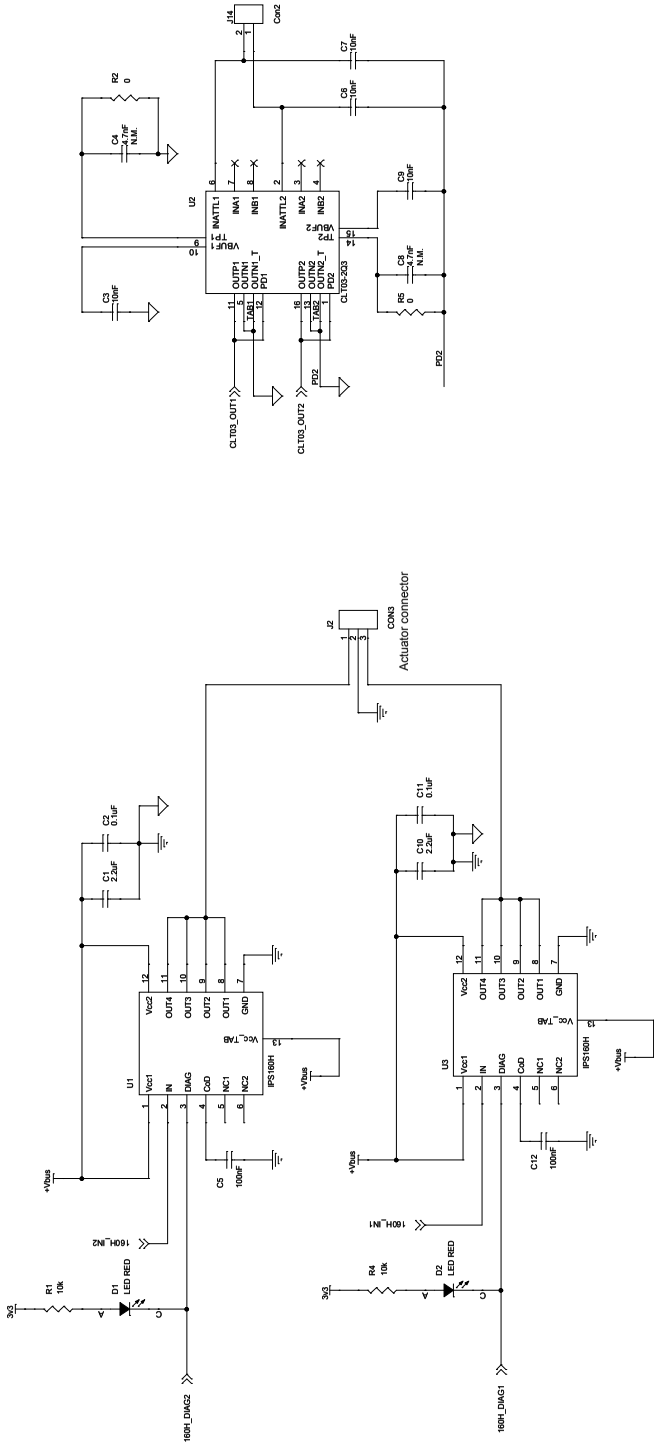


Figure 2. STEVAL-ETH001V1 circuit schematic (2 of 10)

Figure 3. STEVAL-ETH001V1 circuit schematic (3 of 10)

Motion Control - Current Sensing External op-amp

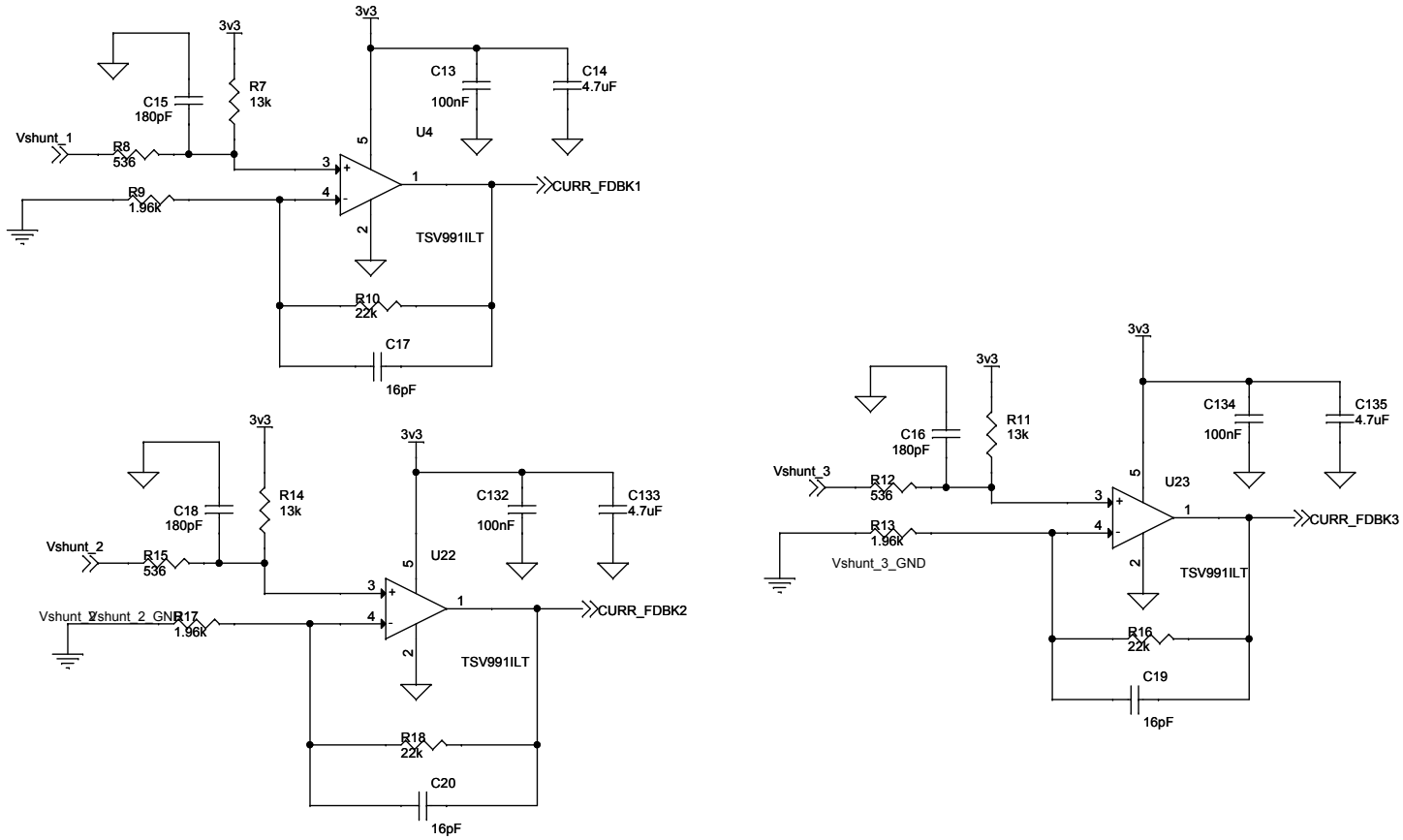


Figure 4. STEVAL-ETH001V1 circuit schematic (4 of 10)

Motion Control - Power Stage

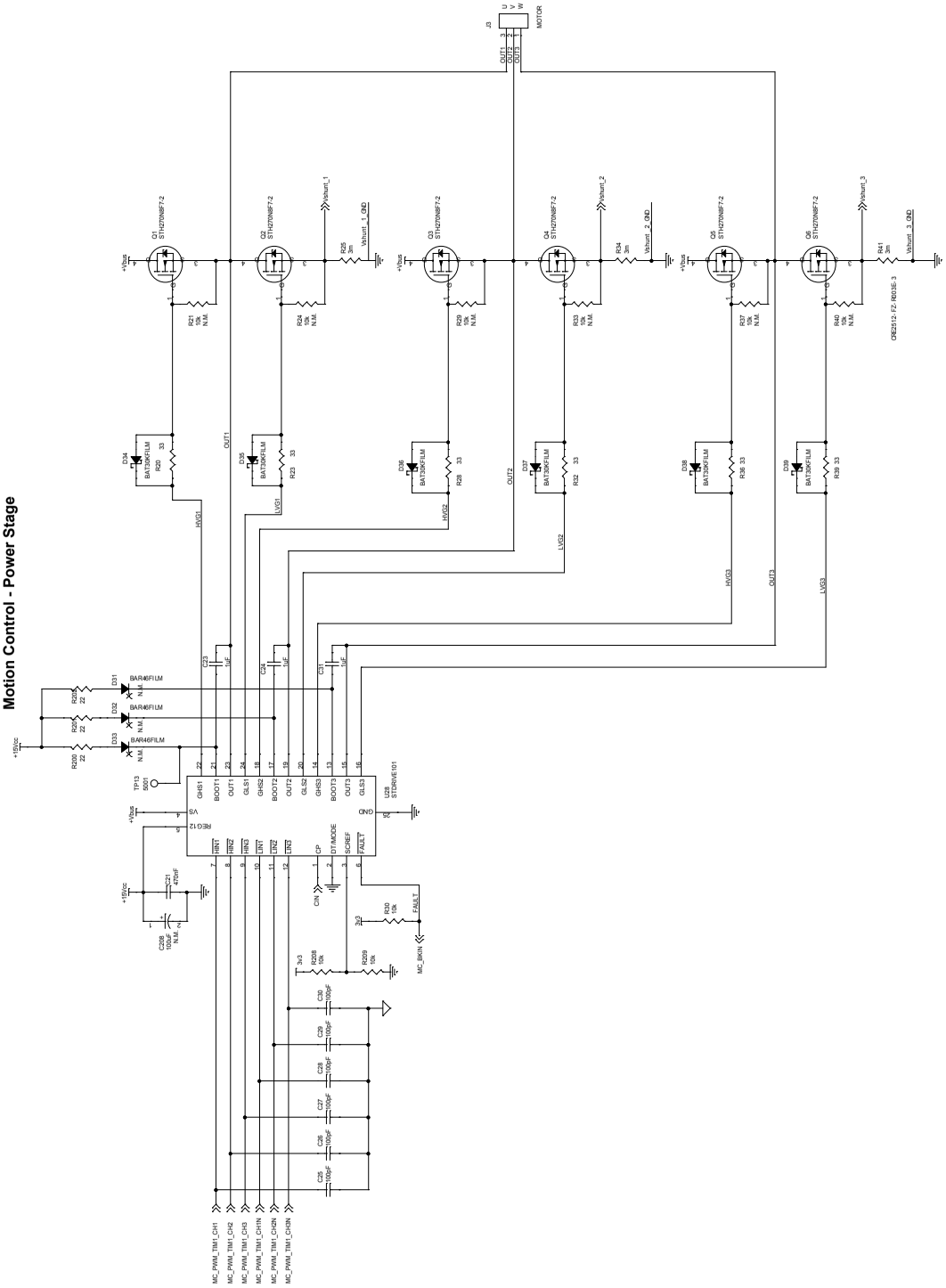
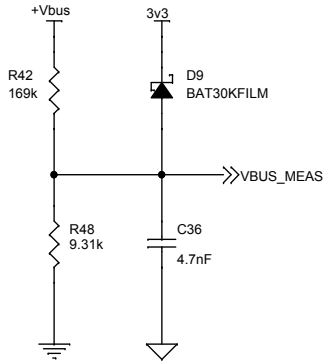
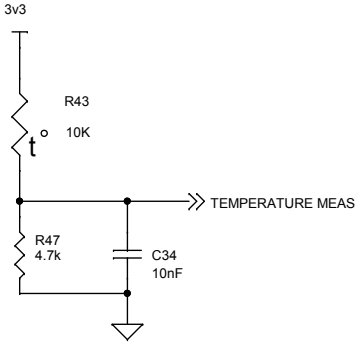


Figure 5. STEVAL-ETH001V1 circuit schematic (5 of 10)

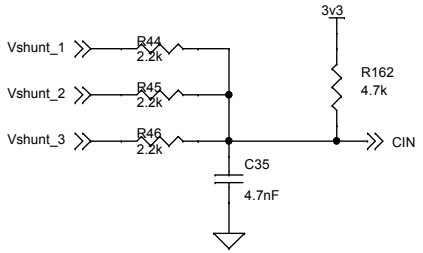
Bus Voltage Sensing



Temperature Sensor



Over Current Protection



Brake Motor Network for over voltage energy dissipation

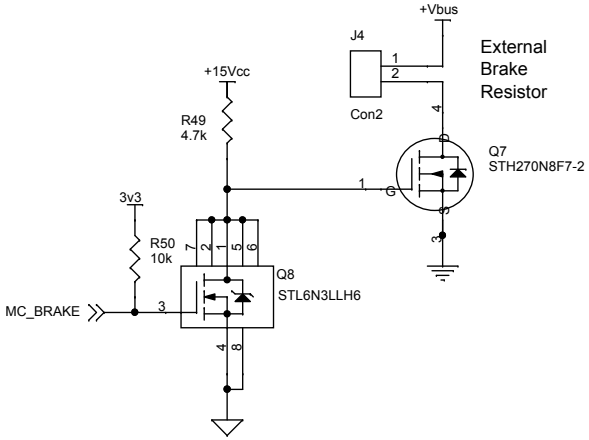


Figure 6. STEVAL-ETH001V1 circuit schematic (6 of 10)

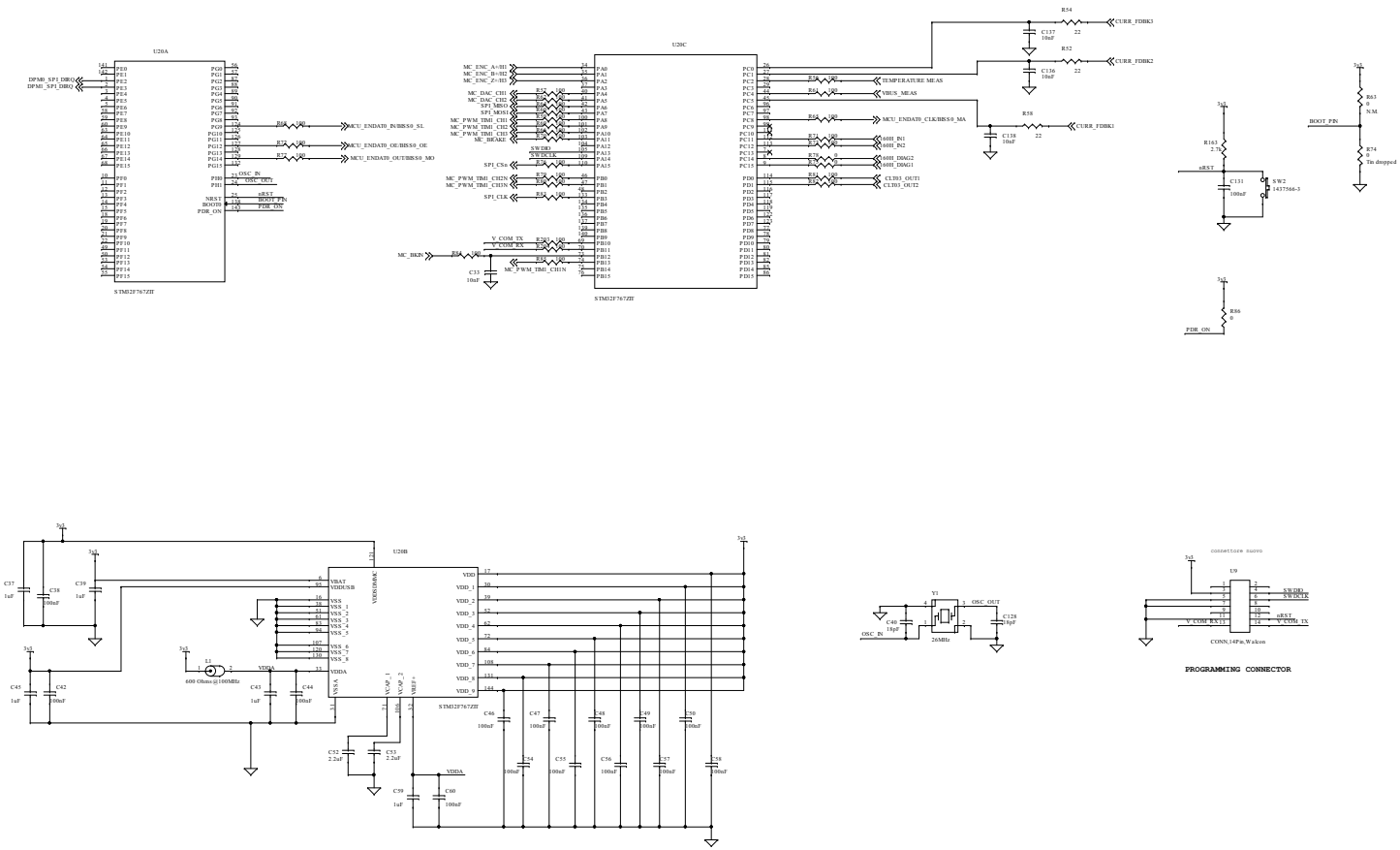


Figure 7. STEVAL-ETH001V1 circuit schematic (7 of 10)

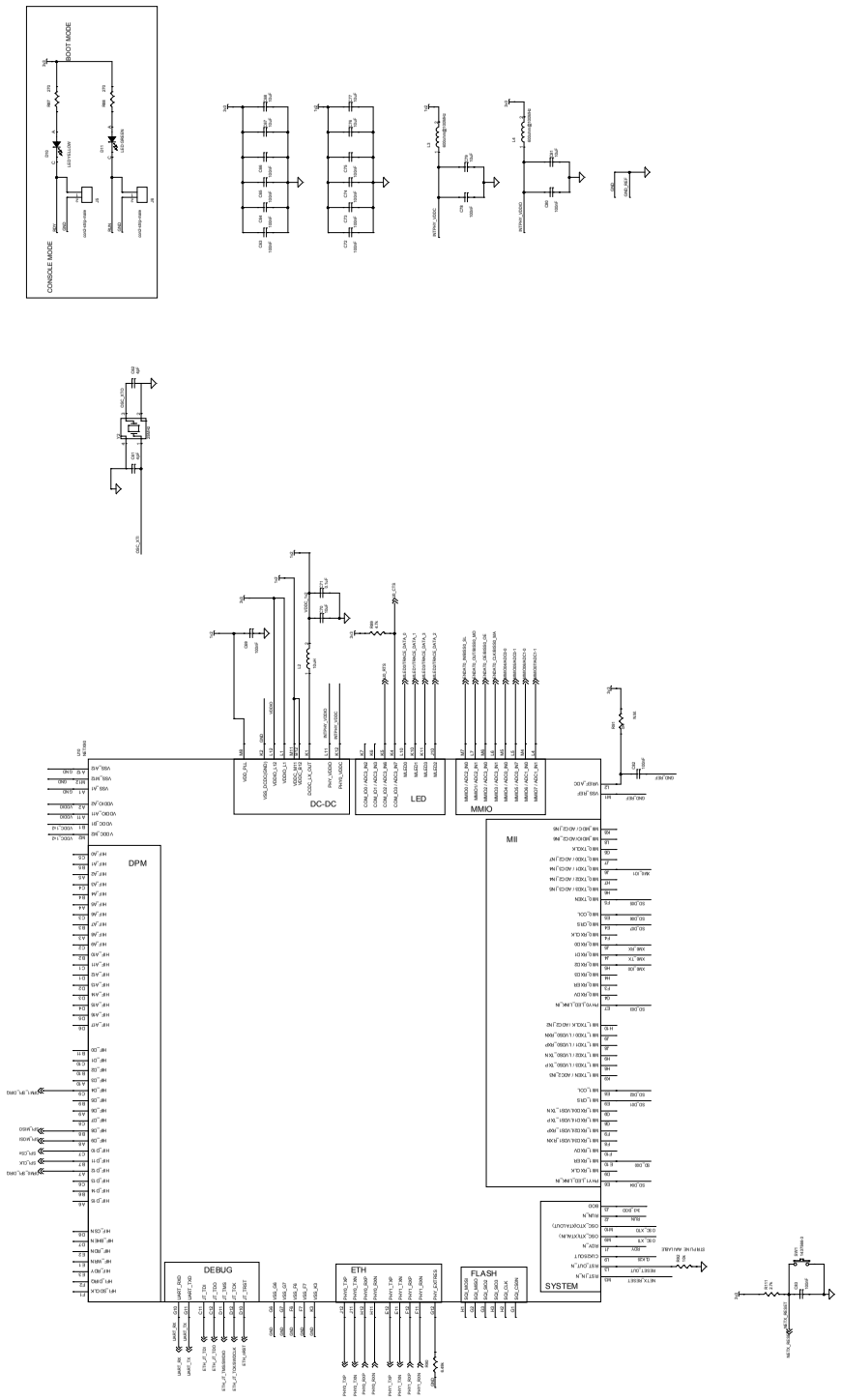


Figure 8. STEVAL-ETH001V1 circuit schematic (8 of 10)

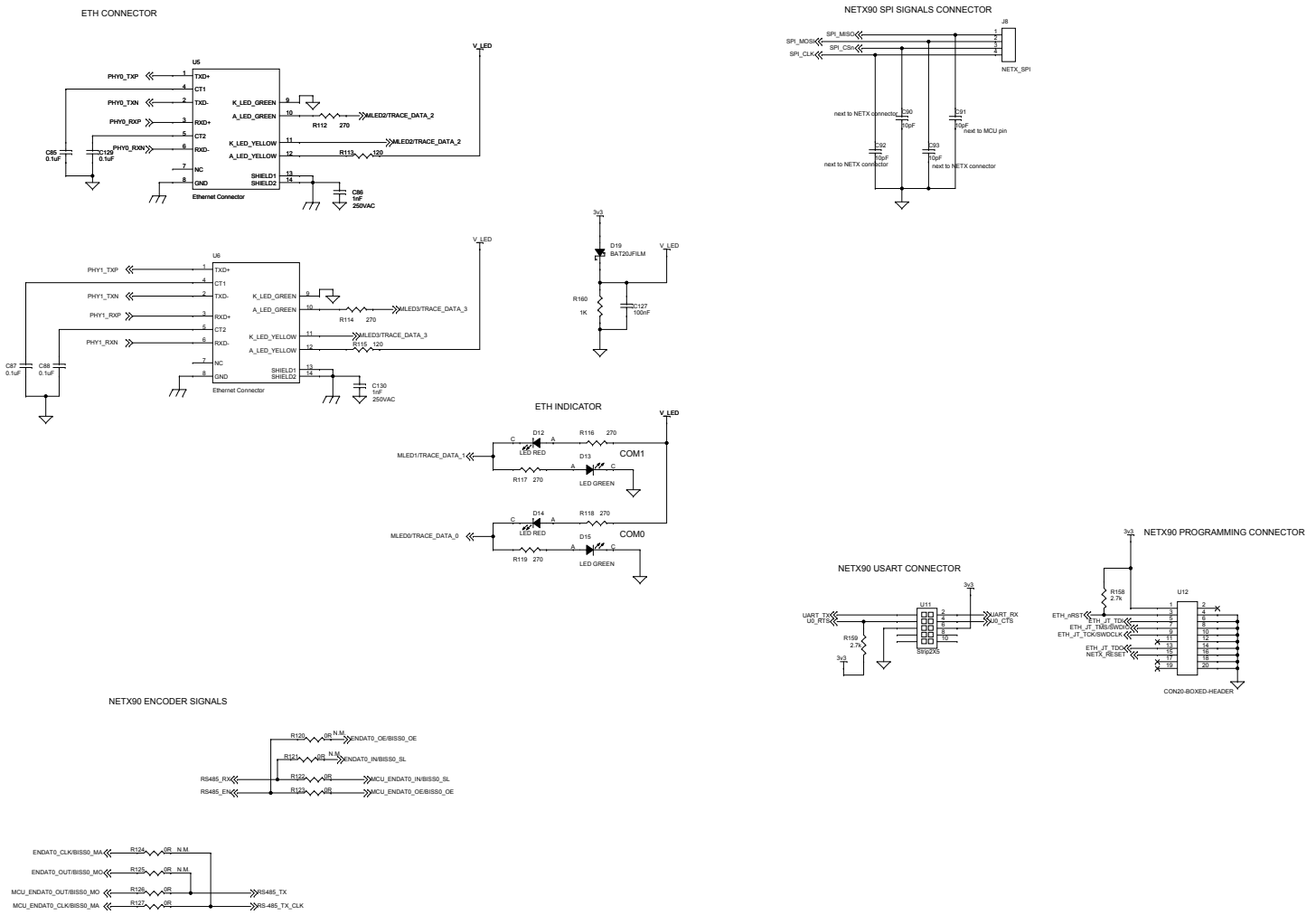


Figure 9. STEVAL-ETH001V1 circuit schematic (9 of 10)

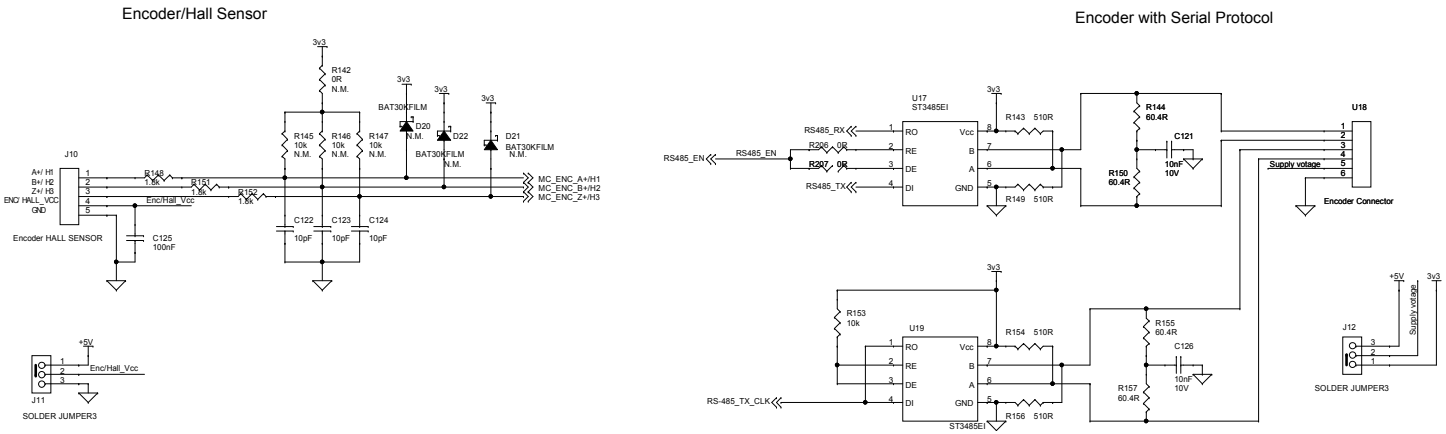
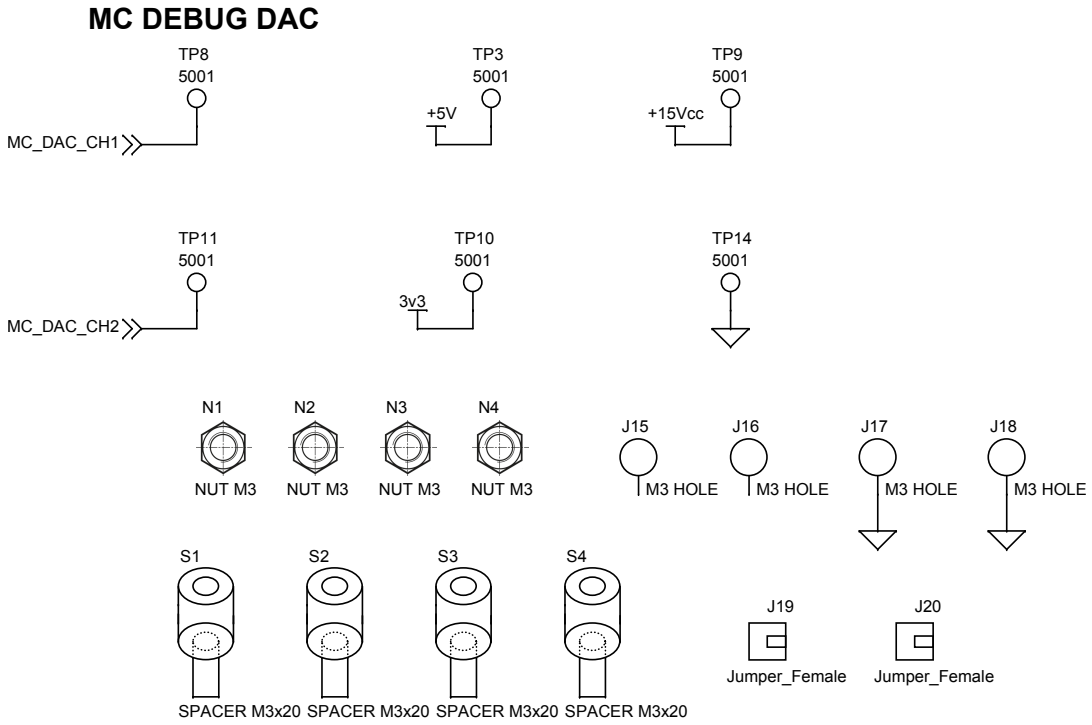


Figure 10. STEVAL-ETH001V1 circuit schematic (10 of 10)



Revision history

Table 1. **Document revision history**

Date	Version	Changes
07-Apr-2021	1	Initial release.