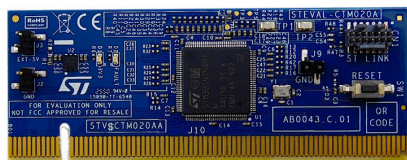


Compact MCU-based control board for multi-phase and multi-motor FOC drives



Features

- Compact MCU-based control board optimized for advanced motor control applications
- Supports field-oriented control (FOC) and other advanced control schemes
- Suitable for synchronous and asynchronous brushless motors (permanent magnet, induction, synchronous reluctance, switched reluctance)
- Multimotor and multiphase drive capability for complex motion systems
- Flexible hardware architecture for easy adaptation to different power stages / inverter boards compatible with MC connector V2
- On-board STM32G474QB microcontroller with dedicated motor control peripherals
- Designed for seamless integration with ST motor control firmware libraries and tools
- Multiple feedback options (for example, sensorless, hall sensors, encoder, resolver) depending on system configuration
- Debug and communication interfaces for tuning, monitoring, and parameterization via the STLINK connector
- Suitable for industrial motor control applications

Description

The **STEVAL-CTM020A** is a compact MCU-based control board designed for advanced motor control applications, with a special focus on multiphase and multimotor FOC drives.

Based on the **STM32G474QB** microcontroller, which integrates dedicated motor control peripherals, the board provides a high-performance and flexible platform for implementing field-oriented control (FOC) and other sophisticated control schemes.

The hardware architecture supports a wide range of synchronous and asynchronous brushless motors, including permanent magnet, induction, synchronous reluctance, and switched reluctance machines.

Thanks to its multimotor and multiphase drive capability, the **STEVAL-CTM020A** is well suited for complex motion systems that require independent or coordinated control of several motors.

The control board is designed to be used in combination with external power stages or inverter boards through the MC connector V2, allowing easy adaptation to different power ratings and topologies while reusing the same control platform.

Multiple feedback options can be supported, such as sensorless control, hall-effect sensors and encoder-based sensing, depending on the specific system configuration.

The **STEVAL-CTM020A** is fully zest-compatible and is part of the STM32 motor control ecosystem, ensuring seamless integration with ST motor control firmware libraries, configuration tools, and development environments. Debug and communication interfaces available via the STLINK connector enable straightforward tuning, monitoring, and parameterization of motor control applications.

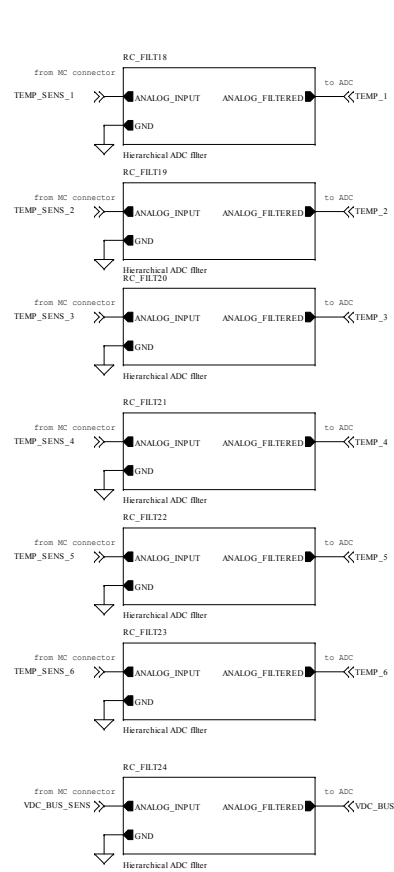
This control board can be used as a reference design or as a development and evaluation platform for high-performance motor control in industrial applications, helping designers accelerate the implementation and optimization of advanced FOC-based multimotor systems.

Product summary	
Compact MCU-based control board for multi-phase and multi-motor FOC drives	STEVAL-CTM020A
Mainstream Arm Cortex-M4 MCU 170 MHz with 128 Kbytes of Flash memory, Math Accelerator, HR Timer, High Analog level integration	STM32G474QBT6
Applications	Motor Control

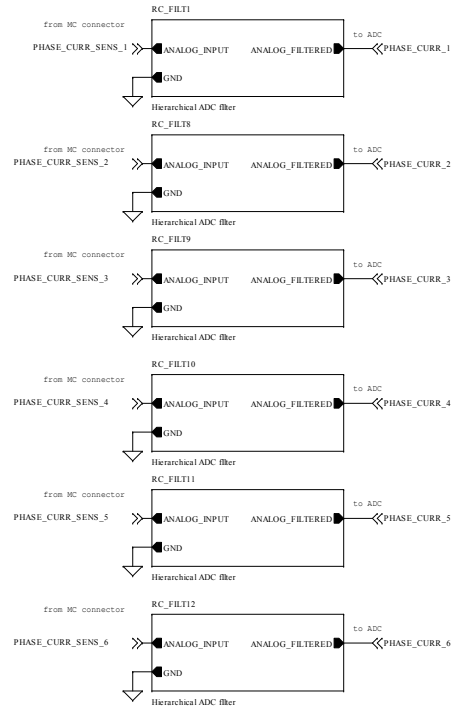
Schematic diagrams

Figure 1. STEVAL-CTM020A circuit schematic (1 of 26)

Temperature and DC Voltage Filters



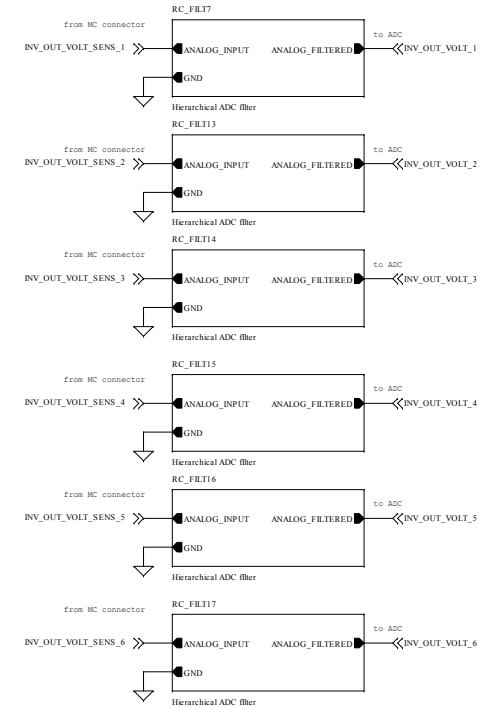
Phase Current Filters



Resolver signals filters

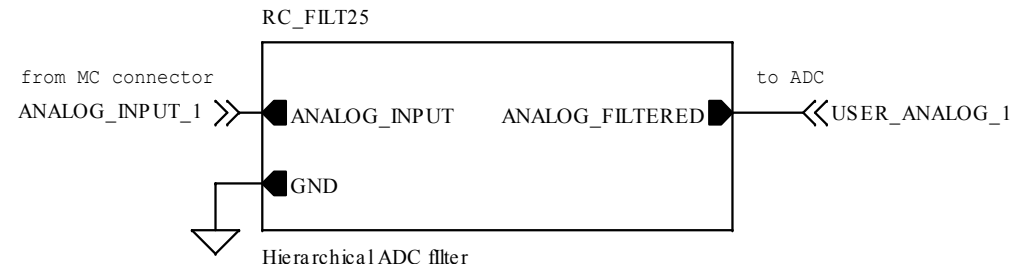


Inverter Output Voltage Filters



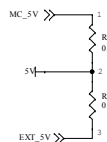
User Analog Input Filters

Figure 2. STEVAL-CTM020A circuit schematic (2 of 26)



STEVVAL-CTM020A

Schematic diagrams



	5V	
	MC 5V	EXT 5V
1-2	Closed	Open
2-3	Open	Closed

STLinkV3 Connector

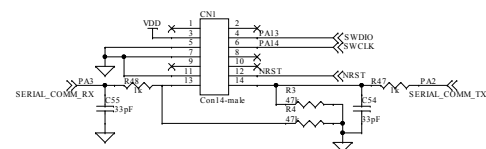


Figure 4. STEVAL-CTM020A circuit schematic (4 of 26)

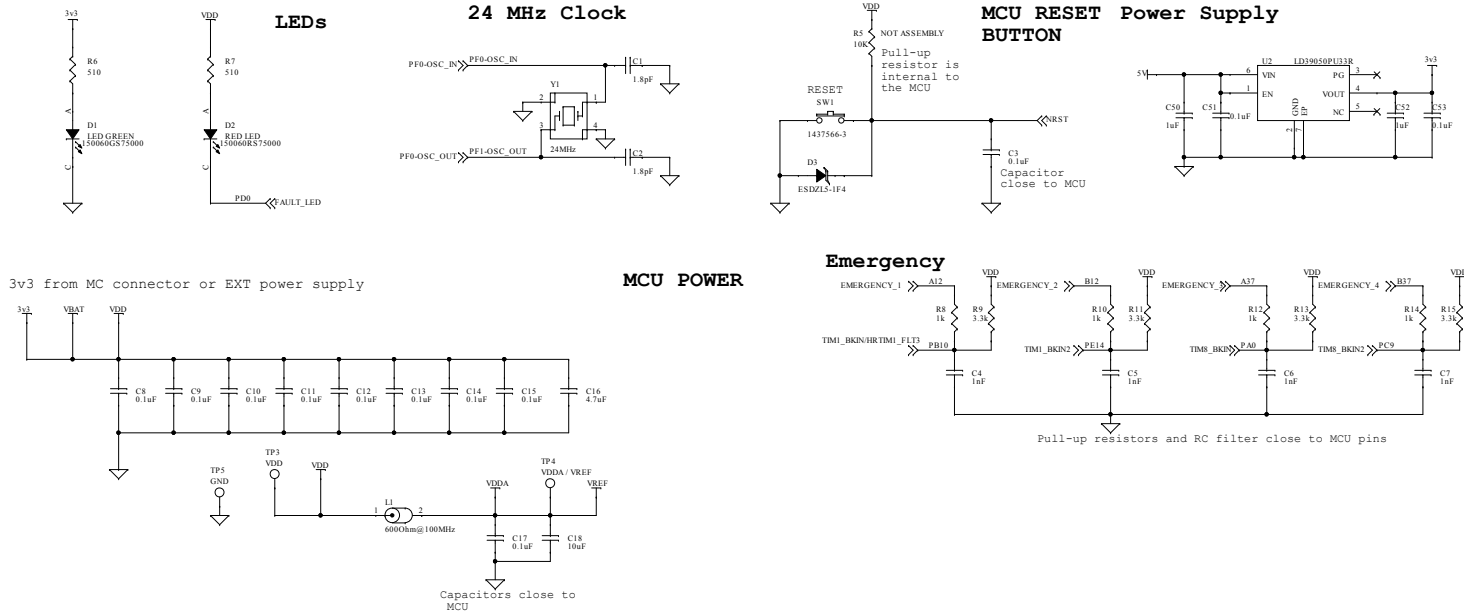
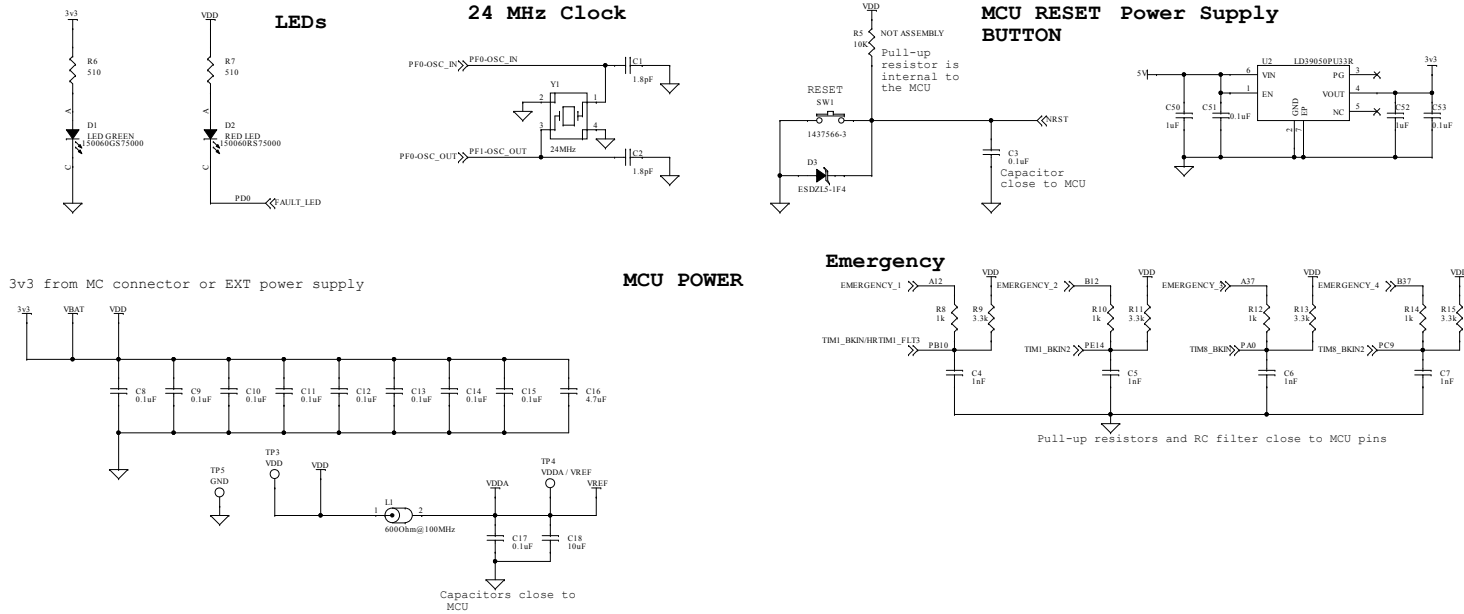
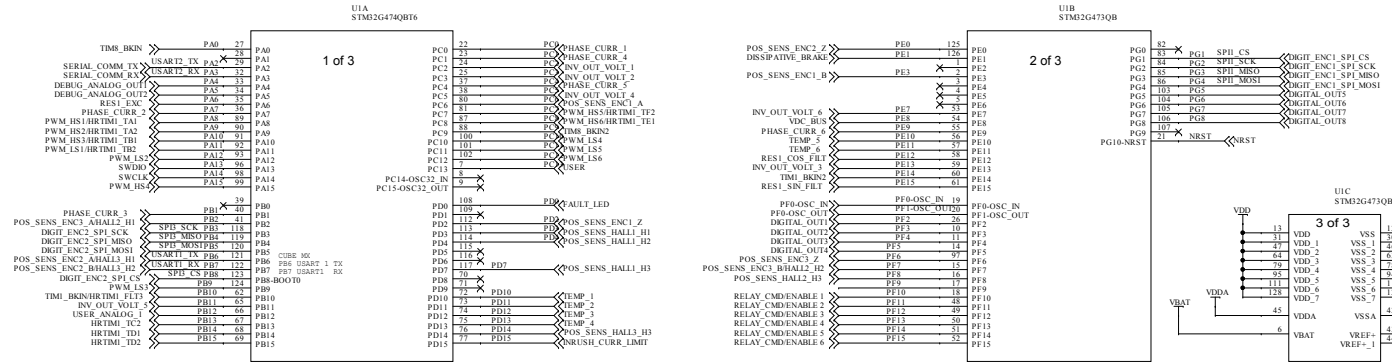


Figure 5. STEVAL-CTM020A circuit schematic (5 of 26)
RC filter close to MCU pin

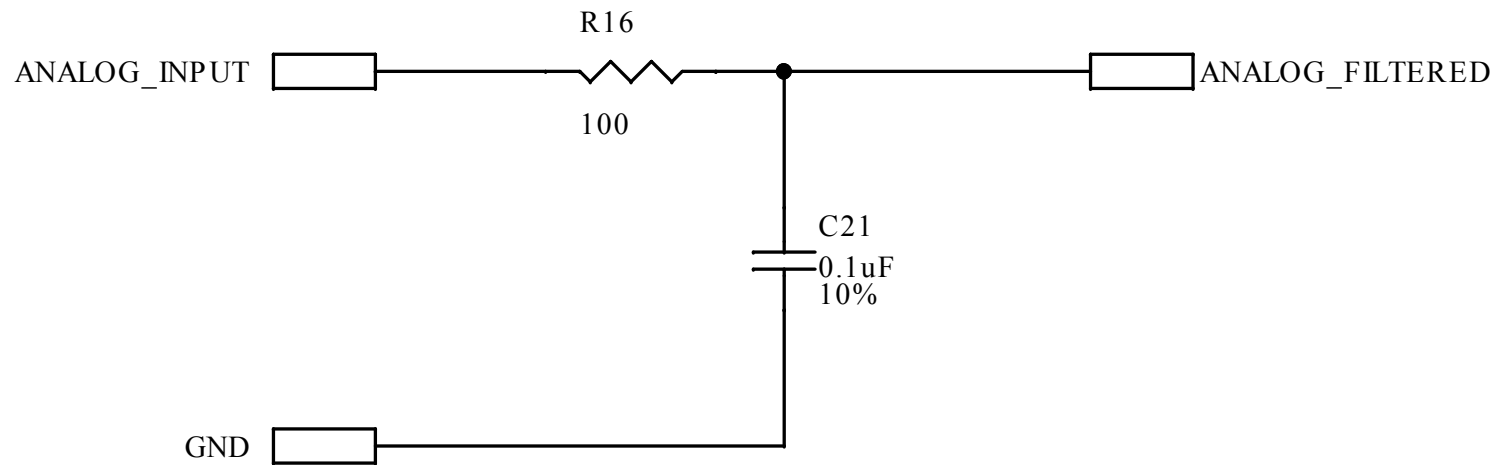


Figure 6. STEVAL-CTM020A circuit schematic (6 of 26)
RC filter close to MCU pin

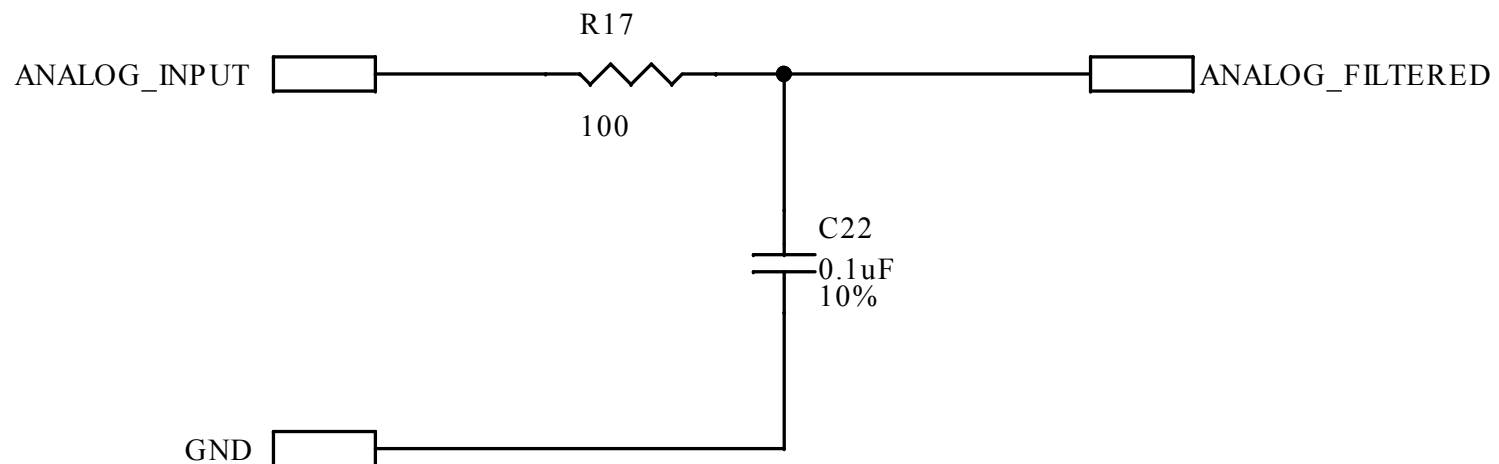


Figure 7. STEVAL-CTM020A circuit schematic (7 of 26)
RC filter close to MCU pin

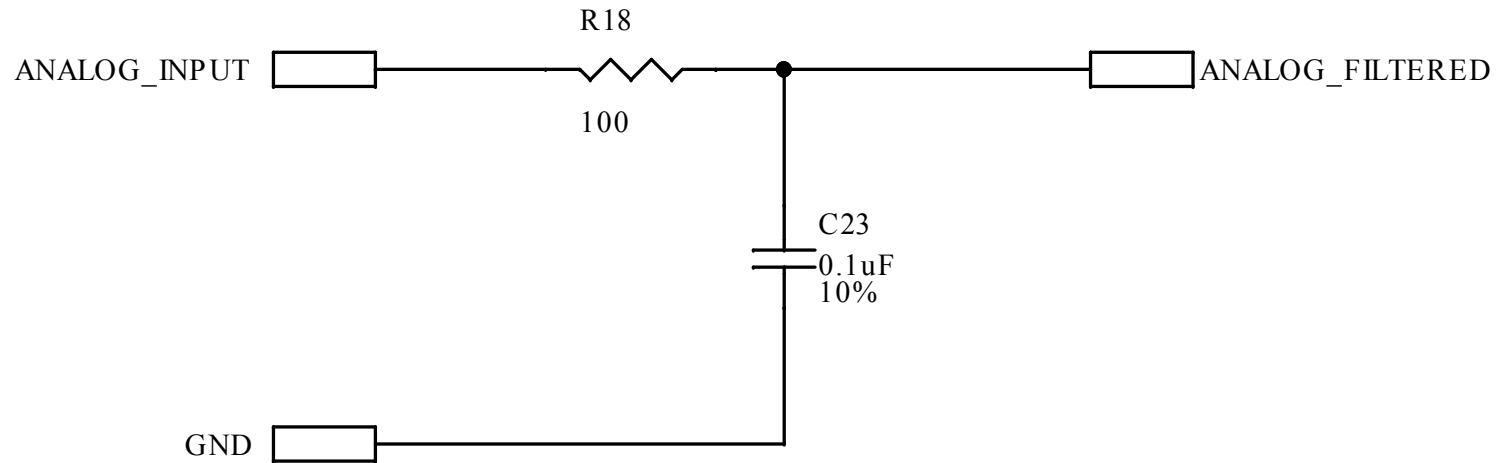


Figure 8. STEVAL-CTM020A circuit schematic (8 of 26)
RC filter close to MCU pin

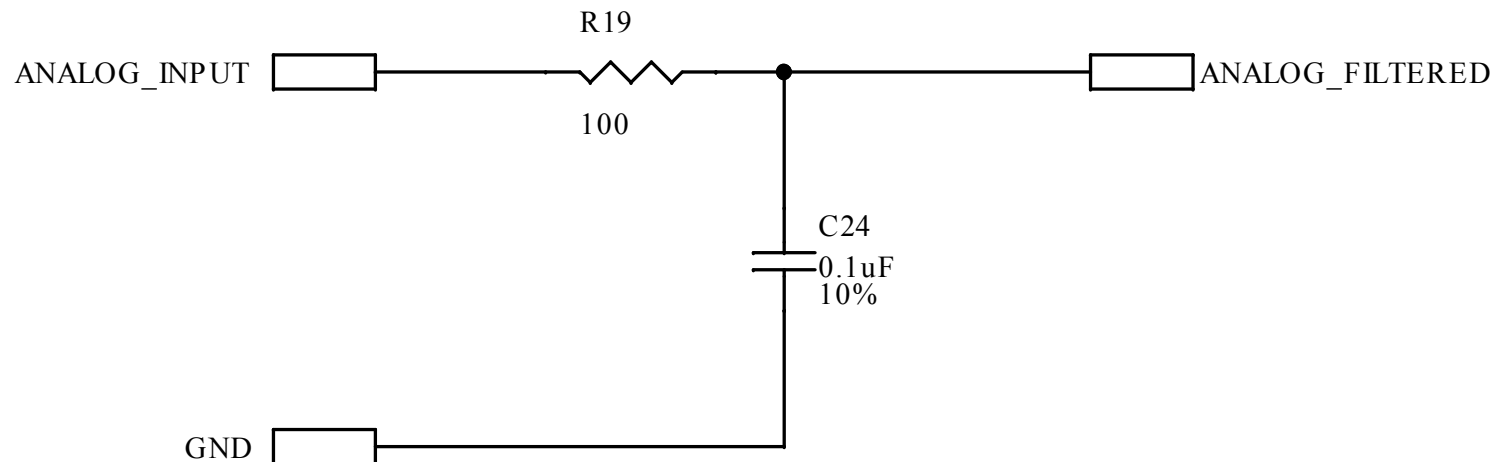


Figure 9. STEVAL-CTM020A circuit schematic (9 of 26)
RC filter close to MCU pin

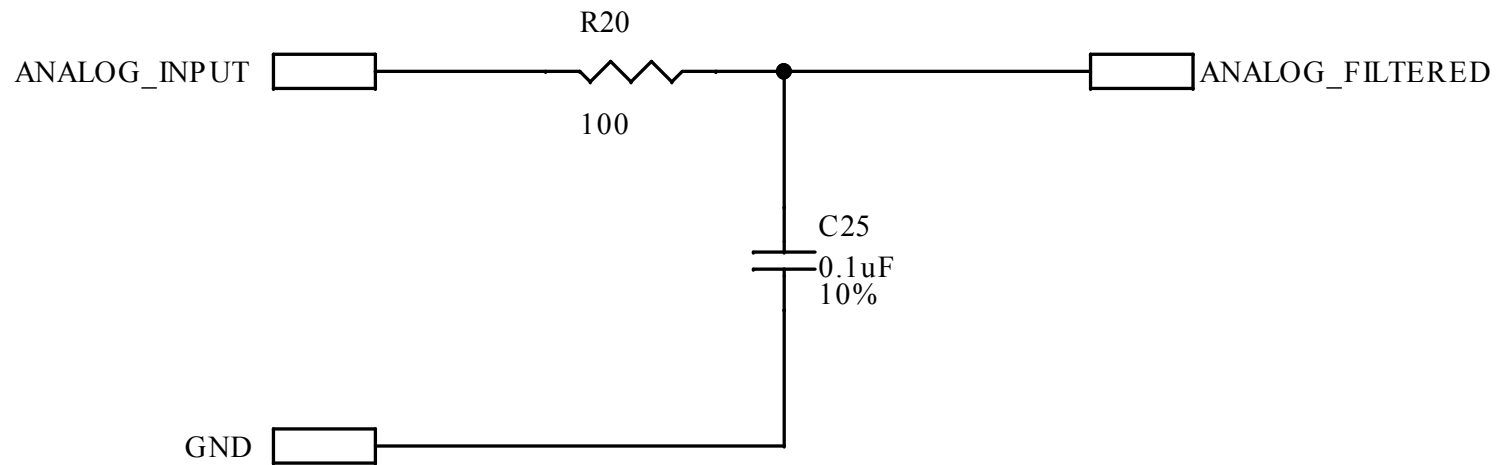


Figure 10. STEVAL-CTM020A circuit schematic (10 of 26)
RC filter close to MCU pin

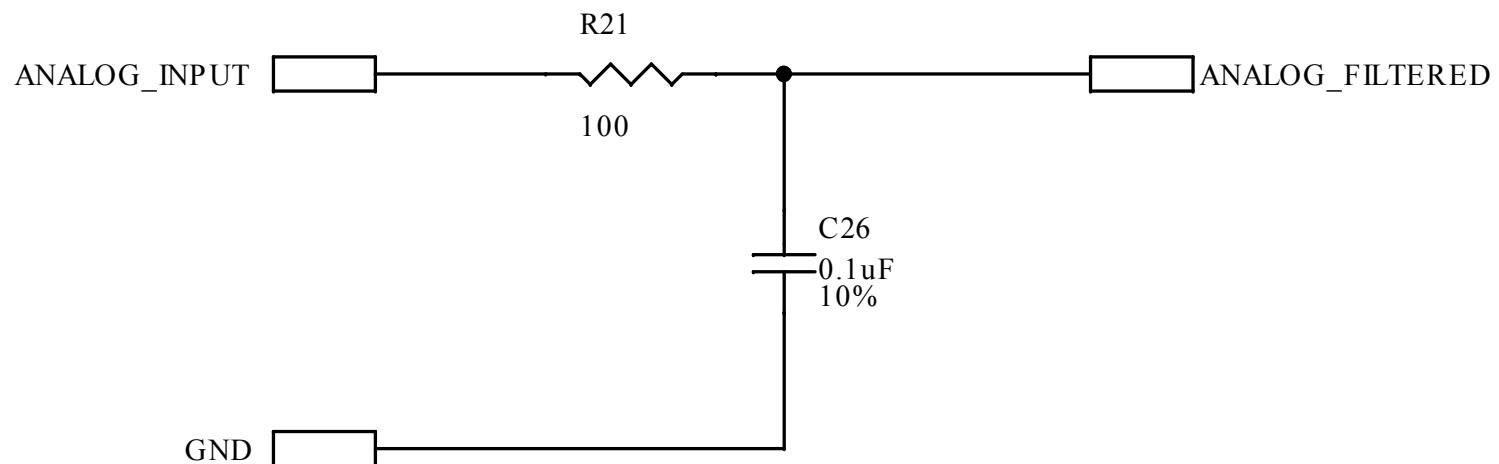


Figure 11. STEVAL-CTM020A circuit schematic (11 of 26)
RC filter close to MCU pin

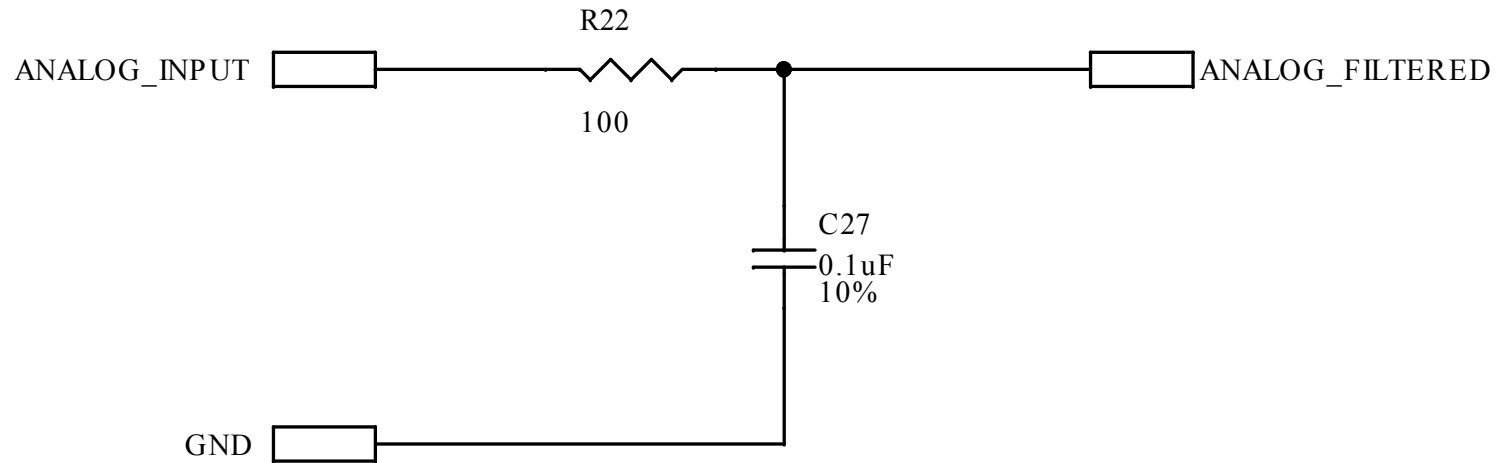


Figure 12. STEVAL-CTM020A circuit schematic (12 of 26)
RC filter close to MCU pin

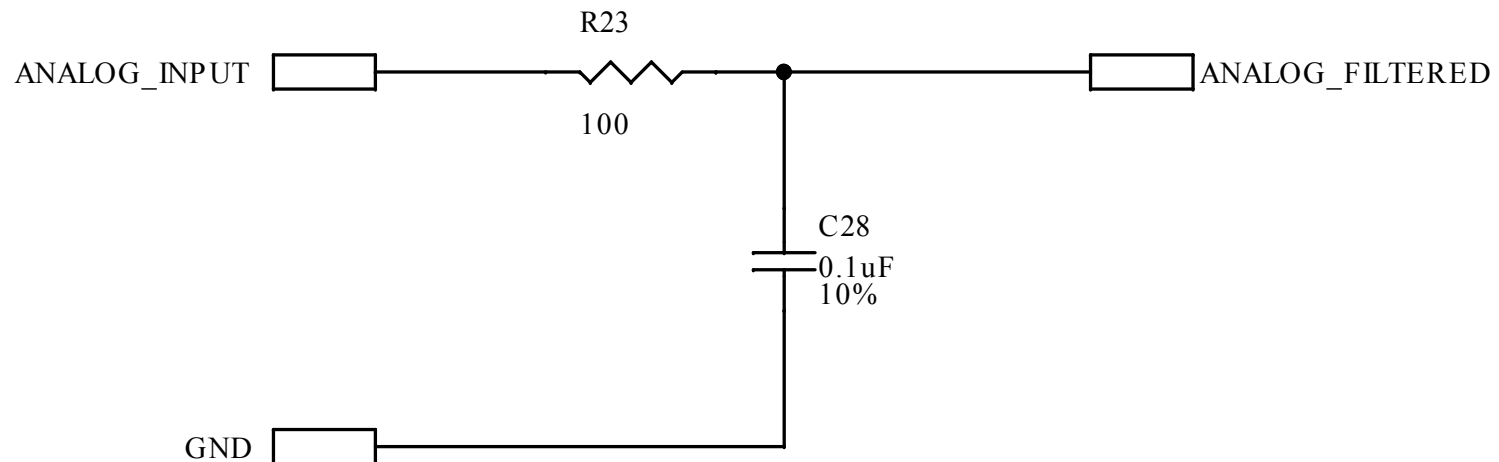


Figure 13. STEVAL-CTM020A circuit schematic (13 of 26)
RC filter close to MCU pin

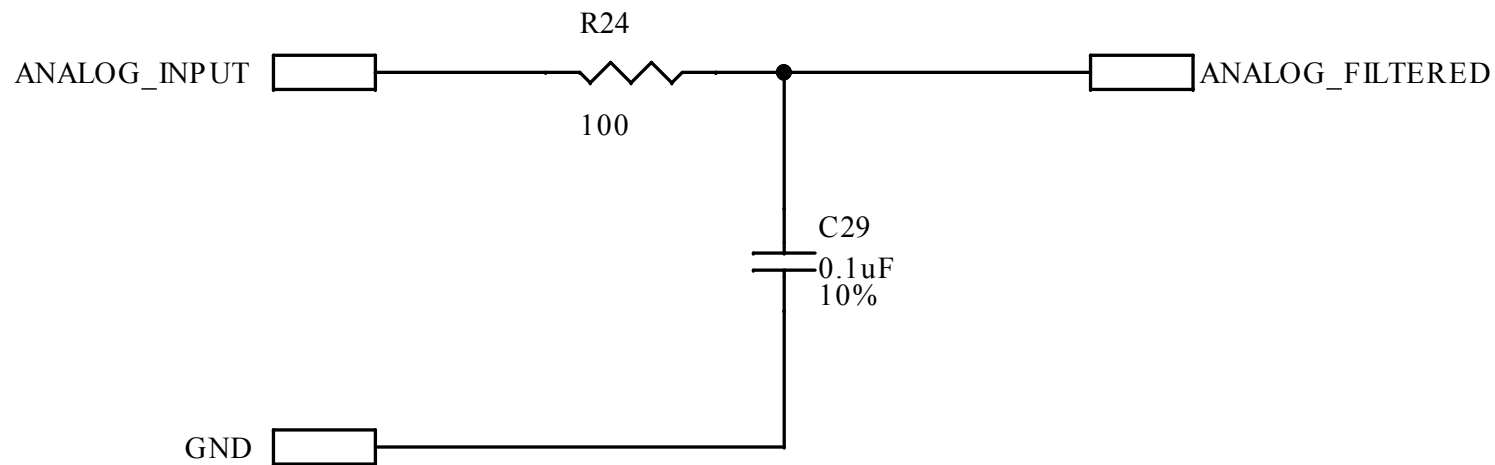


Figure 14. STEVAL-CTM020A circuit schematic (14 of 26)
RC filter close to MCU pin

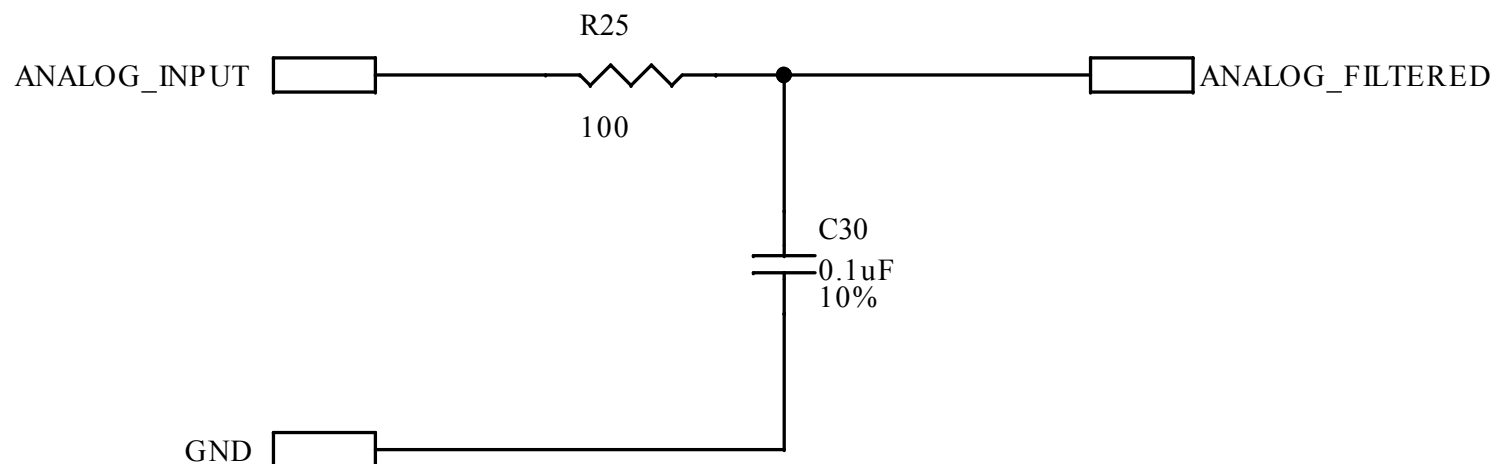


Figure 15. STEVAL-CTM020A circuit schematic (15 of 26)
RC filter close to MCU pin

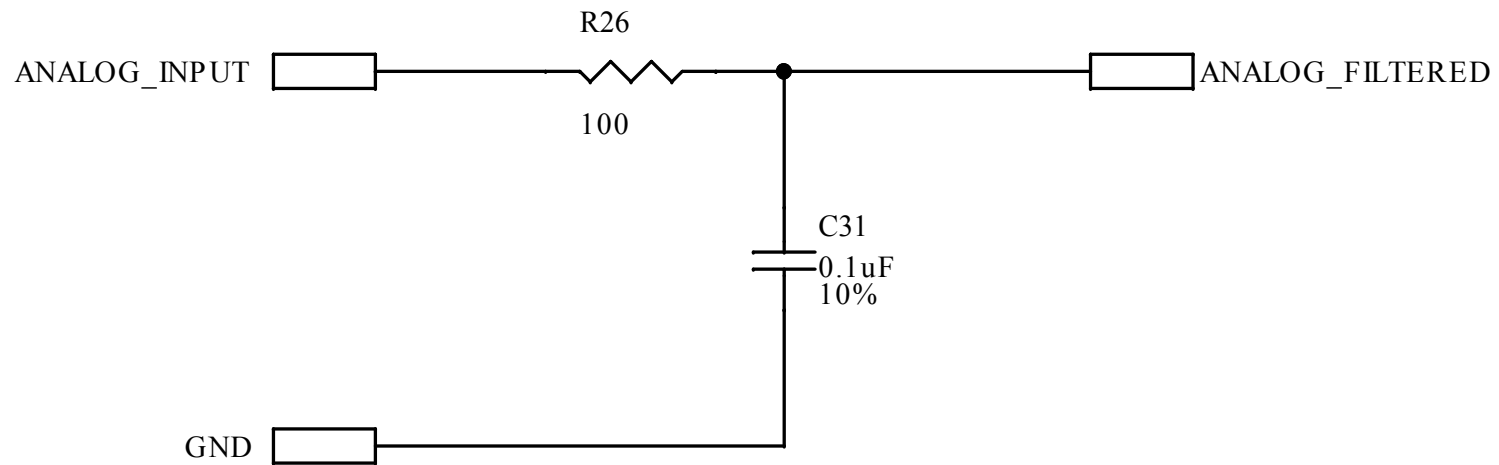


Figure 16. STEVAL-CTM020A circuit schematic (16 of 26)
RC filter close to MCU pin

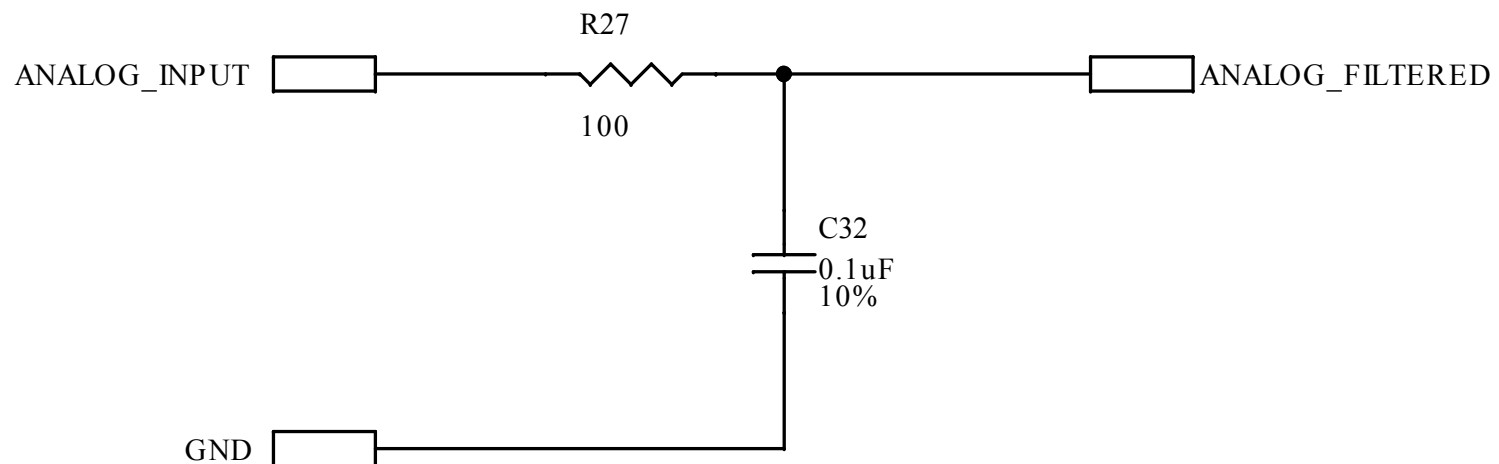


Figure 17. STEVAL-CTM020A circuit schematic (17 of 26)
RC filter close to MCU pin

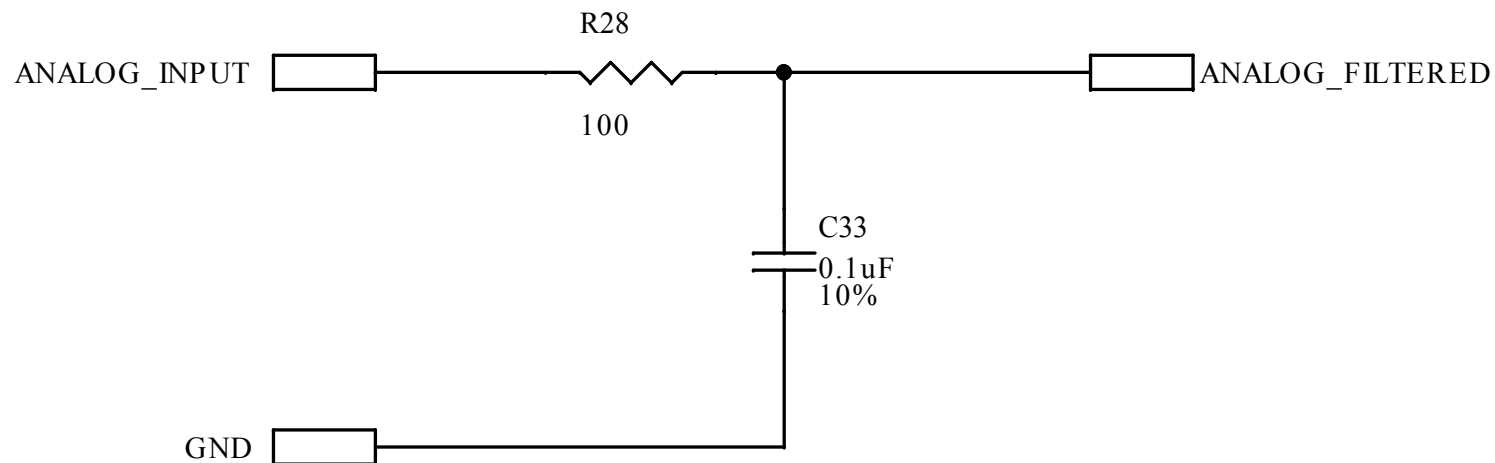


Figure 18. STEVAL-CTM020A circuit schematic (18 of 26)
RC filter close to MCU pin

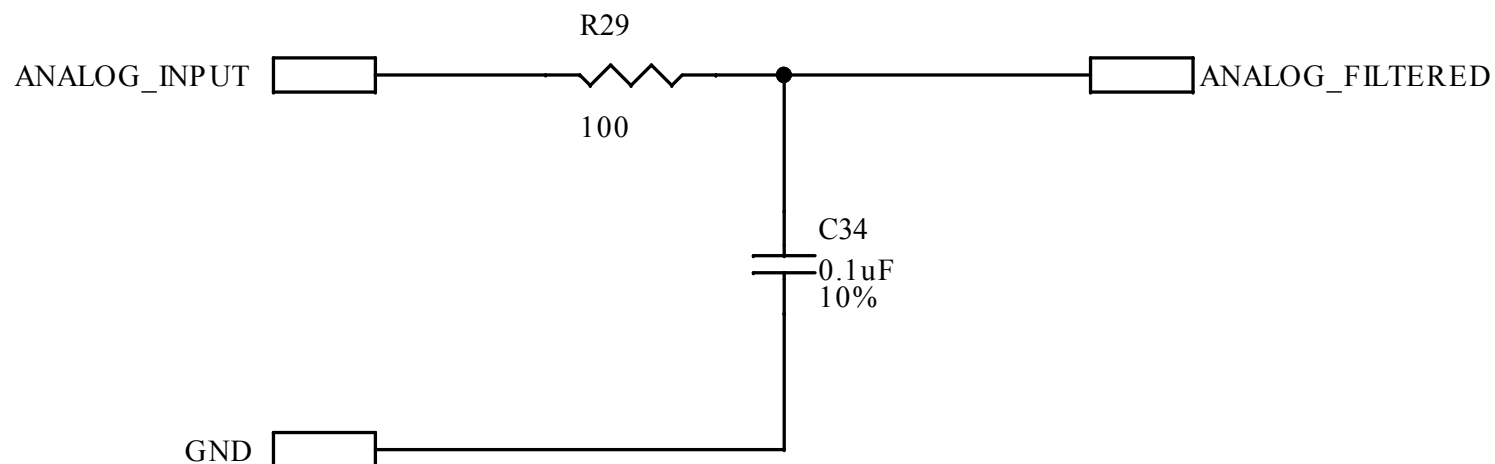


Figure 19. STEVAL-CTM020A circuit schematic (19 of 26)
RC filter close to MCU pin

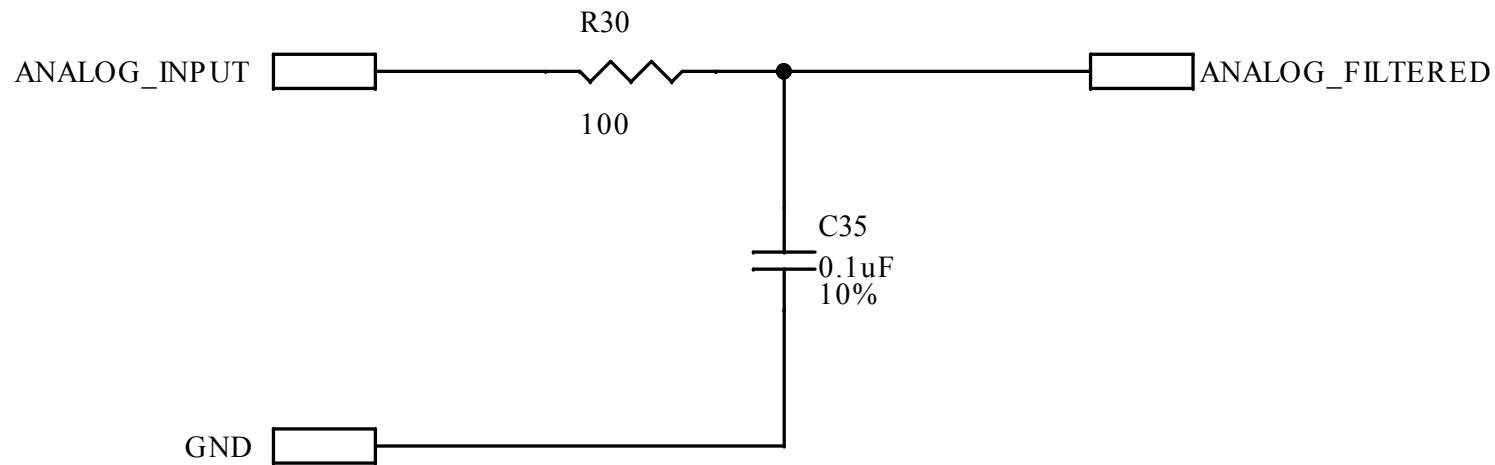


Figure 20. STEVAL-CTM020A circuit schematic (20 of 26)
RC filter close to MCU pin

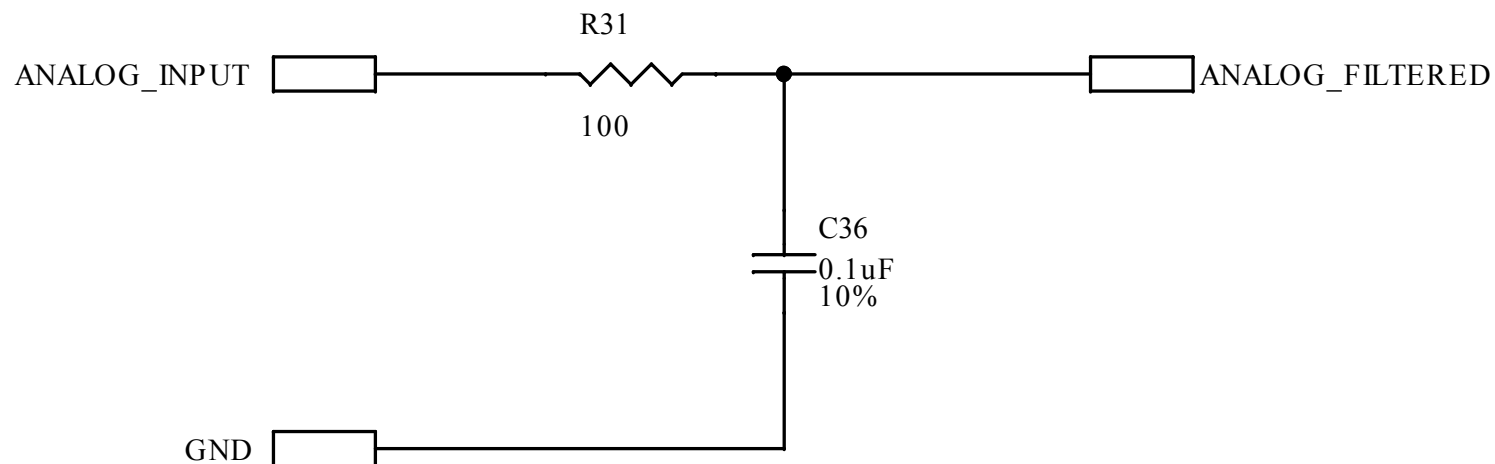


Figure 21. STEVAL-CTM020A circuit schematic (21 of 26)
RC filter close to MCU pin

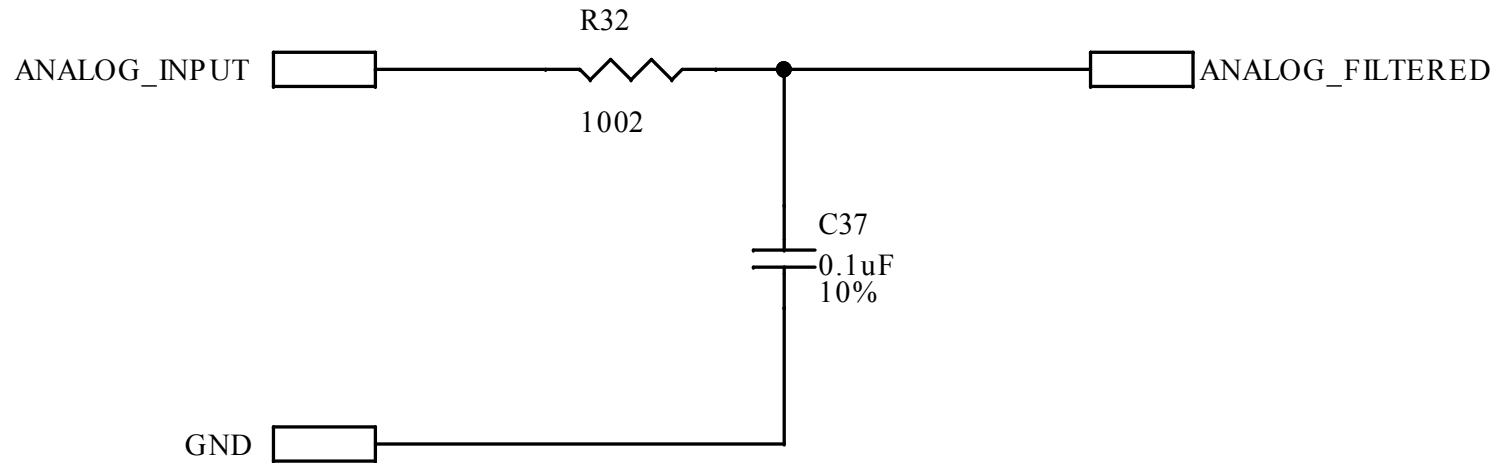


Figure 22. STEVAL-CTM020A circuit schematic (22 of 26)
RC filter close to MCU pin

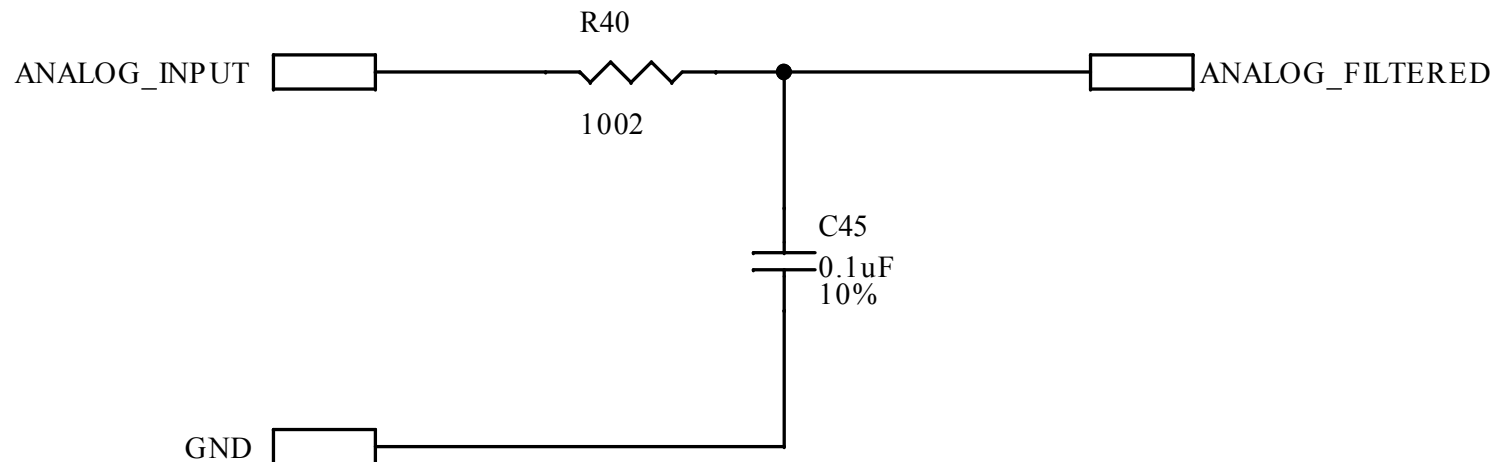


Figure 23. STEVAL-CTM020A circuit schematic (23 of 26)
RC filter close to MCU pin

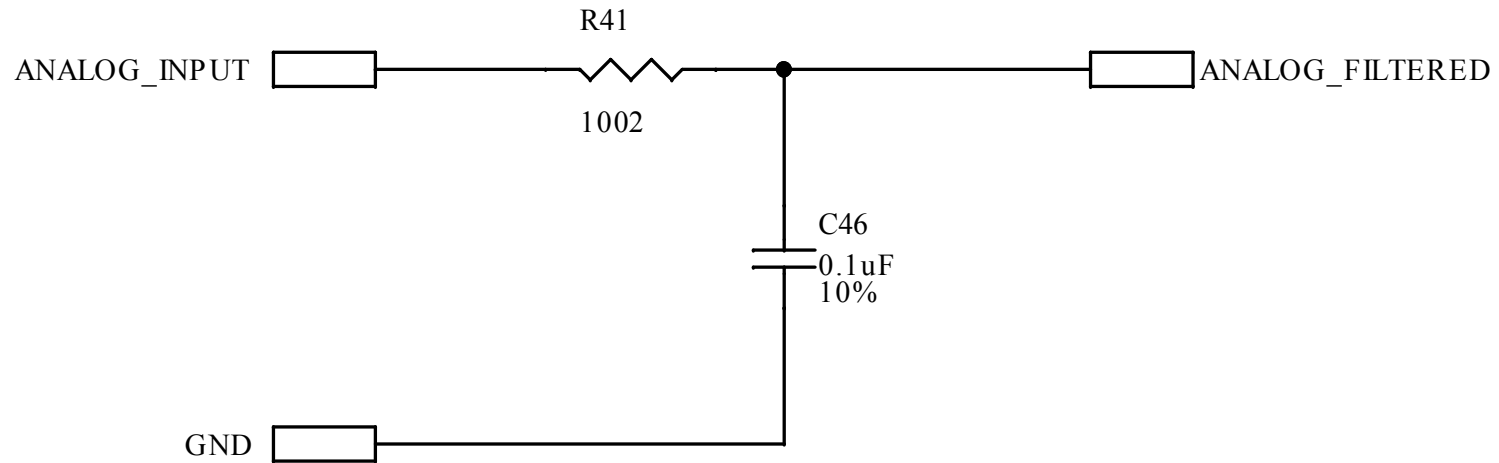


Figure 24. STEVAL-CTM020A circuit schematic (24 of 26)
RC filter close to MCU pin

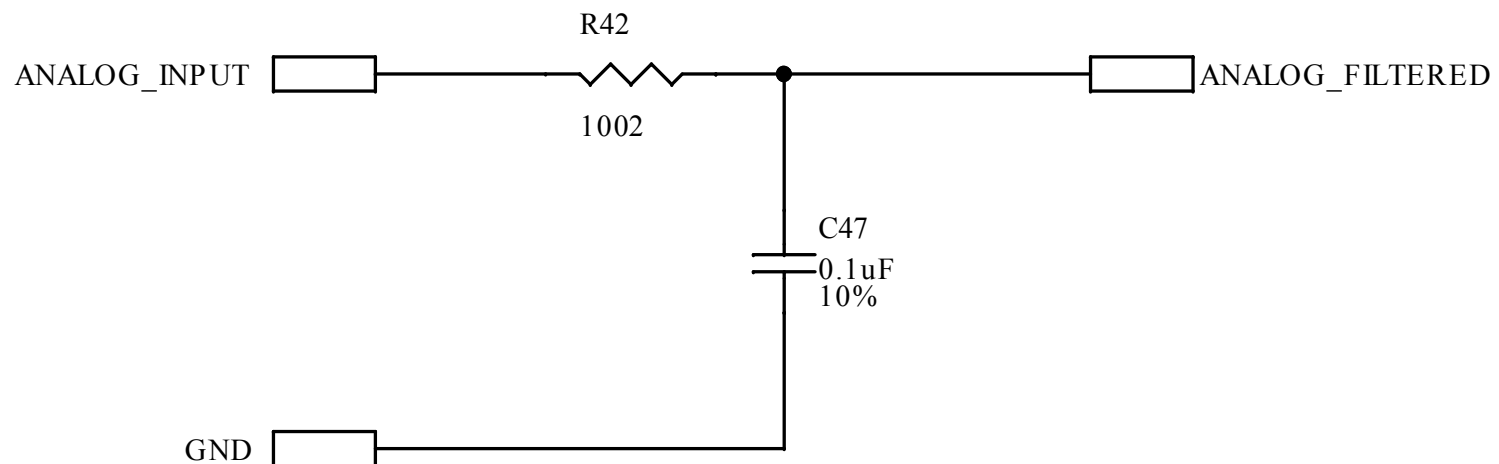


Figure 25. STEVAL-CTM020A circuit schematic (25 of 26)
RC filter close to MCU pin

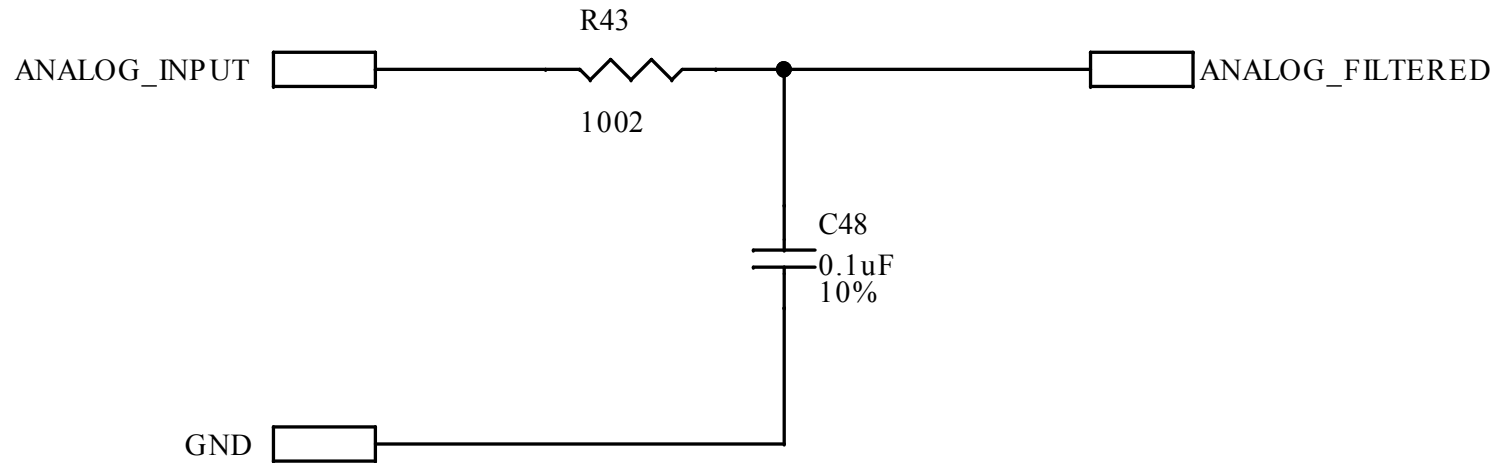
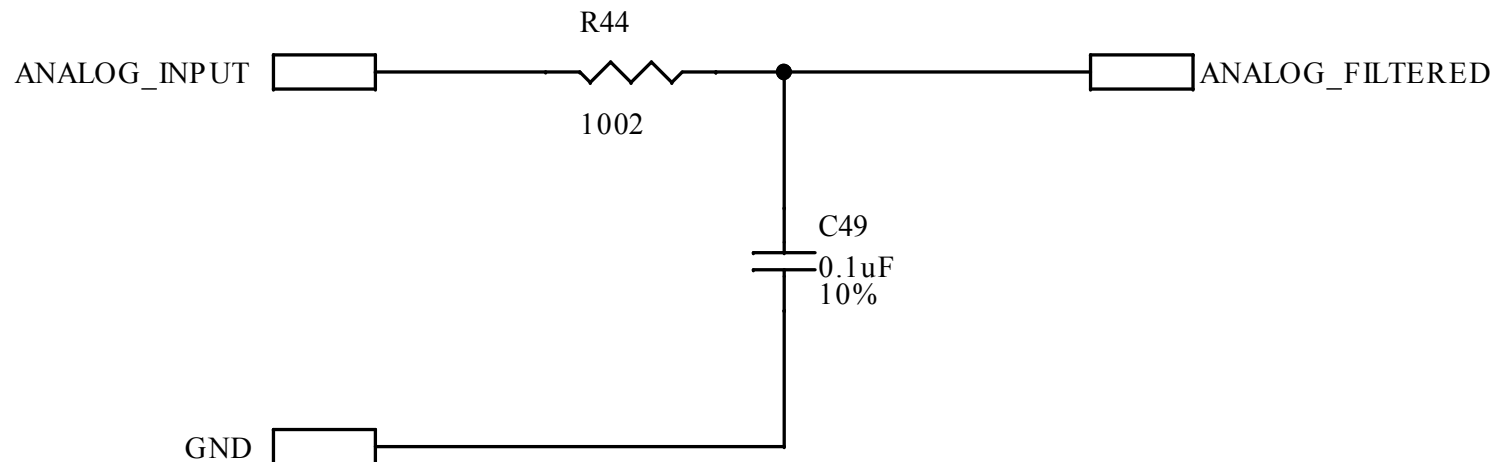


Figure 26. STEVAL-CTM020A circuit schematic (26 of 26)
RC filter close to MCU pin



2 Board versions

Table 1. STEVAL-CTM020A versions

Finished good	Schematic diagrams	Bill of materials
STV\$CTM020AA ⁽¹⁾	STV\$CTM020AA schematic diagrams	STV\$CTM020AA bill of materials

1. This code identifies the STEVAL-CTM020A evaluation board first version.

Revision history

Table 2. Document revision history

Date	Revision	Changes
11-Feb-2026	1	Initial release.

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