FDCAN internal peripheral

Stable: 26.09.2019 - 13:43 / Revision: 26.09.2019 - 13:56

A quality version of this page, approved on *26 September 2019*, was based off this revision.

Contents

1 Article purpose

The purpose of this article is to:

- briefly introduce the FDCAN peripheral and its main features
- indicate the level of security supported by this hardware block
- explain how each instance can be allocated to the two runtime contexts and linked to the corresponding software components
- explain, when necessary, how to configure the FDCAN peripheral.

2 Peripheral overview

FDCAN peripheral handles data communication in a Controller Area Network (CAN) bus system using message-based protocol originally designed for in-vehicle communication. The CAN subsystem consists of two CAN modules (FDCAN1 and FDCAN2), a shared message RAM and an optional clock calibration unit.

2.1 Features

Both FDCAN instances are compliant with classic CAN protocol[1] and CAN FD[2] (CAN with Flexible Data-Rate) protocol. In addition, FDCAN1 supports time triggered CAN (TTCAN).

FDCAN1 and FDCAN2 share a dedicated 10 Kbyte CAN SRAM for message transfers.

Refer to STM32MP15 reference manuals for the complete list of features, and to the software components, introduced below, to see which features are implemented.

2.2 Security support

FDCAN is a **non secure** peripheral.

3 Peripheral usage and associated software

3.1 Boot time

The FDCAN is not used at boot time.

3.2 Runtime

3.2.1 Overview

FDCAN instances can be allocated to:

- the Arm®Cortex®-A7 non-secure core to be controlled in Linux® by the NetDev framework (See CAN overview)

or

- the Arm®Cortex®-M4 to be controlled in STM32Cube MPU Package by STM32Cube FDCAN driver

3.2.2 Software frameworks

Domain	Peripheral	Software frameworks			Comment
Cortex-A7 secure (OP-TEE)	Cortex-A7 non-secure (Linux)	Cortex-M4 (STM32Cube)			
Networking	FDCAN		Linux net/can framework	STM32Cube FDCAN driver	

3.2.3 Peripheral configuration

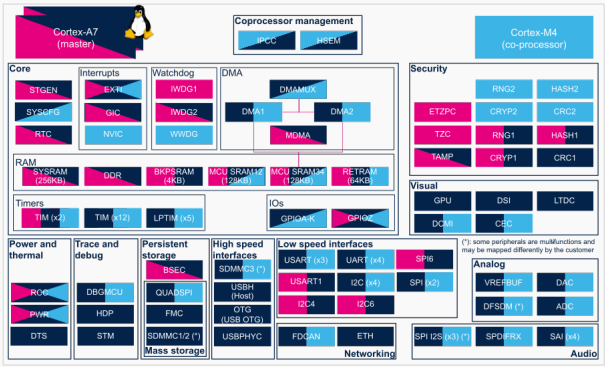
The configuration is applied by the firmware running in the context to which the peripheral is assigned. The configuration can be done alone via the STM32CubeMX tool for all internal peripherals, and then manually completed (particularly for external peripherals) according to the information given in the corresponding software framework article. When the FDCAN peripheral is assigned to the Linux®OS, it is configured through the device tree according to the information given in the FDCAN device tree configuration article.

3.2.4 Peripheral assignment

Check boxes illustrate the possible peripheral allocations supported by STM32 MPU Embedded Software:

- means that the peripheral can be assigned () to the given runtime context.
- is used for system peripherals that cannot be unchecked because they are statically connected in the device.

Refer to How to assign an internal peripheral to a runtime context for more information on how to assign peripherals manually or via STM32CubeMX.
The present chapter describes STMicroelectronics recommendations or choice of implementation. Additional possiblities might be described in STM32MP15 reference manuals.



Internal peripherals

Domain	Periphera l	Runtime allocation				Comment
Instance	Cortex-A7 secure (OP-TEE)	Cortex-A7 non-secure (Linux)	Cortex-M4 (STM32Cube)			
Networking	FDCAN	FDCAN1				Assignment (single choice)
		FDCAN2				Assignment (single choice)

4 How to go further

Information

Use this paragraph to add more information and introduce other documentation such as Application Notes (AN)

5 References

- CAN protocol implementations, from the CAN in Automation group (CiA)
- CAN FD - The basic idea, from the CAN in Automation group (CiA)

Controller Area Network (robust bus mainly used for automotive applications)

Random Access Memory (Early computer memories generally hadserial access. Memories where any given address can be accessed when desired were then called "random access" to distinguish them from the memories where contents can only be accessed in a fixed order. The term is used today for volatile random-acces ssemiconductor memories.)

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