

EXAMPLE NAME: MULTICAN_CONFIG_EXAMPLE_XMC47

EXAMPLE REVISION HISTORY:

1.0 Initial Version

OVERVIEW:

This example shows transmission and reception of message objects using gateway and FIFO functionality of the MultiCAN+ peripheral in Loop-Back mode.

DESCRIPTION:

MULTICAN_CONFIG APP configures 3 nodes and 5 message objects of the MultiCAN+ peripheral. All nodes communicate between themselves using the internal CAN bus of the XMC4700/XMC4800 device (Loop-Back).

M00 set to RX mode with “User defined Message ID” (0x444) is allocated to the NODE0 and it is used as a gateway source object.

M01 and M02 are allocated to the NODE1 and they are used as gateway destination objects. Both of the MOs are set to TX mode and they have the same “User defined Message ID” (0x777). Together they represent a TX FIFO structure.

M03 is set to TX mode with “User defined Message ID” (0x444) and allocated to the NODE2. The purpose of this M0 is to trigger data transmission through the gateway.

M04 is to RX mode with “User defined Message ID” (0x777) and allocated to the NODE2. The purpose of this M0 is to receive data send from the TX FIFO structure.

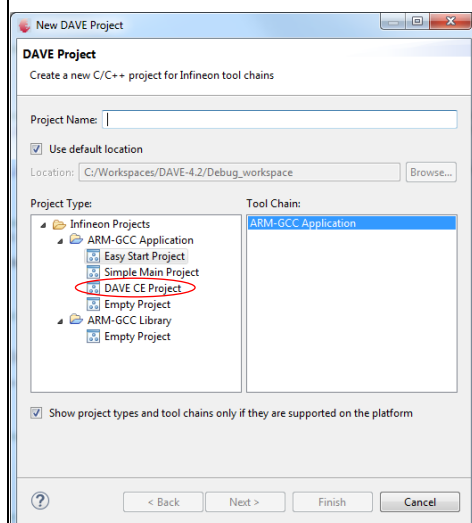
REQUIRMENTS:

Boards required: XMC4700/XMC4800 Relax Kit

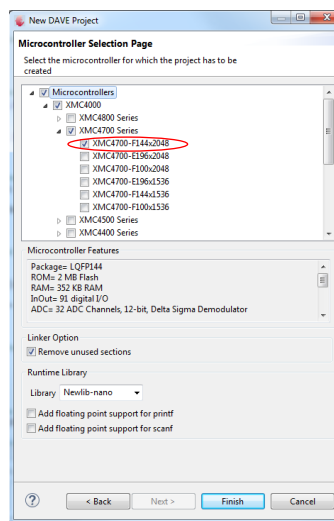
HOW TO CREATE THE PROJECT:


1. Open the DAVE CE and use  “Add IDE New Project Wizards” found in the toolbar to add a new DAVE project.

Enter project name
Select “Project type → DAVE CE Project”



Select “Microcontrollers → XMC4000 →
XMC4700/XMC4800 Series →
XMC4700-F144x2048/ XMC4800-F144x2048



- Use the  “Add New APP” found in the toolbar to add an instance of MULTICAN_CONFIG APP, INTERRUPT APP, and DIGITAL_IO APP. Configure the APP instances with the following configurations.

Views: APP Dependency Tree and APP Dependency

APP Dependency Tree

DIGITAL_IO_0

INTERRUPT_0

MULTICAN_CONFIG_0

GLOBAL_CAN_0

CLOCK_XMC4_0

APP Dependency

MULTICAN_CONFIG
MULTICAN_CONFIG_0

INTERRUPT
INTERRUPT_0

DIGITAL_IO
DIGITAL_IO_0

GLOBAL_CAN
GLOBAL_CAN_0

CLOCK_XMC4
CLOCK_XMC4_0

CPU_CTRL_XMC4
CPU_CTRL_XMC4_0

MULTICAN_CONFIG APP (NODE0):

Node Settings

Node Selection

Select Node: 0

☒ Enable node

Baud rate (Kbps): 500

☐ Enable analyzer mode(CALM)

☒ Enable loopback mode(LBM)

Bit Timing

Synchronization jump width [tq]: 1

Sample point for the bit time [%]: 80

Frame Counter

Frame counter mode: Frame Count Mode

Frame count selection(NFCRx.CFC): 0

Events

☐ Enable node alert

☐ Enable last error code

☐ Enable transfer ok

☐ Enable frame counter overflow

MULTICAN_CONFIG APP (NODE1):

Node Settings

Node Selection

Select Node: 1

☒ Enable node

Baud rate (Kbps): 500

☐ Enable analyzer mode(CALM)

☒ Enable loopback mode(LBM)

Bit Timing

Synchronization jump width [tq]: 1

Sample point for the bit time [%]: 80

Frame Counter

Frame counter mode: Frame Count Mode

Frame count selection(NFCRx.CFC): 0

Events

☐ Enable node alert

☐ Enable last error code

☐ Enable transfer ok

☐ Enable frame counter overflow

MULTICAN_CONFIG APP (NODE2):

Node Settings

Node Selection

Select Node: 2

☒ Enable node

Baud rate (Kbps): 500

☐ Enable analyzer mode(CALM)

☒ Enable loopback mode(LBM)

Bit Timing

Synchronization jump width [tq]: 1

Sample point for the bit time [%]: 80

Frame Counter

Frame counter mode: Frame Count Mode

Frame count selection(NFCRx.CFC): 0

Events

☐ Enable node alert

☐ Enable last error code

☐ Enable transfer ok

☐ Enable frame counter overflow

MULTICAN_CONFIG APP (MO_0):

Node Settings

Message Objects

Number of message objects: 5

MO Settings

Logical MO: LMO_0

Message Type: Rx

List Allocation(LIST): List 1(Node 0)

Identifier Value: 0x444

Identifier Type(DE): Std_11bit

Mask Value: 0x7FF

Acceptance Mask: Matching_IDE

Priority: 1

Data Settings

DLC: 8

DB0-DB3: 0x0 0x0 0x0 0x0

DB4-DB7: 0x0 0x0 0x0 0x0

Message Object Mode Control(MMC) Settings

MMC Selection: Gateway source object

Bottom pointer: LMO_1

Top pointer: LMO_2

Transfer Settings

☐ Single data transfer(SDT)

☐ Single transmit trial(STT)

☐ Foreign remote request

Interrupt Settings

☐ Transmit interrupt

☐ Receive interrupt

☐ FIFO overflow interrupt

Gateway Settings

☐ Initialize as gateway destination

☒ Copying identifier

☒ Copying data

☒ Copying data length code

☒ Sending gateway data frame

MULTICAN_CONFIG APP (MO_1):

Node Settings

Message Objects

Number of message objects: 5

MO Settings

Logical MO: LMO_1

Message Type: Tx

List Allocation(LIST): List 2(Node 1)

Identifier Value: 0x777

Identifier Type(DE): Std_11bit

Mask Value: 0x7FF

Acceptance Mask: Matching_IDE

Priority: 1

Data Settings

DLC: 8

DB0-DB3: 0x1 0x1 0x1 0x1

DB4-DB7: 0x1 0x1 0x1 0x1

Message Object Mode Control(MMC) Settings

MMC Selection: Transmit FIFO base object

Bottom pointer: LMO_1

Top pointer: LMO_2

Transfer Settings

☐ Single data transfer(SDT)

☐ Single transmit trial(STT)

☐ Foreign remote request

Interrupt Settings

☐ Transmit interrupt

☐ Receive interrupt

☐ FIFO overflow interrupt

Gateway Settings

☒ Initialize as gateway destination

☐ Copying identifier

☐ Copying data

☐ Copying data length code

☐ Sending gateway data frame

MULTICAN_CONFIG APP (MO_3):

Node Settings | Message Objects

Number of message objects: 5

MO Settings

Logical MO: LMO_2
Message Type: Tx
List Allocation(LIST): List 2(Node 1)
Identifier Value: 0x777
Identifier Type(IDE): Std_11bit
Mask Value: 0x7FF
Acceptance Mask: Matching_IDE
Priority: 1

Data Settings

DLC: 8
DB0-DB3: 0x2 0x2 0x2 0x2
DB4-DB7: 0x2 0x2 0x2 0x2

Interrupt Settings

☐ Transmit interrupt
☐ Receive interrupt
☐ FIFO overflow interrupt

Message Object Mode Control(MMC) Settings

MMC Selection: Transmit FIFO slave object
Bottom pointer: n.a.
Top pointer: n.a.

Gateway Settings

☒ Initialize as gateway destination
☐ Copying identifier
☐ Copying data
☐ Copying data length code
☐ Sending gateway data frame

Transfer Settings

☐ Single data transfer(SDT)
☐ Single transmit trial(STT)
☐ Foreign remote request

MULTICAN_CONFIG APP (MO_4):

Node Settings | Message Objects

Number of message objects: 5

MO Settings

Logical MO: LMO_3
Message Type: Tx
List Allocation(LIST): List 3(Node 2)
Identifier Value: 0x444
Identifier Type(IDE): Std_11bit
Mask Value: 0x7FF
Acceptance Mask: Matching_IDE
Priority: 1

Data Settings

DLC: 8
DB0-DB3: 0x3 0x3 0x3 0x3
DB4-DB7: 0x3 0x3 0x3 0x3

Interrupt Settings

☐ Transmit interrupt
☐ Receive interrupt
☐ FIFO overflow interrupt

Message Object Mode Control(MMC) Settings

MMC Selection: Standard message object
Bottom pointer: n.a.
Top pointer: n.a.

Gateway Settings

☐ Initialize as gateway destination
☐ Copying identifier
☐ Copying data
☐ Copying data length code
☐ Sending gateway data frame

Transfer Settings

☐ Single data transfer(SDT)
☐ Single transmit trial(STT)
☐ Foreign remote request

MULTICAN_CONFIG APP (MO_4):

Node Settings | Message Objects

Number of message objects: 5

MO Settings

Logical MO: LMO_4
Message Type: Rx
List Allocation(LIST): List 3(Node 2)
Identifier Value: 0x777
Identifier Type(IDE): Std_11bit
Mask Value: 0x7FF
Acceptance Mask: Matching_IDE
Priority: 1

Data Settings

DLC: 8
DB0-DB3: 0x0 0x0 0x0 0x0
DB4-DB7: 0x0 0x0 0x0 0x0

Interrupt Settings

☐ Transmit interrupt
☒ Receive interrupt
☐ FIFO overflow interrupt

Message Object Mode Control(MMC) Settings

MMC Selection: Standard message object
Bottom pointer: n.a.
Top pointer: n.a.

Gateway Settings

☐ Initialize as gateway destination
☐ Copying identifier
☐ Copying data
☐ Copying data length code
☐ Sending gateway data frame

Transfer Settings

☐ Single data transfer(SDT)
☐ Single transmit trial(STT)
☐ Foreign remote request

INTERRUPT APP:

Interrupt Settings

☒ Enable interrupt at initialization

Interrupt Priority

Preemption priority: 63
Subpriority: 0

Interrupt handler:

CAN_IRQHandler

DIGITAL_IO APP:

General Settings

Pin direction: Input/Output

Input Settings


Mode: Tristate

Output Settings




Mode: Push Pull
Initial output level: Low
Driver strength: Don't Care

- Use the “HW Signal Connections” (right click on the MULTICAN_CONFIG APP in App Dependency view and select “HW Signal Connections”) to configure the signal connections for the MULTICAN_CONFIG APP.

Filter: MULTICAN_CONFIG_0					
	Source APP Instance Name	Source Signal	Connect To	Target APP Instance Name	Target Signal
	+	MULTICAN_CONFIG_0			
		event_lmo_04_rxinp	---->	INTERRUPT_0	sr_irq
		Not Selected	---->	Not Selected	Not Selected

4. Use the  “Manual Pin Allocator” found in the toolbar to configure the pin for the DIGITAL_IO APP.

APP Instance Name	APP Pin Name	Pin Number (Port)	
▲ DIGITAL_IO_0	pin	#57 (P5.9)	

5. Generate the code for the configurations made using  and change “main.c” accordingly.
6. Build () and download to the microcontroller (.

HOW TO TEST:

Download and run the demo in the microcontroller.

OBSERVATIONS:

LED connected to pin P5.9 will switch on once the receiving node successfully receives both transmitted messages. Additional requirement is that received message data and DLC should match the transmitted once.

HINTS HOW TO MIGRATE EXAMPLE TO OTHER DEVICES:

The main thing to consider when migrating example to other device is the number of CAN nodes. This examples uses 3 CAN nodes, so it’s necessary to select the device which has 3 or more CAN nodes.

EXAMPLE PROJECT LIMITATIONS/KNOWN ISSUES:

Not applicable

REFERENCES:

[XMC4700/XMC4800 Reference Manual](#)