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April 1st, 2010
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M32C/87

CAN Extension ID Mode

Introduction

This example demonstrates CAN 2.0B protocol using Extension ID Mode function support Extension ID Function.

Users set the slot to extension ID mode by using the application program of the CAN API.

Target Device

The example application is applied to the following configuration:

M32C/87

The R32C/87, part name M30879FLGP, is a group of the M32C series based on the M32C CPU Core used in the application system with a maximum operating frequency at 32MHz.

ROM: 1M+4K bytes

RAM: 48K bytes

ROM Type: Flash Memory

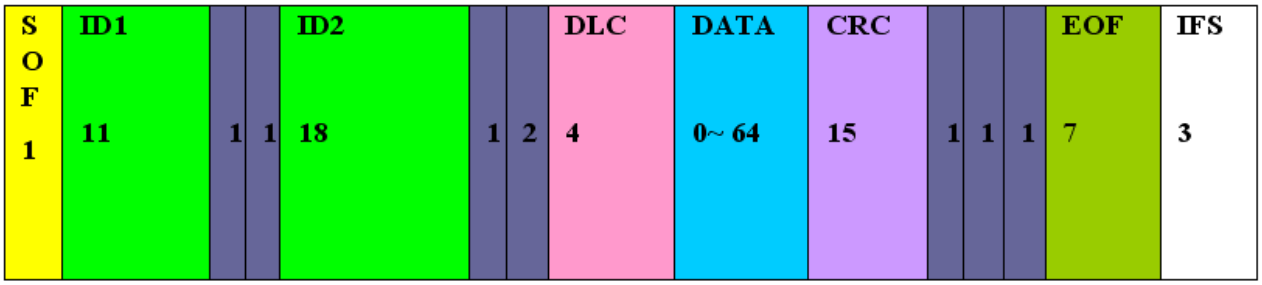
CAN: 2 channels and supporting CAN 2.0B specification

Package Type: PLQP0100KB-A

Contents

1. Extension Mode of the CAN

The extension mode of the CAN is used the specification of CAN2.0B protocol. The structures of the data frame are shown in the figure1.



Note : unit is bit

Figure1 The data frame of the extension ID mode

- SOF: 1bit , Start of the frame
- ID1: 11bits, Identifier1. This is standard IDs.
- ID2: 18bits, Identifier2. Here it is only in the extension mode of the CAN.
- DLC: 4bits, Data length code.
- DATA:0 ~64 bits. It is the data of the frame. The valid length of data is controlled by DLC.
- CRC: 15 bits
- EOF: End of the frame

The total bits of the extension ID are 29 bits. It can generate 536 million IDs.

2. CAN APIs

The below is the function calls contained in the **can.h** and **can.c** C source code files.

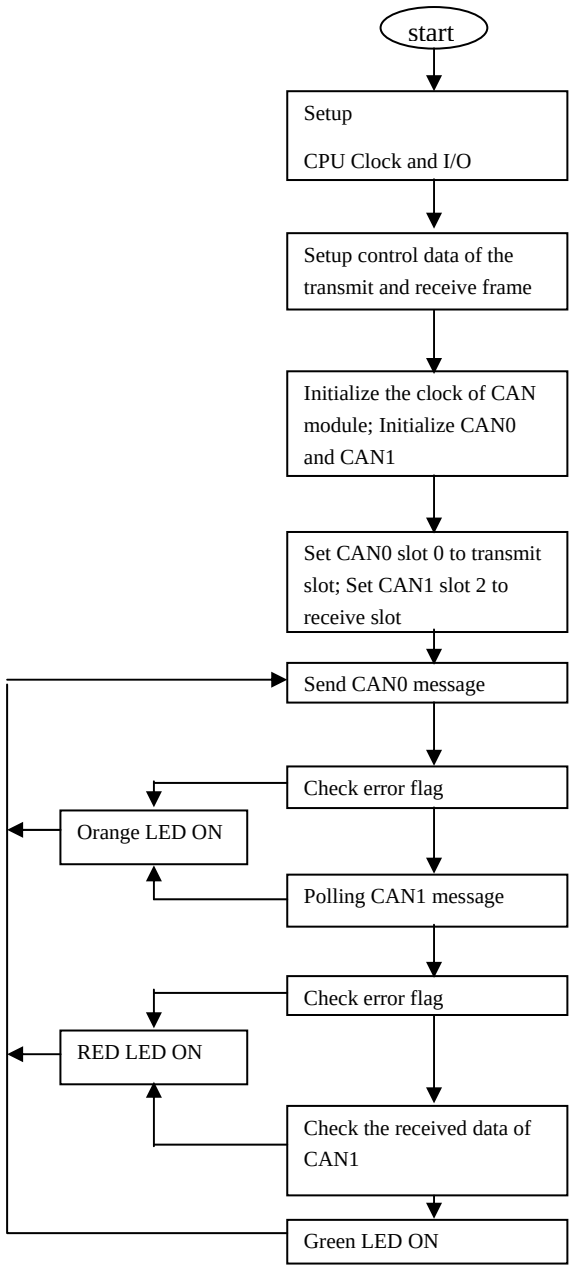
Table1 CAN APIs

Function Type	Function name	note
Initialization functions	1. void InitCAN0 (void); 2. void InitCAN1 (void); 3. void InitialCAN_Module(void);	
Transmit functions	1. void SetCAN0_TxDataStdFrame(unsigned short, can_std_data_def *); 2. void SetCAN0_TxDataExtFrame(unsigned short, can_std_data_def *); 3. int SendCAN0Message(unsigned char Slot); 4. void SetCAN1_TxDataStdFrame(unsigned short, can_std_data_def *); 5. void SetCAN1_TxDataExtFrame(unsigned short, can_std_data_def *); 6. int SendCA10Message(unsigned char Slot);	
Receive functions	1. void SetCAN0_RxDataStdFrame(unsigned short, can_std_data_def *); 2. void SetCAN0_RxDataExtFrame(unsigned short, can_std_data_def *); 3. int PollCAN0Message(unsigned char Slot); 4. void ReadCAN0Message(unsigned short in_slot, can_std_data_def *in_trm_data); 5. void SetCAN1_RxDataStdFrame(unsigned short, can_std_data_def *); 6. void SetCAN1_RxDataExtFrame(unsigned short, can_std_data_def *); 7. int PollCAN1Message(unsigned char Slot); 8. void ReadCAN1Message(unsigned short in_slot, can_std_data_def *in_trm_data);	
Error functions	1. int CheckERR_CAN0(void); 2. int CheckERR_CAN1(void);	

There are four type functions in the C source file.

- Initialization functions: Initialize the clock source and operation of CAN modules.
- Transmit functions: Setup the slot to transmission slot. User can choose using CAN 2.0A or CAN 2.0B.
- Receive functions: Setup the slot to receiver slot. User can choose using CAN 2.0A or CAN 2.0B.
- Error functions: check the error flag of the CAN module.

3. Program Flowchart



1. Setup the CPU clock and I/O port

2. Setup the IDs of transmission and receiver frame

3. Setup the mode, timing and baud rate of CAN0 and CAN1

4. Set slot 0 of CAN0 to a transmission slot; Set slot2 of CAN1 to a receiver slot.

5. Send CAN0 message.

6. Check error flag. If error of transmission happens, orange LED on.

7. Polling received data of the CAN1.

8. Check error flag. If error of receiver happens, red led on.

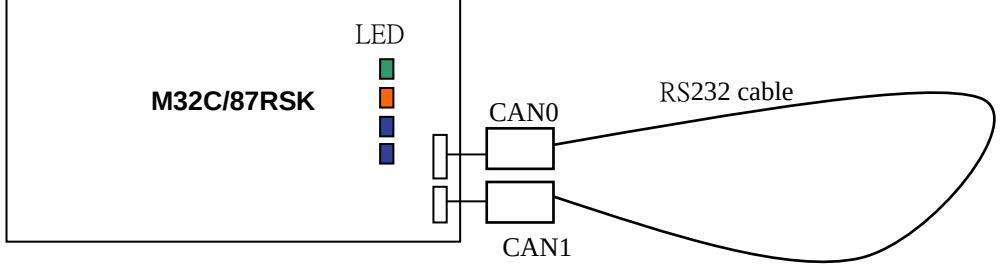
9. Check the received data with the transmitted data. . If data is mismatched, red LED on.

10 If there are no errors, green LED on.

Figure2 Program flowchart

4. System Block Diagram

The system use a RS232 for connecting the I/O pin of CAN0 and CAN1 of the M32C87RSK.The system block diagram is shown in the Figure3.The lighting of the LEDs will be depended on the status of the bus.



Note: M32C/87 RSK part number :R0K330879C04BE

Figure 3 system block diagram

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Revision Record of CAN Bus Extension ID Mode Sample Code

Rev.	Date	Description	
		Page	Summary
1.00	May.27.09	-	First edition issued

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