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M32C/83 Group

REJ05B0253-0100Z

[CAN] Reception of a Data Frame

Rev.1.00

Oct. 16, 2003

1. Abstract

This document describes about reception of a data frame for M32C/83 group.

The following is contents of this document.

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2. Receiving Messages

CAN messages are received following three procedures described below.

- CAN configuration procedure
- Slot configuration procedure
- Processing procedure of the received message

2.1. CAN Configuration Procedure

Set each relevant bit of CAN0 control register 0 during CAN initialization mode.

Refer to the application note (REJ05B0149-) for details about the CAN configuration procedure.

2.2. Slot Configuration Procedure

The CAN module of the M32C/83 group has a total of 16 slots. When not using the acceptance filter, the received message is always stored in the slot with the smallest number among those which have been set for reception.

Use of the acceptance filter allows to select the messages to receive.

Set the desired receive mode by using the CAN0 message slot *i* control register (*i* = 0-15)

Table 1 shows the setting value of CAN0 message slot *i* control register (*i* = 0-15).

Table 1. Setting value of CAN0 message slot *i* control register

CAN0 message slot <i>i</i> control register								Contents of receive modes set for a slot
bit7 TrmReq	bit6 RecReq	bit5 Remote	bit4 RspLock	bit3 RemActive	bit2 MsgLost	bit1 InvalData	bit0 NewData	
0	0	-	-	-	-	-	-	Do not transmit or receive.
0	1	0	0	0	0	0	0	Receive a data frame.
1	0	1	0	0	0	0	0	When finished transmitting a remote frame, receive a data frame.

2.3. Processing Procedure of the Received Message

If a slot has received a new message successfully after it had finished receiving successfully, the slot is overwritten with the new message received. Therefore, after the program has finished reading out the received message, it should verify that the slot has not been overwritten while the received message was being read out.

To read out the received message from a slot after it has finished receiving successfully, follow the procedure in Figure 2.

3. Receiving Procedure of a Data Frame

By setting a slot for data frame receive mode, it is possible to receive a data frame which has the matching ID with that slot.

If two more slots are set to receive a data frame which has the same ID, the received message is always stored in the slot with the smallest number.

The data frame reception procedure is shown in Figure 1.

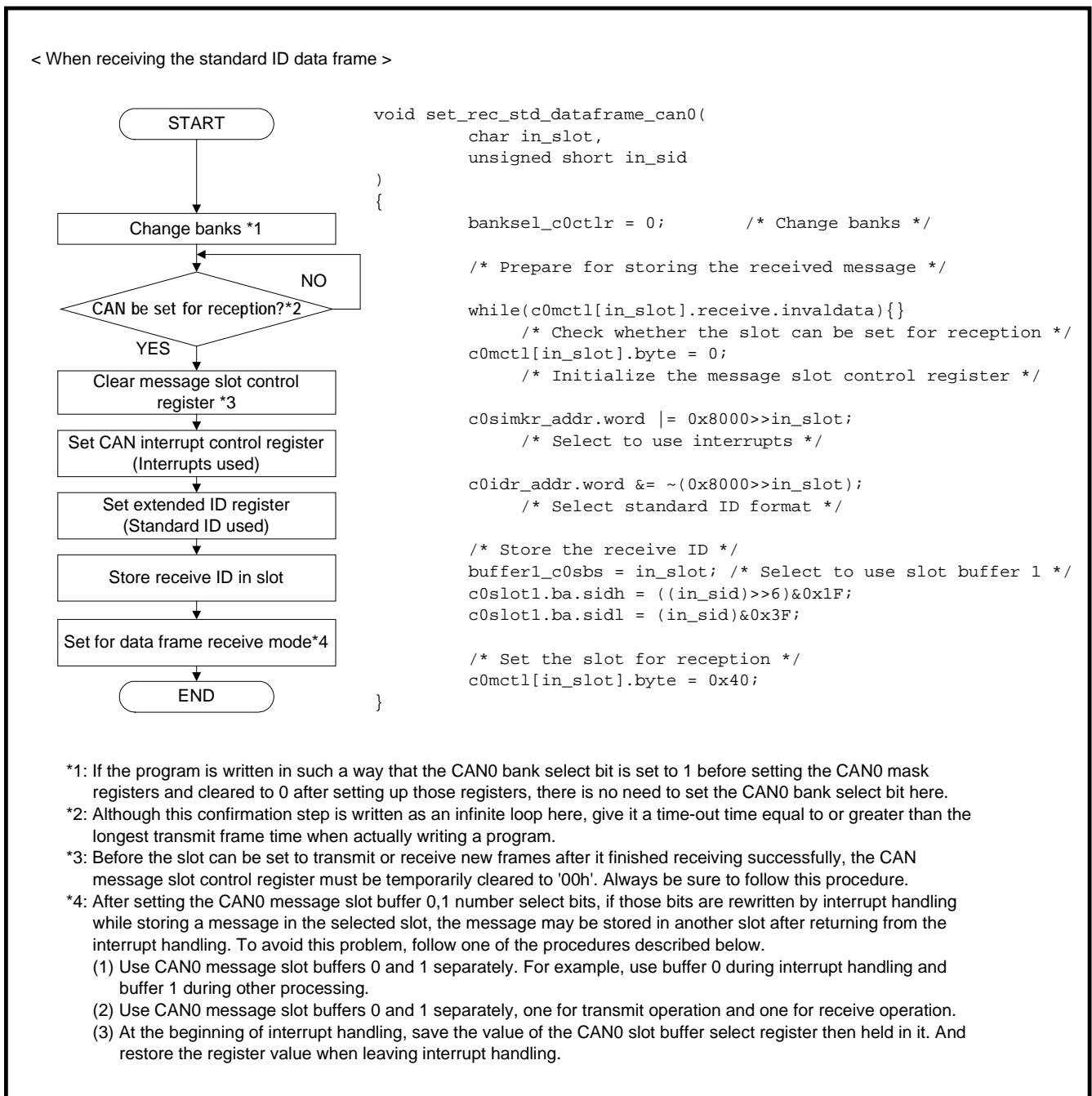


Figure 1. Receiving procedure of a data frame

4. Processing the Received Message

Figure 2 shows the processing procedure of a received message by polling.

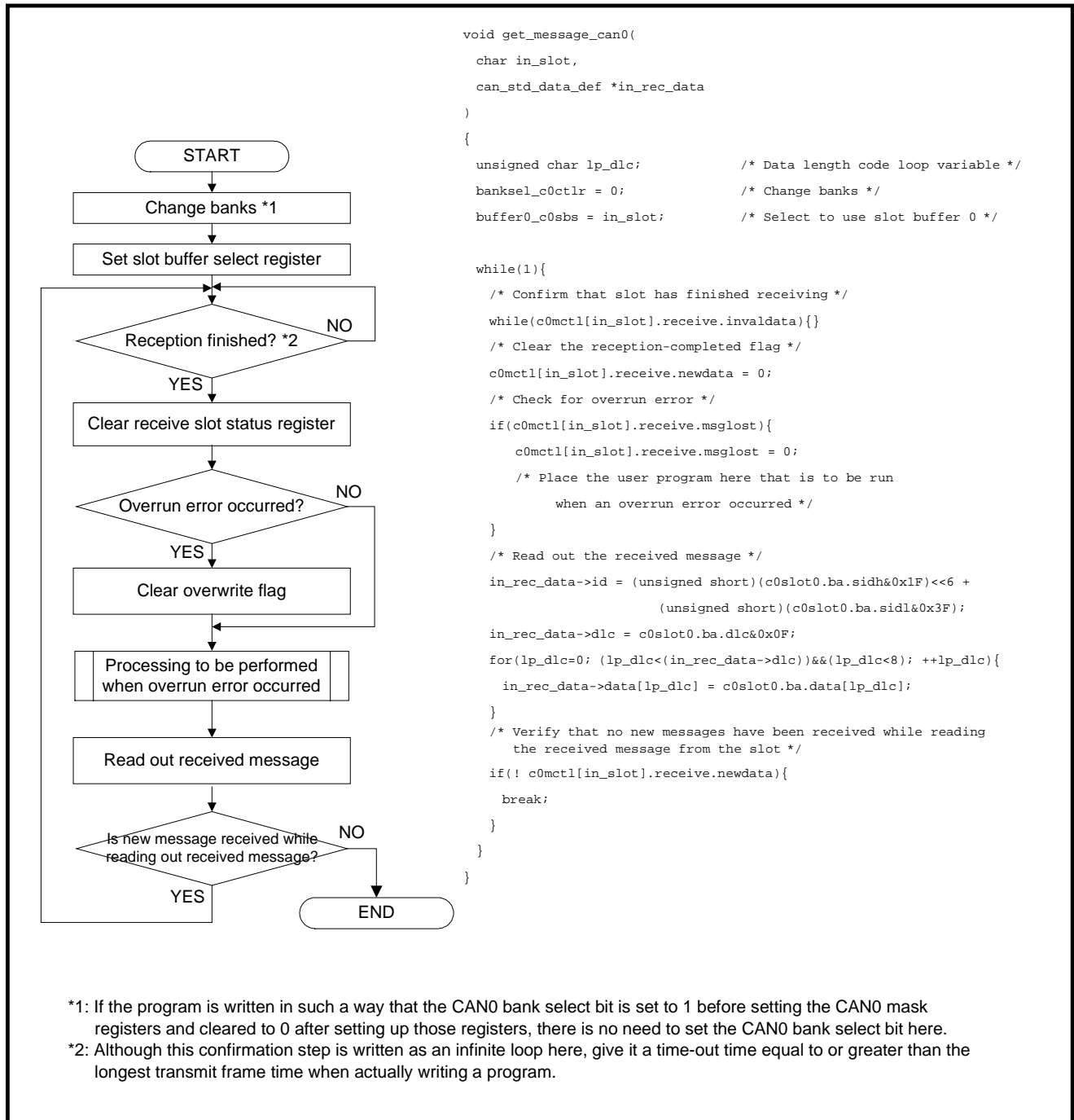


Figure 2. Processing procedure of a received message

5. Confirmation of a Successful Reception

The following describes how to confirm that the CAN module has finished receiving a message successfully.

For this confirmation, use polling or CAN interrupt.

5.1. Confirmation by Polling

Figure 3 shows the procedure of confirmation of a successful reception by polling.

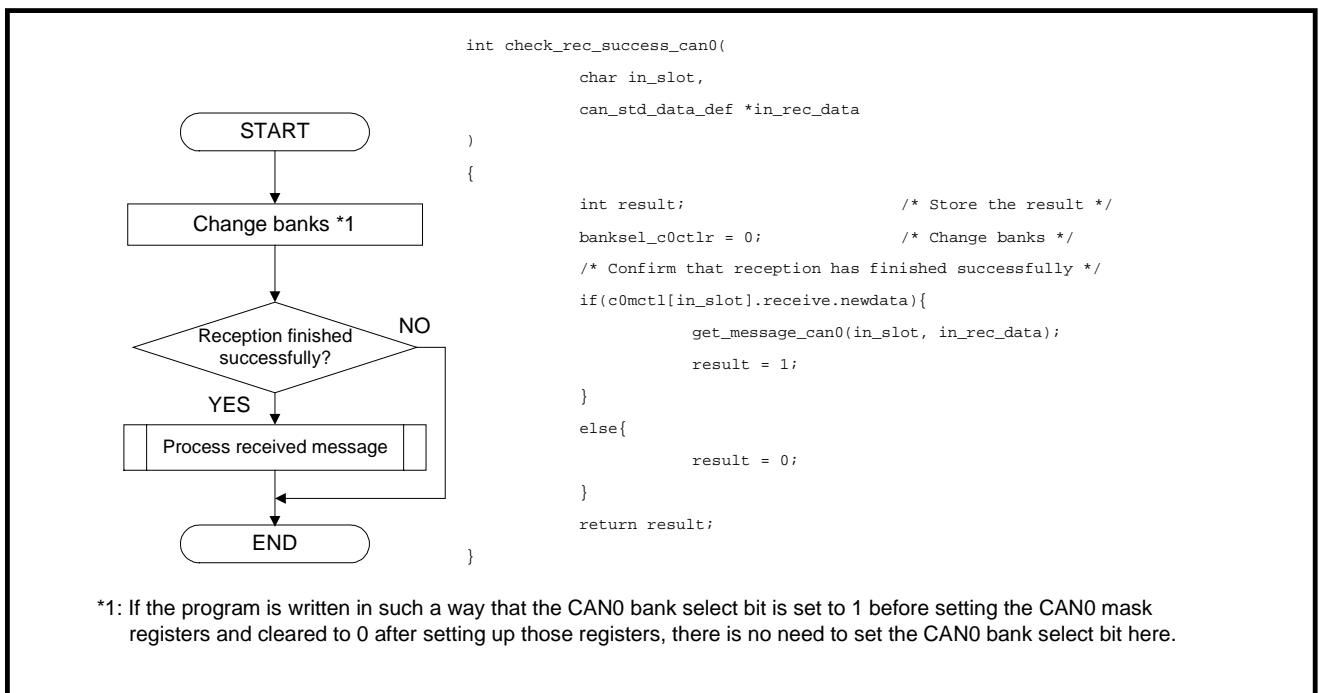


Figure 3. Confirming procedure of a successful reception by polling

5.2. Confirmation by Using CAN Interrupts

When using CAN interrupt for confirmation of a successful reception, first set the interrupt control register to enable it and then the corresponding interrupt enable register. Next, set the CAN0 slot interrupt mask register bits to 1 that correspond to each slot. That way, a CAN reception-completed interrupt can be enabled for each slot individually.

The interrupt control register is used in common for CAN transmission-completed interrupt, CAN reception-completed interrupt, and CAN error interrupt. Similarly, the CAN0 slot interrupt mask register is used in common for CAN transmission-completed interrupt and CAN reception-completed interrupt.

Figure 4 shows the procedure of confirmation of a successful reception by using a CAN interrupt. In this confirmation procedure, the slot number for which a message was received is verified by inspecting the CAN0 message slot i control register (i = 0-15) for the slot that has been set for reception.

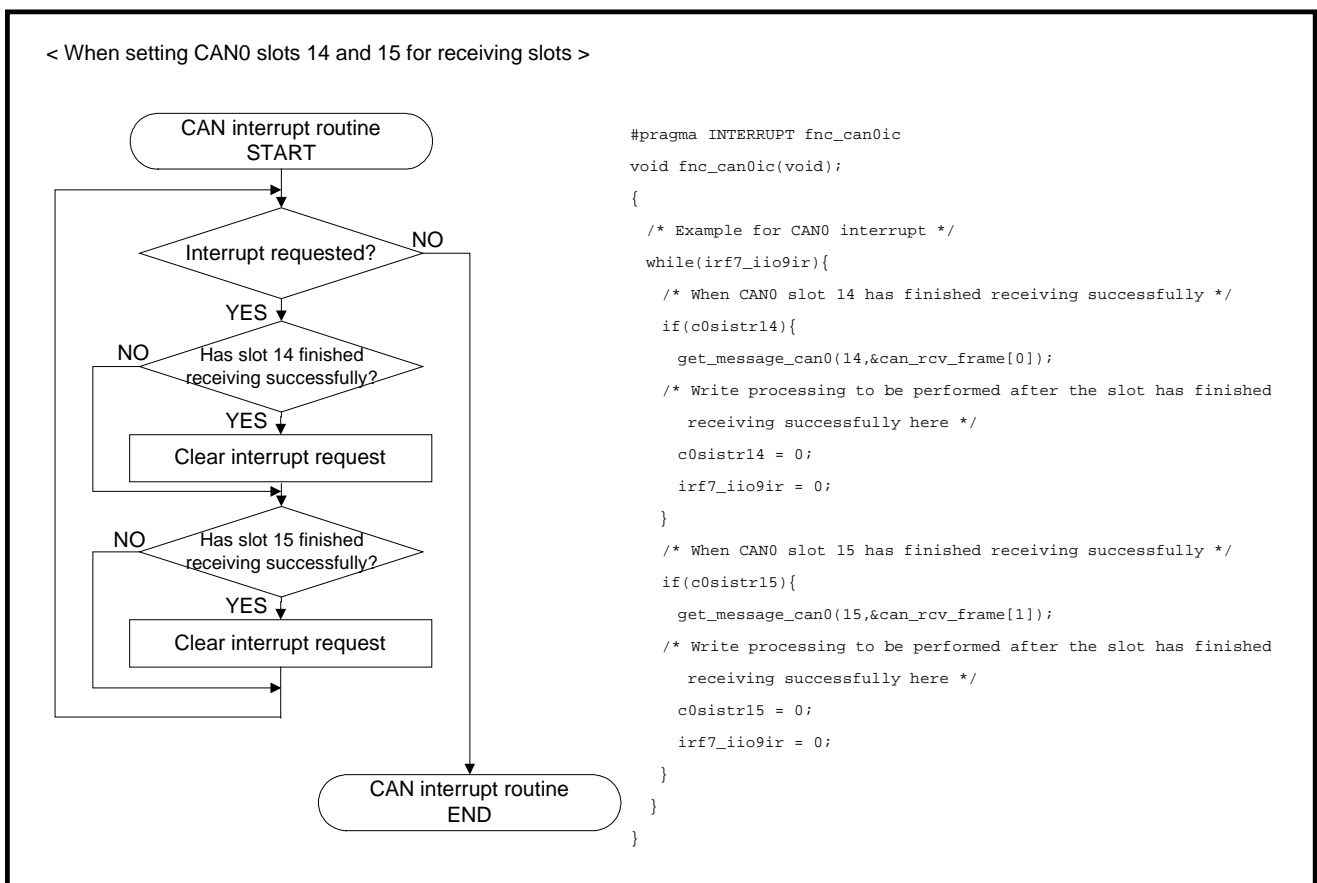


Figure 4. Confirming procedure of a successfully reception by using CAN interrupt

6. Precaution about Sample Program in This Document

6.1. Symbol Description of Each Register

Symbol of each register which is included in the sample program of this document complies with the description of C-language SFR header file for Renesas standard M32C/83 group.

6.2. Structure of Sample Program

Structure which is included in the sample program of this document is following configuration.

```
/* Definition of a standard data frame */
typedef struct{
    unsigned short id;
    unsigned char dlc;
    unsigned char data[8];
}can_std_data_def;

/* Definition of a standard remote frame */
typedef struct{
    unsigned short id;
    unsigned char dlc;
}can_std_remote_def;

/* Definition of an extend data frame */
typedef struct{
    unsigned long id;
    unsigned char dlc;
    unsigned char data[8];
}can_ext_data_def;

/* Definition of an extend remote frame */
typedef struct{
    unsigned long id;
    unsigned char dlc;
}can_ext_remote_def;
```

6.3. Infinite Loop of "while"

In some part of the sample program an infinite loop is formed with "while", however, it is described in this way so that the description could be simplified. In actual programming, each while-loop must have a time limit. At over-time it should come out of the loop.

7. Reference

- M32C/83 group Data Sheet
- M32C/83 group Hardware Manual

When using this document, be sure to download the latest manual from Renesas website.

8. Website and Contact Information for Technical Support

- Renesas's technology corporation semiconductor website
<http://www.renesas.com>
- Contact information for technical support for CAN MCU
E-mail : csc@renesas.com

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