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April 1st, 2010
Renesas Electronics Corporation

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H8S/2200 Series

Multiprocessor Communication

Introduction

Uses the H8S/2200 multiprocessor function to transmit and receive data asynchronously, sharing a serial communication line with two H8/2215 units.

Target Device

H8S/2239, H8S/2215

Contents

1. Specifications

1. As shown in figure 1, this sample task transmits and receives data between on H8S/2239 and two H8S/2215 units, sharing the serial communication line.
2. When H8S/2239 transmits data to H8S/2215, the H8S/2215 only receives data oriented to the main station. In a receiving station, data matching the main station ID is received.
3. 8-bit data is transmitted and received at 38400 bps with 1-stop bit and non-parity.

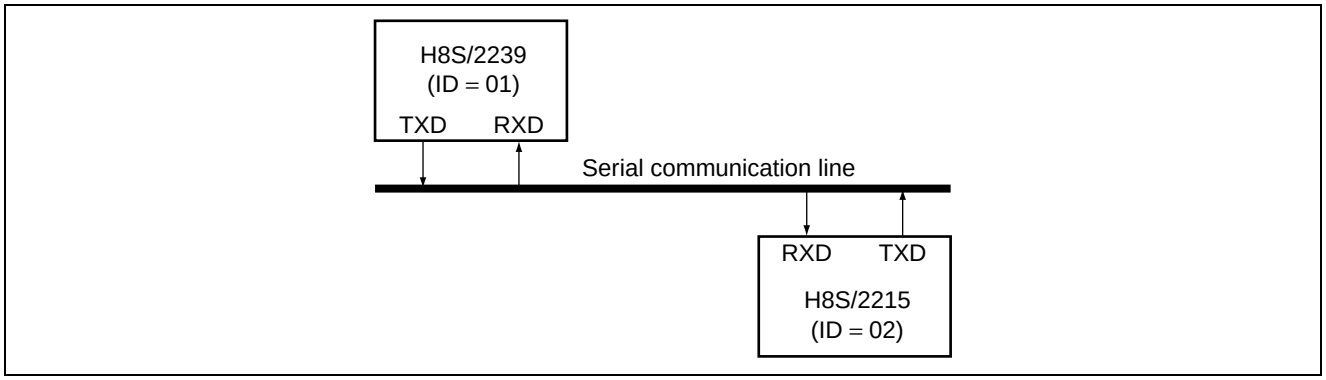


Figure 1 Block Diagram of Asynchronous SCI Using Multiprocessor Function

2. Description of Functions

1. This sample task uses the SCI multiprocessor communication function to perform multiprocessor communication.
   A. The block diagram of the transmitting station SCI used by the sample task is shown in figure 2.
   This sample task uses the following SCI functions for transmission:
   - Function that performs data communication in the asynchronous mode in 8-bit data units for synchronization. (Asynchronous mode)
   - Function that performs data communication in which a multiprocessor bit is added. (Multiprocessor communication function)
   - Function that generates an interrupt at start of transmission. (TXI interrupt)

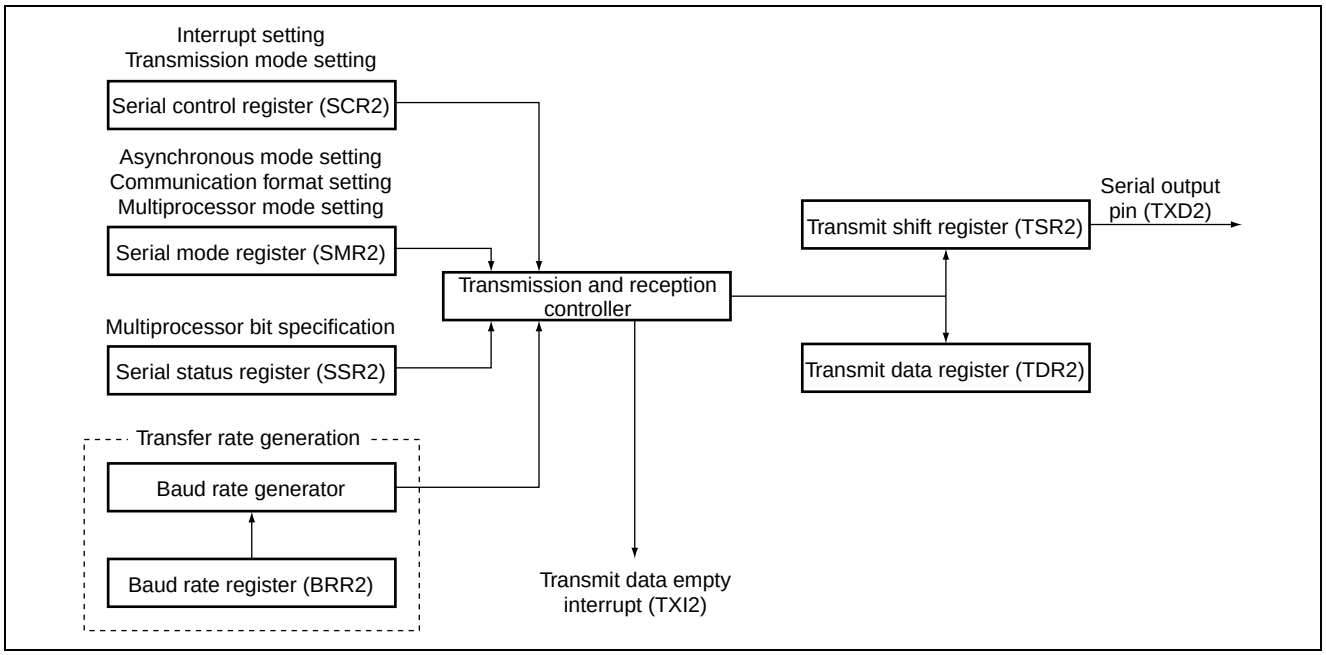


Figure 2 Block Diagram of Transmitting Station SCI

B. The block diagram of the receiving station SCI used by the sample task is shown in figure 3. This sample task uses the following SCI functions for reception:
   - Function that performs data communication in the asynchronous mode in 8-bit data units for synchronization. (Asynchronous mode)
   - Function that performs data communication in which a multiprocessor bit is added. (Multiprocessor communication function)
   - Function that generates an interrupt at reception of a multiprocessor bit. (Multiprocessor interrupt)
   - Function that generates an interrupt at completion of reception. (RXI interrupt)

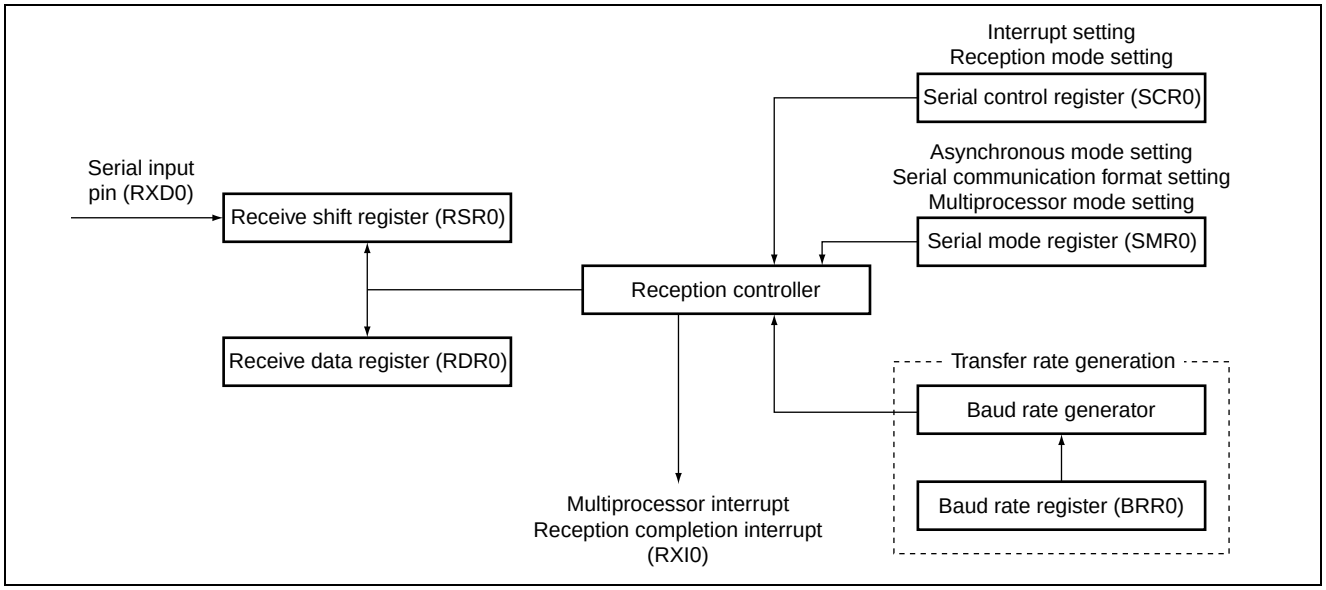


Figure 3 Block Diagram of Receiving Station SCI

2. Function allocation of this sample task is shown in table 1. This sample task allocates SCI functions as shown in table 1 to perform multiprocessor communication.

Table 1 Assignment of Functions

Elements	Description
RXD2	Receives data from H8S/2215.
TXD2	Transmits data to H8S/2215.
SMR2	Sets SCI to the asynchronous mode and multiprocessor mode.
SCR2	Enables a transmission/reception interrupt and set the SCI to the transmission/reception mode.
SSR2	Starts transmission/sets the multiprocessor bit.
RDR2	Sets data received from on H8S/2215.
TDR2	Sets data to be transferred to on H8S/2215.
BRR2	Set the transfer rate.

3. Principles of Operation

1. Transmission

The principles of transmission operations used of this task are shown in figure 4. This task performs software and hardware processing at timing in figure 4 to transmit data to the receiving station, H8S/2215.

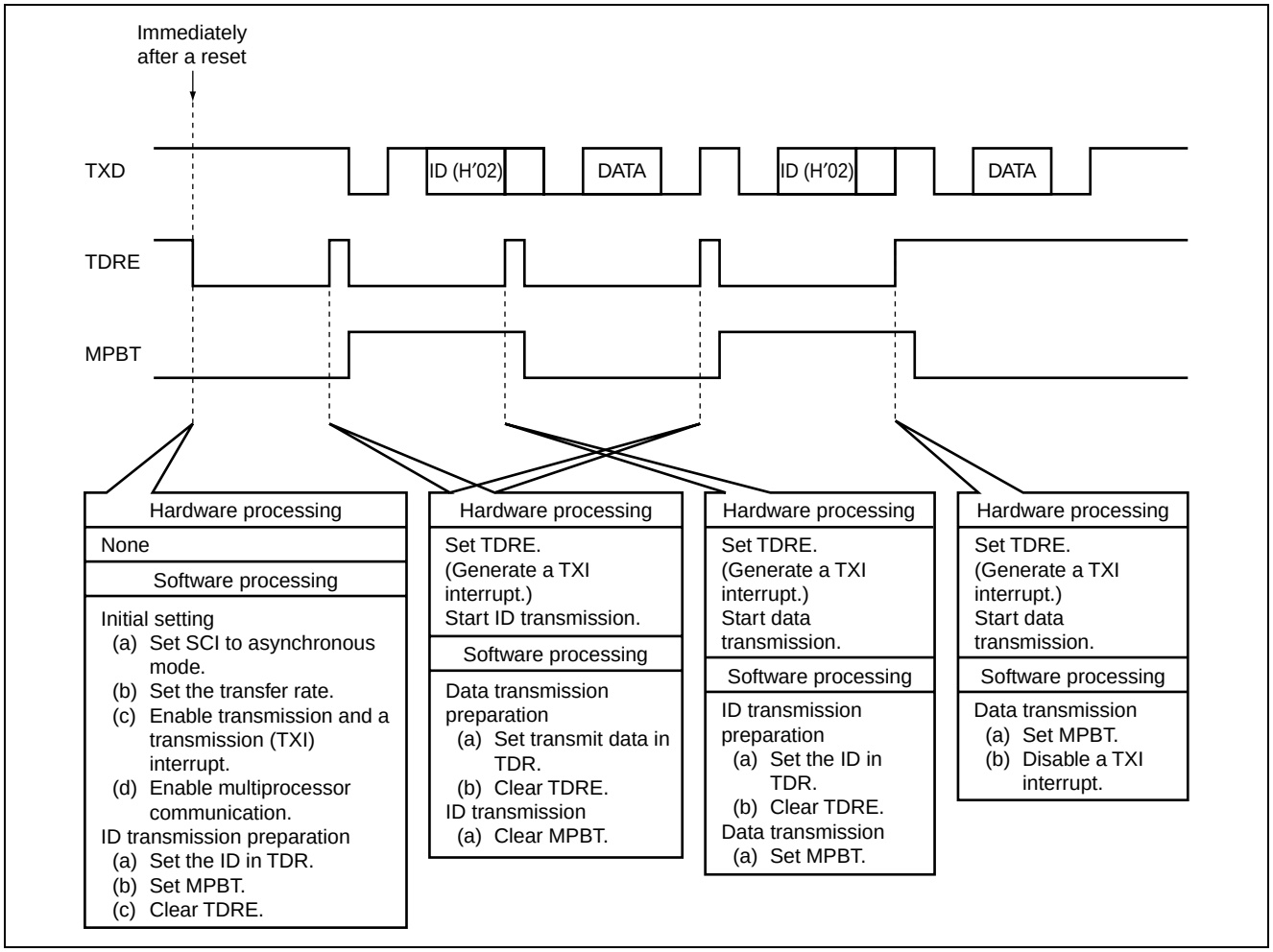


Figure 4 Principles of Operations Used for Multiprocessor Communication (Transmitting Station)

2. Reception

The principles of reception operations used by this sample task are shown in figure 5. This task performs software and hardware processing at timing in figure 5 to receive data from the transmitting station.

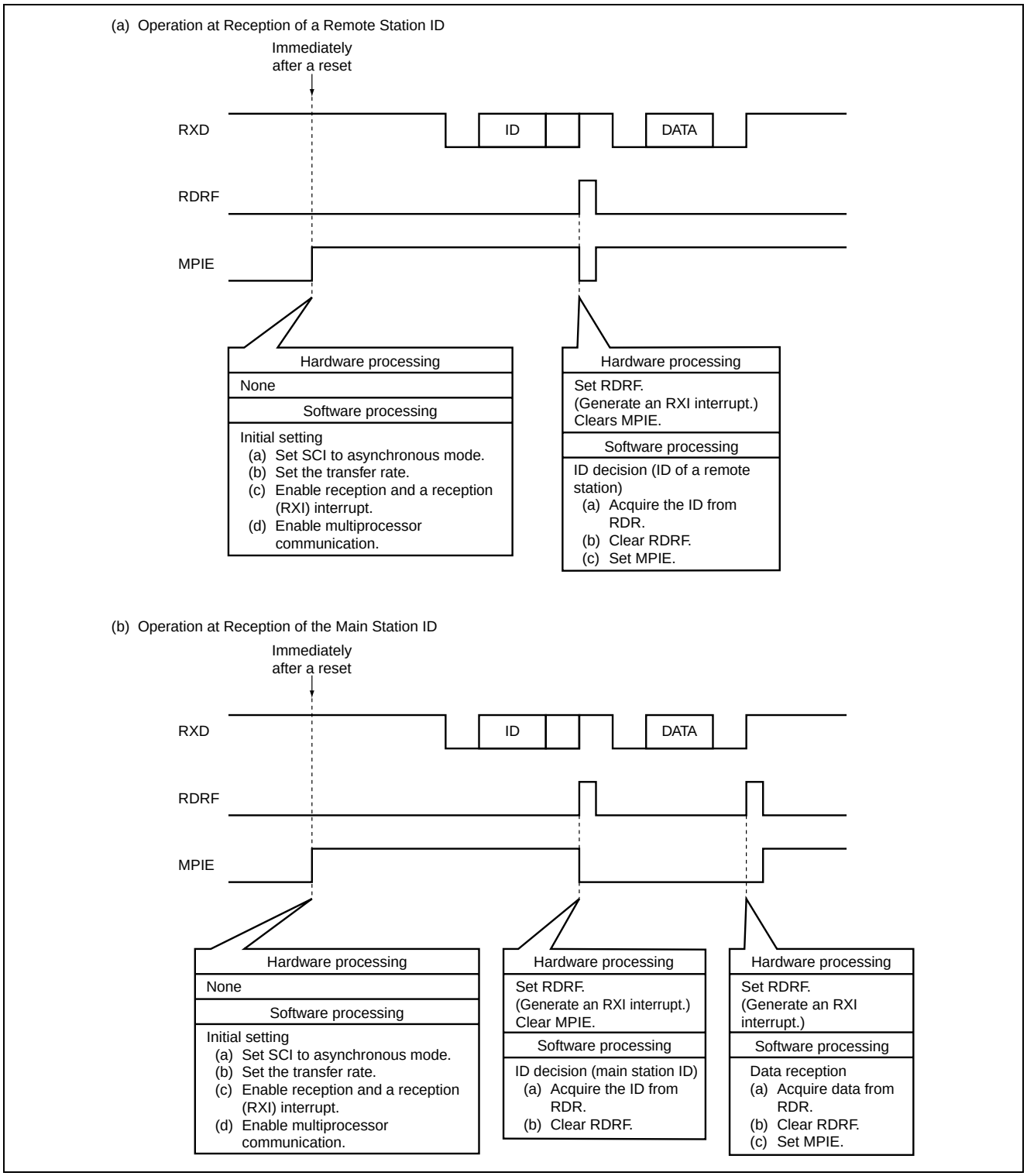


Figure 5 Principles of Operations Used of Multiprocessor Communication (Receiving Station)

4. Description of Software

1. Description of Sending Station Software

A. Description of Modules

Module Name	Label Name	Function
Main routine	MPMASMN	Performs initial setting of SCI.
Data transmission	MPSCITX	Starts up by a TXI interrupt and transmits the ID and data.

B. Description of Arguments

Label Name	Function	Data Length	Used in	I/O
txdata	Buffer storing the ID and data to be transmitted to the receiving station H8S/2215.	unsigned char	Main routine	Output
			Data transmission	Input
txendf	Indicates transmission end. 1: Transmission ended 0: Transmission in progress	unsigned char	Main routine	Input
			Data transmission	Output

C. Description of Internal Registers Used

Register Name	Function	Used in
SMR2	Sets the SCI mode (asynchronous), the transfer format, and selected clock to the baud rate generator (ϕ clock input).	Main routine
SCR2	Enables interrupt (TXI) and sets SCI enable/disable transmission.	Main routine
		Transmission end
SSR2	Clears TDRE (b7) to instruct transmission to start.	Main routine
		Data transmission
TDR2	Sets the ID and data to be transmitted to the receiving station H8S/2215.	Main routine
		Data transmission
BRR2	Sets the transfer rate.	Main routine
MSTPCR	Cancels the SCI module stop mode.	Main routine

D. RAM Usage

Table below describes RAM usage in this sample task.

Label Name	Function	Data Length	Used in
txcnt	Counts transmitted data items.	unsigned char	Data transmission

2. Description of Receiving Station Software

A. Description of Modules

Module Name	Label Name	Function
Main routine	MPSRVMN	Performs initial setting of SCI.
Data reception	MPSCIRX	Starts up by an RXI interrupt and receives the ID and data.

B. Description of Arguments

Elements	Function	Data Length	Used in	I/O
rcv_data	Sets the received ID and data.	unsigned char	Data reception	Output
			Main routine	Input
idrcvf	Flag indicating reception of the main station ID.	unsigned char	Data reception	Output
	1: ID received 0: ID not received		Main routine	Input
dtrcvf	Flag indicating data reception	unsigned char	Data reception	Output
	1: Data received 0: Data not received		Main routine	Input

C. Description of Internal Registers Used

Register Name	Function	Used in
SMR0	Sets the SCI mode (asynchronous), the transfer format, and selected clock to the baud rate generator (ϕ clock input).	Main routine
SCR0	Enables an interrupt (RXI) and sets SCI reception enabled.	Main routine
RDR0	Sets the ID and data received from the transmitting station H8S/2215.	Data reception
BRR0	Sets the transfer rate.	Main routine
MSTPCR	Cancels the SCI module stop mode.	Main routine

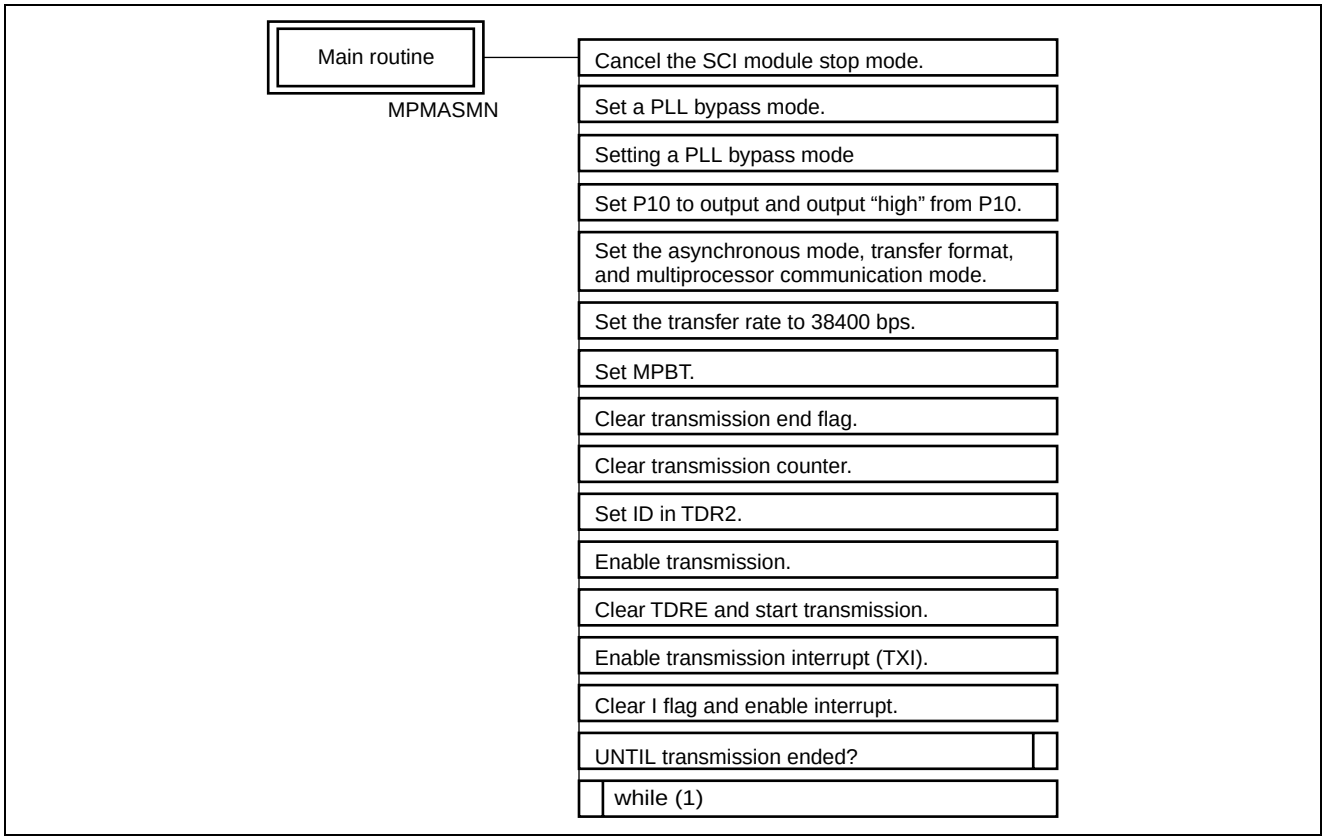
D. RAM Usage

Table below describes RAM usage in this sample task.

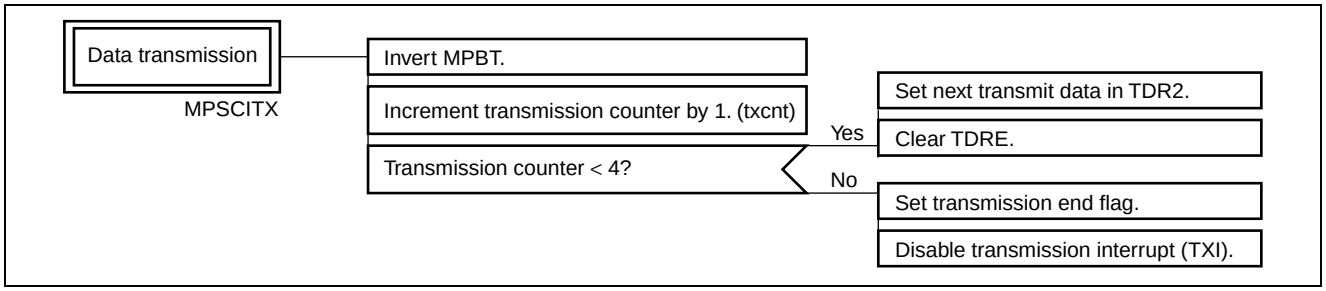
Label Name	Function	Data Length	Used in
rxid	Sets the received ID.	unsigned char	Main routine
rxdata	Sets received data.	unsigned char	Main routine
myid	Sets the main station ID.	unsigned char	Data reception

5. PAD

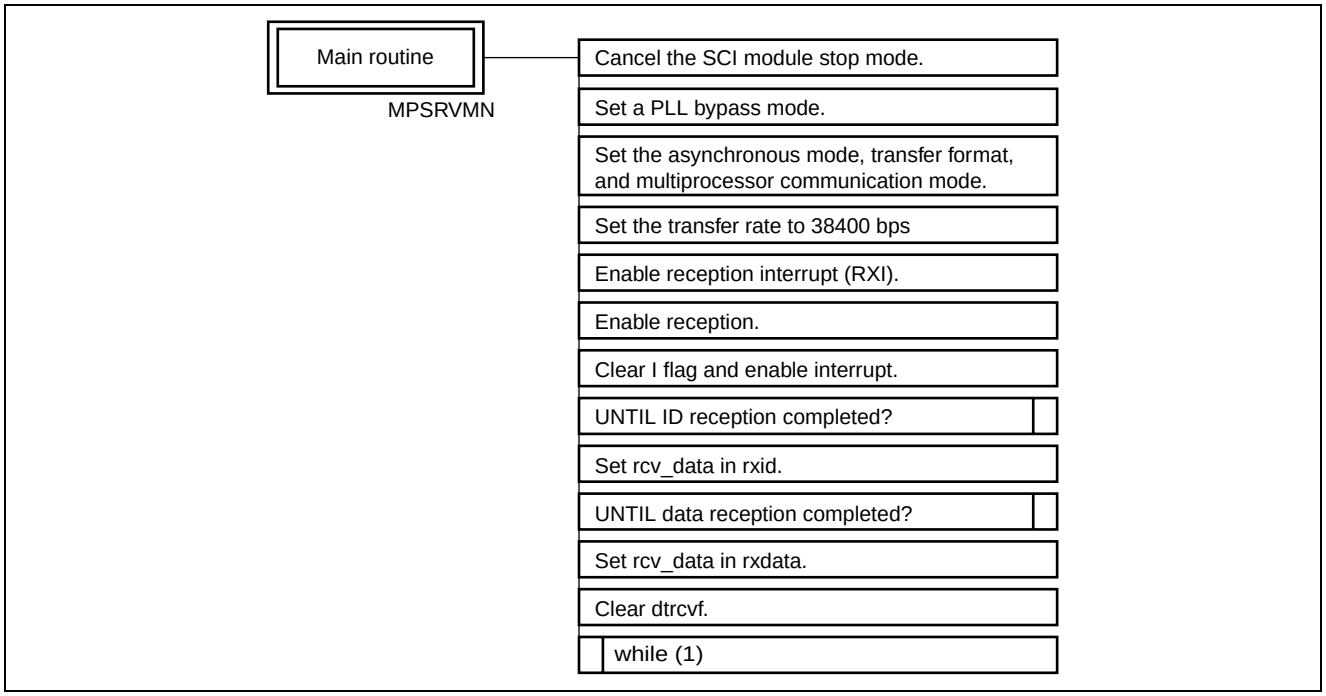
1. Transmitting Station
   A. Main Routine



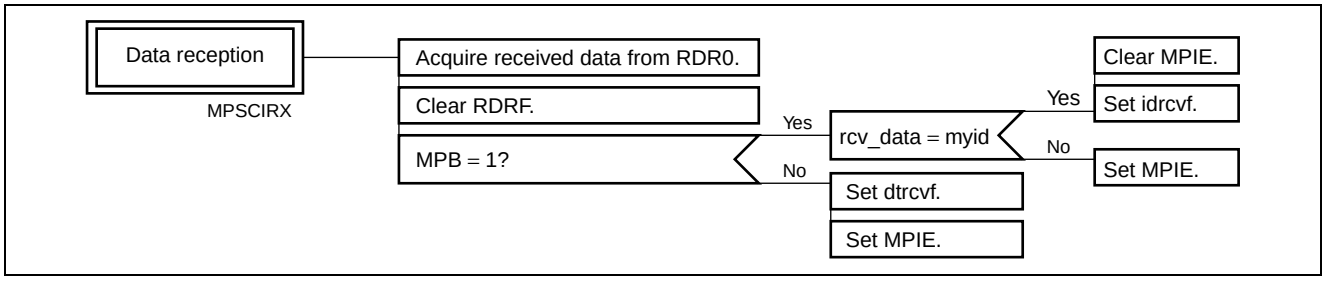
   B. Data Transmission



2. Receiving Station
   A. Main Routine



   B. Data Reception



Revision Record

Rev.	Date	Description	
		Page	Summary
1.00	Mar.16.04	—	First edition issued

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