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Spec No: 002-04121

Spec Title: AN204121 - CXPI APPLICATION CIRCUIT FOR S6BT112A (CXPI TRANSCEIVER)

Replaced by: 002-27376

AN204121

CXPI Application Circuit for S6BT112A (CXPI Transceiver)

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Associated Part : S6BT112A

Related Documents: Datasheet of S6BT112A

This application note describes the CXPI application circuit for the S6BT112A CXPI Transceiver.

1 Introduction

This application note describes the CXPI application circuit for the S6BT112A CXPI transceiver. Refer to the datasheet for S6BT112A specifications.

Clock Extension Peripheral Interface (CXPI) is a protocol that includes an application layer, data link layer, and physical layer. Its features include the following:

- It has a quick response time even if there are many nodes because it uses the carrier sense multiple access/collision resolution (CSMA/CR) access method. Therefore, it can send event triggers and communicate with each node in the same way as in controller area network (CAN).
- The slave node does not need a crystal because the master node sends a clock pulse with data on the communication line, and the slave node synchronizes with the master clock with each bit of data.
- It can be used with most types of microcontrollers because it supports the UART interface.

Table 1 lists the CXPI specifications.

Table 1. CXPI Specifications

Classification	Function	CXPI
Application layer	Wakeup/sleep functions	Supported
Data link layer	Access method	CSMA/CR (nondestructive type)
	Error detection	8 method (includes 8-bit /16-bit CRC)
	Consecutiveness detection	Supported
Physical layer	Network topology	Bus type
	Communication line	Single wire
	Number of nodes	16 maximum
	Length of bus line	40 meter, maximum
	Encoding method	PWM
	Baud rate	20 kbps maximum

2 Pin Functions

Table 2 lists the S6BT112A pin functions.

Table 2. Pin Functions

Pin umber	Pin Name	I/O	Function
1	RXD	O	Receive data output pin
2	NSLP	I	Sleep control pin 0 : Sleep mode/Standby mode 1 : Normal mode
3	CLK	I	If using master node (SELMS='0') : CLK input pin Input the clock, with the communication baud rate, to this pin.
		O	If using slave node (SELMS=1) : CLK output pin This pin outputs the clock with the communication baud rate.
4	TXD	I	Transmit data input pin
5	GND	–	GND pin
6	BUS	I/O	BUS line input/output pin
7	BAT	–	Battery power input pin
8	SELMS	I	This pin selects either master or slave. 0 : Master 1 : Slave

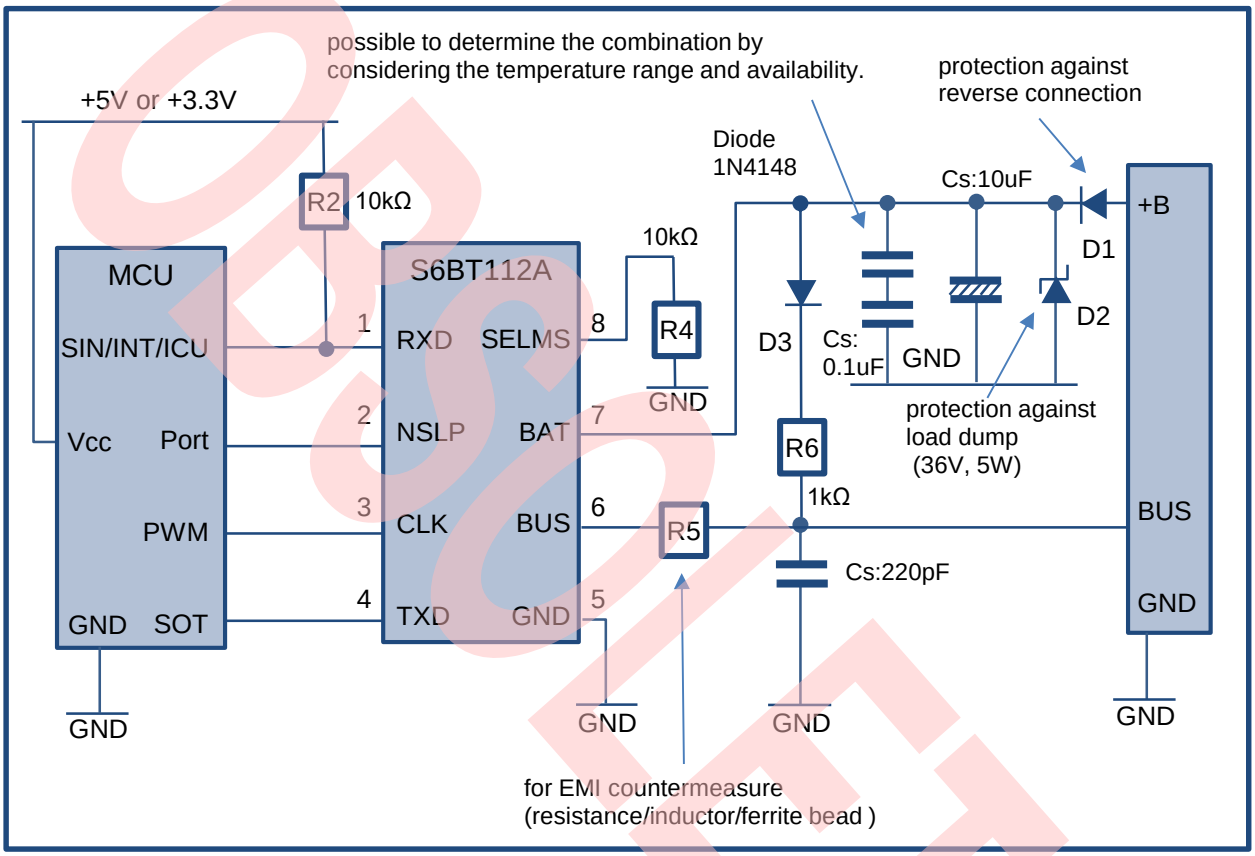
S6BT112A can use either the master node or the slave node by changing the pin level of SELMS (pin 8).

3 CXPI Application Circuit

3.1 Master Node

When S6BT112A uses the master node (Figure 1), connect pin 8 (SELMS) to the pull-down resistor and input the PWM output to pin 3 (CLK).

Figure 1. Example of Application Circuit for Master Node



Note: The Zener diode (D2) shown in Figure 1 for protection against load dump is not always necessary.

The resister (R5) for EMI countermeasures is usually specified by the automobile companies because it is necessary to decide on the whole CXPI network

Table 3 specifies the connection between S6BT112A and the MCU for the master node.

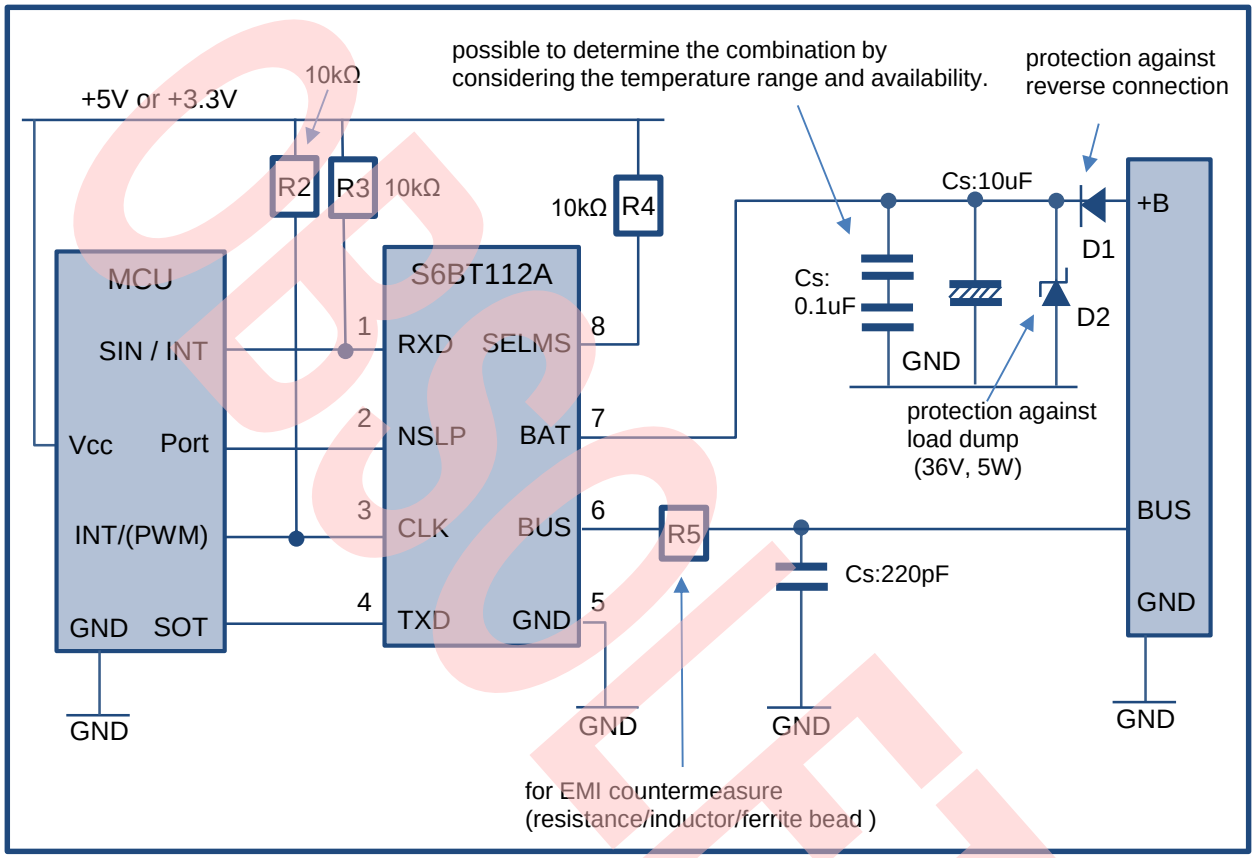
Table 3. Example of Connection Between S6BT112A and MCU for Master Node

S6BT112A			MCU		
Pin Number	**Pin Name**	**I/O**	**Pin Name**	**Description**	**I/O**
1	RXD	O	SIN / INT / ICU	Serial data input (receive data) External interrupt input (falling-edge detection) Input capture (wakeup pulse detection)	I
2	NSLP	I	Port	General purpose output	O
3	CLK	I	PWM	PWM output	O
4	TXD	I	SOT	Serial data output (transmit data)	O

3.2 Slave Node

When S6BT112A uses the slave node (Figure 2), connect pin 8 (SELMS) to the pull-up resistor. To correspond with the secondary clock master function, control the level of pin 8 from the MCU. In addition, input the PWM output to pin 3 (CLK).

Figure 2. Example of Application Circuit for Slave Node



Note: The Zener diode (D2) shown in Figure 2 for protection against load dump is not always necessary.

The resister (R5) for EMI countermeasures is usually specified by the automobile companies because it is necessary to decide on the whole CXPI network

Table 4 specifies the connection between S6BT112A and the MCU for the slave node.

Table 4. Example of Connection Between S6BT112A and MCU for Slave Node

S6BT112A			MCU		
Pin Number	**Pin Name**	**I/O**	**Pin Name**	**Description**	**I/O**
1	RXD	O	SIN / INT	Serial data input (receive data) External interrupt input (falling-edge detection)	I
2	NSLP	I	Port	General purpose output	O
3	CLK	O /(I)	INT / (PWM)	External interrupt input (wakeup pulse detection) / (PWM output)	I / (O)
4	TXD	I	SOT	Serial data output (transmit data)	O

Note: When replacing a slave with a master with secondary master function, it is necessary to change the clock input from the MCU to the transceiver IC.

Document History

Document Title: AN204121 – CXPI Application Circuit for S6BT112A (CXPI Transceiver)

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Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	5016031	AKFU	06/24/2015	Initial Release.
*A	5336069	AKFU	01/30/2017	Updated Document Title to read as “AN204121 – CXPI Application Circuit for S6BT112A (CXPI Transceiver)”. Replaced S6BT111A00 with S6BT112A in all instances across the document. Updated to new template.
*B	5801575	AESATMP9	07/06/2017	Updated Cypress Logo and Copyright.
*C	6743570	SAKU	12/03/2019	Obsolete document. Completing Sunset Review.

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