EPSON

Application Note

Speech LSI and Voice/Sound MCU External QSPI-Flash Select Guide

SEIKO EPSON CORPORATION

Rev.1.0

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Table of Contents

1. Overview

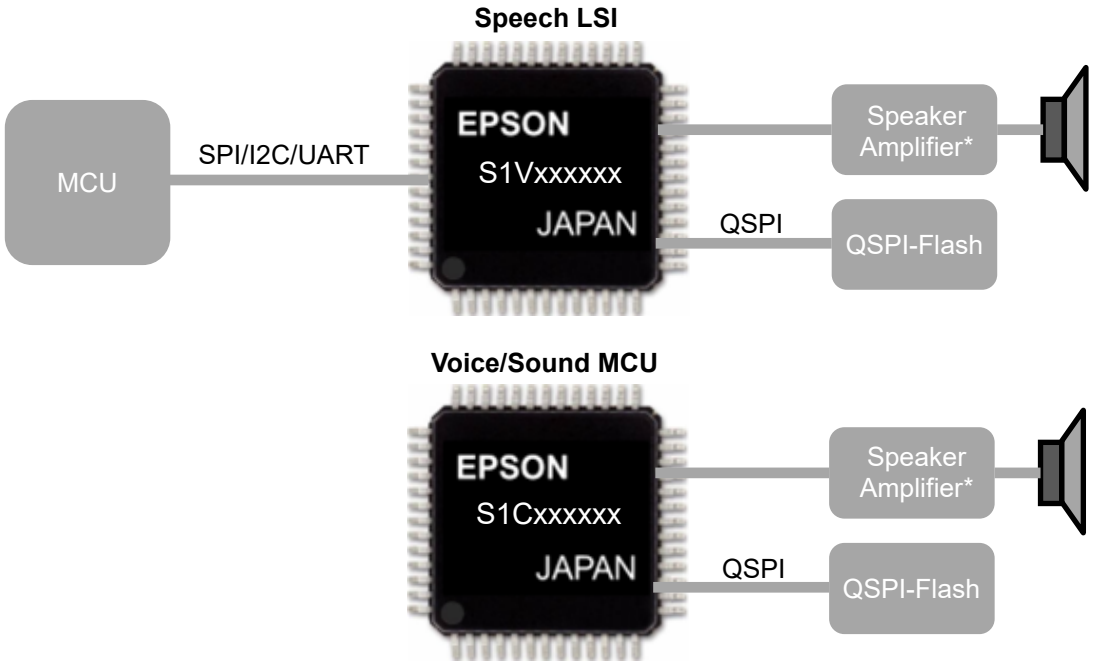
This application note is a reference document for selecting an external QSPI-Flash that can be connected to **Epson's Speech LSIs and Voice/Sound MCUs (hereinafter "Voice/Sound devices")**. The applicable model of this application note is shown in Table1.1. These products require access(read/write) via Quad-SPI.

The connection diagrams with Epson's Voice/Sound devices are shown in Figure 1.1.

Table 1.1 Applicable models of this application note

Product model number					
Speech LSI			Voice/Sound MCU		
S1V3G340	S1V3F351	S1V3F352	S1C31D50	S1C31D51	S1C31D41
Not Applicable**	✓	✓	✓	✓	✓

** **S1V3G340 is not applicable in this application note.** Refer to "S1V3G340 External SPI-Flash Select Guide" for S1V3G340.



*It may be a buzzer.

Figure 1.1 Connection diagrams of Epson's "Voice/Sound devices" and QSPI-Flash

2. QSPI-Flash Selection Conditions

The QSPI-Flash conditions to which Epson's Voice/Sound devices can be connected (Connection test completed) are shown in Table 2.1.

Table 2.1 Conditions for QSPI-flash to which Epson's Voice/Sound devices can be connected

Item	Condition
Operation Voltage	Operates at 3.0 to 3.6V
Operation mode	Meets the timing charts in Figure 2.1 and 2.2, and supports XIP, or Performance-enhancing mode, or AX read operation
Maximum size	16Mbyte
Commands	Meets Table 2.2

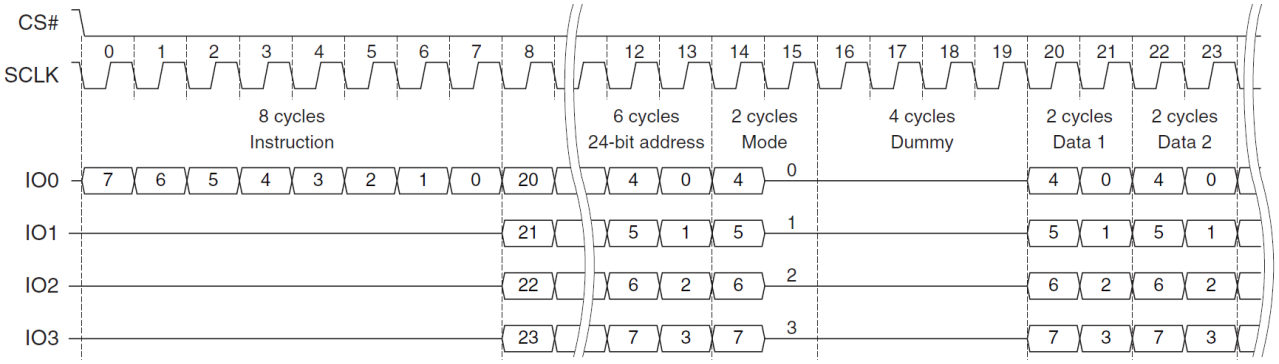


Figure 2.1 XIP Example - Spansion S25FL128S Quad I/O Read Command Sequences (3-byte address, 0xeb [ExtAdd = 0], LC = 0b00)

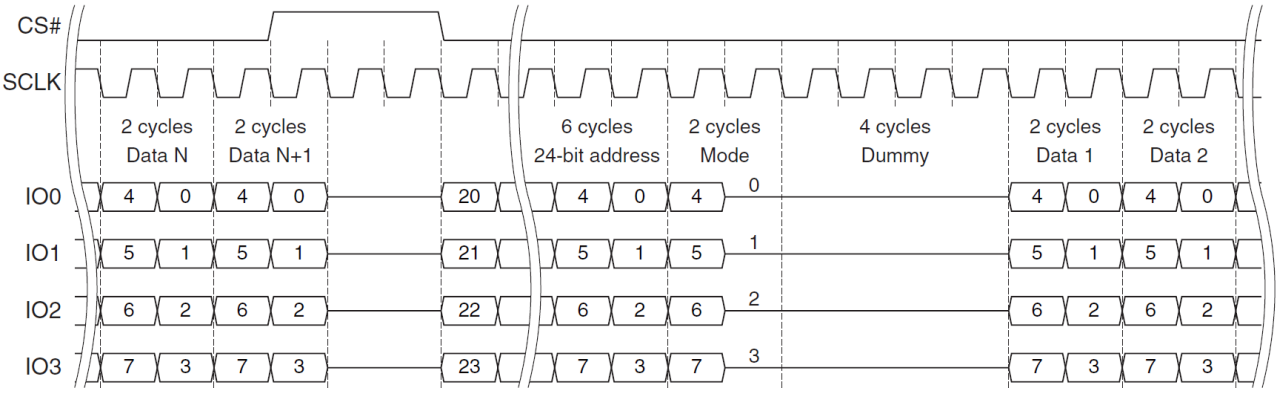


Figure 2.2 XIP Example - Spansion S25FL128S Continuous Quad I/O Read Command Sequence (3-byte address, LC = 0b00)

2. QSPI-Flash Selection Conditions

Table 2.2 The QSPI-Flash commands compatible with Epson's Speech LSIs

Command type	Speech LSIs (Fixed value)
Flash ID read command	0x9F
Write enable command	0x06
Chip erase command	0xC7
Sector erase command (64KB)	0xD8
Sector erase command (4KB)	0x20
Program command	0x02
Read command for normal SPI	0x0B
Read command for Quad SPI	0xEB

** Commands can be defined in software in case of Voice/Sound MCUs, so command products other than the above numbers can be supported. Refer to Appendix B.

Appendix A List of QSPI-Flash compatible modes that can be connected to Voice/Sound devices

Table A.1 List of QSPI-Flash compatible modes (Connection test completed) that can be connected to Voice/Sound devices

Manufacture	Operation mode
Macronix	Performance-enhancing mode
ISSI	AX read operation
Winbond	XIP (Execute In Place)
Giantec	XIP (Execute In Place)

Appendix B QSPI-Flash access with Voice/Sound MCU

QSPI-Flash command specification may not have the values shown in Table 2.2. In case of Voice/Sound MCU used, it can be accessed using software that meets the specification of the QSPI-Flash being used.

For example, it can be accessed by changing the symbol definition values for each command (refer to Table B.1) in “xxxxx_flash.h” packed in Voice/Sound MCU sample software published in Epson’s web site to meet QSPI-Flash being used.

Table B.1 Symbol definition of QSPI-Flash commands in Voice/Sound MCU sample software

Command type	Symbol definition in sample software
Flash ID read command	CMD_READ_ID_SINGLE_MODE
Write enable command	CMD_WRITE_ENABLE
Chip erase command	CMD_BULK_ERASE
Sector erase command (64KB)	CMD_SECTOR_ERASE
Sector erase command (4KB)	CMD_SUBSECTOR_ERASE
Program command	CMD_PAGE_PROGRAM
Read command for normal SPI	CMD_FAST_READ
Read command for Quad SPI	CMD_QUAD_FAST_READ

Revision History

Attachment-1

Rev. No.	Date	Page	Category	Contents
Rev 1.0	2025/05/12	All	new	Newly enacted

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