AN1372
APPLICATION NOTE

How to Use M58LW032A as Replacement for 28F320J3A in an Asynchronous Environment

CONTENTS

INTRODUCTION

This application note is preliminary information regarding a Flash memory currently being developed by STMicroelectronics. It describes how to use the M58LW032A as a replacement for the 28F320J3A StrataFlash memory.

The M58LW032A is a 32Mbit Flash memory from STMicroelectronics. The device is 2Mbit x16 and features Page Mode to speed up read operations and a Write Buffer to reduce programming times. The M58LW032A is a new device in the 0.15µ process technology. Refer to the M58LW32A datasheet for further information.

ELECTRONIC SIGNATURE (M58LW032A)

– Manufacturer code: 0020h

– Device code M58LW032A : 8816h

POWER SUPPLY

M58LW032A:

– V_{DD} = 2.7V to 3.6V , Core power supply

– V_{DDQ} = 1.8V to V_{DD}, Input and output buffer power supply

– V_{PP} = 2.7V to 3.6V = Program/Erase voltage, used to protect blocks during Program/Erase operations

Please refer to Table 2 for a summary of characteristics.

PACKAGES AND PINOUT/BALLOUT COMPARISON

The M58LW032A is offered in TSOP56 and TBGA64 packages.

Figure 1 shows the TSOP56 pin comparison of the two devices. Figures 2 and 3 show a comparison of the TBGA64 ball out for the two devices. Table 1 gives a description of how the pins of M58LW032A must be connected when it is used in Asynchronous Mode.

Figure 1. TSOP56 (14 x 20mm) Comparison

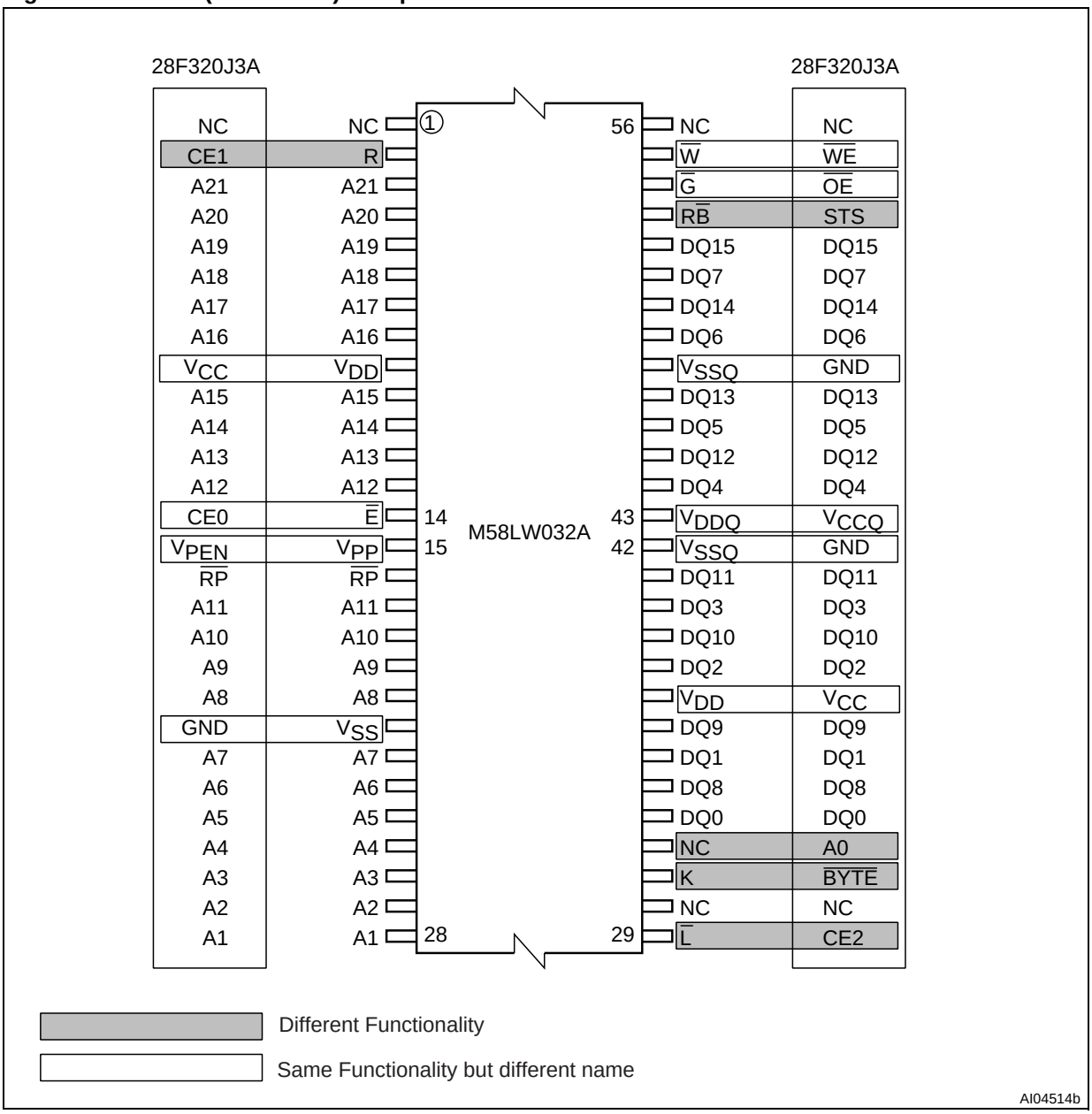

Figure 2. M58LW032A TBGA64 Connections (Top view through package)

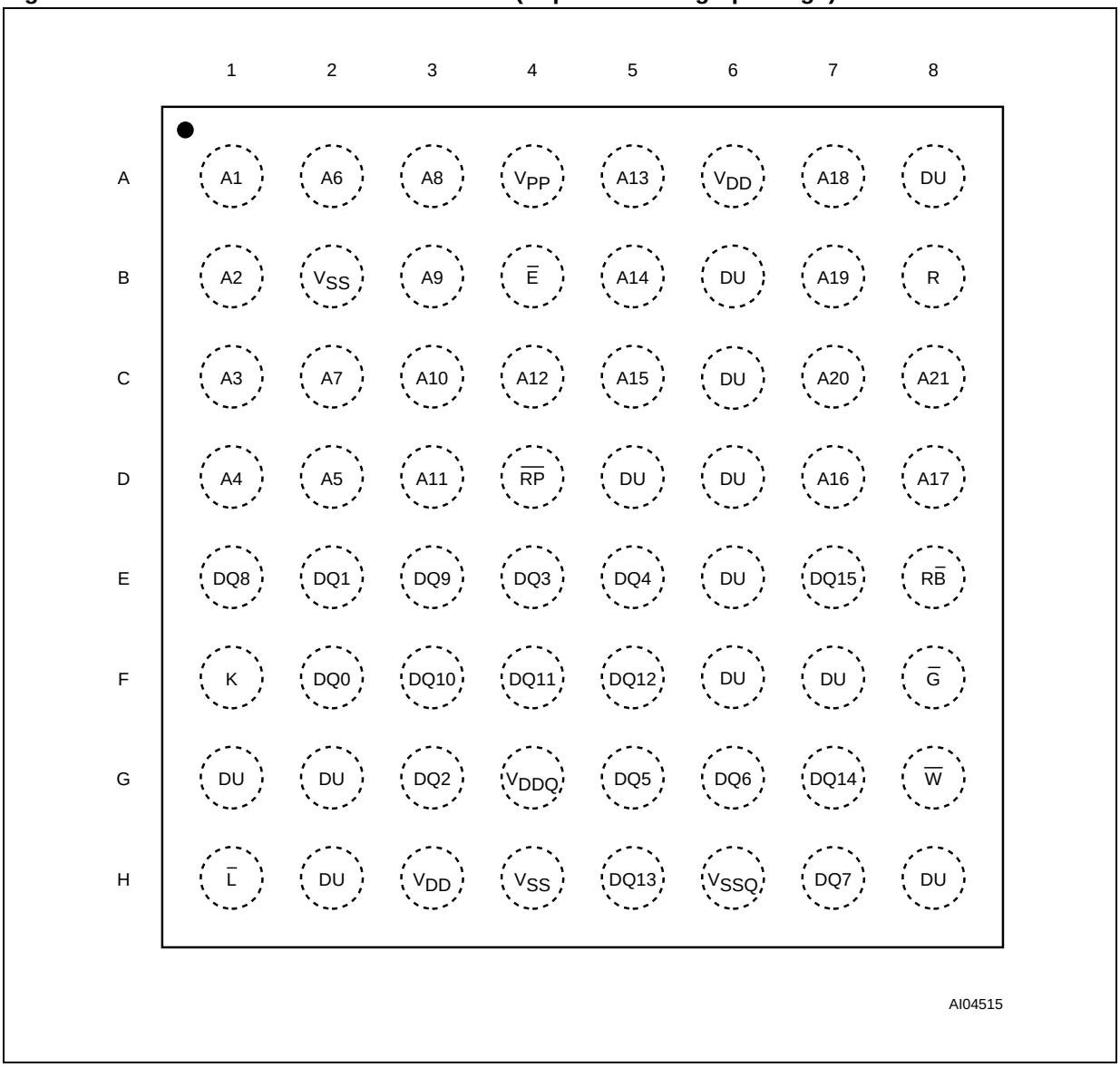

Figure 3. 28F320J3A Connections (Top view through package)

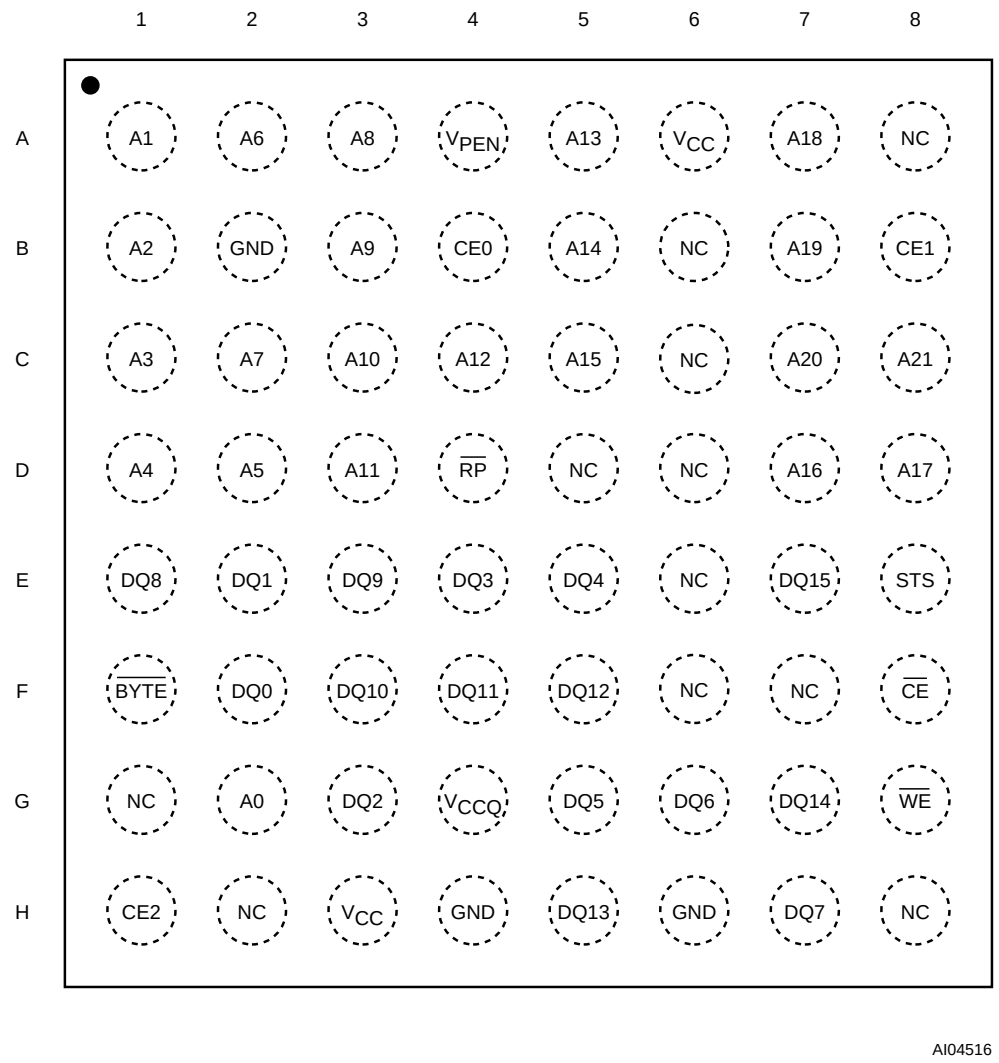

Table 1. Pin Connections

Package		M58LW032A	28F320J3A	Comments
TSOP56	TBGA64			
pin 2	ball B8	R	CE1	R is an open drain output pin in synchronous burst mode, during asynchronous mode it is High Impedance. CE1 is a Chip Enable input. The pin can be grounded.
pin 29	ball H1	$\overline{L}$	CE2	$\overline{L}$ is the Latch Enable used to latch the address for multiplexed addresses in data bus systems. CE2 is a Chip Enable input. The pin can be grounded for successful operation of both memories in the same socket.
pin 31	ball F1	K	$\overline{BYTE}$	The Burst Clock , K, is used to perform synchronous burst operations. $\overline{BYTE}$ selects x8 or x16 mode. The pin should be set High for correct operation of both memories in the same socket.
pin 32	ball G2	NC	A0	Address Input A0 is not used when 28F320J3A is in x16 mode. NC Not Connected. The pin can be set Low or High.
pin 53	ball E8	$R\overline{B}$(5)	STS	$R\overline{B}$ Ready/Busy open drain output. STS configuration status pin. After power-up or reset on the 28F320J3A the STS pin is configured to function the same as the $R\overline{B}$ pin, therefore both pins will behave the same unless the configuration of the 28F320J3A is changed.

BLOCK ORGANIZATION

The M58LW032A has 64 uniform blocks of 32KWords (512Kbit) each. The M58LW032A device has a 128 bit Security Register used for security purposes. It is divided into two 64 bit parts, one written in the factory by the manufacturer and the other programmable by the user. The user programmable part can be locked.

COMMAND SET AND SOFTWARE COMPATIBILITY

This section highlights the command set differences between the two devices M58LW032A and 28F320J3A and shows the aspects that must be taken into account when writing software to manage the different devices.

Recovery from Reset

For read operations 28F320J3A offers a recovery time ($\overline{RP}$ high to output valid) of 150ns, while a delay of 1µs (after the rising edge of $\overline{RP}$) is required before the device is ready for program or erase operations. For read operations M58LW032A offers a recovery time ($\overline{RP}$ high to output valid) of 150ns. The device will be ready for program or erase operations 150ns after the rising edge of $\overline{RP}$.

Read

The M58LW032A offers an asynchronous access time of 90ns, and a 4 Word asynchronous Page mode feature with 90/25ns access time. Refer to Table 2 for a summary of the characteristics.

Write

To speed up write operations the M58LW032A features a 16 Word Write Buffer. The Write Buffer feature is especially useful to free the microprocessor to perform other work during the program execution. The information about the Write Buffer Size is part of the Common Flash Interface so it is possible to manage this information automatically. The M58LW032A offers a Word Program command and a Write to Buffer command. Please refer to Table 2 for a summary of write characteristics.

Erase

The different block organizations must be taken into account. Please refer to Table 2 for Erase performances.

Security features

Both M58LW032A and 28F320J3A have commands to manage the Protection Register.

28F320J3A offers a command to configure STS pin.

SUMMARY OF CHARACTERISTICS AND PERFORMANCES

Table 2 gives a summary of all the important characteristics and performances of the two devices.

Table 2. Device Characteristics and Performances Summary

Parameter	M58LW032A	28F320J3A
Power Supply	V_{DD} = 2.7V to 3.6V V_{DDQ} = 1.8V to V_{DD}	V_{CC} Core = 2.7V to 3.6V V_{CC} I/O = 2.7V to V_{CC} Core
Program/Erase Voltages	V_{PP} = 2.7V to 3.6V(1)	V_{PEN} = 2.7V to 3.6V(1)
Bus Width	x16	x8/x16
Block Organization	64 blocks 32KWord	32 blocks 64KWord
Random Access Time	90ns	110ns
Page Mode Size	4 Words	4 Words
Page Mode Access Time	90ns/25ns	110ns/25ns
Write Buffer Size	16 Words	16 Words
Program Time Using Write Buffer	290µs/16 Words	218µs/16 Words
Word Program Time	18µs	210µs
Block Erase Time	1.1s	1s
Maximum number of Program/Erase Cycles	100,000	100,000

Note: 1. V_{PP} and V_{PEN} refer to Program/erase voltage, used to protect blocks during program/erase operations.

REVISION HISTORY

Date	Version	Revision Details
08-Jun- 2001	-01	First Issue
28-Feb- 2002	-02	M58LSW32 device removed from document, Random Access time and Program and Erase times modified, Pin connections clarified.

If you have any questions or suggestion concerning the matters raised in this document please send them to the following electronic mail address:

ask.memory@st.com (for general enquiries)

Please remember to include your name, company, location, telephone number and fax number.