

INTRODUCTION

Like the GLST55LC100/GLS55LC100M, the GLST55LC200 is the heart of a high-performance, flash media-based data storage system with relatively minor differences. This application note describes the differences between the GLS55LC200 and the GLS55LC100/GLS55LC100M, and provides the guidelines to migrate current GLS55LC100/GLS55LC100M NAND controller based designs to a GLST55LC200 design.

This application note only covers the differences between these devices. For detailed product information, refer to the data sheets for each product.

ATA/IDE Bus Interface Working Mode

The GLST55LC200 offers increased host interface data transfer rates as detailed below.

TABLE 1: ATA/IDE Bus Interface Working Mode Differences

	GLS55LC100/GLS55LC100M	GLS55LC200
Bus Width	8- or 16-bit access	16-bit access ¹
PIO Mode	Up to PIO mode 4	Up to PIO mode 6
Multi-word DMA	Up to Multi-word DMA mode 2	Up to multi-word DMA mode 4
Ultra DMA mode	Not supported	Up to Ultra DMA mode 4

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1. For 8-bit access, contact Greenliant for support and details.

NAND Flash Media Interface

TABLE 2: NAND Flash Media Interface Differences

	GLS55LC100/GLS55LC100M	GLS55LC200
Single Channel Mode ¹	Supported	Supported
Dual Channel Mode ²	Not Supported	Supported
16-bit NAND Bus ³	Supported	Not Supported
ECC	Up to 3 Random 12-bit Symbols Corrections	Up to 8 Random Bit Error Corrections
Single-level Cell Flash	Supported by GLS55LC100	Supported
Multi-level Cell Flash	Supported by GLS55LC100M	Supported
Flash Page Size ⁴	2 KBytes or 512 Bytes	2 KBytes and 4 KBytes

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1. In Single Channel Mode, for both devices, all NAND flash are connected with the low 8-bit data bus (FAD0:FAD7).
2. In Dual Channel Mode, for both devices, all NAND flash are connected evenly with the low 8-bit data bus (FAD0:FAD7), and with the high 8-bit data bus (FAD7:FAD15) of the GLS55LC200.
3. For GLS55LC100/GLS55LC100M, in 16-bit Access Mode, NAND flash with 16-bit data buss is connected with the 16-bit flash bus (FAD0:FAD15).
4. Dual Channel Mode can only be implemented when GLS55LC200 is interfacing with a 2 KByte page size NAND flash.

Application Note

Maximum Capacity and Performance

The maximum capacity of the GLS55LC200 is significantly larger than the GLS55LC100/GLS55LC100M, and the sustained Read and Write are faster.

TABLE 3: Maximum Capacity and Performance Differences

		GLS55LC100/GLS55LC100M	GLS55LC200
Maximum Capacity	Single Channel Mode	Up to 8 GBytes	Up to 32 GBytes
	Dual Channel Mode	Not supported	Up to 32 GBytes
Performance	Sustained Read	Up to 10 MBytes/sec	Up to 30 MBytes/sec
	Sustained Write	Up to 10 MBytes/sec	Up to 30 MBytes/sec

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External Clock Interface

The external clock interface is not supported by the GLS55LC200. Because of this change, three pins of the GLS55LC200 have been re-defined.

TABLE 4: External Clock Differences

Pins		Functions	
TQFP (TQW)	TFBGA (BW) ¹	GLS55LC100/GLS55LC100M	GLS55LC200
26	J1	FCE7#/INTCLKEN	FCE7#
99	A3	EXTCLKOUT	DNU
100	B3	EXTCLKIN	TIE_DN

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1. The TFBGA (BW) package is not available for GLS55LC200.

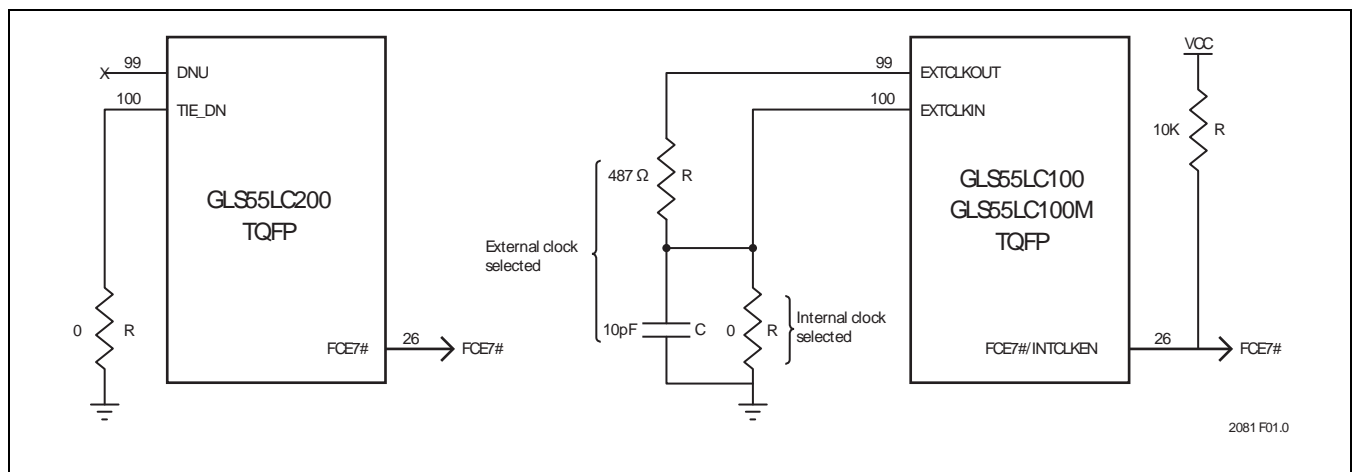


FIGURE 1: Clock Interface Pin Out

Pin Assignment

The GLS55LC200, GLS55LC100, and GLS55LC100M are available in 100-lead TQFP packages. For these packages, the same printed circuit board (PCB) can be used when migrating from either the GLS55LC100 or GLS55LC100M to the GLS55LC200. For the most part, the pin assignments for this package is the same between the GLS55LC200 and the GLS55LC100/GLS55LC100M. There are only four pins with different functions. See Table 6 for details.

TABLE 5: Pin Assignment Differences

Pins TQFP (TQW)	Functions	
	GLS55LC100/GLS55LC100M	GLS55LC200
26	FCE7#/INTCLKEN	FCE7# ¹
55	WP/IOCS16#	IOCS16#
97	FWP#	WP#/PD#
99	EXTCLKOUT	DNU
100	EXTCLKIN	TIE_DN

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1. The external clock interface, which is added to the FCE7# (pin 26) of the GLS55LC100/GLS55LC100M, is used to sense and slow down the system clock if an external clock mode is selected by the user. The GLS55LC200 does not support this feature.

Jumper resistors are required to make the PCBs compatible for either the GLS55LC100/GLS55LC100M or the GLS55LC200.

- FAD0 and FAD7 are used to implement a single channel design for the GLS55LC100, GLS55LC100M, and the GLS55LC200.
- The GLS55LC200 does not support FWP# signals; therefore, WP# signals on NAND devices are pulled up when interfaced with the GLS55LC200.
- Add jumper resistors and capacitors to correspond with labels 100x or 200 in the design. For example, resistors and capacitors named 100x (i.e. R_100x and C_100x) should be added in the GLS55LC100 or GLS55LC100M designs. Resistors and capacitors named 200 (i.e. R_200 and C_200) should be added in the GLS55LC200 design.

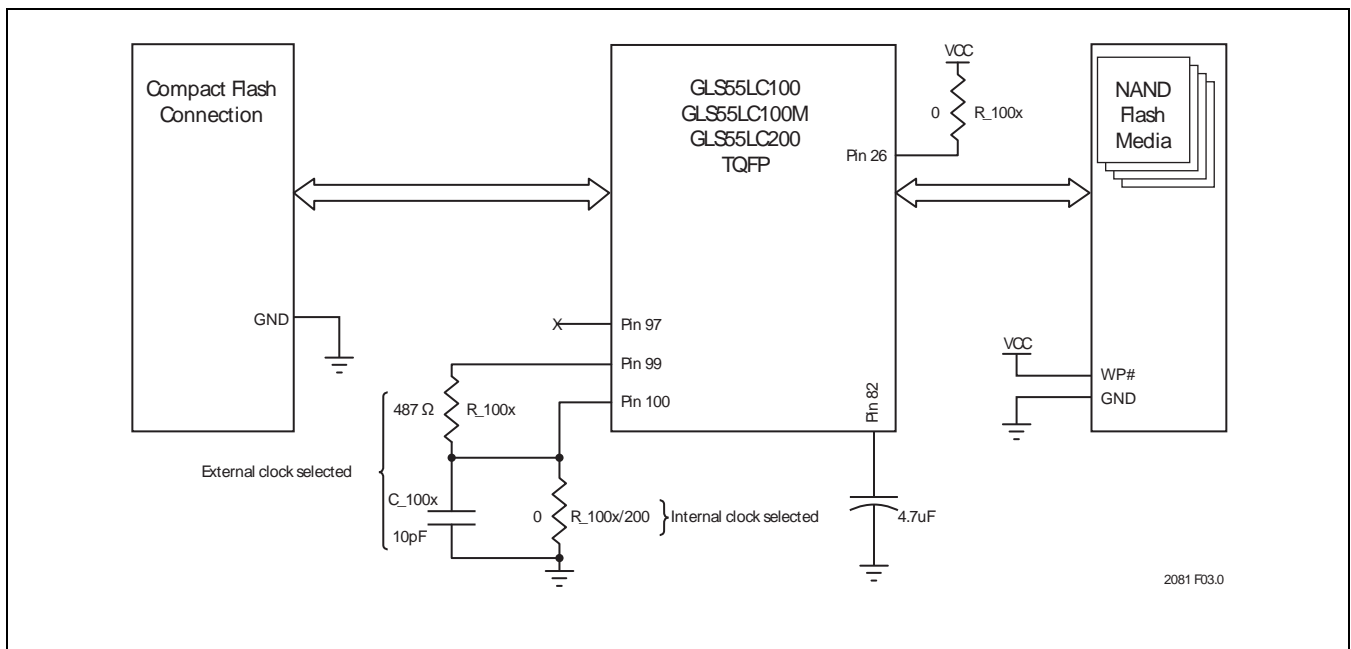


FIGURE 2: Design Modifications with Additional Jumper Resistors and Capacitors

Application Note

Dual Channel Mode

Both the GLS55LC100 and GLS55LC100M offer single channel 8-bit or 16-bit access interface for standard NAND flash media, while the GLS55LC200 supports single or dual channel 8-bit access.

TABLE 6: Single/Dual Channel Mode Differences

Product	Single-Channel	Dual-Channel	Functions
GLS55LC100	Supported	Not Supported	Supports up to 8 flash media devices directly
GLS55LC100M	Supported	Not Supported	Supports up to 8 flash media devices directly
GLS55LC200	Supported	Supported	Supports up to 4 flash media devices per channel, dual channel Supports up to 8 flash media devices directly, single channel

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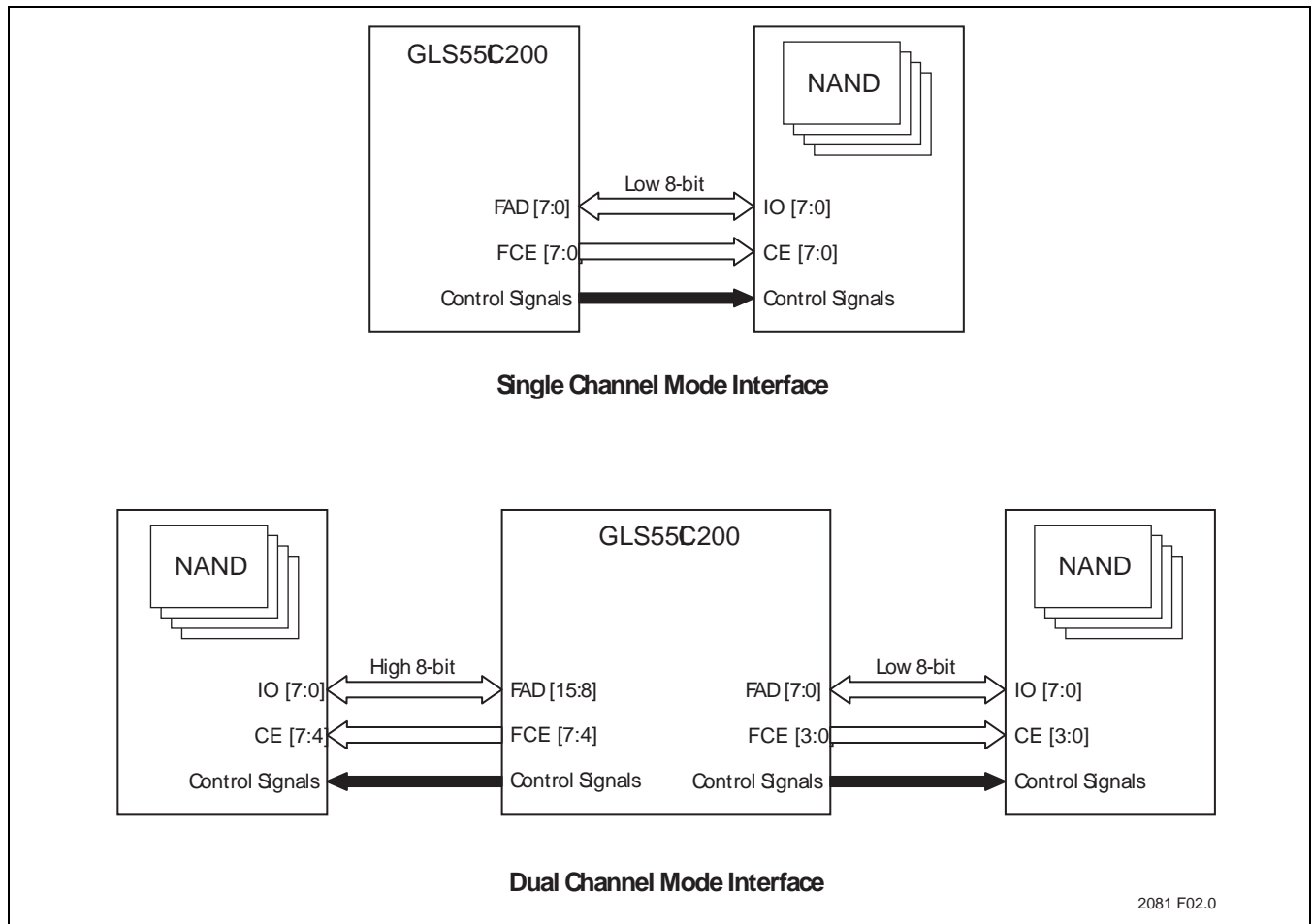


FIGURE 3: Single/Dual Channel Mode Interface

Note: The GLS55LC200 features external decoding logic to attain maximum capacity. Refer to the reference design supplied by Greenliant for more information.

When not using the external decoding logic, FCE0# must be connected to CE of the NAND flash.

Reference Designs and Tools

Reference designs and manufacturing tools are available to assist with your design needs. Many resources are also available on www.greenliant.com.

- Reference Designs: Contact your Greenliant sales representative for reference design schematics and a schematic review.
- Application Notes: Contact your Greenliant sales representative for available application notes.
- Tools: Contact your Greenliant sales representative for access to Manufacturing Utility, PT2 Windows version.

Note: Greenliant provides a list of NAND devices supported by the GLS55LC200 with specified revision firmware which can be obtained from your sales representative.