

June 2002

EXAR'S XR68C92/192 AND XR88C92/192 COMPARED WITH PHILIP'S SC28L92

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1.0 INTRODUCTION

This application note describes the major difference between Exar's XR68C92/192 and XR88C92/192 with Philips's SC28L92. These devices are very similar, with a few hardware, firmware-related and bus timing differences.

1.1 HARDWARE DIFFERENCES

- The Philips SC28L92 is available in two footprints: 44-pin PLCC and 44-pin QFP. The XR68C92/192 and XR88C92/192 are available in these footprints as well as in a 40-pin PDIP.
- In the PLCC and QFP packages, the Exar and Philips DUARTs are pin-to-pin compatible with one exception. The Philips SC28L92 has an additional pin I/M which is not available in the XR68C92/192 and XR88C92/192 (the corresponding pin is a no-connection). If the I/M pin in the SC28L82 is grounded (Motorola Mode), then it will be functionally compatible with the XR68C92/192 and if the I/M pin is tied to VCC (Intel Mode) then it will be functionally compatible with the XR88C92/192.
- The Exar's 44-pin TQFP package is the same size and has the same pitch as the Philips' 44-pin QFP package. But they differ in the package thickness and the lead length. See the list below:

	<u>Exar</u>	<u>Philips</u>
Thickness:	1.4mm	1.75mm
Lead Length, Lp:	0.45mm < Lp < 0.75mm	0.55mm < Lp < 0.95mm

- It is to be noted that the XR68C92/192 or the XR88C92/192 can replace the SC28L92 without any hardware changes.

1.2 FIRMWARE DIFFERENCES

All the internal registers in the SC28L92, XR68C92/192 and XR88C92/192 are identical with only a few exceptions:

- The MR0 register bit-3 in SC28L92 needs to be a logic 0 (8 byte FIFO) to be functionally compatible with the XR68C92 and the XR88C92. The MR0 register bit-3 in SC28L92 needs to be a logic 1 (16 byte FIFO) to be functionally compatible with the XR68C192 and the XR88C192. MR0 register bit-3 is unused in the XR68C92/192 and XR88C92/192.
- The unique feature of the Exar DUARTs is that in the multi-drop mode, the user need not wait at all in order to change A/D tag from address to data. This allows the user to possibly load the entire polling packet data to the TX FIFO.
- When MR0 register bit-6 is a logic 0 and MR1 register bit-6 is a logic 1, the Receive FIFO Trigger level in the XR68C92/192 and XR88C92/192 is 6 but with the same bits set to those values in the SC28L92, the Receive FIFO Trigger level is 8. In most cases, this difference will not have any noticeable effect during normal operation. There is no similar difference for the Transmit FIFO Trigger Levels.

1.3 BUS TIMING DIFFERENCES

- The XR68C92/192 and XR88C92/192 data access time is shorter than the SC28L92. The data access time during a read is a maximum of 32 ns for the Exar DUARTs, whereas it is a maximum of 55 ns for the SC28L92.

1.4 SUMMARY OF DIFFERENCES

In the table below, some differences between the XR68C92/192, XR88C92/192 and SC28L92 are summarized.

TABLE 1: DIFFERENCES BETWEEN EXAR'S XR68C92/192 AND XR88C92/192 WITH PHILIPS'S SC28L92

DIFFERENCES	XR68C92/192	XR88C92/192	SC28L92
Data Bus Standard	Motorola Only	Intel Only	Motorola and Intel
Max Operating Current @ 3.3/5 V	3 / 6 mA	3 / 6 mA	5 / 25 mA
Max Frequency on XTAL1	24 MHz	24 MHz	8 MHz
Max Data Rate	1 Mbps	1 Mbps	1 Mbps
Operating Temperature Range	Commercial and Industrial	Commercial and Industrial	Industrial Only
Package	44-TQFP, 44-PLCC, 40-PDIP	44-TQFP, 44-PLCC, 40-PDIP	44-QFP, 44-PLCC
44-(T)QFP package thickness	1.4 mm	1.4 mm	1.75 mm
44-(T)QFP package max lead lengths	0.75 mm	0.75 mm	0.95 mm
TX FIFO Size	8 (XR68C92) 16 (XR68C192)	8 (XR88C92) 16 (XR88C192)	8 (MR0 bit-3 = 0) 16 (MR0 bit-3 = 1)
RX FIFO Size	8 (XR68C92) 16 (XR68C192)	8 (XR88C92) 16 (XR88C192)	8 (MR0 bit-3 = 0) 16 (MR0 bit-3 = 1)
TX FIFO Trigger Levels	8, 4, 6, 1 (XR68C92) 16, 8, 12, 1 (XR68C192)	8, 4, 6, 1 (XR88C92) 16, 8, 12, 1 (XR88C192)	8, 4, 6, 1 (MR0 bit-3 = 0) 16, 8, 12, 1 (MR0 bit-3 = 1)
RX FIFO Trigger Levels	1, 3, 6, 8 (XR68C92) 1, 6, 12, 16 (XR68C192)	1, 3, 6, 8 (XR88C92) 1, 6, 12, 16 (XR88C192)	1, 3, 6, 8 (MR0 bit-3 = 0) 1, 8, 12, 16 (MR0 bit-3 = 1)
Multi-drop Mode	Extra Storage for 9th bit (Address/Data Bit)	Extra Storage for 9th bit (Address/Data Bit)	Extra Storage for 9th bit Not Available

1.5 REPLACING THE SC28L92 WITH THE XR68C92/192 OR XR88C92/192

You can directly replace the Philips SC28L92 with either the Exar XR68C92/192 or XR88C92/192 without any hardware changes as described in the hardware differences section above.

The XR68C92/192 and XR88C92/192 are available in both the commercial grade and industrial grade packages unlike the SC28L92 that is only available in the industrial grade packages. Also, the XR68C92/192 and XR88C92/192 has a lower power consumption than the SC28L92 at 3.3 and 5 V.

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June 2002

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