

January 2005

MIGRATING FROM THE ST16C2550 TO THE XR16L2750

Author: PY

1.0 INTRODUCTION

This application note describes the changes necessary and what to consider when migrating from the ST16C2550 to the XR16L2750.

1.1 HARDWARE DIFFERENCES

Table 1 below summarizes the differences between the ST16C2550 and XR16L2750.

TABLE 1: SUMMARY OF DIFFERENCES BETWEEN THE ST16C2550 AND XR16L2750

HARDWARE DIFFERENCES	ST16C2550	XR16L2750
Available Packages	48-pin TQFP, 44-pin PLCC and 40-pin PDIP	48-pin TQFP and 44-pin PLCC
Operating Voltage Range	2.97V - 5.5V	2.25V - 5.5V
5V Tolerant Inputs	No	Yes
Maximum data rate at 5V	4 Mbps	6.25 Mbps
Maximum data rate at 3.3V	1.875 Mbps	4 Mbps

- The ST16C2550 and XR16L2750 are both available in the 44-pin PLCC and 48-pin TQFP packages. The ST16C2550 is also available in the 40-pin PDIP package but the XR16L2750 is not.
- The ST16C2550 can operate from 2.97 V to 5.5V only. The XR16L2750 can operate from 2.25 V up to 5.5 V.
- The maximum data rate for the ST16C2550 is 4 Mbps at 5V using a 64 MHz external clock and 1.875 Mbps at 3.3V using a 30MHz external clock. The ST16C2550 uses a data sampling rate of 16X. The maximum data rate for the XR16L2750 is 6.25 Mbps at 5V using a 50 MHz external clock and 4 Mbps at 3.3V using a 33MHz external clock. These maximum data rates can be achieved for the XR16L2750 by enabling the 8X sampling rate via EMSR bit-7.
- In the 44-pin PLCC and 48-pin TQFP packages, the ST16C2550 and XR16L2750 have identical pinouts so they are fully pin-to-pin compatible. The XR16L2750 is not available in the 40-pin PDIP package.

1.2 FIRMWARE DIFFERENCES

The internal register set of the XR16L2750 is based on the internal register set of the ST16C2550, except that some unused bits in the ST16C2550 register set are used in the XR16L2750. Also, the XR16L2750 has an Enhanced Register Set not found in the ST16C2550. Table 2 on the following page lists the firmware differences between the ST16C2550 and XR16L2750.

TABLE 2: ST16C2550 AND XR16L2750 REGISTER SET DIFFERENCES

A2:A0	R/W	ST16C2550	XR16L2750
LCR Bit-7 = 0 (Standard Register Set)			
001	R/W	Interrupt Enable Register (IER) <ul style="list-style-type: none"> • Bit-7 = Not Used • Bit-6 = Not Used • Bit-5 = Not Used • Bit-4 = Not Used 	Interrupt Enable Register (IER) <ul style="list-style-type: none"> • Bit-7 = Auto CTS# Interrupt Enable • Bit-6 = Auto RTS# Interrupt Enable • Bit-5 = Xoff Interrupt Enable • Bit-4 = Sleep Mode Enable
010	W	FIFO Control Register (FCR) <ul style="list-style-type: none"> • Bit-5 = Not Used • Bit-4 = Not Used 	FIFO Control Register (FCR) <ul style="list-style-type: none"> • Bit-5 = TX FIFO Trigger Level Select Bit-1 • Bit-4 = TX FIFO Trigger Level Select Bit-0
010	R	Interrupt Status Register (ISR) <ul style="list-style-type: none"> • Bit-5 = Not Used • Bit-4 = Not Used 	Interrupt Status Register (ISR) <ul style="list-style-type: none"> • Bit-5 = Auto RTS/CTS Interrupt • Bit-4 = Xoff or Special Character Interrupt
100	R/W	Modem Control Register (MCR) <ul style="list-style-type: none"> • Bit-7 = Not Used • Bit-6 = Not Used • Bit-5 = Not Used 	Modem Control Register (MCR) <ul style="list-style-type: none"> • Bit-7 = BRG Prescaler Select • Bit-6 = IR Mode Enable • Bit-5 = XonAny
LCR Bit-7 = 0, FCTR Bit-6 = 1			
111	W	N/A	Enhanced Mode Select Register (EMSR) <ul style="list-style-type: none"> • 8X Sampling, LSR Interrupt Immediate, Auto RTS Hysteresis Select (MSB), RS485 Output Inversion, FLVL select - TX or RX FIFO
111	R	N/A	FIFO Level Register (FLVL) <ul style="list-style-type: none"> • Current Level of the TX or RX FIFO
LCR Bit-7 = 0, DLL = 0x00, DLM = 0x00			
000	R	N/A	Device Revision (DREV)
001	R	N/A	Device ID (DVID) = 0x0A
LCR = 0xBF (Enhanced Register Set)			
000	R	N/A	FIFO Data Count Register (FC)
000	W	N/A	Trigger Level Register (TRG) <ul style="list-style-type: none"> • Programmable Trigger Levels 1-64 for TX and RX FIFO
001	R/W	N/A	Feature Control Register (FCTR) <ul style="list-style-type: none"> • RX/TX Programmable Trigger Level Select, Scratchpad Swap, Trigger Table Select, Auto RS485 Enable, RX Infrared Input Inversion, Auto RTS Hysteresis Select (LSB)
010	R/W	N/A	Enhanced Feature Register (EFR) <ul style="list-style-type: none"> • Auto RTS/CTS Enable, Enable Enhanced (shaded) bits in Standard Register Set, Software Flow Control Select
100	R/W	N/A	XON1
101	R/W	N/A	XON2
110	R/W	N/A	XOFF1
111	R/W	N/A	XOFF2

1.3 REPLACING THE ST16C2550 WITH THE XR16L2750

You can directly replace the ST16C2550 with the XR16L2750 in the 44-pin PLCC and 48-pin TQFP packages. In those packages, they are pin-to-pin compatible. If using the ST16C2550 in the 40-pin PDIP package, then hardware changes will be required since the XR16L2750 is not available in that package.

Since the internal registers of the XR16L2750 are the same as the ST16C2550, the XR16L2750 will work with the same driver that is used with the ST16C2550 without any changes. However, to take advantage of the enhanced features in the XR16L2750 such as the larger FIFO, Programmable Trigger Levels, FIFO Level Counters, Auto Hardware Flow Control, Auto Software Flow Control and RS-485 Half-Duplex Control, the existing software needs to be modified.

In a nutshell, the ST16C2550 and XR16L2750 are very similar devices but with different FIFO sizes and the XR16L2750 has some additional features not found in the ST16C2550.

NOTICE

EXAR Corporation reserves the right to make changes to the products contained in this publication in order to improve design, performance or reliability. EXAR Corporation assumes no responsibility for the use of any circuits described herein, conveys no license under any patent or other right, and makes no representation that the circuits are free of patent infringement. Charts and schedules contained here in are only for illustration purposes and may vary depending upon a user's specific application. While the information in this publication has been carefully checked; no responsibility, however, is assumed for inaccuracies.

EXAR Corporation does not recommend the use of any of its products in life support applications where the failure or malfunction of the product can reasonably be expected to cause failure of the life support system or to significantly affect its safety or effectiveness. Products are not authorized for use in such applications unless EXAR Corporation receives, in writing, assurances to its satisfaction that: (a) the risk of injury or damage has been minimized; (b) the user assumes all such risks; (c) potential liability of EXAR Corporation is adequately protected under the circumstances.

Copyright 2005 EXAR Corporation

January 2005

Send your UART technical inquiry with technical details to hotline: uarttechsupport@exar.com

Reproduction, in part or whole, without the prior written consent of EXAR Corporation is prohibited.