

SMSC - FDC37C93x Tips
Differences Between the FDC37C93x Ultra I/O Versions
Detailing the FDC37C931 vs. FDC37C932 and FDC37C935
Footprint, Configuration and Keyboard BIOS Issues
By Bob Gross

Footprint, Pinout and Printed Circuit Board (PCB) Issues :

All SMSC FDC37C93x devices are 100% footprint and pinout compatible. There are no PCB issues. The devices can be mechanically and electrically interchanged.

There are however configuration and BIOS differences. These are detailed below.

Configuration:

FDC37C931

The 'CONFIG PORT' is actually four (4) different I/O ports or addresses:

- #1 - To enter configuration mode
- #2 - To exit configuration mode
- #3 - The Index port
- #4 - The Data port

The table below details those ports.

PORT NAME	BASE I/O ADDRESS	TYPE
CONFIG_ENTR PORT	0xFB	Write
CONFIG_EXIT PORT	0xF9	Write
INDEX PORT	Relocatable : 0xE0, 0xE2, 0xE4, 0xEA	Write
DATA PORT	INDEX PORT + 1 Relocatable : 0xE1, 0xE3, 0xE5, 0xEB	Read/Write

The INDEX and DATA ports are effective only when the chip is in the Configuration State (these ports default to **0xEA**, **0xEB** at power-up or following RESET_DRV). In the Configuration State, the 8-bit address written to the INDEX PORT is used to select one of the chip's CONTROL or CONFIGURATION registers which may then be written or read through the DATA PORT. Please refer to SMSC's FDC37C93x data sheets for detailed information related to CONTROL and CONFIGURATION registers.

***Bold Addresses** can note **default addresses**

Entering the Configuration State:

The device enters the Configuration Mode on any write to the CONFIG_ENTR Port (0xFB).

Exiting the Configuration State:

To exit the Configuration State the system writes any byte to the CONFIG_EXIT Port (0xF9) or writes 0x02 to the Configuration Control Register. The chip returns to the RUN State.

Relocating the Configuration Registers:

The Configuration Registers are relocated by the following procedure:

1. Write any data to 0xFB.
2. Write 0x03 to the present INDEX PORT (0xEA default) to select the INDEX ADDRESS Register.
3. Write the desired new address 0x0-0x3 to the DATA PORT
4. Wait 150nsec and the INDEX PORT and DATA PORT can be accessed at the new location.

Configuration:

FDC37C932 and FDC37C935

After a hard reset or Power On Reset, the FDC37C93x is in the Run Mode with all logical devices disabled. The logical devices may be configured through two (2) standard Configuration I/O Ports (Index and Data). This is accomplished by putting the FDC37C93x into the Configuration Mode. The SYSTEM BIOS uses these configuration ports to initialize the logical devices, contained within the FDC37C93x, at POST. The INDEX and DATA Ports are only valid when the FDC37C93x is in the Configuration Mode.

The SYSOPT pin is latched on the falling edge of RESET_DRV or on a Power On Reset. The state, high or low, of this pin, determines the Configuration Register's Base Address. During reset, this pin is briefly an input.

All I/O addresses are qualified with AEN.

Port Name	SYSOPT = 0 (Pull-down resistor) see note below	SYSOPT = 1 (10 K Pull-up resistor)	Type
Config Port	0x03F0	0x0370	Write
Index Port	0x03F0	0x0370	Write
Data Port	Index Port + 1	Index Port + 1	Read / Write

The SYSOPT function is shared with nRTS1 and is on PIN # 148.

Note : If using Bipolar RS-232 drivers on the SYSOPT pin , use a 1 K pull-down resistor.
If using CMOS RS-232 drivers on SYSOPT pin, use a 10 K pull-down resistor.

Entering the Configuration State:

The device enters the Configuration State when the following Configuration Key is successfully written to the CONFIG PORT.

Config Key = < 0x55, 0x55 >

Exiting the Configuration State:

The device exits the Configuration State when the following Configuration Key is successfully written to the CONFIG PORT.

Config Key = < 0xAA >

Keyboard BIOS:

Background:

All SMSC FDC37C93X Ultra-I/O devices include an integrated 'PC' keyboard controller. This functional block consists of two (2) significant components :

1. Intel compatible 8042 microcontroller
2. Software

The 'software' is the code the compatible 8042 microcontroller executes. This code is responsible for keyboard control and all other ancillary and legacy functions associated with this functional block.

This code is commonly known as 'Keyboard BIOS'. BIOS is the acronym for Basic Input Output System.

Part Numbering and BIOS Designation:

Standard Microsystems Corporation (SMSC's) family of FDC37C93x I/O Controllers are available and differentiated by the Keyboard BIOS, or just 'BIOS', that a particular version is programmed and thus shipped with. The BIOS is masked programmed in an internal ROM..

All Keyboard BIOS's have been designed to handle the basic PC keyboard functional requirements. They perform this task transparently across the vast array of vendor keyboard offerings. Vendor specific Keyboard BIOS's generally differentiate themselves through advanced and innovative features above and beyond the required basic PC keyboard functionality.

The 'X', is used when generically referring to the SMSC FDC37C93x family of Ultra I/O Controllers. For example, without regard to a specific keyboard BIOS version, the generic part number of this family is, SMSC FDC37C93x. This is not a valid part number for ordering purposes.



80 Arkay Drive
Hauppauge, NY 11788
(631) 435-6000
FAX (631) 273-3123

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