Interfacing the fido1100 Microcontroller to Compact Flash Devices

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Abstract

This application note address how the fido1100 can be used to interface to a Compact Flash (CF) memory device.

Introduction

Many electronic appliances utilize removable, non-volatile memory to store data such as photos, video, or music for later download or future use. While the USB flash drives provide the best answer to easily/frequently removable storage in the world of PCs, flash memory cards provide the best answer for applications, especially in the industrial arena, where data is primarily stored for later download, and the device is rarely removed. One of the most widely utilized formats today is the Compact Flash (CF) format. In this application note, we will discuss how to merge a **fido1100** with a CF Memory Card.

In the realm of the **fido1100** and industrial automation, such memory devices could be used to:

Transfer firmware updates

Store personality data/programs for generic hardware systems

Log data

Store databases

Implement a local file system

Approach

Interfacing Details

Interfacing to CF memory cards utilizes both the main external data bus and a Universal I/O Controller (UIC). The external data bus provides address, data, and basic control signaling, while the UIC, in a general-purpose I/O mode, provides the static control signaling.

Electrical Characteristics

CF cards are required to operate at both 3.3 and 5.0 VDC. While the **fido1100** I/O operates at LVTTL levels and is 5.0 VDC tolerant, CF cards require CMOS I/O levels. Therefore, without level translation, the **fido1100** can only interface to a CF card operating at 3.3 VDC. Also, any pullups required must be added at the system level, because the **fido1100** has no pullups built in to the external bus or the UIC I/O signals.

Signaling

The CF standard has a 50 pin interface which can be easily tied to a **fido1100** device. It is assumed that applications will select the PC Card Memory Mode, as this more naturally conforms to the I/O available on the **fido1100**. The following table details the 50 pin interface and how the **fido1100** will connect to the pertinent CF signals (uicx_x signals are only suggestions, the user may select any pin of the assigned (UIC)).

CF Signal	*fido1100 Signal*	*Comment*
VCC/GND	VCC/GND	VCC must be 3.3 VDC for both devices
A10 to A00	a10 to a0	Directly connected to fido1100 address bus
-REG	a11	Directly connected to fido1100 address bit to map registers next to memory block
D15 to D00	d15 to d0	Directly connected to fido1100 data bus
-OE	oe_n	Directly connected to fido1100 bus output enable
-WE	rw_n	Directly connnected to fido1100 bus write enable
-WAIT	rdy_n	Inverted -WAIT connected to fido1100 bus ready
-CE2, -CE1	cs1_n (or other cs)	Both CE's tied to fido1100 chip select – every access is 16-bit
BVD2,BVD1	N/A	Pulled up for PC Card Memory Mode
-CD2, -CD1	uic0_0, uic0_1	Input to UIC for card detect, may need pullups
-CSEL	N/A	Tied to GND for PC Card Memory Mode
-INPACK	N/A	Unconnected for PC Card Memory Mode
-IORD, -IOWR	N/A	Pulled up for PC Card Memory Mode
READY	uic0_2	Input to UIC for confirmation of card initialization
RESET	uic0_3	Output from UIC to force reset on the card
-VS2, -VS1	uic0_4, uic0_5	Inputs to UIC for determining card voltage
WP	uic0_6	Input to UIC acting as a write protect switch

Software Considerations

The **fido1100** has two configuration registers per chip select to customize bus cycles for whatever device is attached to the bus. The first chip select configures basic control, and the second specifies the timing of the bus cycles to the CF Memory Card. In the control register, the following parameters are set:

- Base address, from the perspective of the **fido1100** address space, where the CF Memory Card lives
- Enable the selected **fido1100** csx_n pin
- Disable the SDRAM feature
- Set the bit width of the data bus to 16
- Set the size of the this address block – 8K is the smallest, and this is enough to map the register set and memory block (cylinders/pages are selected in the registers)

In the timing register, the following parameters are set:

- Wait states to adjust cycle time for the reads and writes

- Enable the bus ready function so -WAIT can be used
- Other minor settings to shape the signals involved in the bus cycle

The **fido1100** UIC can be directly used as a GPIO with no additional firmware required. This interface uses 7 I/O lines, all others are still available to the user for other purposes. Because this is such a simple UIC application, the user could still use the remaining UIC I/O to implement a serial bus such as a UART or SMBus, maximizing the available UIC resources.

Conclusions

The flexibility of the **fido1100** and its UIC blocks would permit construction of a relatively simple interface to the popular Compact Flash Memory Cards. This in turn allows any **fido1100**-based system to utilize cost-efficient bulk memory for various applications.

Thank You

Thank you for taking the time to review this application note. We hope you have found the information included in this application useful and east to understand. Please feel free to contact the Innovasic Support Team any time with questions or comments.

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