

## **PRINTER PORT ISSUES - PRINTER CHATTER AND BACK DRIVE**

This application note is applicable to all SMSC PC Super I/O and Ultra I/O devices.

### **PRINTER CHATTER**

#### **Definition**

Printer chatter is loosely defined as any spurious printer operation. Spurious operations may include, but are not limited to, character, line and page feed, erroneous non-host-sourced character printing, improper printer reset and printer lockup.

#### **Background**

The original discrete IBM PC printer port used true open collector drivers and external pull-up resistors on the printer control lines. When the printer port became integrated into I/O controllers, the pull-up resistors were pulled inside the device. In their external or discrete form, these pull-up resistors are true resistors. In their internal integrated or monolithic form, they become active devices. This technique is attractive because it integrates the external pull-up resistors, saving board space and discrete component cost.

Most printers also have pull-up resistors on these control lines. The value of these resistors varies from printer to printer. Printer manufacturers may also change these values during the production run of a particular model. These control lines are active low. They are outputs from the I/O controller and inputs to the printer.

#### **Problem**

A problem with this technique occurs when the PC power is off and the printer power is on. The active pull-up resistors become forward biased diodes conducting to ground. The printer, with power on and its own pull-up resistors on these lines sources current from these inputs. The active pull-up devices in the I/O controller's outputs sink current. As current is pulled from the printer's input pull-up resistors, the voltage on these lines is pulled down. The resulting voltage is a function mainly of the printer's pull-up resistor value. If the voltage is pulled to the active low threshold of these printer inputs, the printer will think it has a valid input signal and respond accordingly.

#### **Solution**

Remove the internal active pull-up devices.

In an on-going effort to provide customers with the best I/O devices possible, SMSC has removed these internal active pull-up devices on the following Super and Ultra I/O devices:

FDC37C653/4 all revisions	FDC37C667
FDC37C663/4 revision C	FDC37C92x
FDC37C665/666 revision GT	FDC37C93x
FDC37C665IR/666IR	

**PLEASE NOTE: The designer must now provide external pull-up resistors on these lines.** SMSC has always, for historical reasons, included discrete pull-up resistors on all Super and Ultra I/O schematics

and evaluation boards. Typically designers have as well. Please be aware of these changes for new designs and double-check old designs for compatibility.

### **Specifics**

The signal names and pin numbers associated with this change follow:

Pin 74 nInit  
Pin 77 nStrobe  
Pin 76 nAutoFd  
Pin 73 nSelectIn

## **BACK DRIVE**

### **Definition**

Back drive is the phenomenon by which an external attached device, in this case a powered printer, will power or partially power a powered down host. Power is sourced to the system by an external device through the external device's host interface. This is typically much more significant with laptop or hand-held, battery-powered hosts. Back drive may cause improper host reset, lockup and battery drain.

### **Background**

In 5V desktop designs with conventional power supplies, back drive was not an issue. Although, depending on the design, the phenomenon may have existed, it never manifested itself with user or system implications. With the advent of battery-powered, low-voltage hosts with advanced power management features, any extraneous source of power introduced to a powered down system may cause unpredictable problems.

### **Problem**

Internal P-channel drivers on the printer port data bus will, when the host is powered down and the printer is powered up, source current through the I/O device to the host  $V_{CC}$ .

### **Solution**

Remove all internal devices which will, when the host power is off and printer power is on, sink current to any host destination.

In an on-going effort to provide customers with the best I/O devices possible, SMSC has removed these internal active pull-up devices on the following Super and Ultra I/O devices:

FDC37C665/666 revision GT	FDC37C92x
FDC37C665IR/666IR	FDC37C93x
FDC37C667	

### **Specifics**

The signal names and pin numbers associated with this change follow:

PD0-PD7

**Note: This change should not require any customer action.**



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