NAME

pbio - 8255 parallel peripheral interface basic I/O driver

SYNOPSIS

device pbio

In */boot/device.hints*:
hint.pbio.0.at="isa"
hint.pbio.0.port="0x360"

#include <dev/pbio/pbioio.h>

DESCRIPTION

The **pbio** driver supports direct access to the Intel 8255A programmable peripheral interface (PPI) chip running in mode 0 (simple I/O). Such an interface provides 24 digital I/O lines. The driver is designed for performing I/O under program control using peripherals such as the Advantech PCL-724 card, which emulates the Intel 8255A PPI in mode 0. Other 8255A-based peripherals such as the BMC Messsysteme PIO24II card have also been reported to work.

The PPI provides two 8-bit ports (port A and port B) and two 4-bit ports (port C upper, port C lower). Each port can be individually programmed for input and (latched) output, and appears at a different offset of the device's base I/O address.

A separate register allows the configuration of ports for input or output. The device is so simple, that reliably probing for it when input data arrives at its terminals is impossible; therefore the kernel configuration has to specify the device's base address. The device driver provides four character devices that correspond to the peripheral's I/O ports. Opening a device for read or write automatically configures the corresponding hardware port for input or output. At boot time all ports are set configured for input to avoid damaging external circuitry.

A set of ioctl(2) requests allow polled input and paced output to be efficiently performed at the driver level without expensive user/kernel context switching. The driver can perform I/O in three different ways:

Basic The read or write operation returns immediately after reading or writing the data to the port at bus speed.

Paced Data is transferred from or to the port at intervals specified by a separate ioctl(2) call.

Differential (Input only.) Only port values that differ from the previous port value are returned.

The pacing interval is specified in *Hz* unit increments. Setting a pace of *n* seconds will result in no more than one value being read or written every *n* seconds. Single byte read/write operations will take at least *n* seconds to complete.

The following ioctl(2) calls are supported:

PBIO_SETDIFF accepts a pointer to an integer as the third argument, and sets the driver for differential input if the integer is non-zero. The input pace speed determines the periodic interval the driver will use to examine the port for a changed value.

PBIO_GETDIFF accepts a pointer to an integer as the third argument, and sets the integer to the last set value for differential input.

PBIO_SETIPACE accepts a pointer to an integer as the third argument, and sets the driver's input pacing speed to the value of that integer.

PBIO_GETIPACE
accepts a pointer to an integer as the third argument, and sets the integer to the last set value for the input pace.

PBIO_SETOPACE
accepts a pointer to an integer as the third argument, and sets the driver's output pacing speed to the value of that integer.

PBIO_GETOPACE
accepts a pointer to an integer as the third argument, and sets the integer to the last set value for the output pace.

FILES

/dev/pbio0a Port A (8 bit I/O).
/dev/pbio0b Port B (8 bit I/O).
/dev/pbio0ch Port C upper (4 bit I/O).
/dev/pbio0cl Port C lower (4 bit I/O).

SEE ALSO

Diomidis Spinellis, "The information furnace: Consolidated home control", *Personal and Ubiquitous Computing*, 1, 7, 53-69, 2003.

HISTORY

The **pbio** device was first used under FreeBSD 4.1.

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BUGS

One of the PCL-724 card’s inputs can optionally be wired to generate an interrupt. This feature is not supported.