



OmniPlex Digital Input Guide

For the Plexon OmniPlex System



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Introduction and Terminology

The OmniPlex data acquisition system comes equipped with two ports for digital input (DI) that can be set in one of two modes:

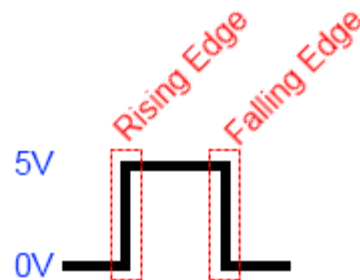
Mode 1: 16 individual events

Mode 3: 15-bit strobed word

The mode terminology is carried over from the Plexon MAP system. Mode 2 is a mixture of individual events and strobe on the same port and is not implemented in the OmniPlex system.

High-true logic is when the rise from 0V to +5V is counted as true.

Low-true logic is when the fall from +5V to 0V is counted as true.



The transitions from 0V (low) to 5V (high) and 5V to 0V are generally referred to as the rising edge and falling edge, respectively.

An **event** is a timestamp that marks the time when an edge is detected.

A **strobed word** is a binary number with a timestamp.

RSTART is a special pin that gives the OmniPlex software a signal when it goes high and low. This is useful for controlling pausing/resuming a recording with a single line. When RSTART becomes true the RSTART signal is detected, and when RSTART becomes false the RSTOP signal is detected.

Hardware Components

Ports A and B on the Digital Input board are nearly identical. The only exception is that only port A has the RSTART pin.

In mode 1 the “Data N” lines represent individual events. In mode 3 the “Data N” lines represent positions in a binary number.

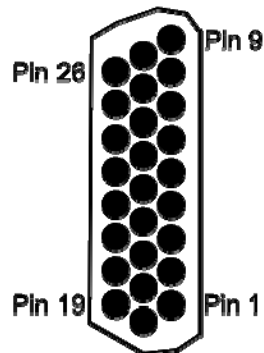
With 15 bits you can send 0 to 32767.

OmniPlex differentiates strobes coming from ports A and B by adding a sixteenth bit to the strobes coming from port B. This adds the number 32768 to strobes coming from port B and the software considers any number over 32768 as originating from there. Some data analysis programs that import .plx files won't recognize this, so be mindful of this fact if you record strobes from port B. It is generally best to record strobes from port A if you only require one port for strobed words.

Digital inputs are detected at a rate of 20 MHz but the timestamps only increment every 25 μ S (40 kHz) since the analog data is digitized at that rate. Sending in events faster than 40 kHz will result in multiple events with identical timestamps. This is generally not desirable (NeuroExplorer will complain), so throttle your digital inputs accordingly.

The inputs on the digital input board will “float high” meaning that when disconnected they will be pulled up to +5V. This won't affect the data in single event mode (mode 1) since events are triggered by edges. Strobed mode (mode 3) will see those floating inputs as high if set to high-true logic and count them as part of the strobed word. It's standard practice to ground unused lines.

Pin Diagram



Pin #	Function
1	Data 1
2	Data 2
3	Data 3
4	Data 4
5	Data 5
6	Data 6
7	Data 7
8	Data 8
9	Data 9
10	Data 10
11	Data 11
12	Data 12
13	Data 13
14	Data 14
15	Data 15
16	Data 16
17	Unused
18	Unused
19	Ground
20	+5V
21	Ground
22	Strobe
23	Ground
24	RSTART
25	Ground
26	Unused

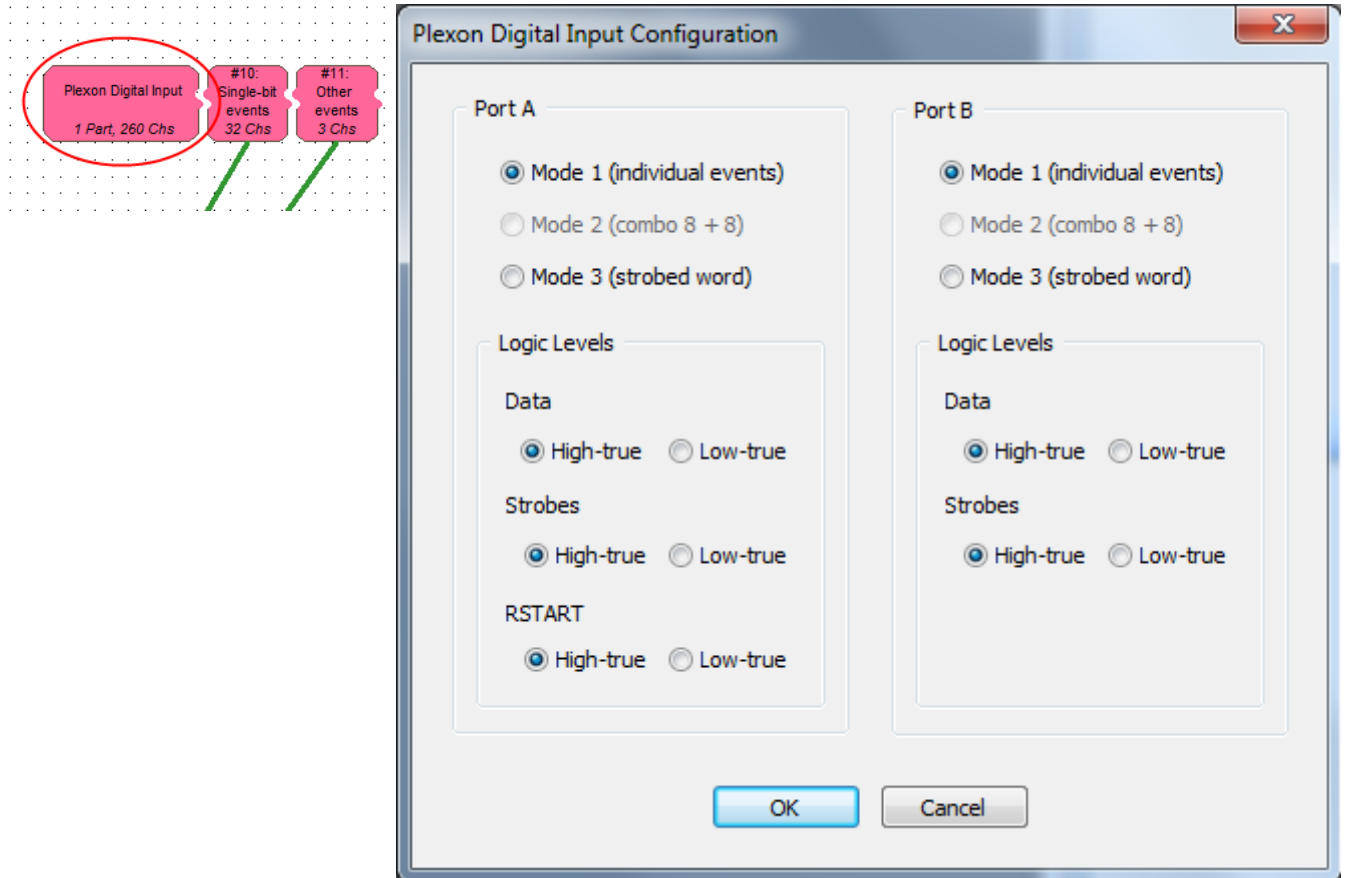
RSTART is on Port A ONLY!

Pins 1 – 16 are called Data 1 to Data 16. In single event mode (mode 1) these correspond to events 1 – 16 when input through Port A, and events 17 – 32 when input through Port B.

In strobed word mode (mode 3) pins 1 – 15 correspond to the fifteen bits of the strobed word (Data 1 is the least significant bit, and Data 15 is the most significant bit).

Software Components – OmniPlex Server

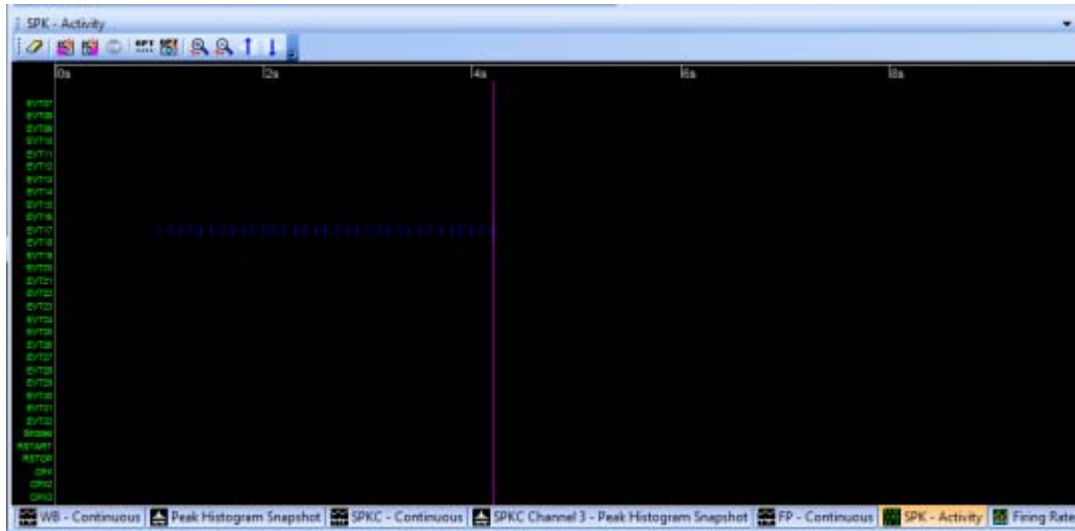
Setting the DI mode and high/true logic is done in OmniPlex Server. Right click on the “Plexon Digital Input” node and select “Edit Device Options”.



The digital input device options set the modes and high/low true logic. If the option to select “Edit Device Options” is greyed out (not clickable) then make sure that the data is stopped.

Software Components - PlexControl

Events can be seen in the activity display in PlexControl.



The activity display shows a blue tick mark when a timestamp is recorded. Ticks for waveform crossings and spike unit detection are shown on top (not shown in the above screenshot), and the events are shown below. There are keyboard events (activated with alt + number key), RSTART, RSTOP, Strobed, and some CinePlex-related events.

Digital inputs are always recorded and there are no enable/disable settings.

Common Uses

Individual event mode (mode 1) is typically used when there are few actions that need to be recorded. Lever presses or IR beam breaks can be sent into the digital input port provided that they produce a detectable voltage edge.

Strobed words (mode 3) are ideal when there are hundreds or thousands of conditions that need to be recorded as happening.

It is possible to rename the events by going to View->Sources and Channels and then clicking on the "Single Bit Events" entry. The Properties view in PlexControl will switch to a spreadsheet of the event names which are editable.

Strobed activity is displayed as a single tick mark in PlexControl but the numeric values are not shown.

The RSTART pin on Port A is typically used to pause and resume a recording. When set to high-true logic a +5 voltage held on the RSTART line will keep the system paused



and a voltage held a 0V will resume the recording (provided that this is set to be the case in PlexControl's recording options). The RSTART line is different than the other data pins because it has to be held high or low instead of simply provide an edge to detect. PlexControl can be set to start/stop and pause/resume on any event pin, and even specific strobe values.

Document History

April 11th 2011 – V1.0

- Initial creation of document