GENERAL PURPOSE I/O PANEL FOR A PDP-9 *

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Introduction

One of the features of PDP computers is the ease of interfacing any user-designed I/O ~~cables~~ devices, a mounting panel, a device selector and some other circuit modules. While a large number of I/O devices can be interfaced with the use of an I/O interface logic arrangement such as one offered by DEC, it happens quite often that those I/O devices need not be connected to a mother computer on a permanent basis. This is especially true in a university environment, where researchers or students design and connect experimental devices, use them on-line only occasionally or just for some time and then leave the laboratory.

It would be desirable to have some sort of general purpose I/O panels so that an arbitrary I/O device can interchangeably be hooked up easily and economically on the spot each time when the need arises. For this purpose I/O panel was designed and attached to the PDP-9 at our laboratory.

A common device code of 77 is assigned to the panel. The terminal arrangement is shown in Figure 1. Available are 35 output signals and 21 input signals associated with IOT77xx instructions. The use of multi-terminal connectors was deliberately avoided, so that one can hook up any loose wires instantly without using expensive multi-terminal connectors.

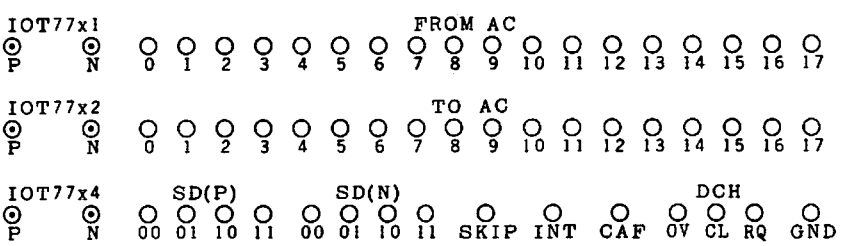

Figure 1 Terminal Arrangement

* This paper has been published in Decuscope (Digital Equipment Computer Users Society, Maynard, Mass.) 8, 19 (1969).

This is permitted within an anticipated frequency range. Care has been taken to insure that there is no direct connection from the panel to the PDP-9 I/O bus. The data channel facility can also be used with this panel and a W104 Bus Multiplexor, although it has not been implemented.

Output Signals

The IOT pulses (IOT77x1, IOT77x2 and IOT77x4) are likely to be used most often and they are available through six BNC connectors both as positive and negative pulses from a W103 device selector. Decoded sub-device signals in four combinations (SD00, SD01, SD10 and SD11) are also available, all as positive levels from a B155 binary decoder and as negative levels from R107 inverters.

Whenever an IOT77x4 instruction is executed, the 18-bit content of the accumulator appears at FROM-AC terminals 0 to 17 as buffered signals (a positive level for a "1") from W500 high impedance followers. Combining IOT77x4 pulse with subdevice signals, one can implement up to four "write" instructions, although only one write instruction will suffice in most applications. Terminals for a DCH I/O OVFLO signal and a DCH CLEAR FLAG signal are also provided for future use. A positive CAF (clear all flags) pulse from an R107 is included also.

Input Signals

The internal connection to input signals is shown in Figure 2.

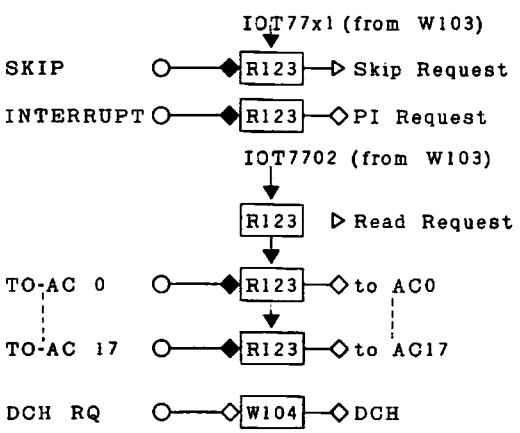

Figure 2 Input Signal Connection

An IOT77x1 instruction becomes a skip instruction when a device flag (a negative level) is connected to the SKIP terminal. When there are two, three or four device flags, one should connect to it an OR output of up to four AND outputs of each of the flags and each of SD00, SD01 and SD11. Then IOT7701, IOT7721, IOT7741 and IOT7761 become skip instructions. Similarly, flags can be connected to the INTERRUPT terminal to cause interrupts.

The IOT7702 instruction has been wired as a read instruction. Hence one can simply feed up to 18 negative levels to 18 TO-AC terminals (0 to 17) in order to input data into the accumulator. This one read instruction will suffice in most applications. A DCH RQ signal terminal is also provided.