User manual for

PC-78

Multi-interface Adapter for PC-26, PC-30, PC-39, PC-74 and PC-77 Analog I/O boards.

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1. Introduction

The PC-78 is an interface adapter for use with PC-74 and PC-30 type analog I/O boards. It allows these I/O boards to be interfaced to a wide variety of industry standard signal conditioning subsystems, using only mass-terminated ribbon cable connectors.

Features

- Interfaces PC-30 and PC-74 to a wide variety of signal conditioning components.
- Simple, quick direct ribbon cable connections between: PC-30 and PC-77 screw terminal card.
- PC-30/PC-74 and industry standard 3B/5B01 analog termination panels.
- PC-30/PC-74 and industry standard 5B02 multiplexed analog termination panels.
- PC-30 / PC-74 and industry standard 8, 16 and 24 position digital I/O (SSR) panels.

The PC-78 is designed to plug directly into the PC-30 user connector, and interfaces to the PC-74 via 50 way ribbon cable.

The PC-78 allows PC-30 users to connect directly, via mass terminated 50-way cable, to the PC-77 screw terminal board. The PC-77 allows connection to all PC-30 analog input lines, both 12-bit DACs, and 16 digital I/O lines.

The PC-78 is configured via 10 jumpers, labeled W1 to W10. The functions of these jumpers are discussed individually for each possible connection described below.

2. PC-74/PC-77 Connection

Connection to PC-74 (and compatible) analog I/O boards is easily made via a 50-way ribbon cable terminated at both ends with a standard 50 way insulation displacement header connector. The PC-74 connector is labeled J2. This connector also serves to connect to PC-77 screw-terminal boards, for use with PC-30 analog I/O boards. If

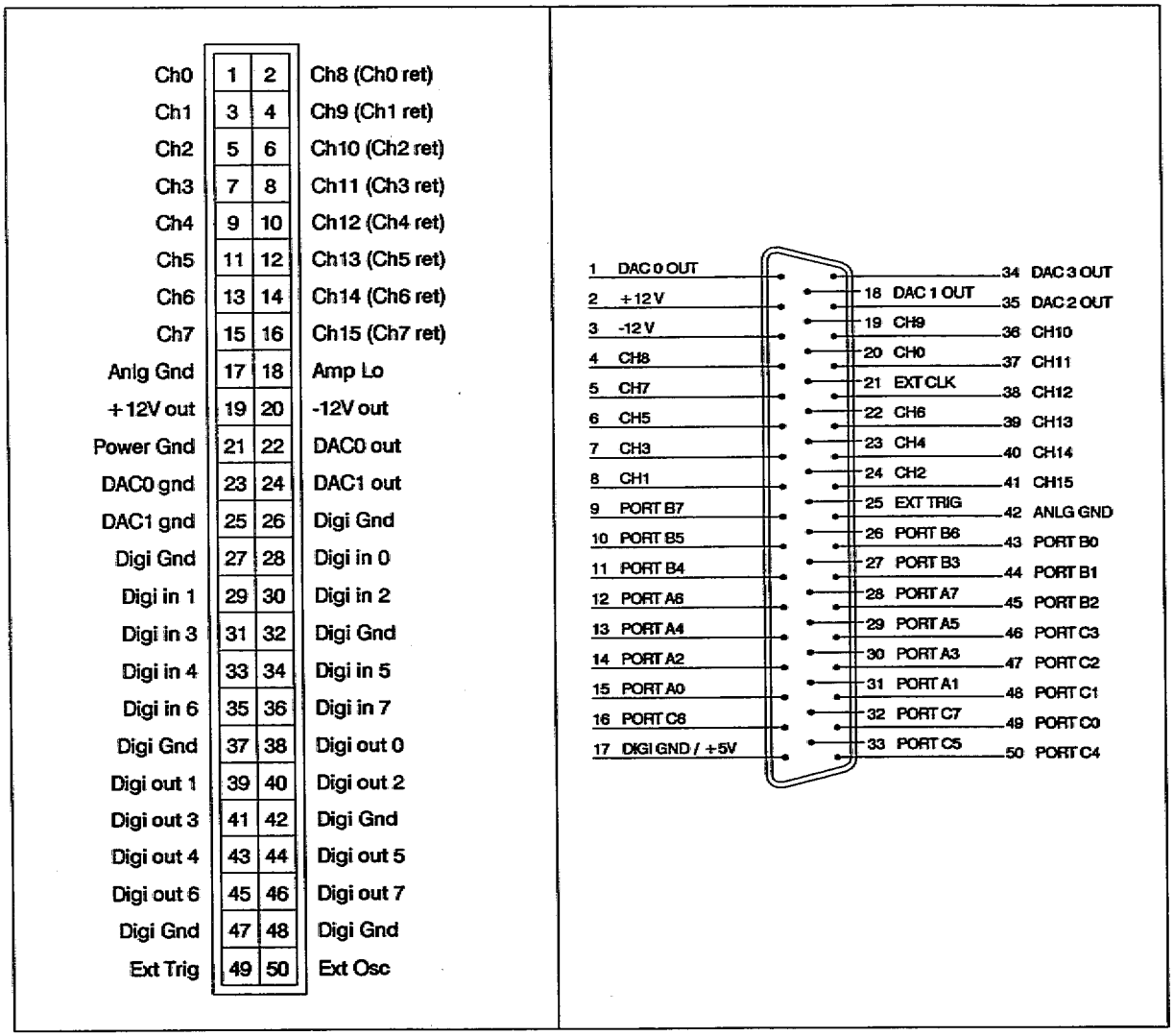

Figure 1. PC-74/PC-77 connector (J2).

Figure 2. PC-30 connector (J1).

you wish to connect a PC-77 and a PC-74 to the PC-78, simply connect all three in parallel, by using a cable with three header connectors. Pin connections for this connector are shown in figure 1.

Notes

- The PC-74 provides only 16 digital I/O lines. As a result only the first 16 digital I/O lines (DIO0 - DIO15) are driven when a PC-74 is used.
- The PC-74 provides only two analog outputs. As a result, only two analog output devices can be driven.

Cable required

50 way ribbon cable, terminated at both ends with 50 way header connectors. If a PC-74, PC-77 and PC-78 are to be connected simultaneously, the cable should have three connectors.

Jumpers required

No specific jumpering is required; however note that jumpers W1, W8 and W10 have no function when the PC-78 is connected to a PC-74.

3. PC-30 Connection

The PC-78 allows connection from any member of the PC-30 family: PC-30, PC-30B, PC-30C, PC30D, PC-30DS, PC-30DS/4 or PC-39. Connection to any PC-30 analog I/O board can be made either by plugging the PC-78 direct into the PC-30, or via a 50-way ribbon cable terminated at one end with a male 50-way D-type insulation displacement connector, and at the other end with a female 50-way D-type insulation displacement connector. The PC-30 connector is labeled J1. Pin connections are shown in figure 2.

Notes

- If a PC-77 is to be used in conjunction with your PC-30, remember that the PC-77 only makes provision for the first 16 digital I/O lines, and the DACs 0 and 1.

Cable (optional)

50 way ribbon cable, terminated at one end with a male 50-way D-type insulation displacement connector, and at the other end with a female 50-way D-type insulation displacement connector.

Jumpers required

When using a PC-30, analog and digital grounds are normally connected. In order to achieve this, jumper W2 must be inserted.

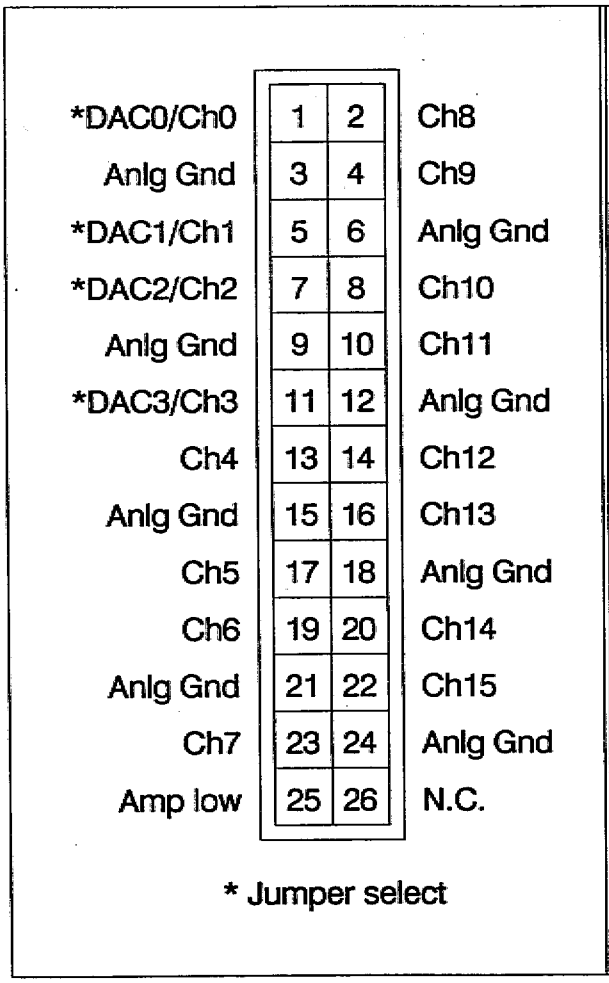

Figure 3. 3B/5B01 connector (J4).

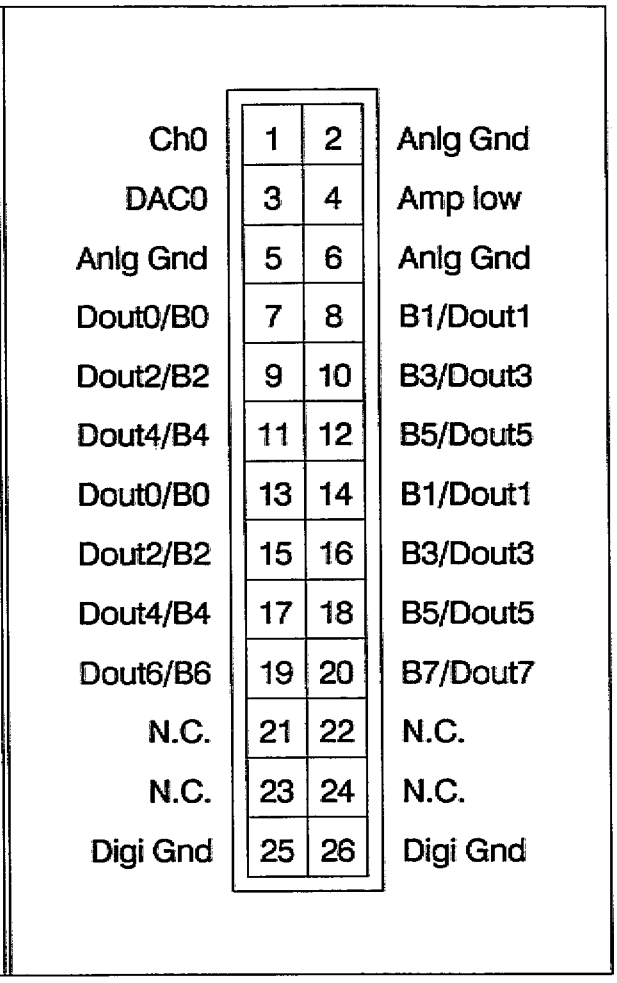

Figure 4. 5B02 connector (J5).

4. 3B/5B01 analog terminations panels

Both the PC-30 and the PC-74 can be used in conjunction with industry standard 3B analog input/output panels, as well as panels which use the newer 5B series modules in non-multiplexed mode. Each panel can accommodate up to 16 modules. The first 4 modules (PC-30) or 2 modules (PC-74) can be jumper selected on the PC-78 to accept either input or output modules, while the other 12 modules are input only.

Interface to the 3B/5B01 panel is via reliable mass-terminated 26-way ribbon cable. The 3B/5B01 connector is labeled J4. Pin connections for this connector are shown in figure 3.

	W3	W4
Input	In	Out
Output	Out	In

Table 1. 3B/5B01 module 0 selection.

	W5	W6
Input	In	Out
Output	Out	In

Table 2. 3B/5B01 module 1 selection.

	W7	W8
Input	In	Out
Output	Out	In

Table 3. 3B/5B01 module 2 selection.

	W9	W10
Input	In	Out
Output	Out	In

Table 4. 3B/5B01 module 3 selection.

Notes

- Remember that you must provide a separate power supply for the 3B/5B01 panel.

Cable required

26 way ribbon cable, terminated at both ends with 26 way header connectors.

Jumpers required

The first 4 modules (PC-30) or 2 modules (PC-74) can be jumper selected on the PC-78 to accept either input or output modules, while the other 12 modules are input only. This is controlled by jumpers W3, W4, W5, W6, W7, W8, W9 and W10, as shown in tables 1, 2, 3 and 4.

5. 5B02 analog termination panels

The PC-78 allows both the PC-30 series of boards and the PC-74 to interface to multiplexed 5B series modules. Multiplexed 5B series panels can accommodate up to 16 modules each. Up to 64 input, and 64 output modules can be supported simultaneously, at the cost of only 1 PC-30/PC-74 analog input and analog output line, and 8 digital output lines.

Interface to the 5B02 panel is via mass-terminated 26-way ribbon cable. The 5B02 connector is labeled J5. Pin connections for this connector are shown in figure 4.

Notes

- Remember that you must provide a separate power supply for the 5B02 panel.

Cable required

26 way ribbon cable, terminated at both ends with 26 way header connectors.

Jumpers required

None.

Software

The procedure for using the 5B02 panels is as follows. Each 5B module is assigned an address, by the channel addressing circuitry on the panel, and the module's physical position on the panel. This address is then used to select the required module.

The PC-78 uses channel 0 to read analog inputs from the panel, and DAC0 to write analog data to the panel.

- Addressing is performed by DIO13 to DIO8. These bits correspond to bits 0 to 5 of the PC-74 output port, or bits 0 to 5 of port B on a PC-30 series board. DIO8 is the least significant bit.
- The analog voltage on the output of DAC0 is written to the selected module when DIO15 is low. This corresponds to bit 7 of the PC-74's digital output port, or bit 7 of port B on a PC-30.
- The analog voltage from the selected input module can be read on input channel 0 when DIO14 is low. This corresponds to bit 6 of the PC-74's digital output port, or bit 6 of port B on a PC-30.

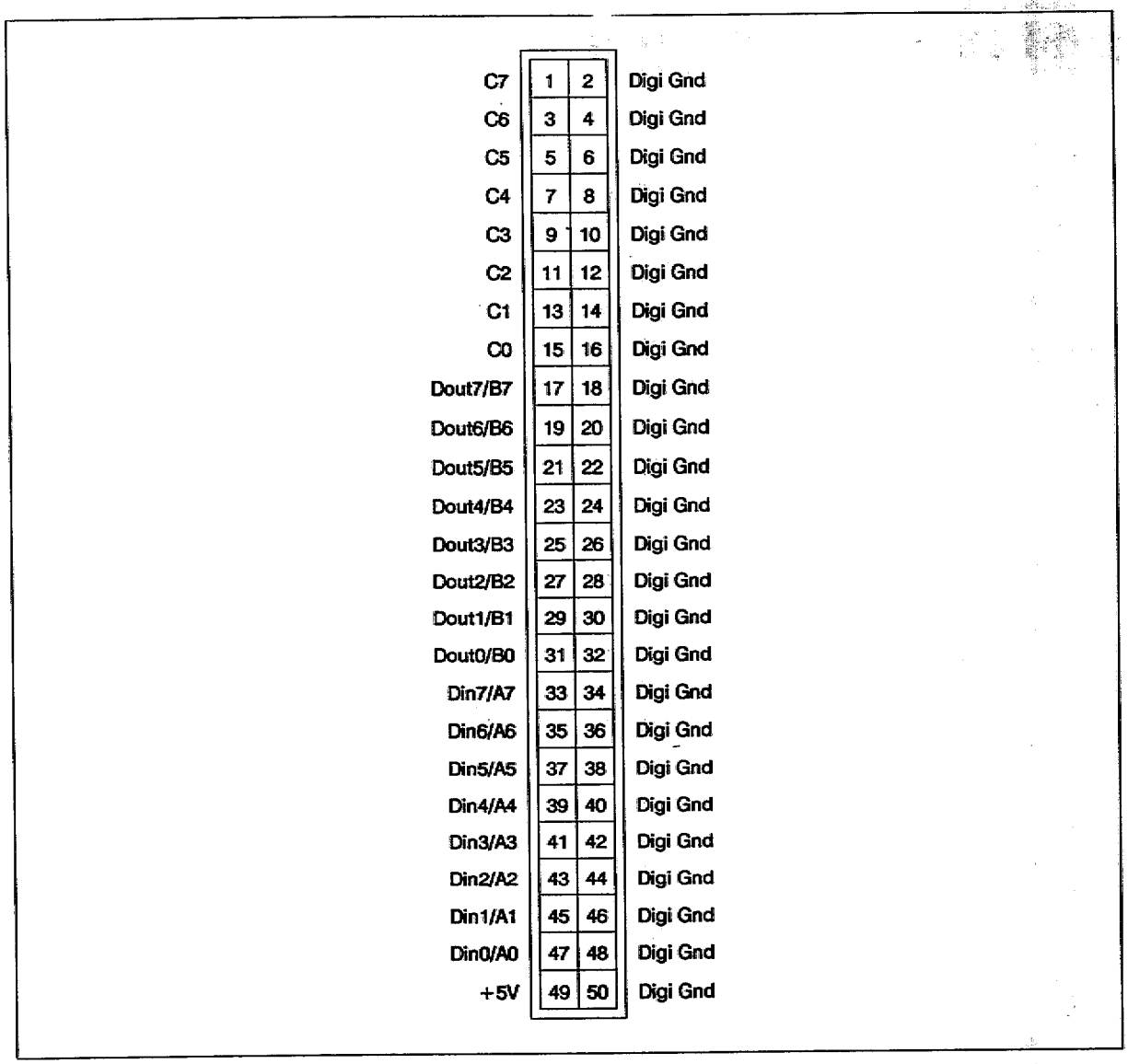

Figure 5. Digital I/O connector (J3).

5. 1. Writing to a module

a) Set DAC0 to the required voltage.

b) Set the lower 6 bits of the digital I/O port (PC-74) or the lower 6 bits of port B (PC-30) to the address of the required module, with the upper 2 bits set to 1.

c) Without changing the other bits, set bit 7 of the digital I/O port (PC-74) or bit 7 of port B (PC-30) to 0. The data is then written.

d) Without changing the other bits, return bit 7 to 1.

5. 2. Reading from a module

a) Set the lower 6 bits of the digital I/O port (PC-74) or the lower 6 bits of port B (PC-30) to the address of the required module, with the upper 2 bits set to 1.

b) Without changing the other bits, set bit 6 of the digital I/O port (PC-74) or bit 6 of port B (PC-30) to 0.

c) Read the output from the input module on channel 0 of the PC-74 or PC-30.

d) Without changing the other bits, return bit 6 to 1.

6. PC-30/PC-74 to digital I/O panels

In addition to analog I/O, the PC-78 also allows both the PC-30 and the PC-74 to interface to industry standard digital I/O panels. These panels can contain up to 24 digital I/O modules. Modules are available that allow digital outputs to switch a variety of AC and DC loads, or provide conditioning for digital input signals.

The digital I/O connector is labeled J3. Pin connections for this connector are shown in figure 5.

Notes

- The PC-74 provides only 8 digital inputs and 8 digital outputs. DIO0 to DIO7 are inputs, and DIO8 to DIO15 are outputs.
- When used in conjunction with a PC-30, a small amount of power (20 mA) can be obtained from the PC-30. To enable this, jumper W1 must be inserted. Note also that on the new series PC-30 boards (PC-30B, PC-30C, PC-30C, PC-30D and PC-30DS), the PC-30 jumper must also be set appropriately for this to take place.
- The PC-30 digital outputs have only limited drive capability (1.7 mA). If you are using optically isolated output modules, you should verify that this is sufficient. The PC-74, with a drive capability of 24 mA, can drive most standard I/O panels.

Cable required

50 way ribbon cable, terminated at one end with a 50 way header connector, and at the other end with either another 50 way header, or a 50 way PCB (finger type) insulation displacement connector (selected to suit the panel in use).

Jumpers required

If a PC-30 is in use, and is required to supply +5 V power to the digital panel, then jumper W1 must be inserted. If this is not the case, then W1 must be removed.

7. Specifications

Size:	3.1" by 3.9"
Mounting:	Provision for panel mounting via four 3 mm machine screws.
Hole centers	0.2" x 0.7" in from corners.
Temperature:	-25 C to +85 C
Relative humidity	up to 95% non-condensing

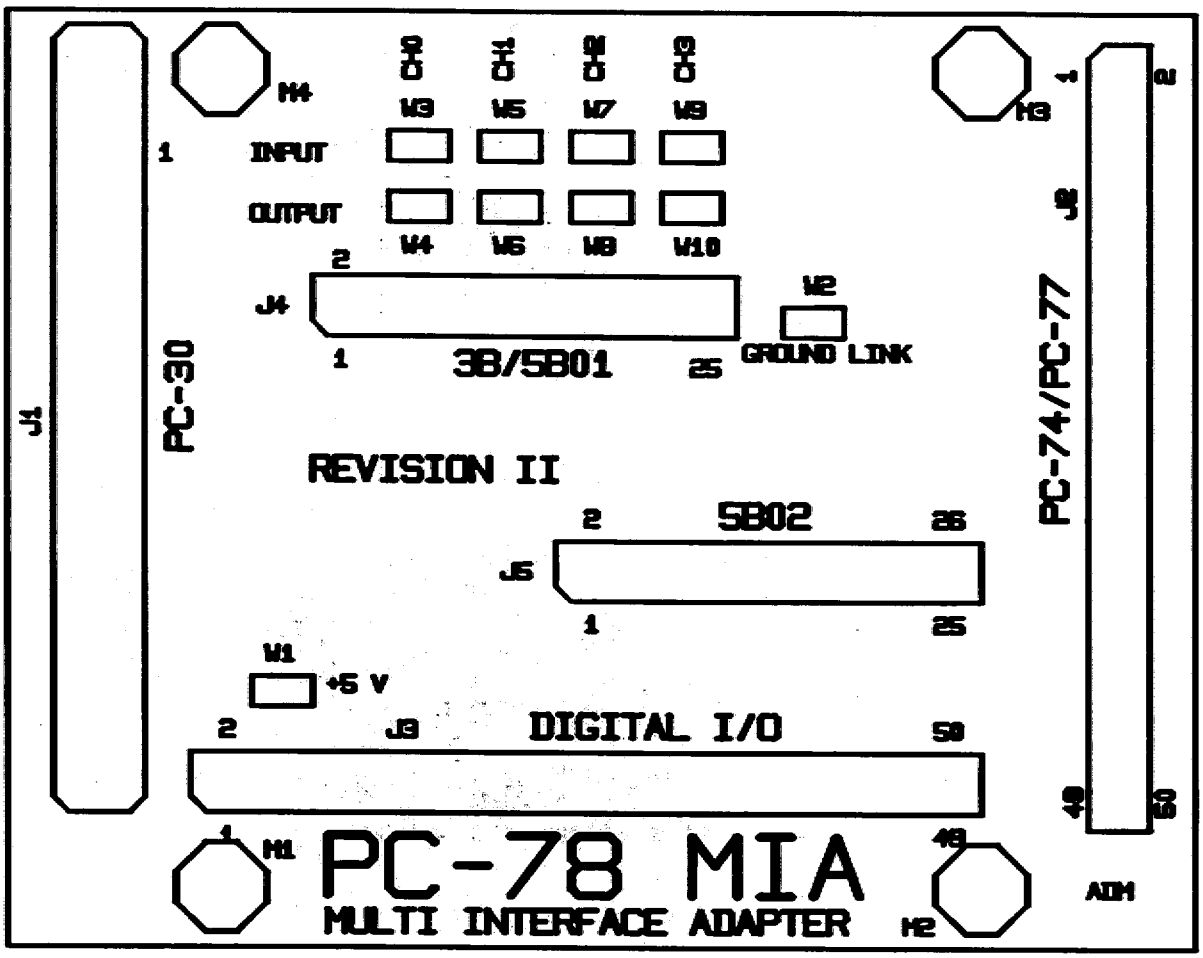

Figure 6. PC-78 layout.

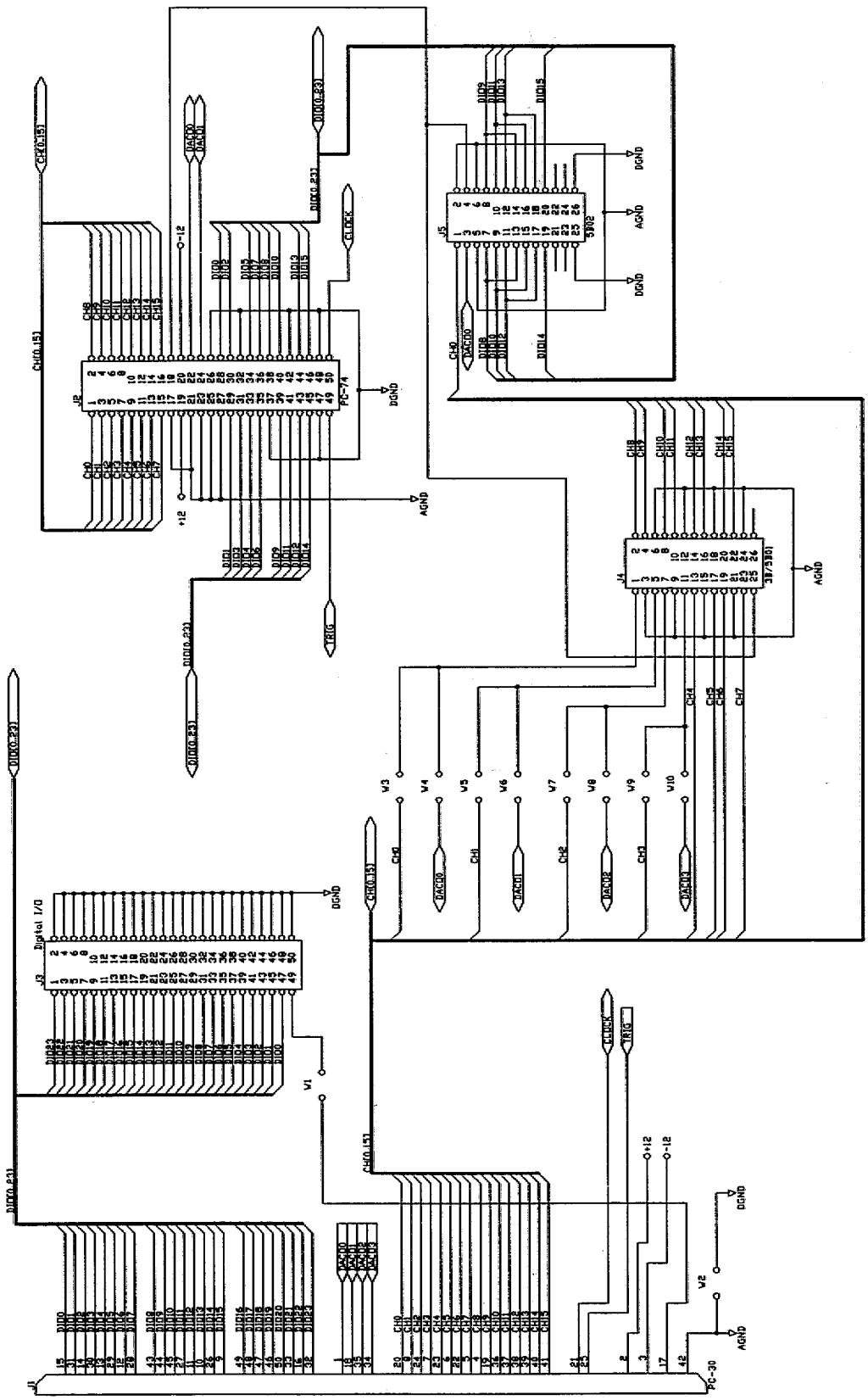

Figure 7. PC-78 circuit diagram.