

INSTRUCTION MANUAL

I/O INTERFACE

MODEL DPO 100-PC

KIKUSUI ELECTRONICS CORPORATION

TABLE OF CONTENTS

	Page
1. General	1
1-1. Description	1
2. Specifications	2
3. Operating Instructions	3
3-1. Precautions for Operation (Installation)	3
3-2. Explanation of Controls and Connectors	4
3-3. Operating Method	5
* DPO 100-PC pin layout	
* Timing chart	
4. Sample Programs	9
4-1. Precautions Regarding Program Preparation	9
4-2. Program Example	10

SECTION 1: General

1-1. Description

The DPO 100-PC interface is one of the digital programming options in the Kikusui DPO series, and is designed to connect the Kikusui regulated DC power supply and electronic loads with microcomputer I/O ports. It is used in connection with our D/A converters (DPO 108 and DPO 112).

* Before operating this unit, please refer to the instruction manuals for the DPO 108 or the DPO 112 and the instruction manuals for the power supplies (electronic loads) to be connected.

SECTION 2: Specifications

Table 2-1

Specifications		
Model		DPO 100-PC
1. Input Data	Input Data	8 bit binary, TTL level
	Input Method	8 bit parallel - byte serial
	Address	0-127 (with listen-only mode)
	Logic	Positive logic
2. Control Signal		
	Input	TTL level Data strobe 1 bit } neg. Address strobe 1 bit } logic Acknowledge 1 1 bit } Busy 1 bit pos. (2.2k Ω pull-up) logic
	Output	Output strobe 1 bit (open collector, negative logic) Acknowledge 2 1 bit (TTL level, negative logic)
3. Output Data		8 bit binary, open collector, 30mA sink
4. Input and Output Response Time		Min. 500 μ S
5. Power Supply		AC 10V center tap \pm 10%
6. Operating Ambient Temperature and Humidity Range		0 $^{\circ}$ C - 40 $^{\circ}$ C, 10% - 90% RH
7. Input, Output - case Isolation Voltage		AC 500V 1 min.
8. Isolation Resistance		DC 500V more than 30M Ω
9. Dimensions		W 140mm \times H 26mm \times D 110mm
10. Weight		approx. 380g
11. Accessories		34 wire flat cable, with connector at both ends (length: 7cm)

SECTION 3: Operating Instructions

3-1. Precautions for Operation (Installation)

(1) Ambient Temperature

The temperature range satisfactory for this unit's operation is 0 - 40°C. Generally, semiconductor life is highly affected by ambient temperature; it is considered that parts will deteriorate exponentially with increasing ambient temperature.

(2) Mounting Position

In some cases, this unit is installed on the backboard of the PAD-L. Keep this unit about 20cm or more away from the wall so that hot air from the fan does not accumulate. Do not operate any equipment sensitive to heat near this unit.

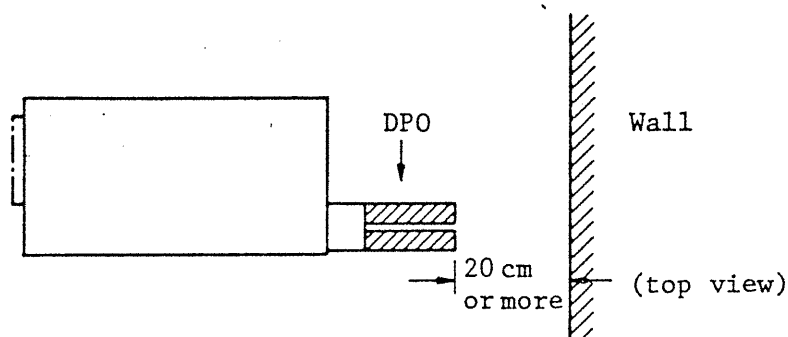


Figure 3-1

* The mounting position of the DPO varies depending on the unit.

Do not use this unit in a place with excessive dust or moisture. Place this unit in a relatively vibration-free location.

(3) Transfer

This unit can be mounted on the backboard of the PAD-L, thereby making transfer easy. In such a case, however, care must be exercised to prevent DPO breakage when transferring the PAD-L main unit with the DPO attached.

3-2. Explanation of Controls and Connectors

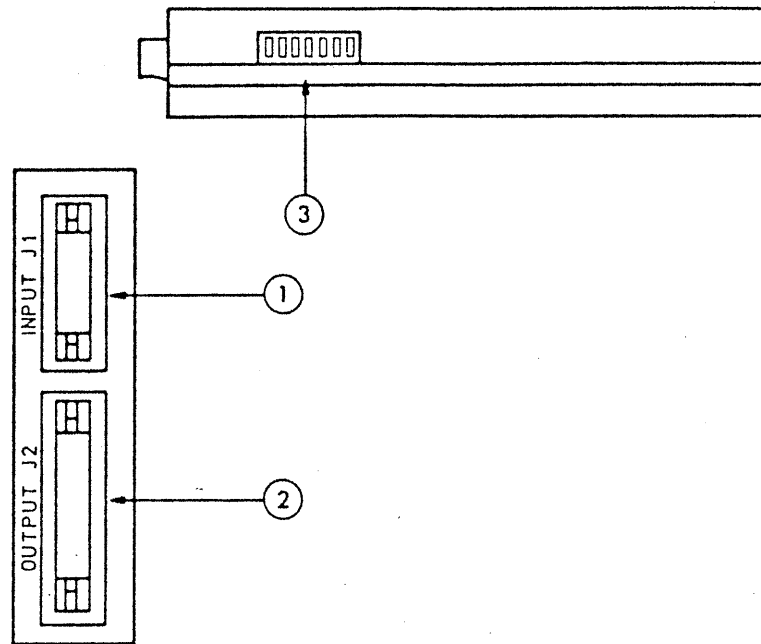


Figure 3-2

- (1) Input Connector J1 (INPUT J1)
26 pin flat cable connector (manufactured by KEL Co., Ltd. or Yamaichi) for connecting output from I/O port via flat cable.
(See Fig. 3-6)
- (2) Output Connector J2 (OUTPUT J2)
34 pin flat cable connector (manufactured by KEL Co., Ltd. or Yamaichi) for connecting the D/A converter (DPO 108/DPO 112) via a 34 wire flat cable.
- (3) Address Setting Switch
8 pole dipswitch for freely setting the DPO 100-PC address from 0 to 127. Can also be set in a LISTEN ONLY mode.

3-3. Operating Method

(1) Connection of the Unit to the Computer

Output from the I/O port is conducted through a 26 wire flat cable (sold separately). Only one end of the flat cable has a connector attached, and this is connected to the J1 input connector. The other end is conducted by changing wire according to the microcomputer used and etc.

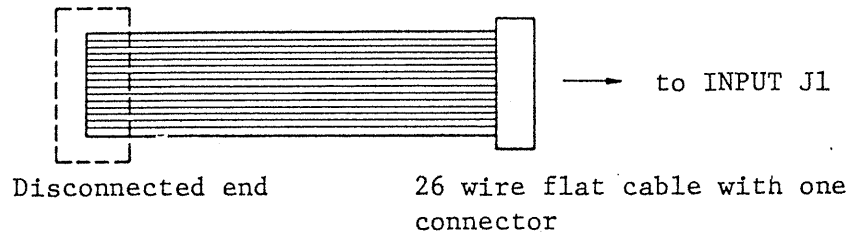


Figure 3-3

See Fig. 3-6 for the pin layout, Fig. 3-7 for the timing layout, and Ch. 3-1 for input terminal hardware.

(2) Connection of the Unit to the D/A Converter (DPO 108)

Utilize a 34 wire flat cable to connect this unit's output connector J2 with the DPO 108 input connector J1. A standard 7 cm long cable is included as an accessory. If the units are to be placed a greater distance apart, they can be connected at a distance of up to 50 m.

The ∇ marks on the cable should correspond with the ∇ mark on the output connector J2 and the ∇ mark on DPO 108 to be connected.

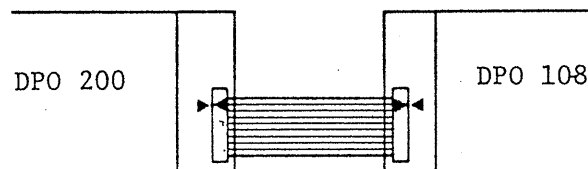


Figure 3-4

(3) Address Setting Method

Because the address for this unit can be set by the I/O port output, it is possible to control many interfaces from one I/O port by parallel connection of input. The maximum number of parallel boards is determined by the drive capacity of the I/O port. With LS type standard drive, the maximum is 10.

Setting Address

The address for this unit is set by using the 8 pole dipswitch address setting switch. Poles 1-7 are used to set the address. The address number is set using a binary code, and settings from 0-127 can be freely made. An example is shown in Fig. 3-5, where the binary code is "0100101", making the address for the unit "37".

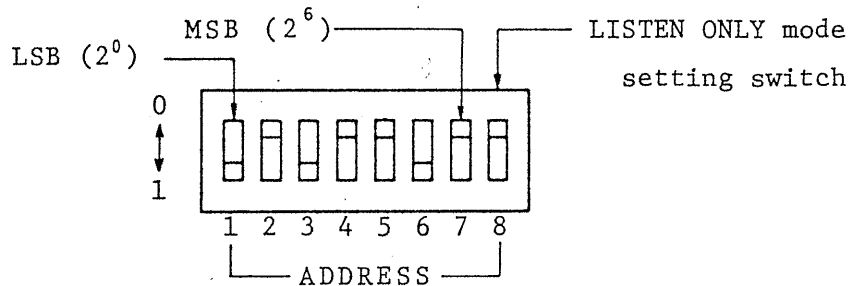


Figure 3-5

LISTEN ONLY Mode

When the pole 8 is set on "1", the unit is in a LISTEN ONLY mode and will take up data irrespective of the address, because the address strobe ceases to be effective. This switch is used to check system operations.

DPO 100-PC connection number

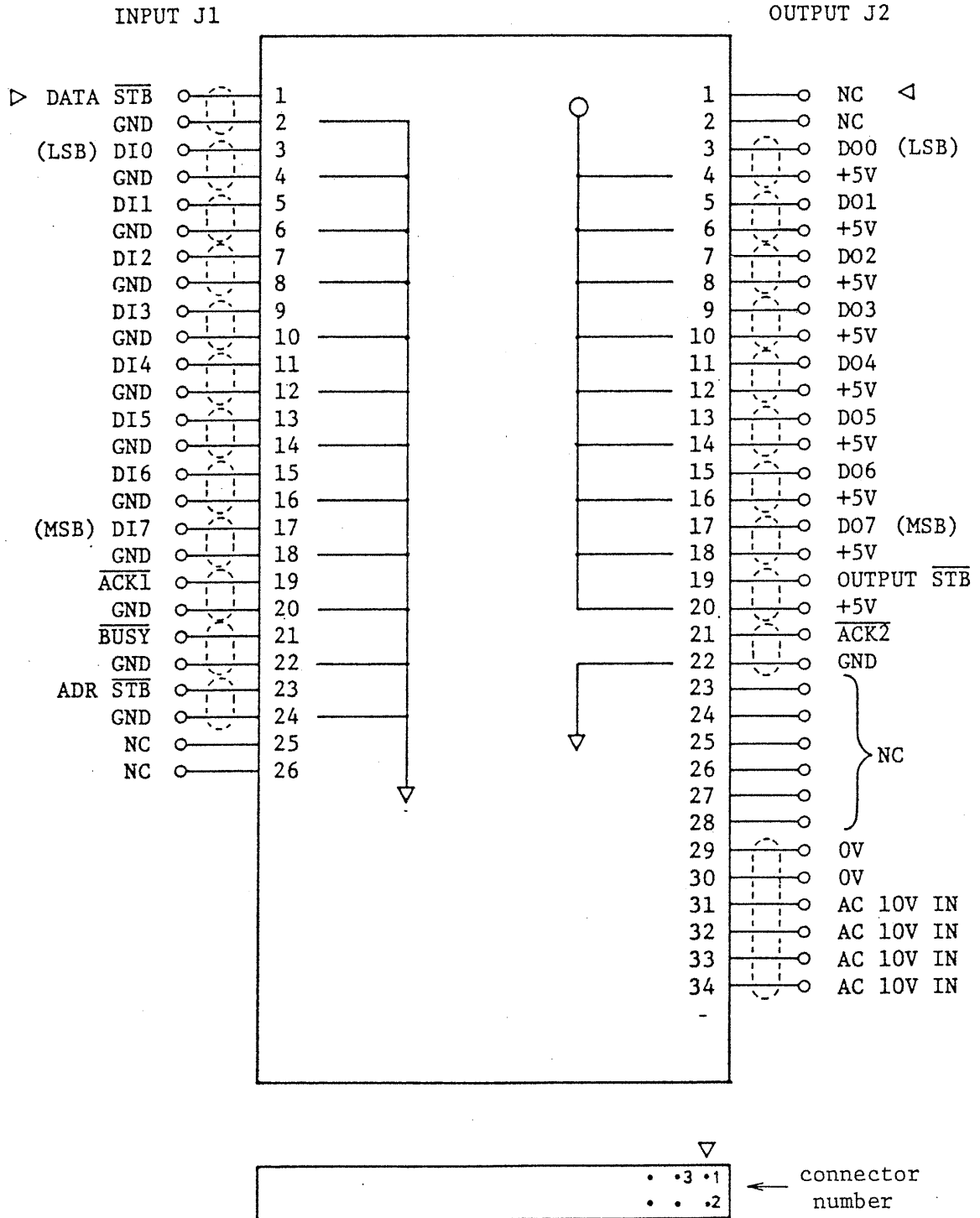


Figure 3-6

DPO 100-PC Timing

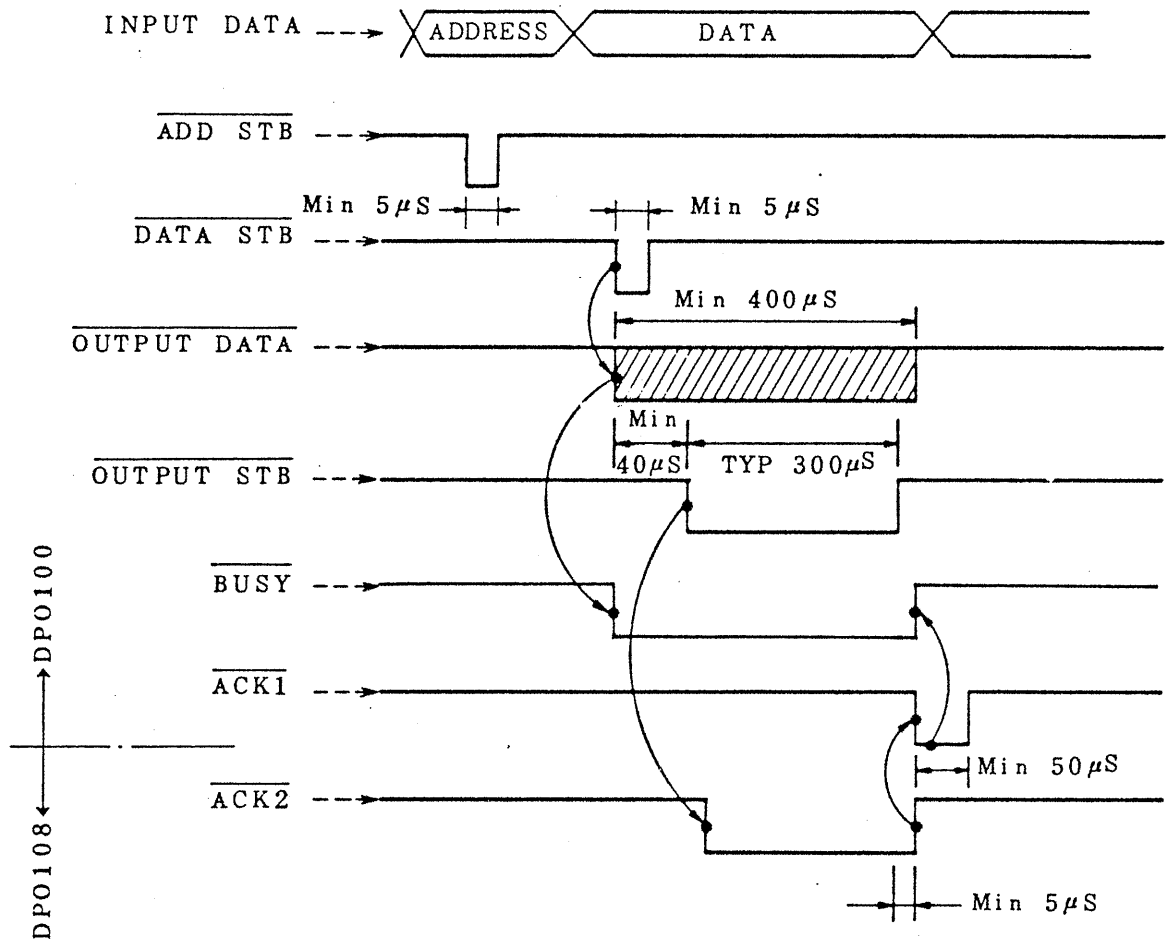
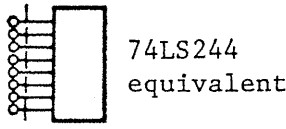
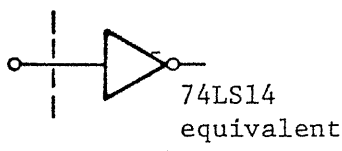
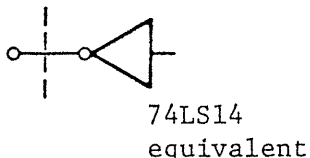
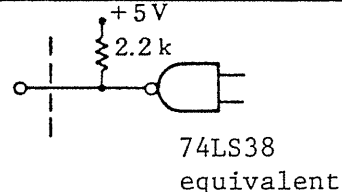


Figure 3-7

Table 3-1

Hardware for Input Connector J1	
INPUT DATA	DATA STB , ADDRESS STB
 <p>74LS244 equivalent</p>	 <p>74LS14 equivalent</p>
<p>ACK1</p>  <p>74LS14 equivalent</p>	<p>BUSY</p>  <p>74LS38 equivalent</p>

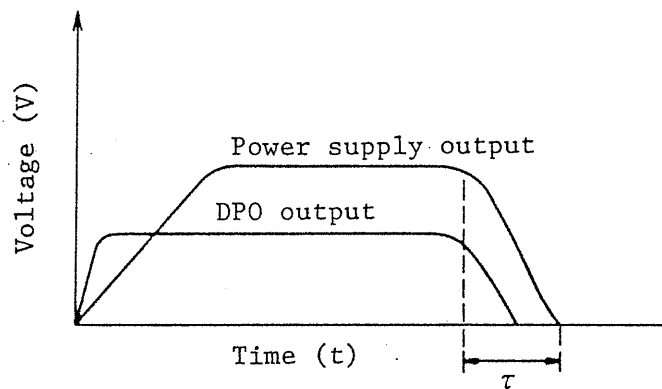
SECTION 4: Sample Program

4-1. Precautions Regarding Program Preparation

This unit is an interface which permits connection to microcomputer I/O ports, but I/O port output varies according to the particular microcomputer. Preparation of programs must therefore be undertaken only after careful study of this unit's pin layout and timing chart.

Power Supply Rise Time and Fall Time

When this unit is used with the D/A converter, the rise time of the D/A converter is approximately 1 mS, but the rise time of the regulated DC power supply is a relatively slow 50 - 100 mS. Furthermore, the rise time will vary depending on the load conditions. This must be taken into consideration when preparing a program.



C : Power supply output terminal condenser

$$\tau = CR$$

R : Load resistance

τ : Rise time constant

Figure 4-1

* For high-speed rise time, we recommend our DPS series or our POW series for use in connection with this unit. -

4-2. Program Example

This unit can be controlled by any kind of I/O port. BASIC language programs are best suited for low-speed programs. For high-speed programs, to keep the need for use of memory domains at a minimum, machine language programs may be considered most suitable. Methods for linking of basic and machine language programs can also be devised.

Program example for use with PC 8011 general purpose I/O port

```
DATA STORBE : OUT 0
ADDRESS STORBE : OUT 1

10 '*DPO100-PC+DPO108+PAD35-10L*
20 '*      Operations Program      *
30 A=0    : 'OUTPUT  0V
40 B=255  : 'OUTPUT  35V
50 C=127  : 'OUTPUT 17.5V
60 OUT&HB3,0:OUT&HB1,8:OUT&HB3,2:OUT&HB3 } Print out
   ,0:OUT&HB1,A:OUT&HB3,1:OUT&HB3,0
65 GOSUB 200
70 OUT&HB3,0:OUT&HB1,8:OUT&HB3,2:OUT&HB3 } Print out
   ,0:OUT&HB1,B:OUT&HB3,1:OUT&HB3,0
75 GOSUB 200
80 OUT&HB3,0:OUT&HB1,8:OUT&HB3,2:OUT&HB3 } Print out
   ,0:OUT&HB1,C:OUT&HB3,1:OUT&HB3,0
85 GOSUB 200
120 END
200 FOR E=0 TO 400 :NEXT
210 RETURN
```

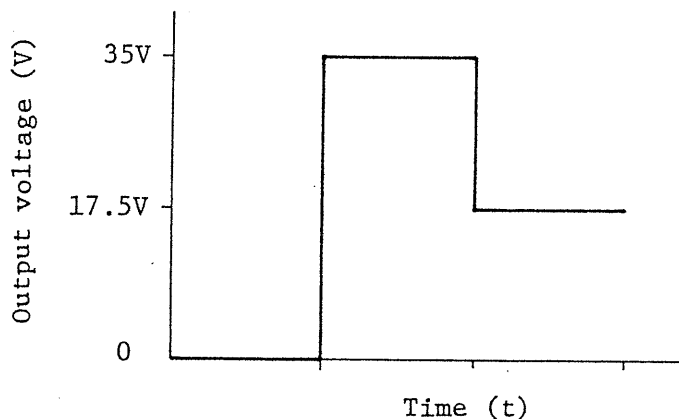


Figure 4-2

* Using PC 8001 + PC 8011, BASIC language