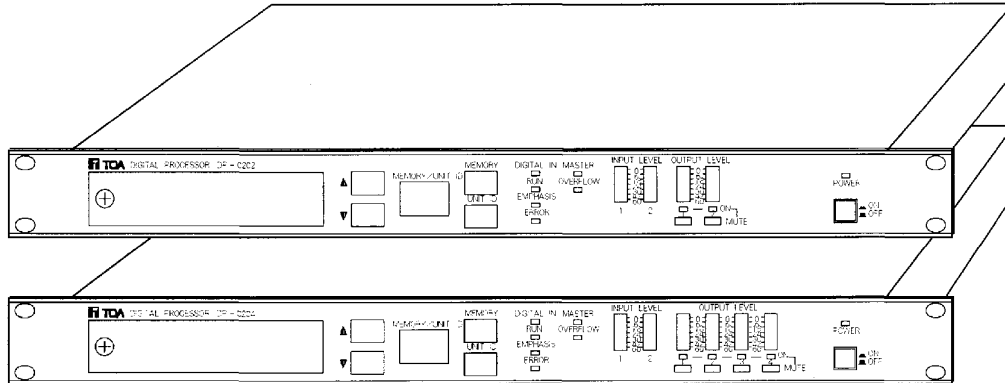# ZI TOA

DIGITAL PROCESSORS

DP-0202
DP-0204

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION

TO REDUCE THE RISK OF ELECTRICAL SHOCK, DO NOT REMOVE COVER. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL

THE LIGHTNING FLASH WITH ARROWHEAD WITHIN A TRIANGLE IS INTENDED TO TELL THE USER THAT PARTS INSIDE THE PRODUCT ARE A RISK OF ELECTRIC SHOCK TO PERSONS.

THE EXCLAMATION POINT WITHIN A TRIANGLE IS INTENDED TO TELL THE USER THAT IMPORTANT OPERATING AND SERVICING INSTRUCTIONS ARE IN THE PAPERS WITH THE APPLIANCE.

CONTENTS

Please follow the instructions in this manual to obtain the optimum results from these units.
We also recommend that you keep this manual handy for future reference.

TOA Corporation

1. GENERAL DESCRIPTION

The TOA DP-0202 (DP-0204) is a digital processor provided with a signal processing function for controlling sound systems. Using dedicated software operating on a personal computer, an operator can set each function in detail. The settings can be stored in the component's internal memory, and the memory can be recalled from the component even when not connected to a personal computer.

2. FEATURES

● Digital signal processing allows setting of highly-accurate acoustic parameters.

● The signal flow and signal processing functions can be set from a personal computer, and these settings can be stored as a file for later use.

● Up to 16 setting patterns can be stored, which can be easily recalled even without connecting to a personal computer.

● The stored information can be remotely recalled from external equipment, and the memory selection status can be output.

● Analog or digital inputs and outputs can be used as required.

● Two communications ports of RS-232C (for controlling a single unit) and RS-485 (for controlling up to 30 units).

● A system locking function prevents problems resulting from operation error.

● Multiple signal processing functions yet space-saving design (sized for 19" rack).

● Wide operating voltage range: 90 VAC-250 VAC.

● 2 IN/2 OUT (DP-0202) and 2 IN/4 OUT (DP-0204).

3. HANDLING PRECAUTIONS

● The digital processor has no parameter setting functions, so you use a personal computer and the dedicated TOA software program to set the parameters.

● Turn the power switch ON only after all terminals and other wires are connected.

● Avoid installing the unit near a heater or exposing it to direct sunlight as this may damage the unit. Also, do not install the unit in humid or dusty locations.

● Do not jolt or vibrate the DP-0202 (DP-0204) as it is a precision instrument.

● Never attempt to service the unit yourself as opening or moving the covers may expose you to dangerous voltage or other hazards. Refer all servicing to TOA dealers.

4. SIGNAL PROCESSING FUNCTION

The DP-0202 (DP-0204) is a black box equipped with a signal processor. All signal processing functions and setting value ranges are, therefore, accomplished by operating the personal computer software. Refer to the software specifications for details of the signal processing functions.

5. NOMENCLATURE AND FUNCTIONS

[FRONT PANEL]

DP-0202

DP-0204
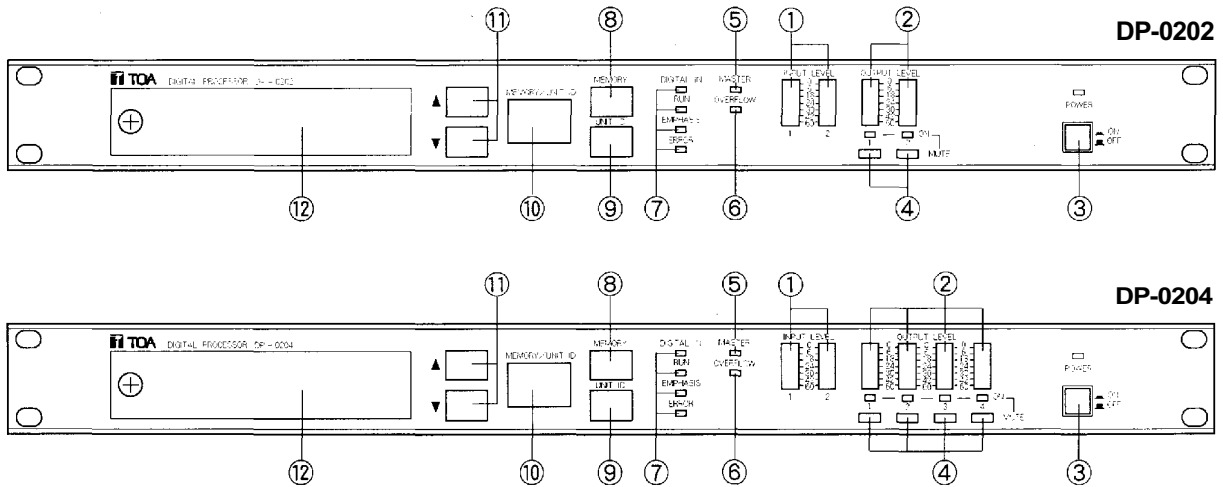
① **Input level meter** [INPUT LEVEL]
② **Output level meter** [OUTPUT LEVEL]

These meters display the I/O levels. The topmost point is a digital full scale (clipping point), and is +24dB in terms of analog. The dynamic range of indication is 60dB. Adjust the volume control to a point where program source dynamic peaks remain just within the range of the level indicator LEDs and do not cause the clipping indicator to flash on.

③ **Power switch** [▬ ON, ▣ OFF]

Set this switch to ON and the processor starts operating in the status it was in just before the power was last turned OFF. The power LED lamp lights at this time.

④ **Muting button [MUTE]**

This button is used to disconnect output signals to stop sound. If this button is pressed, the output is muted and its corresponding LED lamp lights.

⑤ **Master unit indicator [MASTER]**

The unit in which the ID number is set to "1" (LED lamp lights) functions as a master unit when switching between stored information. For details, refer to p.8 "7. UNIT ID NUMBER SETTING".

⑥ **Overflow indicator** [OVERFLOW]

This lamp lights when the internal digital signal processor overflows for equalizing or filtering operation.

⑦ **Digital input signal operation indicators**

DIGITAL IN : Lights when the input mode is set for digital signal.
RUN : Lights when a digital signal is input correctly.
EMPHASIS : Lights when EMPHASIS information is received.
ERROR : Lights when there is an error in digital signals.

⑧ **Memory call key [MEMORY]**

This key is used to recall the memory pattern selected with the memory/unit number selection key.

⑨ **Unit ID number indication key [UNIT ID]**

This key is used to show the unit ID number on the display.

⑩ **Memory/unit ID number display**
[MEMORY/UNIT ID]

Either the memory number or unit ID number is displayed. Usually, the selected memory number is displayed.
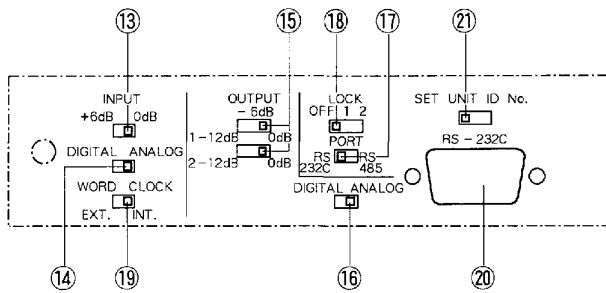
⑪ **Memory/unit ID number selection key** [▲ , ▼]

The memory number or unit ID number can be selected with the UP and DOWN keys.

⑫ **Pocket cover**

[FRONT POCKET]

DP-0202

DP-0204

⑬ **Input boost switch** [INPUT]

This switch simultaneously boosts the analog signal level of each input by 6dB. When the input signal level is low, signal processing that provides good S/N ratio can be achieved by using this switch.

⑭ **Input mode selection switch** [DIGITAL ANALOG]

Either analog or digital mode can be selected for input signals.

⑮ **Output attenuation switch** [OUTPUT]

This switch individually attenuates the analog signal level of each output by 6dB or 12dB. More residual noise can be reduced for sound output with a good S/N ratio.

⑯ **Output mode selection switch**

[DIGITAL ANALOG]

Either analog or digital mode can be selected for output signals.

⑰ **Communications port selection switch** [PORT]

This switch is used to select the communications port your computer is connected to. RS-232C is valid only when controlling a single unit, and the front or rear-mounted D-SUB connector can be used. Use RS-485 when controlling multiple units. XLR connectors for RS-485 are mounted on the back of the unit.
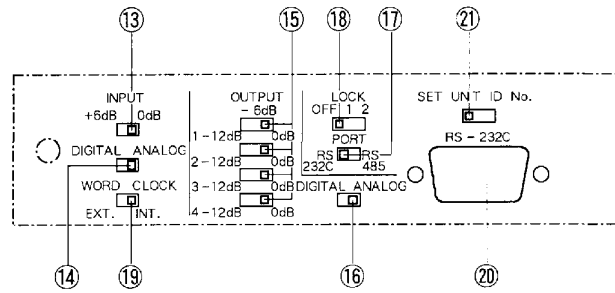
⑱ **System locking switch** [LOCK]

Use this switch to set how the hardware is locked.

OFF : All functions are available (unlocked), such as memory switching.

1 : All functions are locked except memory switching.

2 : All front panel facilities are locked.

Make sure the power is switched ON when you use this switch.

⑲ **Word clock switch** [WORD CLOCK]

For most operations, set this switch to the "INT" position. When controlling an internal signal processing clock from external equipment, set this switch to the "EXT" position.

⑳ **RS-232C communications port** [RS-232C]

This is a 9-pin D-SUB connector for RS-232C communications, and can only be used when the communications port selection switch is set to "RS-232C". This port is connected in parallel to the rear-mounted D-SUB connector for RS-232C. For details, refer to p. 6 "6. PERSONAL COMPUTER CONNECTIONS".

㉑ **Unit ID number setting switch**

[SET UNIT ID No.]

Use this key to set the unit ID number. For details, refer to p. 8 "7. UNIT ID NUMBER SETTING".

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[REAR PANEL]
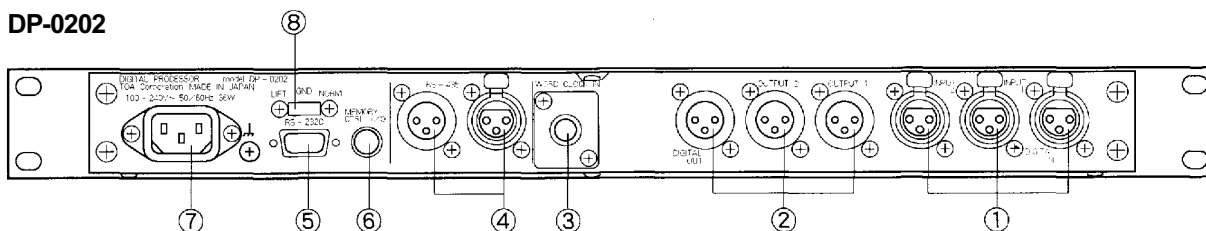
DP-0202

DP-0204
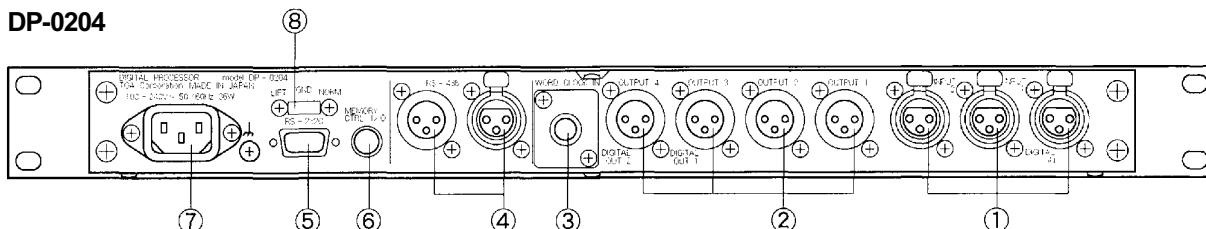
① **Input connector** [DIGITAL IN, INPUT 1, 2]

An electronically-balanced XLR connector. Both The DP-0202 and DP-0204 have two input channels for each digital and analog signals. "DIGITAL IN", and "INPUT 1" and "INPUT 2" (both for analog signals) are provided for the inputs. The AES/EBU format is employed in the digital input, allowing two-channel transmission.

② **Output connector**

[DIGITAL OUT 1, 2   OUTPUT 1,2,3,4]

An electronically-balanced XLR connector. The DP-0202 has two output channels, while the DP-0204 has four output channels.

DP-0202

The outputs are "OUTPUT 1" and "OUTPUT 2" (both for analog signals), and "DIGITAL OUT". The AES/EBU format is employed in the digital output, allowing 2-channel transmission.

DP-0204

The outputs are "OUTPUT 1" through "OUTPUT 4" (all for analog signals), and "DIGITAL OUT1" and "DIGITAL OUT 2".

Digital output 1 corresponds to signals of analog outputs 1 and 2, while digital output 2 corresponds to signals of analog outputs 3 and 4.

③ **Word clock input connector** [WORD CLOCK IN]

A BNC connector for clock input which allows external control of internal signal processing. This connector can only be used when the word clock switch located in the front pocket is set to "EXT". The impedance is 75 Ω and level is a TTL level.

④ **RS-485 communications port** [RS-485]

A 3-pin XLR connector for RS-485 communications. This connector can only be used when the communications port selection switch located in the front pocket is set to "RS-485". When simultaneously controlling two or more units, use this port and connect each unit in turn. A mode conversion adaptor is required because data are usually transmitted from a personal computer in RS-232C mode. For details, refer to p. 6 "6. PERSONAL COMPUTER CONNECTIONS".

⑤ **RS-232C communications port** [RS-232C]

A 9-pin D-SUB connector for RS-232C communications. This connector can only be used when the communications port selection switch located in the front pocket is set to "RS-232C". This connector is connected in parallel to the D-SUB connector for RS-232C in the pocket, and is valid only when controlling a single unit. For details, refer to p. 6 "6. PERSONAL COMPUTER CONNECTIONS".

⑥ **Memory I/O connector** [MEMORY CTRL I/O]

This connector allows external remote pattern memory control, as well as output of memory selection status to external equipment. Remote control is accomplished by make contact, and the 5V logic output is used for external output. For details, refer to p. 9 "8. USING THE MEMORY I/O CONNECTOR".

⑦ **Power inlet**

Connect the power cord included with the unit to this inlet.

⑧ **Ground loop break switch** [GND]

This switch, when set to "LIFT" position, breaks a hum-generating ground loop formed when the unit is connected to external components. Normally, set this switch to "NORM" position.

6. PERSONAL COMPUTER CONNECTIONS

Neither the DP-0202 nor the DP-0204 has built-in parameter setting functions. You need to use the dedicated TOA software operating on a personal computer to set the parameters. Up to 30 units can be controlled.
There are two connection (communications) methods; RS-232C and RS-485 communications.
Use either communications method depending on the system configurations exampled below.

(1) When setting parameters of a single unit, connect to the RS-232C connector.
(2) When setting parameters of more than one unit, connect to the RS-485 connector.
(3) When setting parameters in the system employing this unit and the DX-0808 matrix unit, connect the RS-485 connector.

(1) When setting parameters of only one unit

In this case, use the communications method called "RS-232C". Set the communications port selection switch in the front pocket to "RS-232C". As shown in Fig. 1, connect a straight cable from the PC's RS-232C port to the DP-0202's (DP-0204's) connector for RS-232C communications.
Either the connector in the front pocket or on the rear panel may be used: both are 9-pin D-SUB connectors and are connected in parallel. Below are RS-232C's control specifications:

> Baud rate : 9,600 bps
> Parity : None
> Data : 8 bits
> Stop bits : 1 bit

Although RS-232C is a one-to-one communications method, the maximum transmission distance is 10m. If the distance exceeds 10m, we recommend connecting your unit to the PC using an RS-485, even if using only one unit. In addition, because the setting status is stored in the unit's memory, set patterns can still be used even with a personal computer disconnected.
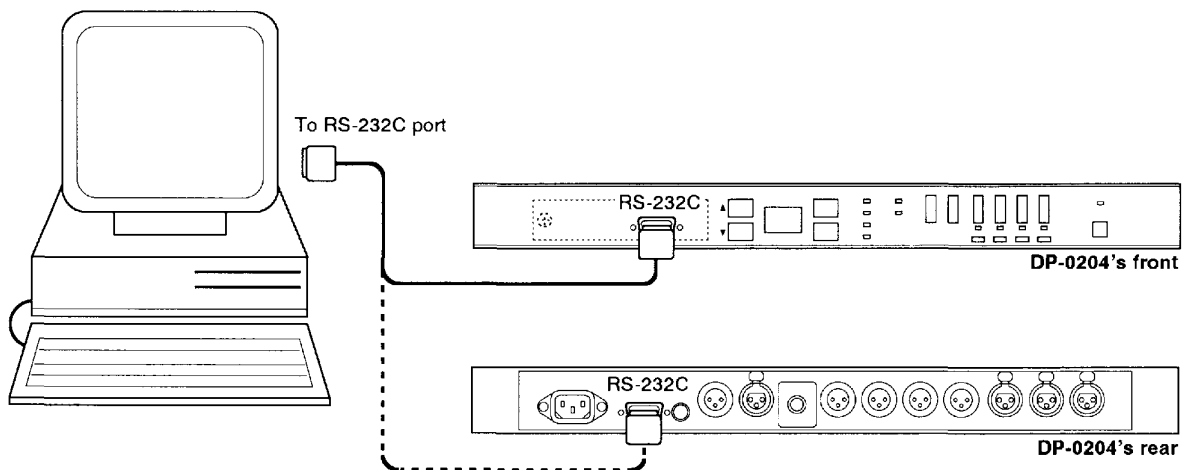

Fig. 1 RS-232C port connection between a PC and a single unit

(2) When setting parameters of more than one unit

In this case, use the communications method called "RS-485". Because multiple units are controlled, each unit needs its own unique ID registered in advance. For details, refer to p. 8 "7. UNIT ID NUMBER SETTING".
Set the communications port selection switch in the front pocket to "RS-485". Connection between a personal computer and each unit is shown in Fig. 2.

Personal computers normally have only an RS-232C port, and thus require an adaptor to convert the RS-232C port to an RS-485 port.

Connect the PC's RS-232C port to the DP-0202's (DP-0204's) female connector for RS-485 communications via the adaptor. Similarly, make connections for the second unit and its subsequent units as shown in Fig. 2. Since the settings made through the PC can be stored in each unit's memory, the set patterns can be recalled if only units are connected as shown in Fig. 2 ; the adaptor and computer are not necessary to recall the patterns. In this case, the unit with ID No. 1 acts as a master unit to control the other units.
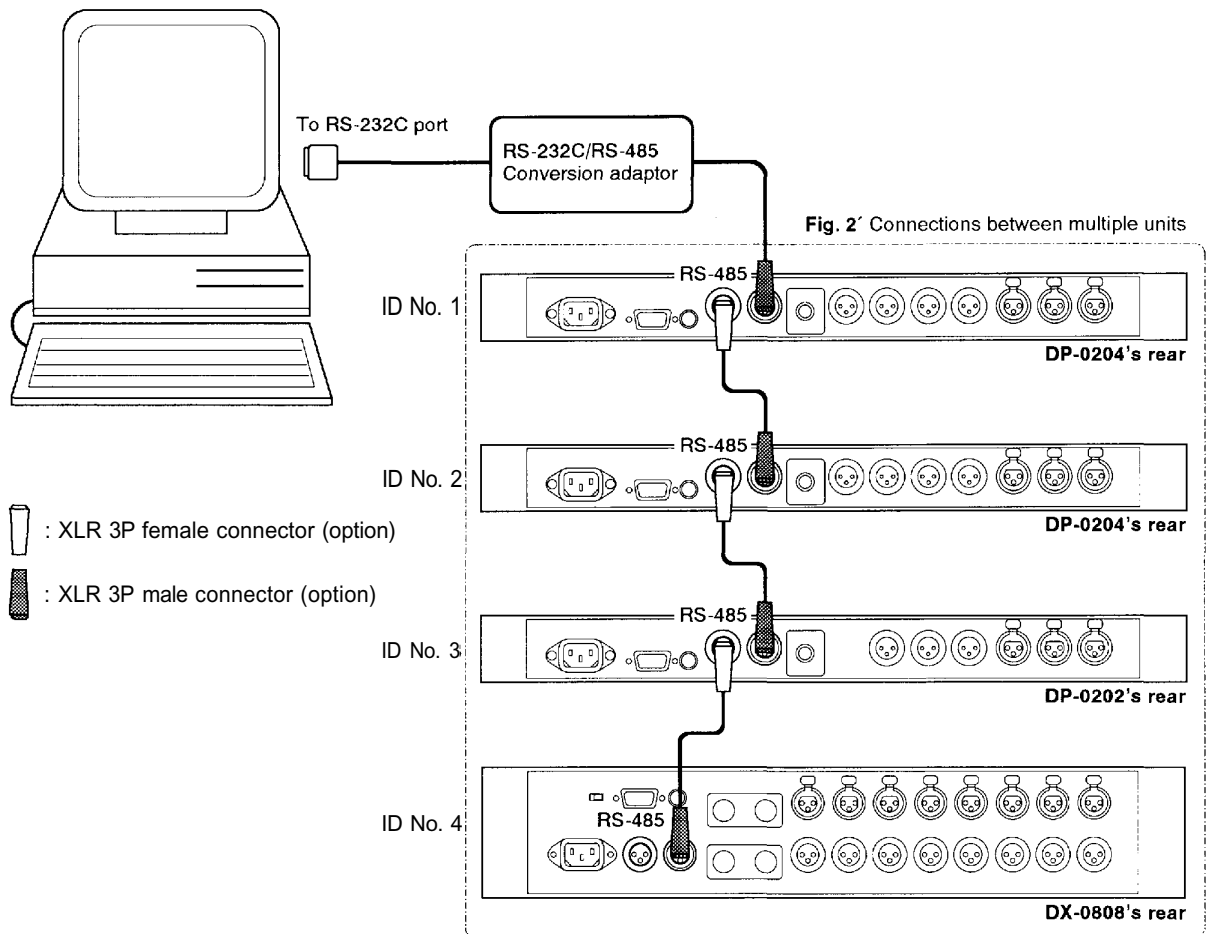

**Fig. 2** Communications port connections between a PC and multiple units

(3) When using the DP-0202/DP-0204 in conjunction with the DX-0808 matrix unit

Parameters can be set and controlled from one PC in the same manner and connections as described in Item 2 above.

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7. UNIT ID NUMBER SETTING

To control two or more units, give each unit a separate number called a unit ID number, then send the setting data from a personal computer. The ID numbers must be consecutive from No. 1 to No. 30, and be set in advance.

Setting the number
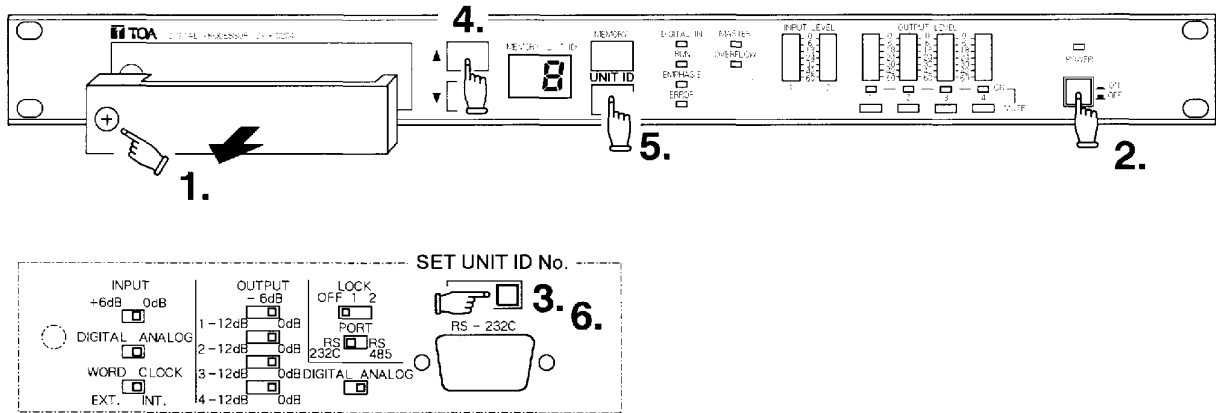
1. Open the front pocket.

2. Switch on the power.

3. Hold the lever of the unit ID number setting switch to the right.

4. While holding the lever, operate the front-mounted memory/unit number selection key to show the desired number on the memory/unit number display.

5. Push the unit ID number indication key to register the number being displayed.

6. Release the unit ID number setting switch.

Notes
- The ID number is factory preset to No. 1.
- Make sure the same number is not registered twice.
- To confirm the set number, press the unit ID number display key located on the front panel.

8. USING THE MEMORY I/O CONNECTOR

The memory I/O connector allows remote control of 16 pattern memories from external equipment, as well as output of the memory selection status to external equipment. The I/O controls are performed in 4 bits. Remote operations can be controlled using a make contact, and a 5V logic output is used to output information to external equipment. By using this terminal, stored information can be remotely recalled or control signals can be sent to other equipment.

8- 1. Remote memory call

Keeping the level of pin No. 2 low enables external remote memory control. Table 1 shows the relationship of each pin's input status to memory number. Set patterns can be recalled through a simple diode matrix.

Note No connection is possible for the pins in "H" status shown in Table 1. (These pins are pulled up at 5V.)

Table 1 Pin's input status VS. memory number

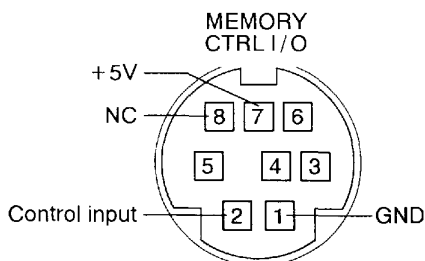|	PIN 2 CTRL IN	PIN 6 IN	PIN 5 IN	PIN 4 IN	PIN3 IN
Memory No. 1	L	L	L	L	L
Memory No. 2	L	L	L	L	H
Memory No. 3	L	L	L	H	L
Memory No, 4	L	L	L	H	H
Memory No. 5	L	L	H	L	L
Memory No. 6	L	L	H	L	H
Memory No. 7	L	L	H	H	L
Memory No. 8	L	L	H	H	H
Memory No. 9	L	H	L	L	L
Memory No. 10	L	H	L	L	H
Memory No. 11	L	H	L	H	L
Memory No. 12	L	H	L	H	H
Memory No. 13	L	H	H	L	L
Memory No. 14	L	H	H	L	H
Memory No. 15	L	H	H	H	L
Memory No. 16	L	H	H	H	H

8-2. Memory selection status output

The memory selection status can be output to external equipment by making the connector's pin No. 2 a high level. Table 2 shows the relationship of selected memory to each pin's output status.

Note No connection is possible for the pin 2 (CTRL input) shown in Table 2. (This pin is pulled up at 5V.)

● Pin arrangement of the memory I/O connector

Table 2 Selected memory VS. pin's output status

|	PIN 2 CTRL IN	PIN 6 OUT	PIN 5 OUT	PIN 4 OUT	PIN3 OUT
Memory No. 1	H	L	L	L	L
Memory No. 2	H	L	L	L	H
Memory No. 3	H	L	L	H	L
Memory No. 4	H	L	L	H	H
Memory No. 5	H	L	H	L	L
Memory No. 6	H	L	H	L	H
Memory No. 7	H	L	H	H	L
Memory No. 8	H	L	H	H	H
Memory No. 9	H	H	L	L	L
Memory No. 10	H	H	L	L	H
Memory No. 11	H	H	L	H	L
Memory No. 12	H	H	L	H	H
Memory No. 13	H	H	H	L	L
Memory No. 14	H	H	H	L	H
Memory No. 15	H	H	H	H	L
Memory No. 16	H	H	H	H	H

9. RECALLING THE PATTERN MEMORIES

Although storing the set parameters into up to 16 memories of the DP-0202 or DP-0204 needs the dedicated TOA software and a personal computer, recalling them can be performed without using the software and computer.

When multiple units are connected through RS-485 communications ports as shown in Fig.2. on page 7, the unit with ID No. 1 acts as a master unit to recall the same pattern memory of all connected units.

Follow the procedures below to recall pattern memories when the DP-0202 or DP-0204 is a master unit.
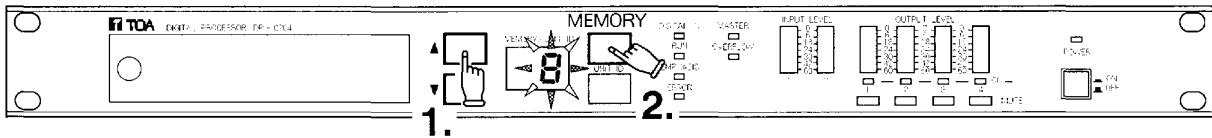
1. Push the front-mounted memory/unit ID number selection key to show the desired memory number on the display. (The displayed number will flash.)

2. Push the memory recall key to recall the selected pattern memory. (The display stops flashing.)

The memory recall can be performed remotely by a personal computer or by external equipment connected through the rear-mounted memory I/O connector.

10. SPECIFICATIONS

Power requirements	AC 100 V- 240 V, 50/60HZ, 36 W
Input/output	2 IN/ 2 OUT (DP-0202) 2 IN/ 4 OUT (DP-0204)
Analog signal input	+4 dB* (Max. +23 dB*), 10 kΩ, electronically-balanced, XLR-3-31 type connector
Analog signal output	+4 dB* (Max. +24 dB*), 600 Ω, electronically-balanced, XLR-3-32 type connector
Digital input/output	AES/EBU format, sampling frequency 48 kHz, XLR-3-31 , 3-32 type connector
AD converter	20 bits
DA converter	20 bits
Sampling frequency	48kHz
Dynamic range	At least105dB (IHF-A)
Frequency response	20- 20 kHz +0dB, -1dB
Total harmonic distortion	Less than 0.05 % at 1 kHz, +4 dB*
Closstalk	Less than -80 dB at 1 kHz
Preset memories	16 presets
Input booster	0, +6dB
Output attenuation	0, -6dB, -12 dB
System lock	OFF, 1,2
Input level meter	7-point LED
Output level meter	7-point LED
Memory No./unit ID No. indication	Double digit LED
Muting switch	Provided for each output
Master indication	Green LED
Overflow indication	Red LED
Digital input operation indication	DIGITAL IN, RUN, EMPHASIS, ERROR
Communication	Single unit control : RS-232C, 9-pin D-SUB connector System control : RS-485, XLR-3-31, 3-32 type connector
Control input	External memory selection by make contact
Control output	Output of memory selection status (TTL level)
Word clock input	48 kHz, 75 Ω, BNC connector
Control software	Corresponding to MS-Windows
Dimensions	483 (W) x 44 (H) x 327.7 (D) mm (19.0 x 1.7 x 12.9 in.), 1 -size (EIA)
Weight	5kg (11 lb.)
Color	Black
Standard Accessoris	AC power cord .... 1 Rack mounting screw .... 4 Operating instructions .... 1 AC fuse 1

* 0 dB is referenced to 0.775 V RMS.

Specifications are subject to change without notice.

11. APPEARANCE