

**SONY**<sup>®</sup>

2-995-692-21 (1)

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Instrumentation Cassette Recorder/Channel Expansion Unit

# PC216A PCGX32

**PCPS22**  
AC Pack

**PCRM22**  
Remote Control Unit

**PCHL21**  
Guard Frame

## Operating Instructions

Before operating this unit, please read this manual thoroughly and retain it for future reference.

**DIGITAL**

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This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

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This apparatus complies with the Class A Limits for radio noise emissions set out in Radio Interference Regulations.

Cet appareil est conforme aux normes Classe A, pour bruits radioélectriques, tel que spécifier dans le Règlement sur le brouillage radioélectrique.

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Sony was one of the first to apply DAT technology to PCM data recorders. With the PC204A/208A, Sony condensed its numerous new technologies in a unit and introduced the DAT double speed recording/playback to the world. The PC216A is the world's smallest and lightest 16-channel data recorder (A4 size, approximately 4.5 kg), based on high performance and efficiency of PC204A/208A.

Simultaneous recording up to 32 channels' data has been realized by using a channel expansion unit PCCX32. Moreover, in the sync mode, simultaneous recording is possible up to 32 channels with two PC216As and up to 64 channels with PC216A and PCCX32. The PC216A can also serve as a stand-alone digital data recorder with high speed serial digital data I/O in addition to the parallel digital data output and the digital I/O channel using LSB. In addition to its excellent performance in field-use, the PC216A can serve for a wide variety of use in measurement field.

## 1-2 Principal Features

### World's Smallest Model of 16 Channels

The PC216A became the world's smallest and lightest 16-channel data recorder (A4 size, approximately 4.5 kg) by using the DAT second generation technologies including highly reliable mechanism and large-scale integrated electronics.

### 32-Channel Data Recording

The channel expansion unit PCCX32 allows the simultaneous data recording and playback up to 32 channels at maximum.

### Multiple B/C Mode

Multiple band/channel mode capable of 2-channel\*, 4-channel, 8-channel, 16-channel, or 32-channel recording/playback is provided. (32-channel mode is available only when the PCCX32 is used.)  
\*Normal speed only  
In addition to regular recording/playback, the PC216A can playback the data recorded on a conventional audio DAT recorder using 2-channel/48 KHz sampling.

## Synchronizing Mode

By synchronizing two PC216As, simultaneous 32-channel data recording is enabled in 16-channel frequency band.  
By synchronizing two PC216As with PCCX32s, simultaneous 64-channel data recording is also enabled in 32-channel frequency band.

## Doubled Frequency Band in DAT System

In previous DAT systems, the total bandwidth provided by all channels was 40 KHz. This unit possesses an 80 KHz band in the double speed mode, as the tape speed and drum rotation have been doubled.  
The PC216A provides up to 5 KHz for each of 16 channels, and up to 2.5 KHz for each of 32 channels.

## Variable Time Axis

Playing back at the double speed a tape recorded at the normal speed reduces the playback time by half. Alternatively, playing back at the normal speed a tape recorded at the double speed allows desired phenomena in the data to be reproduced at a slower rate.

## Increased Recording Time

A new tape mechanism developed for thin DDS (Digital Data Storage) tapes, enables a recording time of 180 minutes (normal speed) or 90 minutes (double speed).

## Digital Data Input/Output

The recording mode can be either Analog Mode (analog input/output) or Digital Mode (digital input/output).  
• In Analog mode, the output of the parallel digital data and the input and output of the LSB digital data are available besides the input and output of the main analog data.  
The data input in analog can be output in a 16-bit parallel digital data format. The input and output of the LSB digital data is available for one channel by utilizing the Least Significant Bit (LSB) of each digital word, which facilitates the recording of binary signals such as rotation pulses and timing signals.  
• In Digital Mode, input and output of the serial bit stream is possible.  
The transfer rate in sync mode is 1.536 Mbps (normal speed) or 3.072 Mbps (double speed).

## LSB Channel

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In addition to the analog main data channels, digital input/output is available by utilizing the Least Significant Bit (LSB) of each digital data word. The LSB channel facilitates the recording of binary signals such as rotation pulses and timing signals.

## Multiple Power Supply System

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The PC216A and the PCCX32 operate on AC, DC power, or an optionally built-in battery pack, allowing the unit to be used as easily outdoors as indoors. When the AC and external DC power supplies are used jointly, the AC source is given priority, that is, the AC source is automatically selected for the operation. Should the AC power supply be interrupted, the unit instantaneously switches to the external DC power supply without any interruption in the operation. When the external DC power supply and the battery pack are used jointly, the external DC power supply powers the unit, with the battery pack acting as a back-up.

## Power Save Mode

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The playback circuit and the LCD backlight can be turned off during recording to reduce power consumption to a minimum.

## Heavy Duty

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The unit has been designed with an emphasis on durability, making it suitable for outdoor use.

## RAW (Read After Write) Error Check

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Equipped with a 4-head drum, the unit can play back data immediately after recording with the RAW function. During recording, errors are detected and indicated on the display panel.

## Wide Dynamic Range

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With a 16-bit linear-quantized pulse-code modulation (PCM) system, the PC216A offers a wide dynamic range of more than 80 dB. Since extra head room (2.5 dB) is provided above the reference level ( $\pm 100\%$  or 0 dB) to capture signals within the given dynamic range, input signals which are in the vicinity of the reference level can be recorded without distortion, and the input level can be set easily. All 16 bits of the PCM area are used for data. Announcements, amplifier setting information, and index information are stored in a separate sub code area. \*  $\pm 100\%$  level, for example, is the level that corresponds to  $\pm 1$  Vp input signal when the input range is set to "1V", or  $\pm 2$  Vp input signal when the input range is set to "2V", and so on.

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## Reduction of Inter-channel Phase Difference

Multiplexing of data generated by simultaneous AD conversion of analog signals, together with careful handling of analog circuit, makes it possible to reduce the inter-channel phase difference to less than three degrees.

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## Automatic Calibration of DC Offset/Gain

When the power is turned ON, when the cassette is inserted, or in SLF CHK mode, the DC offset and the gain errors are automatically corrected by the built-in DSP (Digital Signal Processor). Any drift due to aging is eliminated, and high precision recording and playback can be performed without the need for adjustment.

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## Built-in Test Signal

The user can select various test signals;  $\pm 100\%$  AC,  $\pm 100\%$  DC or 0 V. These signals can be monitored at the data output connectors or recorded onto tape to be used as reference signals.

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## Highly Luminescent Display

The PC216A display panel incorporates a wide angle view LCD with a highly luminescent backlight, providing a high degree of readability. The bar meter can be displayed using either a percentage scale or a dB scale, as required.

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## Memory Search Function

Two search targets can be stored in the memory by marking location points on the tape using special keys for the simple search.

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## Fan Control Mode

This mode serves to stop the ventilation fan when the unit's internal temperature is low enough. This function makes the PC216A well-suited for applications such as acoustic measurement in an anechoic chamber when silence is required.

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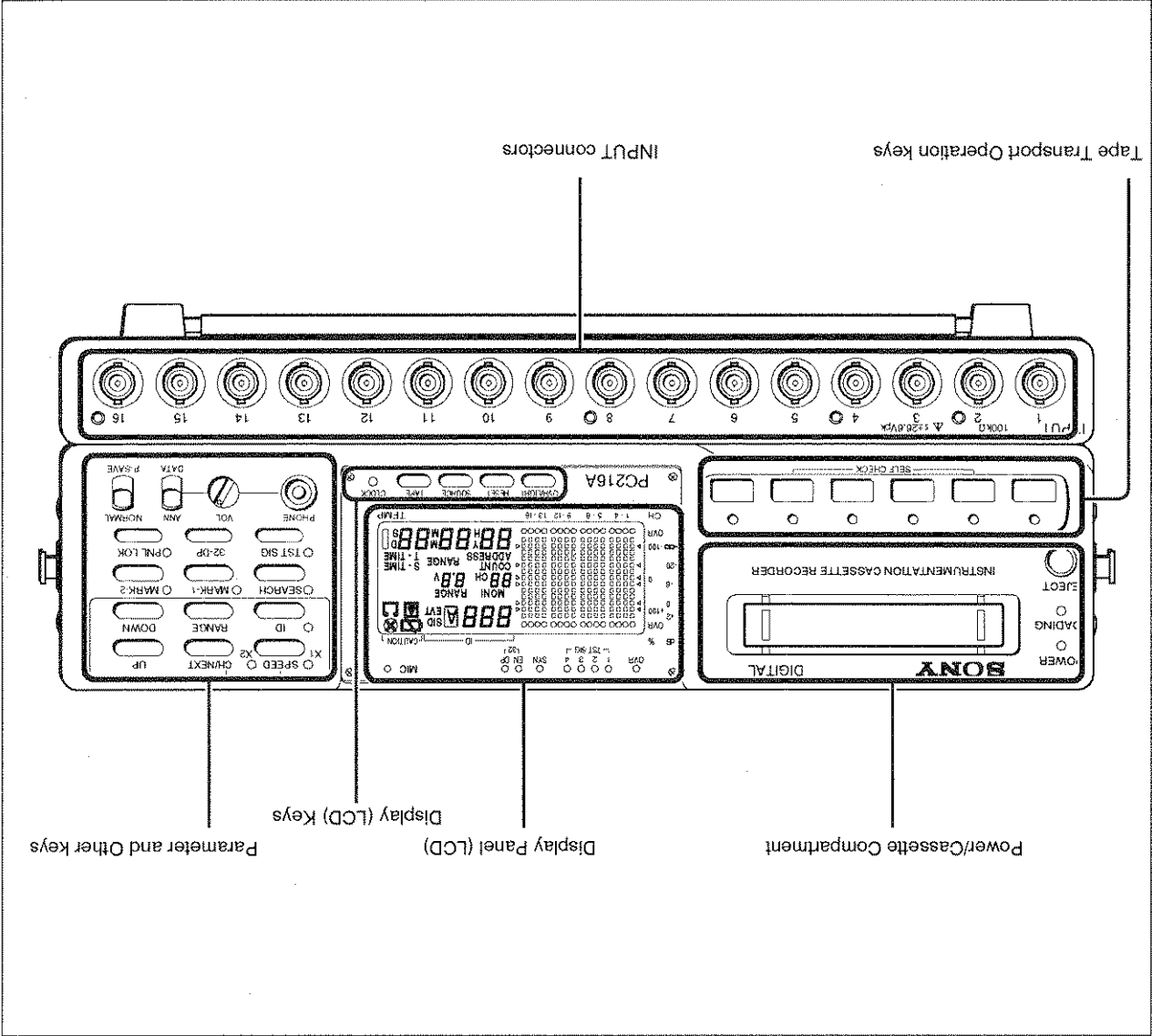
## Highly Efficient Remote Control Unit (optional)

The remote control unit PCRM22 has a display almost identical to the main unit's display. Data input level, tape remaining and error check message are just a few of the functions provided. Furthermore, as the remote control interface conforms to the RS-232C standard, it is possible to use a host computer to control the main unit.

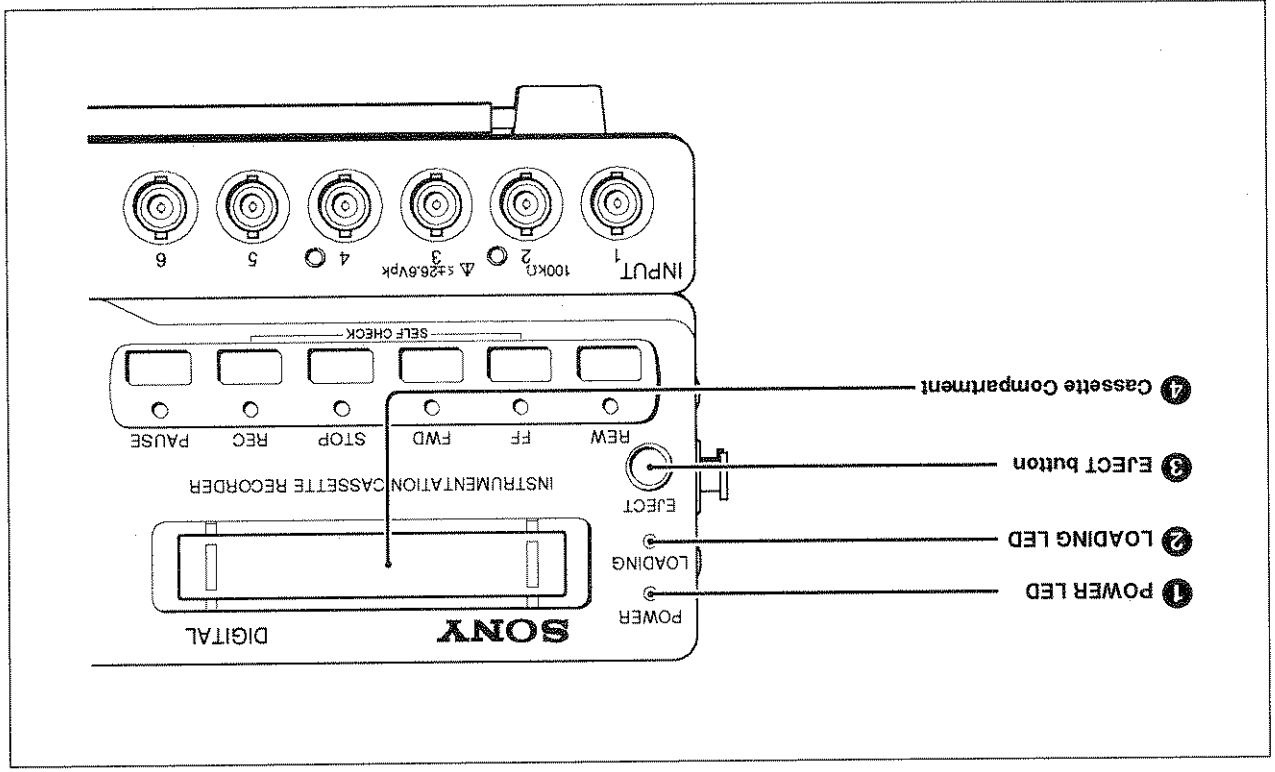


# 2 Location and Function of Parts and Controls

2-1 Front Panel



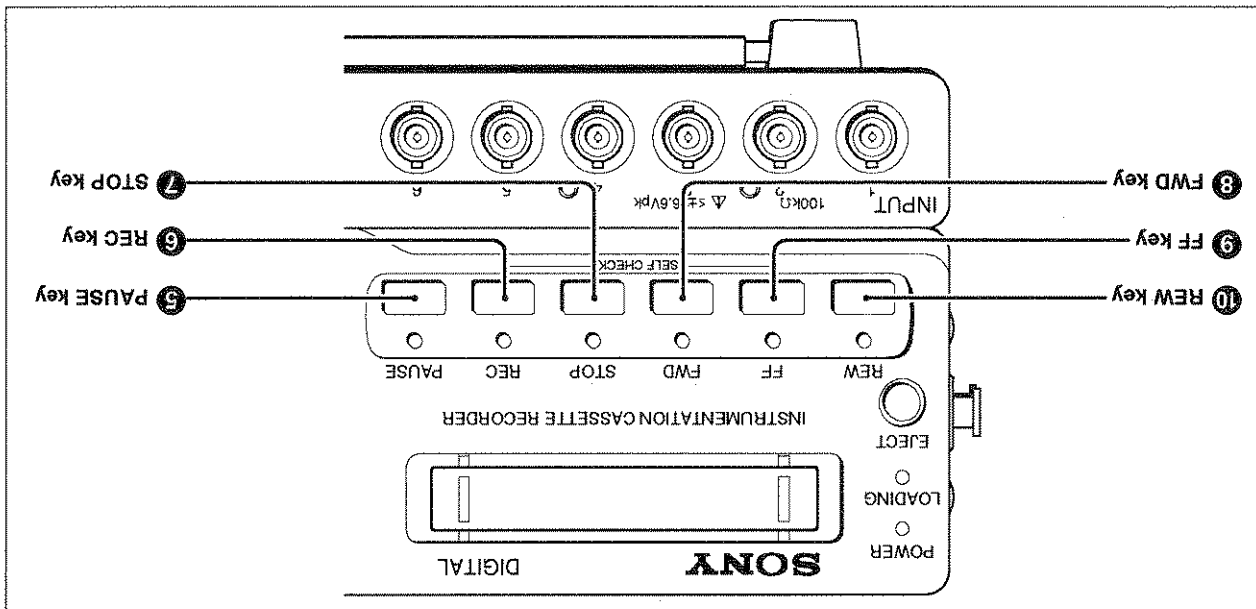
Power/Cassette Compartment



- ① **POWER LED**  
Lights when power is supplied to the unit.
- ② **LOADING LED**  
Lights when tape has been drawn out of the loaded cassette and is in the fixed tape path. Blinks while loading or unloading. Goes off when tape is out of the unit.
- ③ **EJECT button**  
Press this button to eject the cassette from the unit.
- ④ **Cassette Compartment**  
Insert the cassette into the compartment in the right direction. The cassette loads automatically.

## Tape Transport Operation Keys

The LEDs above the operation keys will light during each mode.



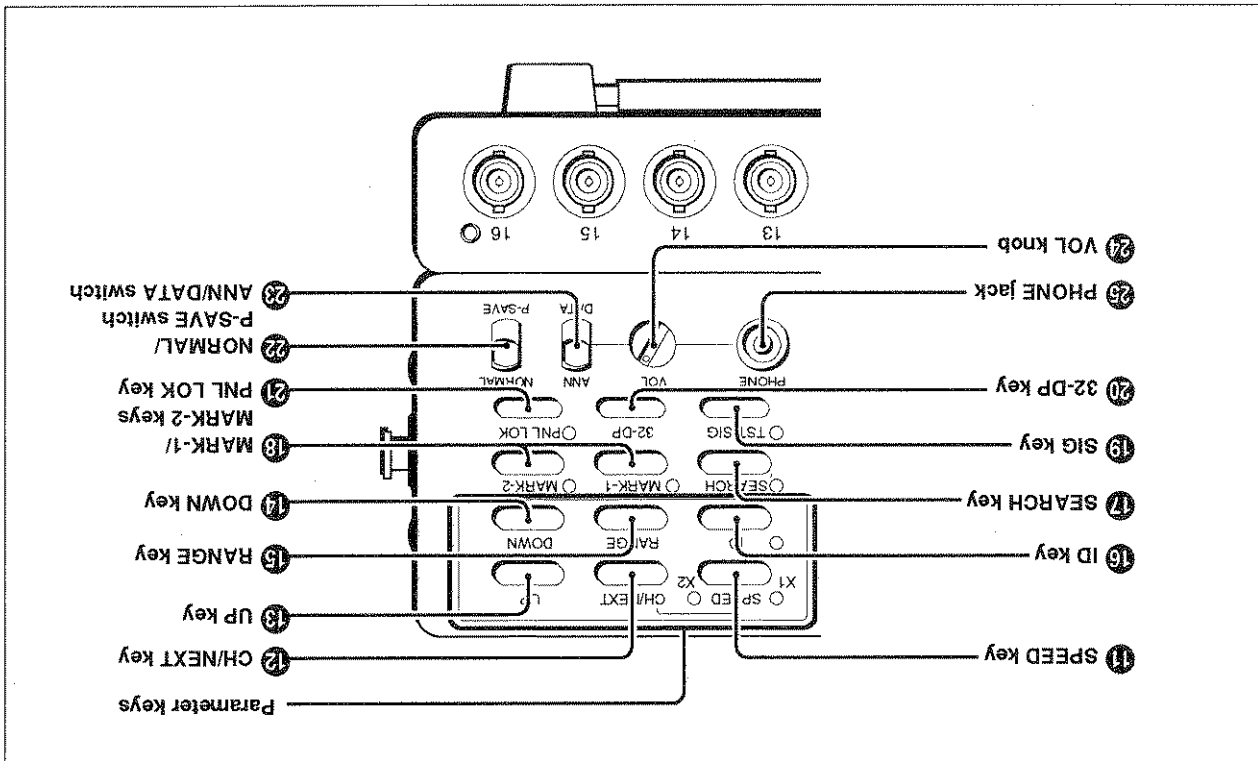
### 5 PAUSE key

- Press this key to select the PAUSE mode. In this mode the rotating head drum is in contact with the stationary tape.
- The PAUSE mode is used when tape transport is to be temporarily stopped, or when (in either the REC or PLAYBACK modes) the tape transport needs to be restarted quickly.
- The PAUSE mode cannot be selected from the FF, REW, SEARCH or SLP-CHECK modes.
- Pressing the PAUSE key while the unit is in the STOP mode puts the unit in PLAYBACK PAUSE mode. Press this key a second time to select PLAYBACK mode, and play back the tape signal.
  - Pressing the PAUSE key while the unit is in the E-E mode puts the unit in REC PAUSE mode. Press this key a second time to select REC mode and record a signal onto the tape.
  - Pressing the PAUSE key during recording or playback puts the unit in the REC PAUSE and PLAYBACK PAUSE modes respectively. Press this key a second time to return the unit to the REC and PLAYBACK modes respectively.
  - From the REC PAUSE and PLAYBACK PAUSE modes, the REC and PLAYBACK modes can be selected by pressing the FWD key.
  - From any of the various PAUSE modes, pressing the STOP key puts the unit in the STOP mode.
  - The PAUSE mode is maintained for approximately 3 minutes. After this time, the unit will automatically return to the STOP mode.

- mode.
- Pressing this key while the unit is in STOP mode puts the unit in E-E mode.
- In E-E mode, the recording/playback system amplifier operates and the input signal is directly output from the recording to the playback system. This enables adjustments to be made to the recording/playback system amplifier without running a tape. The E-E mode can only be entered from the STOP mode.
- To select the REC mode, hold the REC key down and press the FWD key. The signal will be recorded onto the tape.
  - To select the SELF-CHECK mode, hold the REC key down and press the FF key. Self-checking is performed, and the characters 'SLF' will be displayed in the ID section of the LCD. When the check has been completed and no error has been detected, the characters 'SLF' will be extinguished. If an error has been detected, a blinking error code will be displayed in the ID display section.
- 7 STOP key**
- Pressing this key in either REC, PLAYBACK, FF, REW, E-E, PAUSE, SEARCH or SELF-CHECK mode puts the unit into STOP mode.
- 8 FWD key**
- Press this key to select PLAYBACK mode. Pressing this key will have no effect while the unit is recording, conducting a search or in the SELF-CHECK mode.
- 9 FF key (Fast-Forward)**
- Press this key to select FF mode. Pressing this key will have no effect while the unit is recording, conducting a search, in PAUSE mode or in the SELF-CHECK mode.
- To select the fastforward manual search mode (at 16 × normal tape speed), hold the FF key down during playback.
  - To select the forward ID search mode, press the SEARCH key and then press the FF key.
- 10 REW key (Rewind)**
- Press this key to select the REW mode. Pressing this key will have no effect while the unit is recording, conducting a search, in PAUSE mode or in the SELF-CHECK mode.
- To select the reverse manual search mode (at 16 × normal tape speed), hold the REW key down during playback.
  - To select the reverse ID search mode, press the SEARCH key and then the REW key.

## Parameter and Other Keys

These keys are used to set parameters such as tape speed, input range and ID.



## 11 SPEED key and LEDs

- Used to select the 1× or 2× normal tape speed. The selection can only be made in the E-E or STOP mode.
- The selected speed is indicated by the appropriate LED (1×/2) being lit green.
- During playback, the LED is lit green if the tape speed in the recording mode and in the playback mode is the same, while the LED is lit orange if the tape speed is different.
- To select the desired number of channels (refer to the table below), press the CH/NEXT key while pressing the SPEED key.

2 channel mode (normal speed only)	4 channel mode	8 channel mode	16 channel mode	32 channel mode (when PCCX32 used)
	20 KHZ	10 KHZ	5 KHZ	2.5 KHZ
× 1 (Normal speed)	20 KHZ	10 KHZ	5 KHZ	2.5 KHZ
× 2 (2 times speed)	—	20 KHZ	10 KHZ	5 KHZ

### Note

When using the SPEED key, note that the unit enters into another speed mode the moment a finger is released.

## 12 CH/NEXT key

Normally used to select the monitor channel. When setting parameters, press this key to start setting of the next digit.

- Press RANGE key more than 2 seconds to display all the input ranges as shown in the next page. The selected channel range indicators on the LCD will blink and the selection is made by the UP or the DOWN key. The range setting channel can be selected using the NEXT key.

The range setting can be done during monitoring the signal levels as described above, but it is also possible to make the RANGE settings by monitoring all channel settings instead of the signal levels in the display as below.

The range setting channel can be selected using the CH/NEXT key. voltage has been input. reference level ( $\pm 100\%$  or 0 dB) when the +20 V (peak) or -20 V (peak) and DOWN keys,  $\pm 20$  Vp, for example, is the range which becomes the Select from  $\pm 20$  Vp,  $\pm 10$  Vp,  $\pm 5$  Vp,  $\pm 2$  Vp,  $\pm 1$  Vp,  $\pm 0.5$  Vp using the UP channel number and the range indications on the LCD blink. The selected

#### ⑥ RANGE key

- Press this key to select the recording amplifier input ranges. The selected channel number and the range indications on the LCD blink.
- Select from  $\pm 20$  Vp,  $\pm 10$  Vp,  $\pm 5$  Vp,  $\pm 2$  Vp,  $\pm 1$  Vp,  $\pm 0.5$  Vp using the UP and DOWN keys,  $\pm 20$  Vp, for example, is the range which becomes the reference level ( $\pm 100\%$  or 0 dB) when the +20 V (peak) or -20 V (peak) voltage has been input.
- The range setting channel can be selected using the CH/NEXT key.

#### ⑦ DOWN key

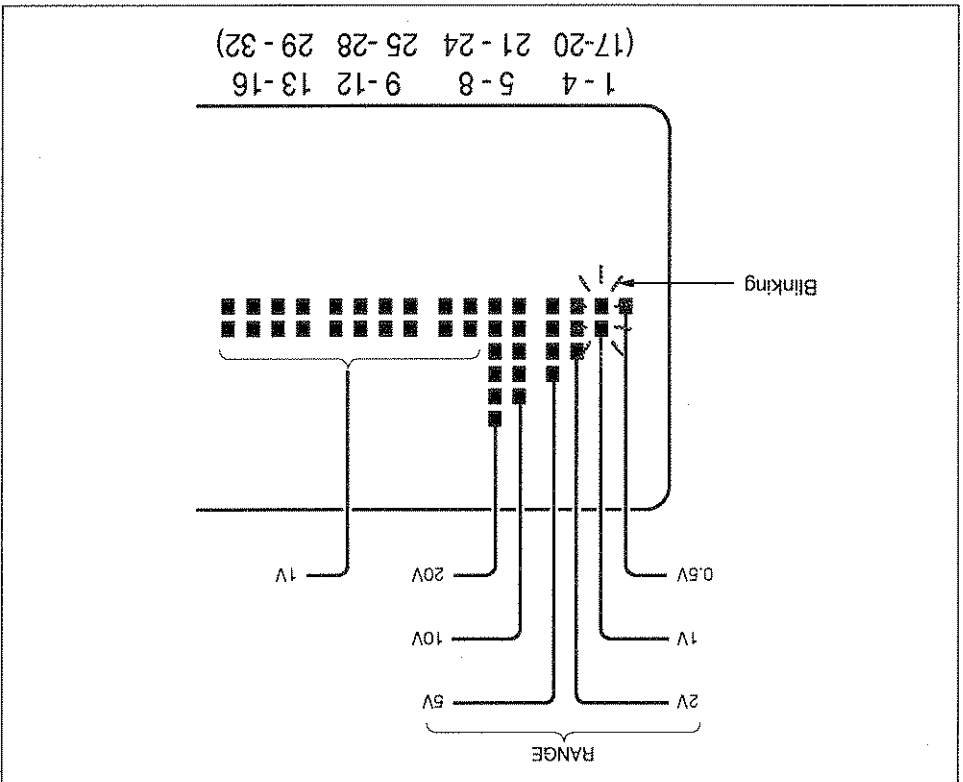
- When setting parameters, press this key to decrease the value of the blinking digit.
- When setting other than parameter, press this key to monitor the channel of lower number.

#### ⑧ UP key

- When setting parameters, press this key to increase the value of the blinking digit.
- When setting other than parameters, press this key to monitor the channel of higher number.

key is pressed during E-E or STOP mode. When the unit's internal temperature is low, the ventilation fan is stopped. During the FAN CONTROL mode, the indicator located in the lower right part of the LCD lights up or blinks. For details, refer to page 3-13.

Above figure is an example when ch2 is monitored (blinking) and the input range settings are ch1: 0.5V, ch2: 1 V, ch3: 2 V, ch4: 5 V, ch5: 10 V, ch6: 20 V, and ch7 to ch16: 1 V, respectively.



**Note**

Confirm that the triangle marks (◀, ▶) located on both sides of the bar meter display go off. Note that the normal bar meter display mode will be set while the marks are lighting.

- When setting all channels to the same input range, set the input range of the monitoring (blinking) channel to a desired value using the UP and DOWN keys, then press the RESET key.

**ID key**

- Press this key to set the ID number. The ID number can be set during STOP or E-E mode.
- Press the CH/NEXT key to shift the digits and set the desired numbers using the UP or DOWN key.
- Shift the digit to the right of the 1st digit, press the UP or DOWN key to start the character "A" lighting in the blinking square frame. Press the ID key once again so that the "A" lights appears on the LCD display. This indicates as the auto-increment mode. Each time a recording session is interrupted, the ID value increases by one.
- Once the ID has been set, press the ID key once again to exit from the ID setting mode.
- During recording or recording pause, each time the ID key is pressed the ID value increases by one.
- To select the ID SEARCH mode, first press the SEARCH key and then the ID key.

**⑦ SEARCH key**

Press this key to select the SEARCH mode. The SEARCH key LED will light and the unit will enter SEARCH standby. At the same time the MARK-1, MARK-2, ID, FF and REW key LEDs will blink. According to which key is pressed next, one of three search modes can be selected:

(1) MARK-1/MARK-2 keys .....MEMORY SEARCH

The tape address stored in memory becomes the target (Refer to the next ⑧).

(2) ID key .....ID SEARCH

The three digit ID number recorded on the tape becomes the target.

(3) FF key/REW key .....START ID SEARCH

Press the FF key to search for the start ID in the tape end direction from the present stop position. Press the REW key to search for the

start ID toward beginning of the tape.

- The SEARCH key LED will blink during a SEARCH operation. When the search has been completed, the SEARCH key LED will be extinguished. If not, the blinking continues.
- When the SEARCH has been completed, the tape will stop at the targeted position.

- By pressing the STOP key, the SEARCH mode is exited.

**⑧ MARK-1/MARK-2 keys**

The MARK-1 and MARK-2 keys are used in the MEMORY SEARCH

mode to store any position on the tape into the memory, and find them easily later on.

- If, during recording, no specific mark is set, the position at which recording began, and the position at which recording stopped will be automatically stored into the memory as MARK-1 and MARK-2, respectively.
- During recording, press the MARK-1 key to store a desired position in the memory. If the MARK-2 key is pressed during recording, the position at which the key was pressed will be written into memory; however, when recording is stopped, the position at which the tape stopped will overwrite the previous MARK-2 position.
- During playback, the MARK-1 and MARK-2 keys can be used to store desired positions in the memory. Doing so overwrites the previously marked positions.
- By pressing the SEARCH key, and then either the MARK-1 or MARK-2 key, the marked position will be searched for.
- MARK-1 and MARK-2 are disabled for modes other recording and playback.



**19 TST SIG key**

Press this key to generate a test signal. (To prevent accidental operation, this key must be held down for more than two seconds.) The TST SIG key LED will blink and the test signal mode will be entered.

In the TST SIG mode, each time the NEXT key is pressed the test signal is switched successively from  $\pm 100\%$  AC (500 Hz for normal speed, 1 kHz for double speed)  $\rightarrow +100\%$  DC  $\rightarrow -100\%$  DC  $\rightarrow 0V$ , and the corresponding TST SIG LED (1 to 4) lights. During the test signal mode the TST SIG key LED will blink. By pressing the TST SIG key once again (holding the button down for two seconds is not necessary), the TST SIG mode is exited.

**20 32-DP key**

Press this key to select either 1 to 16 channels or 17 to 32 channels for bar meter display, when the optional PCCX32 is connected to the PC216A and the operation in the 32-channel mode is made possible.

**21 PNL LOK key**

Press this key to lock the panel keys. (When the panel keys are locked, only the PNL LOK key itself can be operated.) To prevent accidental operation, this key must be pressed down continuously for more than two seconds. While the unit is in the PNL LOK mode, the PNL LOK key LED will light. Even when the PNL LOK mode is set, the front panel NORMAL/P-SAVE and ANN/DATA switches and the rear panel POWER switch remain unlocked. To unlock the panel keys, press PNL LOK key for more than two seconds. If the power is turned off, the PNL LOK mode is released.

**22 NORMAL/P-SAVE switch**

This toggles the unit between NORMAL and P-SAVE modes. In the P-SAVE mode, the display panel backlight and the playback circuitry (during analog recording) are turned OFF. When using the battery, the P-SAVE mode minimizes power consumption.

**23 ANN/DATA switch**

Switches the speaker/earphone playback source between the recorded voice annotations and the data signal. In DATA mode, the signal of the monitored channel will be output to the speaker or earphone as sound.

**24 VOL knob**

Rotate to adjust the volume of the speaker or earphone.

**25 PHONE jack**

The main data or voice annotations recorded on the tape can be monitored by an earphone through this jack. Output from the speaker is cut when the earphone is plugged in.

Press this key to display the source index. The indexes generated in the machine and recorded on tape at the recording are referred to as SOURCE index, including ID number (ID), tape counter (COUNT) and SOURCE time (S-TIME; year/month/day, hour/minute/second). The ID number signifies the SOURCE data. Except for the ID number, each pressing of the key selects COUNT, REMAIN (tape remaining), S-TIME (year/month/day) and S-TIME (hour/minute/second) in succession.

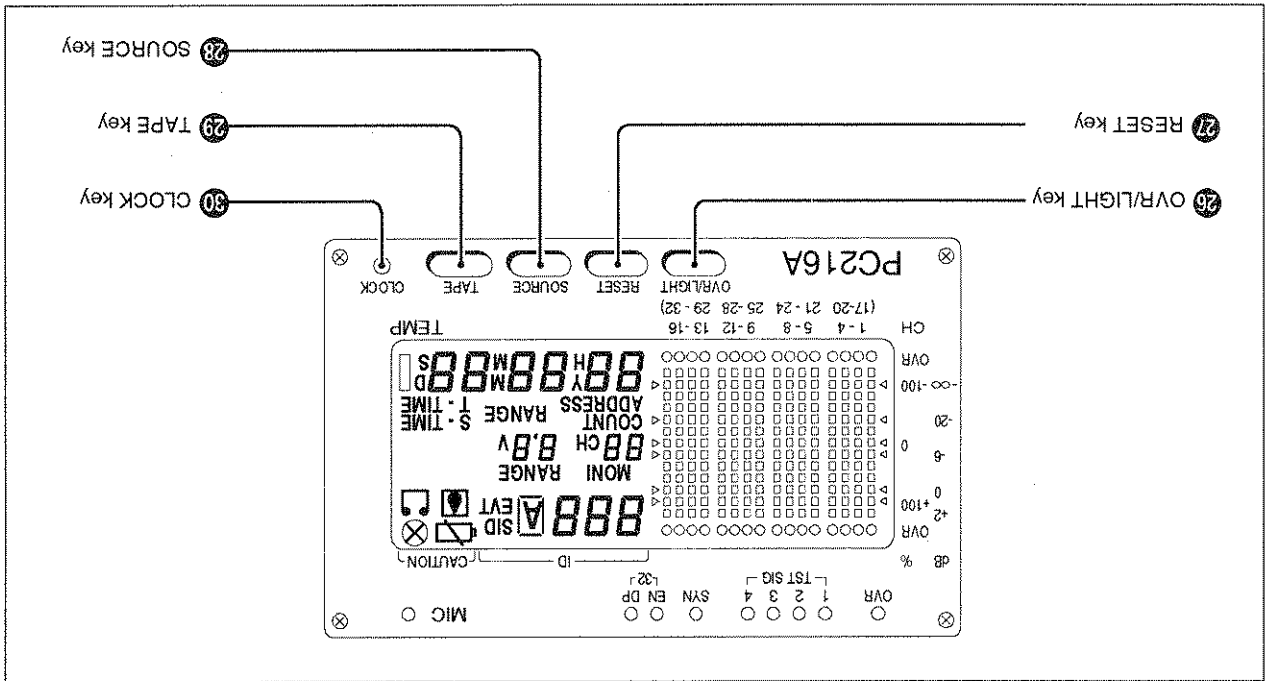
26 SOURCE key

- Press this key to reset the tape counter to zero.
- Pressing this key while the ID is being set resets the ID value to 000.
- While the input ranges are displayed all together, press this key to set all channels to the range to the selected channel.

27 RESET key

Each time this key is pressed, the lighting OVR LED and the OVR marks on the LCD go off. The backlight of the LCD is turned ON/OFF by pressing this key for two seconds in the NORMAL mode. By pressing this key for about two seconds during the P-SAVE mode, the backlight is ON for ten seconds only.

26 OVR/LIGHT key



Display (LCD) keys

## 29 TAPE key

Press this key to display TAPE Index.

The indexes played back from tape are referred to as TAPE Index, including ID number (ID), tape address (ADDRESS), and TAPE time (T-TIME ; year/month/day, hour/minute/second).

The ADDRESS signifies the tape counter values recorded on tape. The ID number signifies the TAPE data.

Except for the ID number, each pressing of the key selects ADDRESS,

REMAIN, T-TIME (year/month/day) and T-TIME (hour/minute/second) in succession.

## 30 CLOCK key

Press this key to set the clock. Pressing the key once allows setting of the year, month and day. Use the CH/NEXT key to shift the digit, and the UP or DOWN key to increase/decrease the value. Pressing the key a second time allows setting of the hour, minutes and seconds. When the clock has been set, press this key once again. The clock will start running at this point. The current year/month/day and time are displayed as S-TIME in the SOURCE mode.

Test Signal	TST SIG LED
± 100% AC (500 Hz for 1× speed, 1 kHz 2× speed)	1
+ 100% DC	2
- 100% DC	3
0V	4

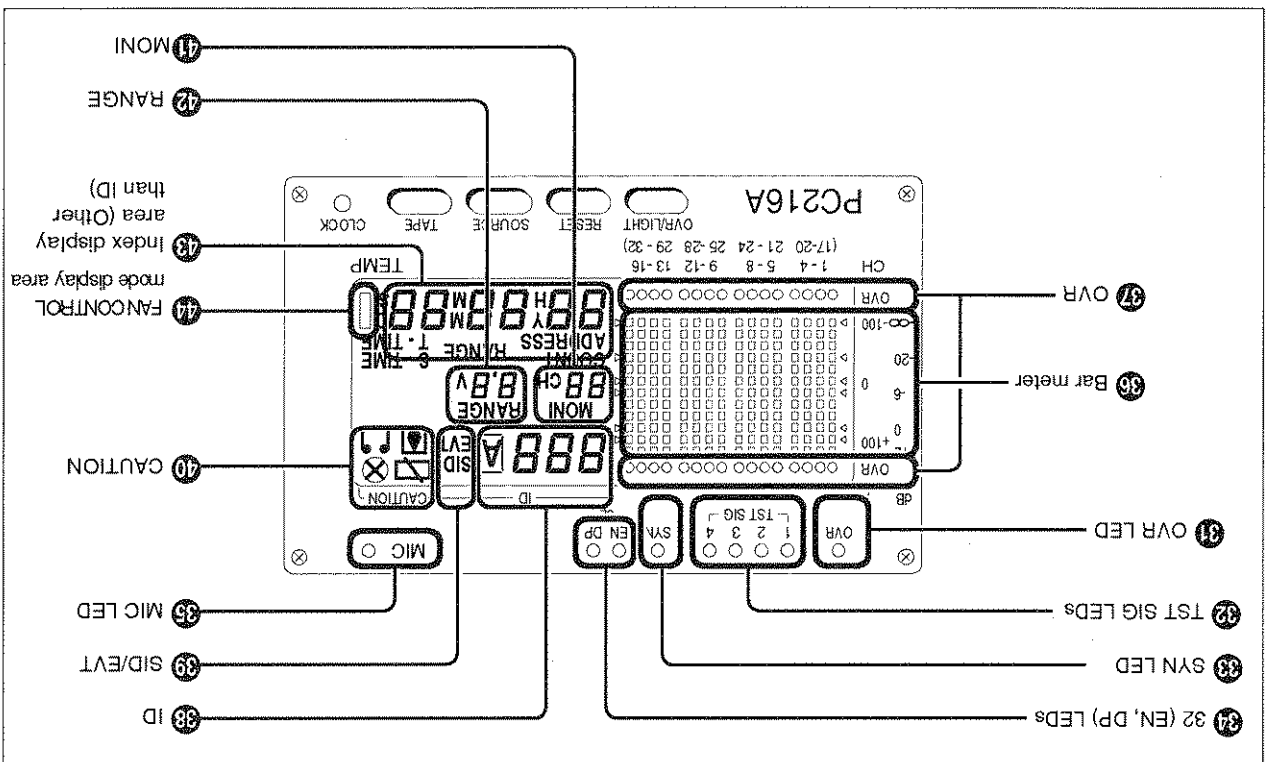
When the TST SIG key has been pressed one of the TST SIG LEDs will light, depending on which test signal is being generated, as follows:

**32 TST SIG LEDs (1 to 4)**

- In the REC, PLAYBACK, E-E, and REC-PAUSE mode, when the signal level in any channel among 1 to 32 channels reaches the over range which is beyond the dynamic range of the A/D or D/A converters, the OVR LED will be lit.
  - Select the mode to light the OVR LED by HLD/RAL switch on the rear panel. (See 2-2-2).
  - ① Hold mode (HLD)
  - ② Auto-reset mode (RAL)
- When the level is beyond the range, the OVR LED is kept lighting until the STOP key or the OVR/LIGHT key is pressed.
- The OVR LED lights for one second at the over range.

**31 OVR LED**


Display Panel (LCD)



**33 SYN LED**  
 During synchronizing mode, the SYN LED blinks or lights according to the status of the PC216A.  
 For details, refer to "6. Synchronizing Mode."

**32 (EN, DP) LEDs**  
 The EN LED lights when the optional channel expansion unit PCCX32 is connected and ready to use. In the 32 channel mode, press the 32-DP key so that the DP LED blinks indicating the bar meter being selected to the 17 to 32 channels.

**31 MIC LED**  
 During recording, the MIC LED will light when voice annotation is input from the microphone. The brightness of the LED varies according to the microphone input level. During playback, the MIC LED lights according to the voice annotation level (ANN/DATA switch is set to ANN) or signal level of the monitored channel (ANN/DATA switch is set to DATA).

**30 Bar meter**  
 The bar meter indicates the level for each channel.  
 • When the percentage scale is selected, the data signal level is displayed as a percentage (+100%, 0%, -100%, etc.) relative to the reference level ( $\pm 100\%$ ).  
 The reference level ( $\pm 100\%$ ) is defined as the level 33% below the full scale of the A/D or D/A converters. When the range setting is 1V, for example, the input level of  $\pm 1$  Vp indicates  $\pm 100\%$ .  
 In the case of DC signal or signals with slow amplitude change, a signal level (the peak level) of each channel is indicated by a single LCD segment. If signals with faster amplitude change are displayed, the level indications look like bars indicating positive and negative peak values. Therefore the percentage scale is useful to monitor the signals with DC offsets.  
 • When the dB scale is selected, the data signal level is displayed as a dB value (+2 dB, -6 dB, -20 dB, - $\infty$  dB, etc.) relative to the reference level (0 dB).  
 The reference level (0 dB) is defined as the level 2.5dB below the full scale of the A/D or D/A converters. When the range setting is 1V, for example, the input level of  $\pm 1$  Vp indicates 0 dB.  
 The level is indicated in one direction regardless of the signal polarity.  
 • The percentage scale or the dB scale can be selected by using the dB/% switch on the rear panel (Refer to 2-2 ).  
 The dB scale is suitable for acoustic measurements, while the percentage scale is suitable for measuring the data signals, which include a DC component, i.e. stress, distortion, etc.  
 • The dots, 0% dots (for percentage display) or - $\infty$  dB dots (for dB display), blink for monitored channels.  
 • The bar meters for valid channels only are displayed according to the mode selection.

**37 OVR** The OVR marks for each channel lights up when the signal level is at the over range. When the percentage scale is selected for the bar meter display, the OVR marks positive <+> or negative <-> side or both sides light up according to the signal level. The lighting mode can be selected between real-time and peak-holding. To select the mode, use the HLD/RAL switch on the rear panel (Refer to 2-2-2).

**38 ID** Any three digit number can be used as an ID number for discrimination, and it can written to any portion of the tape during recording. This ID number is shown on the ID display section.  
 In the SOURCE mode, the ID number displays the source index (values in the machine). In the TAPF mode, the ID number displays the tape index (Values recorded on the TAPF).  
 The auto-increment mode is set when **A** is displayed on the right side, and each time a recording operation is stopped the ID number increases by one.

**39 SID/EVT**

- The SID lights when START-ID is being recorded or played back. At each start of the recordings, START-ID is automatically recorded with 15-second duration (at normal speed).
- The EVT lights when EVENT-ID is being recorded or played back.

EVENT-ID can be recorded via RS-232C commands. Refer to 12-2.

**40 CAUTION** Warning messages concerning low DC voltage, mechanical malfunction, condensation in the machine and data errors are displayed in this section. For details, refer to section 3-6.

**41 MONI** Displays the channel number of monitored channel.

**42 RANGE** Displays, for each channel, the values for the monitored channel input range either in the machine (SOURCE mode) or on the tape (TAPF mode).

Display	±20 Vp	±10 Vp	±5 Vp	±2 Vp	±1 Vp	±0.5 Vp
Input range	20 V	10 V	5 V	2 V	1 V	0.5 V

±20 Vp, for example, is the range which becomes the reference level (±100% or 0 dB) when the +20 V peak or -20 V peak voltage is input.

Ⓔ **Index display area (excluding the ID)**

In the REC, E-E and REC-PAUSE modes, displays only the source data (Count, Remain and S-TIME). In the PLAYBACK, PLAYBACK-PAUSE, FF, REW and the STOP mode, by pressing either the SOURCE key or the TAFE key, the following displays or values can be selected.

- COUNT:** Displays the tape counter in ±hours, minutes and seconds.
- ADDRESS:** Displays the address (tape counter values recorded on the tape) in hours, minutes and seconds.
- REMAIN:** Displays the amount of tape remaining in hours, minutes and seconds.
- S-TIME:** Displays the source time in year/months/days and in hours/minutes/seconds.
- T-TIME:** Displays the tape time in years/months/days and in hours/minutes/seconds.

For details, refer to section 3-7.

Ⓕ **FAN CONTROL mode display area**

During FAN CONTROL mode, the rectangular mark of this section lights up or blinks. When the unit's internal temperature is low, the mark lights up. When the temperature increases, shortly before the ventilation fan starts, the mark blinks to draw attention. When the temperature increases even more, the mark goes OFF at the same time the ventilation fan starts and the FAN CONTROL mode is canceled. For details, refer to section 3-7.

Lights during the 16-Channel mode.

49 16ch LED

Lights during the 8-channel mode.

48 8ch LED

Lights during the 4-channel mode.

47 4ch LED

Lights during the 2-channel mode.

46 2ch LED

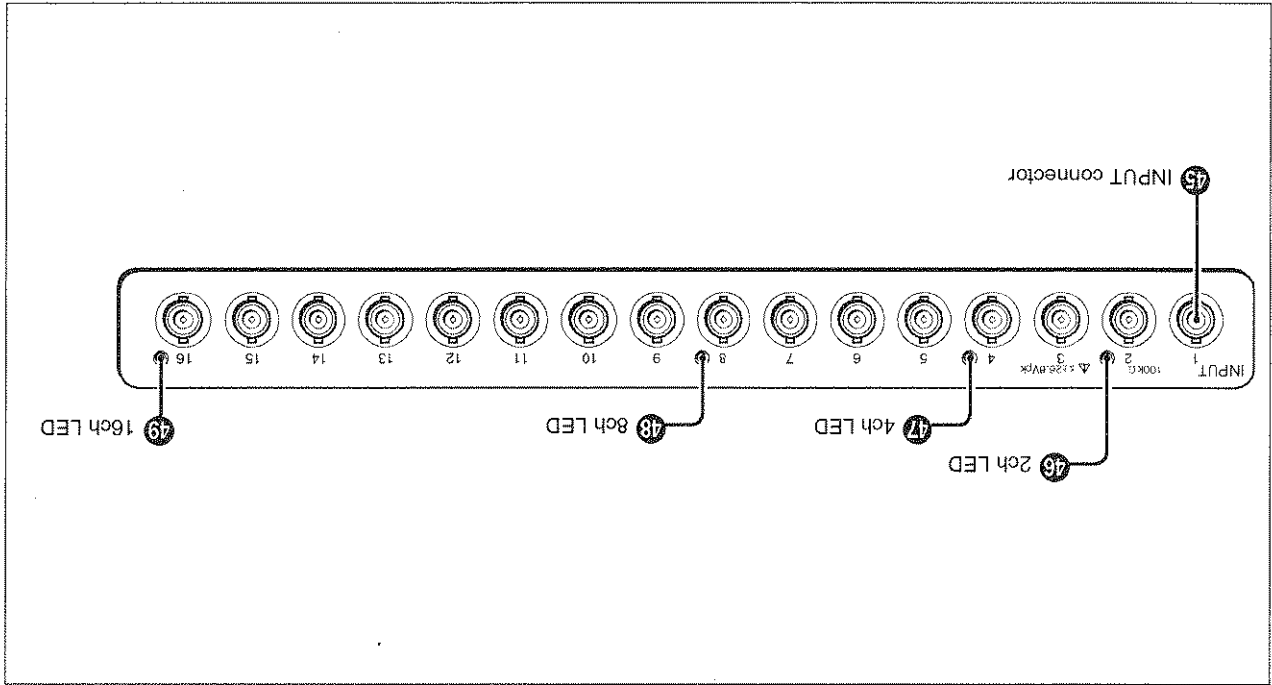
Channel mode	2	4	8	16	32
Active channel/connector	1, 2	1, 2, 3, 4	1, 2, 3, 4, 5, 6, 7, 8	1 to 16	1 to 32 (17 to 32: PCCX32)

Depending on the channel mode, the active channels differ. Refer to the CH LEDs on the front panel, as follows:

**Note**

Used to input analog data signals of 1 to 16 channels.

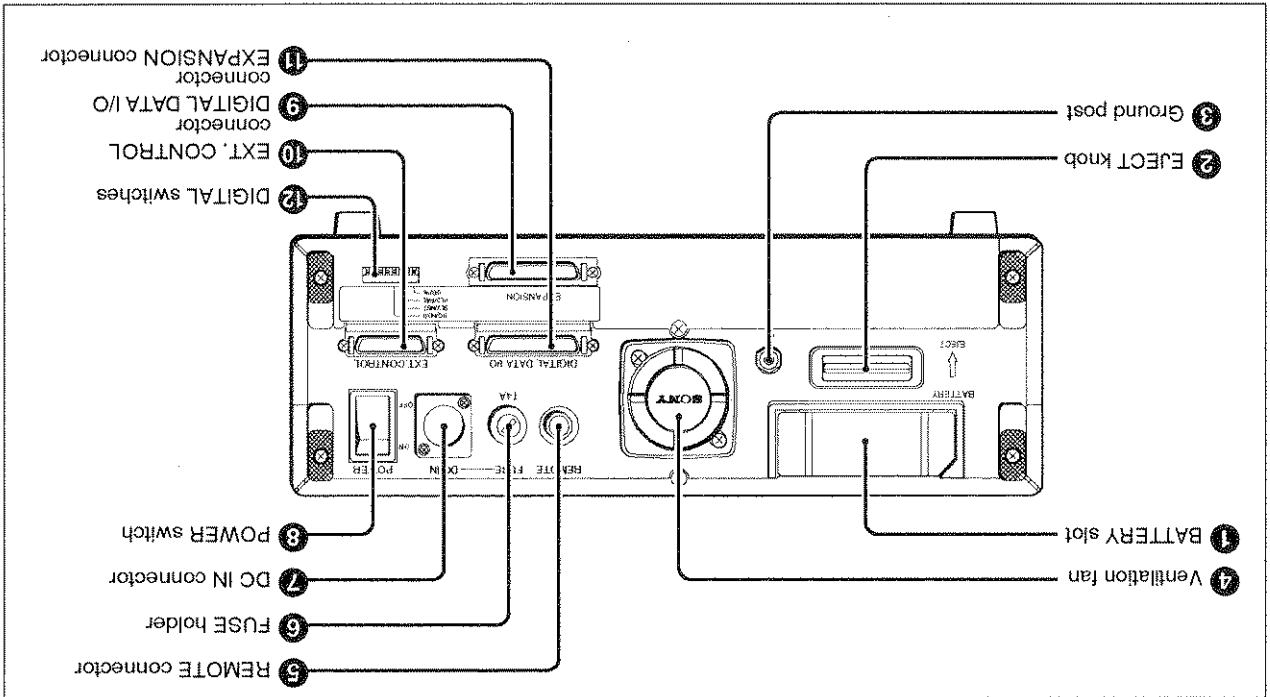
45 INPUT connectors



INPUT connectors



## 2-2 Rear Panel



- 1 BATTERY slot** Insert the AC power pack or optional battery pack here.

- 2 EJECT knob** Push the knob in the direction of the arrow to eject the battery pack/AC power pack.

- 3 Ground post** For safety reasons, connect the ground post to local earth (ground).

- 4 Ventilation fan** This fan cools the interior of the unit. It should not be blocked.

- 5 REMOTE connector**

Connect the optional remote control unit here. As the interface conforms to the RS-232C standard, the unit can also be controlled from a personal computer. To connect a computer to the unit, use the optional spare connector.

The DC fuse is inserted here.

**Note**

Use only fuses specified for use with this machine.

**6 FUSE holder**

**7 DC IN connector**  
External DC power (11 V to 30 V) can be supplied to this connector.

**8 POWER switch**

Turn this switch ON to supply power to the machine.

**9 DIGITAL DATA I/O connector**

Connect a 50-pin half-pitch connector for serial digital input/output, parallel digital output, and LSB channel input/output.  
For details, refer to 13. Digital Data I/O.

**10 EXT. CONTROL connector**

Connect a 36-pin half-pitch connector for controlling the machine by means of simple relay make contacts.  
Also use for synchronizing two PC216As.  
For details, refer to 6. Synchronizing Mode and 10. External Control.

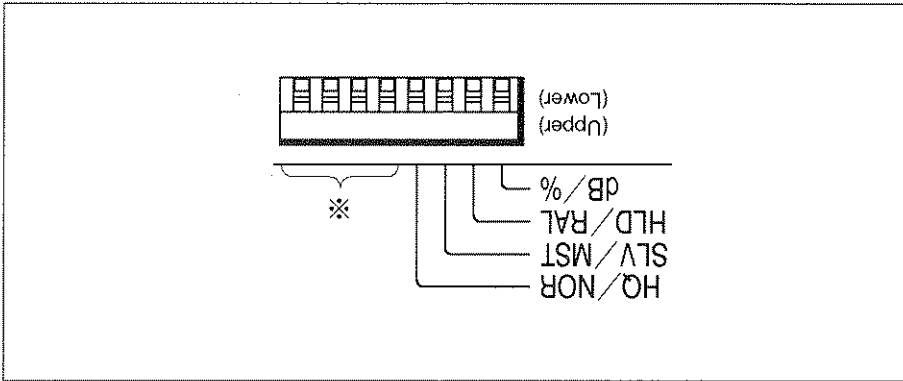
**11 EXPANSION connector**

Connect a 50-pin half-pitch connector for using the channel expansion unit PCCX32.  
For details, refer to 5. Channel Expansion Unit.

**Note**

Although the pin numbers are the same as the DIGITAL DATA I/O connector, the pin assignment differs.

12 Digital switches



• dB/% switch

To display in percentage scale, set the dB/% switch to lower position, and to display in dB scale, set to upper position.

• HLD/RAL switch

To set the real-time (auto reset) overrange display, set the HLD/RAL switch to lower position, and to set the peak-holding display, set to upper position.

In the real-time display, the OVR LED and the OVR marks on the LCD light up for one second at the overrange. In the peak-holding display, both the OVR LED and the OVR marks are kept lighting until the OVR/LIGHT key or the STOP key is pressed.

• SLV/MST switch

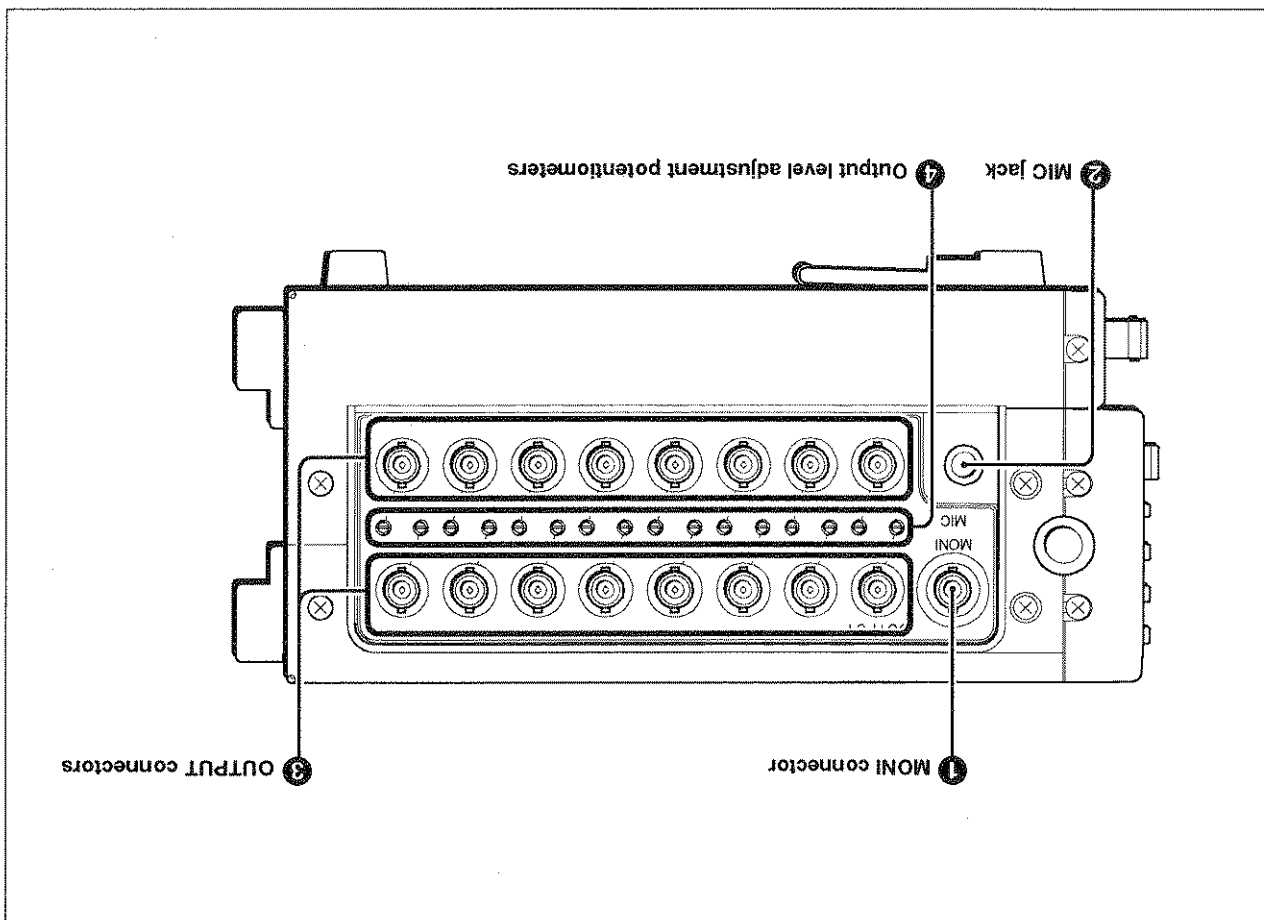
To set the PC216A as a master machine, set the SLV/MST switch to lower position, and to set as a slave machine, set to upper position. Refer to 6. Synchronizing Mode.

• HQ/NOR switch

To maintain compatibility of the voice annotation characteristics with other Sony's conventional series (PC108M, PC116, PC204/208, PC204A/208A), set the HQ/NOR switch to lower position. To further improve the voice annotation characteristics, set to upper position. During playback mode, the recording status (HQ or NOR) is automatically detected and switched.

**Note**

Be sure to set the \*-marked four switches to lower position.



2-3 Side Panel

① **MONI connector**  
Used to monitor the selected channel analog data signal.

② **MIC jack**  
Plug the supplied microphone into this jack.

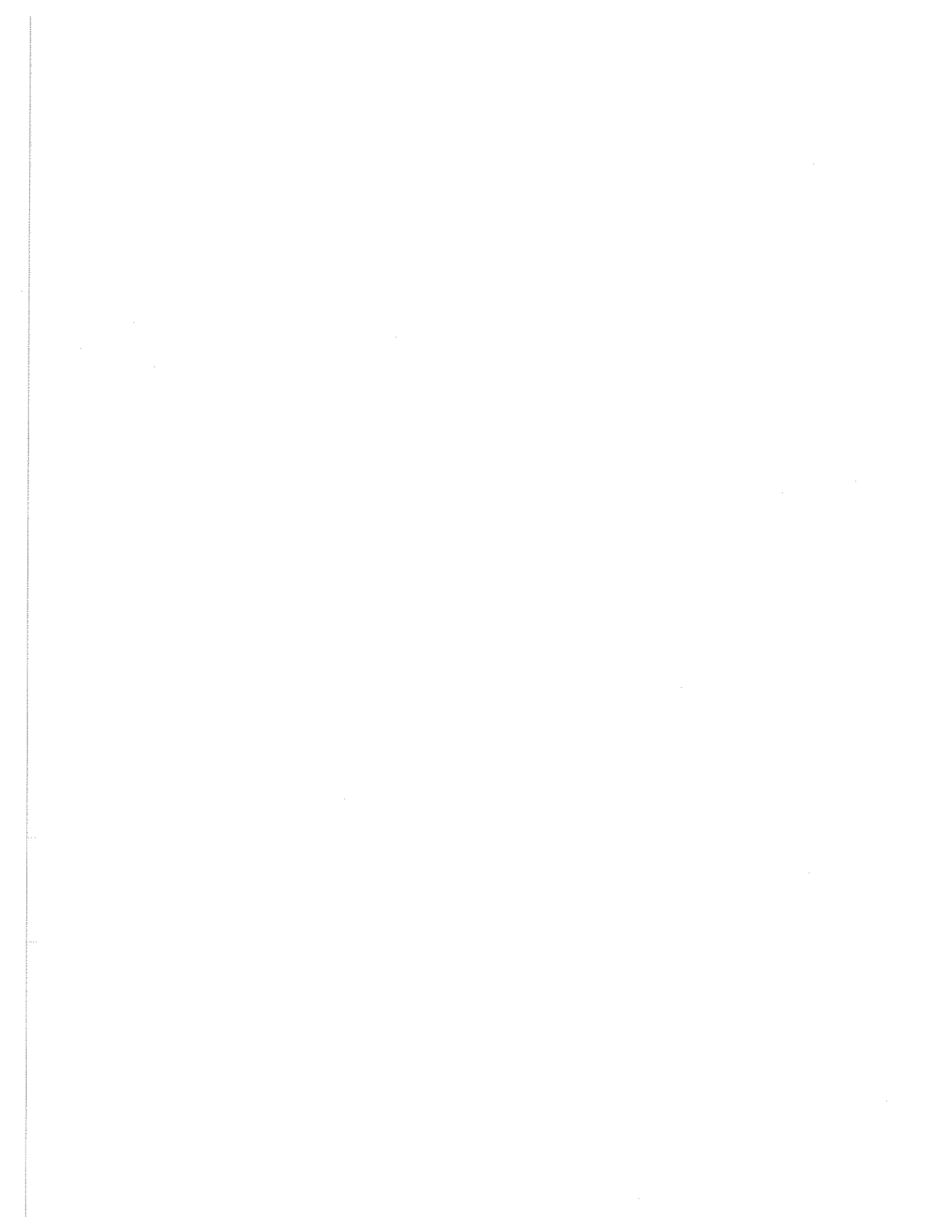
③ **OUTPUT connectors**  
Used to output analog data signals of 1 to 16 channels.

④ **Output level adjustment potentiometer**  
To adjust the output level of each channel (1 to 16), rotate this using the supplied precision screwdriver.  
Calibrated level of  $\pm 1\text{Vp}$  is available when turned fully counterclockwise, and adjustable up to  $\pm 3\text{Vp}$  by turning clockwise, while the input signal level is the reference level ( $\pm 100\%$  or 0 dB).

**Note**

Depending on the channel mode, the active connectors and potentiometers differ.  
Refer to the CH indication on the side panel, as follows:

Channel mode	Active channel/connector
2	1, 2
4	1, 2, 3, 4
8	1, 2, 3, 4, 5, 6, 7, 8
16	1 to 16
32	1 to 32 (17 to 32: PCCX32)



## 3 Preparations

### 3-1 Precautions

#### Use and Storage Locations

- Do not store or use the unit under any of the following conditions.
  - In excessive cold or humidity. Condensation occurs on the head drum when the unit is moved from a cool to a warm location, or used in a humid atmosphere. If condensation occurs, the unit stops transporting the tape and removes the condensation using the internal heater.
  - In excessive heat. Especially take care that the unit does not exceed the recommended temperature when operating it in a locked automobile in summer.
  - In dusty locations or in locations near strong magnetic fields. Keep the tape transport areas clean, and protect the tape from magnetic fields. Clean the heads periodically using the supplied cleaning cassette.

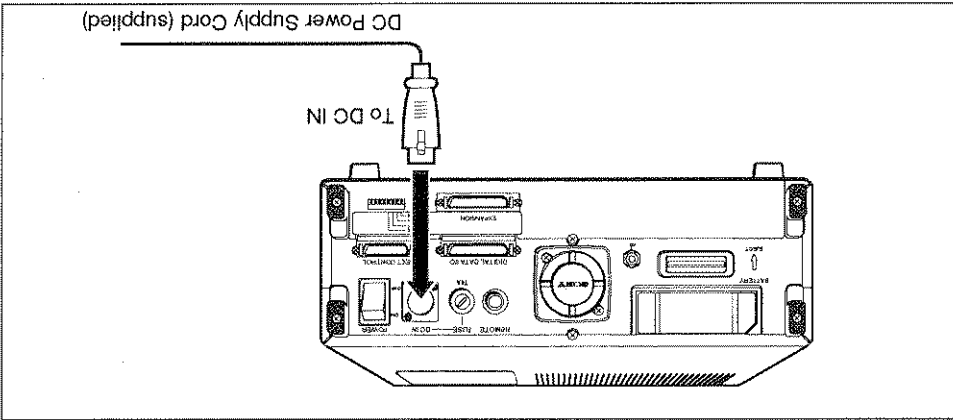
#### Cassettes

- In order to maintain optimum recording and playback conditions, take note of the following points.
- Be careful not to touch the tape inside the cassette.
  - When the cassette is to be stored for a long period of time, place it in the case and store it in a location not subject to high temperatures or high humidity.
  - Recording on a previously recorded tape will erase the recorded material.
  - To avoid accidental erasure of important recorded material, set the safety tab to the recording disabled position.

## 3-2 Connecting the Power Supply

### Using a DC Power Supply

Connect the supplied DC power supply cord (positive for white, negative for black) to the DC IN connector, and supply 11 to 30 V DC. If the supplied AC power pack is installed, the unit takes its power from the AC power pack.

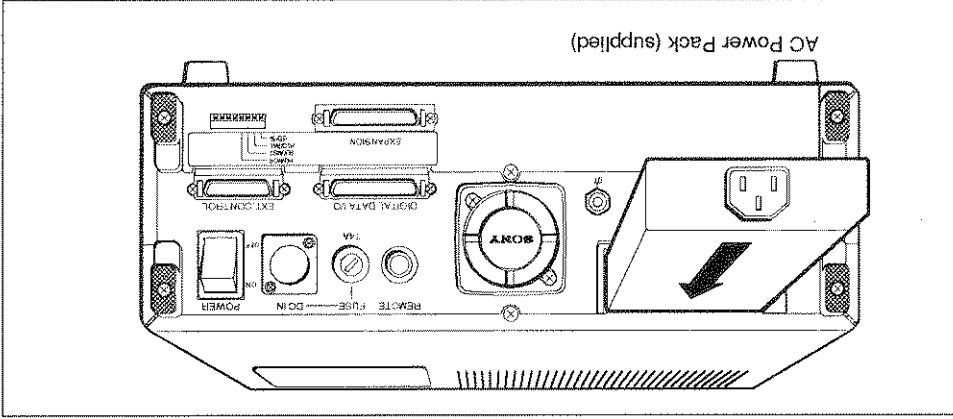


#### Note

When supplying the power from the airplane, etc., make sure that the voltage does not exceed 30 V. Or the DC fuse will be broken by the overvoltage protection circuit.

### Using an AC Power Supply

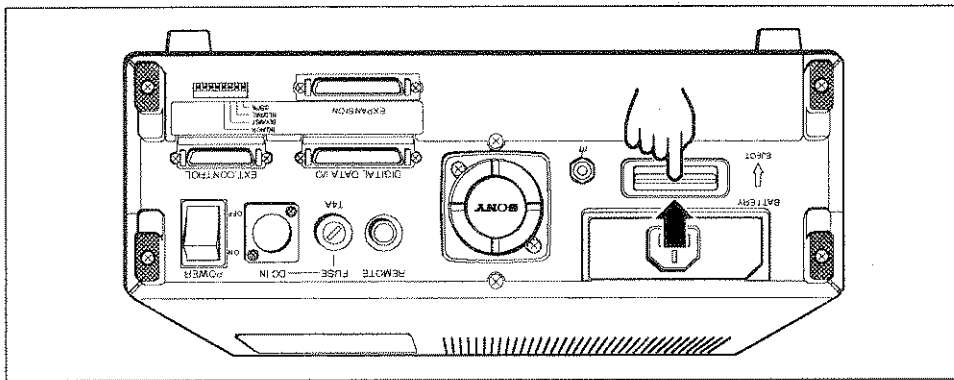
Insert the supplied AC power pack into the rear panel battery slot, and supply 100 to 240 V AC.



#### Note

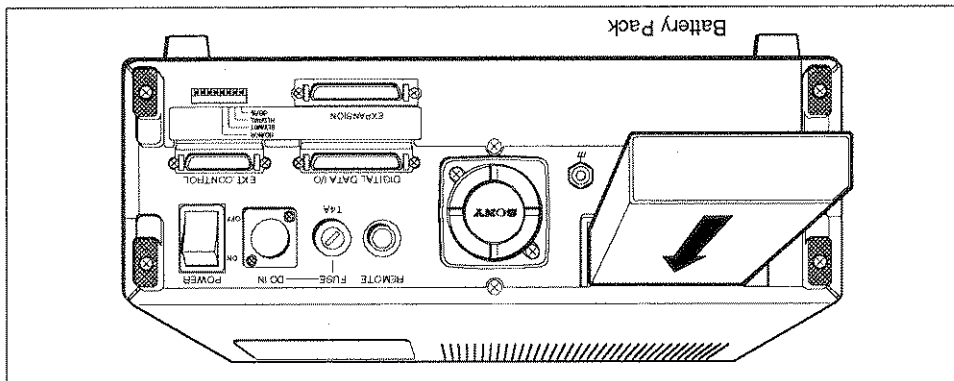
When supplying the AC power from an inverter, make sure that no excessive spike noises are added.





To remove the AC power pack (or the battery pack), push the EJECT knob, located below the battery slot, in the direction of the arrow.

### Ejecting an AC Power Pack (or a Battery Pack)



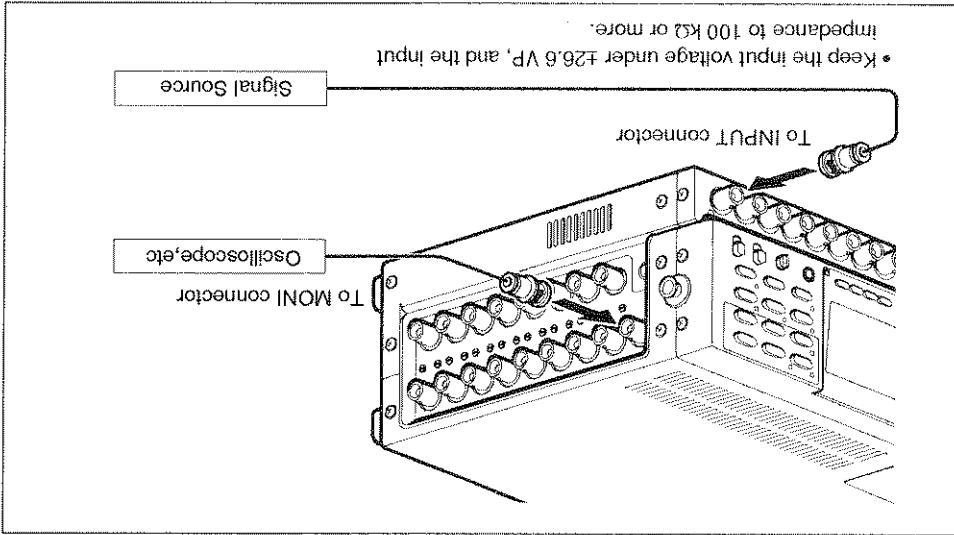
Insert the optional charged battery pack into the battery slot. If the DC power supply cord is connected to the DC IN connector, the unit operates from the external DC power supply in preference to the battery pack.

### Using a Battery Pack

### 3-3 Connecting Signals (Analog Mode)

#### Data Signal Connection

Using an optional BNC cables, connect the INPUT connector of each channel to a signal source. If required, connect an oscilloscope to the MONI connector (monitor output) using the optional BNC cable.

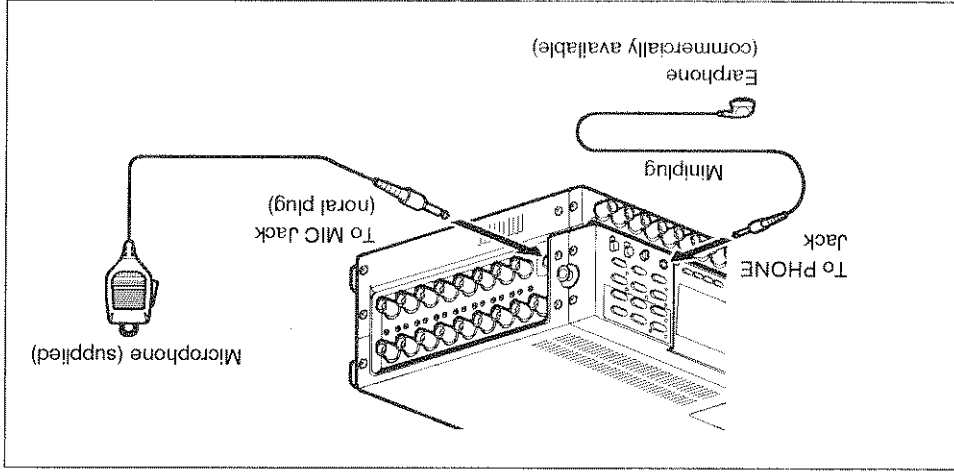


#### Note

Depending on the channel mode, the available connectors differ. Refer to the CH indication on the front panel.

#### Microphone and Earphone Connection

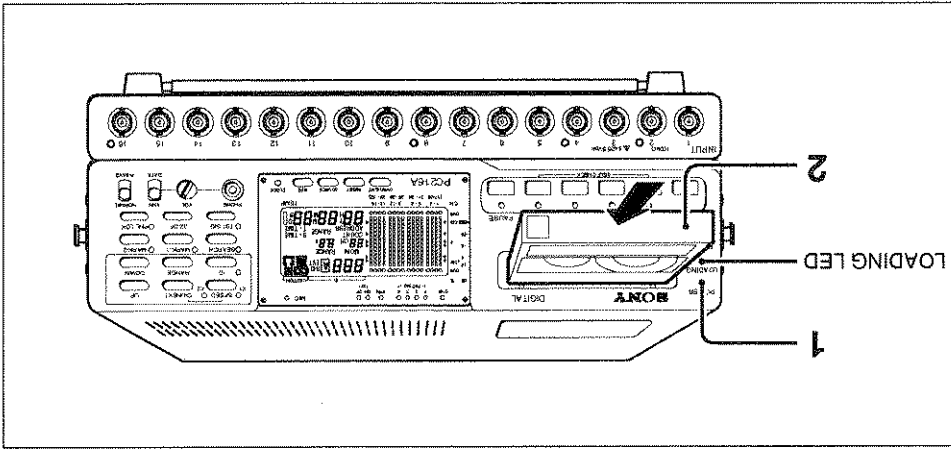
Connect the supplied microphone and commercially available earphone to their respective jacks when necessary.



#### Note

Output to the speaker is disabled when the earphone is plugged in or during recording mode.

Loading a Cassette



1 Check that the POWER switch is set to ON (the POWER LED will light).

2 Insert a cassette into the cassette compartment. Press the arrow indicated part

(cassette bottom center).

The LOADING LED blinks while the tape is being threaded onto the tape

path.

When loading is complete, the LOADING LED will stay lit.

Note

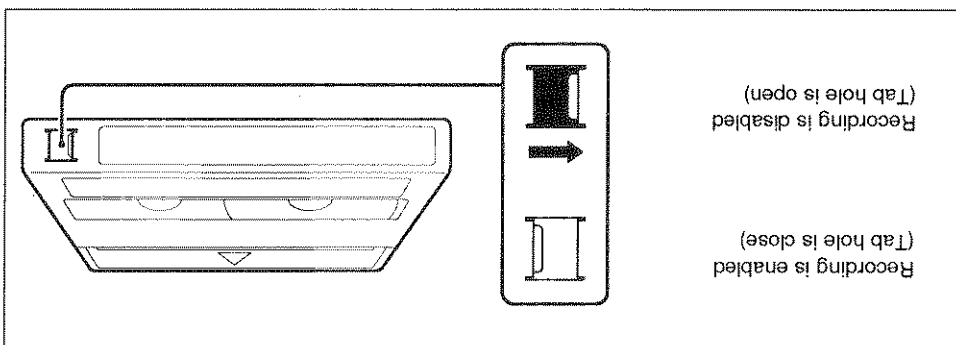
To prevent damage of the cassette compartment, do not use excessive force when inserting the cassette.

When the power switch is turned OFF, the cassette can not be inserted.

Also, when the mechanical error code is displayed, the cassette can not be

inserted.

Therefore, be sure to insert the cassette after turning ON the power switch again.

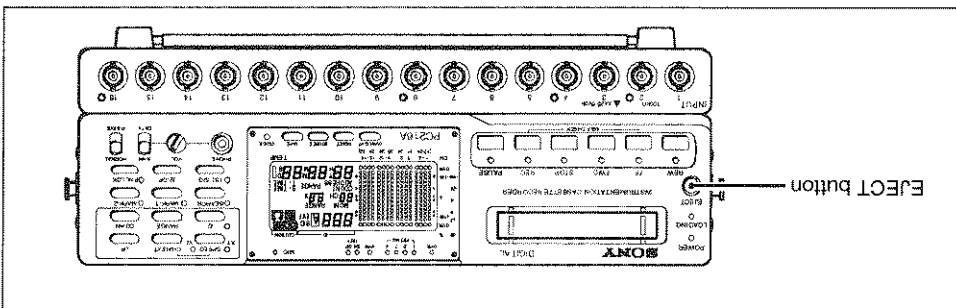


To ensure that needed data is not accidentally overwritten, set the safety tab on the cassette to the position shown below, so that the tab hole is open. With the safety tab in this position, recording is disabled.

### Preventing Overwrite to a Recorded Tape

If the unit is placed so that the front panel is facing upwards, the cassette may not eject successfully.

**Note**



With the power ON, press the EJECT button to remove the cassette (unloading). While the tape is being unloaded, the LOADING LED will blink.

### Ejecting the Cassette

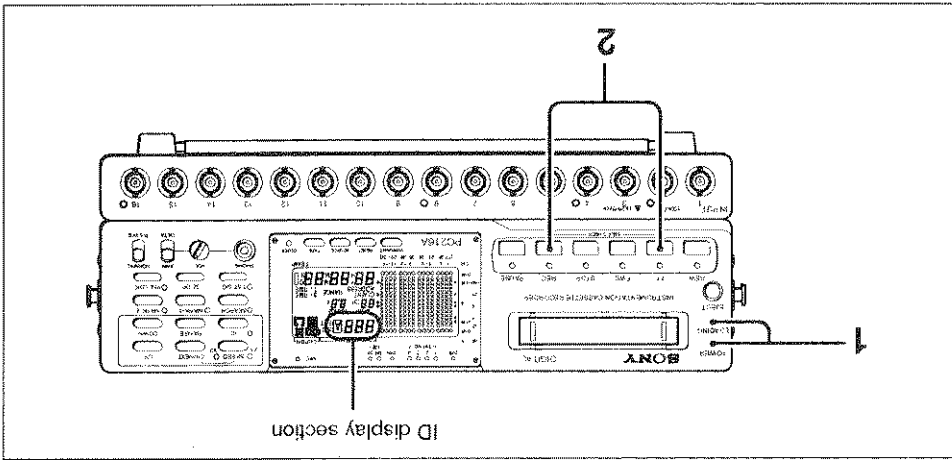
## 3-5 Self-Checks

Perform the self-check prior to operation to confirm the unit is functioning normally.

The self-check process consists of the following operations:  
(Required 75 seconds approx, for PC216A only or 85 seconds approx, with PCCX32 to complete the checks.)

- Power supply check
- Servo checks
- Head (Record/Playback) checks
- Recording and playback amplifier checks

### To Enter the SELF-CHECK Mode



- 1 Turn the power switch ON, and insert a cassette.  
Because signals are recorded on the tape during the self-check, use a spare cassette for this purpose.  
If the cassette is record-protected (the tab hole is open), it will be automatically ejected and "SLF" will be displayed on the ID display section until the STOP key is pressed.

- 2 To enter the SELF-CHECK mode, press the FF key while holding the REC key down.  
The symbols "CAL" and "SLF" will be displayed in the ID display section in sequence, and a self-check will be performed.

- 3 If no cassette is inserted in SELF-CHECK mode, only calibration of DC offset and gain are performed. Required 20 seconds approx, for PC216A only or 25 seconds approx, with PCCX32.

If no error has been detected by the SELF-CHECK mode, the symbol "SLF" will be extinguished. If an error has been detected, error code will be displayed in the ID display section.

There might be a case that each error code is displayed other than during the SLF CHK mode. When the error code is displayed even though any countermeasures have been taken, please contact a Sony service center.

**E01 : Power supply voltage error**  
 Power supply failure. Check that the voltage is within the specified range, or use a fresh battery pack.

**E02 : RS-232C command error**  
 An incorrect command has been received from the host computer.

**E03 : Unable to play back (1)**  
 Displayed when loading and playing back a tape which was try to playback a 2-channel mode recording tape by the  $\times 2$  speed, or a tape recorded in not provided channel mode.

**E04 : Unable to play back (2)**  
 Displayed when a tape which has been recorded in a different modes (analog/digital) is played back. Select the correct mode for the tape. (Refer to 11. DIGITAL DATA I/O.)

**E05 : Sync error**  
 Displayed when an error is occurred during sync mode. (See 6. Synchronization Mode.)

**E06: Channel Expansion Unit error**  
 Displayed when an error occurred during operation of the unit. Reconfirm the cable connection.

**E07 : Interruption caused by condensation**  
 Displayed when the operation has been stopped due to a dew condensation.

**E11 to 19 : Mechanical malfunction**  
 Mechanical malfunction. Press the EJECT button and remove the cassette, or turn the POWER switch on the rear panel ON and OFF.

**E31 to 39 : Internal communication error**  
 Communication error between the CPUs in the unit.  
 Turn the power switch on the rear panel ON and OFF.

**E99 : Write/Read error**  
 Head writing or reading is faulty. Replace the tape with a new one, or clean the heads with the supplied cleaning cassette.

**A01 to A32 : A/D or Amplifier error (A17 to A32: Only when the channel expansion unit is connected.)**  
 The A/D converter section or input amplifier system is faulty.

**d01 to d32 : D/A or Amplifier error (d17 to d32: Only when the channel expansion unit is connected.)**  
 The D/A converter section or output amplifier system is faulty.

**S01 to S32 : Signal processing error (S17 to S32: Only when the channel expansion unit is connected.)**  
 The overall signal processing of the recording/playback amplifier system is faulty. The heads may be dirty, in which case error codes for all the channels will be displayed. Clean the heads with supplied cleaning cassette.

### 3-6 Warning Display

If a malfunction occurs in the unit, the appropriate symbol will be shown by the warning display in the CAUTION area.

In this situation, perform the measures outlined below before operating the unit further.

#### (Low DC voltage)

This is displayed when either the battery voltage or the external DC voltage has dropped below the required level.

Replace the battery pack with a charged one, or check the DC power supply (11 to 30 V).

To prevent malfunction, and for longer operating times, replace the battery pack with a fully-charged one as soon as the low DC voltage symbol is displayed.

The durability of NP-1B (new and fully-charged) for continuous operation are as follows:

	NORMAL mode	Approx. 40min	PC216A
	P-SAVE mode	Approx. 60min	PCCX32
		Approx. 80min	
		Approx. 150min	

#### (Mechanical malfunction)

This is displayed when the drum or reel malfunctions, or if the cassette has not been loaded properly.

1. When a mechanical malfunction is detected, the tape will stop.
2. Eject and reload the cassette, then run the tape.
3. If the warning symbol is still displayed after step 2 has been performed, turn the power OFF, and then ON again.
4. If the malfunction is still present, contact a Sony service center.

#### (Condensation)

This is displayed when the moisture is condensed on the head drum caused by using the unit in an excessively cold or humid location, or moving from a cool to a warm location.

During this display, the tape will stop and the condensation will be removed by the internal heater.

Do not use the unit until the warning display has been extinguished.

## Servo Lock

The condition in which the tape and the drum have reached the specified speed during recording or playback is called "Servo Lock". Locking the servo takes a couple of seconds after start up. The servo lock condition cannot be reached until approximately one second after the FWD key is pressed, and approximately 0.5 seconds after pause release. Data is not recorded or played back until this time.

## Calibration

The DC offset and gain errors are automatically calibrated at POWER ON and in the self-check mode. When a self-check is conducted without a cassette inserted, only calibration is performed.

## 3-7 Notes on Key Operations and Operation Modes

Having a 4-head drum, the unit's read-after-write (RAW) system enables recording and playback to be performed (track recorded is immediately traced by two playback heads) simultaneously, and writing errors to be detected. If writing errors are detected by tracing the track, an error indication is shown on the display.

Causes of the writing error are either scratches or wrinkles on the tape, or head clogging (dirt build-up on the heads). Therefore, if writing errors occur, replace the cassette or clean the heads as appropriate using the supplied cleaning cassette. When the error check mark is randomly displayed, the analog data can be reproduced by the interpolation function of the unit.

This error message will also be displayed when an unrecorded portion of the tape is played back. If the error mark is persistently displayed beyond that section of tape, replace the tape or perform head cleaning.

If the error mark is still displayed, contact a Sony service center.

## ⊗ (Error check)



## Panel Lock

---

The front panel PNL LOK key is used to prevent the accidental operation of the front panel during recording and the subsequent interruption of the recording of important data.

Press the PNL LOK key continuously for about two seconds. The PNL LOK key LED lights, and most of the front panel keys are locked. To release the lock, press the PNL LOK key again for two seconds. The PNL LOK key LED will be extinguished, and the lock released.

## Tape Running Modes

---

With the following exceptions, the various tape running modes can be directly entered without the need to press the STOP key first.

- E-E mode
- This mode can only be entered from the STOP mode (by pressing the REC key).
- REC mode
- This mode can be entered from the STOP mode, by holding down the REC key and pressing the FWD key. Also from the E-E mode, by pressing the PAUSE key twice.
- During searches and self-checking, only a STOP command will be accepted.
- During recording, only a PAUSE or a STOP command will be accepted.
- To switch from FWD mode to FF or REW mode, press the STOP key and then the FF or REW key.

## Power Save Mode

---

The power save mode is provided to minimize the power consumed during recording. To enter the power save mode, set the NORMAL/P-SAVE switch to P-SAVE. During this mode, the backlight of the LCD display and the playback circuitry will be turned off.

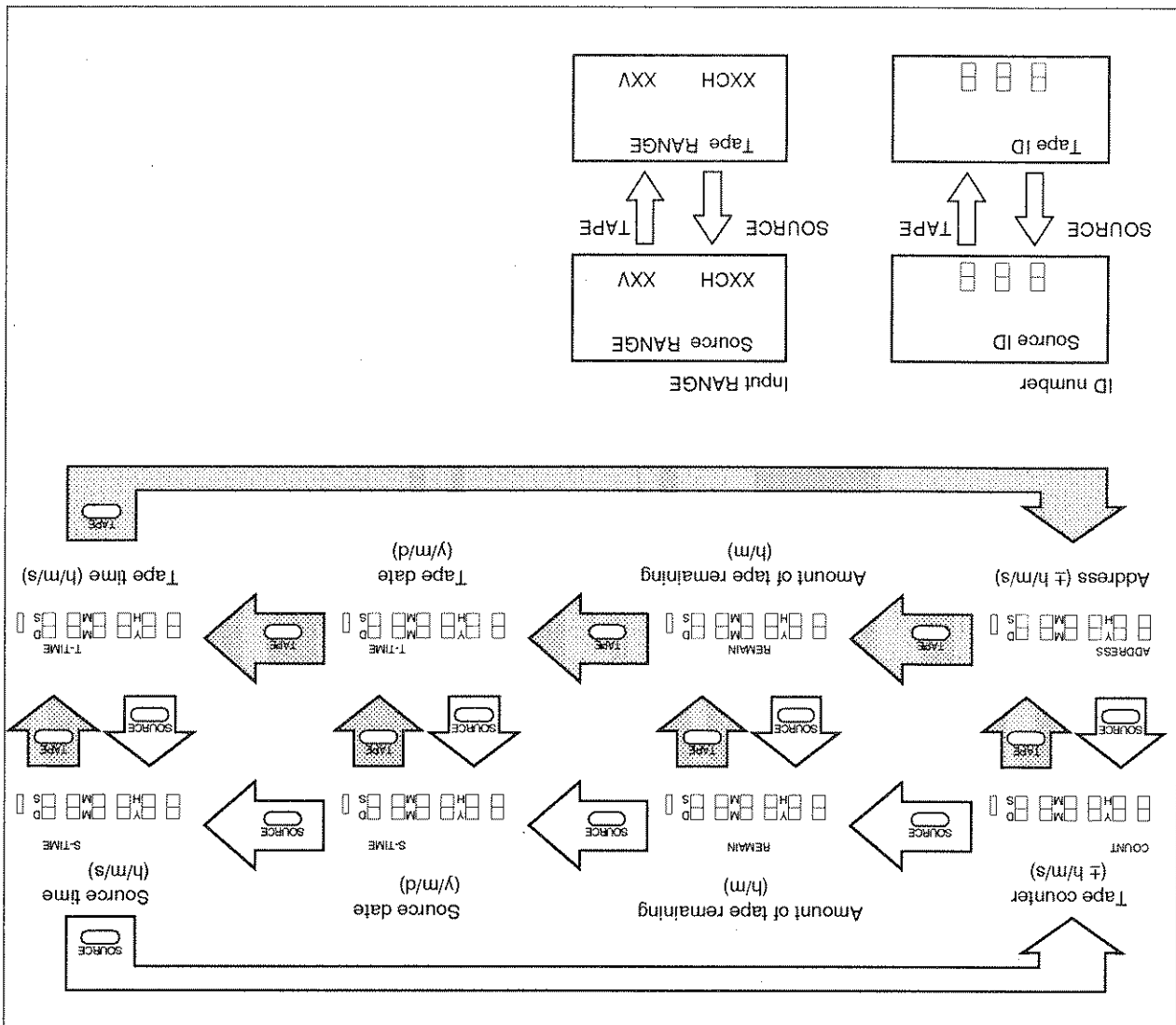
### Note

When the mode has been changed from NORMAL to P-SAVE mode, noise may come out from the OUTPUT connectors in a moment. Of course, these do not affect the data recorded on tape.

### SOURCE mode/TAPE mode

During playback, the index (ID number, counter, address, time) and the setting of input RANGE can be switched between the SOURCE mode (displaying the source data) and the TAPE mode (displaying the tape data), by pressing the TAPE or SOURCE key.

The switching sequence and contents are as follows.



The machine automatically goes into the source mode display during the REC, REC-PAUSE or E-E mode.

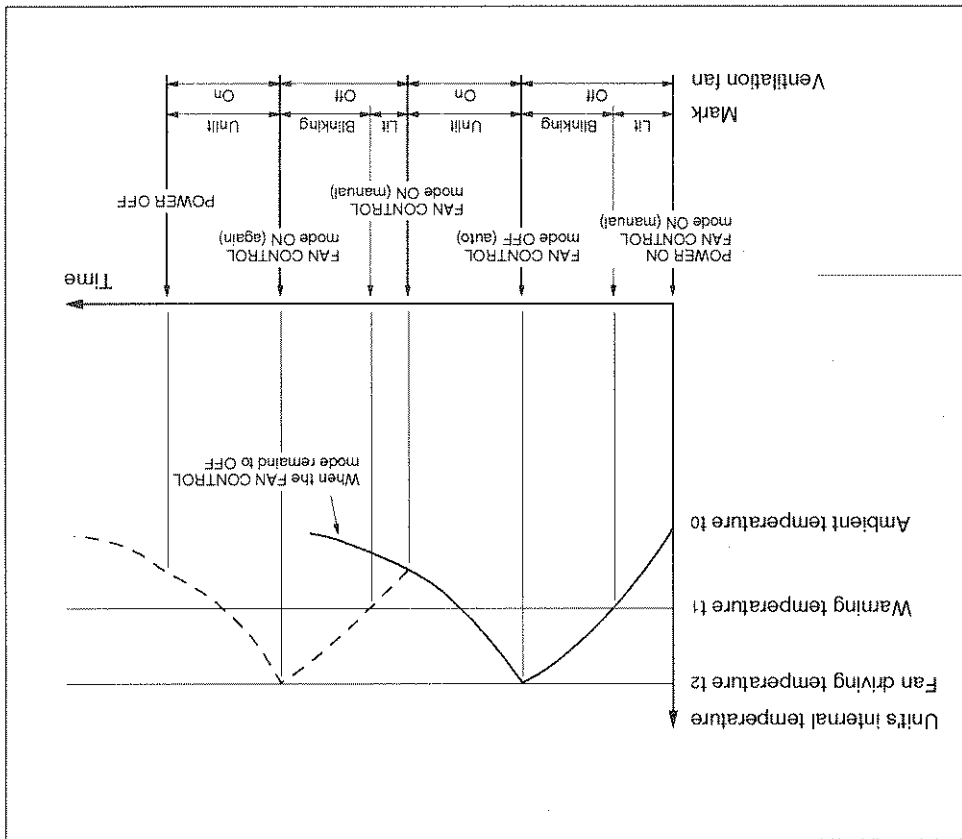
When these modes are switched to the FWD mode again, the display mode (source or tape) of the previous FWD mode is automatically switched on.

If channel mode, input range and ID number are newly set in the STOP mode, the display automatically changes to the SOURCE mode.

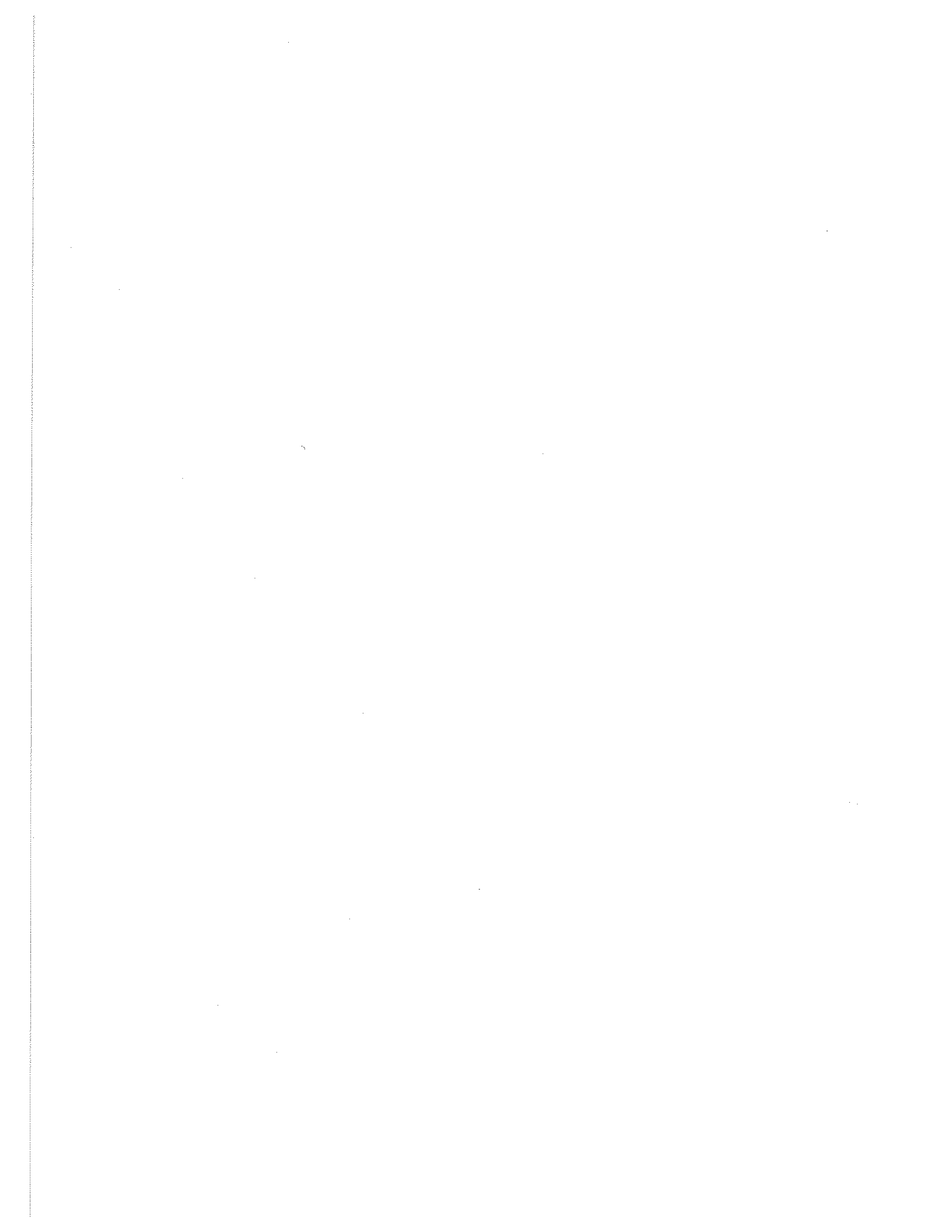
## FAN CONTROL mode

This mode is designed to reduce the noise level by stopping the ventilation fan when the unit's internal temperature is low. The FAN CONTROL mode is toggled by pressing the DOWN key with the LP key held down. In the FAN CONTROL mode, the rectangular mark lights or blinks according to the unit's internal temperature as follows:

- The rectangular mark stays ON until the unit's internal temperature reaches the warning temperature  $t_1$ .
- When the unit's internal temperature exceeds the warning temperature  $t_1$ , the rectangular mark blinks as a warning indication.
- When the unit's internal temperature reaches the fan driving temperature  $t_2$ , the ventilation fan starts operation and the rectangular mark indicator goes out (FAN CONTROL MODE is OFF).



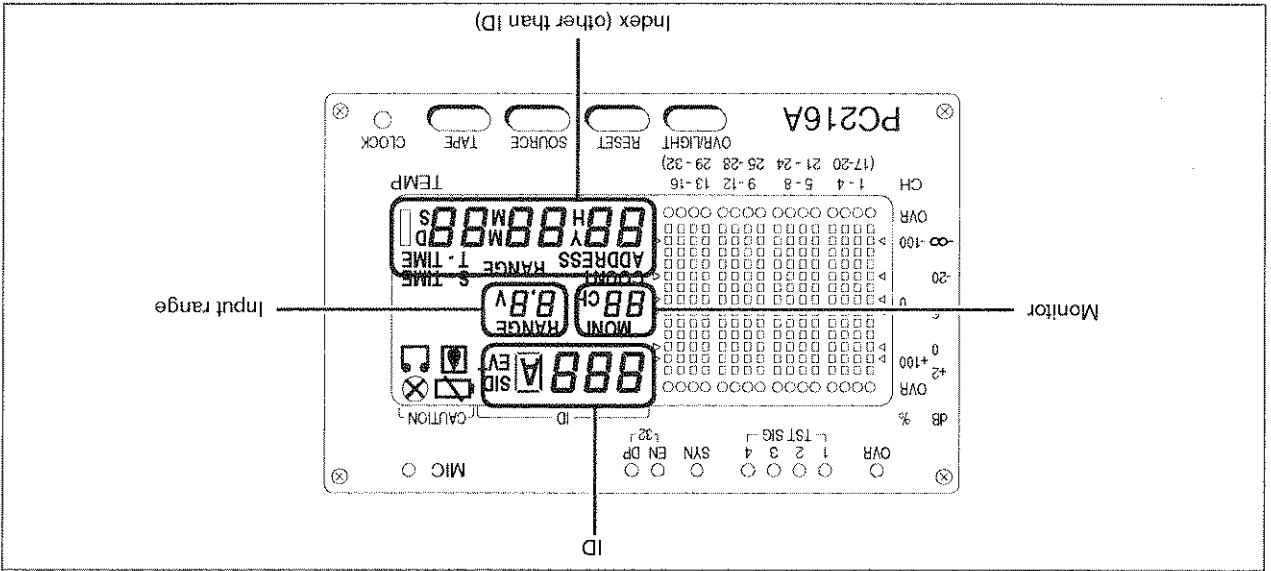
The period of time before the fan stops depends on the unit's internal temperature and the ambient temperature. Generally, however, it takes 15 to 20 minutes (in P-SAVE mode) from the power ON for starting (cold start) till the fan driving when the ambient temperature is 20°C.



# 4 Recording/Playback (Analog mode)

## 4-1 Prior to Operation

When the power is first switched ON, the following display is shown. Before commencing recording or playback, set any necessary values.



## CH/NEXT (Channel Mode)

The channel mode can be switched in turn as 2 → 4 → 8 → 16 → (32 → ) 2, when the CH/NEXT key is pressed while pressing the SPEED key. The frequency band and recording time changes according to the channel mode and the tape speed as follows.

Tape Speed	Frequency Band						Recording Time
	2 channel mode	4 channel mode	8 channel mode	16 channel mode	32 channel mode (With PCCX32)	DG60MA	
Normal Speed	DC to 20 kHz	DC to 10 kHz	DC to 5 kHz	DC to 2.5 kHz	DC to 1.25 kHz	120 min	180 min
2 × Speed	—	DC to 20 kHz	DC to 10 kHz	DC to 5 kHz	DC to 2.5 kHz	60 min	90 min

## SPEED (Tape Speed)

Select the tape speed (normal or double speed) with the SPEED key. The selected LED (× 1 or × 2) lights green.

## MONI (Monitor)

The monitored channel number is indicate here. Each pressing the CH/NEXT key the next channel is selected, even during recording or playback. On the other hand, by pressing the UP or DOWN key a channel having higher or lower channel number can be selected respectively.

## RANGE (Input range)

The input range of monitoring recording amplifier is displayed on the RANGE area.

To alter the input range, perform the following steps:

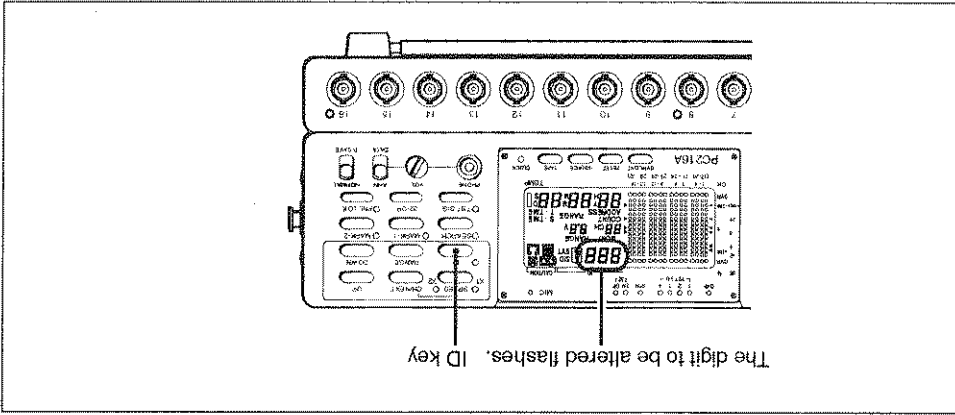
- 1 Press the RANGE key. Using the CH/NEXT key, select the target channel number and enter the desired value by using the UP and DOWN keys.

- 2 Press the CH/NEXT key to shift to the next channel, and set as above.

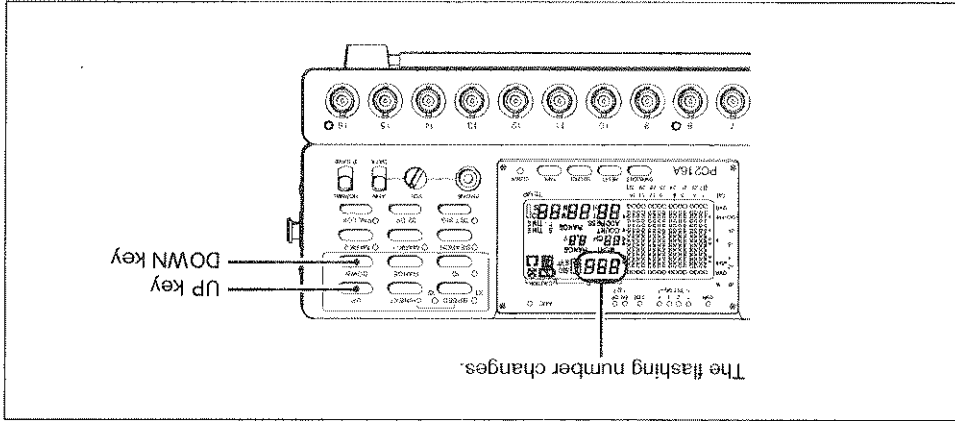
## Setting the ID Numbers

The ID number can be any three digit number, and can be set in STOP or E-E mode.

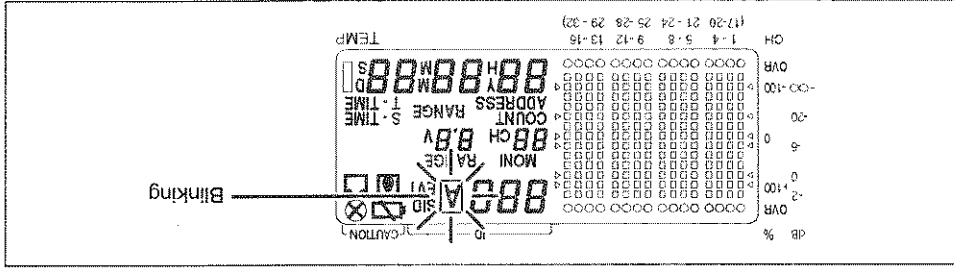
- 1 Press the ID key to enter ID setting standby mode. On the ID display section, the digit which can be altered will blink.



- 2 Using the UP and DOWN keys, set the value of the blinking digit.



In this mode, each time a recording session is stopped the ID number increases by one. The next session will be assigned the new ID number.



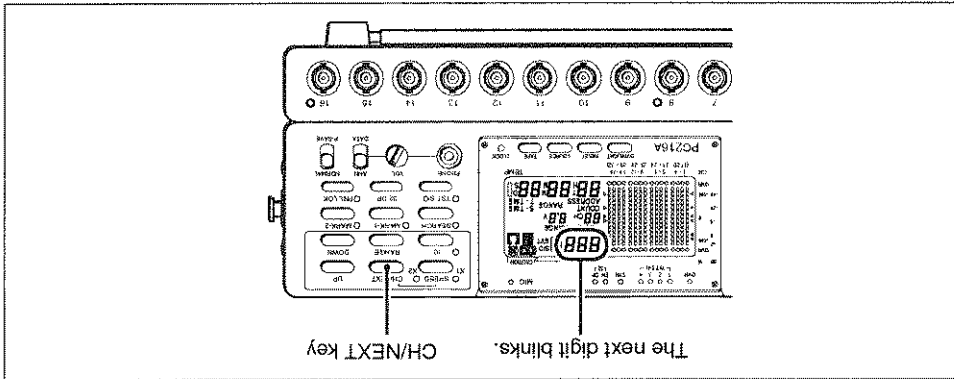
② The square frame blinks. No character appears in the frame. → - Auto-increment mode OFF

① The square frame blinks and the **A** mark appears. → **A** Auto-increment mode ON

To increase the ID number with each recording operation (Auto-increment mode) During ID setting standby mode (step 3 above), press the CH/NEXT key to start the square frame of the **A** mark blinking. Then select ① of the following by pressing the UP and DOWN keys, and press the ID key once again to light up the **A** mark.

5 When the ID number has been set, press the ID key again. To increase the ID number during recording The ID number will increase each time the ID key is pressed during recording or recording pause.

4 If the RESET key is pressed during the set up operation, the ID number will reset to 000.

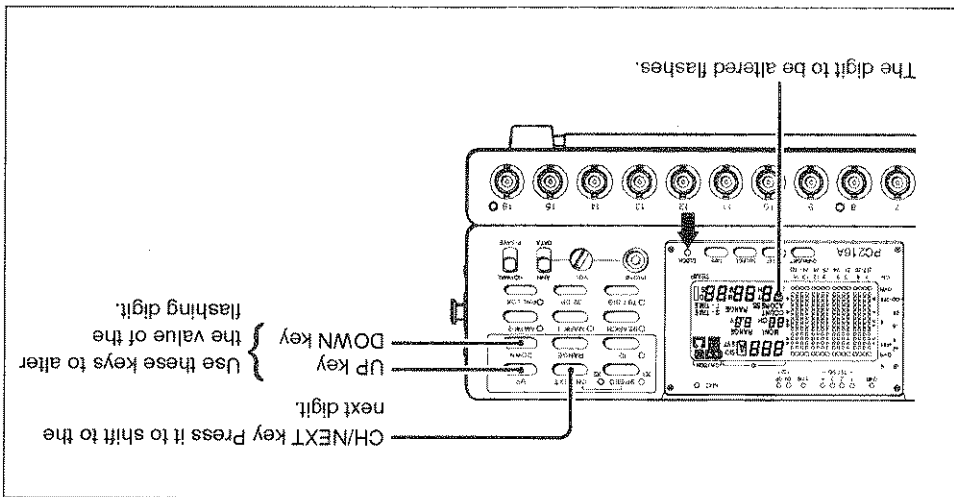


3 Press the CH/NEXT key to shift to the other two digits and set their values.

## Setting the Clock

To set the internal clock:

- 1 Use the tip of a mechanical pencil, or a similar object, to press and release the recessed CLOCK button. The year, month and day can now be set. Using the UP and DOWN keys, set the value of the blinking digit. Press the CH/NEXT key to shift to the next digit.



- 2 When the year, month and day have been set, press the CLOCK key again. The hour, minutes and seconds can now be set. Using the UP and DOWN keys, set the value of the blinking digit, then press the CH/NEXT key to shift to the next digit.
- 3 Press the CLOCK key once again. The clock will start running at this point.
- 4 The value of the internal clock is displayed in S-TIME.

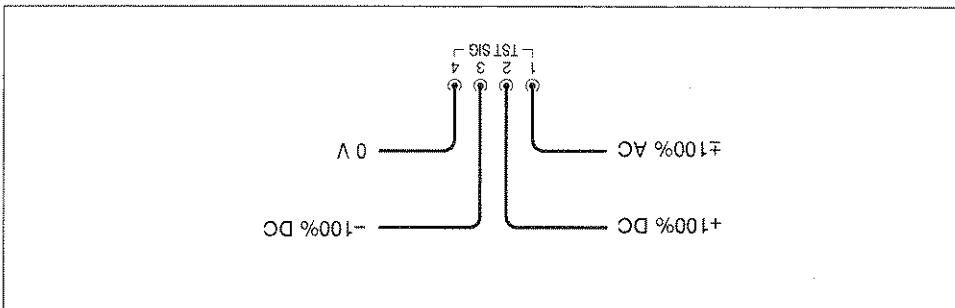


## Test Signal Mode

The unit is equipped with a built-in test signal generator which generates  $\pm 100\%$  AC (500 Hz for normal speed, 1 kHz for double speed), +100% DC, -100% DC and 0V test signals during the E-E mode. In test signal mode, by entering the REC mode the generated test signal can be recorded onto the tape as a reference signal.

1 In E-E mode, press the TST SIG key down continuously for two seconds until the TST SIG key LED blinks.

2 By pressing the CH/NEXT key, the signal output from the test signal generator can be selected. The TST SIG LEDs (1 to 4) that correspond to the selected signal lights and displays the type of signal being generated.



3 To exit this mode, press the TST SIG key once. The TST SIG key LED will be extinguished.

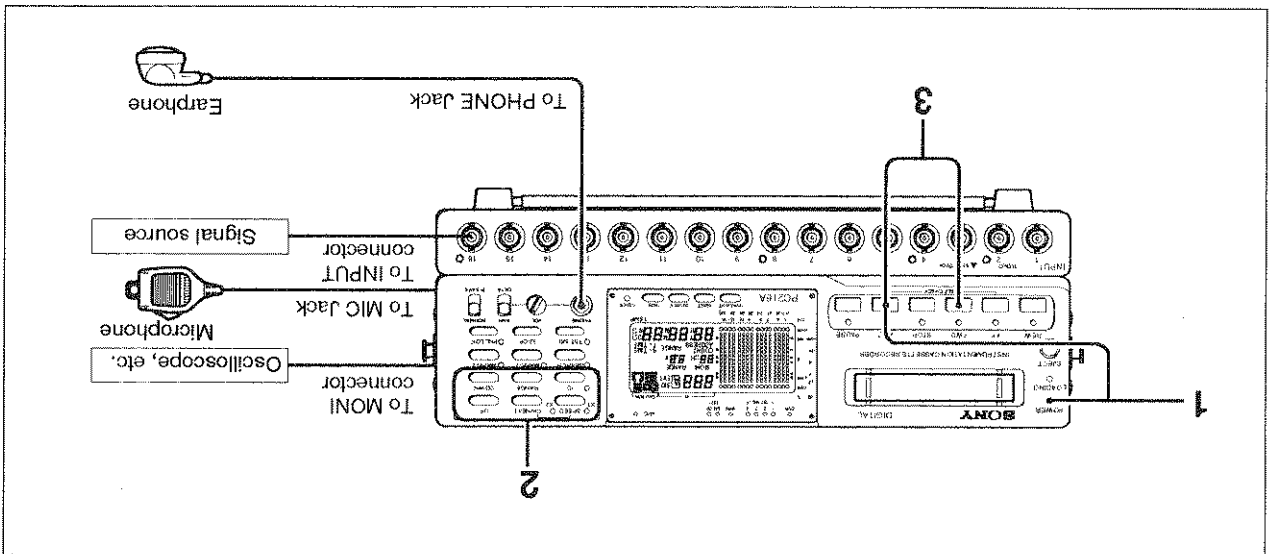
4 Pressing the STOP key will also release the TST SIG mode.

### Note

If recording starts without exiting the TST SIG mode, the test signal will be recorded on each channel, regardless of the signals present at the INPUT connectors.

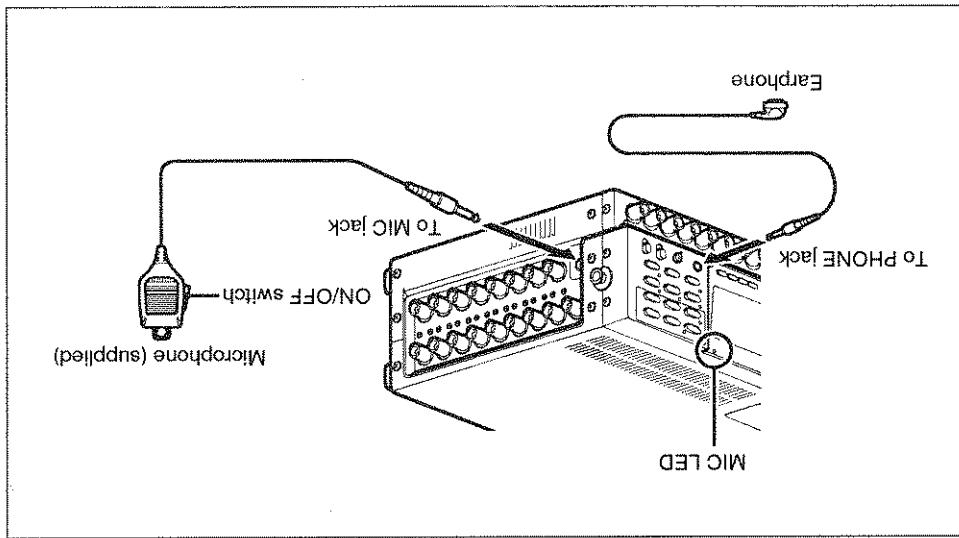
\* E-E (E to E) mode:  
The recording/playback amplifier operates, and the input signal is directly output from the recording system to the playback system.

- 1 Insert a cassette and press the REC key. The machine will enter E-E mode\*. The condition of the input signal can be checked on the display, or through OUTPUT/MONI connectors without the need to run a tape. When voice annotations are to be recorded, attach the supplied microphone to the MIC Jack.
- 2 Check the settings of the channel modes, tape speed, input range, ID, etc. once again. Press the RESET key to reset the counter to 000.
- 3 Place the unit in recording mode by pressing the REC and FWD keys at the same time. The data signal along with the index and amplifier settings is recorded on the tape. The start ID is recorded and the SID mark is displayed for 15 seconds.



## Recording Voice Annotations

Voice annotations can be recorded alongside the input data. Connect the supplied microphone to the MIC jack. Press the switch on the left side of the microphone to turn it on. Release the switch to turn it off. By doing so, only necessary voices can be recorded.



The recording level is adjusted automatically. The sound will not be output during recording, only during playback. The MIC LED will make sure that voice annotations are being correctly recorded. The brightness of the LED will change according to the microphone input level or voice annotation playback level.

## Monitor

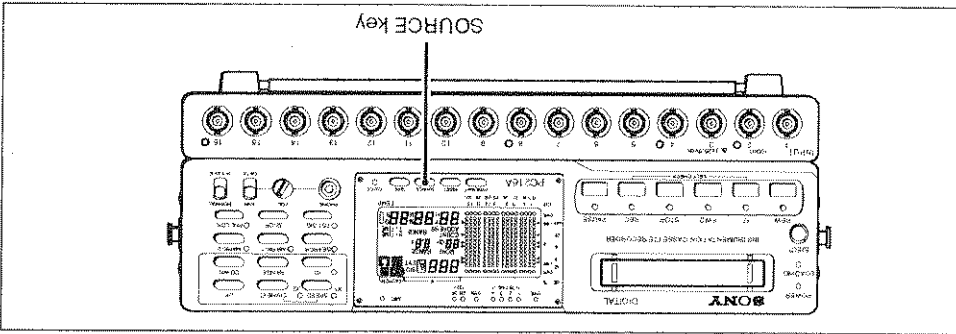
The analog data signal can be monitored during recording by connecting an optional BNC cable to the MONI connector. Press the CH/NEXT key to select the channel to be monitored.

## REC PAUSE mode

The recording pause mode is set by pressing the PAUSE key in E-E mode. By pressing the PAUSE key again, or by pressing FWD, recording will start after a short delay. If the recording pause mode has been set by pressing the PAUSE key during recording, the pause mode can be released by pressing the PAUSE or FWD key.

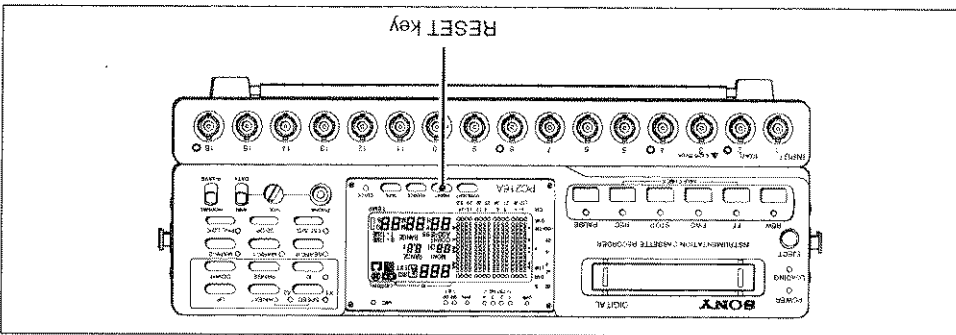
Press the SOURCE key to display the source date in years, months and days.  
 Press the SOURCE key again to display the source time in hours, minutes and seconds.  
 Press the SOURCE key once more to return to the counter display.

### Source Time Display (S-TIME)



Press the SOURCE key once to show the amount of tape remaining on the counter display.  
 This remaining time is displayed in hour/min.

### Tape Remaining Display (REMAIN)



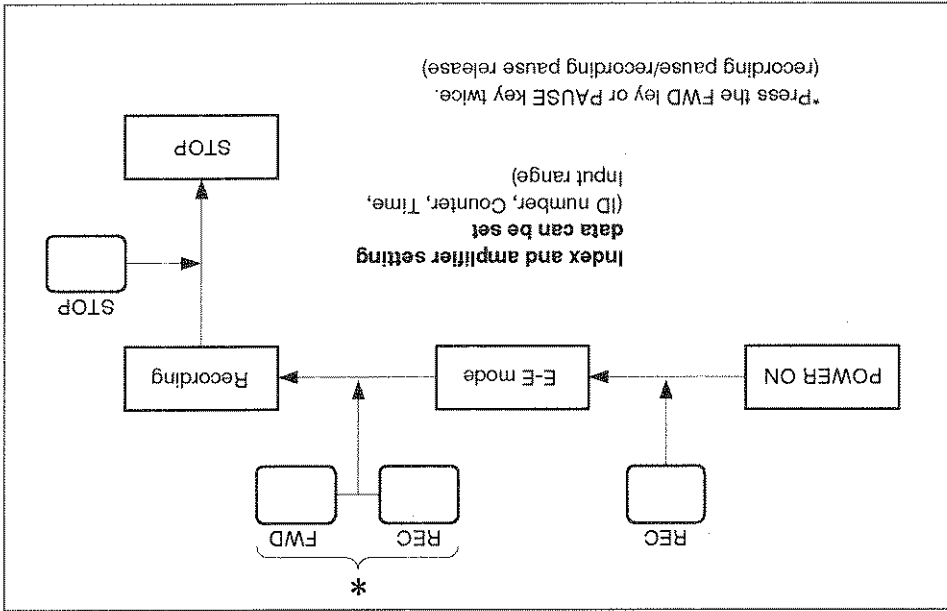
The counter displays time elapsed in hours, minutes and seconds. In the double speed mode, the counter turns over at twice the rate of the normal speed mode. When a different cassette is inserted, the time count begins from 0 hours, 00 minutes, 00 seconds. If the power switch is turned OFF while the cassette is still in the machine, the time value is preserved. Press the RESET key to set the tape counter value to zero.

### Counter Display (COUNT)

## Use Caution When Recording IDs

To perform ID searches during playback, an ID signal should be recorded for more than 2 minutes (at normal speed) at the beginning of the target. In addition, as the START ID is recorded for 15 seconds (at normal speed), a recording interval of less than 2 minutes (at normal speed) may cause targeting errors during search operations.

### Data Recording Sequence



The active channels differ depending on the channel mode. Refer to the CH indication on the front panel.

**Note**

Since the amplifier setting data (channel mode and input range) during recording are simultaneously played back and the display is automatically set under the same condition as in the recording mode, the setting condition during recording can be checked easily.

3 Insert a recorded tape and press the FWD key.

The unit will enter the PLAYBACK mode and the signal recorded on the tape will be played back.

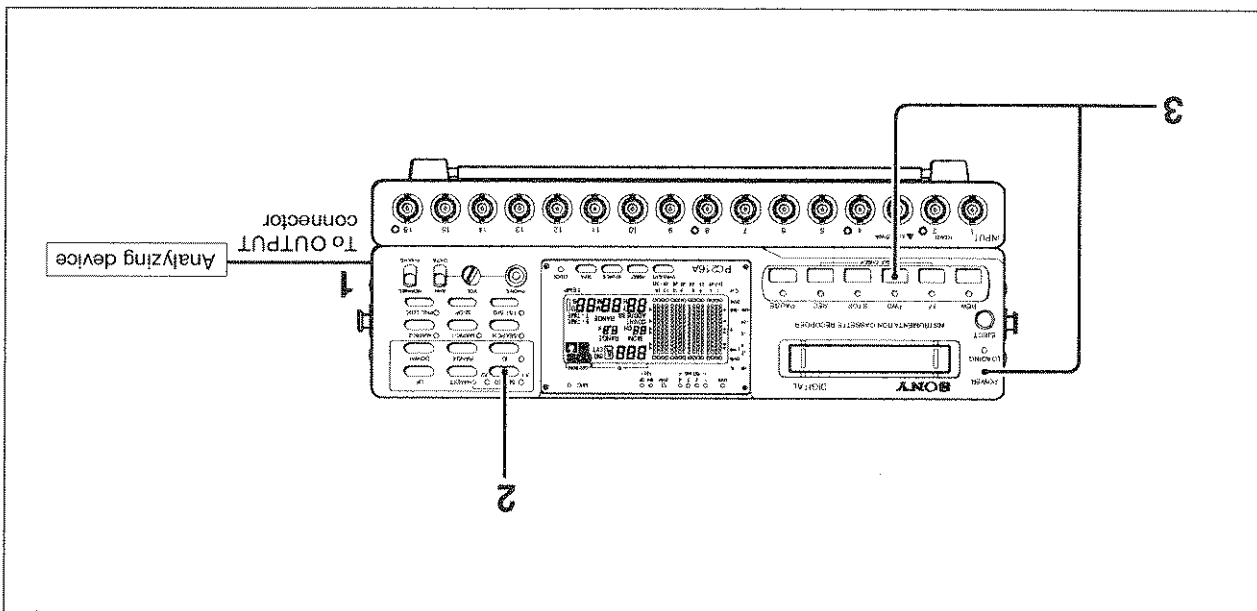
2 Choose the speed using the SPEED key.

The LED ( $\times 1$  or  $\times 2$ ) of the selected tape speed lights. When the speed at which the tape was recorded and the speed at which the tape is played back match, the LED will light green. If the tape speeds differ, the selected tape speed LED will light orange.

1 Using the optional BNC cable(s), connect each channel OUTPUT connector to the analyzing device.

A load impedance of at least 600  $\Omega$  is recommended.

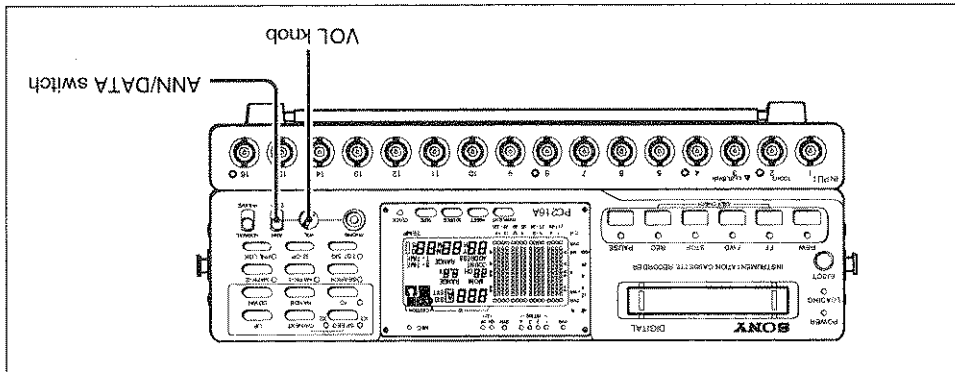
The maximum output current is 10 mA (100  $\mu$ A) load for output  $\pm 1$  Vp).



**4-3 Playing Back Data**

## Playing Back Voice Annotations

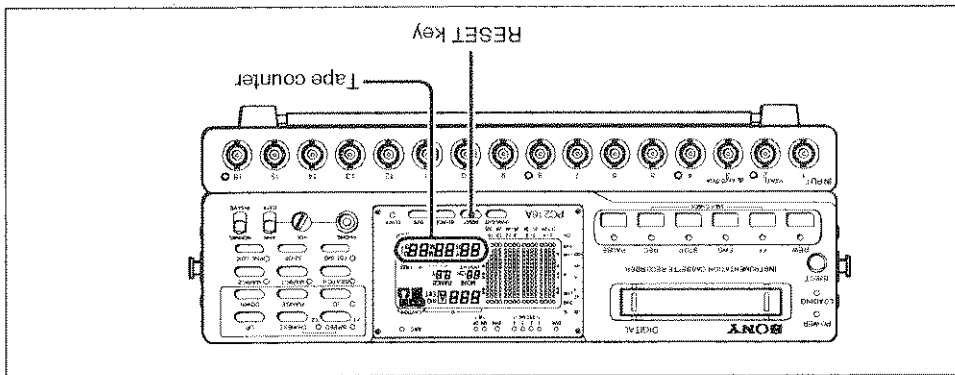
By setting the ANN/DATA switch to ANN, the voice annotations recorded are played back on either the speaker or earphones. Adjust the volume using the VOL knob.



By setting the ANN/DATA switch to DATA, the data signal of the channel which has been selected on the monitor is played back on either the speaker or earphone as sound.

## Counter Reset

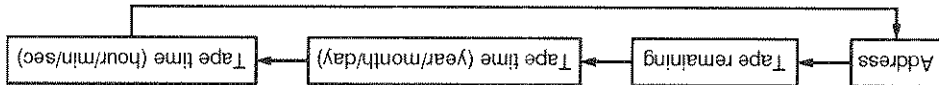
Press the RESET key to return the tape counter to zero.



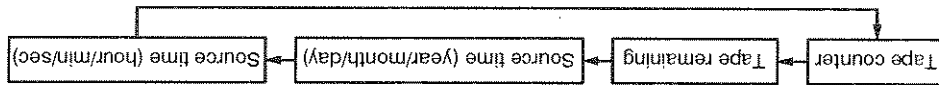
### Switching Between Source and Tape

Use the TAPF mode during playback to display the tape index (recorded on the tape) and amplifier information.

- To enter the TAPF mode, press the TAPF key. The display shows the tape index. Each time the TAPF key is pressed, the display changes as shown below.



- To enter the SOURCE mode, press the SOURCE key. The display shows the source index. Each time the SOURCE key is pressed, the display changes as shown below.



### Setting and Check for Amplifier During Playback

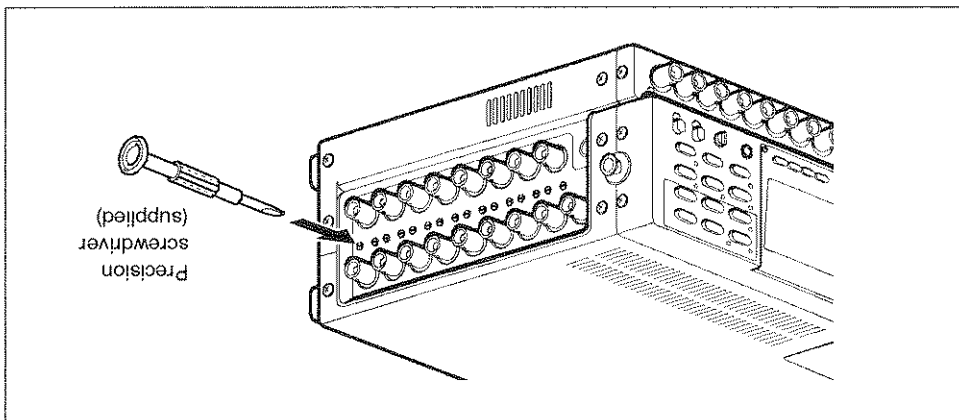
The amplifier setting data (channel mode and input range) is recorded on the tape as sub-code information, and read out in playback. The channel mode is automatically set to the same as recorded, and the input range of each channel at recording can be confirmed.

According to the channel mode, the bar meters for active channels only are indicated.



## Output Level Adjustment

If it is necessary to adjust the level of the playback signal output from the PC216A, use the supplied precision screwdriver to adjust each channel's level adjustment potentiometer, located on the side panel.



### Note

The valid level adjustment potentiometers differ depending on the channel mode. Refer to the CH indication (see ④ on page 2-14) on the display panel.

## PLAYBACK PAUSE Mode

The playback pause mode is set by pressing the PAUSE key in STOP mode. By pressing the PAUSE key or FWD key once, playback will begin after a short delay. The playback mode can be restarted by pressing the PAUSE or FWD key. If the playback pause mode has been set during playback using the PAUSE key,

## 2 Channel Playback

The PC216A is capable of 2-channel mode recording and playback (normal speed only). With this function, the machine can play back a tape recorded on a 2-channel general audio recorder (only when 48 kHz sampling).

### Note

Since sub-code systems of the PC-Series and audio DAT recorders are incompatible, only the main data signal can be played back by the PC216A.

**Search**  
 Pressing the same key a second time will overwrite the previously stored position.  
 When the SEARCH key and then MARK-1 or MARK-2 key are pressed in sequence, the stored position will be searched for and the tape will stop at that position.

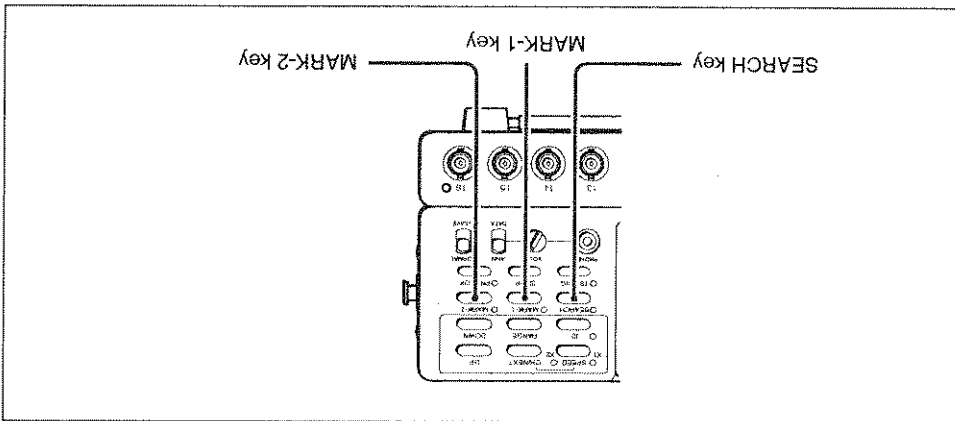
**NOTE**

The MARK-1 and MARK-2 keys can be used to store two desired positions in the memory.

**• During Playback**  
 when recording stops. This facilitates returning a tape to the start position of recording quickly for review, and searching for the end position of recording to continue recording. When the MARK-1 key is pressed, the tape position at this time will be stored in memory. However, it is replaced automatically by the stop position when recording stops.

**• During Recording**  
 If no specific mark is set during recording, the position at which recording began and the position at which recording was stopped will be automatically stored in memory as MARK-1 and MARK-2 respectively.

**MARK setting**



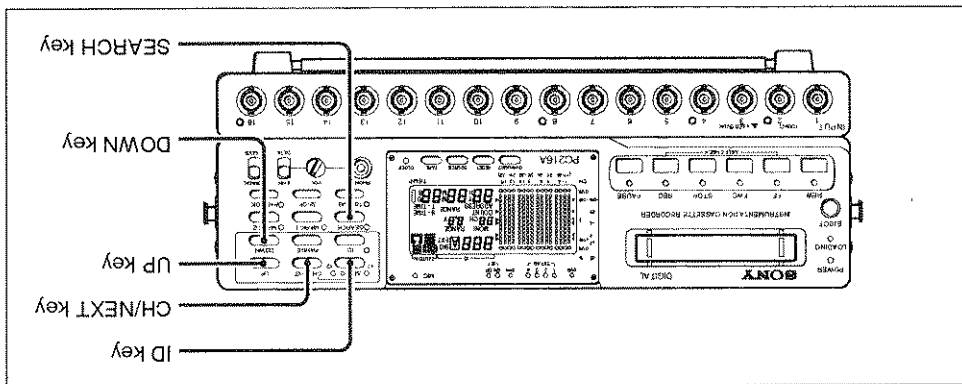
This function allows any position to be marked on the tape and stored in memory for use in later searches.

**Memory Search Function**

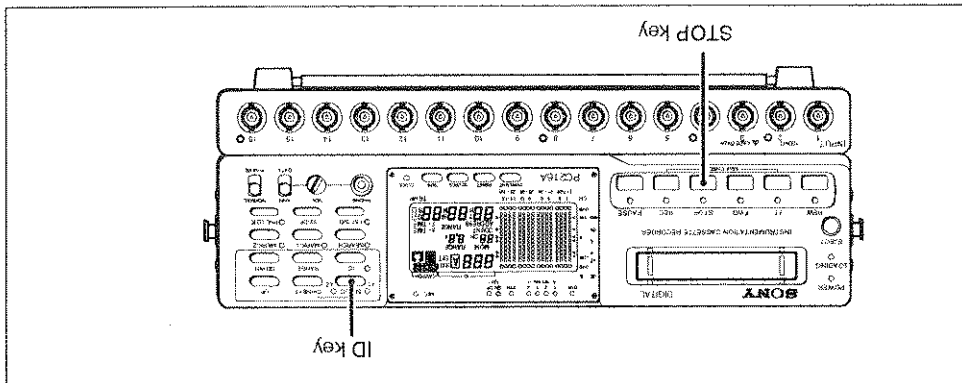
- The search functions of the PC216A consist of four types: memory search, ID search, start ID search and manual search.
- During SEARCH mode, the LED of the SEARCH key will turn off when the target has been found, and blink when it has not been found.

## ID Searches

**1** To search for IDs set during recording allows targets to be set. Use the UP and DOWN keys to set the ID value blinking on the display, then press the CH/NEXT key to set the next digit.

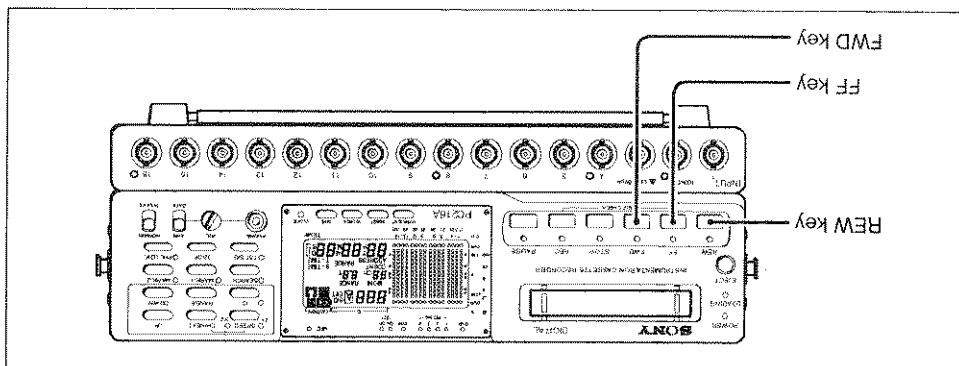


**2** By pressing the ID key once again, the target ID will be searched for and the tape will stop at the beginning of the ID.



**3** The SEARCH LED and ID LED will blink when the target cannot be found.

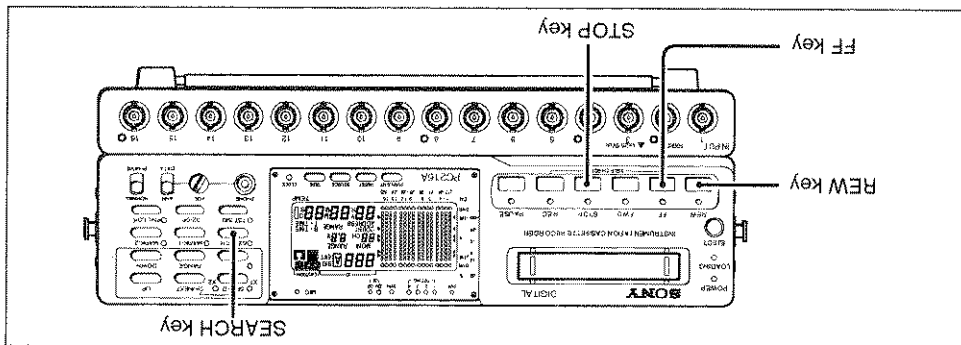
**4** Press the STOP key to interrupt the search.



Manual Search is used to search for the target point using the displayed index (i.e. address, time, etc.) in the forward and reverse directions on the tape. The forward manual search mode is set by pressing the FF key during playback. The reverse manual search mode is set by pressing the REW key. The manual searches are conducted at 16x normal tape speed.

### Manual Search

Press the STOP key to exit the search mode.



During the first 15 seconds of recording, a START ID is automatically recorded on the tape to allow the position of the start of recording to be accessed swiftly. Press the SEARCH key, then either the FF key or the REW key to start forward START ID searching or reverse START ID searching respectively.

### START ID Search

## 5 Channel Expansion Unit

The PC216A can perform the recording and playback of the analog data signal up to 32 channels at one time, using the optional channel expansion unit PCCX32.

### 5-1 Precautions

- Connect the PCCX32 to the PC216A when its power is turned OFF.
- The PCCX32 operates with independent power supply from the PC216A. Supply the specified power (external AC/external DC/built-in battery) to the PCCX32.
- When the power voltage of the unit becomes under the specified level, the POWER LED of the unit will blink to alert.
- A ventilation fan is attached to rear side of the unit. So, be careful not to block it.

Lights during the 32-channel mode.

④ 32ch LED

Used to input the analog data signals of channels 17 to 32.

③ INPUT connectors

The analog data signal level for channels 17 to 32 can also be displayed on the PC216A. Refer to 2-1 ④.

Since the bar meter of the PCCX32 indicates the level in one direction regardless of the signal polarity, even when the level is displayed in percentage scale, the indication may differ from that of the PC216A. The analog data signal level for channels 17 to 32 can also be displayed on the range of each channel.

Using the dip switches on the PC216A rear panel, either percentage display or dB display is selected. Set the switch to lower position to display in percentage scale (10%, 50%, 100%, 125%) in the left, and set to upper position to display in dB scale (-20 dB, -6 dB, 0 dB, +2 dB) in the right. In either case, the uppermost LED will light up when the level is beyond the range of each channel.

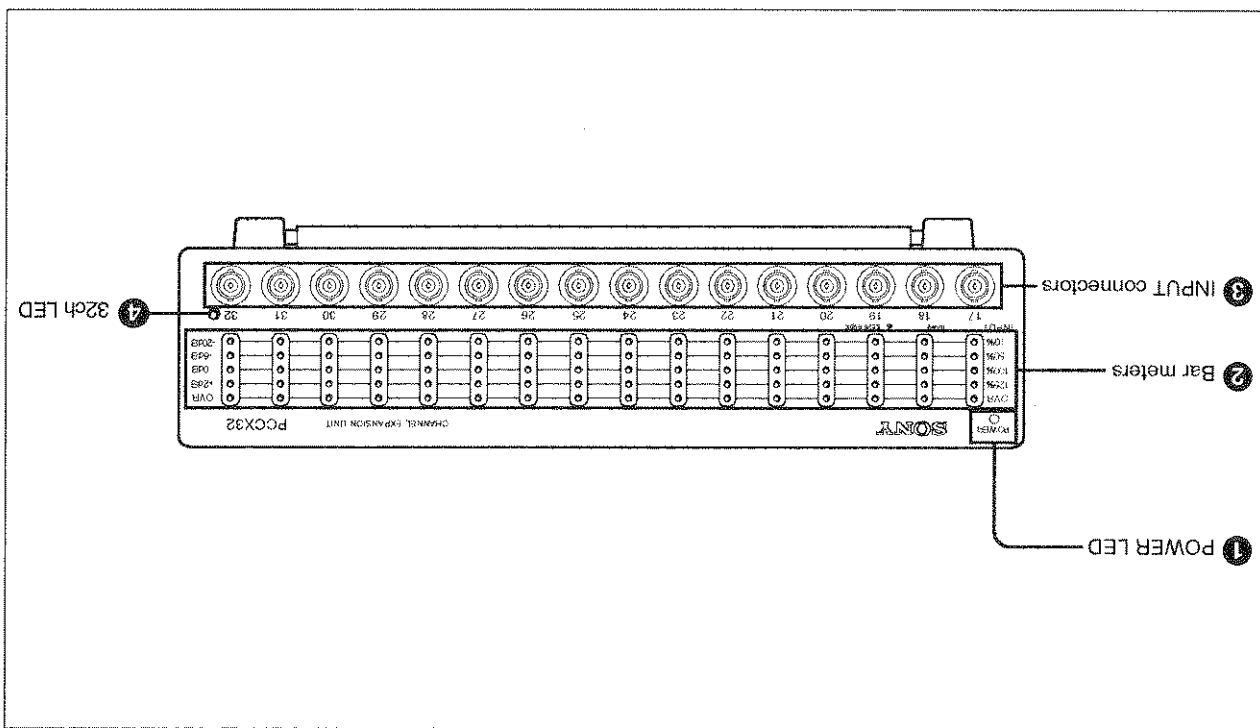
Displays the analog data signal level of channels 17 to 32.

② Bar meters

Lights when power is supplied to the unit, and blinks when the power voltage lowers the specified level.

Turn the power ON/OFF with the POWER switch on the PC216A rear panel.

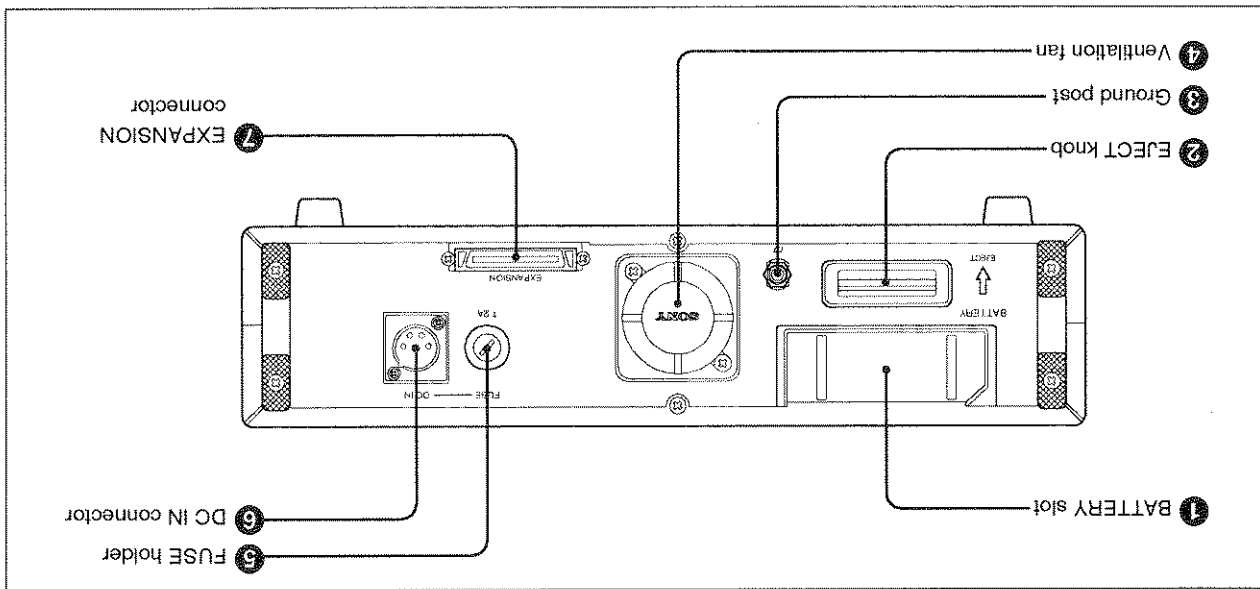
① POWER LED



Front Panel

5-2 Names and Functions of Each Part

## Rear Panel



**1 BATTERY slot**  
Insert the supplied AC power pack or optional battery pack here.

**2 EJECT knob**  
Press the knob in the arrow direction to eject the battery pack/AC power pack.

**3 Ground post**  
Chassis ground.

**4 Ventilation fan**  
This fan cools the interior of the unit.  
It should not be blocked.

**5 FUSE holder**  
The DC fuse is inserted here.

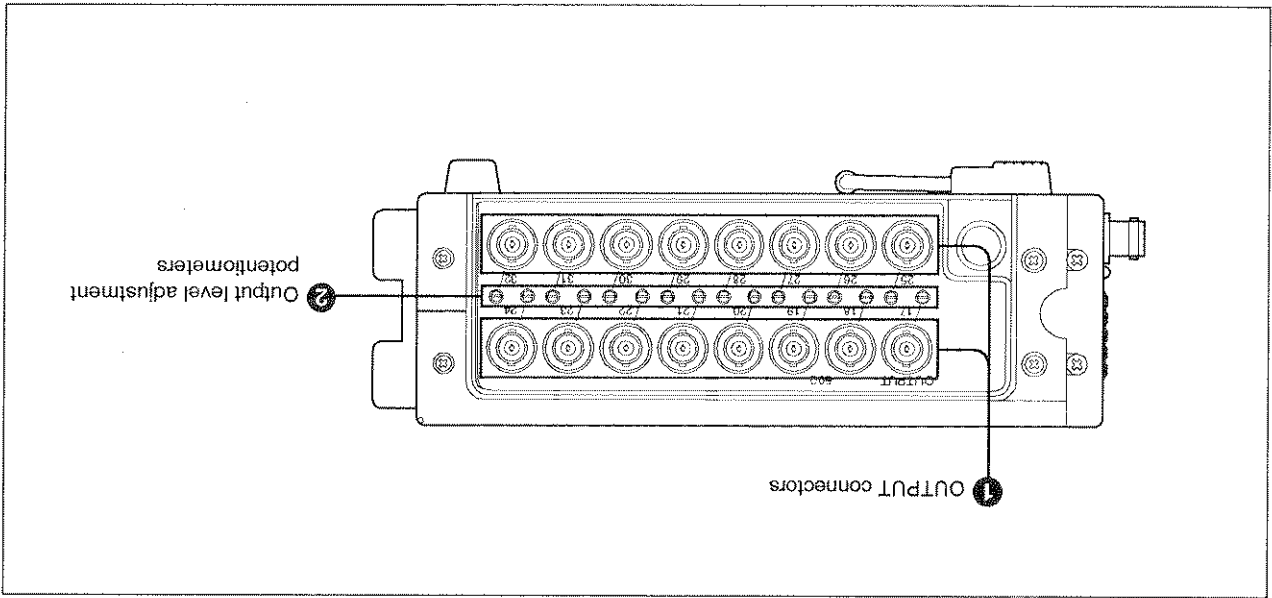
### NOTE

Use only fuses specified for use with this unit.

**6 DC IN connector**  
External DC power (11 V to 30 V) can be supplied to this connector.

**7 EXPANSION connector**  
Connect a supplied connection cable.

Side Panel



1 OUTPUT connectors

Used to output the analog data signals of channels 17 to 32.

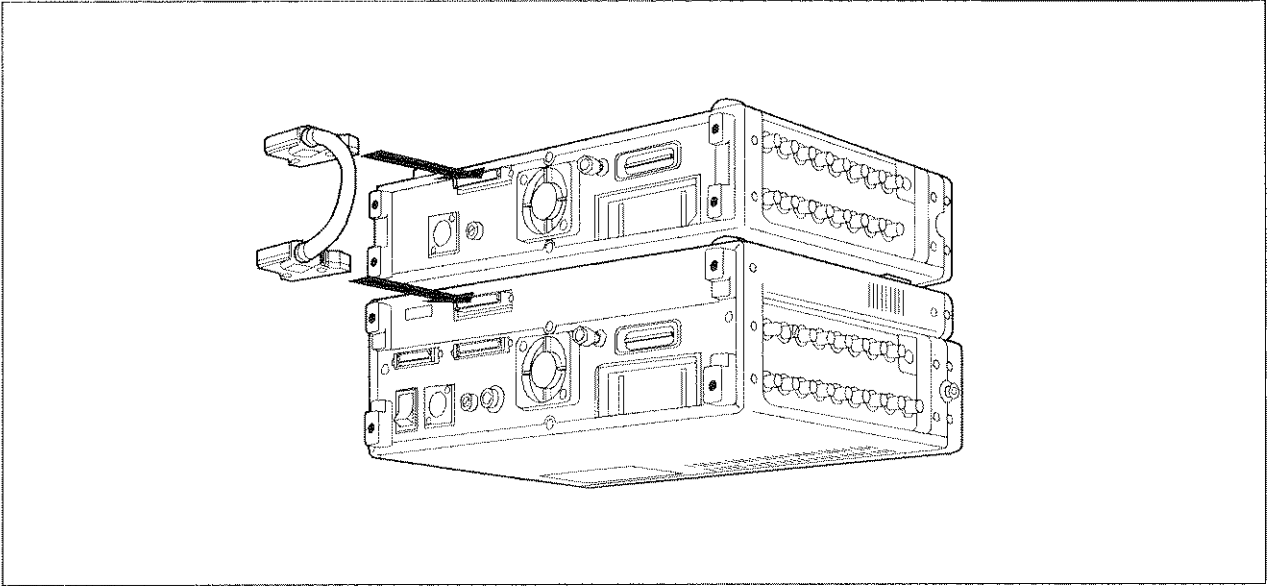
2 Output level adjustment potentiometers

Used to increase and decrease the output level for each channel (17 to 32). Refer to 2-3 4.



## 5-3 Connecting to the PC216A

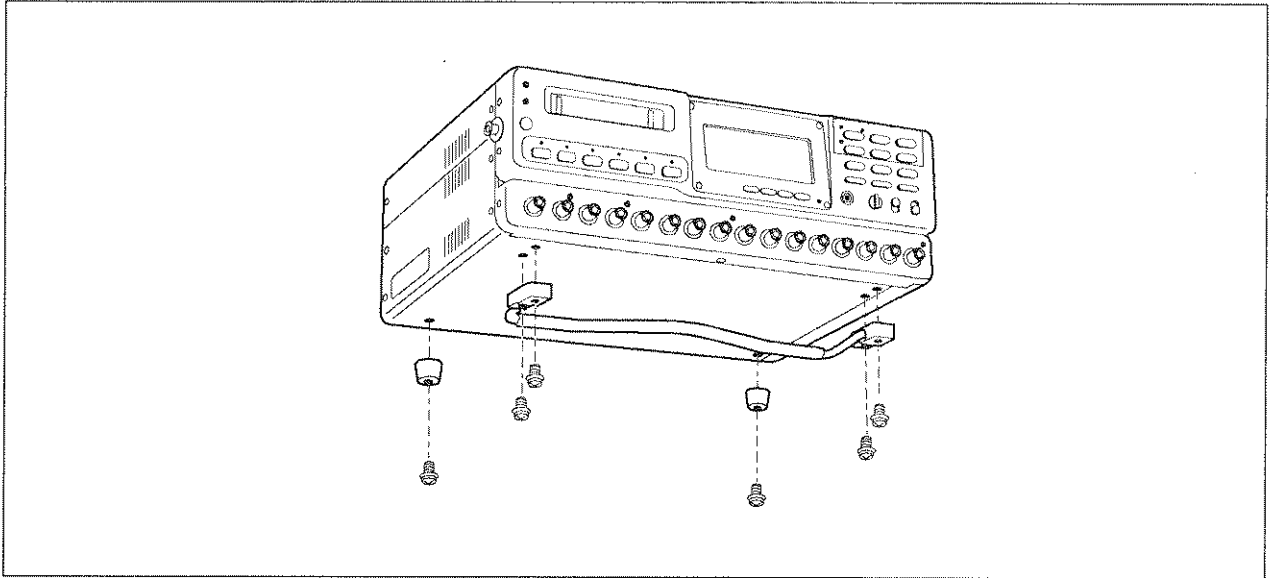
- 1 Make a connection between the EXPANSION connectors of PC216A and PCCX32, using the supplied cable.
- 2 Turn ON the power of the PC216A.



- 3 Using the supplied combining frames (totally 4 for the front and back, right and left), attach the PCCX32 to the PC216A, so that will make it easy to carry and fix onto a base rack.  
Refer to the following for attachment.

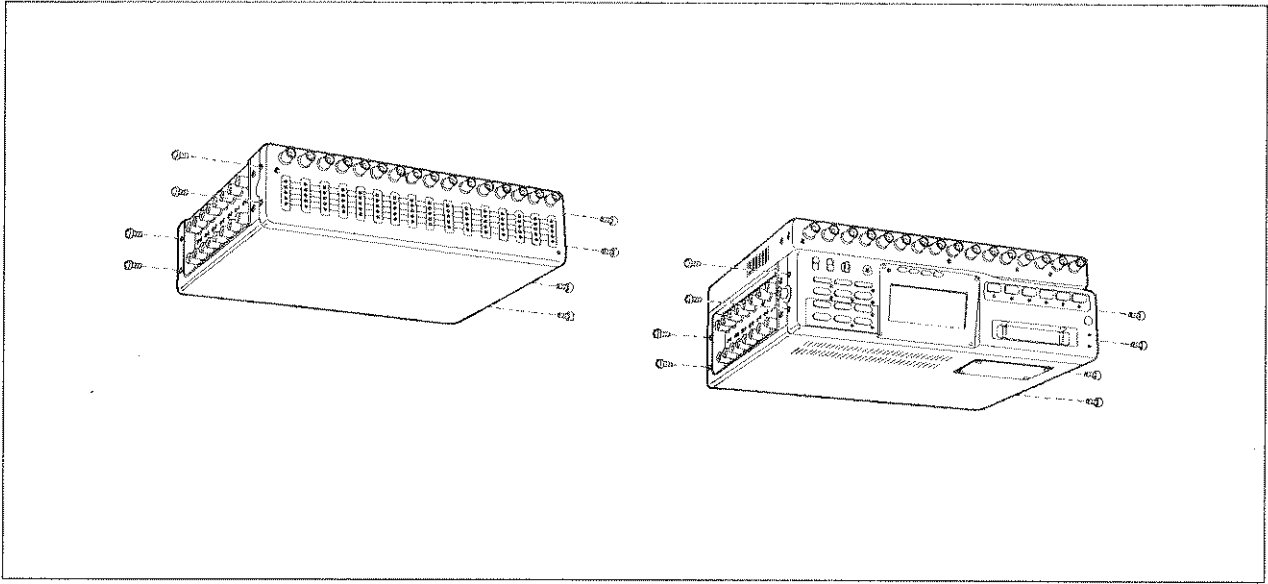
## Attaching the Combining Frames

- 1 Prepare a 3 mm Phillips screwdriver.
- 2 Turn over the PC216A. Using the screwdriver, remove the six screws  $\oplus$ PS3  $\times$  8 (with spring washers) fastening the front and back feet. Remove the feet from the PC216A.



- 3 Remove the four small binding screws  $\oplus$ B3  $\times$  6 (black) at the right and left sides of the PC216A.

- 4 Remove the four small binding screws  $\oplus$ B3  $\times$  6 (black) at the right and left sides of the PCCX32.



When the 32-channel mode cannot be selected, reconfirm the connection. Refer to section 4-2, since the data-recording procedure is the same as using the PC216A alone.

**Note**

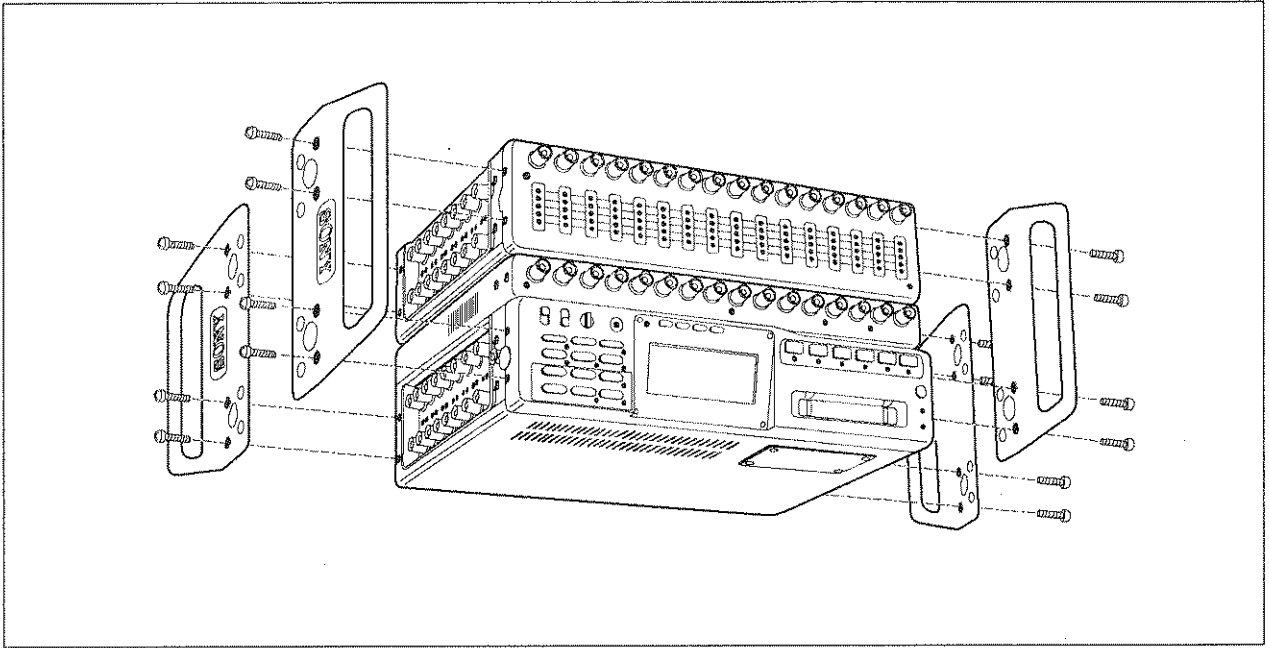
Use the SPEED key and the CH/NEXT key of the PC216A to set the 32-channel mode.

## Recording (Analog Mode)

Using an optional BNC cable, connect the INPUT connector of each channel to a signal source. The data signals of channels 17 to 32 can be monitored with the MONI connector of PC216A.

## Connecting Data Signals

6 After temporarily fixing the four frames, fix them securely.



5 Mount the PC216A onto the PCCX32. With the guard sheet sides facing inside, temporarily fix the combining frames with the supplied four small binding screws  $\oplus B3 \times 12$  (black). The four combining frames are all same type. Fix all four combining frames temporarily in the same way.

## Playback (Analog Mode)

---

The PCCX32 is only active for the 32-channel mode playback. Refer to section 4-3, since the data playback procedure is the same as using the PC216A alone.

### Note

When a tape which has been recorded in the 32-channel mode is played back using the PC216A without PCCX32, the analog data of 17 to 32 channels cannot be output while the analog data of 1 to 16 channels and the parallel digital data can. And in this case, which channel mode (16-channel or 32-channel) was selected at the recording can be recognized by the following method:

32-channel mode: The channel number between 17 to 32 can be selected and indicated at the MONI area on the display.

16-channel mode: The above channel number can not be selected and indicated.

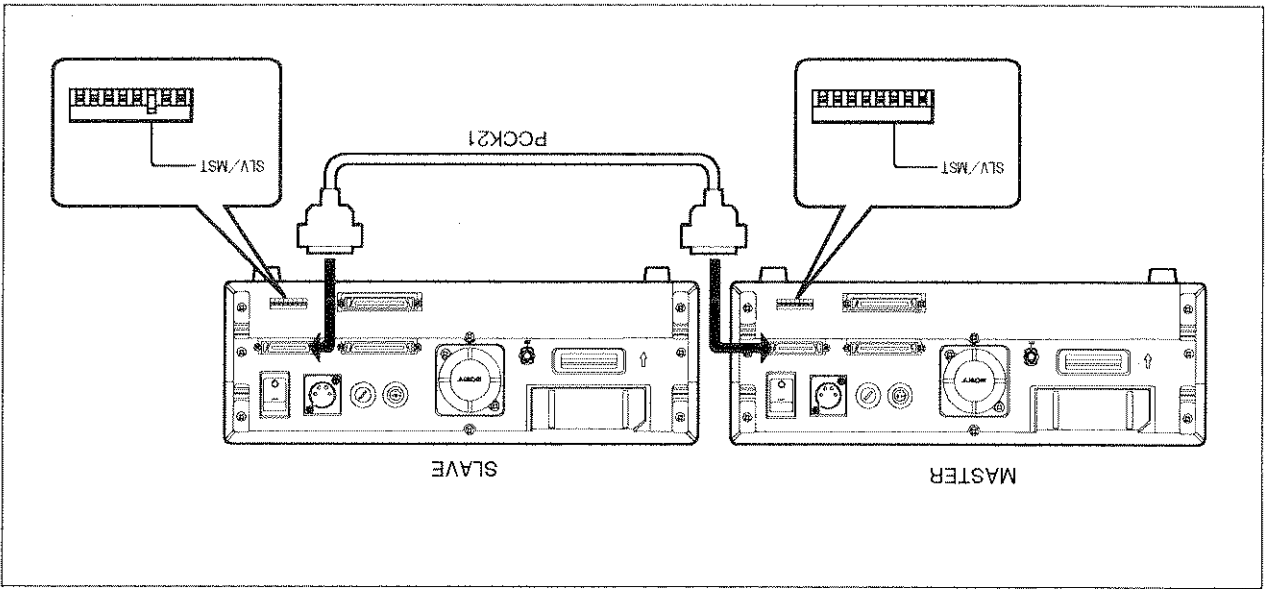
## 6 Synchronizing Mode

With two PC216As in synchronizing mode, the number of channels can be doubled without changing the frequency band. As the slave machine is locked to the master's clock, word-accurate synchronous recording is possible. The recording and playback can also be performed in different channel modes or analog/digital modes according to the setting of the master and slave machines.

### 6-1 Precautions

- The power of both machines must be turned OFF when connecting the both machines with the SYNC cable (PCCK21).
- The power is supplied separately. Supply the specified power (external AC/external DC/built-in battery) to both machines.
- First turn ON the power of the master machine, and then the slave machine.
- If both machines are set to the same mode, i.e. master or slave, they can not enter into the synchronizing mode and will be operated independently.
- When the master machine is automatically stopped by EOT, the slave machine will be stopped at the same time. On the other hand, the master machine will keep running even when the slave machine is stopped by EOT due to the difference in tape length.
- Without the connection for the synchronizing mode, the each machine operates as a master regardless of the positions of the DIP switches on the rear panel.

- 1 Make a connection between the EXT. CONTROL connectors of PC216As, using the optional SYNC cable PCKK21 when the power of both machines are turned OFF.
- 2 Using the SLV/MST switch on the rear panel, set one machine as a master and the other as a slave. Set the switch to lower position to use the machine as master, and set to upper position to use as slave. See page 2-19.
- 3 First turn ON the power of the master machine, and then the slave machine.
- 4 Make sure that the SYN LED on the front panel of the master machine starts blinking and the SYN LED of the slave machine does not light or blink.



## 6-2 Connecting and setting two PC216As

**1. SPEED (Tape speed)**

The SPEED setting on the slave machine follows the setting on the master machine.

**2. Tape transport control**

The modes on the slave machine follow ones on the master machine, such as REC, PLAYBACK, FF, REW, E-E, PAUSE and manual search. They are also linked when the machine is externally controlled from the REMOTE connector.

**Note**

The slave machine can not control the operation of the master unit.

**3. Counter/Address**

The tape counters (COUNT) of both machines are automatically reset to zero at the each start of recording. The COUNT of the slave machine follows that of the master machine during recording. Thus the data recorded on the master and the slave tapes at the same ADDRESS are exactly synchronized.

**4. ID number**

The ID number can be preset for the master and the slave machines independently. The ID increment of both machines can be performed simultaneously by pressing ID key of the master machine. If the master machine is set to auto ID increment mode (refer to the page 4-3), the ID numbers of the both machine are auto-incremented at each stop of recording.

Except above-mentioned settings, the master and slave machines can be set individually, such as analog/digital mode, B/C mode, Input range, etc.

**Note 1: Synchronous playback**

Although the master and the slave machines run synchronously in FWD mode, the slave machine does not automatically chase the master machine for the same ADDRESS. However, the data at the same ADDRESS for the both tapes are the data captured at the same sampling time. So "off-line synchronization" is possible by transferring the data from the specific ADDRESS on both the master tape and the slave tape to a host computer.

**Note 2: SYN LED**

In the setting for synchronous mode, the indication of the SYN LED varies according to the status of the machines.

Status	MASTER	SLAVE
Recording in sync condition	ON	OFF
All other status other than above	BLINK	OFF
Erroneous operation*	OFF	OFF

\* Check setting and cabling.

**Note 3: Abnormal conditions**

The error code on the LCD display and SYN LED indication will appear if abnormal conditions happen during synchronizing operation.

MASTER		SLAVE	
Error code	SYN LED	Error code	SYN LED
Power down at Master	---	---	BLINK
Power down at Slave	E05	BLINK	---
Failure in the connection*	E05	BLINK	BLINK

\* When both machines are restarted by Power-on, each machine will run as a master independently.



The PC216A can operate on commercial AC power (100 to 240 V) using the supplied AC pack.

## Caution

- Use this AC pack only for the data recorder PC216A. Do not use as a battery charger, or for other purposes.
- Use only AC100 to 240 VAC.
- The AC pack becomes hot during use. Be careful when handling.
- When not using, be sure to disconnect the power supply cord from the outlet.
- Make sure that the contacts are always clean.
- Do not dismantle it.
- Do not apply excessive force or drop it.

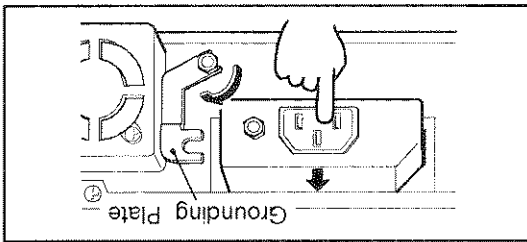
## Connecting and disconnecting from the main unit

Refer to Section 3-2 Connecting a Power Supply.

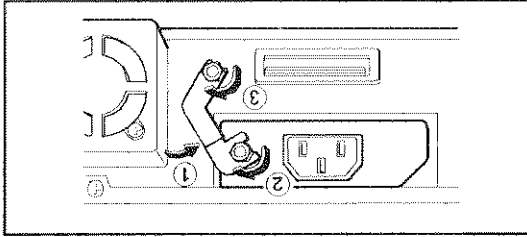
## Caution for U.S.A./Canada models

To comply with FCC/DOC rules, be sure to connect the PC216A ground post and the AC pack ground post using the grounding plate supplied.

1. AC Power Pack Installation  
Move grounding plate to the right, then insert AC pack into the battery slot.

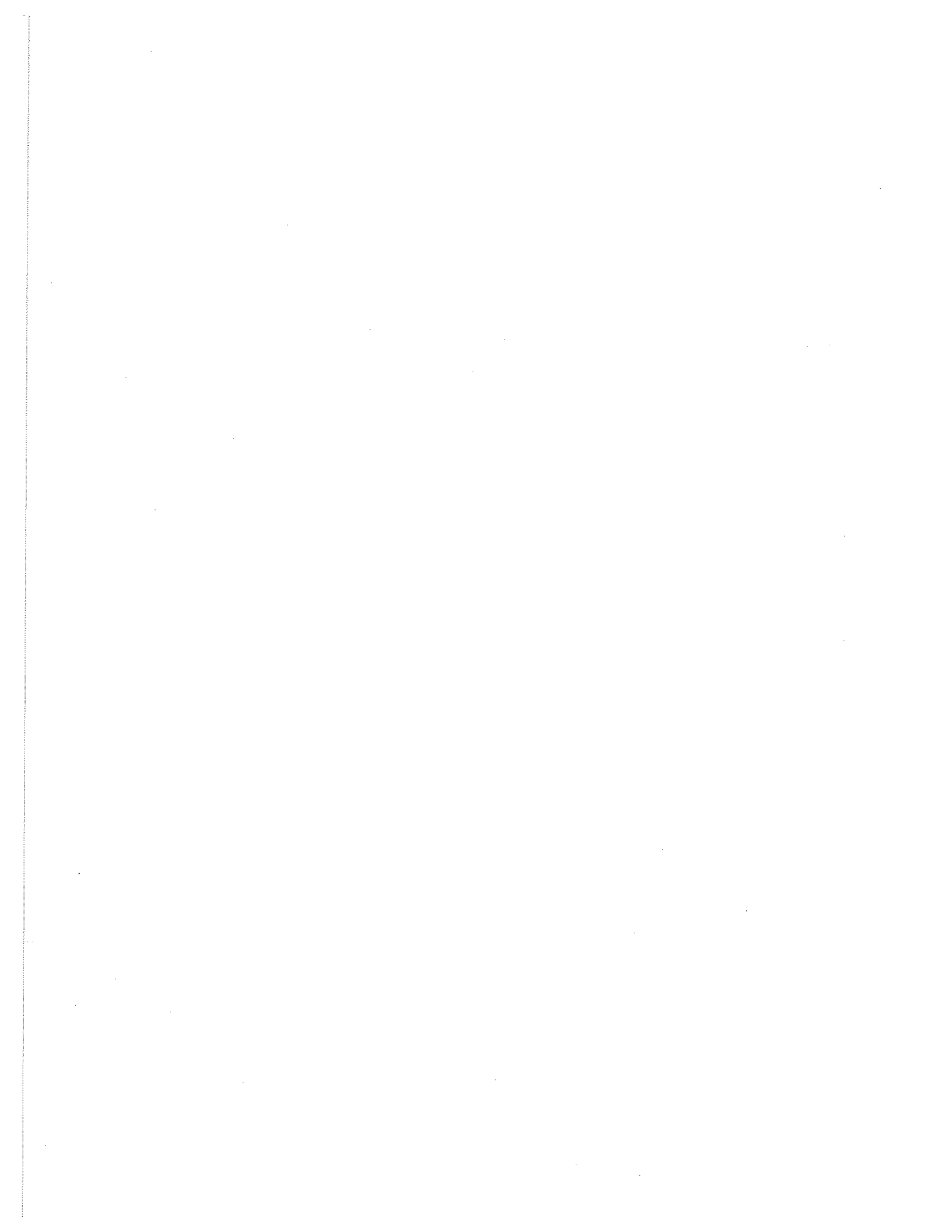


2. Fixing Ground Post  
Slant grounding plate to the left, then attach the grounding plate to AC pack ground post.  
Turn AC pack ground post screw clockwise and tighten it.
3. Turn PC216A ground post screw clockwise and tighten it.



Follow the above steps in reverse order.

## 3. AC Power Pack Removal



The PC216A can also be operated using the optional battery pack.

## Before Use

Be sure to recharge the nickel cadmium rechargeable battery before use.

Refer to the instruction manual for the optional battery charger on how to charge.

• Use only the specified battery charger.

• Although the battery can be charged in ambient temperatures of between 5 to

40°C, it is recommended that it be charged between temperatures of 10 to

30 °C to fully make use of the battery pack capacity.

• Batteries may not be fully charged if charged when the battery pack is warm or

if the surrounding temperature is high. This will shorten the time the battery

can be used.

• Wait a few minutes before charging the battery after use.

Battery packs which only last for a short time after they have been charged have

reached the end of their useful life. Replace with a new battery pack.

## When not using

When not using, remove from the unit and store in a well ventilated area.

## Precautions upon Use

• Avoid short-circuits.

Short-circuits may occur if metal objects touch the contact parts of the

battery packs. Store in a box or wrap with cloth after use.

• Do not place the battery pack near heat or fire.

• Do not dismantle.

• Do not allow the battery to come in contact with water.

• Do not apply excessive force or drop.

• Always keep the terminals clean.

• After charging or use, the battery pack may become warm. This is normal.

## Mounting and Removing

Refer to section 3-2 Connecting a Power Supply.



By using the optional guard frame PCHL21, the unit can be installed onto the body of a vehicle. The PC216A can thus be protected when the vehicle is moving.

## Before Using

Check the contents of PCHL21.

**PCHL21:**

One for both left and right respectively

(The face with the guard seal is the inner side)

**Accessories:**

Small binding screws  $\oplus$  B3  $\times$  12 (Black)

Band boss B

Small countersunk screw  $\oplus$  K3  $\times$  20 (silver)

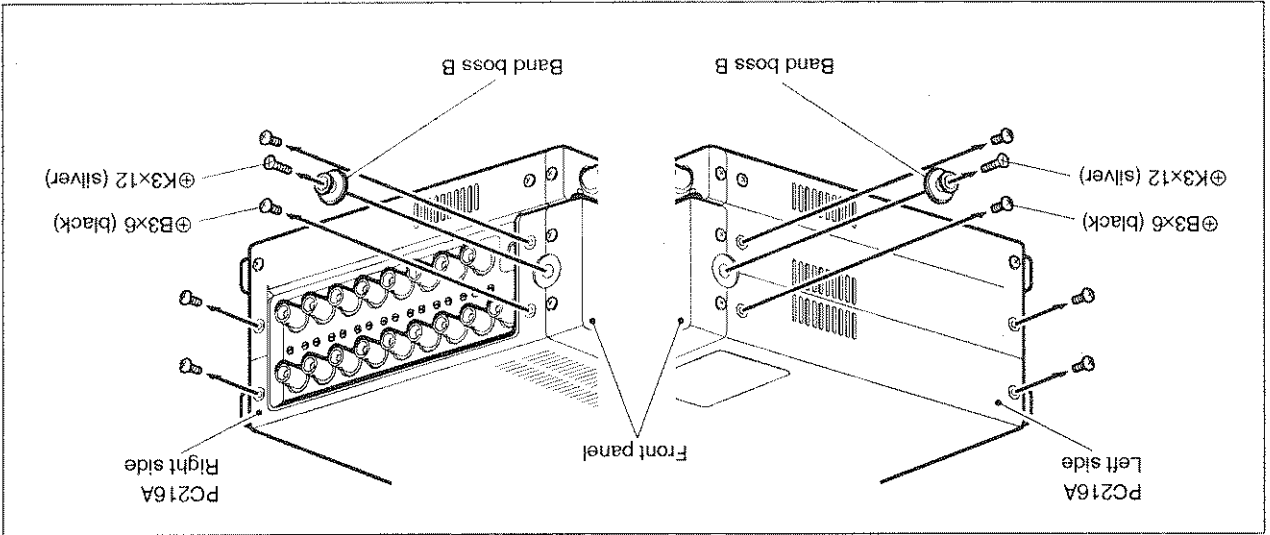
2

2

8

## Installing

- 1 Remove the 4 small binding screws  $\oplus$  B  $\times$  6 (black) on the right and left sides of PC216A. Remove the small countersunk screws  $\oplus$  K3  $\times$  12 (silver) on both sides and remove the band bosses.

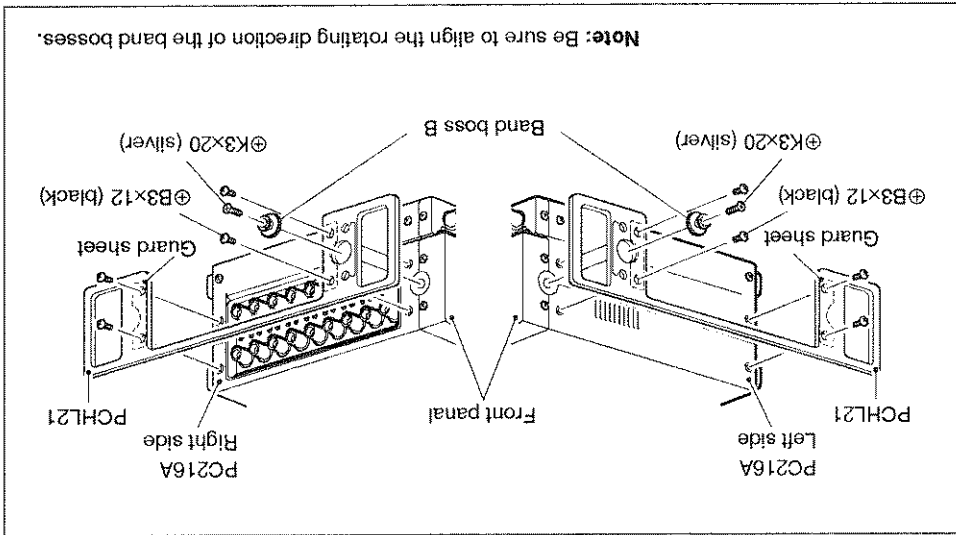


### Note

It is not necessary to remove the band bosses when the shoulder belt is not used together with the guard frame.

- 2 Attach the supplied band boss B to the left and right sides, and fasten the supplied small plate screw  $\oplus$  K3  $\times$  20 (silver) to each side. Be sure to adjust the hole of the band boss to the protrusion on the body.

**3** Attach PCHL21 to the side of the main unit with the guard sheet facing inwards. Tighten all four of the supplied small binding screws  $\oplus$  B3 x 12 (black) on both the left and right sides.

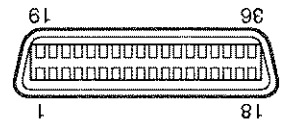


# 10 External Control

## Functions

**Input:** FF, REW, FWD, STOP, REC, PAUSE, counter reset, ID increment, event marker  
**Output:** FF, REW, FWD, STOP, REC, PAUSE, BOT, EOT, event marker, loading complete, servo lock, alarm (mechanical malfunction, condensation)

## Interface



**Connector:** Square-shaped, half-pitch, 36-pin  
**Input:** TTL level, pulse width 100 ms or more  
**Output:** CMOS level, sink current 20 mA (maximum)

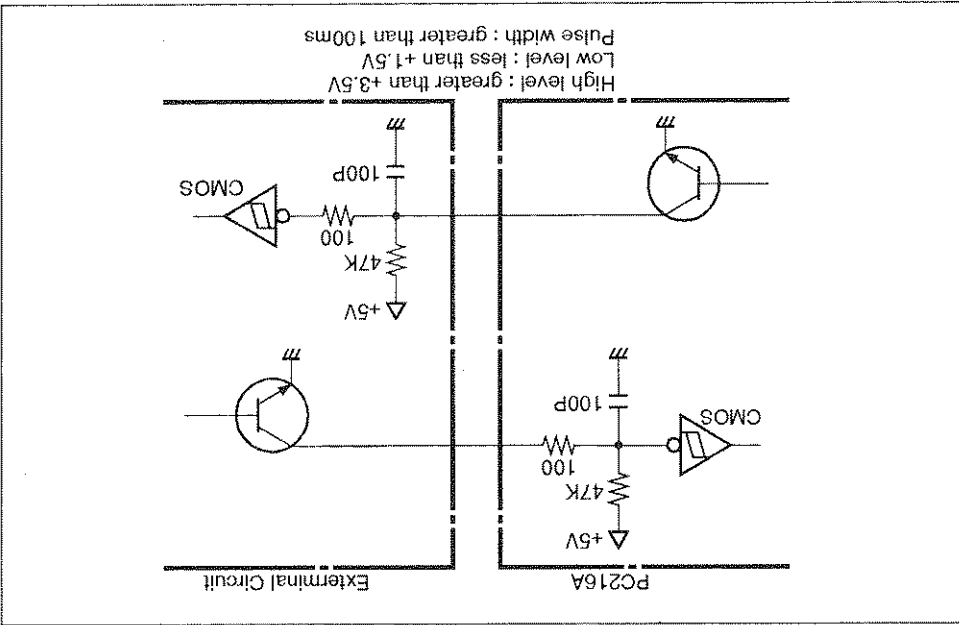
Pin No.	Signal	Function	Pin No.	Signal	Function
1	REW	REW output	20	IFF	FF input
2	OFF	FF output	21	IFWD	FWD input
3	OFWD	FWD output	22	ISTOP	STOP input
4	OSTOP	STOP output	23	IREW	REC input
5	OREC	REC output	24	IPAUSE	PAUSE input
6	OPAUSE	PAUSE output	25	IBEVENT/	Event marker/speed input*4
7	OEVENT/	Event marker/speed output*4	26	CNT/	Count reset/servo lock input*4
8	LOADING	Loading output	27	IDINC	ID increment input
9	SVLOCK	Servo lock output*1	28	CRSCBL	Cross cable identification input*4
10	ALARM	Alarm output*2	29	IMS	Master/slave handshake input*4
11	BOT/	BOT/ID increment output*4	30	OMS	Master/slave handshake output*4
12	EOT	EOT output	31	ISYNC	Playback sync timing input*4
13	OSYNC	Playback sync timing output*4	32	IBXCX	Sync clock 1 input*4
14	OEXSY	Sync clock 1 output*4	33	IBRCK	Sync clock 2 input*4
15	OIRCK	Sync clock 2 output*4	34	IADDRST	Address reset input*4
16	OADDRST	Address reset output*4	35	+5 V	Auxiliary power supply*3
17	+5 V	Auxiliary power supply*3	36	GND	Signal ground
18	GND	Signal ground			
19	IRRW	RRW input			

\*1 It is output with muting release when the tape running becomes stable.

\*2 Output in the event of mechanical malfunction or condensation formation.  
 \*3 Used to light LEDs, etc. Pins 17 and 35 of this connector and Pins 44 and 45 of DIGITAL DATA I/O PORT provide a combined maximum of 100 mA. Refer to 13. Digital Data I/O.

\*4 Used for sync mode.

Pin No.	Signal	Function
7	Event maker output	Event maker output
11	BOT output	ID increment output
25	Event maker input	Speed input
26	Count reset input	Servo lock input



Recommended External Circuit



# 11 Remote Control Unit

The optional remote control unit (PCRM22) can be used to control the unit from a distance.

## Functions

### Command Functions

The remote control unit can output the following commands to the data recorder:

- Tape transport mode
- Controls the various tape transport modes.
- Counter reset
- Monitor channel selection
- Search

Memory search functions are conducted as on the main unit.

- ID increment

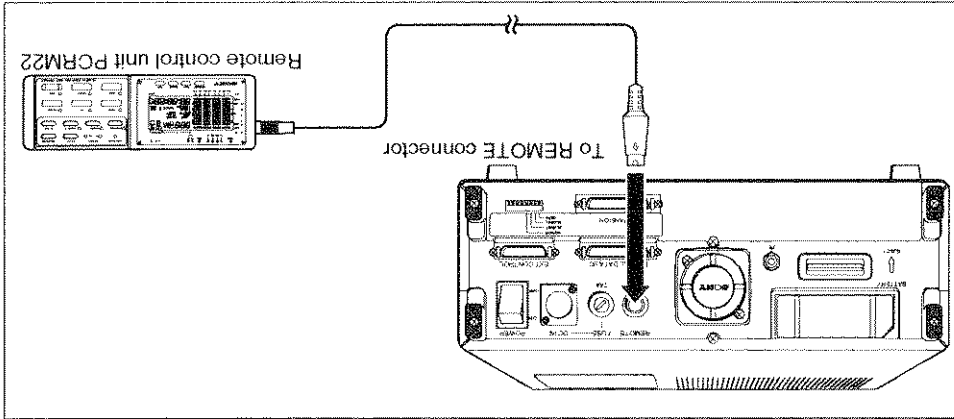
ID number can be increased by key operations during the recording mode or recording pause mode.

### Checking functions

The remote control unit can display the following information from the data recorder:

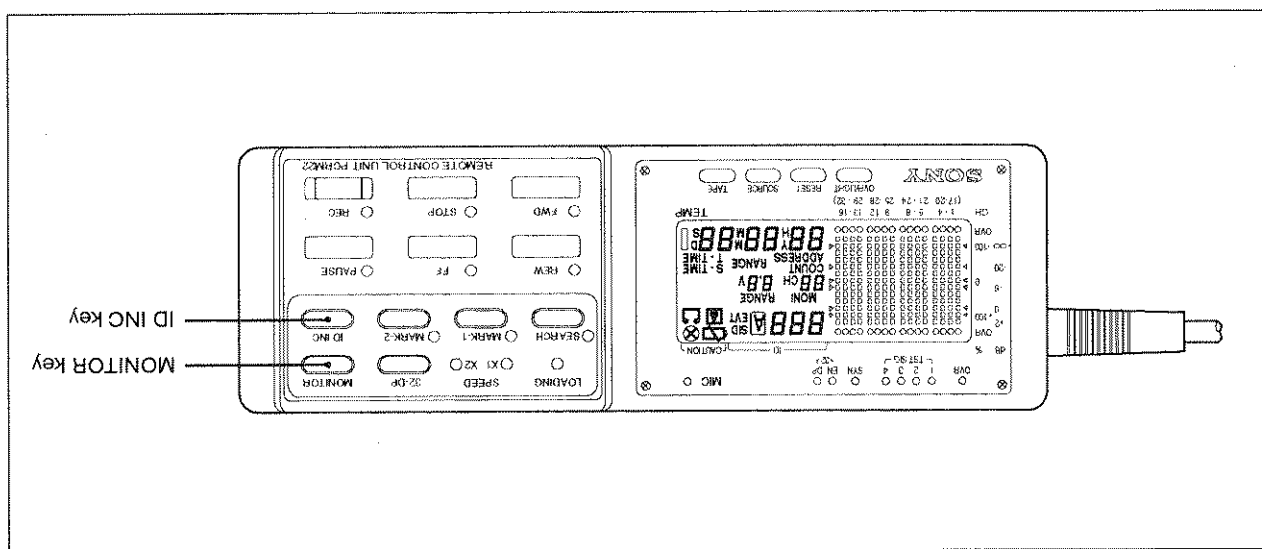
Bar meter for each channel, Monitor channel, Tape speed (normal/double speed), Tape running mode, Search mode, Loading condition, Over range, Test signal Synchronizing condition, Expansion units condition, Voice annotation level, Source data/tape data of various indexes, Warning messages (DC low voltage, mechanical malfunction, condensation, error check)

## Connecting the Remote Control Unit



Tape transport operation keys	Pages 2-3 and 2-4
32-DP key	Page 2-9
SEARCH key, MARK-1/-2 key	Page 2-8
LOADING LED	Page 2-2
SPEED LEDs (x1/x2)	Page 2-5
TST SIG (1 TO 4) LEDs	Page 2-12
SYN LED	Page 2-13
32 (EN, DP) LEDs	Page 2-13
OVR LED	Page 2-12
MIC LED	Page 2-13
Display	Pages 2-12 to 2-15
OVR/LIGHT key	Page 2-10
RESET key	Page 2-10
SOURCE key	Page 2-10
TAPE key	Page 2-11

For a description of the following controls and indicators refer to the indicated pages:



With the exception of the following, all keys and LEDs have the same functions as on the main unit. The remote control unit display is identical to the main unit display.

- MONITOR key** : Monitor channel can be selected by pressing the MONITOR key.
- ID INC key** : ID number can be incremented by one by pressing the ID INC key during recording or recording pause.

### Operating the Remote Control Unit

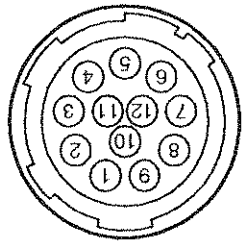
# 12 RS-232C Control

As the remote control interface conforms to the Electronic Industries Association RS-232C standard, it is possible to use a host computer to control the main unit.

## 12-1 Interface Specifications

- Signal format: Conforms to EIA-RS-232C
- Connector: Circular 12-pin
- Baud rate: 9600 bps
- Character length: 8 bits
- Parity bit: none
- Stop bit: 1 bit
- X parameter: none
- Flow control: none

Connector Pin Assignment (Rear View)



PIN No.	SIGNAL	FUNCTION	PIN No.	SIGNAL	FUNCTION
1	+6 V	Power	7	RSVD	
2	MICI		8	RXD	RS-232C input
3	SGD	RS-232C signal ground	9	TXD	RS-232C output
4	SGS	RS-232C signal ground	10	FG	RS-232C shield
5	RSVD		11	RSVD	
6	RSVD		12	RSVD	

## 12-2 Command Contents

Communication between the computer and PC216A is performed by transmitting commands from the computer and returning status from the unit in response to the commands. Each unit of both transmission and reply is called a "record". The terminator characters which indicate the end of the records are "CR" (carriage return) and "LF" (line feed).  
 (The unit acknowledges CR as the record terminator even if LF is missing.)  
 Before setting the commands, check that the unit is in the "receiving possible" condition with the "RDY?" command. The unit returns the "RDY" command when it is ready for receiving. When transmitting the status command, confirmation using with the "RDY?" command is not necessary. All communications are performed using ASCII codes.  
 The symbols on the command/status display are as follows:  
 indicates space (blank).  
 ①, ②, ③... are characters in the command, and indicate 0 to 9 or the ASCII characters of the alphabets.  
 [ ] indicates PCCX32 only.  
 RSTD indicates reserved.

## Setting Commands (Transmit from computer to unit)

Command	Contents
ATT□□□①②③④ ⑤⑥⑦⑧ ⑨⑩⑪⑫ ⑬⑭⑮⑯⑰ ⑱⑲⑲⑲⑲⑲ ⑳㉑㉒㉓㉔ ㉕㉖㉗㉘㉙ ㉚㉛㉜㉝㉞	Range setting (attenuator) ①: Channel 1 0 = 20 V 1 = 10 V 4 = 1 V 5 = RSTD 6 = 0.5 V 3 = 2 V ②: Channel 2 As above ③ to ⑩: Channel 32 (PCCX32) As above ⑪ to ⑳: Channel 32 (PCCX32) As above
BCME□①	B/C mode setting ①: 0 = 2 channel mode 2 = 4 channel mode 5 = 8 channel mode 9 = 16 channel mode A = 32 channel mode (PCCX32) Zero calibration execution
CAL□	Zero calibration execution
CNT□□①②③④⑤⑥	Counter value reset ①: + or - ②: 0 to 7 (hour) ③④: 00 to 59 (min.) ⑤⑥: 00 to 59 (sec)
DAT□□①	Tape/source mode selection ①: 0 = Tape 1 = Source SOURCE/TAPE selection at returning the value to ATT?, HDSP?, MEM?, SPD?, STA?, STCP?, TAP? and TTM? commands.
EMK	Event marker recording During REC-FWD, the event marker is recorded approximately 15 seconds immediately after this command.
FAN□①	Fan control mode setting ①: 0 = Cancel 1 = Fan control mode ON
HLD□□①②	Level data hold mode ①: Always 0. ②: 0 = Transmits the real time value of the level data when accessed by BAR? command. ← Default 1 = Maintains the maximum value of the level data until it is accessed by BAR? command.

Command	Contents
ID#□□□①②③④	ID number set ①②③: 000 to 999 (ID number) ④: <input type="checkbox"/> = Auto-increment <input type="checkbox"/> (Blank) = No auto-increment
INP□□①	Recording amplifier input switching ①: 0 = Data 1 = 0 V (Test mode) 2 = +100% DC (Test mode) 3 = -100% DC (Test mode) 4 = +/-100% AC (Test mode) Note: AC frequency is 500 Hz (normal speed)/1 kHz (double speed)
MEM□□①②③④⑤⑥	Memo character string setting ①②③④⑤⑥⑦⑧⑨⑩⑪⑫: Maximum of 12 characters (ASCII codes from 20 to 5F)
MOD□①	Tape transport setting ①: 0 = FWD 1 = RBC 2 = E-E 3 = STOP 4 = FF 5 = RBW 6 = FWD×2.5 7 = REV×2.5 8 = FWD×16 9 = REV×16 A = FWD·PAUSE B = REC·PAUSE
MON□□①②	Monitor channel selection ①: 01 to 02 (2 channel mode), 01 to 04 (4 channel mode), 01 to 08 (8 channel mode), 01 to 16 (16 channel mode), 01 to 32 (32 channel mode), PCCX32), Monitor channel No.
PNL□①	Panel lock ①: 0 = OFF 1 = ON
RPT□①	Auto-repeat ①: 0 = Stop 1 = Start
SCH□□①②③ □□④⑤⑥⑦⑧⑨ ⑩⑪⑫⑬⑭⑮	High speed search ①: Search item 0 = Counter 1 = Address 2 = Time 3 = ID 4 = RSVD 5 = Start ID 6 = RSVD ②: After mode 0 = STOP 1 = FWD ③: Direction designation in start ID search 0 = Other than start ID search 1 = FWD 2 = RVS ④⑤⑥: ID number during ID search ⑦⑧⑨: + or -/hour/minute/second of the counter, or address search ④⑤⑥⑦⑧⑨: Year, Month, Day, Hour, Minute, Second of the time search
SLF□①	Self-check ①: 0 = Stop 1 = Start
SPD□①	Recording/Playback Speed Selection ①: 0 = normal speed 1 = double speed
TIM□□①②③④⑤⑥ ⑦⑧⑨⑩⑪⑫	Internal clock setting ①②: 00 to 99 (Year) ③④: 00 to 12 (Month) ⑤⑥: 00 to 31 (Day) ⑦⑧: 00 to 23 (Hours) ⑨⑩: 00 to 59 (Minutes) ⑪⑫: 00 to 59 (Seconds)
TRG□□①②③④⑤ ⑥⑦⑧⑨	Trigger setting* ①: Trigger mode 0 = Trigger output inhibit 1 = Address trigger 2 = Event marker trigger ② to ⑨: Target value (Only when trigger mode = 1) ②: ± +/1 ③: Hour 0 to 7 ④⑤: Minute 00 to 59 ⑥⑦: Second 00 to 59 ⑧⑨: Frame 00 to 32 * Be sure to set the mode during STOP mode when changing from the address trigger mode to event trigger mode, and vice versa.

## Status Command

When the status request command (×××?) from the computer is received, status bytes or values previously set in the computer by the unit are sent back.

Command	Contents
ALM?	ALM□□12345 ①: Condensation 0 = Normal 1 = Condensation (Heater ON) ②: RSV D (Always 0) ③: Mechanism 0 = Normal 1 = Abnormal ④⑤: RSV D (Always "00")
ATT?	ATT□□1234 ⑤⑥⑦⑧ ⑨⑩⑪⑫ ⑬⑭⑮⑯ ⑰⑱⑲⑳ ㉑㉒㉓㉔ ㉕㉖㉗㉘ ㉙㉚㉛㉜ ㉝㉞㉟㊱ ㊲㊳㊴㊵ ㊶㊷㊸㊹ ㊺㊻㊼㊽ ㊾㊿ (Variable length according to B/C mode)
Bar meter indication	BAR□□123456 ⑦⑧⑨⑩⑪⑫ ⑬⑭⑮⑯⑰⑱ ㉑㉒㉓㉔㉕ ㉖㉗㉘㉙㉚ ㉛㉜㉝㉞㉟ ㊱㊲㊳㊴㊵ ㊶㊷㊸㊹ ㊺ (Variable length according to B/C mode)
CMD?	CMD□□1 ①: 0 = No command error 1 = Command error occurred just before
ERR?	ERR□□123456 ⑦⑧⑨⑩⑪⑫ ⑬⑭⑮⑯⑰⑱ ㉑㉒㉓㉔ ㉕㉖㉗㉘ ㉙㉚㉛㉜ ㉝㉞㉟ (Variable length according to B/C mode)
Error code indication	①②③: Number of errors which occurred 000 to 128 ④⑤⑥: Number of errors which undetected 000 to 096 ⑦⑧⑨⑩⑪⑫⑬⑭⑮⑯⑰⑱⑲⑳㉑㉒㉓㉔㉕ *Errors are transmitted by every 32 unit at max. Transmit the ERR? command and receive the error code until unread error number becomes "000".
FAN?	FAN□□1 ①: 0 = OFF 1 = ON
ID number	IDS□□234 ①: S = Source data ②③④: ID number (3 digits) T = Tape data
MEM?	MEM□□23456 ⑦⑧⑨⑩⑪⑫⑬ ①: S = Source data T = Tape data Memo character (Maximum 12 characters)

<p>Command</p>	<p>Over bit indication</p> <p>(Variable according to B/C mode)</p> <p>①: B/C mode</p> <p>②: 0 = 2 channel mode 2 = 4 channel mode 5 = 8 channel mode</p> <p>③: 0 = 16 channel mode A = 32 channel mode (PCCX32)</p> <p>④ to ③③: CH-1 to CH-32</p> <p>① = Over 0 = Not over</p>	<p>RDY?</p> <p>RDY</p>	<p>Recording/playback speed status</p> <p>①: S = Source T = Tape</p> <p>②: 0 = normal speed 1 = double speed</p>	<p>STA?</p> <p>STA? ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮</p> <p>①: Tape running mode</p> <p>0 = FWD 1 = RHC 2 = H-E 3 = STOP 4 = FF</p> <p>5 = REW 6 = FWD x2.5 7 = REV x2.5 8 = FWD x16 9 = REV x16</p> <p>A = FWD • PAUSE B = REC • PAUSE</p> <p>②: Channel mode 2 = 4 channel mode 5 = 8 channel mode</p> <p>③: 0 = 16 channel mode = 32 channel mode</p> <p>④: Zero calibration 0: Not under calibration 1: Under calibration</p> <p>⑤: Servo lock</p> <p>⑥: 0 = Unlocked 1 = Locked at FWD 2 = Locked at REC-FWD</p> <p>⑦: Recording amplifier input switching</p> <p>0 = Data 1 = 0 V (Test mode) 2 = +100% DC (Test mode)</p> <p>⑧: Note: AC frequency is 500 Hz (1x speed)/1 kHz (2x speed)</p> <p>3 = -100% DC (Test mode) 4 = +/-100% AC (Test Mode)</p> <p>⑨: TAPF/SOURCE mode</p> <p>0 = Tape 1 = Source</p> <p>⑩: EOT (End of Tape) detection</p> <p>0 = Not EOT 1 = EOT</p> <p>⑪: BOT (Beginning of Tape) detection</p> <p>0 = Not BOT 1 = BOT</p> <p>⑫: Tape loading</p> <p>0 = Tape not loaded 1 = Tape loaded</p> <p>⑬: Record protect</p> <p>0 = Record protect is set or tape not loaded 1 = Recording possible</p> <p>⑭: Monitor channel</p> <p>01 to 32</p> <p>⑮: RSV D (Always 0)</p>	<p>Status A</p> <p>①: Event Marker</p> <p>0 = Event marker not present during recording or playback</p> <p>1 = Event marker being recorded or played back</p> <p>②③: RSV D (Always 0)</p> <p>④: Self-check</p> <p>0 = READY 1 = BUSY 2 = RSV D</p> <p>3 = End (OK) 4 = End (NG) 5 = Interruption by EOT</p> <p>6 = Record protect</p> <p>Note: Self-check re-start up possible except during 1 (BUSY)</p> <p>⑤: Auto-repeat</p> <p>0 = Not auto-repeat 1 = Recording 2 = Rewinding</p> <p>⑥: Search</p> <p>0 = Not search mode 1 = READY 2 = Searching 3 = RSV D</p> <p>4 = RSV D 5 = FOUND 6 = NOT FOUND</p> <p>⑦: RSV D (Always 0)</p> <p>Panel lock 0 = Off 1 = ON</p> <p>⑧: RSV D (Always 0)</p> <p>0 = Off 1 = ON</p> <p>⑨: RSV D (Always 0)</p> <p>Start ID 0 = Start ID not present during recording or playback</p> <p>1 = Start ID being recorded or played back</p> <p>⑩: Status B</p> <p>①: Event Marker</p> <p>0 = Event marker not present during recording or playback</p> <p>1 = Event marker being recorded or played back</p> <p>②③: RSV D (Always 0)</p> <p>④: Self-check</p> <p>0 = READY 1 = BUSY 2 = RSV D</p> <p>3 = End (OK) 4 = End (NG) 5 = Interruption by EOT</p> <p>6 = Record protect</p> <p>Note: Self-check re-start up possible except during 1 (BUSY)</p> <p>⑤: Auto-repeat</p> <p>0 = Not auto-repeat 1 = Recording 2 = Rewinding</p> <p>⑥: Search</p> <p>0 = Not search mode 1 = READY 2 = Searching 3 = RSV D</p> <p>4 = RSV D 5 = FOUND 6 = NOT FOUND</p> <p>⑦: RSV D (Always 0)</p> <p>Panel lock 0 = Off 1 = ON</p> <p>⑧: RSV D (Always 0)</p> <p>0 = Off 1 = ON</p> <p>⑨: RSV D (Always 0)</p> <p>Start ID 0 = Start ID not present during recording or playback</p> <p>1 = Start ID being recorded or played back</p> <p>⑩: Status B</p>
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Command	Contents
STC? <input type="checkbox"/> 1 2 3 4 STC? <input type="checkbox"/> 1 2 3 4	<b>Status C</b> ①: 0 = Analog mode 1 = Digital mode Synchronizing mode ②: 0 = Asynchronous 1 = Synchronizing mode (Master) 2 = Synchronizing mode (Slave) ③: Channel expansion unit 0 = Disconnected 1 = Connected Voice annotation characteristics ④: 0 = NOR 1 = HQ
TAP? <input type="checkbox"/> 1 2 3 4 5 6 TAP? <input type="checkbox"/> 1 2 3 4 5 6 7 8 9 10	<b>Tape position</b> ①: S = Source T = Tape ② ③ ④ ⑤ ⑥ ⑦: +/- hour/min/sec. ⑧ ⑨ ⑩: Tape remaining amount (hour/min)
TIM? <input type="checkbox"/> 1 2 3 4 5 6 TIM? <input type="checkbox"/> 1 2 3 4 5 6 7 8 9 10 11 12 13	<b>Time</b> ①: S = Source T = Tape ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬: Time (year/month/day/hour/minute/second)
TRG? <input type="checkbox"/> 1 2 3 4 5 6 7 8 9 TRG? <input type="checkbox"/> 1 2 3 4 5 6 7 8 9	<b>Setting trigger status request</b> ①: Trigger mode 0 = Trigger output inhibit 1 = Address trigger 2 = Event marker trigger ② to ⑨: Target value ②: +/- ③: hour 0 to 7 ④ ⑤: minute 00 to 59 ⑥ ⑦: second 00 to 59 ⑧ ⑨: frame 00 to 32



The PC216A is a data recorder capable of analog data input/output but data is stored on the magnetic tape as a digital (binary) formatted code. The digital formatted code can be output during playback in addition to analog data. This makes data transfer possible (either directly or via the digital data interface unit PCF11A/PCIF-1) for high-accuracy data analysis.

An LSB channel is provided in addition to the main analog data channels (2, 4, 8, 16, and 32 channels), facilitating the recording/playing back of digital data simultaneously with main-channel analog data.

Also, when the digital mode is selected and the serial digital input/output function (conformed to RS-422A) is available, the PC216A can also be used as a digital data recorder.

## 13-1 Function

### Parallel Data Output (analog mode)

The playback of the analog main data signal (2, 4, 8, 16, or 32 channel) can be output in a 16-bit parallel format (main data 15-bit + LSB 1-bit). Data coding is offset binary\*.

Data transfer rate is 96 k words/s (normal speed), or 192 k words/s (double speed). Interface output level is TTL.

### LSB Channel Input/Output (analog mode)

Use of the least significant bit (LSB) of quantized 16 bits for digital I/O, the LSB channel can be used to record/play back digital signals (i.e. engine rotation pulse, control signal, time code signal, etc.) independently from the main channel analog signals (2, 4, 8, 16, or 32 channel). Although the dynamic range of 80 dB and other analog characteristics are secured as quoted. Both input and output levels are TTL compatible. Sampling frequency is 96 kHz (normal speed) or 192 kHz (double speed).

### Serial Input/Output (digital mode)

The serial digital data can be input and output between the PC216A and an external PCM encoder/decoder. The transfer rate is 1.536 Mbps (normal speed) or 3.072 Mbps (double speed) when synchronized, and less than 0.768 Mbps (normal speed) or less than 1.536 Mbps (double speed) when unsynchronized. The input/output level conforms with RS-422A.

\* Offset binary

Offset binary is a variation of the 2's complement system, in which the MSB is inverted. In the PC series, 0% data is assigned to 8000H. For more details, see item "DATA" on page 13-5.

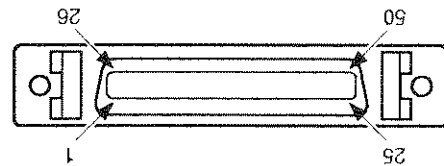
\*2: Together with pins 17 and 35 of EXT. CONTROL connector provide a maximum of 100 mA. Refer to 10. "External Control".

SW1	Mode	Connection
H	Analog input	Open
L	Digital input (serial)	Short-circuit to GND

\*1: SW1 (34 pin) INPUT MODE SWITCH

No.	SIGNAL	FUNCTION	I/O TYPE	No.	SIGNAL	FUNCTION	I/O TYPE
25	GND			50	GND		
24	Reserved			49	CLOCK	WORD CLOCK	TTL
23	XA4	ADDRESS OUTPUT		48	XMUTE	MUTING OUTPUT	TTL
22	A3	ADDRESS OUTPUT	TTL	47	ERR	ERROR FLAG OUTPUT	TTL
21	A2	ADDRESS OUTPUT	TTL	46	XTRIG	TRIGGER OUTPUT	TTL
20	A1	ADDRESS OUTPUT	TTL	45	+SV	Auxiliary power supply *2	
19	A0	ADDRESS OUTPUT	TTL	44	+SV	Auxiliary power supply *2	
18	GND			43	Reserved		
17	D16	PARALLEL DATA OUT (MSB)	TTL	42	Reserved		
16	D14	PARALLEL DATA OUT	TTL	41	Reserved		
15	D13	PARALLEL DATA OUT	TTL	40	Reserved		
14	D12	PARALLEL DATA OUT	TTL	39	Reserved		
13	D11	PARALLEL DATA OUT	TTL	38	Reserved		
12	D10	PARALLEL DATA OUT	TTL	37	NC		
11	D9	PARALLEL DATA OUT	TTL	36	NC		
10	D8	PARALLEL DATA OUT	TTL	35	Reserved		
9	GND			34	SW 1	INPUT MODE SWITCH *1	TTL
8	D7	PARALLEL DATA OUT	TTL	33	LSB CH OUT	LSB CH OUTPUT	TTL
7	D6	PARALLEL DATA OUT	TTL	32	LSB CH IN	LSB CH INPUT	TTL
6	D5	PARALLEL DATA OUT	TTL	31	SCLK -	SERIAL DATA CLOCK	RS-422A -
5	D4	PARALLEL DATA OUT	TTL	30	SCLK +	SERIAL DATA CLOCK	RS-422A +
4	D3	PARALLEL DATA OUT	TTL	29	SO -	SERIAL DATA OUT	RS-422A -
3	D2	PARALLEL DATA OUT	TTL	28	SO +	SERIAL DATA OUT	RS-422A +
2	D1	PARALLEL DATA OUT	TTL	27	SI -	SERIAL DATA IN	RS-422A -
1	D0	PARALLEL DATA OUT (LSB)	TTL	26	SI +	SERIAL DATA IN	RS-422A +

CONNECTOR PIN ASSIGNMENT



CONNECTOR (Rear View)

DIGITAL DATA I/O (Half-pitch 50-pin connector)

Input or output each digital signal to a specified pin (see section 13-2).

- Parallel Digital Output
- Optional digital cable PCDK21 and PCDK22 are available for connection with the PCIF11A and PCIF-1, respectively (see Fig. 13-3-1).

- LSB Channel Input/Output

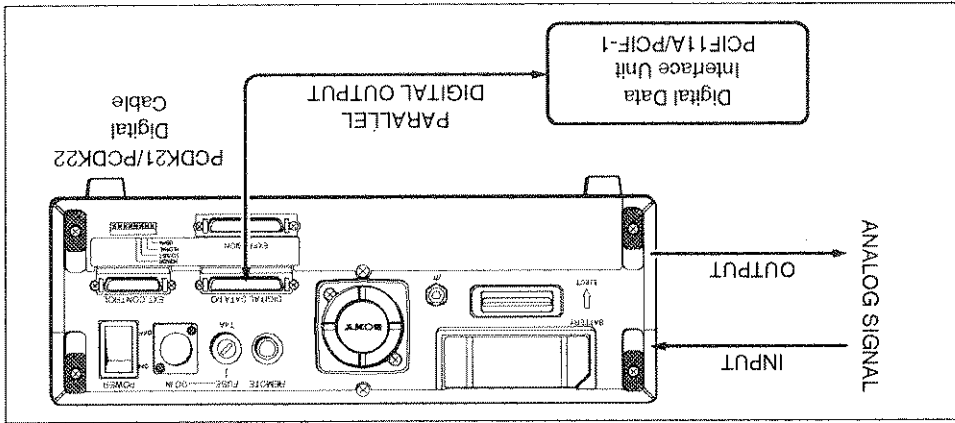
Optional digital cable PCDK22 and the signal splitter PCCB21/21A are available for interfacing the LSB channel signal (see Fig. 13-3-2) with BNC cables.

- Serial Digital Input/Output

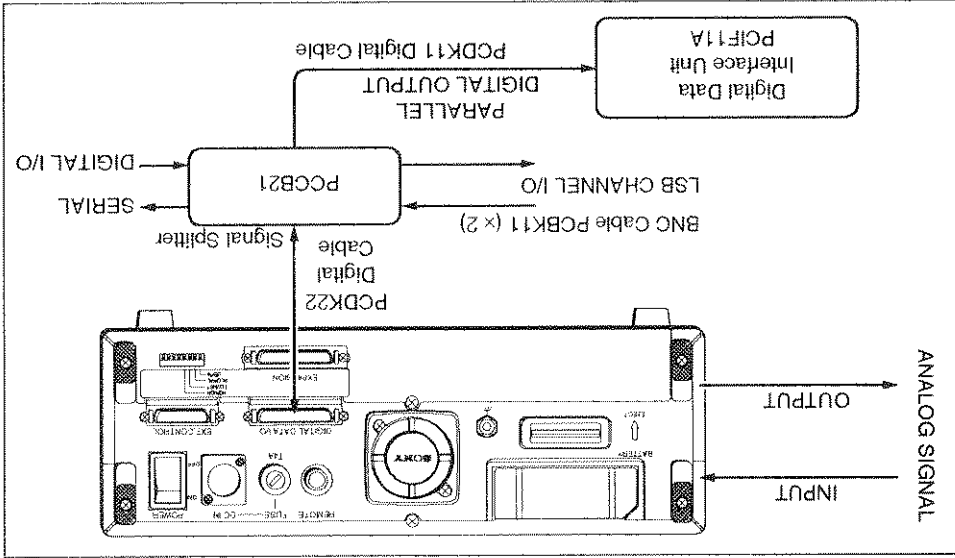
Optional digital cable PCDK22 and the signal splitter PCCB21/21A are available for input/output the serial digital signals (see Fig. 13-3-2) through D-sub 9pin connector.

- Connection of PCIF11A/PCIF-1

To connect the PCIF11A to the PCCB21/21A, use optional digital cable PCDK11 (see Fig. 13-3-2).



13-3-1



13-3-2

## 13-4 Analog/Digital Mode Selection

### Selection of Analog/Digital Mode

Selection between analog mode and digital mode can be made by shorting pin 34 and ground of DIGITAL DATA I/O connector. With the optional signal splitter PCCB21/21A which has a slide switch, the analog/digital mode selection can be easily achieved.

## 13-5 Parallel Digital Output

When the PC216A is in analog mode, the main data signals on tape are played back and the parallel digital signals are output from the specified terminal of the DIGITAL DATA I/O connector together with the analog data. (See the table on page 13-2.)

When using the Digital Data Interface Unit PCIF1A, the data can be transferred to a host computer at normal speed only, and the PCIF-1 at normal speed and at 2 times speed.

### Description of DIGITAL DATA I/O Connector (See timing chart.)

<p><b>DATA:</b> 15-bit PCM data (Offset Binary)</p> <ul style="list-style-type: none"> <li>• Data sequence (channel order)           <ul style="list-style-type: none"> <li>2ch mode: 1, 2, 1, 2, .....</li> <li>4ch mode: 1, 2, 3, 4, 1, 2, 3, 4, 1, .....</li> <li>8ch mode: 1, 2, 3, 4, 5, 6, 7, 8, 1, .....</li> <li>16ch mode: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 1, .....</li> <li>32ch mode: 1, 2, 3, ....., 30, 31, 32, 1, .....</li> </ul> </li> <li>• Data Word (D15 to D1)           <ul style="list-style-type: none"> <li>FFFFH(+Full range), ..., E000H(+100%), ..., ..., 8000H(0%), ..., ...,</li> <li>2000H(-100%), ..., ..., 0000H(-Full range)</li> </ul> </li> <li>• Data Word (D0)           <ul style="list-style-type: none"> <li>When the LSB channel is used: Same as the LSB channel output</li> <li>When the LSB channel is not used: Always "0"</li> </ul> </li> </ul> <p><b>ADDRESS:</b> 5-bit channel address</p> <p>Indicates an address code showing the channel number.</p> <ul style="list-style-type: none"> <li>• Contents of data (XA4, A3, A2, A1, A0)           <ul style="list-style-type: none"> <li>0(CH-1), 1(CH-2), 2(CH-3), 3(CH-4), 4(CH-5), 5(CH-6), 6(CH-7), 7(CH-8), ....., 30(CH-31), 31(CH-32)</li> </ul> </li> </ul> <p><b>CLOCK:</b> Word clock</p> <p>Normal speed: 96 KHz Double speed: 192 KHz</p> <p>The data values change at the rising edge of the clock. (See Fig. 13-5-1.)</p> <p><b>MUTE:</b> Muting flag</p> <p>Indicates that muting was canceled.</p> <ul style="list-style-type: none"> <li>L: Muting ON</li> <li>H: Muting OFF</li> </ul> <p><b>ERR:</b> Interpolation flag</p> <p>Indicates that an error which cannot be corrected has been interpolated.</p> <ul style="list-style-type: none"> <li>L: Interpolation OFF</li> <li>H: Interpolation ON</li> </ul>	<p>13-5</p>
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TRIG: Two types of trigger output are possible using RS-232C control.

1. Address frame trigger output

When playing back the specified address ( $\pm$ HxxxMxxxSxxF), this signal goes high for one drum rotation period. In the normal speed, be sure to set the address frame trigger for 3 seconds (100 frames) unit if continuous data transfer is to be done.

The relation between the time (seconds) of address, frame no., and

frame quantity is shown below.

Second	Frame No.	Frame Qty
-59	00 ~ 32	33
-58	00 ~ 32	33
⋮	⋮	⋮
+3	00 ~ 32	33
+2	00 ~ 33	34
+1	00 ~ 32	33
0	00 ~ 32	33
-1	00 ~ 33	34
-2	00 ~ 32	33
-3	00 ~ 32	33
⋮	⋮	⋮
-58	00 ~ 32	33
-59	00 ~ 32	33

- side: In the case where 1 is the remainder when the value (seconds) is divided by 3: 00 to 33 frames  
Others: 00 to 32 frames

+ side: In the case where 2 is the remainder when the value (seconds) is divided by 3: 00 to 33 frames  
Others: 00 to 32 frames

*Ex: When the PC216A is in normal speed 16 channel mode, using PCIF11A*  
Since data for one channel are sampled at 6 kHz, set the number of words to 18000 for three seconds with the DNM command.  
2. Event trigger output

This signal goes High for one drum rotation when the data recorder

PC216A enters the event playback mode.

Thus, data which is synchronized with the generation of an event can be transferred. Always start to transfer the data from STOP mode.

## Channel Address & Data Channel

The tables below show the channel addresses (XA4, A3, A2, A1 and A0) and corresponding data channels when the PC216A plays back a tape recorded on the PC-108M/PC116.

### 2-Channel Mode Tape

CHANNEL ADDRESS	PC-216A	PC-108M	PC116
0000 (0)	Channel 1	Channel 1	Channel 1
0001 (1)	Channel 2	Channel 5	Channel 9

### 4-Channel Mode Tape

CHANNEL ADDRESS	PC-216A	PC-108M	PC116
0000 (0)	Channel 1	Channel 1	Channel 1
0001 (1)	Channel 2	Channel 3	Channel 5
0010 (2)	Channel 3	Channel 5	Channel 9
0011 (3)	Channel 4	Channel 7	Channel 13

### 8-Channel Mode Tape

CHANNEL ADDRESS	PC-216A	PC-108M	PC116
0000 (0)	Channel 1	Channel 1	Channel 1
0001 (1)	Channel 2	Channel 2	Channel 3
0010 (2)	Channel 3	Channel 3	Channel 5
0011 (3)	Channel 4	Channel 4	Channel 7
00100 (4)	Channel 5	Channel 5	Channel 9
00101 (5)	Channel 6	Channel 6	Channel 11
00110 (6)	Channel 7	Channel 7	Channel 13
00111 (7)	Channel 8	Channel 8	Channel 15

### 16-Channel Mode Tape

CHANNEL ADDRESS	PC-216A	PC116
00000 (0)	Channel 1	→
00001 (1)	Channel 2	→
00010 (2)	Channel 3	→
00011 (3)	Channel 4	→
00100 (4)	Channel 5	→
00101 (5)	Channel 6	→
00110 (6)	Channel 7	→
00111 (7)	Channel 8	→
01000 (8)	Channel 9	→
01001 (9)	Channel 10	→
01010 (10)	Channel 11	→
01011 (11)	Channel 12	→
01100 (12)	Channel 13	→
01101 (13)	Channel 14	→
01110 (14)	Channel 15	→
01111 (15)	Channel 16	→

All the address lines, which are output on the DIGITAL DATA I/O connector, are active low excluding A4 and all the data lines are active low.

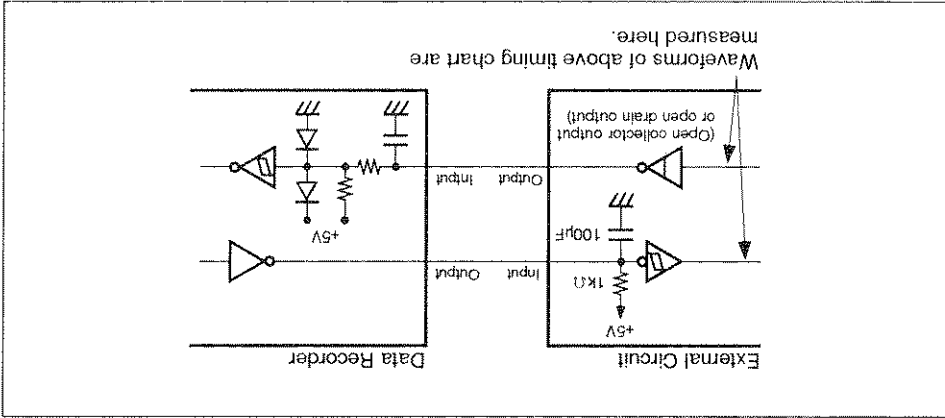
**Note**

CHANNEL ADDRESS	Recorded by PC-216A+PCX32
00000 (0)	Channel 1
00001 (1)	Channel 2
00010 (2)	Channel 3
00011 (3)	Channel 4
00100 (4)	Channel 5
00101 (5)	Channel 6
00110 (6)	Channel 7
00111 (7)	Channel 8
01000 (8)	Channel 9
01001 (9)	Channel 10
01010 (10)	Channel 11
01011 (11)	Channel 12
01100 (12)	Channel 13
01101 (13)	Channel 14
01110 (14)	Channel 15
01111 (15)	Channel 16
10000 (16)	Channel 17
10001 (17)	Channel 18
10010 (18)	Channel 19
10011 (19)	Channel 20
10100 (20)	Channel 21
10101 (21)	Channel 22
10110 (22)	Channel 23
10111 (23)	Channel 24
11000 (24)	Channel 25
11001 (25)	Channel 26
11010 (26)	Channel 27
11011 (27)	Channel 28
11100 (28)	Channel 29
11101 (29)	Channel 30
11110 (30)	Channel 31
11111 (31)	Channel 32

32-Channel Mode Tape



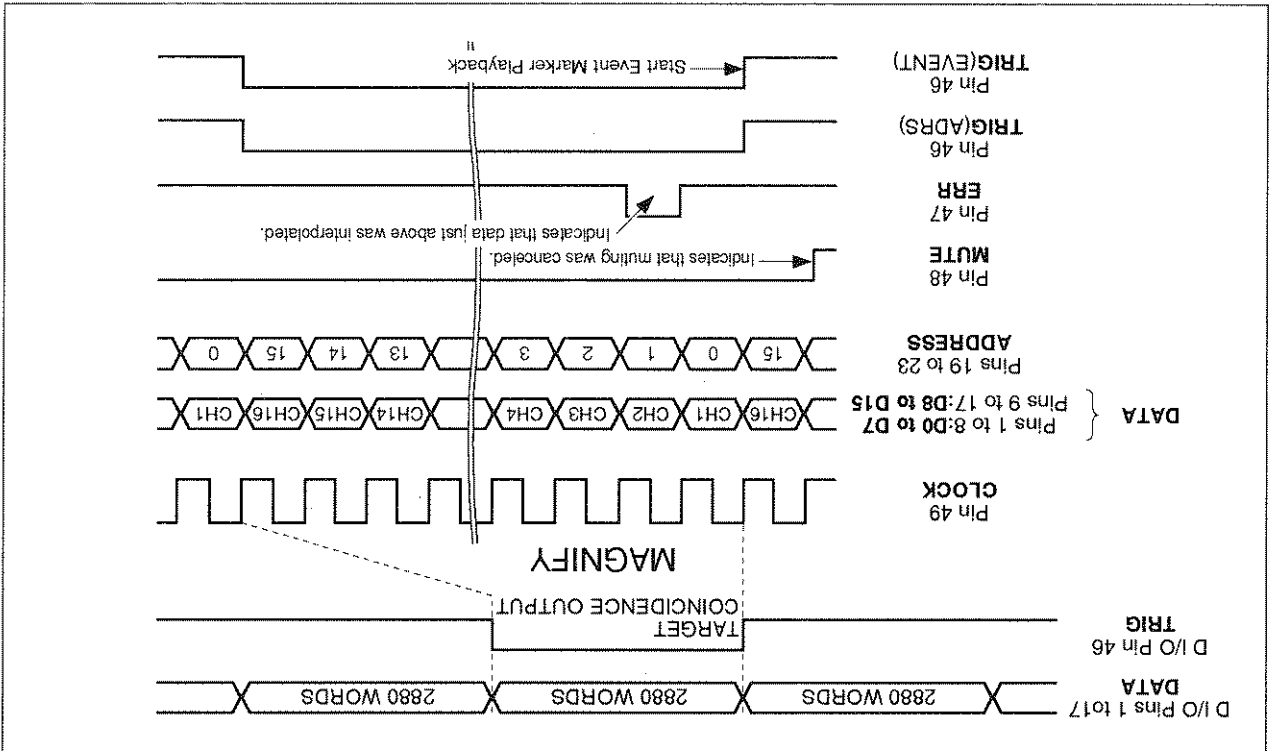
Fig. 13-5-2. AN EXAMPLE OF CONNECTION TO THE RECOMMENDED EXTERNAL CIRCUIT



The signals are measured at the point indicated by the arrow in the following recommended external circuit. However, XA4 (Pin 23) only is not inverted.

**Note**

Fig. 13-5-1. AN EXAMPLE OF PARALLEL DIGITAL OUTPUT TIMINGS



Input/output digital signals to the specified pins of the DIGITAL DATA I/O connector (see page 13-2). When the data recorder is in record mode, LSB input signal through the DIGITAL DATA I/O connector is recorded at the same time as the main data signals. When the unit is in playback mode, the LSB signal is output through the DIGITAL DATA I/O connector.

**Note**

Care should be exercised in the selection of the sampling rate, in order to avoid the distortion inherent in discrete sampling.

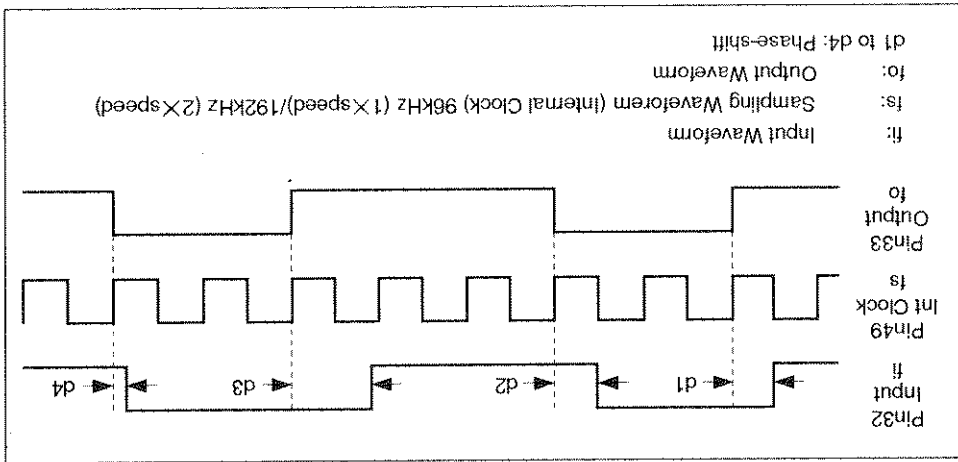


Fig. 13-6-1. AN EXAMPLE OF PHASE SHIFT CAUSED BY SAMPLING

## 13-7 Serial Digital Input/Output

By setting the PC216A into Digital Mode, it is possible to record an incoming serial digital signal generated by an external PCM machine (such as a digital telemetry system) where analog signals, typically generated from multiple transducers, are A/D-converted and formatted (encoded and multiplexed). The serial input and output terminals are provided in the DIGITAL DATA I/O connector.

In the Digital Mode the PC216A functions as a transparent storage device, i.e. the played back digital signal is equivalent to the incoming signal to the recorder. Thus, the Digital Mode is well suited to record a digital bit stream which is pre-formatted/encoded by external PCM equipment.

There are two types of data transfer between the PC216A and external PCM equipment: synchronous mode and asynchronous mode.

### Synchronous Mode

In this mode, the incoming digital signal generated by the external PCM equipment must be synchronized by the PC216A and the bit rate must match the bit clock SCLK. The SCLK is provided in the DIGITAL DATA I/O connector to lock the external PCM equipment (PC216A can not be synchronized by an external clock). The incoming digital signal (NRZ) is in sync with the rising edge of the SCLK, and the playback digital signal is generated by clocking the data within the recorder as illustrated in Fig. 13-7-1. In synchronous mode, it is possible to record and play back a digital signal at the maximum bit rate, i.e. 1.536 Mbits/sec. at the normal speed mode or 3.072 Mbits/sec. at the double speed mode.

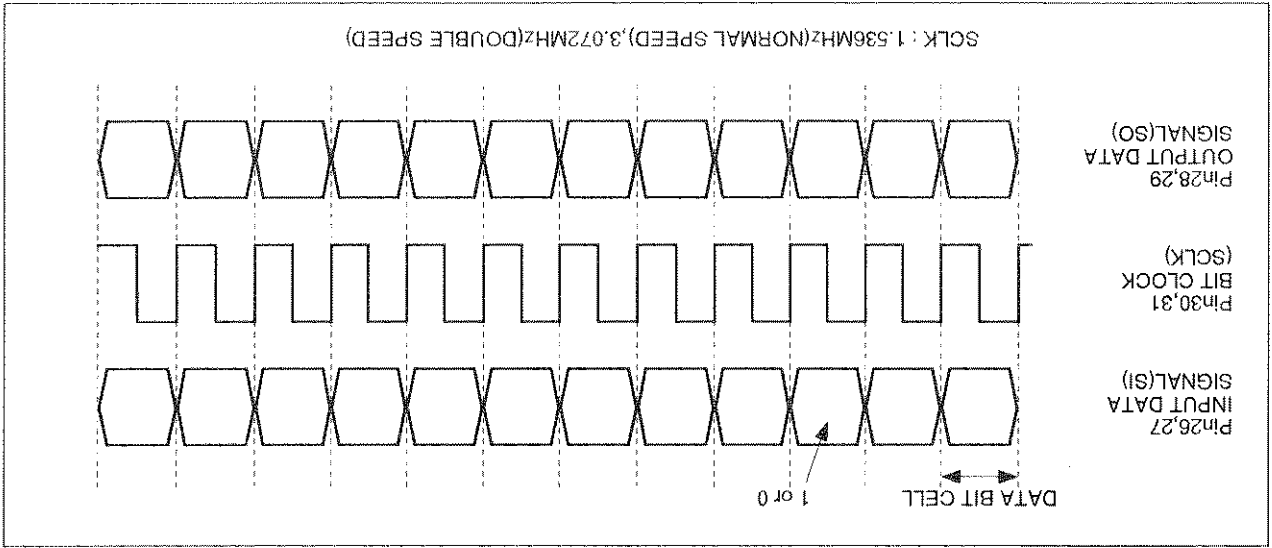


Fig. 13-7-1. AN EXAMPLE OF SYNCHRONOUS MODE (NRZ SYSTEM)

## Asynchronous Mode

In asynchronous mode the bit rate of the external PCM equipment is independent of the clock frequency (SCLK) of the PC216A. In this mode, the data transfer is made without using SCLK. The incoming digital signal (NRZ) is sampled using the SCLK and then recorded. Because of asynchronous sample timing, the length of the sampled data bits of the incoming data will vary. The data can not be correctly reproduced if the amount of fluctuation exceeds one half of the original bit length. In other words, the maximum bit rate must be less than half of the sampling rate. In 13-7-2 shows an example of timing when the incoming bit rate is more than half of the sampling rate, and Fig. 13-7-3 shows the case when the incoming bit rate is less than half of the sampling rate.

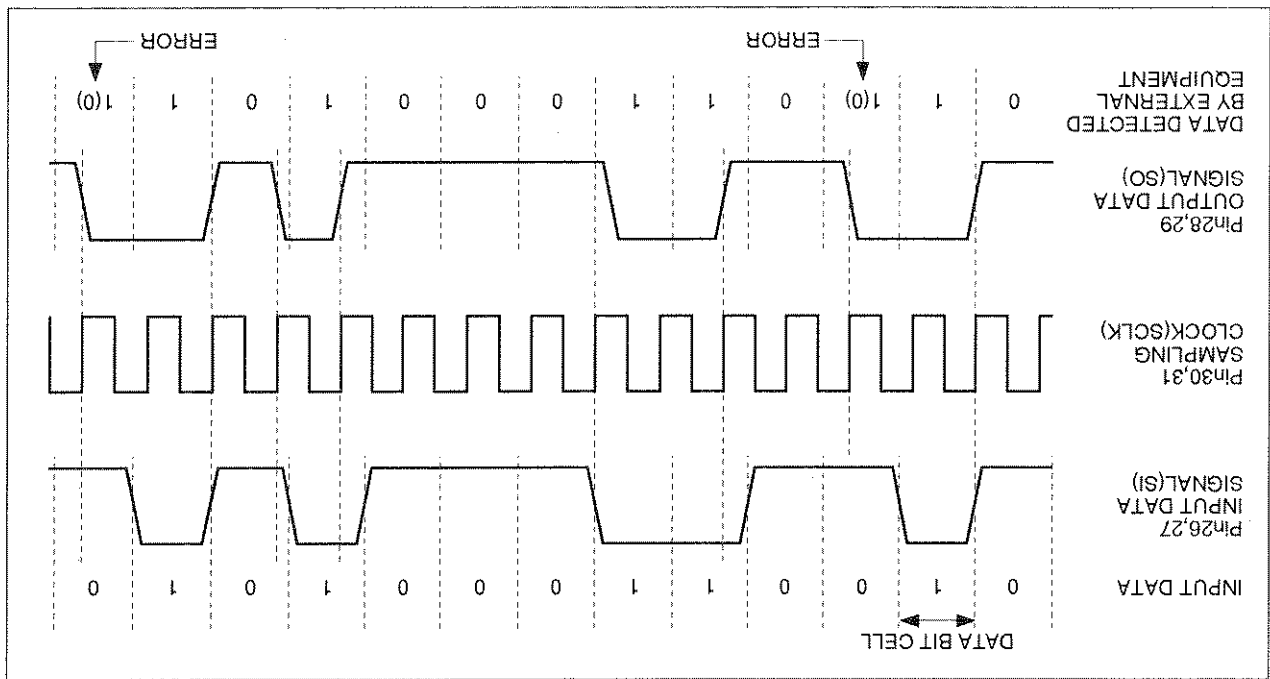


Fig. 13-7-2. AN EXAMPLE OF ASYNCHRONOUS MODE (INPUT BIT RATE IS NOT BELOW HALF OF THE SAMPLING RATE, NRZ SYSTEM)

Fig. 13-7-5. AN EXAMPLE CONNECTION TO THE RECOMMENDED EXTERNAL CIRCUIT

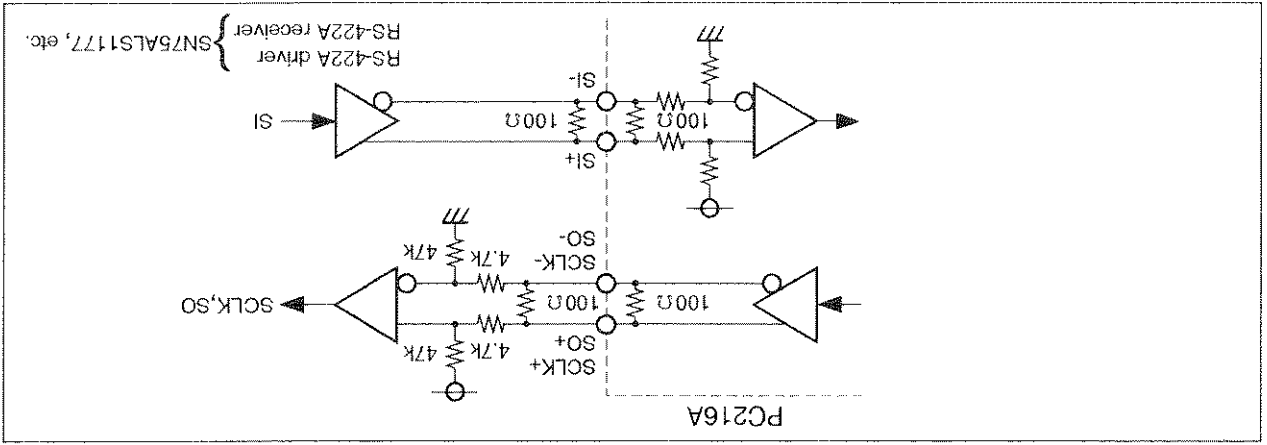
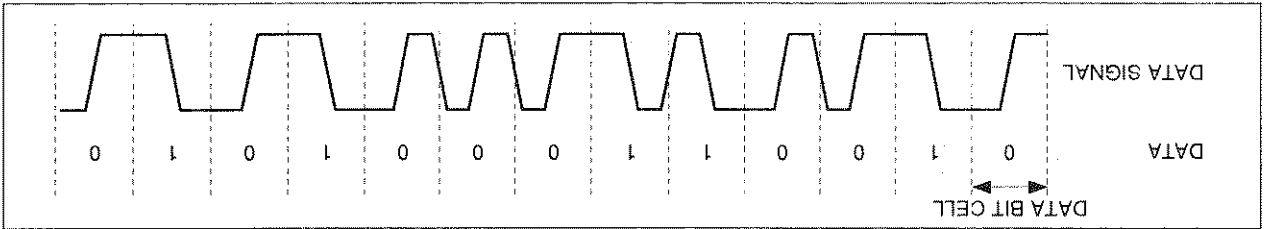
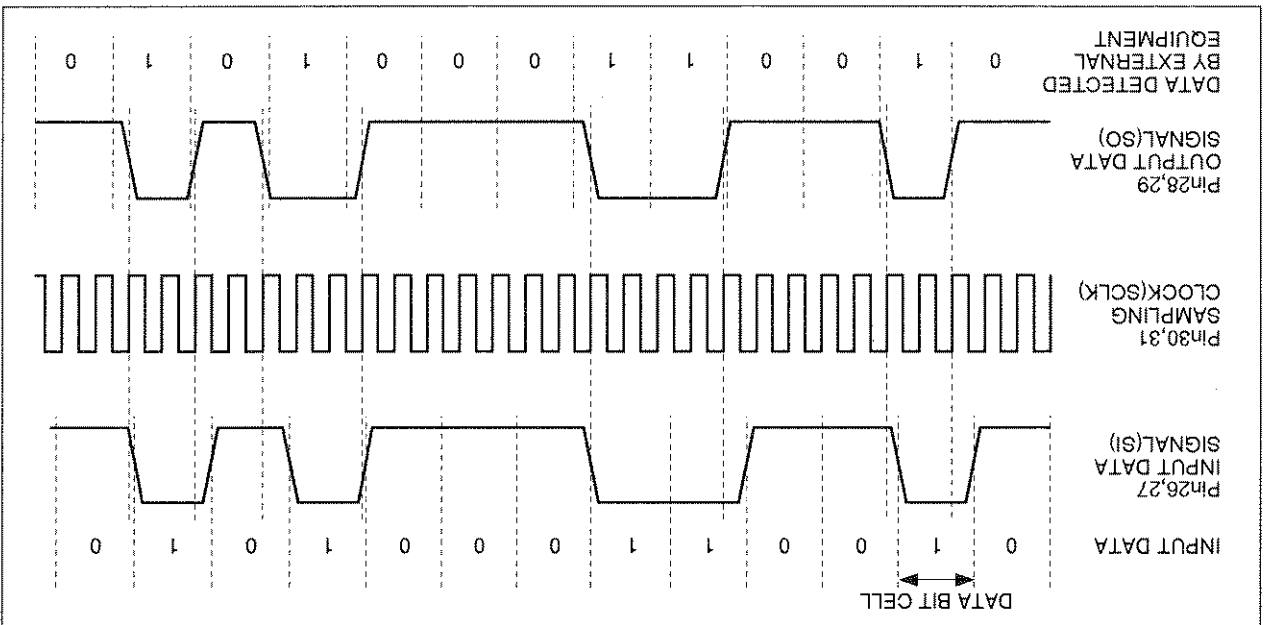


Fig. 13-7-4. AN EXAMPLE OF BI PHASE-L SIGNAL



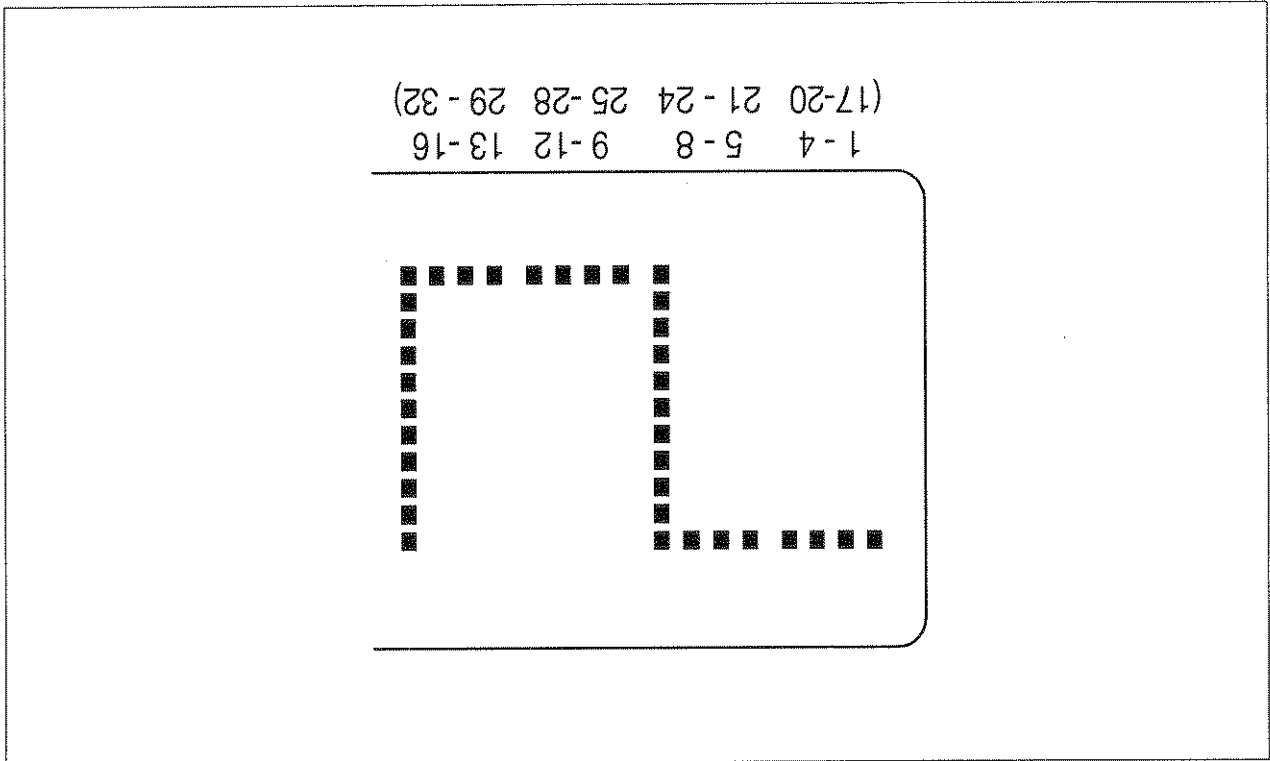
When the incoming digital signal is in modulated form such as Bi-Phase-L (commonly used for IRIG telemetry signals), the maximum bit rate should be less than a quarter of the sampling rate, i.e. 0.384 Mbps at normal speed or 0.768 Mbps at double speed. This is because there can be a level transition at the middle of a data bit cell in the Bi-Phase-L signal, doubling the maximum frequency component in the signal compared with the NRZ signal of the same bit rate. An example of Bi-Phase-L signal is illustrated in Fig. 13-7-4.

Fig. 13-7-3. AN EXAMPLE OF ASYNCHRONOUS INTERFACE (INPUT BIT RATE IS BELOW HALF OF THE SAMPLING RATE, NRZ SYSTEM)



### LCD Display in Digital Mode

During the digital mode, the square-wave shown below is displayed and scanned on the LCD display as an indication of speed.



The following selections, settings, indications, functions, etc. are identical with those of the analog mode.

- Tape speed selection
- ID number setting
- Clock setting
- Counter indication
- Address indication
- Source time indication
- Tape time indication
- Warning indication
- Amount of tape remaining indication
- Voice annotation characteristics
- Search operation

## Digital Test Signal Mode

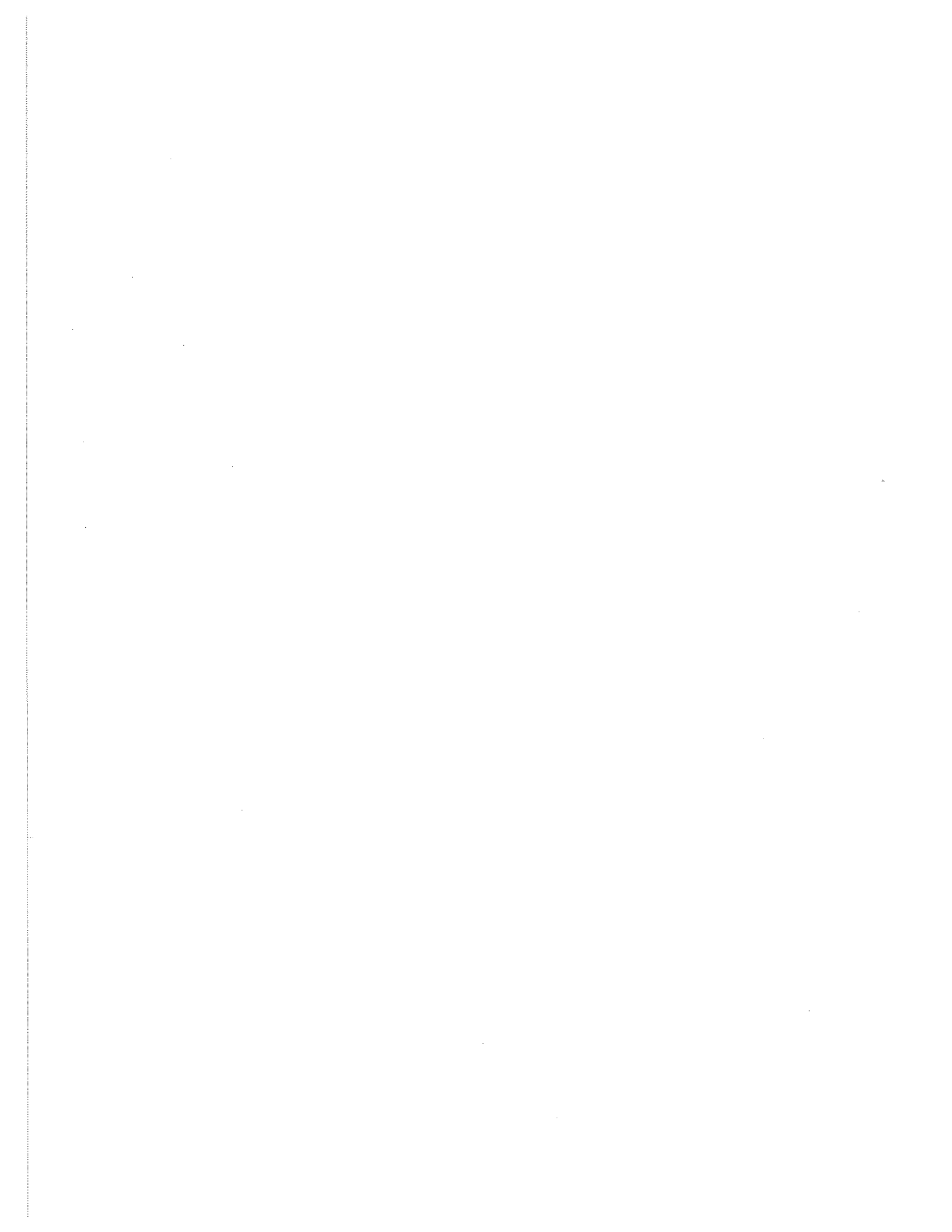
In digital test mode, the following four test signals are generated with a built-in test signal generator in E-E mode. They are output from the DIGITAL DATA I/O connector and can be recorded onto tape as a reference signal by entering the REC mode.

TST SIG LED	Digital Signal
1	01010101 .....
2	11111111 .....
3	00000000 .....
4	1000000010000000 .....

- 1 In E-E mode, press the TST SIG key for two seconds until the TEST SIG key LED blinks.
- 2 By pressing the CH/NEXT key, the signal output from the test signal generator can be selected. The TST SIG (1 to 4) LED that corresponds to the selected signal lights and displays the type of signal being generated.
- 3 To exit this mode, press the TST SIG key once. The TST SIG key LED will be extinguished.
- 4 Pressing the STOP key will also release the TST SIG mode.

### Note

If recording starts without exiting the TST SIG mode, the test signal will be recorded on the tape regardless of the signal present at the DIGITAL DATA I/O connector; therefore please be sure to check that the TST SIG LED is extinguished when recording.





Tape Transport System

Tapes used:

Recording/playback time (minutes)

	normal speed	double speed
DG60MA	120	60
DG90MA	180	90
DT-46	46	23
DT-60	60	30
DT-90	90	45
DT-120	120	60

Tape width: 3.81 mm

Tape speed: 8.15 mm/s (normal speed), 16.30 mm/s (double speed)

Heads:

Rotary heads; 2 for recording, 2 for playback

Drum diameter:

30 mm

Drum wrapping angle: 90°

Drum rotational speed: normal speed: 2000 min<sup>-1</sup> {2000 rpm}

double speed: 4000 min<sup>-1</sup> {4000 rpm}

Relative tape speed: normal speed: 3.133 m/s, double speed: 6.266 m/s

Track pitch:

13.59 μm

Tracking system:

Area division ATF

Starting time:

Less than 1 second (from PAUSE)

Stopping time:

Less than 0.5 seconds

Tape end detection:

Detection of transparent BOT and EOT leaders

by photo-sensor

Recording/playback direction:

Forward only

Capstan servo:

ATF control (playback)/phase control (recording)

Drum servo:

Phase control/speed control

Reel servo:

Constant tension control (recording/playback)

Synchronous mode:

The slave machine is phase-locked to the drum rotation

Motors:

×1 Drum, ×1 capstan, ×2 reel, ×1 control

Fast forward/rewind time:

Less than 60 seconds (DG60MA)

software } servo

## Recording/Playback system

### Analog mode

No. of channels:	2 (for only normal speed)/4/18/16/32 (when PCGX32 used) selection
Input/output connectors:	BNC
Frequency band	
2 channel mode:	DC to 20 kHz (normal speed)
4 channel mode:	DC to 10 kHz (normal speed)/DC to 20 kHz (double speed)
8 channel mode:	DC to 5 kHz (normal speed)/DC to 10 kHz (double speed)
16 channel mode:	DC to 2.5 kHz (normal speed)/DC to 5 kHz (double speed)
32 channel mode:	DC to 1.25 kHz (normal speed)/DC to 2.5 kHz (double speed)
Frequency response:	+0.5 to -1.0 dB (0 dB at 200 Hz)
Sampling frequency:	3 kHz (at 1.25 kHz band), 6 kHz (at 2.5 kHz band), 12 kHz (at 5 kHz band), 24 kHz (at 10 kHz band), 48 kHz (at 20 kHz band)
(× 64 over-sampling for A/D, D/A)	
Quantization:	16-bit linear quantization (main data 15bit + LSB 1bit)
Interleave:	2 track linked-type
Error correction:	Double Reed Solomon system
Error interpolation:	Interpolation of average value and previous value
S/N ratio:	80 dB or greater (within band)
Crosstalk:	78 dB or greater (within band)
Distortion:	-80 dB or less (within band)
DC linearity:	±0.1 % or less
Phase difference between channels:	3 degree or less
Input range:	±20 Vp, ±10 Vp, ±5 Vp, ±2 Vp, ±1 Vp, ±0.5 Vp
Coupling:	DC
Automatic calibration:	Gain, offset
Output level:	When power ON, self-check ±1 Vp to ±3 Vp, variable
Output current:	10 mA max.
Input impedance:	100 k, unbalanced
Output impedance:	50, unbalanced
Drift:	Recording/playback 0.1% or less (15 minutes after power ON to 2 hours)
Test signal:	±100% sine wave (500 Hz for normal speed/1 kHz for double speed)/+100% DC/-100% DC/0 V, 4 types selectable

### Announcement

Input connector: MIC (standard jack)  
Output connector: EAR (mini-jack)  
System: ADM (recorded into subcode areas)  
No. of channels: 1  
Sampling frequency: 24 kHz (NML mode)/25.6kHz (HQ mode) selectable

### LSB channel

Input/output connector: Half-pitch 50-pin  
System: Externally open and fix the LSB of PCM data area and directly sample the input signal.  
Input/output level: TTL  
No. of channels: 1  
Sampling frequency: 96 kHz (normal speed), 192 kHz (double speed)  
Input signal: 1bit  
Output signal: 1bit  
Sink current: 10 mA max.

### Parallel digital output

Output connector: Half-pitch 50-pin  
Signal format: 16-bit parallel (main data 15bit + LSB 1bit)  
Data coding: Offset binary  
Output level: TTL  
Output signal: 15bit  
Main data: 15bit  
LSB: 1bit  
Address: 5bit  
Trigger flag: 1bit  
Error flag: 1bit  
Muting flag: 1bit  
Word clock: 1bit  
Data transmission rate: 96 kword/s (normal speed), 192 kword/s (double speed)  
Word clock: 96 kHz (normal speed), 192 kHz (double speed)  
Bit sync: By internal clock  
Sink current: 10 mA max.

**Digital mode**

Input/output connector: Half-pitch 50-pin  
 Input: SI (serial input)  
 Output: SO (serial output), SCLK (clock output)  
 I/O level: RS-422A  
 Signal format: Bit serial  
 Bit rate (sync): 1.536 Mbps (normal speed), 3.072 Mbps (double speed), NRZ  
 Bit clock: 1.536 MHz (normal speed), 3.072 MHz (double speed)  
 Bit sync: By internal clock  
 Bit rate (async): Less than 0.768 Mbps (normal speed), less than 1.536 Mbps (double speed), NRZ  
 Test signal: 01010101.../All I/All O/1000000... 4 types selectable

**Analog mode/Digital mode selection**

Mode selection: By external switch (when STOP mode)  
 Valid function: Analog mode Digital mode  
 BNC input/output Yes N/A  
 LSB input/output Yes N/A  
 Parallel digital output Yes N/A  
 Serial digital input/output N/A Yes  
 Bar meter indication Yes N/A  
 Input range indication Yes N/A  
 Digital mode indication N/A Yes  
 Index indication Yes Yes  
 Warning indication Yes Yes  
 Voice annotations input/output Yes Yes  
 Data sound monitor Yes N/A

**Subcode channel**

PCM area: B/C mode (analog mode), tape speed at the recording  
 Subcode area: ID, time code, address, voice annotation, event, start ID, input range (analog mode), coupling code (analog mode), memo characters

Tape operation keys: REC, STOP, FWD, FF, REW, PAUSE  
 Cassette ejection button: EJECT  
 Parameter setting keys: SPEED (1×/2×), CH/NEXT, UP, ID, RANGE (analog mode), DOWN  
 Search mode key: SEARCH  
 Mark keys: MARK-1, MARK-2  
 Other setting keys, SWS:  
 TST SIG (test signal), 32-DP (PC216A/PCXC32 selection, analog mode), PNL LOK (panel lock), ANN/ DATA (sound monitor), NORMAL/P-SAVE (power save)  
 Display (LCD) setting keys:  
 OVR/LIGHT (overrange reset/backlight), RESET (counter reset), SOURCE (source mode), TAPE (tape mode), CLOCK (clock set mode)  
 Tape counter: ±Hour/Minute/Second, arbitrary reset  
 ID auto-increment: Increased by 1 at end of recording, ON/OFF selectable  
 Start ID: Automatic recording for 15 seconds from start  
 High-speed search: Max. of 200× normal speed  
 High-speed search item: Mark 1, mark 2, ID, start ID  
 Memory search target  
 Mark 1:  
 At recording: Recording start point (auto) or Arbitrarily marked point while recording  
 At playback: Arbitrarily marked point  
 Mark 2:  
 At recording: Recording end point (auto)  
 At playback: Arbitrarily marked point  
 Manual search:  
 Perform search in FWD/REV direction at 16× normal speed.  
 Self-check: Power supply, servo, head, amplifier (analog mode)  
 Fan control mode: Stops the ventilation fan drive until internal temperature reaches the setting temperature.  
 Remote control: Controlled by PCRM22 or host computer with RS-232C RS-232C:  
 EXT control: Refer to section 10.  
 Refer to section 12.  
 Refer to section 10.

## Monitor system

High contrast and wide-angle LCD (with backlight)	Main display:
Bar meter (analog mode):	
All channels simultaneously indicated, bi-direction (%) or one-direction (dB) with monitor channel indication	Digital mode display (digital mode):
Indicates rectangular waveform that corresponds to tape speed in dot matrix, 4 dots (L) × 8 dots (W)	
	Index (source)
	ID:
	Tape counter:
	Tape remaining:
	Time:
	Index (tape)
	ID:
	Address:
	Tape remaining:
	Time:
	Fan control mode:
Internal status is displayed in mark.	Display (LED) to check:
Power supply, loading, bar meter indication (analog mode), announcement level, running modes (REC, STOP, FWD, FF, REW, PAUSE), parameter setting (SPEED 1×/2×, ID), search, mark (-1, -2), test signal, panel lock	
	Warning indication
	On display:
	LED:
	Monitor output:
	Sound monitor:
	Speaker:
	Memo announcement
	Recording:
	Playback:
	Microphone (normally supplied accessory) used
	Speaker/ear phone (commercially available) selection

## Power Supply System

DC:  
 Voltage: IN connector  
 12 V (rated), 11 V to 30 V (allowable range), via DC  
 Current consumption: Power save mode  
 2A @ 12 V, double speed REC  
 Normal mode  
 3A @ 12 V, double speed FWD  
 AC (used with PCPS22)  
 Voltage: 100 to 240 V (rated), 90 to 250 V (allowable range)  
 Frequency\*: 50/60 Hz (rated) 47 to 440 Hz (allowable range)  
 Current consumption\*: 120 V/60 Hz:

Power save mode  
 0.4A @double speed REC  
 Normal mode  
 0.6A @double speed FWD  
 220 to 240 V/50 Hz:  
 Power save mode  
 0.3A @double speed REC  
 Normal mode  
 0.4A @double speed FWD  
 Battery: 12 V/2.3 Ah (used with NP-1B)

Power supply priority grading:  
 ① AC/DC combination: AC pack priority/DC backup  
 ② DC/battery combination: DC priority, battery backup  
 \* NOTE : Current leakage may increase when power line frequency exceeds 60 Hz.

## External Dimensions/Mass

Dimensions: 297 (W) × 100 (H) × 220 (D) mm (PC216A only, excluding protrusions)  
 Mass (Weight): Approximately 4.5 kg (PC216A only)

## Supplied Accessories

AC pack PCPS22 (×1)  
 AC Cord (×1)  
 Microphone (×1)  
 DC power supply (×1)  
 Spare DC fuse (×2)  
 Precision screwdriver No. 3 (×1)  
 Carrying belt (×1)  
 Spare REMOTE connector (×1)  
 Spare EXT connector (×1)  
 Instruction Manual (×1)  
 Cassette tape (×1)  
 Cleaning cassette (×1)

## Operating Environment

Recommended temperature/humidity for specifications:  
 5 to 40°C, 40 to 80% RH (non-condensating)  
 Recommended temperature/humidity for operation:  
 0 to 40°C, 20 to 80% RH (non-condensating)  
 Recommended temperature/humidity for storage:  
 -10 to 50°C, 10 to 90% RH (non-condensating)  
 Recommended pressure for specifications:  
 860 to 1060 hPa  
 Operating position: Horizontal (normal position), vertical (front panel facing upwards)  
 Vibration resistance: Under the conditions specified by MIL-STD-810C, Method 514.2, Curve V (±1.5G), normal operation in horizontal position.  
 Shock resistance: 392 m/s<sup>2</sup> (40 G), 11 ms (while stored)



# 15 Specifications of Optional Accessories

## Battery Pack (NP-1B)

Battery used: Nickel cadmium battery  
 Nominal voltage: DC 12 V  
 Capacity: 2.3 Ah  
 Ambient temperature: 0°C to +40°C  
 Storage temperature: -20°C to +40°C  
 Dimensions: 72 (W) × 25 (H) × 185 (D) mm  
 Mass (weight): Approximately 0.7 kg

## Battery Charger (BC-1WD)

Input voltage: AC 120 V (UC)  
 AC 220 V to 240 V (EK)  
 Input power supply frequency: 50/60 Hz  
 Battery quantity: Maximum 4  
 Charging time (for 1 battery): Approximately 90 min.  
 Dimensions: 107.5 (W) × 88 (H) × 325 (D) mm  
 Mass (weight): Approximately 1.7 kg

## Remote Control Unit (PCRM22)

Operation keys: Transport mode section: REC, STOP, FWD, FF, REW, PAUSE  
 Operation section: Monitored channel select, search, MARK-1, MARK-2, ID increment, 32-DP  
 LCD section: Backlight ON/OFF, counter reset, SOURCE mode, TAPE mode  
 Confirmation displays: Transport modes: Button-selected mode  
 Operations: Loading complete, tape speed, operation button-selected mode  
 LCD: Identical to main unit  
 Displayed warnings: Overrange input, low DC voltage, mechanical malfunction, condensation, error check message  
 Interface: RS-232C  
 Cable length: Approximately 3 m  
 External dimensions: 210 (W) × 25 (H) × 70 (D) mm (excluding protrusions)  
 Mass (Weight): Approximately 0.5 kg

## Channel Expansion Unit (PCCX32)

Dimensions: 297 (W) × 70 (H) × 212 (D) mm (Excluding projection)  
 Mass (weight): Approximately 3.0 kg

### Recording/Playback System

No. of channels: 16 (ch17 to ch32)  
 Input/output connectors: BNC

Frequency band: DC to 1.25 KHz (normal speed)/  
 DC to 2.5 KHz (double speed)

Frequency response: +0.5 to -1.0 dB (0 dB at 200 Hz)

Sampling frequency: 3 KHz (at 1.25 KHz band),  
 6 KHz (at 2.5 KHz band)

Dynamic range: 80 dB or greater (within band)

S/N ratio: 78 dB or greater (within band)

Crosstalk: -80 dB or less (within band)

Distortion: 0.02 % or less (within band)

DC linearity: ±0.1 % or less

Phase difference between channels:  
 3 degree or less

Input range: ±20 Vp, ±10 Vp, ±5 Vp, ±2 Vp, ±1 Vp, ±0.5 Vp

Coupling: 0C

Output level: ±1 Vp to ±3 Vp, variable

Output current: 10 mA max

Input impedance: 100 kΩ, unbalanced

Output impedance: 50 kΩ, unbalanced

Drift: Recording/playback 0.1 % or less  
 (15 minutes after power ON to 2 hours)

### Monitor System

Bar meter (analog mode) Simultaneous indication for 17~32 ch, one-direction  
 indicator, % or dB indication (selectable)

Display (LED) to check Power supply, 32 ch mode

Warning indication Over-range

Power supply system 12 V (rated), 11~30 V (allowable range)

DC input voltage via DC INP/UT connector

DC current consumption Power save mode 0.8 A @ 12 V, X2 REC

Normal mode 1.5 A @ 12 V, X2 FWD

AC input voltage 100 to 240 V (rated), 95 to 250 V (allowable range)

AC frequency 50/60 Hz (rated), 47~440 Hz (allowable range)

AC current consumption 120 V/60 Hz

Power save mode 0.3 A @ × 2 REC

Normal mode 0.4 A @ × 2 FWD

## Guard Frames (PCHL21)

Dimensions: 300 (W) × 72 (H) × 70 (D) mm (per frame)  
Mass: Approximately 0.15 kg (per frame)  
Material: High stiffness aluminium alloy die-casting

## BNC Cable (PCBK21)

Type: Single cable  
Cable length: Approximately 2 m  
Cable color: Black  
Connectors: BNC/BNC

## BNC Cable (PCBK28)

Type: 8 cables  
Cable length: Approximately 2 m  
Cable color: Black, with 8-color tubes  
Connectors: BNC/BNC

## System carrying case (PCTC22)

Internal dimensions: 460 (W) × 155 (H) × 300 (D) mm  
Mass (weight): Approximately 4.5 kg  
Material: Aluminium alloy

## Digital cable (PCDK21)

Type: Single multiple cable  
Cable length: Approximately 1 m  
Connectors: Half-pitch 50-pin/D-SUB 25-pin  
Use: Connection PC216A and PCF11A

## Digital cable (PCDK22)

Type: Single multiple cable  
Cable length: Approximately 1 m  
Connectors: Half-pitch 50-pin/Half-pitch 50-pin  
Use: Connection PC216A and PCF11A

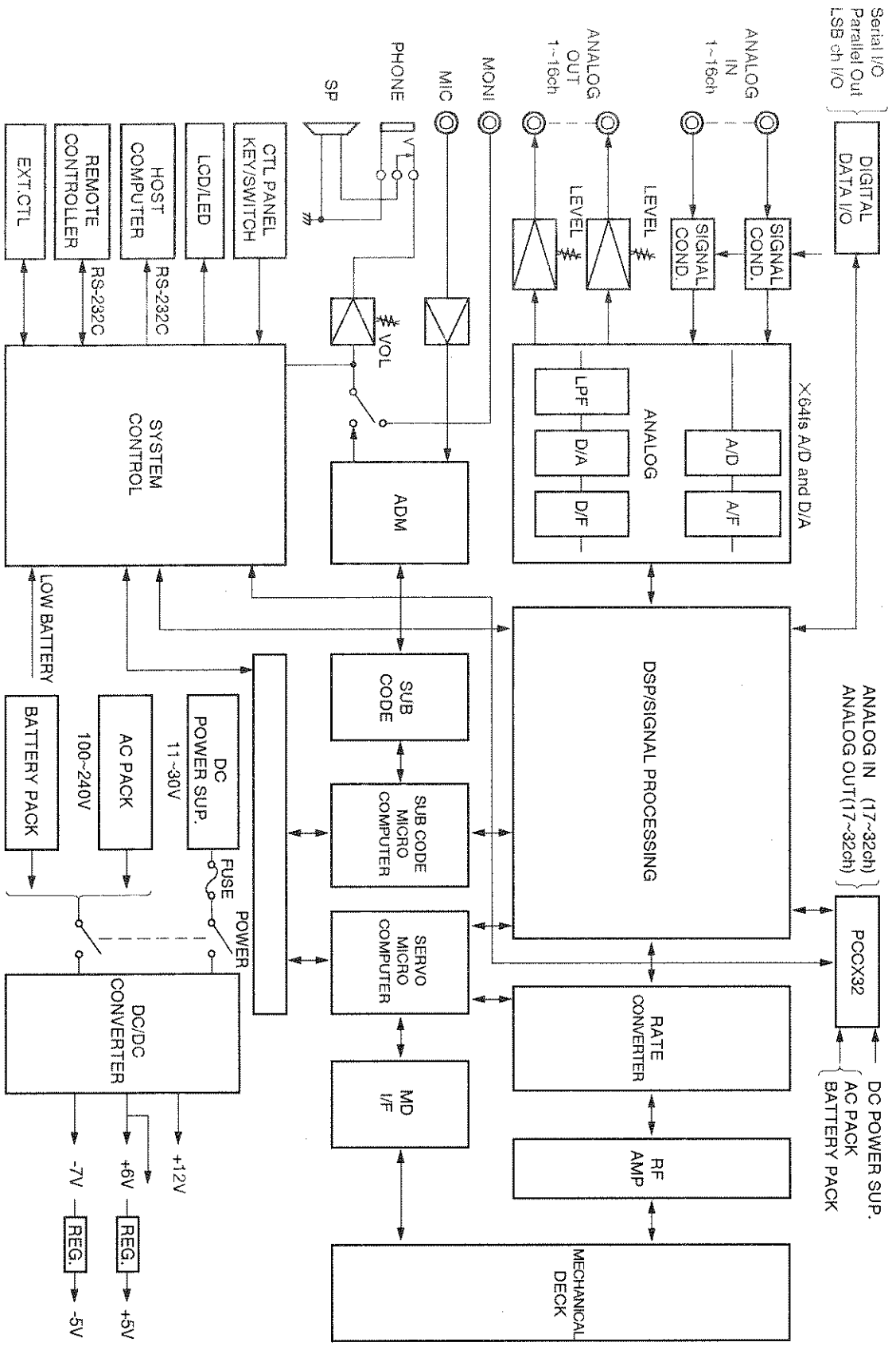
**Sync cable (PCCK21)**

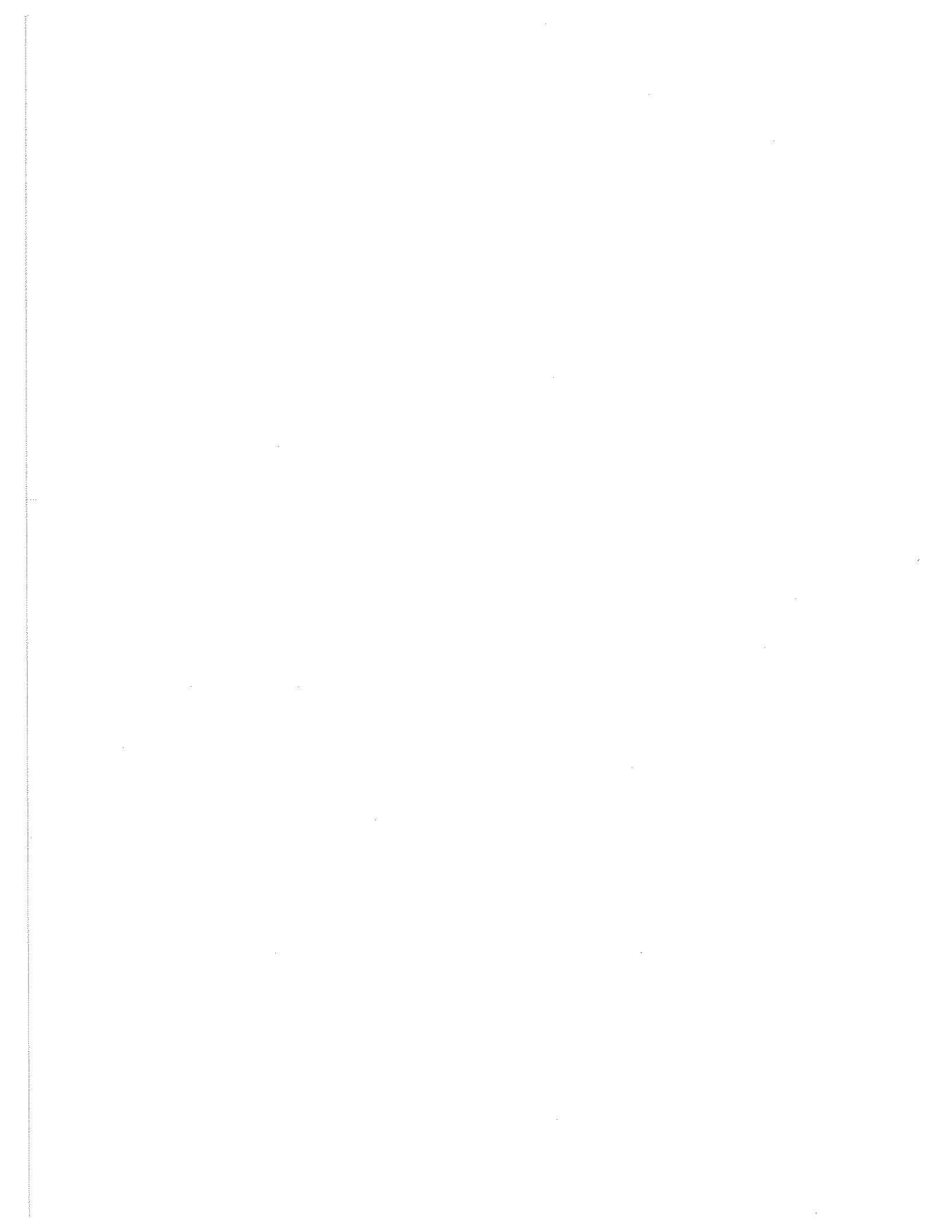
Type: Single multiple cable  
 Cable length: Approximately 1m  
 Connectors: Half-pitch 36-pin/Half-pitch 36-pin  
 Use: Two PC216As' synchronization

**Signal splitter (PCCB21/21A)**

Dimensions: 120 (W) × 29 (H) × 80 (D) mm (excluding protrusions)  
 Mass (weight): Approximately 0.3kg  
 Connectors: Half-pitch 50-pin/D-SUB 25-pin/D-SUB 9-pin/BNC × 2

# Block Diagram

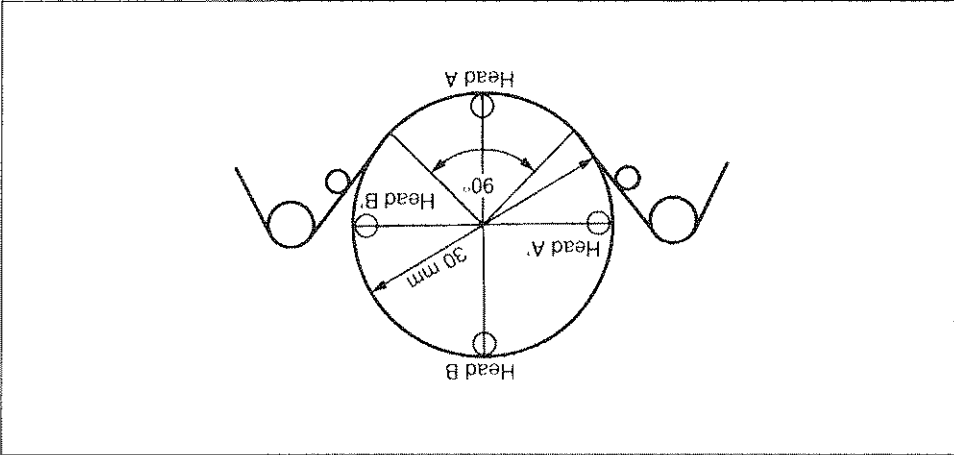




16-1 Recording Format of the DAT

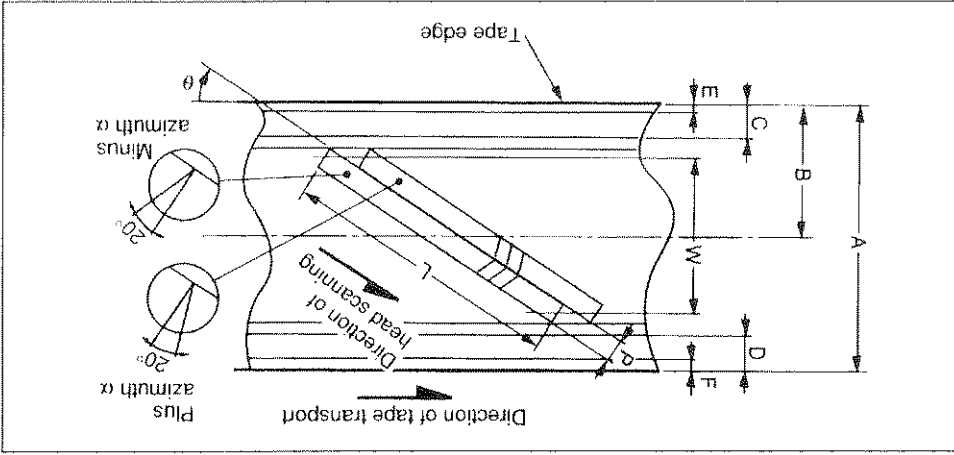
The DAT format offers a high recording density of 114 Mbit/in<sup>2</sup>, using metal particle tape and a helical scan rotary head drum. With full 16-bit quantization and 48 kHz sampling, the system offers considerable performance advantages over traditional analog recording, particularly in terms of the dynamic range achieved.

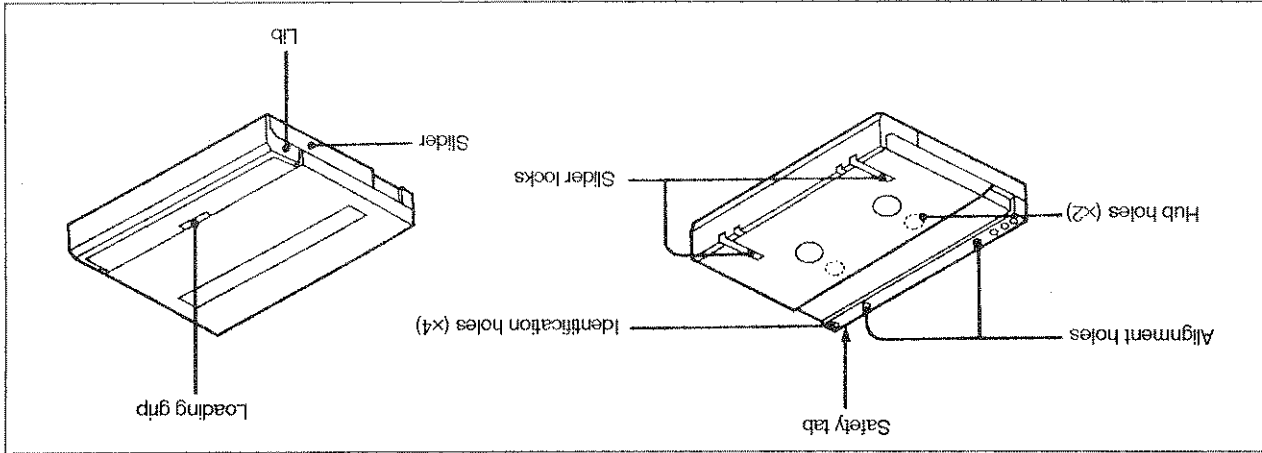
The PC216A is equipped with a four-head drum, allowing simultaneous read-after-write capability. The drum diameter is 30 mm, and the tape wrap angle is 90-degrees. The two dimensional tape loading mechanism is both simple and highly reliable.



16-2 Tape Pattern

The DAT tape format is shown in the figure below. The tape width is 3.81 mm (as for compact cassette) but the width tolerance is +0/-0.02 mm to meet the required standards of mechanical precision. The cassette shell is equipped with a sealing mechanism to protect the tape.





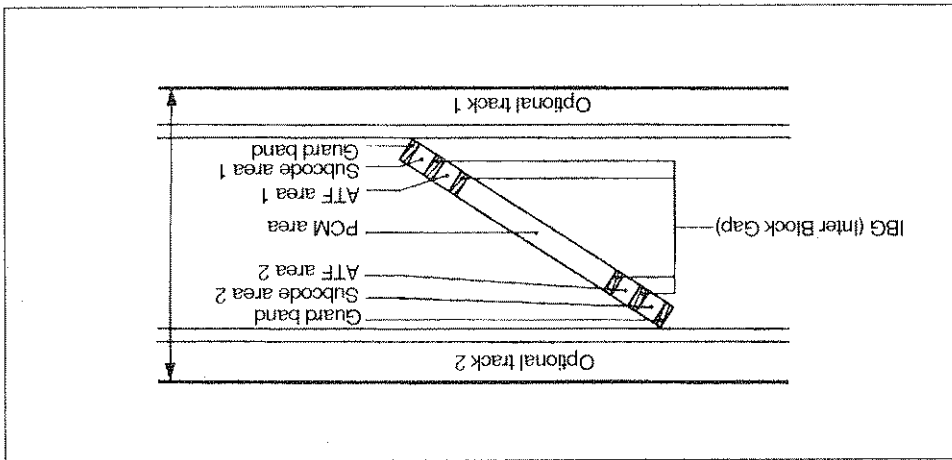
Construction of a DAT cassette

PC Series PC216A, PC208A, PC204A, PC116, PC-108M	A	Tape width (mm)	3.81
	W	Width of recording area (mm)	2.613
	L	Track length (mm)	23.501
	P	Track pitch (µm)	13.591
	B	Track center (mm)	1.905
	C	Optional track 1 (mm)	0.5
	D	Optional track 2 (mm)	0.5
	E	Edge guard 1 (mm)	0.1
	F	Edge guard 2 (mm)	0.1
	#	Track angle (degrees)	6° 22' 59.5"
	#	Head gap azimuth angle (degrees)	± 20°

DAT Tape Format



A DAT track can record various kinds of information in addition to the data signal, as illustrated below. As a result, numerous supplementary information such as ID and timecode can be recorded. All 16 bits of data are placed in the PCM area.



### Guard bands

The guard bands are maintained at both sides of the tape to ensure mechanical stability. No signal is recorded in these areas.

### Subcode areas 1 and 2

The subcode area provides capacity for various data (about four times that of a compact disc). As a countermeasure to burst errors (consecutive errors usually caused by detection, scratch, or synchronous error of the tape), signals are recorded in two areas of both sides. This format also affords considerable opportunity for reading of supplementary data in addition to the full 16-bit PCM information in the high-speed search mode.

### ATF (Automatic Track Finding) areas 1 and 2

A signal used to enable precise tracking on replay is recorded automatically in this area.

### PCM area

The PCM area (2/3 of the tape at wrap angle 60°) is utilized for the recording of User Data and its associated Error Correction code.

