MITSUBISHI

OPERATING INSTRUCTIONS FOR
VIDEO COPY PROCESSOR

MODEL P71E

PRECAUTIONS:

In the interest of safety, please observe the following precautions:

WARNING : THIS APPARATUS MUST BE EARTHED.

DO NOT OPERATE THIS UNIT IF CONDENSATION IS PRESENT

If condensation is present inside the Video Copy Processor, the "Stand-By" indicator will not illuminate.

Do not press the "Print" or "Copy" button to avoid a paper jam.

Do not operate, leave the power switch "ON" for approximately one hour or until all traces of condensation have evaporated.

The "Stand-By" indicator will illuminate when the condensation has evaporated.

Before operating, replace the condensed paper roll. This paper roll can be used after all traces of condensation are gone.

Condensation is likely to occur when:

1. The Video Copy Processor is moved from a cold room to a warm room or from outdoors to inside your house;
2. A cold room is heated quickly;
3. The humidity is very high.

Note   Avoid using the Video Copy Processor where cold air, such as that from an air conditioner, will blow on it directly.

DO NOT PLACE OBJECTS CONTAINING WATER, SUCH AS FLOWER POTS, OR DRINKS ON THE TOP OF THE VIDEO COPY PROCESSOR

PROTECT THE POWER CORD

Damage to the power cord may cause fire or shock hazard. When unplugging hold by the plug only and remove carefully.

UNPLUG THE POWER CORD DURING A LONG ABSENCE

Turn off the MAIN power switch and unplug the power cord during a long absence.

MAINTAIN GOOD VENTILATION

Ventilation slots and holes are provided on the top, sides and bottom of this unit. Place the unit on a hard and level surface and locate at least 4 inches from walls to ensure proper ventilation.

NEVER INSERT ANY OBJECT INTO THE SET

Foreign objects of any kind inserted into this unit constitute a safety hazard and can cause extensive damage

DO NOT PLACE ANYTHING ON THE VIDEO COPY PROCESSOR

Heavy objects placed on the Video Copy Processor can cause damage or obstruct proper ventilation.

CARE OF THE CABINET

Unplug and clean with a soft cloth slightly moistened with a mild soap and water solution. Allow to dry completely before operating.

Never use petroleum base solutions or abrasive cleaners.

TO PREVENT PAPER JAMS

1. Do not Pull or Touch the thermal paper during the printing process.
2. Tear off a print copy only after the paper advance has come to a full stop.
3. Do not use paper that has been affected by condensation.

CARE OF THE LEVER

Place the lever in the "up" position when the Video Copy Processor is inoperative for an extended period. If left in the "down" position, the rubber roller can be damaged, causing uneven prints.

CARE AND USE OF VIDEO COPY PROCESSOR PAPER

1. Two kinds of paper can be used.
   * K-70N — Normal paper for normal-grade prints
   * K-70S — Super paper for high-grade prints
   Select paper best suited to your application.

2. Both grades of paper yield approximately 90 prints per roll.

3. Keep the paper away from sources of heat (ie: direct sunlight, heater's, etc.). Store and use the paper in a temperature range of 32–104°F/0–40°C and relative humidity range of 20–80%.

4. Moving the paper from low temperature conditions to high temperature conditions may cause moisture or dew on the paper surface which can result in poor quality prints and/or paper jamming. Let the paper adjust to room temperature prior to use.

5. Fingerprints, dirt or dust on the surface of the paper may poor quality prints.

6. The paper is provided with a red-end warning section which indicates that approximately 2.5 feet (75 cm) of paper is remaining.
   Print quality may decrease after the red warning section [last 2.5 feet (75 cm)].

7. If paper runs out during operation, the print function stops and the "Stand-By" indicator goes off. Install a new paper roll.

8. Store prints in a low humidity location away from direct sunlight to avoid discoloration or deterioration of the image.

9. When the paper absorbes non-volatile organic solvents such as alchol, either and ketone, the image may be affected.
   Cellophane tapes and soft vinyl chlorides also may cause discoloration or fading. Also, avoid its contact with wet diazo copies as the image may fade away.

10. For correct performance, use one of the specified papers.

11. If the paper is stacked or jammed, refer to the "CORRECTION OF PAPER MISFEED" section of this instruction booklet.

BEFORE OPERATING

Please review the following important instructions before operating your new MITSUBISHI Video Copy Processor.
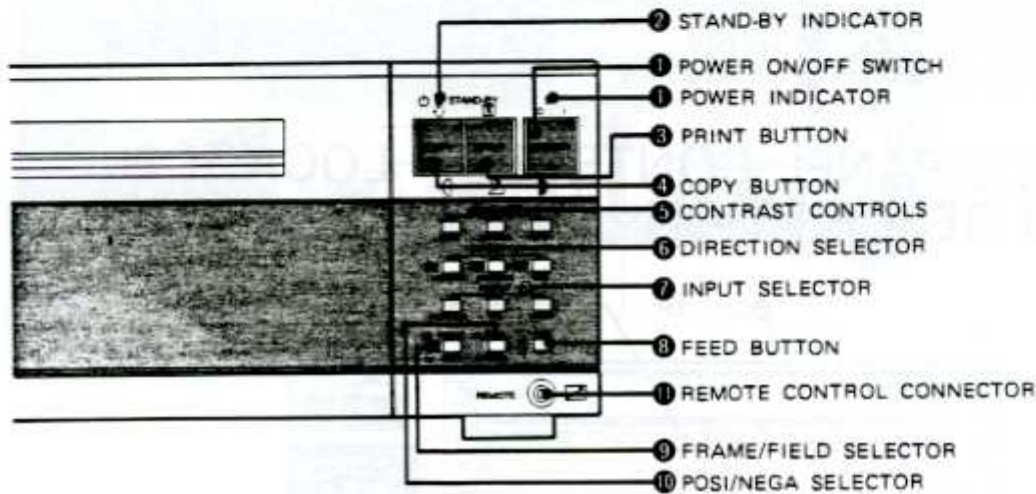
LOCATION

1. Choose a location where direct sunlight or other bright light does not fall directly on the Video Copy Processor.
2. Choose a well ventilated location away from radiators or other heat sources and at least 4 inches (10 cm) away from walls.
3. Do not place in the direct air flowing from an air conditioner.

POWER REQUIREMENT

This Video Copy Processor is designed for operation with 220/240 volts, 50 hertz (cycles), alternating current (AC) only.

Never connect to any outlet or power supply having a different voltage or frequency.

FRONT PANEL CONTROLS — LOCATION AND DESCRIPTION

- ❷ STAND-BY INDICATOR
- ❶ POWER ON/OFF SWITCH
- ❶ POWER INDICATOR
- ❸ PRINT BUTTON
- ❹ COPY BUTTON
- ❺ CONTRAST CONTROLS
- ❻ DIRECTION SELECTOR
- ❼ INPUT SELECTOR
- ❽ FEED BUTTON
- ⓫ REMOTE CONTROL CONNECTOR
- ❾ FRAME/FIELD SELECTOR
- ❿ POSI/NEGA SELECTOR

❶ POWER INDICATOR/POWER SWITCH

This indicator illuminates when the Power switch is in the ON position.

❷ STAND-BY INDICATOR

This indicator illuminates when the set is ready to print or copy.

❸ PRINT BUTTON

Press the PRINT button to print the picture on the TV screen.

❹ COPY BUTTON

Press the COPY button for additional copies of the print.

❺ CONTRAST CONTROLS

These controls are adjusted to obtain optimum print contrast.

❻ DIRECTION SELECTOR

Press the NORMAL button for normal direction (button to top) print or copy.

Press the REVERSE button for reverse direction (upside-down) print or copy.

Press the SIDE button for prints or copies rotated 90° (side to side).

❼ INPUT SELECTOR

Press the button of the signal you want to print.

TTL : RGB TTL signal (e.g. personal computer)

VIDEO : Composite Video signals (e.g. TV broadcasting)

PARALLEL : Parallel data signal (e.g. personal computer with CENTRONICS® standard).

Note. In normal cases, press the VIDEO button.

❽ FEED BUTTON

Press the FEED button to feed the paper continuously until the button is released.

⑨ FRAME/FIELD SELECTOR

For 625 line (PAL or SECAM) operation this switch should normally be set the FRAME position.
The FRAME position displays two field images, with a total of 600 lines.
The FIELD position displays a complete FIELD (300 lines) or ½ vertical resolution.
Use the FIELD mode to capture the next while one field is already printing.
Use the FIELD mode to print a quick action scene.

For 525 lines (NTSC) operation this switch should normally be set the FRAME position.
The FRAME position displays two field images, with a toatl of 500 lines.
The FIELD position displays a complete FIELD (250 lines) or ½ vertical resolution.
Use the FIELD mode to capture the next while one field is already printing.
Use the FIELD mode to print a quick action scene.

⑩ POSI/NEGA MODE SELECTOR

Set the selector to the POSItive (�-■) position to obtain a positive print.
Set the selector to the NEGAtive (▬) position to obtain a negative print.

⑪ REMOTE CONTROL CONNECTOR

The wired remote control is connected here.

INSIDE PANEL CONTROLS —LOCATION AND DESCRIPTION

⑥ CUTTER   **④ ENTRANCE SLOT**   **② LEVER**
① DOOR   **⑤ EXIT SLOT**   **③ HOLDER**
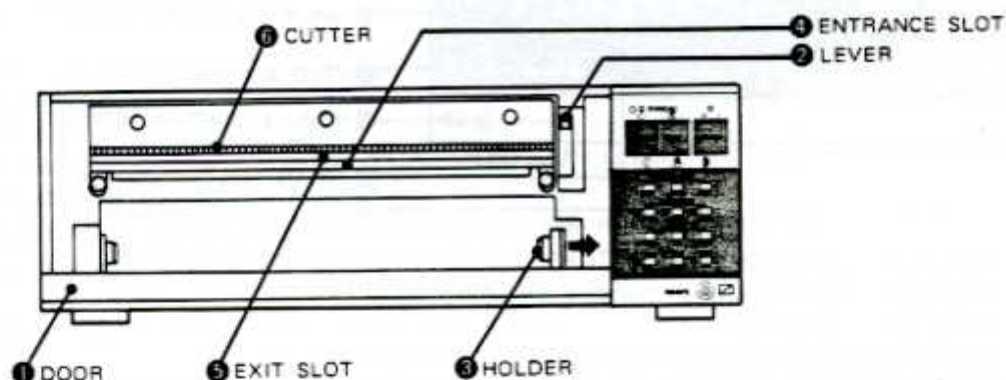
① DOOR
Open this DOOR to replace the paper.

② LEVER
Lift this LEVER upward to feed the paper.

③ HOLDER
Push this HOLDER to the right to install and remove the paper roll.

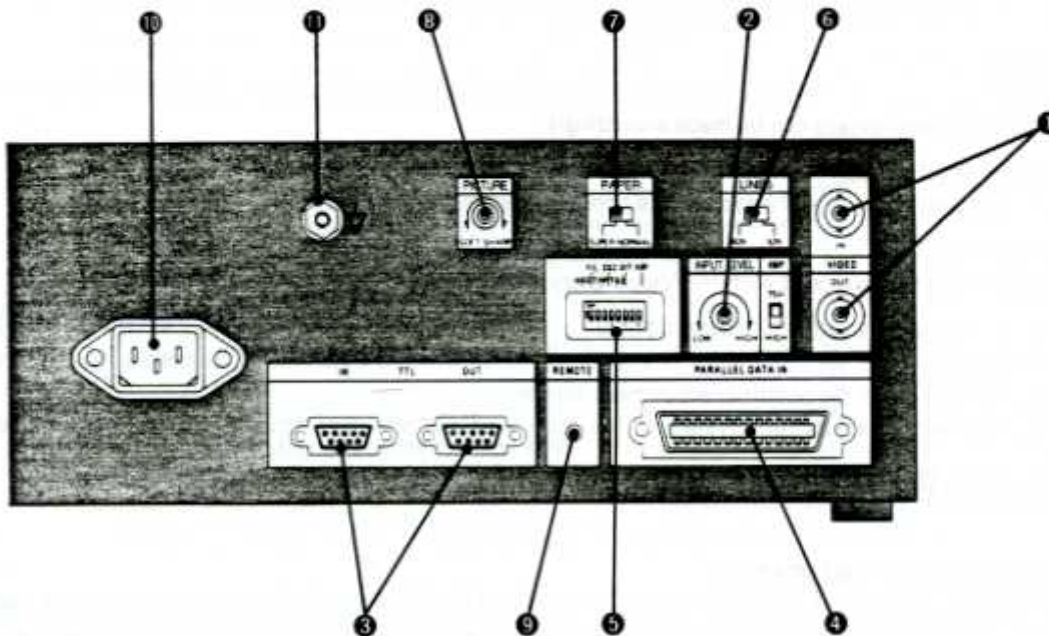**④ ENTRANCE SLOT**
New paper is inserted into this slot.

⑤ EXIT SLOT
Printed paper will come out through this slot.

⑥ CUTTER
Remove the finished print using the CUTTER.

REAR PANEL TERMINOLOGY AND DESCRIPTION

❶ VIDEO INPUT/OUTPUT TERMINAL AND IMPEDANCE SELECTOR

The VIDEO INput terminal (BNC–Type) is used for direct connection to the video output of a TV, VCR, Video Disc Player.

The video signal applied to the VIDEO INput terminal is fed to the VIDEO OUTput terminal.

Slide the IMPedance selector to the "75Ω" position when the video signal is terminated. (Video signal is connected to "IN" jack)

Slide the selector to the "HIGH" position when the video signal is unterminated. (Extra equipment is connected to "OUT" jack)

❷ VIDEO INPUT LEVEL CONTROL

This control is adjusted to obtain optimum video signal input level.

Refer to the "USING THE SPECIAL FEATURES" section for details.

❸ TTL INPUT/OUTPUT TERMINAL

The RGB INput terminal (DSUB9P) is used for direct connection to the digital TTL level signal output of a PERSONAL COMPUTER.

The digital TTL level signal applied to the TTL input is looped through to the TTL OUTput terminal.

❹ PARALLEL DATA INterface TERMINAL (CENTRONICS® STANDARD)

The PARALLEL DATA INterface terminal (36-pin connector) is used for direct connection to the parallel data output of a personal computer. (Note: This terminal is not specifically for Graphics or Word Processing use.)

❺ DIP SWITCH

This selects 7 functions.

● LINES SELECTOR

Set the switch to 625 for operation on the Standard PAL or SECAM system. If the equipment you want to connect is of the NTSC standard then set the switch to 525. Incorrect setting will result in bad pictures.

● PAPER SELECTOR

Position setting is determined by the type of paper used (Super or Normal).

● PICTURE CONTROL

Usually this is set at the center position. When it is turned toward SHARP, or SOFT sides, prints with sharp or soft details can be made accordingly.

● REMOTE TERMINAL

Print are possible through a wired-remote control connected to this terminal.

● MAINS INLET

Plug the mains lead supplied with the Video Copy Processor into the MAINS INLET.

● POTENTIAL ADJUSTMENT CONNECTION

If the videoprinter is set up in medically used rooms, in which a potential adjustment is required, it must be linked up to the potential adjustment system.

Link the potential adjustment system of the room with the potential adjustment connection guide rail.

Please follow the instructions of the videoprinter.

HOW TO INSTALL THE PAPER

One roll of thermal paper is provided in the carton box. The thermal-head should be cleaned with the cleaning-sheet before installing each 10th new roll-paper. (Please refer cleaning method of thermal head, page 25.)

1) Open the door by pulling down on the top left corner.
2) Push the "HOLDER" to the right and install the paper roll.
3) Fold the end of paper and lift the "LEVER" up.
4) Insert the end fully into the entrance slot.
   Note: When the paper is not easily inserted, press the "FEED" button to draw the paper into the unit.
5) Lower the "LEVER" down. Press and hold "FEED" button until the paper emerges from the exit slot.
6) Confirm that the paper feeds freely and remove the end using the cutter on the exit slot.
   Note: If the paper is not properly installed, re-adjust the paper by lifting the "LEVER" upward.
7) Close the door.

NOTE 1: Paper loading instructions and diagrams are also inside the Video Copy Processor door.

NOTE 2: If the buzzer sounds after the FEED button is pressed to install the paper, the paper is jammed.
In this case, cease the paper feed and execute the procedure on page 23 and 24.

USING THE SPECIAL FEATURES

1) POSI/NEGA SELECTOR

a) Set the selector to the POSItive (■) position.

A monochrome print, that is, white on a black background is obtained in this position.

b) Set the selector to the NEGAtive (▬) position.

A monochrome print is reversed to black on a white background.

Note: Negative printing is particularly useful for reproducing text from a personal computer, teletext, or similar video display information.

2) DIRECTION SELECTOR

a) Press the NORMAL button for normal direction (bottom to top) print or copy.

b) Press the REVERSE button for reverse direction (upside-down) print or copy.

c) Press the SIDE button for prints or copies rotated 90° (side to side).

3) CONTRAST CONTROLS

This set is equipped with 3 step-contrast controls. Select the appropriate position.

LIGHT : This button produces a lighter print.

NORMAL : This button produces a normal print.

DARK : This button produces a darker print.

Note: When a large number of copies of images with large black area content are made consecutively, image contrast may be reduced. This is due to the heating process employed for thermal printing. Allow a brief cooling period between copies to restore original contrast.

4) VIDEO INPUT LEVEL CONTROL

The VIDEO INPUT LEVEL CONTROL located on the rear panel adjusts the video signal level applied to the VIDEO INPUT TERMINAL of the Video Copy Processor.

The factory preset or center "detent" position has been carefully chosen for optimum print picture quality.

Normally no adjustment is necessary.

When the video input signal level is too high, the print will be too bright with poor contrast (similar to an overexposed photograph). If this occurs, rotate the level control counterclockwise until satisfactory print quality is obtained.

When the video input signal is too low, the print will be too dark with excessive contrast (similar to an underexposed photograph). Rotate the level control clockwise until satisfactory print quality is obtained.

Note: This unit is designed for one(1) volt peak-to-peak signal. Image quality depends on signal strength.

5) WIRED REMOTE CONTROL

The print function of the Video Copy Processor may be operated using the wired remote control.

6) DIP SWITCH

< BIT 1 > AGC

- When this switch is at ON position, the Automatic Gain Control will operate, thereby adjusting and lightening the dark shades of the overall picture in order to let you have a print with a clear contrast.
- This function responds only to composite video signal.
- This function will not be effected by the amplitude of the synchronizing signal as the brightness of the picture is set constantly at the maximum level.
- Further, when this switch is at ON, the Video Input Level control has no effect.

< BIT 2 > FIL/< BIT 3 > TRP

- Through the ON/OFF (< Bit 2 > and < Bit 3 >) combination and when the LINES switch is on 525 (NTSC), it is possible to select Comb Filter/Color Sub-Carrier Trap/Through modes. When the LINES switch is on 625 (PAL/SECAM), it is possible to select Color Sub-Carrier Trap/ Through modes.
- When the Comb Filter is activated and when a signal unharmonical with the timing of a standard NTSC signal is inputted, it would be possible to output the off-set signal (ghost) super-imposed on the original signal and thereby causing "miss-print" in the final output. In such a case, turn off Bit 2 and activate TRAP mode or use the Through mode.
- This feature is applicable only with composite video signals.

< BIT 4 > CG2

- At ON position and when the video signal at mid-gradation (gray-level) as a threshold level, it would be possible to print B/W pictures with 2 gradations. In other words, if the signal is brighter than the threshold level, it would be out at white-level, and if its darker than the threshold level, it would be output at black-level.
- This feature is applicable only with composite video signals.
- It is possible to change the 2-gradation threshold level by adjusting the "Threshold Level" Control on the lower (under−) side of the VIDEO COPY PROCESSOR.

< BIT 5 > TG2

- At ON position, when any of the RGBI signals is high, it would be output at white level of gradation, and when they are all low, it would be output at black level of gradation; 2 gradations print outputs.
- As the terminal for the I-signal input is raised internally to +5 V (by means of a resistor), when an I-free RGB signal is inputted, the print output is always at black level.
- When any of the RGB signals is high, in order to achieve 2-gradation output, the I-signal input terminal has to be lowered by external mandatory means.

< BIT 6 > DIT

- At ON position, "dithering" procedure will not be possible. In case of an input signal with no changes in the continuity of its gradation, RGB TTL signals inputs, etc. a non-dithering print output with clear profiles (outlines) is desired. This function is applicable only with RGB TTL signals.
- At OFF position, "dithering" procedure would be applicable.
- When there are changes in the continuity of the gradation of the composite video signal, and upon applying the "dithering" procedure, e.g. to smooth out changes in the gradations on portraits, etc., it would be possible to output prints close to the natural gradation.

< BIT 8 > ASP

At ON position, the output will have an Aspect Ratio (side-to-vertical ratio) of 1:1.

At OFF position, the output print will have an Aspect Ratio of 4:3.

For X-ray picture signals and other special signals, it would be possible to print with an Aspect Ratio of 1:1.

For visual reproductions of normal signals, set it at OFF position.

APPLIED CONNECTION AND EXAMPLES

The Video Copy Processor can be connected to a wide variety of imaging devices with a variety of signal types.

- **Composite Video Signal:**
  A composite video signal can be connected to the video input and output terminals by any standard BNC-type connecting cables (shielded). Most consumer and industrial video imaging products such as TV's VCR's, Video Disc Players, Medical Imaging Equipment, Security Monitoring Devices and some Personal Computers have the composite video inputs and/or outputs.
  This signal must be a standard (PAL/SECAM/NTSC) composite video signal.

- **RGB TTL Signal:**
  A RGB TTL signal can be connected to the TTL input and output D-sub 9 pin socket by standard D-Sub 9 pin (MIL-C-24308) type connecting cable (shielded). A personal computer image can be reproduced in a 16-level gray scale, ideal for speedy hard copy of graphics.
  Synchronization timing must be similar to the standard (PAL/SECAM/NTSC) composite video signal.

- **Parallel Data Interface (Centronics®Standard)**
  The Parallel Data signals can be connected by the use of a standard 36 pin (Amphenol 57E-30360 equivalent) type connecting cable (shielded). For computer use, this interface has a builtin ASCII character set (96 characters).
  Note: This terminal is not specified for Graphics or Word Processing use.
  Centronics is registered trademark of the Centronics Data Corporation.

1. COMPOSITE VIDEO SIGNAL

### A. VIDEO COPY PROCESSOR + TV
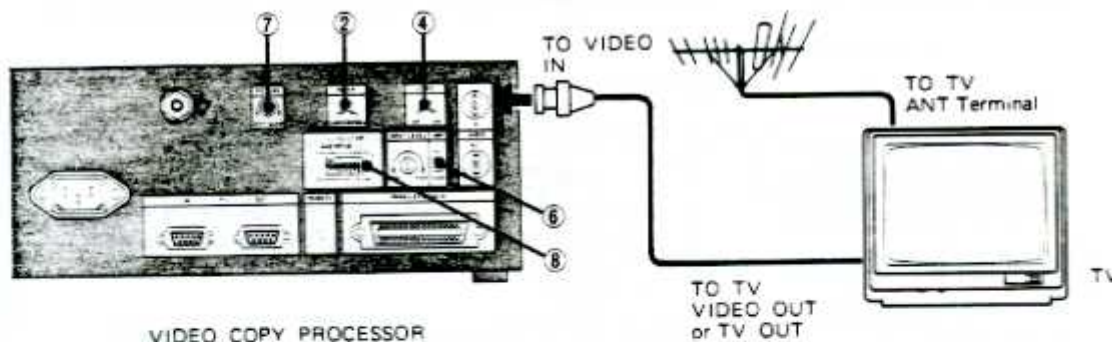
SETTING

Various switches on the rear panel of VIDEO COPY PROCESSOR are set as follows:

① INPUT selector (Front)	VIDEO
② PAPER selector (Rear)	SUPER (when super thermal paper is used)
	NORMAL (when normal thermal paper is used)
③ FRAME/FIELD selector (Front)	FRAME
④ LINES selector (Rear)	625
⑤ VIDEO INPUT LEVEL control (Rear)	CENTER (Adjust the input level, if necessary)
⑥ IMPedance selector (Rear)	75 Ω
⑦ PICTURE control (Rear)	CENTER
	(Adjust the sharpness level, if necessary.)
⑧ DIP switch (Rear)	When Bit 2 only at ON position.
	(Choose each Bit, if desired.)

Note   If the TV is not equipped with a video out or TV out terminal, the Video Copy Process-
        or cannot be connected directly.
        Refer to other connection examples.

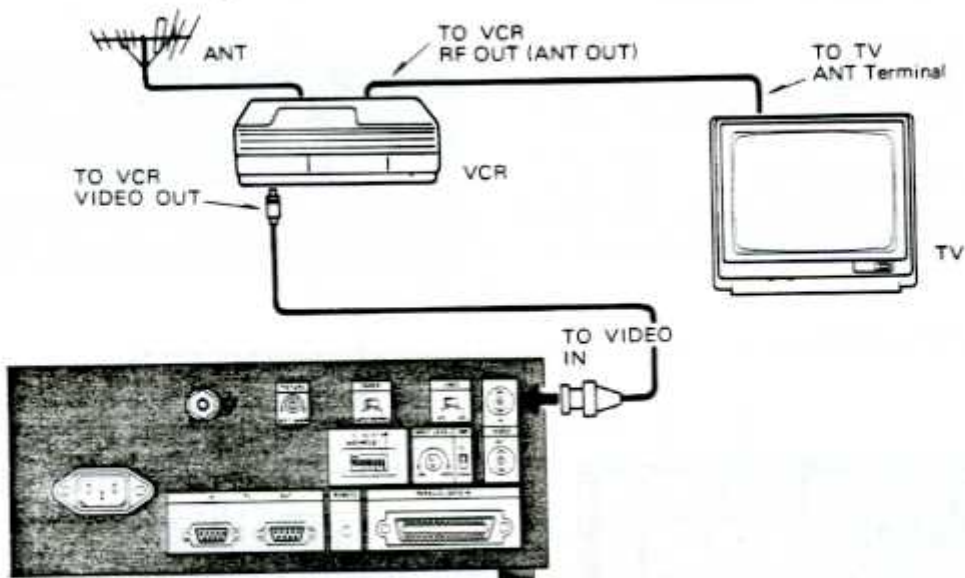## B. VIDEO COPY PROCESSOR + VCR + TV

a) TV with Video Input terminal
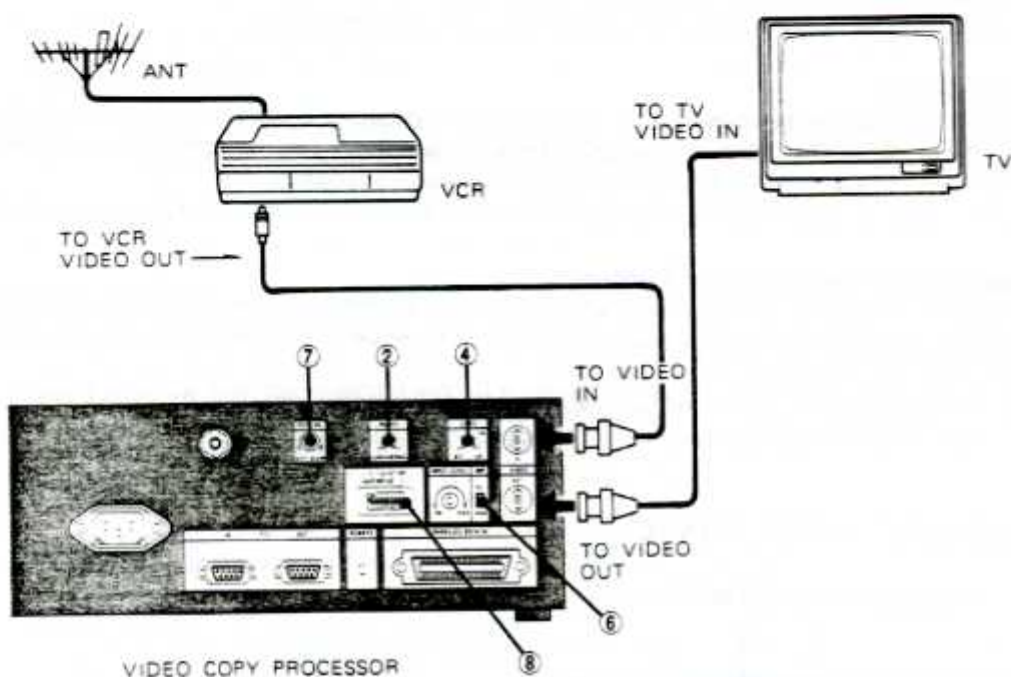
SETTING

① INPUT selector (Front)   VIDEO
② PAPER selector (Rear)   SUPER   (when super thermal paper is used)
                                      NORMAL   (when normal thermal paper is used)
③ FRAME/FIELD selector (Front)   FRAME
④ LINES selector (Rear)   625
⑤ VIDEO INPUT LEVEL control (Rear)   CENTER (Adjust the input level, if necessary)
⑥ IMPedance selector (Rear)   HIGH
⑦ PICTURE control (Rear)   CENTER
                                      (Adjust the sharpness level, if necessary.)
⑧ DIP switch (Rear)   When Bit 2 only at ON position.
                                      (Choose each Bit, if desired.)
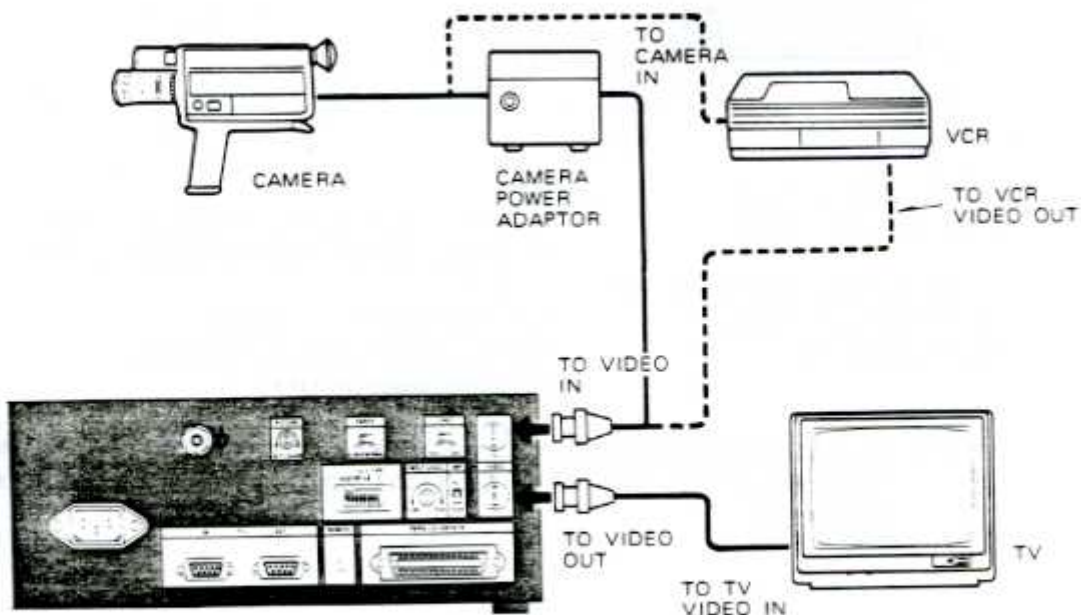
b) TV without Video Input Terminal

VIDEO COPY PROCESSOR

SETTING
For setting of various switches, refer to "VIDEO COPY PROCESSOR + TV" section.
(Page 9)

C. VIDEO COPY PROCESSOR + CAMERA + (VCR) + TV

VIDEO COPY PROCESSOR

a) When using VCR, connect the video signal from the camera directly to the Camera in of VCR.

b) If a VCR is not used, connect the Video out from the Camera power adaptor to the Video in of the Video Copy Processor.
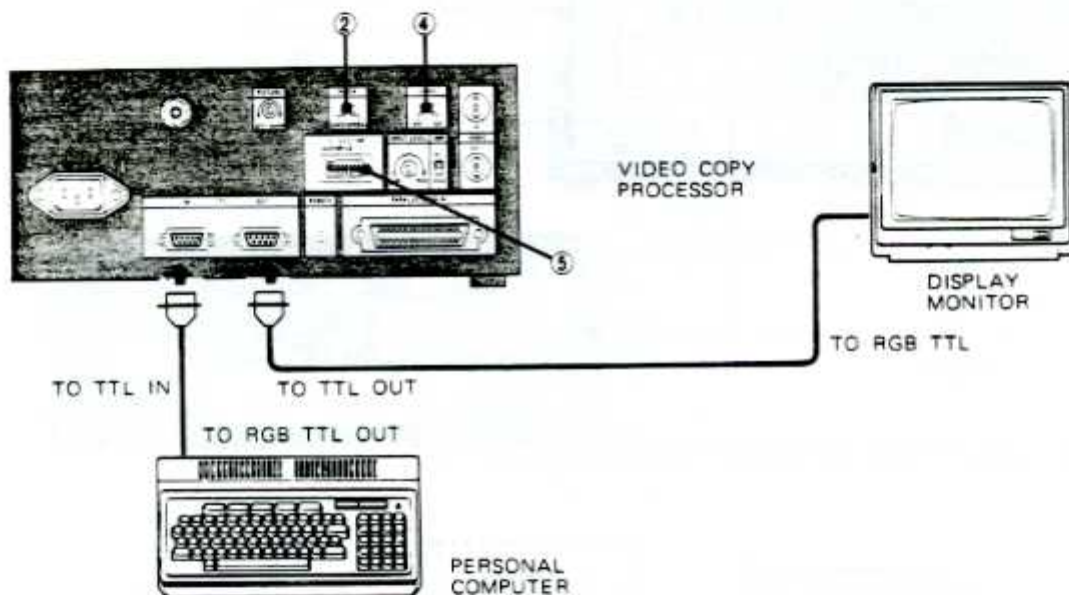
SETTING

For setting of various switches, refer to "VIDEO COPY PROCESSOR + VCR + TV — TV with Video Input terminal" (Page 10)

Note: BNC/RCA ADAPTOR

If the TV, VCR, Monitor or Video Source is equipped with RCA-type connectors, connect accessory BNC/RCA ADAPTOR provided with the Video Copy Processor.
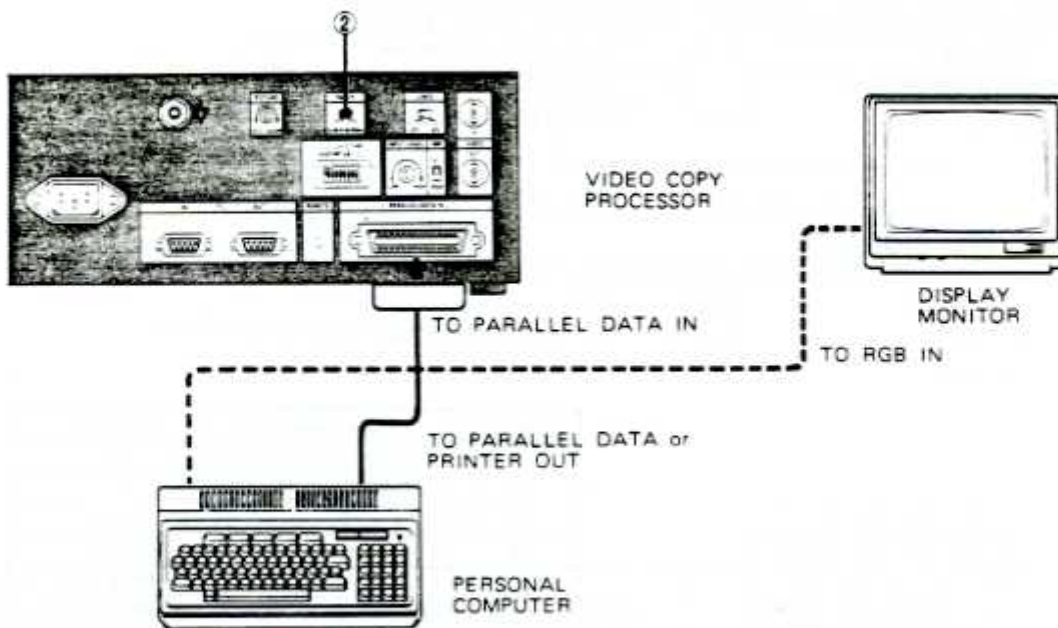
2. RGB TTL SIGNAL

SETTING

① INPUT selector (Front)   TTL

② PAPER selector (Rear)   SUPER   (when super thermal paper is used)
                            NORMAL (when normal thermal paper is used)

③ FRAME/FIELD selector (Front)   FRAME

④ LINES selector (Rear)   625 (PAL/SECAM) or 525 (NTSC)

⑤ DIP switch (Rear)   Normally, Bit 5 ~ 8 are at OFF position
                            (if desired; select ON/OFF.)

Note: Connecting cords for external equipment are not supplied with this unit. Refer to the "SPECIFICATIONS FOR INPUT SIGNALS" section for details on pin and signal arrangement.

3. PARALLEL DATA IN

VIDEO COPY
PROCESSOR

DISPLAY
MONITOR

TO PARALLEL DATA IN

TO RGB IN

TO PARALLEL DATA or
PRINTER OUT

PERSONAL
COMPUTER

a) Connect the parallel data out signal from personal computer to PARALLEL DATA IN of the Video Copy Processor

b) If a display monitor is used, connect the RGB TTL signal from personal computer directly to the RGB in of the display monitor.

SETTING

① INPUT selector	PARALLEL
② PAPER selector	SUPER (when super thermal paper is used)
	NORMAL (when normal thermal paper is used)

Note   Connecting cord for parallel data is not supplied with this unit.   Refer to the "SPECIFICATIONS FOR INPUT SIGNALS" section for details on pin and signal arrangement.

SPECIFICATIONS FOR INPUT SIGNALS
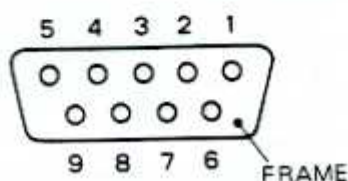
1. COMPOSITE VIDEO SIGNAL

STANDARD (PAL/SECAM/NTSC) COMPOSITE VIDEO SIGNAL

1)	Input Level	1V p-p (input terminal)
2)	Input Impedance	75Ω—HIGH Switch
3)	Connector	BNC type

2. RGB TTL SIGNAL

R.G.B.I HD · VD SEPARATE VIDEO SIGNAL

1)	Input Level	TTL
2)	Timing Chart	Similar to Standard Composite Video Signal
3)	Connector	D-SUB9 Pin

```
   5  4  3  2  1
  ┌──────────────┐
  │ O  O  O  O  O │
  │  O  O  O  O   │
  └──────────────┘
    9  8  7  6    FRAME
```
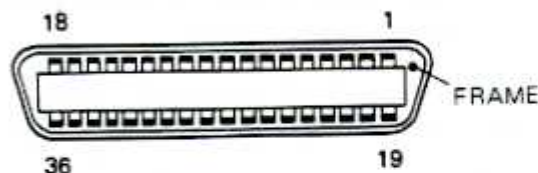
Pin No.	Input Signal	Polarity
1	Signal Ground	—
2	Signal Ground	—
3	R	Positive
4	G	Positive
5	B	Positive
6	Intensity	Positive
7	—	—
8	H-SYNC	(Negative/Negative) or (Positive/Positive)
9	V-SYNC	
Frame	Frame Ground	—

* NOTE: Connect the Frame to shield wire of connecting cables.

3. PARALLEL DATA SIGNAL (According to CENTRONICS® Interface)

1)	● Input Level:	TTL
	● Connector:	JD-36SL or equivalent

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18                          1
┌─────────────────────────────┐
│ ▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄           │
│                              ├── FRAME
│ ▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀           │
└─────────────────────────────┘
36                         19
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	● Mode Types:	● Character Mode
		● Line Scan Graphic Mode
		● 16-Gradation Dot Graphic Mode
		● 2-Gradation Dot Graphic Mode

2) Parallel Interface Timing
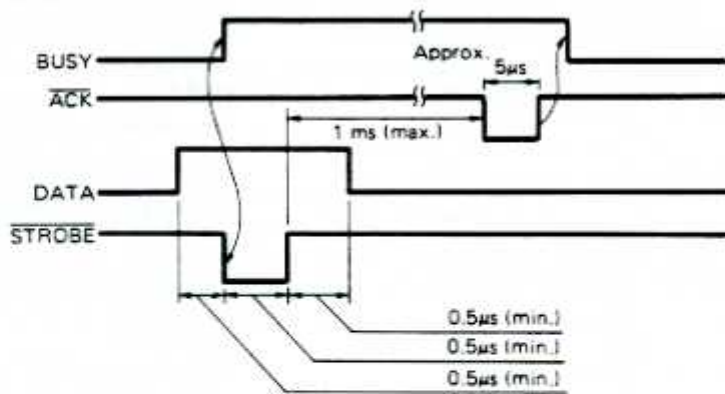
3) Standard Parallel Interface
   a) Input Connector
      Plug 57-30360 (AMPHENOL Equivalent)
   b) Input Connector Signal Assignment

Pin No.	Pin No. Return Side	Signal	Signal Source	Function
1	19	STROBE	Computer	Strobe pulse for the data reading. Pulse width: over 0.5 μs Normal "High" Data Reading "Low"
2 3 4 5 6 7 8 9	20 21 22 23 24 25 26 27	DATA 1 DATA 2 DATA 3 DATA 4 DATA 5 DATA 6 DATA 7 DATA 8	Computer Computer Computer Computer Computer Computer Computer Computer	Each signal indicates the information of the parallel data from 1 bit till 8 bit. High — Data 1 Low — Data 0
10	28	ACK	Video Copy Processor	Low indicates that the printer received the data and is ready to receive the next data.
11	29	BUSY	Video Copy Processor	High signifies that the Video Copy Processor can not accept the data. Low indicates that the Video Copy Processor can accept the data. In the next cases, this signal will be changed to High. 1 While the data is entered. 2 While printing is on. 3 While paper is being fed.
12		P · E	..	Paper supply Low: available High: Not available
13~15, 18		No Connection		Not used
16, 17		GND		Earth
19~30, 33		Ground level signal for twist pair return		
31, 32, 34~36		No Connection		Not used
Frame	—	Frame Ground		Connect to shield wire of connecting cables.

Control Code

	Code Name	Code	Function
1	LF	‹0A›H	Carriage Return and Line Feed
2	VT	‹0B›H	Same as LF
3	FF	‹0C›H	Carriage Return and Form Feed
4	HT	‹09›H	Horizontal Tab (Every 8 columns)
5	SO	‹0E›H	Double-Width Print-Mode
6	SI	‹0F›H	Cancels SO
7	CAN	‹18›H	Clears the printer buffer
8	DEL	‹7F›H	Same as CAN
9	DC1	‹11›H	Makes the printer on line. Can be used to cancel DC3
10	DC3	‹13›H	Makes the printer off line
11	ESC 0	‹1B›H ‹30›H	Sets no space between lines
12	ESC 2	‹1B›H ‹32›H	Cancels ESC 0 (Normalizes the space)
13	ESC, C, (n)	‹1B›H ‹43›H ‹n›H (1<n<127)	Sets the page length (1<n<127) The printer defaults to 66 lines-per-page when powered on.
14	ESC, W, (l₁), (l₂), (n₁), (n₂)	‹1B›H ‹57›H ‹l1›H ‹l2›H ‹n1›H ‹n2›H	Sets the line-scan Graphic Mode without Gray Scale.
15	ESC, (00), (x), (n₁), (n₂)	‹1B›H ‹00›H ‹x›H ‹n1›H ‹n2›H	Sets the Dot Graphic Mode with Gray Scale
16	ESC (01), (x), (n₁), (n₂)	‹1B›H ‹01›H ‹x›H ‹n1›H ‹n2›H	Sets the Dot Graphic mode without Gray Scale
17	ESC (02), (x)	(1B)H (02)H (x)H	Print Video Signal
18	ESC (03), (x)	(1B)H (03)H (x)H	Copy Video Signal

DATA Multipurpose Control Codes

Full Buffer Print

When setting "Character Mode", "Full Buffer Print" will be selected automatically.
1. Title   Full Buffer Print
2. Code   None
3. Function   After print data (including the spacing) is inputted for all lines, printing will proceed automatically for valid data within the Print—Buffer.
      * After inputting up to 79 lines and if that follows data has enlarged characters in this event, the mode will change to a Full Buffer, and printing of enlarged characters will proceed from the next line.

Remarks on Multi-purpose Control Codes

(1) LF
1. Title   Line Feed
2. Code   (OA) H
3. Function   When LF Code is inputted, printing will proceed within the Print Buffer, and registration paper will be forwarded by one line.

(2) VT
1. Title   Vertical Tab
2. Code   (OB) H
3. Function   Same as LF.

(3) FF
1. Title   Form Feed
2. Code   (OC) H
3. Function   When FF Code is inputted, printing within the Print Buffer will proceed for a full length of the pre-determined page depth, and the header lead for the following page will be forwarded.
      * The position of the header of the page is set upon turning on the power switch.
      * When the power switch is turned on, page depth is set for 66 lines.

(4) HT
1. Title   Horizontal Tab
2. Code   (09) H
3. Function   The cursor will move by 8 character-widths (even at double width enlarged front).

Example: (30)H (09)H (31)H (32)H (33)H   0 123
        0   HT   1   2   3   8 Characters

(5) SO
1. Title   Shift Out
2. Code   (OE) H
3. Function   When SO Code is inputted, the following data are printed enlarged at double width.
      * The SO Code is cancelled upon inputting SI Code.

Example: !"=S%&'< >#+,-./0123

This character line will be entered at double in-character spacing.

! " # $ % & ' < > ※ + , — . / 0 1 2 3

(6) SI
1. Title   Shift In
2. Code   (OF) H
3. Function   When SI Code is entered, enlargement at double character width will be cancelled.

(7) CAN

1. Title   Cancel
2. Code   (18) H
3. Function   When CAN Code is entered, data within the Print-Buffer and on the same line will be erased.

(8) DEL

1. Title   Delete
2. Code   (7F) H
3. Function   This has the same function as CAN.

(9) DC 1

1. Title   Device Control 1
2. Code   (11) H
3. Function   When DC 1 Code is inputted, the printer will be selected and data will be forwarded.
   * This code is valid only for return from "Printer deselect" mode induced by inputting DC 3 Code.

(10) DC 3

1. Title   Device Control 3
2. Code   (13) H
3. Function   When DC 3 Code is inputted, the printer is deselected (though the printer remains electrically connected, data-wise it is disconnected.)
   * When DC 1 Code is inputted, select mode will be returned.

DC 1/DC 3	BUSY	ACK	Data treatment
DC 1	LOW/HIGH during entry	Ready mode output	Normal treatment or data entry
DC 3	Ditto	Ditto	Data entry or data are omitted while waiting for DC 1.

(11) ESC 0

1. Title   Line spacing is omitted.
2. Code   (1B) H   (30) H
3. Function   When ESC 0 is inputted, print of the following types, (fonts) will proceed at 9-line spacing.
   * (See Fig. "A")

(12) ESC 2

1. Title   Line spacing is set at 5 Dot-lines.
2. Code   (1B) H   (32) H
3. Function   When ESC 2 is inputted, the following type (fonts) will be printed at 14-line spacing. At the beginning, the mode is pre-set for 14-line spacing.
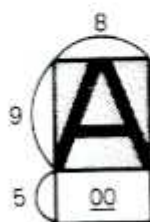   * (See Fig. "A")

The character for each font (as shown on the left figure) consists of 8 x 14 dots. The contents of the font-data are limited to the upper 8 x 9 sector, while the lower 8 x 5 dots sector is empty normally. Accordingly, this 5-dots spacing is allotted to the line. Whether to output this part or not depends on the code input, ESC 0 or ESC 2.

Fig. A

(13) ESC C (n)

1. Title   Page length is set.

2. Code   (1B) H   (43) H   (n) H

                           (n: 1 ~ 127)

3. Function   Page length is set in line units.

                * (n) H indicates the number of lines.

                * When the power source is turned on, the page length is set at 66 lines.

(14) ESC W (ℓ_1) (ℓ_2) (n1) (n2) . . . . . (Graphic data)

1. Title   Line Scan Graphic Mode

2. Code   (1B) H   (57) H (ℓ_1) H (ℓ_2) H   (n1) H   (n2) H

3. Function   When ESC, W Code is inputted, "Graphic Mode" will be initiated.

                When ℓ_1 is entered, the left margin (the print beginning) will be designated, and when ℓ_2 is entered, printing domain will be designated too. Further, n1 and n2 will determine number of dot-lines.

                1 dot is expressed by 1 bit, and 0/1 means Black/White printing.

                In reality, the data number for the drive operation is:

$$\text{(Data No.)} = \text{(Printing Domain)} \times \text{(Dot-line No.)}$$
$$= (\ell_2 \text{ byte}) \times (n1, n2)$$

                The printer will accept the data upon specifying ℓ_2, n1 and n2, and will go into "Character Mode" automatically.

                * Each of ℓ_1, ℓ_2, n1 and n2 are in 2 figures of 16 ordinals. n1 stands for the lower position and n2 for the upper position.

                * The domain for each of ℓ_1, ℓ_2, n1, and n2 are:

$$\ell_1 : \quad 0 \le \ell_1 < 80$$
$$\ell_2 : \quad 0 < \ell_2 \le 80 - \ell_1$$
$$n1 : \quad 0 \le n1 \le FF_H = 255$$
$$n2 : \quad 0 \le n2 \le FF_H = 255$$

Example: Graphic Mode entry:

U.P.: Upper Position.
L.P.: Lower Position.

80 Bytes (640 Dots)

10 Bytes   60 Bytes (480 Dots)

Printed area   (n1, n2) line

ℓ_1 ℓ_2
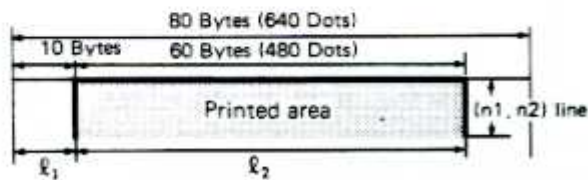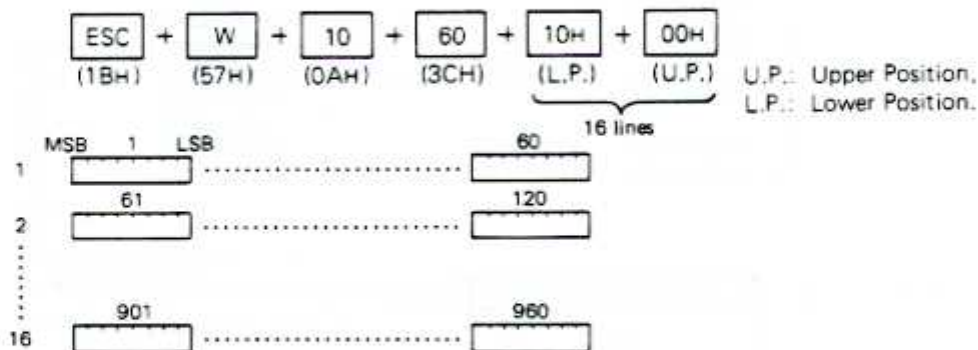
As shown in the left figure, the printing domain for the data is 60 bytes (60 × 8 = 480 dots), and in case of 16 dot-line, the domain is (60 bytes) × (16 dot-lines) = 960 bytes.

(15) ESC (00)

1. Title   16 Gradations Dot Graphic Mode

2. Code   (1B) H   (00) H   (X) H   (n1) H   (n2) H

3. Function   When ESC 00 Code is inputted, mode 16 Gradations Graphic will proceed. When X is entered, Field/Frame (00H/01H) will be selected, and upon entering n1 and n2, the number of dot-line will be specified.

1 dot expressed by 4 bits, and as 0 approaches F, the print gets nearer to black.
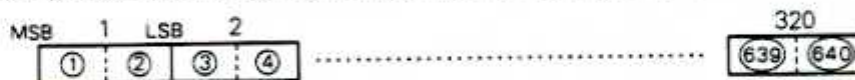

Line is fixed at 640 dots, however, in reality, the number of data being forwarded is (320 bytes) x (dot-line number). When these data numbers are compiled, printing will proceed and operation will change automatically into "Character" mode.

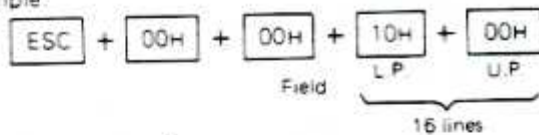   MSB: Most Significant Bit
     LSB: Least Significant Bit

   i)   X = 00H Field

When this mode is specified, data for the same line are printed twice.

Example:
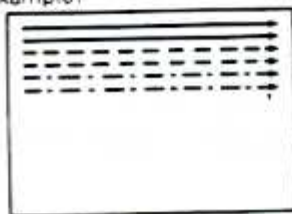
Line number = 3
Data forwarded

$$\left(\underset{1}{\longrightarrow}\right)+\left(\underset{2}{-\,-\,\rightarrow}\right)+\left(\underset{3}{-\,\cdot\,\rightarrow}\right)$$
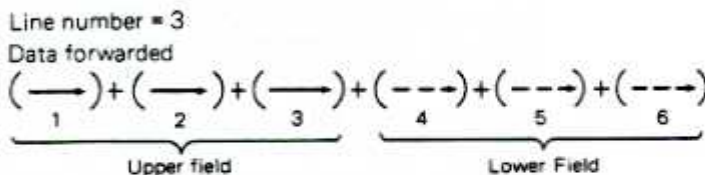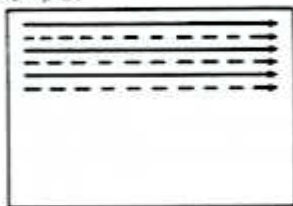
Example:
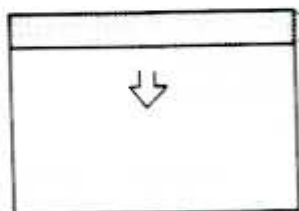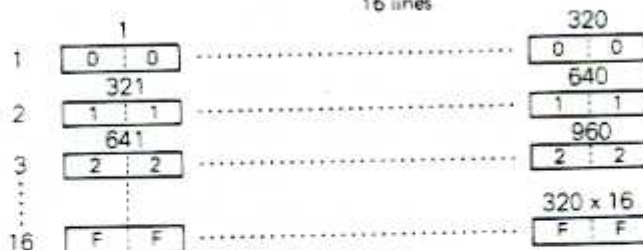
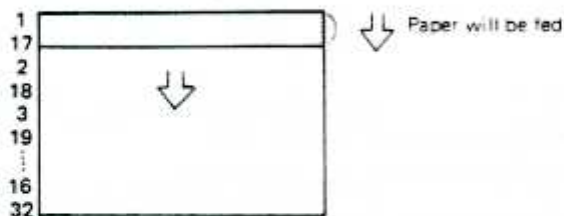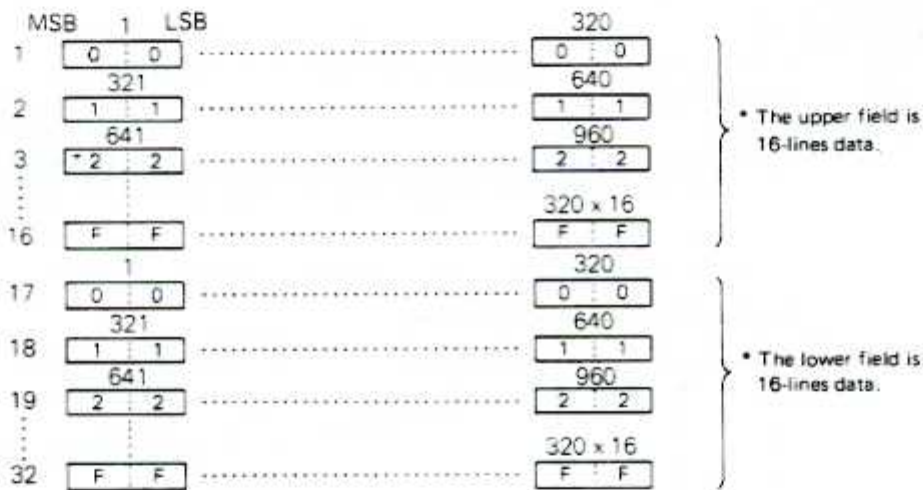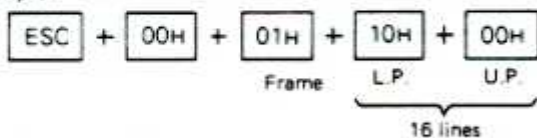Paper will be fed by 16 x 2 dot-lines.

ii) X = 01H Frame

When this mode is specified, only the line number for the upper field will be forwarded in the beginning, and then it will continue while forwarding the line number for the lower field.

Example:

Line number = 3
Data forwarded

$$\underbrace{(\longrightarrow) + (\longrightarrow) + (\longrightarrow)}_{\text{Upper field}} + \underbrace{(--\rightarrow) + (--\rightarrow) + (--\rightarrow)}_{\text{Lower Field}}$$

 1 2 3 4 5 6

Note 1 : Each of (—→), (--→) and (—→) is 320 bytes data.

Example:

| ESC | + | 00H | + | 01H | + | 10H | + | 00H |

Frame L.P. U.P.

16 lines

• The upper field is 16-lines data.

• The lower field is 16-lines data.

Paper will be fed

Note: In this example, though the contents for the lower and upper fields are the same, normally, it is necessarily to be so.

(16) ESC (01) (X) (n1) (n2)

1. Title 2 Gradations Dot Graphic Mode

2. Code (1B) H (01) H (X) H (n1) H (n2) H

3. Function When ESC 01 Code is inputted, the 2 Gradations Dot Graphic mode will proceed, X, n1 and n2 are the same as in the 16 Gradations Dot Graphic mode.
 1 dot is expressed by 1 bit, and 0/1 is printing in Black/White.

MSB 1 LSB 2

One line is fixed at 640 dots, and in actuality, the number of data forwarded is (80 bytes) x (dot-line number). When Field/Frame mode is entered, data forwarding will proceed in the same manner as in the 16 Gradations Dot Graphic mode.
Data numbers per line are 80 bytes only at rare cases.

Note: Since (16 Gradations Dot Graphic) and (2 Gradations Dot Graphic) modes are stored in RAM, after driving only once, switching the input selector from PARALLEL to VIDEO modes, by activating COPY , you will be able to output the same print repeatedly.

* Depending on n1 and n2, the maximum value for the line number is governed by the NTSC/PAL Field/Frame. Parts that are beyond these limits are not printed.
* The line number (n1, n2) at Frame mode determines the line number for 1 field. (After printing, the paper is advanced.)

(17) ESC (02) (X)
(18) ESC (03) (X)

1. Title   Print video signal (02), Copy video signal (03)
2. Code   (1B) H (03) H (X) H
3. Function   02H . . . . Print
              03H . . . . Copy (However, when copying, b_6 will be disregarded.)
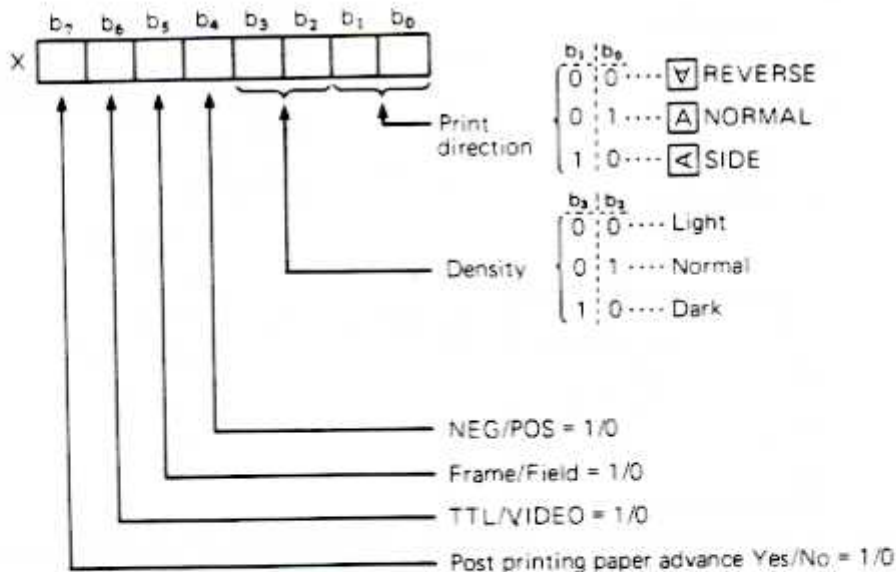
* As consideration is given to TTL/VIDEO switching time, printing will proceed after one second.
* When switching on the power to the first time, ESC 03 (COPY) and ESC 02 (PRINT) have the same function.
* During ESC 03 (COPY), b_6 will have no meaning.

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ASCII 96 Kinds

	0	1	2	3	4	5	6	7
0			SP	0	@	P	`	p
1		DC1	!	1	A	Q	a	q
2			"	2	B	R	b	r
3		DC3	#	3	C	S	c	s
4			$	4	D	T	d	t
5			%	5	E	U	e	u
6			&	6	F	V	f	v
7			'	7	G	W	g	w
8		CAN	(	8	H	X	h	x
9	HT		)	9	I	Y	i	y
A	LF		*	:	J	Z	j	z
B	VT	ESC	+	;	K	[	k	{
C	FF		,	<	L	\	l	:
D			−	=	M	]	m	}
E	SO		.	)	N	^	n	—
F	SI		/	?	O	_	o	DEL

• SP means the space

CORRECTION OF PAPER MISFEED

In the event that the paper is not fed from the exit slot when the copy or print button is pressed, the paper may be jammed. In this case, the buzzer sounds and the stand-by indicator goes off.

1. PAPER JAM MAY OCCUR ·····
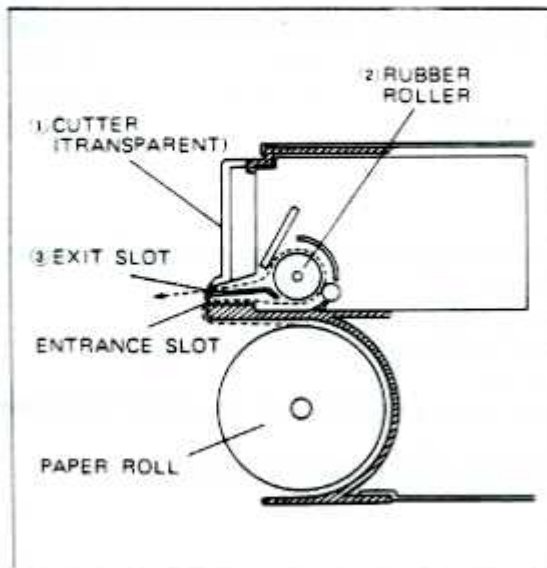
1. ···at THE CUTTER
If the paper is badly wrinkled when torn off at the cutter.

2. ···at THE RUBBER ROLLER
If the set is continuously operated in a high humidity location, moist paper may stick to the rubber roller.

3. ···at THE EXIT SLOT
If the paper is installed improperly, either misaligned or wrinkled at the entrance slot, it may jam at the exit slot.

4. ···when the paper is pulled during the printing process.

5. ···when the paper is torn off before the paper advance comes to a full stop.

2. OVERCOMMING THE PAPER JAM
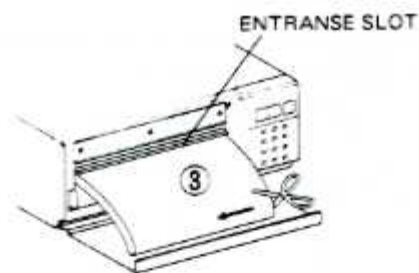
CASE 1 WHEN THE PAPER PROTRUDING FROM THE EXIT SLOT:
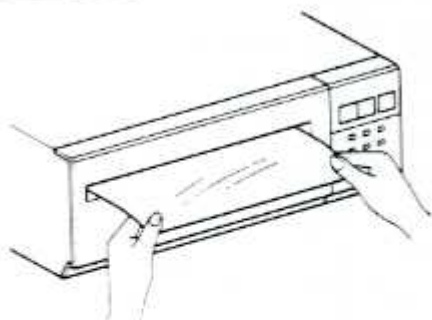
1) Draw out the paper in straight direction from the EXIT SLOT until beeping sound stops and the STAND-BY indicator illuminates.
The unit will reset itself from jammed condition when the jammed paper is drawn condition when the jammed paper is drawn completely out of the printer.

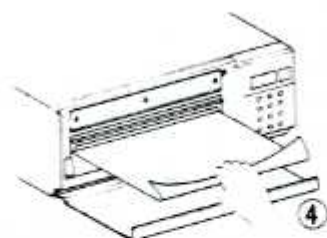**CASE 2** WHEN THE PAPER IS NOT FED FROM THE EXIT SLOT:
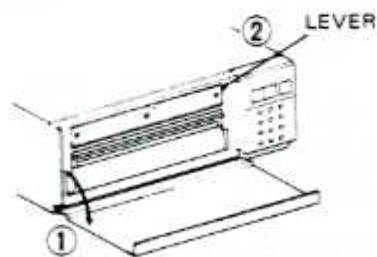
LEVER

1) Open the door by pulling down on the top left corner.

2) Lift the lever to the upward position.

ENTRANSE SLOT

3) Loosen the rolled paper and cut the middle of the paper as shown.

4) Draw the paper strongly in straight direction from the ENTRANCE SLOT until beeping sound stops and the STAND-BY indicator illuminates.

Note
1) If the paper is slightly wrinkled in printing, print the picture repeatedly (about 5 times) or until normal printing is resumed.
2) If the prints are still wrinkled, the paper may be misaligned.
Adjust the paper to the normal position by lifting the lever and realigning.
Reset the lever to the downward position.
3) If there is little paper (red end warning appears) remaining, the prints may become uneven. Install a new roll paper.
4) When powder from the paper accumulates on the cutter, clean with a soft brush.

CLEANING METHOD OF THERMAL HEAD

Clean the thermal head with the attached cleaning-sheet only.

It will be necessary
    a)   before installing each 10th new roll paper
or b)   if streak pattern or vertical white lines appear on the printed image.

1. Open the door and raise the paper release lever.
2. Cut the thermal paper at the paper feed slot.
3. Remove the paper roll from the set.
4. Lower the paper release lever.
5. Press the PRINT or the FEED button so that remaining paper comes out.
6. Raise the paper release lever.
7. Feed the cleaning sheet to the paper feed slot. (Carbon black side up.)
    Note: At the time, the STAND-BY indicator does not light.
8. Lower the paper release lever.
9. Press the FEED button and make sure the cleaning sheet fully comes out.
    If the sheet does not go through by FEED button, remove it once and try again inserting deeper. Make sure that the sheet goes in straight. Otherwise the sheet may get cleased and cannot be used again.
    If the INPUT selector is set at PARALLEL, the set will not be operated by FEED or other buttons.
10. Repeat the cleaning sheet feeding two or three times. Then load the thermal paper and print two or three pictures to make sure if the thermal head is cleaned.

If the symptom (vertical lines, streaking, etc.) is not cured by cleaning, the set may be faulty. Call for repair.
Keep cleaning sheet in a cool and dark place. Also keep away from children.
This celaning sheet is designed for thermal head cleaning only.
Never use for other purpose.

CLEANING OF RUBBER ROLLER

If dust accumulates on the rubber roller for an extended period of time, the print copies may become uneven or appear to have lines running throughout.
Should this occur, clean the surface of the rubber roller with a soft brush.
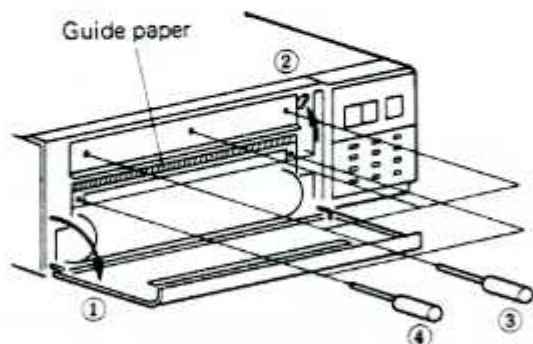
Guide paper

1) Open the door.

2) Lift the lever to the upward position.

3) Remove the cutter unscrewing with a screwdriver.

4) Remove the Paper Guide by unscrewing with a screwdriver.

5) Clean the surface of the rubber roller with a soft brush.

6) After cleaning, assemble the set as it was before.

CALLING FOR SERVICE

Before requesting service please review this instruction book to correct minor complaints. If you are unable to correct the problem, consult your MITSUBISHI Dealer or MITSUBISHI Service Department.

DO NOT ADJUST ANY CONTROLS NOT DESCRIBED IN THIS INSTRUCTION BOOK.

DO NOT REMOVE THE PROTECTIVE ENCLOSURE OF THIS UNIT.