FOR.A®
INNOVATIONS IN VIDEO
and AUDIO TECHNOLOGY

OPERATION MANUAL

DIGITAL TIME BASE CORRECTOR FA-330P

(1st EDITION - Rev.2)

FOR-A COMPANY LIMITED

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SECTION 1. SPECIFICATIONS AND INSTALLATION

1-1. GENERAL

The FA-330P Multi-Format TBC is the most versatile member of the FOR.A "Master Series" line of TBCs. It is capable of accepting composite video, Y/C 443, YP_BP_R or Y/C DUB inputs while providing simultaneous output of composite, Y/C443 and YP_BP_R signals. The FA-330P also functions as an excellent transcoder.

Exclusive Noise Reduction

The most unique feature of FOR.A's "Master Series" TBCs is a significant improvement in picture quality as a result of exclusive 3-step motion-compensated recursive filter noise reduction for luminance and chrominance. FOR.A's exclusive noise reduction technique improves the output signal-to-noise ratio by up to 9 dB, with none of the loss in resolution typically associated with conventional noise reduction methods. Adaptive comb filtering ensures a full 5.0 MHz bandwidth for all input signals, including composite video and Y/C 443 source. In addition, full phasing and procamp controls simplify timing the FA-330P to any system and allows levels to be easily adjusted as required.

The FA-330P is designed to meet the challenge of today's video system world in processing off-tape signals and in producing the highest quality pictures for postproduction, cable or broadcast application.

1-2. FEATURES

- Composite, YP_BP_R, Y/C 443 or Y/C DUB inputs standard.
- Composite, Y/C 443 and YP_BP_R outputs.
- Three step noise reduction with motion compensation for enhanced image quality.
- Component 4:2:2 processing; 8-bit processed Y and C.
- Wide band CCD comb filter maintains 5.0 MHz luminance bandwidth.
- Dynamic tracking (DT)* capability.
- Full frame memory for infinite window correction.
- Highly sensitive Auto Chroma Level circuit to minimize color distortion.
- Frame or field picture freeze, variable time interval strobe freeze function.
- CNR circuit (Chroma Noise Reduction) achieves high S/N ratio and prevents color flicker in frozen pictures.
- Digital dropout compensation (DOC).

* Dynamic Tracking is a trademark of Sony Corp.

1-3. Specifications

Television Standard	PAL
Signal Processing	Component 4:2:2
Correction Range	2 Fields
Input Signals	EBU color bars
Composite	1.0 Vp-p, 75Ω
Y/C 443	Y: 1.0 Vp-p, 75Ω C: (burst level), 0.3 Vp-p, 75Ω, 4-pin, S connector
YP_BP_R	Y: 1.0 Vp-p, 75Ω P_B: 0.525 Vp-p, 75Ω P_R: 0.525 Vp-p, 75Ω
Y/C DUB	Y: 0.5 Vp-p, 75Ω, 4-pin S-connector Composite : 1.0 Vp-p,75Ω

NOTE: If Y/C DUB is selected, only the Y signal is used as the DUB input, while the C signal is obtained from internal separation of the COMPOSITE/Y input. (Composite signal input must be present.)

GENLOCK	B.B. 0.45 Vp-p, 75Ω, or loop-through
DOC	RF 0.2 to 1.0 Vp-p, 75 Ω
DT	Requires optional interconnection cable
Output Signals	EBU color bars
Composite	1.0Vp-p, 75Ω (Composite 1 used for by-pass)
Y/C 443	Y: 1.0 Vp-p, 75Ω C: (burst level) 0.3 Vp-p, 75Ω, 4-pin, S-connector

YP_BP_R	Y: 1.0 Vp-p, 75Ω (Can be used as COMPOSITE 2 output connector.) P_B/P_R:0.525 Vp-p, 75Ω
ADV SYNC	4.0 Vp-p, 75Ω
Sampling Frequency	Y: 13.5 MHz, C: 6.75 MHz (4:2:2)
Quantization	Y: 8 bits; C: 8 bits
Freeze Function	Frame/field selectable
Noise Reduction	Luminance and chrominance Selectable in 3 steps Motion compensation Frame rate recursive filter Max. noise reduction –9 dB
Auto Freeze	Upon detection of interrupted H sync.
Strobe Freeze	Adjustable 0.1 ~ 1.0 sec.
Vertical Blanking	Lines 10 through 24 H
Auto Chroma Control	Built-in
Dropout Compensator	Built-in
Frequency Response	Y: 500 kHz ~ 5.0 MHz, –3dB, roll off over 5.0 MHz C: 4.43 MHz ±0.5 MHz, –3dB
DG, DP	2%, 2° (APL 50%)
K Factor (2T Pulse)	2% (Composite signal), 1% (Y/C signal)
H Tilt, V Tilt	1%
Residual Jitter	Y: ±15 ns, C: ±2°
S/N Ratio	≥ 56dB (excluding quantization noise)
Operating Temperature	10° C ~ 40°C (50°F ~ 104°F)
Relative Humidity	≤ 90%
Power Supply	220 ~ 240V AC, 50/60 Hz
Power Consumption	72 VA (50 W)
Dimensions	430 (W) x 44 (H) x 450 (D) mm (17" x 1.75" x 17.7")
Weight	8 kg (18 lb.)
Standard Accessories	Operation manual, AC power cord, rack mount brackets
Options	Slide rail set, DT cable, DUB cable Service Manual

NOTE: All interface connectors are BNC unless otherwise noted.

1-4. INSTALLATION

a. Unpacking

This unit is fully assembled prior to shipment, and is ready to operate immediately upon unpacking.

Check your received items against the packing list below.

ITEM	QUANTITY
MAIN UNIT	1
AC CORD	1
OPERATION MANUAL	1
RACK MOUNTING BRACKETS	1 PR.

Check to ensure that no damage has occurred during shipment. If damage has occurred, or items are missing, inform your supplier immediately.

b. Power Supply

This unit operates on 220 ~ 240V AC, 50/60Hz. Required voltage should be specified at time of purchase.

c. Grounding

This unit comes equipped with a 3-pin power cable that automatically grounds the unit to protect against electrical shock. In the event your power outlet has a 2 pin-socket, use a 2-pin to 3-pin connector adaptor and ground the green wire (pigtail), or ground the ground terminal on the rear panel of the main unit.

d. Installation

Avoid using the FA-330P in areas having high temperature, high humidity or excessive dust. Moderate air-cooling is required for optimum operation. Ensure that no other equipment is located closer than 5cm from the front or rear of this unit.

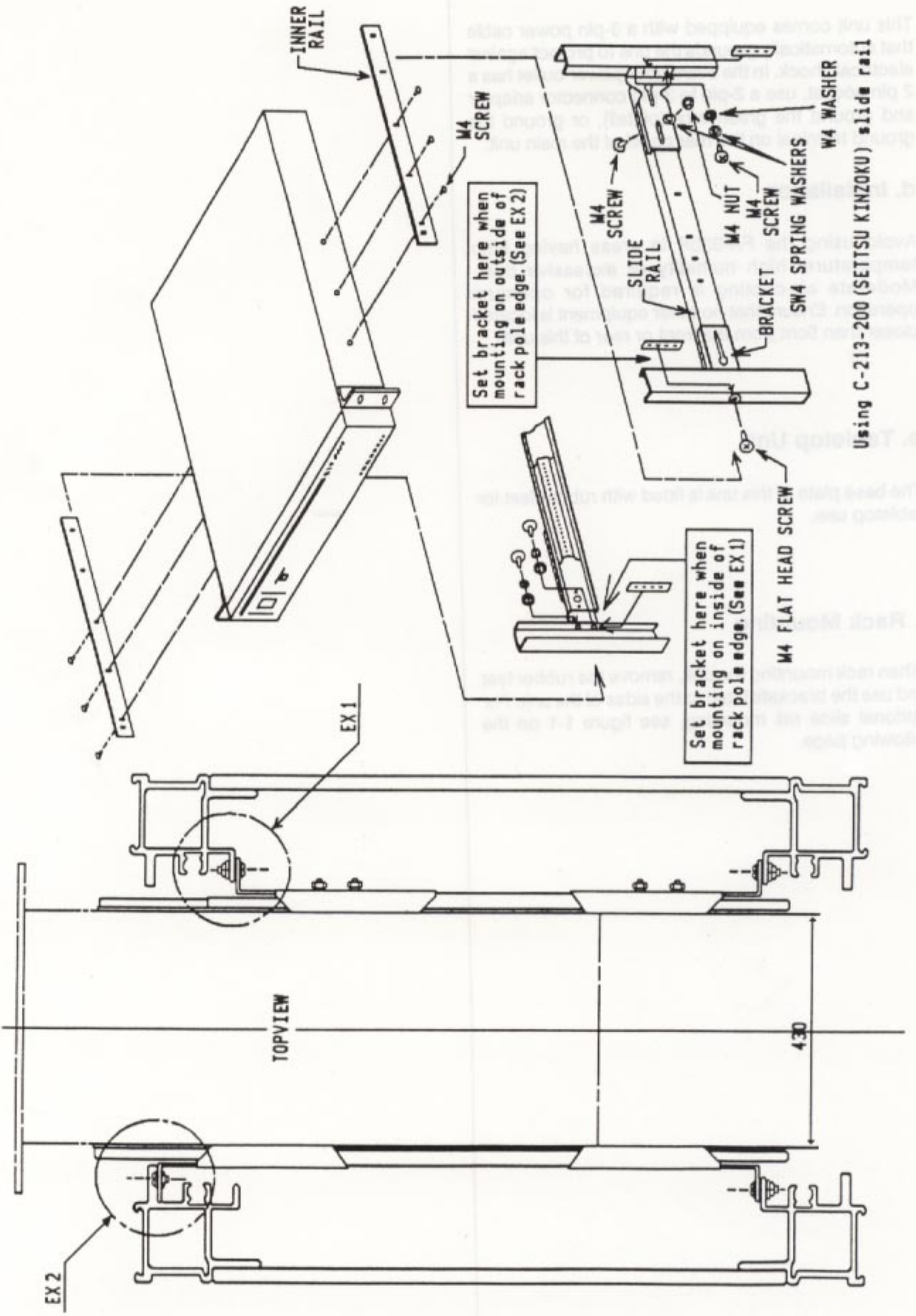
e. Tabletop Unit

The base plate of this unit is fitted with rubber feet for tabletop use.

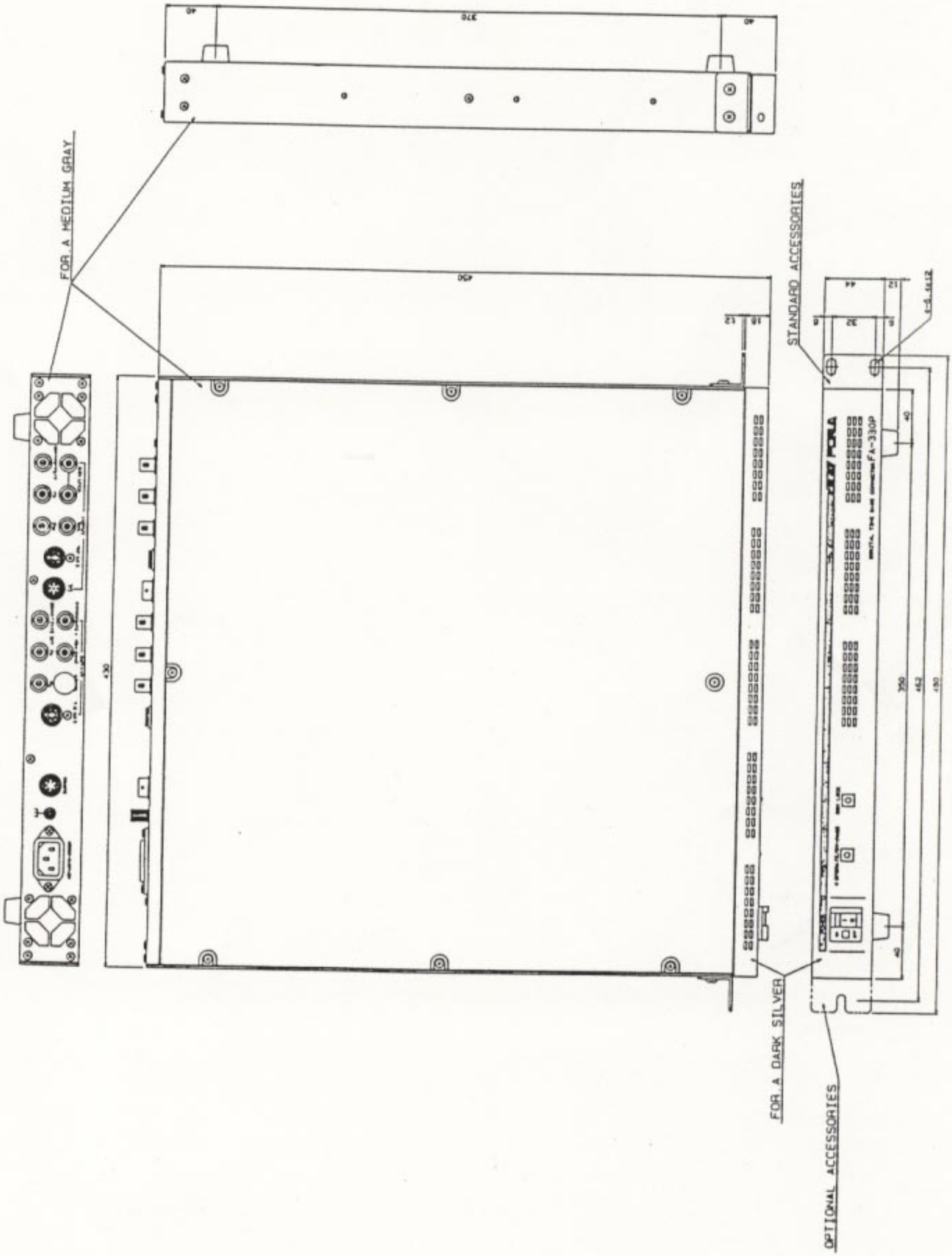
f. Rack Mounting

When rack mounting the unit, remove the rubber feet and use the brackets fitted to the sides of the unit. For optional slide rail mounting, see figure 1-1 on the following page.

FIG. 1-1


INNER RAIL
M4 SCREW
Set bracket here when mounting on outside of rack pole edge. (See EX 2)
M4 SCREW
SLIDE RAIL
M4 NUT
M4 SCREW
BRACKET
SW4 SPRING WASHERS
W4 WASHER
Using C-213-200 (SETTSU KINZOKU) slide rail
M4 FLAT HEAD SCREW
Set bracket here when mounting on inside of rack pole edge. (See EX 1)
EX 1
TOPVIEW
430
EX 2

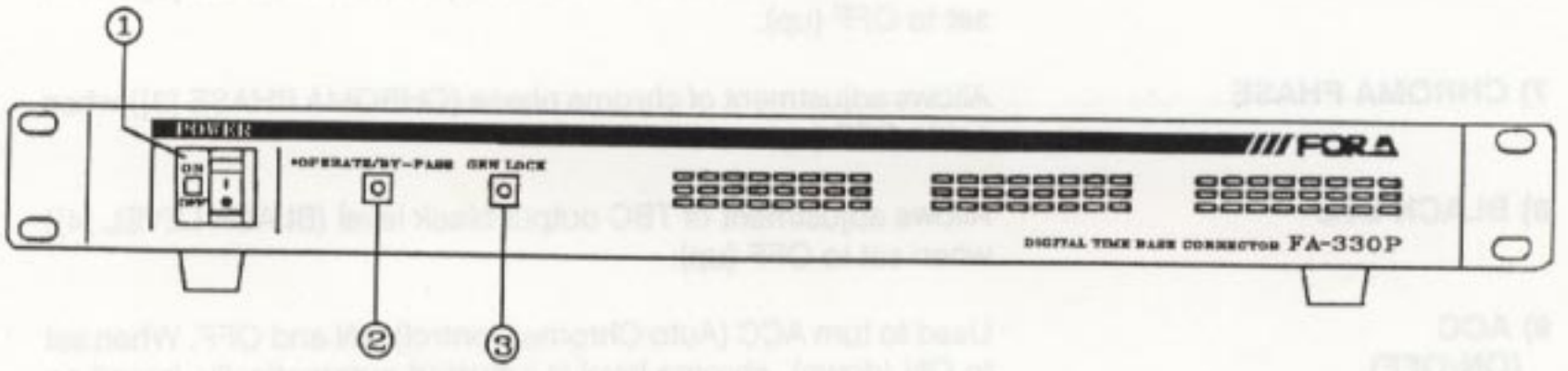
1-5. EXTERNAL DIMENSIONS



SECTION 2. OPERATION

2-1. PANEL DESCRIPTION AND FUNCTIONS

2-1-1. Front Panel

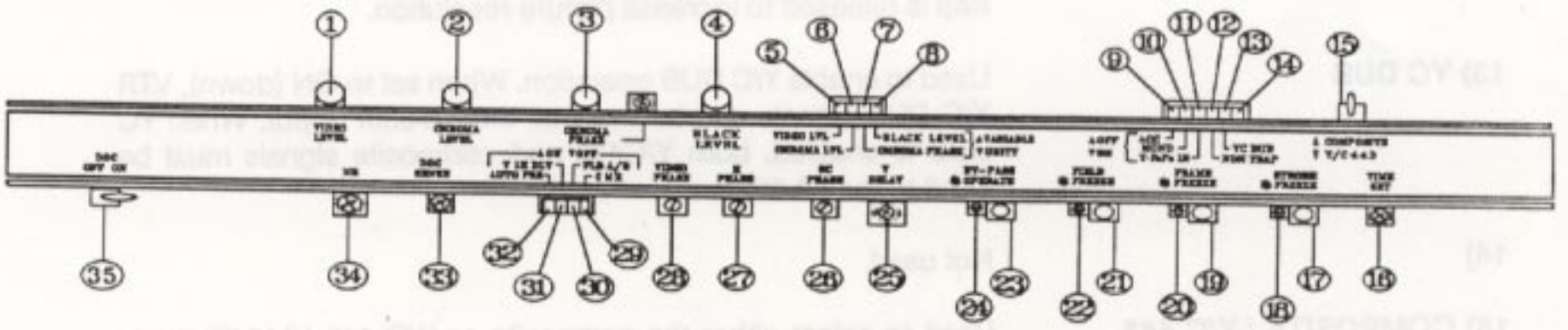


1) POWER switch and indicator — Indicator lights when power is switched on.

2) OPERATE/BY-PASS indicator — Indicator lights when BYPASS/OPERATE switch inside the unit is set to OPERATE.

3) GEN LOCK indicator — Indicator lights when a genlock signal (Black Burst) is fed to the GEN LOCK IN connector on the rear panel.

2-1-2. Internal Adjustments (behind front panel)



1) VIDEO LEVEL — Used to adjust the input video level in relation to the input video level at the connector (1 Vp-p) when VIDEO LVL [5] is OFF (up). Adjustable range is approx. ±3 dB (min range is 6 dB).

2) CHROMA LEVEL — Used to adjust the chroma level of the input signal in relation to the input video level (EBU color bar signal) when CHROMA LVL [6] is OFF (up). Adjustable range is approx. ±3 dB (min range is 6 dB). When the black position mark is placed straight up, output level is at unity.

3) CHROMA PHASE — Used to adjust the relative phases of the TBC burst and chroma output to within a range of ±30° when CHROMA PHASE [7] is set to VAR (up). When the black position mark is placed straight up, output chroma phase will match input chroma phase.

4) BLACK LEVEL

Used to adjust TBC output black level in relation to input black level when BLACK LVL [8] is OFF (up). Adjustable range is approx. ±100 mV. If black position mark is set straight up, black level is at unity.

5) VIDEO LVL

Allows adjustment of the input video level (VIDEO LEVEL [1]) when set to OFF (up).

6) CHROMA LVL

Allows adjustment of chroma level (CHROMA LEVEL [2]) when set to OFF (up).

7) CHROMA PHASE

Allows adjustment of chroma phase (CHROMA PHASE [3]) when set to OFF (up).

8) BLACK LVL

Allows adjustment of TBC output black level (BLACK LEVEL [4]) when set to OFF (up).

9) ACC (ON/OFF)

Used to turn ACC (Auto Chrome Control) ON and OFF. When set to ON (down), chroma level is adjusted automatically, based on the burst level of the input signal. In this case, CHROMA LEVEL [2] can be used to adjust the chroma level if CHROMA LVL [6] is OFF (up). Chroma level can also be changed by adjusting VIDEO LEVEL [1]; however, this will affect luminance signal level.

10) MONO (B/W / COLOR)

Selection switch for B/W (Black & White) or color processing. When B/W is selected, the output does not have a burst signal. When COLOR is selected, a burst signal is generated on the output, even if a B/W signal is input.

11) YP_BP_R IN (ON/OFF)

If the YP_BP_R input is used, this switch must be set to ON (down). Otherwise, normally set to OFF (up).

12) NON TRAP (ON/OFF)

Factory set to OFF (up) for TBC use. Set to ON (down) when the FA-330P is used as a frame synchronizer. When ON, a 4.43 MHz trap is released to increase picture resolution.

13) YC DUB

Used to enable Y/C DUB operation. When set to ON (down), VTR Y/C DUB signals can be used as the FA-330P input. When YC DUB is enabled, both Y/C443 and composite signals must be input to the FA-330P.

14)

Not used.

15) COMPOSITE / Y/C 443

Used to select either the composite or Y/C 443 (S-VHS) component signal as the input video.

16) TIME SET

Adjusts strobe freeze time interval when STROBE FREEZE [15] is ON (STROBE FREEZE indicator [16] is lit).

17) STROBE FREEZE

Used to initiate a strobe freeze function when either FRAME FREEZE [19] or FIELD FREEZE [21] is set to ON (corresponding indicator is lit). Will automatically reset to OFF each time power is switched ON (STROBE FREEZE indicator [18] is not lit).

18) STROBE FREEZE (indicator)

Lights when STROBE FREEZE [17] is ON.

19) FRAME FREEZE

Used to initiate a frame freeze function. If FIELD FREEZE [21] is ON when this switch is initiated, it will overide the field freeze (switch [21] will reset to OFF and indicator [22] will go out) and replace it with a frame freeze. In addition, this switch automatically resets to OFF whenever unit power is switched ON.

20) FRAME FREEZE (indicator)

Lights when FRAME FREEZE [20] is ON.

21) FIELD FREEZE

Used to initiate a field freeze function. If FRAME FREEZE [19] is ON when this switch is initiated, it will overide the frame freeze (switch [19] will reset to OFF and indicator [20] will go out) and replace it with a field freeze. In addition, this switch automatically resets to OFF whenever unit power is switched ON.

22) FIELD FREEZE (indicator)

Lights when field freeze [21] is ON (indicator [22] is lit).

23) BY-PASS/OPERATE

When in OPERATE (BY-PASS/OPERATE indicator [24] is lit), a time base corrected signal is output by the unit. When in BY-PASS (indicator [24] is not lit), video input to the unit will be directly bypassed to the unit output.

24) BY-PASS/OPERATE (indicator)

When lit, indicates the unit is in the OPERATE mode. When not lit, the unit is in the BY-PASS mode.

25) Y DELAY

Adjusts delay between the Y and C signals by changing Y signal phase. Phase change is adjustable in 16 steps / 74 nsec each.

26) SC PHASE

Used to adjust TBC output SC phase in relation to the input video. Adjustable range is ±180°. Physical adjustment range of the pot is 15 turns.

27) H PHASE

Used to adjust TBC output H phase in relation to the input video. Adjustable range is approx. ±2μsec (min range is 4 μsec). Physical adjustment range of the pot is 15 turns.

28) VIDEO PHASE

Used to adjust TBC output video phase. Adjustable range is approx. ±1.5 μsec (min range is 3 μsec). Physical adjustment range of the pot is 15 turns.

29) CNR

High levels of chroma noise are automatically compensated for when this switch is set to ON (up). **HOWEVER**, it is recommended that this switch be left in OFF (down) during normal operation as color resolution in the vertical direction may otherwise be noticeably attenuated! (Low levels of line related phase error will still be compensated for in the OFF position.)

30) FLD A/B

Pressing this switch will change field 1 to field 2 or field 2 to field 1 depending on timing.

31) Y 1H DELAY

When ON (down), applies a 1H delay to the Y (luminance) signal only. This switch is used to offset the luminance-chrominance gap produced during 1/2" VTR dubbing.

32) AUTO FRZ

When ON (down), the output video signal will be automatically frozen whenever the input signal is disturbed.

33) DOC SENSITIVITY

Used to adjust dropout detection sensitivity (sensitivity increases as the adjustment pot is turned clockwise).

34) NR

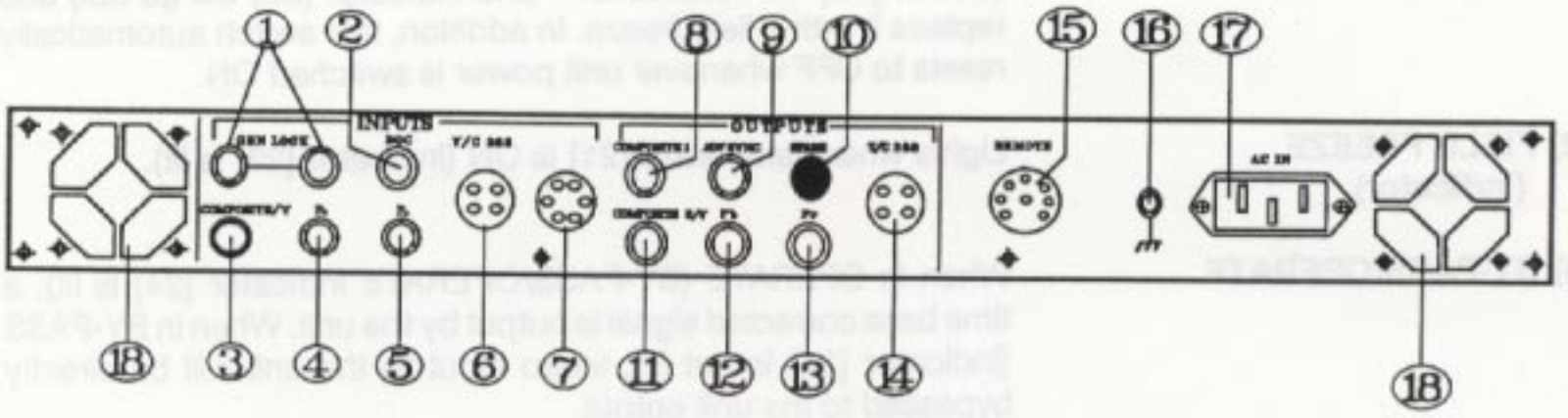
Adjusts the noise reduction (NR) level of the unit in 4 steps; 0 NR (OFF/step 1), 1 NR (step 2), 2 NR (step 3) and 3 NR (step 4).
(The NR switch has 9 stops. Positions 4 & 8 = 0 NR, 5 & 9 = 1, 6 = 2 and 7 = 3.)

35) DOC ON/OFF

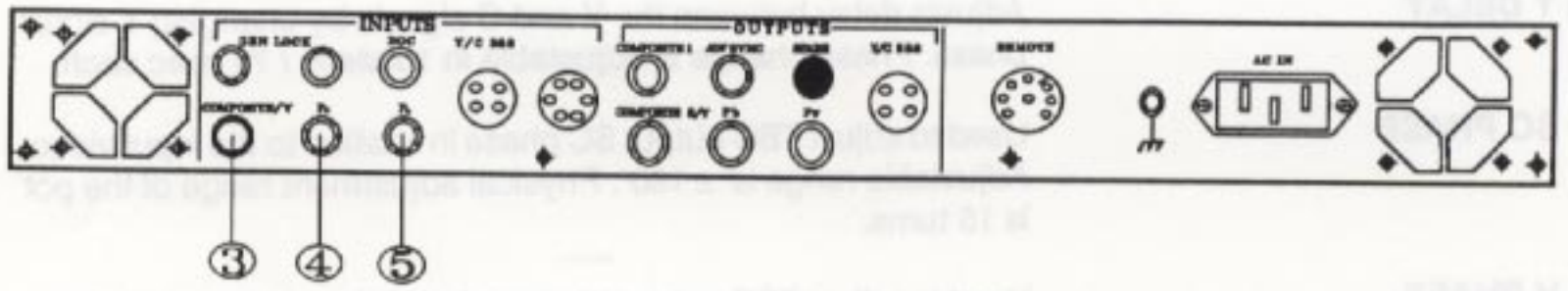
Used to turn the Dropout compensation function ON and OFF.

2-1-3. Rear Panel Configurations

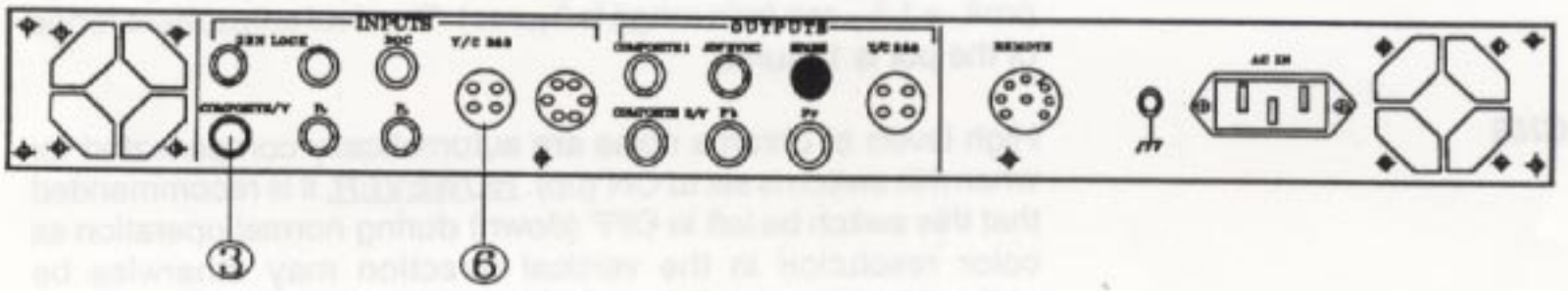
A) General



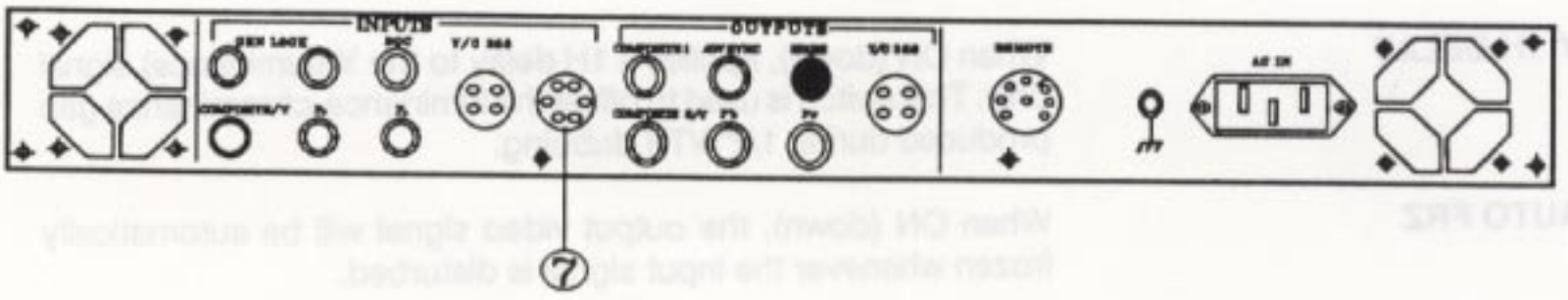
B) YP_BP_R Input



C) Y/C DUB Input



D) DT Input



INPUTS (Figures A ~ D)

1) GEN LOCK — Input connectors for reference black burst signal. If no connections are made, internal sync operation is automatically selected.

2) DOC — Input connectors to supply an RF VTR signal to initiate the DOC (Dropout Compensation) function of the FA-330P. The RF signal is used to detect any dropout of the output signal.

3) Composite/Y

Input connector for a composite video signal from a VTR. If Y P_B P_R input is required (fig. B), a Y signal must be input to this connector (YP_BP_R switch must be set to ON). If Y/C DUB input is required (fig. C), a composite video signal must be input.

4) P_B

Input connector for the P_B signal when YP_BP_R input is required (YP_BP_R switch must be set to ON).

5) P_R

Input connector for the P_R signal when YP_BP_R input is required (YP_BP_R switch must be set to ON).

6) Y/C 443

4-pin input connector for a Y/C 443 signal from an S(S-VHS) VTR. When the Composite / Y/C 443 selection switch is set to Y/C 443, input signals are processed by the unit. When Y/C DUB is required (fig. C), only the Y signal will be used for operation (Y/C DUB switch must be set to ON).

7) DT*

DT input signal connector (fig. D). (*Optional cable necessary for DT signal input). Pin designations are as shown below.

PIN NO.	SIGNALS
1	GND (ground)
2	DT-ON
3	NC (no connection)
4	DT-V
5	GND (ground)
6	NC (no connection)

<u>OUTPUTS</u>

8) Composite 1

Video signal output. If the unit is OFF, or in the BY-PASS mode, the signal supplied to the COMPOSITE/Y video input will pass directly to this connector. If the unit is in OPERATE, a timebase corrected signal will be output.

9) ADV SYNC

Used to feed an advanced sync signal (8H) to the EXT SYNC input of a capstan servo VTR for synchronization purposes.

10) Spare

Spare connector hole. Normally has a rubber plug installed.

11) Composite 2/Y

Outputs either composite video or a component Y signal, depending on the setting of JP7 on the PROCESS Card. No signal will be output if the unit is in the BY-PASS mode.

12) P_B When the unit is in the OPERATE mode, the time base corrected P_B(B-Y) component of the input video signal will be output. When in BY-PASS, no signal is present.

13)P_R When the unit is in the OPERATE mode, the time base corrected P_R(R-Y) component of the input video signal will be output. When in BY-PASS, no signal is present.

14) Y/C 443 Y/C 443 (Luminance/4.43 MHz Chrominance) component signal output. When the unit is in the BY-PASS mode, or power is OFF, the Y/C 443 input signal is passed directly to this connector.

15) Remote Input connector for external freeze control signals. Signal inputs are momentary make contact (contact closure time must be at least 20 msec) or TTL negative pulse.
Pin designations are as shown below.

PIN NO.	SIGNALS
1	FRAME FREEZE
2	FIELD FREEZE
3	GND (ground)
4	Noise reduction input
5	NC (no connection)
6	NC (no connection)
7	NC (no connection)

OTHER

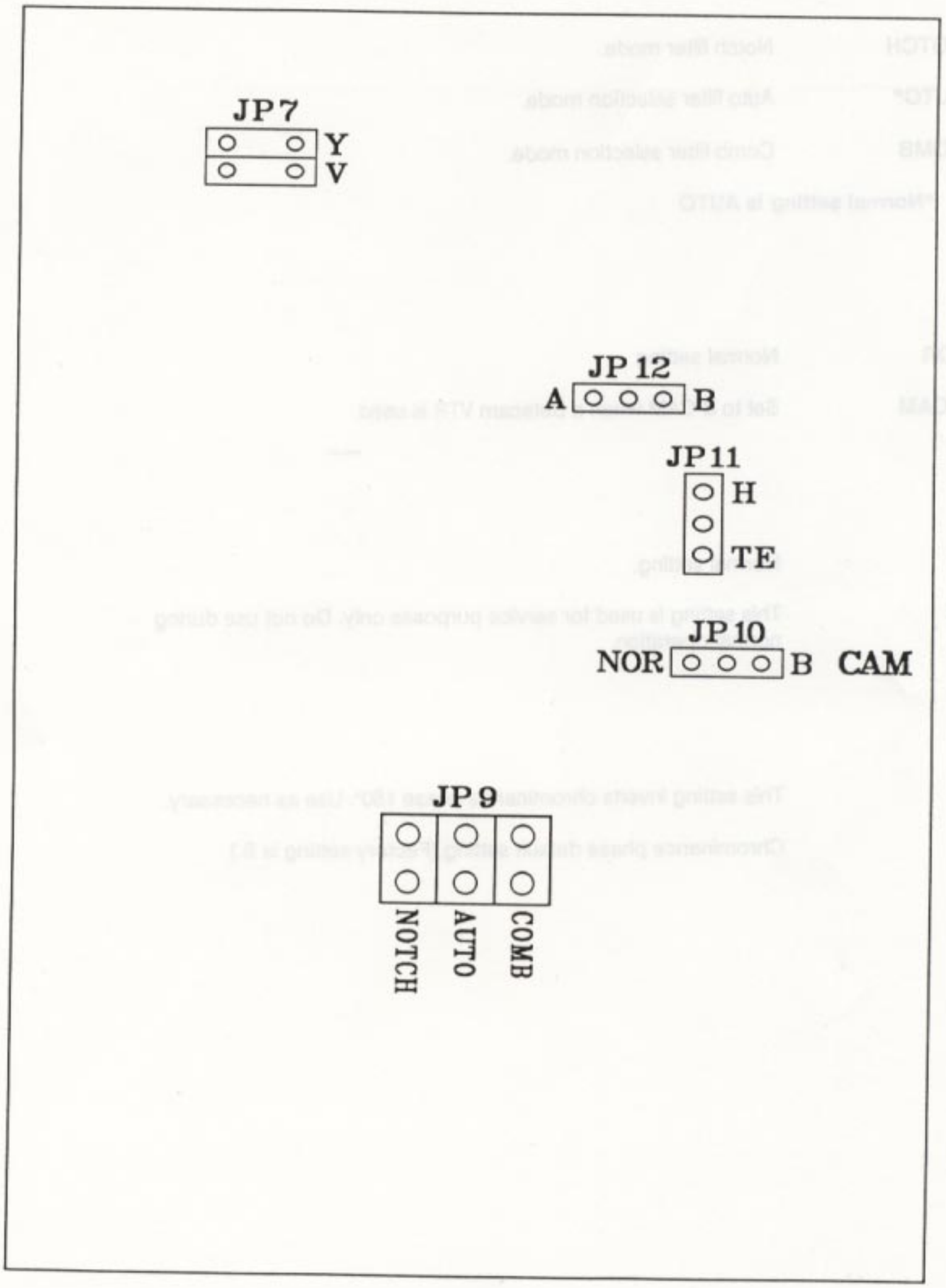
16) Ground terminal

17) AC IN

18) Fans

2-2. INTERNAL ON-BOARD SETTINGS

2-2-1. PROCESS CARD



JP 7)

V (VIDEO)	Set to V when the composite output is used.
Y	Normal setting.

JP 9)

NOTCH	Notch filter mode.
AUTO*	Auto filter selection mode.
COMB	Comb filter selection mode.

***Normal setting is AUTO**

JP 10)

NOR	Normal setting
B CAM	Set to B CAM when a Betacam VTR is used.

JP 11)

H	Normal setting.
TE	This setting is used for service purposes only. Do not use during normal operation.

JP 12)

A	This setting inverts chrominance phase 180°. Use as necessary.
B	Chrominance phase default setting.(Factory setting is B.)

2-2-2. DIGITAL CARD

JP 8)

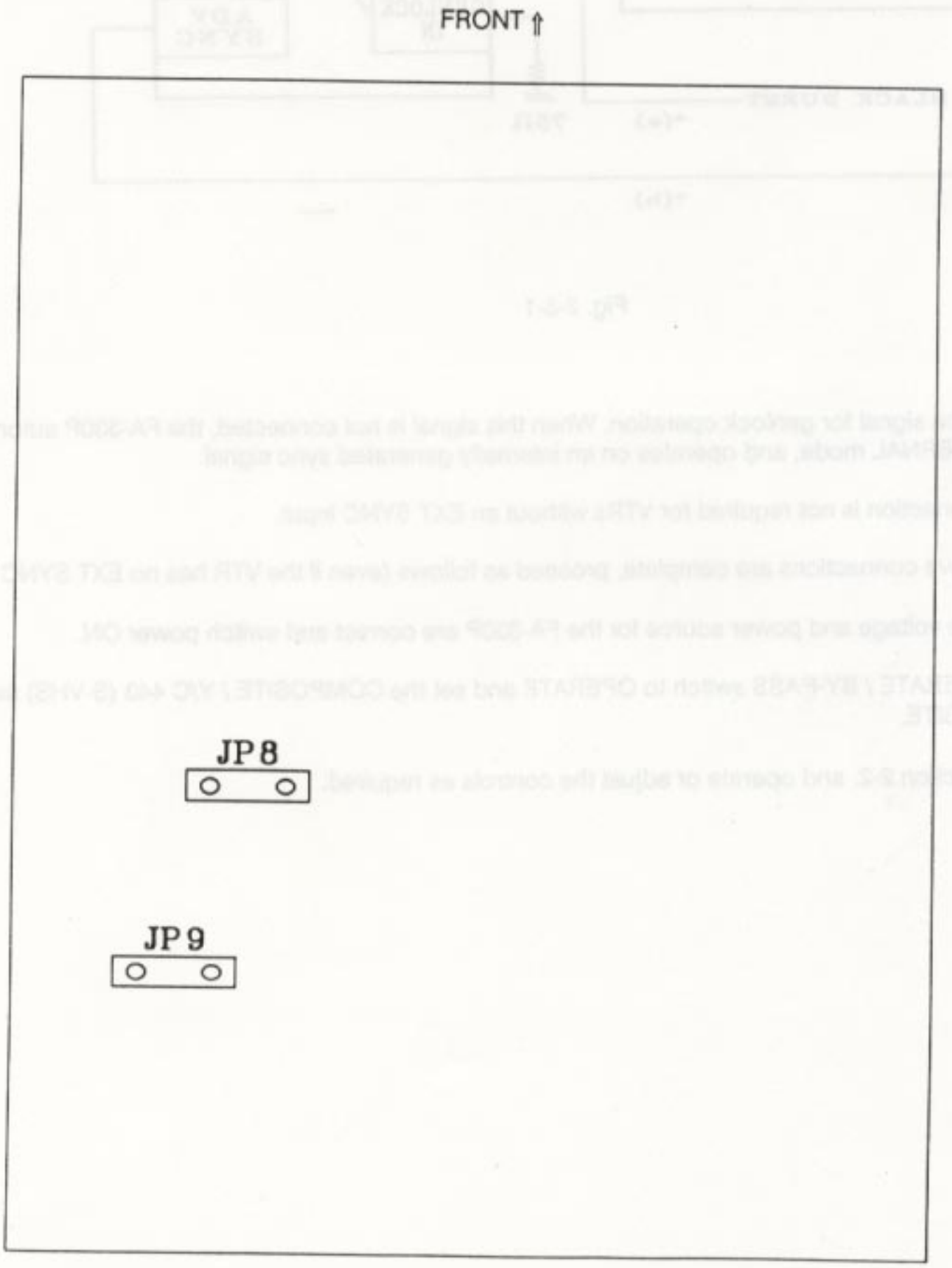
SHORT	Vertical blanking is applied to the unit.
OPEN*	Vertical blanking is released to pass through the VITS signal.

* Factory set to OPEN.

JP 9)

Set to OPEN.

***Used for alignment purposes only.**



2-3. CONNECTION AND OPERATION

2-3-1. Connection to composite VTRs (U-matic, VHS, Beta, etc.)

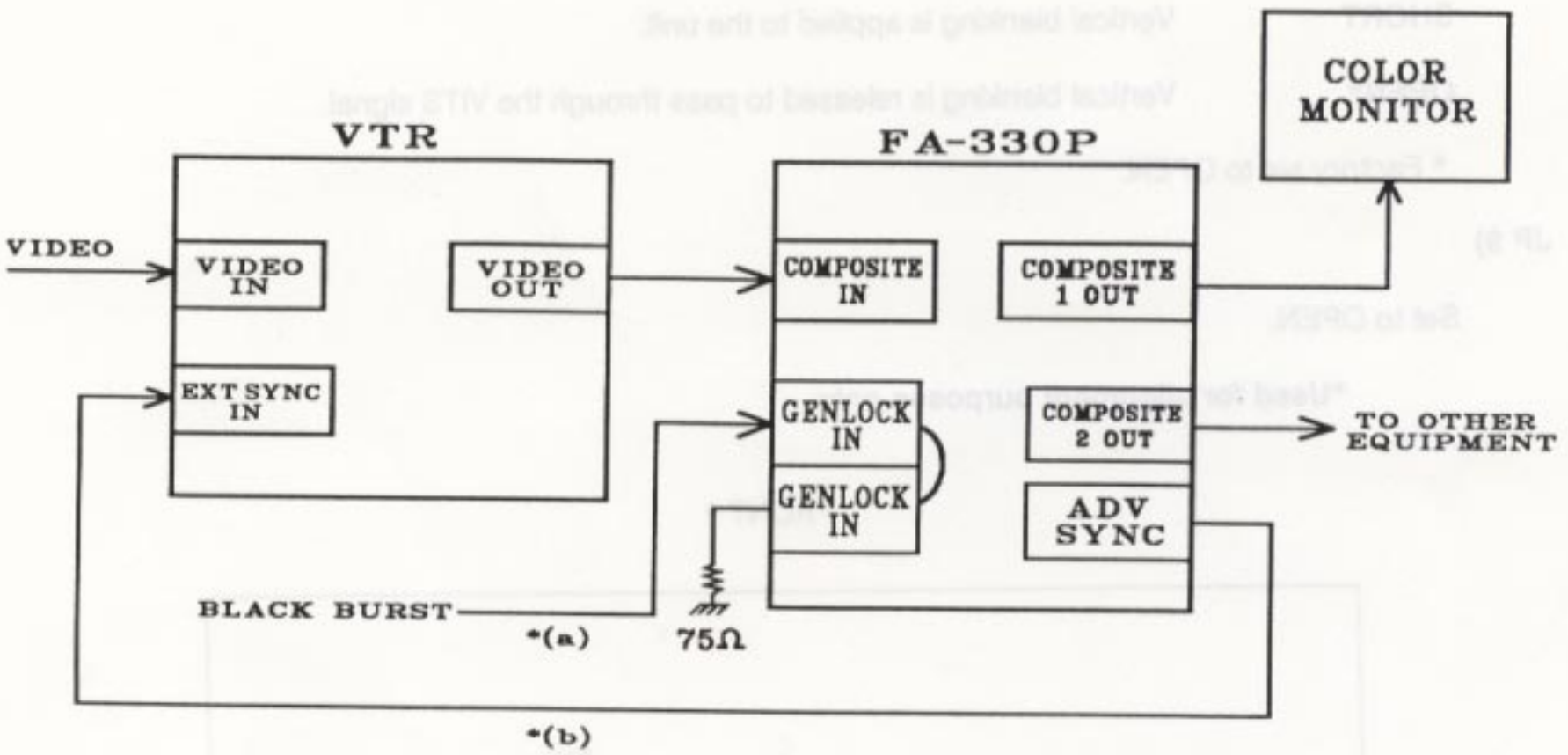


Fig. 2-3-1

- (a) Reference signal for genlock operation. When this signal is not connected, the FA-330P automatically goes to INTERNAL mode, and operates on an internally generated sync signal.
- (b) This connection is not required for VTRs without an EXT SYNC input.

When the above connections are complete, proceed as follows (even if the VTR has no EXT SYNC input):

1) Confirm the voltage and power source for the FA-330P are correct and switch power ON.

2) Set the OPERATE / BY-PASS switch to OPERATE and set the COMPOSITE / Y/C 443 (S-VHS) switch to COMPOSITE.

3) Refer to Section 2-2. and operate or adjust the controls as required.

2-3-2. Connection to component VTRs (S-VHS, etc.)

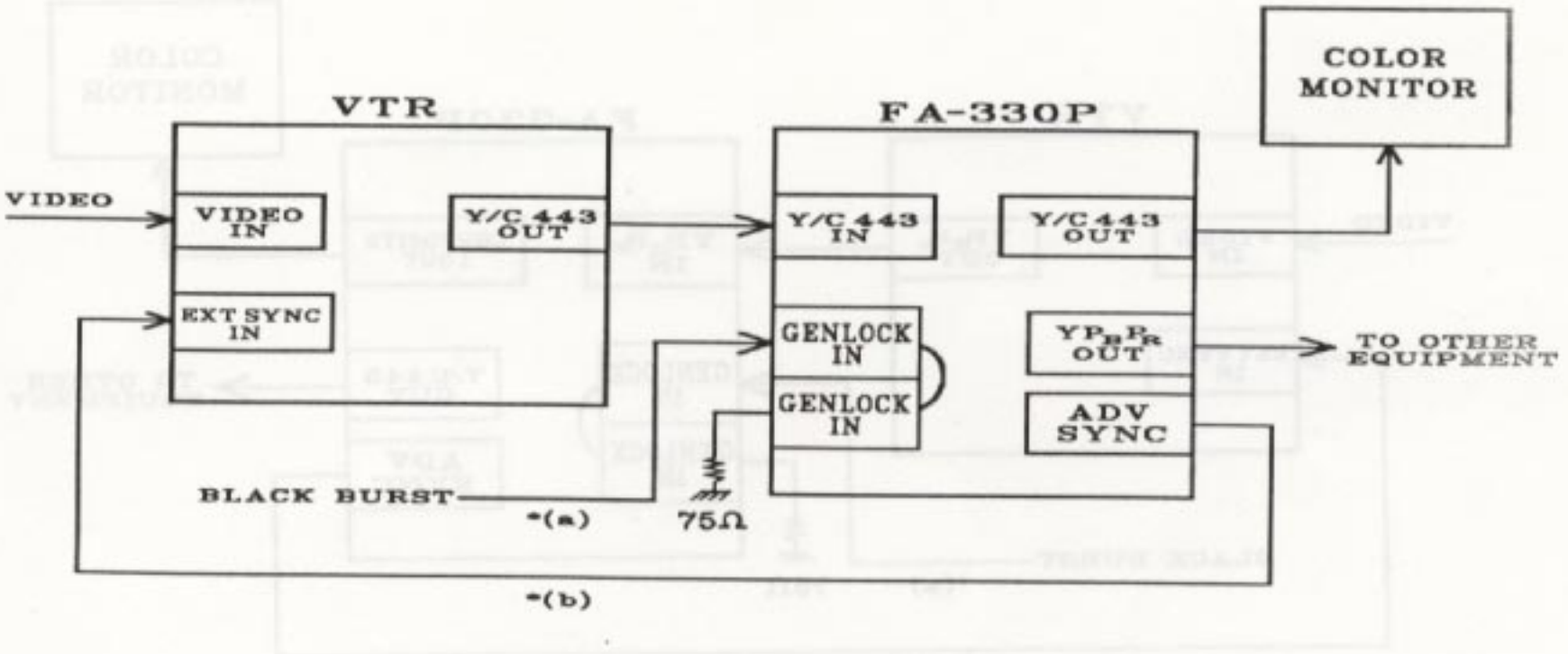


Fig. 2-3-2

- (a) Reference signal for genlock operation. When this signal is not connected, the FA-330P automatically goes to INTERNAL mode, and operates on an internally generated sync signal.
- (b) This connection is not required for VTRs without an EXT SYNC input.

When the above connections are complete, operate as follows(even if the VTR has no EXT SYNC input):

1) Confirm the voltage and power source for the FA-330P are correct and switch power ON.

2) Set the OPERATE / BY-PASS switch to OPERATE and set the COMPOSITE / Y/C443(S-VHS) switch to YC443(S-VHS).

3) Refer to Section 2-2. and operate or adjust the controls as required.

2-3-3. Connection to VTRs with YP_BP_R Output.

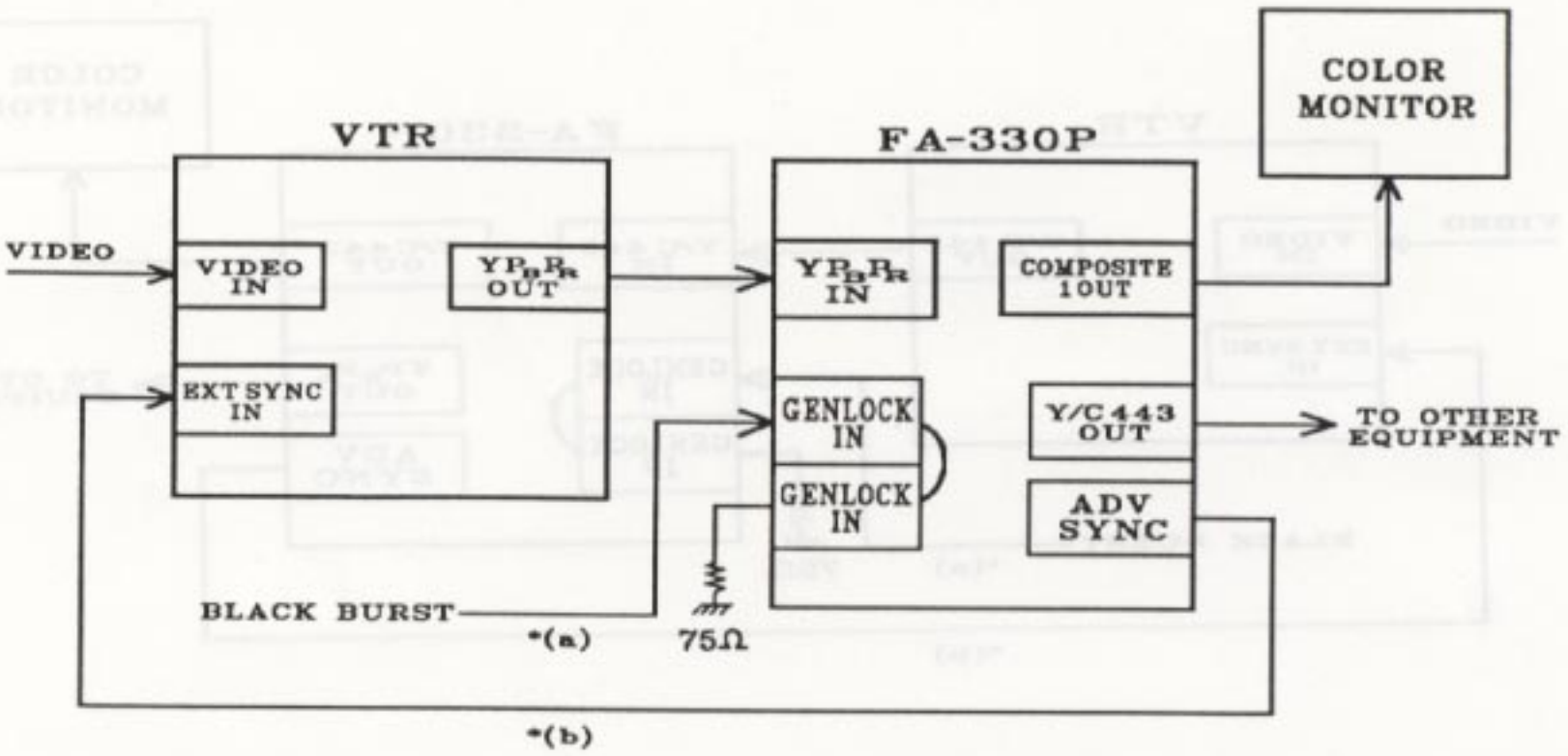


Fig. 2-3-3

- (a) Reference signal for genlock operation. When this signal is not connected, the FA-330P automatically goes to INTERNAL mode, and operates on an internally generated sync signal.
- (b) This connection is not required for VTRs without an EXT SYNC input.

When the above connections are complete, operate as follows:

1) Confirm the voltage and power source are correct for the FA-330P and switch power ON.

2) Set the OPERATE / BY-PASS switch to OPERATE , and set Y P_B P_R IN to ON (see page 2-2, P_B P_R INON/OFF).

3) Refer to Section 2-2. and operate or adjust the controls as required.

2-3-4. Connection to U-DUB Signal (VTR output)

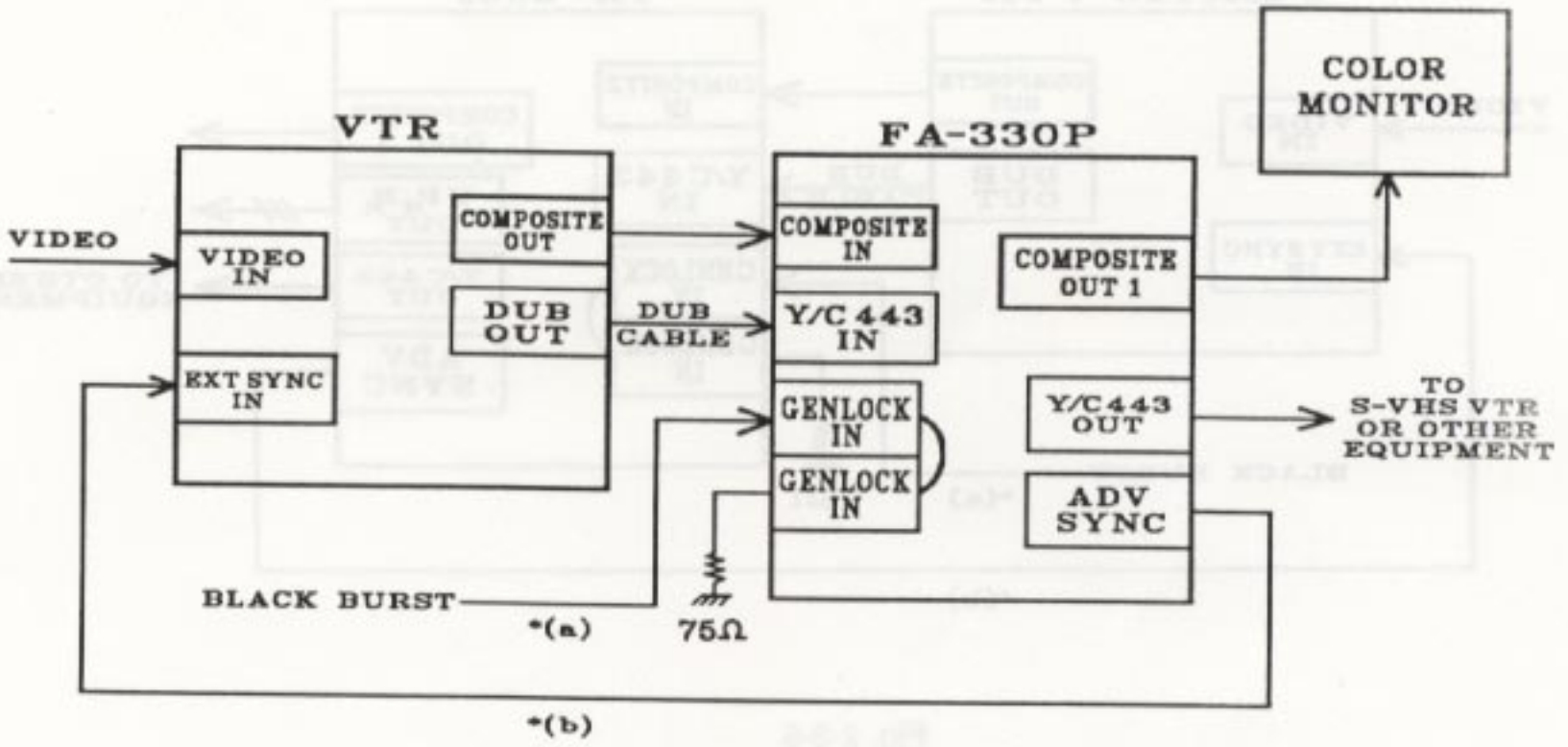


Fig. 2-3-4

- (a) Reference signal for genlock operation. When this signal is not connected, the FA-330P automatically goes to INTERNAL mode, and operates on an internally generated sync signal.
- (b) This connection is not required for VTRs without an EXT SYNC input.

When the above connections are complete, operate as follows(even if the VTR has no EXT SYNC input):

1) Confirm the voltage and power source for the FA-330P are correct and switch power ON.

2) Set the OPERATE / BY-PASS switch to OPERATE (LED should light) and set the COMPOSITE / Y/C443 switch to COMPOSITE.

3) Set YC DUB on the front edge of the internal PC boards to ON (see page 2-2, [13] : Y/C DUB).

4) Refer to Section 2-2. and operate or adjust the controls as required.

2-3-5. Connection of Y/C DUB signal from U-matic VTRs

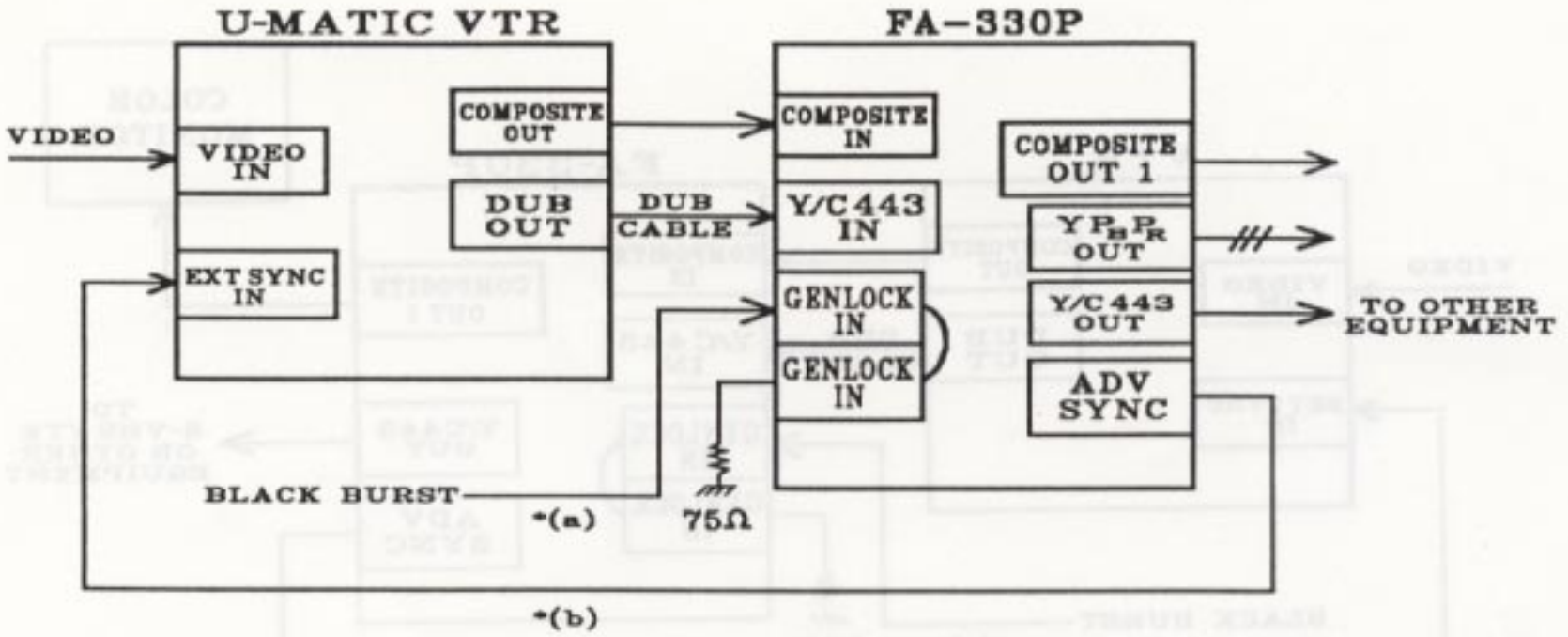


Fig. 2-3-5

- (a) Reference signal for genlock operation. When this signal is not connected, the FA-330P automatically goes to INTERNAL mode, and operates on an internally generated sync signal.
- (b) This connection is not required for VTRs without an EXT SYNC input.

When the above connections are complete, operate as follows(even if the VTR has no EXT SYNC input):

1) Confirm the voltage and power source for the FA-330P are correct and switch power ON.

2) Set the OPERATE / BY-PASS switch to OPERATE and set the COMPOSITE / Y/C443 switch to COMPOSITE (up).

3) Set Y/C DUB switch to ON (see page 2-2, [13] : Y/C DUB).

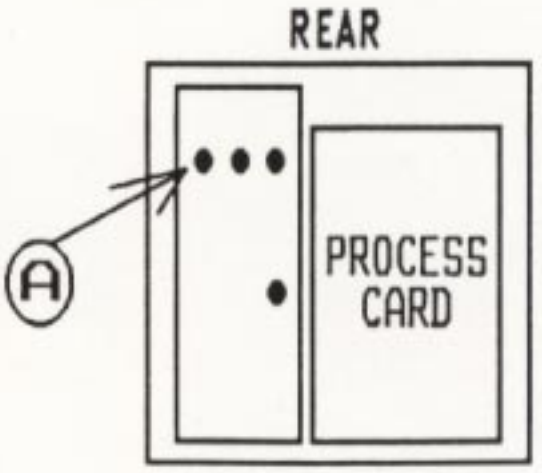
4) Set YP_BP_R IN switch to OFF (see page 2-2, [11] :YP_BP_R IN/OUT).

5) Refer to Section 2-2. and operate or adjust the controls as required.

6) If the Y/C DUB input level from the VTR is not 0.5 Vp-p, adjust the FA-330P internal input level to compensate for the difference and obtain 0.5 Vp-p (see below).

To adjust Y DUB input level:

Remove FA-330P top panel and adjust A (indicated in the figure at right) to set COMPOSITE 2/Y output level to 1.0 Vp-p with the Y/C DUB card edge switch set to ON. Verify output level remains at 1.0 Vp-p when the Y/C DUB switch is set to OFF.



2-3-6. To genlock the FA-330P with the system reference signal

When the FA-330P is genlocked to a system, or when it is used as part of a system, connections should be made as shown below.

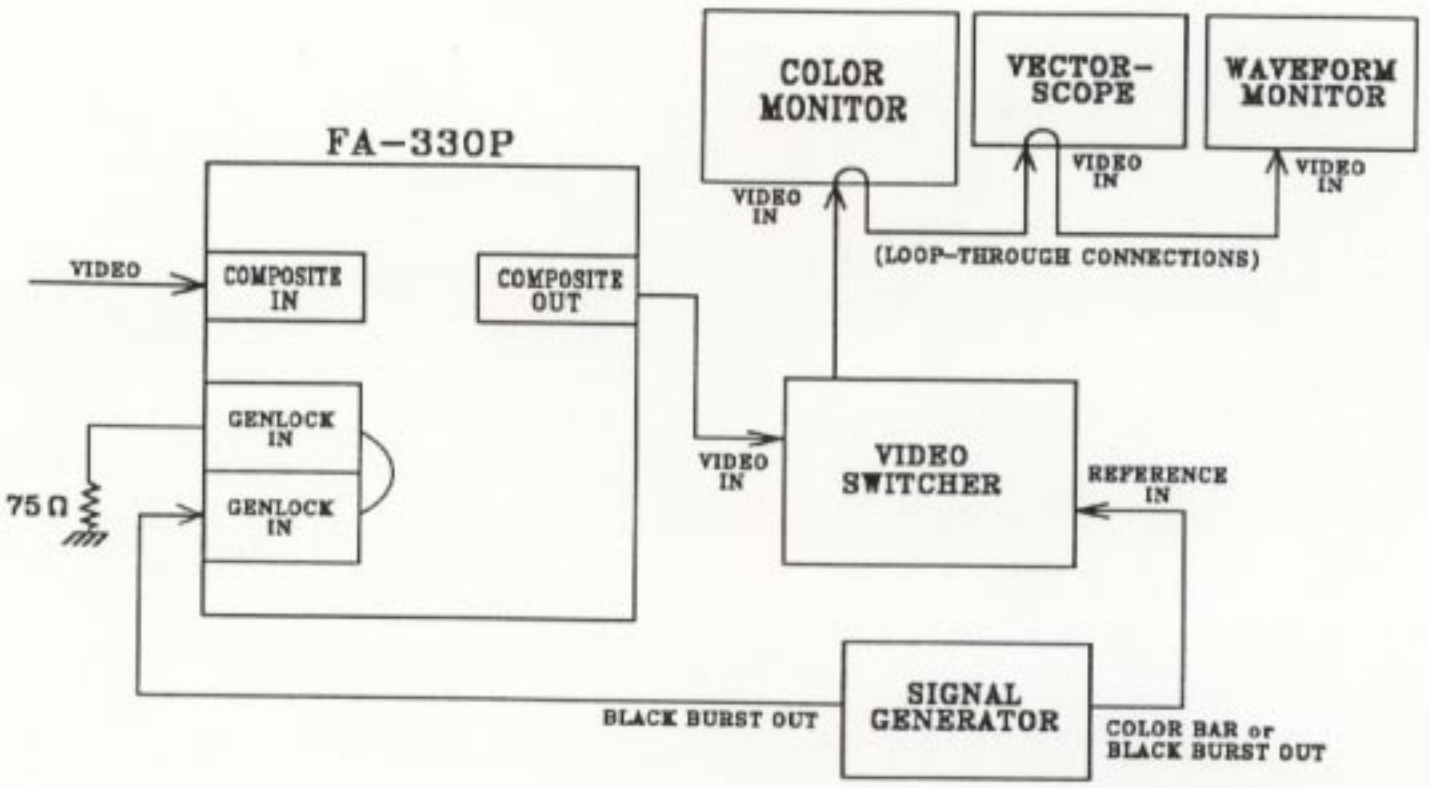


Fig. 2-3-6

NOTE: The connections outlined in Fig.2-3-6 indicate minimum required.

When the above connections are complete, operate as follows:

1) Confirm the voltage and power source are correct for the FA-330P and switch power ON.
2) Confirm that the GEN LOCK indicator is lit.

   NOTE: The following adjustments can only be performed when a genlock reference signal is input.

3) Adjust the H PHASE (see page 2-3, [27] : H PHASE) control inside the FA-330P until the H phase of the FA-330P video output matches system H phase at the input side of the switcher, etc.
4) Adjust the SC PHASE (see page 2-3, [26] : SC PHASE) control inside the FA-330P until the burst phase of FA-330P video output matches burst phase of the system reference black burst signal at the input side of the switcher, etc.

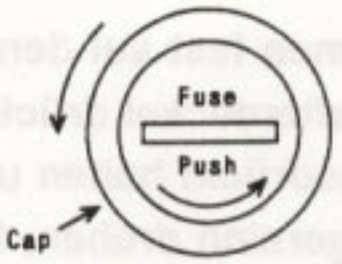
Replacing Fuses

Type of fuse

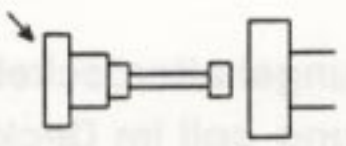
Current capacity is determined by the rating label on the unit. Always use a fuse of the labeled amperage rating.

To replace the fuse

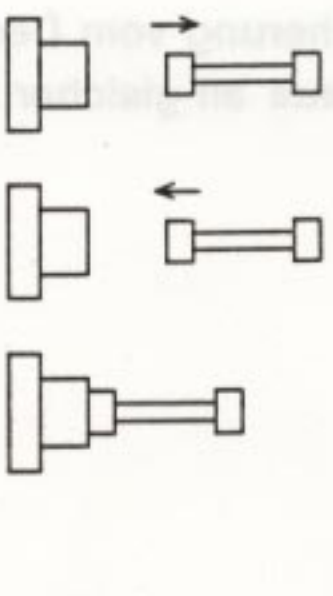
① **As a safety precaution, disconnect the power cord of the unit from the power source before starting fuse replacement.**

② 

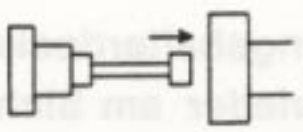
Firmly push down on the fuseholder cap with your thumb. While maintaining pressure, turn counter clockwise until cap releases.

③ 

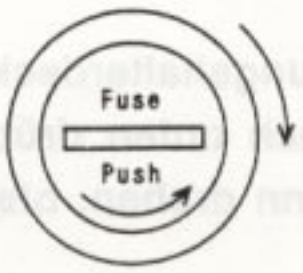
Pull off the cap of the fuseholder. (Fuse should remain in cap.)

④ 

Remove the old fuse from the cap and insert the new fuse in the same position.

⑤ 

Reposition fuseholder cap, with fuse, on the fuseholder.

⑥ 

Press down on fuseholder cap with thumb and turn clockwise until cap remains firmly locked in place.

Auswechseln von Sicherungen

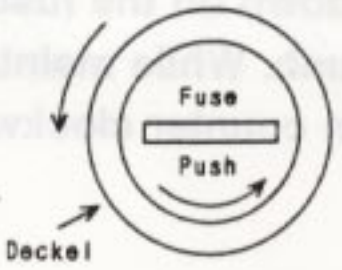
Sicherungstyp

Die Stromkapazität ist am Typenschild des Geräts angegeben. Stets eine Sicherung der vorgeschriebenen Amperezahl verwenden.

Auswechseln der Sicherung

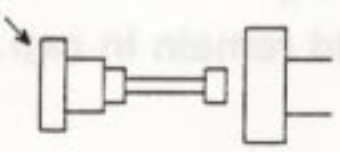
① Zur Sicherheit stets das Stromkabel des Geräts von der Stromversorgung abtrennen, bevor die Sicherung gewechselt wird.

②



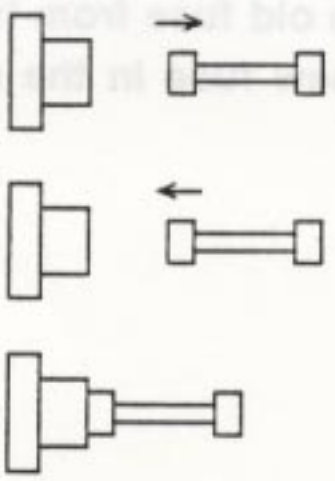
Mit dem Daumen fest auf den Sicherungshalterdeckel drücken. Den Deckel gedrückt halten und im Gegenuhrzeigersinn drehen, bis er sich löst.

③



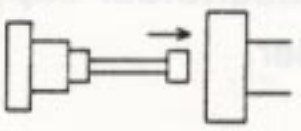
Den Sicherungshalterdeckel abziehen. (Die Sicherung soll im Deckel verbleiben.)

④



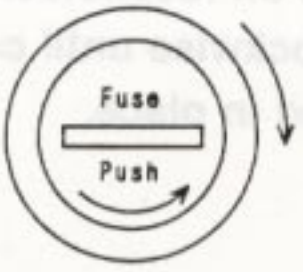
Die alte Sicherung vom Deckel entfernen und eine neue an gleicher Position einsetzen.

⑤



Den Sicherungshalterdeckel mit der neuen Sicherung wieder am Sicherungshalter anbringen.

⑥



Den Sicherungshalterdeckel mit einem Daumen nach unten drücken und im Uhrzeigersinn drehen, bis er geschlossen bleibt.

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* The contents of this manual are subject to change without notice.