

**A2300 GENLOCK  
TECHNICAL SPECIFICATIONS  
(NTSC *including* PAL)**

AUGUST, 1988

PN-314871-02





# **A2300 GENLOCK**

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**PN-314871-02**

#### **Commodore Business Machines, Inc.**

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# Technical Specifications

These specifications apply to both Models A2300 (NTSC) and A2301 (PAL) unless otherwise noted. If there is a difference between the two models, the specifications for Model A2301 will be in italics and enclosed in parentheses.

## Theory of Operation

When the Genlock is attached to the Amiga 2000 computer, the system clock for the A2000 comes from the 28MHz VCO (Voltage controlled oscillator) on the Genlock unit. During the power-up sequence, the A2000's Kickstart configures the computer into an external synch mode. The Genlock unit extracts the horizontal and vertical timing information from the external source video and resets the horizontal and vertical counters of the computer so that the computer video is synched to the external video. When the external video source is removed, the computer is self-synchronized.

The Genlock also allows for video overlay of the computer graphics over the source video. The incoming composite video is decoded into RGB components, and the computer's RGB is keyed in over the external video RGB. The combined video signal then goes to the RGB output to drive an RGB monitor. It also goes to a color encoder to drive a composite video monitor or VCR.

The major system blocks of the Genlock unit are:

- 1) VCO and horizontal beam counter
- 2) Synch separator and detector
- 3) PLL (Phased locked loop)
- 4) Synch generator, color decoder timing generator, and horizontal and vertical reset generator
- 5) Color decoder
- 6) Color encoder and video overlay circuit

### 1. VCO and Horizontal Beam Counter

The VCO consists of TR2 and associated circuits. TR2 and varactor are the active elements of the 28.63636MHz (28.37516MHz/*PAL*) oscillator. The frequency changes approximately  $\pm 1\text{MHz}$

as the VCO control voltage is varied +2/-3V around the 3.0V nominal operating point. The error voltage corresponds to the difference in phase between the horizontal synch of the source video and the computer. When they are in phase the oscillator is sitting at 28.63636MHz (28.37516MHz).

The horizontal beam counter consists of divide-by-four prescaler, IC5 and IC8, and divide-by-455 (453/PAL) counter, IC2, IC3, IC4, and IC5. The 3.58MHz (3.54MHz) clock from the computer is used to generate the 7.16MHz (7.08MHz) prescaler output, so that it has a known time relation to the color clock of the computer. This insures that the horizontal reset signal, which is derived from the H-drive, has proper set-up and hold times when sampled by the computer's color clock.

## **2. Synch Separator and Detector**

The source video synch separator consists of TR1 and associated components. The detected composite synch goes to the rest of the board and to the external synch detector, IC13. If there are external synch missing, the synch detector circuit switches the synch source of the Genlock to the A2000, so that the computer will be self-synchronized.

## **3. Phased Locked Loop**

The phased locked loop consists of the VCO, horizontal beam counter, and phase comparator (sample-hold and analog switch circuit for NTSC; sample-hold and voltage comparator circuit for PAL). The basic theory of the operation of the PLL is to convert the relative position of the horizontal synch of the source video and horizontal drive signal to an error voltage to control the VCO. (The horizontal drive signal mirrors the horizontal synch of the A2000.) When the PLL is locked, the burst-flag is active during the proper portion of the horizontal drive. During the off time, the voltage is pulled down to 0Vdc to cut off the IC10. When the PLL is locked, pin 3 of the IC10 will be at 3V.

## **4. Synch Generator, Color Decoder Timing Generator, and Horizontal and Vertical Reset Generator**

The horizontal synch separator, IC9, C34, and R39, triggers the leading edge of the composite synch generator. The output of the IC9 goes to the vertical synch separator circuit and to 1/2 IC11 which recreates the 4.8 $\mu$ sec horizontal sync for the RGB connector.

The horizontal reset circuit consists of IC5 and the horizontal counter. The reset signal occurs on the alternate cycle of the horizontal beam counter. A  $32\mu\text{sec}$ /NTSC ( $0.55\mu\text{sec}/\text{PAL}$ ) reset pulse is sent to the computer at the beginning of every other line.

The vertical synch separator consists of IC9, R40 and C33. The R40 and C33 have an integrator input which filters the vertical synch information from the composite synch.

The vertical reset pulse is generated on the odd fields to reset the vertical beam counter of the computer. The field detect circuit consists of IC12, C9 and R11. The circuit is configured to detect odd fields and is connected to the vertical reset logic so that the reset to the computer is sent on the odd field.

### **5. Color Decoder**

Once the computer video is synched to the source video, the source video is decoded by the color decoder, IC14. All of the controls for IC14 are preselected with the exception of hue. (Hue does not apply for PAL.) The RGB output of IC14 goes to the color encoder, IC15.

### **6. Color Encoder and Video Overlay Circuit**

The color encoder, IC15, takes the RGB outputs of the color decoder and converts it to NTSC or PAL composite signals. It also has the capability of switching an external RGB signal over the decoded RGB signal. The composite output signal drives  $1\text{Vp-p}$  into a  $75\text{ ohm}$  load. The RGB output signal drives  $0.6\text{Vp-p}$  into a  $75\text{ ohm}$  load.

## Component Functions

### 1. Variable components function

Location No.	Name	Function
VR 1	BRIGHTNESS	Brightness control for external source video input.
VR 2	COLOR	Gain control of chroma amplifier for external source input.
VR 3	FSC	To adjust free-running frequency of color subcarrier.
VR 4	HUE	HUE control. (Does not apply to PAL.)
VR 5	H-POSITION	To adjust computer composite synch timing.
VR 6	BURST BLANK	To adjust burst blanking during vertical interval.
L6	VCO	To adjust PLL in range.

### 2. IC's function

Location No.	Name	Function
IC 12	V7010	<ul style="list-style-type: none"> <li>• Fundamental clock generator for CPU PLL</li> <li>• Phase detector for CPU main clock generator</li> <li>• Field ID detector</li> </ul>
IC 13	NJM2220	<ul style="list-style-type: none"> <li>• External video signal detector by horizontal interval timing</li> </ul>
IC 14	V7020	<ul style="list-style-type: none"> <li>• Color decoder for external source video</li> </ul>
IC 15	V7040	<ul style="list-style-type: none"> <li>• Pixel switch</li> <li>• Composite color encoder for external video and computer</li> <li>• 75 ohm RGB and composite video driver</li> </ul>

<b>Location No.</b>	<b>Name</b>	<b>Function</b>
IC 8	74S74	• PLL prescaler/divide by 8
IC 5	3/4 74LS00	
IC 1	74LS30	• PLL count down/divide by 455 (453 for PAL)
IC 2	74LS161	• Horizontal reset pulse generator
IC 3	74LS161	
IC 4	74LS161	
IC 5	1/4 74LS00	
IC 11	1/2 74LS221	• Computer H-sync phase shifter
IC 11	1/2 74LS221	• Horizontal sync width generator
IC 10	74HC4066	• PLL select (computer or genlock) • Phase comparator and sample-hold • Composite synch select
IC 7	74AC04	• Clock amp • Clock driver • Horizontal-drive current amp
IC 6	74HC00	• Genlock mode selector
IC 9	74HC14	• Composite synch driver • Horizontal synch separator • Vertical synch separator

### **3. Mode Switch Function**

**Computer Only:** The Genlock system provides the computer video signal. The CPU clock is generated by the V7010 fundamental clock generator and the PLL frequency multiplier. However, if external video is present, the Genlock system provides frame reset, horizontal reset, and the CPU clock. These are synchronized by the external source video timing.

**Overlay Computer and Source:** If an external video source is not provided, the computer is self-synchronized. If external video is present, the Genlock system provides frame reset, horizontal reset, and the CPU clock. These are synchronized by the external source video timing.

**Source Video Only:** The Genlock system provides the external video source only to the RGB and composite video outputs.

## Connectors

### 1. Interface connector (to the computer)

No.	Signal	In/Out	Function
1	NC	...	No connection
2	NC	...	No connection
3	L.AUDIO IN	IN	No use
4	R.AUDIO IN	IN	No use
5	NC	...	No connection
6	+5V	IN	+5V dc input
7	R	IN	Red video input
8	+5V	IN	+5V dc input
9	GND	...	Signal ground
10	+12V	IN	+12V dc input
11	G	IN	Green video input
12	GND	...	Signal ground
13	GND	...	Signal ground
14	C	IN	Digital composite synch
15	B	IN	Blue video input
16	XCLK EN	OUT	External clock enable output
17	GND	...	Signal ground
18	B BST	IN	No use
19	C4	IN	No use
20	GND	...	Signal ground
21	GND	...	Signal ground
22	HSV	OUT	Horizontal reset output
23	DI	IN	No use
24	GND	...	Signal ground
25	DB	IN	No use
26	VSY	OUT	Vertical reset output
27	DG	IN	No use
28	QSY	IN	No use
29	DR	IN	No use
30	ZD	IN	Pixel switch input
31	$\pm 5V$	IN	No use
32	GND	...	Signal ground
33	XCLK	OUT	28MHz clock output
34	Cl	IN	3.58MHz clock input (3.54MHz/PAL)
35	NC	...	No connection
36	NC	...	No connection

36            2        COMPONENTS SIDE  
 35            1        SOLDER SIDE

**2. Male 23-pin "D" type connector**

No.	Signal
1	No connection
2	No connection
3	Red video input
4	Green video input
5	Blue video input
6	No connection
7	No connection
8	No connection
9	No connection
10	Composite sync output
11	Horizontal sync output
12	Vertical sync output
13	No connection
14	No connection
15	No connection
16	Signal ground
17	Signal ground
18	Signal ground
19	Signal ground
20	Signal ground
21	No connection
22	No connection
23	No connection

## Electrical Characteristics

Characteristics	Jack	Pin	Min	Typ	Max	Units
Supply current 5V	CN4	6, 8				mA
Supply current 12V	CN4	10				mA
RGB input	CN4	7, 11, 15		700		mVp-p
RGB input impedance				75		ohm
C-synch V(IH)	CN4	14	2.0			Vdc
C-synch V(IL)					0.8	Vdc
Cl-clock V(IH)	CN4	34	2.0			Vdc
Cl-clock V(IL)					0.8	Vdc
28MHz V(OH)	CN4	33	2.0			Vdc
28MHz V(OL)					0.4	Vdc
H-reset V(OH) - 800uA	CN4	22	2.4			Vdc
H-reset V(OL) 16mA					0.4	Vdc
V-reset V(OH) - 800uA	CN4	26	2.4			Vdc
V-reset V(OL) 16mA					0.4	Vdc
RGB output impedance	CN1	3, 4, 5		75		ohm
RGB output signal				700		mVp-p
C-synch V(OH) - 12mA	CN1	10	2.4			Vdc
C-synch V(OL) 12mA					0.4	Vdc
H-synch V(OH) - 12mA	CN1	11	2.4			Vdc
H-synch V(OL) 12mA					0.4	Vdc
V-synch V(OH) - 12mA	CN1	12	2.4			Vdc
V-synch V(OL) 12mA					0.4	Vdc
Video input impedance	CN2			75		ohm
Video input signal				1.0		Vp-p
Video output impedance	CN3			75		ohm
Video output signal				1.0		Vp-p

## **Adjustment Procedure**

**NOTE: THE A2300/2301 GENLOCK ADJUSTMENTS SHOULD ONLY BE MADE BY QUALIFIED PERSONNEL USING CALIBRATED TEST EQUIPMENT. ATTEMPTS TO ADJUST THE A2300/2301 GENLOCK BY UNQUALIFIED PERSONS AND/OR FAILURE TO FOLLOW THE PROCEDURES OUTLINED HERE MAY RESULT IN UNSATISFACTORY PERFORMANCE OF THE GENLOCK UNIT AND/OR A2000 SYSTEM FAILURE. MALADJUSTMENT WILL NOT BE COVERED UNDER WARRANTY SERVICE.**

### **Required Test Equipment**

LEADER LCG-396 PATTERN GENERATOR or equivalent (NTSC)  
LEADER LCG-396PAL PATTERN GENERATOR or equivalent (PAL)  
HEWLETT PACKARD 5316-A FREQUENCY COUNTER or equivalent  
HITACHI V-1100 OSCILLOSCOPE or equivalent  
LEADER LVS-5850B VECTORSCOPE or equivalent (NTSC)  
LEADER LVS-5851A VECTORSCOPE or equivalent (PAL)

### **Checking Calibration of NTSC (PAL) Generator**

Verify 1.0 volt peak-peak video output from NTSC (PAL) Pattern Generator and chroma levels and Fig. 1 on oscilloscope display. Verify CHROMA phase angles and levels on vectorscope display. Refer to test equipment operating manuals if levels are incorrect.

### **Adjustment Controls**

VR1 Video Output Level  
VR2 Chroma Output Level  
VR3 Sub-Carrier Free Run Frequency  
VR4 Chroma Phase Angle (TINT)—NTSC Only  
VR5 Computer Overlay Horizontal Position  
VR6 Burst Holdoff  
SW1 Genlock Mode Switch 3 Position

### Adjustment Order

CONTROL	INPUT	MODE SWITCH	OUTPUT	ADJUSTMENT
VR3	n/a	COMPUTER ONLY	COUNTER	NOTE 1
VR6	n/a	COMPUTER ONLY	OSCILLOSCOPE	NOTE 2
VR5	n/a	OVERLAY	OSCILLOSCOPE	NOTE 3
VR1	GENERATOR	EXTERNAL ONLY	OSCILLOSCOPE	NOTE 4
VR2	GENERATOR	EXTERNAL ONLY	VECTORSCOPE	NOTE 5
VR4	GENERATOR	EXTERNAL ONLY	VECTORSCOPE	NOTE 6

NOTE 1: Sub-Carrier free run frequency adjust. Measure at C61 near pin 1 or 1C 14 while adjusting VR3. Be sure no external video is connected to the Genlock VIDEO IN.

NTSC 3.579545 MHZ  $\pm$  25 HZ  
 PAL 4.433619 MHZ  $\pm$  25 HZ

NOTE 2: Burst Hold-off adjust. Monitor Vertical sync'd video output from Genlock and adjust VR6 for no burst in vertical sync area.

NOTE 3: Computer overlay horizontal adjust. Monitor line sync'd video output and adjust VR5 so computer video is centered on source video.

NOTE 4: Video output level adjust. Monitor line sync'd video output and adjust VR1 for 1.0 volt peak to peak (sync tip to 100% white).

NOTE 5: Chroma output level adjust. Monitor vectorscope for best match to IRE targets while adjusting VR2.

NOTE 6: Chroma phase angle adjust. (NTSC Only) Monitor vectorscope for best match to IRE targets while adjusting VR4.

**BE SURE TO HAVE A PROPER 75 OHM LOAD ON THE VIDEO OUTPUT FOR ALL MEASUREMENTS. USE ONLY 75 OHM COAXIAL CABLE FOR INTER-CONNECTIONS.**

## COMPONENT PARTS LIST

**PLEASE NOTE:** Commodore part numbers are provided for reference only and do not indicate the availability of parts from Commodore. Industry standard parts (Resistors, Capacitors, Connectors) should be secured locally. Approved cross-references for TTL chips, Transistors, etc. are available in manual form through the Service Department, order part #314000-01.

INTEGRATED CIRCUITS			RESISTORS (continued)		
	A2300	A2301		A2300	A2301
IC1	HD74LS3OP	HD74LS3OP	R33	2.2KΩ	
IC2	HD74LS161P	HD74LS161P	R34	2.2KΩ	15KΩ
IC3	HD74LS161P	HD74LS161P	R35	15KΩ	390Ω
IC4	HD74LS161P	HD74LS161P	R36		3.9KΩ
IC5	HD74LS00P	HD74LS00P	R37		820Ω
IC6	HD74LS00P	HD74HC00P	R38		1.8KΩ
IC7	HD74AC04P	HD74AC04P	R39	1.8KΩ	1.5KΩ
IC8	HD74LS74P	HD74LS74P	R40	1.5KΩ	4.7KΩ
IC9	HD74HC14P	HD74HC14P	R41	4.7KΩ	22KΩ
IC10	TC74HC4066P	TC74HC4066P	R42	22KΩ	100KΩ
IC11	HD74LS221P	HD74LS221P	R43	100KΩ	4.7KΩ
IC12	V7010	V7010	R44	4.7KΩ	68Ω
IC13	NJM2220S	NJM2220S	R45	68Ω	4.7KΩ
IC14	V7020	V7020	R46	4.7KΩ	470Ω
IC15	V7040	V7040	R47	470Ω	10KΩ
IC16	NJM556D	NJM556D	R48	10KΩ	
IC17	HA17805	HA17805	R49	100Ω	10KΩ
<b>RESISTORS — All are carbon 1/6 watt</b>			R50	10KΩ	10KΩ
	A2300	A2301	R51	10KΩ	10KΩ
R1	27Ω	27Ω	R52	10KΩ	6.2KΩ
R2	47Ω	47Ω	R53	6.2KΩ	470Ω
R3	27Ω	27Ω	R54	470Ω	68Ω
R4	47Ω	47Ω	R55	68Ω	68Ω
R5	27Ω	27Ω	R56	68Ω	68Ω
R6	47Ω	47Ω	R57	68Ω	68Ω
R7	10KΩ	10KΩ	R58	68Ω	1KΩ
R8	1MΩ	1MΩ	R59	1KΩ	10KΩ
R9 <sup>1</sup>	27KΩ	27KΩ	R60		1KΩ
R10	150KΩ	100KΩ	R61	1KΩ	1KΩ
R11	330KΩ	330KΩ	R62	1KΩ	10KΩ
R12	100KΩ	150KΩ	R63	10KΩ	1KΩ
R13	100Ω	100Ω	R64	1KΩ	2.2KΩ
R14	220KΩ	220KΩ	R65	2.7KΩ	75KΩ
R15	1KΩ	1KΩ	R66	75Ω	27KΩ
R16	33KΩ	33KΩ	R67	22KΩ	10KΩ
R17	10KΩ	10KΩ	R68		10KΩ
R18	75Ω	75Ω	R69	11KΩ	2.2KΩ
R19	75Ω	75Ω	R70	2.2KΩ	2.2KΩ
R20	1KΩ	1KΩ	R71	2.2KΩ	75KΩ
R21	1KΩ	1KΩ	R72	62KΩ	47KΩ
R22	1KΩ	1KΩ	R73	47KΩ	4.7KΩ
R23	470Ω	470Ω	R74	4.7KΩ	47KΩ
R24	390KΩ	390KΩ	R75	47KΩ	47KΩ
R25	180KΩ	180KΩ	R76	47KΩ	4.7KΩ
R26		390Ω	R77	4.7KΩ	150Ω
R27	1.5KΩ	1.5KΩ	R78	150Ω	150Ω
R28	1.8KΩ	1.8KΩ	R79	150Ω	150Ω
R29	22KΩ	22KΩ	R80	150Ω	10KΩ
R30	2.2KΩ	2.2KΩ	R81	10KΩ	
R31	1.2KΩ	1.2KΩ	R82	47KΩ	47KΩ
R32	6.2KΩ	6.2KΩ	R83	1KΩ	3.9KΩ
			R84		7.5KΩ
			R85		1KΩ

<sup>1</sup>±1%

## COMPONENT PARTS LIST *(Continued)*

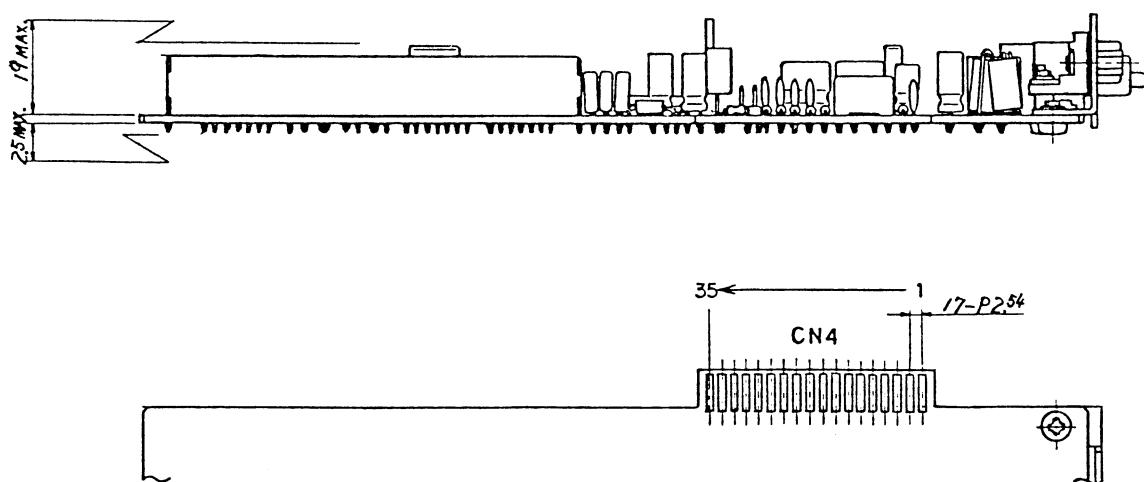
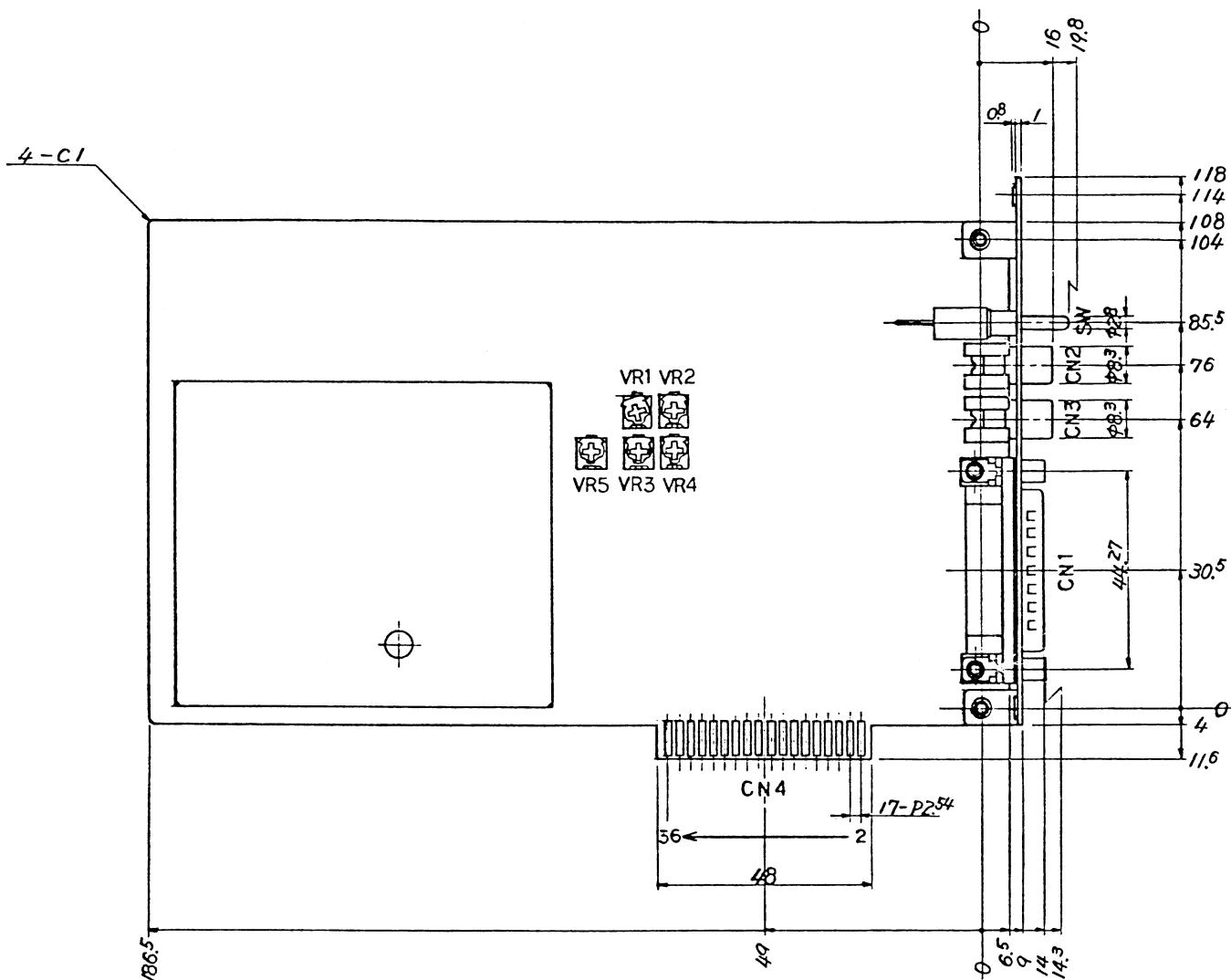
DIODES			CAPACITORS (continued)			
	A2300	A2301		A2300	A2301	
D1	1SS119	1SS119		C34	2200pF	2200pF Ceramic
D2	1SS119	1SS119		C35	1000pF	1000pF Ceramic
D3	1SS119	1SS119		C36	100 $\mu$ F 10V	100 $\mu$ F 10V Alumi Elect
D4	1SS119	1SS119		C37	0.047 $\mu$ F	0.047 $\mu$ F Plastic Film
D5	1SV101	1SV101		C38	47pF	47pF Ceramic
D6	1SS106	1SS106		C39	18pF	18pF Ceramic
D7	1SS106	1SS106		C40	18pF	18pF Ceramic
D8		1SS106		C41	39pF	39pF Ceramic
D9		1SS106		C42	39pF	39pF Ceramic
D10		1SS106		C43	39pF	39pF Ceramic
D11		1SS106		C44	220pF	220pF Ceramic
D12		1SS106		C45	2200pF	2200pF Ceramic
D13	1SS119	1SS119		C46	100 $\mu$ F 10V	100 $\mu$ F 10V Alumi Elect
D14	1SS119	1SS119		C47	0.02 $\mu$ F	0.02 $\mu$ F Ceramic
D15	1SS106	1SS106		C48	470 $\mu$ F 6.3V	470 $\mu$ F 6.3V Alumi Elect
CAPACITORS				C49	470 $\mu$ F 6.3V	470 $\mu$ F 6.3V Alumi Elect
	A2300	A2301		C50	470 $\mu$ F 6.3V	470 $\mu$ F 6.3V Alumi Elect
C1	33pF	33pF	Ceramic	C51	470 $\mu$ F 6.3V	470 $\mu$ F 6.3V Alumi Elect
C2	10pF	10pF	Ceramic	C52	10 $\mu$ F 16V	10 $\mu$ F 16V Alumi Elect
C3	0.02 $\mu$ F	0.02 $\mu$ F	Ceramic	C53	0.1 $\mu$ F	0.1 $\mu$ F Ceramic
C4	100 $\mu$ F 10V	100 $\mu$ F 10V	Alumi Elect	C54	0.1 $\mu$ F	0.1 $\mu$ F Plastic Film
C5	0.1 $\mu$ F	0.1 $\mu$ F	Ceramic	C55	0.1 $\mu$ F	0.1 $\mu$ F Ceramic
C6	0.1 $\mu$ F	0.1 $\mu$ F	Ceramic	C56	0.1 $\mu$ F	0.1 $\mu$ F Ceramic
C7	0.1 $\mu$ F	0.1 $\mu$ F	Ceramic	C57	0.1 $\mu$ F	0.1 $\mu$ F Ceramic
C8	1 $\mu$ F*	0.1 $\mu$ F	*Alumi Elect	C58	0.1 $\mu$ F	0.1 $\mu$ F Ceramic
			Ceramic	C59	0.1 $\mu$ F	0.1 $\mu$ F Ceramic
C9	0.1 $\mu$ F	0.1 $\mu$ F	Plastic Film	C60	0.1 $\mu$ F	0.1 $\mu$ F Ceramic
C10	1 $\mu$ F 50V	10 $\mu$ F 16V	Alumi Elect	C61	0.01 $\mu$ F	0.01 $\mu$ F Plastic Film
C11	10 $\mu$ F 50V	1 $\mu$ F 50V	Alumi Elect	C62	0.02 $\mu$ F	0.02 $\mu$ F Ceramic
C12	5600pF	5600pF	Plastic Film	C63	0.02 $\mu$ F	0.02 $\mu$ F Ceramic
C13	1000pF	1000pF	Ceramic	C64	0.02 $\mu$ F	0.02 $\mu$ F Ceramic
C14	1 $\mu$ F 50V	1 $\mu$ F 50V	Alumi Elect	C65	0.02 $\mu$ F	0.02 $\mu$ F Ceramic
C15	0.02 $\mu$ F	0.02 $\mu$ F	Ceramic	C66	0.02 $\mu$ F	0.02 $\mu$ F Ceramic
C16	0.1 $\mu$ F	0.1 $\mu$ F	Plastic Film	C67	0.02 $\mu$ F	0.02 $\mu$ F Ceramic
C17	0.047 $\mu$ F	0.047 $\mu$ F	Plastic Film	C68	0.02 $\mu$ F	0.02 $\mu$ F Ceramic
C18	1 $\mu$ F 50V	1 $\mu$ F 50V	Alumi Elect	C69	0.022 $\mu$ F	0.022 $\mu$ F Plastic Film
C19	1 $\mu$ F 6.3V	1 $\mu$ F 50V	Alumi Elect	C70	0.022 $\mu$ F	0.022 $\mu$ F Plastic Film
C20	0.01 $\mu$ F	0.01 $\mu$ F	Plastic Film	C71	2200pF	2200pF Ceramic
C21	0.047 $\mu$ F	0.047 $\mu$ F	Plastic Film	C72	0.022 $\mu$ F	0.022 $\mu$ F Plastic Film
C22	0.1 $\mu$ F	0.1 $\mu$ F	Ceramic	C73	0.22 $\mu$ F	0.22 $\mu$ F Plastic Film
C23	0.47 $\mu$ F	0.47 $\mu$ F	Plastic Film	C74	10 $\mu$ F 16V	10 $\mu$ F 16V Alumi Elect
C24	0.1 $\mu$ F	0.1 $\mu$ F	Ceramic	C75	10 $\mu$ F 16V	10 $\mu$ F 16V Alumi Elect
C25		0.01 $\mu$ F	Ceramic	C76	33pF	33pF Ceramic
C26		0.01 $\mu$ F	Ceramic	C77	22 $\mu$ F 16V	39pF* Alumi Elect
C27	470 $\mu$ F 6.3V	470 $\mu$ F 6.3V	Alumi Elect	C78 <sup>1</sup>	0.1 $\mu$ F	*Ceramic Ceramic
C28	0.47 $\mu$ F	0.47 $\mu$ F	Plastic Film	C79 <sup>1</sup>	0.1 $\mu$ F	Ceramic Ceramic
C29	0.1 $\mu$ F	0.1 $\mu$ F	Ceramic	C80 <sup>1</sup>	0.1 $\mu$ F	Ceramic Ceramic
C30	22pF	22pF	Ceramic	C81 <sup>1</sup>	0.1 $\mu$ F	Ceramic Ceramic
C31	47pF	47pF	Ceramic	C82 <sup>1</sup>	0.1 $\mu$ F	Ceramic Ceramic
C32		0.01 $\mu$ F	Plastic Film	C83 <sup>1</sup>	0.1 $\mu$ F	Ceramic Ceramic
C33	0.022 $\mu$ F	0.022 $\mu$ F	Plastic Film	C84 <sup>1</sup>	0.1 $\mu$ F	Ceramic Ceramic
				C85 <sup>1</sup>	0.1 $\mu$ F	

<sup>1</sup>Low ESR Capacitor

## COMPONENT PARTS LIST *(Continued)*

TRANSISTORS			MISCELLANEOUS (continued)		
	A2300	A2301		A2300	A2301
TR1	2SA564	2SA564	EM1	270pF	270pF EMI Filter
TR2	2SC460	2SC460	EM2	270pF	270pF EMI Filter
TR3	2SC1684	2SC1684	EM3	270pF	270pF EMI Filter
TR4	2SC1684	2SC1684	EM4	FBA04VA900NA-00	FBA04VA900NA-00 EMI Filter
<b>MISCELLANEOUS</b>			EM5	FBA04VA900NA-00	FBA04VA900NA-00 EMI Filter
	A2300	A2301	EM6	FBA04VA900NA-00	FBA04VA900NA-00 EMI Filter
L1			EM7	FBA04HA450NA-00	FBA04HA450NA-00 EMI Filter
L2		8.2μH	EM12	FBA04HA450NA-00	EMI Filter
L3		8.2μH	EM13	FBA04HA450NA-00	EMI Filter
L4			TC1	30 pF	Ceramic Trimmer Cap
L5	10μH	10μH	RY1	RZ-5W-K	Relay
L6	0.6μH	0.6μH	CN1	CA-M59	D-Sub Connector
L7	1.2μH		CN2	JPJ 1018	RCA Phono Jack
DL1	600 nsec.	600 nsec.	CN3	JPJ 1018	RCA Phono Jack
DL2	400 nsec.	400 nsec.	CN4		6-Pin Header
DL3		63.943 sec.			
BPF1	3.58 MHz	4.43 MHz			
BPF2	3.58 MHz	4.43 MHz			
VR1	500Ω	500Ω			
VR2	500Ω	500Ω			
VR3	500Ω	500Ω			
VR4	5KΩ				
VR5	5KΩ	5KΩ			
VR6	10KΩ	10KΩ			
X1	3.579545 MHz	3.546895 MHz			
X2	3.579545 MHz	4.433619 MHz			

**A2300 GENLOCK  
TECHNICAL SPECIFICATIONS**



**2300 GENLOCK — NTSC  
312805-01 PCB OUTLINE**  
*Sheet 1 of 2*

**A2300 GENLOCK  
TECHNICAL SPECIFICATIONS**

NO.	C N 1
1	N C
2	N C
3	R
4	G
5	B
6	N C
7	N C
8	N C
9	N C
10	C-SYNC
11	H
12	V
13	N C
14	N C
15	N C
16	GND
17	GND
18	GND
19	GND
20	GND
21	N C
22	N C
23	N C

C N 2
VIDEO IN

C N 3
VIDEO OUT

NO.	C N 4
1	N C
2	N C
3	AUDIO(L)
4	AUDIO(R)
5	N C
6	+ 5 V
7	R
8	+ 5 V
9	GND
10	+ 12 V
11	G
12	GND
13	GND
14	C
15	B
16	EXCLKEN
17	GND
18	B BST
19	C 4
20	GND
21	GND
22	H-SYNC
23	D
24	GND
25	D B
26	V-SYNC
27	D G
28	C-SYNC
29	D R
30	Y S
31	- 5 V
32	GND
33	EXCLK
34	C
35	N C
36	N C

VR 1
BRIGHT ADJ.

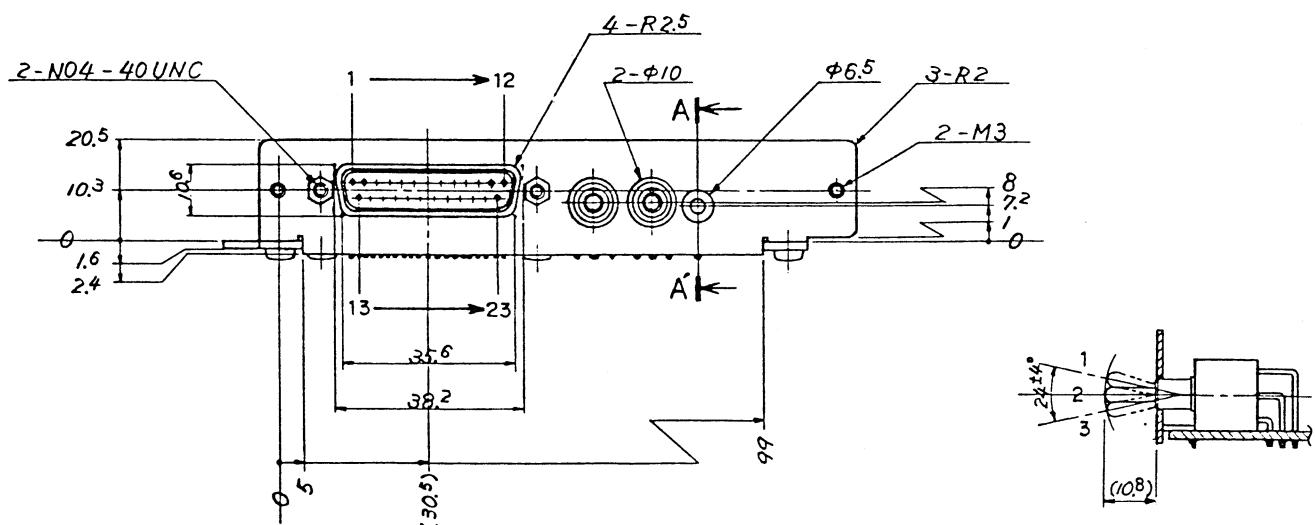
VR 2
COLOR ADJ.

VR 3
F.S.C. ADJ.

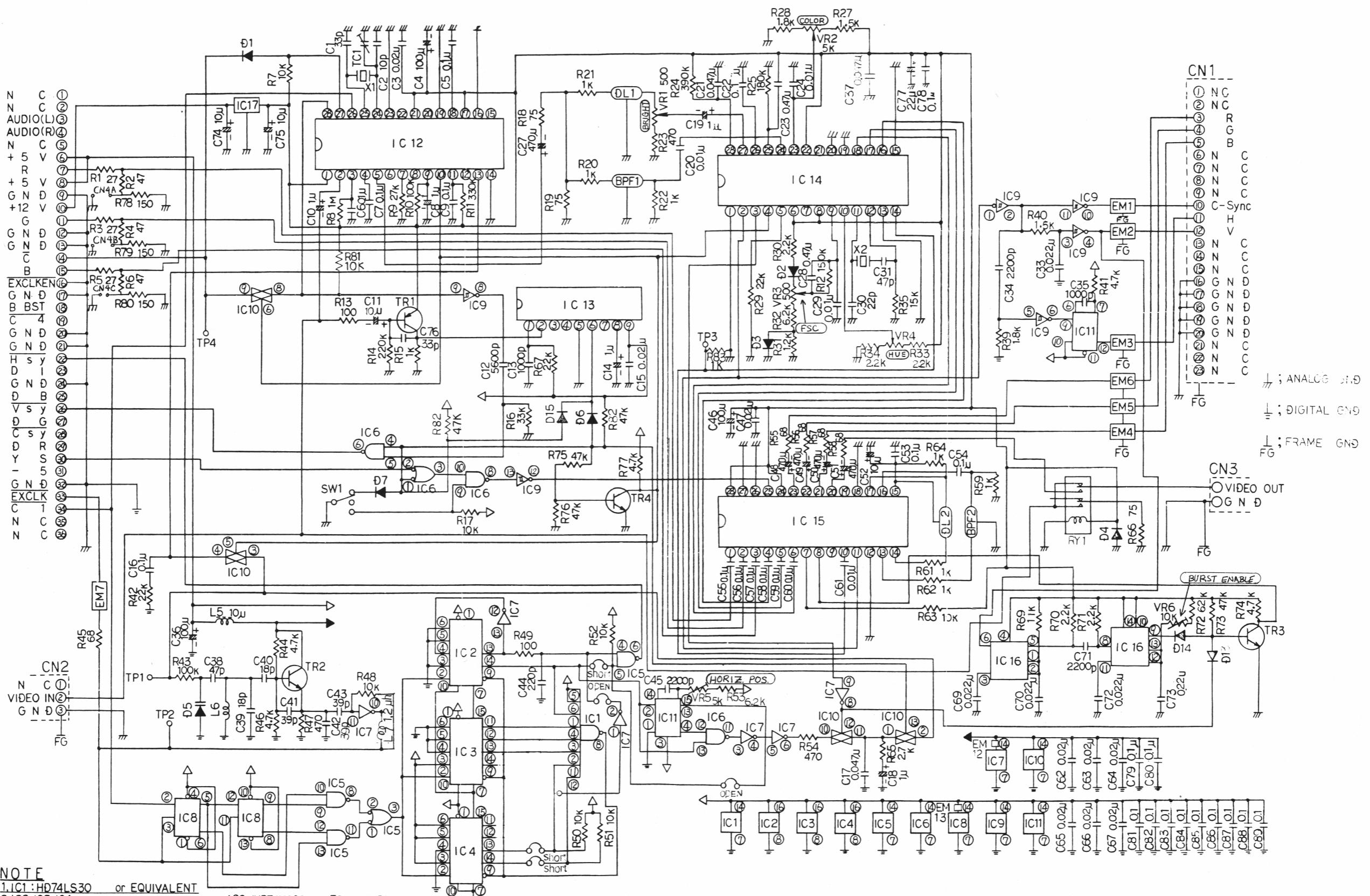
VR 4
HUE ADJ.

VR 5
H-POSITION ADJ.

NO.	S W
1	P. C. MODE
2	OVER LAY MODE
3	SOURCE VIDEO MODE



**2300 GENLOCK — NTSC  
312805-01 PCB OUTLINE**  
*Sheet 2 of 2*



## NOTE

- |                                    |               |                                  |               |
|------------------------------------|---------------|----------------------------------|---------------|
| 1.IC1 : HD74LS30                   | or EQUIVALENT | 16. IC1 : HD74HC00               | or EQUIVALENT |
| 2.IC2:IC3:IC4<br>: HD74LS161       | or EQUIVALENT | 9. IC12: V7010                   | or EQUIVALENT |
| 3.IC5-<br>: HD74LS00 or EQUIVALENT |               | 10. IC13: NJM2220S or EQUIVALENT |               |
| 4.IC7 : HD74AC04                   | or EQUIVALENT | 11. IC14: V7020                  | or EQUIVALENT |
| 5.IC8 : HD74S74                    | or EQUIVALENT | 12. IC15: V7040                  | or EQUIVALENT |
| 6.IC9 : HD74HC14                   | or EQUIVALENT | 13. IC17: V78C5                  | or EQUIVALENT |
| 7.IC10: TC74HC4066                 | or EQUIVALENT | 14. D1~D4: ISS119                | or EQUIVALENT |
| 8.IC11:HD74LS221                   | or EQUIVALENT | 15. D5 : 1SV101                  | or EQUIVALENT |

I

- 15.D6~D15:1SS106 or EQUIVALENT  
17.TR1:2SA564 or EQUIVALENT  
18.TR2:2SC460 or EQUIVALENT  
19.X1.X2:3579545MH3 or EQUIVALENT

## 20. COMPONENT PARTS VALUE

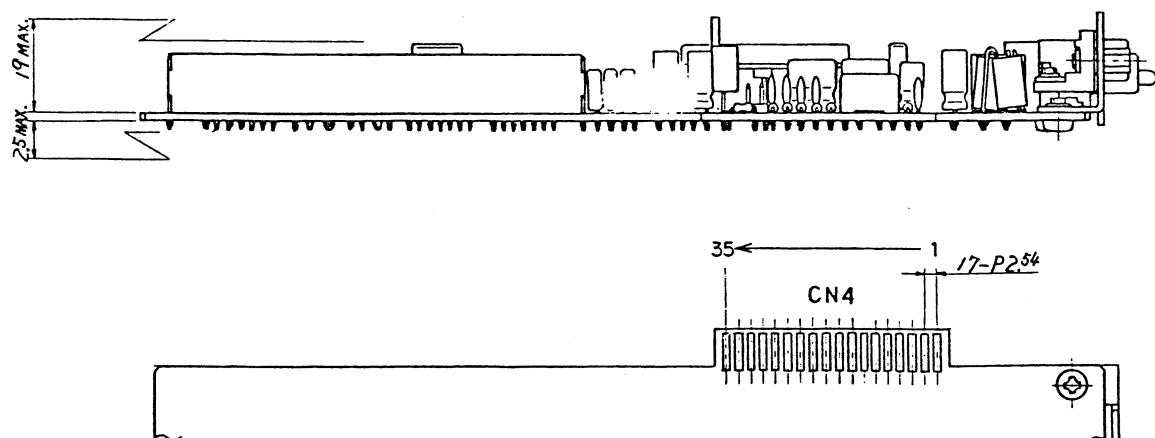
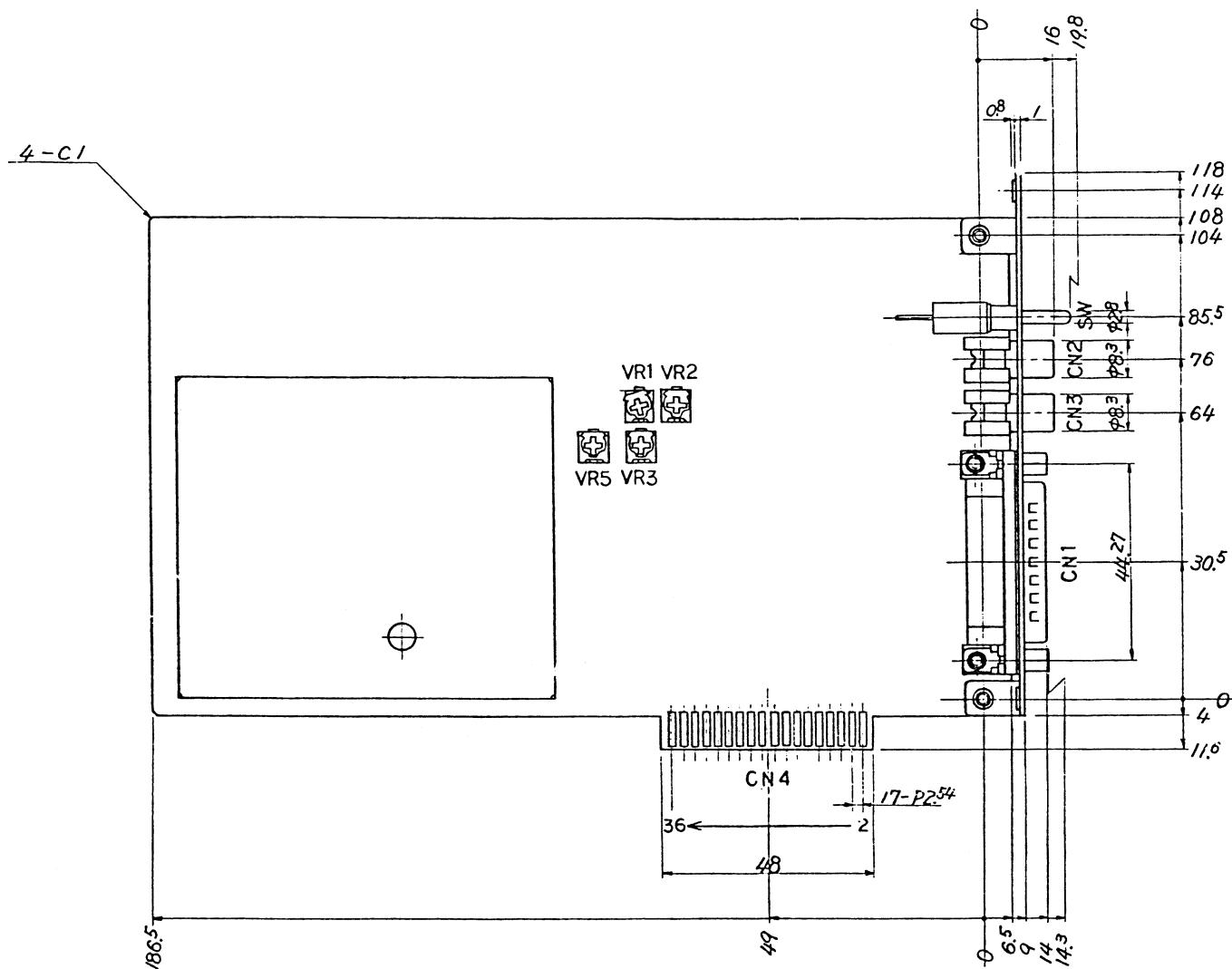
$$R = \Omega, C = F, L = H$$

21. SWI SHOWN IN COMPUTER ONLY POSITION

22.CN4A-C SHORTED F

**2300 GENLOCK — NTSC  
312804-01 REV. A**

**A2301 GENLOCK  
TECHNICAL SPECIFICATIONS**



**2301 GENLOCK — PAL  
312807-01 PCB OUTLINE**  
*Sheet 1 of 2*

**A2301 GENLOCK  
TECHNICAL SPECIFICATIONS**

NO.	C N 1
1	N C
2	N C
3	R
4	G
5	B
6	N C
7	N C
8	N C
9	N C
10	C-SYNC
11	H
12	V
13	N C
14	N C
15	N C
16	GND
17	GND
18	GND
19	GND
20	GND
21	N C
22	N C
23	N C

C N 2
VIDEO IN

C N 3
VIDEO OUT

NO.	C N 4
1	N C
2	N C
3	AUDIO(L)
4	AUDIO(R)
5	N C
6	+ 5 V
7	R
8	+ 5 V
9	GND
10	+ 12 V
11	G
12	GND
13	GND
14	C
15	B
16	EXCLKEN
17	GND
18	B BST
19	C 4
20	GND
21	GND
22	H-SYNC
23	D I
24	GND
25	D B
26	V-SYNC
27	D G
28	C-SYNC
29	D R
30	Y S
31	- 5 V
32	GND
33	EXCLK
34	C T
35	N C
36	N C

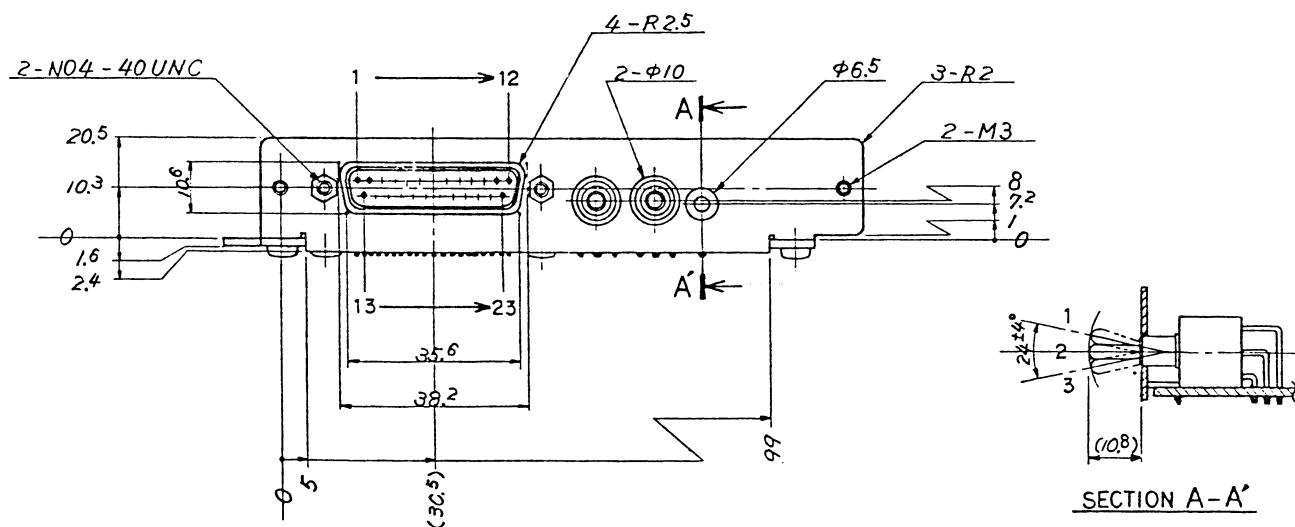
VR 1
BRIGHT ADJ.

VR 2
COLOR ADJ.

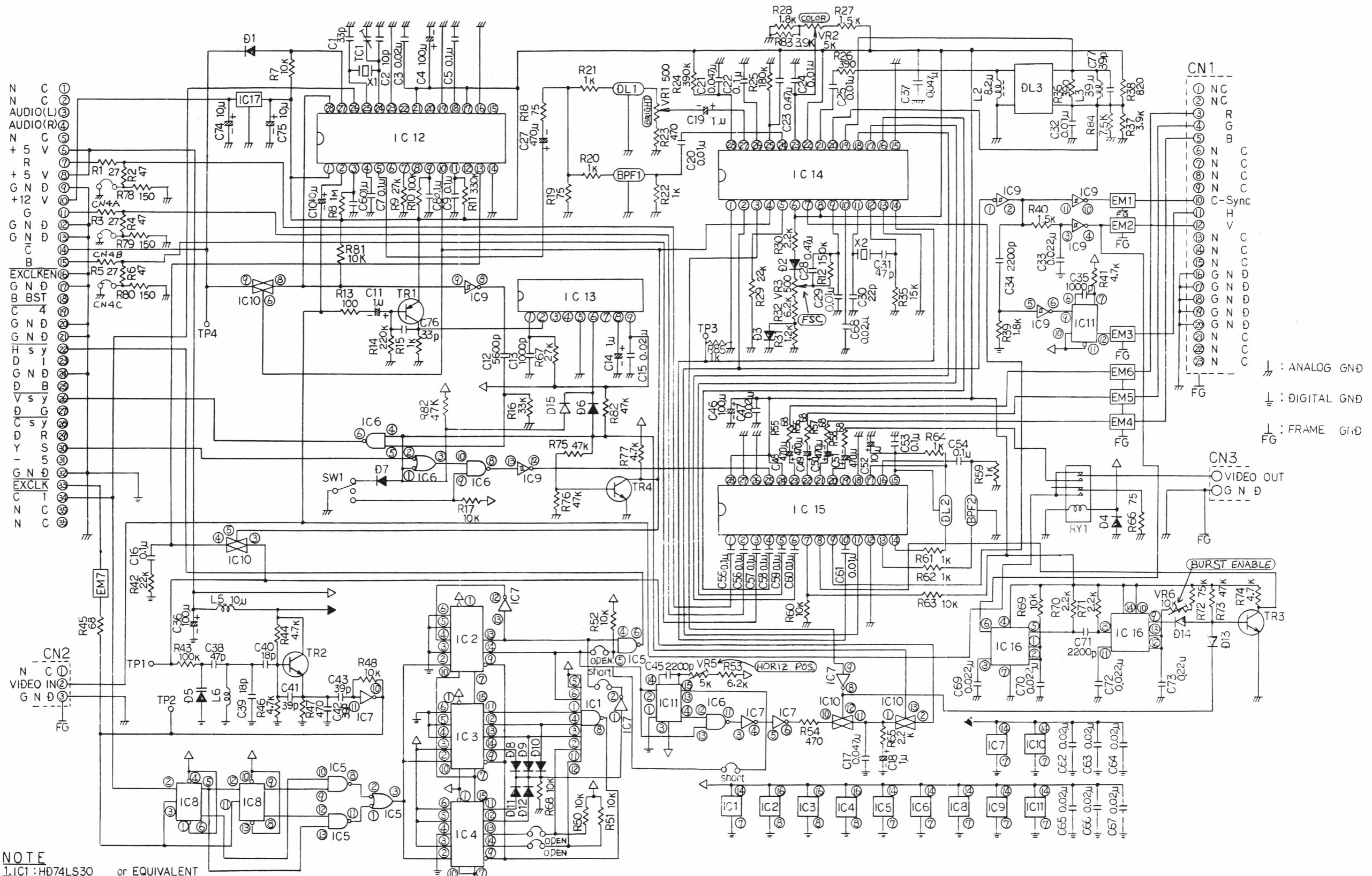
VR 3
F.S.C. ADJ.

VR 5
H-POSITION ADJ.

NO.	S W
1	P. C. MODE
2	OVER LAY MODE
3	SOURCE VIDEO MODE



**2301 GENLOCK — PAL  
312807-01 PCB OUTLINE**  
Sheet 2 of 2



NOTE

1. IC1 : HD74LS30 or EQUIVALENT  
2. IC2·IC3·IC4 : HD74LS161 or EQUIVALENT  
3. IC5 : HD74LS00 or EQUIVALENT  
4. IC7 : HD74AC04 or EQUIVALENT  
5. IC8 : HD74S74 or EQUIVALENT  
6. IC9 : HD74HC14 or EQUIVALENT  
7. IC10 : TC74HC4066 or EQUIVALENT  
8. IC11 : HD74LS221 or EQUIVALENT

IC6 : HD74HC00 or EQUIVALENT  
9. IC12 : V7010 or EQUIVALENT  
10. IC13 : NJM2220S or EQUIVALENT  
11. IC14 : V7020 or EQUIVALENT  
12. IC15 : V7040 or EQUIVALENT  
13. IC17 : V7805 or EQUIVALENT  
14. D1~D4 : ISS119 or EQUIVALENT  
15. D5 : ISV101 or EQUIVALENT

16. E6~D12 : ISS106 or EQUIVALENT  
17. TR1 : 2SA564 or EQUIVALENT  
18. TR2 : 2SC460 or EQUIVALENT  
19. X1 : 3.546395MHz or EQUIVALENT

20x2:4.433619MHz or EQUIVALENT  
21. COMPONENT PARTS VALUE:  
R = Ω, C = F, L = H  
22. SW1 SHOWN IN COMPUTER ONLY POSITION  
23. CN4A-C SHORTED FOR 4 LAYER GERMAN  
BUILT A2301's ONLY

2301 GENLOCK — PAL  
312806-01 REV. A





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