

**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  $\pm 2$ -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  $32\mu\text{sec/NTSC}$  ( $0.55\mu\text{sec/PAL}$ ) 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 1Vp-p into a 75 ohm load. The RGB output signal drives 0.6Vp-p into a 75 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>



Location No.	Name	Function
IC 8 IC 5	74S74 3/4 74LS00	• PLL prescaler/divide by 8
IC 1 IC 2 IC 3 IC 4 IC 5	74LS30 74LS161 74LS161 74LS161 1/4 74LS00	• PLL count down/divide by 455 (453 for PAL) • Horizontal reset pulse generator
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	VSX	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	±5V	IN	No use
32	GND	...	Signal ground
33	XCLK	OUT	28MHz clock output
34	CI	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**

<b>No.</b>	<b>Signal</b>
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		0.8	Vdc
C-synch V(IL)					0.8	Vdc
Cl-clock V(IH)	CN4	34	2.0		0.8	Vdc
Cl-clock V(IL)					0.8	Vdc
28MHz V(OH)	CN4	33	2.0		0.4	Vdc
28MHz V(OL)					0.4	Vdc
H-reset V(OH) – 800uA	CN4	22	2.4		0.4	Vdc
H-reset V(OL) 16mA					0.4	Vdc
V-reset V(OH) – 800uA	CN4	26	2.4		0.4	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		0.4	Vdc
C-synch V(OL) 12mA					0.4	Vdc
H-synch V(OH) – 12mA	CN1	11	2.4		0.4	Vdc
H-synch V(OL) 12mA					0.4	Vdc
V-synch V(OH) – 12mA	CN1	12	2.4		0.4	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 vector-scope 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	2.2K $\Omega$	
IC2	HD74LS161P	HD74LS161P	R34	2.2K $\Omega$	15K $\Omega$
IC3	HD74LS161P	HD74LS161P	R35	15K $\Omega$	390 $\Omega$
IC4	HD74LS161P	HD74LS161P	R36		3.9K $\Omega$
IC5	HD74LS00P	HD74LS00P	R37		820 $\Omega$
IC6	HD74LS00P	HD74HC00P	R38		1.8K $\Omega$
IC7	HD74AC04P	HD74AC04P	R39	1.8K $\Omega$	1.5K $\Omega$
IC8	HD74LS74P	HD74LS74P	R40	1.5K $\Omega$	4.7K $\Omega$
IC9	HD74HC14P	HD74HC14P	R41	4.7K $\Omega$	22K $\Omega$
IC10	TC74HC4066P	TC74HC4066P	R42	22K $\Omega$	100K $\Omega$
IC11	HD74LS221P	HD74LS221P	R43	100K $\Omega$	4.7K $\Omega$
IC12	V7010	V7010	R44	4.7K $\Omega$	68 $\Omega$
IC13	NJM2220S	NJM2220S	R45	68 $\Omega$	4.7K $\Omega$
IC14	V7020	V7020	R46	4.7K $\Omega$	470 $\Omega$
IC15	V7040	V7040	R47	470 $\Omega$	10K $\Omega$
IC16	NJM556D	NJM556D	R48	10K $\Omega$	
IC17	HA17805	HA17805	R49	100 $\Omega$	10K $\Omega$
<b>RESISTORS — All are carbon 1/6 watt</b>			R50	10K $\Omega$	10K $\Omega$
	A2300	A2301	R51	10K $\Omega$	10K $\Omega$
R1	27 $\Omega$	27 $\Omega$	R52	10K $\Omega$	6.2K $\Omega$
R2	47 $\Omega$	47 $\Omega$	R53	6.2K $\Omega$	470 $\Omega$
R3	27 $\Omega$	27 $\Omega$	R54	470 $\Omega$	68 $\Omega$
R4	47 $\Omega$	47 $\Omega$	R55	68 $\Omega$	68 $\Omega$
R5	27 $\Omega$	27 $\Omega$	R56	68 $\Omega$	68 $\Omega$
R6	47 $\Omega$	47 $\Omega$	R57	68 $\Omega$	68 $\Omega$
R7	10K $\Omega$	10K $\Omega$	R58	68 $\Omega$	1K $\Omega$
R8	1M $\Omega$	1M $\Omega$	R59	1K $\Omega$	10K $\Omega$
R9 <sup>1</sup>	27K $\Omega$	27K $\Omega$	R60		1K $\Omega$
R10	150K $\Omega$	100K $\Omega$	R61	1K $\Omega$	1K $\Omega$
R11	330K $\Omega$	330K $\Omega$	R62	1K $\Omega$	10K $\Omega$
R12	100K $\Omega$	150K $\Omega$	R63	10K $\Omega$	1K $\Omega$
R13	100 $\Omega$	100 $\Omega$	R64	1K $\Omega$	2.2K $\Omega$
R14	220K $\Omega$	220K $\Omega$	R65	2.7K $\Omega$	75K $\Omega$
R15	1K $\Omega$	1K $\Omega$	R66	75 $\Omega$	27K $\Omega$
R16	33K $\Omega$	33K $\Omega$	R67	22K $\Omega$	10K $\Omega$
R17	10K $\Omega$	10K $\Omega$	R68		10K $\Omega$
R18	75 $\Omega$	75 $\Omega$	R69	11K $\Omega$	2.2K $\Omega$
R19	75 $\Omega$	75 $\Omega$	R70	2.2K $\Omega$	2.2K $\Omega$
R20	1K $\Omega$	1K $\Omega$	R71	2.2K $\Omega$	75K $\Omega$
R21	1K $\Omega$	1K $\Omega$	R72	62K $\Omega$	47K $\Omega$
R22	1K $\Omega$	1K $\Omega$	R73	47K $\Omega$	4.7K $\Omega$
R23	470 $\Omega$	470 $\Omega$	R74	4.7K $\Omega$	47K $\Omega$
R24	390K $\Omega$	390K $\Omega$	R75	47K $\Omega$	47K $\Omega$
R25	180K $\Omega$	180K $\Omega$	R76	47K $\Omega$	4.7K $\Omega$
R26		390 $\Omega$	R77	4.7K $\Omega$	150 $\Omega$
R27	1.5K $\Omega$	1.5K $\Omega$	R78	150 $\Omega$	150 $\Omega$
R28	1.8K $\Omega$	1.8K $\Omega$	R79	150 $\Omega$	150 $\Omega$
R29	22K $\Omega$	22K $\Omega$	R80	150 $\Omega$	10K $\Omega$
R30	2.2K $\Omega$	2.2K $\Omega$	R81	10K $\Omega$	
R31	1.2K $\Omega$	1.2K $\Omega$	R82	47K $\Omega$	47K $\Omega$
R32	6.2K $\Omega$	6.2K $\Omega$	R83	1K $\Omega$	3.9K $\Omega$
			R84		7.5K $\Omega$
			R85		1K $\Omega$

<sup>1</sup>  $\pm 1\%$

## 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	100µF 10V	100µF 10V	Alumi Elect
D4	1SS119	1SS119		C37	0.047µF	0.047µF	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		Ceramic
D12		1SS106		C45	2200pF	2200pF	Ceramic
D13	1SS119	1SS119		C46	100µF 10V	100µF 10V	Alumi Elect
D14	1SS119	1SS119		C47	0.02µF	0.02µF	Ceramic
D15	1SS106	1SS106		C48	470µF 6.3V	470µF 6.3V	Alumi Elect
CAPACITORS				C49	470µF 6.3V	470µF 6.3V	Alumi Elect
	A2300	A2301		C50	470µF 6.3V	470µF 6.3V	Alumi Elect
C1	33pF	33pF	Ceramic	C51	470µF 6.3V	470µF 6.3V	Alumi Elect
C2	10pF	10pF	Ceramic	C52	10µF 16V	10µF 16V	Alumi Elect
C3	0.02µF	0.02µF	Ceramic	C53	0.1µF	0.1µF	Ceramic
C4	100µF 10V	100µF 10V	Alumi Elect	C54	0.1µF	0.1µF	Plastic Film
C5	0.1µF	0.1µF	Ceramic	C55	0.1µF	0.1µF	Ceramic
C6	0.1µF	0.1µF	Ceramic	C56	0.1µF	0.1µF	Ceramic
C7	0.1µF	0.1µF	Ceramic	C57	0.1µF	0.1µF	Ceramic
C8	1µF*	0.1µF	*Alumi Elect	C58	0.1µF	0.1µF	Ceramic
			Ceramic	C59	0.1µF	0.1µF	Ceramic
C9	0.1µF	0.1µF	Plastic Film	C60	0.1µF	0.1µF	Ceramic
C10	1µF 50V	10µF 16V	Alumi Elect	C61	0.01µF	0.01µF	Plastic Film
C11	10µF 50V	1µF 50V	Alumi Elect	C62	0.02µF	0.02µF	Ceramic
C12	5600pF	5600pF	Plastic Film	C63	0.02µF	0.02µF	Ceramic
C13	1000pF	1000pF	Ceramic	C64	0.02µF	0.02µF	Ceramic
C14	1µF 50V	1µF 50V	Alumi Elect	C65	0.02µF	0.02µF	Ceramic
C15	0.02µF	0.02µF	Ceramic	C66	0.02µF	0.02µF	Ceramic
C16	0.1µF	0.1µF	Plastic Film	C67	0.02µF	0.02µF	Ceramic
C17	0.047µF	0.047µF	Plastic Film	C68		0.02µF	Ceramic
C18	1µF 50V	1µF 50V	Alumi Elect	C69	0.022µF	0.022µF	Plastic Film
C19	1µF 6.3V	1µF 50V	Alumi Elect	C70	0.022µF	0.022µF	Plastic Film
C20	0.01µF	0.01µF	Plastic Film	C71	2200pF	2200pF	Ceramic
C21	0.047µF	0.047µF	Plastic Film	C72	0.022µF	0.022µF	Plastic Film
C22	0.1µF	0.1µF	Ceramic	C73	0.22µF	0.22µF	Plastic Film
C23	0.47µF	0.47µF	Plastic Film	C74	10µF 16V	10µF 16V	Alumi Elect
C24	0.1µF	0.1µF	Ceramic	C75	10µF 16V	10µF 16V	Alumi Elect
C25				C76	33pF	33pF	Ceramic
C26		0.01µF	Ceramic	C77	22µF 16V	39pF*	Alumi Elect
C27	470µF 6.3V	470µF 6.3V	Alumi Elect				*Ceramic
C28	0.47µF	0.47µF	Plastic Film	C78 <sup>1</sup>	0.1µF		Ceramic
C29	0.1µF	0.1µF	Ceramic	C79 <sup>1</sup>	0.1µF		Ceramic
C30	22pF	22pF	Ceramic	C80 <sup>1</sup>	0.1µF		Ceramic
C31	47pF	47pF	Ceramic	C81 <sup>1</sup>	0.1µF		Ceramic
C32		0.01µF	Plastic Film	C82 <sup>1</sup>	0.1µF		Ceramic
C33	0.022µF	0.022µF	Plastic Film	C83 <sup>1</sup>	0.1µF		Ceramic
				C84 <sup>1</sup>	0.1µF		Ceramic
				C85 <sup>1</sup>	0.1µF		Ceramic

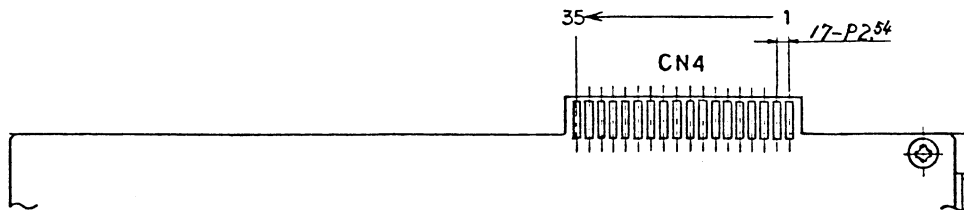
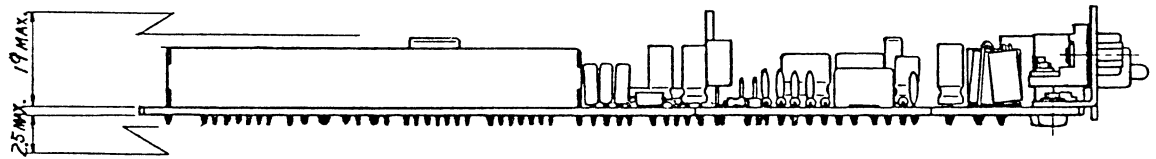
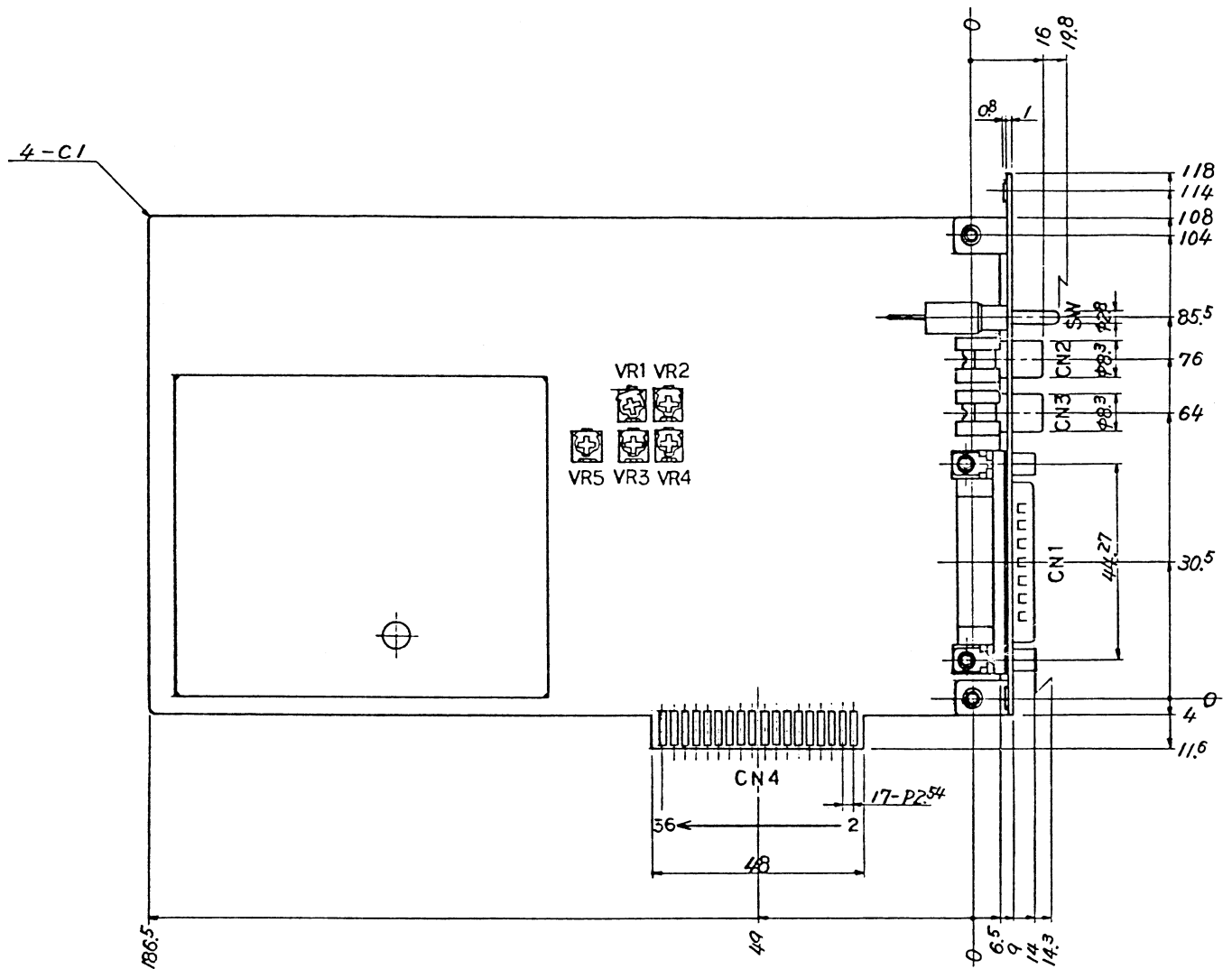
<sup>1</sup>Low ESR Capacitor



## 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
MISCELLANEOUS				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		8.2 $\mu$ H	Axial Inductor	EM12	FBA04HA450NA-00		EMI Filter
L3		8.2 $\mu$ H	Axial Inductor	EM13	FBA04HA450NA-00		EMI Filter
L4				TC1	30pF	30 pF	Ceramic
L5	10 $\mu$ H	10 $\mu$ H	Axial Inductor				Trimmer Cap
L6	0.6 $\mu$ H	0.6 $\mu$ H	Oscillator Coil	RY1	RZ-5W-K	RZ-5W-K	Relay
L7	1.2 $\mu$ H		Axial Inductor	CN1	CA-M59	CA-M59	D-Sub
DL1	600 nsec.	600 nsec.	Delay Line				Connector
DL2	400 nsec.	400 nsec.	Delay Line	CN2	JPJ 1018	JPJ 1018	RCA Phono
DL3		63.943 sec.	Delay Line				Jack
BPF1	3.58 MHz	4.43 MHz	Band Pass	CN3	JPJ 1018	JPJ 1018	RCA Phono
			Filter				Jack
BPF2	3.58 MHz	4.43 MHz	Band Pass	CN4			6-Pin Header
			Filter				
VR1	500 $\Omega$	500 $\Omega$	Variable Res.				
VR2	500 $\Omega$	500 $\Omega$	Variable Res.				
VR3	500 $\Omega$	500 $\Omega$	Variable Res.				
VR4	5K $\Omega$		Variable Res.				
VR5	5K $\Omega$	5K $\Omega$	Variable Res.				
VR6	10K $\Omega$	10K $\Omega$	Variable Res.				
X1	3.579545 MHz	3.546895 MHz	Crystal				
X2	3.579545 MHz	4.433619 MHz	Crystal				

# 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	G N D
10	+ 12 V
11	G
12	G N D
13	G N D
14	C
15	B
16	EXCLKEN
17	G N D
18	B BST
19	C 4
20	G N D
21	G N D
22	H-SYNC
23	D I
24	G N D
25	D B
26	V-SYNC
27	D G
28	C-SYNC
29	D R
30	Y S
31	- 5 V
32	G N D
33	EXCLK
34	C I
35	N C
36	N C

	VR 1
	BRIGHT ADJ.

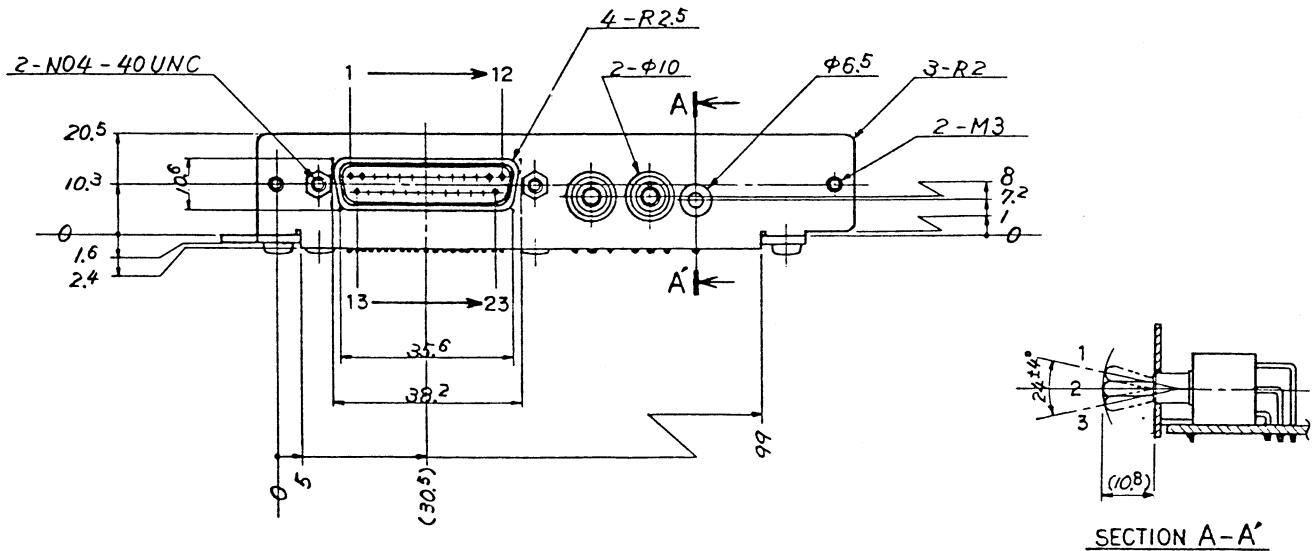
	VR 2
	COLOR ADJ.

	VR 3
	F.S.C. ADJ.

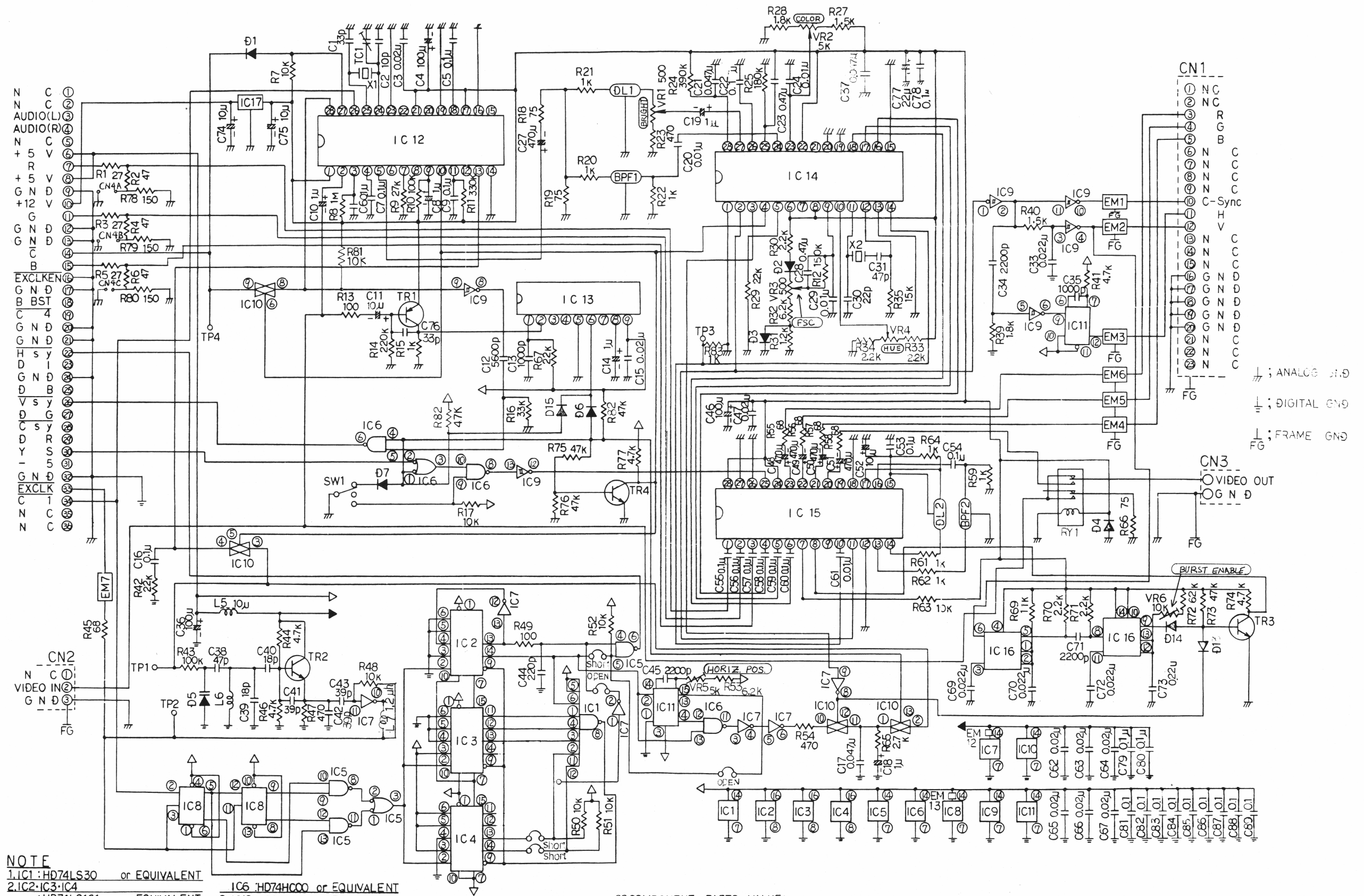
	V R 4
	HUE ADJ.

	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
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

9. IC12: V7010 or EQUIVALENT
10. IC13: NJM2220S or EQUIVALENT
11. IC14: V7020 or EQUIVALENT
12. IC15: V7040 or EQUIVALENT
13. IC17: V78C5 or EQUIVALENT
14. D1~D4: 1SS119 or EQUIVALENT
15. D5: 1SV101 or EQUIVALENT

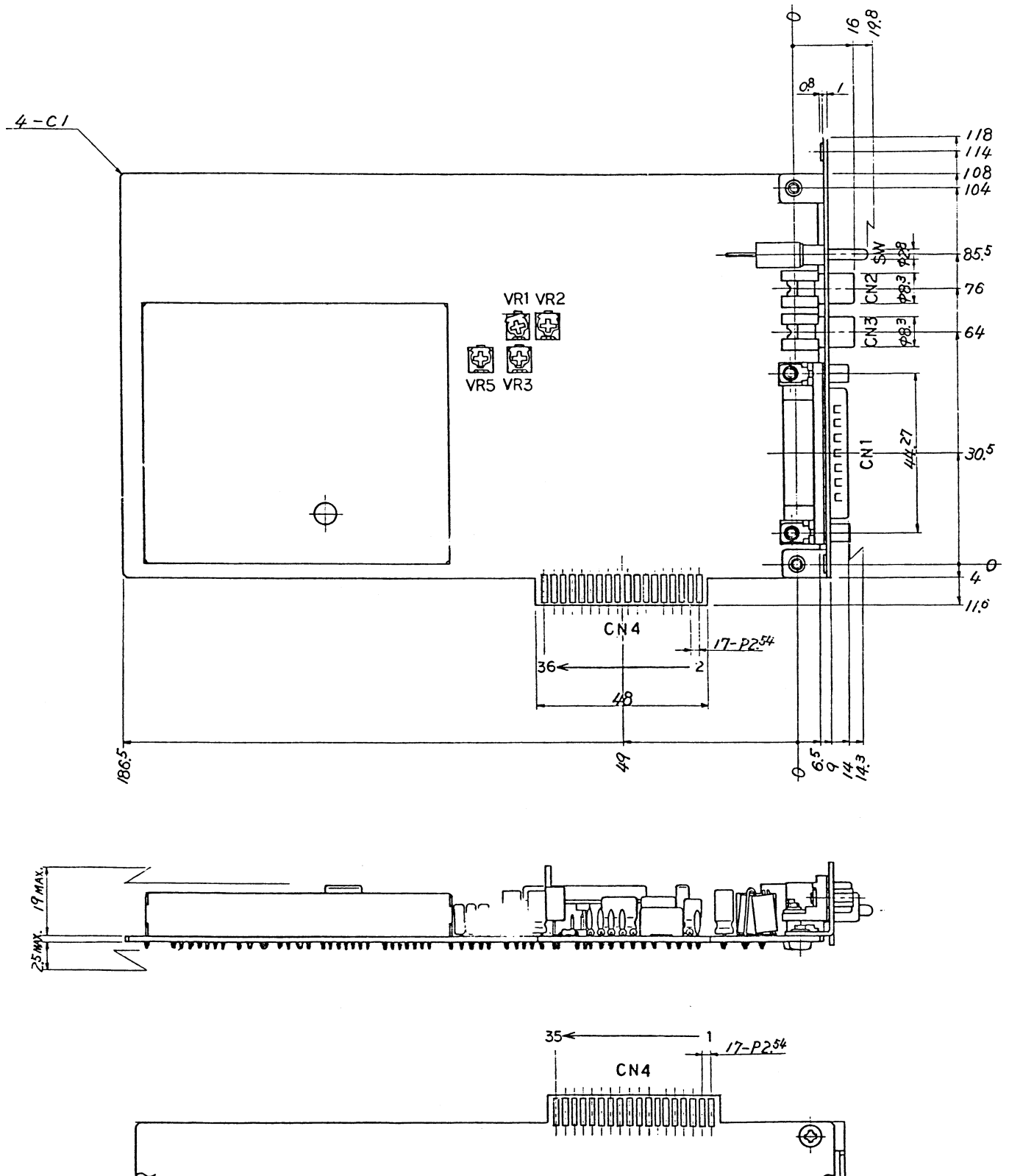
16. D6~D15: 1SS106 or EQUIVALENT
17. TR1: 2SA564 or EQUIVALENT
18. TR2: 2SC460 or EQUIVALENT
19. X1~X2: 3.579545MHz or EQUIVALENT

**20. COMPONENT PARTS VALUE:**

- R = Ω, C = F, L = H
21. SW1 SHOWN IN COMPUTER ONLY POSITION
22. CN4A-C SHORTED FOR 4 LAYER GERMAN BUILT A2000'S ONLY

**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 I
35	N C
36	N C

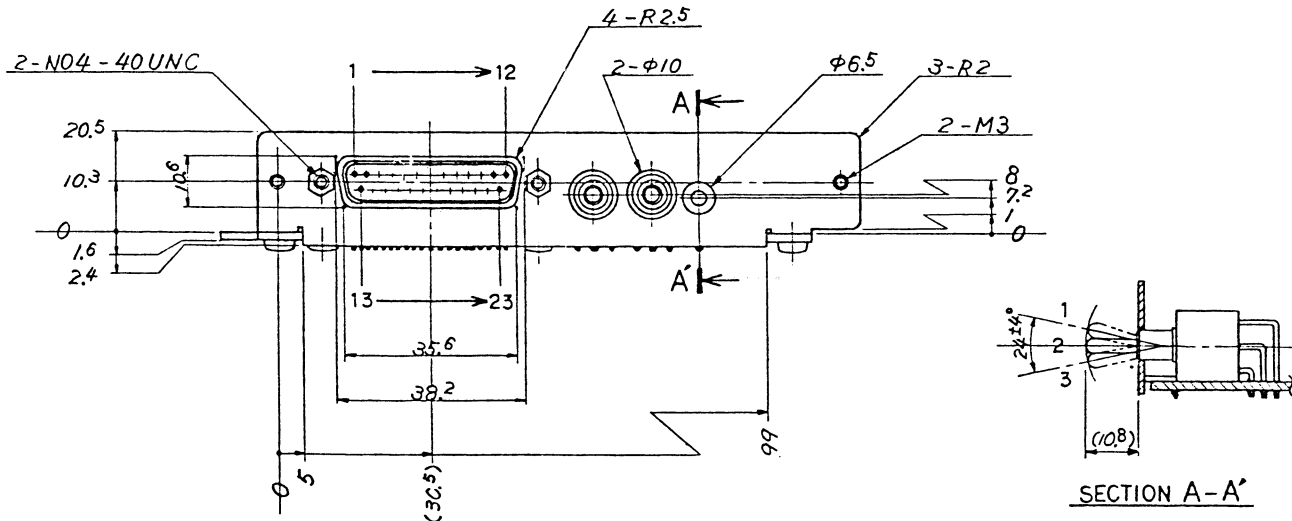
VR 1
BRIGHT ADJ.

VR 2
COLOR ADJ.

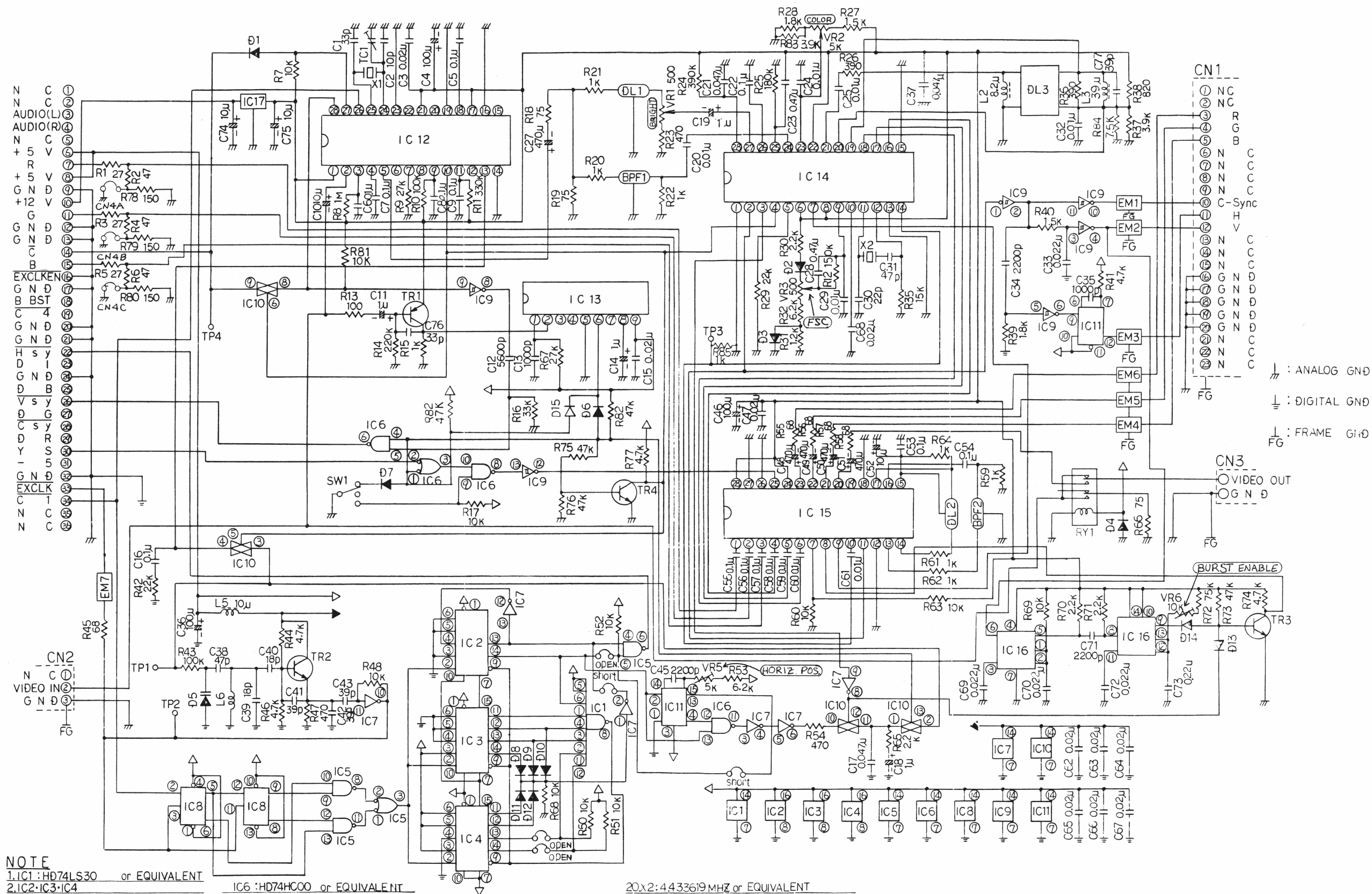
VR 3
F.S.C. ADJ.

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: TC74HC066 or EQUIVALENT
8. IC11: HD74LS221 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: 1SS119 or EQUIVALENT
15. D5: 1SV101 or EQUIVALENT

16. D6~D12: 1SS106 or EQUIVALENT
17. TR1: 2SA564 or EQUIVALENT
18. TR2: 2SC460 or EQUIVALENT
19. X1: 3.546095MHZ or EQUIVALENT

20. X2: 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 A2000'S ONLY

**2301 GENLOCK — PAL  
312806-01 REV. A**







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