

APPLICATION		REVISIONS			
NEXT ASSY.	USED ON	LTR	DESCRIPTION	DATE	APPROVED
	A500	A	Pilot Production Release per ECO 880112	8/16/88	R. Bucks
	A2000CR	B	Revised per ECO 880170	10/26/88	R. Bucks
1.0 Description		C	Revised per ECO 890087	4/12/89	R. Bucks
		D	Revised per ECO 890270	10/4/89	RMB
		E	REVISED PER ECO 910128	5/14/91	RMB
		F	REVISED PER ECO 910170	7/3/91	RMB
		G	REVISED PER ECO 910315	9/17/91	RMB

This specification describes the requirements for a thick film Hybrid Integrated Circuit which combines 4 bits each of digital RED, GREEN, and BLUE to form analog RED, GREEN and BLUE signals to interface with a monitor. This hybrid also buffers the composite SYNC signal, and generates monochrome composite video output

2.0 Mechanical Requirements

Parts shall be marked with Commodore part number 390229-01, manufacturer's identification, and EIA date code. (Unit shall be rejected if EIA date code indicates an age of three years or more.) Pin 1 shall be identified. See figure 1.

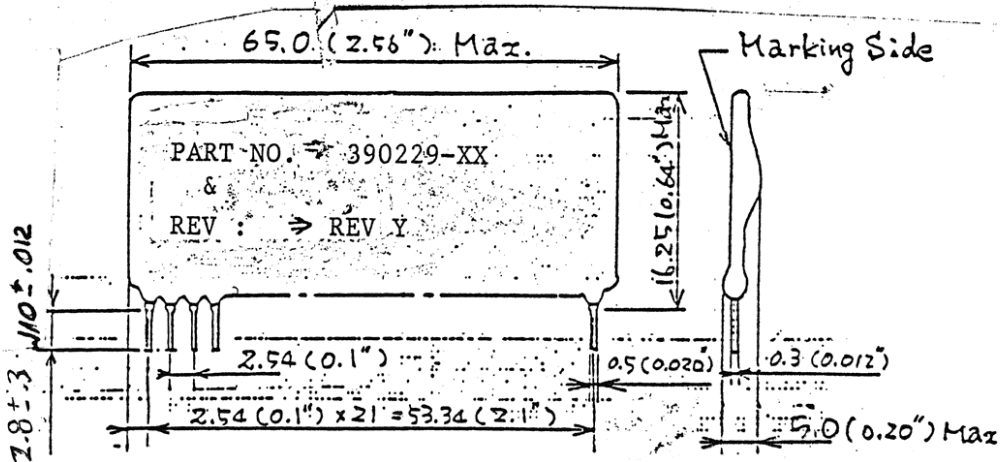


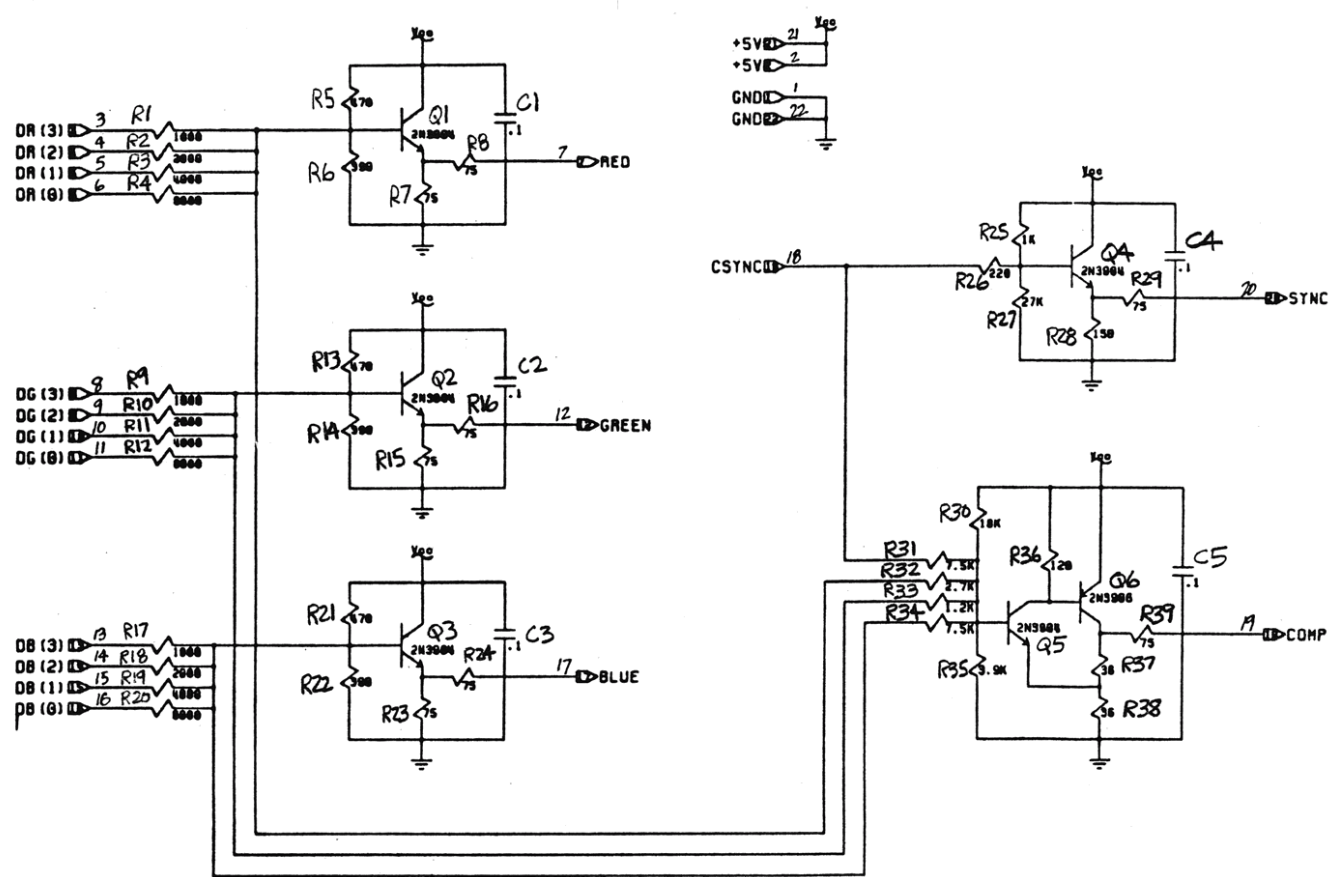
FIGURE 1

COMMODORE PART #	STATUS				
390229-01	INACTIVE				
390229-02	INACTIVE				
390229-03	ACTIVE				

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ANGLES +/- 1 DEGREE 2 PLACE DECIMALS +/- .02 3 PLACE DECIMALS +/- .010	DRWN	J. Porter	12/1/86		
	SYSTEMS ENG				
	TEST ENG			TITLE	
	CIRCUIT ENG	R. M. Bucks	12/2/86	HYBRID, VIDEO	
	COMP ENG			SIZE	
				DRAWING NO.	
				A	390229
				SCALE	SHEET 1 OF 6

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3.0 Schematic



COMPONENTS No.	COMPONENTS NAME	SUPPLIER	NOTES
Q1 ~ Q5	NTM3904-L 2SC3123 2SC3734 MMBT3904	NEC TOSHIBA NEC	NEC SAMSUNG
Q6	NTM3906-L YST3908 2SA1461 MMBT3906	NEC TOSHIBA NEC	NEC SAMSUNG
C1 ~ C5	C20F1H104Z	MINING & CEMENT	

4.0 Component list

RESISTOR No.	VALUE (Ω)	TOLERANCE (%)	NOTES
R1, R9, R17, R25	1 k	± 1	Thick film
R2, R10, R18	2 k	± 1	Thick film
R3, R11, R19	4 k	± 1	Thick film
R4, R12, R20	8 k	± 1	Thick film
R5, R13, R21	470	± 1	Thick film
R6, R14, R22	390	± 1	Thick film
R7, R8, R15, R16 R23, R24, R29, R39	75	± 1	Thick film
R26	220	± 1	Thick film
R27	27 k	± 1	Thick film
R28	150	± 1	Thick film
R30	18 k	± 1	Thick film
R31, R34	7.5 k	± 1	Thick film
R32	2.7 k	± 1	Thick film
R33	1.2 k	± 1	Thick film
R35	3.9 k	± 1	Thick film
R36	120	± 1	Thick film
R37, R38	36	± 1	Thick film

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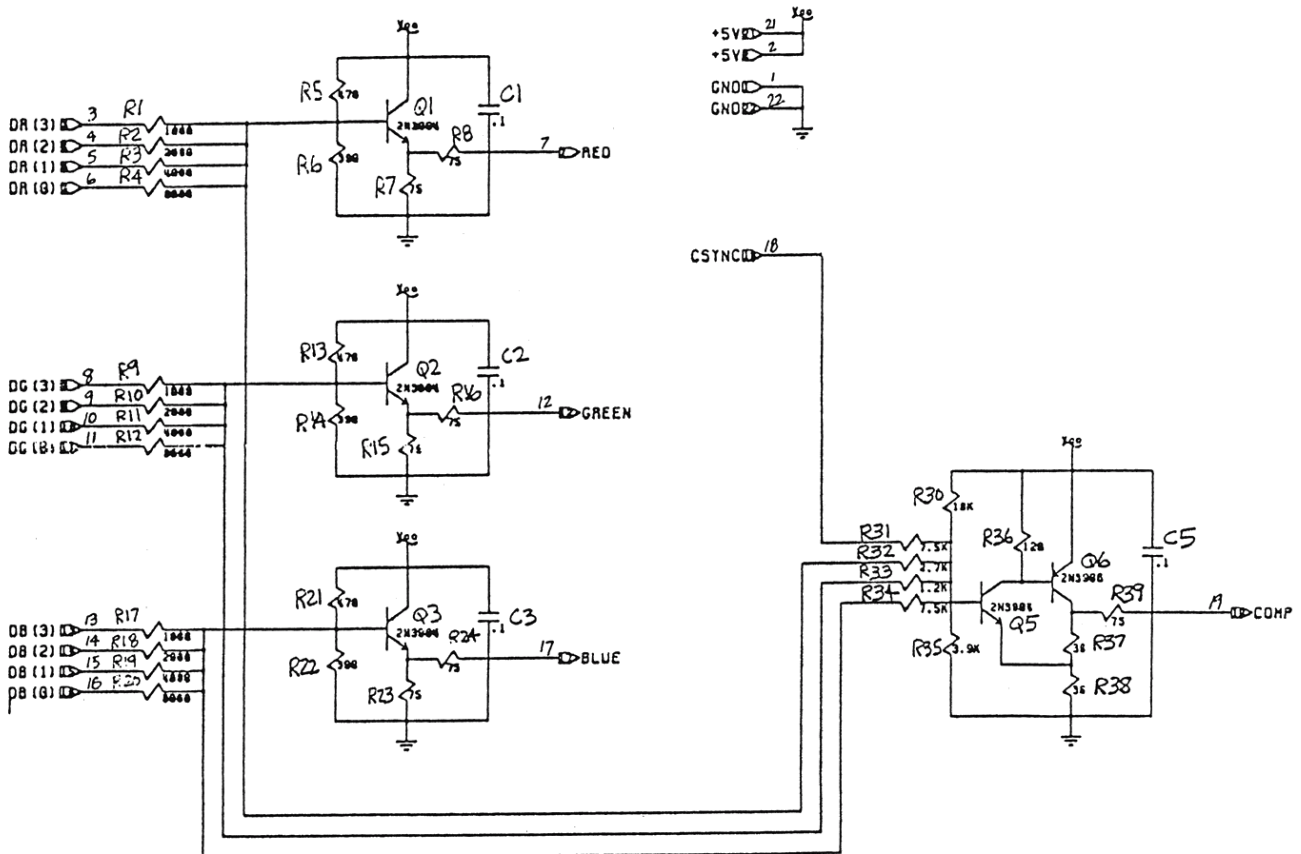
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SIZE A DRAWING NO. 390229 REV G

TITLE Hybrid, Video

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3.1 Schematic



COMPONENTS No.	COMPONENTS NAME	SUPPLIER	NOTES
Q1 ~ Q3, Q5	NTM33904-L 2SC3123 2SC3732	25C423 MMBT3904 NEC TOSHIBA NEC	NEC SAMSUNG
Q6	NTM3306-L YST3906 2SA1461	2SA812 MMBT3906 NEC TOSHIBA NEC	NEC SAMSUNG
C1 ~ Q3, Q5	C20F1H104Z	DAIICHI MITSUBISHI MINING & CEMENT	

4.0 Component list

RESISTOR No.	VALUE (Ω)	TOLERANCE (%)	NOTES
R1, R9, R17, R18	1 k	± 1	Thick film
R2, R10, R18	2 k	± 1	Thick film
R3, R11, R19	4 k	± 1	Thick film
R4, R12, R20	8 k	± 1	Thick film
R5, R13, R21	470	± 1	Thick film
R6, R14, R22	390	± 1	Thick film
R7, R8, R15, R16 R23, R24, R25, R39	75	± 1	Thick film
R30	18 k	± 1	Thick film
R31, R34	7.5 k	± 1	Thick film
R32	2.7 k	± 1	Thick film
R33	1.2 k	± 1	Thick film
R35	3.9 k	± 1	Thick film
R36	120	± 1	Thick film
R37, R38	36	± 1	Thick film

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TITLE

Hybrid, Video

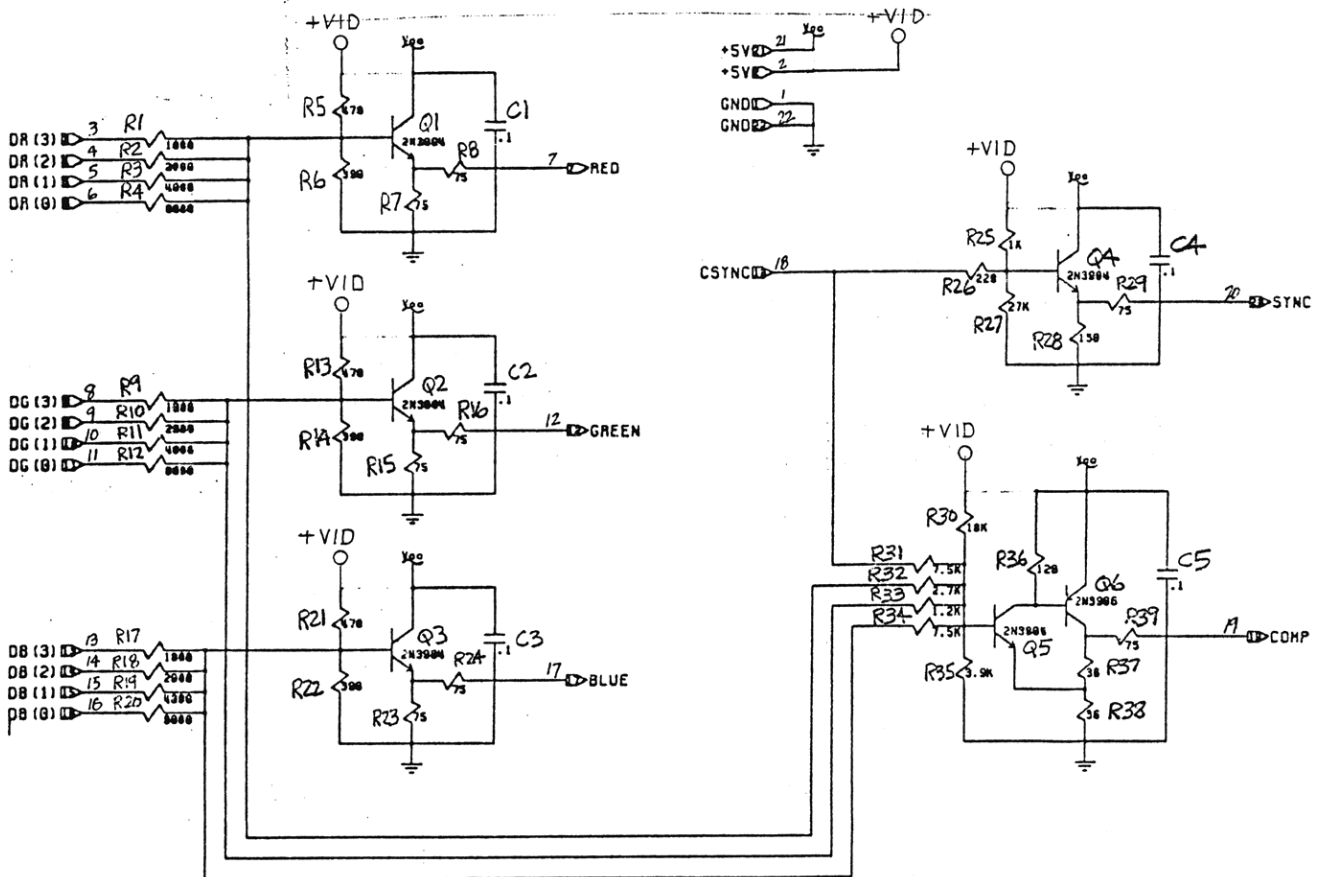
SIZE A DRAWING NO. 390229

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3.2 Schematic



COMPONENTS No.	COMPONENTS NAME	SUPPLIER	NOTES
Q1 ~ Q5	NTM3904-L 2SC3123 2SC3734	2SCM23 TOSHIBA NEC	NEC SAMSUNG
Q6	NTM3906-L YST3906 2SA1461	2SA812 TOSHIBA NEC	NEC SAMSUNG
C1~C5	C20F1H104Z	MINING & CEMENT	

4.0 Component list

RESISTOR No.	VALUE (Ω)	TOLERANCE (%)	NOTES
R1, R9, R17, R25	1 k	± 1	Thick film
R2, R10, R18	2 k	± 1	Thick film
R3, R11, R19	4 k	± 1	Thick film
R4, R12, R20	8 k	± 1	Thick film
R5, R13, R21	470	± 1	Thick film
R6, R14, R22	390	± 1	Thick film
R7, R8, R15, R16	75	± 1	Thick film
R23, R24, R29, R39			
R26	220	± 1	Thick film
R27	27 k	± 1	Thick film
R28	150	± 1	Thick film
R30	90.9 k	± 1	Thick film
R31, R34	37.4 k	± 1	Thick film
R32	13.3 k	± 1	Thick film
R33	6.04 k	± 1	Thick film
R35	19.6 k	± 1	Thick film
R36	270	± 1	Thick film
R37, R38	36	± 1	Thick film

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5.0 Electrical Characteristics

5.1 Absolute Maximum Ratings

Supply Voltage	0 to 7.0v (Ta=25 C)
Operating Temperature range	-20 to 75 C
Storage Temperature range	-30 to 85 C

5.2 Electrical Test

- a. Apply 5vdc to pins 2 and 21. Ground pins 1 and 22.
- b. Ground all input pins.
- c. Apply a binary sequence of +5 and Ground to input pins 3,4,5, and 6. Output measured at pin 7 should be a staircase with each step equal to _____ volts.
- d. Repeat step (c) with input pins 8,9,10, and 11, and output pin 12.
- e. Repeat step (c) with input pins 13,14,15, and 16, and output pin 17.
- f. Pin 19 shall vary between _____ v and _____ v during step (c).
- g. Pin 19 shall vary between _____ v and _____ v during step (d).
- h. Pin 19 shall vary between _____ v and _____ v during step (e).
- i. Input a zero to 5v square wave into pin 18 at 16KHz.
The output of pin 20 shall measure _____ Vpp square wave with less than 1% THD.
- j. Pin 19 shall measure _____ Vpp during step (i).

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5.3 Reliability

Item	Conditions	Characteristic criteria
High temperature storage	85 ± 3°C 1000 ± 12 hr.	Nothing unusual about the electric characteristics
High temperature operating	75 ± 3°C 1000 ± 12 hr. (Power supply only)	Nothing unusual about the electric characteristics
Humidity heat storage	60 ± 3°C 90~95%RH 1000 ± 12 hr.	Nothing unusual about the electric characteristics
Humidity heat operating	60 ± 3°C 90~95%RH 1000 ± 12 hr. (Power supply only)	Nothing unusual about the electric characteristics
Temperature cycling	-25°C ↔ 25°C ↔ 85°C (30min.) (5min.) (30min.) 10 cycles	Nothing unusual about the electric characteristics and appearance
Solder leaching	260 ± 5°C 10 ± 1 sec. dipping	Nothing unusual about the electric characteristics
Vibration	10~550Hz (1min.) 1.5mm amplitude each 2 hr. X,Y and Z direction	Nothing unusual about the electric characteristics and appearance
Pin bent strength	250g weight 90° bent there and back 1 cycle	Nothing unusual about the pins
Pin strain strength	1kg weight 10 ± 1 sec. (pin direction)	Nothing unusual about the pins
Solderbility	230 ± 5°C 3 ± 0.5 sec. dipping	Covering equally above 90%
Low temperature storage	-40 ± 3°C 1000 ± 12 hr.	Nothing unusual about the electric characteristics

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Approved Vendor List

This page must be detached from the remainder of the drawing whenever this drawing is shown or transmitted to vendors.

<u>Commodore Part Number</u>	<u>Vendor</u>
390229-01	Samsung
390229-01	Asahi Glass Company Ltd.
390229-01	Nikko Company Ltd.
390229-01	Tahara
390229-01	Gold Star
390229-01	MINEBEA (NMB)
390229-02	Asahi Glass Company Ltd.
390229-02	Samsung
390229-03	Minebea (NMB)
	Tahara

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