

TV Chroma Amplifier/ Demodulator

Provides Complete System for Processing Chroma
When Used with RCA-CA3070 or CA3170

FEATURES:

- Excellent linearity in dc chroma gain-control circuit
- Improved filtering resulting in reduced 7.2 MHz output from the color demodulators
- Current limiting for short-circuit protection
- Good tolerance to B+ supply variations
- Good temperature coefficient stability

The RCA-CA3121E is a monolithic silicon integrated circuit chroma amplifier/demodulator with ACC and killer control for color-TV receivers. It is designed to function compatibly with the CA3070 or CA3170 in a two-package chroma system. Figs. 5 and 6 show a functional block diagram and the outboard circuitry of a typical two-package chroma

system incorporating the CA3121E and CA3170, respectively.

The CA3121E is supplied in a 16-lead dual-in-line plastic package.

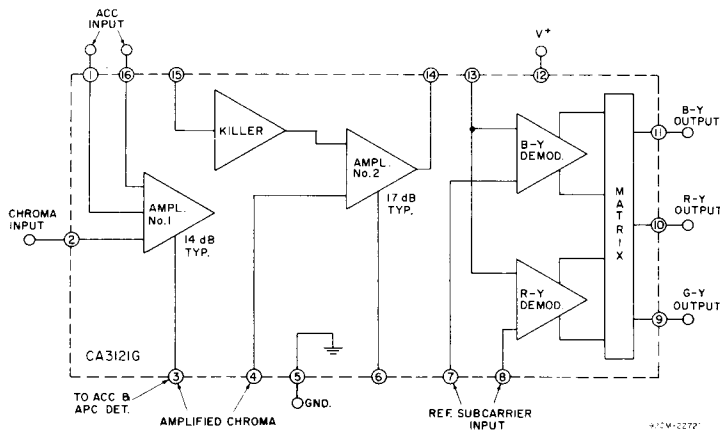


Fig. 1 — Functional block diagram of the CA3121E.

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MAXIMUM RATINGS, Absolute-Maximum Values at $T_A = 25^\circ\text{C}$

Supply Voltage	30 V
Device Dissipation:	
Up to $T_A = 55^\circ\text{C}$	1 W
Above $T_A = 55^\circ\text{C}$	derate linearly 10.5 mW/ $^\circ\text{C}$
Operating Temperature Range	-40 to +85 $^\circ\text{C}$
Storage Temperature Range	-65 to +150 $^\circ\text{C}$
Lead Temperature (During Soldering)	
At distance 1/16" \pm 1/32" (1.59 \pm 0.79 mm) from case for 10 s max.	+265 $^\circ\text{C}$

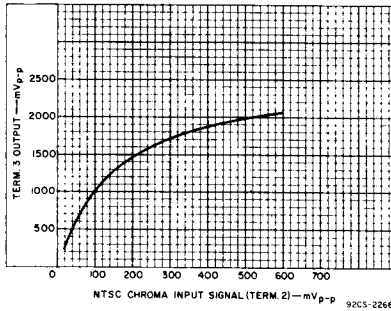
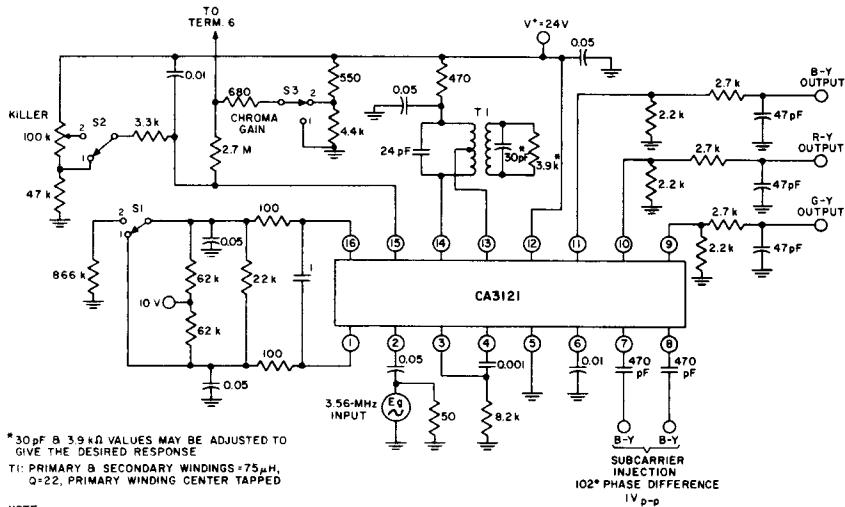


Fig. 2 - Typical ACC plot for the CA3121E when used with the CA3070.



* 30 pF & 3.9 kΩ VALUES MAY BE ADJUSTED TO GIVE THE DESIRED RESPONSE
 T1: PRIMARY & SECONDARY WINDINGS - 75 μH, Q = 22, PRIMARY WINDING CENTER TAPPED

NOTE:
 2.2-kΩ LOADS ONLY FOR TEST PURPOSE, 3.3-kΩ LOADS RECOMMENDED FOR APPLICATIONS.
 RESISTANCE VALUES ARE IN OHMS
 CAPACITANCE VALUES ARE IN MICROFARADS UNLESS OTHERWISE INDICATED.

92CM-22732R1

Fig. 3 - Typical characteristics test circuit for the CA3121E.

ELECTRICAL CHARACTERISTICS at $T_A = 25^\circ\text{C}$ and Reference to Test Circuit (Fig. 3)

CHARACTERISTIC, TERMINAL MEASURED, AND SYMBOL	TEST CONDITIONS	LIMITS			UNITS
		Min.	Typ.	Max.	
Supply Current I_T	—	—	40	50	mA
Input Sensitivity V_2	Vary E_g ; set V_4 for 55 mV RMS	6	10	15	mV RMS
Second-Stage Sensitivity V_4	Vary E_g ; set V_{11} for 2 V RMS	25	55	100	mV RMS
Output Voltage (Killer off) V_{11}	Switch Position: S1=2, S2=2, S3=2 Adjust killer potentiometer until output drops	—	—	70	mV RMS
Demodulator Characteristics:					
Output Voltages V_g, V_{10}, V_{11}	—	13	14.3	15.6	V
DC Output Balance (Between any 2 outputs)	—	-0.6	—	+0.6	V
Unbalance V_g, V_{10}, V_{11}	$E_g=0$; Switch Position: S1=1, S2=1, S3=1	—	—	0.8	Vp-p
Relative Outputs— R-Y V_{10}	Vary E_g ; set V_{11} for 2 V RMS	1.4	1.52	1.68	V RMS
G-Y V_9		0.3	0.4	0.5	V RMS
Relative Phase— R-Y V_{10}	Vary E_g ; set V_{11} for 2 V RMS; read phase of V_{10} and V_g with V_{11} as reference	-101	-106	-111	degrees
G-Y V_9		112	104	96	degrees
Max. Output Voltage V_{11}	$E_g = 750$ mV	2.8	—	—	V RMS

CIRCUIT OPERATION

The CA3121E consists of three basic circuit sections: (1) amplifier No.1, (2) amplifier No.2, and (3) demodulator. Amplifier No.1 contains the circuitry for automatic chroma control (ACC) and color-killer sensing. The output of amplifier No.1 (Terminal 3) is coupled to the Chroma Signal Processor (CA3070, CA3170 or equivalent) for ACC and automatic phase control (APC) operation and to the input of amplifier No.2 (Terminal 4) containing the chroma gain control circuitry. The signal from the color-killer circuit in amplifier No.1 acts upon amplifier No.2 to greatly reduce its gain.

The output from amplifier No.2 (Terminal 14) is applied, through a filtering network, to the demodulator input (Terminal 13).

The demodulator also receives the R-Y and B-Y demodulation subcarrier signals (Terminals 7 and 8) from the oscillator output of the Chroma Signal Processor. The R-Y and B-Y demodulators and the matrix network contained in the demodulator section of the CA3121E reconstruct the G-Y signal to achieve the R-Y, G-Y, and B-Y color difference signals. These high-level output signals with low impedance outputs are suitable for driving high-level R, G, and B output amplifiers. Internal capacitors are included on each output to filter out unwanted harmonics. For additional operating information and signal waveforms, refer to Television Chroma System (utilizing RCA-CA3070, CA3071, CA3072), File No. 468.

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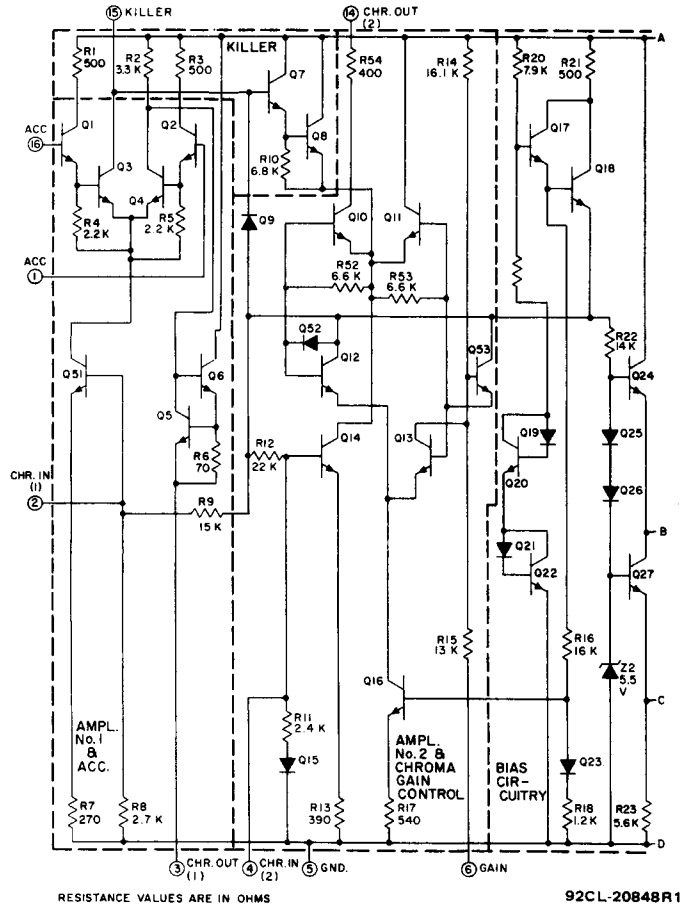


Fig. 4 - Schematic diagram of the CA3121E (cont'd on next page).

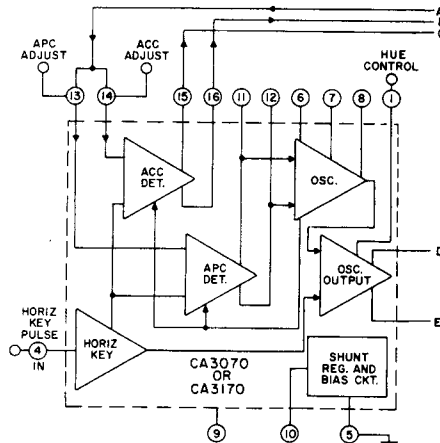


Fig. 5 - Simplified functional diagram of a two-package TV chroma system utilizing the CA3121E and CA3070 or CA3170 (cont'd on next page).

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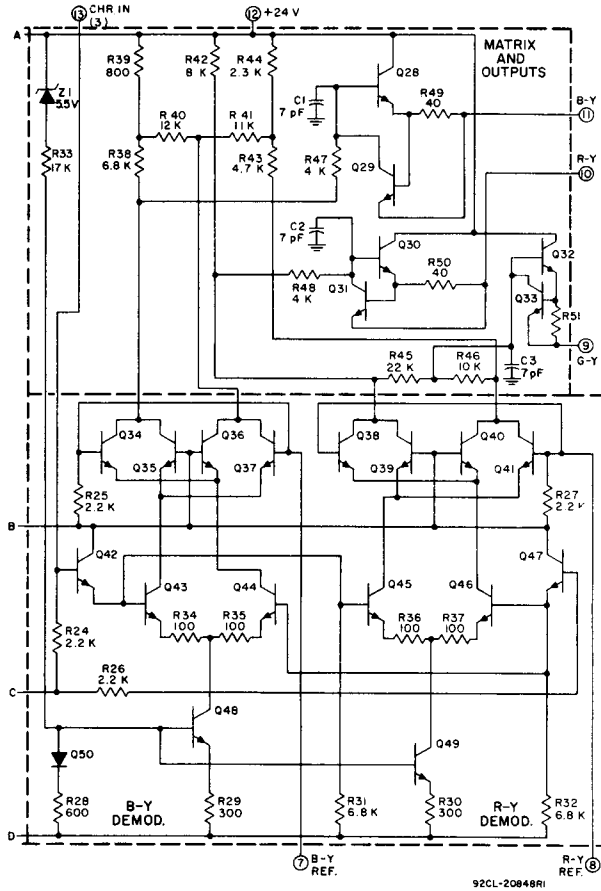


Fig. 4 - Schematic diagram of the CA3121E (cont'd from previous page).

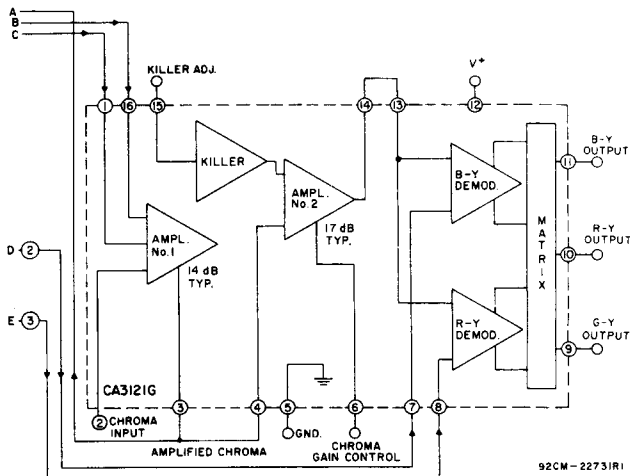


Fig. 5 - Simplified functional diagram of a two-package TV chroma system utilizing the CA3121E and CA3070 or CA3170 (cont'd from previous page).

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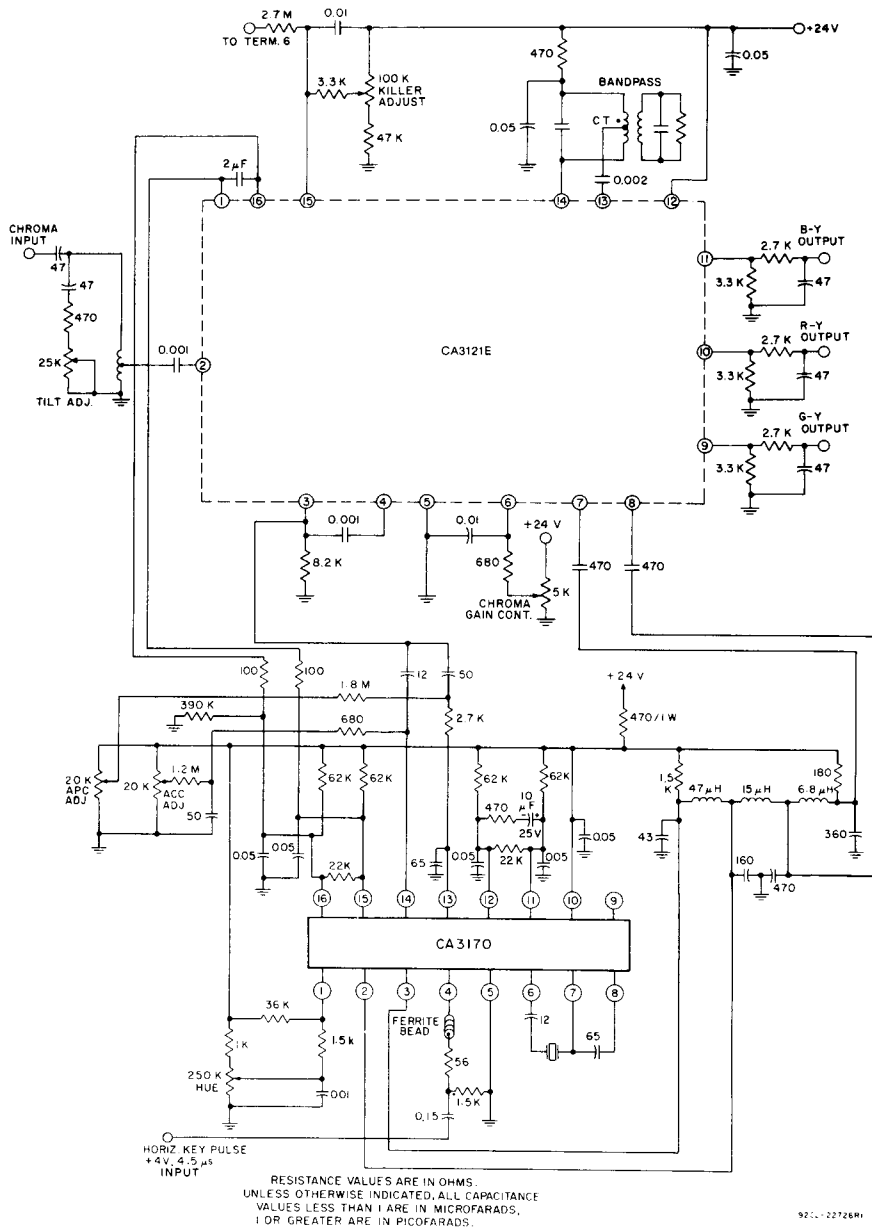


Fig. 6 — Outboard circuitry of a typical two-package chroma system for color-TV receivers utilizing the CA3121E and CA3170.