

## 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.

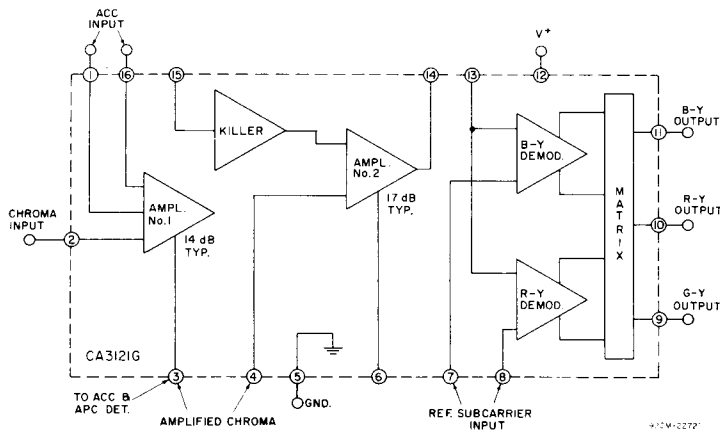


Fig. 1 — Functional block diagram of the CA3121E.

# CA3121

**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 $^\circ\text{C}$                     |

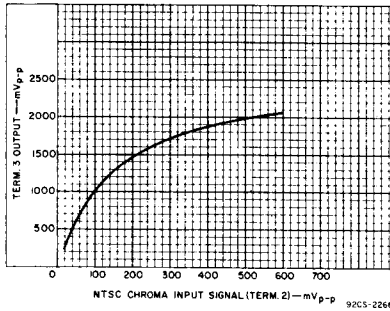
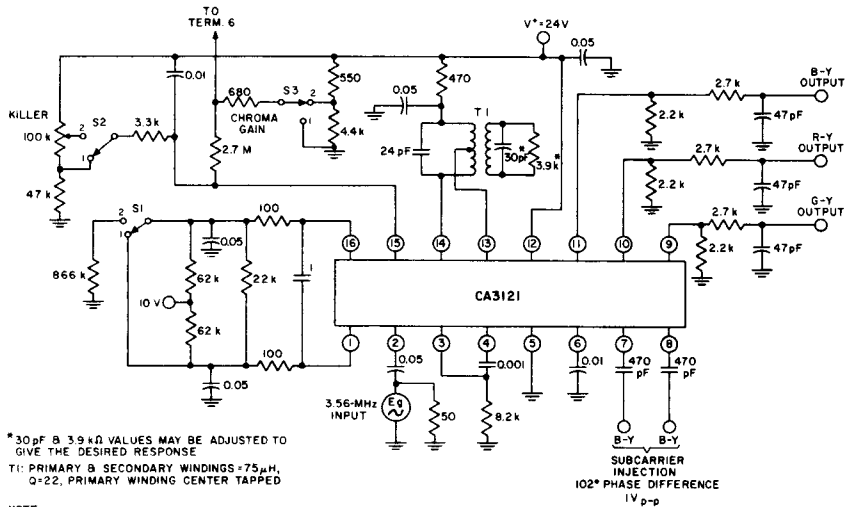


Fig. 2 — Typical ACC plot for the CA3121E when used with the CA3070.



\* 30 pF & 3.3 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,<br>TERMINAL MEASURED,<br>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<br>(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<br>$V_g, V_{10}, V_{11}$            | —  | 13     | 14.3 | 15.6 | V                |
| DC Output Balance<br>(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  | V <sub>p-p</sub> |
| Relative Outputs—<br>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—<br>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.

# CA3121

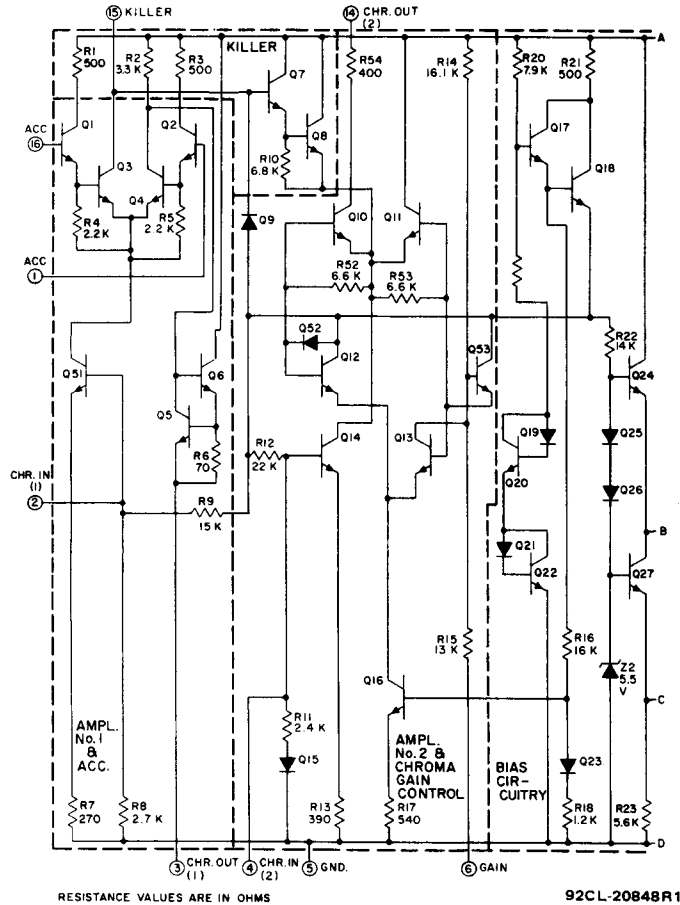


Fig. 4 - Schematic diagram of the CA3121E (cont'd on next page).

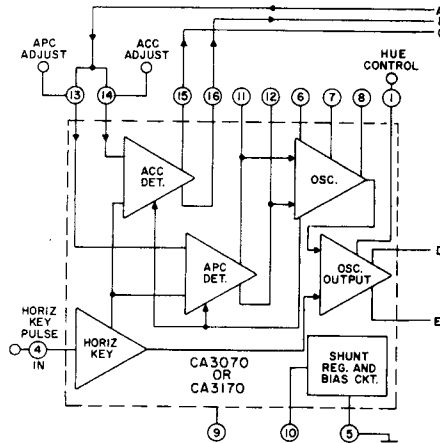


Fig. 5 - Simplified functional diagram of a two-package TV chroma system utilizing the CA3121E and CA3070 or CA3170 (cont'd on next page).

# CA3121

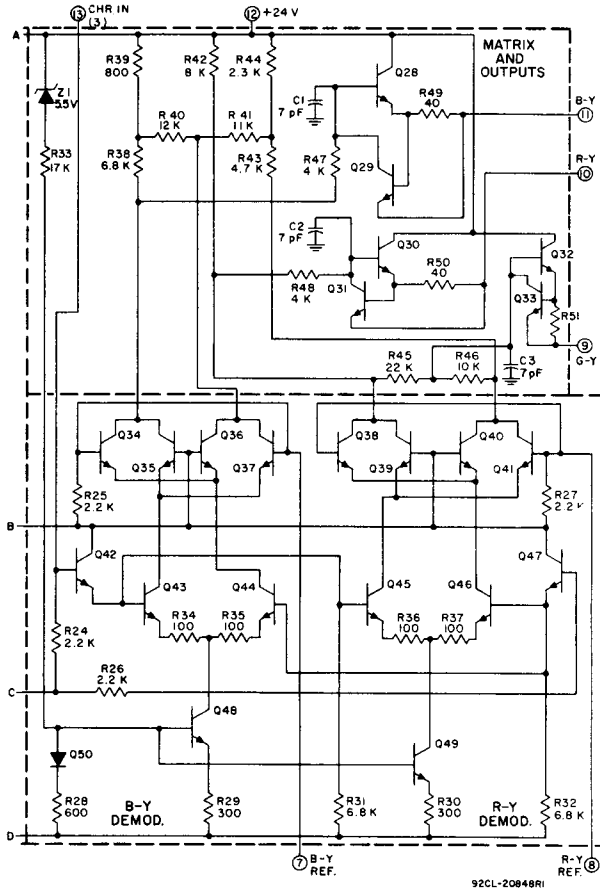


Fig. 4 - Schematic diagram of the CA3121E (cont'd from previous page).

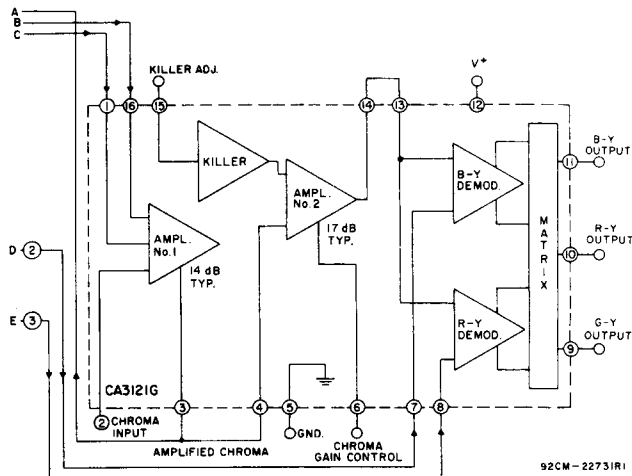


Fig. 5 - Simplified functional diagram of a two-package TV chroma system utilizing the CA3121E and CA3070 or CA3170 (cont'd from previous page).

# CA3121

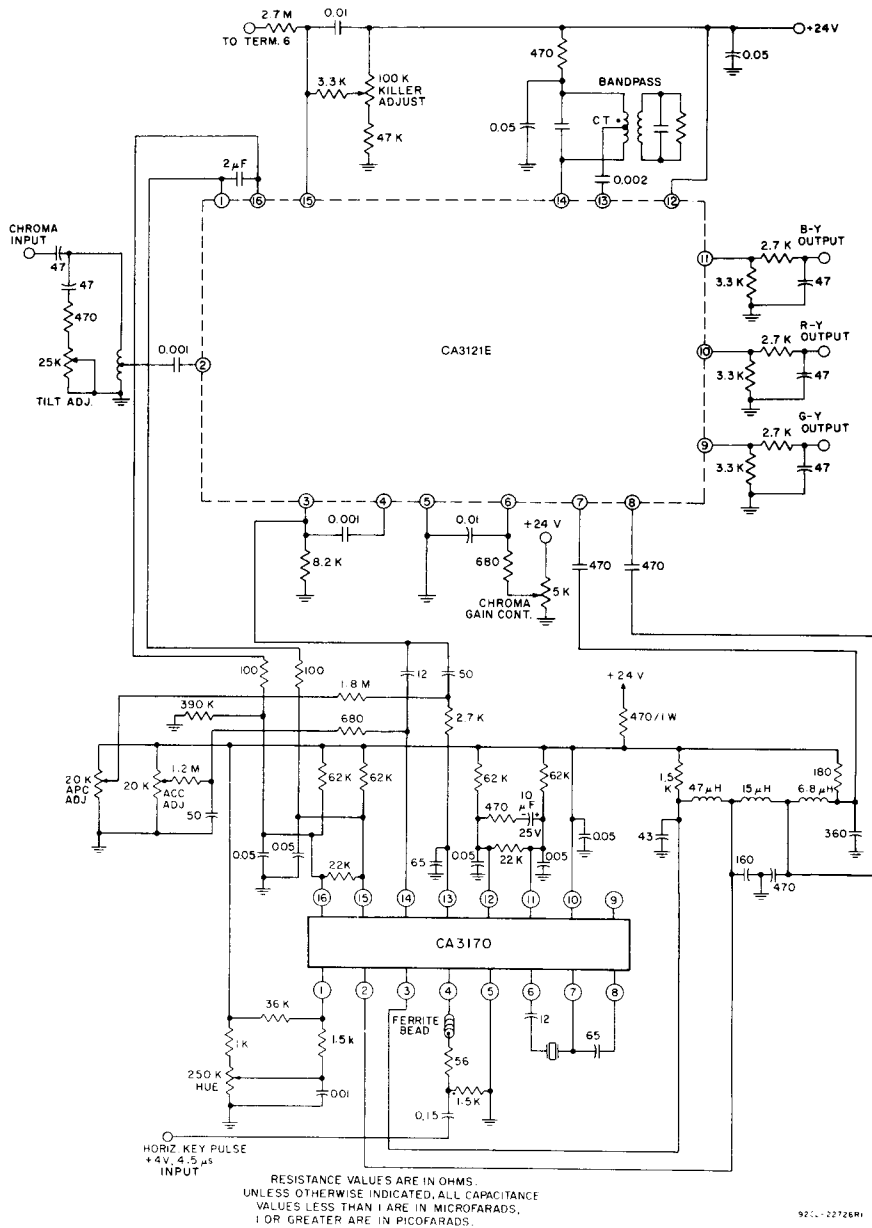


Fig. 6 — Outboard circuitry of a typical two-package chroma system for color-TV receivers utilizing the CA3121E and CA3170.