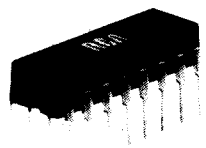


16-Lead Dual-in-Line
Plastic Package
"E"-Suffix Type H-1622

TV Chroma Amplifier/ Demodulator

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

FEATURES:

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

The RCA-CA3221E is a monolithic silicon integrated circuit chroma amplifier/demodulator with ACC, saturation control, and killer control for use in NTSC color TV receivers. It is designed to function compatibly with the CA3070 or CA3170 in a 2-package chroma system. The CA3221E is functionally identical to the industry standard CA3121, but has a modified saturation control as well as a modified color difference matrix.

The CA3221E is supplied in the 16-lead dual-in-line plastic package.

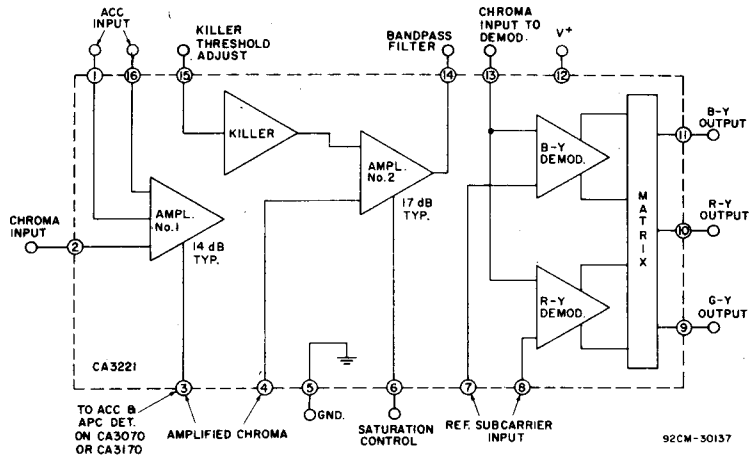


Fig. 1 — Functional block diagram of the CA3221E.

CA3221E

MAXIMUM RATINGS at $T_A = 25^\circ C$

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

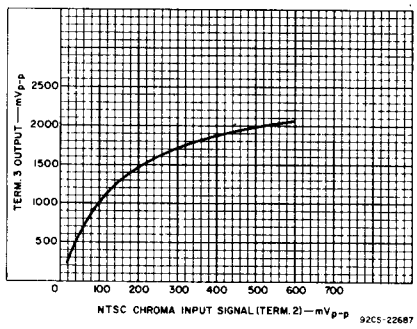


Fig. 2 —Typical ACC plot for the CA3221E when used with the CA3070.

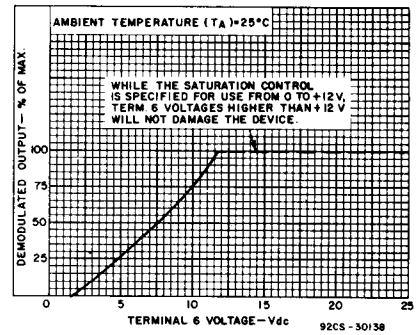
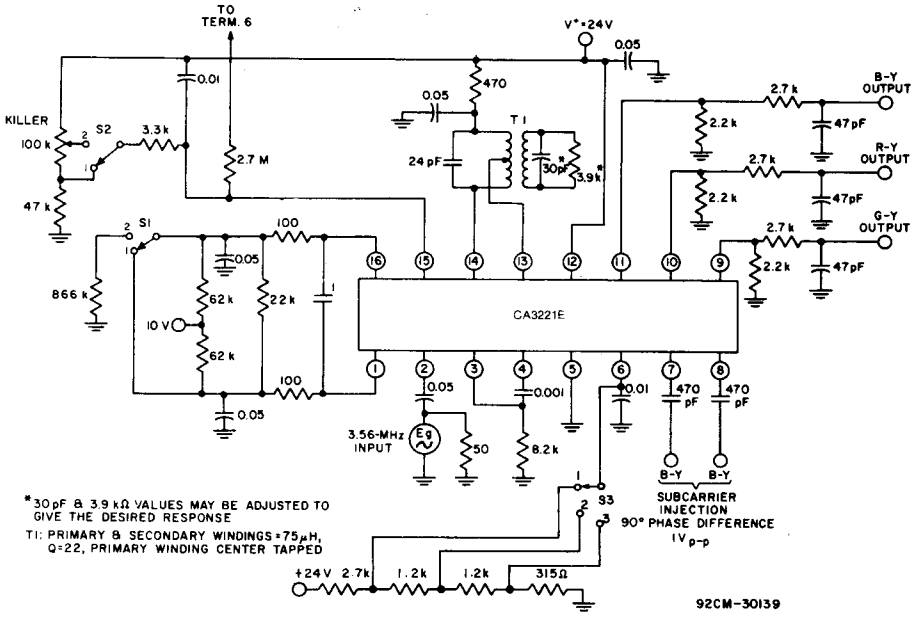


Fig. 3 – Saturation control characteristic.



*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.

Fig. 4 — Typical characteristics test circuit for the CA3221E.

ELECTRICAL CHARACTERISTICS at T_A = 25°C and Referenced to Test Circuit (Fig. 4)

CHARACTERISTIC, TERMINAL MEASURED, AND SYMBOL	TEST CONDITIONS	LIMITS			UNITS
		Min.	Typ.	Max.	
Supply Current, I_T	–	–	40	50	mA
Input Sensitivity, V_2	Vary Eg; set V_{11} for 2 V RMS S3 = 1	4	12	20	mV RMS
Second-Stage Sensitivity, V_4	Vary Eg; set V_{11} for 2 V RMS S3 = 1	30	53	75	mV RMS
Output Voltage (Killer off)	Switch Positions: S1=2, S2=2, S3=1 Adjust killer potentiometer until output drops	–	–	70	mV RMS
Saturation Control Characteristics: * V_{11} 50% Gain	Vary Eg; set V_{11} for 2 V RMS with S3 = 1. Set S3 = 2 measure V_{11}	0.71	0.95	1.16	V RMS
0% Gain	Same as above, S3 = 3	–	–	20	mV RMS
Demodulator Characteristics: Output Voltages, V_9, V_{10}, V_{11}	–	13.5	14.5	15.5	V
DC Output Balance (Between any 2 outputs)	–	–0.6	–	+0.6	V
Unbalance, V_9, V_{10}, V_{11}	Eg=0; Switch Position: S1=1, S2=1, S3= 1	–	–	0.8	Vp-p
Relative Outputs– R-Y, V_{10}	Vary Eg; set V_{11} for 2 V RMS, S3 = 1	1.75	1.85	1.95	V RMS
G-Y, V_9		0.6	0.7	0.8	V RMS
Relative Phase – R-Y, V_{10}	Vary Eg; set V_{11} for 2 V RMS; read phase of V_{10} and V_9	–	90	–	degrees
G-Y, V_9	with V_{11} as reference	–	244	–	degrees
Max. Output Voltage, V_{11}	Eg = 750 mV	2.8	–	–	V RMS

*See Fig. 3 for saturation control characteristic.

CIRCUIT OPERATION

The CA3221E 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 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 under weak signal conditions.

The output from amplifier No. 2 (Terminal 14) is applied, through a Bandpass Filter, to the demodulator input (Terminal 13). The demodulator also receives the R-Y and B-Y demodulator 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 CA3221E reconstruct the G-Y signal to achieve the R-Y, G-Y, and B-Y color difference signals. These high-level outputs signals with low impedance outputs are suitable for driving high-level R, G, 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.

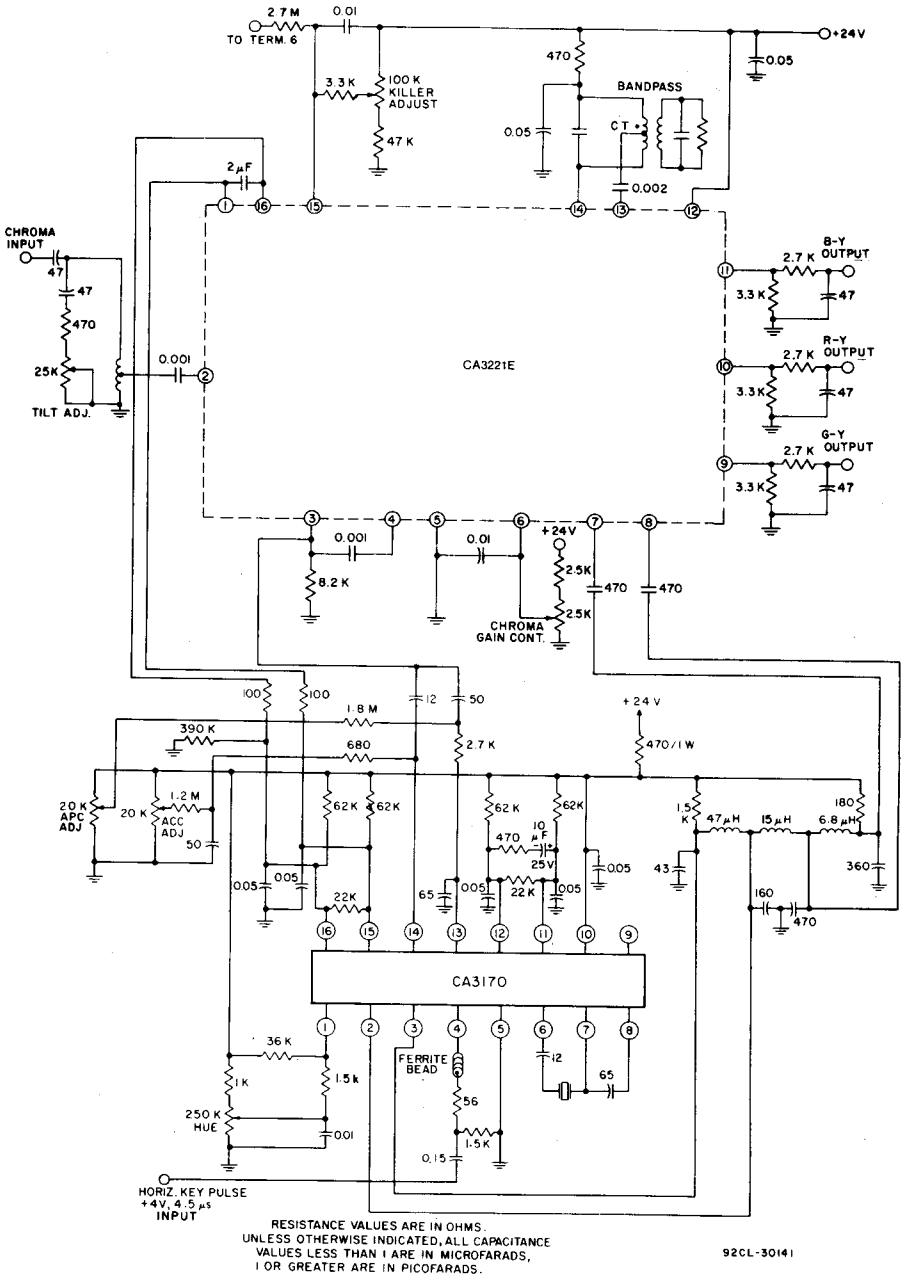
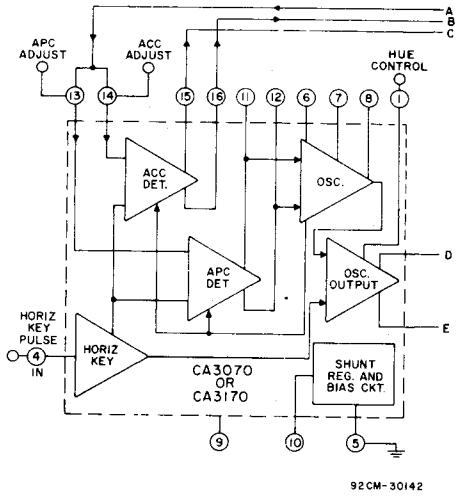


Fig. 5 — Outboard circuitry of a typical two-package chroma system for color-TV receivers utilizing the CA3221E and CA3170.



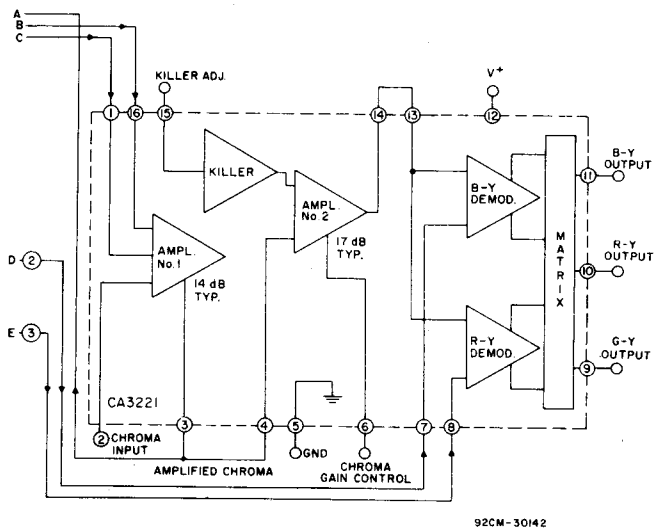


Fig. 6 — Simplified functional diagram of a two-package TV chroma system utilizing the CA3221E and CA3070 or CA3170.

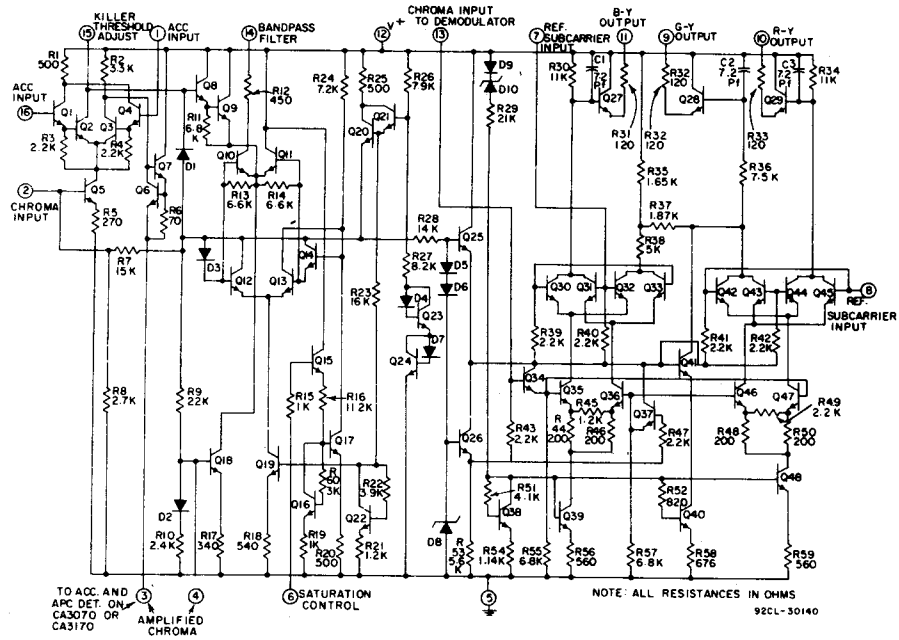


Fig. 7 — Schematic diagram of CA3221E.