TV Chroma Demodulator

SYSTEM FEATURES:

- *Synchronous detector with color-difference matrix*
- *Emitter-follower output amplifier with short-circuit protection*
- *Typical R-Y output ratio of 0.95 and 89°, G-Y output ratio of 0.33 and 244°, and B-Y output ratio of 1.0 and 0°*

The RCA-CA3172E is a monolithic silicon integrated circuit intended for use as a chroma demodulator in TV applications. It is operated from a 24-volt supply.

The device has synchronous detectors with matrix circuits to achieve the R-Y, G-Y, and B-Y color-difference output signals. The chroma input signal is applied to terminal Nos. 3 and 4, while the oscillator injection signal is applied to terminal Nos. 6 and 7. The color-difference signals, after

matrix, have a fixed relationship of amplitude and phase.

The outputs of the CA3172E are suitable for driving high-level color-difference or R, G, and B output amplifiers. The emitter-follower stages used to drive the high-level color amplifiers have short-circuit protection.

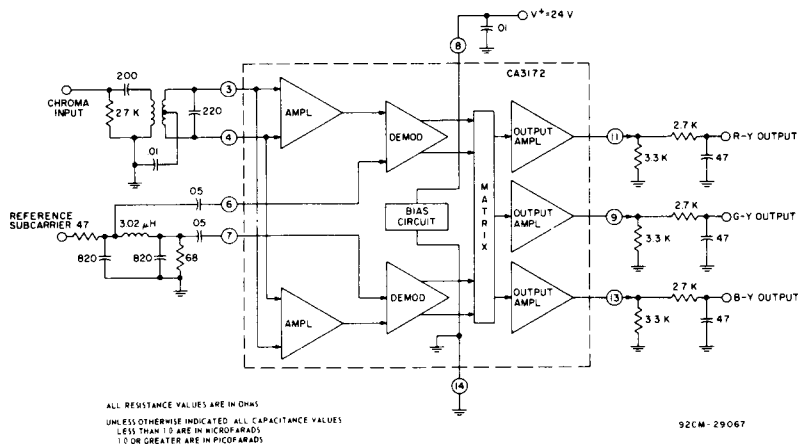The CA3172E is supplied in a 14-lead dual-in-line plastic package.

Fig. 1 — Functional diagram of RCA-CA3172E.

CA3172

MAXIMUM RATINGS, *Absolute Maximum-Values at $T_A = 25°C$*

DC SUPPLY VOLTAGE (Terminal 8 to Terminal 14) 27   V
REFERENCE INPUT VOLTAGE   . . . . 5 V_{p-p}
CHROMA INPUT VOLTAGE   . . . . 5 V_{p-p}
DEVICE DISSIPATION:
    Up to $T_A = +70°C$ . . . . 530 mW
    Above $T_A = +70°C$ . . . . Derate Linearly at 6.7 mW/°C
AMBIENT TEMPERATURE RANGE:
    Operating   . . . . –40 to +85°C
    Storage   . . . . -65 to +150°C
LEAD TEMPERATURE (During Soldering):
    At distance 1/32 in. (3.17 mm) from seating plane for 10 s max.   . . . . +265°C

Maximum Voltage and Current Ratings
at $T_A = +25°C$

Terminal No.	MIN VOLTS	MAX VOLTS	Terminal No.	I_I mA	I_O mA
3	0	+5	3	—	—
4	0	+5	4	—	—
6	0	+12	6	—	—
7	0	+12	7	—	—
8	0	+27	8	—	—
9	0	+20	9	1.0	20
11	0	+20	11	1.0	20
13	0	+20	13	1.0	20

* With reference to terminal No. 14 and with
the voltage between terminal No. 8 and termi-
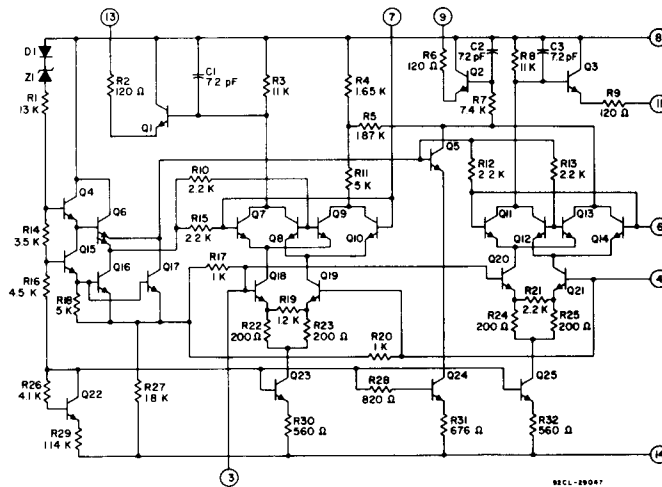nal No. 14 at +24 V except as given in rating
for terminal No. 8

Fig. 2 — Schematic diagram for CA3172E.

ELECTRICAL CHARACTERISTICS, at $T_A = 25°C$ and $V^+ = +24$ V unless otherwise specified

CHARACTERISTICS	SYMBOLS	SPECIAL TEST CONDITIONS	LIMITS CA3172			UNITS
			MIN.	TYP.	MAX.	

Static Characteristics[a]

CHARACTERISTICS	SYMBOLS	SPECIAL TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Supply Current With Output Loads	I_T	S_1 Closed	16.5	—	28.5	mA
With No Output Loads		S_1 Open	—	9	—	
G–Y, R–Y, B–Y Outputs	V_9 V_{11}, V_{13}	S_1 Closed	13	14.5	15.5	
Chroma Inputs	V_3, V_4	S_1 Open	—	3.6	—	V
Reference Subcarrier	V_6, V_7	S_1 Open	—	6.4	—	

Dynamic Characteristics[b]

CHARACTERISTICS	SYMBOLS	SPECIAL TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Demodulator Unbalance	V_9, V_{11}, V_{13}	$V_3 = V_4 = 0$	—	—	0.6	$V_{p\text{-}p}$
Maximum Color Difference Output Voltage	V_{13}	$V_3 = V_4 = 0.35$ $V_{p\text{-}p}$	5	—	—	$V_{p\text{-}p}$
Chroma Input Sensitivity	V_3	Adjust e_c for 5.0 $V_{p\text{-}p}$ @ term No. 13 (B–Y)	—	0.2	0.35	
R–Y Output Ratio	V_{11}		—	0.95	—	
G–Y Output Ratio	V_9		—	0.32	—	
V_{DC} Difference Between any two Output Terminals	$|V_9| - |V_{11}|$ $|V_9| - |V_{13}|$ $|V_{11}| - |V_{13}|$	$e_c = 0$	—	—	0.6	V
Input Impedance Reference Subcarrier	$R_i 6, 7$ $C_i 6, 7$		— —	1.7 6	— —	kΩ pF
Input Impedance at Chroma Inputs	$R_i 3, 4$ $C_i 3, 4$		— —	0.95 6	— —	kΩ pF
Output Resistance	$R_o 9, R_o 11,$ $R_o 13$		—	180	—	Ω

[a] Test circuit Fig. 3
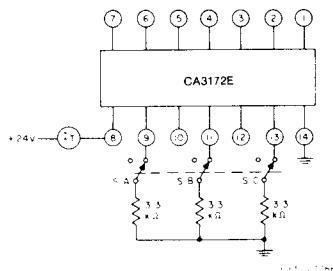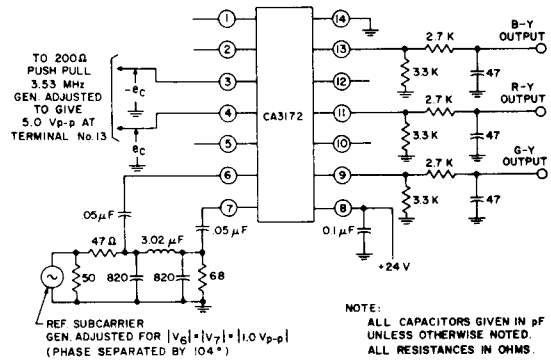
[b] Test circuit Fig. 4

Fig. 3 – Static characteristics test circuit.

Fig. 4 – Dynamic characteristics test circuit.