

CA1398

Television Chroma Processor

Features

- Minimum number of external components required
- Injection-lock oscillator with internal feedback
- DC chroma gain control and hue control circuits
- Low-impedance internal voltage regulation

RCA-CA1398E is a monolithic silicon integrated-circuit chroma processor containing chroma-amplifier and gain-control, color-killer, color subcarrier oscillator, hue control, and ACC circuitry. It has been designed for interchangeability with other "1398"-type chroma-processor devices. It functions compatibly with the RCA-CA3125E Chroma Demodulator as well as other commercially available chroma demodulators in color-TV receivers. Fig. 2 shows a functional block diagram of a 2-package TV chroma system incorporating the CA1398E and CA3125E. The CA1398E is supplied in a 14-lead dual-in-line plastic package.

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

Peak Horizontal-Pulse Input Current	250 μA
Supply Current (Terminal 14)	35 mA
Ambient Temperature Range:	
Operating	-40 to $+85^\circ\text{C}$
Storage	-65 to $+150^\circ\text{C}$
Lead Temperature (During Soldering):	
At distance $1/16" \pm 1/32"$ (1.59 ± 0.79 mm)	
from case for 10 s max.	265°C

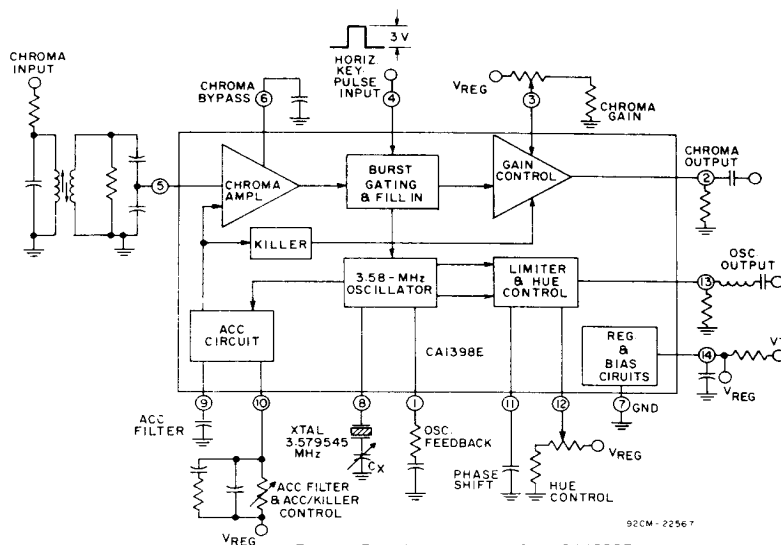


Fig. 1 — Functional diagram of the CA1398E.

ELECTRICAL CHARACTERISTICS at $T_A = 25^\circ\text{C}$ and Referenced to Test Circuit (Fig. 4)

CHARACTERISTIC	TERMINAL MEASURED AND SYMBOL	TEST CONDITIONS						LIMITS			UNITS
		SWITCH POSITION (S1)	CONTROL SETTING			V _{BURST} mV p-p	V _{CHROMA} mV p-p	MIN.	TYP.	MAX.	
			CHROMA	HUE	KILLER						
Static Characteristics											
Regulated Supply Voltage	V ₁₄	2	max.	max.	max.	0	0	8.9	9.5	11.5	V
Chroma Output Bias	V ₁₄ to V ₂	2	max.	max.	max.	6	0	1.2	2.4	3.6	V
Regulator Impedance	See Note 1	2	max.	max.	max.	0	0	—	12	25	Ω
Dynamic Characteristics (Refer to Test Set-Up Procedure for Oscillator)											
Max. Chroma Gain	V ₂	1	max.	max.	See Note 2 ↓	6	5	310	425	—	mV p-p
Min. Chroma Gain	V ₂	1	min.	max.		6	5	—	—	7	mV p-p
ACC Action	V ₂ (dB up from gain test)	1	max.	max.		50	50	2	7	11	dB
Killer Function:											
Kill	V ₂	2	max.	max.		0	5	—	—	7	mV p-p
Unkill	V ₂	1	max.	max.		15	5	100	—	—	mV p-p
Oscillator Lock-Up:											
Voltage	V ₁₃	1	max.	max.		6	0	250	340	390	mV p-p
Phase (Referenced to burst)	φ ₁₃	1	max.	max.		6	0	−20	0	+20	degrees
Hue Control Range:											
Voltage	V ₁₃	1	max.	min.		6	0	250	340	390	mV p-p
Phase (Referenced to burst)	φ ₁₃	1	max.	min.		6	0	95	110	140	degrees

Note 1 — Measure V₁₄ at I_{SUPPLY} = 38 mA and 18 mA. Calculate the regulator impedance:

$$Z_{\text{reg}} = (V_{14} \text{ (at 38 mA)} - V_{14} \text{ (at 18 mA)}) / 0.02$$

Note 2 — Increase the killer potentiometer resistance from minimum until the circuit unkills. This condition is evidenced by a shift in bias voltage at Term. 6. Maintain this potentiometer setting for all the dynamic tests.

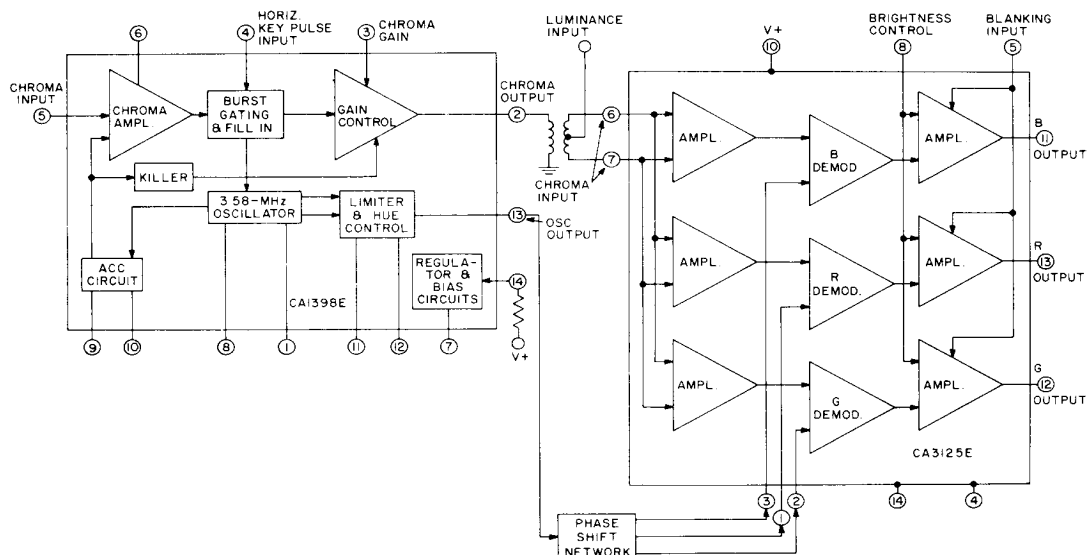


Fig. 2 - TV chroma system functional block diagram.

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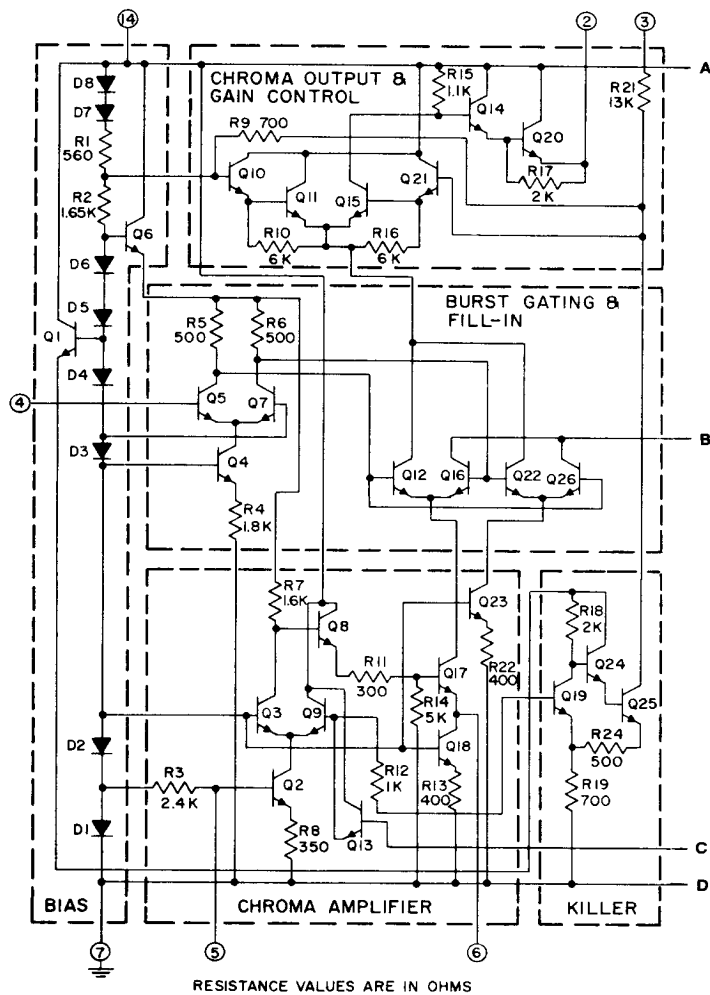
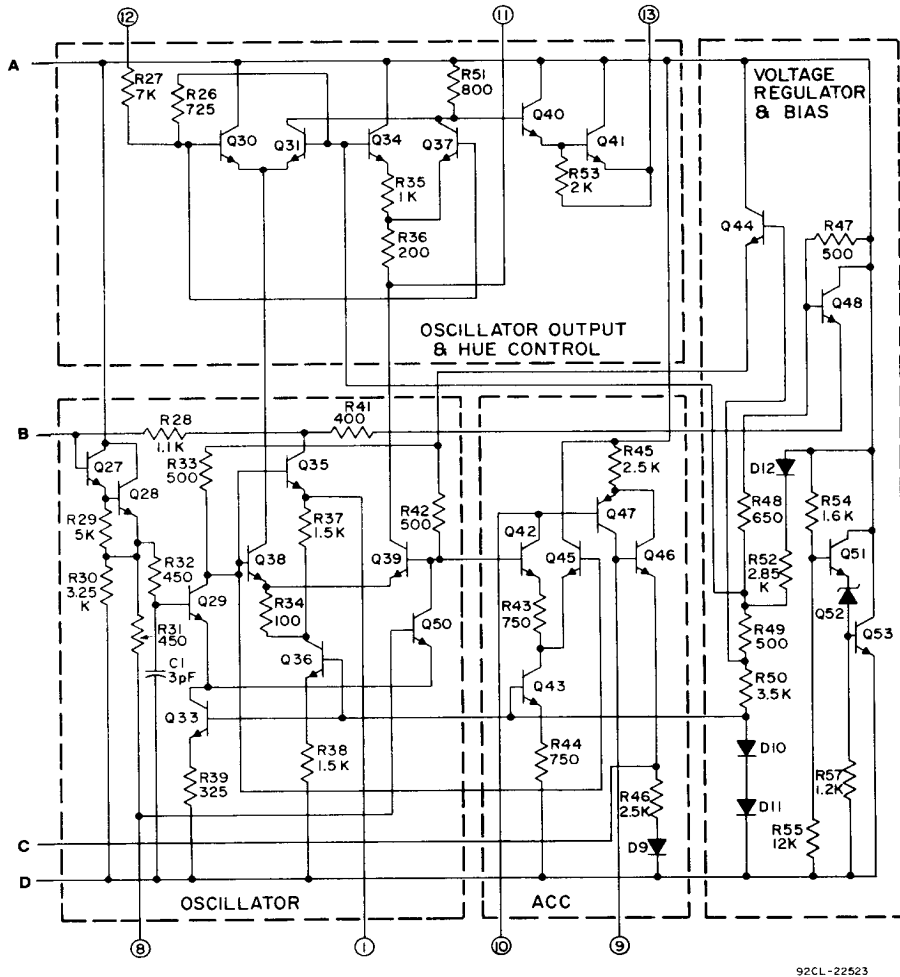


Fig. 3 - Schematic diagram of the CA1398E (cont'd on next page).



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Fig. 3 - Schematic diagram of the CA1398E (cont'd from previous page).

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TEST SET-UP PROCEDURE FOR OSCILLATOR

Remove the horizontal keying and chroma inputs and adjust C_X to obtain a free-running oscillator frequency of 3.579545

MHz ± 10 Hz. Under the same Test Conditions described in the Electrical Characteristics Chart for Oscillator Lock-Up, vary L_1 (approx. 20 μ H) and/or C_1 (approx. 1000 pF) to obtain the initial conditions for amplitude and phase oscillator lock-up.

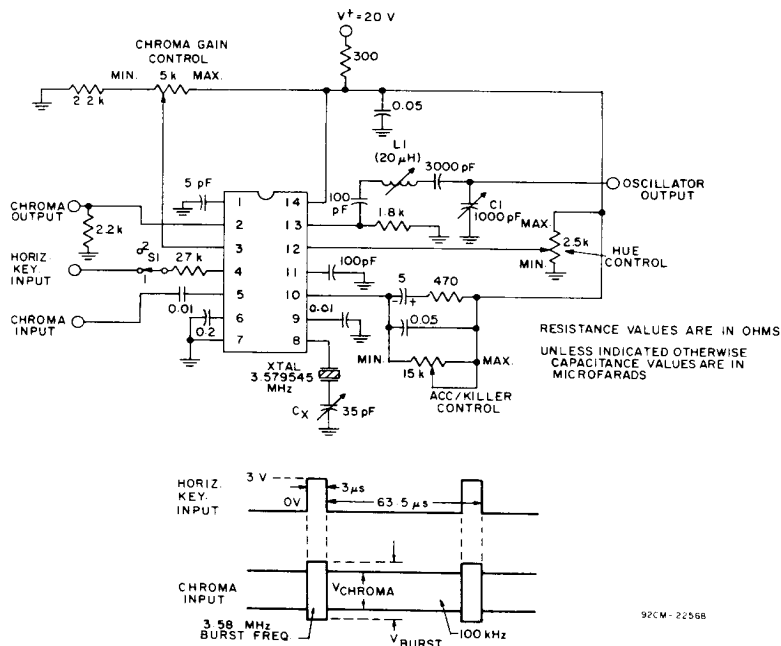


Fig. 4 — Typical static and dynamic characteristics test circuit for the CA1398E.