

CA3254, CA3255

Product Preview

RS-170 Sync Generator (CA3254)

Features:

- Single LSI IC with multiple genlock capability
- EIA RS-170 Sync with 2:1 Interlace
- PLL for lock to power line zero crossing
- Genlocks to RS-170, RS-330 or random interlace
- Crystal control mode sync option
- Four modes of genlock control
- Maximum of external components
- I²L injection configured to work in series with the camera tube filament

The RCA CA3254* is an integrated circuit sync generator with all functions required to provide EIA RS-170 standard sync for signal processing in cameras and video applications where RS-170 2:1 interlaced sync is needed. The CA3254 is processed in integrated injection logic which provides advantages of combined linear integrated circuit compatibility with functions that enhance the performance of the sync system. These functions include a 60 Hz phase locked loop to synchronize to the power line frequency, horizontal and vertical drive processing circuits which process the drive signals for logic and V_{CO} control.

Horizontal and vertical drive may be applied to their respective inputs for genlock operation. When external drive is present, the system automatically switches to external control. Composite sync may be applied in parallel directly to the horizontal and vertical drive inputs as an option. Operation from a dc power source requires the use of the 64 times horizontal frequency crystal reference. The genlock accepts RS-170, RS-330, or random interlace sync.

The CA3255* is available for 625-line, 50-Hz systems.

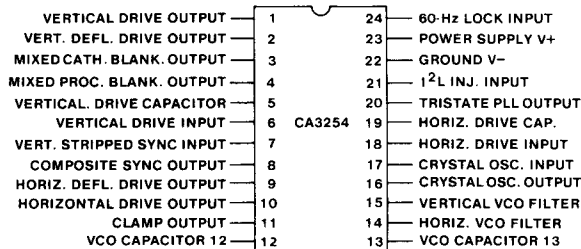
*Formerly RCA Development Type No. TA10466 (CA3254) and TA10985 (CA3255).

Applications:

- All RS-170 Sync systems
- Security cameras
- CCTV systems
- Cable systems
- Text encoder sync
- Computer display systems
- Graphics systems

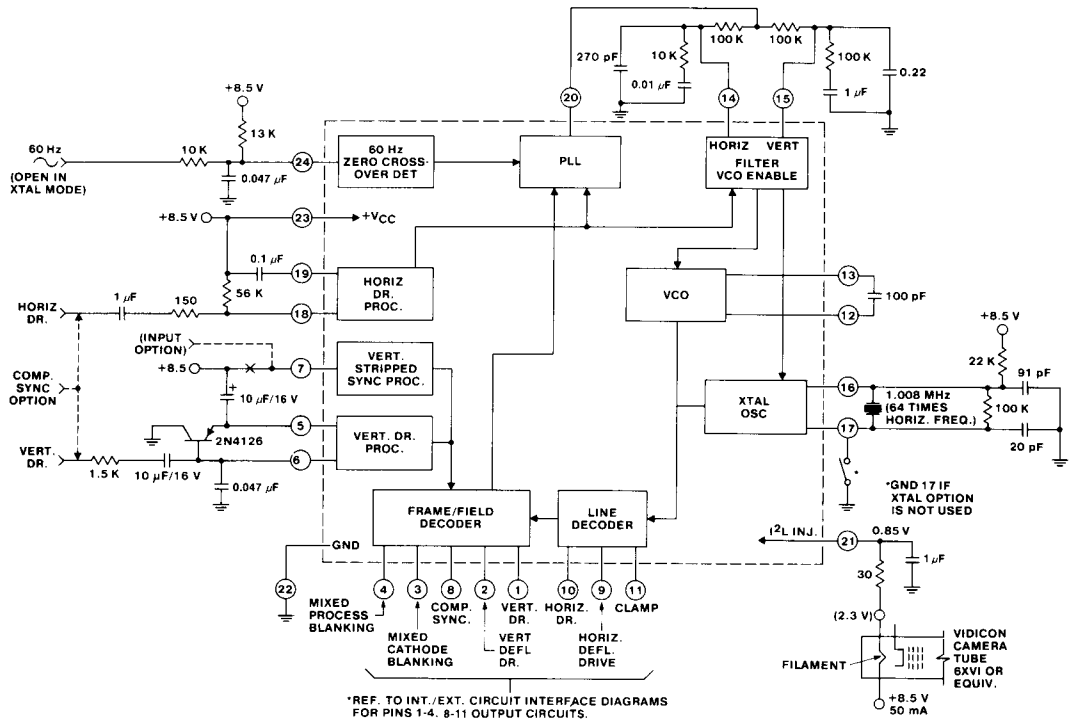
The PLL synchronizes the V_{CO} to the power line zero crossing which provides clean switching, splitting and time lapse V_{CR} performance. The available output signals are as follows: horizontal drive, horizontal deflection drive, clamp, vertical drive, vertical deflection drive, mixed cathode blanking, mixed process blanking, and composite sync (RS-170, 2:1 interlace).

The CA3254 device is supplied in a 24-lead dual-in-line plastic package (E suffix).



TERMINAL ASSIGNMENT

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92CL-39220

Fig. 1 - Functional block diagram of the CA3254 sync generator.

MAXIMUM RATINGS, Absolute-Maximum Values:

DC SUPPLY:

Terminal 23, V_{CC}	11 V
Terminals 1, 2, 3, 9, 10 I_{SINK}	5 mA
Terminals 4, 8, 11 I_{SINK}, I_{SOURCE}	± 5 mA

DEVICE DISSIPATION:

Up to +70°C	695 mW
Above +70°C	Derate linearly at 8.7 mW/°C

AMBIENT TEMPERATURE RANGE:

Operating	0 to 70°C
Storage	-55 to +150°C

LEAD TEMPERATURE (DURING SOLDERING):

At distance $1/16 \pm 1/32$ in. (1.59 ± 0.79 mm) from case for 10 s max.	265°C
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PERFORMANCE CHARACTERISTICS (See Internal Circuit Interface for loads)

Typical Power Supply	8.5 V
Supply Voltage Range	7.5 to 10.5 V
Power Supply Current @ 8.5 V	20 mA
Injection Current Input @ Pin 21	50 mA
60-Hz Power Line Sync Input	8 V _{p-p}
Typical Horizontal and Vertical Drive Input	4 V _{p-p}
Horizontal/Vertical Drive Input Range	3 to 6 V _{p-p}
Vertical Stripped Sync Input Range	3 to 6 V _{p-p}
Vertical Drive Output	8 V _{p-p}
Vertical Deflection Drive Output	8 V _{p-p}
Horizontal Drive Output	8 V _{p-p}
Horizontal Deflection Drive Output	8 V _{p-p}
Mixed Cathode Blanking Output	8 V _{p-p}
Clamp Output	8 V _{p-p}
Mixed Process Blanking Output	8 V _{p-p}
Composite Sync Output	8 V _{p-p}

TIMING - HORIZONTAL:

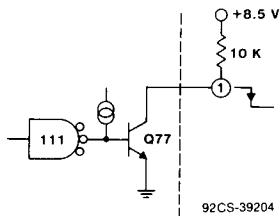
Horizontal Blanking	0 to 11 μ sec.
Horizontal Sync	1.5 to 6 μ sec.
Equalization	1.5 to 4 μ sec.
Serration	-3.5 to 1.5 μ sec.
Clamp	3 to 5 μ sec.
Horizontal Drive	0 to 6 μ sec.
Horizontal Deflection Drive	0 to 11 μ sec.
Cathode Blanking	1.5 to 8.5 μ sec.

TIMING - VERTICAL:

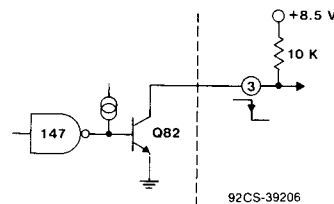
Vertical Blanking	0 to 20H
Equalization	0 to 3H and 6 to 9H
Serration	3 to 6H
Vertical Drive	0 to 9H
Vertical Deflection Drive	3 to 9H
Reset Disable	510 to 18+ serrations

CA3254 INTERNAL/EXTERNAL CIRCUIT INTERFACE

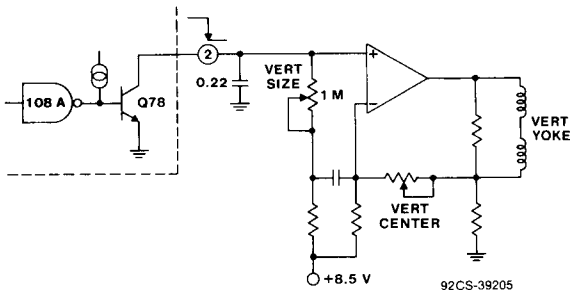
PIN 1: VERTICAL DRIVE OUTPUT



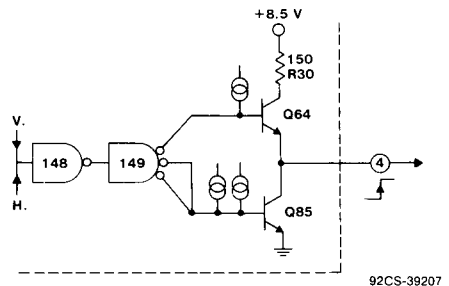
PIN 3: MIXED CATHODE BLANKING OUTPUT



PIN 2: VERTICAL DEFLECTION DRIVE OUTPUT



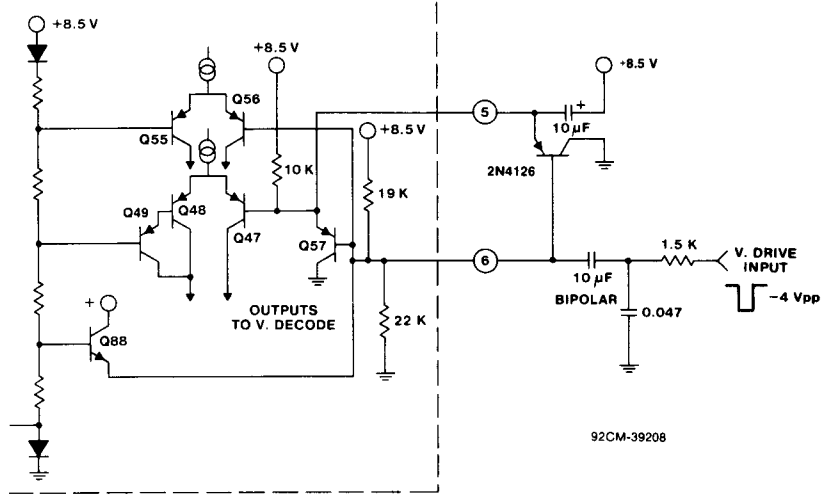
PIN 4: MIXED PROCESS BLANKING OUTPUT



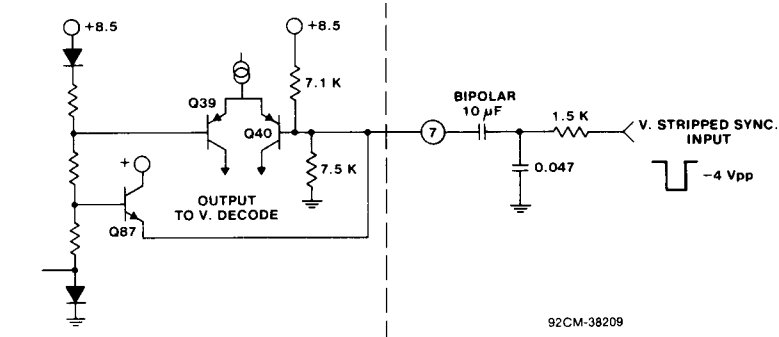
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CA3254 INTERNAL/EXTERNAL CIRCUIT INTERFACE (Continued)

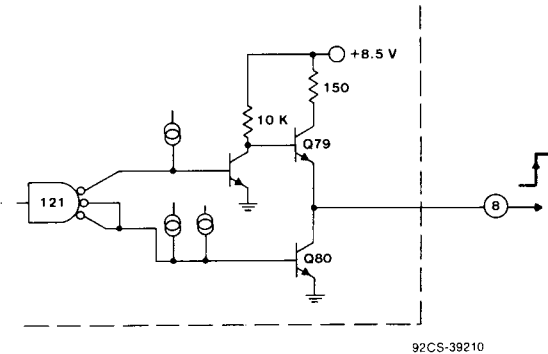
PIN 5 & 6: VERTICAL CAP. AND VERTICAL DRIVE INPUT



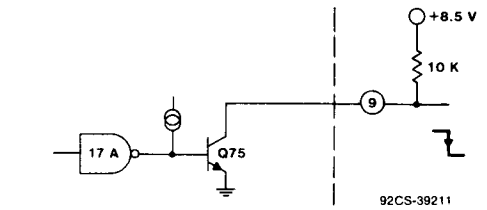
PIN 7: VERTICAL STRIPPED SYNC INPUT



PIN 8: COMPOSITE SYNC OUTPUT



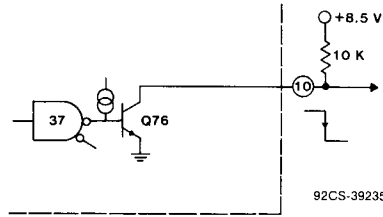
PIN 9: HORIZONTAL DEFLECTION DRIVE OUTPUT



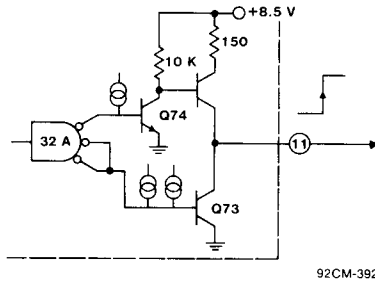
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CA3254 INTERNAL/EXTERNAL CIRCUIT INTERFACE (Continued)

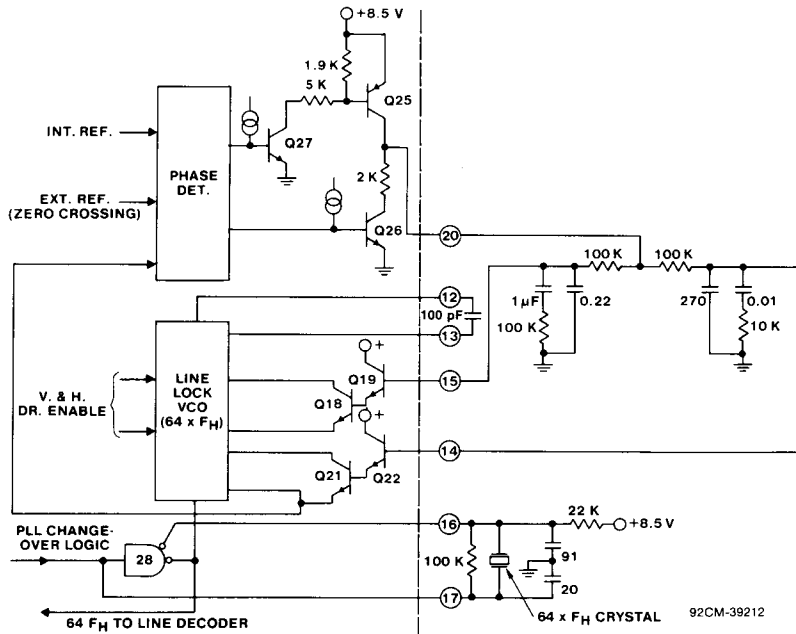
PIN 10: HORIZONTAL DRIVE OUTPUT



PIN 11: CLAMP OUTPUT



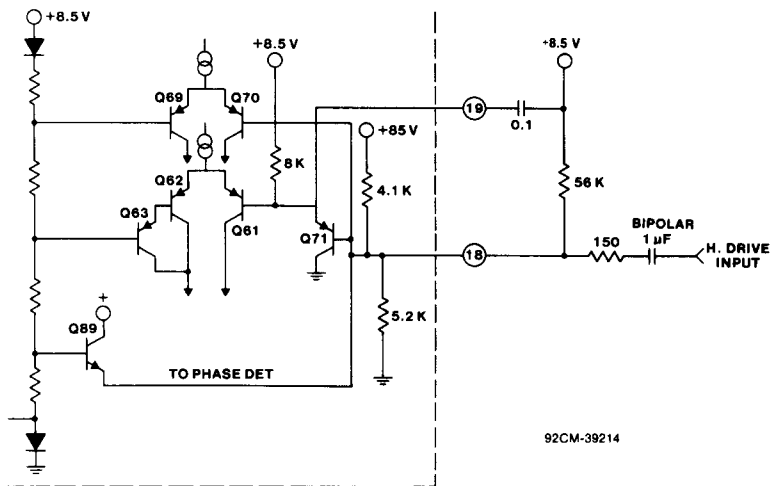
- PINS 14 & 15: VERTICAL AND HORIZONTAL FILTER
- PINS 16 & 17: CRYSTAL OSCILLATOR
- PIN 24: 60 HZ SIGNAL INPUT FOR LINE LOCK
- PIN 20: TRISTATE PHASE DETECTOR OUTPUT
- PINS 12 & 13: VCO CAPACITOR



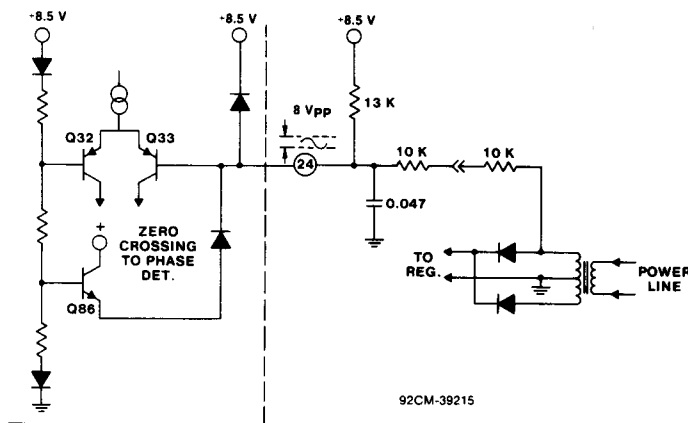
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CA3254 INTERNAL/EXTERNAL CIRCUIT INTERFACE (Continued)

PINS 18 & 19: HORIZONTAL DRIVE INPUT



PIN 24: 60-HZ SIGNAL INPUT



APPLICATION INFORMATION

SYNC GENERATOR

The sync generator is a 24 pin IC requiring a single +8.5 V_{DC} power source. It supplies all pulses required for 2:1 interlaced 525/60 Hz EIA RS-170 sync timing.

For 625/50 Hz operation, a CA3255 IC is available. A 24-pin IC socket permits easy changing of the sync generator IC for either 525/60 Hz or 625/50 Hz.

The normal mode of operation is a zero crossing line lock mode, but the generator may operate crystal controlled or be externally driven.

For crystal operation, the 525/60 Hz crystal frequency is 1.008 MHz and for 625/50 Hz, the crystal frequency is 1 MHz. For NTSC sync operation the 64 times horizontal crystal frequency is 1.006993 MHz and is externally phase locked to the 3.579545 MHz (f_c) color sub carrier, where $f_H = 2f_c/455$.

Circuit Operation

An AC sine wave signal is fed into Pin 24 to synchronize to the zero crossing of the power line. R44 and R45 form a voltage divider to optimize the zero crossing point. There is also a short circuit protection resistor in the externally power supply in series with R44 - (10K). This resistor is part of the zero crossing voltage divider. C33 filters any spikes which might occur at the zero crossing.

Pin 23 is the +8.5 V_{DC} input and is filtered by C34.

Pin 22 is the common and is tied to case ground.

Pin 21 is the injector input to operate part of the logic. The injector requires +0.85 V_{DC} at approximately 50 mA DC. To save power, the injector voltage is taken in series with the filament of the vidicon. C35 is a filter for the injector. A 150-ohm/0.5 watt resistor to +8.5 V may be used in place of the 30-ohm resistor and vidicon filament in series.

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Circuit Operation (cont'd)

Pin 7 if not used is tied to the +8.5 V_{cc}. It is a vertical stripped sync input equivalent to vertical drive input.

Pin 6 is the external vertical drive or composite sync input normally requiring 4 V p-p, but will operate between 3 and 6 V p-p. R57 and C46 integrate the signal to remove horizontal and C47 is a DC blocking capacitor.

Pin 5 detects the presence of external vertical drive by the charge placed on C45. Q22 is a follower used to prevent C45 loading the vertical drive input on Pin 6.

Pin 4 supplies positive going 7.8 V p-p mixed horizontal and vertical blanking pulses to the video amplifier per RS-170 specifications. Vertical blanking is approximately 1.3 ms and horizontal blanking is approximately 11 μ s.

Pin 3 supplies negative going horizontal and vertical 0.65 V p-p pulses to the cathode blarker Q6. The amplitude of the pulses are limited to 0.65 V p-p by the emitter base of Q6. The width of the vertical pulses are approximately 200 μ s and the horizontal is 7 μ s. R56 is a pull up resistor for Pin 3 bias.

Pin 2 supplies negative going pulses to the vertical deflection circuit. These pulses act as a switch during vertical retrace time and appear as a sawtooth due to capacitor C32 in the vertical deflection circuit. This sawtooth is typically near 0.65 V p-p.

Pin 1 is the vertical drive output.

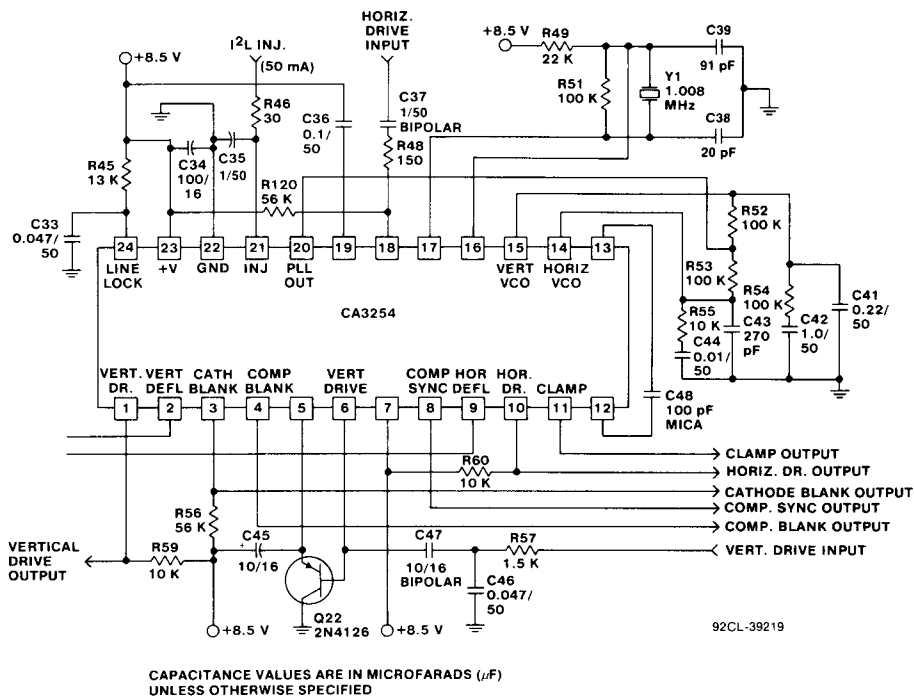
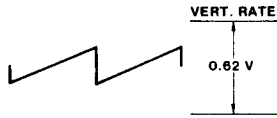
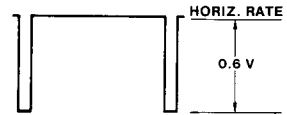


Fig. 3 - Crystal mode of operation.

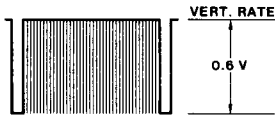
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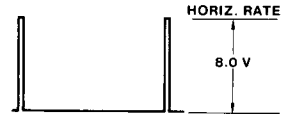
PIN 2 — VERTICAL DRIVE



PIN 9 — HORIZONTAL DRIVE



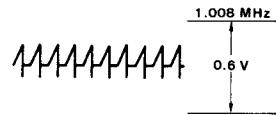
PIN 3 — CATHODE BLANKING



PIN 11 — CLAMP



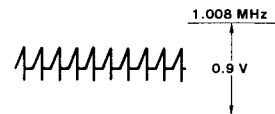
PIN 4 — COMPOSITE BLANKING



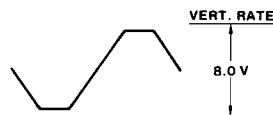
PIN 12 — OSCILLATOR



PIN 8 — COMPOSITE SYNC



PIN 13 — OSCILLATOR



PIN 24 — LINE LOCK

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Fig. 4 - Waveforms (See Fig. 2)

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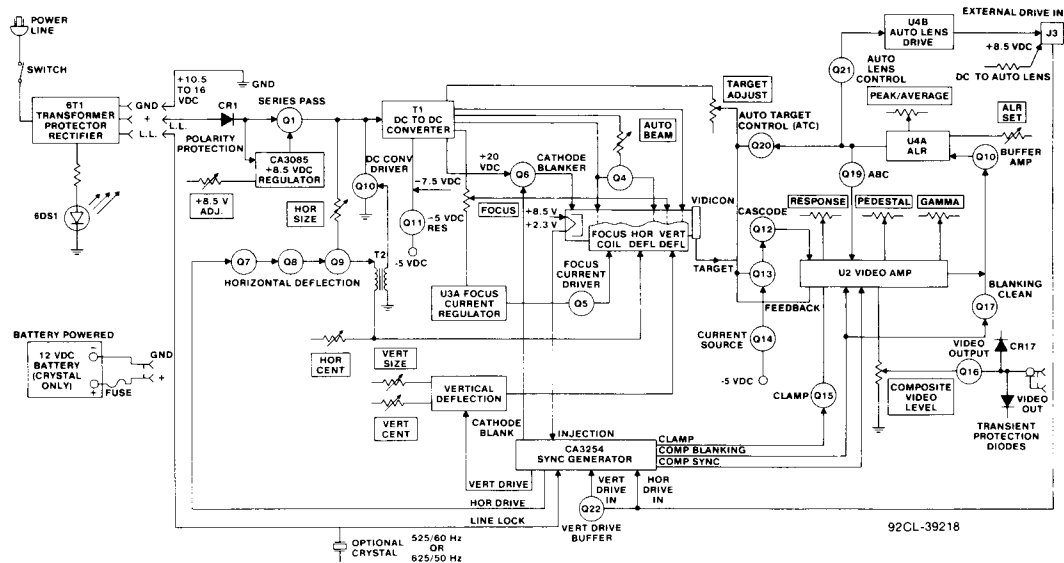


Fig. 5 - Block diagram of camera system.
(RCA-TC2000 series CCTV camera)