Ordering number:ENN2866A

Monolithic Linear IC

LA7510

Quasi-Parallel Intercarrier Detector

Overview

The LA7510 is a 4.5MHz to 6.5MHz intercarrier audio IF detector for high-quality multi-channel TV and VCR sound systems. It is designed for use in quasi-parallel circuit configurations to eliminate audio buzz and minimize other side-effects present in conventional detection circuits.

The LA7510 includes a 3-stage IF amplifier, IF AGC circuit and transistor intercarrier audio detection circuit. It operates from a single 8 to 10 power supply.

A compact 9-pin single-in-line package and coil-less circuit simplifiers the design of low-cost detection circuitry.

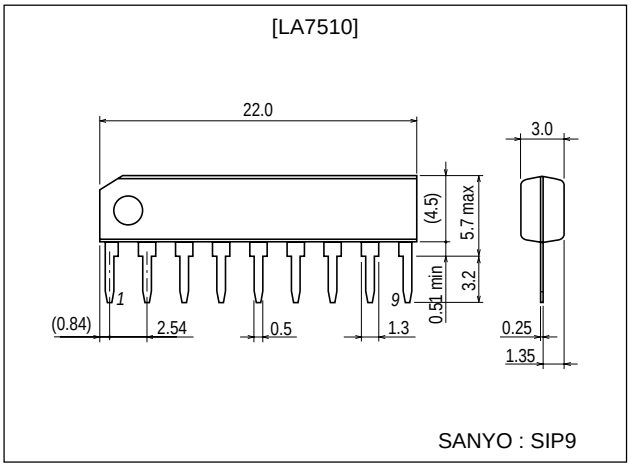
Features

- Compact package.
- Excellent audio S/N characteristics.
- Coil-less circuit.

Package Dimensions

unit:mm

3017D-SIP9



Specifications

Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max		12	V
	V_3 max	V_{CC}=12V	12	V
Allowable power dissipation	Pd max	Ta≤65˚C	540	mW
Operating temperature	Topr		–10 to +65	˚C
Storage temperature	Tstg		–55 to +125	˚C
Maximum output current	I_6 max		3	mA

Operating Conditions at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_7		9	V
Operating voltage range	V_7 op		8 to 10	V

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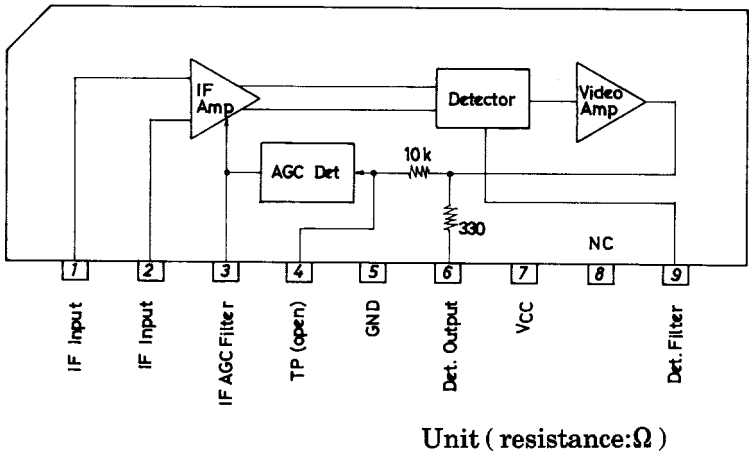
Operating Characteristics at Ta = 25˚C, V_{CC}=9V

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Supply current	I_7	V_3 (IF AGC)=4V	17	22	23	mA
Input sensitivity	Vi	IF input level for 0.35Vp-p detector output with 40% modulation.	34	42	50	dBμ
AGC range	GR	(maximum input for V_O=0.35Vp-p) – Vi	60	70		dB
Maximum input level	Vi max	IF input level for detector output increase of 1dB	100	120		dBμ
Detector output amplitude	V_{O6}	4.5MHz output level, P/S=13dB	90	130	180	mVrms
Audio S/N	S/N	fp=58.75MHz, 87.5% staircase modulation fs=54.25MHz, P/S=13dB [S : FM±25kHz, fm=400Hz; N : Non-modulation]	50	56		dB

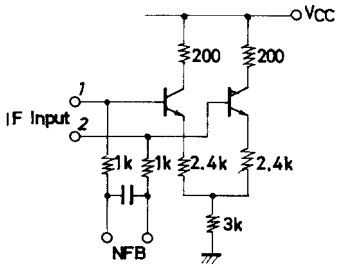
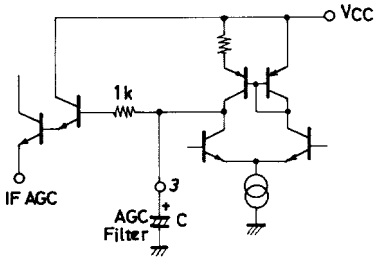
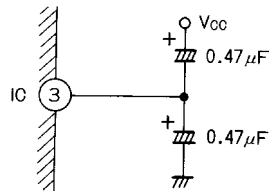
Equivalent Circuit Block Diagram



Unit (resistance:Ω)

Pin Functions

Unit (resistance : Ω)

Pin No.	Internal Circuit	Description
1, 2		IF amplifier balanced inputs. Should be decoupled with a ≥0.01μF capacitor.
3		IF AGC filter pin. The filter capacitor should be 1μF. A capacitor with good tan δ temperature characteristics should be used, such as an ALSi capacitor. If power supply ripple is high, ripple on the detector output can be reduced by using the following circuit. 

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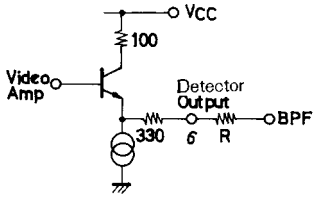
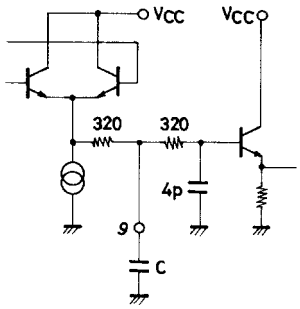
Continued from preceding page. Unit (resistance : Ω)

Pin No.	Internal Circuit	Description
6		Detector output. The output stage is an emitter-follower. The external resistance R is required to match impedances with the following 4.5MHz ceramic band-pass filter. Note that the LA7510 has an internal 330Ω resister on the output pin.
9		Transistor detector filter pin. The filter capacitor should be selected for optimum audio signal-to-noise. Its value should be less than 85pF, since the 4.5MHz signal drops as the capacitance increases, increasing the picture/sound carrier level ratio and degrading audio S/N performance.

Functional Description

1. IF Amplifier

As shown in figure 1, the IF amplifier is a 3-stage balanced circuit. The AGC detector output controls the gain of all three stages.

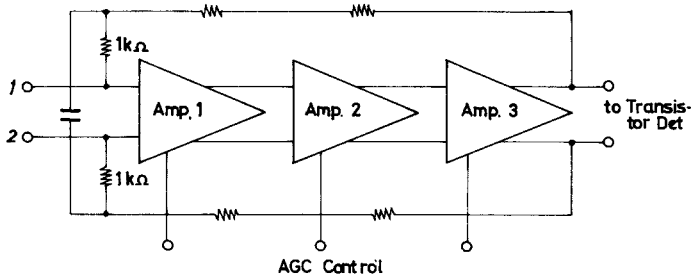


Figure 1

2. AGC Detector

The AGC detector , shown in figure 2, is a peak-detection type circuit. Pin 3 is the peak-detection filter capacitor connection.

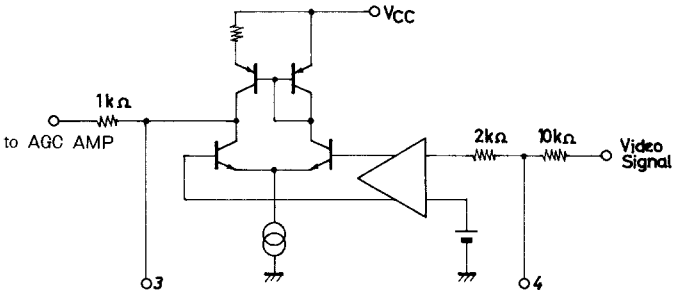


Figure 2

3. Transistor Detector and Video Amplifier

The detector circuit is shown in figure 3. The balanced IF signals from the IF amplifier and applied separately to the bases of the differential pair.

The detector output is taken from the emitters of the differential pair, smoothed by the filter on pin 9, and amplified by the video amplifier. The video signal (≈0.85/Vp-p) and sound IF signal are output on pin 6 via a 330Ω resistor.

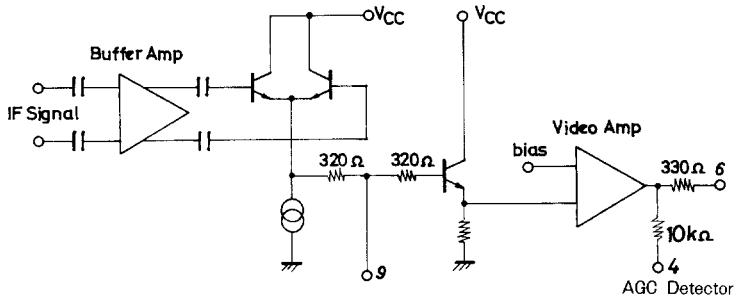
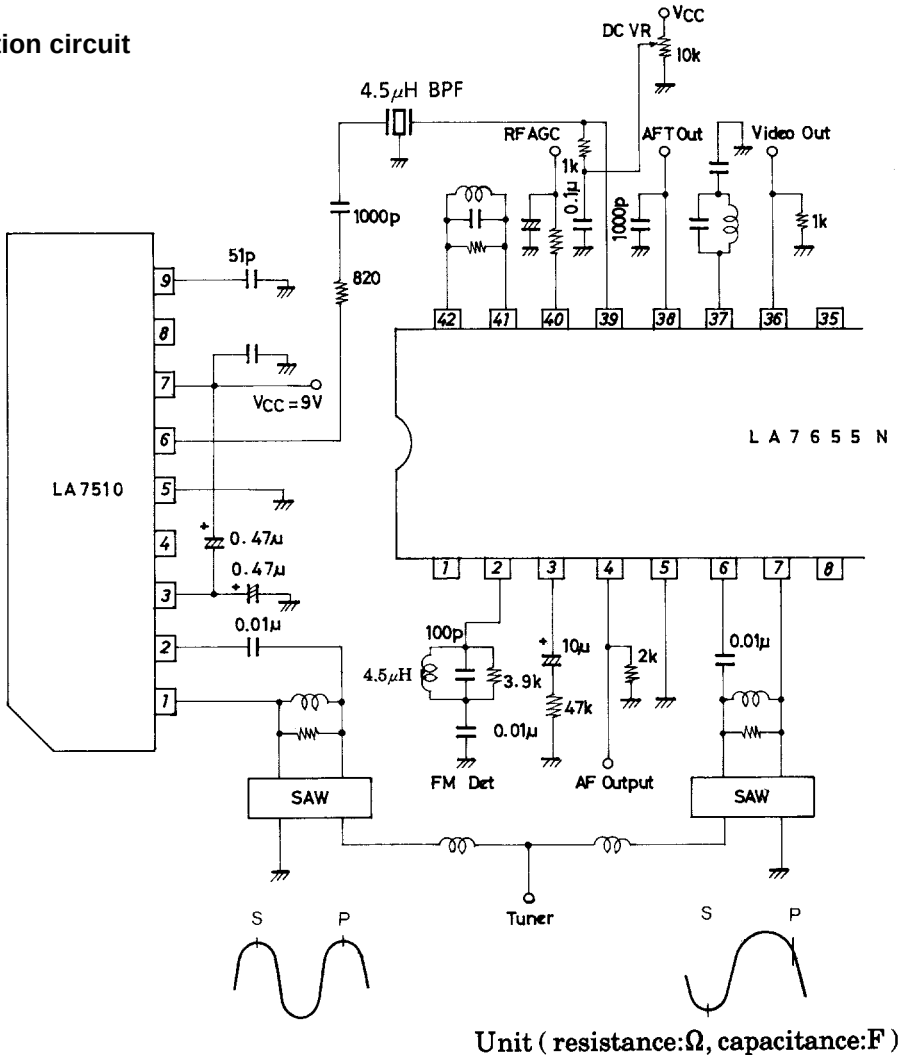


Figure 3

Sample Application circuit



Unit (resistance:Ω, capacitance:F)