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NTE842
Integrated Circuit
Television Video IF Amplifier,
Sync Separator, and AGC Processor

Description:

The NTE842 is a monolithic silicon integrated circuit in a 16–Lead DIP type package designed to perform IF amplification, tuner AGC, and composite sync–separation functions in color or monochrome TV receivers.

PIN diodes are used in the IF amplifiers for gain control, resulting in increased dynamic range and better signal–to–noise ratio.

Features:

- High–Gain Wide–Band IF Amplifiers
- Sample–and–Hold Keyed AGC
- Composite Sync Separator with Noise Immunity
- Fast AGC using PIN Diodes
- Gain Reduction with Excellent Stability
- Internal Varactor Pole Shift at Max Gain

Absolute Maximum Ratings:

DC Supply Voltage, V_{CC}
- Between Pin11 and Pin3, Pin13 . . . 14V
- Between 24K connected to Pin6 and Pin3, Pin13 . . . 25V

DC Supply Current, I_C
- At Pin1 + Pin2 + Pin11 + Pin14 at Max. Gain . . . 60mA
- At Pin (Open Collector) . . . 2mA

Device Dissipation ($T_A \leq +55°C$), P_D . . . 750mW
- Derate Above +55°C . . . 7.9mW/°C

Operating Ambient Temperature Range, T_{opr} . . . –40° to +85°C

Storage Temperature Range, T_{stg} . . . –65° to +150°C

Lead Temperature (During Soldering, 1/16” from case, 10sec max), T_L . . . +265°C

Electrical Characteristics: (T_A = +25°C, +12–V Supply)

Parameter		Test Conditions	Min	Typ	Max	Unit
Operating Supply Current		Note 1, $I_1 + I_2 + I_{11} + I_{14}$	–	40	60	mA
Supply Current		Note 2, $I_1 + I_2 + I_{11} + I_{14}$	15	20.5	30	mA
Initial Alignment		Note 3, Fixture Tune Voltage	0	8	15	V
Bandwidth 45.75–MHz Response		Note 4	55	70	85	%
Skew (Pole Shift)		Note 5	35	60	85	%
Maximum Gain		Note 6	–	80	–	dB
AGC Gain Reduction		Note 16	–	80	–	dB
Sensitivity		Note 6	1.5	3	–	ΔV
AGC Delay 1		Notes 7, 9	0	0.75	1	mA
AGC Delay 2		Notes, 8, 9	0	100	150	µA
Noise		Note 10	–	9	11	$mV_{(rms)}$
Picture/Noise		Note 11	55	57	–	dB
Sync Output	1	Note 12	4.5	5	6	V_{p-p}
	2		4.5	5	6	
IF AGC	A @ 50mV	Note 13	–	$6V_{p-p}$	–	Ref
	B @ 5mV		95	–	110	%
	C @ 100mV		90	–	105	
Bar (100 IRE) To Sync		Note 14	2	2.5	3	Ratio
Sync Tip		Note 15	1.4	1.8	2.2	V
Input Impedance		Note 1	–	1K	–	Ω

Note 1. No signal, AGC bias = GND (maximum gain).

Note 2. No signal, AGC bias = +10V (minimum gain).

Note 3. Adjust sweep generator for 50mV(rms) across an external 50Ω termination and sweep width of 10MHz centered at 44MHz. Apply sweep signal (without 50Ω termination) to test–fixture input. Apply positive voltage (0V to 10V) to AGC bias input on fixture and adjust for a peak response (44MHz) of 3V above GND while adjusting fixture tune voltage so that the response at 42.17MHz and 45.75MHz are equal. This corresponds to a 5 to 8V peak–to–peak response curve on an oscilloscope. Measure the fixture bandwidth tune supply voltage.

Note 4. Retain tune voltage and AGC bias voltage from previous test. Measure response at 45.75MHz with respect to peak response (44MHz)

Note 5. Retain tune voltage. Reduce amplitude of sweep signal 34dB (1mV(rms) across 50Ω). Adjust AGC bias votlage so that the response at 45.75MHz is 3V above GND. Measure response at 42.17MHz with respect to 45.75MHz.

Note 6. Retain tune voltage. Remove sweep signal. Apply +10V to AGC bias input. Measure video output, V_{OH}. (The voltage will depend on the individual unit of NTE842 used in the test circuit and will be between 8 and 11V.) Remove +10V at AGC bias input, and ground the AGC bias input. Apply a 200µV signal at 45.75MHz (as measured across an external 50Ω termination), and measure the change in the video output voltage with respect to V_{OH}. Note that the actual sensitivity in a TV receiver can be higher because the test fixture includes a 5.2–dB attenuator.

Note 7. Retain tune voltage. With AGC bias open and video input switch closed, apply a 15mV(rms) signal (as measured across an external 50Ω termination) at 45.75MHz. As the AGC delay current is varied from 0 to 1mA, the reverse tuner output voltage should go from high to low, and forward tuner output from low to high.

Note 8. Same as Note 7, except increase input signal to 60mV(rms). As the delay current is varied from 0 to 150µA, the reverse tuner output voltage should go from high to low and forward tuner output from low to high.

Note 9. The reverse tuner AGC output is an open collector. A 12KΩ resistor may be connected to a +12V supply or a 24KΩ resistor to a +24V supply. The output high voltage will be within 1V of the supply voltage.

Note 10. Apply a 45.75MHz, 50mV(rms) signal (as measured across an external 50Ω termination) to the fixture input. Apply a positive DC voltage to the AGC bias input and close the video input switch. Adjust the AGC bias for a 2V reading at the video output. Measure the AC rms noise.

Note 11. Apply a 100 IRE bar–modulated IF signal to the fixture IF input. Modulation should be set at 87.5%. Close the video input switch. Using an external 75Ω to 50Ω matching pad and 50Ω step attenuators, adjust the modulated IF signal to a 50mV equivalent (141.5mV$_{p-p}$ signal on a wide–band oscilloscope). Apply a key pulse to fixture input. Measure amplitude of 100 IRE bar signal (black level to white level) at video output. $(S + N) \div N = 20 \text{ Log}_{10}$ (Bar ÷ Noise).

Note 12. Signal conditions same as Note 11. Measure amplitude of sync output. Repeat test with IF input attenuated 20dB (14.5mV$_{p-p}$). Output at Pin12 is 9V$_{p-p}$ to 12V$_{p-p}$.

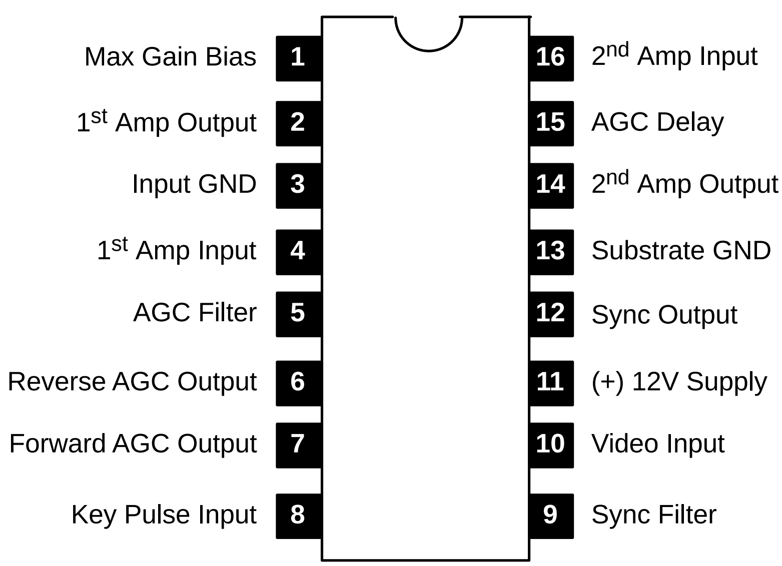
Note 13. A. Signal conditions same as Note 11. Measure amplitude of 100 IRE bar.
B. Repeat test with IF input attenuated 20dB. B% = 100 x Test 13B ÷ Test 13A.
C. Repeat test with IF input increased 6dB (283 mV$_{p-p}$). C% = 100 x Test 13C ÷ Test 13A.

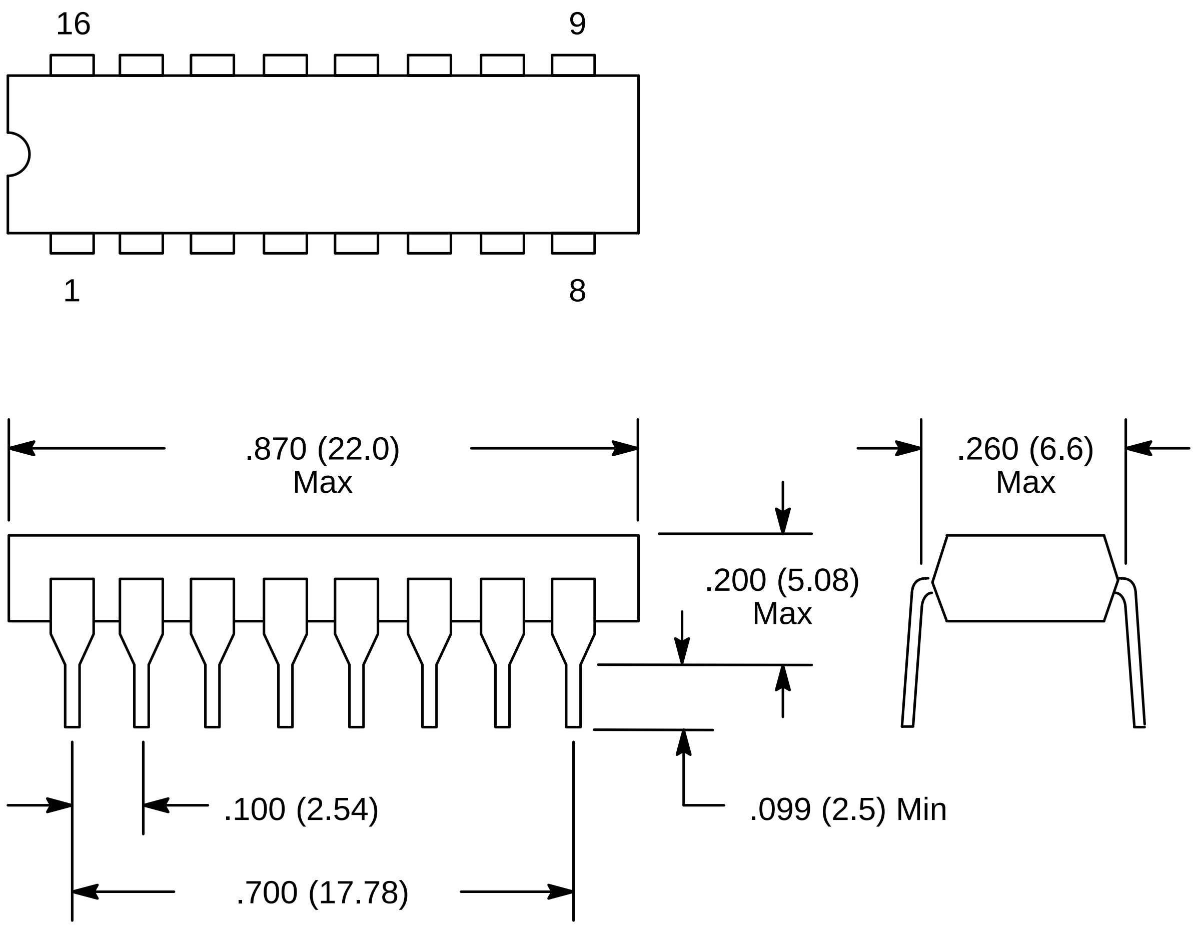
Note 14. Same signal and conditions as Note 11. Measure ratio of 100 IRE bar signal to sync signal of composite video output. Repeat test with input IF signal increased 6dB.

Note 15. The sync tip to ground voltage is equivalent to the keyed AGC threshold. The test signal and conditions are the same as Note 11. Measure the sync tip to ground voltage at the video output.

Note 16. A typical application circuit includes a tuner having at least 20dB AGC gain reduction.

Pin Connection Diagram





16
9
1
8
.870 (22.0)
Max
.260 (6.6)
Max
.200 (5.08)
Max
.100 (2.54)
.099 (2.5) Min
.700 (17.78)