Signetics

TBA120U
Sound IF Amplifier/ Demodulator for TV

Product Specification

Linear Products

DESCRIPTION

The TBA120U is an IF amplifier with a symmetrical FM demodulator and an AF amplifier with adjustable output voltage. The AF amplifier is also provided with an output for volume control and an input for VCR operation.

The input and output of the TBA120U are especially designed for LC circuits, but the input can also be used with a ceramic filter.

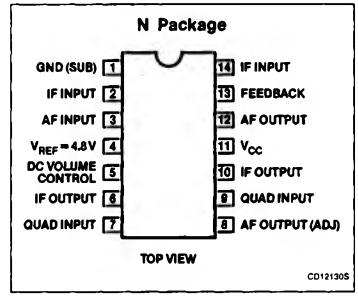
FEATURES

- **Outstanding limiting**
- **AF input**
- **Few external components**
- **DC volume control**

APPLICATIONS

- **Black/white and color TV receivers**
- **Video cassette recorders (VCRs)**
- **CATV converters**

PIN CONFIGURATION



ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE
14-Pin Plastic DIP (SOT-27K)	0 to +70°C	TBA120UN

ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	RATING	UNIT
$V_{CC} = V_{11-1}$	Power voltage (Pin 11)	18	V[1]
V_{5-1}	Adjustment voltage (Pin 5)	6	V
P_{TOT}	Total power dissipation	400	mW
R_{13-14}	Bypass resistance	1	kΩ
T_{STG}	Storage temperature range	−65 to +150	°C
T_A	Operating ambient temperature range	−15 to +70	°C

NOTE:
1. Supply voltage operating range is 10 to 18V.

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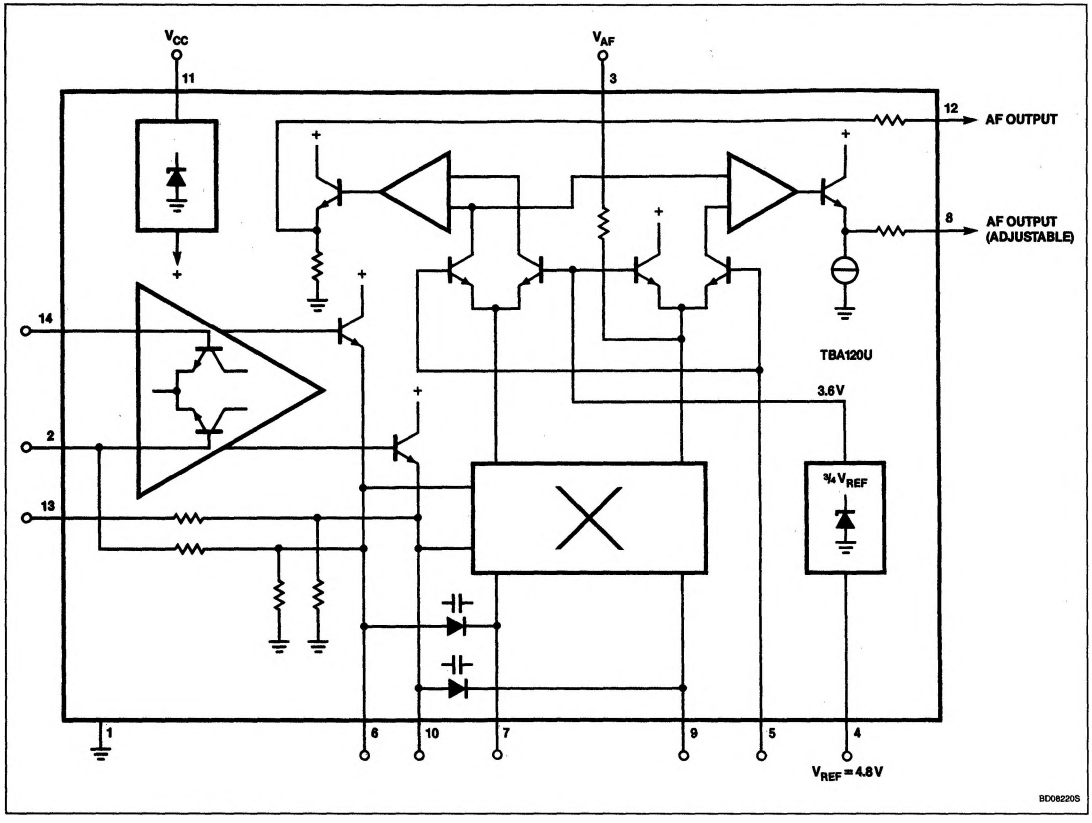
BLOCK DIAGRAM



DC ELECTRICAL CHARACTERISTICS V_{CC} = 12V; T_A = 25°C; f = 5.5MHz, unless otherwise specified.

SYMBOL	PARAMETER	LIMITS			UNIT
		Min	Typ	Max	
$A_{V\ IF\ 6-14}$	IF voltage gain		68		dB
V_I	Input voltage starting limiting at $\Delta f = \pm$ 50kHz; f_M = 1kHz		30	60	μV
$V_{O\ IF\ (P-P)}$	IF output voltage at limiting (peak-to-peak value)		250		mV
α	AM suppression at $\Delta f = \pm$ 50kHz; V_I = 500μV; f_M = 1kHz; m = 30%	50	60		dB
	IF residual voltage without de-emphasis				
V_{IF12}	at Pin 12		30		mV
V_{IF8}	at Pin 8		20		mV
$A_{V\ AF8-3}$	AF voltage gain		7.5		
$\Delta V_{O\ AF}$	AF adjustment at R_{4-5} = 5kΩ; R_{5-1} = 13kΩ	20	28	36	dB
$\Delta V_{O\ AF}$	AF output voltage control range	70	85		dB
R_{4-5}	Adjustment resistor[1]		1 to 10		kΩ
	DC voltage portion at the AF outputs				
V_{12-1}	Pin 12		5.6		V
V_{8-1}	Pin 8		4.0		V
	Output resistance of the AF outputs				
$R_{O\ 12-1}$	Pin 12		1.1		kΩ
$R_{O\ 8-1}$	Pin 8		1.1		kΩ
$R_{I\ 3-1}$	Input resistance of the AF input		2		kΩ
$V_{4-1} = V_{REF}$	Stabilized reference voltage	4.2	4.8	5.3	V
R_{4-1}	Source resistance of reference voltage source		12		Ω
	Ripple rejection				
V_{12}/V_{11}	at Pin 12		30		dB
V_8/V_{11}	at Pin 8		35		dB
$I_{CC} = I_{11}$	Supply current (Pin 11)	9.5	13.5	17.5	mA
$\lvert Z_I \rvert$	IF input impedance				
	C_L 4.5pF		40		kΩ
	C_L 6.0pF	15			kΩ
	AF output voltage at $\Delta f = \pm$ 50kHz; f_M = 1kHz; V_I = 10mV; Q_O = 45; RMS value				
$V_{O\ AF\ (RMS)}$	at Pin 12		1.0		V
$V_{O\ AF\ (RMS)}$	at Pin 8		1.2		V
d_{TOT}	Distortion at $\Delta f = \pm$ 50kHz; f_M = 1kHz; V_I = 10mV; Q_O = 20		1		%

NOTE:
1. Pin 5 must be connected to Pin 4, when volume control adjustment is not applicable.

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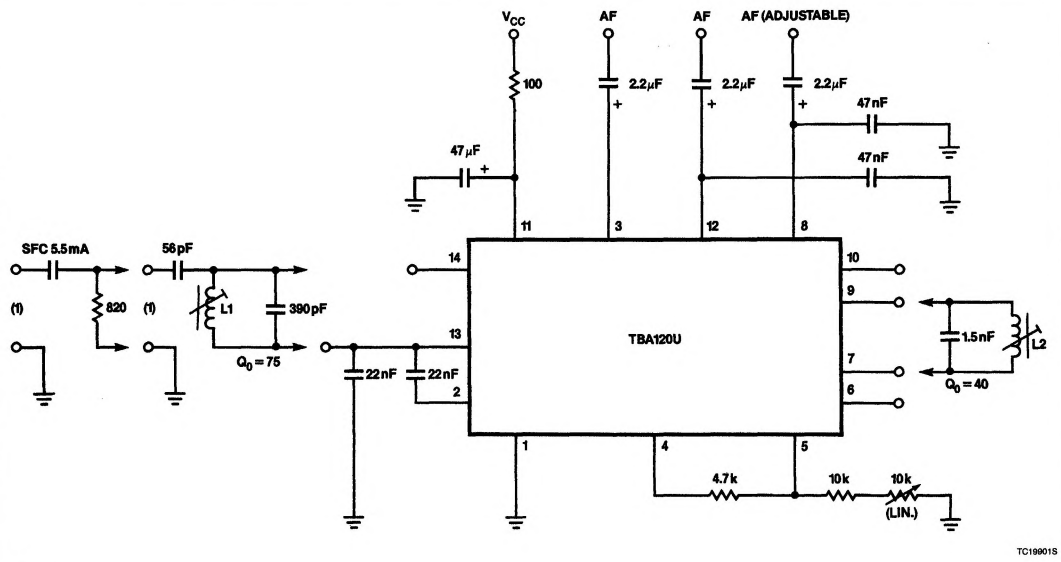


NOTE:
1. Either one of these circuits may be used.

Figure 1. Application Example Using TBA120U

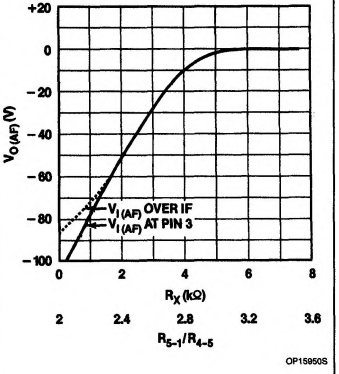


Figure 2. The AF Output Voltage at Pin 8 as a Function of the Resistance Values as Shown in Figure 3

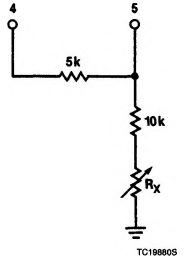
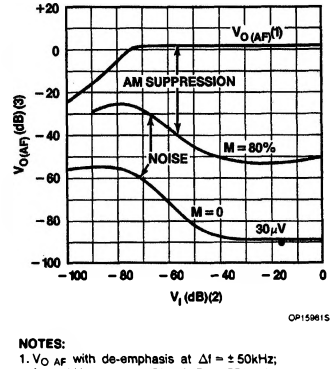
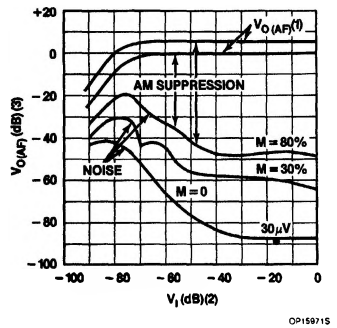


Figure 3. Resistor Conditions for Curves in Figure 2



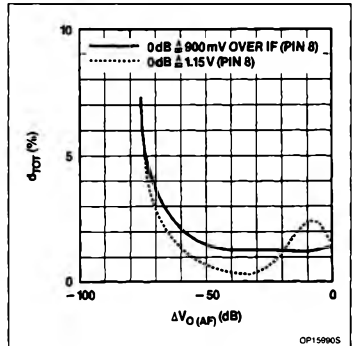
NOTES:
1. $V_{O\ AF}$ with de-emphasis at $\Delta f = \pm 50$kHz; f_M = 1kHz; d_{TOT} = 1.5%; 0dB ≈ 770mV.
2. V_I: 0dB ≈ 200mV at 60Ω

Figure 4. The AF Output Voltage at Pin 8 as a Function of the Input Voltage With SFC 5.5mA at the Input (see Figure 1)



NOTES:
1. $V_{O\ AF}$ with de-emphasis at f_m = 1kHz; 0dB ≈ 770mV;
   curve a: $\Delta f = \pm 50$kHz; d_{TOT} = 3%;
   curve b: $\Delta f = \pm 25$kHz; d_{TOT} = 1%.
2. V_I: 0dB ≈ 200mV at Pin 14.

Figure 5. The AF Output Voltage at Pin 8 as a Function of the Input Voltage With Broadband Input (60Ω)



NOTES:
——— 0dB ≈ 900mV over IF (Pin 8)
- - - - 0dB ≈ 1.15V (Pin 8)

Figure 7. Total Distortion as a Function of the AF Output Voltage Change

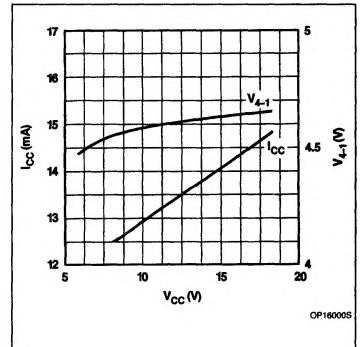


Figure 8. Supply Current and the Reference Voltage at Pin 4 as a Function of Supply Voltage

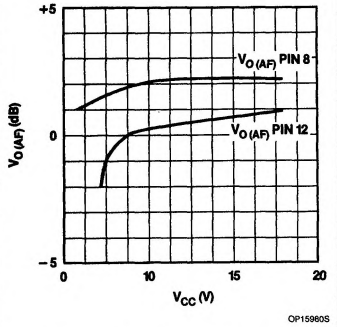


Figure 6. The AF Output Voltage at Pins 8 and 12 as a Function of the Supply Voltage; 0dB ≈ 770mV