

**MULTISTANDARD VIDEO AND SOUND IF SYSTEM  
WITH AUDIO AND VIDEO SWITCHES**

ADVANCE DATA

- VIDEO PLL DEMODULATION
- SOUND PLL DEMODULATION
- POSITIVE AND NEGATIVE MODULATION
- AGC FOR BG AND L STANDARDS
- AUDIO SWITCH
- DC VOLUME CONTROL
- VIDEO SWITCH



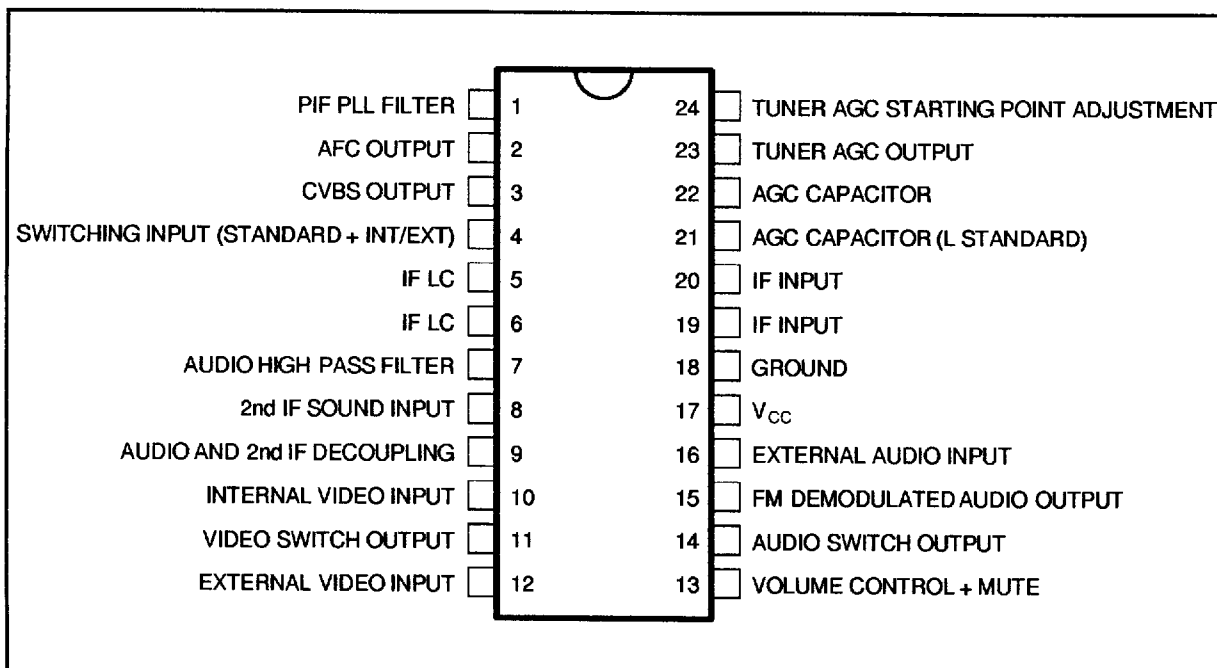
**DESCRIPTION**

The STV8224A1 is a picture and sound IF processor for multistandard application with very few external components and adjustments.

It provides the audio and video switches for one SCART plug application.

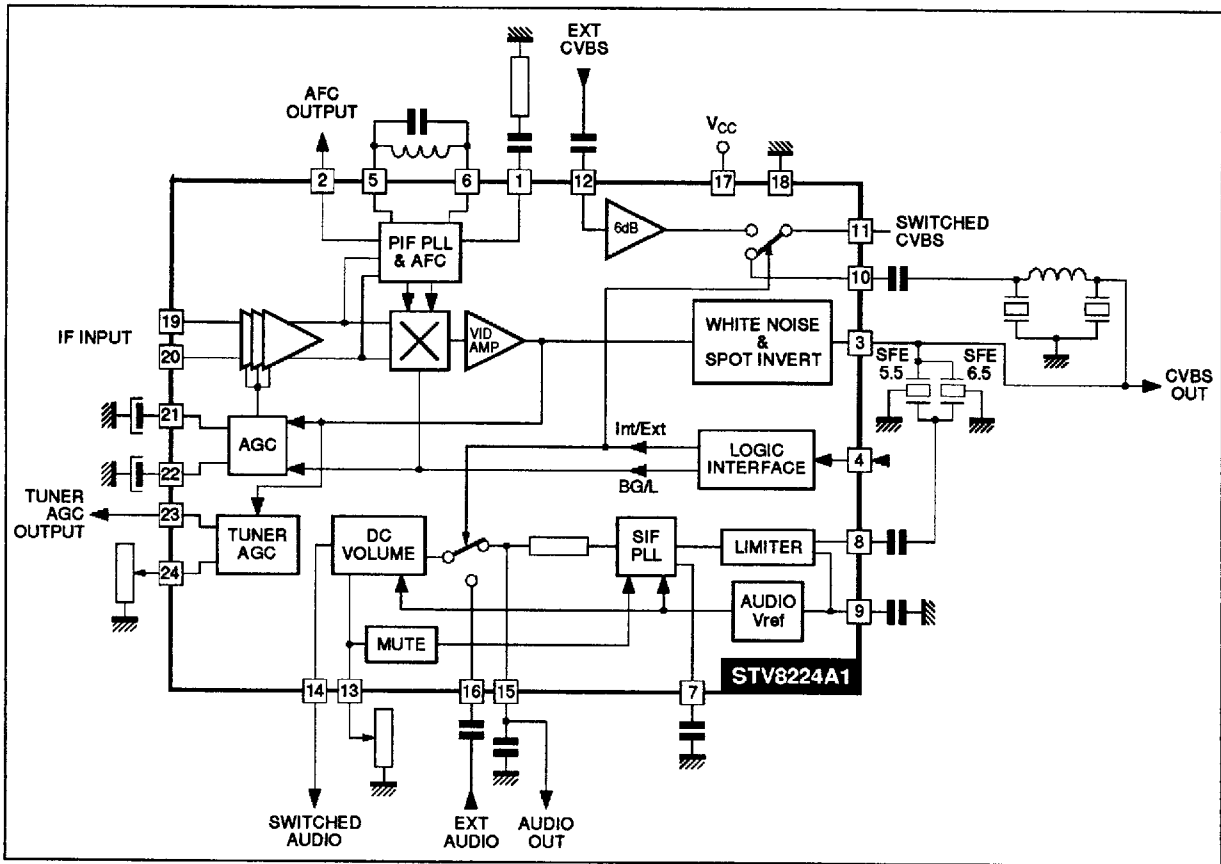
AM sound demodulation is performed with the STV8225 add-on.

**PIN CONNECTIONS**



82241-01 EFS

**BLOCK DIAGRAM**



82241-02.EPS

**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value	Unit
V <sub>s</sub>	Supply Voltage	13.5	V
V <sub>x</sub>	Tuner AGC Voltage	V <sub>cc</sub>	V
T <sub>stg</sub>	Storage Temperature	-40, +150	°C
T <sub>oper</sub>	Operating Temperature	0, +70	°C

82241-01.TBL

**THERMAL DATA**

Symbol	Parameter	Value	Unit
R <sub>th(j-a)</sub>	Junction-ambient Thermal Resistance	Max. 75	°C/W

82241-02.TBL

**ELECTRICAL CHARACTERISTICS**

( $T_{amb} = 25^{\circ}\text{C}$ ,  $V_{CC} = 9\text{V}$ , IF input =  $10\text{mV}_{RMS}$  sync level at B/G, Peak-white level at L,  
Video modulation DSB, D = 90% at B/G, D = 95% at L,  $f_{PC} = 38.9\text{MHz}$ ,  $f_{SC} = 33.4\text{MHz}$ ,  
Video BW = 5MHz, Sound carrier input : 5.5MHz,  $10\text{mV}_{RMS}$ ,  $f_M = 1\text{kHz}$ , Audio BW = 20kHz,  $\Delta f = \pm 50\text{kHz}$ ,  
Volume attenuation = 0dB, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
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**SUPPLY**

$V_{CC}$	Supply Voltage		8	9	12.6	V
$I_{CC}$	Supply Current	$I_{17}$ , $V_{CC} = 9\text{V}$		70	95	mA

**IF AMPLIFIER**

$V_{19-20}$	Input Sensitivity (RMS)	-3dB Video at Output		70		$\mu\text{V}_{RMS}$
$R_{19-20}$	Differential Input Resistance			1.5		k $\Omega$
$C_{19-20}$	Differential Input Capacitance			2		pF
$G_r$	Gain Control Range			64		dB
	Max Input Signal	+1dB Video at Output		110		$\text{mV}_{RMS}$

**SYNCHRONOUS VIDEO DEMODULATOR**

$DF_{PC}$	Vision Carrier Capture		-1.4		1.6	MHz
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**AFC**

$S_2$	AFC Slope	See Figure 21		0.2		$\mu\text{A/kHz}$
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**DEMODULATED VIDEO OUTPUT (Pin 3)**

$V_{A3}$	Amplitude	Top Sync to White	2	2.3	2.6	$V_{PP}$
BG vs L	Amplitude Difference				10	%
$V_{S3}$	Top Sync Level	B/G and L	1.6	1.9	2.2	V
	Zero Carrier Level	B/G L		4.4 1.8		V V
BW	Bandwidth	-3dB Video Signal	6	7		MHz
$D_g$	Differential Gain			6	8	%
$D_p$	Differential Phase			6	8	Degree
$V_{r3c}$	Residual Carrier Signal (RMS Value)			1	10	mV
$V_{r3h}$	Residual 2nd Harmonic (RMS Value)			1	10	mV
$I_3$	Internal Bias of Emitter Follower		3	5		mA
S/N	Signal to Noise Ratio	Note 1 - Weighted CCIR-567	53	58		dB
	Intermodulation 1.07MHz	Note 2		52		dB
$V_{WTH}$	White Noise Threshold Voltage			4.85		V
$V_{WIL}$	White Noise Insertion Level			3.6		V
$V_{BTH}$	Black Noise Threshold Voltage			1.3		V
$V_{BIL}$	Black Noise Insertion Level			2.5		V

**AGC CIRCUIT (BG MODE)**

$I_{22CBG}$	Charging Current		550	950	1300	$\mu\text{A}$
$I_{22DBG}$	Discharge Current		12	20	28	$\mu\text{A}$
C/D	Charging/Discharging Ratio			45		

Notes : 1.  $\frac{S}{N} = 20 \log 10 \frac{V_{out \text{ black white}}}{V_N (\text{mV}_{RMS})}$  at BW = 5MHz

2. Video carrier relative level = 0dB, Chroma subcarrier level = -3.2dB, Sound carrier relative level = -20dB. AGC voltage (Pin 22) is adjusted to get 1V<sub>PP</sub> signal on output (Pin 3).

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**ELECTRICAL CHARACTERISTICS (continued)**

( $T_{amb} = 25^{\circ}\text{C}$ ,  $V_{CC} = 9\text{V}$ , IF input = 10mV<sub>RMS</sub> sync level at B/G, Peak-white level at L, Video modulation DSB, D = 90% at B/G, D = 95% at L,  $f_{PC} = 38.9\text{MHz}$ ,  $f_{SC} = 33.4\text{MHz}$ , Video BW = 5MHz, Sound carrier input : 5.5MHz, 10mV<sub>RMS</sub>,  $f_M = 1\text{kHz}$ , Audio BW = 20kHz,  $\Delta f = \pm 50\text{kHz}$ , Volume attenuation = 0dB, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
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**AGC CIRCUIT (L MODE)**

$I_{22CL}$	Charging Current	Note 3	2	3.3	4.5	mA
$I_{22DL}$	Discharge Current			0.3		$\mu\text{A}$
$I_{22CL+}$	Additional Charging Current	L in case of missing, VITS Pulses and no White in Video Content		5		$\mu\text{A}$
	Threshold Voltage Level for Additional Charging Current	Referred to Pin 3		2.75		V
$I_{22DL+}$	Additional Discharging Current		28	40	56	$\mu\text{A}$
	Threshold Voltage Level for Additional Discharging Current	Referred to Pin 3		2.25		V

**TUNER AGC**

$I_{23}$	Maximum Sunked Current		1.5	2	2.5	mA
S23	Current Slope	$R_{24} = 5\text{k}\Omega$	100	170	230	$\mu\text{A}/\text{dB}$
$I_{23+}$	Maximum Tuner Plus Sunked Current	Note 4		40		mA

**FM SOUND DEMODULATION**

$V_{8S}$	Input Sensitivity	-3dB FM detected signal		35		$\mu\text{V}$
$R_8$	Limiter Input Resistance			600		$\Omega$
	DC Voltage (Pin 8)			4.2		V
AMR	Amplitude Modulation Rejection	Note 5	50	61		dB
SVR	Supply Voltage Rejection Ratio	Ripple signal : 100Hz, 0.5V <sub>PP</sub>	12	17		dB
$V_{15}$	Detected Audio Output Signal		0.85	1.1	1.4	V <sub>RMS</sub>
THD	Total Harmonic Distortion			0.2	1	%
$R_{15}$	Internal Deemphasis Resistor		600	750	900	$\Omega$
S/N	Signal to Noise Ratio	Note 6, Weighted CCIR 468-4 (quasi peak level)	50	55		dB

**VOLUME CONTROL**

$V_C$ Range	Control Range	See Figure 22	72	77		dB
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**AUDIO SWITCH**

$R_{16}$	Input Resistance		45	60	75	$\text{k}\Omega$
CR <sub>tk</sub>	Crosstalk		70	80		dB
$E_n$	Output Noise Level (Pin 14)	Weighted CCIR 468-4, $V_{13} = 0.5\text{V}$ (quasi peak level)		120		$\mu\text{V}$
EXTHD	THD on External Signal (Pin 14)	$V_{IN} = 2\text{V}_{RMS}$ , Attenuation = 0dB		0.1	0.3	%
	Audio Reference Voltage (Pin 9)			5		V

Notes : 3. Triggered on white level

4. Additional sunked current for large increasing steps of input signal when :

- Voltage Pin 22 > starting point defined Pin 24.
- Output signal (Pin 3) saturated ( $V_3 < V_{BTH}$  in BG mode,  $V_3 > V_{WTH}$  in L mode).

5.  $AMR = 20 \log \frac{V_{15} (mV_{RMS})}{V_{AM}}$  (dB) where  $V_{AM}$  = output amplitude in AM for  $f_M = 1\text{kHz}$  and  $m = 30\%$

6.  $\frac{S}{N} = 20 \log \frac{V_{15} (mV_{RMS})}{V_N (mV_{RMS})}$  (dB)

**ELECTRICAL CHARACTERISTICS (continued)**

( $T_{amb} = 25^{\circ}\text{C}$ ,  $V_{CC} = 9\text{V}$ , IF input =  $10\text{mV}_{RMS}$  sync level at B/G, Peak-white level at L, Video modulation DSB, D = 90% at B/G, D = 95% at L,  $f_{PC} = 38.9\text{MHz}$ ,  $f_{SC} = 33.4\text{MHz}$ , Video BW = 5MHz, Sound carrier input : 5.5MHz,  $10\text{mV}_{RMS}$ ,  $f_M = 1\text{kHz}$ , Audio BW = 20kHz,  $\Delta f = \pm 50\text{kHz}$ , Volume attenuation = 0dB, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
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**VIDEO SWITCH**

$V_{DC12}$	DC Input Level	No signal	1.6	1.9	2.2	V
$V_{S12}$	Top Sync. Clamp Level			1.8		V
$V_{I1}$	DC Output Level	No signal	1.7	2	2.3	V
$V_{S11}$	Top Sync. Clamp Level			1.5		V
	Crosstalk			55		dB
GEX	Gain from Ext. Input to Output		5.5	6	6.5	dB
	Output Swing		4	5		V
$I_{I2}$	Input Current	$V_{I2} = V_{DC12} = 1.5\text{V}$		1	5	$\mu\text{A}$
VBW	Bandwidth	$V_{IN} = 1\text{V}_{PP}$		15		MHz
$G_{IN}$	Gain from Int. Input to Output		-0.5	0	+0.5	dB

**MUTE (Pin 13)**

$V_{TH13}$	Threshold Voltage Pin 13		0.2	0.3	0.4	V
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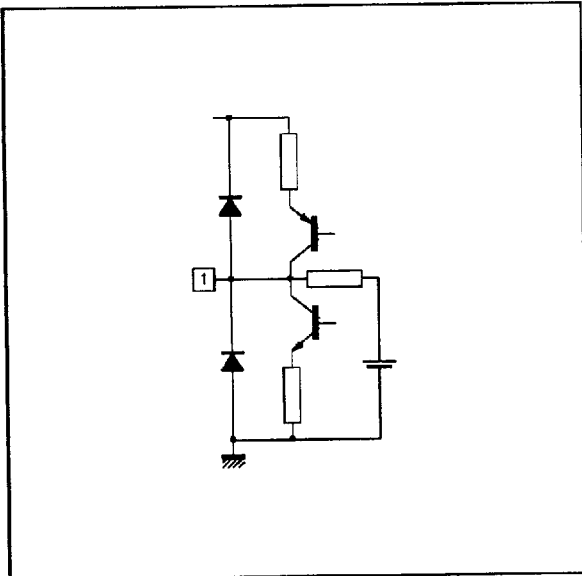
**CONTROL INPUT**

	Negative Modulation	Video : External - Audio : External	7.2			V
	Threshold 3	Level linked to $V_{CC}$	6.4	6.8	7.2	V
	Positive Modulation	Video : External - Audio : External	4.9		6.4	V
	Threshold 2	Level linked to $V_{CC}$	4.1	4.5	4.9	V
	Positive Modulation	Video : Internal - Audio : External	2.6		4.1	V
	Threshold 1	Level linked to $V_{CC}$	1.8	2.2	2.6	V
	Negative Modulation	Video : Internal - Audio : Internal			1.8	V

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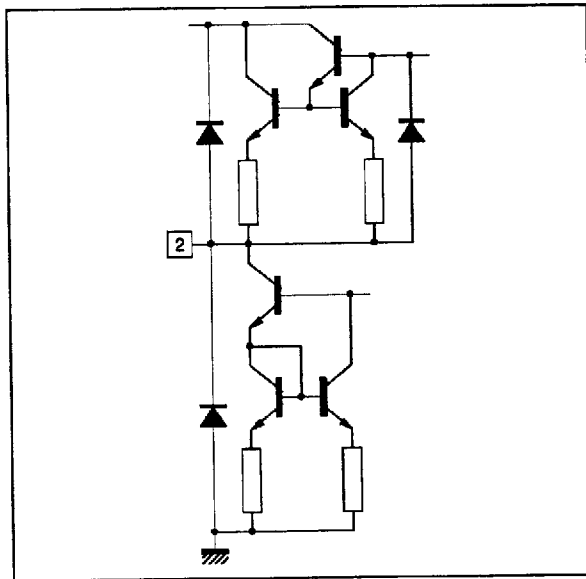
**INPUT/OUTPUT PIN CONFIGURATION**

**Figure 1 : PIF PLL Filter**



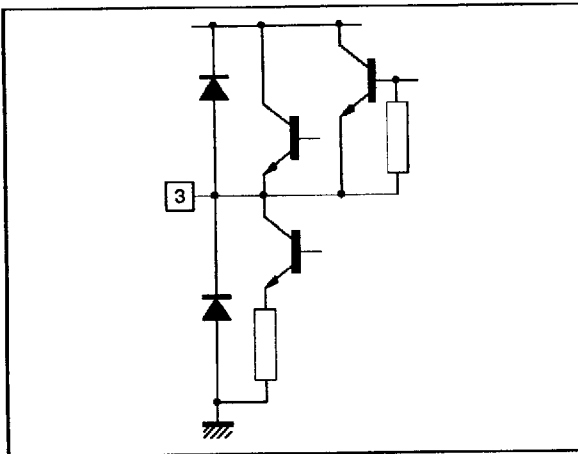
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**Figure 2 : AFC Output**



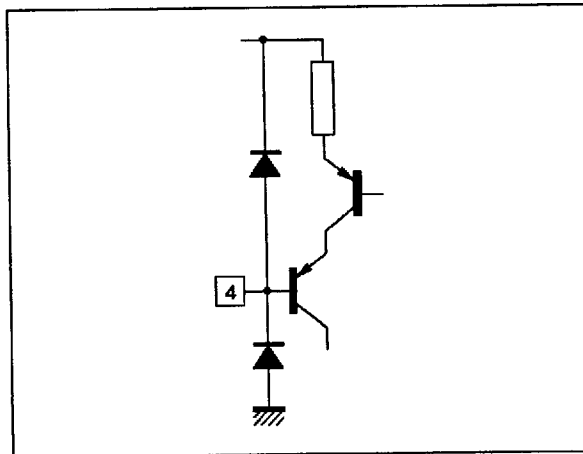
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**Figure 3 : CVBS Output**



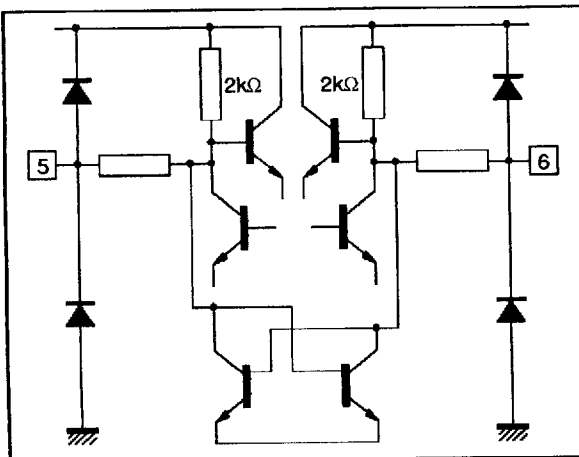
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**Figure 4 : Switching Input Standard + INT/EXT**



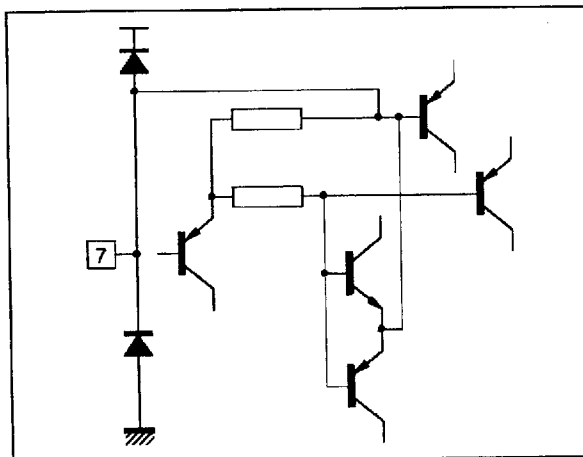
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**Figure 5 : IFLC**



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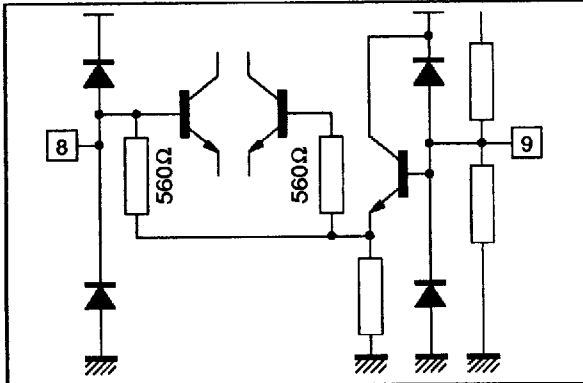
**Figure 6 : Audio High Pass Filter**



82241-08.EPS

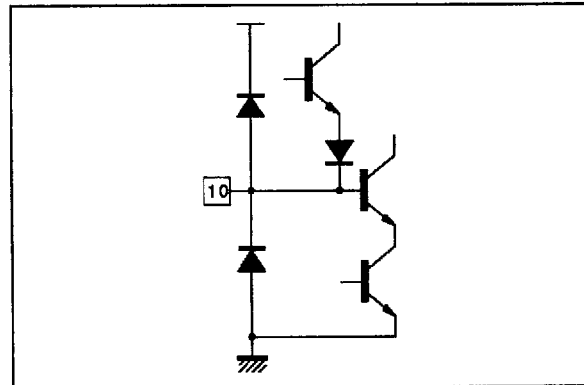
INPUT/OUTPUT PIN CONFIGURATION (continued)

**Figure 7 :** 2<sup>nd</sup> IF Sound Input (Pin 8)  
Audio and 2<sup>nd</sup> IF Decoupling (Pin 9)



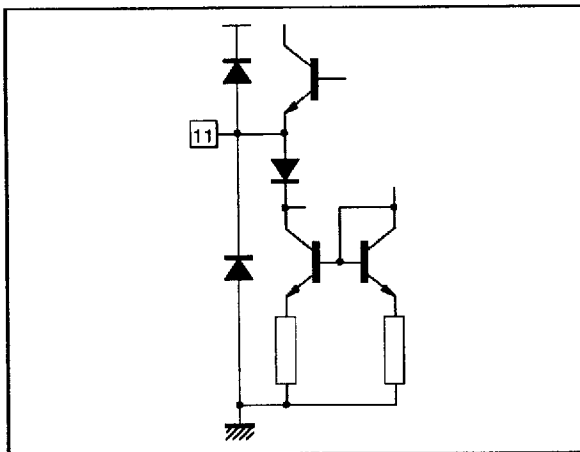
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**Figure 8 :** Internal Video Input



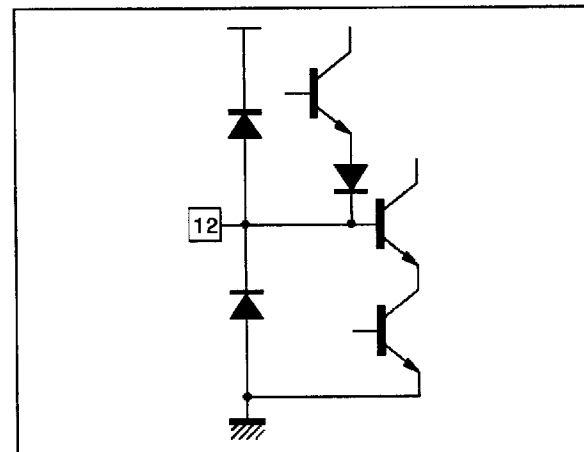
82241-10.EPS

**Figure 9 :** Video Switch Output



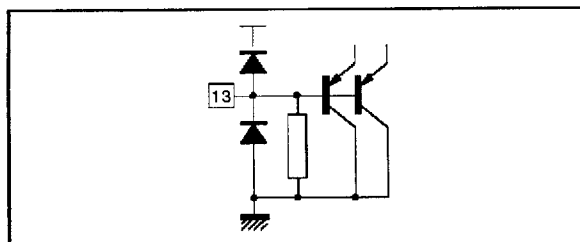
82241-11.EPS

**Figure 10 :** External Video Input



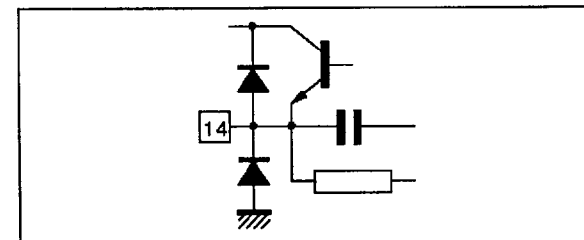
82241-12.EPS

**Figure 11 :** Volume Control + Mute



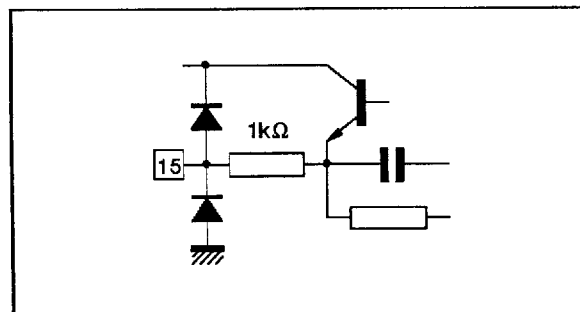
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**Figure 12 :** Audio Switch Output



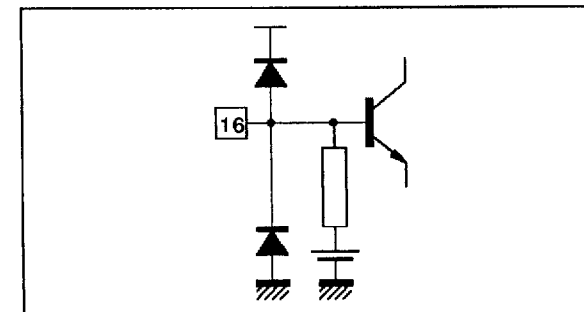
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**Figure 13 :** FM Demodulated Audio Output



82241-15.EPS

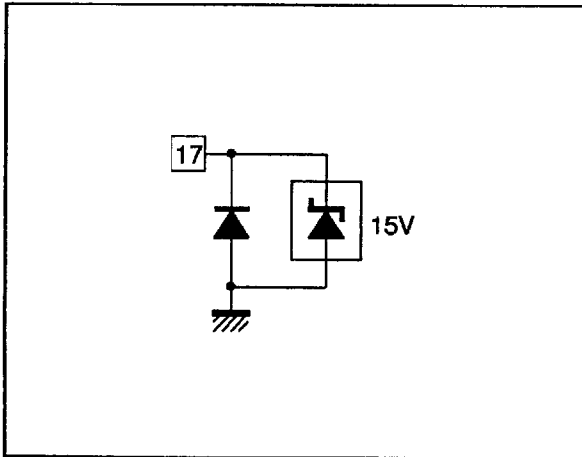
**Figure 14 :** External Audio Input



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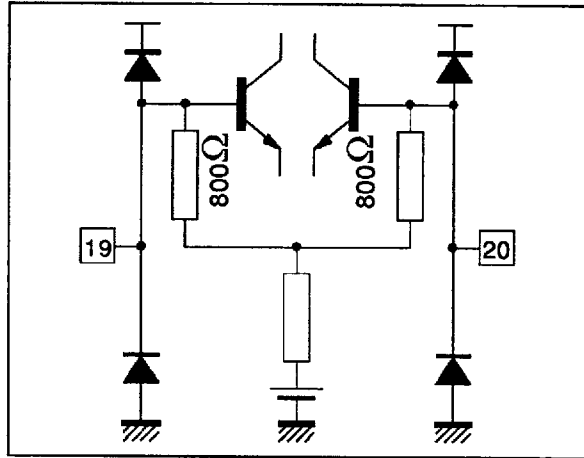
INPUT/OUTPUT PIN CONFIGURATION (continued)

Figure 15 : Vcc



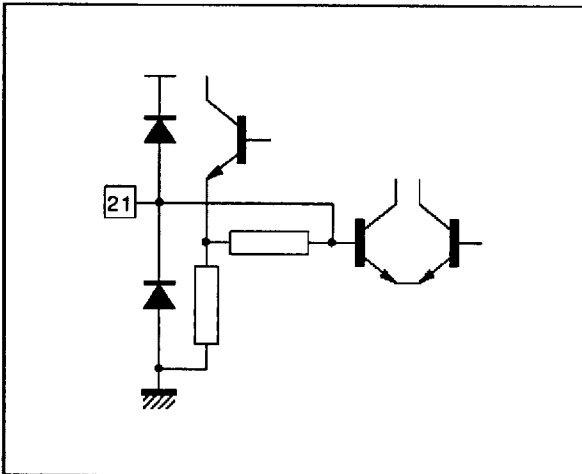
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Figure 16 : IF Input



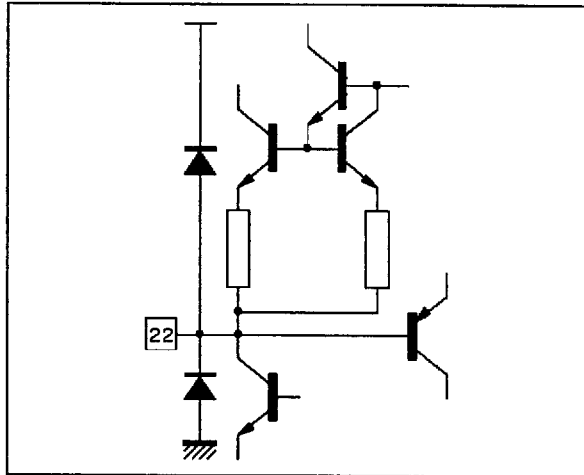
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Figure 17 : AGC Capacitor



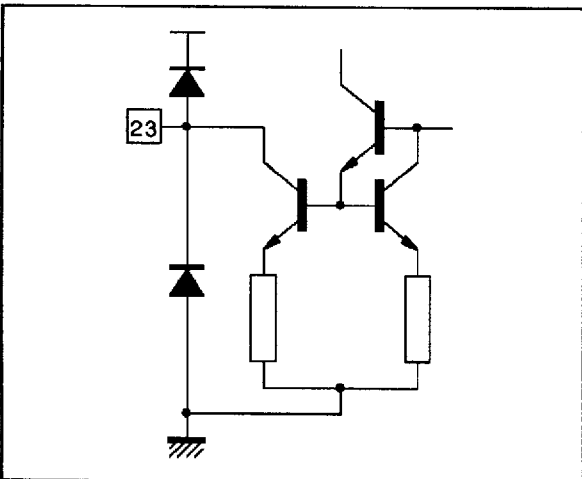
82241-19.EPS

Figure 18 : AGC Capacitor



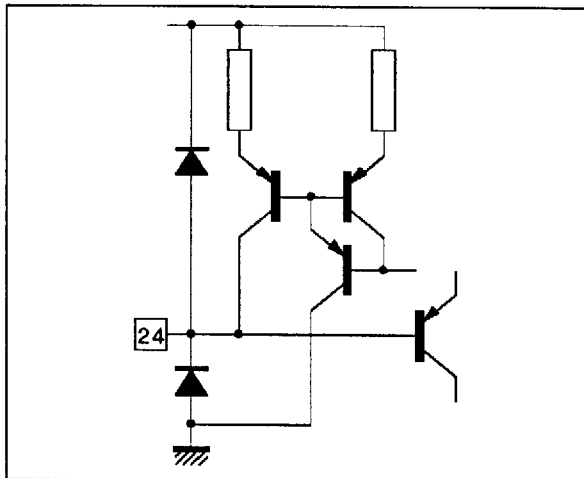
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Figure 19 : Tuner AGC Output



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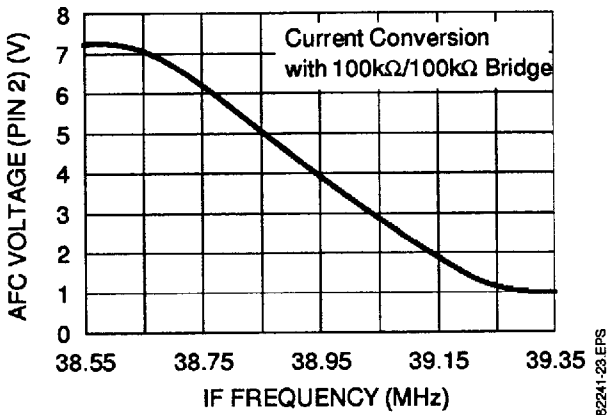
Figure 20 : Tuner AGC Starting Point Adjustment



82241-22.EPS

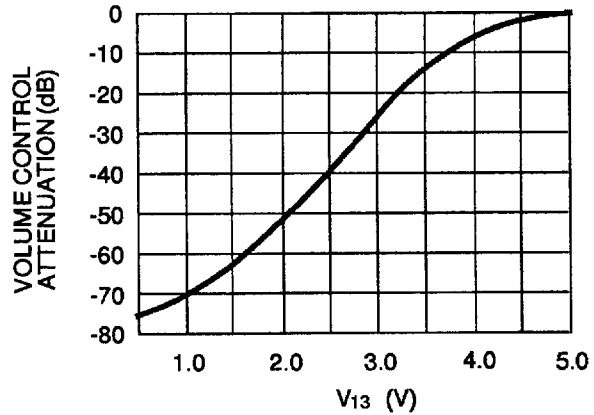


Figure 21 : AFC Voltage Pin 2 vs IF Frequency



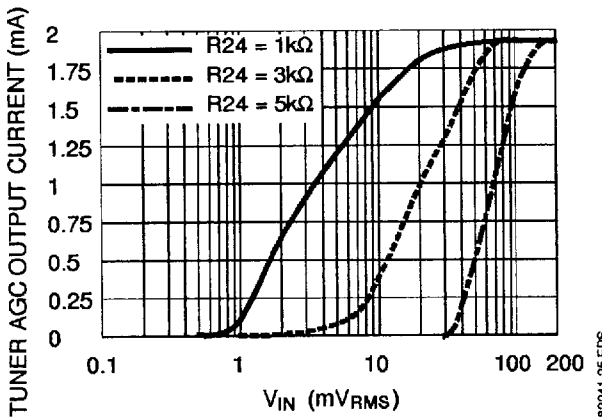
82241-23.EPS

Figure 22 : Volume Control Attenuation vs  $V_{13}$



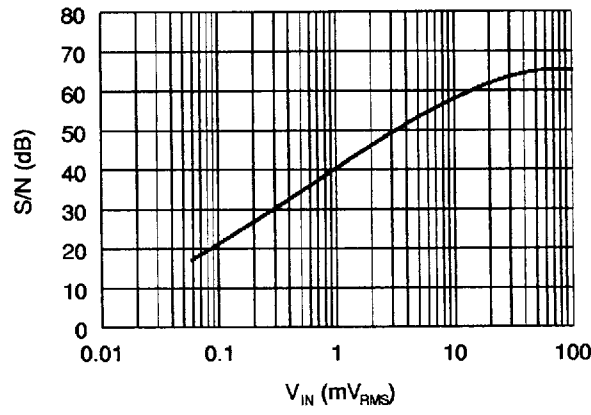
82241-24.EPS

Figure 23 : Tuner AGC Output Current vs  $V_{IN}$  (R24 is external adjustment Pin 24)



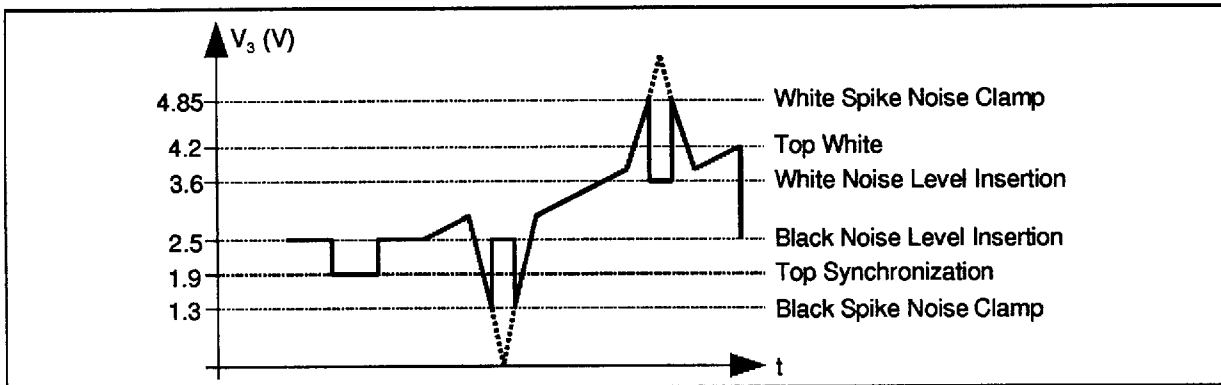
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Figure 24 : Video Signal to Noise Ratio (Pin 3) as a function of IF Input Signal (Pins 19-20) Weighted CCIR-567



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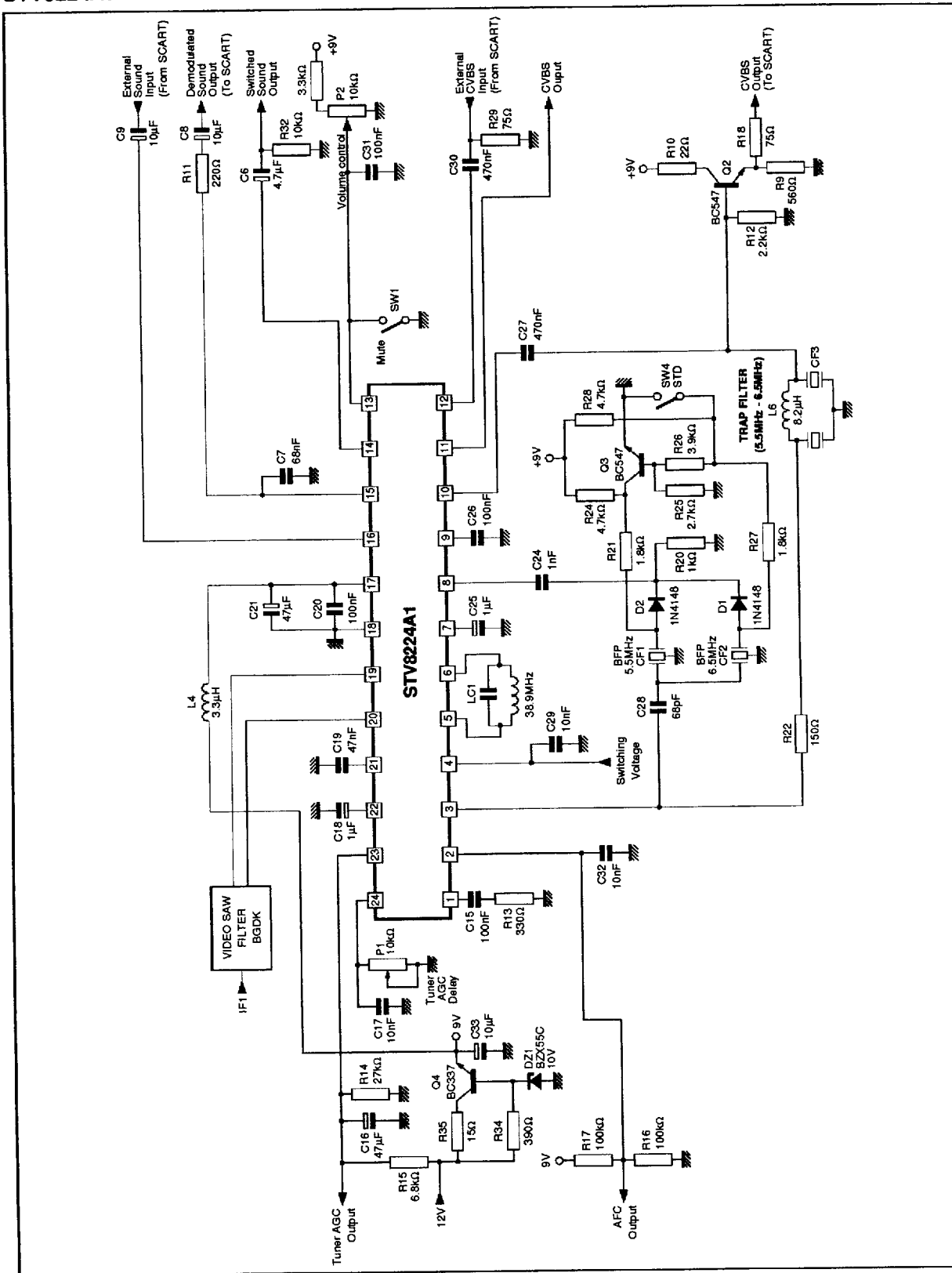
Figure 25 : Black and White Noise Inverter



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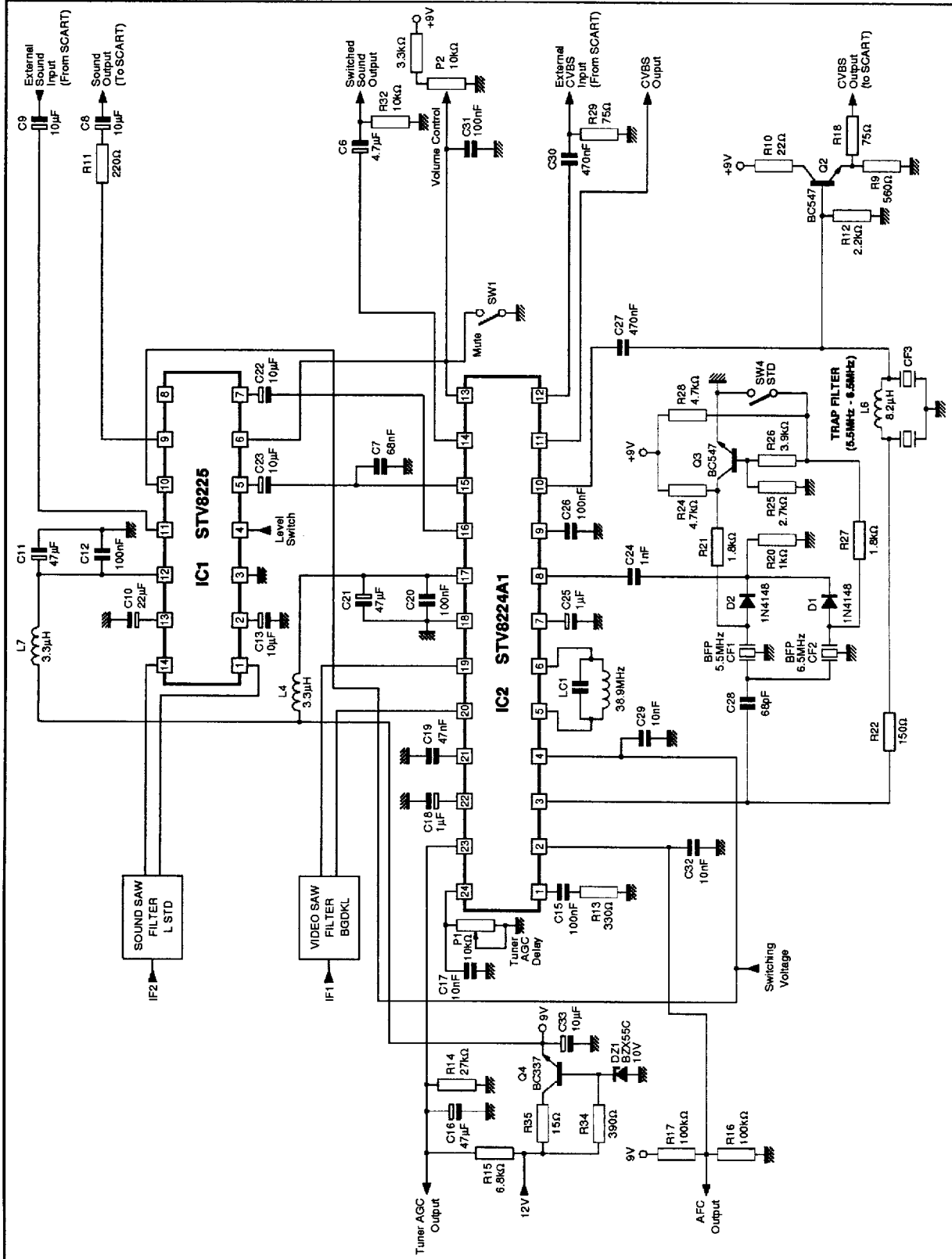
STV8224A1

APPLICATION DIAGRAM (B/G/D/K)  
STV8224A1



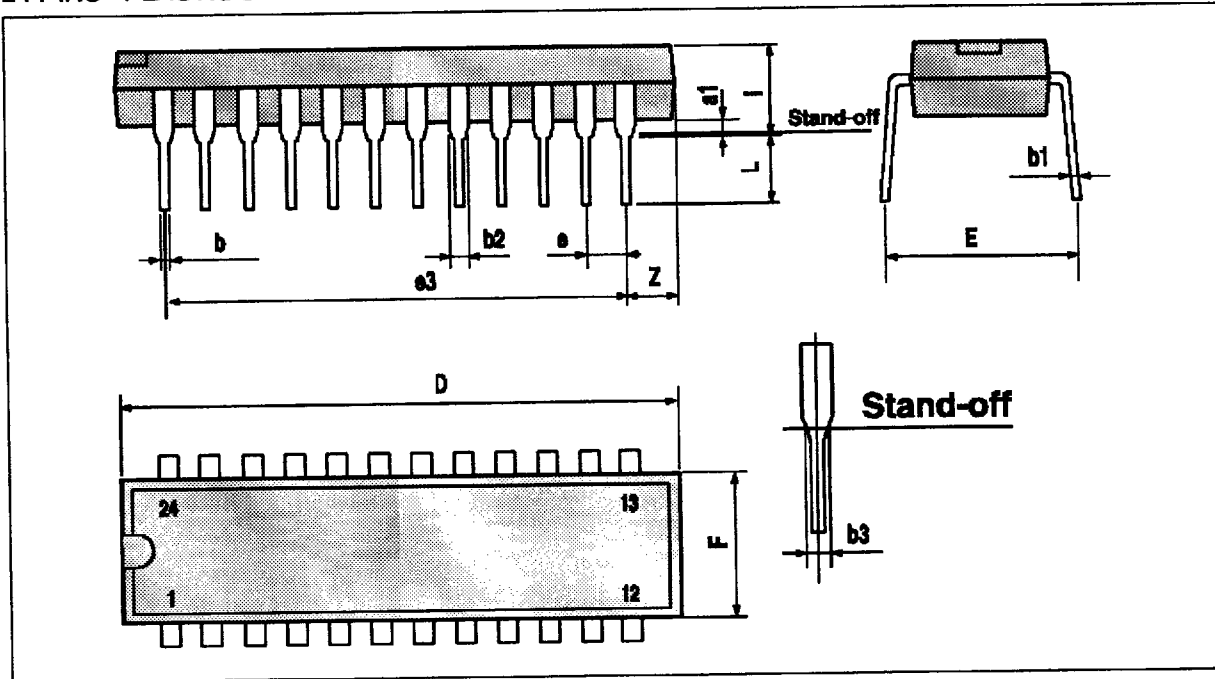
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APPLICATION DIAGRAM (B/G/D/K, L)  
STV8224A1 - STV8225



82241-28-EP5

**PACKAGE MECHANICAL DATA**  
**24 PINS - PLASTIC SHRINK DIP**



RMSDIP24-WMF

Dimensions	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A		3.3			0.130	
a1	0.51			0.020		
b	0.35		0.59	0.014		0.023
b1	0.2		0.36	0.008		0.014
b2	0.75		1.42	0.030		0.056
b3	0.75			0.030		
D			23.11			0.910
E	7.95		9.73	0.313		0.383
e		1.778			0.070	
e3		19.558			0.770	
e4		7.62			0.300	
F			6.86			0.270
i			5.08			0.200
L	2.54			0.100		

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