

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

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

**DESCRIPTION**

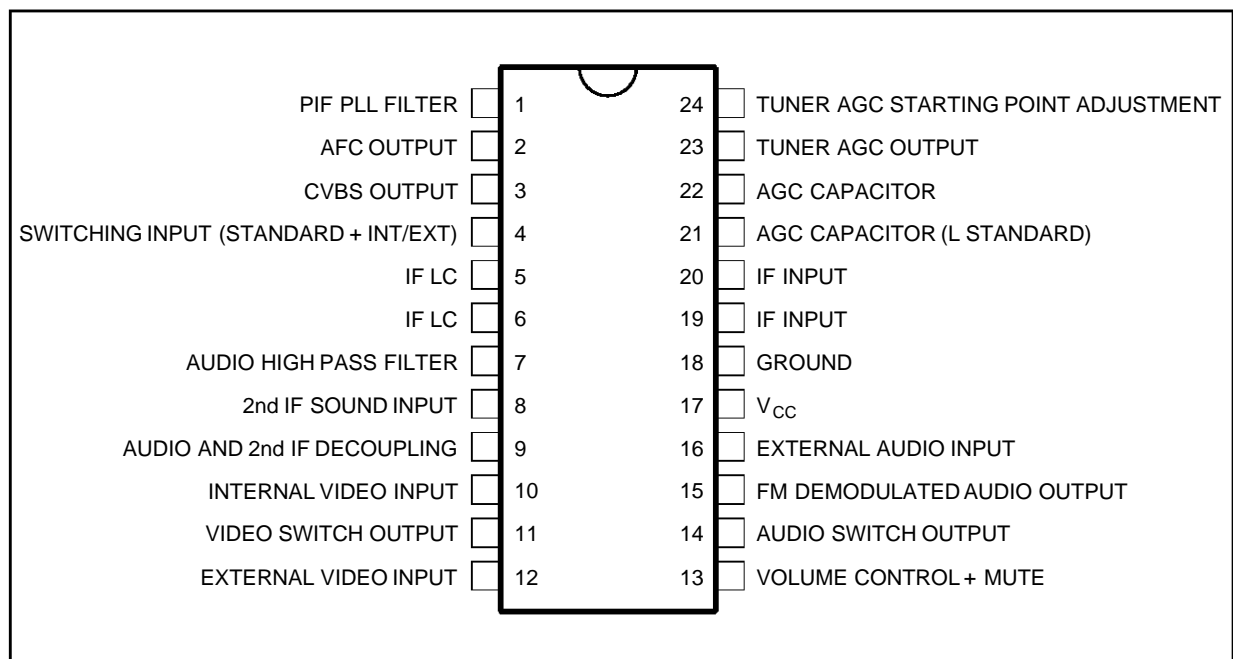
The STV8224B is a picture and sound IF processor for multistandard application with very few external components and adjustments.

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

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

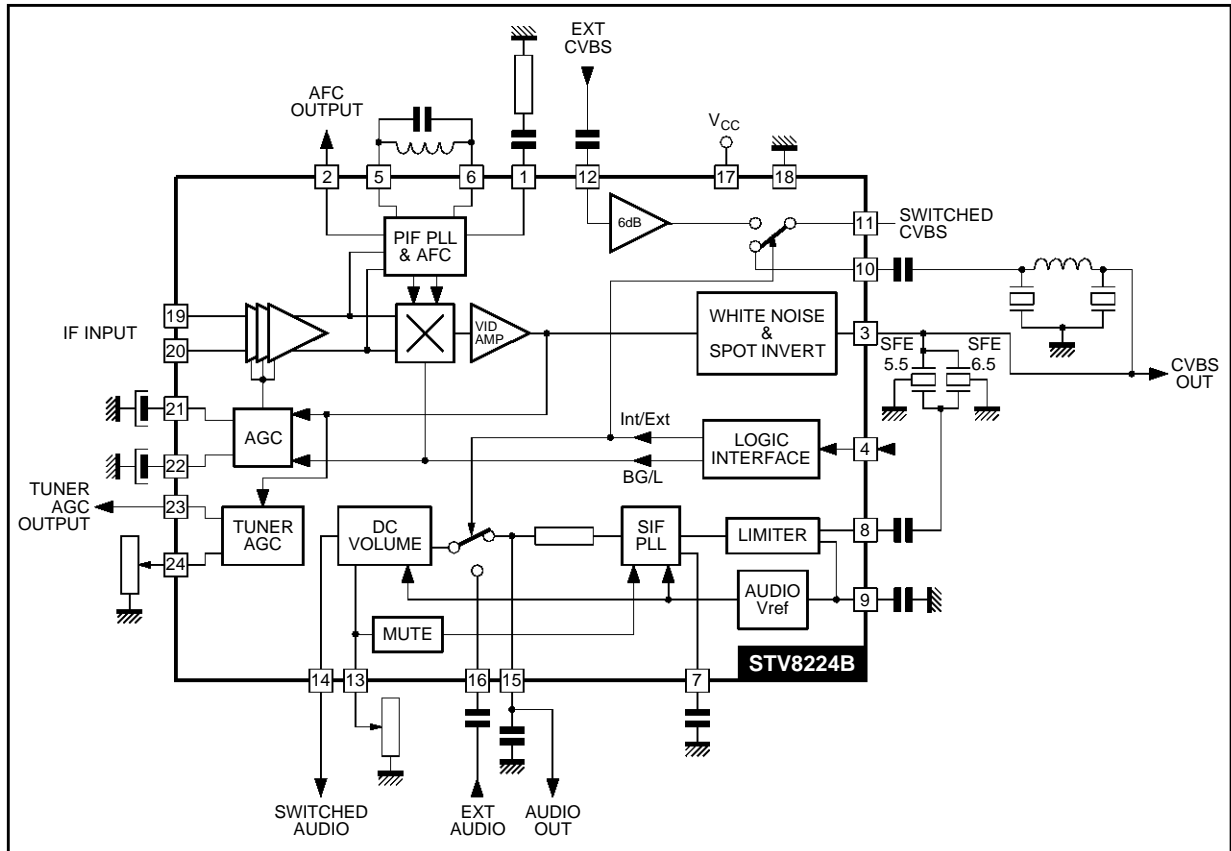


**PIN CONNECTIONS**



8224B-01EFS

BLOCK DIAGRAM



8224B-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

8224B-01.TBL

THERMAL DATA

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

8224B-02.TBL

**ELECTRICAL CHARACTERISTICS**

( $T_{amb} = 25^{\circ}\text{C}$ ,  $V_{CC} = 9\text{V}$ , IF input =  $10\text{mV}_{\text{RMS}}$  sync level at B/G, Peak-white level at L, Video modulation DSB, D = 90% at B/G, D = 95% at L,  $f_{\text{PC}} = 38.9\text{MHz}$ ,  $f_{\text{SC}} = 33.4\text{MHz}$ , Video BW = 5MHz, Sound carrier input : 5.5MHz,  $10\text{mV}_{\text{RMS}}$ ,  $f_{\text{M}} = 1\text{kHz}$ , 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**

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

**IF AMPLIFIER**

$V_{19-20}$	Input Sensitivity (RMS)	-3dB Video at Output		70		$\mu\text{V}_{\text{RMS}}$
$R_{19-20}$	Differential Input Resistance			2		$\text{k}\Omega$
$C_{19-20}$	Differential Input Capacitance			2		pF
Gr	Gain Control Range			68		dB
	Max Input Signal	+1dB Video at Output		180		$\text{mV}_{\text{RMS}}$

**SYNCHRONOUS VIDEO DEMODULATOR**

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

S2	AFC Slope	See Figure 21		0.2		$\mu\text{A}/\text{kHz}$
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**DEMODULATED VIDEO OUTPUT (Pin 3)**

$V_{\text{A3}}$	Amplitude	Top Sync to White	2	2.3	2.6	$V_{\text{PP}}$
BG vs L	Amplitude Difference				10	%
$V_{\text{S3}}$	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	7	9		MHz
Dg	Differential Gain			6	8	%
Dp	Differential Phase			3	6	Degree
$V_{\text{r3c}}$	Residual Carrier Signal (RMS Value)			1	10	mV
$V_{\text{r3h}}$	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	56	61		dB
	Intermodulation 1.07MHz	Note 2		52		dB
$V_{\text{WTH}}$	White Noise Threshold Voltage			4.85		V
$V_{\text{WIL}}$	White Noise Insertion Level			3.6		V
$V_{\text{BTH}}$	Black Noise Threshold Voltage			1.3		V
$V_{\text{BIL}}$	Black Noise Insertion Level			2.5		V

**AGC CIRCUIT (BG MODE)**

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

Notes : 1.  $\frac{S}{N} = 20 \log 10 \frac{V_{\text{out black white}}}{V_{\text{N}} (\text{mV}_{\text{RMS}})}$  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  $1V_{\text{PP}}$  signal on output (Pin 3).

8224B-03.TBL

**ELECTRICAL CHARACTERISTICS** (continued)

( $T_{amb} = 25^{\circ}C$ ,  $V_{CC} = 9V$ , IF input =  $10mV_{RMS}$  sync level at B/G, Peak-white level at L, Video modulation DSB, D = 90% at B/G, D = 95% at L,  $f_{PC} = 38.9MHz$ ,  $f_{SC} = 33.4MHz$ , Video BW = 5MHz, Sound carrier input : 5.5MHz,  $10mV_{RMS}$ ,  $f_M = 1kHz$ , Audio BW = 20kHz,  $\Delta f = \pm 50kHz$ , 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		$\mu A$
$I_{22CL+}$	Additional Charging Current	L in case of missing, VITS Pulses and no White in Video Content		5		$\mu A$
	Threshold Voltage Level for Additional Charging Current	Referred to Pin 3		2.75		V
$I_{22DL+}$	Additional Discharging Current		28	40	56	$\mu A$
	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	$R_{24} = 5k\Omega$	100	170	230	$\mu A/dB$
$I_{23+}$	Maximum Tuner Plus Sunked Current	Note 4		40		mA

FM SOUND DEMODULATION

$V_{8S}$	Input Sensitivity			150		$\mu V_{RMS}$
$R_8$	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>	28	33		dB
$V_{15}$	Detected Audio Output Signal		0.85	1.1	1.4	$V_{RMS}$
THD	Total Harmonic Distortion			0.2	1	%
$R_{15}$	Internal Deemphasis Resistor		600	750	900	$\Omega$
S/N	Signal to Noise Ratio	See Note 6, Weighted CCIR 468-4, (quasi peak level) input Pin 8	55	60		dB
	Black Picture (sync only)	Measurement between IF input (Pins 19-20) and audio output (Pin 15) SAW : K2955 BPF : SFE5.5MB	47	52		dB
	White Picture		46	50		dB
	250kHz Square Wave		47	52		dB

VOLUME CONTROL

$V_C$ Range	Control Range	See Figure 22	72	77		dB
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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  $f_M = 1kHz$  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 =  $5\text{MHz}$ , Sound carrier input :  $5.5\text{MHz}$ ,  $10\text{mV}_{RMS}$ ,  $f_M = 1\text{kHz}$ , Audio BW =  $20\text{kHz}$ ,  $\Delta f = \pm 50\text{kHz}$ , Volume attenuation =  $0\text{dB}$ , unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
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## AUDIO SWITCH

$R_{16}$	Input Resistance		55	70	85	$\text{k}\Omega$
$CR_{tk}$	Crosstalk		70	80		dB
$E_n$	Output Noise Level (Pin 14)	Weighted CCIR 468-4, $V_{13} = 0.5\text{V}$ (quasi peak level)		70		$\mu\text{V}$
EXTHD	THD on External Signal (Pin 14)	$V_{IN} = 2V_{RMS}$ , Attenuation = $0\text{dB}$		0.1	0.3	%
	Audio Reference Voltage (Pin 9)			4.5		V

## 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
$V_{11}$	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
$I_{12}$	Input Current	$V_{12} = V_{DC12} = 1.5\text{V}$		1	5	$\mu\text{A}$
VBW	Bandwidth	$V_{IN} = 1V_{PP}$		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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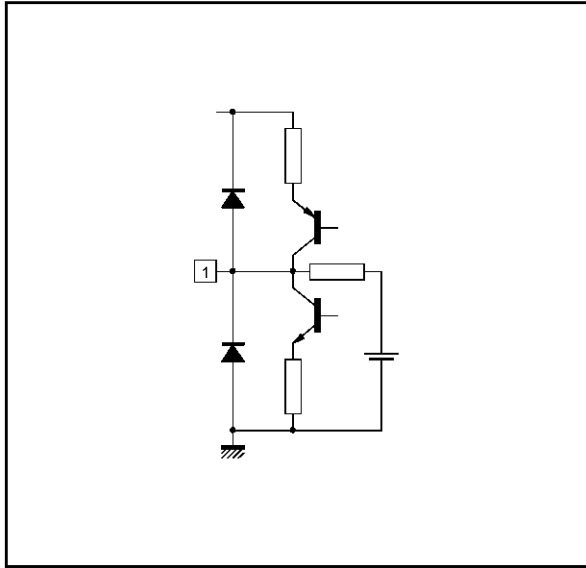
## CONTROL INPUT

	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

8224B-05.TBL

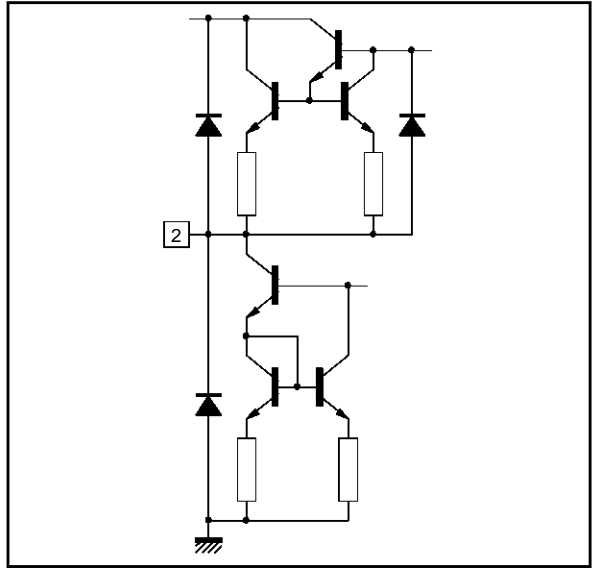
INPUT/OUTPUT PIN CONFIGURATION

Figure 1 : PIF PLL Filter



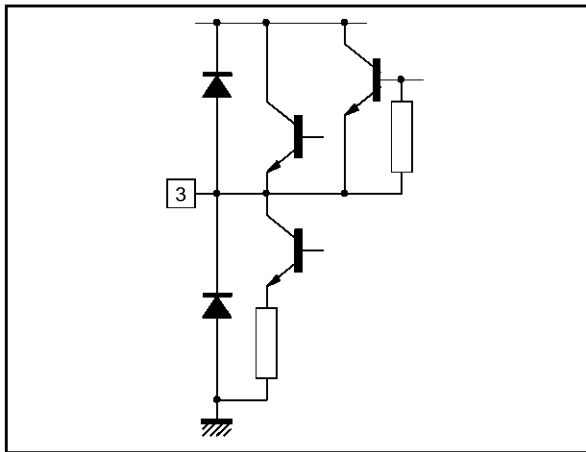
8224B-03.EPS

Figure 2 : AFC Output



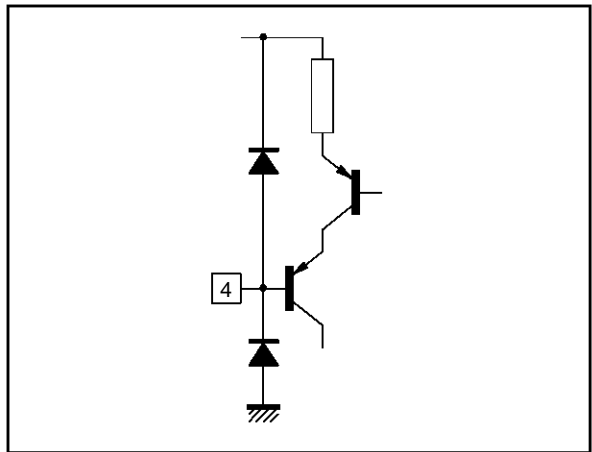
8224B-04.EPS

Figure 3 : CVBS Output



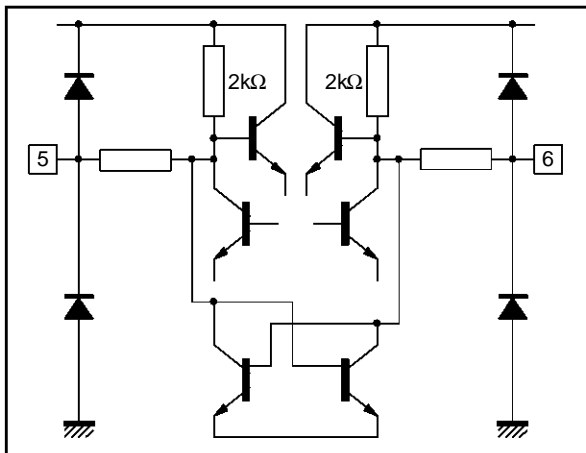
8224B-05.EPS

Figure 4 : Switching Input Standard + INT/EXT



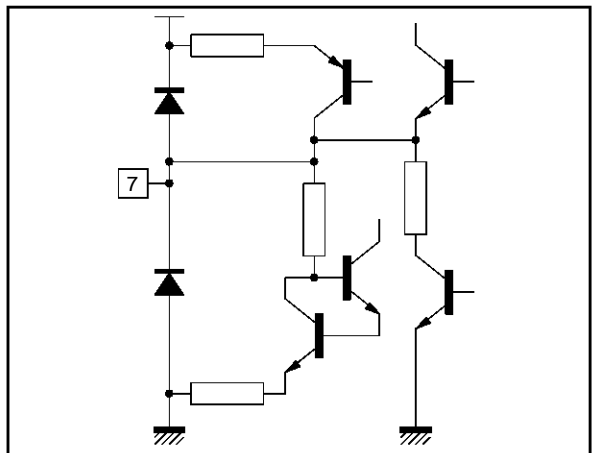
8224B-06.EPS

Figure 5 : IFLC



8224B-07.EPS

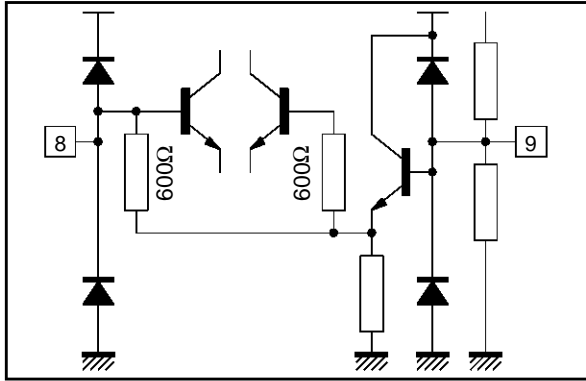
Figure 6 : Audio High Pass Filter



8224B-08.EPS

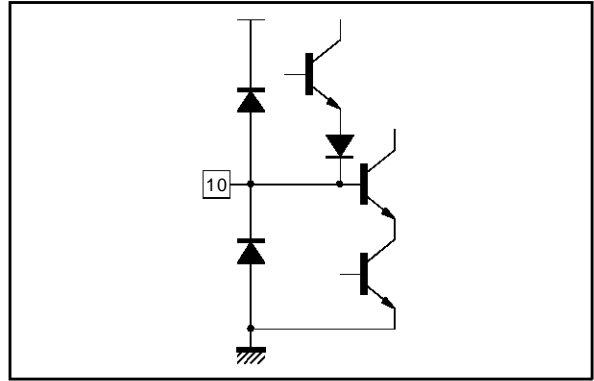
INPUT/OUTPUT PIN CONFIGURATION (continued)

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



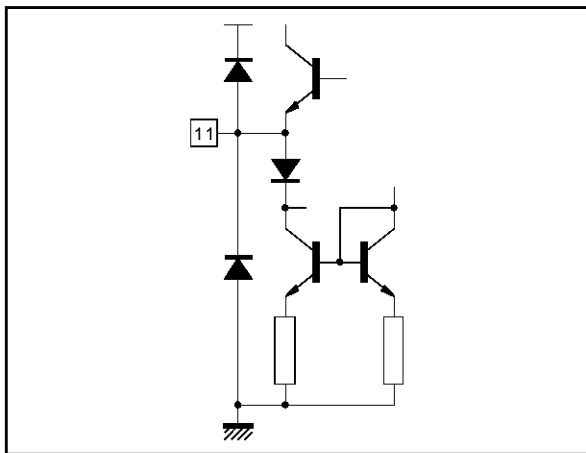
8224B-09.EPS

**Figure 8 :** Internal Video Input



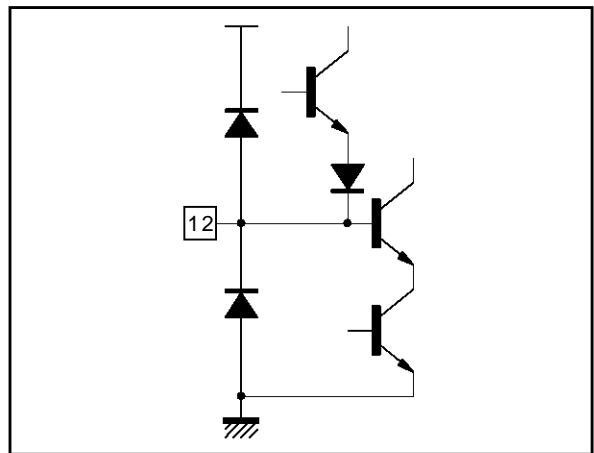
8224B-10.EPS

**Figure 9 :** Video Switch Output



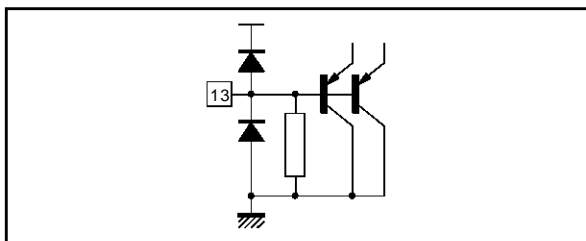
8224B-11.EPS

**Figure 10 :** External Video Input



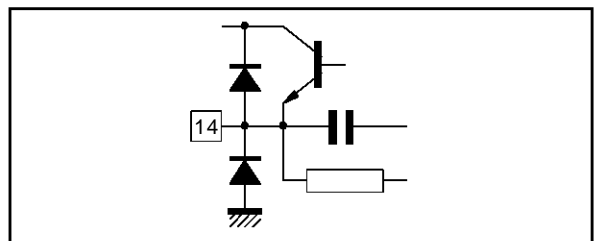
8224B-12.EPS

**Figure 11 :** Volume Control + Mute



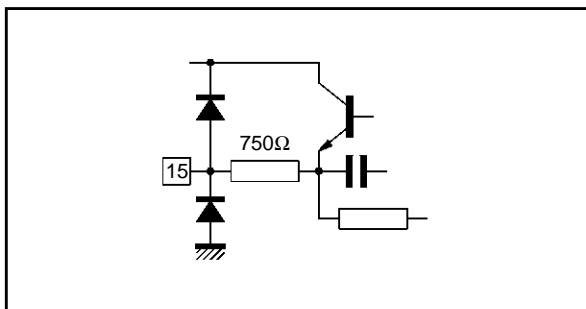
8224B-13.EPS

**Figure 12 :** Audio Switch Output



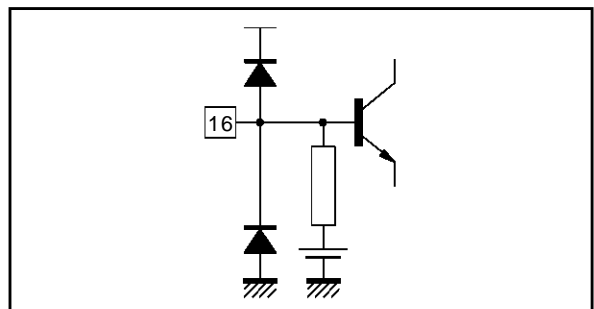
8224B-14.EPS

**Figure 13 :** FM Demodulated Audio Output



8224B-15.EPS

**Figure 14 :** External Audio Input



8224B-16.EPS

INPUT/OUTPUT PIN CONFIGURATION (continued)

Figure 15 : V<sub>CC</sub>

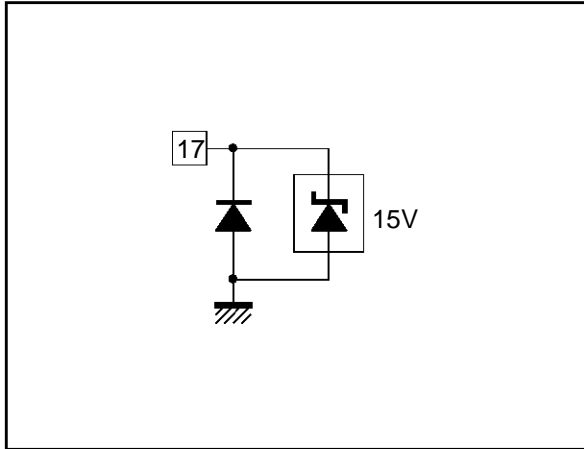


Figure 16 : IF Input

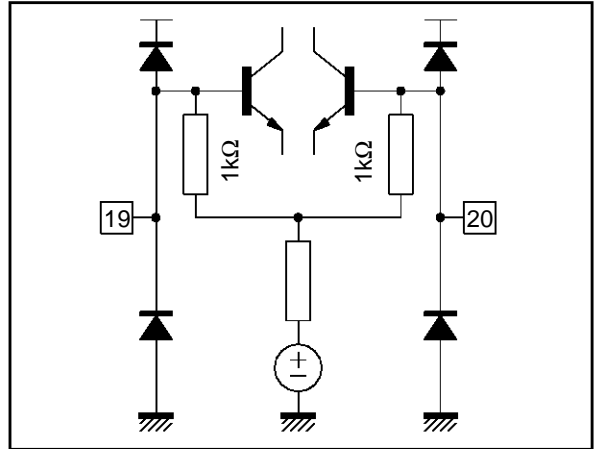


Figure 17 : AGC Capacitor

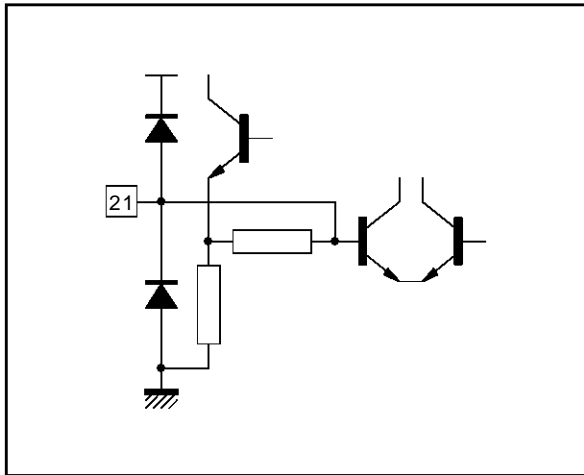


Figure 18 : AGC Capacitor

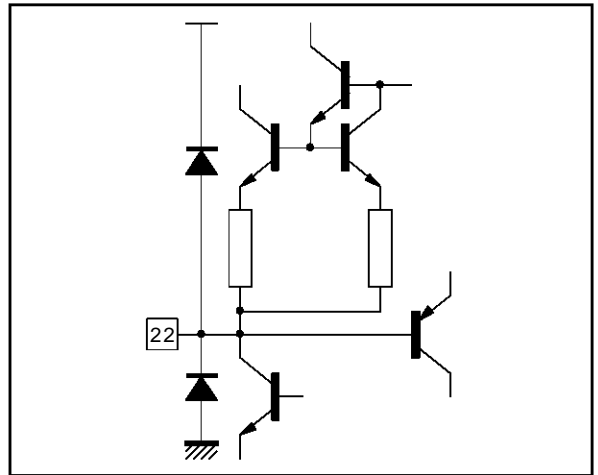


Figure 19 : Tuner AGC Output

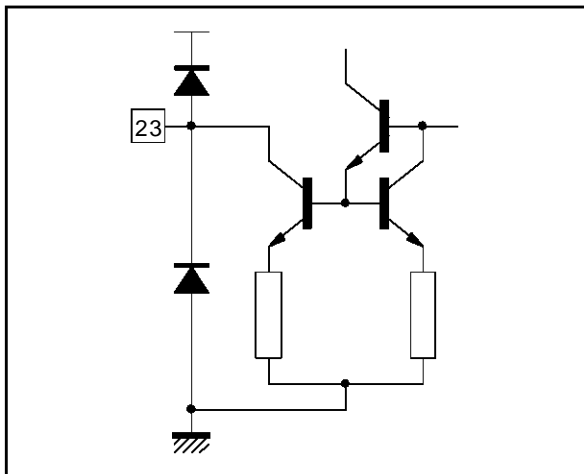
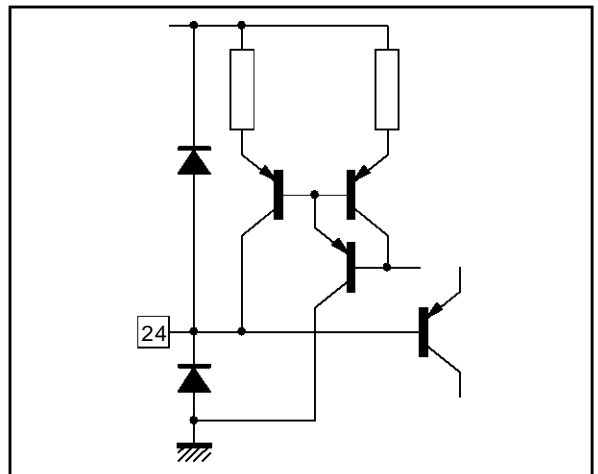
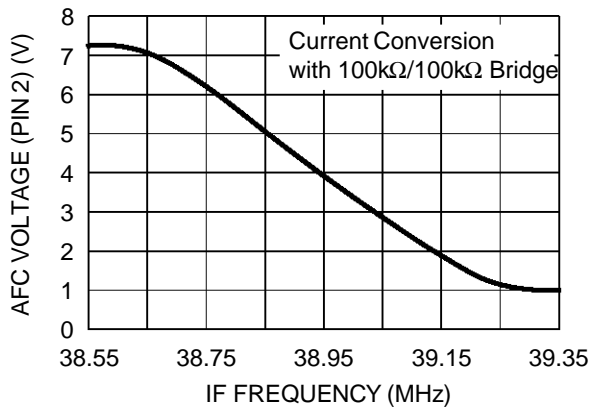


Figure 20 : Tuner AGC Starting Point Adjustment



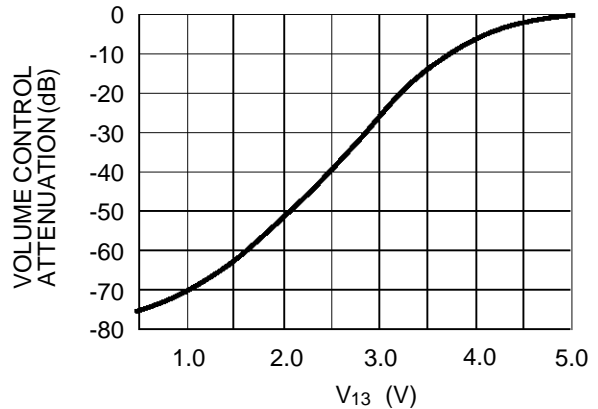


**Figure 21 : AFC Voltage Pin 2 vs IF Frequency**



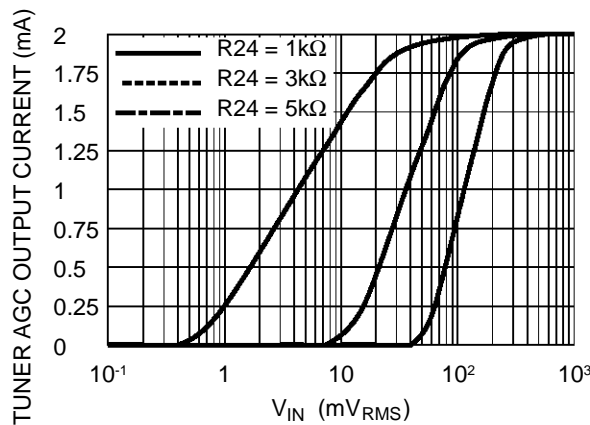
8224B-23.EPS

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



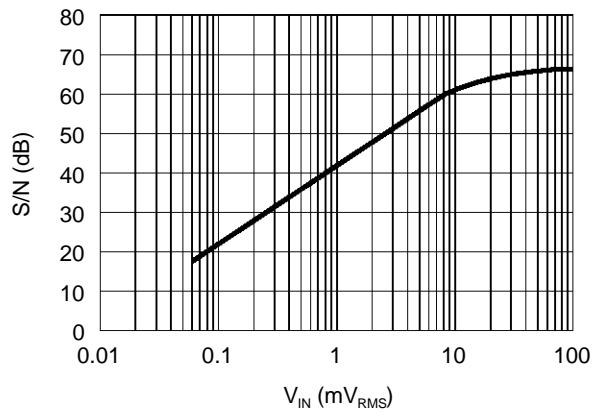
8224B-24.EPS

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



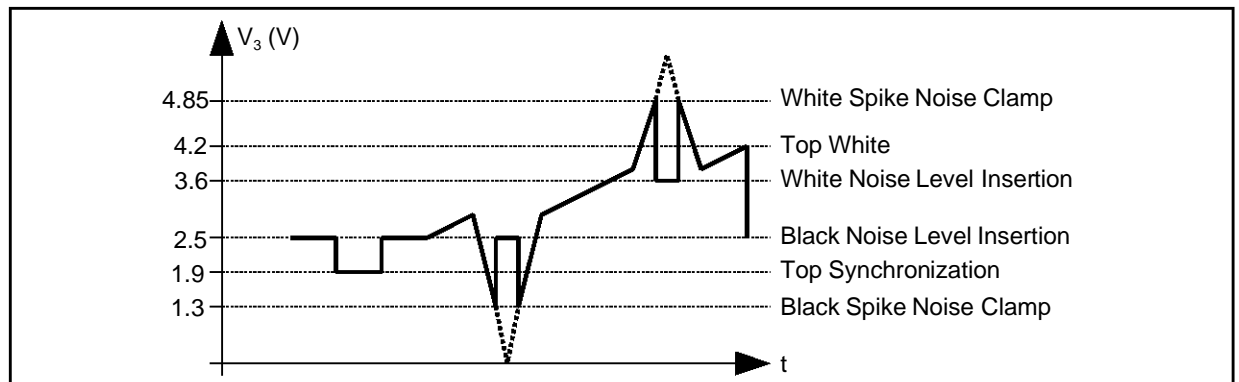
8224B-25.EPS

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



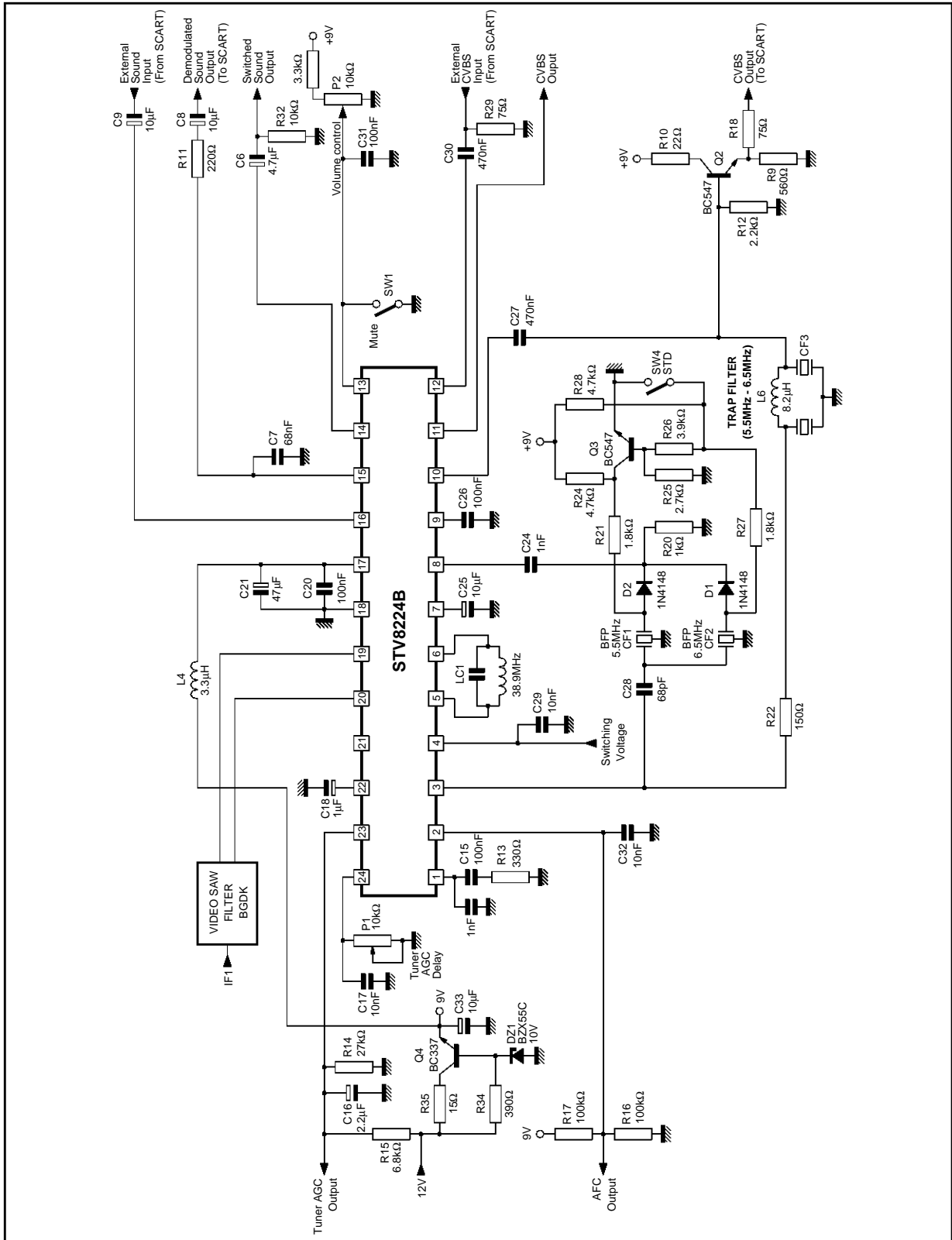
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**Figure 25 : Black and White Noise Inverter**



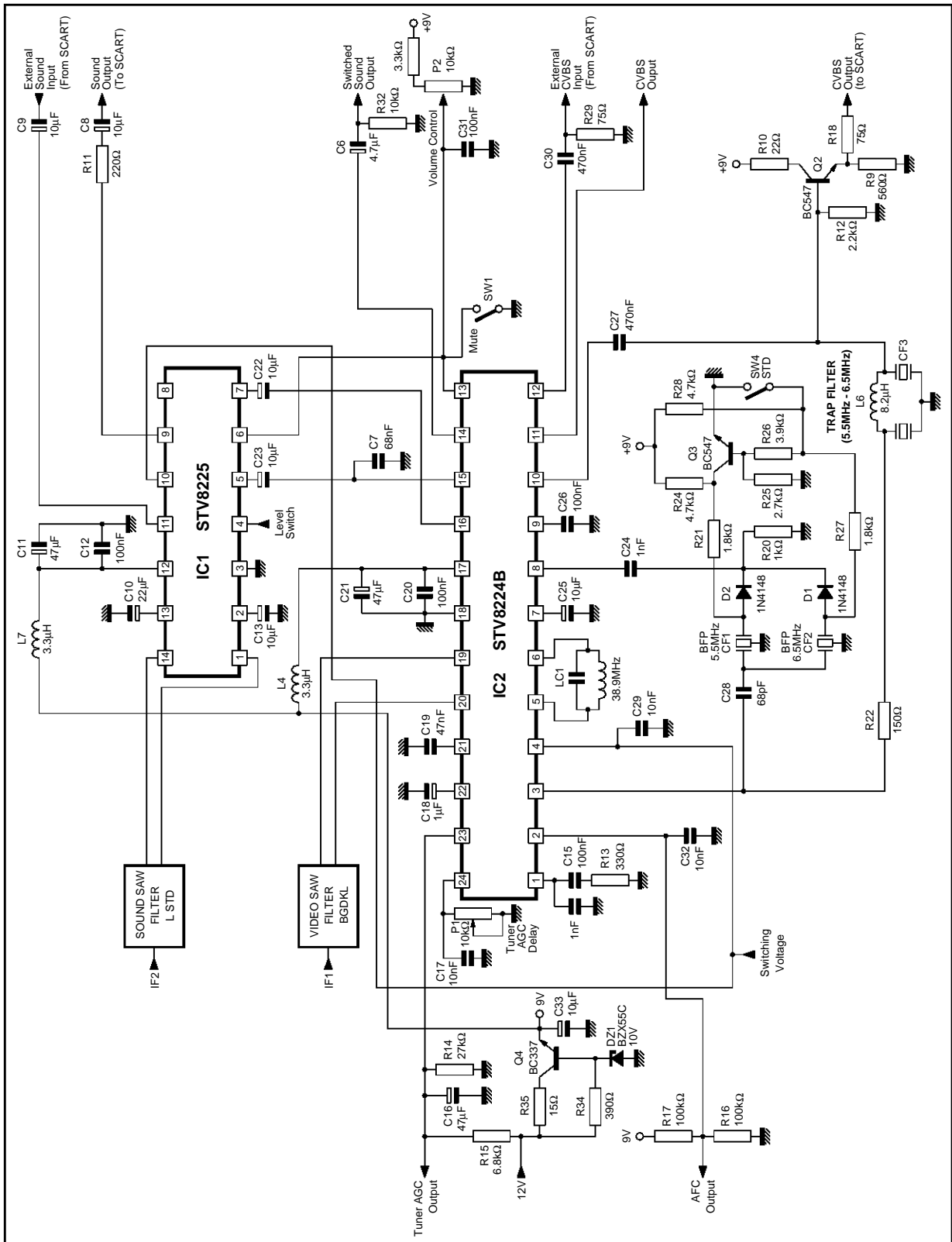
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APPLICATION DIAGRAM (B/G/D/K)  
STV8224B



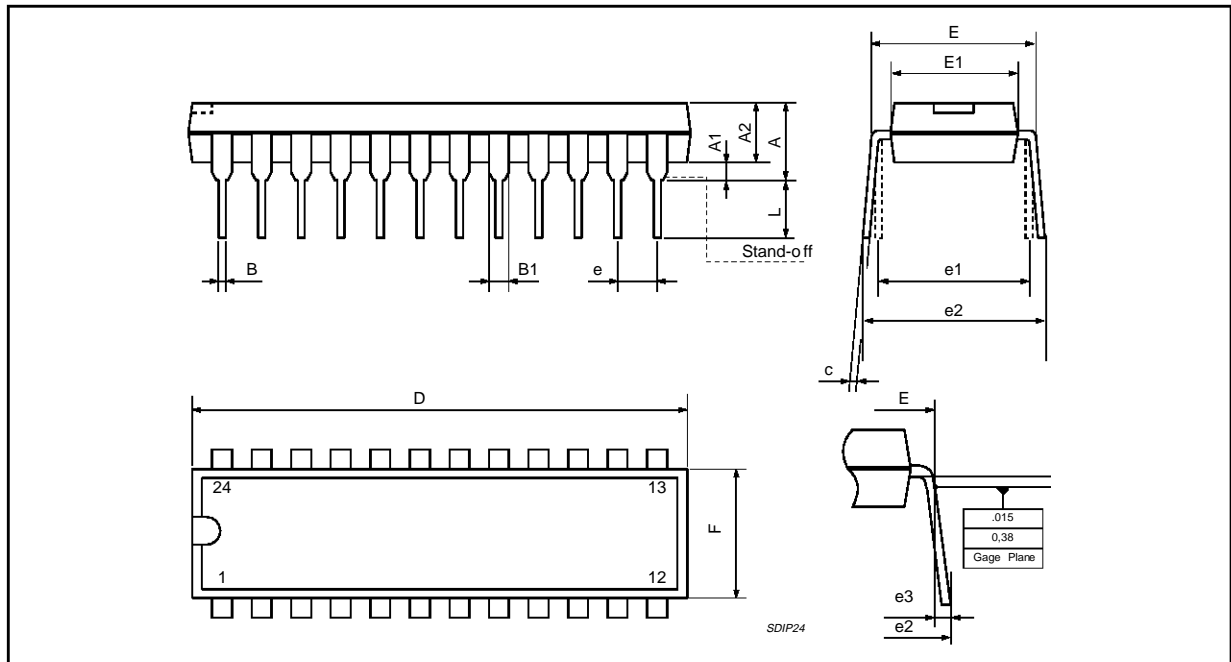
8224B-27.EPS

APPLICATION DIAGRAM (B/G/D/K, L)  
STV8224B - STV8225



8224B-2&EPS

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



Dimensions	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			5.08			0.20
A1	0.51			0.020		
	3.05	3.30	4.57	0.120	0.130	0.180
B	0.36	0.46	0.56	0.0142	0.0181	0.0220
B1	0.76	1.02	1.14	0.030	0.040	0.045
C	0.23	0.25	0.38	0.0090	0.0098	0.0150
D	22.61	22.86	23.11	0.890	0.90	0.910
E	7.62		8.64	0.30		0.340
E1	6.10	6.40	6.86	0.240	0.252	0.270
e		1.778			0.070	
e1		7.62			0.30	
e2			10.92			0.430
e3			1.52			0.060
L	2.54	3.30	3.81	0.10	0.130	0.150

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