

**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

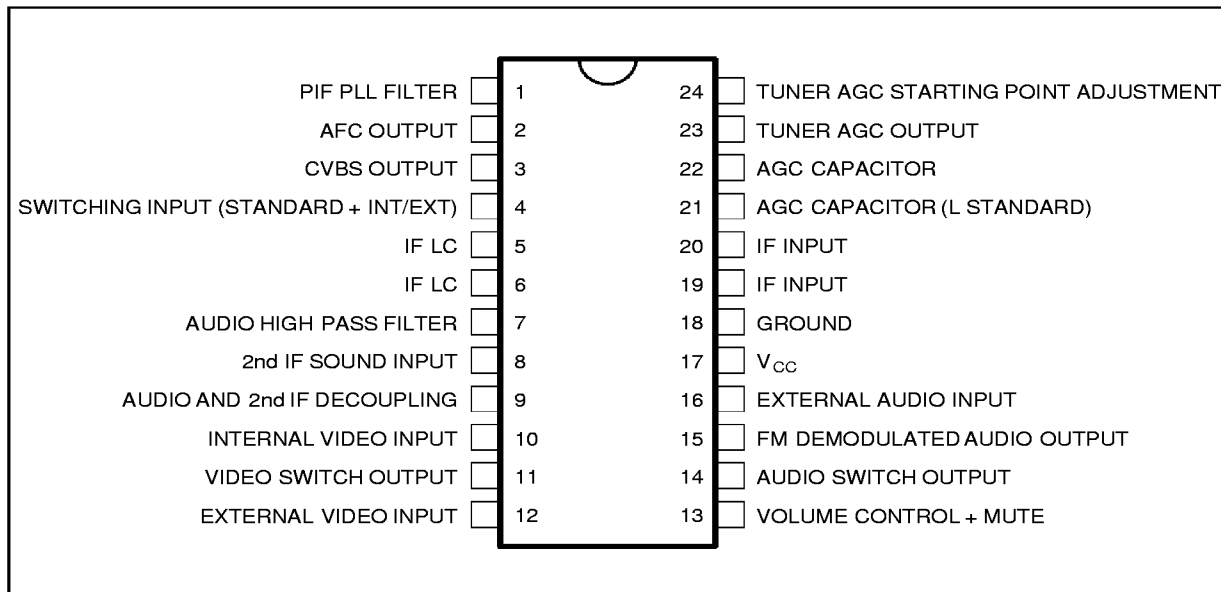
The STV8224A2 is a picture and sound IF processor for multistandard application with very few external components and adjustments.

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

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

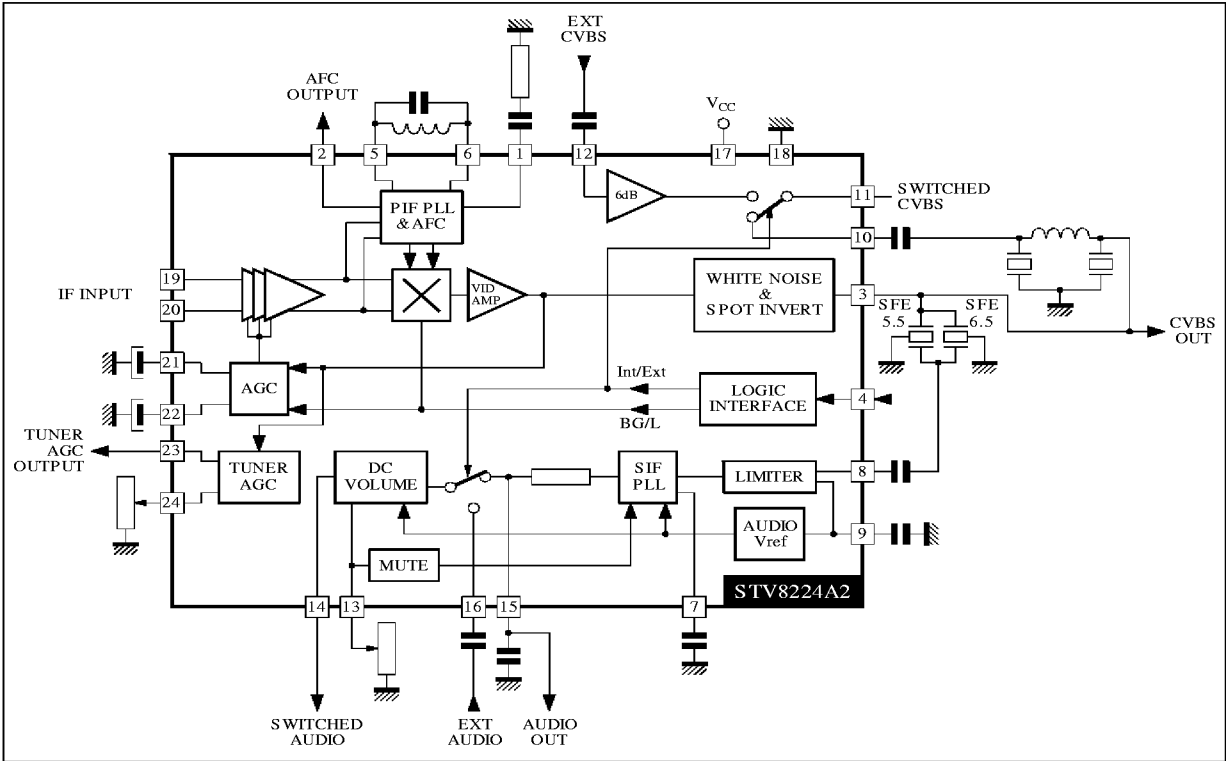


PIN CONNECTIONS



STV8224A2

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _S	Supply Voltage	13.5	V
V _x	Tuner AGC Voltage	V _{CC}	V
T _{stg}	Storage Temperature	-40, +150	°C
T _{oper}	Operating Temperature	0, +70	°C

THERMAL DATA

Symbol	Parameter	Value	Unit
R _{th (j-a)}	Junction-ambient Thermal Resistance	75	°C/W

ELECTRICAL CHARACTERISTICS

($T_{amb} = 25^{\circ}\text{C}$, $V_{CC} = 9\text{V}$, 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, $f_{PC} = 38.9\text{MHz}$, $f_{SC} = 33.4\text{MHz}$, Video BW = 5MHz , Sound carrier input : 5.5MHz , 10mV_{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		μV_{RMS}
R_{19-20}	Differential Input Resistance			1.5		k Ω
C_{19-20}	Differential Input Capacitance			2		pF
Gr	Gain Control Range			64		dB
	Max Input Signal	+1dB Video at Output		110		mV_{RMS}

SYNCHRONOUS VIDEO DEMODULATOR

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

S2	AFC Slope	See Figure 21		0.2		$\mu\text{A/kHz}$
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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
Dg	Differential Gain			6	8	%
Dp	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	μA
I_{22DBG}	Discharge Current		12	20	28	μA
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 $1V_{PP}$ 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_{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 , 10mV_{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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AGC CIRCUIT (L MODE)

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

TUNER AGC

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

FM SOUND DEMODULATION

V_{8S}	Input Sensitivity	-3dB FM detected signal		35		μV
R_8	Limiter Input Resistance			600		Ω
	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_{PP}	12	17		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	Ω
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_{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)		120		μV
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 sinked 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 = 10mV_{RMS} sync level at B/G, Peak-white level at L, Video modulation DSB, D = 90% at B/G, D = 95% at L, $f_{PC} = 38.9\text{MHz}$, $f_{SC} = 33.4\text{MHz}$, Video BW = 5MHz , Sound carrier input : 5.5MHz , 10mV_{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
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	μA
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

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INPUT/OUTPUT PIN CONFIGURATION

Figure 1 : PIF PLL Filter

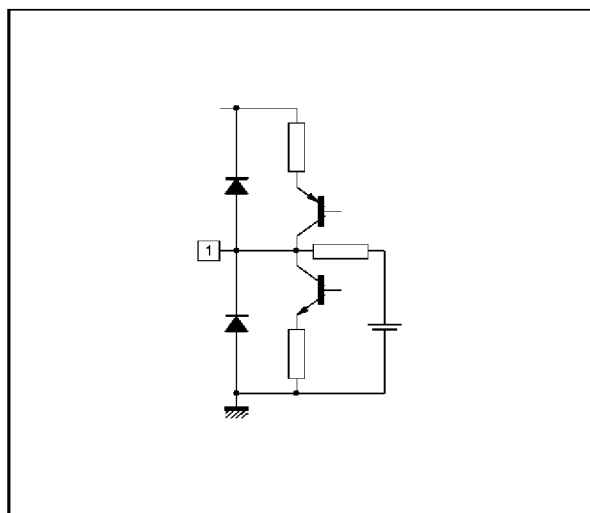


Figure 2 : AFC Output

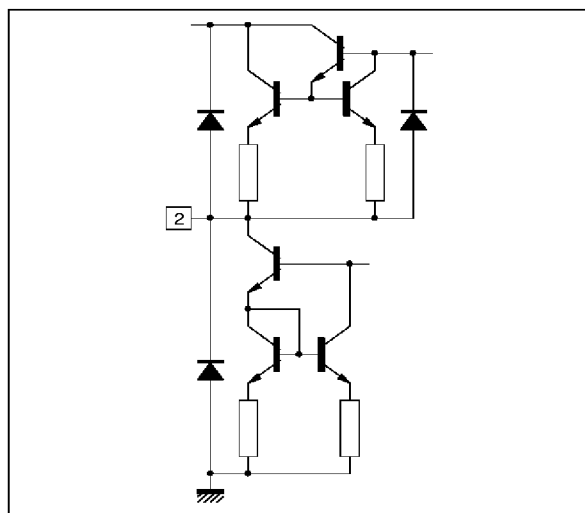


Figure 3 : CVBS Output

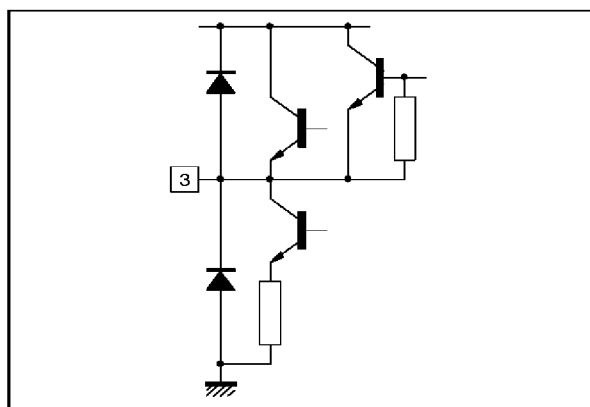


Figure 4 : Switching Input Standard + INT/EXT

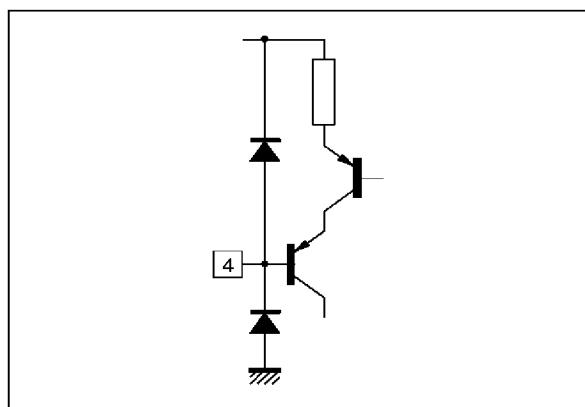


Figure 5 : IFLC

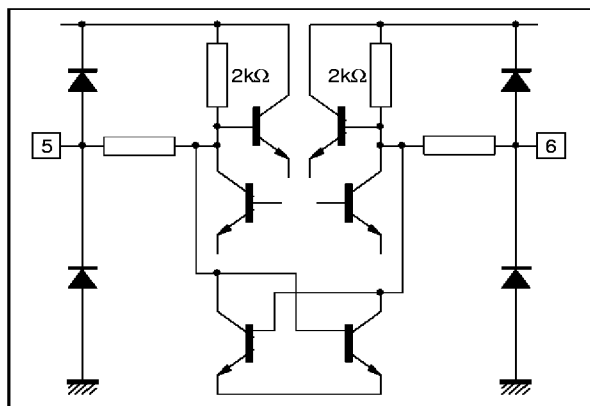
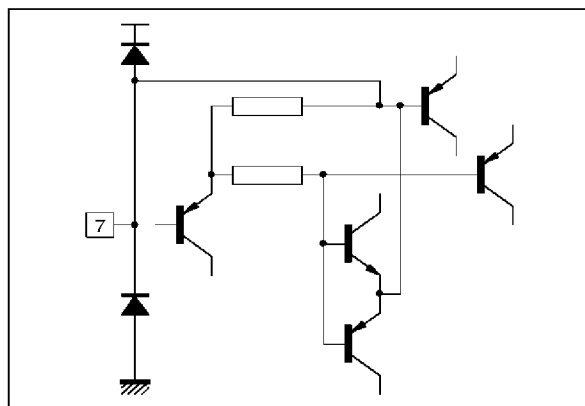
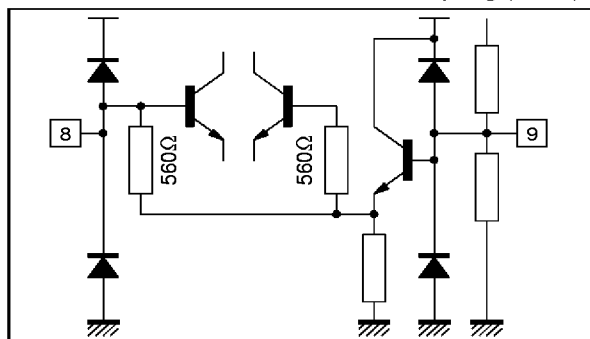
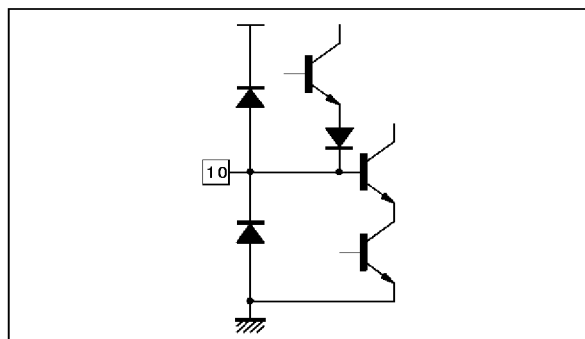


Figure 6 : Audio High Pass Filter

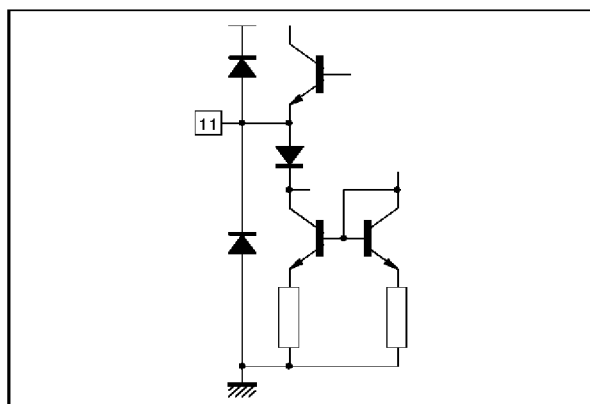


INPUT/OUTPUT PIN CONFIGURATION (continued)**Figure 7 :** 2nd IF Sound Input (Pin 8)
Audio and 2nd IF Decoupling (Pin 9)

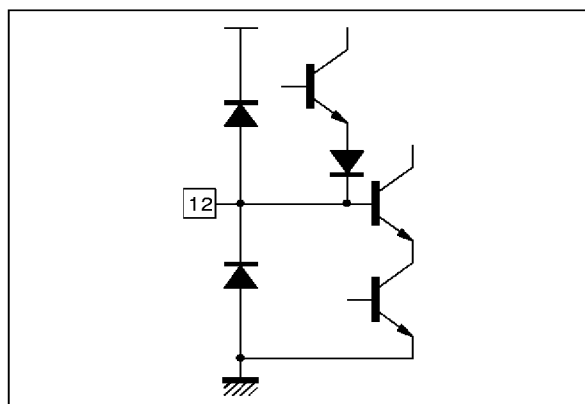
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Figure 8 : Internal Video Input

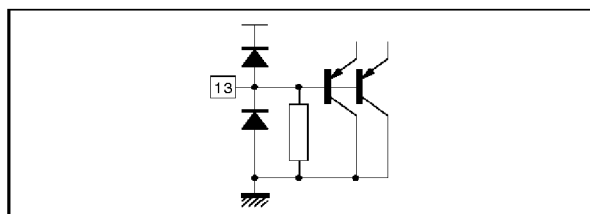
82242-10.EPS

Figure 9 : Video Switch Output

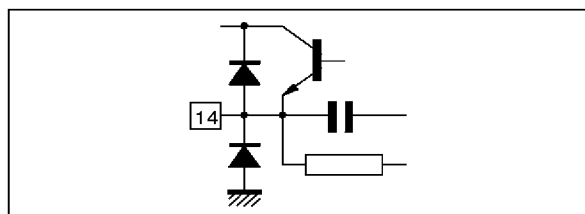
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Figure 10 : External Video Input

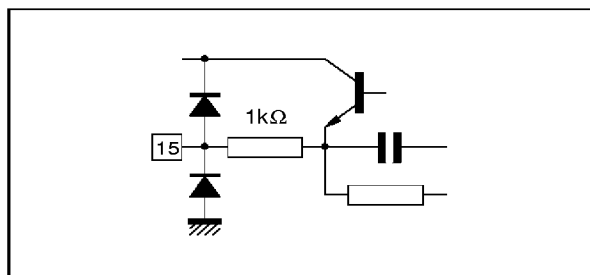
82242-12.EPS

Figure 11 : Volume Control + Mute

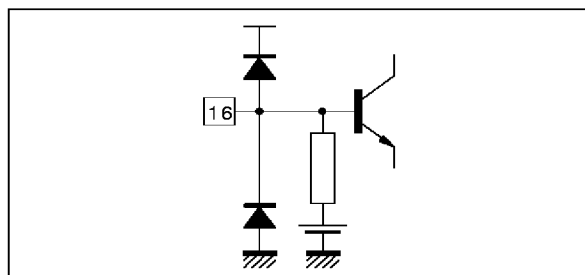
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Figure 12 : Audio Switch Output

82242-14.EPS

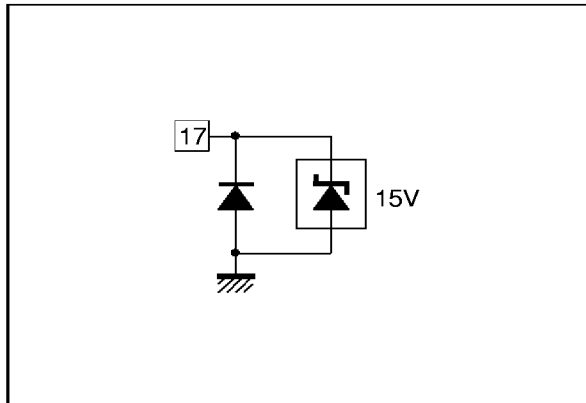
Figure 13 : FM Demodulated Audio Output

82242-15.EPS

Figure 14 : External Audio Input

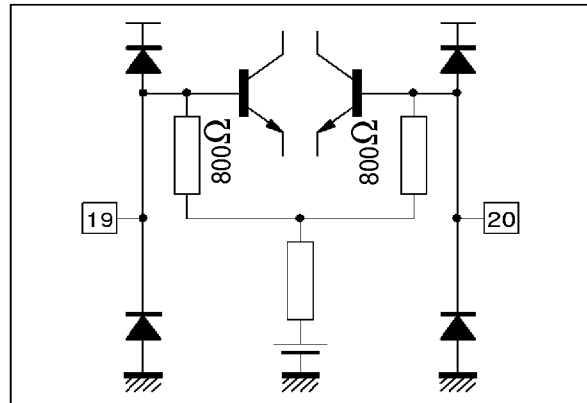
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INPUT/OUTPUT PIN CONFIGURATION (continued)

Figure 15 : V_{CC} 

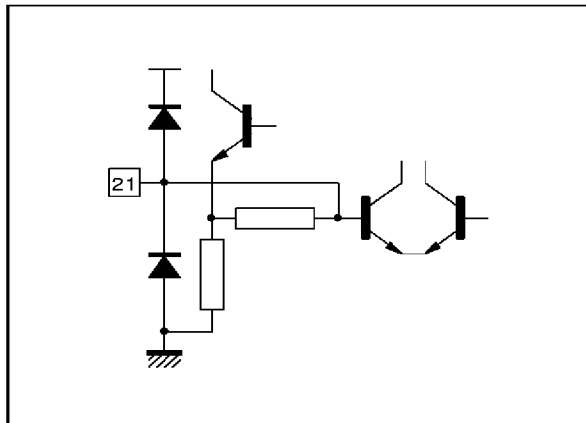
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Figure 16 : IF Input



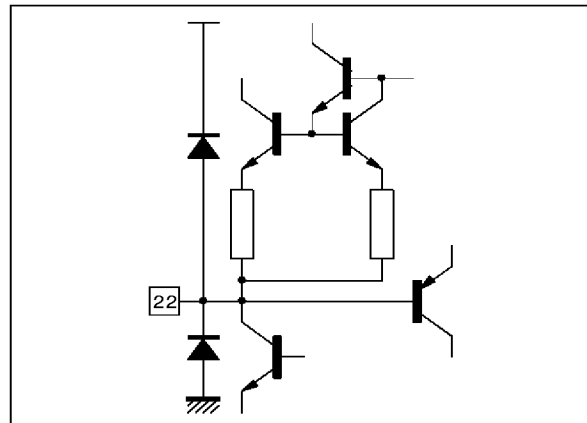
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Figure 17 : AGC Capacitor



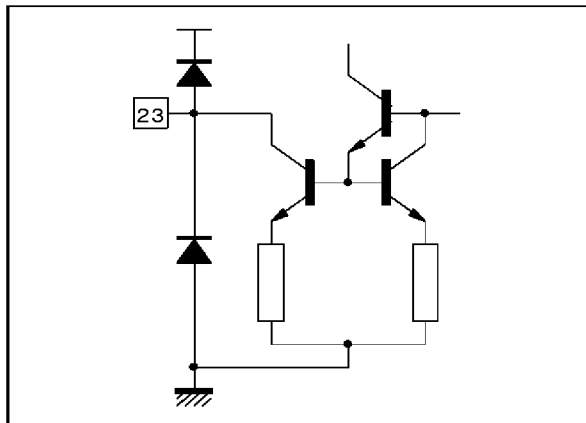
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Figure 18 : AGC Capacitor



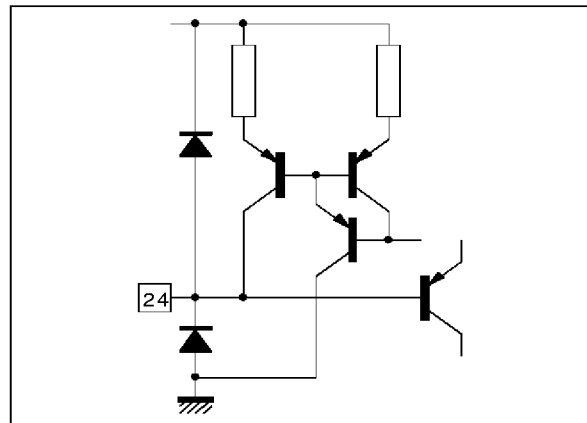
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Figure 19 : Tuner AGC Output

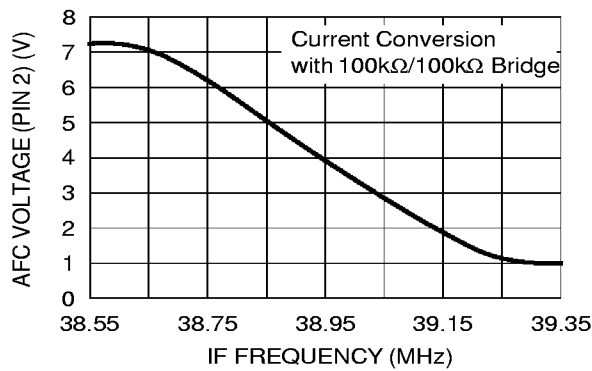
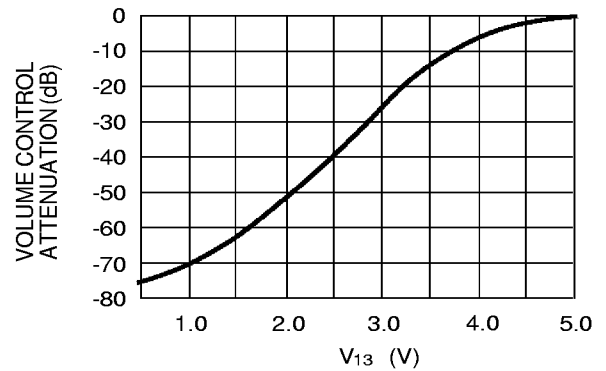
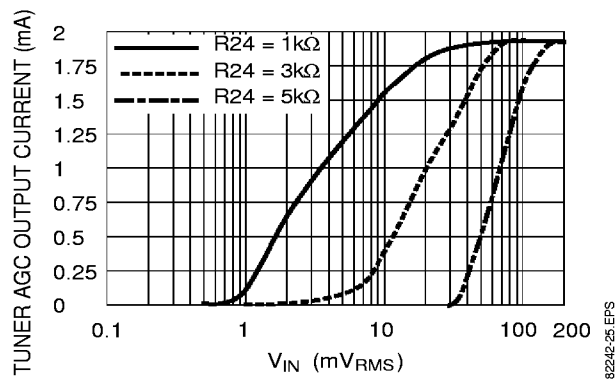
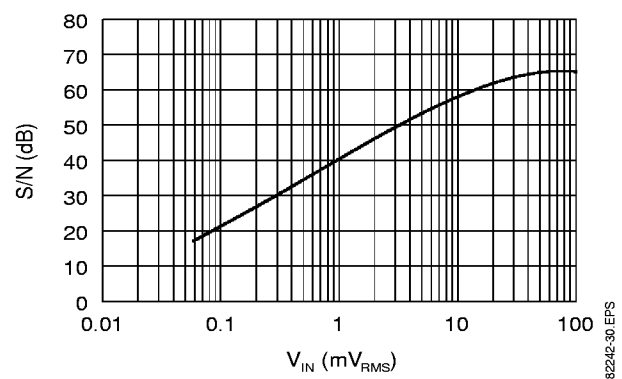
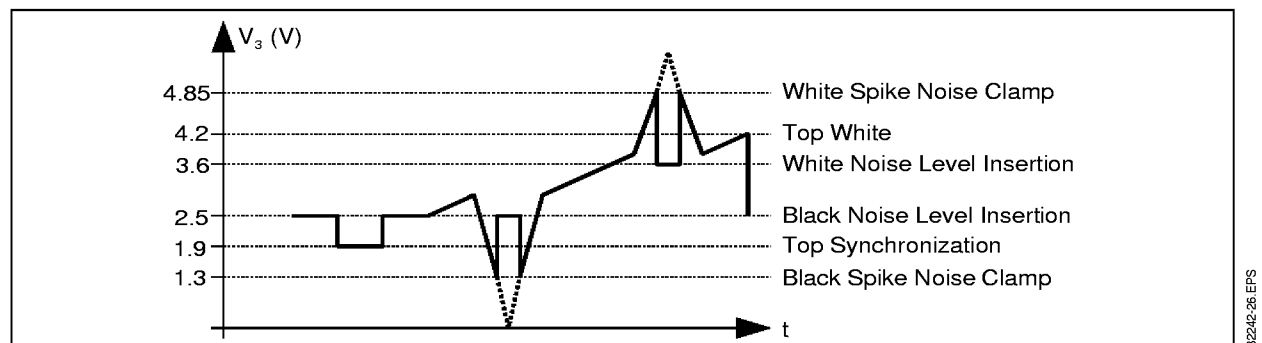


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Figure 20 : Tuner AGC Starting Point Adjustment

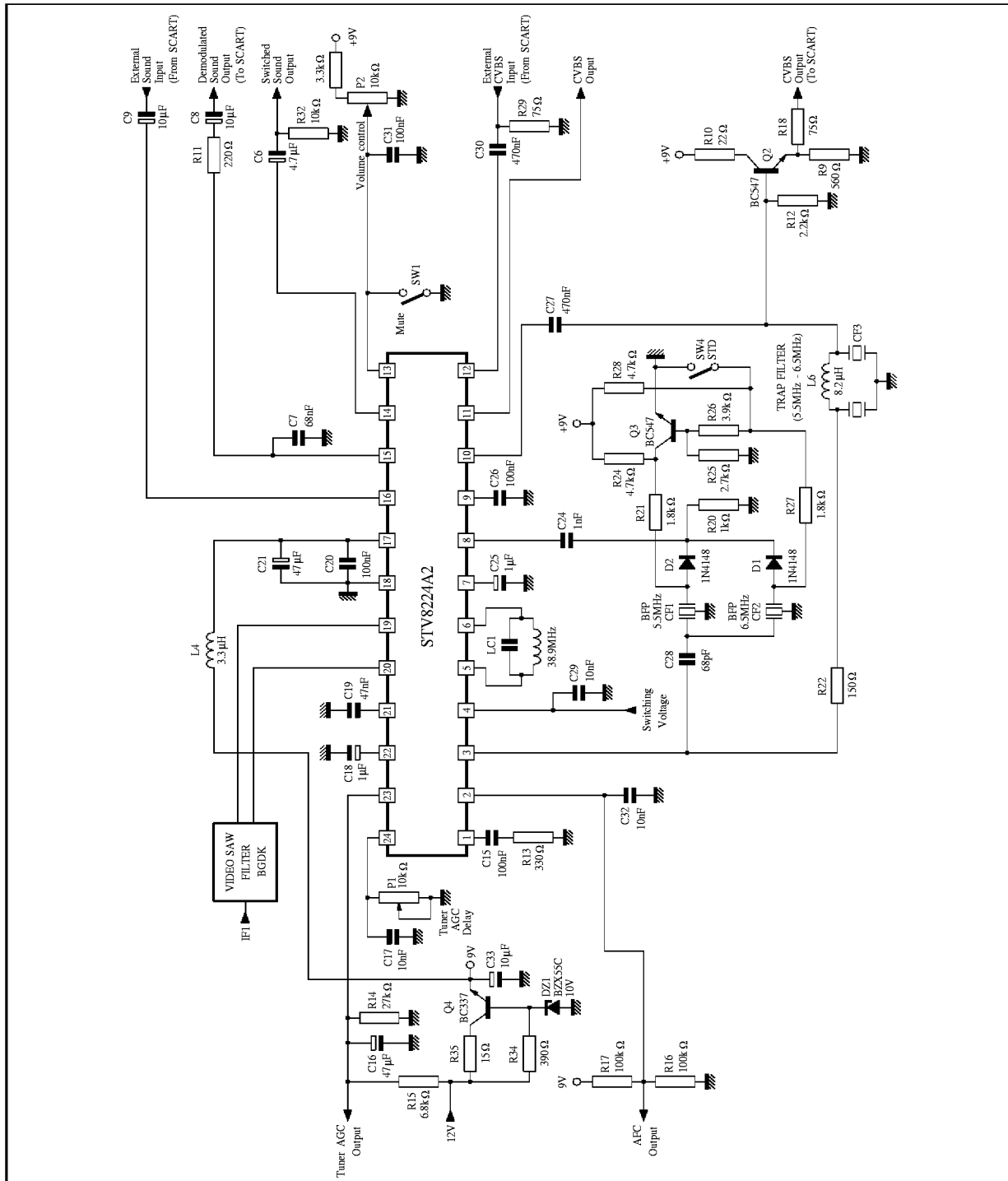


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Figure 21 : AFC Voltage Pin 2 vs IF Frequency**Figure 22** : Volume Control Attenuation vs V_{13} **Figure 23** : Tuner AGC Output Current vs V_{IN} (R_{24} is external adjustment Pin 24)**Figure 24** : Video Signal to Noise Ratio (Pin 3) as a function of IF Input Signal (Pins 19-20) Weighted CCIR-567**Figure 25** : Black and White Noise Inverter

STV8224A2

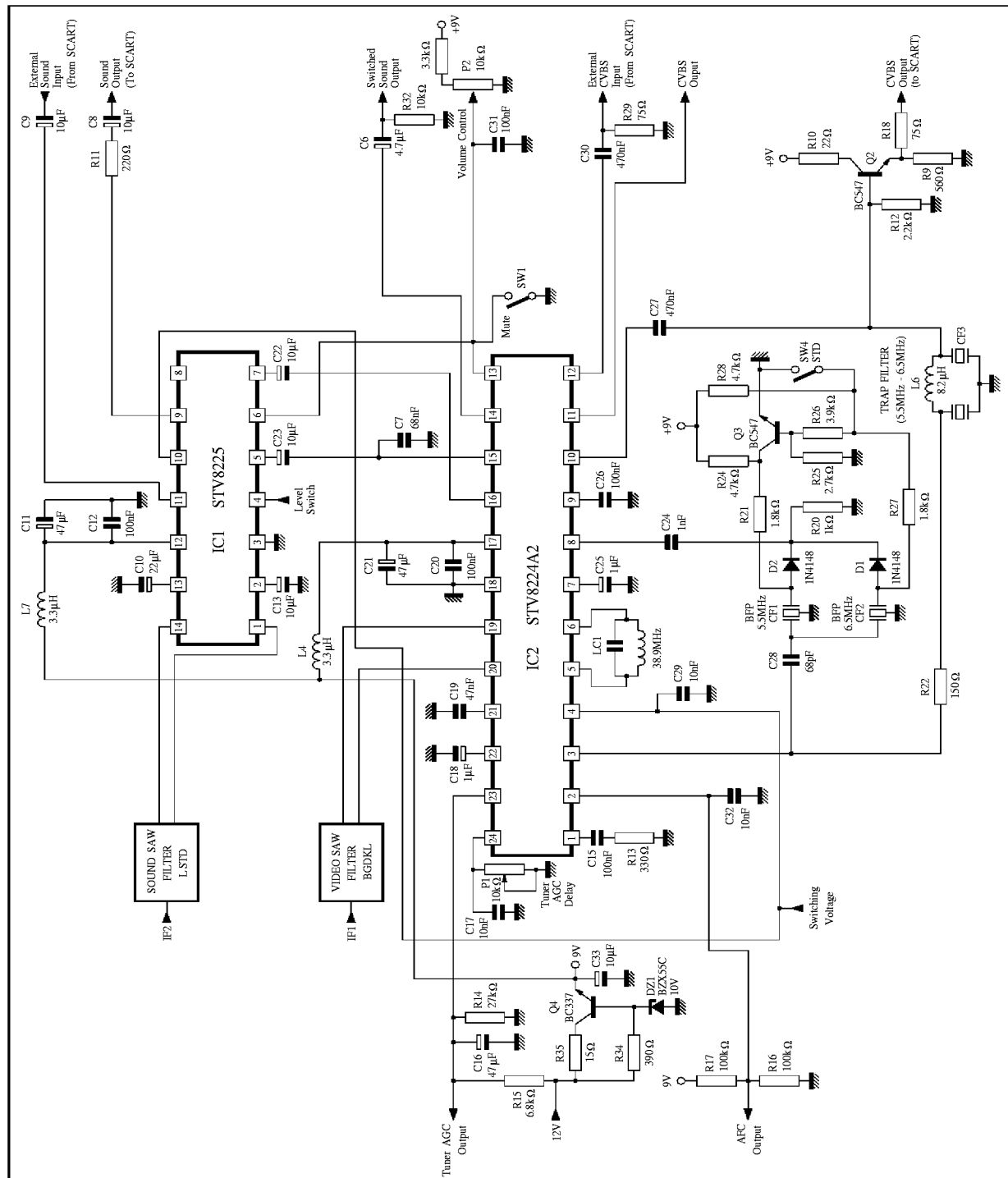
APPLICATION DIAGRAM (B/G/D/K) STV8224A2



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APPLICATION DIAGRAM (B/G/D/K, L)

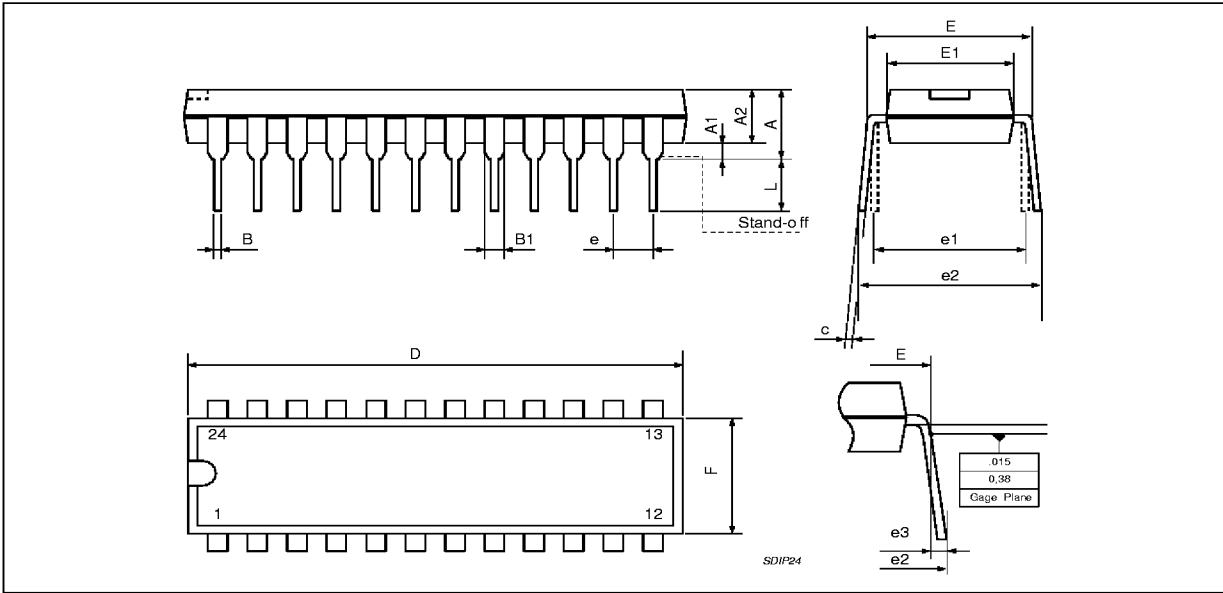
STV8224A2 - STV8225



82242-28 EPS

STV8224A2

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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