

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

PRELIMINARY DATA

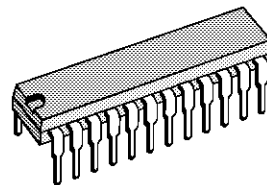
- VIDEO PLL DEMODULATION
- SOUND PLL DEMODULATION
- POSITIVE AND NEGATIVE MODULATION
- AGC FOR BG AND L STANDARDS
- AUDIO SWITCH
- DC VOLUME CONTROL
- VIDEO SWITCH

**DESCRIPTION**

The STV8224A 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.

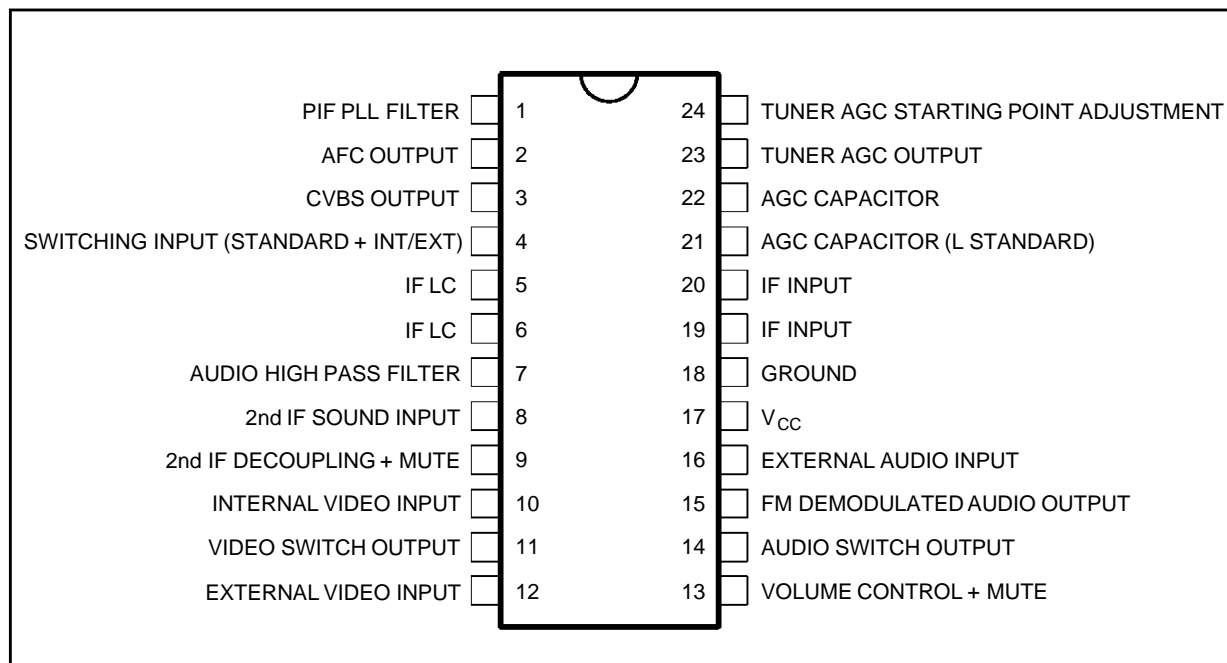
AM sound demodulation is performed with the STV8225 add-on.



**SHRINK24**  
(Plastic Package)

**ORDER CODE : STV8224A**

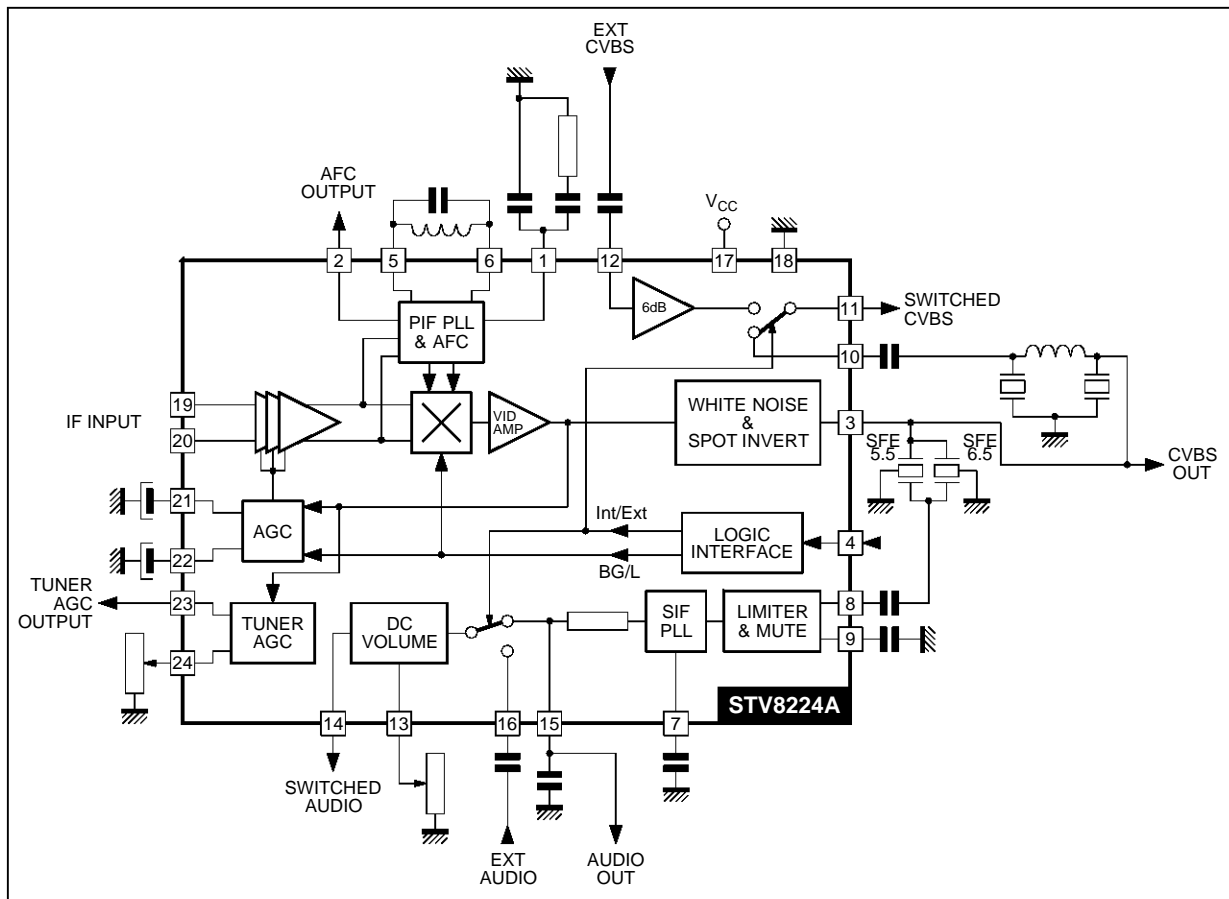
**PIN CONNECTIONS**



8224A-01.EPS

# STV8224A

## BLOCK DIAGRAM



8224A-02.EPS

## 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	$^{\circ}C$
$T_{oper}$	Operating Temperature	0, +70	$^{\circ}C$

8224A-01.TBL

## THERMAL DATA

Symbol	Parameter	Value	Unit
$R_{th(j-a)}$	Junction-ambient Thermal Resistance	Max. 75	$^{\circ}C/W$

8224A-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 =  $5\text{MHz}$ , 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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**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		$\text{k}\Omega$
$C_{19-20}$	Differential Input Capacitance			2		pF
Gr	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**

S2	AFC Slope	See Figure 21		0.2		$\mu\text{A}/\text{kHz}$
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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
Vr3c	Residual Carrier Signal (RMS Value)			1	10	mV
Vr3h	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 =  $5\text{MHz}$

2. Video carrier relative level =  $0\text{dB}$ , Chroma subcarrier level =  $-3.2\text{dB}$ , Sound carrier relative level =  $-20\text{dB}$ . AGC voltage (Pin 22) is adjusted to get  $1V_{PP}$  signal on output (Pin 3).

8224A-03.TBL

## STV8224A

### ELECTRICAL CHARACTERISTICS (continued)

( $T_{amb} = 25^{\circ}\text{C}$ ,  $V_{CC} = 9\text{V}$ , 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 =  $5\text{MHz}$ , Sound carrier input :  $5.5\text{MHz}$ ,  $10\text{mV}_{\text{RMS}}$ ,  $f_{\text{M}} = 1\text{kHz}$ , 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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#### AGC CIRCUIT (L MODE)

$I_{22\text{CL}}$	Charging Current	Note 3	2	3.3	4.5	mA
$I_{22\text{DL}}$	Discharge Current			0.3		$\mu\text{A}$
$I_{22\text{CL+}}$	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
$I_{22\text{DL+}}$	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 Sinked 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 Sinked Current	Note 6		40		mA

#### FM SOUND DEMODULATION

$V_{8\text{S}}$	Input Sensitivity	-3dB FM detected signal		35		$\mu\text{V}$
$R_8$	Limiter Input Resistance			1.2		$\text{k}\Omega$
AMR	Amplitude Modulation Rejection	Note 4	50	61		dB
SVR	Supply Voltage Rejection Ratio	Ripple signal : $100\text{Hz}$ , $0.5\text{V}_{\text{PP}}$	12	17		dB
$V_{15}$	Detected Audio Output Signal		0.85	1.1	1.4	$\text{V}_{\text{RMS}}$
THD	Total Harmonic Distortion			0.2	1	%
$R_{15}$	Internal Deemphasis Resistor		600	750	900	$\Omega$
S/N	Signal to Noise Ratio	Note 5, Weighted CCIR 468-4	50	55		dB

#### VOLUME CONTROL

$V_{\text{C}}$ Range	Control Range	See Figure 22	72	77		dB
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#### AUDIO SWITCH

$R_{16}$	Input Resistance		45	60	75	$\text{k}\Omega$
CRtk	Crosstalk		70	80		dB
EXTHD	THD on External Signal	$V_{\text{IN}} = 2\text{V}_{\text{RMS}}$ , Attenuation = $0\text{dB}$		0.1	0.3	%

Notes : 3. Triggered on white level

4.  $\text{AMR} = 20 \log \frac{V_{15} (\text{mV}_{\text{RMS}})}{V_{\text{AM}}} (\text{dB})$  where  $V_{\text{AM}}$  = output amplitude in AM for  $f_{\text{M}} = 1\text{kHz}$  and  $m = 30\%$

5.  $\frac{\text{S}}{\text{N}} = 20 \log \frac{V_{15} (\text{mV}_{\text{RMS}})}{V_{\text{N}} (\text{mV}_{\text{RMS}})} (\text{dB})$

6. Additional sinked current for large increasing steps of input signal when :  
 - Voltage Pin 22 > starting point defined Pin 24.  
 - Output signal (Pin 3) saturated ( $V_3 < V_{\text{BTH}}$  in BG mode,  $V_3 > V_{\text{WTH}}$  in L mode).

8224A-04.TBL

**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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## 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 9 or Pin 13)

$V_{TH9}$	Threshold Voltage Pin 9		1.7	2	2.3	V
$V_9$	DC Level when Mute Disabled	High impedance controlling circuit		2.8		V
$V_{TH13}$	Threshold Voltage Pin 13		0.2	0.3	0.4	V

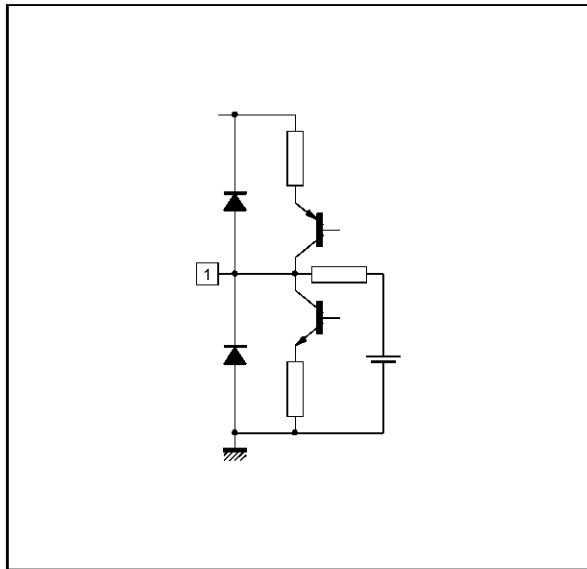
## CONTROL INPUT

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

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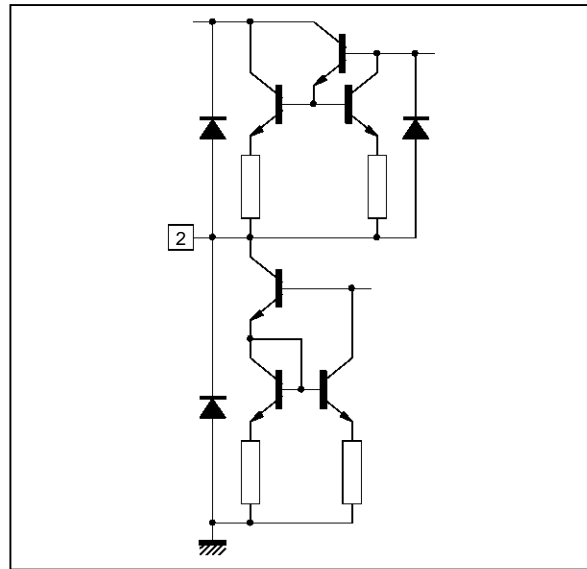
INPUT/OUTPUT PIN CONFIGURATION

Figure 1 : PIF PLL Filter



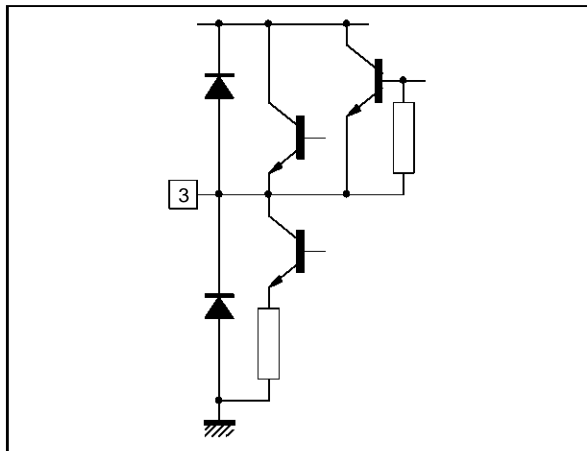
8224A-03.EPS

Figure 2 : AFC Output



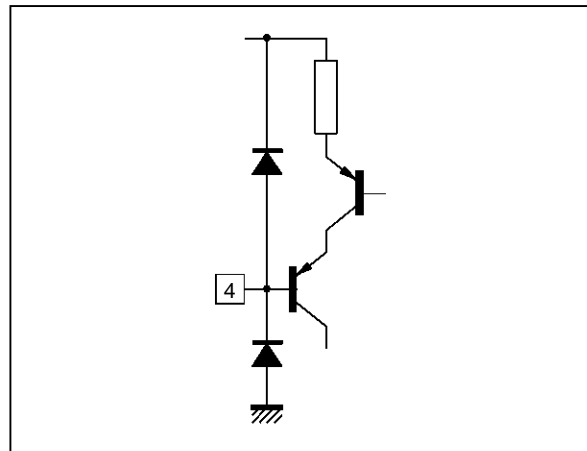
8224A-04.EPS

Figure 3 : CVBS Output



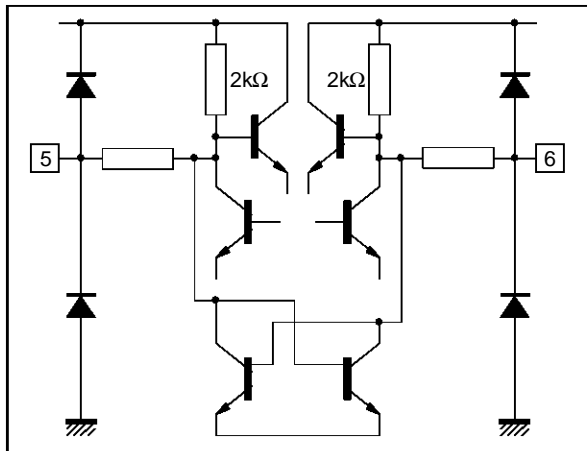
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Figure 4 : Switching Input Standard+ INT/EXT



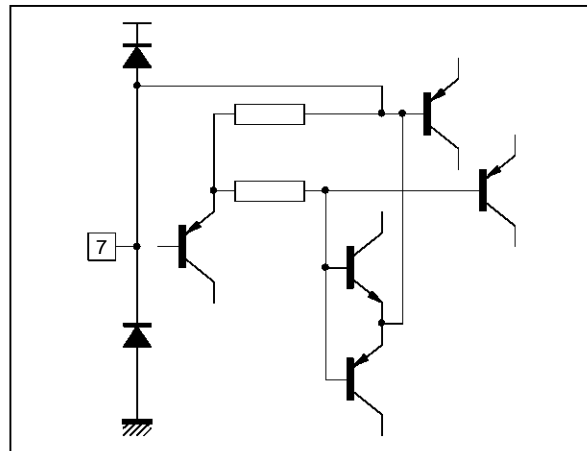
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Figure 5 : IFLC



8224A-07.EPS

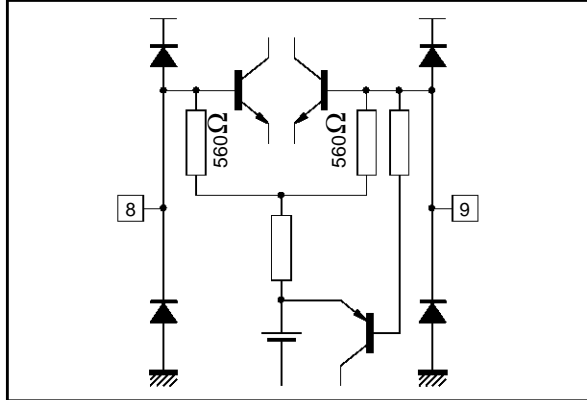
Figure 6 : Audio High Pass Filter



8224A-08.EPS

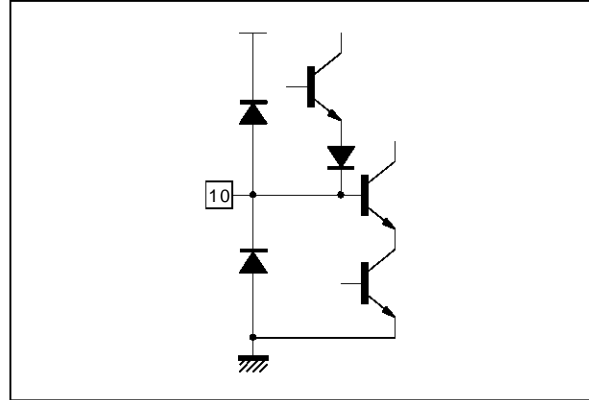
**INPUT/OUTPUT PIN CONFIGURATION** (continued)

**Figure 7 :** 2CD IF Sound Input (Pin 8)  
2CD IF Decoupling + Mute (Pin 9)



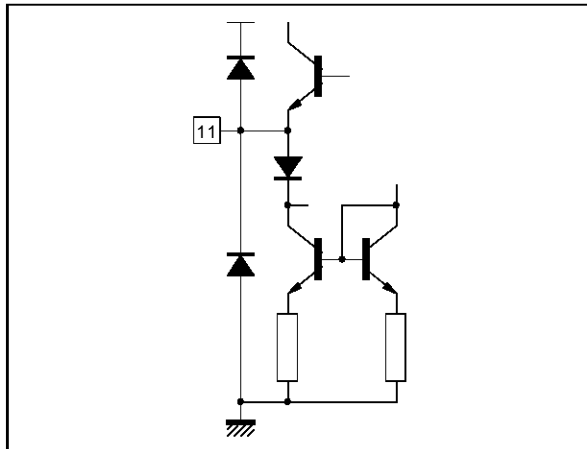
8224A-09.EPS

**Figure 8 :** Internal Video Input



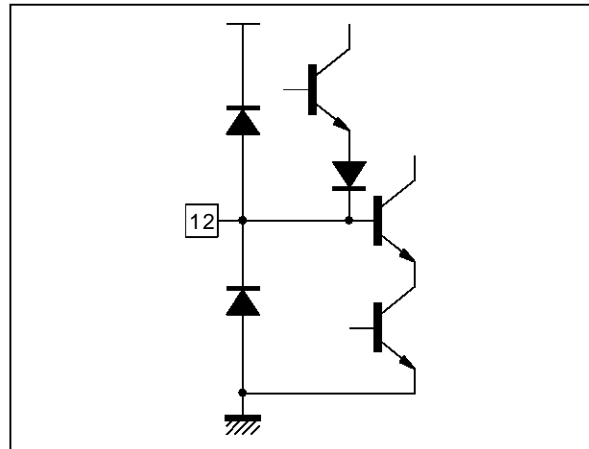
8224A-10.EPS

**Figure 9 :** Video Switch Output



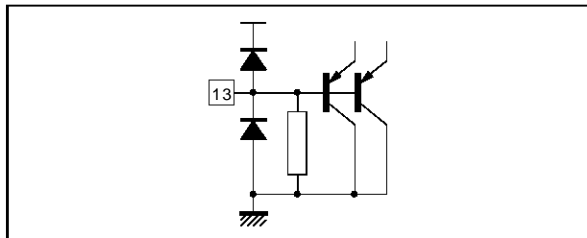
8224A-11.EPS

**Figure 10 :** External Video Input



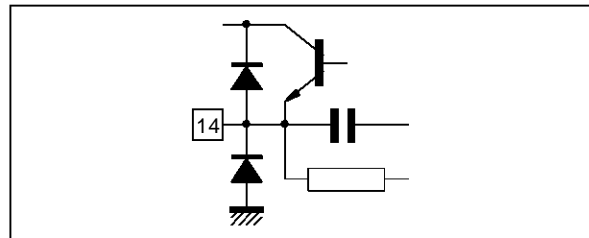
8224A-12.EPS

**Figure 11 :** Volume Control + Mute



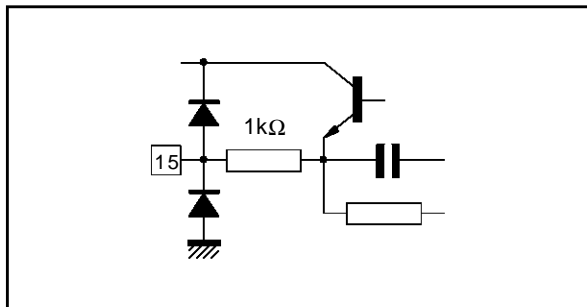
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**Figure 12 :** Audio Switch Output



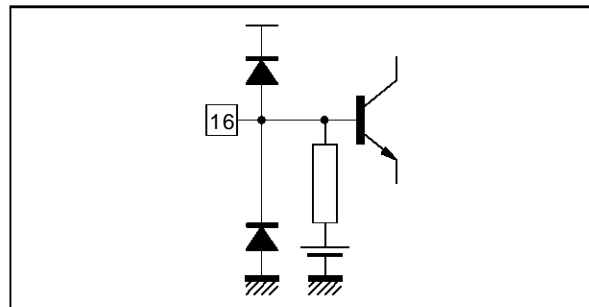
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**Figure 13 :** FM Demodulated Audio Output



8224A-15.EPS

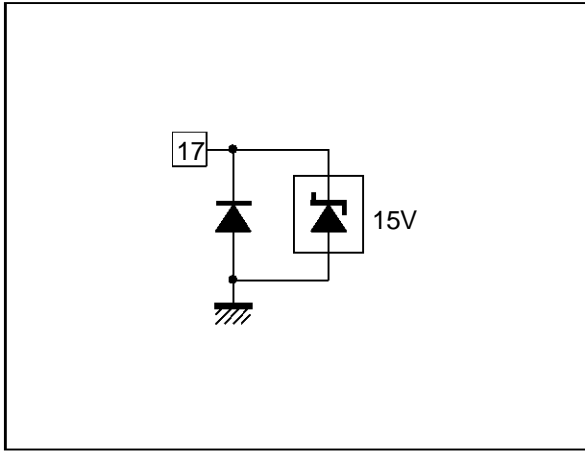
**Figure 14 :** External Audio Input



8224A-16.EPS

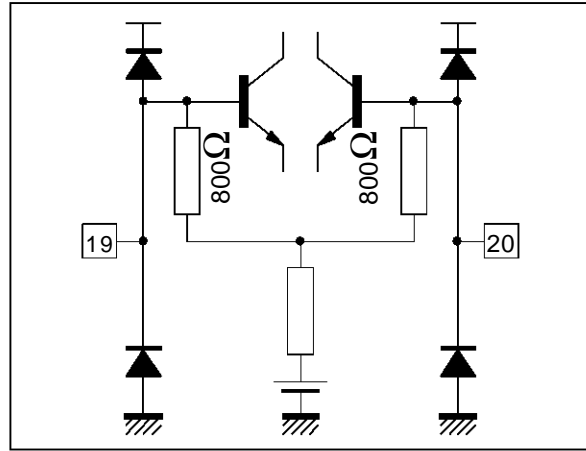
INPUT/OUTPUT PIN CONFIGURATION (continued)

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



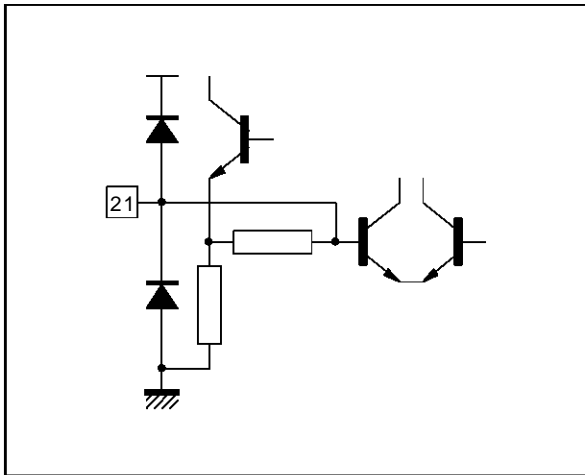
8224A-17.EPS

Figure 16 : IF Input



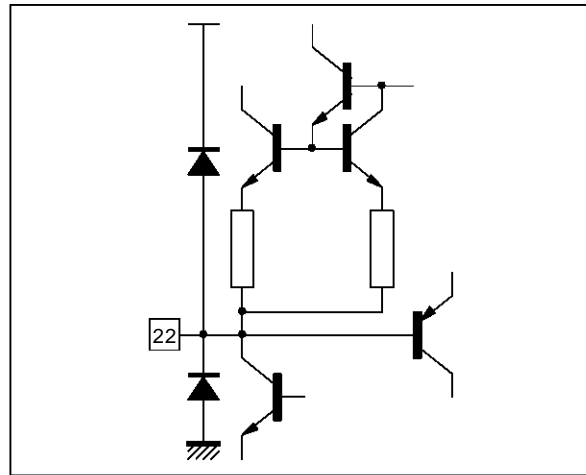
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Figure 17 : AGC Capacitor



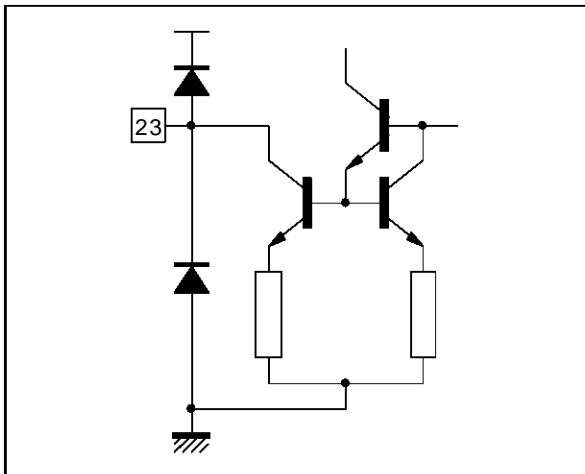
8224A-19.EPS

Figure 18 : AGC Capacitor



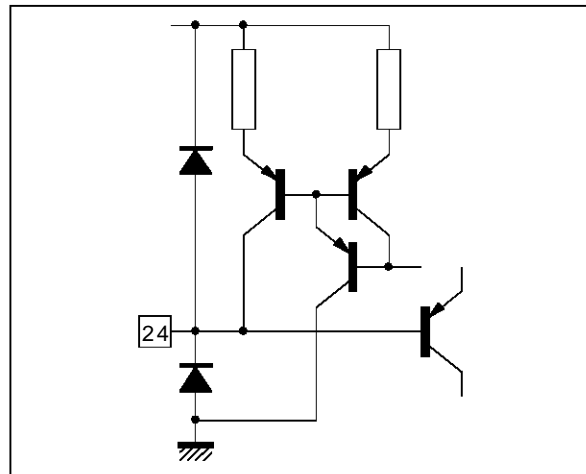
8224A-20.EPS

Figure 19 : Tuner AGC Output



8224A-21.EPS

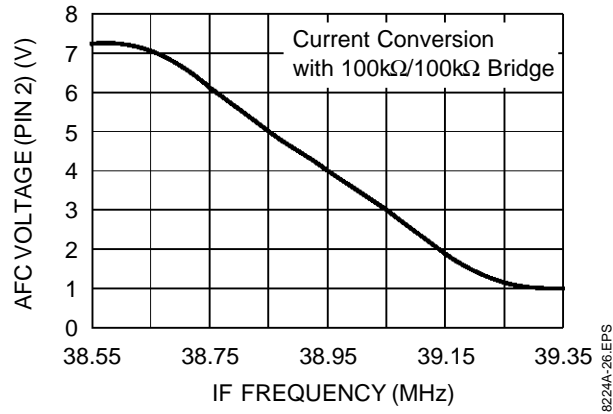
Figure 20 : Tuner AGC Starting Point Adjustment



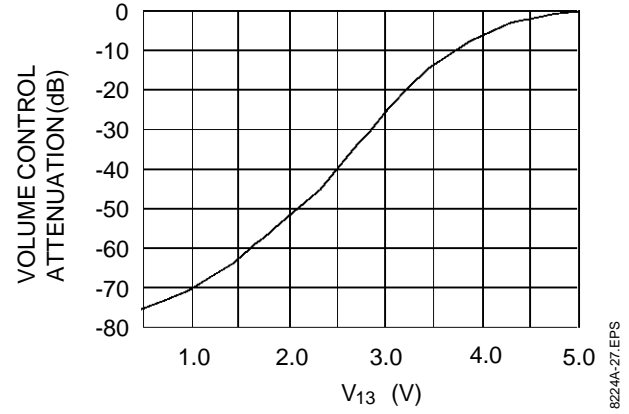
8224A-22.EPS



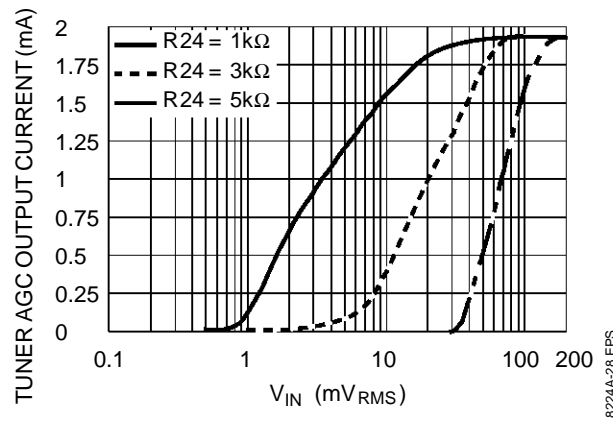
**Figure 21 : AFC Voltage Pin 2 vs IF Frequency**



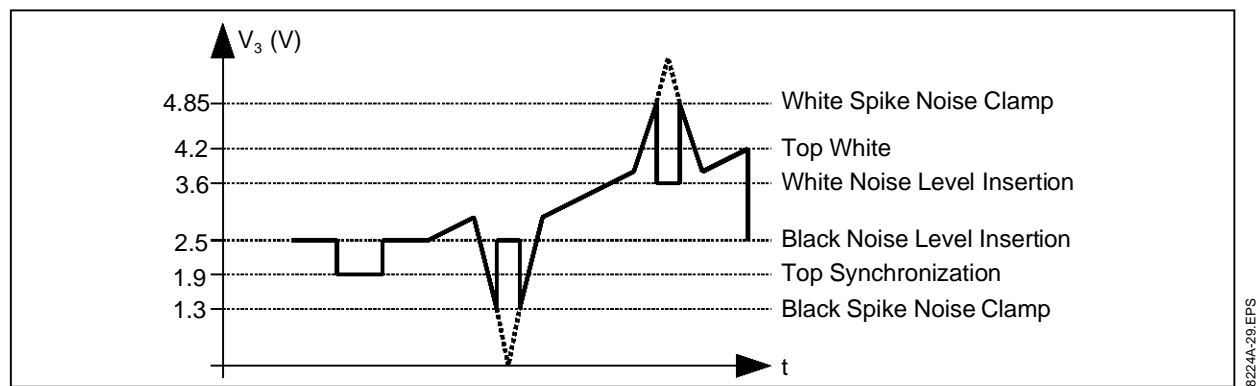
**Figure 22 : Volume Control Attenuation vs V<sub>13</sub>**



**Figure 23 : Tuner AGC Output Current vs V<sub>IN</sub> (R24 is external adjustment Pin 24)**

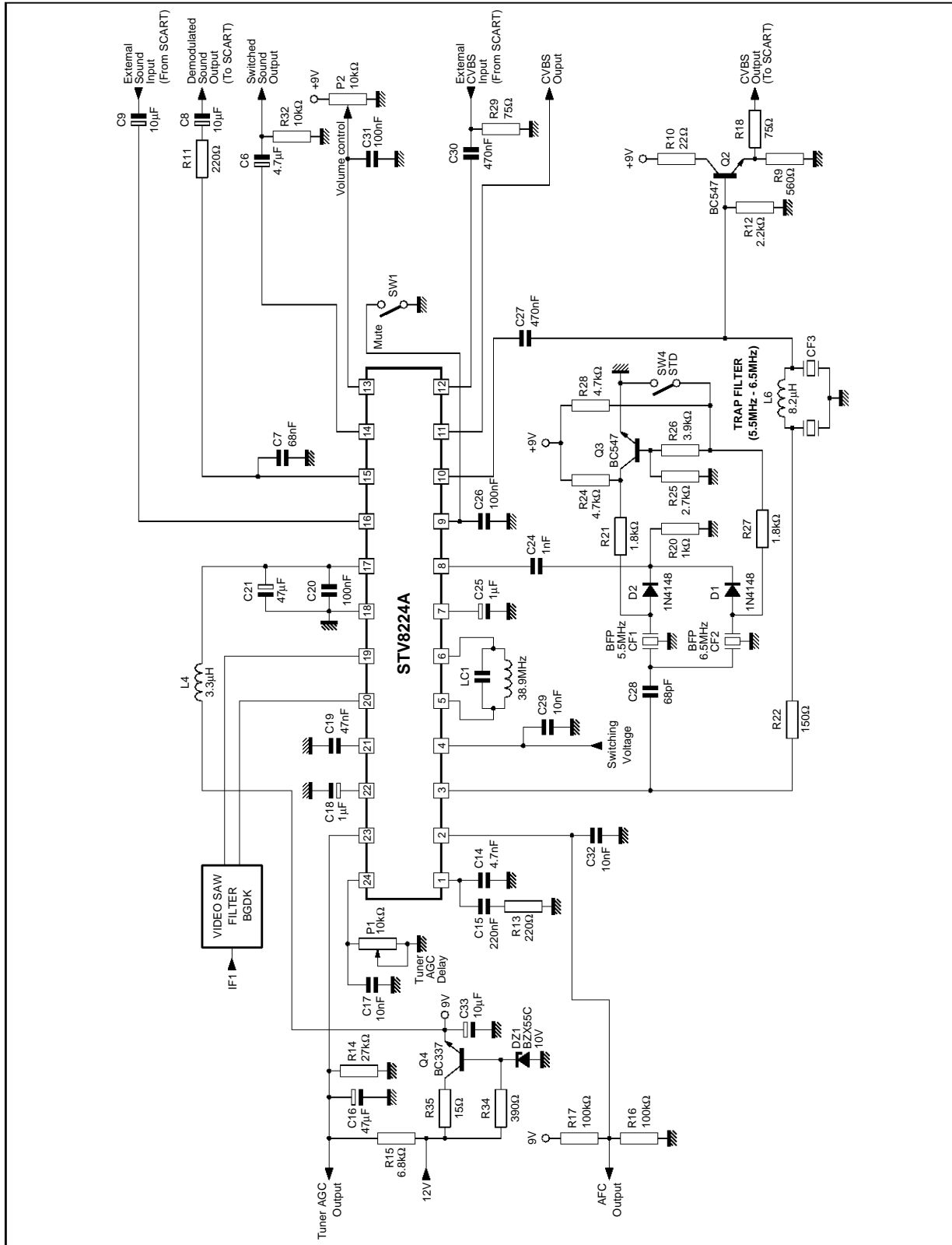


**Figure 24 : Black and White Noise Inverter**



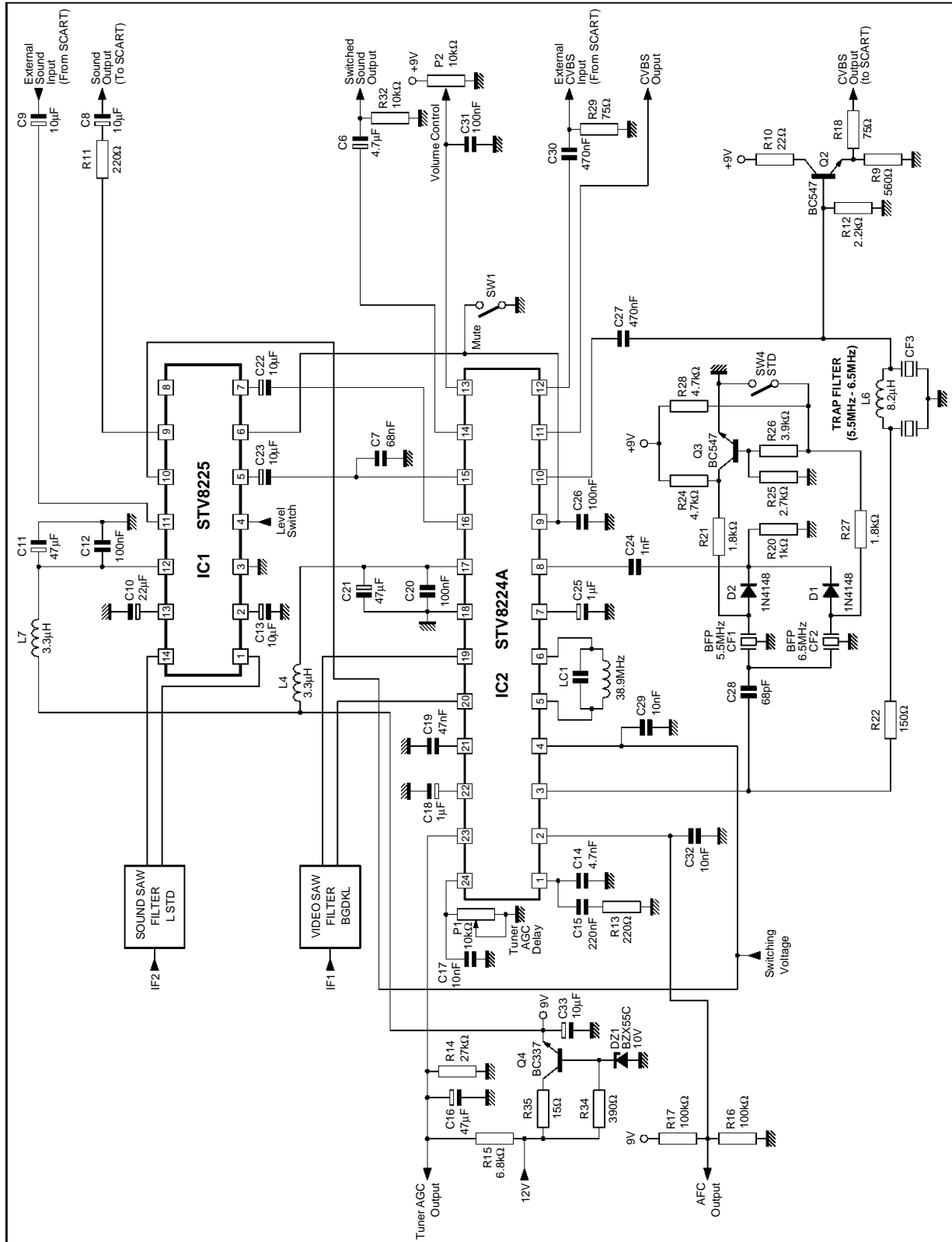
# STV8224A

## APPLICATION DIAGRAM (B/G/D/K) STV8224A



8224A-25.EPS

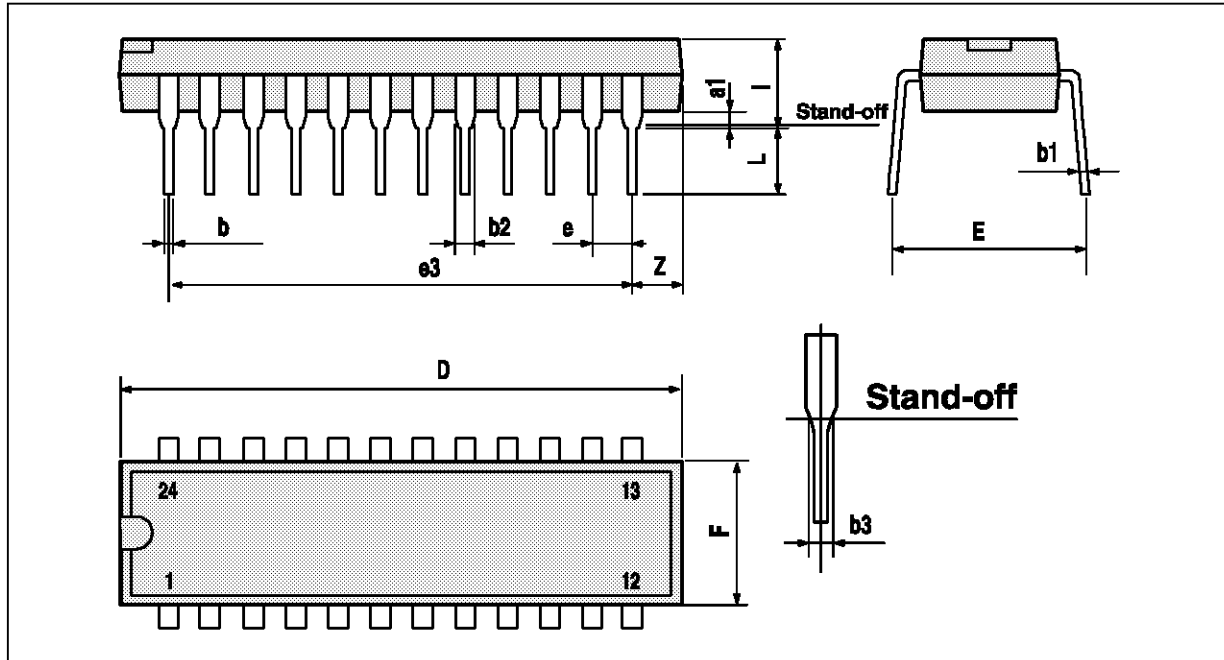
APPLICATION DIAGRAM (B/G/D/K, L)  
STV8224A- STV8225



8224A-24.EPS

# STV8224A

## PACKAGE MECHANICAL DATA 24 PINS - PLASTIC SHRINK DIP



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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