

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

PRELIMINARY DATA

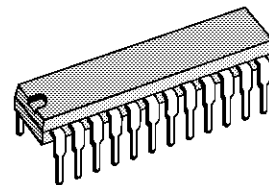
- VIDEO PLL DEMODULATION
- SOUND PLL DEMODULATION
- POSITIVE AND NEGATIVE MODULATION
- AGC FOR BG AND L STANDARDS
- AUDIO SWITCH
- DC VOLUME CONTROL
- VIDEO SWITCH

**DESCRIPTION**

The STV8224 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.

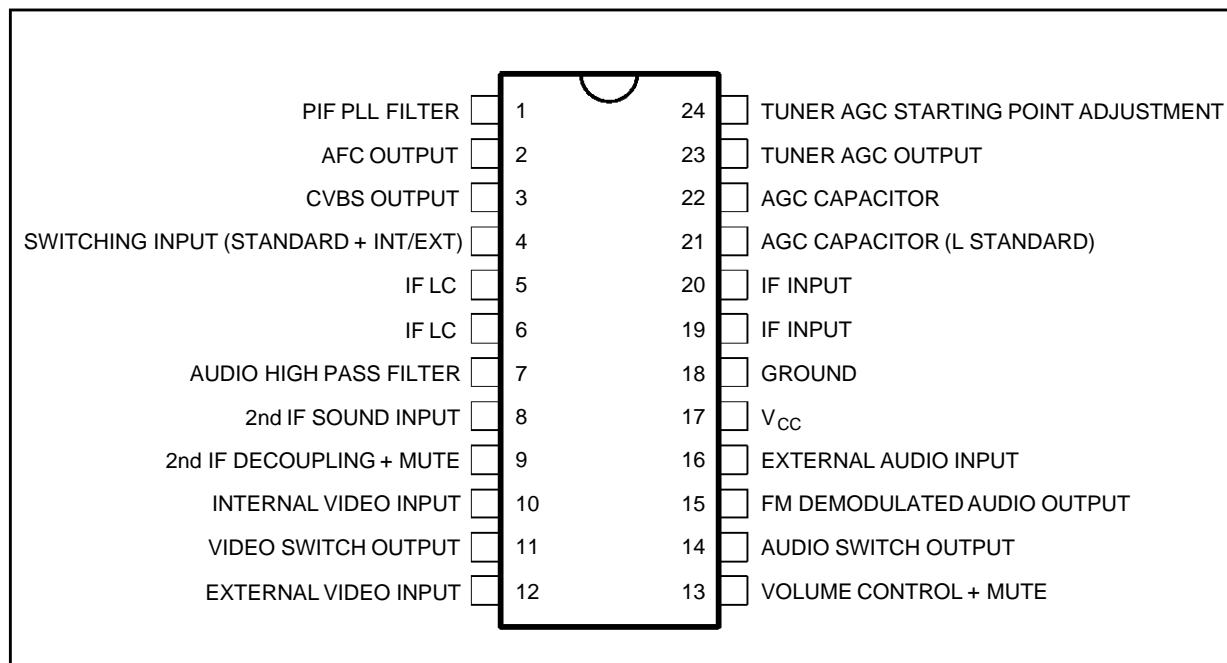
AM sound demodulation is performed with the STV8225 add-on.



**SHRINK24**  
(Plastic Package)

**ORDER CODE : STV8224**

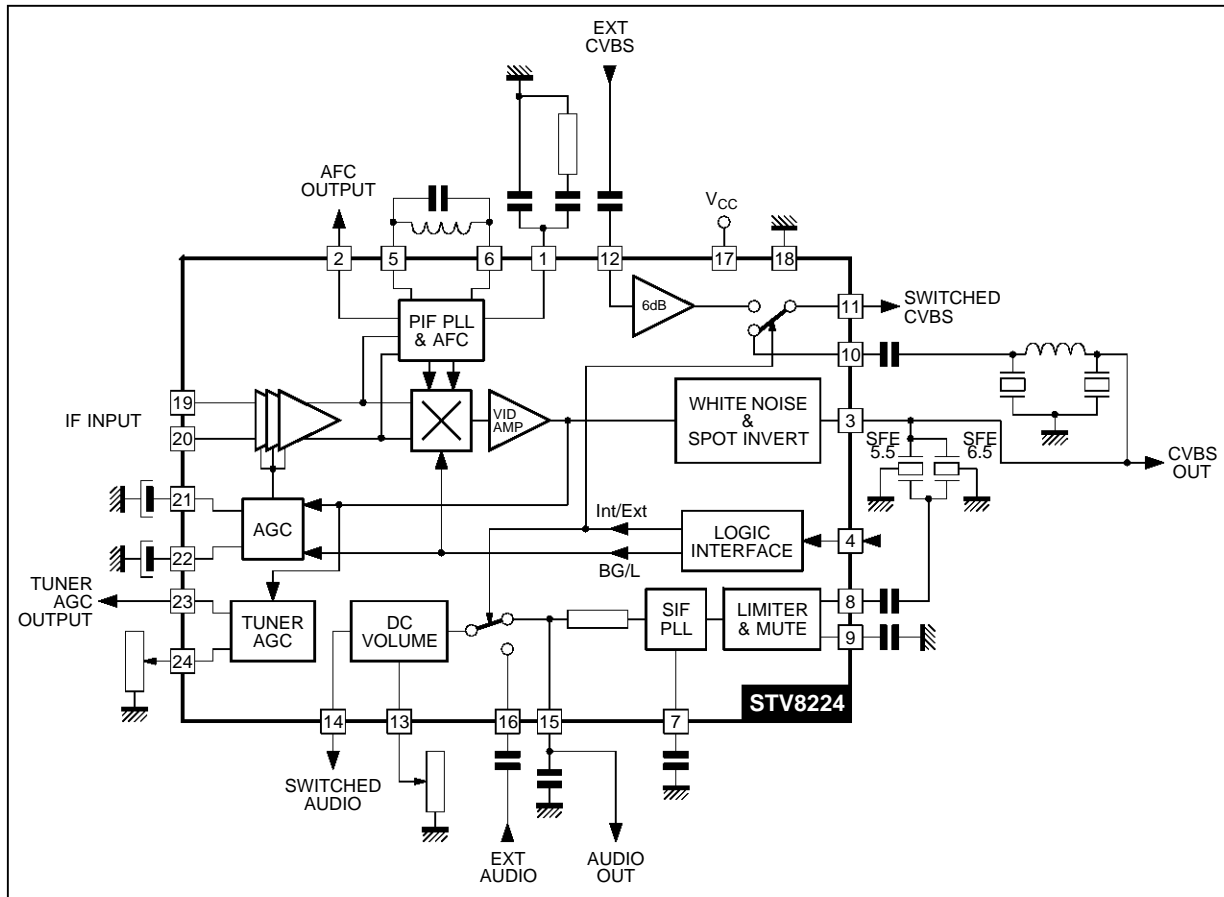
**PIN CONNECTIONS**



8224-01.EPS

# STV8224

## BLOCK DIAGRAM



8224-02.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	$^{\circ}C$

8224-01.TBL

## THERMAL DATA

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

8224-02.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,  $D = 100\%$  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**

$V_{CC}$	Voltage Operating		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		$\text{mV}_{RMS}$

**AFC**

	AFC Slope			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		4.3 1.9		V V
BW	Bandwidth	-3dB Video Signal		9		MHz
Dg	Differential Gain			3	7	%
Dp	Differential Phase			3	7	Degree
$V_{r3}$	Residual Carrier Signal (RMS Value)			1	10	mV
$V_{r3}$	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		55		dB
	Intermodulation 1.07MHz	Note 2		50		dB
$V_{WTH}$	White Noise Threshold Voltage			4.6		V
$V_{WIL}$	White Noise Insertion Level			3.3		V
$V_{BTH}$	Black Noise Threshold Voltage			1.3		V
$V_{BIL}$	Black Noise Insertion Level			2.5		V

**AGC CIRCUIT (BG MODE)**

$I_{22C}$	Charging Current		550	950	1300	$\mu\text{A}$
$I_{22D}$	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 =  $-20\text{dB}$

8224-03.TBL

## STV8224

### 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,  $D = 100\%$  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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#### AGC CIRCUIT (L MODE)

$I_{22C}$	Charging Current	Note 3		3.3		mA
$I_{22D}$	Discharge Current (Frame Sampled)			40		$\mu\text{A}$
	Additional Charging Current (Frame Sampled)	L in case of missing, VITS Pulses and no White in Video Content		180		$\mu\text{A}$
	Threshold Voltage Level	L in case of missing, VITS Pulses and no White in Video Content		$V_{Black} + 0.1$		V

#### TUNER AGC

$I_{23}$	Sinked Current		1.4	2.1	2.8	mA
S23	Current Slope	$R = 3\text{k}\Omega$ on Pin 24		300		$\mu\text{A}/\text{dB}$

#### FM SOUND DEMODULATION

$V_{8S}$	Input Sensitivity	-3dB FM detected signal		60		$\mu\text{V}$
$R_8$	Limiter Input Resistance			1.2		$\text{k}\Omega$
AMR	Amplitude Modulation Rejection	Note 4	40	53		dB
SVR	Supply Voltage Rejection Ratio			TBF		dB
$V_{15}$	Detected Audio Output Signal			1		$\text{V}_{RMS}$
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		55		dB

#### VOLUME CONTROL

$V_C$ Range	Control Range			80		dB
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#### AUDIO SWITCH

$R_{16}$	Input Resistance		40	65		$\text{k}\Omega$
CRtk	Crosstalk		70	80		dB
EXTHD	THD on External Signal	$V_{IN} = 2\text{V}_{RMS}$ , Attenuation = $0\text{dB}$		0.05	0.3	%

Notes : 3. Triggered on white level

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

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

8224-04.TBL

**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,  $D = 100\%$  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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## VIDEO SWITCH

$V_{\text{DC}12}$	DC Input Level	No signal	1.6	1.9	2.2	V
$V_{\text{S}12}$	Top Sync. Clamp Level			1.8		V
$V_{11}$	DC Output Level	No signal	1.4	1.7	2	V
$V_{\text{S}11}$	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			V
$I_{12}$	Input Current	$V_{12} = V_{\text{DC}12} = 1.5\text{V}$		1	5	$\mu\text{A}$
VBW	Bandwidth	$V_{\text{IN}} = 1\text{V}_{\text{PP}}$		15		MHz
$G_{\text{IN}}$	Gain from Int. Input to Output		-0.5	0	+0.5	dB

## MUTE (Pin 9 or Pin 13)

$V_9$	Threshold Voltage			2.1		V
$V_9$	DC Level when Mute Disabled	High impedance controlling circuit		2.8		V
$V_{13}$	Threshold			0.3		V

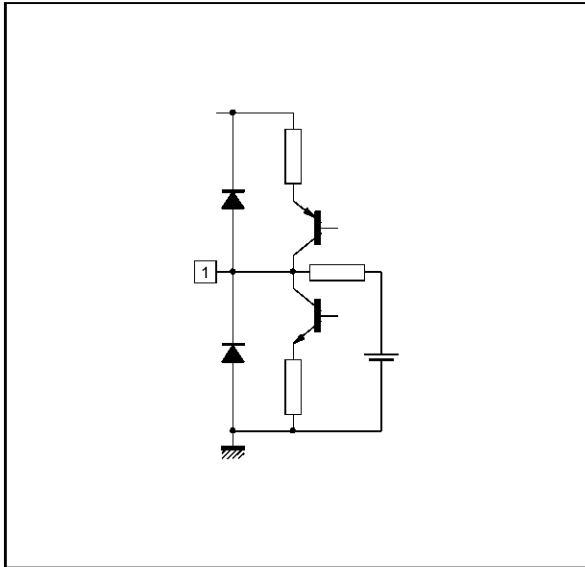
## CONTROL INPUT

	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 $V_{\text{CC}}$	6.4	6.8	7.2	V
	Threshold 2	Level linked to $V_{\text{CC}}$	4.1	4.5	4.9	V
	Threshold 1	Level linked to $V_{\text{CC}}$	1.8	2.2	2.6	V

8224-05.TBL

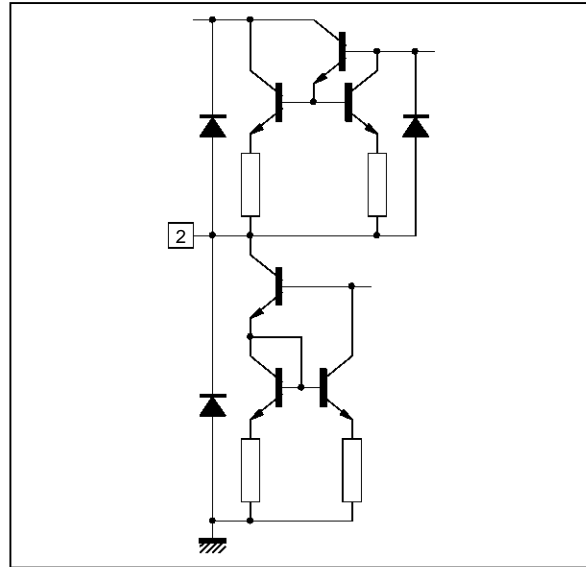
INPUT/OUTPUT PIN CONFIGURATION

Figure 1 : PIF PLL Filter



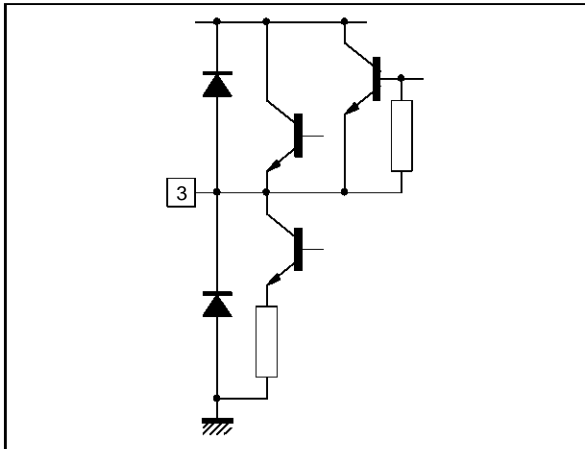
8224-03.EPS

Figure 2 : AFC Output



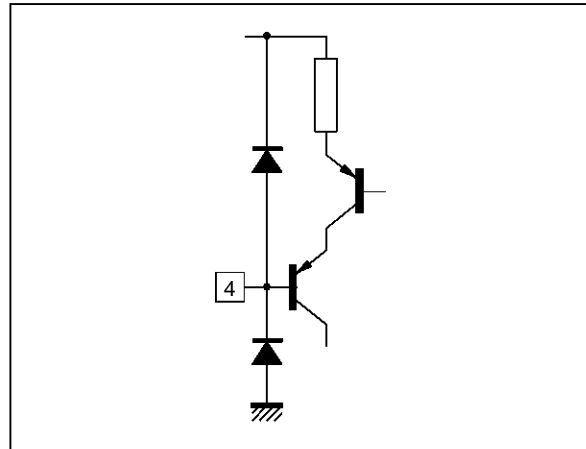
8224-04.EPS

Figure 3 : CVBS Output



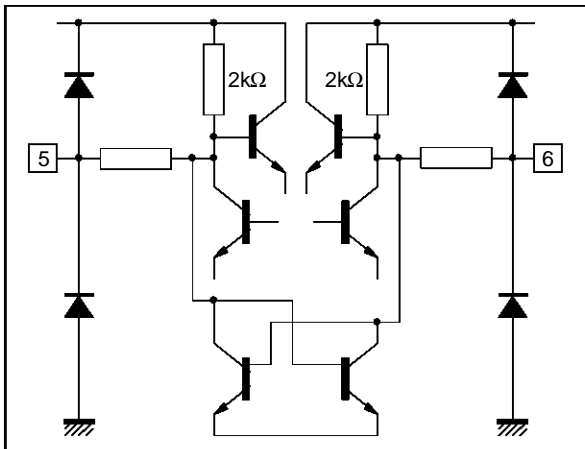
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Figure 4 : Switching Input Standard + INT/EXT



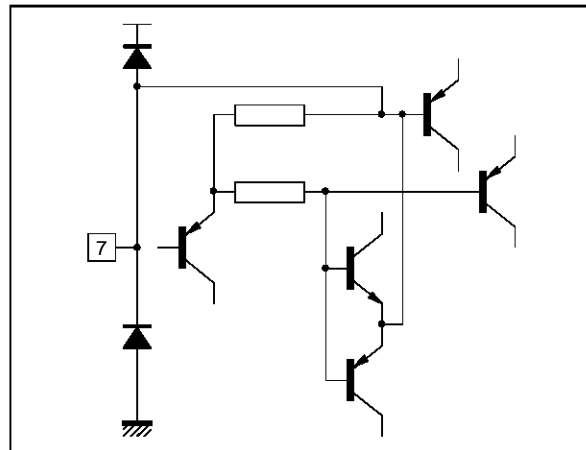
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Figure 5 : IFLC



8224-07.EPS

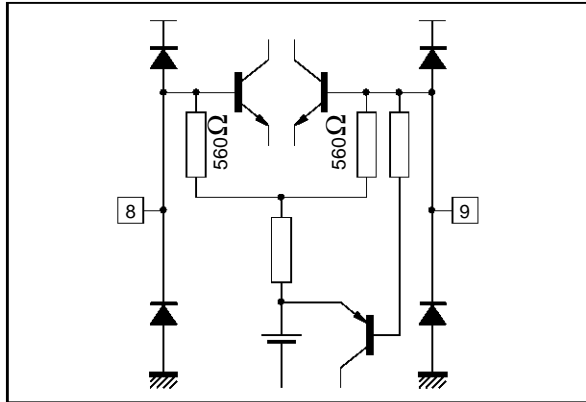
Figure 6 : Audio High Pass Filter



8224-08.EPS

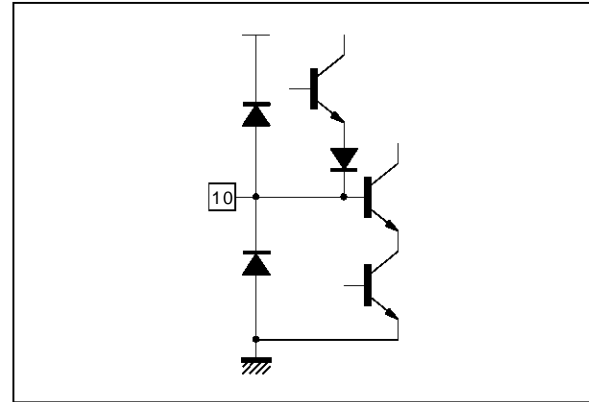
**INPUT/OUTPUT PIN CONFIGURATION** (continued)

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



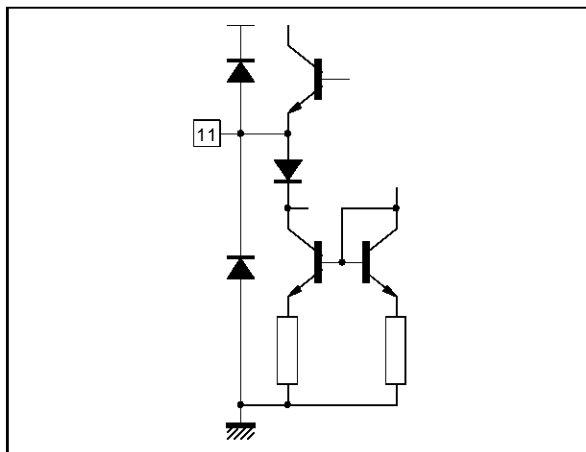
8224-09.EPS

**Figure 8 :** Internal Video Input



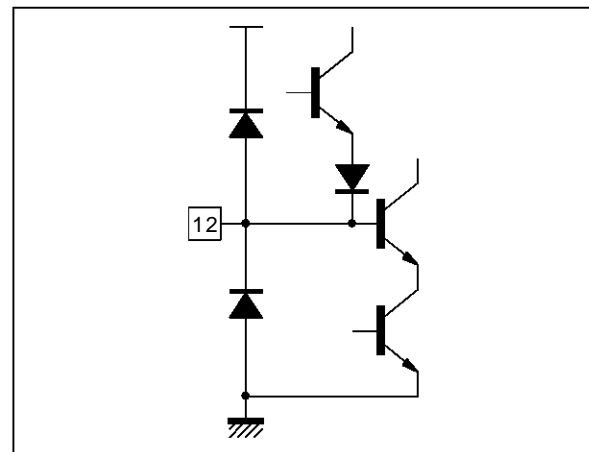
8224-10.EPS

**Figure 9 :** Video Switch Output



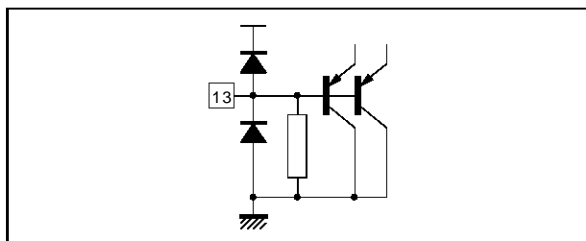
8224-11.EPS

**Figure 10 :** External Video Input



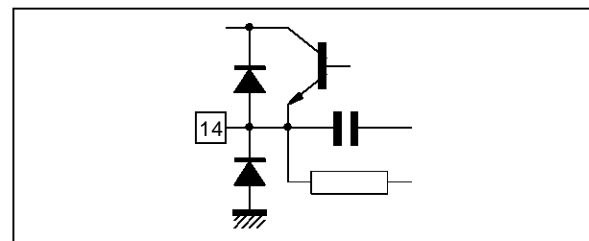
8224-12.EPS

**Figure 11 :** Volume Control + Mute



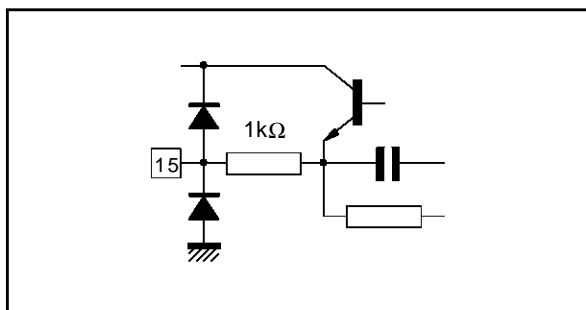
8224-13.EPS

**Figure 12 :** Audio Switch Output



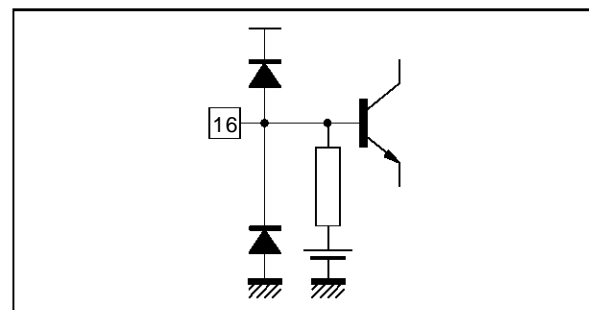
8224-14.EPS

**Figure 13 :** FM Demodulated Audio Output



8224-15.EPS

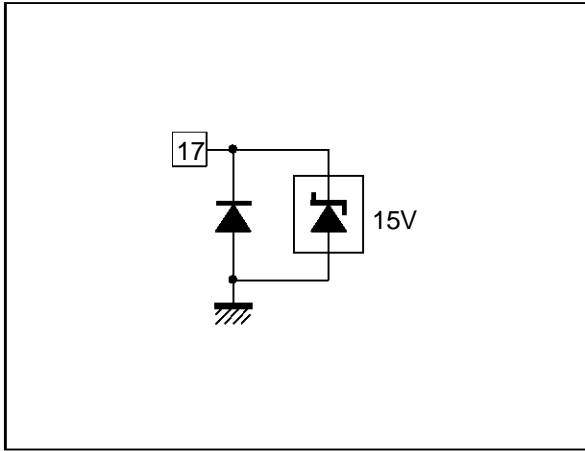
**Figure 14 :** External Audio Input



8224-16.EPS

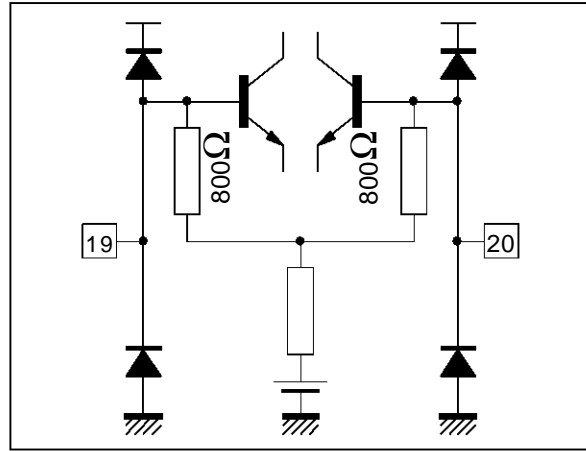
INPUT/OUTPUT PIN CONFIGURATION (continued)

Figure 15 : Vcc



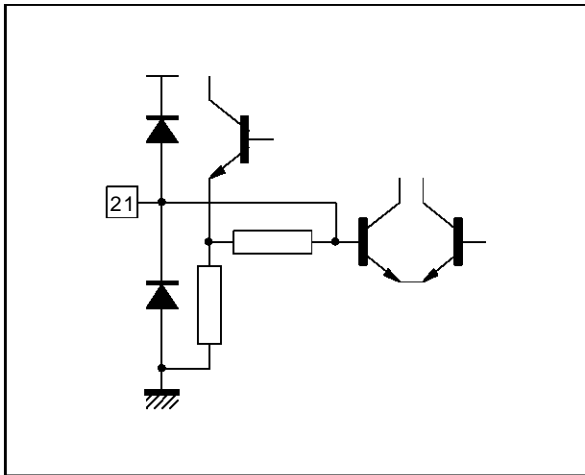
8224-17.EPS

Figure 16 : IF Input



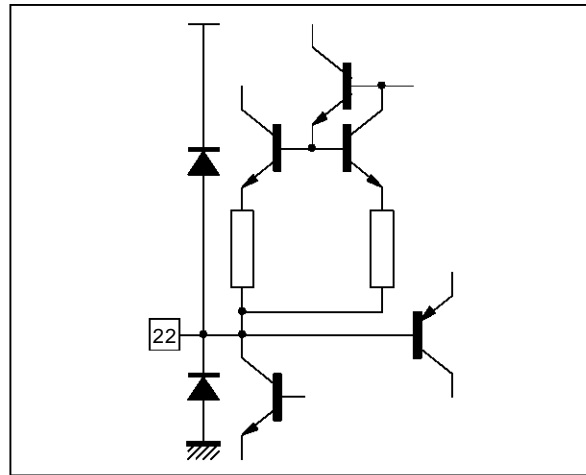
8224-18.EPS

Figure 17 : AGC Capacitor



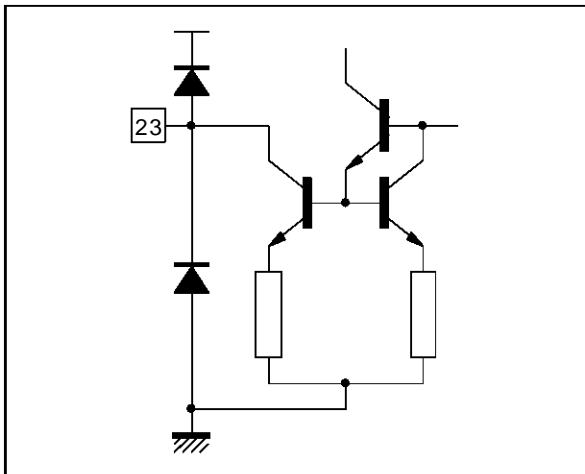
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Figure 18 : AGC Capacitor



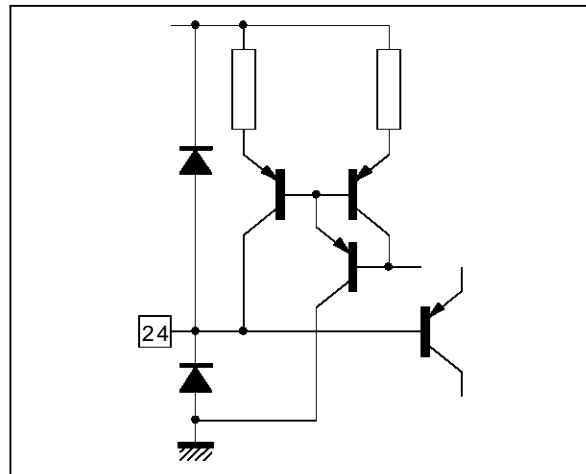
8224-20.EPS

Figure 19 : Tuner AGC Output



8224-21.EPS

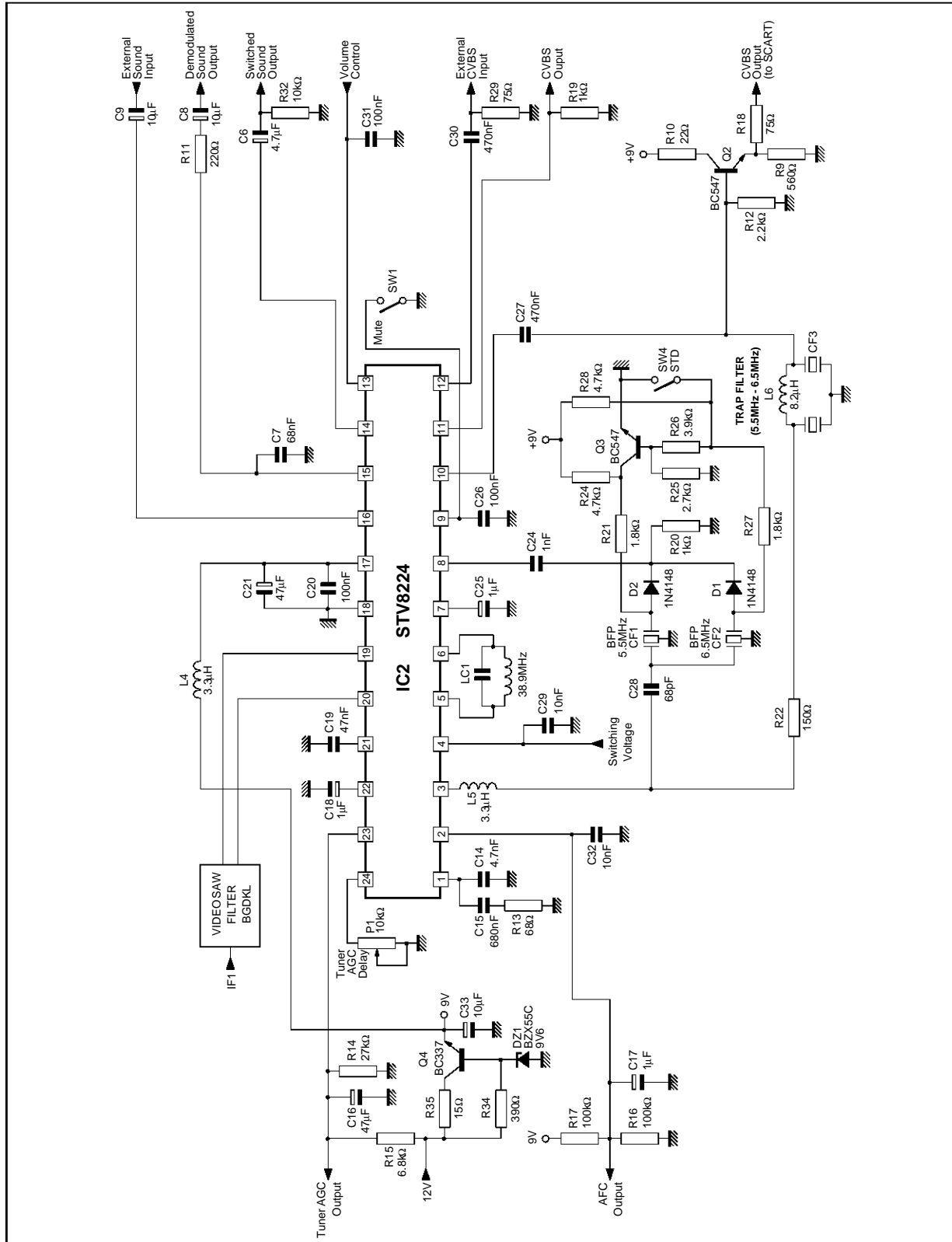
Figure 20 : Tuner AGC Starting Point Adjustment



8224-22.EPS



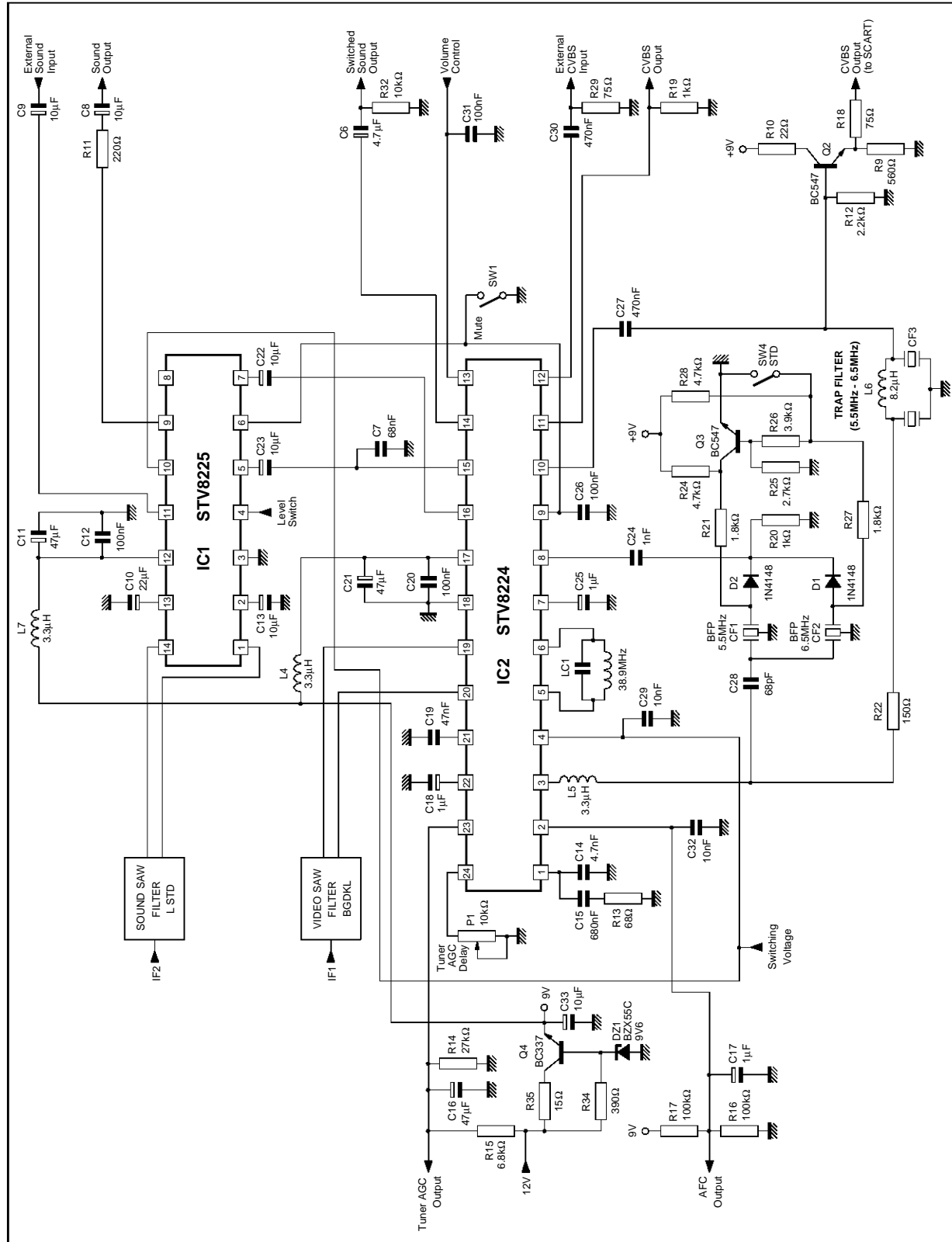
APPLICATION DIAGRAM  
STV8224



8224-23.EPS

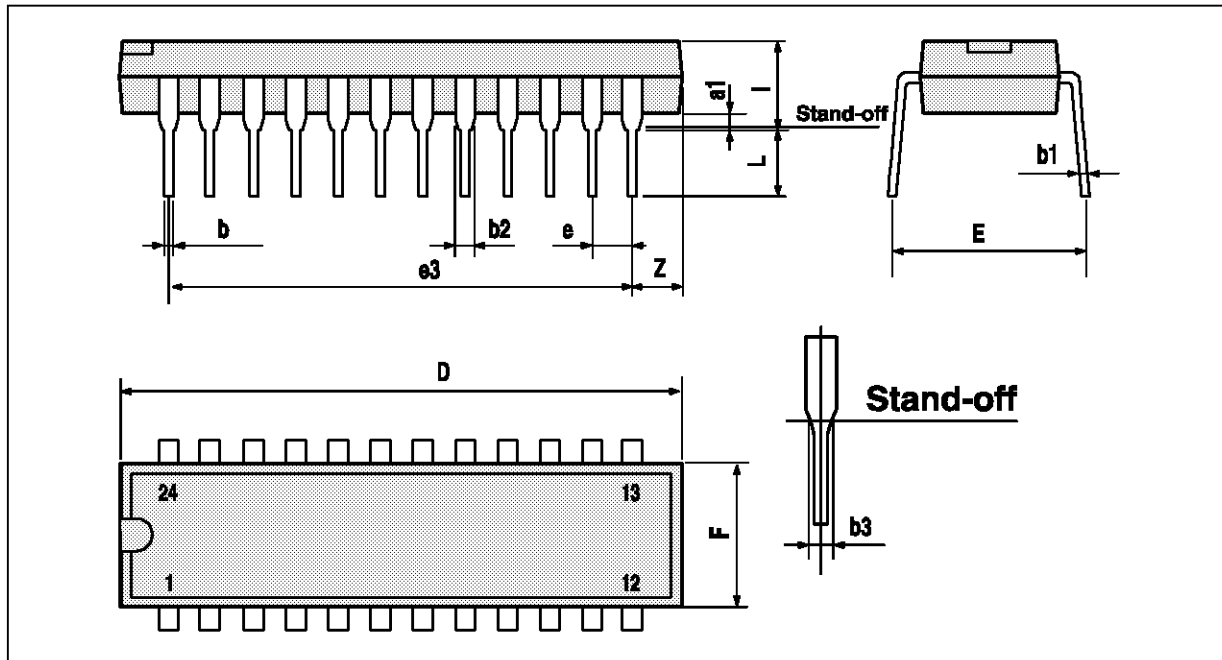
APPLICATION DIAGRAM

STV8224 - STV8225



8224-24.EPS

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



PMSDIP24.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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