

VTR Sound Component

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TDA 5651

Preliminary data

Bipolar IC

Type	Ordering code	Package
TDA 5651	Q67000-A2463	DIP 22

The integrated circuit TDA 5651 includes the essential features for sound processing in video tape recorders

such as

- Amplification and adjustment of levels
- Setting of the required input and output impedances
- Switch-over between 4 signal sources
- Switch-over from recording to playback mode
- Muting pulse
- Adjustment of the switching signals (point 3-5) to bus-compatible control levels
- Automatic level control
- Setting of the recording and playback frequency response through external negative feedback



Maximum ratings

	min	max	
Input microphone amplifier			V
Input playback amplifier		V_{REF}	V
Output playback amplifier		V_{REF}	V
Output playback amplifier	-5		mA
		6	V
Input AF signal	0	$+V_S$	V
Time constant muting pulse	0	$V_{REF} + 5$	V
Logic input	0	$+V_S$	V
Supply voltage	0	20	V
Output AF signal	0		V
Output AF signal		5	mA
Input AF amplifier	0	$V_{REF} + 5$	V
Input recording amplifier	0	$+V_S$	V
Output recording amplifier	-5	+5	mA
Logic input	0	$+V_S$	V
Logic input	0	$+V_S$	V
Input/Output AV signal	0	$+V_S$	V
Time constant level control	0	$+V_S$	V
Output level control	0	7	V
Reference voltage blocking	-5		mA
Reference voltage blocking		7	V
Junction temperature		150	°C
Storage temperature range	-40	125	°C
Thermal resistance (system-ambient air)		65	K/W

Operating range

Supply voltage	V_S	9.8 to 14	V
Frequency	f_{max}	15	kHz
0 dB		10	kHz
Ambient temperature	T_A	0 to 60	°C

Characteristics

$V_S = 12\text{ V}$; $T_A = 25\text{ }^\circ\text{C}$

Current consumption
 $V_S = 12\text{ V}$, AF, without signal

	min	typ	max	
I_S		15	25	mA

Recording mode

Microphone input
 Input impedance
 Input signal 1 kHz
 Signal-to-noise ratio, microphone
 according to plot A, $V_{i,rms} = 1\text{ mV}$

R_{iM}	-25%	10	+25%	k Ω
$V_{iM,rms}$	1.0 40 ¹⁾		50	mV dB

AV input
 Input impedance
 Input signal 1 kHz
 AV signal-to-noise ratio
 according to plot A, $V_{i,rms} = 100\text{ mV}$

R_{iAV}	10			k Ω
$V_{iAV,rms}$	0.15 60	1.0	2	V dB

AF input
 Input impedance
 Input signal 1 kHz
 AF signal-to-noise ratio
 according to plot A, $V_{i,rms} = 100\text{ mV}$

R_{iAF}	50			k Ω
$V_{iAF,rms}$	0.15 60	0.3	2	V dB

AF output (monitor)
 Output impedance
 Output signal
 Total harmonic distortion
 with 1 kHz
 $V_i = 1\text{ V}$ at AF output

R_{q13}			0.1	k Ω
$V_{q13,rms}$		1		V
THD			1.5	%
THD ₃			0.5	%

Playback mode

Playback head input
 Input current
 Input signal at 330 Hz
 Input voltage

I_3			100	nA
V_{ip}		60 ²⁾		μV
V_3	2.4	2.7	3.0	V

AV output
 Output impedance
 Output signal
 1 V_{rms} at pin 13
 Playback gain at 330 Hz
 Signal-to-noise ratio referred
 to playback head
 $V_{ip} = 180\text{ }\mu\text{V}$
 according to plot A, $R_{ip} = 10\text{ }\Omega$
 Total harmonic distortion
 with 1 kHz; $V_{ip} = 200\text{ }\mu\text{V}$

R_{q19}			1	k Ω
$V_{q19,rms}$		1		V
		84 ²⁾		dB
	56 ²⁾			dB
THD			1.5	%
THD ₃			0.5	%

1) Objective is 46 dB

2) Including preamplifier and circuitry; refer to figure

Characteristics $V_S = 12\text{ V}$; $T_A = 25^\circ\text{C}$ **Recording head output**

	min	typ	max	
Output impedance				
Output signal	R_{Q16}			$k\Omega$
$V_{iAF_{rms}} = 1\text{ V}$ (1 kHz)	$V_{Q16_{pp}}$	-20%	5	0.1 +20%
Automatic level control				
Gain $f = 1\text{ kHz}$				
Microphone input up to AF output	V_{13}/V_{iM}	26		60
AV input up to AF output	V_{13}/V_{iAV}	-6		16
AF input up to AF output	V_{13}/V_{iAF}	-6		16
Playback amplifier output up to AF output	V_{13}/V_4	0		22
Charging current for AGC	$+I_{20}$	1		dB
Discharging current for AGC	$-I_{20}$	0.3	0.5	0.65
Time period for 34 to 66 dB	t_1			4
Time period for 66 to 34 dB	t_2			100
Time period for control deviation of 40 dB at 40 Hz	t_3			200
Cross-talk of switched-off inputs				
Switching inputs A, B, C			40	dB
Input control current	$I_{7/17/18}$	-20		0
$V_{7/17/18} = 0\text{ V}$				μA
Low voltage "0"	$V_{L7/17/18}$	0		1.2
High voltage "1"	$V_{H7/17/18}$	2		V_S V
Switching times				
Muting response time via pin A	$t_{7/13}$		20	ms
Total switch-over time via pin B, C	$t_{17/13}$			
Time delay for sound recurrence after muting pulse	$t_{18/13}$		2	s
	$t_{7/13}$		1	s

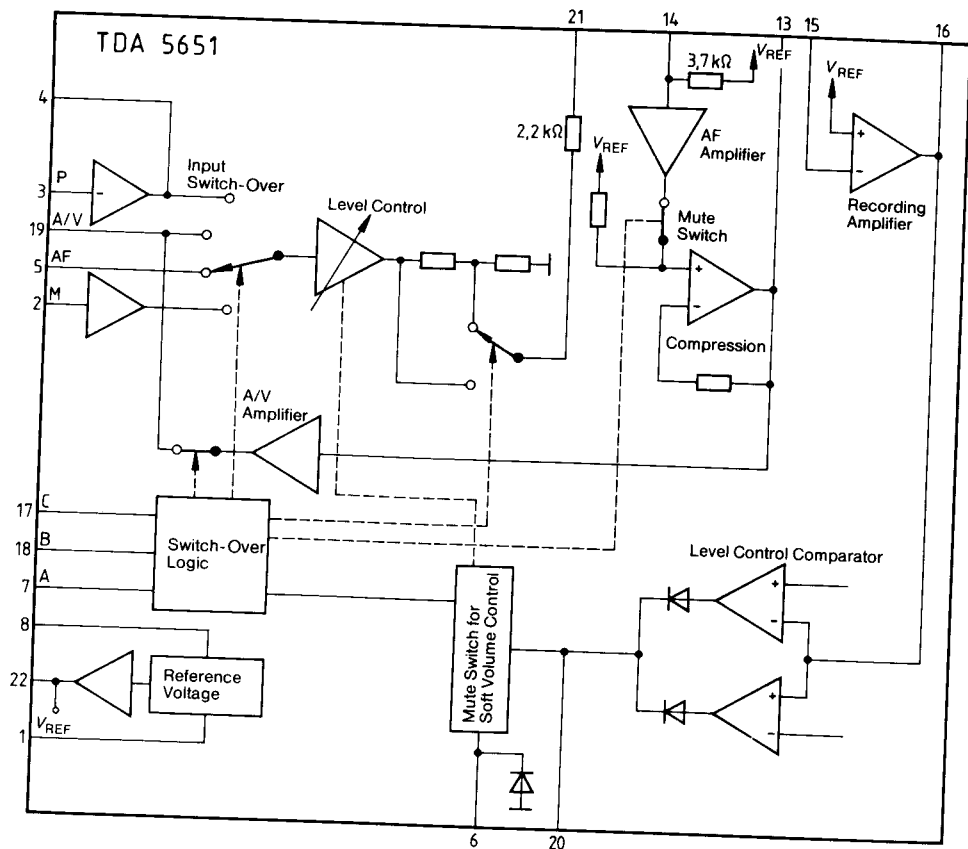
Truth table

		Switching inputs		
		A	B	C
Recording, microphone	M	1	0	0
Recording A/V	A/V	1	0	1
Playback	P	1	1	0
Recording, AF	AF	1	1	1
Mute mode	S	0	X	X

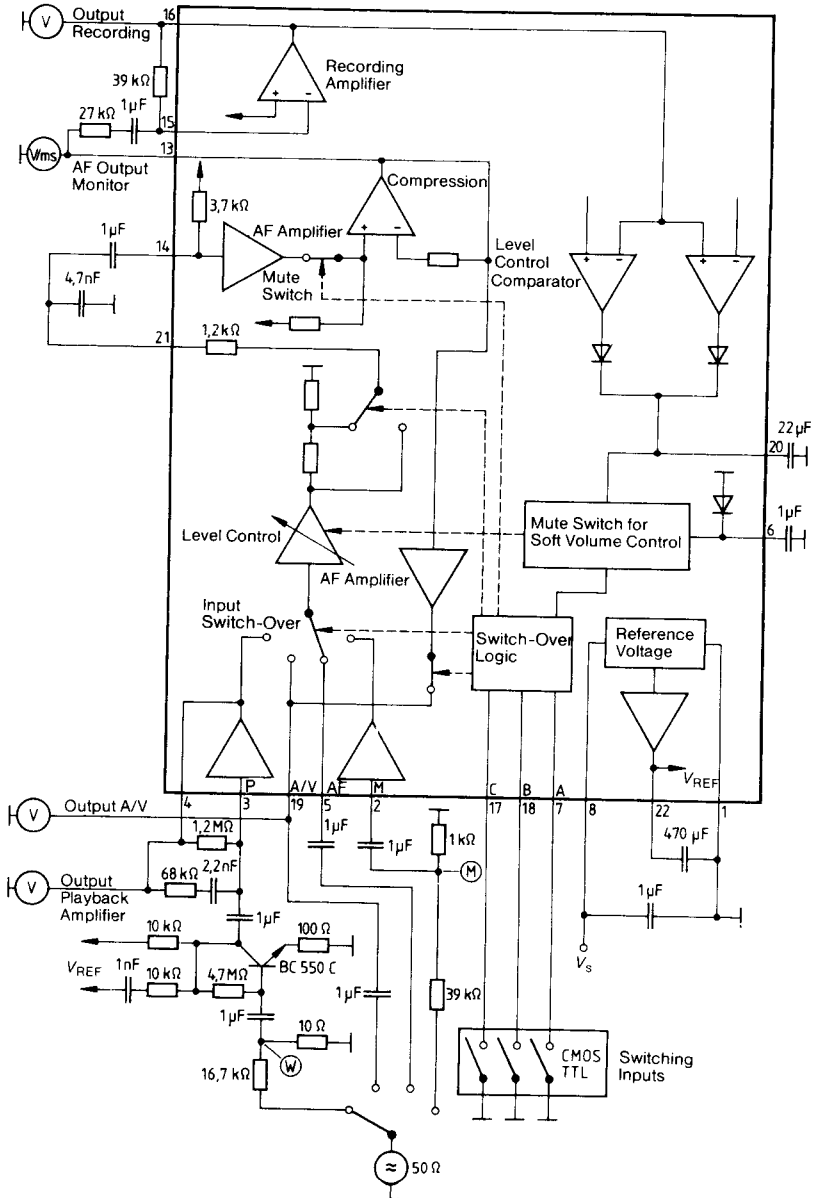
Pin description

Pin	Function
1	GND
2	Input recording microphone
3	Input playback and frequency response playback
4	Output playback amplifier
5	Input recording AF (IF)
6	Time constant for switch-over and soft sound gain control
7	Logic input (muting pulse)
8	Supply voltage
9	Not connected
10	Not connected
11	Not connected
12	Not connected
13	Output AF (monitor)
14	Line stop filter
15	Frequency response, recording
16	Output recording (head)
17	Logic input (switch-over)
18	Logic input (switch-over)
19	Input recording AV
20	Time constant level control
21	Line stop filter (output level control)
22	Capacitive support C V_{REF}

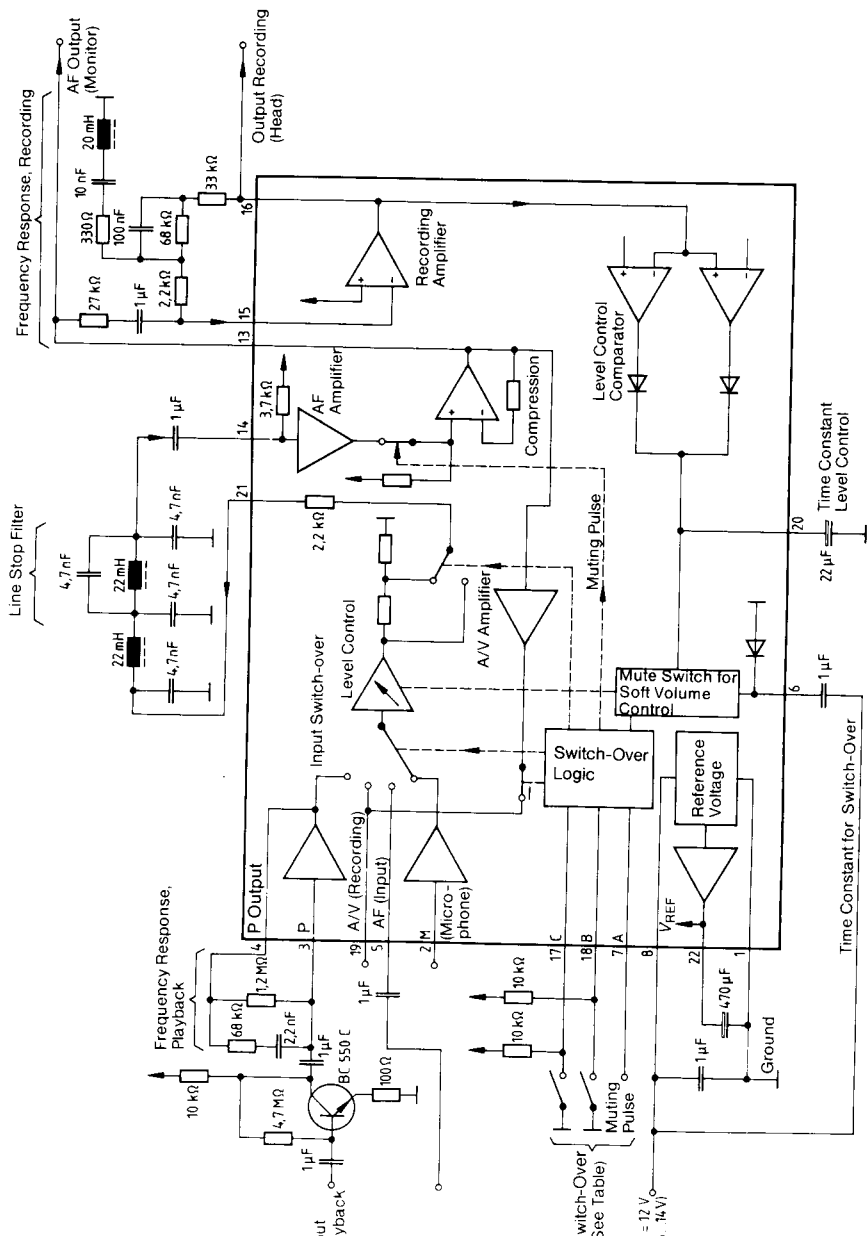
Block diagram



Test and measurement circuit

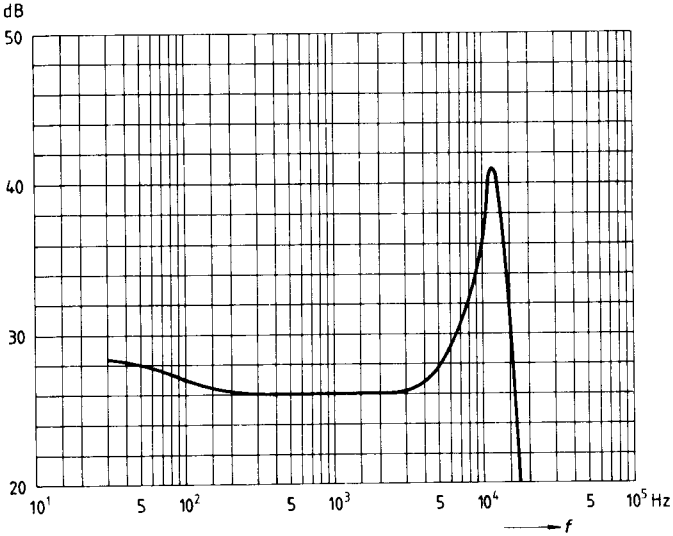


Application circuit



Frequency responses

**Recording mode (AF input – recording output)
realizable frequency response**



**Playback mode (preamplifier input – monitor output)
realizable frequency response**

