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_M		V_{REF}	V
Input playback amplifier	$V_{I\,p\,amp}$		V_{REF}	V
Output playback amplifier	$I_{Q\,p\,amp}$	−5		mA
Output playback amplifier	$I_{Q\,p\,amp}$		6	V
Input AF signal	$V_{I\,AF}$	0	$+V_S$	V
Time constant muting pulse	V_τ	0	$V_{REF}+5$	V
Logic input	V_{L7}	0	$+V_S$	V
Supply voltage	V_S	0	20	V
Output AF signal	$V_{Q\,AF}$	0		V
Output AF signal	$I_{Q\,AF}$		5	mA
Input AF amplifier	$V_{I\,AF\,amp}$	0	$V_{REF}+5$	V
Input recording amplifier	$V_{I\,rec\,amp}$	0	$+V_S$	V
Output recording amplifier	$I_{Q\,rec\,amp}$	−5	+5	mA
Logic input	$V_{L\,17}$	0	$+V_S$	V
Logic input	V_{L18}	0	$+V_S$	V
Input/Output AV signal	$V_{I/Q\,AV}$	0	$+V_S$	V
Time constant level control	$V_{\tau\,LC}$	0	$+V_S$	V
Output level control	$V_{Q\,LC}$	0	7	V
Reference voltage blocking	$I_{Q\,REF}$	−5		mA
Reference voltage blocking	V_{REF}		7	V
Junction temperature	T_j		150	°C
Storage temperature range	T_{stg}	−40	125	°C
Thermal resistance (system-ambient air)	R_{thSA}		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

$V_S = 12$ V; $T_A = 25$ °C

		min	typ	max	
Current consumption $V_S = 12$ V, AF, without signal	I_S		15	25	mA
Recording mode					
Microphone input					
Input impedance	R_{iM}	−25%	10	+25%	kΩ
Input signal 1 kHz	$V_{iM\,rms}$	1.0		50	mV
Signal-to-noise ratio, microphone according to plot A, $V_{i\,rms} = 1$ mV		40[1]			dB
AV input					
Input impedance	R_{iAV}	10			kΩ
Input signal 1 kHz	$V_{iAV\,rms}$	0.15	1.0	2	V
AV signal-to-noise ratio according to plot A, $V_{i\,rms} = 100$ mV		60			dB
AF input					
Input impedance	R_{iAF}	50			kΩ
Input signal 1 kHz	$V_{iAF\,rms}$	0.15	0.3	2	V
AF signal-to-noise ratio according to plot A, $V_{i\,rms} = 100$ mV		60			dB
AF output (monitor)					
Output impedance	R_{q13}			0.1	kΩ
Output signal	$V_{q13\,rms}$		1		V
Total harmonic distortion with 1 kHz	THD			1.5	%
$V_i = 1$ V at AF output	THD_3			0.5	%
Playback mode					
Playback head input					
Input current	I_3			100	nA
Input signal at 330 Hz	V_{ip}		60[2]		µV
Input voltage	V_3	2.4	2.7	3.0	V
AV output					
Output impedance	R_{q19}			1	kΩ
Output signal 1 V_{rms} at pin 13	$V_{q19\,rms}$		1		V
Playback gain at 330 Hz			84[2]		dB
Signal-to-noise ratio referred to playback head $V_{ip} = 180$ µV according to plot A, $R_{ip} = 10$ Ω		56[2]			dB
Total harmonic distortion with 1 kHz; $V_{ip} = 200$ µV	THD			1.5	%
	THD_3			0.5	%

[1] Objective is 46 dB

[2] Including preamplifier and circuitry; refer to figure

Characteristics

$V_S = 12$ V; $T_A = 25$ °C

		min	typ	max	
Recording head output					
Output impedance	R_{q16}			0.1	kΩ
Output signal	$V_{q16\,pp}$	−20%	5	+20%	V
$V_{iAF\,rms} = 1$ V (1 kHz)					
Automatic level control					
Gain $f = 1$ kHz					
Microphone input up to AF output	V_{13}/V_{iM}	26		60	dB
AV input up to AF output	V_{13}/V_{iAV}	−6		16	dB
AF input up to AF output	V_{13}/V_{iAF}	−6		16	dB
Playback amplifier output up to AF output	V_{13}/V_4	0		22	dB
Charging current for AGC	$+I_{20}$	1			mA
Discharging current for AGC	$-I_{20}$	0.3	0.5	0.65	µA
Time period for 34 to 66 dB	t_1		4		min
Time period for 66 to 34 dB	t_2		100		ms
Time period for control deviation of 40 dB at 40 Hz	t_3			200	ms
Cross-talk of switched-off inputs			40		dB
Switching inputs A, B, C					
Input control current	$I_{7/17/18}$	−20		0	µA
$V_{7/17/18} = 0$ V					
Low voltage "0"	$V_{L7/17/18}$	0		1.2	V
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

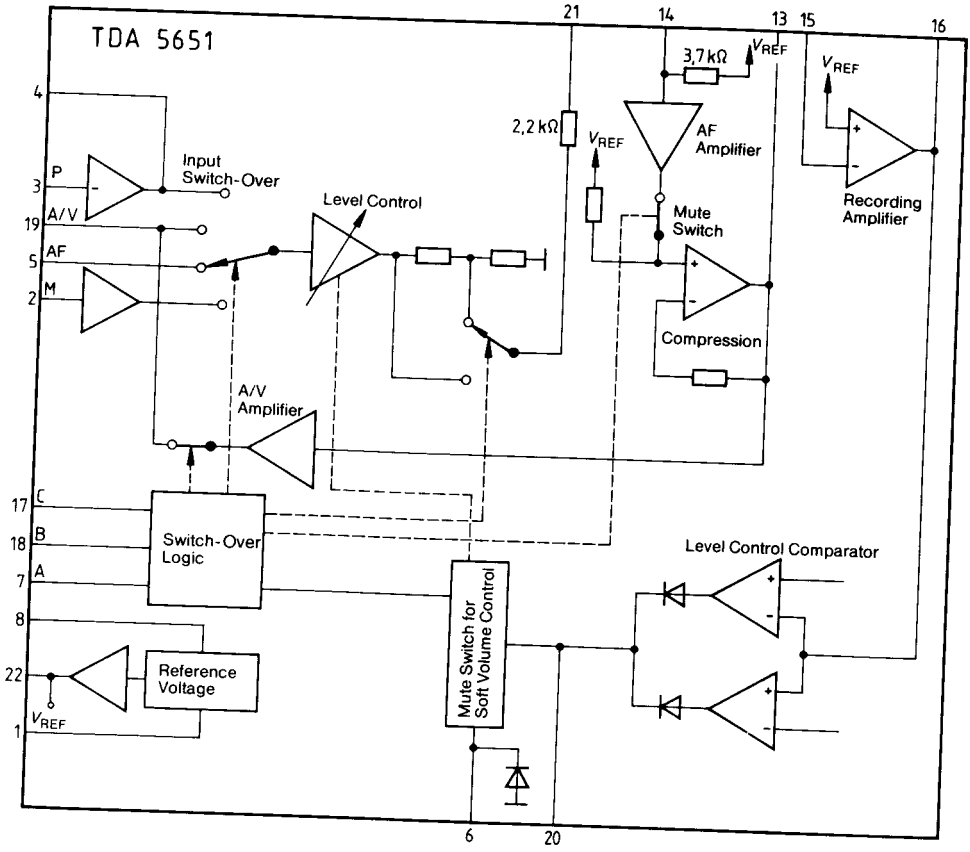
Truth table

		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

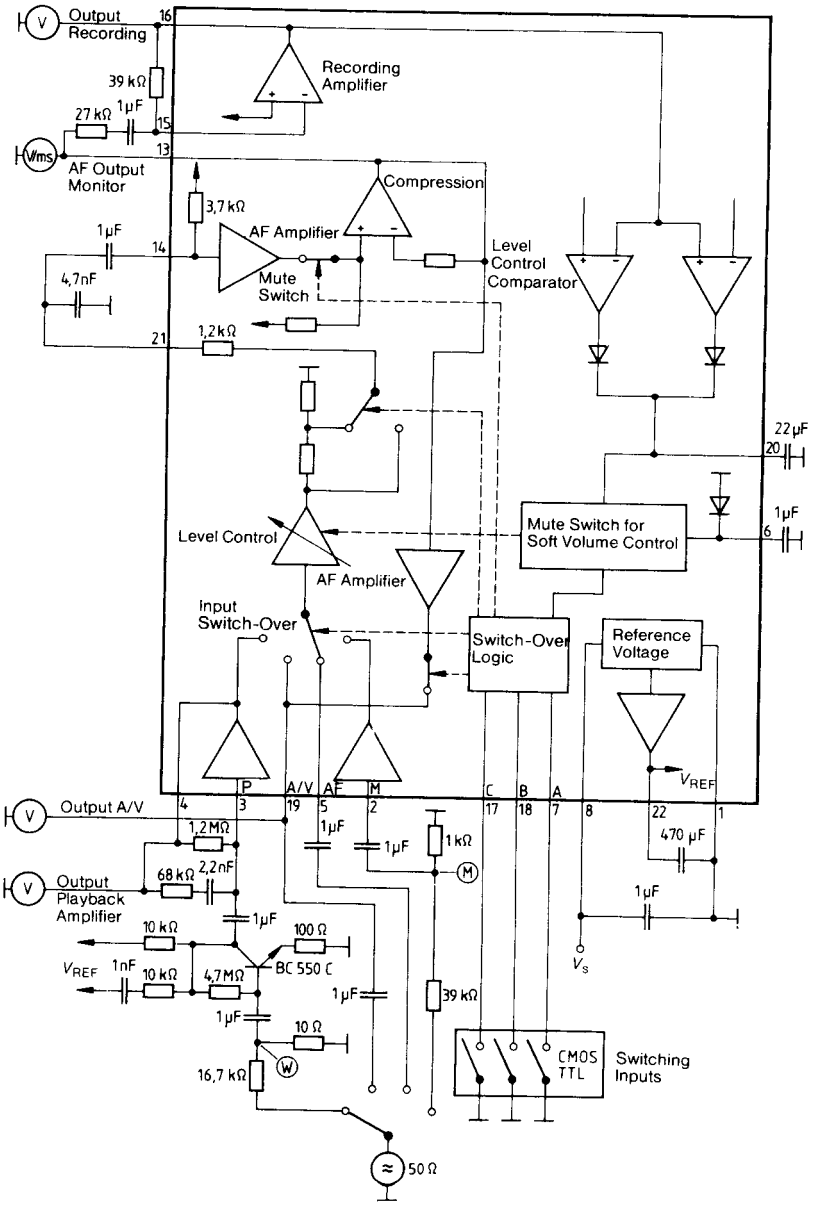
Pin description

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}

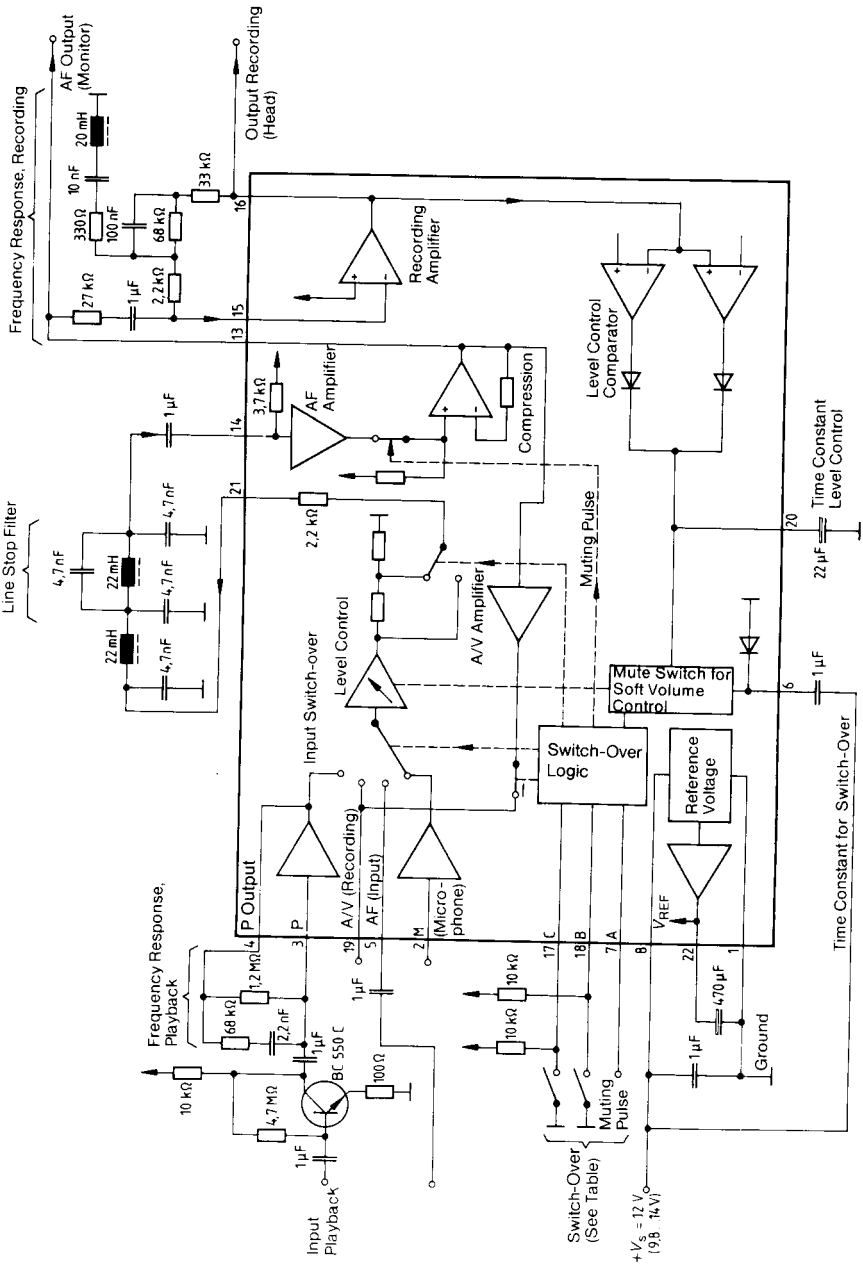
Block diagram



Test and measurement circuit

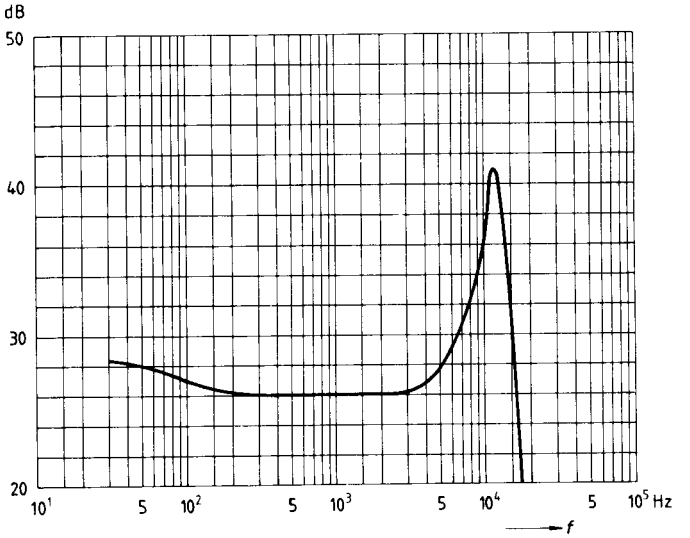


Application circuit



Frequency responses

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



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