

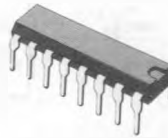
DUAL LOW NOISE TAPE PREAMPLIFIER WITH AUTOREVERSE

The TDA3410 is a dual preamplifier with tape autoreverse facility for the amplification of low level signals in applications requiring very low noise performance, as stereo cassette players. Each channel consists of two independent amplifiers. The first has a fixed gain of 30dB while the second one is an operational amplifier optimized for high quality audio application.

The TDA3410 is a monolithic integrated circuit in a 16-lead dual in-line plastic package and its main features are:

- Very low noise
- High gain
- Low distortion

- Single supply operation
- Wide supply range
- SVR = 120dB
- Large output voltage swing
- Tape autoreverse facility
- Short circuit protection



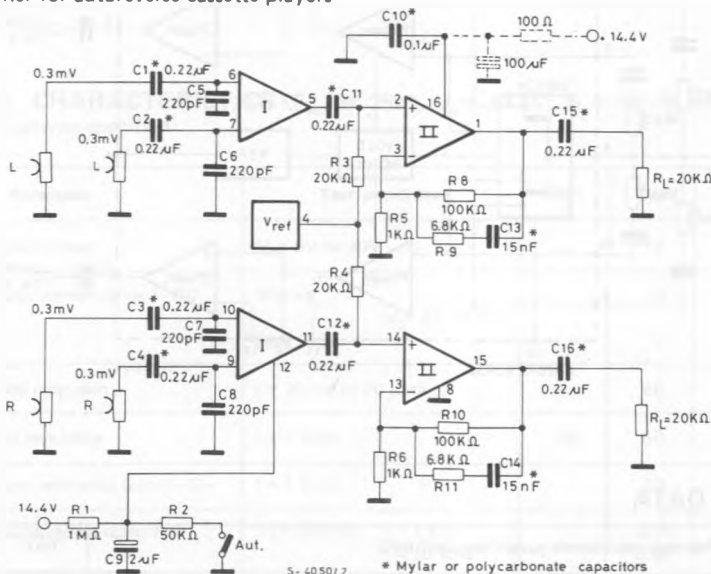
DIP-16 Plastic
(0.4)

ORDERING NUMBER: TDA3410

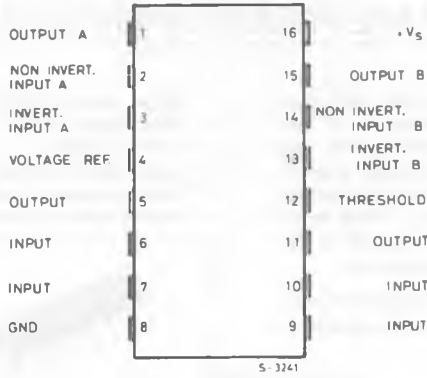
ABSOLUTE MAXIMUM RATINGS

V_s	Supply voltage	36	V
P_{tot}	Total power dissipation at $T_{amb} = 60^\circ\text{C}$	600	mW
T_j, T_{stg}	Storage and junction temperature	-40 to 150	$^\circ\text{C}$

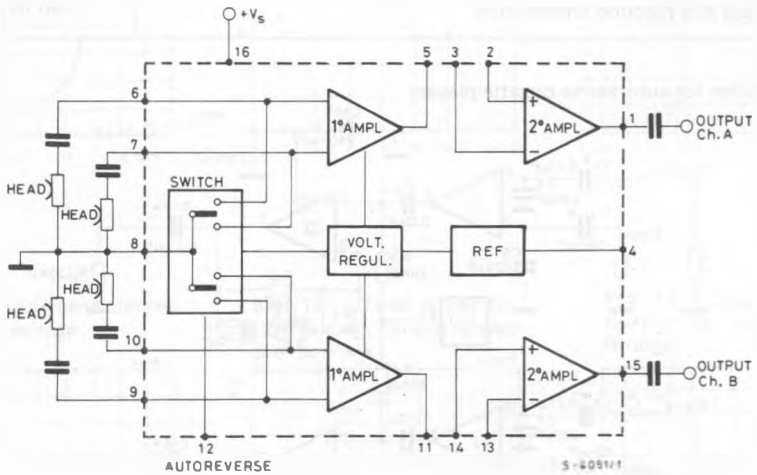
Stereo preamplifier for autoreverse cassette players



CONNECTION DIAGRAM (top view)

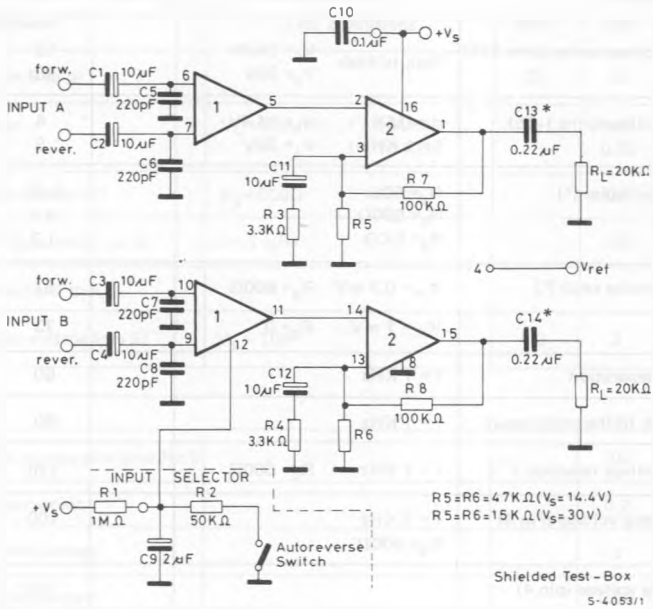


BLOCK DIAGRAM



THERMAL DATA

R _{th j-amb}	Thermal resistance junction-ambient	max	150	°C/W
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TEST CIRCUIT (Flat Gain - $G_v = 60$ dB)

* Mylar or polycarbonate capacitors.

ELECTRICAL CHARACTERISTICS ($T_{\text{amb}} = 25^\circ\text{C}$, $V_s = 14.4\text{V}$, $G_v = 60$ dB, refer to the test circuit, unless otherwise specified)

Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_s	Supply current $V_s = 8\text{V to } 30\text{V}$		10		mA
I_o	Output current (pins 1-15) Source $V_s = 8\text{V to } 30\text{V}$ Sink		10 1		mA
G_v	Closed loop gain $f = 20\text{ Hz to } 20\text{ KHz}$		60		dB
R_i	Input resistance $f = 1\text{ KHz}$	50	80		$\text{K}\Omega$
R_o	Output resistance (pins 1-15) $f = 1\text{ KHz}$		50		Ω
THD	Total harmonic distortion $V_o = 300\text{ mV}$ $f = 1\text{ KHz}$ $f = 10\text{ KHz}$		0.05 0.05		% %

ELECTRICAL CHARACTERISTICS (continued)

Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_o Output voltage swing (pins 1-15)	Peak to Peak $V_s = 14.4V$ $V_s = 30V$		12 28		V V
V_o Output voltage (pins 1-15)	$d = 0.5%$ $V_s = 14.4V$ $f = 1 KHz$ $V_s = 30V$		4 8		V_{rms} V_{rms}
e_n Total input noise ($^{\circ}$)	$R_g = 50\Omega$ $R_g = 600\Omega$ $R_g = 5K\Omega$		0.25 0.4 1.3	0.6	μV μV μV
S/N Signal to noise ratio ($^{\circ}$)	$V_{in} = 0.3 mV$ $R_g = 600\Omega$ $V_{in} = 1 mV$ $R_g = 0$		57 73		dB dB
CS Channel separation	$f = 1 KHz$		60		dB
CT($^{\circ\circ}$) Cross-talk (differential input)	$f = 1 KHz$		80		dB
SVR Supply voltage rejection ($^{\circ\circ}$)	$f = 1 KHz$ $R_g = 600\Omega$		120		dB
SVR ($^{\circ\circ}$) Of reference voltage (Pin 4)	$f = 1 KHz$ $R_g = 600\Omega$		100		dB
V_{ref} Reference voltage (pin 4)			55		mV
R_{ref} Ref. voltage output resistance (pin 4)			100		Ω
$\frac{\Delta V_{ref}}{\Delta T}$ Voltage temperature coefficient			10		$\mu V/^{\circ}C$

($^{\circ}$) The weighting filter used for the noise measurement has a curve A frequency response.

($^{\circ\circ}$) Referred to the input.

($^{\circ\circ\circ}$) Between a disabled input and an input ON.

ELECTRICAL CHARACTERISTICS (Refer test circuit, $V_s = 30V$)**AMPLIFIER N° 1**

Parameter	Test conditions	Min.	Typ.	Max.	Unit
G_v Gain (pins 6 to 5)		29	30	30.5	dB
d Distortion	$V_o = 300\text{ mV}$ $f = 1\text{ KHz}$ $f = 10\text{ KHz}$		0.05 0.05		%
e_n Total input noise (°)	$R_g = 600\Omega$		0.4		μV
Z_o Output impedance (pin 5)	$f = 1\text{ KHz}$		100		Ω
I_o Output current (pin 5)			1		mA
V_s DC output voltage (pin 5)	$V_s = 10V$	1.3	2	2.7	V

AMPLIFIER N° 2

G_v Open loop voltage gain (pins 2 to 1)			100		dB
I_B Input bias current			0.2		μA
V_{os} Input offset voltage			2		mV
I_{os} Input offset current			0.05		μA
BW Small signal bandwidth	$G_v = 30\text{ dB}$		150		KHz
e_n Total input noise (°)	$R_g = 600\Omega$		2		μV
R_i Input impedance	$f = 1\text{ KHz}$ (open loop)	150	500		$K\Omega$

AUTOREVERSE

P_{in}	$V_{12} < 2V$	$V_{12} > 4.5V$
6 – 10	OFF	ON
7 – 9	ON	OFF

(°) The weighting filter used for the noise measurement has a curve A frequency response.

Fig. 1 - Total input noise vs. source resistance (curve A)

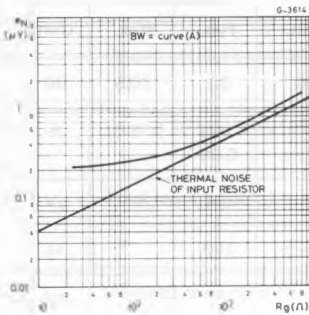


Fig. 2 - Total input noise vs. source resistance (BW= 22 Hz to 22 KHz)

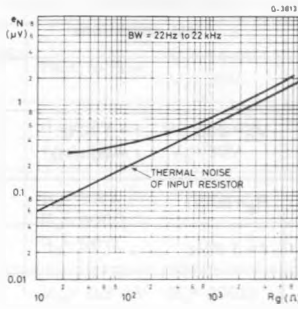


Fig. 3 - Total harmonic distortion vs. output voltage

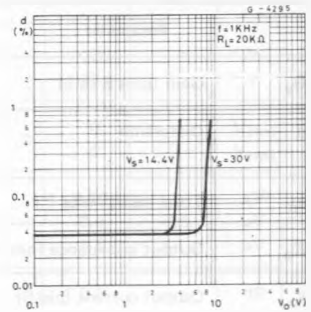


Fig. 4 - Very low noise stereo preamplifier for car cassette players (with Gap Loss Correction and autoreverse function)

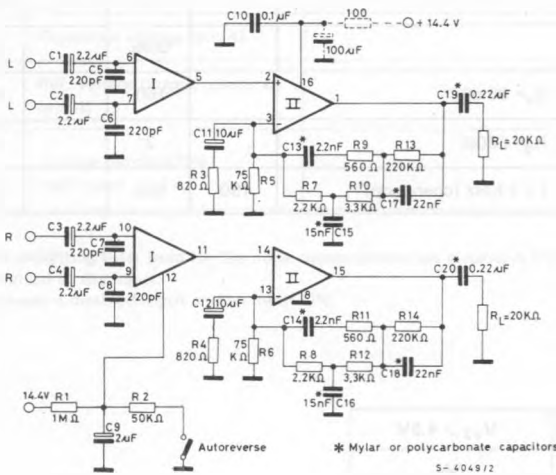


Fig. 5 - Frequency response

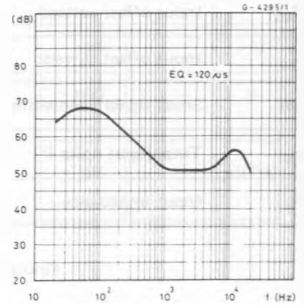


Fig. 6 - P.C. board and component lay-out (1:1 scale) for the circuit of fig. 4

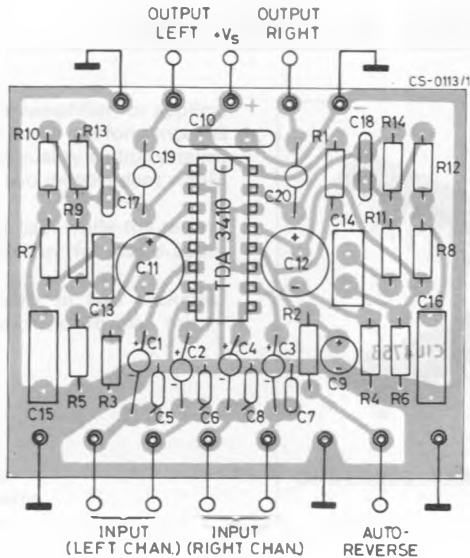


Fig. 7 - Stereo preamplifier for car cassette players, with low value capacitors (Autoreverse function)

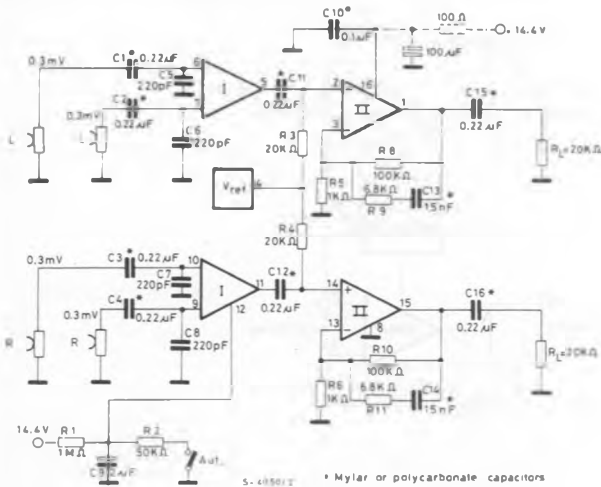


Fig. 8 - Frequency response

