



No.1890



LC7520

C MOS IC

GRAPHIC EQUALIZER VOLUME CONTROLLER
FOR HOME STEREO, MUSIC CENTER USE

The 3-chip configuration consisting of the LC7520, a controller (LC7060 or general-purpose microcomputer LC6502), and a display LSI (LC7560 LCD, LC7565 FLT, LED) provides an electronic graphic equalizer system having the following features.

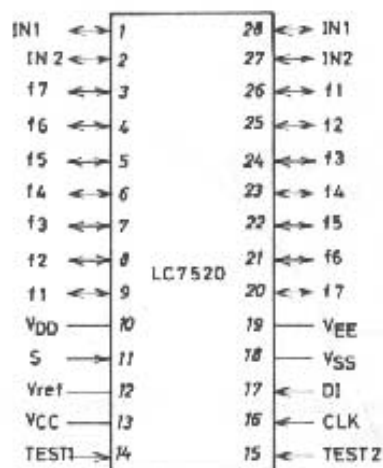
Functions

- On-chip electronic volume control for graphic equalizer with 7 bands each of right/left.
- 2dB/step variable in each band.
- Maximum boost of +10dB, maximum cut of -10dB, and 11 positions in each band.
- Setting can be made separately for right/left band.
- Band setting is made by serial data input. There are 2 control lines.
- Wide dynamic range.
- CMOS LSI of 40V breakdown voltage.

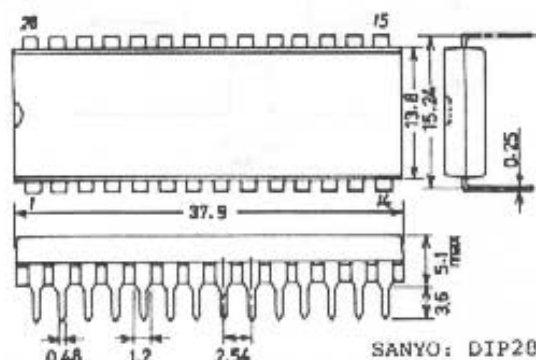
Features

- The gain in each band can be increased/decreased with one touch.
- Since the preset memory contents can be called with one touch, your desired frequency characteristic to the music can be selected.
(Example) User option 2 modes + Maker option 3 modes + Last channel memory
- '0dB in each band (flat function)', 'The frequency characteristic in each band is reversed with respect to 0dB (reverse function).' - These functions can be software-controlled with one touch.
- Spectrum analyzing display facilitates recording equalization.
- Since 2 control lines can be also used for a display LSI, wiring between microcomputer and LSI is facilitated.

Pin Assignment



Case Outline 3012A-D28IC
(unit:mm)



Absolute Maximum Ratings at $T_a=25^{\circ}\text{C}$, $V_{SS}=0\text{V}$

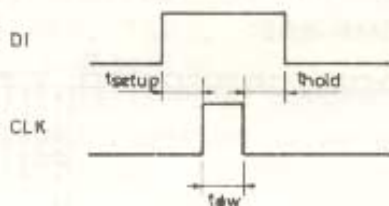
				unit
Maximum Supply Voltage	$V_{DD\max}$	V_{DD}	$V_{EE} \leq V_{SS}$	$V_{DD}-V_{EE} \leq 40$ V
	$V_{EE\max}$	V_{EE}		
	V_{ref}	V_{ref}	$V_{SS} \leq V_{ref}$	$V_{DD}-V_{ref} \leq 11$ V
	$V_{CC\max}$	V_{CC}		V_{SS} to $V_{SS}+7$ V
Maximum Input Voltage	$V_{I1\max}$	CLK, DI		$V_{SS}-0.3$ to $V_{CC}+0.3$ V
	$V_{I2\max}$	f1 to f7, IN1, 2		$V_{EE}-0.3$ to $V_{DD}+0.3$ V
	$V_{I3\max}$	S, TEST1, 2		$V_{ref}-0.3$ to $V_{DD}+0.3$ V
	$P_{d\max}$		$T_a \leq 75^{\circ}\text{C}$	150 mW
Operating Temperature	T_{opg}			-30 to $+75^{\circ}\text{C}$
Storage Temperature	T_{stg}			-40 to $+125^{\circ}\text{C}$

Allowable Operating Conditions at $T_a=25^{\circ}\text{C}$, $V_{SS}=0\text{V}$

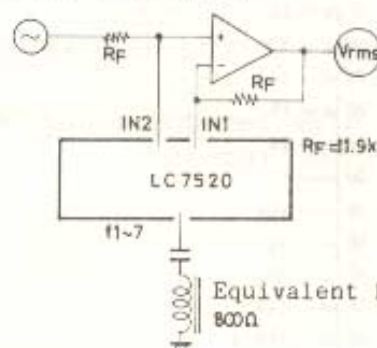
				unit
Supply Voltage	V_{DD}	V_{DD}	$V_{EE} \leq V_{SS}$	$8 \leq V_{DD}-V_{EE} \leq 37$ V
	V_{EE}	V_{EE}	$V_{CC} \leq V_{DD}$	
	V_{ref}	V_{ref}	$V_{DD}-V_{ref} \leq 10$	0 to $V_{DD}-4.5$ V
	V_{CC}	V_{CC}		4.5 to (5.0typ) to 5.5 V
Input "H"-Level Voltage	V_{IH1}	CLK, DI		$0.8V_{CC}$ to V_{CC} V
	V_{IH2}	S		$V_{ref}+0.9(V_{DD}-V_{ref})$ to V_{DD} V
Input "L"-Level Voltage	V_{IL1}	CLK, DI		V_{SS} to $0.2V_{CC}$ V
	V_{IL2}	S		V_{ref} to $V_{ref}+0.1(V_{DD}-V_{ref})$ V
Input Pulse Width	$t_{\phi w}$	CLK		1 min. us
Setup Time	t_{setup}	DI		1 min. us
Hold Time	t_{hold}	DI		1 min. us

Electrical Characteristics at $T_a=25^{\circ}\text{C}$, $V_{SS}=0\text{V}$

			min	typ	max	unit
Total Harmonic Distortion THD1	IN1, 2: All bands flat,				0.005	%
	f=20kHz, output 1V					
THD2	IN1, 2: Boost, f=20kHz, Output 1V				0.05	%
	CT : f=1kHz		60			dB
Crosstalk	CT					dB
Setting Error	ΔB	Other band flat	$\pm 10\text{dB}$	± 9	$\pm 10 \pm 11.5$	dB
		Test Circuit 1	$\pm 8\text{dB}$	± 6.6	$\pm 7.6 \pm 9.0$	dB
		(No reversion occurs.)	$\pm 6\text{dB}$	± 4.9	$\pm 5.9 \pm 7.2$	dB
			$\pm 4\text{dB}$	± 3.0	$\pm 3.8 \pm 4.9$	dB
			$\pm 2\text{dB}$	± 1.0	$\pm 1.9 \pm 3.0$	dB
Analog SW OFF Leak	I_{OFF}	IN1, IN2, f1-f7			10	μA
Pull-down Resistance	R_{PD}	S : $V_{DD}=13\text{V}$, S		100		kohm
Current Dissipation	I_{DD}				1	mA
	I_{CC}				0.5	mA



Test Circuit 1

Equivalent LC resonance impedance
800 Ω