M5226P/FP

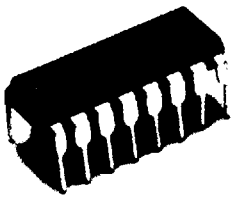
5-ELEMENT GRAPHIC EQUALIZER IC

DESCRIPTION

The M5226 is a 5-element graphic equalizer IC best suited to audio systems. It has a built-in 5-element resonance circuits with transistor system and an output OP amp. The IC can be used in hybrid ICs and compact sets of high-density assemblies. Its applications include radio cassette tape players, car audio systems, and music centers.

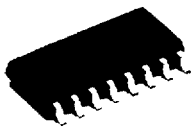
FEATURES

- The number of part can be reduced drastically for compact size.
- Graphic equalizer can be easily composed
- Low distortion ..... THD = 0.02% (typ)
  @ Flat input short
- Low noise ..... V_{NO} = 5μVrms (typ)
  @ f = 1kHz, Flat
- Large allowable input voltage ..... V_i = 2.3Vrms (typ)
  @ V_{CC} = 9V, f = 1kHz, Flat



Outline 16P4(P)

2.54mm pitch 300mil DIP
(6.3mm × 19.0mm × 3.3mm)



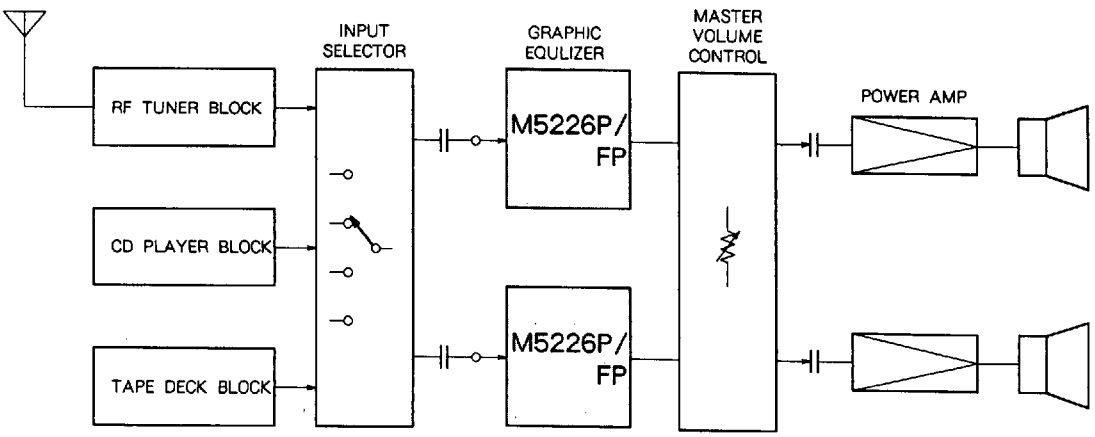
Outline 16P2S-A(FP)

1.27mm pitch 225mil SOP
(4.4mm × 10.0mm × 1.5mm)

RECOMMENDED OPERATING CONDITIONS

Supply voltage range ..... V_{CC} = 4 to 20V
Rated supply voltage ..... V_{CC} = 20V
Rated power dissipation ..... 700mW (P)
550mW(FP)

SYSTEM CONFIGURATION



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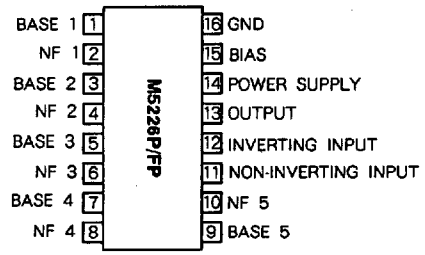
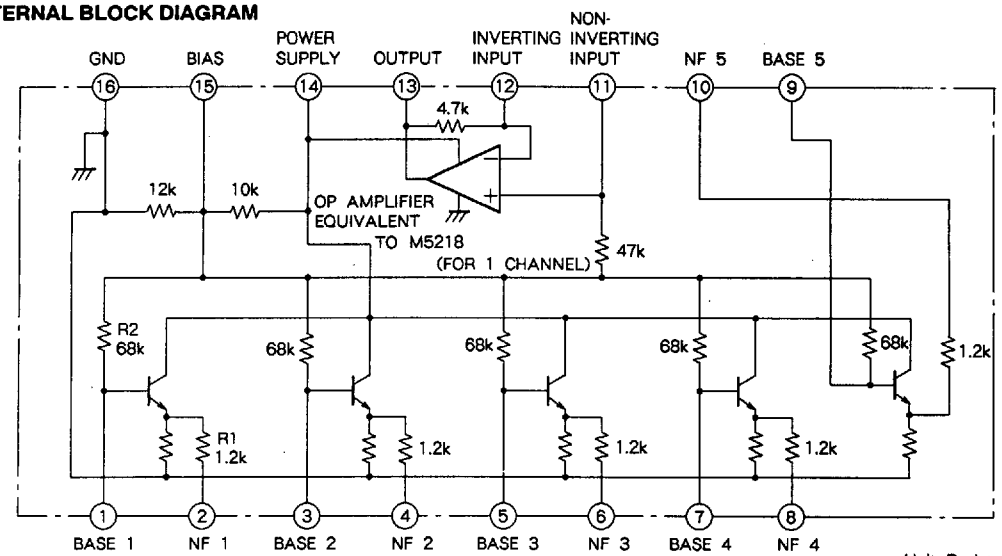
5-ELEMENT GRAPHIC EQUALIZER IC

PIN CONFIGURATION (TOP VIEW)



Outline 16P4(P)
16P2S-A(FP)

IC INTERNAL BLOCK DIAGRAM



Unit Resistance : Ω

ABSOLUTE MAXIMUM RATINGS (Ta = 25℃, unless otherwise noted)

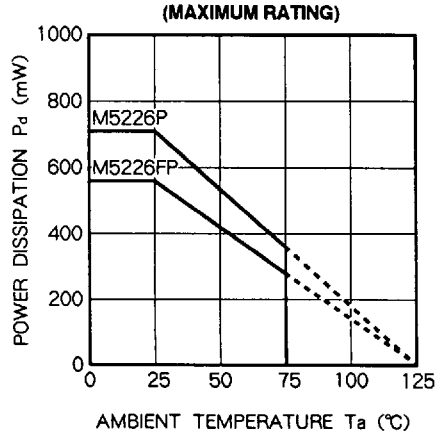
Symbol	Parameter	Ratings	Unit
V_{CC}	Supply voltage	20	V
I_{LP}	Load current	30	mA
P_d	Power dissipation	550(FP)/1000(DIP)	mW
T_{opr}	Operating temperature	− 20 to + 75	℃
T_{stg}	Storage temperature	− 55 to + 125	℃

ELECTRICAL CHARACTERISTICS (Ta = 25℃, Vcc = 9V)

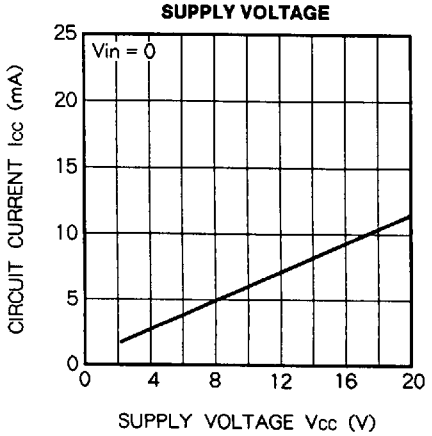
Symbol	Parameter		f (Hz)	Test conditions	Limits Min	Limits Typ	Limits Max	Unit
Icc	Circuit current		−	V_{in} = 0	3.0	5.2	8.0	mA
$G_{V(FLAT)}$	Voltage gain	Flat	1k	V_{in} = − 10dBm	− 3.8	− 0.8	+ 2.2	dB
$G_{V(BOOST)}$	Voltage gain	Boost	108	V_{in} = − 10dBm	7.2	9.7	11.2	dB
			343		7.2	9.7	11.2	
			1.08k		7.2	9.7	11.2	
			3.43k		7.2	9.7	11.2	
			10.8k		7.2	9.7	11.2	
$G_{V(CUT)}$	Voltage gain	Cut	108	V_{in} = − 10dBm	− 12.8	− 11.3	− 8.8	dB
			343		− 12.8	− 11.3	− 8.8	
			1.08k		− 12.8	− 11.3	− 8.8	
			3.43k		− 12.8	− 11.3	− 8.8	
			10.8k		− 12.8	− 11.3	− 8.8	
THD	Total harmonic distortion		1k	V_{in} = 1Vrms	−	0.02	0.1	%
V_{NO}	Output noise voltage		Input short BW : 10Hz to 30kHz (3dB) flat		−	5.0	20	μVrms

TYPICAL CHARACTERISTICS

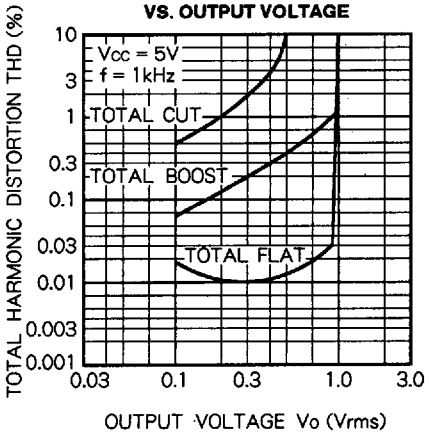
THERMAL DERATING (MAXIMUM RATING)



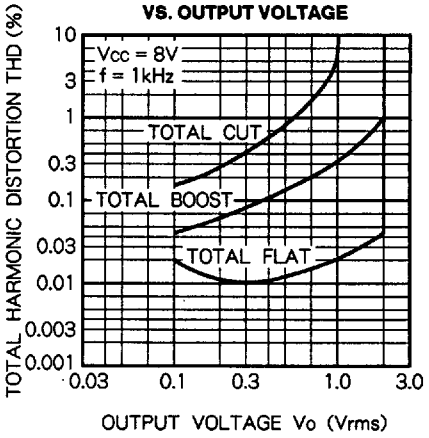
CIRCUIT CURRENT VS. SUPPLY VOLTAGE



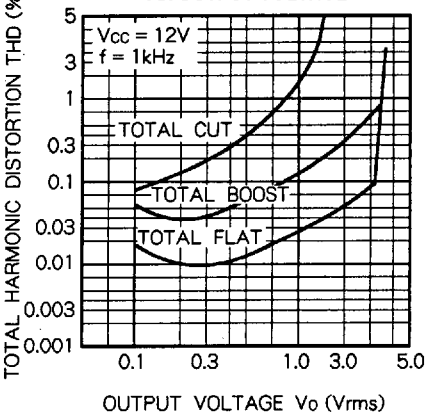
TOTAL HARMONIC DISTORTION VS. OUTPUT VOLTAGE



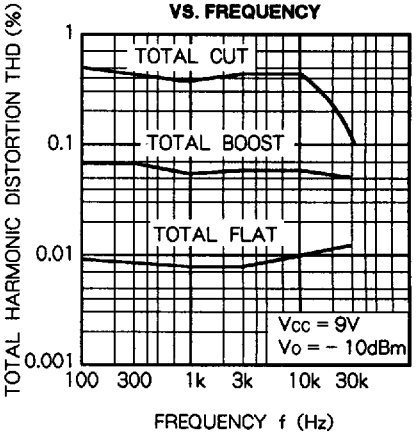
TOTAL HARMONIC DISTORTION VS. OUTPUT VOLTAGE



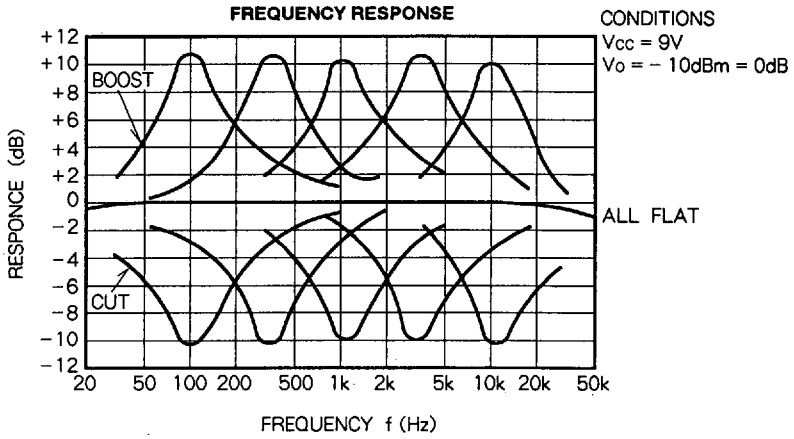
TOTAL HARMONIC DISTORTION VS. OUTPUT VOLTAGE



TOTAL HORMONIC DISTORTION VS. FREQUENCY

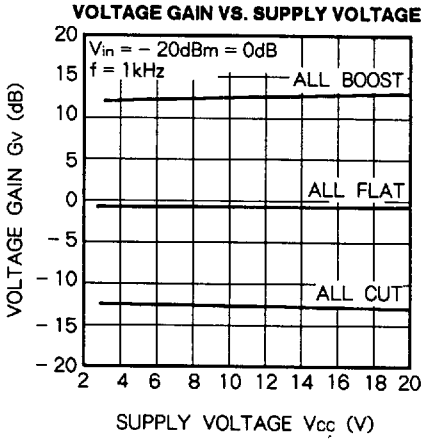


FREQUENCY RESPONSE

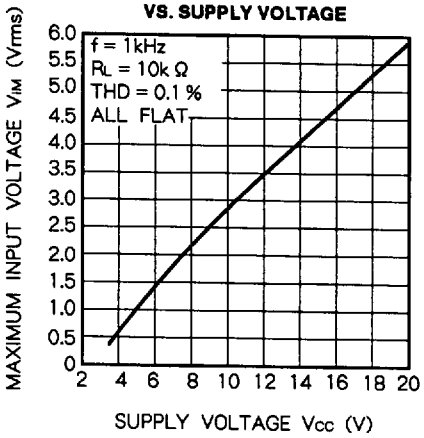


CONDITIONS
Vcc = 9V
Vo = – 10dBm = 0dB

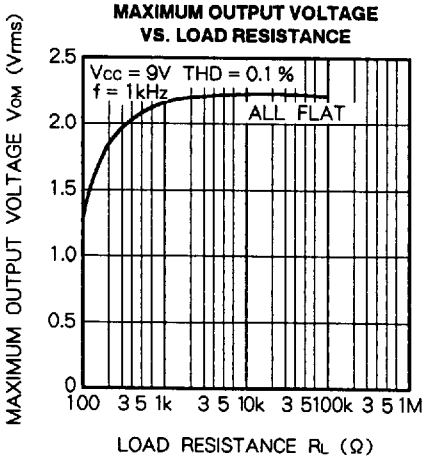
VOLTAGE GAIN VS. SUPPLY VOLTAGE



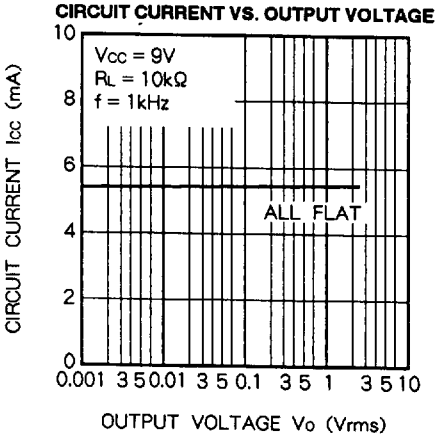
MAXIMUM INPUT VOLTAGE VS. SUPPLY VOLTAGE



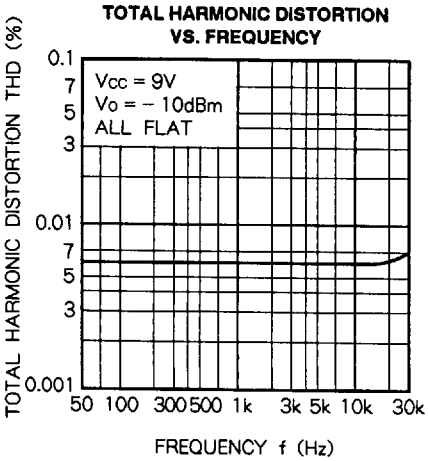
MAXIMUM OUTPUT VOLTAGE VS. LOAD RESISTANCE



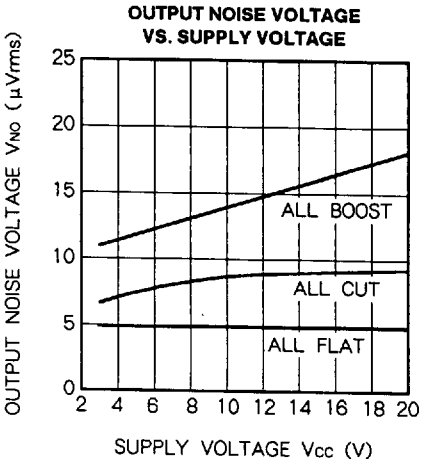
CIRCUIT CURRENT VS. OUTPUT VOLTAGE



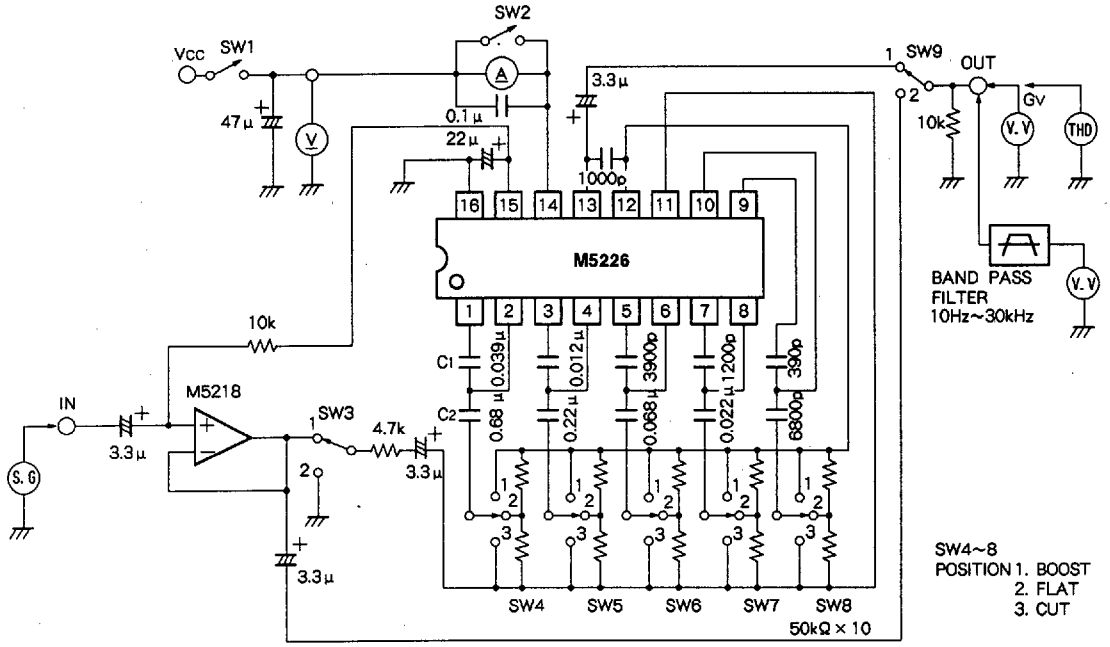
TOTAL HARMONIC DISTORTION VS. FREQUENCY



OUTPUT NOISE VOLTAGE VS. SUPPLY VOLTAGE



TEST CIRCUIT (Circuit current Icc, Voltage gain Gv, Total harmonic distortion THD, Output noise voltage VNO)



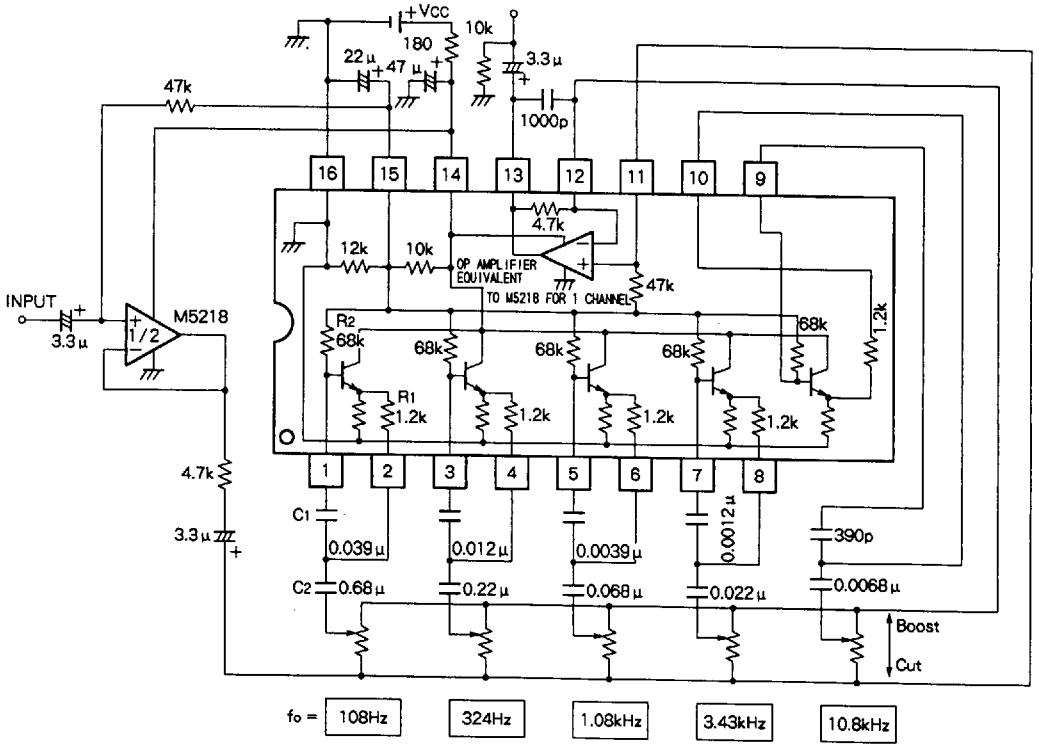
Units Resistance : Ω
Capacitance : F

TEST CIRCUIT SWITCH MATRIX

Test item		SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9
Icc		OFF	1	○	○	○	○	○	1
GV(FLAT)		ON	1	2	2	2	2	2	1
GV(BOOST)	f = 108Hz	ON	1	1	2	2	2	2	1
	f = 343Hz	ON	1	2	1	2	2	2	1
	f = 1.08kHz	ON	1	2	2	1	2	2	1
	f = 3.43kHz	ON	1	2	2	2	1	2	1
	f = 10.8kHz	ON	1	2	2	2	2	1	1
GV(CUT)	f = 108Hz	ON	1	3	2	2	2	2	1
	f = 343Hz	ON	1	2	3	2	2	2	1
	f = 1.08kHz	ON	1	2	2	3	2	2	1
	f = 3.43kHz	ON	1	2	2	2	3	2	1
	f = 10.8kHz	ON	1	2	2	2	2	3	1
THD		ON	1	2	2	2	2	2	1
VNO(ALLFLAT)		ON	2	2	2	2	2	2	1

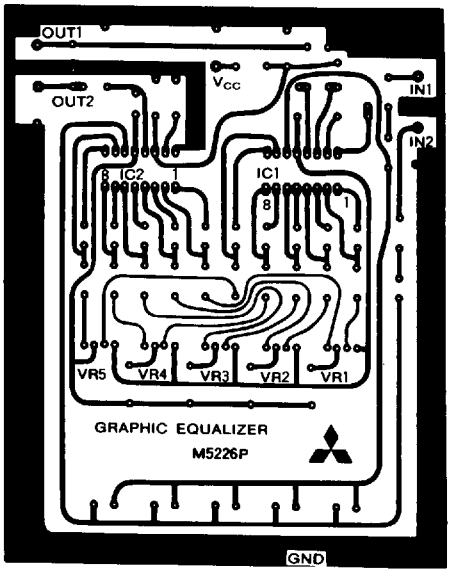
Note : The mark "○" applies to both 1 and 2

APPLICATION EXAMPLE

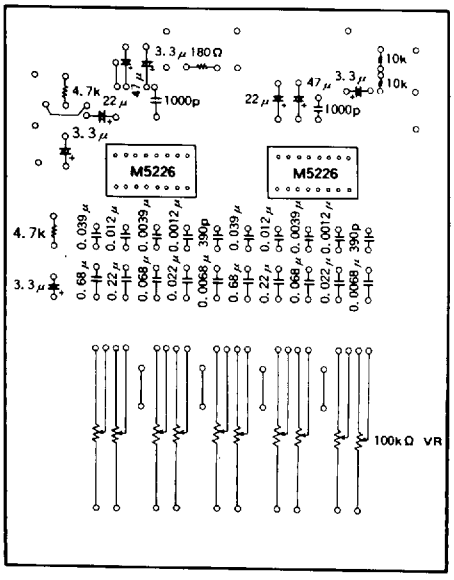


PRINTED CIRCUIT BOARD FOR CIRCUIT TESTING (TYPICAL APPLICATION EXAMPLE)

PC BOAD PARTS-PLACEMENT DIAGRAM
(COPPER FOIL SIDE)



PC BOAD PARTS-PRACEMENT-DIAGRAM
(PARTS SIDE)



APPLICATION EXAMPLE (7-ELEMENT)