



# LA1875M

## Single-chip, Electronic Tuner for Car Stereo

### Overview

The LA1875M is an electronic tuner IC that incorporates AM, FM IF and MPX circuit sections on a single chip, making it ideal for use in car stereo equipment.

The LA1875M features an antenna-damping AM AGC circuit with rapid charge and discharge characteristics. It also features an S-meter driver, tuning and FM-stereo LED outputs, FM soft-mute and forced mono modes and a no-adjustment MPX VCO.

The LA1875M AM circuit comprises a mixer, oscillator, RF AGC, IF amplifier and IF buffer. The FM IF circuit comprises an IF amplifier, quadrature detector, and AFC and IF buffer outputs. The MPX circuit comprises a VCO and stereo noise control (SNC) and high-cut control (HCC) circuits.

The LA1875M operates from a 7 to 10V supply and is available in 36-pin MFPs.

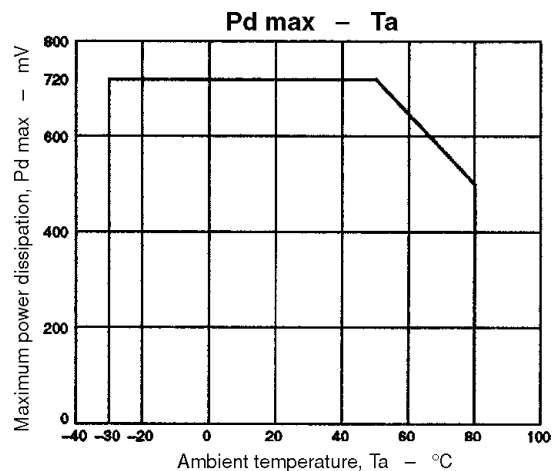
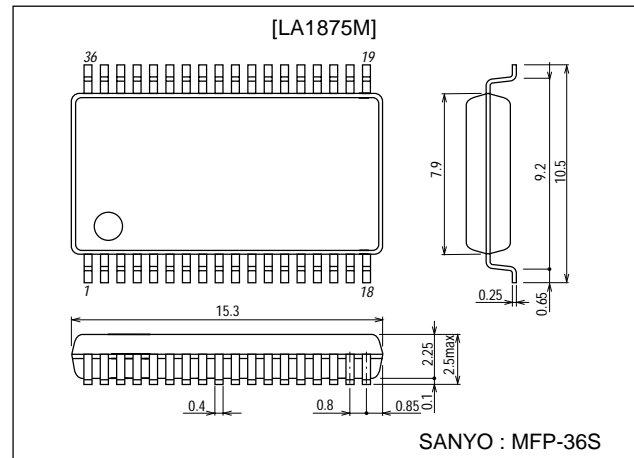
### Features

- AM, FM IF and MPX circuits.
- Antenna-damping AM AGC circuit with rapid charge and discharge characteristics.
- S-meter driver.
- Tuning and FM-stereo LED outputs.
- AFC and IF buffer outputs.
- AM mixer, oscillator, AGC, IF amplifier and IF buffer.
- FM IF amplifier, quadrature detector.
- MPX no-adjustment VCO, SNC and HCC.
- FM soft-mute and forced-mono modes.
- 7 to 10V supply.
- 36-pin MFP.

### Package Dimensions

unit:mm

3129-MFP36S



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# LA1875M

## Specifications

### Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	$V_{CC}$		11	V
Power dissipation ( $T_a \leq 50^\circ\text{C}$ )	$P_D$		720	mW
Operating temperature range	$T_{opr}$		-30 to +80	$^\circ\text{C}$
Storage temperature range	$T_{stg}$		-40 to +150	$^\circ\text{C}$

### Recommended Operating Conditions at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	$V_{CC}$		8.5	V
Supply voltage range	$V_{CC}$		7 to 10	V

## Electrical Characteristics

### FM characteristics at $T_a = 25^\circ\text{C}$ , $V_{CC}=8.5\text{V}$ , $f_c=10.7\text{MHz}$ , $f_m=1\text{kHz}$ , 75kHz deviation unless otherwise noted.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Quiescent supply current	$I_{CCO}$	No signal	21	31	41	mA
-3dB limiting sensitivity	-3dBLS	Referred to $V_I=100\text{dB}\mu$ , Mute is ON.	27	37	47	dB $\mu$
Tuning LED turn-on input voltage	$V_{LED}$	$V_{26}=2\text{V}$	43	58	73	dB $\mu$
Detector output voltage	$V_O$	$V_I=100\text{dB}\mu$	165	250	345	mV
S-meter output voltage	$V_{SM}$	No signal	0	0.15	0.7	V
		$V_I=100\text{dB}\mu$	5.0	6.1	7.0	
IF buffer output voltage	$V_{IF}$	$V_I=80\text{dB}\mu$ , $V_{12}=5\text{V}$	200	360	540	mV
SNC output voltage	$V_{SUB}$	$V_I=100\text{dB}\mu$ , $V_{34}=0.1\text{V}$ . See note.		0.5	5.0	mV
Tuning LED turn-on bandwidth	$BW_{LED}$	$V_I=100\text{dB}\mu$ , $V_{26} \geq 2\text{V}$	85	130	180	kHz
Signal-to-noise ratio	S/N	$V_I=100\text{dB}\mu$	66	74		dB
AM suppression ratio	AMR	$V_I=100\text{dB}\mu$ at 1kHz with 30% AM modulation	38	60		dB
Separation	Sep	$V_I=100\text{dB}\mu$ , See note.	30	45		dB
Channel balance	CB		-1.5	0	+1.5	dB
HCC output attenuation	$\alpha$	$V_I=100\text{dB}\mu$ , $V_{33}=0.6\text{V}$ , $f_m=10\text{kHz}$ , See note.	-10.0	-5.0	-0.5	dB
Stereo LED turn-on pilot tone modulation	LED-ON	$V_I=100\text{dB}\mu$	1.8	3.2	5.0	%
Stereo LED turn-off pilot tone modulation	LED-OFF	$V_I=100\text{dB}\mu$		2.2		%
Total harmonic distortion	THD	$V_I=100\text{dB}\mu$ , mono signal		0.5	2.5	%
		$V_I=100\text{dB}\mu$ , main channel signal		0.5	2.5	

### Note

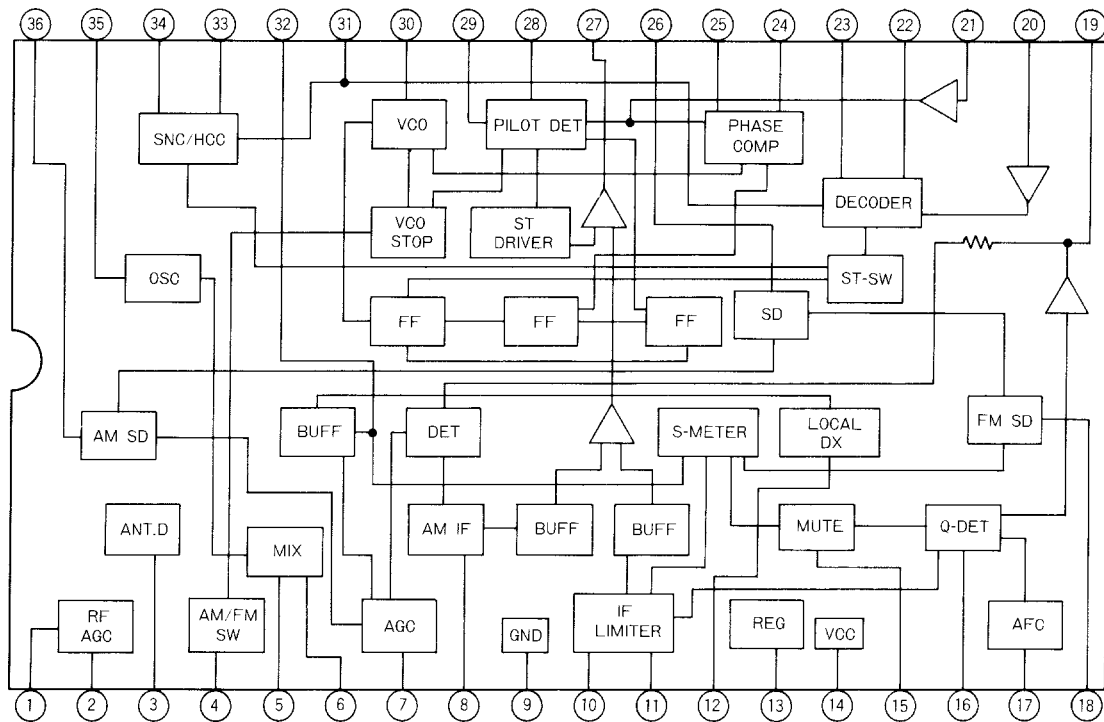
$V_I$  comprises 90% left + right signal and 10% pilot signal.

### AM characteristics at $T_a = 25^\circ\text{C}$ , $V_{CC}=8.5\text{V}$ , $f_c=1\text{MHz}$ with 30% modulation.

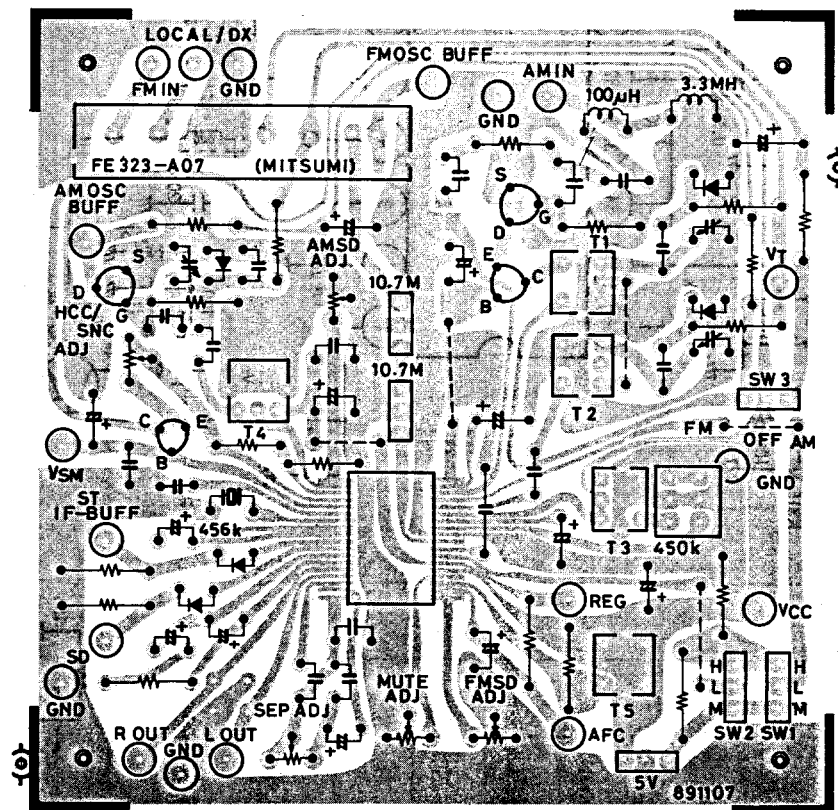
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Quiescent supply current	$I_{CCO}$	No signal	16	24	33	mA
Tuning LED turn-on input voltage	$V_{LED}$	$V_{26}=2\text{V}$	21	30	39	dB $\mu$
RF AGC turn-on input voltage	$V_{AGC}$	$V_I=3\text{V}$	50	57	64	dB $\mu$
Detector output voltage	$V_O$	$V_I=25\text{dB}\mu$	18	40	68	mV
		$V_I=74\text{dB}\mu$	70	105	156	
IF buffer output voltage	$V_{IF}$	$V_I=50\text{dB}\mu$ , $V_{12}=5\text{V}$	150	260	390	mV
S-meter output voltage	$V_{SM}$	No signal	0	0.7	1.3	V
		$V_I=74\text{dB}\mu$	2.6	3.7	5.2	
Pin-diode driver current	$I_{antd}$	$V_I=0.7\text{V}$	2.0	2.5	3.0	mA
Signal-to-noise ratio	S/N	$V_I=25\text{dB}\mu$	17	21		dB
		$V_I=74\text{dB}\mu$	42	49		
Total harmonic distortion	THD	$V_I=74\text{dB}\mu$		0.35	1.0	%
		$V_I=130\text{dB}\mu$		0.4	2.0	

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## Block Diagram



## Sample Printed Circuit Pattern



Cu-foiled area 90×90mm<sup>2</sup>

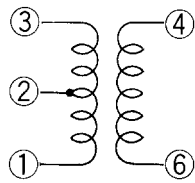




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## LA1875M Coil Specifications

T1 RF double tuning coil (Primary)

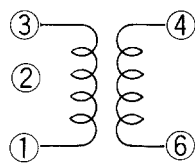


$$L1 - 3 = 224\mu\text{H}$$

YT-30020 (Mitsumi)

- ① - ② 2T
- ⑥ - ④ 37T
- ② - ③ 82T

T2 RF double tuning coil (Secondary)

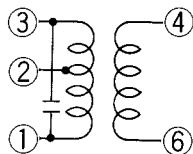


$$L1 - 3 = 224\mu\text{H}$$

YT-30018 (Mitsumi)

- ① - ② 2T
- ⑥ - ④ 15T
- ② - ③ 82T

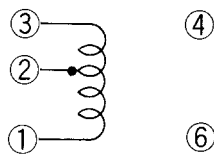
T3 AM IFT Coil (Matching Coil for SFZ 450 HL3)



HW-6145 (Mitsumi)

- ③ - ② 67T  $Q_0 = 70 \pm 20\%$
- ② - ① 85T  $f = 450\text{kHz}$
- ⑥ - ④ 10T internal 180pF

T4 AM OSC Coil

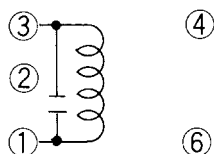


$$L1 - 3 = 118\mu\text{H}$$

YT-30008 (Mitsumi)

- ① - ② 29T
- ② - ③ 29T

T5 FM DET Coil



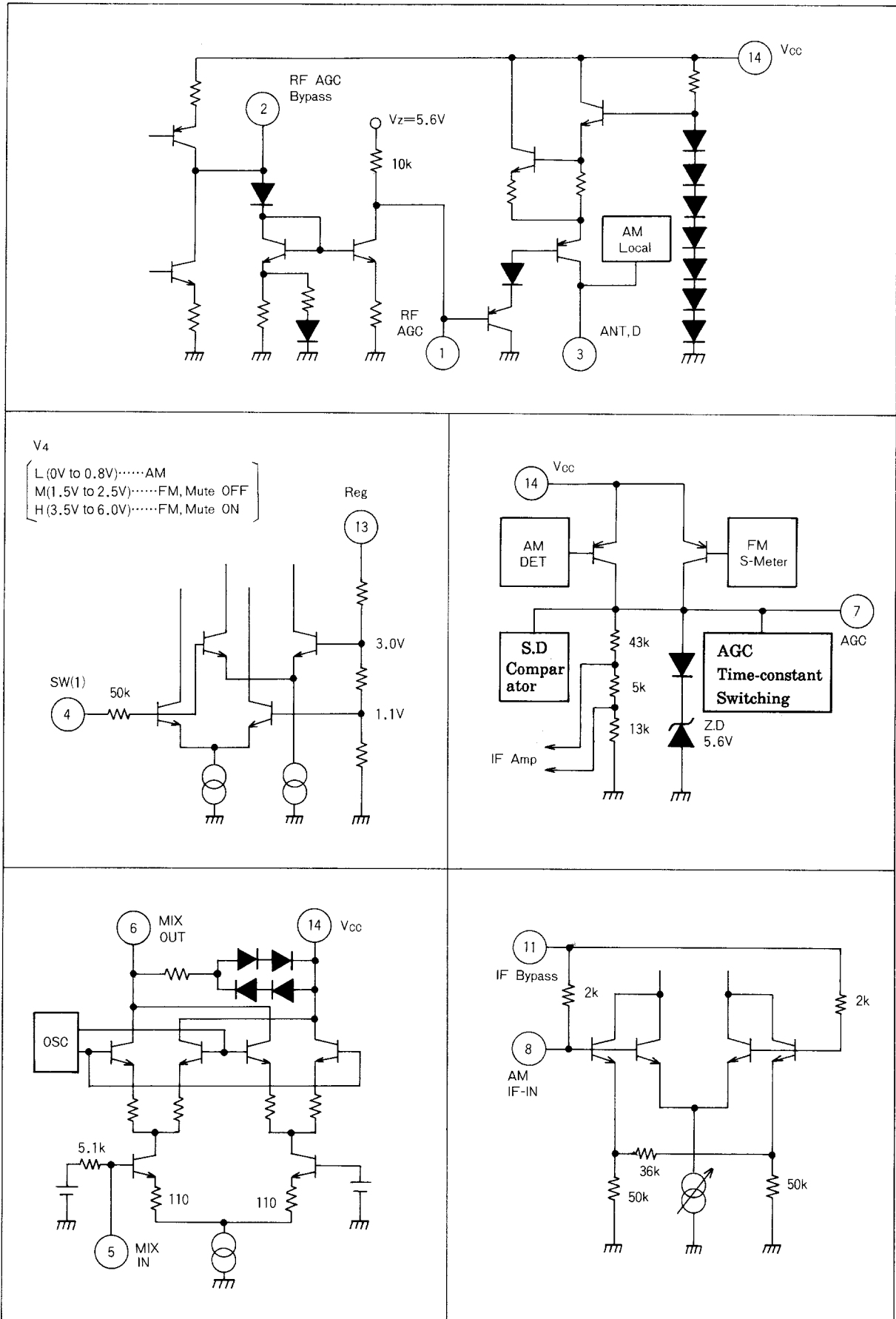
292TEAS-3741Z (Toko)

- ① - ③ 21T
- $f = 10.7\text{MHz}$
- internal 82pF
- $Q_0 = 38 \pm 20\%$

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## IC Internal Equivalent Circuit Diagrams

Unit (resistance:  $\Omega$ )

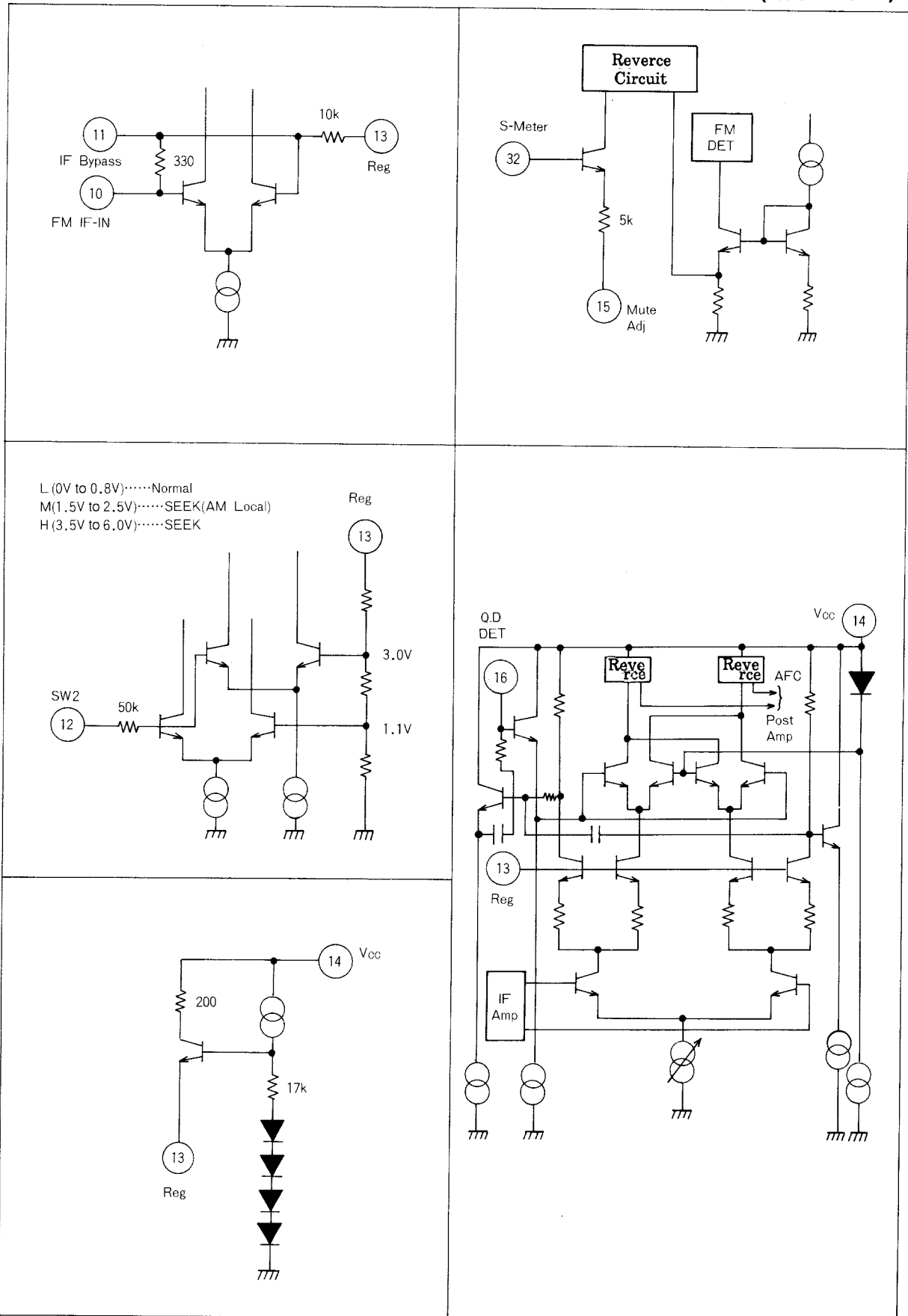


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Unit (resistance:  $\Omega$ )



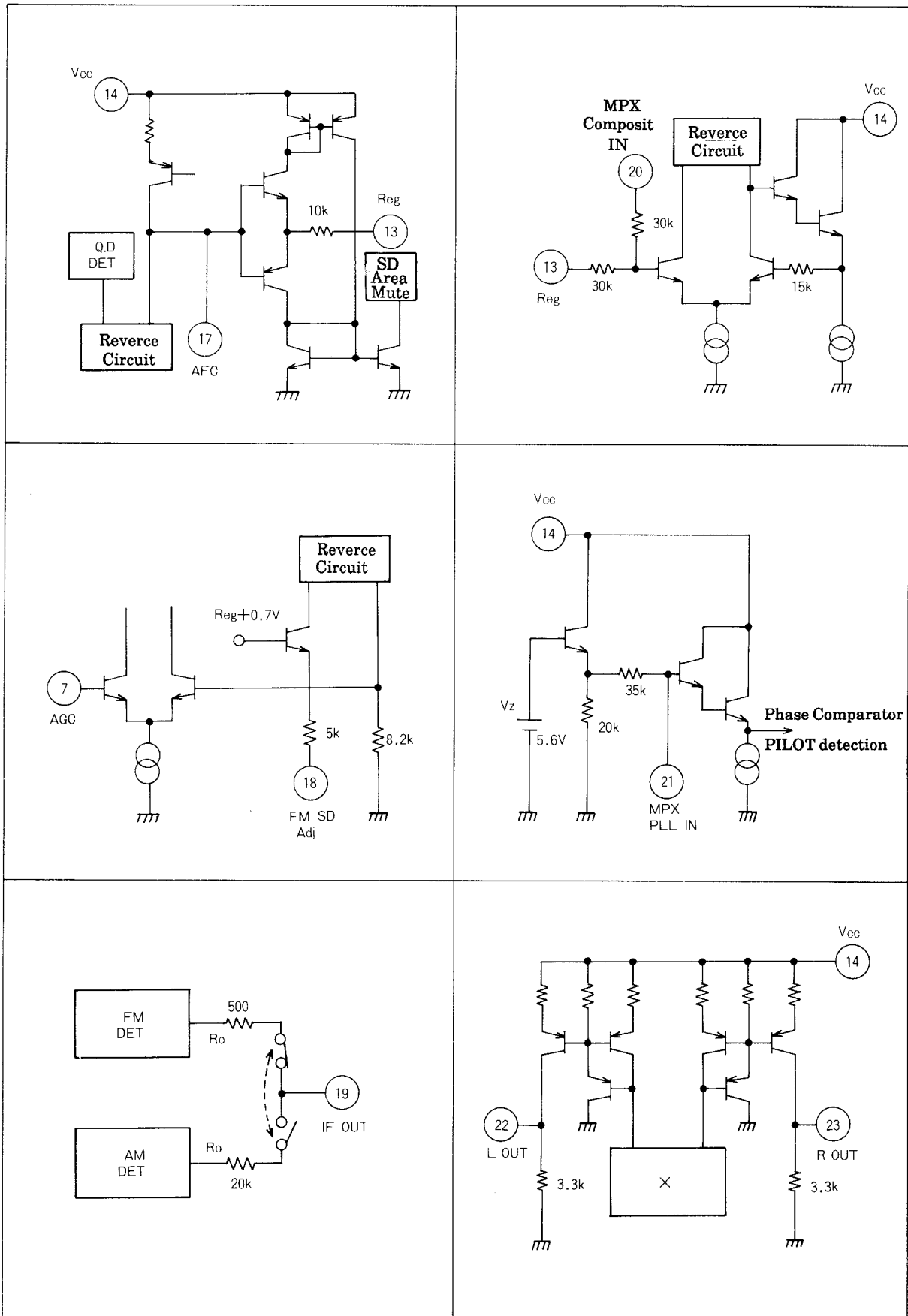
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Unit (resistance:  $\Omega$ )

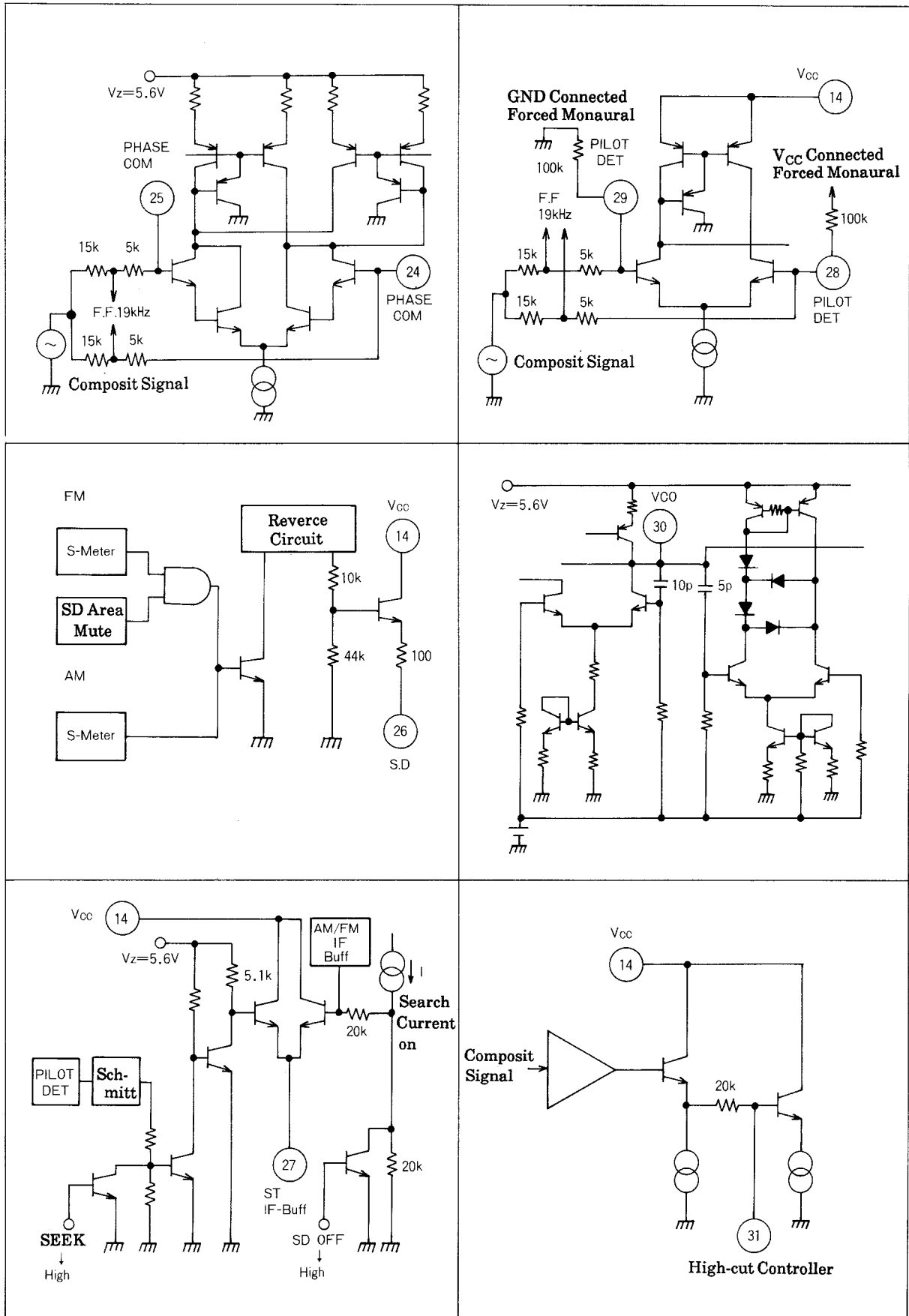


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Unit (resistance:  $\Omega$ )

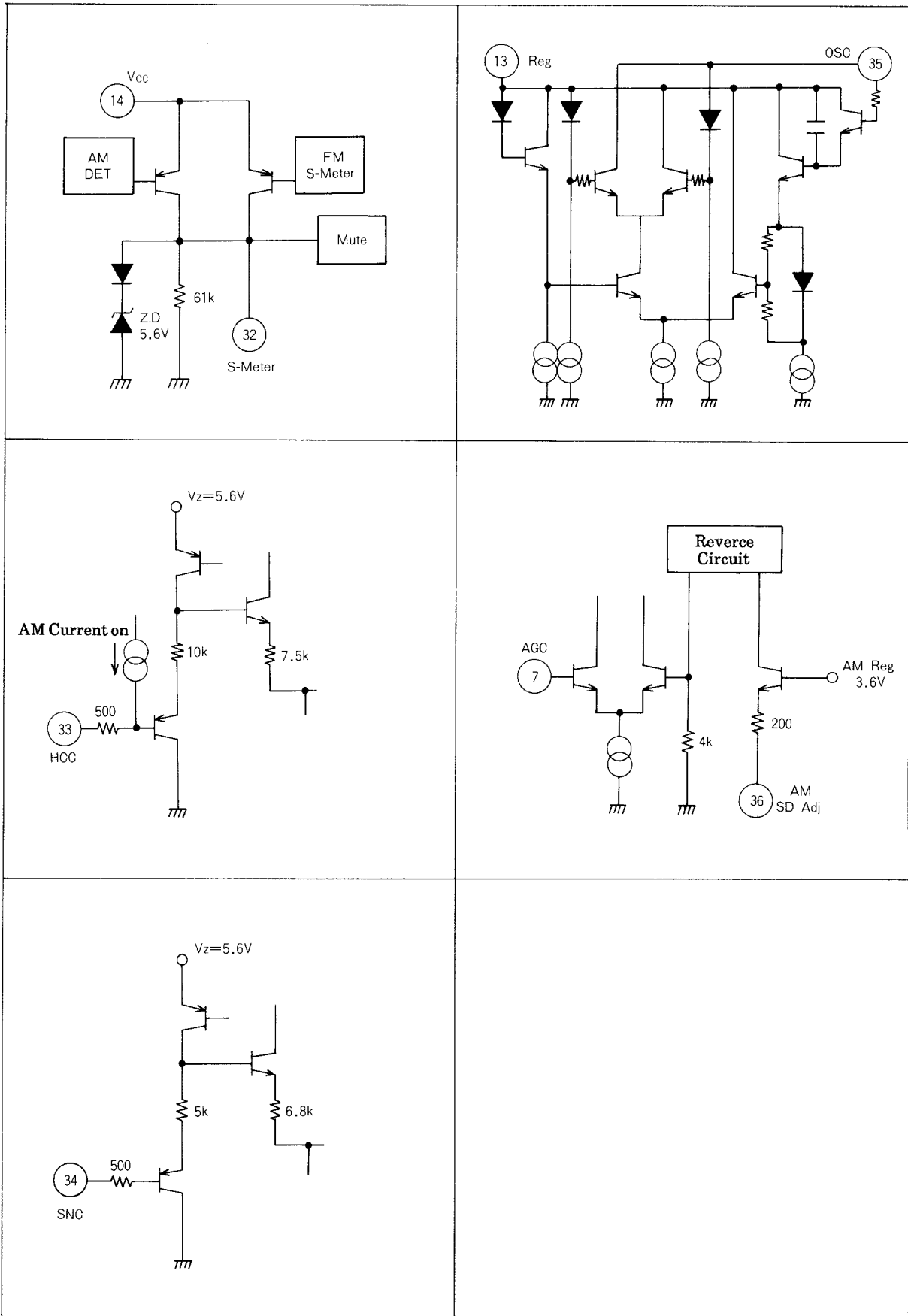


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Unit (resistance:  $\Omega$ )



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