

**SANYO**

No.3342B

**LA1875M****Single-chip, Electronic Tuner  
for Car Stereos****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.

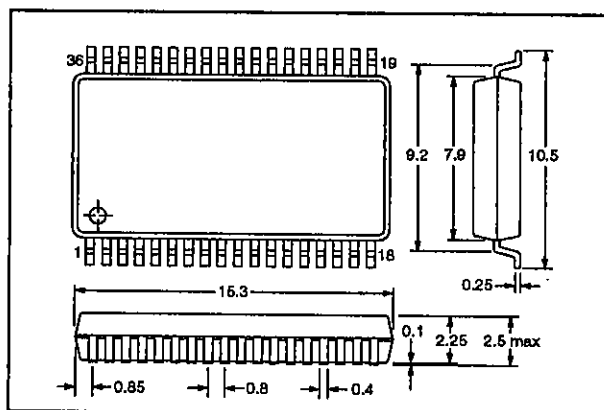
The LA1875M features an antenna-damping AM AGC circuit with rapid charge and discharge characteristics. It also features an S-meter driver, tuning and FM-stereo LED outputs, FM soft-mute and forced-mono modes and a no-adjustment MPX VCO.

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 10 V supply and is available in 36-pin MFPs.

**PACKAGE DIMENSIONS**

Unit: mm

**3129-MFP36S****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 10 V supply
- 36-pin MFP

## SPECIFICATIONS

### Absolute Maximum Ratings

| Parameter                                                   | Symbol    | Rating     | Unit               |
|-------------------------------------------------------------|-----------|------------|--------------------|
| Supply voltage                                              | $V_{CC}$  | 11         | V                  |
| Power dissipation ( $T_a \leq 50\text{ }^{\circ}\text{C}$ ) | $P_D$     | 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

$T_a = 25\text{ }^{\circ}\text{C}$

| Parameter            | Symbol   | Rating  | Unit |
|----------------------|----------|---------|------|
| Supply voltage       | $V_{CC}$ | 8.5     | V    |
| Supply voltage range | $V_{CC}$ | 7 to 10 | V    |

### Electrical Characteristics

#### FM characteristics

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

| Parameter                                 | Symbol     | Condition                                                                                    | Rating |      |      | Unit     |
|-------------------------------------------|------------|----------------------------------------------------------------------------------------------|--------|------|------|----------|
|                                           |            |                                                                                              | min    | typ  | max  |          |
| Quiescent supply current                  | $I_{CCQ}$  | No signal                                                                                    | 21     | 31   | 41   | mA       |
| -3 dB limiting sensitivity                | -3dBLS     | Referred to $V_1 = 100\text{ dB}\mu$ .<br>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                   | $V_O$      | $V_1 = 100\text{ dB}\mu$                                                                     | 165    | 250  | 345  | mV       |
| S-meter output voltage                    | $V_{SM}$   | No signal                                                                                    | 0      | 0.15 | 0.7  | V        |
|                                           |            | $V_1 = 100\text{ dB}\mu$                                                                     | 5.0    | 6.1  | 7.0  |          |
| IF buffer output voltage                  | $V_{IF}$   | $V_1 = 80\text{ dB}\mu$ , $V_{12} = 5\text{ V}$                                              | 200    | 360  | 540  | mV       |
| SNC output voltage                        | $V_{SUB}$  | $V_1 = 100\text{ dB}\mu$ ,<br>$V_{34} = 0.1\text{ V}$ . See note.                            | -      | 0.5  | 5.0  | mV       |
| Tuning LED turn-on bandwidth              | $BW_{LED}$ | $V_1 = 100\text{ dB}\mu$ , $V_{26} \geq 2\text{ V}$                                          | 85     | 130  | 180  | kHz      |
| Signal-to-noise ratio                     | S/N        | $V_1 = 100\text{ dB}\mu$                                                                     | 66     | 74   | -    | dB       |
| AM suppression ratio                      | AMR        | $V_1 = 100\text{ dB}\mu$ at 1 kHz<br>with 30% AM modulation                                  | 38     | 60   | -    | dB       |
| Separation                                | Sep        | $V_1 = 100\text{ dB}\mu$ . See note.                                                         | 30     | 45   | -    | dB       |
| Channel balance                           | CB         |                                                                                              | -1.5   | 0    | 1.5  | dB       |
| HCC output attenuation                    | $\alpha$   | $V_1 = 100\text{ dB}\mu$ ,<br>$V_{33} = 0.6\text{ V}$ , $f_m = 10\text{ kHz}$ .<br>See note. | -10.0  | -5.0 | -0.5 | dB       |
| Stereo LED turn-on pilot tone modulation  | LED-ON     | $V_1 = 100\text{ dB}\mu$                                                                     | 1.8    | 3.2  | 5.0  | %        |
| Stereo LED turn-off pilot tone modulation | LED-OFF    | $V_1 = 100\text{ dB}\mu$                                                                     | -      | 2.2  | -    | %        |

| Parameter                 | Symbol | Condition                                       | Rating |     |     | Unit |
|---------------------------|--------|-------------------------------------------------|--------|-----|-----|------|
|                           |        |                                                 | min    | typ | max |      |
| 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 |      |

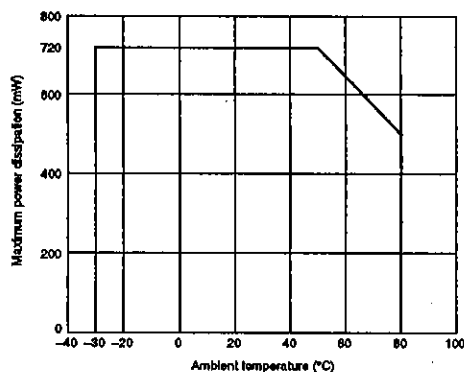
**Note**

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

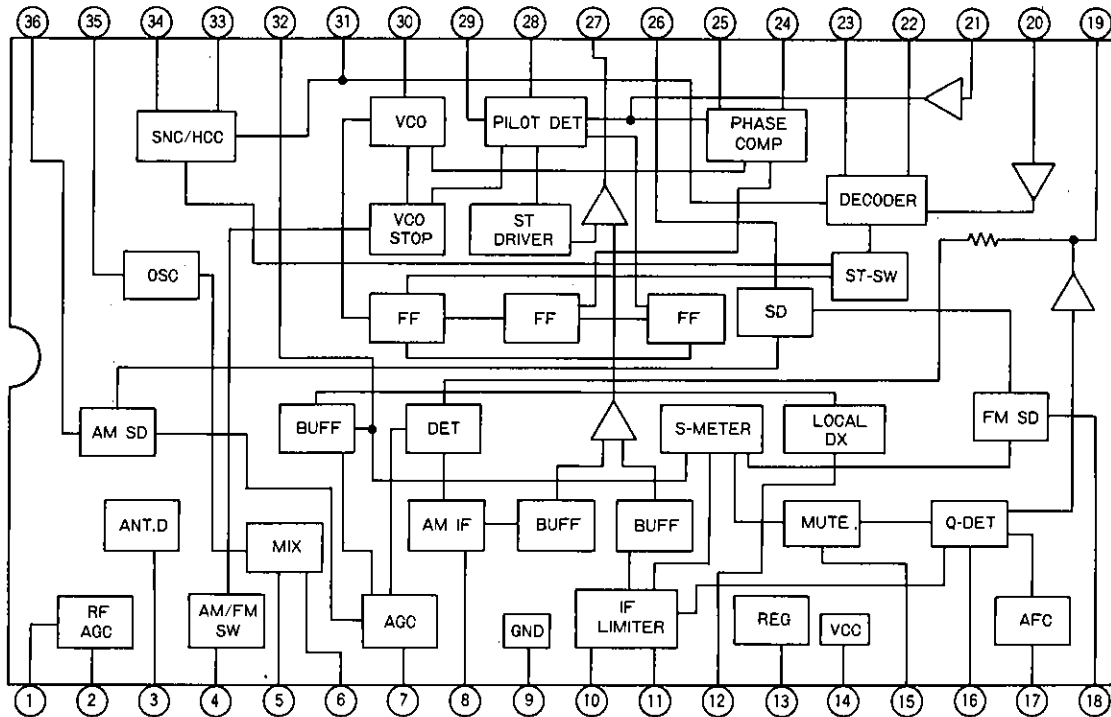
**AM characteristics**

$V_{CC} = 8.5 \text{ V}$ ,  $T_a = 25 \text{ }^\circ\text{C}$ ,  $f_c = 1 \text{ MHz}$ ,  $f_m = 1 \text{ kHz}$  with 30% modulation

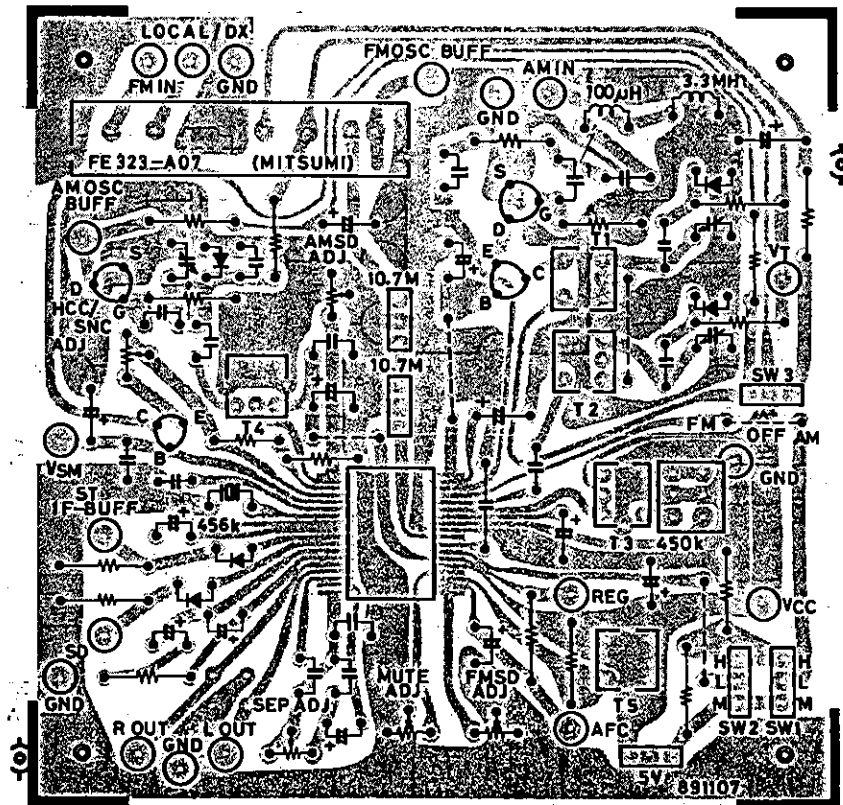
| Parameter                        | Symbol     | Condition                                         | Rating |      |     | Unit           |
|----------------------------------|------------|---------------------------------------------------|--------|------|-----|----------------|
|                                  |            |                                                   | min    | typ  | max |                |
| Quiescent supply current         | $I_{CCO}$  | No signal                                         | 15     | 24   | 33  | mA             |
| Tuning LED turn-on input voltage | $V_{LED}$  | $V_{26} = 2 \text{ V}$                            | 21     | 30   | 39  | $\text{dB}\mu$ |
| RF AGC turn-on input voltage     | $V_{AGC}$  | $V_I = 3 \text{ V}$                               | 50     | 57   | 64  | $\text{dB}\mu$ |
| 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         | $V_{IF}$   | $V_I = 50 \text{ dB}\mu$ , $V_{I2} = 5 \text{ V}$ | 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 |                |

**Typical Performance Characteristics****Maximum power dissipation vs. ambient temperature**

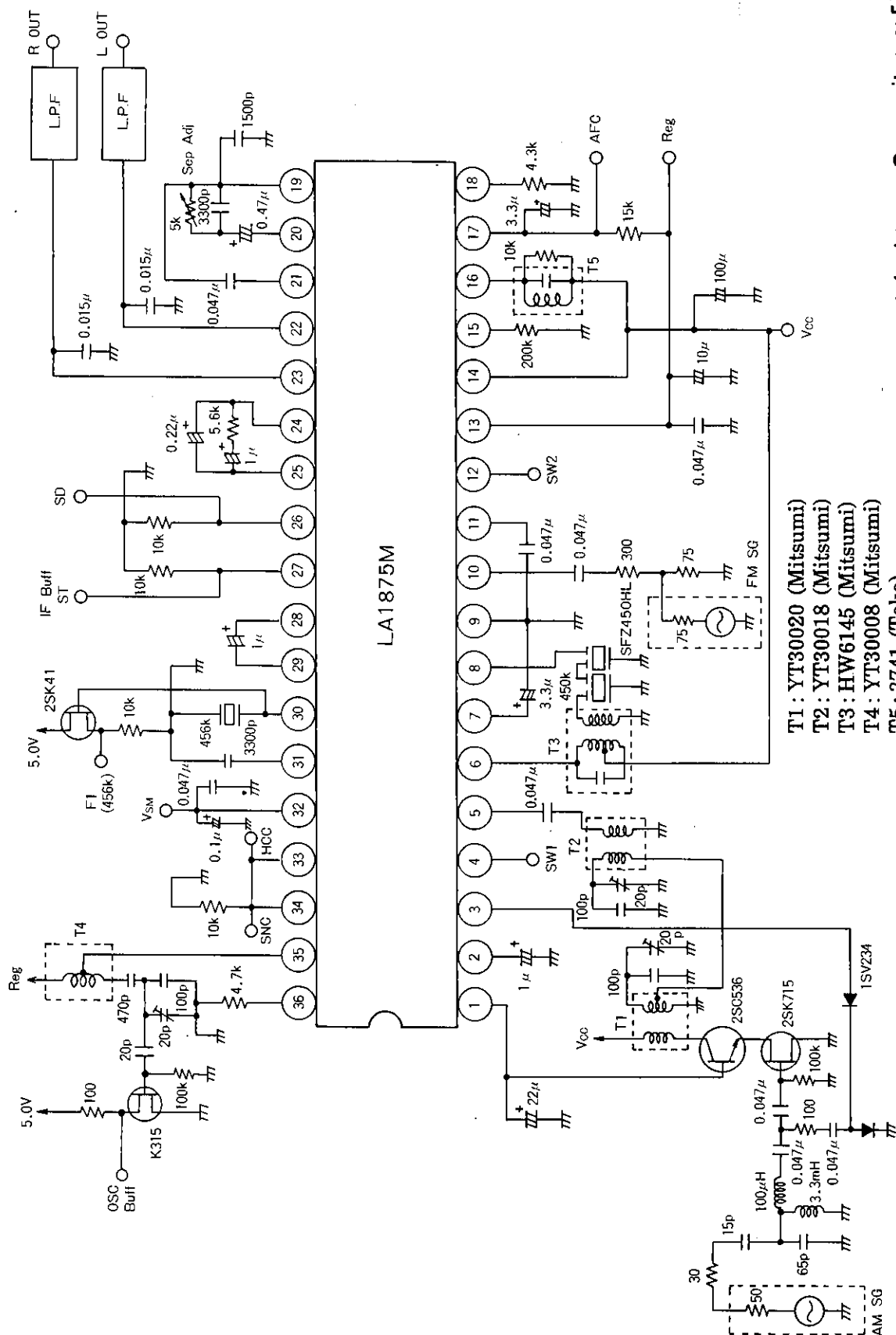
Block Diagram



Sample Printed Circuit Pattern



Cu-foiled area 90×90mm<sup>2</sup>

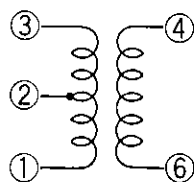
Unit (resistance:  $\Omega$ , capacitance: F)

Ceralock B456F23 (Murata)



## LA1875M Coil Specifications

## T1 RF double tuning coil (Primary)

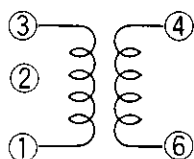


$$L1 - 3 = 224\mu\text{H}$$

## YT-30020 (Mitsumi)

- ① - ② 2T  
⑥ - ④ 37T  
② - ③ 82T

## T2 RF double tuning coil (Secondary)

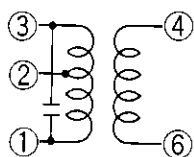


$$L1 - 3 = 224\mu\text{H}$$

## YT-30018 (Mitsumi)

- ① - ② 2T  
⑥ - ④ 15T  
② - ③ 82T

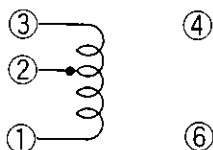
## T3 AM IFT Coil (Matching Coil for SFZ 450 HL3)



## 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

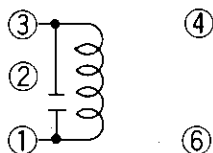


$$L1 - 3 = 118\mu\text{H}$$

## YT-30008 (Mitsumi)

- ① - ② 29T  
② - ③ 29T

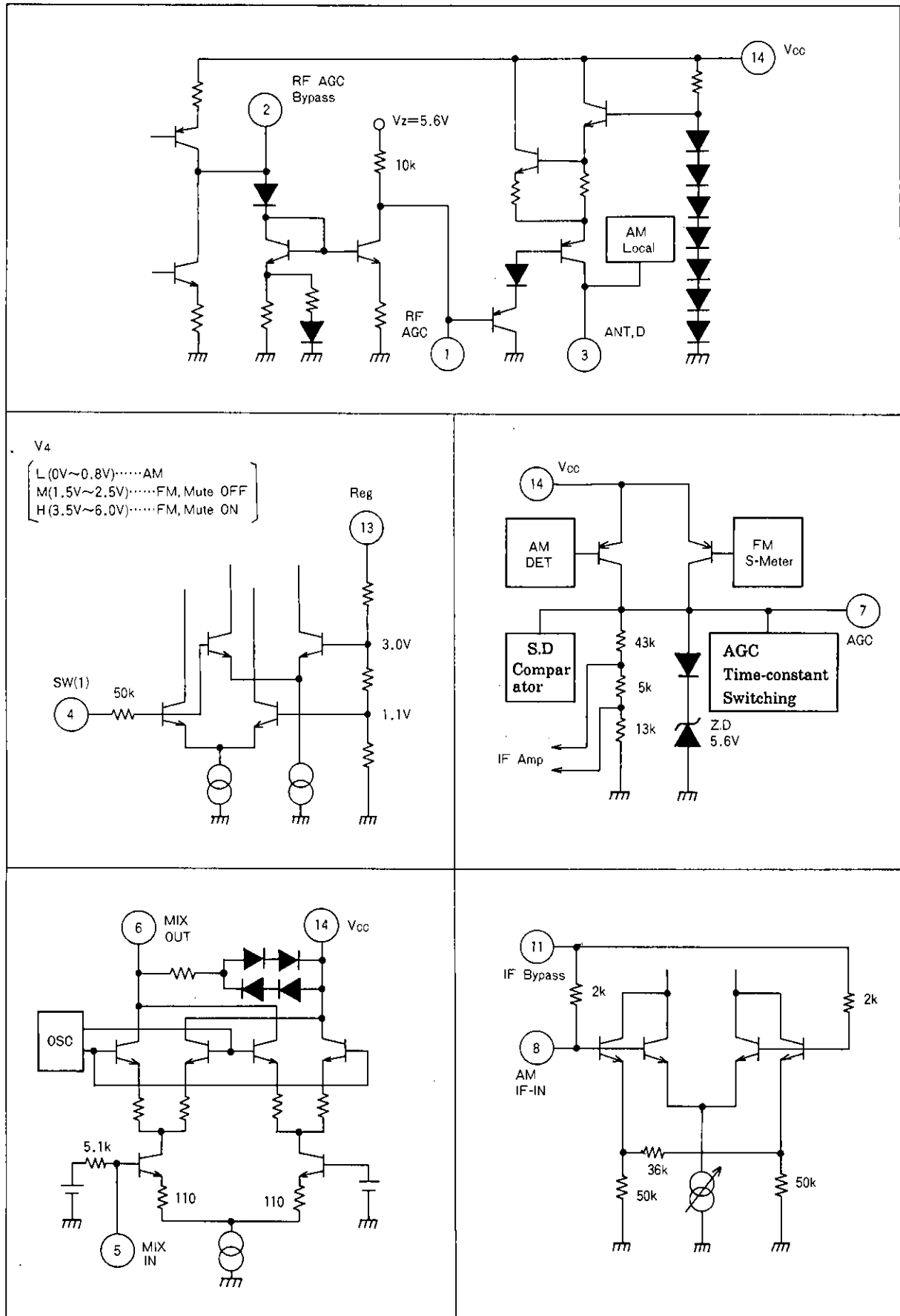
## T5 FM DET Coil



## 292TEAS-3741Z (Toko)

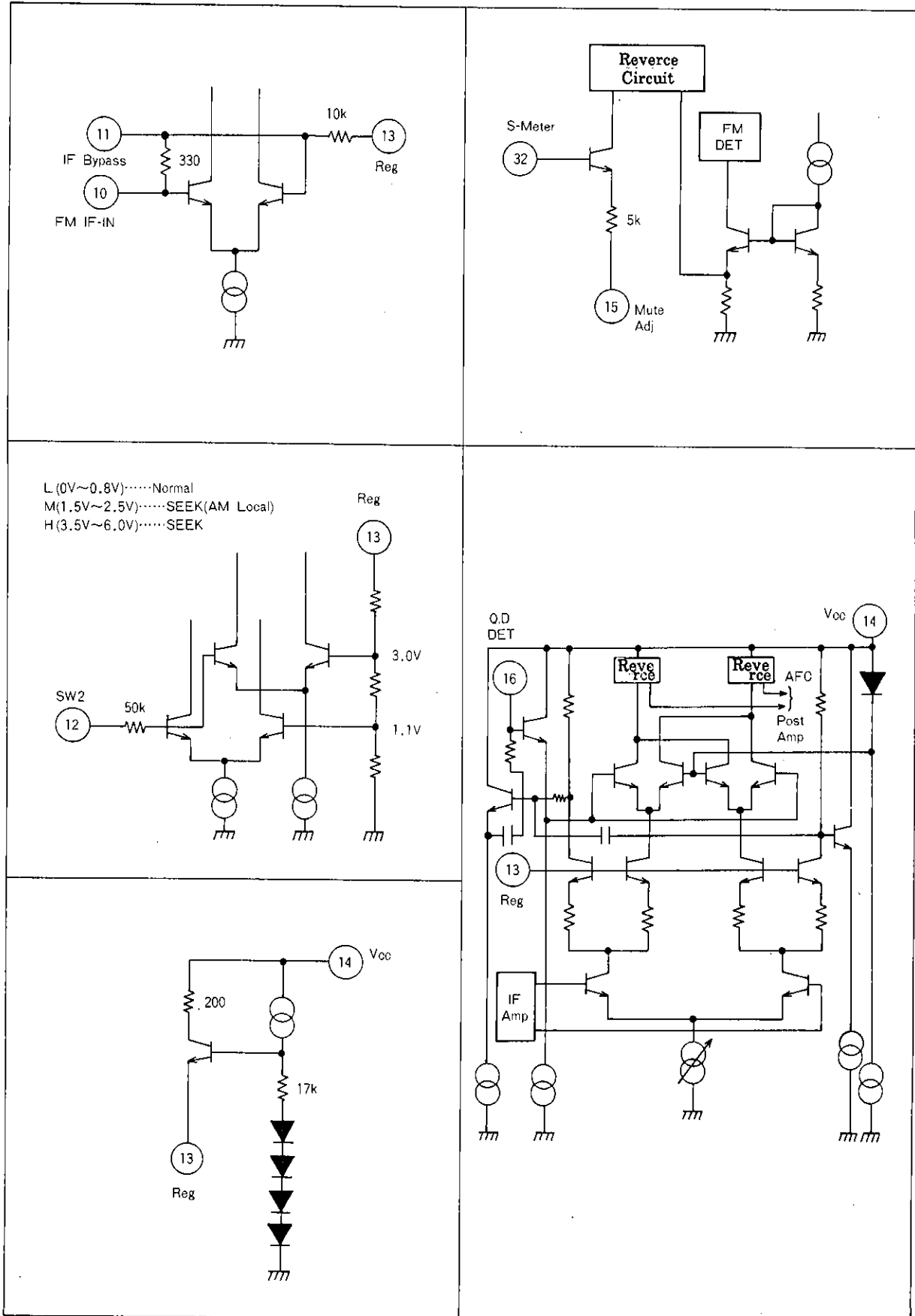
- ① - ③ 21T  
 $f = 10.7\text{MHz}$   
internal 82pF  
 $Q_0 = 38 \pm 20\%$

## IC Internal Equivalent Circuit Diagrams

Unit (resistance:  $\Omega$ )

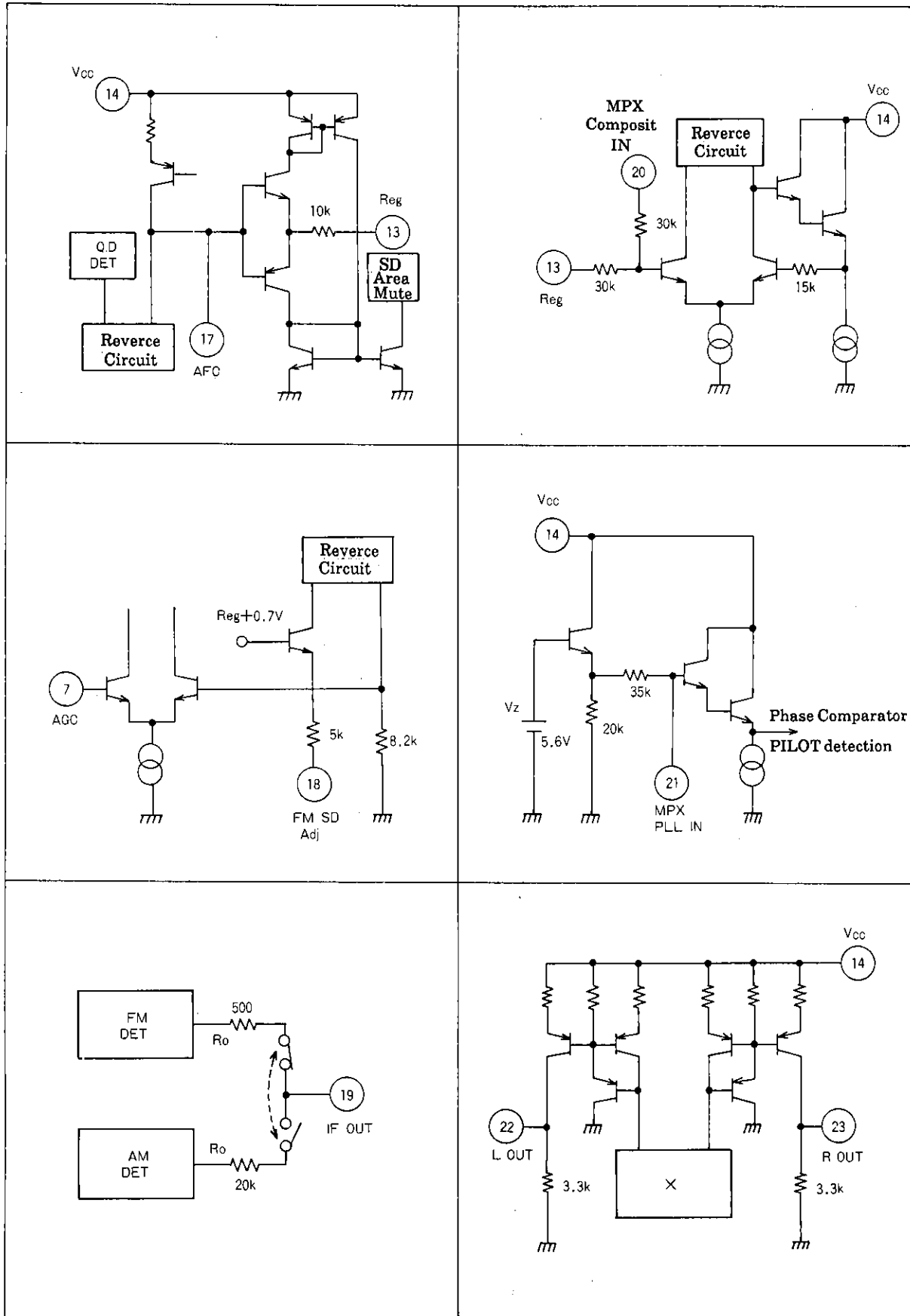
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Unit (resistance:  $\Omega$ )

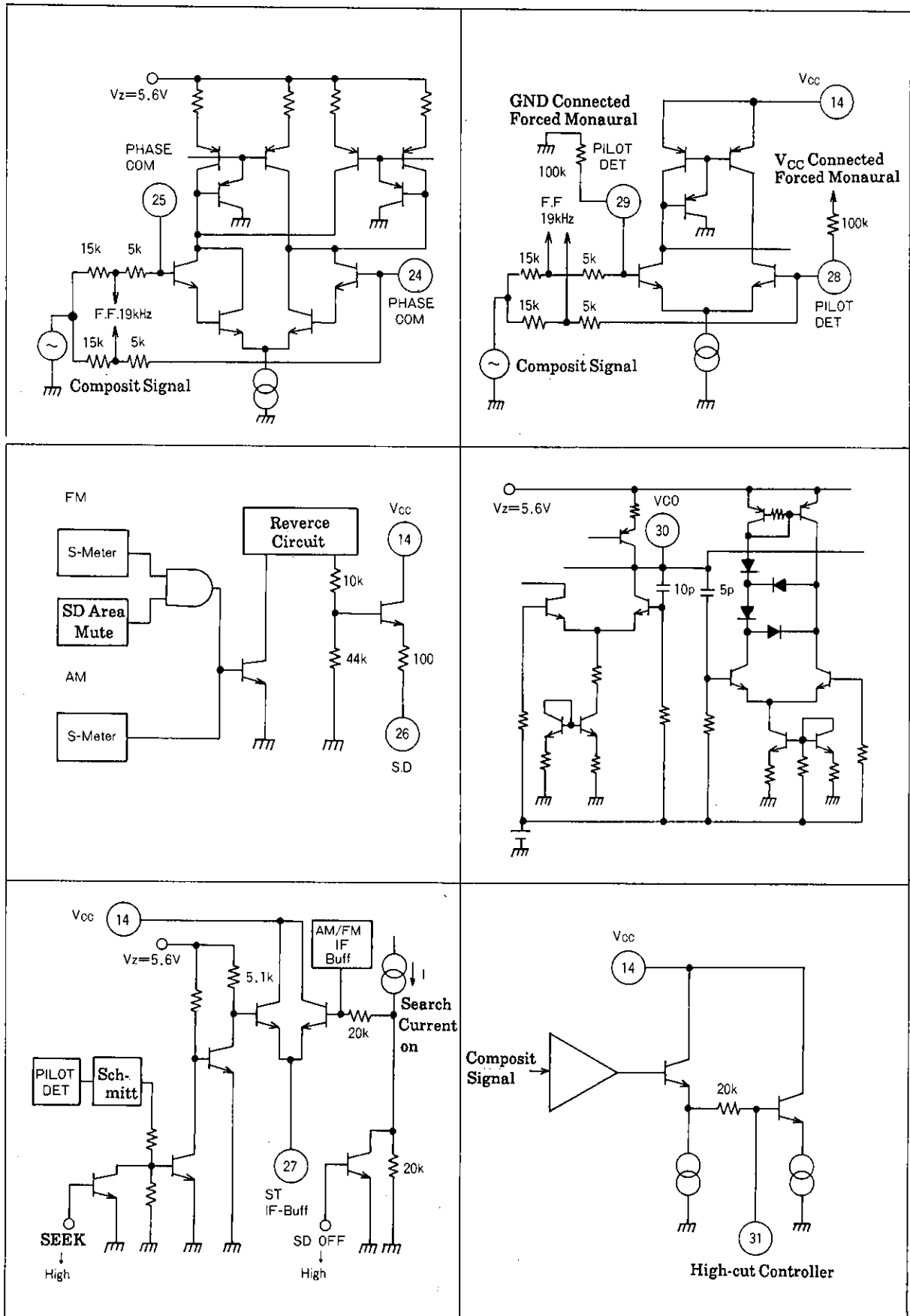
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Unit (resistance:  $\Omega$ )

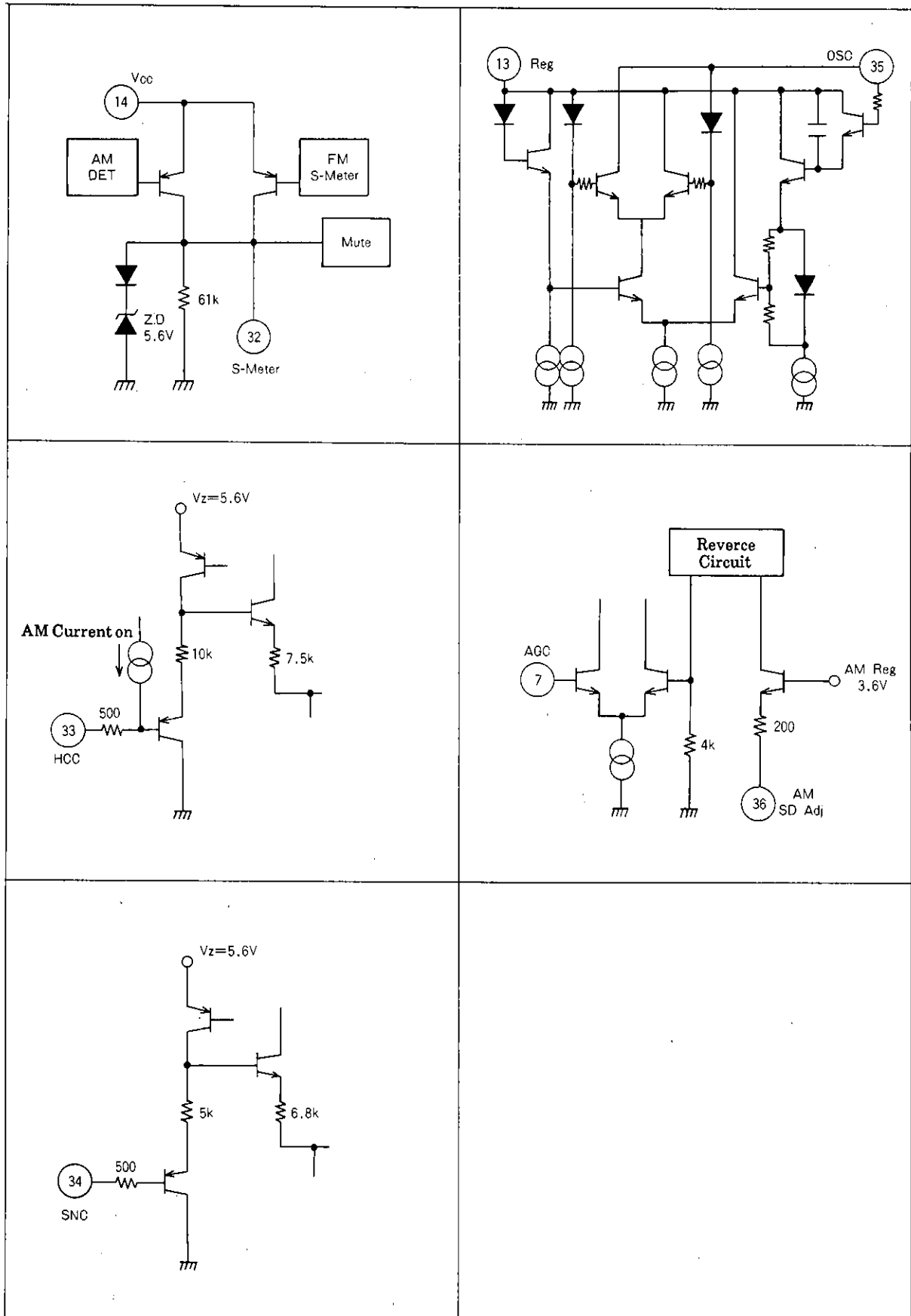
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Unit (resistance:  $\Omega$ )

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Unit (resistance:  $\Omega$ )

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