

EIAJ Sound Multiplexing Decoder

**Description**

The CXA1518Q/S are bipolar ICs designed for EIAJ TV sound multiplexing decoders. These ICs provide various functions including sound multiplexing demodulation, broadcast mode discrimination (stereo/bilingual discrimination display), mode display, and muting.

**Features**

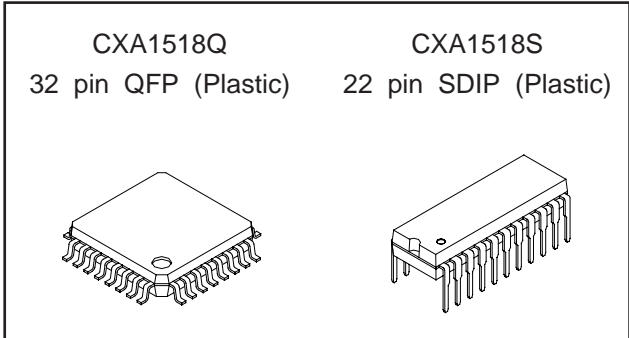
- External parts greatly reduced with a built-in active filter.
- Count down can be used for broadcast mode discrimination so that adjustment for discrimination system (Q-OSC) is not required.
- Output level of 380 mVrms (1 kHz, MONO, 100 %)
- Forced monaural operates with both stereo and bilingual broadcasts.
- Built-in digital facsimile interference elimination filter.
- Low supply voltage ( $V_{CC}=5\text{ V}$ )
- The pin configuration of the CXA1518S is identical to that of the CXA1138AS.

**Applications**

- Color TVs
- Hi-Fi VCRs
- Liquid crystal TVs

**Structure**

Bipolar silicon monolithic IC



**Absolute Maximum Ratings** ( $T_a=25\text{ }^\circ\text{C}$ )

[Pin numbers shown are for the CXA1518S.]

|                                     |           |             |                  |
|-------------------------------------|-----------|-------------|------------------|
| • Supply voltage                    | $V_{CC}$  | 10          | V                |
| • Input signal (Pin 6)              | $V_{IS}$  | 0.6         | Vp-p             |
| • Control voltage (Pins 12, 13, 14) | $V_{IC}$  | $V_{CC}$    | V                |
| • Operating temperature             | $T_{OPR}$ | -20 to +75  | $^\circ\text{C}$ |
| • Storage temperature               | $T_{STG}$ | -65 to +150 | $^\circ\text{C}$ |
| • Allowable power dissipation       | $P_D$     | 900         | mW (SDIP)        |
|                                     |           | 470         | mW (QFP)         |
| • LED drive current                 | $I_{LED}$ | 10          | mA               |

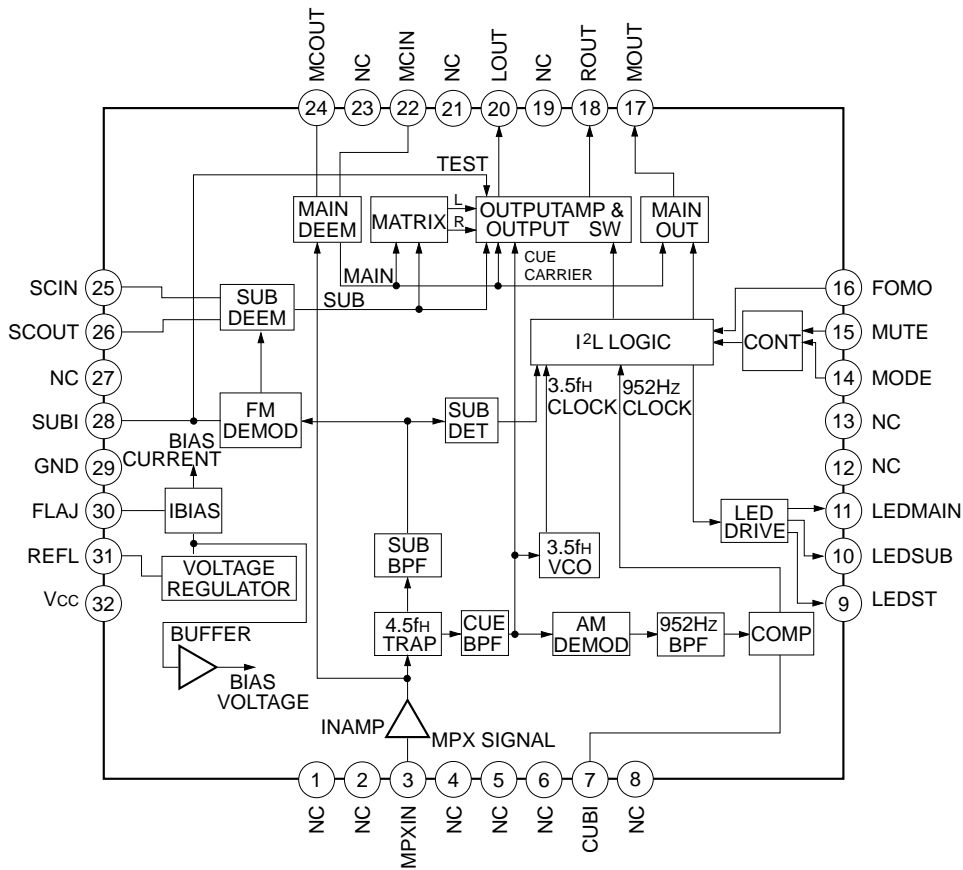
**Operating Voltage**

6.0 to 4.5 V

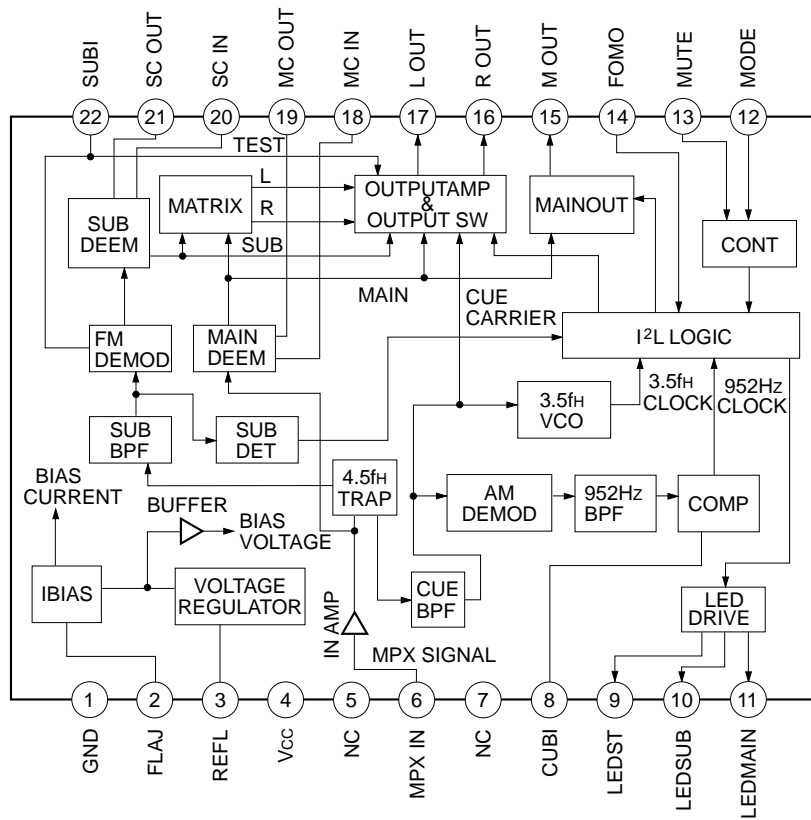
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Block Diagram

CXA1518Q



CXA1518S



Pin Description (Ta=25 °C, Vcc=5 V)

Pin numbers in brackets are for the CXA1518Q.

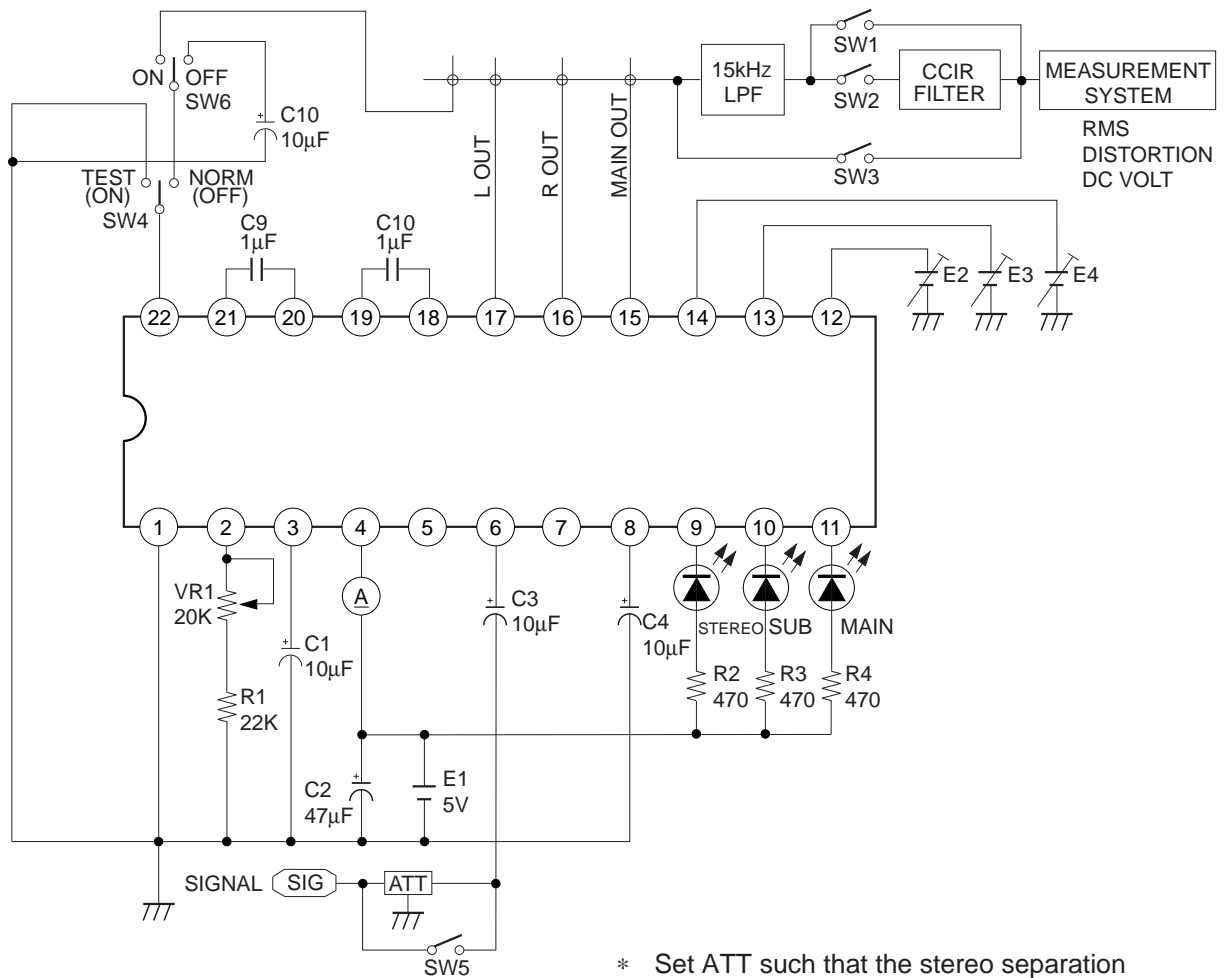
| Pin No. |     | Symbol | Pin voltage | Equivalent circuit | Description   |
|---------|-----|--------|-------------|--------------------|---|
| SDIP    | QFP |        |             |                    |   |
| 1       | 29  | GND    | 0           |                    | GND   |
| 2       | 30  | FLAJ   | 2.4 V       |                    | Filter adjustment pin   |
| 3       | 31  | REFL   | 2.5 V       |                    | Connects noise elimination filter of internal reference power supply.             |
| 4       | 32  | Vcc    | —           |                    | Power supply pin  |
| 6       | 3   | MPXIN  | 2.5 V       |                    | Sound multiplexing signal input.<br>Standard input level=70 mVrms<br>(MONO 100 %) |
| 8       | 7   | CUBI   | 2.4 V       |                    | Connects bias capacitor for Cue pulse generator.                                  |

| Pin No. |     | Symbol | Pin voltage | Equivalent circuit | Description   |
|---------|-----|--------|-------------|--------------------|---|
| SDIP    | QFP |        |             |                    |   |
| 9       | 9   | LEDST  | —           |                    | Connects the LEDs to display each mode.<br>Pin 9: Stereo<br>Pin 10: Sub<br>Pin 11: Main   |
| 10      | 10  | LEDSU  |             |                    |   |
| 11      | 11  | LEDM   |             |                    |   |
| 12      | 14  | MODE   | —           |                    | Switches the output mode with the DC voltage during bilingual broadcasting.   |
| 13      | 15  | MUTE   | —           |                    | Output mute pin.<br>When set to high, only DC is output from Pins 15, 16 and 17 (Pins 17, 18 and 20).   |
| 14      | 16  | FOMO   | —           |                    | Forced monaural pin.<br>When set to high, monaural function (main) is forcibly set regardless of stereo and bilingual broadcasts and LEDs are extinguished. |
| 15      | 17  | MOUT   | 2.4 V       |                    | Main signal output pin.<br>Always outputs the main signal component regardless of the broadcast mode.   |

| Pin No. |     | Symbol | Pin voltage | Equivalent circuit | Description  |
|---------|-----|--------|-------------|--------------------|--|
| SDIP    | QFP |        |             |                    |  |
| 16      | 18  | ROUT   | 2.4 V       |                    | R-ch output pin  |
| 17      | 20  | LOUT   | 2.4 V       |                    | L-ch output pin.<br>During "TEST", outputs the Cue signal component passed through the Cue BPF.                    |
| 18      | 22  | MCIN   | 2.5 V       |                    | Connects DC cut capacitor of the main signal.  |
| 19      | 24  | MCOUT  | 1.7 V       |                    |  |
| 20      | 25  | SCIN   | 2.5 V       |                    | Connects DC cut capacitor of the sub signal.   |
| 21      | 26  | SCOUT  | 1.7 V       |                    |  |
| 22      | 28  | SUBI   | 2.4 V       |                    | Connects bias capacitor of the sub FM detector.<br>Grounding this pin enables the TEST mode for filter adjustment. |

| Pin No. |  | Symbol | Pin voltage | Equivalent circuit | Description   |
|---------|--|--------|-------------|--------------------|---|
| SDIP    | QFP  |        |             |                    |   |
| 5, 7    | 1, 2<br>4, 5<br>6, 8<br>12, 13<br>19, 21<br>23, 27 | NC     | —           | —                  | Keep these pins open<br>(They are not connected to the chip.) |

**Electrical Characteristics Measurement Circuit (CXA1518S)**



**Electrical Characteristics** (Ta=25 °C, Vcc=5 V) Pin numbers shown in conditions are for the CXA1518S.

| No. | Item  | Symbol | SW conditions | Bias conditions | Conditions   | Test point           |                | Min.  | Typ.  | Max.  | Unit  |
|-----|---|--------|---------------|-----------------|--|----------------------|----------------|-------|-------|-------|-------|
|     |   |        |               |                 |  | SDIP                 | QFP            |       |       |       |       |
| 1   | Current consumption                           | Icc    | 1             | 1               | Measures the input current to Pin 4.   | Pin 4                | Pin 32         | 14    | 20    | 26    | mA    |
| 2   | Sub output level 400 Hz                       | VS1    | 4             | 2 and 3         | Input signal: SIG1<br>Measures output amplitude at Pins 16 and 17 (400 Hz, sine wave) : Vs1<br>(15 k LPF)                                  | Pins 16 and 17<br>*1 | Pins 18 and 20 | 330   | 380   | 480   | mVrms |
| 3   | Sub frequency response characteristics 1 kHz  | FS1    | 4             | 2 and 3         | Input signal: SIG2<br>Measures output amplitude at Pins 16 and 17 (1kHz, sine wave) : Vs2<br>$Fs1=20 \log \frac{Vs2}{Vs1}$<br>(15 k LPF)   | Pins 16 and 17<br>*1 | Pins 18 and 20 | -1.6  | -0.6  | 0     | dB    |
| 4   | Sub frequency response characteristics 10 kHz | FS2    | 4             | 2 and 3         | Input signal: SIG3<br>Measures output amplitude at Pins 16 and 17 (10 kHz, sine wave) : Vs3<br>$Fs2=20 \log \frac{Vs3}{Vs1}$<br>(15 k LPF) | Pins 16 and 17<br>*1 | Pins 18 and 20 | -19.0 | -17.0 | -14.7 | dB    |
| 5   | Sub distortion factor                         | DS     | 4             | 2 and 3         | Input signal: SIG2<br>Measures output signal distortion factor at Pins 16 and 17 (1 kHz, sine wave).<br>(15 k LPF)                         | Pins 16 and 17<br>*1 | Pins 18 and 20 | —     | 1     | 2     | %     |
| 6   | Sub S/N                                       | NS     | 4             | 2 and 3         | Input signal: SIG2<br>Measures S/N ratio of the outputs (1 kHz) at Pins 16 and 17.<br>(15 k LPF. RMS)                                      | Pins 16 and 17<br>*1 | Pins 18 and 20 | 58    | 62    | —     | dB    |
| 7   | Stereo distortion factor L ch                 | Dst1   | 4             | 2               | Input signal: SIG4<br>Measures output signal distortion factor at Pin 17 (1 kHz, sine wave).<br>(15 k LPF)                                 | Pin 17               | Pin 20         | —     | 0.2   | 1.5   | %     |
| 8   | Stereo distortion factor R ch                 | Dstr   | 4             | 2               | Input signal: SIG5<br>Measures output signal distortion factor at Pin 16 (1 kHz, sine wave)<br>(15 k LPF)                                  | Pin 16               | Pin 18         | —     | 0.2   | 1.5   | %     |
| 9   | Stereo output level L ch 1 kHz                | Vst1   | 4             | 2               | Input signal: SIG4<br>Measures output amplitude at Pin 17 (1 kHz, sine wave).<br>(15 k LPF)  | Pin 17               | Pin 20         | 310   | 360   | 440   | mVrms |

\*1 When bias condition is [3], the test point is Pin 16 only.

| No. | Item  | Symbol | SW conditions | Bias conditions | Conditions  | Test point     |                | Min.  | Typ.  | Max.  | Unit  |
|-----|---|--------|---------------|-----------------|---|----------------|----------------|-------|-------|-------|-------|
|     |   |        |               |                 |   | SDIP           | QFP            |       |       |       |       |
| 10  | Stereo output level<br>R ch 1 kHz                 | Vstr   | 4             | 2               | Input signal: SIG5<br>Measures output amplitude at Pin 16 (1 kHz, sine wave).<br>(15 k LPF)   | Pin 16         | Pin 18         | 310   | 360   | 440   | mVrms |
| 11  | Main output level<br>MAIN OUT                     | Vm1    | 4             | 2               | Input signal: SIG6<br>Measures output signal at Pin 15 (400 Hz, sine wave).<br>(15 k LPF)   | Pin 15         | Pin 17         | 330   | 390   | 480   | mVrms |
| 12  | Main output level                                 | Vm2    | 4             | 2               | Input signal: SIG6<br>Measures output signal amplitude at Pins 16 and 17 (400 Hz, sine wave).<br>(15 k LPF)                               | Pins 16 and 17 | Pins 18 and 20 | 330   | 390   | 480   | mVrms |
| 13  | Main frequency response characteristics<br>1 kHz  | Fm1    | 4             | 2               | Input signal: SIG7<br>Measures output amplitude at Pins 16 and 17 (1kHz, sine wave) : Vm3<br>$Fm1=20 \log \frac{Vm3}{Vm2}$<br>(15 k LPF)  | Pins 16 and 17 | Pins 18 and 20 | -1.6  | -0.6  | 0     | dB    |
| 14  | Main frequency response characteristics<br>10 kHz | Fm2    | 4             | 2               | Input signal: SIG8<br>Measures output amplitude at Pins 16 and 17 (10 kHz, sine wave): Vm4<br>$Fm2=20 \log \frac{Vm4}{Vm2}$<br>(15 k LPF) | Pin 15         | Pin 17         | -16.5 | -14.5 | -12.5 | dB    |
| 15  | Main distortion factor<br>MAIN OUT                | Dm1    | 4             | 2               | Input signal: SIG7<br>Measures output signal distortion factor at Pin 15 (1 kHz, sine wave).<br>(15 k LPF)                                | Pins 16 and 17 | Pins 18 and 20 | —     | 0.2   | 1     | %     |
| 16  | Main distortion factor                            | Dm2    | 4             | 2               | Input signal: SIG7<br>Measures output signal distortion factor at Pins 16 and 17 (1 kHz, sine wave).<br>(15 k LPF)                        | Pins 16 and 17 | Pins 18 and 20 | —     | 0.2   | 1     | %     |
| 17  | Main distortion factor at maximum input           | Dm3    | 4             | 2               | Input signal: SIG9<br>Measures output signal distortion factor at Pins 16 and 17 (1 kHz, sine wave).<br>(15 k LPF)                        | Pins 16 and 17 | Pins 18 and 20 | —     | 0.3   | 3     | %     |
| 18  | Main S/N ratio                                    | Nm     | 4             | 2               | Input signal: SIG7<br>Measures S/N ratio of outputs at Pins 16 and 17 (1 kHz).<br>(15 k LPF. RMS)   | Pins 16 and 17 | Pins 18 and 20 | 65    | 69    | —     | dB    |



| No. | Item                                  | Symbol | SW conditions | Bias conditions | Conditions   | Test point     |                | Min. | Typ. | Max. | Unit |
|-----|---------------------------------------|--------|---------------|-----------------|--|----------------|----------------|------|------|------|------|
|     |                                       |        |               |                 |  | SDIP           | QFP            |      |      |      |      |
| 19  | Stereo separation<br>L → R            | Sstr   | 4             | 2               | Input signal: SIG4<br>Sstr=<br>$20 \log \frac{\text{Pin17 output amplitude}}{\text{Pin 16 output amplitude}} \text{ (dB)}$<br>(15 k LPF)   | Pins 16 and 17 | Pins 18 and 20 | 35   | 50   | —    | dB   |
| 20  | Stereo separation<br>R → L            | Sstl   | 4             | 2               | Input signal: SIG5<br>Sstl=<br>$20 \log \frac{\text{Pin16 output amplitude}}{\text{Pin17 output amplitude}} \text{ (dB)}$<br>(15 k LPF)  | Pins 16 and 17 | Pins 18 and 20 | 35   | 50   | —    | dB   |
| 21  | Cross talk<br>Main → Sub              | Cms1   | 2             | 2               | Input signal: SIG15<br>Calculates the level difference between the output amplitude at Pins 16 and 17 (Vms1) and the measured value in measurement No. 13 (Vm3).<br>$\text{Cms1} = 20 \log \frac{V_{m3}}{V_{ms1}} \text{ (dB)}$<br>(15 k LPF, 1 k BPF) | Pins 16 and 17 | Pins 18 and 20 | 52   | 59   | —    | dB   |
| 22  | Cross talk<br>Sub → Main              | Csm1   | 2             | 1               | Input signal: SIG2<br>Calculates the level difference between the output amplitude at Pins 16 and 17 (Vsm1) and the measured value in measurement No. 3 (Vs2).<br>$\text{Csm1} = 20 \log \frac{V_{s2}}{V_{sm1}} \text{ (dB)}$<br>(15 k LPF, 1 k BPF)   | Pins 16 and 17 | Pins 18 and 20 | 59   | 66   | —    | dB   |
| 23  | Cross talk<br>Main → Sub<br>BOTH MODE | Cms2   | 2             | 3               | Input signal: SIG15<br>Calculates the level difference between the output amplitudes at Pin 16 (Vms2) and at Pin 17 (Vms3)<br>$\text{Cms2} = 20 \log \frac{V_{ms3}}{V_{ms2}} \text{ (dB)}$<br>(15 k LPF, 1 k BPF)                                      | Pins 16 and 17 | Pins 18 and 20 | 52   | 58   | —    | dB   |

| No. | Item                                  | Symbol | SW conditions | Bias conditions | Conditions   | Test point           |                | Min. | Typ. | Max. | Unit  |
|-----|---------------------------------------|--------|---------------|-----------------|--|----------------------|----------------|------|------|------|-------|
|     |                                       |        |               |                 |  | SDIP                 | QFP            |      |      |      |       |
| 24  | Cross talk<br>Sub → Main<br>BOTH MODE | Csm2   | 2             | 3               | Input signal: SIG2<br>Calculates the level difference between the output amplitude at Pin 17 (Vsm2) and at Pin 16 (Vsm3).<br>$Csm2=20 \log \frac{Vsm3}{Vsm2} \text{ (dB)}$<br>(15 k LPF, 1 k BPF)  | Pins 16 and 17       | Pins 18 and 20 | 59   | 64   | —    | dB    |
| 25  | Residual carrier Sub                  | Lcs    | 3             | 2               | Input signal: SIG11<br>Measures the amplitude of the subcarrier component of the output at Pins 16 and 17.   | Pins 16 and 17       | Pins 18 and 20 | —    | 14   | 30   | mVrms |
| 26  | Residual carrier Main                 | Lcm    | 3             | 1               | Input signal: SIG11<br>Measures the amplitude of the subcarrier component of the output at Pins 16 and 17.   | Pins 16 and 17       | Pins 18 and 20 | —    | 10   | 20   | mVrms |
| 27  | Mute volume Main                      | Mm     | 2             | 4               | Input signal: SIG7<br>Calculate the level difference between the output amplitude at Pins 16 and 17 (VMm) and the measured value in measurement No. 13 (Vm3).<br>$Mm=20 \log \frac{Vm3}{VMm} \text{ (dB)}$<br>(1 k BPF, 15 k LPF)  | Pins 16 and 17       | Pins 18 and 20 | 70   | 80   | —    | dB    |
| 28  | Mute volume Sub                       | Ms     | 2             | 4               | Input signal: SIG2<br>Calculates the level difference between the output amplitude at Pins 16 and 17 (VMs) and the measured value in measurement No. 3 (Vs2).<br>$Ms=20 \log \frac{Vs2}{VMs} \text{ (dB)}$<br>(1 k BPF, 15 k LPF)  | Pins 16 and 17       | Pins 18 and 20 | 70   | 80   | —    | dB    |
| 29  | Mute volume Stereo                    | Mst    | 2             | 2 and 4         | Input signal: SIG4 and 5<br>Measures output signal level difference at Pins 16 and 17 under bias conditions 2 and 4.<br>Mst=<br>$20 \log \frac{\text{measured value under bias condition 2 (mVrms)}}{\text{measured value under bias condition 4 (mVrms)}}$<br>(1 k BPF, 15 k LPF) | Pins 16 and 17<br>*2 | Pins 18 and 20 | 70   | 80   | —    | dB    |

\*2 Measure Pin 17 when input signal is SIG4, and Pin 16 when input signal is SIG5.

| No. | Item                          | Symbol | SW conditions | Bias conditions | Conditions   | Test point |        | Min. | Typ. | Max. | Unit  |
|-----|-------------------------------|--------|---------------|-----------------|--|------------|--------|------|------|------|-------|
|     |                               |        |               |                 |  | SDIP       | QFP    |      |      |      |       |
| 30  | DC offset Stereo L ch         | Ostl   | 3             | 2 and 4         | Input signal: SIG18<br>Measures output DC level fluctuation at Pin 17 under bias conditions 2 and 4.   | Pin 17     | Pin 20 | —    | 20   | 100  | mV    |
| 31  | DC offset Stereo R ch         | Ostr   | 3             | 2 and 4         | Input signal: SIG18<br>Measures output DC level fluctuation at Pin 16 under bias conditions 2 and 4.   | Pin 16     | Pin 18 | —    | 20   | 100  | mV    |
| 32  | DC offset Main out            | Om     | 3             | 2 and 4         | Input signal: No input<br>Measures output DC level fluctuation at Pin 15 under bias conditions 2 and 4.  | Pin 15     | Pin 17 | —    | 20   | 100  | mV    |
| 33  | Cue detector sensitivity      | CD     | 4             | 2               | Input signal: SIG12<br>Varying SIG12, measures attenuation while switching from monaural to sound multiplexing mode.   | —          | —      | 8    | 11   | 17   | dB    |
| 34  | Sub detector sensitivity      | SD     | 4             | 2               | Input signal: SIG13<br>Varying SIG13, measures attenuation while switching from monaural to sound multiplexing mode.   | —          | —      | 9    | 12   | 17   | dB    |
| 35  | Cue BPF gain                  | CG     | 5             | 2               | Input signal: SIG14<br>Measures output amplitude at Pin 17   | Pin 17     | Pin 20 | 125  | 190  | 290  | mVrms |
| 36  | 4.5 fH trap attenuation level | TG     | 6             | 2               | Input signal: SIG16 and SIG17<br>Measuring output amplitude at Pin 22, measure the output signal level difference when inputting SIG16 and when inputting SIG17.<br>TG=<br>$20 \log \frac{\text{measured value for SIG16 (mVrms)}}{\text{measured value for SIG17 (mVrms)}}$ | Pin 22     | Pin 28 | 20   | 35   | —    | dB    |

SW Condition Table

| No. \ SW | 1   | 2   | 3   | 4   | 5   | 6   |
|----------|-----|-----|-----|-----|-----|-----|
| 1        | off | off | off | off | off | off |
| 2        | off | on  | off | off | off | off |
| 3        | off | off | on  | off | off | off |
| 4        | on  | off | off | off | off | off |
| 5        | off | off | on  | on  | on  | off |
| 6        | off | off | on  | off | on  | on  |

BIAS Condition Table

| No. \ SW | E1  | E2    | E3    | E4    |
|----------|-----|-------|-------|-------|
| 1        | 5 V | 0.5 V | 0.5 V | 0.5 V |
| 2        | 5 V | 4.5 V | 0.5 V | 0.5 V |
| 3        | 5 V | 2.5 V | 0.5 V | 0.5 V |
| 4        | 5 V | 4.5 V | 4.5 V | 0.5 V |

## Input Signal Definitions

|  |  |
|--|--|
| SIG1 : Sound MPX signal<br>Main : 0 %<br>Sub : 400 Hz, 100 % MOD<br>Cue : Bilingual          | SIG10 : Sound MPX signal<br>L ch : 1 kHz, 100 %<br>R ch : 0 %<br>Cue : Cue signal OFF                                    |
| SIG2 : Sound MPX signal<br>Main : 0 %<br>Sub : 1 kHz, 100 % MOD<br>Cue : Bilingual           | SIG11 : Sound MPX signal<br>Main : 0 %<br>Sub : 0 % (carrier only)<br>Cue : Bilingual                                    |
| SIG3 : Sound MPX signal<br>Main : 0 %<br>Sub : 10 kHz, 100 % MOD<br>Cue : Bilingual          | SIG12 : Sound MPX signal<br>Main : 0 %<br>Sub : 0 % (carrier only)<br>Cue : Bilingual<br>(Level adjusted to the minimum) |
| SIG4 : Sound MPX signal<br>L ch : 1 kHz, 100 %<br>R ch : 0 %<br>Cue : Stereo                 | SIG13 : Sound MPX signal<br>Main : 0 %<br>Sub : 0 % (level adjusted to the minimum)<br>Cue : Bilingual                   |
| SIG5 : Sound MPX signal<br>L ch : 0 %<br>R ch : 1 kHz, 100 %<br>Cue : Stereo                 | SIG14 : 55.069 kHz sine wave<br>5.6 mVrms  |
| SIG6 : Sound MPX signal<br>Main : 400 Hz, 100 %<br>Sub : Carrier OFF<br>Cue : Cue signal OFF | SIG15 : Sound MPX signal<br>Main : 1 kHz, 100 %<br>Sub : 0 % (carrier only)<br>Cue : Bilingual                           |
| SIG7 : Sound MPX signal<br>Main : 1 kHz, 100 %<br>Sub : Carrier OFF<br>Cue : Cue signal OFF  | SIG16 : 31.47 kHz sine wave<br>42 mVrms  |
| SIG8 : Sound MPX signal<br>Main : 10 kHz, 100 %<br>Sub : Carrier OFF<br>Cue : Cue signal OFF | SIG17 : 70.80 kHz sine wave<br>42 mVrms  |
| SIG9 : Sound MPX signal<br>Main : 1 kHz, 250 %<br>Sub : Carrier OFF<br>Cue : Cue signal OFF  | SIG18 : Sound MPX signal<br>L ch : 0 %<br>R ch : 0 %<br>Cue : Stereo   |
|  | * Sound MPX signal level is defined as monaural<br>100 % at 1 Vp-p.  |

**Output and LED ON/OFF Table**

| Broadcast status | MODE SW |      |      | Forced monaural | MUTE | Output status |      |      | LED ON/OFF conditions |     |      |
|------------------|---------|------|------|-----------------|------|---------------|------|------|-----------------------|-----|------|
|                  | SUB     | BOTH | MAIN |                 |      | L             | R    | MAIN | STEREO                | SUB | MAIN |
| Stereo           | ×       | ×    | ×    | off             | off  | L             | R    | L+R  | on                    | off | off  |
|                  | ×       | ×    | ×    | on              | off  | L+R           | L+R  | L+R  | off                   | off | off  |
|                  | ×       | ×    | ×    | ×               | on   | DC            | DC   | DC   | off                   | off | off  |
| Bilingual        | on      |      |      | off             | off  | SUB           | SUB  | MAIN | off                   | on  | off  |
|                  |         | on   |      | off             | off  | MAIN          | SUB  | MAIN | off                   | on  | on   |
|                  |         |      | on   | off             | off  | MAIN          | MAIN | MAIN | off                   | off | on   |
|                  |         |      |      | on              | off  | MAIN          | MAIN | MAIN | off                   | off | off  |
|                  | ×       | ×    | ×    | ×               | on   | DC            | DC   | DC   | off                   | off | off  |
| Monaural         | ×       | ×    | ×    | ×               | off  | MONO          | MONO | MONO | off                   | off | off  |
|                  | ×       | ×    | ×    | ×               | on   | DC            | DC   | DC   | off                   | off | off  |

× : No response

**Control Voltage Range** Pin numbers in brackets are for the CXA1518Q.

| MODE SW                           |      | Voltage range          |
|-----------------------------------|------|------------------------|
| Pin 12<br>(Pin 14)                | SUB  | 4.0 V to Vcc           |
|                                   | BOTH | 2 V to 3 V             |
|                                   | MAIN | 0 V to 0.5 V           |
| FORCED MONO<br>Pin 14<br>(Pin 16) | on   | 3 V to Vcc             |
|                                   | off  | 0 V to 0.5 V (or OPEN) |
| MUTE<br>Pin 13<br>(Pin 15)        | on   | 3 V to Vcc             |
|                                   | off  | 0 V to 0.5 V (or OPEN) |

**Description of Operation** Pin numbers in brackets are for the CXA1518Q.

The sound multiplexing signal input from Pin 6 (Pin 3) passes through IN AMP, and is added to the Cue BPF, SUB BPF and the MAIN de-emphasis circuits.

1 Discrimination system

The Cue BPF passes only the Cue signal component of the multiplexing signal. The AM demodulator detects the amplitude modulation of the Cue signal (AM wave) and generates a sine wave of either 922.5 Hz (for bilingual) or 982.5 Hz (for stereo sound).

COMP shapes the carrier-stripped Cue signal into a waveform, transforming it into pulses of either 922.5 Hz or 982.5 Hz, after which it is added to the LOGIC unit.

A 3.5f<sub>H</sub> VCO generates a 3.5f<sub>H</sub> pulse locked to the Cue signal carrier wave (3.5f<sub>H</sub>), and sends it to the LOGIC unit.

The LOGIC unit performs broadcast mode discrimination using the countdown method. From this result, and the existence/absence of a SUB signal from the SUB Detector, MUTE ON/OFF from CONT, MODE Switch, and the FOMO ON/OFF commands, the logic unit generates an output switchover control signal to control the output statuses of OUTPUT SW and MAIN OUT.

## 2 Main system

MAIN DEEM applies de-emphasis on the MAIN signal component and removes the SUB and Cue components. After having passed through MAIN DEEM, the MAIN signal is added to MATRIX, OUTPUT AMP, and MAIN OUT.

## 3 Sub system

SUB BPF passes the SUB signal component of the multiplexed signal. A 4.5 $\mu$ H trap filter then removes the digital facsimile signal component.

FM demodulation frequency demodulates the Sub signal.

The SUB DEEM applies de-emphasis on the FM demodulated Sub signal and removes the carrier wave component.

After passing through SUB DEEM, the SUB signal is added to MATRIX and OUTPUT AMP.

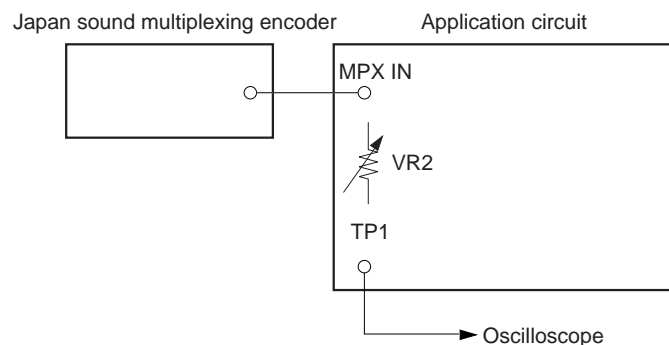
## 4 Matrix and output system

When broadcasting in stereo, MATRIX generates L and R signals by adding and subtracting the MAIN signal from MAIN DEEM and the SUB signal from SUB DEEM.

OUTPUT AMP & OUTPUT SW switch the output signals as instructed by LOCIG. Note that MAIN OUT always outputs the MAIN signal component regardless of the broadcast mode.

## Adjustment Methods

### 1. Preset before filter adjustment

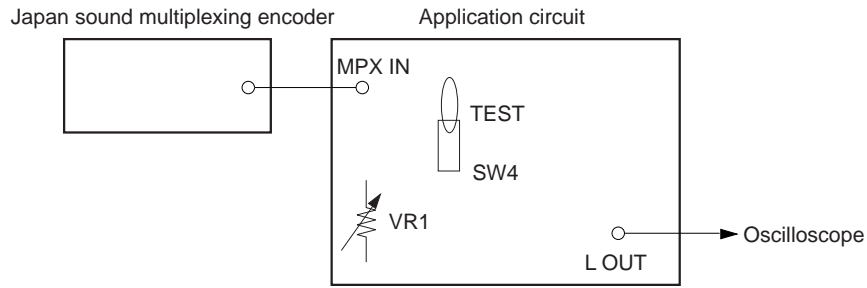


**Fig. 1**

#### Procedure

- 1) Connect as shown in Fig. 1
- 2) Set the encoder to MONO MODE, and input a 1 kHz signal to MPX IN.
- 3) Adjust VR2 until the level on TP1 (Pin 6) is 0.2 V<sub>p-p</sub> (70 mV<sub>rms</sub>).  
(Pin 3 for the CXA1518Q)

**2. Filter adjustment**

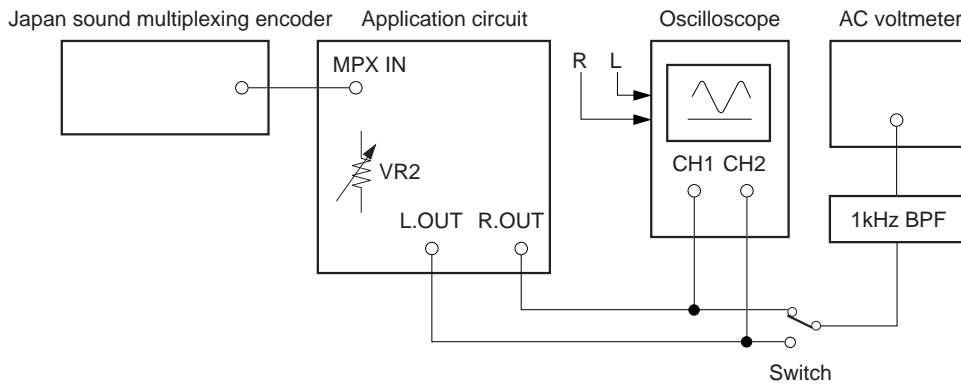


**Fig. 2**

**Procedure**

- 1) Connect as shown in Fig. 2.
- 2) Set SW4 to TEST. (Turn SW6 OFF)
- 3) Put the encoder in stereo mode, and input only a modulated Q signal into MPX IN of the board.
- 4) Observing L.OUT with the oscilloscope, adjust VR1 until the Q signal output to be maximum.

**3 Separation adjustment**



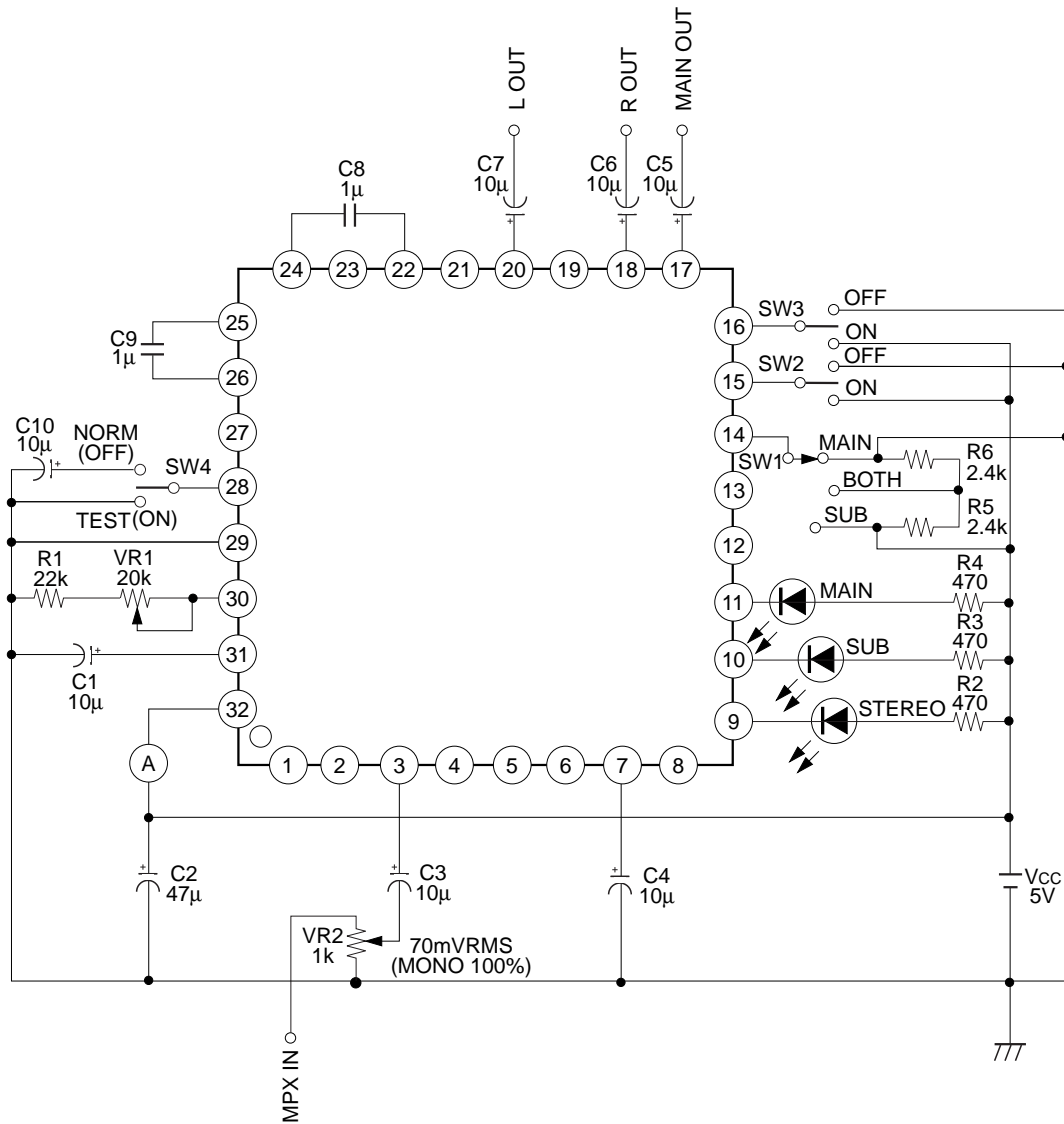
**Fig. 3**

**Procedure**

- 1) Connect as shown in Fig. 3. (Set SW4 to NORM)
- 2) • Set the encoder to stereo mode and perform 100 % modulation of a 1 kHz signal.  
• Output only the L ch.
- 3) Observing the oscilloscope and the AC voltmeter, adjust VR2 until the R ch to be minimum. (Separation standard 35 dB or more)



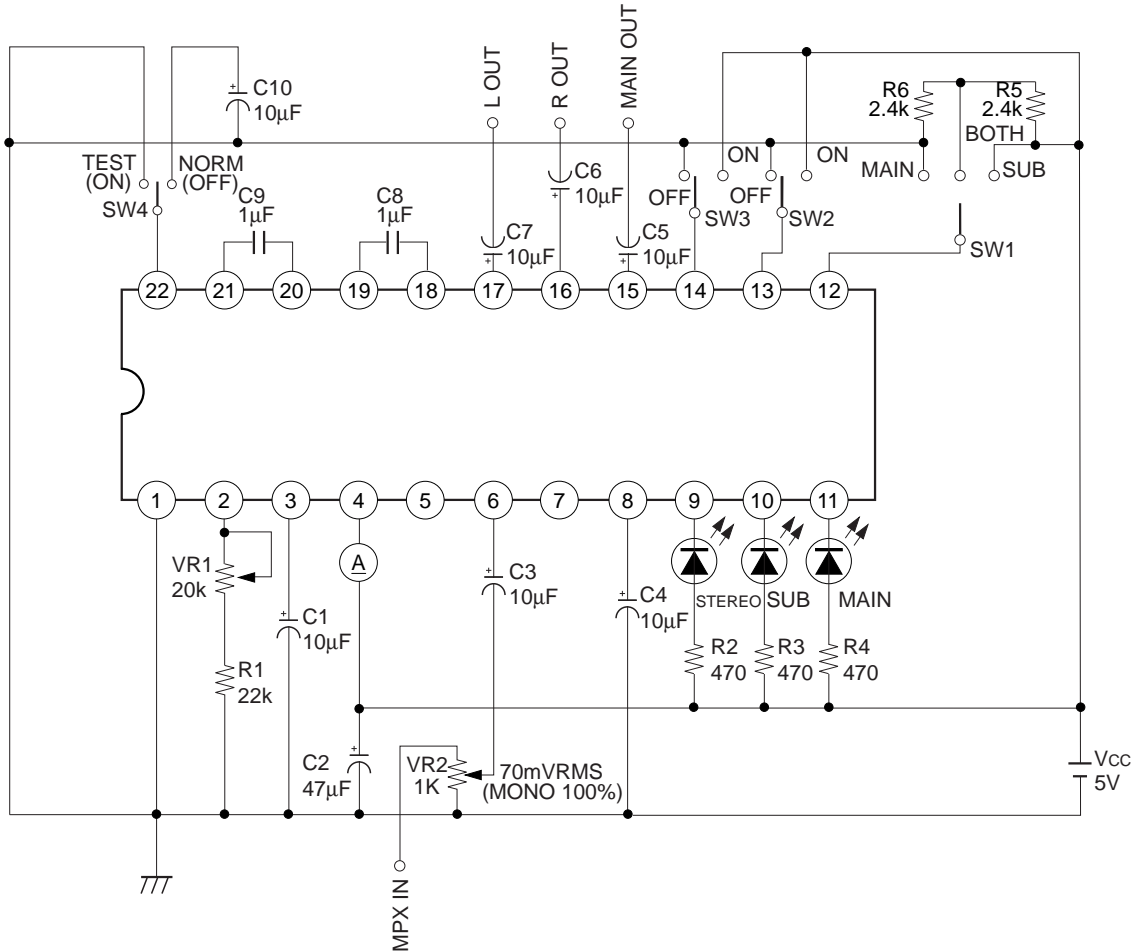
Application Circuit  
CXA1518Q



- \* Non-polar capacitor is recommended for C8 and C9.
- \* NC pin is left open.

Application circuits shown are typical examples illustrating the operation of the devices. Sony cannot assume responsibility for any problems arising out of the use of these circuits or for any infringement of third party patent and other right due to same.

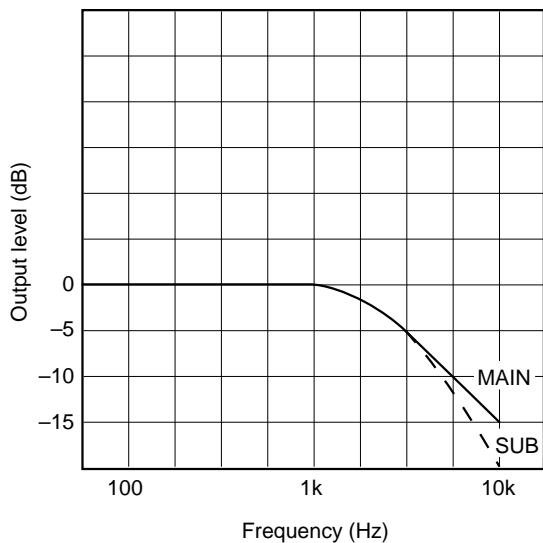
CXA1518S



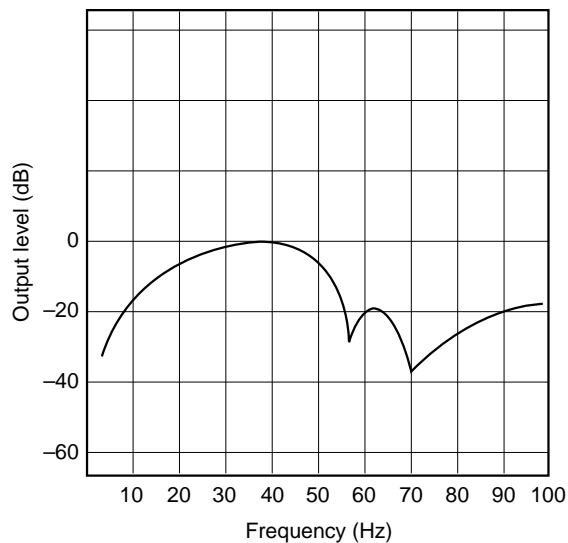
- \* Non-polar capacitor is recommended for C8 and C9.
- \* NC pin is left open.

Application circuits shown are typical examples illustrating the operation of the devices. Sony cannot assume responsibility for any problems arising out of the use of these circuits or for any infringement of third party patent and other right due to same.

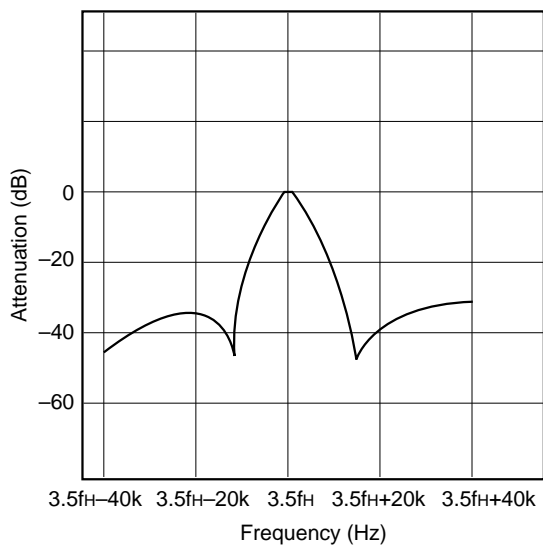
De-emphasis characteristics



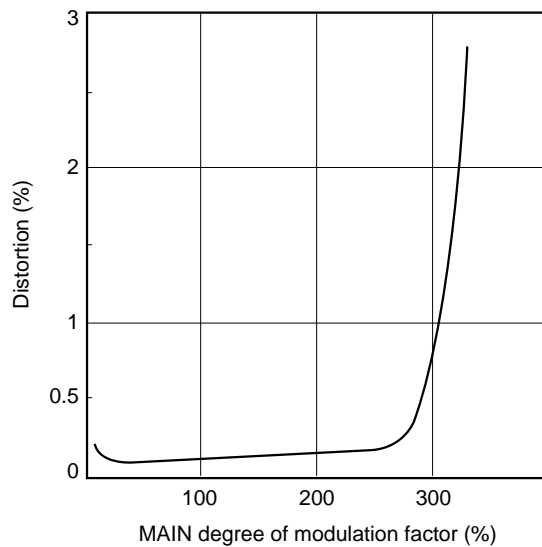
SUB BPF frequency characteristics



Cue BPF frequency characteristics



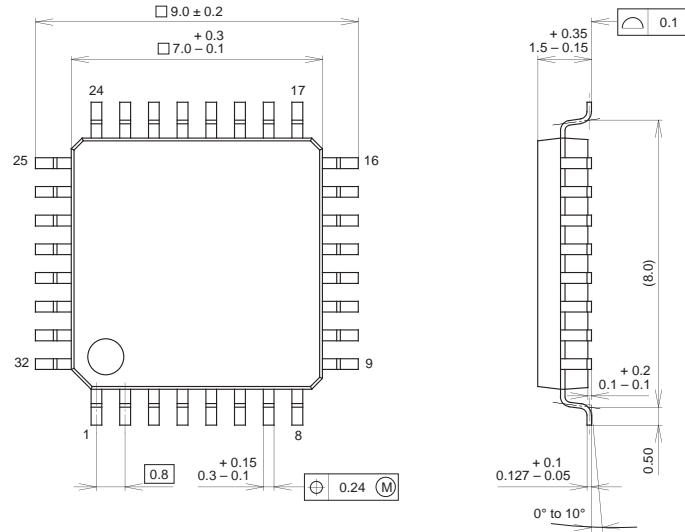
MAIN distortion characteristics



Package Outline Unit : mm

CXA1518Q

32PIN QFP (PLASTIC)

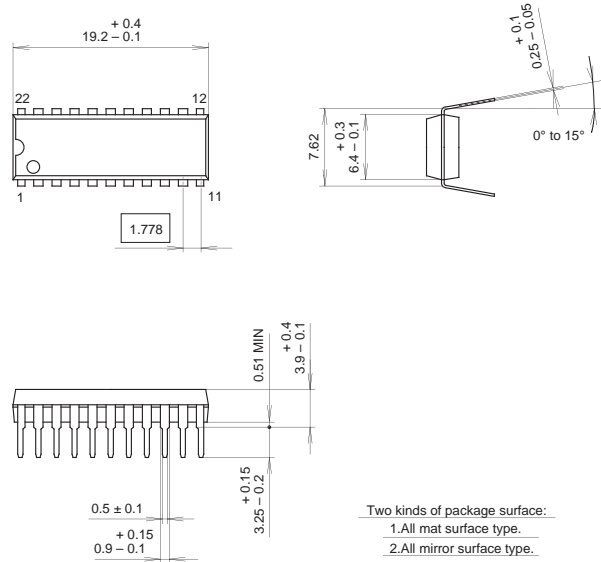


|            |               |
|------------|---------------|
| SONY CODE  | QFP-32P-L01   |
| EIAJ CODE  | QFP032-P-0707 |
| JEDEC CODE |               |

|                  |                |
|------------------|----------------|
| PACKAGE MATERIAL | EPOXY RESIN    |
| LEAD TREATMENT   | SOLDER PLATING |
| LEAD MATERIAL    | 42 ALLOY       |
| PACKAGE MASS     | 0.2g           |

CXA1518S

22PIN SDIP (PLASTIC)



Two kinds of package surface:  
 1. All mat surface type.  
 2. All mirror surface type.

|            |                |
|------------|----------------|
| SONY CODE  | SDIP-22P-01    |
| EIAJ CODE  | SDIP022-P-0300 |
| JEDEC CODE |                |

PACKAGE STRUCTURE

|                  |                |
|------------------|----------------|
| MOLDING COMPOUND | EPOXY RESIN    |
| LEAD TREATMENT   | SOLDER PLATING |
| LEAD MATERIAL    | COPPER ALLOY   |
| PACKAGE MASS     | 0.95g          |