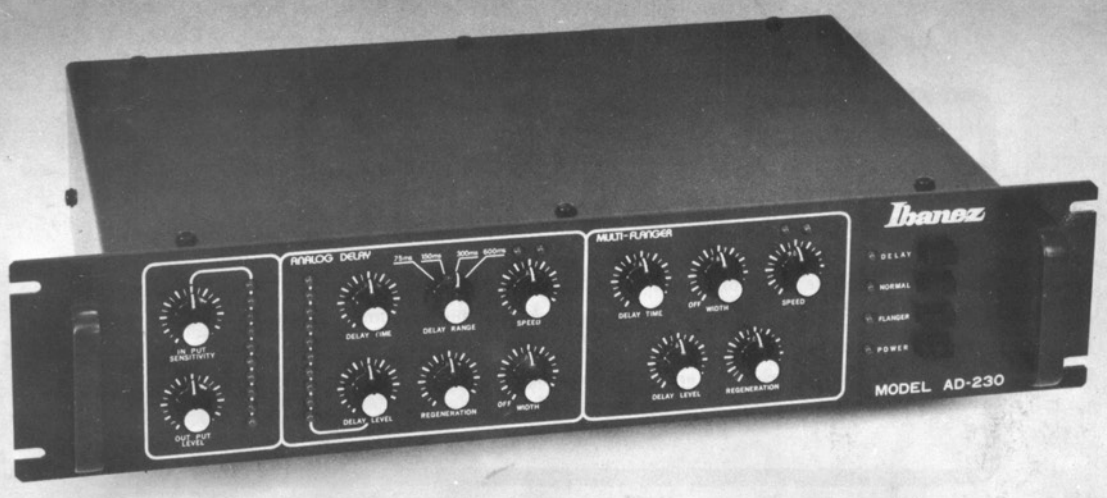
Ibanez
ANALOG DELAY & MULTI-FLANGER AD-230



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SERVICE

The Ibanez AD-230 is manufactured to the highest quality standards and inspected by a special division of Quality Control. However, should you experience problems with the unit, please notify an Ibanez Service Center or authorized dealer.

In case of problems, contact an Ibanez Service Center or authorized dealer first. Many problems can be solved without returning the unit. Should return be necessary, you will be informed. We strongly recommend that all warranty claims be referred to us through the dealer from whom the unit was purchased.

Congratulations on your purchase of the AD-230 Analog Delay and Multi-Flanger. The AD-230 employs BBD (Bucket Brigade Device) technology using a new type high performance integrated circuit, which eliminates noise and moving parts common to other type echo and reverb devices. The fully electronic delay of the AD-230 is quiet, dependable and versatile. The tone quality can not degrade like tape echo as the tape wears out. The AD-230 has no moving mechanical parts to go bad and is insensitive to vibration.
You can rely on outstanding performance time after time no matter what the application.
The isolated Multi-Flanger section provides chorus, vibrato and flanging effects.

OPERATING PRECAUTIONS

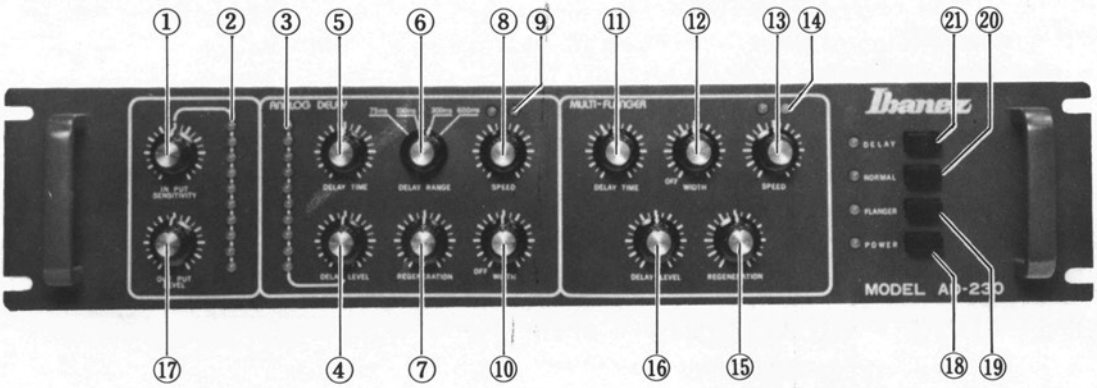
TO PREVENT UNNECESSARY PROBLEMS AND MAINTAIN BEST PERFORMANCE READ THIS BEFORE OPERATING.

* Power supply: 117VAC or 220~240VAC
* Operate unit only if temperature is within the range of 0°C (32°F) to 40°C (104°F). Do not attempt to use AD-230 if ambient temperature exceeds this range.
* The AD-230 is constructed from precision parts. Do not allow liquids or other contami-nents in contact with the unit.
* Press only one function button at a time. The unit will operate in only one of the three modes. NOMAL, DELAY or FLANGER. Combinations are not possible.

FEATURES

* Newly developed high performance BBD ICs provide wide delay time range from 1 to 600ms.
* Individual Analog Delay and Multi-Flanger sections. Each section can be pre set, then switched in when desired.
* High impedance phone jacks and balanced low impedance XLR connectors for input and output.
* Delay only output line in addition to mixed output line.
* Variable input sensitivity. Accepts a wide range of signal levels without distortion and provides optimum signal to noise ratio.
* LED ladder displays input signal level for constant visual monitoring.
* Reverb, chorus, echo and vibrato are among the effects obtainable with the Analog Delay section.
* Multi-Flanger section has 5 variable parameters for flanging and other effects suited to individual taste.
* Newly developed "compander" circuitry for wide dynamic range.
* Emphasis/de-emphasis circuitry provides good S/N.
* Standard 19 inch rack mount front panel.
* Footswitch provides "no hands" selection of delay, flanger or normal mode.

FRONT PANEL



① INPUT SENSITIVITY

Boosts (CW) or cuts (CCW) input signal.

② INPUT LEVEL INDICATOR

Displays level of input signal. INPUT SENSITIVITY should be adjusted so that peak input signal does not peak out the INPUT LEVEL INDICATOR, (all LEDs lit). Too much boost causes distortion, too much cut degrades S/N.

③ DELAY LEVEL INDICATOR

Displays level of delayed signal. Located next to INPUT LEVEL INDICATOR for quick visual comparison of straight and delay levels.

④ DELAY LEVEL

Adjusts level of delayed signal. Provides desired straight/delay mix balance when using regular OUTPUT and acts as output level control when using DELAY OUT.

⑤ DELAY TIME

Varies the delay time continuously from a minimum of 10ms to a maximum as set by the DELAY RANGE switch. CW rotation increases delay time.

⑥ DELAY RANGE

Selects one of four delay time ranges. As the switch is rotated CW, the total available time delay increases and BW (bandwidth) decreases. For greatest BW, the delay range selected should be shortest one that gives the desired delay.

⑦ REGENERATION

Controls the amount of delayed signal fed back within the delay section. On longer delays it varies the number of repeats. For shorter delays it changes the coloration of the sound. Variable from no effect (CCW) to a runaway or oscillating condition (CW).

⑧ SPEED

Selects the rate at which the LFO (low frequency oscillator) varies the delay time for special effects such as doppler shifting, vibrato, flanging and chorus.

⑨ LFO SPEED INDICATOR

Indicates if LFO is on and provides visual display of LFO frequency.

⑩ WIDTH

Turns LFO on and controls amount of delay time shift. WIDTH can be varied from no effect (CCW) to pitch bending (CW).

⑪ DELAY TIME

Varies the flanger section delay time from 1ms (CCW) to 13ms (CW).

⑫ WIDTH

Controls the amount of delay time shift or depth of the flanging effect. Can be adjusted from no effect to wild pitch bending.

⑬ SPEED

LFO frequency control. Adjusts the rate at which the delay time varies for vibrato, flanging and other effects.

⑭ LFO SPEED INDICATOR

Shows If LFO is on and frequency of oscillation.

⑮ REGENERATION

Varies the amount of signal fed back within the flanger section. Used for effect enhancement and sound coloration. Variable from no effect to an oscillating condition.

⑯ DELAY LEVEL

Adjusts level of delayed signal. Controls straight/delay mix for certain effects and acts as output level control when using DELAY OUT.

⑰ OUTPUT LEVEL

Controls signal level at OUTPUT jack. Allows AD-230 to be fed into many other types of equipment without overloading the input.

⑱ POWER SWITCH

Push in to turn unit on. LED indicates power on.

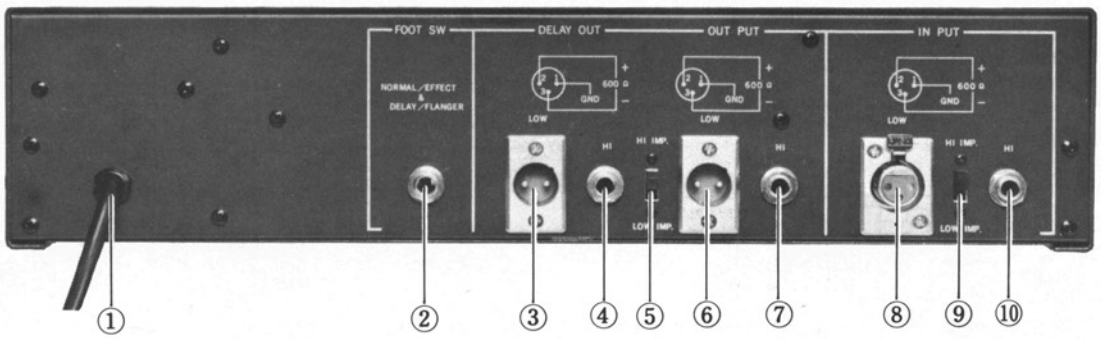
⑲ FLANGER SELECT

⑳ NORMAL SELECT

㉑ DELAY SELECT

Push in any one button to switch unit into desired mode. AD-230 can be operated only in one mode at a time. LEDs indicate operating mode.

BACK PANEL



① AC POWER CORD

After reading instruction manual, connect to AC outlet.

② FOOTSWITCH JACK

Plug in footswitch for remote function switching or DELAY or FLANGER and NORMAL or EFFECT.

③ 600Ω BALANCED DELAY ONLY OUTPUT

④ HIGH IMPEDANCE DELAY ONLY OUTPUT
10KΩ-50KΩ

⑤ OUTPUT IMPEDANCE SWITCH

Switches in desired output connector.

⑥ 600Ω BALANCED OUTPUT

Low impedance straight + delay signal.

⑦ HIGH IMPEDANCE OUTPUT
10KΩ-50KΩ straight + delay signal

⑧ 600Ω BALANCED INPUT

⑨ INPUT IMPEDANCE SWITCH

Switches in desired input jack.

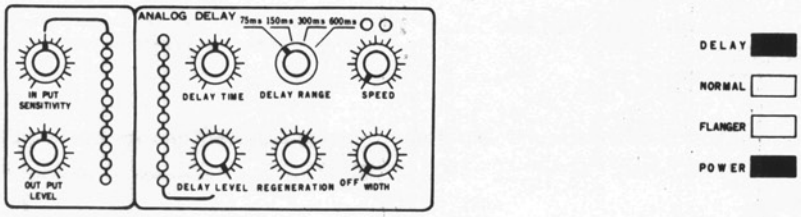
⑩ HIGH IMPEDANCE INPUT
10KΩ-50KΩ

TYPICAL SETTINGS

This section is provided only as a general guide to get you started. Feel free to experiment with control settings to obtain the sounds you desire. Switches and controls are listed on the left, settings are on the right. NA means not applicable. PT means adjust to suit your personal tastes.

REVERB

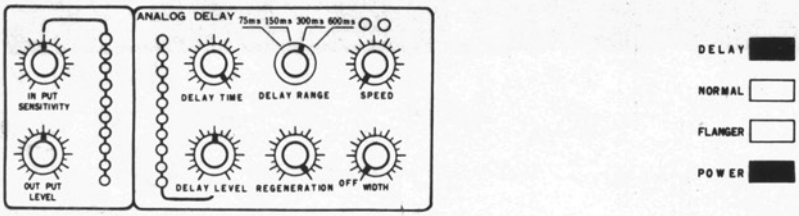
FUNCTION SELECT	DELAY
DELAY RANGE	75ms
DELAY TIME	10:00-2:00 (Set control between 10 o'clock and 2 o'clock)
WIDTH	OFF
SPEED	NA (SPEED is automatically off when WIDTH is off)
REGENERATION	PT
DELAY LEVEL	PT



TAPE ECHO

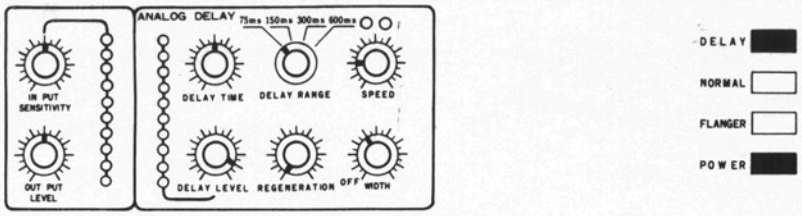
(Long delay and repeat)

FUNCTION SELECT	DELAY
DELAY RANGE	Any
DELAY TIME	PT
WIDTH	OFF
SPEED	NA
REGENERATION	PT (Turning control CW increases number of repeats)
DELAY LEVEL	PT



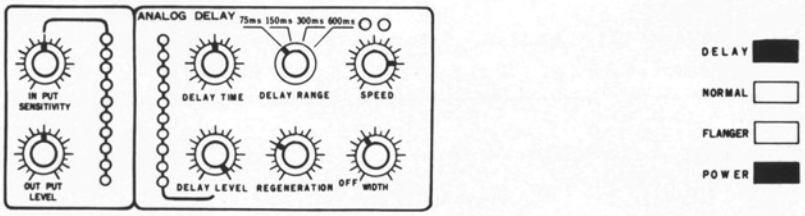
CHORUS or DOUBLING

FUNCTION SELECT	DELAY
DELAY RANGE	75ms
DELAY TIME	11:00-1:00
WIDTH	10:00
SPEED	9:00
REGENERATION	OFF
DELAY LEVEL	PT



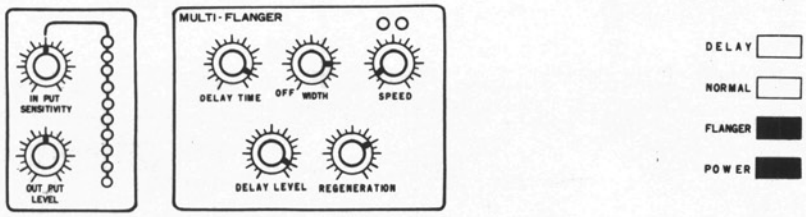
VIBRATO

FUNCTION SELECT	DELAY
DELAY RANGE	75ms
DELAY TIME	11:00 – 1:00
WIDTH	CW past 8:00
SPEED	3:00 – 5:00
REGENERATION	PT
DELAY LEVEL	PT

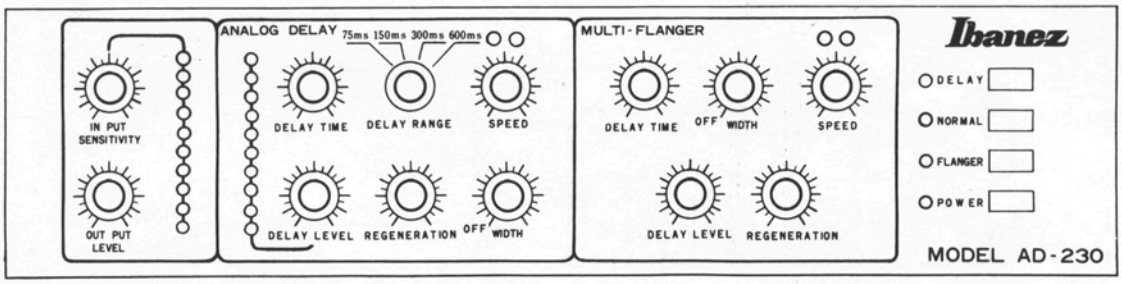


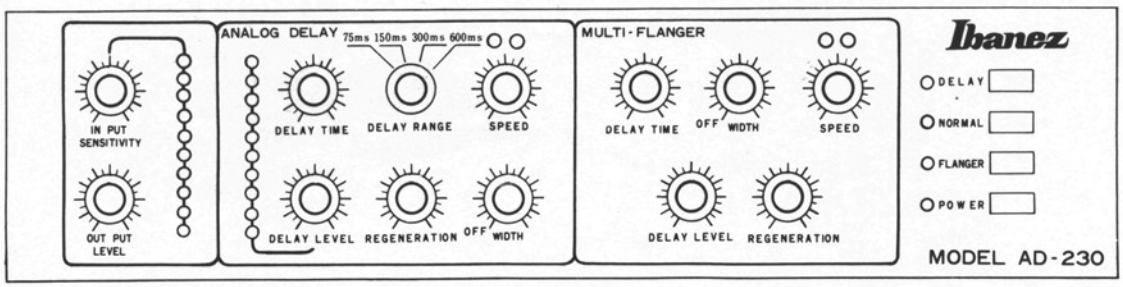
FLANGING

FUNCTION SELECT	FLANGER
DELAY TIME	12:00-CW
WIDTH	3:00
SPEED	8:00
REGENERATION	2:00
DELAY LEVEL	4:00



BLANK CONTROL SETTING CHARTS





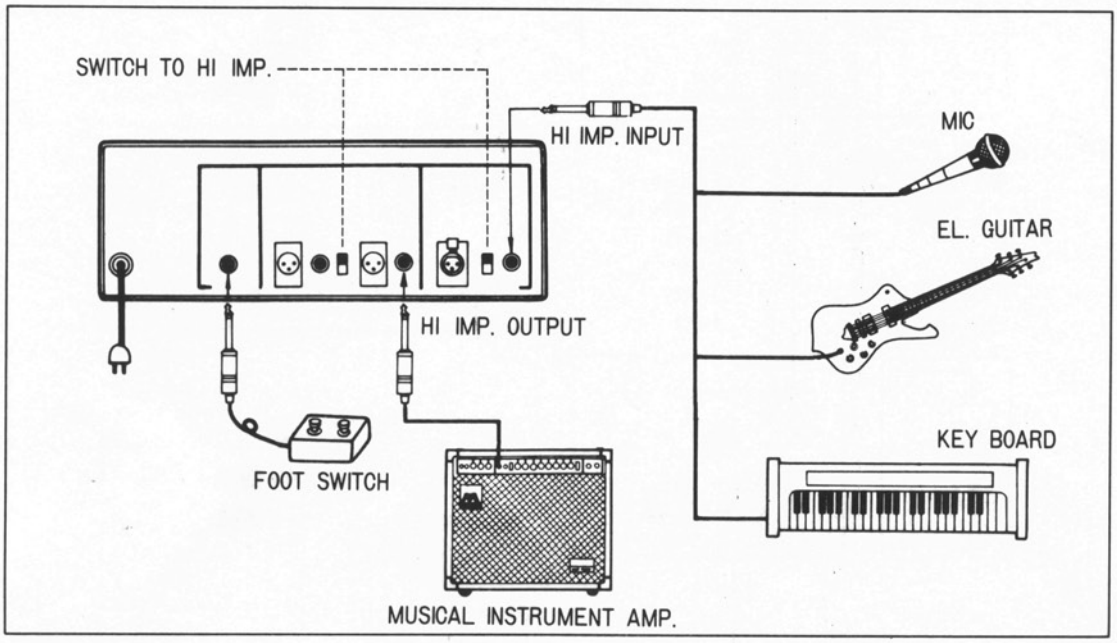
CONNECTION DIAGRAMS

A few basic connection schemes are shown. Many more are possible depending on your equipment and application.

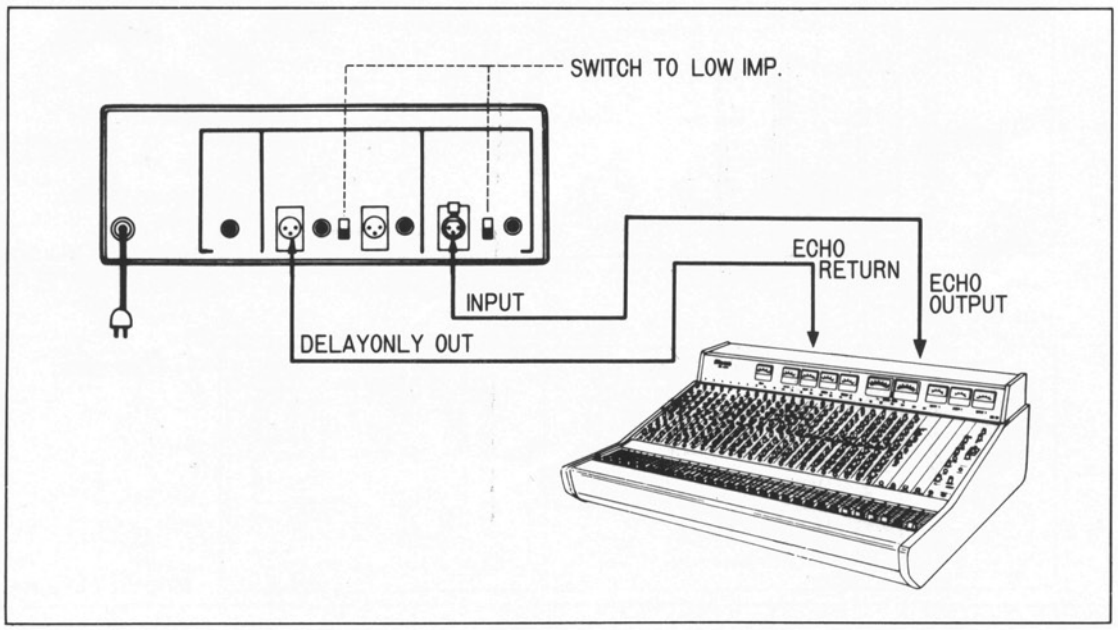
Be sure to match impedances to preserve the low distortion and superb S/N. Use adapters if necessary.

For stereo applications, two AD-230s must be used. It is possible to use one AD-230 with a stereo amplifier, if mono or single channel operation is employed.
In some cases Y-adapters may be necessary.

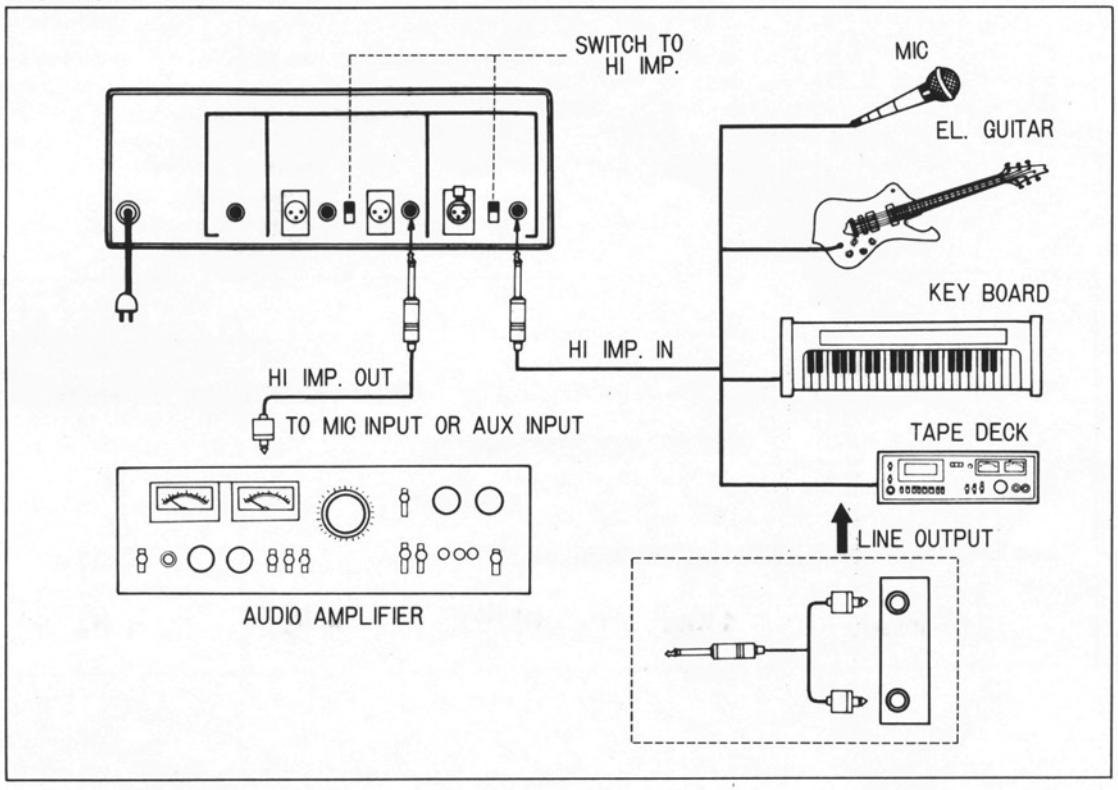
MUSICAL INSTRUMENT AMPLIFIER



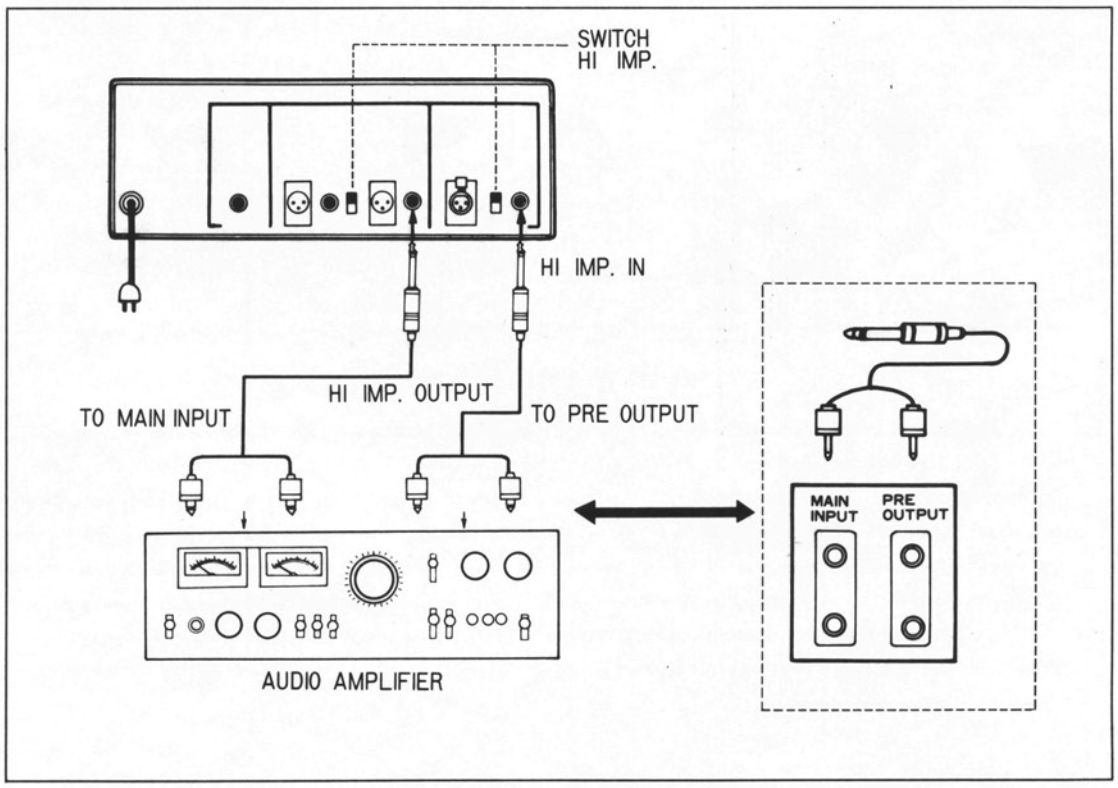
MIXING BOARD



AUDIO AMPLIFIER



AUDIO AMPLIFIER

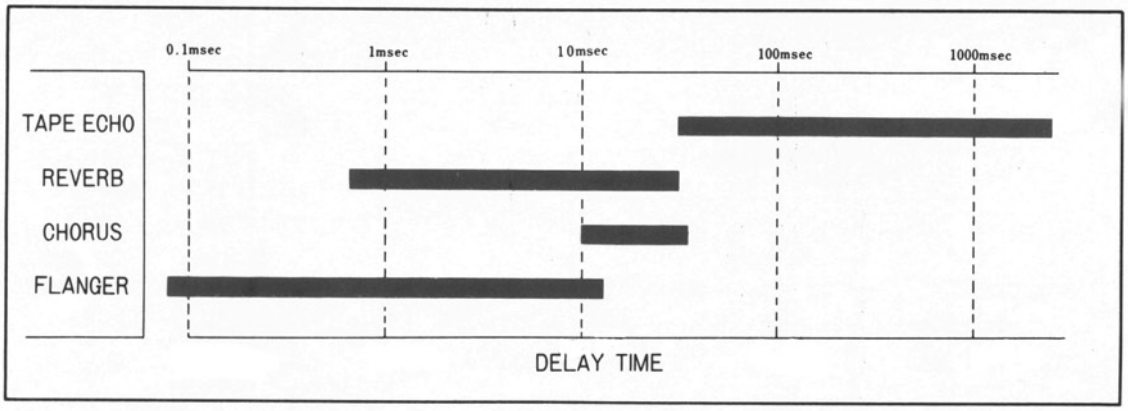


BACKGROUND INFORMATION

DELAY

Basic delay effects are produced by processing a sound into two sounds, one of which is delayed in time. If the time delay is less than approximately 30ms (milliseconds) it is virtually impossible to sense that there are two sounds. Delays in this range are useful for effects other than echo. Reverb can be produced by combining several different delays of the same signal. Chorus or doubling effects use delays in the 10ms to 30ms range. By automatically varying the delay time slightly with a low frequency signal, one voice or instrument can sound like more.

The chart below shows the correlation between ranges of delay times and different effects.

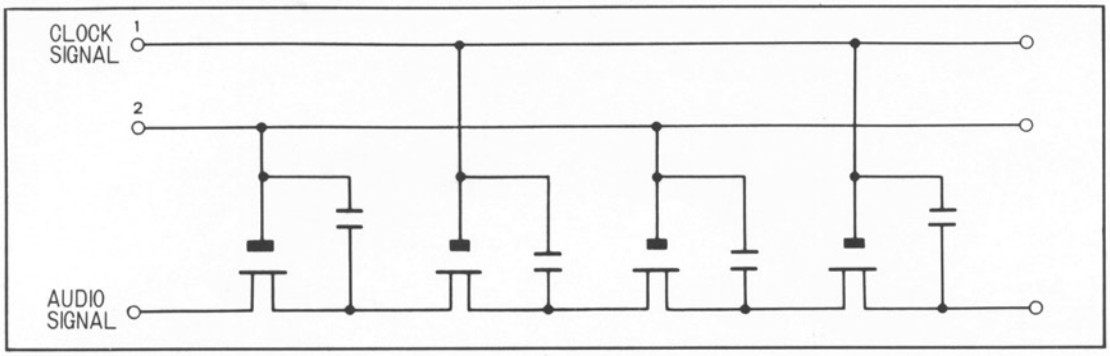


BBD

As the name Bucket Brigade Device implies, a good analogy to the way a BBD works is a bucket brigade. The first person in line gets a bucket of water and hands it to the second person. The second person hands it to the third, while the first is going back for another bucket and so on.

Instead of water, buckets and people, the BBD delay utilizes audio signal, clock pulses and MOS LSI technology. In the diagram below a small piece of a BBD is shown. When the clock connected to point 2 switches on then off again, a piece of the audio signal is temporarily stored in the first capacitor. When the clock at 1 switches on briefly, the bit of audio signal in the first location is transferred and stored in the second location. The clock pulses at 2 cause another bit of the signal to be stored in the first location and so on. This transfer process takes time.

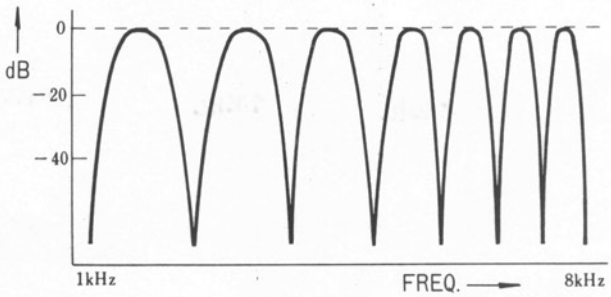
The amount of time depends upon clock frequencies and the number of delay elements. When all the bits of signal are reconstructed at the output of the BBD, it is the same as the input signal. only delayed in time.



FLANGING

Short delay times from 1 to 5ms are used for this effect. The delay time is varied or modulated at a low frequency. As the straight and delay signals are mixed, shifting cancelation and addition of different frequencies in the signals produces the flanging effect. The "comb filter" response of a flanger is shown below. As the delay time varies, different frequencies are "combed" out and others are allowed to pass through.

Both the phaser and flanger are of the same family of effects. The phaser uses R-C networks to continuously shift the phase of the altered signal which is then mixed with the straight signal, producing the phasing effect.



COMB FILTER

These R-C networks alse change the waveshape of the shifted signal. This does not occur with the time delay technique used in flanging. Thus, the two effects have different characteristic sounds.

SPECIFICATIONS

* DELAY TIME
  ANALOG DELAY RANGE
  600ms: 20ms-600ms
  300ms: 20ms-300ms
  150ms: 10ms-150ms
  75ms: 10ms-75ms
  FLANGER 1ms-13ms
* INPUT IMPEDANCE
  HI: 100KΩ
  LOW: 600Ω
* OUTPUT IMPEDANCE
  HI: 10KΩ
  LOW: 600Ω
* INPUT LEVEL
  −40dbm to 0dbm
* OUTPUT LEVEL (max)
  HI: +20dbm
  LOW: 0dbm
* EQUIVALENT INPUT NOISE
  −85dbm (INPUT SHORTED IHF A-CURVE)
* DISTORTION
  NORMAL. .1% @ 1KHz
  DELAY: 1.5% @ 1KHz
* POWER
  117VAC, 50 / 60 Hz, 12W (T,-TYPE) or
  220~240VAC, 50 / 60 Hz, 16W
  (U,S, & R-TYPE)
* SIZE
  100mm (H) X 480mm (W) X 290mm (D)
  (4″ X 19″ X 11½″)
* WEIGHT
  6.7kg, (15 lbs.)

Ibanez

MI-AD 102 Printed in Japan