

INSIDE THIS ISSUE:

- Compressors/Limiters
- E-Series Excitement
- F.A.M.E. on a Floppy
- Mic Tips
- Powered Mixers
- Fostex Necessarys

Application Notes: First in a Series- Compressors/Limiters

by Tom Lubin

Many sound sources have extremely broad dynamic ranges - first the level is very low, then suddenly everything is so loud it's bonkers.

This is frustrating for the recordist.

Logic might suggest that you set the record levels for the loudest peaks, but then lower level signals might be real hissy -- even with noise reduction.

In some cases, the leading edge of the sound wave (or the transient of the envelope) will often be disproportionately loud compared to the sustain and decay of the sound. In other cases, the lingering end of the envelope can cause a low level ring which continues past the desired point.

The electronic tool which helps the recordist solve the first problem is a compressor/limiter; the second problem is solved by a noise gate.

The Fostex Model 3070, by design, solves both of these problems.

By reducing the gain of the compressor/limiter when a peak level occurs, the output level of the peak will be less compared to the rest of the signal; hence, the overall average signal level can be increased, and the dynamic difference between the loudest portion of the sound envelope and the quieter ones will not be as great. The noise gate function can be used to eliminate the lingering ring described above.

For lead vocals, a gentle compression ratio of 2:1 or 4:1 should be used with a fairly quick attack and equally fast release. The idea here is to restrict just the loudest passages. The continuous use of high ratio limiting on a lead voice will tend to make it sound lifeless and lack transparency. In conjunction with a

compressor, the most natural vocal sound can be captured when the vocalist moves away from the microphone on loud passages and closer on quieter sections.

The distance will vary with the mic. This way the compressor doesn't have to handle all the dynamic changes electronically, but works with the vocalist's mic technique.

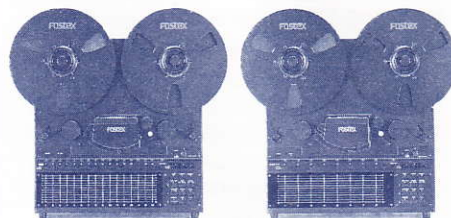
For background vocals a different approach might be taken. Generally a desired sound can be achieved with a fairly slow attack, 6 to 8 dB of compression, and a ratio of 6:1 or 8:1. With these settings, the background vocals will have the attack at their entrances and smoothed-out sustains (which in many cases are "oohs and aahs"). By restricting the dynamic range of the background vocals, their presence in the mix will stay constant throughout the entire song. During mixdown a noise gate can "turn off" the background tracks when the singers aren't singing so earphone leakage, throat clearing, foot tapping, coughing, grunting or counting between entrances can be eliminated.

A noise gate is frequently used on the kick drum or snare to eliminate the leakage between the beats from the rest of the kit. By eliminating this leakage between kick and snare beats, the sound of the entire kit can be "tightened." Further by eliminating the leakage, the sound of the individual drums can be separately treated more uniquely with delays. Harmonizing, slapback, echo, equalization, etc. None of the undesired leakage enters the processing chain and the clarity of the individual instruments and effects is improved.

Continued on page 2

E-SERIES EXCITEMENT

What's New



E-16

E-8

AUTOMATION FEATURES

The new Fostex E-Series recorders were designed with the future in mind. Transports plus record/play logic are **totally microprocessor controlled**, so these machines can run computer-derived edit decision lists.

Gapless punch-out prevents a blank space from occurring immediately after the punch-out point. Only a few very expensive recorders offer this sophisticated function which is **mandatory** for fully automated editing.

A **synchronizer port** will interface with all SMPTE based systems. When used with the Fostex synchronizer, Model 4030, you can then use F.A.M.E., the Fostex Automated Media Editing software program that lets you perform sophisticated audio assembly editing.

When an E-Series recorder is used with the Fostex Autolocator/MIDI to SMPTE synchronizer, Model 4050, you have **automatic program-mable punch-in/out**, in addition to 100-point autolocate, 10 program-mable edits, SMPTE time code generator/reader (all four formats) - plus the ability to **locate to the measure, bar and beat**. The 4050 is the first autolocator to think musically.

Continued on page 2

Compressor/Limiter

(Continued from page 1)

By shortening the gate's release time, the amount of snare which lingers after the beats can turn off immediately after the drum is struck. If the release time is increased, the decay time will also increase. Noise gates can also be used to alter the decay of a reverb. By setting the expander gate so it turns off when the reverb signal drops below a certain point, the decay time of the reverb can be shortened, yielding explosive reverberation which lingers for just a short time. This sort of effect is often used with snare drums. In most cases, a gated reverb sound works best if the reverb is being used for one instrument so the sound can be equalized, compressed, or otherwise effected for that particular instrument. For this reason, you might want one reverb just for the snare drum (and possibly handclaps), another reverb adjusted for other instruments or sounds.

The effectiveness of a noise gate/expander is very much dependent on the ability of the detector to discriminate between the loudest desired sound and the quieter undesired sound or leakage. When the desired signal is dynamically too close to the undesired leakage the detector will become confused and the gain will change in sympathy with the

when the kick drum attack has a great deal of cymbal leakage it is possible to equalize out the cymbal sound and accentuate the kick drum before the signal enters the gate. Unfortunately, in most cases this will adversely affect the kick drum sound. A better solution is to use the 3070 threshold detector access and a 3030 graphic equalizer. Connect the kick drum track to both the input of the 3070, and to the equalizer. The output of the equalizer is connected to the detector input. The equalizer effects the sensitivity of the gate but does not change the sound going through the gate. The equalizer should be adjusted for a very narrow but substantial boost in the frequency range of the kick drum's attack, while cutting all other frequencies so the gate trigger sees a much louder kick drum pulse compared to the leakage. A similar setup can be used on the snare drum gate.

Frequency dependent compression or expansion can also be useful for de-essing a juicy vocalist, or controlling drum machine hi-hats. By connecting the Fostex 3030 graphic equalizer between the detector in and out on the back of the 3070, the sensitivity of the threshold can be made frequency dependent. By boosting at 10KHz + it will act as a high-frequency sensitive compressor for sibilance control. By rolling off the low end and using the 3070 on bass the



3070 COMPRESSOR/LIMITER

leakage as well as the desired sound. Another problem relates to the input envelope if either the attack or decay of the input signal has too gradual a slope or oscillates dynamically. The detector circuit will then cause the gain of the expander/noise gate to flutter as the input signal oscillates past the threshold level. This type of dynamic oscillation generally occurs as a function of signal decay. The sound of an oscillating gate can be controlled by increasing the release time so the natural decay of the input signal falls below this critical threshold point, slightly ahead of the amplifier's gain reduction release.

Where the leakage and the desired sound are dynamically close, another solution can be tried. For instance,

lower notes will have little compression while plucks and high tones will be effected.

Let's say the kick drum doesn't have the proper tonality. Take the kick drum and gate it. The output from the noise gate should go to two places. One should be connected to the mixing board so it can be added to the stereo mix, and the other output will be used externally to "trigger" a second gate. This second gate will be set so that it will turn on and off with the keyed drum from the first gate. Now feed into the input of the second section (that which is being externally controlled by the kick drum) a low frequency square wave or some other suitable tone or synthesizer note. The output from this second

What's New ?

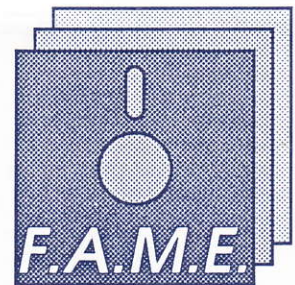
(Continued from page 1)

IMPROVED PERFORMANCE

- A unique phase compensating circuit in the record amplifier significantly improves square wave reproduction.
- A special FET amplifier for Sync/Repro improves the signal-to-noise ratio; with Dolby C NR built-in, s/n figures are compatible with digital recordings.
- Sync crosstalk has been improved by almost 15dB.



E-2



on a Floppy!

Fostex Automated Media Editing is a software program designed for personal computers. Combined with the Fostex synchronizer (Model 4030), **audio assembly editing** is now at your fingertips.

Store all of your effects, music cues, dialog, etc. on an E-2 or E-22 with center-track SMPTE, and your programmed edits will automatically line up with pre-determined locations on your multitrack master recorder. Of course, you could use two multitrack recorders as well.

You can audition and rehearse your takes and "nerf" or adjust your in and out points, easily & quickly.

Currently available for Apple IIc, versions for Macintosh and IBM will soon be available.

*Dolby is a registered trademark of Dolby Licensing Corp.

Compressor/Limiter

(Continued from page 2)

unit is mixed with the rest of the stereo program. The balance between the kick drum and the kick drum-controlled low frequency tone should be such that the actual kick drum is louder than the keyed synthesizer note. The result will give the kick drum a defined musical tonality.

A similar procedure can be used on a gated snare drum. An effective synthesizer sound to be keyed by the snare might be pink or white noise. Unique background vocals, piano or bass, can also be made by having them externally modulated by another instrument such as a kickdrum.

By using a square wave through the second gate, its output could be used to external trigger a Linn, Emulator, Simmons or similar drum machine brain.

Gating a piano will shorten the natural sustain of the instrument. The result will be very percussive and much like a clarinet. It can also make a grand piano sound more like an upright tack piano.

Sometimes after a stereo mix is completed, there may be a need to compress or limit the mix. For stereo limiting, two identical units that can be stereo interlocked should have their controls set pretty much the same. When the stereo interlock is connected if their is an excessive level on one channel of the stereo limiter/compressor, the gain will be reduced equally for both sections. If gain reduction occurred on only the louder channel there would be side to side shifting of center-panned sounds in a stereo mix. By reducing the gain of both channels (even though an excess level only exists on one side) those signals which are equally as loud on both the left and the right track (i.e. positioned in the center) will be reduced and recover equally; thus, their center positioning will be maintained.

The 3070 is a complete compressor/limiter with all the bells and whistles, while the Fostex MN-50 is a portable, less complicated compressor/limiter.



MN-50

(Next, techniques for using reverb with Compressor/Limiters)

Late Breaking News!

RELEASE ON VERSION 2.0 SOFTWARE
FOR THE 4030

Soon to be available (about October 1st) is the new Version 2.0 software for the Fostex 4030 Synchronizer. With this new software, the 4030 **easily outperforms all other synchronizers in lock speed and accuracy!** No matter what audio recorder you're using (MCI, Otari, Tascam, etc.), Version 2.0 not only locks up faster than any other synchronizer we've seen, it offers a number of additional features. Here are just a few:

- 1) Automated learning of recorder's transport characteristics
- 2) Master waiting in chase mode (master will wait for slaves to catch up before going into PLAY)
- 3) Speed readout in 4035 display
- 4) Code-only master status set with software (no jumper plug needed)
- 5) VITC compatibility
- 6) Adjustment of slave park point
- 7) Increased damping control range to accommodate all recorders
- 8) Automatic learning of tach rate
- 9) "Play to park" function

To get your software updated, you need to contact our service department for an RA (return authorization) number and date to send the unit. We are promising 2 day turn-around for updates (assuming there is nothing wrong with your unit). You pay the freight to us plus \$50 (money order or cashier's check) for the new EPROM, we pay the freight back to you (regular UPS), and extend the warranty. You only need to send in the 4030, nothing else. ALL 4030s MUST BE SENT TO FOSTEX NORWALK FOR SOFTWARE UPDATES.

IMPORTANT NOTE FOR 4030/TASCAM OWNERS:

If you are using our interface for your Tascam/4030 system and the programmable punch in/out doesn't work (actually, on some machines it punches in but does not punch out), contact our service dept. for possible modification.

THRU THE GRAPEVINE, What some Fostex users are doing . . .

• Two number one hits last October: Aha's "Take On Me," and "Oh Sheila" by Ready for the World, both cut on B-16s. • No less than 27 records in the Billboard Top Twenty during the past 8 months were recorded on B-16s, mixed to digital 2-tracks, then released as CDs. By the way, this practice of using the B-16, then mixing down to digital with a Sony F-1 is very popular in England. • Tim Weisberg sync'd two B-16s to record his latest album, "High Risk." and also mixed down to digital 2-track. • Another jazz great sax/flute player Ronnie Laws used a B-16 for his latest album (to be released soon). • Jerry Goldsmith, one of the absolute soundtrack masters, has had a B-16 and 4030 setup for the past 6 months. • Mark Donahue recently scored the Charles Bronson flick, "Murphy's Law" at home using a B-16, 4030/4035, and a Sony VO-5800. • Musician/ composer Tom Scott has been using a B-16, 4030/4035, and a JVC BR-8600 for his soundtrack and album work (like "Air Wolf"). • Christine McVie has long been a B-16 user - now there's talk about other Fleetwood Mac members composing on B-16s. • Julian Lennon was photographed with producer Phil Ramone and a Fostex M-88RP mic. • David Byrne of Talking Heads recently purchased an E-16, E-2, 4030/4035 for his sound track work. • Danny Elfman of "Oingo Boingo" has two B-16s, 4030/4035, & is doing soundtracks galore ("The Woman in Red," "Fast Times," etc.). • Steve Vai, a great guitarist now with David Lee Roth's new band, travels with a Model 80 and 450 to work on his material while on the road. • These are just a few notes to let you know what's happening with Fostex users. Let us know what **you're** up to...we want to hear about it.

If you no longer wish to receive additional information from FOSTEX, please contact the editor and your name will be forever purged from our mailing list.

Buy now and save!

If you are thinking about building a FOSTEX studio or just upgrading your existing equipment, **now is the time to buy.**

Come Jan. 1st the calendar is not the only thing that is changing. So are the TAX LAWS. And you have until Dec. 31 to take advantage of the existing tax breaks. For example, with the Federal Government's ITC (investment tax credit) you can write-off 10% of the price of your new E-16. But that's not all, you can also write-off the states sales tax. If you spend \$7000.00 on your new E-16 that's another \$450.00 you can deduct from your taxes.

Due to the Dollar/Yen struggle, FOSTEX (like everyone else) will be forced to raise most of their prices 15-20% by the end of the year, so take advantage of these low prices and tax breaks while you still can.

* Tax information accurate to the worst of our knowledge at the time of printing. Consult your accountant for more current information.



Fostex RP Microphones

RP stands for Regulated Phase, a patented technology which has been under development by Fostex engineers for the past ten years. This unique transducer design has resulted in a family of microphones for the complete range of professional applications -- in the studio, on the air or up on stage.

The Fostex Stereo Microphone

Model M22RP is a true Mid-Side (M/S) Stereo Mic, which means it's really three mics in one. The Mid capsule is a cardioid element, the Side capsule, a bi-directional element. And in addition to the interaction between these two, each may be used separately. When used as a stereo pick-up, there's a matrix box that lets you control the separation from 180° all the way to mono with absolutely no phase funnies! Plus, you won't need an external power supply. Here's a "Must Add" to your mic locker, a one of a kind.

© 1986 Fostex Corp. of America

More New Stuff !!

Fostex Stereo Powered Mixers

MP-800 8 channels/180 W per side
MP-1200 12 channels/250 W per side

Each balanced XLR input has its own transformer for an unusually high common mode rejection ratio. The master outputs are normalised to the 9-band graphic equalizers; these, in turn, are normalised to the amp input stages. So you have independent access to the signal flow at each of these critical junctions for patching auxiliary equipment as needed.

The power amp is a full complementary design. You'll appreciate the higher quality of this amplifier whether you use it for the house mains or the stage.

There's built-in digital echo, fan cooled operation and switchable meters so you can always see what's going on.

NECESSARYS™ & ACCESSORIES

There are those things that you have to have when you record -- take-up reels, head and rubber cleaners, de-magnetizers, etc. There are also goodies that make your recordings a whole lot easier -- FSK units, line mixers, patch bays, snake cables, etc. Finally, there are devices that make your recordings better -- limiters, reverbs, good mics.

Fostex makes all of the above. Everything from the 'would be nice' to the 'gotta have.'

See your local Fostex dealer for detailed info. While not all Fostex dealers carry all of the Fostex main line products, all Fostex dealers can order our complete line of Necessarys™ and Accessories. You can also write or call us for complete information on these items.

ECHO BUSS

FOSTEX USERS GROUP NEWSLETTER

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Fostex[®]
PERSONAL MULTITRACK

2050

LINE MIXER



ONE OF THE MOST VERSATILE AUDIO TOOLS YOU CAN OWN

There is one thing you can count on when you are producing audio. Whether you are recording or mixing music, assembling soundtracks, or doing sound reinforcement, you can always use one more mix. The drummer wants a different headphone mix from the bass player. You want to send three tracks to an echo loop. Four synthesizers, and a clavinet all have to go into a single stereo input. You want a separate stereo recording during a sound reinforcement gig. But extra mixes, even those "can't-do-without" ones can get expensive.

Enter Fostex Personal Multitrack and the Model 2050 Line Mixer.

MORE VERSATILITY WITH PERSONAL MULTITRACK

The 2050 was designed for musicians. It's easy to hook up. Extremely versatile. And very easy to use. Plus, it's equally at home in the studio or on the stage.

With the 2050 in your system (it's ideal with a Fostex multitrack

tape recorder and Model 350 Mixer), you'll generate extra cue and monitor mixes instantly. Individual musicians can get individual mixes and hear just what they need to hear.

The 2050 is an inexpensive keyboard mixer, too. If you're playing in front of an audience, you can use the 2050 and headphones to "pre-listen" for tuning, sequencing and patching. Before the audience hears your performance!

You'll get a new twist in rehearsals with the 2050. For example, you can take the stereo output from another mixer (your band mixer) or the stereo output from a cassette player and mix in your own performance. Or mix a few live instruments into a pre-recorded program.

STACK THEM UP.

Hook up two or three 2050's to expand your capabilities. That's especially handy when you want to create separate PA and recording mixes; separate house, monitor, and recording feeds; or additional cue and monitor mixes. Spend an hour with the 2050 and you'll find its problem-solving abilities almost endless.

2050

LINE MIXER

THE BASIC LAYOUT

You'll find eight line level inputs (TAPE/EFFECTS), each with its own foldback. The foldback lets you re-route the input signal to another device as well as sending it through the 2050's mixing circuitry. Each input chain has its own gain and pan controls.

The input signals are mixed together and then available as a stereo output having two foldbacks each.

The arrangement lets you use the 2050 as a sub-mixer for a multitrack recorder, or as your extra cue and monitor mixer. Your own needs will dictate its final duties. Whether you're rehearsing, recording, or performing, you'll eventually want to plug something into your system for a quick check or fast audition. Although input jacks 1 and 2 are the main program inputs as a keyboard mixer, they can be used as a supplement or extra inputs to the 8 TAPE/EFFECTS channels. Each channel of the input jacks on the front panel (for 1/4" phone plugs) and the rear panel (for standard phono plugs), includes its own gain and pan controls.

The front panel jacks have priority so that even if you have something connected to the back, you will override those signals when you plug something into the front. Without repatching! The entire set-up saves time and energy, while it lets you become more responsive to immediate

needs.

The REMIX control on the front of the 2050 adds the 8x2 cue mix to the INPUT signals available at the line outs. Also, the 8x2 cue mix is available by itself at the CUE OUT jacks.

So, using the BUSS IN and REMIX features, you can stack the 2050 in series. This means you can use two or three 2050's and have a 16x2 or 24x2 mixer ready to help on your biggest recording or sound reinforcement jobs.

ANOTHER MONITORING AID

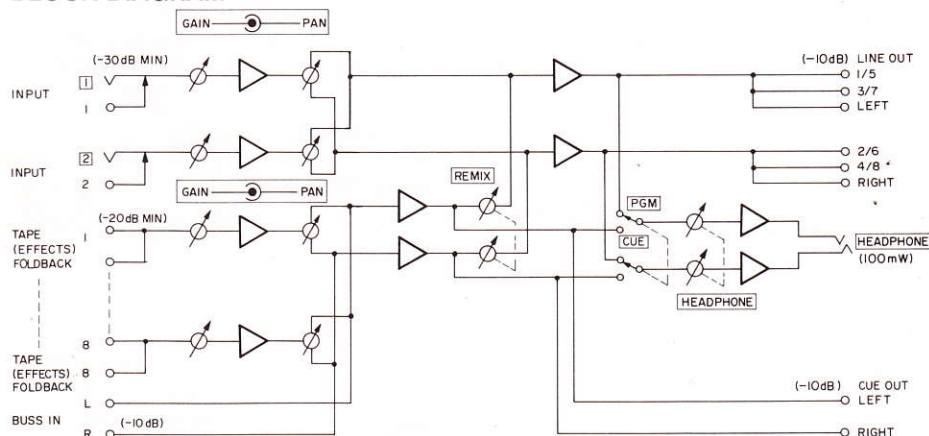
The 2050 has a stereo headphone jack on the front panel so you can get to it quickly and easily. It has its own level control. Plus, you can select what you want to hear: PGM (the mix of the two inputs plus the eight line inputs) or CUE (the eight line inputs alone).

THE MOST VERSATILE LINE MIXER YOU CAN BUY

The 2050 is the solution to an endless array of mixing problems. And, dollar for dollar, it's probably the most versatile line mixer you can buy.

Look into its amazing usefulness at your Fostex dealer. You'll find that the new Model 2050 Line Mixer is a universal problem-solver. One you won't want to be without.

BLOCK DIAGRAM



* Features and/or specifications may change without notice.

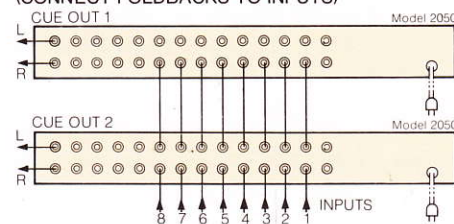
FOSTEX CORPORATION 560-3, MIYAZAWACHO, AKISHIMA, TOKYO, JAPAN.

FOSTEX CORPORATION OF AMERICA 15431 BLACKBURN AVE., NORWALK, CA 90650, U.S.A.

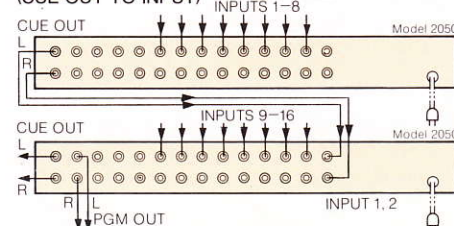
SPECIFICATIONS

INPUTS (x 2)	
INPUT	
IMPEDANCE	40 K Ω
NOMINAL	-10 dBV (0.3 V)
INPUT LEVEL	
MINIMUM	-30 dBV (30 mV)
INPUT LEVEL	
MAXIMUM	+20 dBV (10 V)
INPUT LEVEL	
OUTPUT (1/5, 2/6, 3/7, 4/8, LEFT & RIGHT)	
OUTPUT LOAD	10 K Ω or more
IMPEDANCE	(1 K Ω minimum)
NOMINAL	-10 dBV (0.3 V)
OUTPUT LEVEL	
MAXIMUM	+18 dBV (8 V)
OUTPUT LEVEL	
CUE OUT (STEREO)	
OUTPUT LOAD	10 K Ω or more
IMPEDANCE	(5 K Ω minimum)
NOMINAL	-10 dBV (0.3 V)
OUTPUT LEVEL	
MAXIMUM	+18 dBV (8 V)
OUTPUT LEVEL	
TAPE IN (x 8)	
INPUT	40 K Ω
IMPEDANCE	
NOMINAL INPUT	-10 dBV (0.3 V)
LEVEL	
MINIMUM INPUT	-20 dBV (0.1 V)
LEVEL	
MAXIMUM INPUT	+20 dBV (10 V)
LEVEL	
BUSS IN (STEREO)	
INPUT	20 K Ω
IMPEDANCE	
NOMINAL	-10 dBV (0.3 V)
INPUT LEVEL	
MAXIMUM	+18 dBV (8 V)
INPUT LEVEL	
HEADPHONE OUTPUT	
LOAD IMPEDANCE	8 Ω or more
	(4 Ω minimum)
MAXIMUM OUTPUT	100 mW at 8 Ω
FREQUENCY RESPONSE	
OVERALL-INPUT	30 Hz ~ 20 KHz \pm 1 dB
TO OUTPUT	
HEADPHONE	50 Hz ~ 20 KHz \pm 2 dB
OUTPUT	40 Hz ~ 20 KHz \pm 3 dB
SIGNAL TO NOISE	
RATIO	80 dB weighted
	78 dB unweighted
CROSSTALK	
	60 dB or more (at 1 KHz)
T.H.D.	
	0.03% max. (at 1 KHz)
POWER	
REQUIREMENTS	120 V AC, 60 Hz, 5 W
	(U.S.A./Canadian model)
	220 V AC, 50 Hz, 5 W
	(European models)
	240 V AC, 50 Hz, 5 W
	(UK/Australian models)
	100/120/220/240 V AC,
	50/60 Hz, 5 W (General
	export models)
DIMENSIONS	
	14" (W) x 1-3/4" (H) x
	6-1/2" (D) [360 (W) x 44
	(H) x 165 (D) mm]
WEIGHT	
	Net: 5-3/4 lbs. (2.5 kg.)
	Shipping: 6 lbs. (2.8 kg.)

HOOK UP THE 2050 IN PARALLEL TO CREATE 2 STEREO 8x2 MIXERS (CONNECT FOLDBACKS TO INPUTS)



HOOK UP THE 2050 IN SERIES FOR A 16x2 MIX (CUE OUT TO INPUT)



Fostex[®]
PERSONAL MULTITRACK

3030

GRAPHIC EQUALIZER



THE PERFECT PERSONAL EQUALIZER

Compact. Flexible. Affordable. Our new Model 3030 Stereo Graphic Equalizer gives you important extra control over your music. Plus, it's easy to set up and very easy to use.

The 3030 gives you 12 dB of boost or cut with click-stops. The center frequencies are 31.5 Hz; 63 Hz; 125 Hz; 250 Hz; 500 Hz; 1 kHz; 2 kHz; 4 kHz; 8 kHz and 16 kHz. Yet with all this control flexibility, it's extremely transparent. The signal-to-noise is better than 90 dB (WTD). THD is less than 0.03%. And you get a full 25 dB of headroom to work with. All of which adds up to a very clean equalization at almost any level.

ACCURATE LEVEL CONTROL

To make sure your input signals are just right, and your output signals are distortion-free, the 3030 has a unique input level control system designed for musicians who want to concentrate on music. Not hardware.

There's a master input level control with three LED indicators. When your input signal level is correct, the green NORM light

goes on. When any signal is present, the PRESENT light comes on—that way, you always know if you are hooked up right. When the signal level is too high, the red LIMIT light tells you to turn back the level control. All in all, you have a very easy to read, very quick to use, very accurate way to monitor and set those crucial input levels. So you can prevent distortion before it happens. And keep your music sounding clean and natural.

GETTING IN AND OUT

The 3030 gives you all the patch points you need to do everything you want.

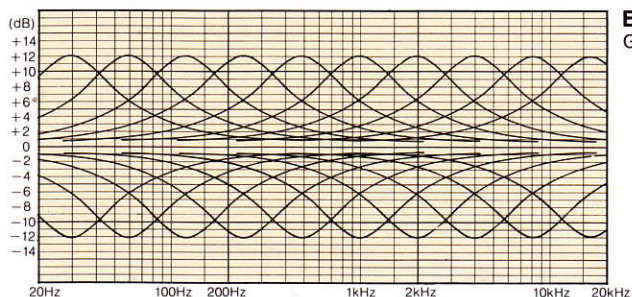
Each input jack has a foldback so you can send the unequalized signal someplace else. That's handy for PA applications when you want to tune the room and record separately; for recording when you only want to equalize the echo send signal; and for special effects in stereo. You'll also find each main output has a parallel-wired AUX OUT jack that lets you send equalized signals to more than one place. All this adds up to an awful lot of extra flexibility for your equalizer dollar.

Fostex®

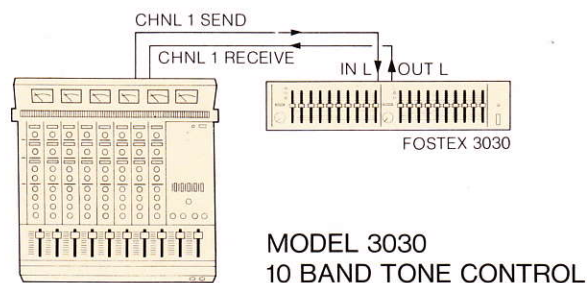
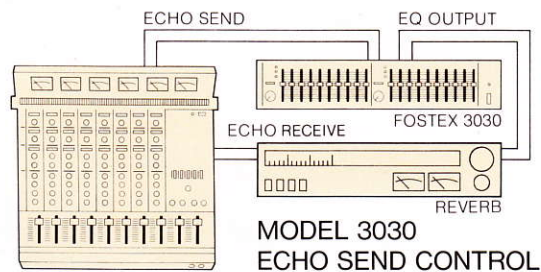
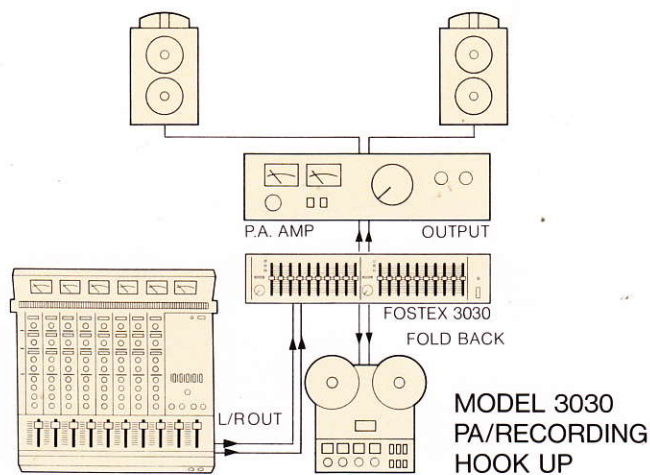
PERSONAL MULTITRACK

3030

GRAPHIC EQUALIZER



EQ CHART
GRAPHIC EQ MODEL 3030



GET TO WORK OR PLAY

The Model 3030 is ready to handle your needs. Whether you have to tune a room, get rid of a sonic gremlin (like hum) or develop a special sound of your own. And, because you have two independent channels to work with (left and right), you can do two jobs at once (like beefing up a snare drum while you mellow out a vocal). So check into the Model 3030 Stereo Graphic Equalizer from Fostex. It sounds great, works right and lets you do what you have to do. It's the perfect solution to your personal equalizer needs.

SPECIFICATIONS

CIRCUIT TYPE	Resonance circuit with semiconductor C
NUMBER OF CHANNELS	2
NUMBER OF BANDS	10
BAND PER OCTAVE	1
CENTER FREQUENCIES (Hz)	31.5/63/125/250/500/1 K/ 2 K/4 K/8 K/16 K
Max. Boost/Cut INPUT	12 dB Nominal Level - 10 dBV (0.3 V) Minimum Level - 20 dBV (0.1 V) Maximum Level + 20 dBV (10 V) Impedance 50 K ohm
OUTPUT	Nominal Level - 10 dBV (0.3 V) Maximum Level + 15 dBV (5.6 V) Load Impedance 10 K ohm or more
FREQUENCY RESPONSE	20 Hz—30 KHz ± 0.5 dB
SIGNAL TO NOISE RATIO	92 dB weighted 90 dB unweighted
T.H.D.	0.03%
HEADROOM	25 dB
DIMENSIONS	17" (W) \times 3-1/2" (H) \times 8-1/4" (D) [430 (W) \times 88 (H) \times 210 (D) mm] Net: 8.8 lbs. (4 kg) Shipping 9.3 lbs. (4.2 kg)
WEIGHT	

* Features and/or specifications may change without notice.

FOSTEX CORPORATION 560-3, MIYAZAWACHO, AKISHIMA, TOKYO, JAPAN.

FOSTEX CORPORATION OF AMERICA 15431 BLACKBURN AVE., NORWALK, CA 90650, U.S.A.

In the dawning age of synthesized and electronic music, creative use of the compressor/limiter is yet another way of generating a new sound. The Fostex 3070 is an excellent example of compressor/limiter technology as applied for today's producer/engineer.



RACK MOUNT ADAPTOR OPTIONAL

● OPERATIONAL FLEXIBILITY

If the sole purpose of the compressor/limiter was overload protection, the ideal circuit would have no control at all. It would simply be a chip in the signal path that tailored the audio to fit a prescribed or programmed dynamic range.

But compressor/limiters are used for many other reasons, including creative effects. From PA to recording to mixing, a single unit like the Fostex 3070 may be used in many different ways. Controls, therefore, are very useful devices. Properly operated, they will help you solve a specific problem, create a specific effect.

And for this reason, the compressor slope, attack time and release time are all continuously variable.

The noise gate function, with an independent threshold setting, is like having another signal processor in the same chassis. You can choose between independent 2-channel operation or linked stereo mode where the stronger of the two signals triggers processing, thereby preserving original stereo imaging.

The point is that you are in control with the Fostex 3070. There are no control settings such as "magic sound" or "hit." The sound you get out of the Fostex 3070 is under your control. Shape it the way you like it or, worst case, the way you have to like it.

● VCA OPERATION

One of the most outstanding features of the Fostex 3070 is the control element. Gain reduction is accomplished by a VCA circuit which is controlled by pulse width modulation.

By varying the length of time an internal electronic switch is open or closed during each cycle, signal energy is reduced with minimum distortion to the program. The VCA after the first input stage is externally accessible via rear panel patch points. The potential for creative effects is thus expanded considerably with the insertion of another processor or signal.

● EXPANDER NOISE GATE

Another noteworthy feature of the Fostex 3070 is its performance in situations where a high compression ratio setting is appropriate—to increase low-level signals above the medium noise, for example. The addition of a noise gate here avoids the common problem of amplified background noise along with low level signal, so the Fostex 3070 gives you the flexibility of processing noise-free signals, even under hard limiting conditions.

● FEATURES AND FUNCTIONS

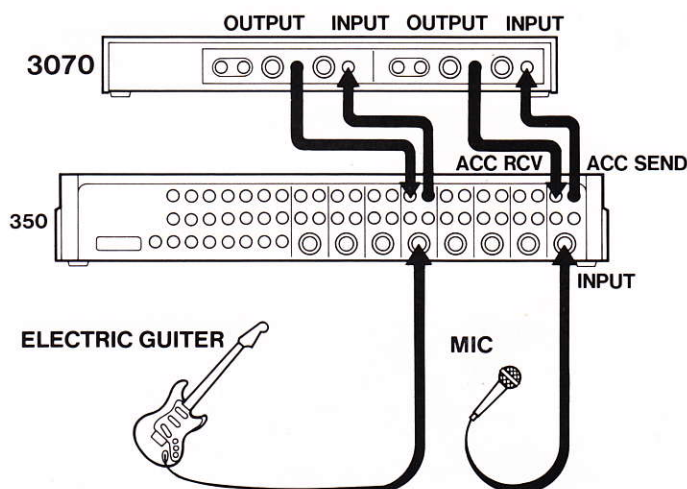
- *Variable threshold effect. While the threshold level at the input of the VCA detect circuit is fixed, by varying the input level reference, you effectively vary the threshold level. The total amount of gain reduction is determined by the setting of the compression ratio slope and the input level control.
- *Compression ratio. Continuously variable from 1:1 through ∞ :1.
- *Attack time. Continuously variable from 0.2 msec. through 20 msec.
- *Release time. Continuously variable from 50 msec. through 2 sec.
- *LED display. Indicates the amount of gain reduction in calibrated decibel readings at 0, 4, 8, 16 and 24. Another LED indicates that maximum gain reduction (32dB) has been reached.
- *Noise gate function with independent threshold setting.
- *Dual mono or "linked" stereo modes. In the latter mode, the stronger of the two signals will trigger the VCA operation of the 3070, so original stereo imaging can be preserved.

● SPECIFICATIONS

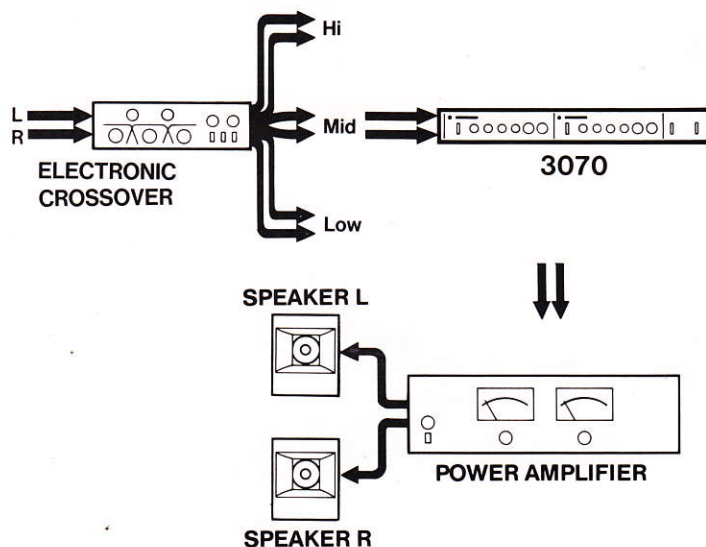
Input:	Unbal. Pin jack and Phone jack
Input Impedance:	30k ohms
Input Level:	+30dBV (300V) max.
Output:	Unbal. Pin jack and Phone jack
Output Load Imp.:	5k ohms or higher
Max. Output Level:	+18dBV (8V)
Gain:	30dB
Comp./Limit Ratio:	1:1—∞:1, Variable compress ratio
Max. Limiting:	32dB from threshold
Attack Time:	0.2 msec.—20 msec.
Release Time:	50 msec.—2 sec.
Frequency Response:	20Hz—20kHz, ±1dB
T.H.D.:	Less than 0.03% below threshold Less than 0.1% with 20dB limiting
Signal-to-Noise Ratio:	80dB unwt'd, ref. to threshold level
Slew Rate:	10V/μsec.
Power Requirements:	120V AC, 60Hz, 12W (U.S.A./Canadian models) 220V AC, 50Hz, 12W (European models) 240V AC, 50Hz, 12W (UK/Australian models)
Dimensions:	1¾"(H) × 17"(W) × 8¼"(D) (44mm × 430mm × 210 mm)
Weight:	Net 6½ lbs. (2.9kg) Shipping 7¼ lbs. (3.3kg)

● TYPICAL APPLICATIONS

- Use With Musical Instruments



- Use With PA



● **OPTIONAL ACCESSORY**

9902 Rack Mount Adaptor

The need for artificial reverberation devices grew dramatically with the advent of multitrack recording techniques. Close-micing techniques, highly absorbent rooms, even isolation booths were all developed to help the engineer isolate individual instruments on separate tracks during the recording process. Each track would be as "tight" and sonically pure as possible in order to have almost limitless flexibility during the mixdown process, where the final version is rendered. The Fostex 3180 is a shining example of how modern technology has achieved a remarkably natural reverb sound at a remarkably reasonable price.



RACK MOUNT ADAPTOR OPTIONAL

● UNIQUE DELAY MATRIX

Typical drive circuits in spring reverb units contribute to an "unreal" sound. The reason is that most of these other units fail to simulate an important part of the natural reverberation process: the first reflection.

In a natural room environment, the direct sound reaches the listener first. Milliseconds later, the first reflection of the direct sound arrives. This delay is a very important element in the natural acoustic experience of reverberation.

But in typical spring units, the first reflection happens so fast at high frequencies, that it becomes indistinguishable from the direct sound. When this signal is then returned with the direct sound, the effect becomes corrupted, and instruments begin to lose definition.

Happily, the Fostex 3180 drive circuit has been designed to effectively simulate this important phenomenon of the first reflection. There is a built-in delay before the signal reaches

the spring transducer. This delayed dry signal is then added to the reverberated signal at the output.

The result is a true sounding first reflection of 24 msec. minimum delay, and increased diffusion for a more natural room sound.

● STEREO IMAGING FOR CREATIVE EFFECTS

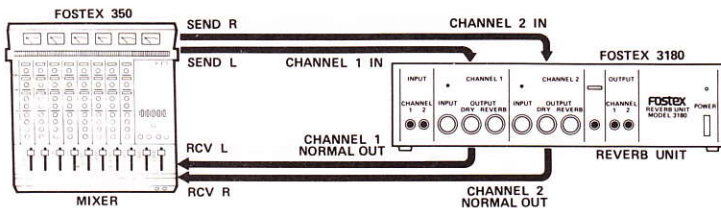
Due to its unique delay matrices, the Fostex 3180 is capable of deriving a stereo effect from a monophonic source in each of its two channels. This results from equally distributing the reverberated and delayed-dry signals to the output pairs in an anti-phase relationship. Thus, when applied to a normal left/right listening system, a spatial, stereo-like image is perceived.

● OTHER FEATURES

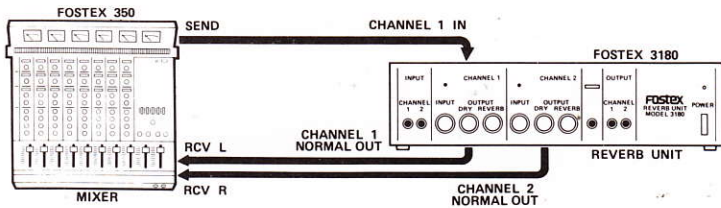
- *Multiple Spring Design.
- *Overload indicator located just prior to the drive circuit for best level matching.
- *Built-in limiter to handle fast transients.
- *Independent channels may be combined.
- *Independent REVERB and DRY mix controls.
- *Remote jack for foot switch operation.
- *Front and rear panel input jacks (front panel priority).
- *Front and rear panel output jacks (wired in parallel).
- *Two outputs per channel for dual stereo effects.

● TYPICAL APPLICATIONS

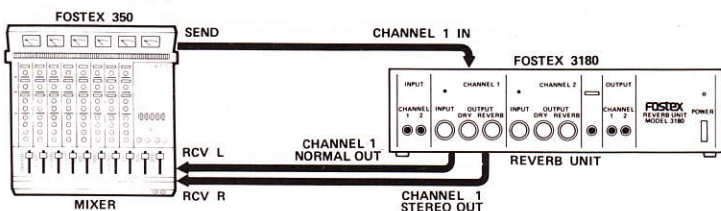
● Stereo Reverb 2 in—2 out



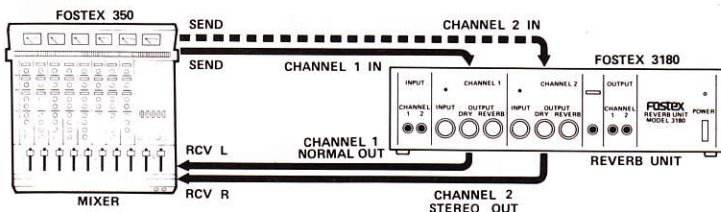
● Stereo Reverb 1 in—2 out



● Pseudo Stereo



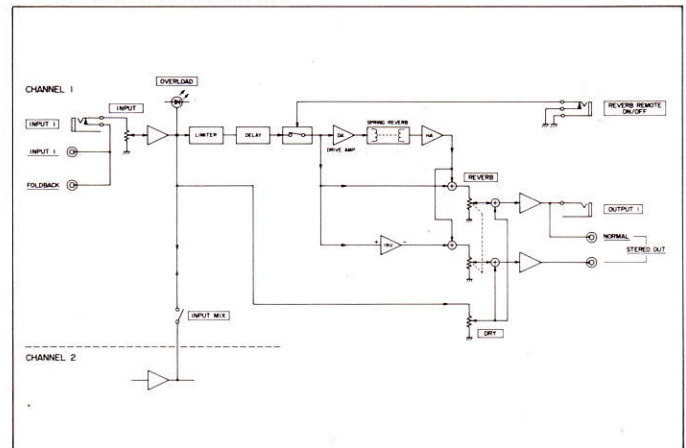
● Stereo Reverb + Pseudo Stereo



● SPECIFICATIONS

Input:	Unbal. Phone jack (Front panel) Unbal. Pin jack (Rear panel)
Input Impedance:	50k ohms
Input Level:	Minimum -30dB (30mV) Maximum +30dB (30V)
Output, Normal:	Unbal. Phone jack (Front panel)
Normal:	Unbal. Pin jack (Rear panel)
Stereo:	Unbal. Pin jack (Rear panel)
Output Load Impedance:	5k ohms or higher
Output Level:	0dB (1V), adjustable
Maximum Output Level:	+17dB (7V)
Reverberation Decay Time:	Approx. 3 sec. (ref. to 1kHz)
Pre-Delay Time:	Approx. 24 msec.
Frequency Range:	
Dry	20Hz—20kHz
Reverb	200Hz—7kHz
T.H.D. Dry:	Less than 0.02%
Signal-to-Noise Ratio:	
Dry	80dB unwt'd, 82dB wtd.
Reverb	58dB unwt'd, 60dB wtd.
Power Requirements:	120V, 60Hz, 9W (U.S.A./Canadian Models) 220V AC, 50Hz, 9W (European Models) 240V AC, 50Hz, 9W (UK/Australian Models)
Dimensions:	3½"(H) × 17"(W) × 8¼"(D) (88mm × 430mm × 210 mm)
Weight:	Net 8¼ lbs. (3.7kg) Shipping 9 lbs. (4.1kg)

● BLOCK DIAGRAM



● OPTIONAL ACCESSORY

- 9903 Rack Mount Adaptor
- 8050 Foot Switch

6301

*Self-Powered
Personal Monitors*

Fostex
PERSONAL MULTITRACK



DESIGN CONSIDERATIONS.

The more you record, the more you'll need a quick, easily accessible, nominal reference. Something that lets you hear what the world at large will hear.

The 6301 Personal Monitor does the job. And after wearing headphones for hours, or loading outputs with Y-patches, or struggling to generate extra monitoring facilities, you'll really appreciate owning 6301s.

THE ALL-PURPOSE MONITOR

The 6301 is completely self-contained. The sound is delivered from a full-range speaker that's surprisingly flat and accurate. It was built into the 6301 because it's a music speaker rather than a musical

instrument speaker — designed to handle the complex waveforms of complete songs.

You get a frequency response of 80Hz-13kHz. Which makes the 6301 an ideal reference when you're producing music, radio spots or audio-visual sound tracks. Plus, it's very handy when you need extra sound reinforcement, a backstage monitor or remote recording monitor (especially when you need one in a hurry).

The built-in 10-watt (RMS, into 8 ohms) amplifier will handle anything you feed it. The 6301's input has been designed to accept any line or instrument-level input, even from an amplifier. There's no confusion. Just one 1/4" phone jack to deal with.

A separate External Speaker jack is also provided. When you plug something into this output, the 6301's internal speaker is defeated. So you can use the 6301's amplifier as an

independent power source for headphone cue feeds, monitor lines, anything you need.

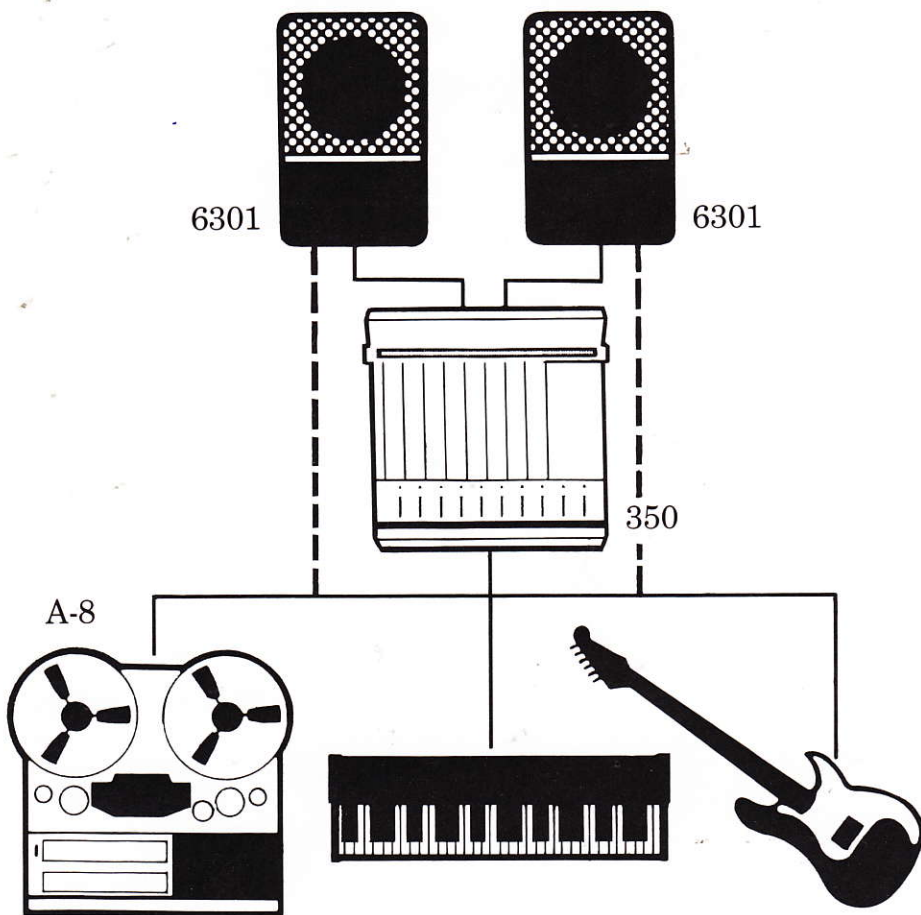
THE 6301 AT WORK.

Our self-contained monitor is perfect for the home recordist. Because it eliminates the need to run the multitrack recording rig through the home hi-fi system. A pair of 6301s can be plugged right into a mixer's outputs. Or, if you're using our 250 Multitracker (cassette with mixer built-in), the 6301s can be driven right off the 250's outputs.

There's an optional fiber case that holds two 6301s. So you can put together an easy to move, easy to afford, truly versatile monitor package. Everything is compact. And adaptable to a wide variety of applications.

TYPICAL CONNECTIONS

In most applications, line level signals from the mixers such as the FOSTEX 350 and 250 Multitracker will be used to drive the 6301 Personal Monitor.



SPECIFICATIONS

Speaker (Internal)	
Type	10cm Full Range Single Cone
Impedance	4 ohms
Efficiency dB/W (1m)	84
Frequency Range	80Hz — 13kHz
Nominal Input Level	-10dB (0.3V)
Output	More than 10W RMS (8 ohm load)
Amplifier (External Output Terminal)	
Response	20Hz — 50kHz, 0dB, -3dB
Distortion	0.05% (at 1W output)
Residual Noise	-70dBV (0.3mV)
Min. Input Sensitivity	0.5V for max. output
Input Impedance	20k ohms
Power Requirements	120V 60Hz (USA/Canada) 33W 220V 50Hz (Europe) 33W 240V 50Hz (UK/Australia) 33W
Dimensions	7 ³ / ₈ " x 4 ³ / ₄ " x 5" (H, W, D) 188 x 120 x 118mm (H, W, D)
Weight	6 pounds 3.2 kg