

The Orban 622 Parametric Equalizer

The World Class Parametric EQ



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Performance Highlights

- +16dB, -infinity dB equalization range
- Each section tunes over 25:1 frequency range
- "Q" adjustable from 0.29 to 3.2
- "Constant-Q" operation enables use of equalizer as notch filter
- True Parametric operation: all controls non-interacting
- Four totally non-interacting peak boost/cut sections, each with TUNING and BANDWIDTH control
- Front panel GAIN control; 12dB gain available
- In/out switches for each section, as well as entire equalizer
- "Peak stretching" overload indicator warns of overload anywhere in equalizer
- Active balanced input; unbalanced output. Transformer-balanced output available
- Very low noise and distortion
- High slew rate for minimum TIM (SID)
- High stability active RC circuitry
- Single or dual-channel models
- RFI suppression of input, output, and power leads
- 115/230V 50-60 Hz AC power supply standard

The 622 Parametric Equalizer

Description

The Orban 622 is a true Parametric Equalizer of high professional quality, providing outstanding versatility and control. The four sections in each channel each use "constant-Q" circuitry. This results in an equalizer of outstanding musicality, and permits any section to be used as a narrowband notch filter (with typically better than 40dB rejection) to effect room tuning or to eliminate fixed-pitch interference, like hum. The sections are totally non-interacting: the total equalization (in dB) is simply the sum of the equalizations of the individual sections.

Considerable attention has been devoted to human engineering, maintainability, and performance in the harsh environments often encountered by the professional user. Levels, impedances, and connectors are fully compatible with virtually all professional equipment. The rugged chassis provides shielding against electrical interference, RFI, and dust. Reliability is assured by a formal burn-in program and additional high temperature burn-in of most semiconductors.

Each feature of the 622 Parametric Equalizer has been thoughtfully chosen and implemented to make the equalizer a particularly powerful tool in nearly all areas of audio: sound reinforcement, public address, recording studio, broadcasting, motion picture sound, disco, theater . . .

Parametric Equalizers—An Explanation

In general, "Parametric" means anything an equalizer manufacturer chooses it to mean. The most commonly accepted definition is that a "Parametric" equalizer provides continuously variable control over the three fundamental parameters of equalization: the amount of peak or dip (in dB), the frequency (the "center frequency") at which the maximum peak (or dip) occurs, and the bandwidth (the number of frequencies on either side of the center frequency which are affected by the equalization.)

Bandwidth is a poorly defined parameter for equalizers. (In particular, it is *not*, as often stated, the ratio of the center frequency to the frequency at which the equalization is 3dB down — what if we're using only 2dB eq?!). The bandwidth is related to a more precisely defined factor called the "pole Q", or simply the "Q", for short. If this factor is kept constant as the EQ control is operated, then a curve family called "constant-Q" (see Fig. 1) is created. These curves are not reciprocal—the dip curves are narrower than the boost curves. Experience has shown that these curves produce a more musically-

useful equalization with minimum readjustment of the BANDWIDTH control as the EQ control is operated. Moreover, unlike the more common reciprocal curves, they permit the creation of deep narrowband notches which are highly useful for suppressing sounds of fixed pitch, with negligible degradation of the rest of the program.

There are two fundamentally different types of Parametric Equalizer. Orban manufactures both types. The 622 is a "true Parametric." This means that adjustment of a single parameter (like the center frequency) does not affect the other two parameters. This configuration is preferred when maximum convenience is desired. Conversely, a "quasi-Parametric" (like our 672A) permits some interaction (usually changing center frequency also changes "Q") to achieve lower cost. For more detailed information on these important but challenging subjects, please request our free paper "How To Choose Equalizers For Professional Applications" by Robert Orban.

Regardless of configuration, Parametric Equalizers are usually superior to other types when maximum control, flexibility, and freedom from undesired side-effects are desired. In using non-parametric equalizers, you must live with whatever bandwidth and whatever discrete center frequencies the manufacturer has chosen. And you don't have any control over how the bandwidth varies as you change EQ. In graphic equalizers, large boosts over a broad bandwidth often become excessively colored and ringy compared with the results obtainable from an optimally adjusted Parametric.

Applications

Sound Reinforcement

The 622 can often do a surprisingly effective job of "tuning" a sound reinforcement system to a room. The availability of four narrowband notches means that sharp resonances can be dealt with—often more effectively than with third-octave filter sets with fixed filter frequencies. While not designed to replace third-octave filters, the 622 can often augment their effectiveness and in many cases can make surprisingly substantial improvements all by itself. One useful variation is to use both equalizers in the 622B in series—one to notch out feedback and one to provide broadband equalization.

In large scale reinforcement systems for traveling shows, the Orban Parametric is highly useful in equalizing stage monitor systems. In bi-amped and tri-amped installations, the use of one channel of Parametric equalization after each output of the electronic crossover has proven to be of substantial value in optimizing the performance of the individual drivers in the loudspeaker system. Anywhere a conventional equalizer is used, the 622 can do the job better. If more complicated equalization is required, use several channels in cascade. The noise level is low enough to permit this.

Motion Picture Sound

The 622 is an ideal replacement for the graphic equalizer ordinarily used for dialogue equalization. The mixer gets finer control, plus the ability to instantly notch out the extraneous sounds that always seem to plague location recordings. In the music recording studio, the 622's improved adjustability means better sound in the theater. In production, use it for special effects like telephone or "old time" recordings.

Recording Studios

Every recording studio needs at least a few channels of Parametric equalization to handle the tough chores that the internal console equalizers can't deal with. Many experienced Orban Parametric users prefer to have one channel of Parametric equalization on each console input. With practice they're fast and easy to use, and the powerful features (like notching and fine-tuning) are instantly available without patching).

The 622 is a particularly valuable adjunct to an electronic music synthesizer—you can create high "Q" formants and shape the spectrum so that the sound comes alive.

If you need to correct the equalization of a finished track because of second thoughts after the mix, the 622 can create the finishing touches as no ordinary equalizer can. It's better than even a third-octave graphic, because the 622 can create broad, non-ringing boosts—the graphic is much more colored and ringy.

Broadcasting

Use the 622 in the production studio to enhance the announce mike and to create special production effects that make your station stand out among its competitors. Meanwhile, another 622 can be quietly and efficiently equalizing the program line for maximum punch and brightness on the air.

Use the 622 to equalize phone and remote lines for flat response—it's much more versatile than the standard phone company equalizers. In the main studio, use it on the announce mike to equalize for maximum presence and also to notch out undesired sounds like mechanical hum from cart machine motors or air conditioning noise. Whatever your application, the 622's RFI suppression and optional balanced-output transformer mean trouble-free installation even in high-RF environments.

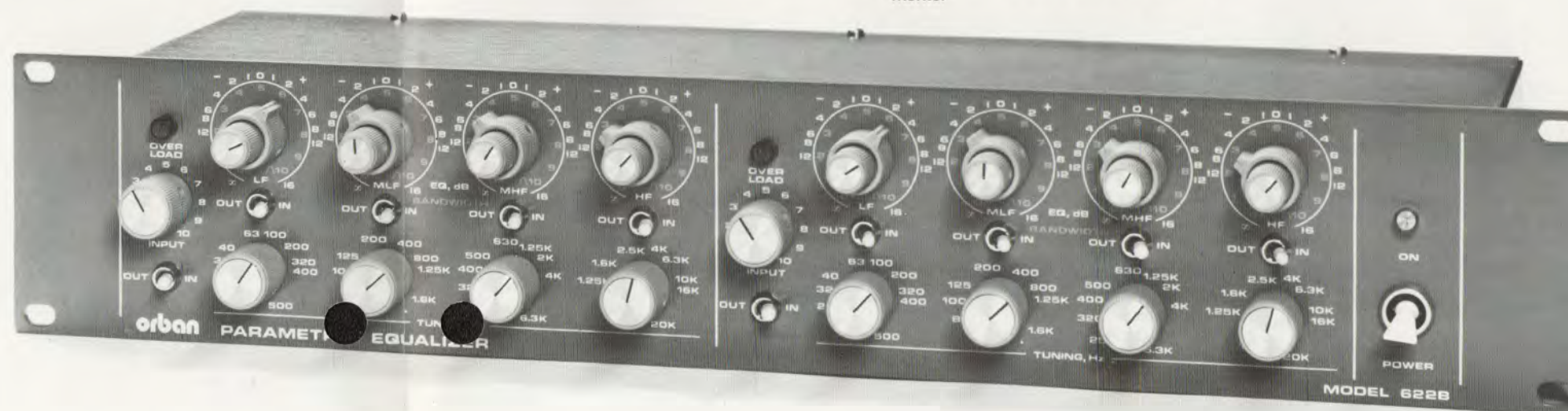
In Summary

Many people are now aware of the power of parametric equalization: the almost sensual satisfaction of getting the sound exactly *right*. These same people are also demanding professionals, insisting on inaudible noise and distortion, human engineering, quality "feel," and uncompromising reliability. We at Orban feel that there is no cheaper equalizer that delivers this full degree of professionalism, and no more expensive equalizer which provides an improvement in performance proportionate to its cost. Our 622 is also backed up by a company which is firmly established in the industry and is committed to service, stability, and responsiveness to customer needs. That's why our 622 is such a fine choice for any professional who needs an equalizer.

The 622 is available from your local Orban professional audio dealer. Call or write for the name of the dealer nearest you.



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Technical Description

The 622 Parametric Equalizer consists of a balanced input buffer amplifier, an input attenuator, and four peak/dip equalization sections connected in series, assuring no interaction between sections. The final section contains a current booster capable of driving 600 ohm loads. The output of the input buffer and each of the equalization sections is monitored at all times by the overload indicator. The EQ IN/OUT switch bypasses all circuitry but the input buffer and output amplifier; it is arranged so that gain and signal polarity are maintained constant in the IN and OUT modes.

Equalization is accomplished by summing the output of a two-pole bandpass filter to the main signal in-phase (for boost) or out-of-phase (for cut). This creates the "Constant-Q" curves described above.

As the BANDWIDTH control is operated, the skirts of the equalization curve move in and out but the peak gain remains constant (see Fig. 1). As the TUNING control is operated, the curves in Fig. 1 slide along the frequency axis but their shape is unchanged. If shelving characteristics

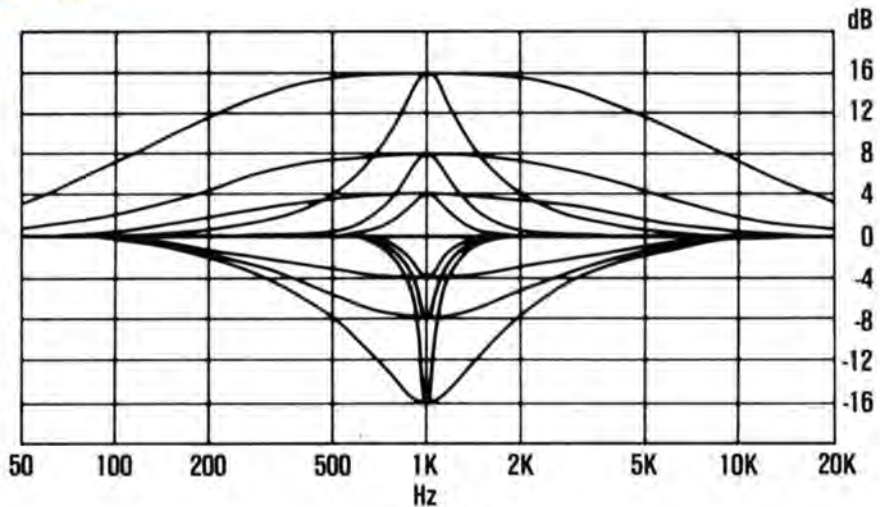


Figure 1

are desired, they may be approximated by adjusting the lowest band to 20Hz and the highest band to 20kHz. The breakpoint of the shelving characteristic is then adjusted with the BANDWIDTH control.

Performance Specifications

Specifications apply to each channel except as noted. All specifications apply when equalizer drives 600 ohm or higher impedances. All noise specifications assume a 20-20,000 Hz bandpass filter with 18 dB/octave Butterworth skirts.

Operating Controls: EQUALIZATION, EQUALIZATION IN/OUT, BANDWIDTH, and TUNING for each of four bands. MASTER EQUALIZATION IN/OUT, GAIN, POWER ON/OFF.

Frequency Response: (EQ controls set mechanically flat) ± 0.25 dB, 20-20,000 Hz.

Available Gain: +12 dB, adjustable to $-\infty$ by means of front-panel GAIN control.

Input: (RF suppressed)

Impedance: (each leg) 100K in parallel with 1000pF, electronically balanced. Driving impedance should be 600 ohms or less.

Absolute Overload Point: +26dBm.

Output: (RF suppressed)

Level: greater than +19 dBm into 600 ohms, 20-20,000 Hz

Impedance: 47 ohms in parallel with 1000pF, unbalanced. (Option 01 provides a transformer-balanced output for both channels)

Equalizer is unconditionally stable and will not ring with any captive load.

Risetime: less than 4 microseconds.

Slew Rate: greater than 6 V/microsecond. Internal bandlimiting assures that slew rate limiting will not occur with even the most severe equalization and program material.

Square Wave Response: Square wave exhibits no spurious ringing at any output level. The only ringing observable is that theoretically associated with any given equalization curve.

Circuitry: active RC, utilizing FET-input IC opamps. The output line driver utilizes a discrete transistor current booster.

Total Harmonic Distortion (+18 dBm output): less than 0.025%, 20-20,000 Hz. Typically less than 0.002% at 1kHz, +18 dBm.

SMPTE Intermodulation Distortion: Typically 0.008% at +18 dBm equivalent peak output, using 60 Hz/7 kHz; 4:1.

Noise: At Output, GAIN control adjusted for unity gain, all EQ switches IN, all EQ controls FLAT: Less than -84 dBm; -87 dBm typical.

Overload-to-noise Ratio of Single Parametric Bandpass Filter: greater than 102 dB for any combination of TUNING and BANDWIDTH settings.

Interchannel Crosstalk, 622B dual-channel equalizer: less than -90 dB, 20-20,000 Hz.

Equalization Characteristics: Figure 1 shows curves corresponding to the maximum and minimum bandwidths for each band. DB equalization contributions of the individual bands add without interaction. BANDWIDTH, TUNING, and EQUALIZATION controls are all continuously variable.

Range of Adjustment of "Q": 0.29 to 3.2.

Range of Adjustment of Peak Equalization: +16 dB to $-\infty$. Typical notch depth obtainable is 40 dB.

Tuning Range (per band): 20-500 Hz, 68-1700 Hz, 240-5850 Hz, 800-20,000 Hz. Tuning dials are calibrated at ISO preferred frequencies.

Power Requirements: 115/230 volt 50-60 Hz AC, approximately 4 watts (622A), 7 watts (622B). Captive "U-Ground" power cord. Option 02 eliminates the AC power supply. Power requirements for the Option 02 version are ± 18 to 28 volts DC at 60 ma per equalizer channel. Option 02 is supplied on special order only, and is recommended only for users planning to install a large number of 622 channels in a given installation.

Overload Lamp: will light for approximately 200 mS if the instantaneous peak output of any amplifier in the equalizer is driven within 1 dB of its clipping point.

Size: 19" (48.3 cm) wide x 3.5" (8.9 cm) high x 5.2" (13.3 cm) deep.

Shipping Weight: 10 lbs. (4.5 kg).

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ORDERING GUIDE & SUGGESTED LIST PRICES

Professional Audio
Products

Revision 15; Effective 1 February 1986

Changes: Add 275A, 275A/RC

No price changes

Change Security Cover from "GY" to "WH"

<u>Model</u>	<u>Description</u>	<u>Suggested List</u>
111B/1	Spring Reverberation (2 channels)	\$899.00
245F	Stereo Synthesizer	\$399.00
275A	Automatic Stereo Synthesizer	\$1,895.00
275A/RC	Remote Control for 275A	\$295.00
412A	Compressor/Limiter (1 channel)	\$425.00
414A	Compressor/Limiter (2 channels)	\$799.00
418A	Stereo Compressor/Limiter	\$899.00
422A	Gated Compressor/Limiter/De-Esser (1 channel)	\$629.00
424A	Gated Compressor/Limiter/De-Esser (2 channels)	\$989.00
536A	Dynamic Sibilance Controller (2 channels)	\$539.00
622A	Parametric Equalizer (1 channel)	\$569.00
622B	Parametric Equalizer (2 channels)	\$879.00
672A	Mono Graphic Parametric Equalizer	\$689.00
674A	Stereo Graphic Parametric Equalizer	\$1,299.00

Prices are domestic U.S. only; F.O.B. San Francisco. Prices based on Buyer's acceptance of Orban Standard Terms & Conditions of Sale are subject to change without notice. All units are supplied for 115V, 50/60 Hz operation unless otherwise specified.

See reverse side for accessories.

PROFESSIONAL AUDIO PRODUCTS ACCESSORIES

ACRYLIC SECURITY COVERS

All security covers are 19" wide. Add suffix in place of xx to specify color. Screws supplied. Fits most EIA-standard panels. 1 1/4" maximum protrusion.

CL Clear
BL Blue transparent
WH Opaque White

Suggested List

ACC-11xx	1 3/4" panel (1 rack space)	\$43.00
ACC-12xx	3" panel (2 rack spaces)	\$45.00
ACC-13xx	5 1/4" panel (3 rack spaces)	\$47.00
ACC-14xx	7" panel (4 rack spaces)	\$49.00

ACCESSORIES FOR 622A/622B

RET-05	Balanced output transformer. Order one per output.	\$16.00
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ACCESSORIES FOR 672A

RET-06	Balanced output transformer. Order one per output.	\$16.00
RET-21	XLR connectors for input and both outputs.	\$18.00

ACCESSORIES FOR 674A

ACC-03	Plexiglass security cover for filter section controls.	\$9.00
RET-07	Balanced output transformers (2) for main outputs.	\$32.00
RET-08	Balanced output transformers (4) for both outputs.	\$64.00
RET-10	TRS phone jacks for inputs & all outputs.	\$13.00
RET-12	XLR connectors for inputs & all outputs.	\$30.00

ACCESSORIES FOR 422A/424A

RET-14	XLR connectors for input and output. (422A)	\$12.00
RET-15	XLR connectors for both inputs and both outputs. (424A)	\$24.00

ACCESSORIES FOR 245F

RET-19	Balanced output transformers (2) for both outputs.	\$32.00
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ACCESSORIES FOR 536A

RET-22	XLR connectors for both inputs and both outputs.	\$24.00
RET-23	Balanced output transformers (2) for both outputs.	\$32.00

ACCESSORIES FOR 412A/414A

RET-28A	XLR connectors for input and output. (412A)	\$12.00
RET-28B	XLR connectors for both inputs and both outputs. (414A)	\$24.00