



## The New FBX Feedback Exterminators®: with SMARTFilter™ Technology

- SMARTFilter Technology
- Super-fast Automatic Feedback Control
- Quick and Quiet Setup
- Accurately distinguishes music from feedback
- Places filters with 1 Hz resolution
- Transparent – leaves your sound clear and untouched
- Provides more gain before feedback (6 to 9dB typical)
- 24-bit Digital Resolution
- Three-color LED filter display
- 12 Filters per channel
- Flexible Filter Controls
- Timed or Manual Dynamic Filter Reset
- XLR & ¼" TRS inputs/outputs
- Unbelievable new price!

### FBX2400 / 1200 Series



Of all the problems you can have with your audio system, nothing is more obvious or annoying to the audience than feedback. You do not need "Golden Ears" to know something is wrong. Thanks to the Sabine FBX Feedback Exterminator, this problem is solved. The FBX makes a significant improvement in your sound – it's a difference you can really hear. Quite simply the FBX gives you the single most important function of sound reinforcement: gain before feedback. And that gain comes with increased clarity and all the mobility you need for your wireless microphones...



Since Sabine first invented digital feedback control in 1991, FBX Feedback Exterminators have set the standard for transparent and reliable automatic feedback control. Now Sabine is proud to announce the next generation of automatic feedback controllers: the FBX1200 and FBX2400, now with SMARTFilter™ technology.

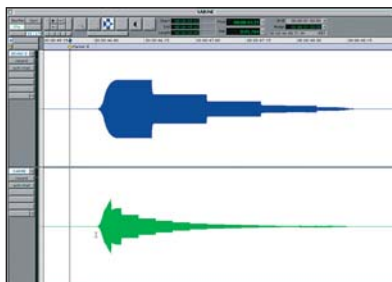
### The Power of FBX

The power of the FBX with SMARTFilters lies in its ability to control feedback during the program, not just at setup time. If feedback occurs during that crucial moment of the show, in the middle of the big solo, or just when the worship leader begins the sermon, the FBX places a filter that only kills the feedback, not the sound and power you work so hard to achieve.

Think of the FBX as a very advanced set of automatic parametric filters. If you had the time, the filters, and the test equipment, you could find the feedback frequencies, dial in the precise filter location, and make a very narrow filter, just deep enough to remove the offending tone. The FBX does it all for you automatically, and it does it faster than any other method.

How do we do it? First let's consider just how a superior feedback control filter should behave. Filters can be described by their Speed, Accuracy, Resolution, and Sonic Integrity.

**SPEED:** The industry's best digital signal processors that run the SMARTFilter algorithm give the new FBX1200 and 2400 a distinct speed advantage over all other automatic feedback controllers. And in Setup Mode the speed is increased, so you can complete your entire setup of the FBX in less than 30 seconds. During the show the 24-bit FBX is constantly on the watch for feedback, never allowing it to ruin your show. Filters are placed almost immediately (in 0.4 seconds at 1 KHz).



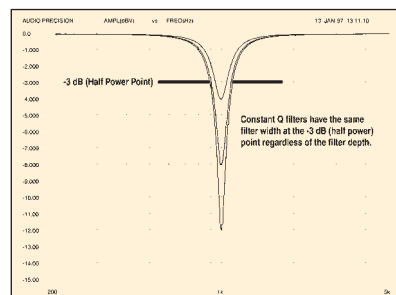
*Speed of feedback elimination, shown as amplitude over time: The top chart shows the speed of a competitor. Note slow reaction time and longer time to eliminate the feedback. The bottom section shows the much faster FBX.*

**ACCURACY:** Is it music or is it feedback? This is the most difficult question your feedback controller must answer. A wrong decision means you waste filters (less gain for you) and punch unnecessary holes in your sound. The FBX has always excelled in its ability to make the right decision, and the new SMARTFilter technology

makes it even better. Less sophisticated feedback controllers place filters on any loud tone, even if it is music, but the FBX uses a patented analysis of the harmonic content of your program material. Because feedback is low in harmonics, and music and speech are rich in harmonics, the FBX is able to make the correct and accurate answer to the music or feedback question.

**RESOLUTION:** This is a big one. Now that we know feedback is happening, we need to target it precisely. Many feedback controllers place their filters in the general vicinity of the feedback and then widen the filters until the feedback goes away. The FBX uses a more sophisticated solution. It centers the filter exactly on the frequency that is feeding back. This unique one-Hertz resolution enables the FBX to control feedback with transparent filters that are ten times narrower than graphic equalizer filters, which can only muster 31 spots to place their very wide filters. Feedback frequencies are single tones, and that means there can be almost 20,000 places for them to occur in the audio spectrum. You can see that using a feedback control device with less resolution is like shooting a fly with a shotgun. You may eventually get that fly, but it will take a lot of shooting and cause a lot of damage!

In contrast, the FBX1200 and 2400 place these accurately chosen filters with one Hz resolution. This means a direct hit on a single feedback tone – every time.



*Filter quality: True Constant Q filters maintain width at any depth when measured at the -3 dB power point. Sabine uses this most rigorous method for computing filter width.*

**SONIC INTEGRITY:** Sabine's innovative approach to digital filtering is unique in the industry. Our filters just sound better, with far less phase distortion and a smoother response. Sabine filters maintain their integrity at all depths, providing true Constant Q performance.

Some competitors tout the benefits of more filters, but why add more filters than you need? The FBX processor could easily produce 50 filters if we wanted them, but they would only degrade your sound. Our experience proves that twelve feedback filters per channel is the right number. More filters just cut into the quality of your sound.

# The New FBX Feedback Exterminators®: with SMARTFilter™ Technology

**Three-color LED Display: Amber for unlocked fixed, Red for locked fixed, & Green for dynamic filters.**

**FBX FILTERS COME IN TWO FLAVORS:** Fixed and Dynamic. Both filters are placed the same way: Feedback is detected and the filter is placed just deep enough to eliminate it. The difference comes after the filter is placed. Fixed filters remain on the initially detected feedback tone – they do not move. These filters provide

the initial maximum gain before feedback and are set automatically during setup. Dynamic filters can release and move to new feedback frequencies and are for adaptive feedback control during the performance. Factory default is 9 fixed and 3 dynamic, but this is easily changed using front panel controls.

Some competitors tout ever narrower filters. The FBX processor can easily produce filters that are 1/100 of an octave wide, but our experience teaches us that filters narrower than 1/10 of an octave allow the feedback to return with very little provocation. Sabine filters are transparent to the ear and offer the ideal balance of width and protection against feedback under shifting conditions. Making them narrower ultimately degrades their performance, and we won't do it.

### Faster Setup...

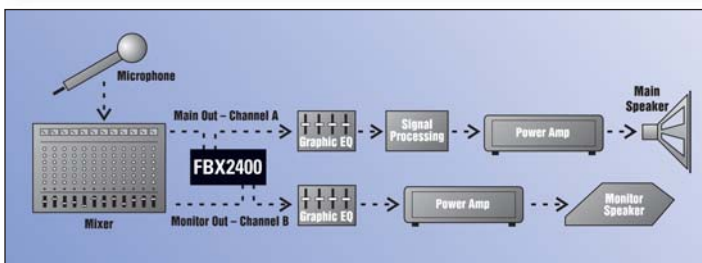
The FBX1200 and 2400 give you the easiest, fastest, and quietest setup procedure. In less than 30 seconds you will be ready to begin your performance, and the whole process is so quiet you can almost do it without anyone knowing it is happening!

### ...and a Bright Display

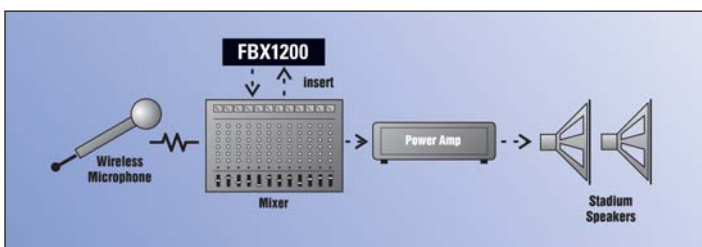
After the super-fast setup is complete the bright blue LED on the Ready button clearly tells you the show can begin, and you've got all the extra gain you need. You have complete control of the mix between filter types (see the Fixed and Dynamic Filter box above), and the bright, three-color LED display shows you your filter status at all times – you can see it from across the room!

### The Bottom Line

Even with all the improvements of SMARTFilters, and the improved specs and audio performance, perhaps the best news is that we lowered the price! And the FBX Feedback Exterminator is made in the USA. Call us or head to your nearest Sabine dealer and try the new FBX for yourself. You will hear your sound and nothing else!



**Total Control:** FBX2400 controlling feedback for the whole mix in both mains and monitors. Patched between mixer and power amps.



**Targeted Control:** FBX1200 controlling feedback in one input channel, or one group of channels. Patched at insert point.

## Applications Guide

### WHERE TO PATCH THE FBX

- For feedback control across the entire mix, patch the FBX between the mixer and the power amp.
- For feedback control on one input channel or sub-group, patch the FBX at the insert point. Choose this setup for targeted feedback control on selected microphones – highly recommended.

### WHERE TO USE THE FBX

The FBX provides more gain before feedback in mains and monitors for voice and instruments in:

- Theaters & Concert Halls
- Worship Centers
- Schools & Auditoriums
- Conference Rooms & Board Rooms
- Sports Arenas & Broadcast Stations
- Teleconferencing & Paging Systems

## Worldwide Users of FBX

AALBORG KONGRESS HALL (Denmark)	NASA	NEW ENGLAND AQUARIUM
UNITED NATIONS HEADQUARTERS	SWACKHAMMER'S, Spokane, WA	CANADIAN BROADCAST COMPANY
THE VATICAN	JACOB JAVITZ CONVENTION CENTER	CBS STUDIOS
KOREAN BROADCAST SYSTEM	NEW ORLEANS JAZZ FESTIVAL	ORLANDO ARENA
TORWAR ARENA (Warsaw, Poland)	THE LATE SHOW WITH DAVID LETTERMAN	AIR FORCE BAND
WESTIN BONAVENTURE HOTEL	BROOKLYN BOTANICAL GARDENS	TAVERN ON THE GREEN
WALT DISNEY COMPANY	DAYTONA BEACH ASSEMBLY HALL CHURCH	THE ROTUNDA, UNIVERSITY OF VIRGINIA
WILLIE NELSON	HOUSE, WESTMINSTER (England)	CAIRO OPERA HOUSE
CONGRESS INNSBRUCK Austrian government	MICHIGAN STATE UNIVERSITY	IOWA STATE EDUCATION SYSTEM
CENTRAL LUTHERAN CHURCH	NATIONAL BOWLING STADIUM	HYATT REGENCY SAN FRANCISCO
ELECTROTEC	HEWLETT PACKARD	BOEING TEST LABS
GUND ARENA Cleveland Cavaliers	AMOCO CORPORATION	LAMBEAU STADIUM, GREEN BAY
CENTURY CLUB, L.A.	AUSTRIAN FEDERAL BROADCAST	IMPACT AUDIO
BANGKOK UNIVERSITY (Thailand)	CITY TV (Toronto)	DR. JOHN
PAUL McCARTNEY	LOS ANGELES SHAKESPEARE FESTIVAL	MUSEUM OF FLIGHT, SEATTLE
WAYLON JENNINGS	UNIVERSAL STUDIOS	MINGIE INTERNATIONAL FOLK ART MUSEUM
MEADOWLANDS EXPOSITION CENTER	UNIVERSITY OF FLORIDA	NBC STUDIOS LOS ANGELES
SMITHSONIAN INSTITUTION	IOWA STATE EDUCATION SYSTEM	UNITED ARTISTS THEATERS
LONE STAR AMPHITHEATER	MTV LATINA	ST. MARY'S CATHEDRAL
AMERICAN MUSEUM OF NATURAL HISTORY	U.S. DISTRICT COURT	NAVY SEA LIFT VESSELS
R.A.I. CONGRESS CENTRE (The Netherlands)	ROSE BOWL	AUSTRALIAN FEDERAL PARLIAMENT
WAVELENGTH HIRE COMPANY (Australia)	GRAND MOSQUE (Oman)	AMERICAN STOCK EXCHANGE
BRYZA HOTEL (Poland)	HEWLETT PACKARD	LOCKHEED MARTIN

## FBX1200 and 2400 Engineering Specifications FILTERS

12 independent digital notch filters per channel, controlled automatically from 40 Hz to 20 KHz.

Filter width: user-controllable – either 1/10 or 1/5 octave\*, constant “Q”

Resolution: 1 Hz

Time required to find and eliminate feedback: 0.4 seconds, typical @ 1 KHz

Number of Dynamic vs. Fixed filters per channel: user selectable. Last configuration stored in memory.

Dynamic Filter Timer: Resets dynamic filters in 1, 5, 30, or 60 minutes

### INPUT/OUTPUT

Input/Output Maximum Signal Levels: Balanced +27dBV peak, unbalanced +21 dBV peak

Output Drive: Unit will perform as specified driving a load >600 Ohms

Input Impedance: Balanced or unbalanced >40K Ohms, PIN 2 high

Output Impedance: Balanced or unbalanced 150 Ohms nominal, PIN 2 high

Bypass: True power off bypass

Headroom: +23 dB peak @ 4 dBV nominal input, balanced

I/O Connectors: XLR-3 and 1/4” TRS

### PERFORMANCE\*\*

Frequency response: 20 Hz - 20 KHz +/- 0.3 dB

Gain matching: +/- 0.2 dB

Spectral Variation: + .25 dB, 20 Hz to 20 KHz

SNR - Dynamic Range: >100 dB

THD: .005% at 1 KHz

< 0.01% 20 Hz - 10 KHz

< 0.025% 10 KHz - 20 KHz

Dynamic Range: >105 dB

### POWER INPUT

115 VAC: 100 - 130 VAC 50/60 Hz

230 VAC: 200 - 240 VAC 50/60 Hz

### FUSE

115 VAC, 0.1 A, 10 W, 0.160 A SB fuse

230 VAC, 0.06A, 10 W, 0.160 A SB fuse

### DIMENSIONS

1-U rack mount; 19 x 1.75 x 6.25 in. nominal (rack mountable);

48.3 x 4.5 x 15.9 cm nominal

### WEIGHT

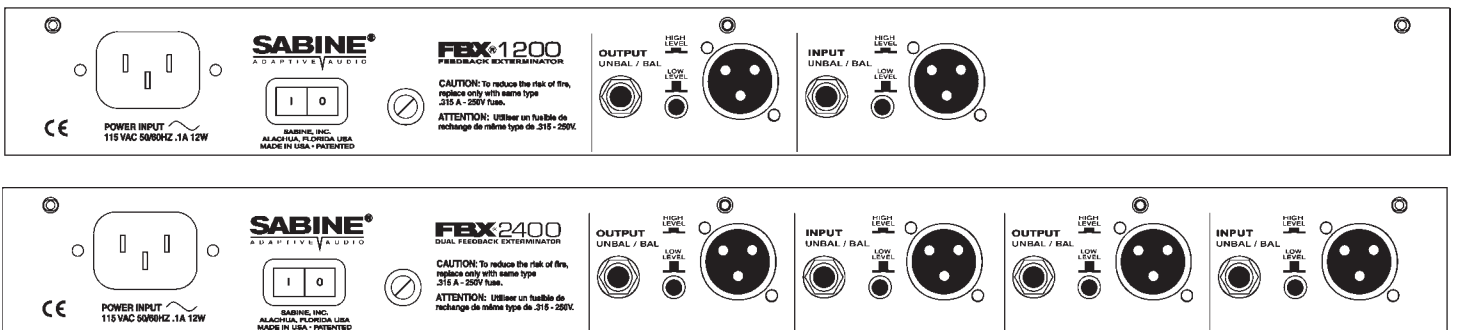
8.0 lbs. (3.6 kg) nominal

### OPERATING TEMPERATURE

Safe operating temperature: -15 to +50 degrees centigrade ambient temperature (5 to 122F)

*\*Below approximately 200 Hz the feedback filters become slightly wider to increase the feedback and rumble capture speed at these low frequencies.*

*\*\*Tests performed using an Audio Precision System One model 322 or equal.*



One-year limited warranty

Patented†

Other Patents Pending

Made in USA

**SABINE**<sup>®</sup>  
ADAPTIVE AUDIO

Complete Operating Guide  
available at our website

**www.Sabine.com**

13301 Highway 441

Alachua, Florida 32615-8544 USA

Tel: (386) 418-2000

Fax: (386) 418-2001

†FBX and FBX Feedback Exterminator are registered trademarks of Sabine, Inc., and are the brand names of its line of automatic feedback controllers. Covered by U.S. Patent No. 5,245,665, Australian Patent No. 653,736, German Patent No. 69118486.0, U.K. Patent No. 0486679, and Canadian Patent No. 2,066,624-2. Other patents pending.