

FBX-1020 PLUS

FEEDBACK

EXTERMINATOR®

FBX-2020 PLUS

DUAL FEEDBACK

EXTERMINATOR®

20-bit

12 filters per channel

THE INDUSTRY

STANDARD

FOR AUTOMATIC

FEEDBACK

CONTROL

SABINE®
ADAPTIVE AUDIO

FBX-1020 PLUS and FBX-2020 PLUS Feedback Exterminators®

“The FBX-2020 made more difference to the sound system in a matter of minutes than anything that could have been achieved by adjusting equalizers and other components for hours and hours.”

**– Mike Crofts
Sound On Stage**

The industry standard in automatic feedback control now has even more features at the same low price.

Sabine introduces the new **FBX-1020 PLUS Feedback Exterminator®** and **FBX-2020 PLUS Dual Feedback Exterminator®**, each with 20-bit digital conversion and 12 patented FBX filters per channel.

Sabine pioneered the automatic feedback controller in 1990, and invented the digital feedback controller in 1991. This new generation of FBX is the state-of-the-art in automatic feedback control – fast, reliable, and quiet. Choose the FBX-1020 PLUS for single channel systems, and the FBX-2020 PLUS for two-channel applications.

Sabine's robust feedback control algorithm identifies feedback and places super-narrow filters precisely on the ringing tone. Each filter is custom-



Quick view of the New 20-bit FBX PLUS Series:

- 12 patented FBX feedback filters per channel
- ClipGuard Adaptive Clip Level Control – maintains optimum clip level, increases dynamic range to 105 dB, and eliminates digital clipping
- TURBO Mode – ultra-fast, low level feedback filtering in setup
- True Constant Q filters – skirt doesn't widen as filter gets deeper
- Not just a setup tool – eliminates feedback during program, too
- Two-stage filter reset – dynamic filters or all filters
- More gain before feedback (6 to 9dB typical)
- Increased program clarity and intelligibility
- Fast setup – less than a minute per channel
- Switchable filter widths: 1/10 or 1/5 octave
- Filter tracking: tracks feedback when it drifts with temperature & humidity
- Rugged, full rack-mount case for heavy use

The industry choice for automatic feedback control is now even better *at the same low price.*

made at the moment of feedback, and is placed just deep enough to remove the ringing tone, in 3 dB steps.

The power of FBX automatic feedback control lies in its ability to distinguish feedback from program material. If feedback occurs in that crucial moment of the show, or just when the worship leader begins the sermon, or in the middle of the big solo, the FBX can place a filter in less than a second – thus saving the performance. And FBX filters do not disturb your

program material, because their ultra-narrow width remains constant no matter how deep they go. Only the feedback is eliminated, not the power and sound you work so hard to achieve.

Here's what all this means to you:

- More gain before feedback
- Increased clarity and intelligibility
- More wireless microphone mobility
- Adaptive, automatic feedback control

ClipGuard™ Adaptive Clip Level Control **No more knobs!**

Until **ClipGuard** engineers had to set audio equipment input and output levels to a compromised setting that allowed either too much noise in quiet programs or clipping during high-level programs. Now **ClipGuard** automates all front panel program level controls and actively extends the effective dynamic range to at least 105 dB!

ClipGuard maintains the optimum signal-to-noise ratio for any input signal, operates transparently while maintaining unity gain, and eliminates digital clipping forever!



THE NEW FBX-1020 PLUS FEEDBACK EXTERMINATOR®

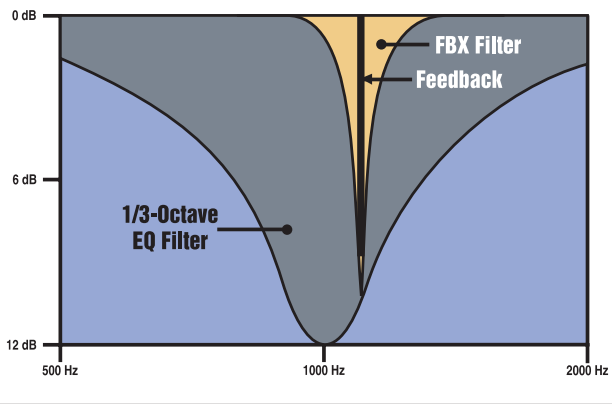


The Inside Story on FBX Filters: Fixed & Dynamic

FBX filters come in two types: **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

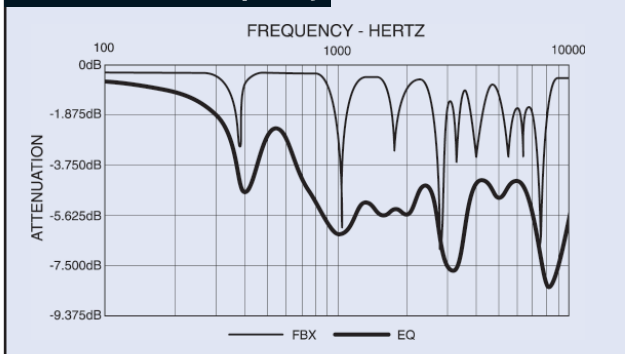
release and move to new feedback frequencies and are for adaptive feedback control during the performance. Factory default is 9 fixed and 3 dynamic per channel, and this is easily changed using front panel controls. For maximum gain before feedback, use more fixed filters. For more adaptive feedback control during the show (for example, with several roving wireless mics), use more dynamic filters.

FBX 1/10-Octave Filter vs. Graphic EQ Filter



Dark gray area shows the sound & power you get back when you use an FBX to control feedback instead of a Graphic EQ.

FBX vs. 1/3-Octave Graphic EQ



A PA System was set up using a microphone, mixer, FBX, power amp and two speakers. The system's gain was raised until the FBX removed nine feedback points. Next the FBX was replaced with a graphic EQ. The EQ was adjusted while the system gain was raised to the same level achieved with the FBX. The frequency response curves of each device were then plotted.

FBX vs. Graphic EQs

Until the invention of the FBX, graphic EQs were the only practical solution to feedback control. But the FBX filters have several important advantages.

- Graphic EQ filters are typically one octave wide. These wide, overlapping filters are good for shaping frequency response, but not good for feedback control. Why chase single-frequency feedback with a wide-band filter? FBX filters are ten times narrower than graphic EQ filters, so your sound remains clear and full. Use your FBX to control feedback and your graphic EQ to shape the sound and you get back 90% of the power you lose by chasing feedback with a graphic EQ filter.

- Graphic EQ filters are limited to 31 center points, spaced 1/3-octave apart. To kill feedback that does not coincide with one of those centers, the closest filter must be pulled down even further, compromising the power and integrity of your sound even more. FBX filters are placed precisely and automatically on the feedback tone, with 1/50 octave resolution, removing only the ringing frequency.

- An FBX filter is placed in less than a second, much faster than you can find and eliminate feedback with a graphic EQ.

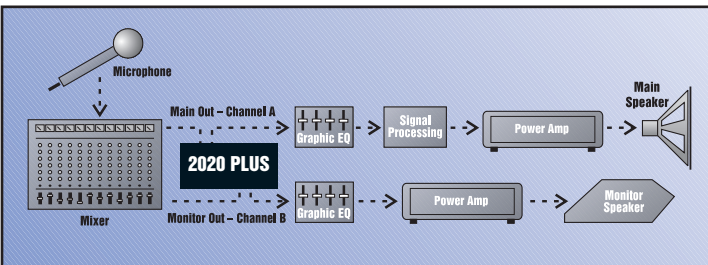
FBX vs. Other Feedback Controllers

- **Automatic Feedback Control:** Not just at setup but during program. The patented, proven FBX algorithm clearly distinguishes feedback from music. That means you get automatic feedback control during the show when you need it most.

- **Filter resolution:** FBX filters are placed with 1/50 octave resolution, giving you precise feedback control with no filters set deeper than necessary.

- **TURBO Mode:** For the fastest, easiest, quietest setup TURBO Mode places FBX filters instantly at low level.

- **ClipGuard™ Adaptive Clip Level Control:** Perfectly matches system gain structure every time, with no level adjustments to worry about and no digital clipping.



Total Control: FBX-2020 PLUS controlling feedback for the whole mix in both mains and monitors. Patched between mixer and power amps.

Applications Guide

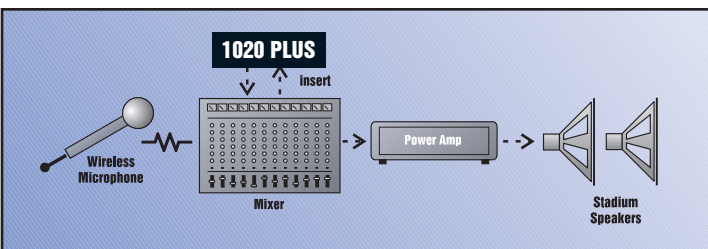
Where to Patch the FBX

- 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.

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



Targeted Control: FBX-1020 PLUS controlling feedback in one input channel, or one group of channels. Patched at insert point.

**FBX-1020/2020 PLUS
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, True Constant Q*

Resolution: 1/50 octave from 40 Hz to 20 KHz

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

Total number of combined filters active per channel: user selectable, from 1 to 12

Number of dynamic vs. fixed filters per channel: user selectable

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 >10K Ohms, PIN 2 high

Output Impedance: Balanced or unbalanced 10 Ohms nominal, PIN 2 high

Bypass: True power off bypass

Headroom: +23dB peak @ 4dBV nominal input, balanced I/O Connectors: XLR-3 and 1/4" TRS

Performance***

Frequency Response: ± .25 dB, 20Hz to 20 KHz

SNR: >100 dB, typical

THD: <0.01% @ 22 dBV sine wave at 1 KHz

Dynamic Range: >105 dB with ClipGuard™ Automatic Clip Level Control active

Power Input

Factory configured to either 115 VAC or 230 VAC. 50/60 Hz, 12 Watt input.

Fuse Replacement

To reduce the risk of fire, replace only with 5x20 mm, .315 A, 250 V, fast-acting fuses.

Memory

Last configuration stored in memory

Dimensions

1-U rack mount; 19 x 1.75 x 8.0 ins. nominal (rack mountable); 48.3 x 4.5 x 20.3 cm nominal (rack mountable)

Weight

8.0 lbs. (3.6 kg) nominal

**PUT THE ADVANTAGES OF
FBX TO WORK FOR YOU, TOO!**

**THEATERS/
ENTERTAINMENT:**

Late Show With David Letterman
Oprah Winfrey Show
Tavern on the Green
Vienna State Opera
Willie Nelson
Cairo Opera House
United Artists Theaters
Lone Star Amphitheater
Craig Chaquico
Grand Ole Opry
L.A. Shakespeare Festival
Waylon Jennings
Steve Miller Band
Disneyland's Tomorrowland
Jeff Carson
Larry Sanders Show

SPORTS ARENAS:

Lambeau Field, Green Bay
Jacksonville Jaguars Stadium
Shea Stadium
Olympics 2000 (Sydney)
Gateway Arena
Orlando Arena
Citrus Bowl
National Bowling Stadium
Baltimore Ravens Stadium

GOVERNMENT:

NASA
The Pentagon
Australian Federal Parliament
United Nations Headquarters
U.S. District Court (Foley Square)
Navy's Sea Lift vessels
lane Cove Municipal Council
Church House, Westminster
Government Hall (Honduras)
Congress Innsbruck
Pennsylvania State Supreme Court

CHURCHES:

The Vatican
Crystal Cathedral
St. Mary's Cathedral
Grand Mosque (Oman)
Baylake United Methodist Church
Golden Era A/V Facility

CORPORATE SOUND:

Walt Disney Company
Hewlett Packard
Microsoft
American Stock Exchange
Boeing Test Labs
Busch Gardens
Sea World
Universal Studios
Wendy's Restaurants

EDUCATION:

University of Michigan
Iowa State Education System
The Rotunda (U. Va.)
Northwestern College
University of Florida
Ohio University
University of North Carolina
Bangkok University

BROADCAST:

CBS Studios
NBC Studios L.A.
TNN
CBC
Korean Broadcast System
Austrian Federal Broadcast
City TV, Toronto
CBS Sound Shop
WRKO Radio

HOTELS:

The Sands Hotel
Luxor Hotel
Westin Bonaventure Hotel
Hyatt Regency San Francisco
Debbie Reynolds Hotel
Marco Island Marriott
Crown Plaza Hotel

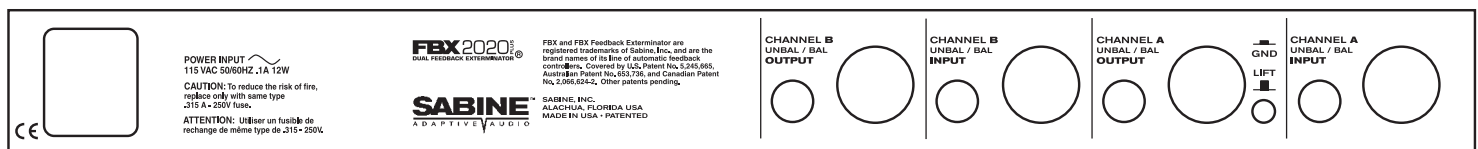
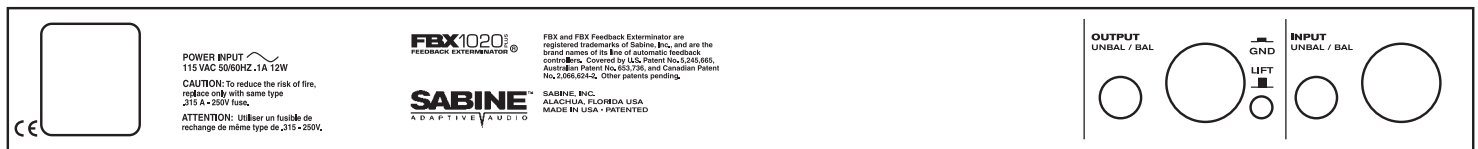
CONVENTION CENTERS:

Jacob Javitz Convention Center
Meadowlands Exposition Center
Metro Portland Convention Center

SOUND COMPANIES:

Showco
Rock 'n' Road Audio
Wavelength Hire Co.
Sound Services
Sound Planning
Sounds Great Enterprises

...And thousands more!



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

** (Note: Inputs may be balanced or unbalanced. For maximum output capability, outputs must be balanced (XLR or TRS). If either side of an output is grounded, the peak output and dynamic range will be reduced by 6 dB.

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

(SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE)

One-year limited warranty • Patented • Made in USA

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*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.