INTERNATIONAL LIMITED WARRANTY

ARX Systems (ARX) warrants to the first purchaser of any ARX equipment that it is free from defects in materials and workmanship under normal use and service. ARX's sole obligation under this warranty shall be to provide, without charge, parts and labour necessary to remedy defects, if any, which appear within twelve (12) months from date of purchase, and for a further twelve (12) months supply parts only.

This is our only warranty. It does not cover finish or appearance items, or if the equipment has been, in ARX's sole judgement:

- •Subjected to misuse, abuse, negligence or accident;
- •Repaired, worked on, or altered by persons not authorized by ARX;
- •Connected, installed, adjusted or used for a purpose other than that for which it was designed.

Some states do not allow the exclusion or limitation of incidental or consequential damages so some of the above exclusions may not apply to you. This warranty gives you and us specific legal rights and you may also have other rights which may apply.

Warranty Service Procedure

Should it become necessary to have your equipment serviced under the terms of the warranty, please follow these steps:

1. Call your ARX distributor for a Return Authorization (RA) number;
2. ***Carefully*** repack the unit, in its original packaging where possible, including a note with a description of the problem, and a copy of the receipt showing date of purchase. Attach these to the actual unit itself. Don't forget to write your name and address clearly, and include a phone number where you can be contacted during normal business hours. Make it easy for our service technicians to contact you if they have a question. Also, use ***plenty*** of packing material - better to be safe than sorry.
3. Send the unit freight prepaid to ARX Systems, at the address given you with your RA number. We will pay the return freight when the serviced unit is returned to you.
4. We strongly recommend you insure the package. We can't fix it if it gets lost! Send it by UPS, Fedex, or any similar service that can track the package. Parcel Post is *not* recommended

If Warranty Registration Card is missing, please write to ARX in the country of purchase, stating model and where purchased, or to ARX, PO Box 15, Cheltenham, Victoria 3192, Australia.

AFW-1

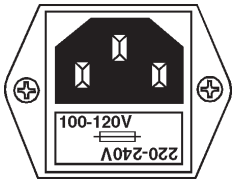
Anti-Feedback Workstation

OWNER'S MANUAL

ARX Systems Pty Ltd, PO Box 15,
Cheltenham, Victoria 3192, Australia
Phone: 03 - 9555 7859 Fax: 03 - 9555 6747
International Fax: +61-3 -9555 6747
On the Web: http://www.arx.com.au
Email: info@arx.com.au

IMPORTANT - PLEASE READ THIS FIRST

This is a dual voltage unit. It is essential that you check that the voltage on the fuseholder cover below the AC connector on the rear of the chassis is set correctly before connecting it to AC power.



THIS IS SET FOR
100 V AC TO 120 V
AC OPERATION

THIS IS SET FOR
220 V AC TO 240 V
AC OPERATION

To change, pull fuseholder out and rotate 180°, then push in again. Do not insert power cable into unit until voltage has been correctly set. Do not plug power cable into AC power until voltage has been correctly set

WARNING SYMBOLS USED ON THIS EQUIPMENT

This symbol is intended to alert you to the presence of important operating instructions contained in this owner's manual

This symbol is intended to alert you to the presence of uninsulated dangerous voltage within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

This symbol indicates that a Slow Blow fuse is used in this equipment. Replace with same type and value only

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

TO PREVENT ELECTRIC SHOCK, DO NOT REMOVE
COVER OR BACK OF UNIT
NO USER-SERVICEABLE PARTS INSIDE
REFER SERVICING TO QUALIFIED PERSONNEL

WARNING

TO PREVENT FIRE OR SHOCK HAZARD, DO NOT
EXPOSE THIS UNIT TO RAIN OR MOISTURE.

ATTENTION

RISQUE DE CHOC ÉLÉCTRIQUE - NE PAS OUVRIR

CE

Complies with 89/336/EEC Electromagnetic Compatibility Directive, amended by 92/31/EEC and 93/68/EEC and meets the following standards:EN 55013 : 1990, Sections 3.2 and 3.5 EN 55020 : 1988, Sections 4.3, 5.4, 6.2, 7.0, 8.0.

Non-Volatile Memory

A complete record of the Anti Feedback filter settings is stored automatically in the AFW-1 when you power down the system. Upon power-up, the system automatically reloads the filters and returns them to the same position and depth as they were when the power was turned off.

Filter Reset

If the sound system's setup has changed, such as a different venue, change of equipment, significant movement of microphones or speakers, or any other change that would cause the feedback points to change, the Anti Feedback section must be reset.

Most Important The AFW-1 should not be RESET during a program. The system's master volume should always be set to a minimum volume before clearing the filters. Otherwise high volume feedback may occur, with potentially damaging results.

Bypass switches

The Active / Bypass switch under the SET ANTI FEEDBACK section of the front panel will bypass the Anti Feedback, the Limiter control, and the Output level control, leaving just the EQ section active.

The Active / Bypass switch under the SET SYSTEM section is a true hardwire bypass for the complete unit, and connects the inputs directly to the outputs, bypassing all circuitry.

Setting up the AFW-1

Setting up the AFW-1 correctly requires that certain steps are taken, in a particular order. Technical people may call this the System Initializing Procedure, but we'll just call it Setup.

1. To install the AFW-1 in a sound system, connect it wherever a Graphic EQ would go. For example, between the Mixing console and the Power amps. If you are using multiple AFW-1's in a monitor rig, then connect one between each monitor send and crossover / amplifier
2. Place the speakers and microphones in the positions where they will be used during the performance. Don't place the microphones facing into the speakers!
3. Turn on the system
4. Set the Limiter Threshold at -10dB. The process of setting up the AFW-1 will induce feedback rings, and the limiter will keep these from damaging the system
5. Check that the Anti Feedback ACTIVE and Unit ACTIVE switches are pressed IN and not Bypassed
6. Adjust the EQ section of the AFW-1 to set the system curve that you want. DO NOT NOTCH FOR FEEDBACK. The EQ sliders should form a smooth curve
7. Set the channel levels on the console at the performance level. Reduce mixing console master levels
8. Press and hold down the switch marked 'PRESS AND HOLD FOR 4 SECONDS TO RESET' on the front of the AFW-1 for 4 seconds to clear out filters set previously.
9. Place the AFW-1 in the active mode by releasing RESET. This procedure is required to set the FIXED filters on the system's resonating frequencies
10. SLOWLY bring up the console's master sliders until feedback starts to occur. The AFW-1 will detect and quickly remove it
11. Continue slowly raising the system master volume until the system is just over the level required for the performance. Now back off the master volume slightly so the system is not on the brink of another feedback point
12. The AFW-1 is now ready for use. It will lock these fixed filters on the feedback frequencies, and leave a further 3 filters 'floating', to pull out any other feedback during the performance if it occurs
13. Reset the Limiter at say, +3dB, or the maximum safe level of your system
14. The Clip LED may flash on transients - this is normal. But if it is lit continually, then the level through the unit is too high and should be reduced. To do this, bring down the master faders on the console a little, and bring up the output gain of the AFW-1 by the same amount. Perhaps you have the Limiter set too low, so it's continually on. Or you could try increasing the crossover output slightly. You could also make sure the amplifiers are on their maximum level. Or you may have too little system for the sound pressure level you want in too big a room. That's one thing we can't fix!

Introduction

Thank you for choosing this ARX AFW-1 Anti-Feedback Workstation. It's a great product, and we hope you enjoy using it as much as we enjoyed creating it. As with all ARX equipment, it has undergone extensive factory calibration and 'burn in' before shipping. Since it involves a few radical departures from the normal way that we think of equalizers, for continued trouble free use please familiarise yourself with the contents of this manual before using the AFW-1 Anti-Feedback Workstation.

About the AFW-1

Tuning a live sound system, whether it's a concert or a conference or all points in between, is a complex procedure at the best of times! Stopping feedback is only a part of it - you still need to adjust the actual sound of the system in the room.

In the ideal world you'd have an equalizer to set the system curve, something to eliminate feedback, and something else to keep the system level under control.

So, we'd like to introduce you to the ARX contribution to the ideal world - the all-new ARX AFW-1 Anti Feedback Workstation. A single channel unit incorporating a 30 band graphic equalizer, a smooth sounding peak limiter, and onboard *genuine* Sabine FBX Feedback Exterminator circuitry.

Want total control over everything? You've got it.

Want automatic feedback locating and suppressing? You've got that too.

Want a safety valve that'll keep your system in one piece? You've got that as well. All integrated into one 2 RU package, all designed to work with each other, and with you.

If the system is in a fixed installation, simply power everything down when you've finished. The AFW-1 remembers your anti-feedback settings next time it is used - there's no need to reset the circuit when it is turned back on.

The ARX AFW-1 Anti Feedback Workstation has an application for every mode of live audio: Monitors, Front of House, Church installations, TV audience monitors, Conferences; in fact, anywhere there's a live microphone, there's a need for the AFW-1.

In the next few pages you'll discover how to set up your AFW-1, where to use it, and how to get the most out of it.

Please take the time to read this manual. If you can't wait, then go straight to Page 4 and at least read the Quick Reference Guide. It'll get you started.

AFW-1 QUICK REFERENCE GUIDE

If you can't wait to use the AFW-1, at least read this page first!

1. To install the AFW-1 in a sound system, connect it wherever a Graphic EQ would go. For example, between the Mixing console and the Power amps
2. Connect up and position the speakers and microphones where they will be used during the performance. Don't place the microphones facing into the speakers!
3. Set the Limiter Threshold at -10dB
4. Check that the Anti Feedback ACTIVE and Unit ACTIVE switches are pressed IN and not Bypassed
5. Adjust the EQ section of the AFW-1 to set the system curve that you want. DO NOT NOTCH FOR FEEDBACK. The EQ sliders should form a smooth curve.
6. Set the channel levels on the console at the performance level. Reduce mixing console master levels
7. Press the switch marked 'PRESS AND HOLD FOR 4 SECONDS TO RESET' on the front of the AFW-1 for 4 seconds
8. SLOWLY bring up the console's master faders until feedback starts to occur. The AFW-1 will detect and quickly remove it.
9. Continue increasing the master level until the required volume level is reached
10. The AFW-1 is now ready for use. It will lock these feedback frequencies, and leave a further 3 filters 'floating', to pull out any other feedback during the performance if required
11. Reset the Limiter at +3dB or the maximum safe level of your system
12. The Clip LED may flash on transients - this is normal. But if it is lit continually, then the level through the unit is too high and should be reduced
13. The AFW-1 will remember its settings the next time it is turned on and will not need resetting if the room or system has not changed.
14. For best results the unit should be reset if there has been any change in the room or system that may change the feedback characteristics
15. Don't reset the unit during the performance!

The result is that the overall program gain is increased 6 or more dB and provides much clearer and more natural sounding speech and music. And since it is fully automatic, no operator is required.

The digital filters inside the AFW-1 are switchable between 1/5th octave and 1/10th octave. 1/5th is recommended for speech applications, such as conferences, speeches, etc, and 1/10th is recommended for music applications.

Before changing this switch, you must first power down the system. Then switch the filter to the setting required. Power up the system again, and during its turn on self test the AFW-1 will change the filter setting. The system should be RESET after doing this, by following the Setup procedure detailed below.

About the Filters

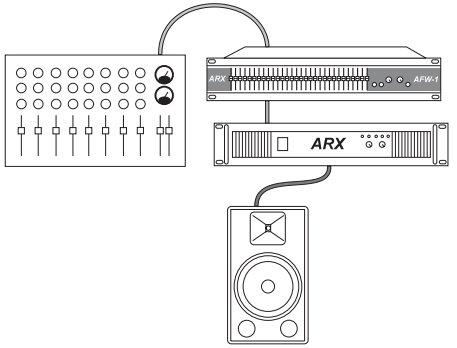
The Anti Feedback section has two types of filters - fixed and dynamic.

Fixed filters retain their frequency center points in memory until the unit is reset by the user. These filters are set in the AFW-1 initialization procedure by the strongest resonating frequencies to provide the system's gain before feedback.

Dynamic filters control intermittent feedback that comes and goes throughout the performance, such as feedback from moving wireless microphones, getting too close to speakers, monitors, that sort of thing. They are automatically reassigned to new frequencies as feedback occurs on a first in - first out protocol.

The Anti Feedback section circuitry has a total of 9 filters; 6 fixed and 3 dynamic filters. This has proven to be the best combination for most applications.

Where To Install The AFW-1 In The Signal Path.



The AFW-1 can be placed anywhere in the system that a line level signal is available. However, best results are obtained if it is placed last in the chain before the power amplifiers.

If you are using a 2 or 3 way or more system, with an active crossover before the amps, then naturally the AFW-1 will go before the crossover

The Limiter Section

The Peak Limiter in the AFW-1 has been included to let you set an absolute ceiling on the output level.

Its attack and release times are program dependent and have been optimized to appear as transparent to the ear as possible.

However, remember that it ***is*** a Limiter, and should be set at a level that coincides with the onset of clipping in the system, where ideally it is not going to be active for the bulk of the time.

AFW-1 Reference Guide

Graphic Equalizers are great products, and are extremely useful tools for professional audio engineers. But, they do require a fair degree of knowledge to operate them successfully.

Feedback Exterminators are great, too, because they automatically find frequencies that are feeding back and pull them down. But, that's all they do. You can't tune the system with them - for that, you need an equalizer, usually a Graphic Equalizer.

In the ARX AFW-1 Anti-Feedback Workstation, we've combined the two products described above, to give users the best of both worlds. An equalizer, to tune the sound of the room / system, and an FBX Anti Feedback to automatically pull out any feedback.

And, as a very useful added bonus, we've included a smooth sounding Peak Limiter to ensure that the signal stays within the level that you decide.

So let's work our way through the operation of the AFW-1, from start to finish.

The Equalizer Section

The EQ section of the AFW-1 has been designed without compromise as a totally accurate professional third octave equalizer, with innovative 'Constant Q' circuitry. Constant Q is a true WYSIWYG (What You See Is What You Get) design concept that allows far more accuracy in EQ control.

Its 30 smoothly damped, centre grounding sliders can be adjusted to give a maximum of 10dB cut or boost. The Q of the filter has been specifically optimised to allow easy combining of the filters. This enables you to set up a musical, notch free system curve.

Using the EQ section

The idea of the EQ section is to 'tune' the room to the system, and to 'tweak' the response a little so that it sounds good. We're not going to use it to notch out feedback - we've got the Anti Feedback section for that - but to adjust the overall sound of the system so it doesn't sound 'boomy' or 'harsh'. So, play a tape or CD that you're very familiar with, and adjust the sliders on the EQ section so that the system sounds 'just right'.

Note that a little EQ is a lot, so use each fader gently. Avoid any sudden dips or peaks - that's not what it's there for. The look of the sliders should resemble a smooth curve. If you don't need to move it, then leave it.

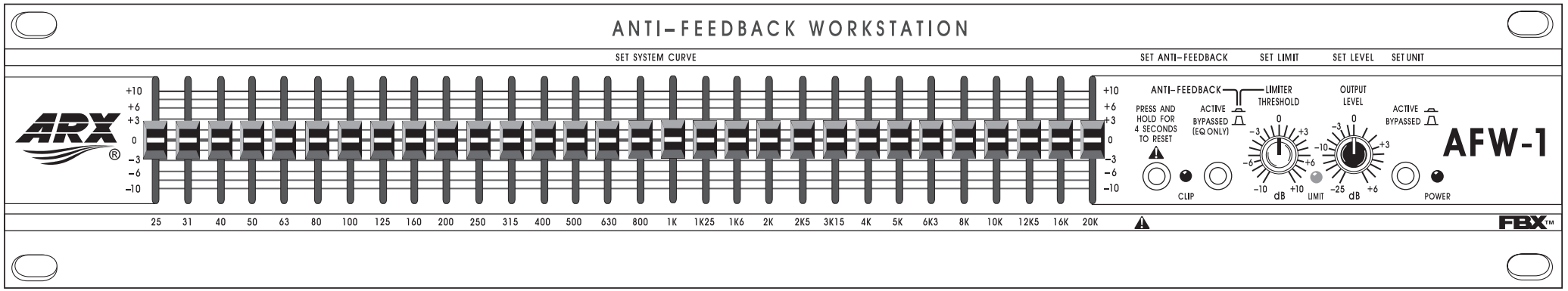
Avoid too much boost at lower frequencies. Very few systems can deliver much response below 30 Hz, so it's pointless pushing those sliders up. However 50 to 100Hz can often benefit from a little boost, as can 10KHz. Between those points it should be a smooth succession of gentle curves.

The Anti Feedback section

The Anti Feedback section of the AFW-1 is essentially a computer controlled parametric equalizer which continuously searches for feedback. Once feedback is detected, it extinguishes the feedback automatically by inserting a very narrow notch filter directly on the feedback frequency, only as deep as necessary to control the feedback. It finds and eliminates feedback typically in less than one second.

AFW-1 Specifications

Input Impedance
20 K Ohm Balanced
Output Impedance
300 Ohm Balanced
Nominal Operating Level
+4dB
Maximum Input Level
+20 dB
Maximum Output Level
+20 dB
Dynamic Range
110 dB
Signal to Noise Ratio
-90dB Unweighted
Distortion
0.01% @ 1 KHz, +4dB
Frequency Response
20 Hz to 20 KHz, 0.5 dB
Equalizer Filters
30 x 1/3rd octave Constant Q on standard ISO frequencies
Equalizer Range
±10dB cut or boost
FBX Filters
6 fixed, 3 dynamic
FBX Filter Range
51Hz to 17 KHz
FBX Filter Width
Switchable 1/5th or 1/10th octave
FBX Filter Depth
0dB to -40dB
Peak Limiter Threshold
-10 dB to +10 dB, user variable
Limiter Status Metering
Amber LED: Limiter Active
AC requirements
90-120 or 220-240 VAC, 50-60Hz, 18 VA
Size 482 x 88 x 230 mm
19"W x 3½"H x 9"D



Front Panel Controls

1. 30 smoothly damped, centre grounding sliders per channel, on standard ISO frequencies
2. Reset control for Feedback Exterminator circuitry
3. Clip LED indicates imminent clipping, monitored at all vital stages throughout the AFW-1
4. Active/Bypass switch for Feedback Exterminator, Limiter and Output level controls
5. Limiter Threshold and Limit LED
6. Hardwire Active/Bypass switch for unit
7. Power LED indicates AFW-1 is connected to AC power

Rear Panel Connectors

1. Balanced Input TRS socket. Tip + HOT, Ring — COLD, Sleeve GROUND
2. Balanced Input XLR type. Pin 2 + HOT, Pin 3 — COLD, Pin 1 GROUND
3. Balanced Output XLR type (same wiring as Input)
4. Balanced Output TipRingSleeve jack socket (same wiring as Input)
5. Feedback Exterminator filter width switch
6. Audio Ground Lift switch
7. IEC 3 pin AC connector and integral fuseholder. RISK OF FIRE - Replace fuse with correct value only: 90 - 120 V AC 1 amp, 220-240 V AC 0.5 amp. Please also refer to voltage details on Page 2