

WAPFACTORY™

THE ULTIMATE VOCODER



English v1.1



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user 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 to persons.



The exclamation point within a equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instruction in the literature accompanying the product.

INSTRUCTIONS PERTAINING TO A RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSON

**IMPORTANT SAFETY INSTRUCTIONS
READ AND SAVE THESE INSTRUCTIONS**

WARNING - When using electric products, basic precautions should always be followed, including the following:

1. Read all the instructions before using the product.
2. Do not use this product near water - for example near a bathtub, washbowl, kitchen sink, in a wet basement, or near a swimming pool, or the like.
3. This product should be used only with a cart or stand that is recommended by the manufacturer.
4. This product, either alone or in combination with an amplifier and headphones or speakers, may be capable of producing sound levels that could cause permanent hearing loss. Do not operate for long period of time at high volume level or at a level that is uncomfortable. If you experience any hearing loss or ringing in the ears, you should consult an audiologist.
5. The product should be located so that its location or position does not interfere with its proper ventilation.
6. The product should be located away from heat sources such as radiator, heat registers, or other products (including amplifiers) that produce heat.
7. Clean only with a damp cloth. Before cleaning the unit, turn off the power and unplug the power cord from the outlet.
8. The power supply cord of the product should be unplugged from the wall outlet during lightning storms or when left unused for a long periods of time.
9. Use only with attachments/accessories specified by the manufacturer.
10. The product should be serviced by qualified service personnel when:
 - A. The power supply cord or the plug has been damaged; or
 - B. Objects have fallen, or liquids has been spilled into the product; or
 - C. The product has been exposed to rain; or
 - D. The product does not appear to be operate normally or exhibits a marked change in performance; or
 - E. The product has been dropped, or the enclosure damaged.
11. Do not attempt to service the product beyond that described in the user maintenance instructions. All other servicing should be referred to qualified service personnel.

For the USA

This product may be equipped with a polarized line plug (one blade wider than the other). This is a safety feature. If you are unable to insert the plug into the outlet, contact an electrician to replace your obsolete outlet, Do not defeat the safety purpose of the plug.

For Canada

For Polarized Line Plug:
Caution: TO PREVENT ELECTRIC SHOCK, MATCH WIDE BLADE OF PLUG TO WIDE SLOT, FULLY INSERT.
Attention: POUR ...VITER LES CHOCS ...LECTRIQUES, INTRODUIRE LA LAME LA PLUS LARGE DE LA FICHE DANS LA BORNE CORRESPONDANTE DE LA PRISE ET POUSSER JASQU' AU FOND.

For the U.K.

IMPORTANT: THE WIRES IN THIS MAINS LEAD ARE COLOURED IN ACCORDANCE WITH THE FOLLOWING CODE:
BLUE: NEUTRAL
BROWN: LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in you plug, proceed as follows.
 The wire which is coloured BLUE must be connected to the terminal which is marked with the letter N or coloured BLACK.
 The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.
 Under no circumstances must either of the above wires be connected to the earth terminal of the three pin plug.

Welcome to the world of Electrix! We would like to thank you for purchasing WarpFactory, The Ultimate Vocoder for musicians, DJs, producers and engineers. WarpFactory is a unique new product with sound shaping capabilities never before offered.

With WarpFactory incredible sounds can be created. The basic principle of WarpFactory is that one signal 'Warps' another. This is accomplished by using two inputs:

- ***The Source - the sound to be shaped***
- ***The Formant - the signal to shape the source***

Formants are the resonances we form with our mouths and throat to articulate vowels and consonants. The formant is then superimposed on the source sound forming an effect that can be very human-like. This can be like having a speaker in the throat.!

Give WarpFactory a source such as a sampler, turntable, synthesizer or guitar. You can derive a formant signal from a microphone and your voice or you can use other inputs such as a drum-machine, turntable or ...well, get creative.

Unlike traditional vocoders, WarpFactory uses a powerful DSP (Digital Signal Processor) to run a proprietary physical modelling algorithm instead of traditional multiband analog filtering.

WarpFactory's unique ***future / retro*** case was designed to allow both desktop and rackmount installation. This concept makes WarpFactory's control surface optimum for live performance as well as studio use.

As an added bonus, WarpFactory has a built in phono pre-amp so you can plug your turntable directly in. This allows you to cue the effect before it goes to the house by using the cueing feature of your mixer. In the studio full MIDI implementation makes FilterFactory the perfect recording tool. You can play the FilterFactory live and capture your performance in a sequence.

▶ **INSPECTION**

In your Electrix box you should find:

- ***1 Electrix WarpFactory***
- ***1 Manual***
- ***1 Rackmount kit***
- ***1 Warranty Card***
- ***1 EIC Power Cable appropriate for your region***

If this is not the case then please call your local Electrix distributor, agent or dealer.

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1. QUICK START

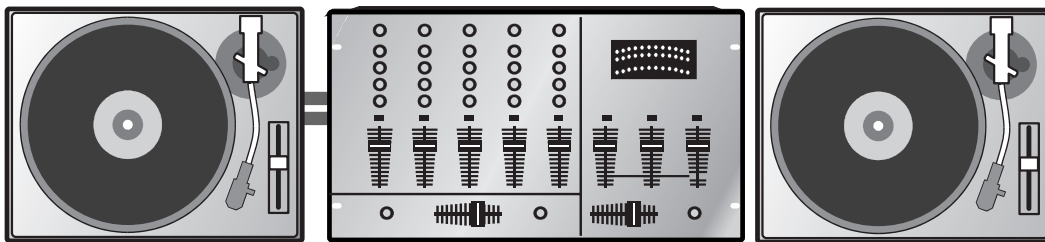
WHAT TO PLUG IN

Here's the simplest way to get sound out of your Electrix WarpFactory:

Set formant input to "Auto".

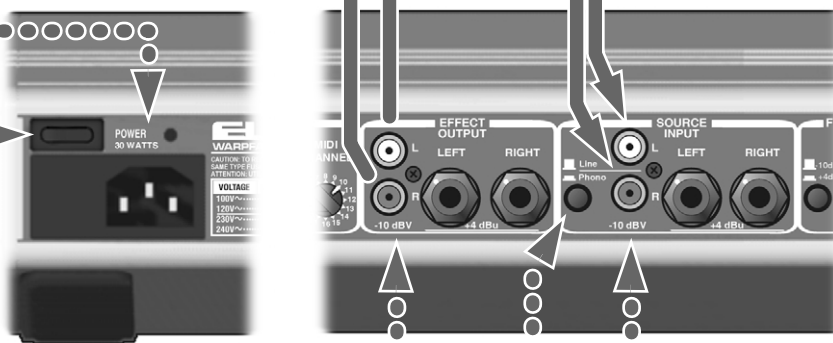


Set Gender, Q and Order like this.



Plug in AC here.

Turn it on.



Use these line level outputs to connect to your mixer or power amplifier.

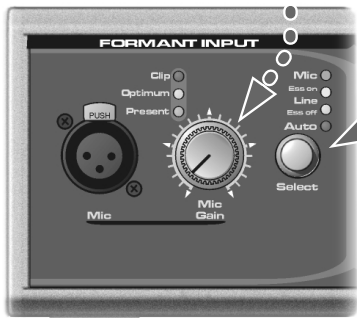
Turn on the phono pre-amp.

Plug in your turntable here.
Phono Inputs.

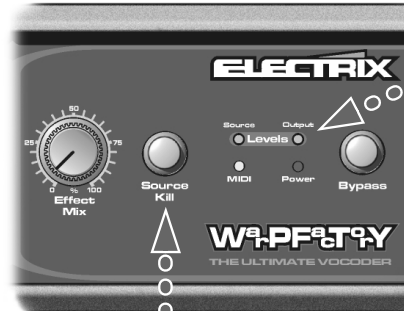
1.2 WHAT TO DO

Selects Formant Input. "Ess On" will give you a Vocoder effect. "Ess Off" is better for modulating music with another music source. Auto mode needs no formant input. It routes the source input to the formant input as well.

Aadjust the mic gain until the "Optimum" LED lights solid when speaking into the microphone.



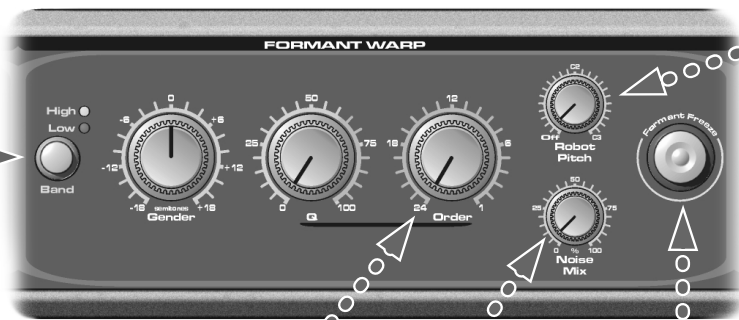
Green and orange indicate optimum source levels, red means that the input being overdriven to clipping



Works like an automatic gate for mic input. When source kill is engaged, WarpFactory will only pass sound while there is a formant input.

Introduces a synth waveform to the source input. Try this with the MIC in and no music for the classic Vocoder sound.

High Band works best for most types of music. Low Band is better for effecting drums and bass.



Effects the Resolution of the Warp effect from clearer to granular

Introduces broadband noise to the source signal.

Freezes the vowel/Warp sound while allowing tweaking the other controls

2. UNDERSTANDING THE PRODUCT

2.1 FRONT PANEL

Note that there are no input or output level controls on the front panel. WarpFactory has been designed to give you Unity Gain when in Bypass mode or when the Effect Mix control is at 0%. Audio signals passing through WarpFactory are not boosted or reduced in gain. When using a line level input (as opposed to a turntable) set the output level from the mixer or source so that WarpFactory's Input Level LED does not remain in "red". Note: it is best to keep all input levels in the "orange", if possible, as this is the optimum WarpFactory operating level.

- ▶ **Mic Input:** You can connect a microphone to this XLR input to control the formant. There is also a line input on the back panel that can control the formant.
- ▶ **Mic Gain:** Use the Mic Gain control to set the proper level for your microphone input. Talk into the mic and set the mic gain to where the Optimum LED lights when you talk. Your signal should only clip occasionally. The Formant Input LEDs will also light when a Line Input is used.

• WHAT IS ESS:

Speech incorporates many types of sounds. One type of sound common to both speech and singing is Sibilance.

Sibilance is the S in 'this' or the CH in 'check'. WarpFactory deals with sibilance differently than traditional analog vocoders.

With 'Ess on', WarpFactory will preserve speech intelligibility even over the most complex of music signals. This is the normal operation of WarpFactory.

Ess off turns that feature off and disregards sibilance. This is useful for driving the Formant input with signals other than voice.

▶ **Formant Input Select:**

Mic: Uses the front panel microphone input as the formant source. **Line (Ess on):** Uses the line input for Formant control. Ess enhances articulation for better intelligibility. This is best for vocal based formant signals.

Line (Ess off): Best for non-vocal inputs.

Auto: Routes the source input to the formant input, so that the music is 'warping' itself.

Band High/Low: This control has the effect of favoring the upper or lower harmonics of the source. Select "Low" for Drum and Bass types of sound. Use "High" for keyboard pads and full range source material.

- ▶ **Gender control:** The Gender control moves the harmonic content of the formant up or down without affecting the fundamental pitch of the musical source. When using the microphone formant input, the Gender control will make the formants deeper (left) or thinner (right).

- ▶ **Q control:** This controls the width of the Warp filters. Lower settings will smooth the effect out so much that it may not be audible. A higher Q setting will give a much more pronounced "tubular" effect. A good place to start is with this control in the far left position.

- ▶ **Order:** This sets the resolution of the filter algorithm. Lower Order settings will give a more "granular" Warp effect, especially when combined with higher settings of the Q control. The maximum position (24) offers the highest resolution, (or intelligibility) when speaking into the microphone.

Robot Pitch: We have included an oscillator to make it easy to get a Vocoder effect without having to supply a synthesizer into the source input. To use this feature, talk into your microphone while having the Mic or Line input selected. Set the Robot pitch to the desired frequency and talk away.

- ▶ **Noise:** This introduces White Noise. The Noise is affected by the various Warp settings. This will give things a dirtier, more harsh sound. (And you put all that effort into making your music sound cleaner...). Try adding a small amount of noise while vocoding to make spoken words sound cleaner.
- ▶ **Freeze Button:** Freezes the formant shape. It's like locking the warp filter. This is cool for creating infinite syllables, i.e. 'I love youuuuuuuuuuuuuuu'. Freeze allows you to sing your own filter shape and lock it in. When a formant is frozen, adjustments of the Gender control will sound like a sweeping filter on the signal.
- ▶ **Source Kill:** When the Source Kill is On, the source signal will come out of the WarpFactory only while you are talking into a microphone that is plugged into the Formant mic input. i.e. When you stop talking into the microphone, WarpFactory will go quiet. When the Source Kill is Off, the WarpFactory will switch to the dry signal when the microphone is not in use.
- ▶ **Effect Mix:** This controls the Mix of the Warp effect in relation to the dry signal. 0% is totally dry, or the same as bypassing WarpFactory. 100% is totally wet with none of the dry signal audible.
- ▶ **Bypass:** This will bypass the Warp Effect.

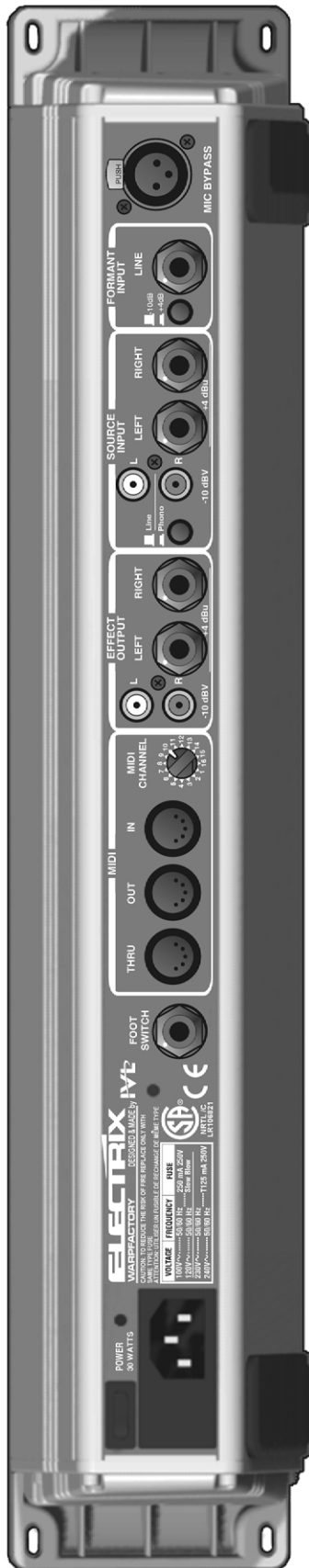


2.2 BACK PANEL

- ▶ **Power input** This input will accept an IEC standard power cable. The internal power supply can be used in any country. The fuse drawer can be rotated to accommodate different power ratings from 100v to 240v. Check the printed chart near the power entry for fuse ratings.
- ▶ **Power Switch** This turns the unit on and off. When turning on equipment, be sure to switch the power amplifiers on last. This will ensure that any noise common to audio mixers and signal processors will not cause damage to the speakers. When powering down the system, be sure to turn the power amplifiers off first to avoid creating "spikes" which can also damage the speakers.
- ▶ **Footswitch** A standard momentary footswitch can be used to control the Bypass of WarpFactory. Both normally open or normally closed footswitches can be accepted by WarpFactory, however the footswitch must be connected before the power is turned on in order for WarpFactory to recognize this.

2. UNDERSTANDING THE PRODUCT

2.2 BACK PANEL



▶ **MIDI In/Out/Thru** - Connect any MIDI devices here. See the MIDI Applications section for more detail.

▶ **Channel Select** This selects the channel for both MIDI input and output.

▶ **Effect Output**

RCA -stereo. The RCA output level is +4 dBu.

1/4"-stereo. This output produces a balanced +4 dBu signal.

Note: connecting both RCA and 1/4" inch jacks to the inputs at the same time causes the level of the 1/4" input to drop. Make sure that when using the 1/4" inputs that nothing is connected to the RCA inputs.

▶ **Source Input** This is the sound to be shaped.

- **Phono/Line Switch** - this switches the RCA inputs to accept phono or line level.

- **RCA -stereo** - when the Phono/Line switch is in the Line position, this input is optimized for a +4 dBu input signal. When the Phono/Line switch is set to Phono, this RIAA phono pre-amp will accept a range of cartridge output levels.

Note: when using a turntable connected to the RCA input, the output should still be connected to a line input on the mixer.

- **1/4"-stereo TRS Balanced** This input is optimized for +4 dBu input signal. When using the 1/4" inputs be sure to use the 1/4" outputs also to ensure there is no signal loss.

▶ **Formant Input** This is the signal input to shape or "Warp" the sound.

- **1/4" unbalanced input.**

- **+4, -10 Switch.** This sets WarpFactory's input level sensitivity to either of these nominal levels. If it is set incorrectly, audio distortion may be experienced (+4 signal into a -10 input) or excessive hiss (-10 signal into a +4 input).

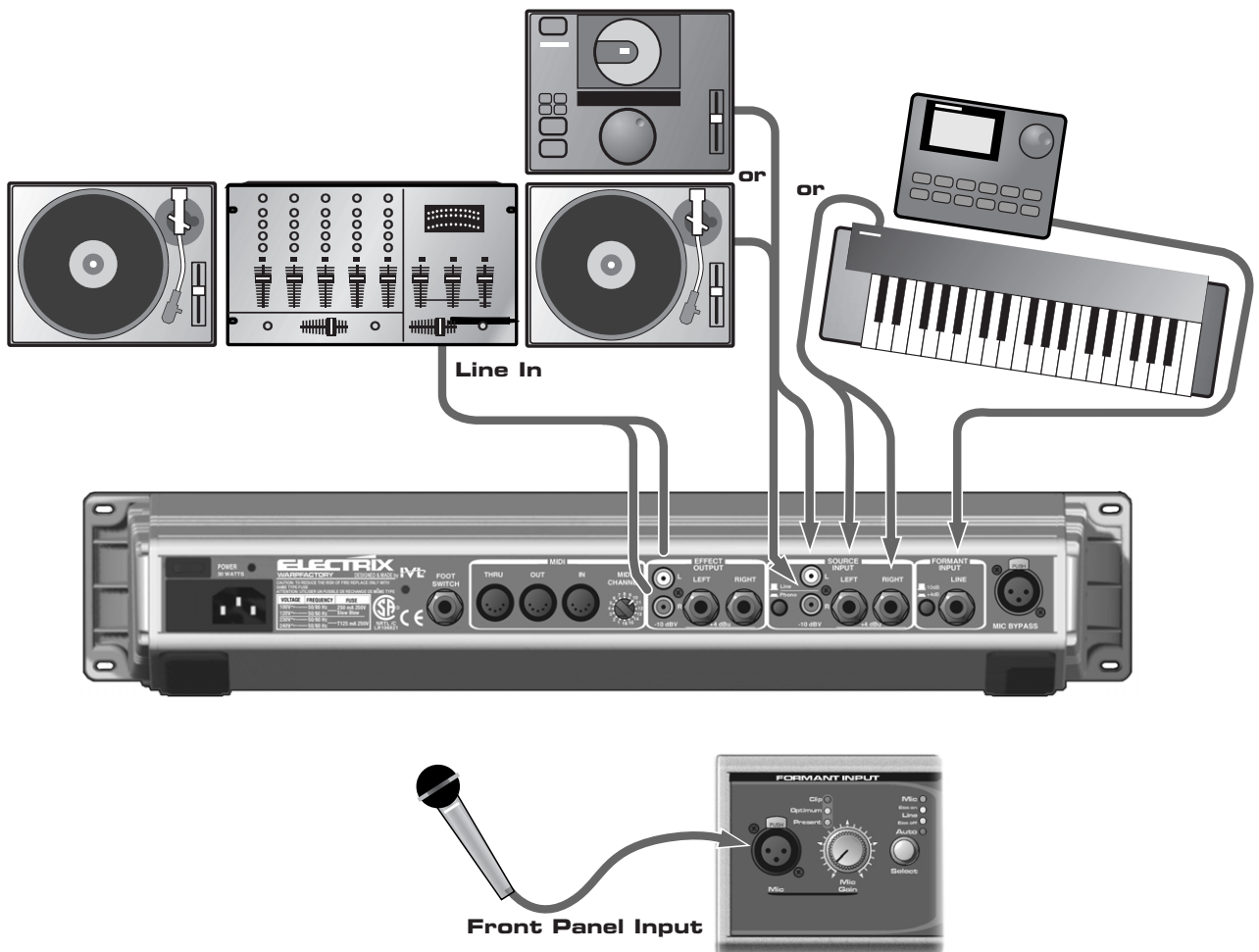
▶ **Mic Bypass Output** This is a bypass for your microphone signal. Connect a Microphone cable from the Bypass Output to the microphone input on the mixer. If the mixer has Phantom power, ensure that it is switched off before connecting WarpFactory's Microphone thru to the Microphone input on the mixer. If this is not done, the phantom power will disrupt the Microphone bypass signal completely and cause a substantial "thump" when bypassing WarpFactory.

3. PERFORMANCE GUIDE

3.1 SET UP 1: PRE-MIXER

All sound sources are connected directly to the WarpFactory. The output is then fed into the audio mixer. The level of the Warp effect is controlled using WarpFactory's wet/dry Effect mix.

The advantage of this setup in a live situation is that the WarpFactory effect can be auditioned (cued) through the mixer while other sources are playing.



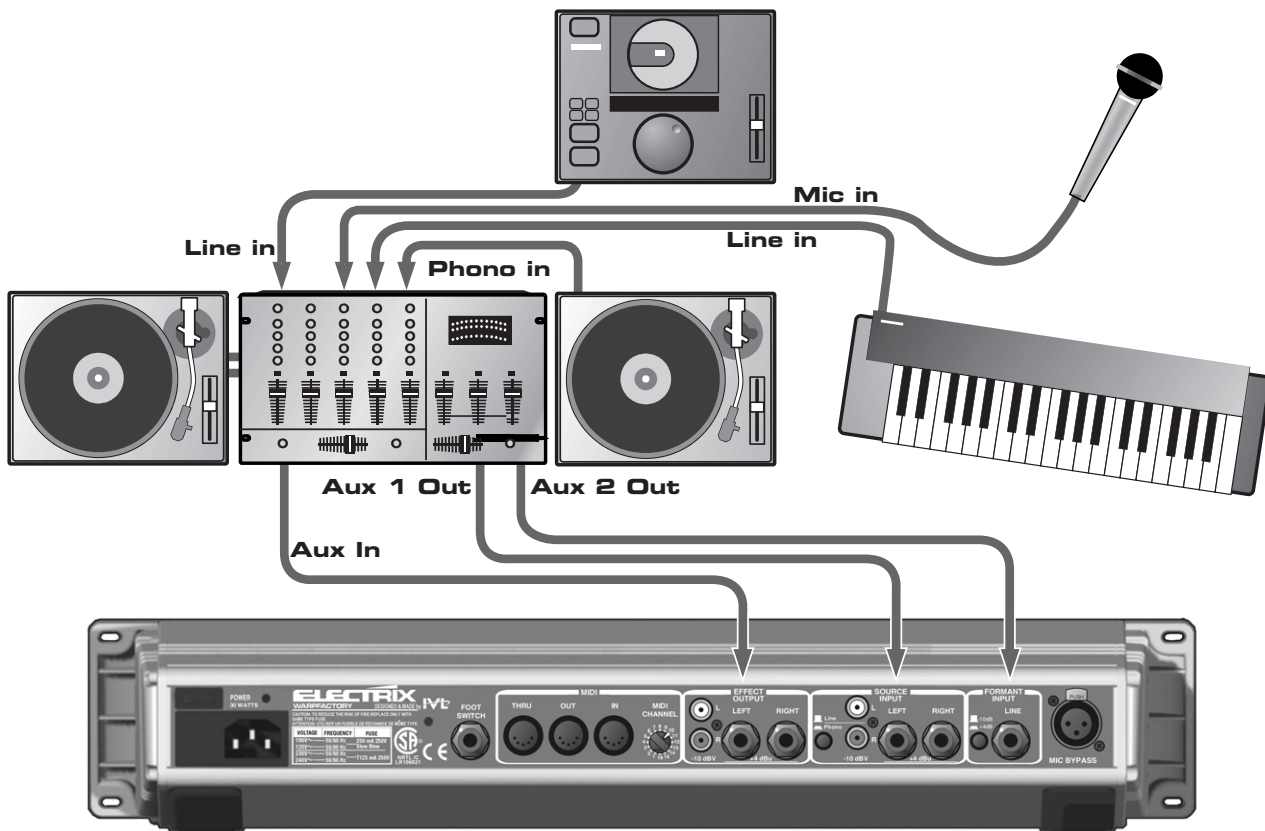
3. PERFORMANCE GUIDE

3.1 SETUP 2: MIXER WITH AUX SENDS

This setup requires a mixer that features auxiliary (aux) send and return capabilities. All audio sources are connected directly to the mixer channel inputs. WarpFactory is fed its Source and Formant signals from the mixer's aux sends.

The primary advantage of this setup is that it allows for any or all of your sound sources to be routed to the source or formant input. The Effect Mix control should be set to 100% wet in order that the dry source signal is only heard through the mixer.

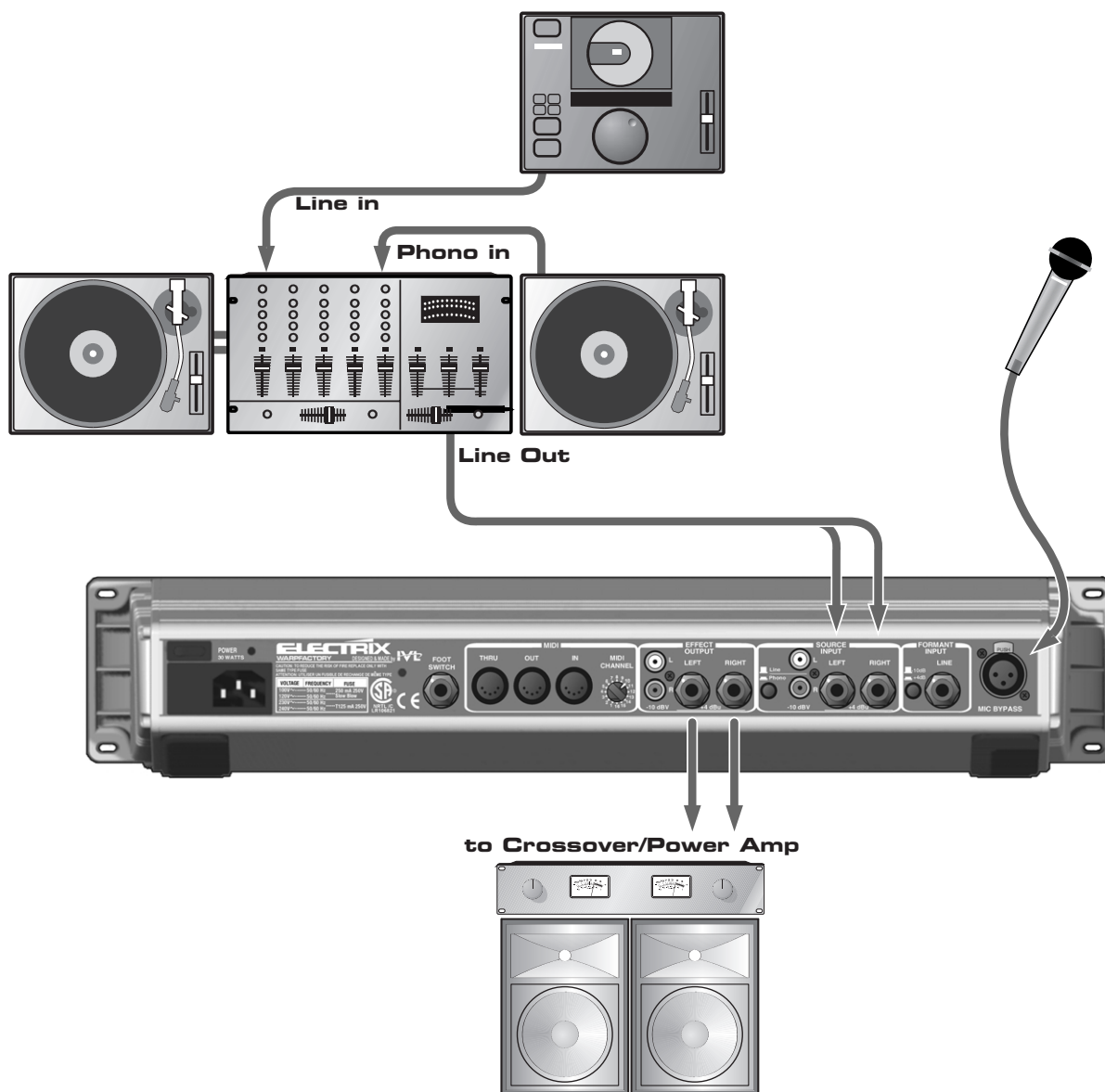
If the mixer has enough aux sends you can create some interesting sounds by sending one source (or mix of sources) to WarpFactory's left input and another to the right.



3.1 SET UP 3: POST MIXER

This is a simple setup for stereo processing of the entire mix. Selecting the Mic or the Auto settings for the formant input will provide plenty of sonic possibilities. Use this setup only after you have explored all the sonic possibilities of WarpFactory because cueing is not possible. The cueing limitation can be minimized by bringing in the effect gradually with WarpFactory's mix control and then making any adjustments from there.

The 1/4" output has a servo driver circuit which is capable of driving longer cables to the power amp.



3. PERFORMANCE GUIDE

3.2 ARTIST APPLICATIONS

▶ Auto Warp

Set the Input Select to Auto which will connect the source as its own formant input to create some interesting Warp effects. The advantage of this setup is that no additional formant input is necessary. This is the quickest method to get warped audio out of the WarpFactory.

Formant Input Select:	Auto
Band:	Low
Gender:	To taste
Q:	0 to start but higher values offer more Warp effect
Order:	24 for clarity but sweeping the Order knob when the Q is set to high values is cool too.
Robot Pitch:	Off
Noise Mix:	Off
Effect Mix:	To taste
Source Kill:	Off

▶ Percussion Warp

With this setup, a percussion source applies Warp formants to another non-percussive source. Two audio sources are required: percussion for the Formant input and a sustained synthesizer pad sound, for example, for the Source input. When using a rhythmic sound for the Source input, this should be beat synchronized to the Formant input for optimum effect.

Formant Input Select:	Line Ess Off
Band:	Low
Gender:	To taste
Q:	Set it high
Order:	Sweep it.
Robot Pitch:	Off
Noise Mix:	Off
Effect Mix:	To taste
Source Kill:	Off

▶ **The Robot Voice Effect**

With this setup, no audio source is required. A microphone connected to the mic input is sufficient. The following settings are intended as a guide only. Adjust any of the parameters. Be creative!

Formant Input Select:	Mic
Band:	High
Gender:	0
Q:	0
Order:	24
Robot Pitch:	Choose a specific pitch or sweep it while you talk
Noise Mix:	To taste
Formant Freeze:	Off, however turning it on at the end of a word produces an infinite sustaining vowel.
Effect Mix:	100% wet
Source Kill:	Off

▶ **The Classic Vocoder**

To achieve a classic vocoder sound, connect a microphone to the Formant input and a keyboard into the Source input. Select a string pad patch on the keyboard and talk into the microphone. Set the Effect Mix (wet/dry) control to 100% wet.

This effect works best with “buzzy” sounding synthesizer pads for the Source input and a mic. Experiment with different vocal sounds such as growls or squeals, or a sustained “ooooooooeaaaaaa” for example. Single line melodies played on the synth can be “sung” if you vocalize while playing.

Formant Input Select:	Mic
Band:	High
Gender:	0
Q:	0
Order:	24
Robot Pitch:	Off
Noise Mix:	A very small amount can help clarity and add a whisper-ey quality
Formant Freeze:	Off, but turning it on at the end of a word produces an infinite sustaining vowel.
Effect Mix:	100% wet
Source Kill:	Off

4. MIDI

4.1 RECORDING PERFORMANCES TO A SEQUENCER

Electrix products are real performance products. They have been designed with this in mind and can accurately transmit and receive your performance through MIDI. Every knob and every switch can be automated. To do this, simply connect the WarpFactory to a sequencer. WarpFactory has MIDI Control Change messages assigned to all of its functions. Any performance will show up in the sequencer as MIDI CC's (Control Change Messages).

Note that a press and hold of the bypass button will dump the present state of the controls. MIDI CC #116 will request a dump of state.

Setting the MIDI channel: On the back of the WarpFactory is a small rotary switch labeled MIDI channel. Use it to set the Transmit / Receive channel of WarpFactory.

4.2 MIDI IMPLEMENTATION CHART

Function		Transmitted	Recognized	Remarks
Basic Channel	Selectable	1-16	1-16	
Mode	Default Messages	X	Mode 3	
		X	X	
Note Number		X	X	
Velocity	Note ON Note Off	X X	X X	
After Touch		X	X	
Pitch Bender		X	X	
Control Change	102 103 104 105 106 ¹ 107 108 110 ² 111 112 ³ 113 ⁴ 115 ⁵ 116	0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0	Gender 4-124 (64 = no gender) Q 0 - 127 Order 2-24 Noise Level 0-127 Waveform Pitch 0-125 (0 = off) Freeze (0-63 off 64-127 = on) Warp Band (0-63 low 64-127 - high) Source Kill 0-90 Effect Mix 0-127 Bypass (0-63 off 64-127 on) Ess On/Off 0-3 Formant input select 0-2 Dump request
Program Change		X	X	
System Exclusive		X	X	
System Common	Song Position Song Select Tune Request	X X X	X X X	
System Real Time	Clock Commands	X X	X X	
Aux Messages	Local On/Off All notes Off Active Sensing System Reset	X X X X	X X X X	
<p>Notes</p> <ol style="list-style-type: none"> 0=mute. Values 1 to 125 increase pitch in 0.25 semitone steps from FO - C3. The front panel Source Kill switch toggles between values of 20 and 90. CC edit allows fine threshold control between 0 and 90. When bypass is held for 2 seconds, it will send CC values for all controls. This will ensure that all parameters are stored during recording even when only one control is swept. Will select Ess value only when Mic or Line input is selected. When formant input is set to auto, this CC will have no effect. If Ess value 1 - 3 is received when Line is selected for formant input, the formant input selected will change to Line (voice). Selects formant input. 0 = mic, 1 = line, 2 = auto. 				
Mode 1: OMNI ON, POLY		Mode 2: OMNI ON, MONO		0: YES
Mode 3: OMNI OFF POLY		Mode 4: OMNI OFF MONO		X: NO

5. SPECIFICATIONS

INPUT					
	SOURCE	SOURCE	SOURCE	FORMANT	FORMANT
Connectors:	1/4" TRS (balanced)	RCA(phono)	RCA(line)	1/4"TS	XLR
Max Input Level:	+16.0 dBu	-24.5 dBV	+16.0dBu	+16.0 dBu	+3.5 dBu
Impedance:	66K Ω	48.5K Ω	66K Ω	20K Ω	2K Ω
OUTPUT		EFFECT OUTPUT		MIC BYPASS	
OUTPUTS					
Connectors:	1/4"TRS bal		RCA		XLR
Impedance:	450 Ω		1K0 Ω		210 Ω
Max Output Level:	+16.0 dBu		+16.0 dBu		+13.0 dBu
PERFORMANCE					
	1/4"	PHONO	RCA		MIC BYPASS
Dynamic Range:	>90db	>78db	<85db		>115db
THD:	<0.04%	<0.05%	<0.05%		<0.001%
Frequency Response:	10Hz-14.3kHz	10Hz-14.3kHz	10Hz-14.3kHz		10Hz-30kHz
A to D Conversion:	18bit/31.250 kHz Sampling rate				CMRR > 50db
D to A Conversion:	18bit/31.250 kHz Sampling rate				
POWER CONSUMPTION					
30 watts	VOLTAGE	FREQUENCY	FUSE		
	100 V	50/60 Hz	250mA 250V Slow blow		
	120 V	50/60 Hz			
	230 V	50/60 Hz	125mA 250V "T"		
	240 V	50/60 Hz			

Actual measurements are subject to change

6. SAFETY & CONFORMITY

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to part 15 of the FCC rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment on and off, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult a qualified dealer or an experienced radio TV technician for help.

The user may find the following booklet, prepared by the Federal Communications Commission, helpful:

"How to identify and Resolve Radio/TV interference Problems."

This booklet is available from the US Government Printing Office, Washington, DC 20402, Stock No. 004-000-0034-4.

▶ **Caution:**

You are cautioned that any change or modifications not expressly approved in this manual could void your warranty.

▶ **For customers in Canada:**

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil Numérique de la Classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

▶ **Certificate of Conformity**

Electrix, a div. of IVL Technologies Ltd., hereby declares on their own responsibility that the following product:

Electrix WarpFactory

that is covered by this certificate and marked CE-label conforms with the following standards:

- EN 60065 Safety requirements for mains operated Electronic and related apparatus for household and similar general use
- EN 55103-1 Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use.
Part 1: Emission
- EN 55103-2 Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use.
Part 1: Immunity

With reference to regulations in following directives:

72/23/EEC, 89/336/EEC as amended by directive 93/68/EEC

Issued in Victoria, March 31, 1999 by Brian Gibson, Executive Vice-President, Research and Development