551E and 552E
Parametric Equalizers

User's Guide

551E / 552E

Symetrix

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Subject to change at our whim and fancy without notice.

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Thank you for choosing the 551E Five Band Parametric Equalizer or the 552E Dual Five Band Parametric Equalizer. [With the exception of Chapters 9 and 10, all text in this User's Guide is applicable to both the 551E and 552E. For brevity we will use the name "551E/552E" to refer to both units.] Both models deliver superior fidelity, flexibility, power, and precision through an unbeatable combination of wide dynamic range, ultra-low distortion, minimal phase shift and ringing, easy to use controls and rock-solid construction. The 551E/552E is a leap forward in affordable equalizer technology.

The five, fully parametric EQ bands are identical in function. Each delivers up to 12 dB of boost and 20 dB of cut, has an adjustable bandwidth control (from .05 octaves to 2 octaves), and a frequency control range from 10 Hz to 20 kHz. Use each band anywhere in the audio spectrum, not just the pre-selected ranges you find on most equalizers. This can be very useful in sound system work, among other things. For instance, you can use three bands to correct low frequency problems and still have two bands left for midrange and high frequency work.

You will find the 551E/552E is just as useful for recording and broadcast applications. The wide control range allows you to perform creative as well as corrective equalization. Sweetening vocal tracks, getting that huge drum sound, disk mastering, or perfecting your radio station's signature sound are the kinds of tasks that are well within the 551E/552E's capability.

As for sonic quality... Our proprietary topology delivers extremely low-noise audio performance - the kind you would normally expect only from a much more expensive unit. We have also included a servo balanced output that completely removes all DC offset, and direct-coupled input and output stages that maximize the 551E/552E's low-frequency response while minimizing noise and distortion.

Inside and out, the 551E/552E is designed to stand up to the worst abuse your roadies can dish out. The tour-worthy all steel chassis houses a double-sided fiberglass circuit board - a significant advantage over the more common phenolic PCBs. Gold-plated XLR connectors, a bypass relay, and high precision components ensure accuracy and reliability. Last, but not least, the 551E/552E has an internal power supply with a detachable cord.

Feel free to contact us if you have questions, comments or suggestions at:

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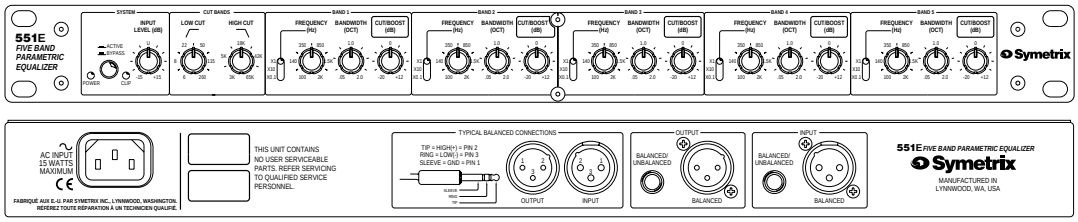
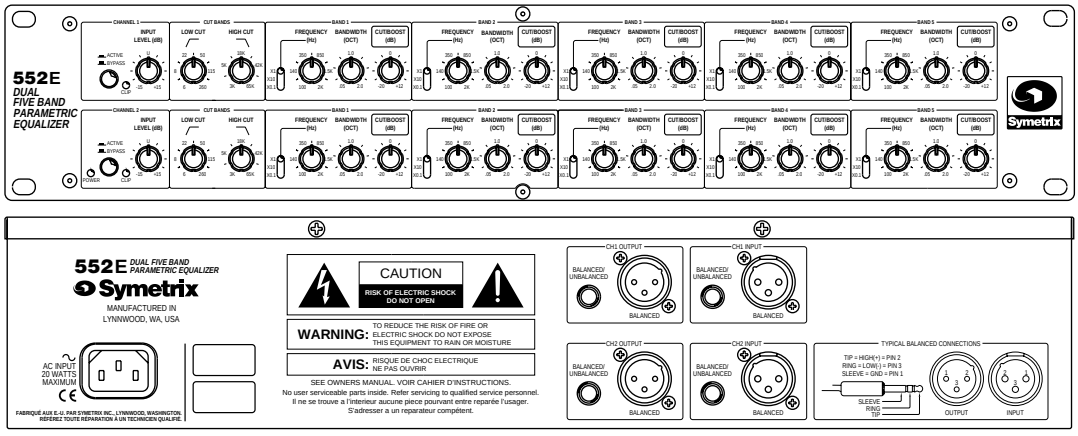


551E Front and Rear panels



552E Front and Rear panels

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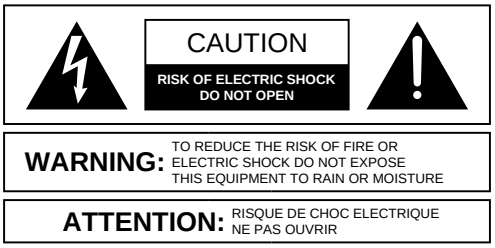
The information in this summary is intended for persons who operate the equipment as well as repair personnel. Specific warnings and cautions are found throughout this manual wherever they may apply; they do not appear in this summary.

The notational conventions used in this manual and on the equipment itself are described in the following paragraphs.

Equipment Markings



The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user of 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 an equilateral triangle is intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the 551E/552E (i.e. this guide).

Caution *To prevent electric shock, do not use the polarized plug supplied with the 551E/552E with any extension cord, receptacle, or other outlet unless the blades can be fully inserted.*

Terms

Several notational conventions are used in this manual. Some paragraphs may use Note, ***Caution***, or **Warning** as a heading or certain typefaces and capitalization are used to identify certain words. These are:

Note — Identifies information that needs extra emphasis. A Note generally supplies extra information to help you to better use the 551E/552E.

Caution — *Identifies information that, if not heeded, may cause damage to the 551E/552E or other equipment in your system.*

Warning — **Identifies information that, if ignored, may be hazardous to your health or that of others.**

CAPITALS — Controls, switches or other markings on the 551E/552E's chassis.

Boldface — Strong emphasis.

Power source - This product is intended to operate from a power source that does not apply more than 255Vrms between the power supply conductors or between either power supply conductor and ground. A protective ground connection, by way of the grounding conductor in the power cord, is essential for safe operation.

Danger from loss of ground - If the protective ground connection is lost, all accessible conductive parts, including knobs and controls that may appear to be insulated, can render an electric shock.

Proper power cord - Use only the power cord specified for the product. Use only a power cord that is in good condition.

Operating location - Do not operate this equipment under any of the following conditions: explosive atmospheres, in wet locations, in inclement weather, improper or unknown AC mains voltage, or if improperly fused.

Stay out of the box - To avoid personal injury or injury to others, do not remove the product covers or panels. Do not operate the product without the covers and panels properly installed.

This is the section for those of you who are *really* in a hurry and cannot take a moment to wade through another owner's manual. Just follow these steps:

1. Plug the 551E/552E into an AC outlet using the IEC-type detachable power cord.
2. Connect audio inputs and outputs. If you do not know how to do this, forget Fast Set-Up and read Chapter 5.
3. Push the Active/Bypass button IN.
4. Set the Input Gain control to 12:00 (unity gain).
5. Turn the Low Cut control fully counter-clockwise and the High Cut control fully clockwise.
6. Set all five Cut/Boost controls to 12:00 (zero detent).
7. You are ready to start.
8. Now read the manual.

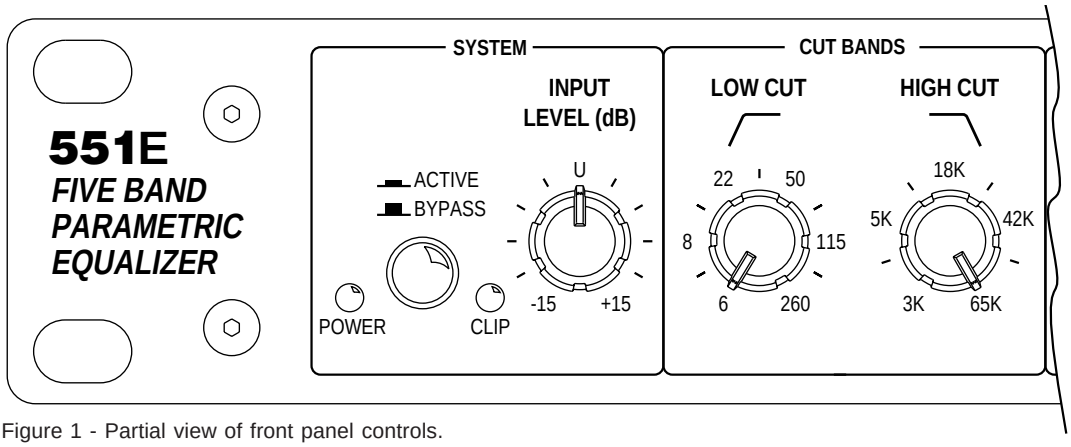


Figure 1 - Partial view of front panel controls.

[With the exception of Chapters 9 and 10, all text in this User's Guide is applicable to both the 551E and the 552E. For brevity we will use the name "551E/552E" to refer to both units.]

System Controls

Input Level

Use this control to adjust the input sensitivity by ±15 dB. Since the 551E/552E's input has 18 dB of headroom above +4dBm, the unity gain position (12:00) should work for normal operating conditions. However, if you apply extreme amounts of EQ boost or find that the input signal level is too high (the clip LED will illuminate), you may need to increase your input headroom. Do this by turning the knob counterclockwise to attenuate the input signal.

If you find that the input signal is very low (the output of a -10 device is a good example), turn the input level control clockwise to boost the level of the signal going through the 551E/552E. This will optimize the signal-to-noise ratio.

Bypass Button

Push this button into the ACTIVE position to engage the 551E/552E's circuitry. The BYPASS (out) position shunts the input signal directly from the input jacks to the output jacks via a relay. There are no passive or active components in the signal path in this mode.

Note: The relay mechanism is also engaged when the AC power is disconnected, enabling the unit to pass signal even when the power is off.

Cut Band Controls

Low Cut Filter

Diagram 2 illustrates a 12 dB per octave low frequency roll-off filter. Use this to protect subwoofers in sound systems, clean-up muddy recordings, or increase speech intelligibility in announce systems. The frequency range is 6Hz (essentially this is bypass) to 260 Hz.

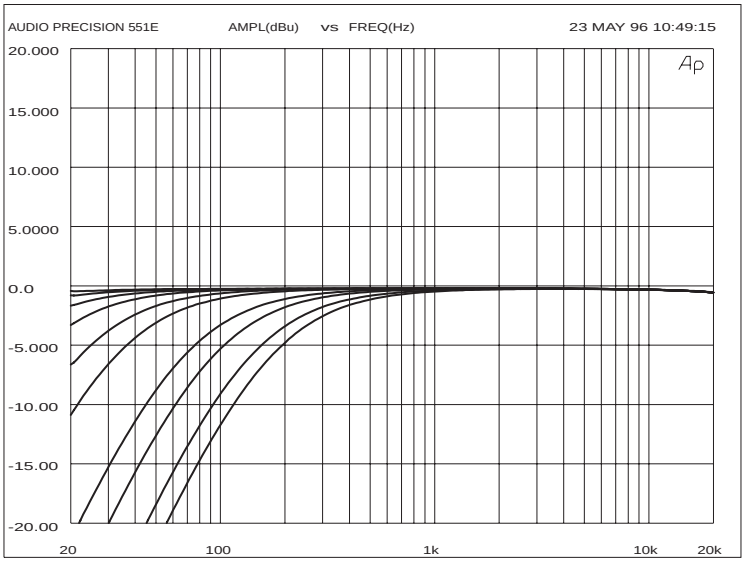


Diagram 2 - Low cut filter with 12 dB per octave.

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High Cut Filter

Diagram 3 illustrates a 12dB per octave high frequency roll-off filter. The range of this control is 3kHz to 65kHz.

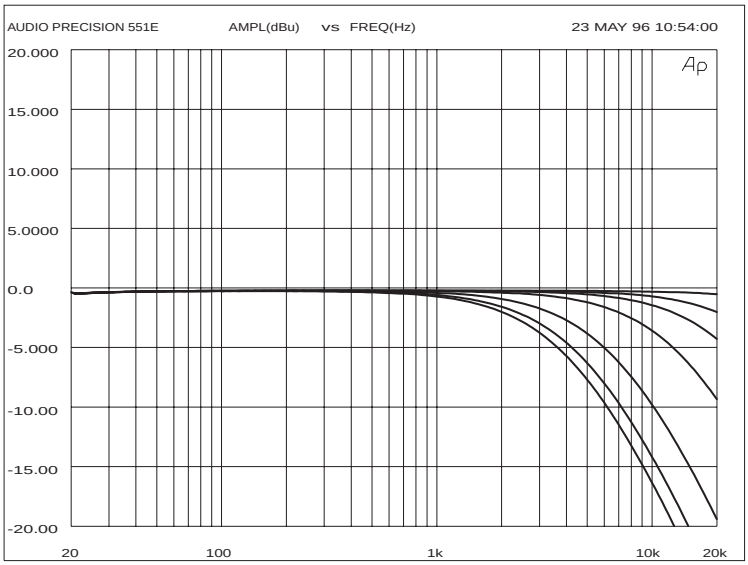

Diagram 3 - High cut filter with 12 dB per octave.

EQ Controls

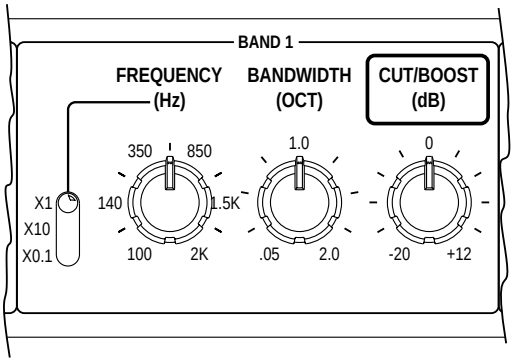

Figure 4 - Front panel view of one EQ band.

Bandwidth

This knob determines how wide an area the band will affect, hence the term band*width*. The knob is calibrated in terms of octaves. The range is .05 (1/20th) to 2 octaves. Use the .05 setting for notch filter applications and the 1.0-2.0 range for "tone control" type sweetening.

Cut/Boost Knob

This control delivers up to 12 dB of boost or 20 dB of cut at the frequency selected by the frequency control and range switch. See Diagram 5.

Note: We've provided a wide range on this knob to help you take care of the occasional drastic problem, but you'll get better results from this (or any) EQ if you use this control in moderation.

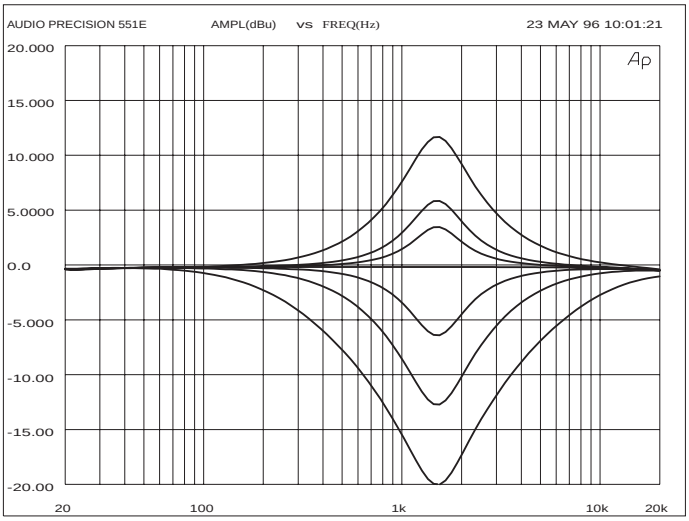

Diagram 5 - Typical Cut/Boost curve.

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Frequency Knob

Use this knob, in conjunction with the Frequency Switch, to adjust the center frequency of the area affected by the filter band. See Diagram 6.

Frequency Switch

Think of this as a Frequency knob multiplier. When you put the toggle in the X1 position the range of the Frequency control corresponds to the numbers printed around the knob - 100 Hz to 2kHz. Use this position when you want to work in the midrange. The X10 position shifts the Frequency knob's range upward by a factor of 10. The range becomes 1kHz to 20 kHz; suitable for high-frequency adjustments. The X0.1 position moves the range downwards (10 Hz to 200 Hz), for fine resolution in the low-frequency area. See Diagram 7.

Before you ask, we want you to know that *we know* it seems to makes no sense that X1 is the top switch position, X10 is middle, and X0.1 is bottom. Our resident circuit guru informs us that there is no way to wire this toggle switch so that it works in the logical order. If you need proof just look at someone else's parametric EQ toggle switch.

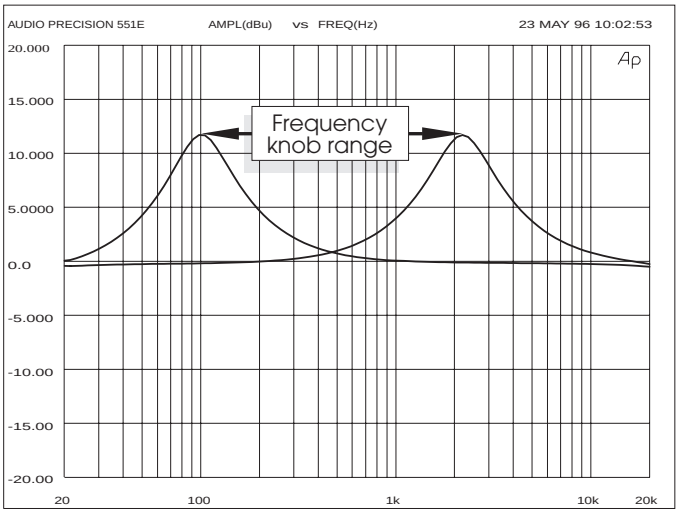

Diagram 6 - Frequency graph.

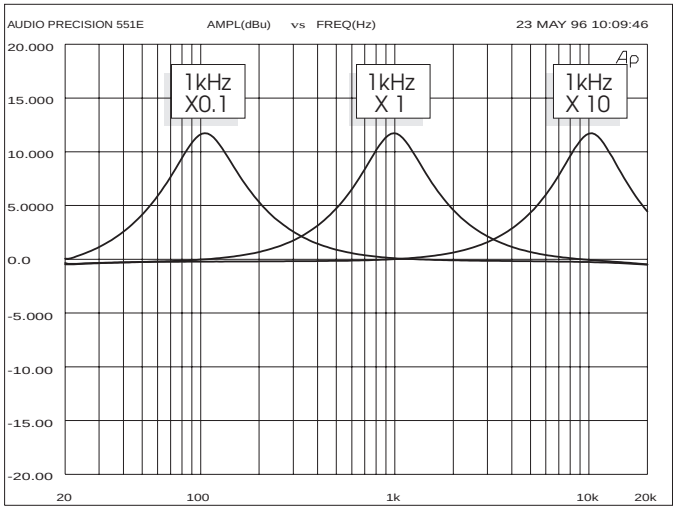

Diagram 7 - Range switch action.

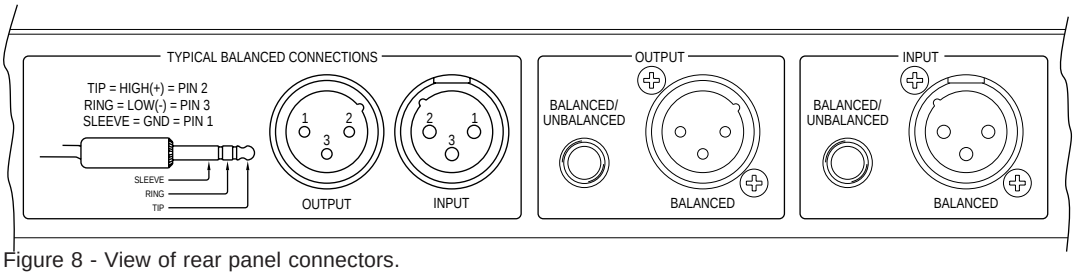

Figure 8 - View of rear panel connectors.

Input Jacks

The 551E/552E is equipped with an XLR and a ¼" jack. Both will work either balanced or unbalanced and will generally accommodate just about any standard +4dBu nominal line level audio source. If you plan on plugging a mic directly into the 551E/552E's XLR input... don't bother. It will not hurt anything, but it just will not work. The input jacks are configured as follows:

XLR
pin 1=ground
pin 2=+/high
pin 3=-/low

¼" Balanced
tip = +/high
ring=-/low
sleeve=ground

See Appendix A for adapter wiring examples.

Output Jacks

There are two output jacks wired parallel to each other - a balanced XLR, and a balanced ¼" TRS. These can drive balanced or unbalanced inputs but you should check Appendix A for wiring examples. The outputs are configured as follows:

XLR
pin 1 = ground
pin 2 = +/high
pin 3 = -/low

¼" Balanced
tip = +/high
ring = -/low
sleeve = ground

Setting the Frequency Controls - Part 1

How do I find the right frequency to cut or boost if I don't have a spectrum analyzer? There are a couple of tune-by-ear methods that, although crude, are quite effective. For lack of a better name we'll call the first method "boost-and-sweep".

Pretend for a second that you are recording an acoustic guitarist in your studio. Everything is fine until you notice that there is a weird low-mid resonance in the guitar body that makes the open A string sound louder than everything else. All you really want to do is reduce the volume of the open A without affecting any other note. No problem. Just insert the 551E/552E in the input channel send/return loop and follow this procedure.

First, select an EQ band and set its BANDWIDTH very narrow (.50 or lower). Then take the BOOST/CUT knob and crank it to +12 dB. This will sound terrible (and is risky to do in a live sound situation), but hang in there. Now turn the FREQUENCY control (and toggle the RANGE switch) until the offending note gets really loud. Although this will sound incredibly bad, it lets you know that you have adjusted the FREQUENCY control correctly. Now adjust the CUT/BOOST (try a starting cut of around 3-6dB) and BANDWIDTH (try widening it a little) until the open A string sounds like it should.

Setting the Frequency Controls - Part 2

Try a "cut-and-sweep" approach if you are using the 551E/552E in a concert sound application. Use basically the same procedure as in Tip #1, but use an extreme amount of cut, not boost, to find the trouble spot. This is a more subtle approach to corrective equalization that you can use during soundchecks (even during shows) without getting nasty looks from the audience.

Bandwidth Control

Most professional engineers follow this rule of thumb: Use narrow bandwidths for cutting, and wide bandwidths for boosting.

Though a narrow bandwidth setting can be very useful for the "surgical" removal of a problem area, it can cause excessive ringing (and generally sound worse) if used for boosts. Wide band boosts (over 1.0 octaves) sound more natural, more like a tone control.

Overlapping Bands

Although each EQ band can cover the entire audio spectrum, the 551E/552E will give you the best (read: most accurate) results if you use adjacent bands for overlapping cuts and boosts. See Diagram 9.

Although the five EQ bands have identical ranges and functions, they are not identical in one respect - the way in which they combine. We have implemented a series/parallel configuration to ensure the most accurate band interaction while maintaining the best noise and distortion performance.

To maximize the performance of this type of layout, make sure you use adjacent EQ bands (i.e. Bands 1 and 2, 2 and 3, 3 and 4, etc.) when you are applying overlapping boosts or cuts. Diagram 9 shows how adjacent, overlapping bands produce a curve that is the result of correctly adding the curves of the individual bands. Nonadjacent bands (1 and 3 for instance) produce a combined curve that is not correctly summed, even though it might be useful in some applications. See Diagram 10.

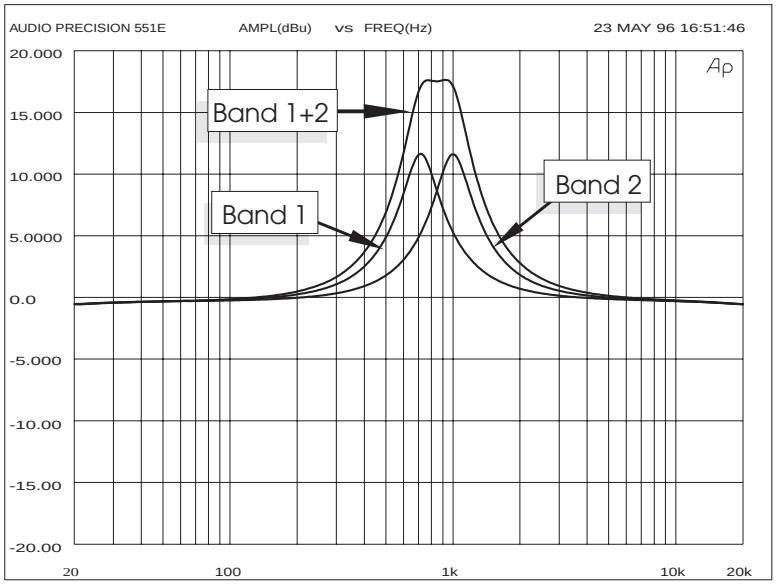

Diagram 9 - Overlapping EQ curves on adjacent bands.

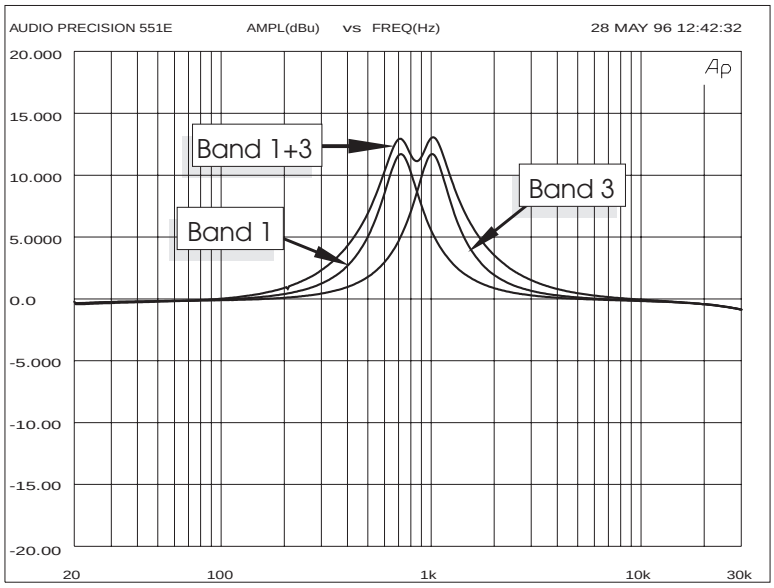

Diagram 10 - Overlapping EQ curves on nonadjacent bands.

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Studio Applications

Multitrack Recording

During tracking, the 551E (or one channel of the 552E) could either be placed in the insert point of a console channel or, if you are using a direct-to-tape approach, following the mic preamp. Use the 551E/552E for creative sweetening of the sound source, or to minimize unwanted noises that exist within the signal you wish to record. Full frequency microphones are great, but can be overly sensitive to rumble or air noise - you may want to eliminate this before it goes to tape. This is especially necessary if you are forced to mix two signals onto the same track. It is much harder to fix problems once the signals are combined.

Mixdown

Patch the 551E (or one channel of the 552E) into the signal path of an individual track - usually on the insert point of the console channel. In this application, use the unit to boost frequencies needed to make that instrument/voice/whatever stand out in the mix, or perhaps cut irritating or nonmusical frequencies. The five, fully overlapping bands make the 551E/552E very versatile in this application.

Mixdown/Mastering

Another place you might need the power of a five band parametric equalizer is on the entire mix. Of course, you need a 552E for stereo applications. Think of the difference a boost at 40 Hz will do for the dance mix, while a boost at 4kHz could rescue a vocal part at the last moment.

Control Room Tuning

An entirely different studio application for parametric equalizers is in control room monitor tuning. Most engineers want to be able to control the tuning of the speakers to fix problems caused by the room. Graphic equalizers may be able to give you a quick picture of their settings, but they lack the precision necessary to really dial in the sound. A parametric equalizer, especially one with five full range bands, is perfect for tuning a room.

Sound Systems

Monitor Mixes

Though graphic equalizers are the most popular tools for equalizing onstage monitors, the task of feedback suppression is an area where parametrics excel. The continuously variable FREQUENCY KNOB on the 551E/552E allows you to zero in precisely on the feedback area. Narrowing the bandwidth allows you to make very drastic cuts while minimizing the effect on the rest of the audio spectrum. Graphic EQs, while easy to use, cannot approach this kind of precision.

Mains

There is no better tool than a parametric EQ for balancing the frequency response of your sound system. Use a couple of bands in notch filter mode to compensate for standing waves or feedback problems. You will still have a few bands left over for sweetening the PA sound.

Aux Send To Subwoofer

If you are using an Aux send on your console to drive your subwoofers, you will still need an EQ somewhere before the crossover. Your best choice for this job is a parametric (a graphic EQ does not have enough precision in the low end) especially if you set the subwoofer crossover point at 100 Hz or lower. With five completely tunable filters at your disposal, you can ensure that your system delivers maximum impact.

Channel Insert

Have you ever wished for a couple of extra EQ bands to really perfect your kick drum sound? The 551E/552E is perfect for the job. Five bands give you the power to make any kick drum sound huge by dialing out unpleasant rings, accentuating the attack of the high end, and adding extra low end. You can use the 551E (or one channel of the 552E) at the channel insert of any mixer channel that requires special attention, from drums to vocals.

Broadcast Systems

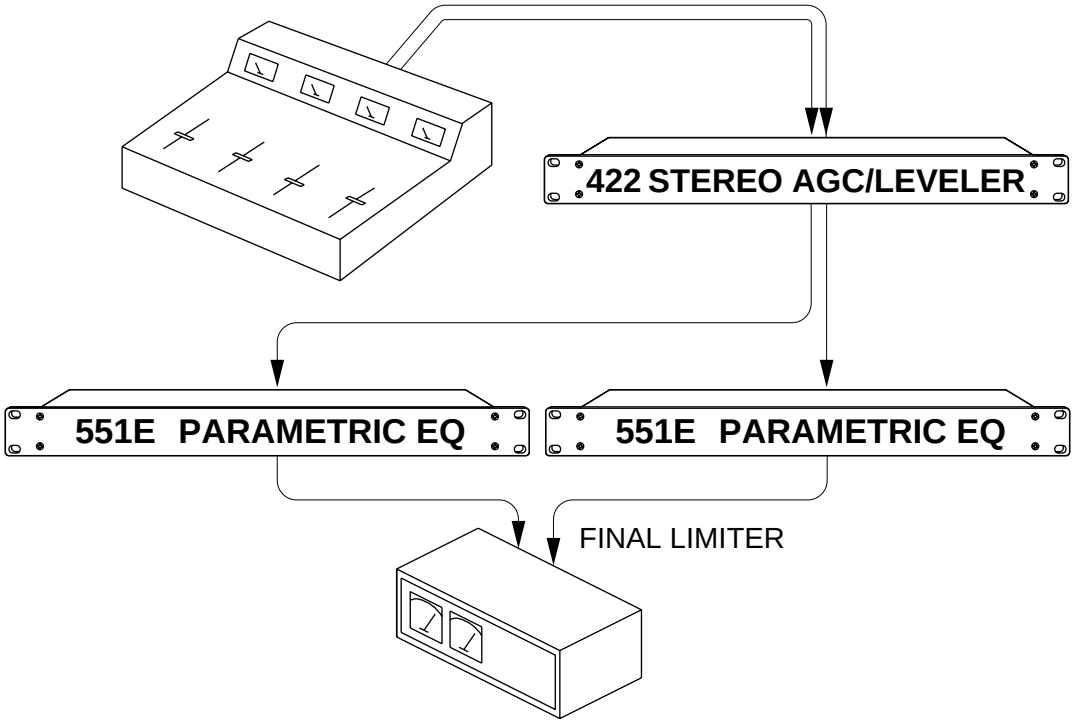
While analog equalizers do not enjoy the status of the latest multiband digital audio processors, there is not a program director in the world who does not want a good equalizer somewhere in the audio processing chain. The equalizing finesse possible with the Symetrix 551E/552E can provide the final touch in producing a signature sound which trounces the competition.

On previous pages you learned how a parametric equalizer, especially the 551E/552E, runs circles around a graphic EQ because of the precise adjustments possible. The important question remaining is, "Where should I install the 551E/552E?"

Install the 551E/552E before the final limiter (see Diagram 11). If wired in the audio chain after the final limiter, the frequencies you boost will cause over-modulation of the transmitter. If the 551E/552E connects directly to the output of the console, sloppy board operation and unusually loud peaks may combine to overload the equalizer's input, in spite of its +22 dBu headroom. Ideally an AGC, like the Symetrix 422 AGC-Leveler, should be installed between the console output and the 551E/552E's input.

This combination provides protection for the 551E/552E's input stage and delivers a leveled signal to the final limiter. The station benefits from a consistent, finely equalized signature sound which does not change with the program material, or each on-air shift change.

Diagram 11 - Recommended audio processing chain for broadcast systems. (Alternately, you could substitute one 552E for the two 551E's in this setup.)



There is no output signal.

Check input and output cables and connections.

Determine that there really is a signal coming from the source, and that it is getting to the 551E/552E.

Distortion in the output signal.

Put 551E/552E into BYPASS. If problem remains, check your signal source.

Check the level of the input signal. Is it overdriving the 551E/552E's input? If so, reduce the incoming signal level. Is the 551E/552E's clip indicator lit?

Is the incoming signal already distorted? Listen "up stream" from the 551E/552E to determine that you are feeding it a clean signal.

Are you using an EQ band or bands to apply a lot of boost? If so, you may be running out of headroom. Fix this by lowering the input level control, or reducing the amount of boost.

Buzz in the output.

Check input and output connector wiring.

Check for ground loops between interconnected system equipment.

Are all system components on the *same* AC ground?

Noise (hiss).

Put 551E/552E into BYPASS. If problem remains, check your signal source. Is the input signal already noisy? Listen "up stream" from the 551E/552E to determine that you are feeding it a clean signal.

Check input signal levels and input level control settings. The input signal may be too low in level. If so, boost the incoming signal (if possible).

Make sure that you are feeding the 551E/552E/ a line-level signal, not a mic-level signal.

Controls don't seem to have any effect.

Is AC power connected to the unit? Since the 551E/552E uses an automatic bypass relay, it will still pass audio even when power is turned off, though the controls will have no effect.

Is the Active/Bypass button in the correct position?

The 551E/552E does not power up or does not respond properly.

Consult a qualified service technician or the Symetrix factory.

The 551E/552E is not plugged in, but works great anyway.

Call us. Call us now.

Architects and Engineers Specifications

The parametric equalizer (EQ) shall be a single channel unit that shall provide five independent filter bands. There shall also be separate high-pass and low-pass filters. The unit shall occupy one rack space (1U).

Each filter band shall have the following controls and control ranges: a cut/boost control with a -20 dB to +12 dB range, a frequency sweep control with a 100 Hz - 2kHz range, a frequency range multiplier switch with X10, X1, and X0.1 settings, and a bandwidth control with a .05 octave - 2.0 octave range. There shall also be a 12 dB/Oct high-pass filter with a user-adjustable cutoff frequency range of 6Hz to 260 Hz, and a 12 dB/Oct low-pass filter with a cutoff frequency range from 3kHz to 65 kHz. A front panel input level control shall provide ±15 dB of gain adjustment.

When the unit is inoperative (either by loss of power or via the BYPASS switch), the inputs and outputs will be wired together by a relay.

The frequency response with all filter bands flat, EQ in, high-pass and low-pass set to the outside extremes of their ranges, shall be 20Hz to 62 kHz (-0.5dB, -3dB). The total harmonic distortion plus noise shall be less than 0.002% (EQ in, all bands flat). The dynamic range shall be greater than 114 dB. The EQ shall accept a maximum input signal of +21 dBu and have a maximum output level of +21 dBu. There shall be a front panel clip indicator that will illuminate at 1dB below clipping. It shall monitor the input, output and each EQ band.

The inputs shall be direct-coupled, active balanced designs terminated with 3-pin XLR (AES/IEC standard wiring), and ¼" TRS female connectors. The input circuitry shall incorporate RFI filters. There shall be a servo-balanced, direct-coupled output that shall terminate in 3-pin XLR (AES/IEC standard wiring) and ¼" TRS connectors.

The EQ shall be capable of operating by means of its built-in power supply connected to 117V nominal AC, 105-130V, 50-60 Hz (230V nominal AC, 207-253V, 50 Hz where applicable). Power consumption shall be 15 watts maximum. There shall be a rear panel receptacle for an IEC-type detachable power cord. The EQ shall be UL and CE approved.

The unit shall be a Symetrix, Inc. model 551E Five Band Parametric Equalizer.

Technical Specifications

Maximum Input Level	+21 dBu balanced
Maximum Output Level	+21 dBu balanced +17 dBu unbalanced
THD+Noise (1kHz at +4dBu)	<0.002% (<10 Hz to 30 kHz measurement bw) -eq in, all bands flat
Signal to Noise Ratio	>96 dB (unweighted, ref to +4dBu) -eq in, all bands flat
Dynamic Range	>114 dB
Frequency Response	-0.5 dB, -3dB (20 Hz - 62 kHz)
Input Impedance	20k ohms balanced, 10k ohms unbal.
Output Impedance	300 ohms balanced, 150 ohms unbal.
EQ band Control Specs:	
Frequency Control Range	10 Hz - 20 kHz (inc. Frequency Switch)
Cut/Boost Range	-20 dB, +12dB
Bandwidth	.05 oct - 2.0 oct

Chassis Size	1.72"H x 19" W x 8.25" D 4.37cm H x 48.26cm W x 20.955cm D
Shipping Weight	8 lbs, 3.64 kg
AC Requirements	via internal supply 117V AC, nominal, 95-130V AC, 50-60 Hz 230V AC, nominal, 165-255V AA , 50 Hz
Power Consumption	15 watts, maximum

In the interest of continuous product improvement, Symetrix, Inc. reserves the right to alter, change, or modify these specifications without prior notice.

551E/552E

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Architects and Engineers Specifications

The parametric equalizer (EQ) shall be a dual channel unit that shall provide five independent filter bands per channel. There shall also be separate high-pass and low-pass filters per channel. The unit shall occupy two rack spaces (2U).

Each filter band shall have the following controls and control ranges: a cut/boost control with a -20 dB to +12 dB range, a frequency sweep control with a 100 Hz - 2kHz range, a frequency range multiplier switch with X10, X1, and X0.1 settings, and a bandwidth control with a .05 octave - 2.0 octave range. There shall also be a 12 dB/Oct high-pass filter with a user-adjustable cutoff frequency range of 6Hz to 260 Hz, and a 12 dB/Oct low-pass filter with a cutoff frequency range from 3kHz to 65 kHz. A front panel input level control shall provide ±15 dB of gain adjustment.

When the unit is inoperative (either by loss of power or via the BYPASS switch), the inputs and outputs will be wired together by a relay.

The frequency response with all filter bands flat, EQ in, high-pass and low-pass set to the outside extremes of their ranges, shall be 20Hz to 62 kHz (-0.5dB, -3dB). The total harmonic distortion plus noise shall be less than 0.002% per channel (EQ in, all bands flat). The dynamic range shall be greater than 114 dB. The EQ shall accept a maximum input signal of +21 dBu and have a maximum output level of +21 dBu. There shall be front panel clip indicators for each channel that will illuminate at 1dB below clipping. These indicators shall monitor the input, output and each EQ band.

The inputs shall be direct-coupled, active balanced designs terminated with 3-pin XLR (AES/IEC standard wiring), and ¼" TRS female connectors. The input circuitry shall incorporate RFI filters. There shall be servo-balanced, direct-coupled outputs that shall terminate in 3-pin XLR (AES/IEC standard wiring) and ¼" TRS connectors.

The EQ shall be capable of operating by means of its built-in power supply connected to 117V nominal AC, 105-130V, 50-60 Hz (230V nominal AC, 207-253V, 50 Hz where applicable). Power consumption shall be 20 watts maximum. There shall be a rear panel receptacle for an IEC-type detachable power cord. The EQ shall be UL and CE approved.

The unit shall be a Symetrix, Inc. model 552E Dual Five Band Parametric Equalizer.

Technical Specifications

Maximum Input Level	+21 dBu balanced
Maximum Output Level	+21 dBu balanced
	+17 dBu unbalanced
THD+Noise (1kHz at +4dBu)	<0.002%
	(<10 Hz to 30 kHz measurement bw)
	-eq in, all bands flat
Signal to Noise Ratio	>96 dB (unweighted, ref to +4dBu)
	-eq in, all bands flat
Dynamic Range	>114 dB
Frequency Response	-0.5 dB, -3dB (20 Hz - 62 kHz)
Input Impedance	20k ohms balanced, 10k ohms unbal.
Output Impedance	300 ohms balanced, 150 ohms unbal.
EQ band Control Specs:	
Frequency Control Range	10 Hz - 20 kHz (inc. Frequency Switch)
Cut/Boost Range	-20 dB, +12dB
Bandwidth	.05 oct - 2.0 oct

Chassis Size	3.5"H x 19" W x 8" D
	8.89cm H x 48.3cm W x 20.32cm D
Shipping Weight	11 lbs, 5kg
AC Requirements	via internal supply
	117V AC, nominal, 95-130V AC, 50-60 Hz
	230V AC, nominal, 165-255V AC, 50 Hz
Power Consumption	20 watts, maximum

In the interest of continuous product improvement, Symetrix, Inc. reserves the right to alter, change, or modify these specifications without prior notice.

Symetrix

551E/552E Limited Warranty

Symetrix, Inc. expressly warrants that the product will be free from defects in material and workmanship for one (1) year. Symetrix's obligations under this warranty will be limited to repairing or replacing, at Symetrix's option, the part or parts of the product which prove defective in material or workmanship within one (1) year from date of purchase, provided that the Buyer gives Symetrix prompt notice of any defect or failure and satisfactory proof thereof. Products may be returned by Buyer only after a Return Authorization number (RA) has been obtained from Symetrix. Buyer will prepay all freight charges to return the product to the Symetrix factory. Symetrix reserves the right to inspect any products which may be the subject of any warranty claim before repair or replacement is carried out. Symetrix may, at its option, require proof of the original date of purchase (dated copy of original retail dealer's invoice). Final determination of warranty coverage lies solely with Symetrix. Products repaired under warranty will be returned freight prepaid by Symetrix via United Parcel Service (surface), to any location within the Continental United States. At Buyer's request the shipment may be returned via airfreight at Buyer's expense. Outside the Continental United States, products will be returned freight collect.

The foregoing warranties are in lieu of all other warranties, whether oral, written, express, implied or statutory. Symetrix, Inc. expressly disclaims any IMPLIED warranties, including fitness for a particular purpose or merchantability. Symetrix's warranty obligation and buyer's remedies hereunder are SOLELY and exclusively as stated herein.

This Symetrix product is designed and manufactured for use in professional and studio audio systems and is not intended for other usage. With respect to products purchased by consumers for personal, family, or household use, Symetrix **expressly disclaims all implied warranties, including but not limited to warranties of merchantability and fitness for a particular purpose.**

This limited warranty, with all terms, conditions and disclaimers set forth herein, shall extend to the original purchaser and anyone who purchases the product within the specified warranty period.

Warranty Registration must be completed and mailed to Symetrix within thirty (30) days of the date of purchase.

Symetrix does not authorize any third party, including any dealer or sales representative, to assume any liability or make any additional warranties or representation regarding this product information on behalf of Symetrix.

This limited warranty gives the buyer certain rights. You may have additional rights provided by applicable law.

Limitation of Liability

The total liability of Symetrix on any claim, whether in contract, tort (including negligence) or otherwise arising out of, connected with, or resulting from the manufacture, sale, delivery, resale, repair, replacement or use of any product will not exceed the price allocable to the product or any part thereof which gives rise to the claim. In no event will Symetrix be liable for any incidental or consequential damages including but not limited to damage for loss of revenue, cost of capital, claims of customers for service interruptions or failure to supply, and costs and expenses incurred in connection with labor, overhead, transportation, installation or removal of products or substitute facilities or supply houses.

Servicing the 551E/552E

If you have determined that your 551E/552E requires repair services and you live *outside* of the United States, please contact your local Symetrix dealer or distributor for instructions on how to obtain service. If you reside in the U.S., then proceed as follows:

Return authorization

At the Symetrix factory, Symetrix will perform in-warranty or out-of-warranty service on any product it has manufactured for a period of five years from date of manufacture.

Before sending anything to Symetrix, contact our Customer Service Department for a return authorization (RA) number. The telephone number is (425) 787-3222, Monday through Friday, 8AM (800 hours) though 4:30 PM (1630 hours), Pacific Time.

In-warranty repairs

To get your 551E/552E repaired under the terms of the warranty:

1. Call us for an RA number.
2. Pack the unit in its original packaging materials.
3. Include your name, address, daytime telephone number, and a brief statement of the problem.
4. Write the RA number on the outside of the box.
5. Ship the unit to Symetrix, freight prepaid. We do *not* accept freight collect shipments.

Just do these five things, and repairs made in-warranty will cost you only one-way freight charges. We'll prepay the return (surface) freight.

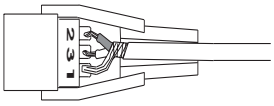
If you choose to send us your product in some sort of flimsy packaging, we'll have to charge you for proper shipping materials. If you don't have the factory packaging materials, then do yourself a favor by using an oversize carton, wrap the unit in a plastic bag, and surround it with bubble-wrap. Pack the box full of Styrofoam peanuts. Be sure there is enough clearance in the carton to protect the rack ears (you wouldn't believe how many units are returned with bent ears). We won't return the unit in anything but Symetrix packaging for which we will have to charge you. Of course, if the problem turns out to be operator inflicted, you'll have to pay for both parts and labor. In any event, if there are charges for the repair costs, you will pay for the return freight. All charges will be COD unless you have made other arrangements (prepaid, Visa or Mastercard).

Out-of-warranty repairs

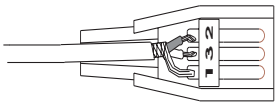
If the warranty period has passed, you'll be billed for all necessary parts, labor, packaging materials, and freight charges. Please remember, you must call for an RA number before sending the unit to Symetrix.

FROM BALANCED OUT

FEMALE XLR
PIN 1 = GROUND
PIN 2 = HIGH
PIN 3 = LOW



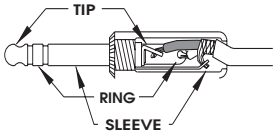
TO BALANCED IN



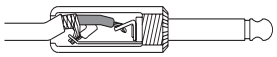
MALE XLR
PIN 1 = GROUND
PIN 2 = HIGH
PIN 3 = LOW

FROM BALANCED OUT

MALE TRS PLUG
TIP = HIGH
RING = LOW
SLEEVE = GROUND



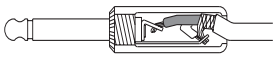
TO UNBALANCED IN FROM TRANSFORMER COUPLED OR FLOATING BALANCED OUTPUT



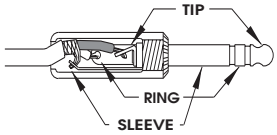
MALE TS PLUG
TIP = HIGH
SLEEVE = GROUND + LOW

FROM UNBALANCED OUT

MALE TS PLUG
TIP = HIGH
SLEEVE = GROUND + LOW



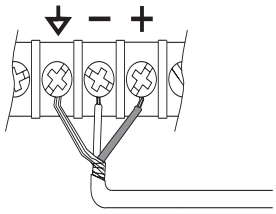
TO BALANCED IN



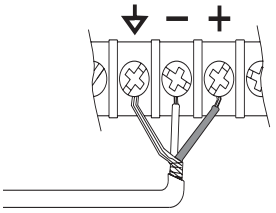
MALE TRS PLUG
TIP = HIGH
RING = LOW
SLEEVE = GROUND

FROM BALANCED OUT

TERMINAL STRIP
(+) = HIGH
(-) = LOW
⏚ = GROUND



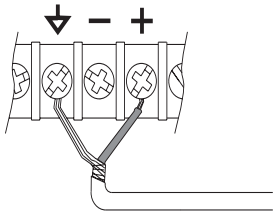
TO BALANCED IN



TERMINAL STRIP
(+) = HIGH
(-) = LOW
⏚ = GROUND

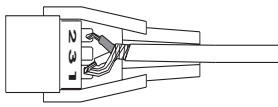
FROM UNBALANCED OUT

TERMINAL STRIP
(+) = HIGH
(-) = NOT USED
⏚ = GROUND

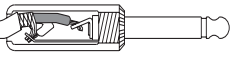


FROM NON-TRANSFORMER (ELECTRONIC) BALANCED OUTPUT (TYPICAL OF SYMETRIX PRODUCTS)

FEMALE XLR
PIN 1 = GROUND + LOW
PIN 2 = HIGH
PIN 3 = NOT USED



TO UNBALANCED IN



MALE TS PLUG
TIP = HIGH
SLEEVE = GROUND + LOW

REV-B

551E/552E

Symetrix

Declaration of Conformity

We, **Symetrix, Inc.**, 14926 35th Ave. West, Lynnwood, Washington, USA, declare under our sole responsibility that the product:

551E and 552E Parametric Equalizers

to which this declaration relates, is in conformity with the following standards:

EN 60065
Safety requirements for mains operated electronic and related apparatus for household and similar general use.

EN 50081-1
Electromagnetic compatibility - Generic emission standard
Part 1: Residential, commercial, and light industry.

EN 50082-1
Electromagnetic compatibility - Generic immunity standard
Part 1: Residential, commercial, and light industry.

The technical construction file is maintained at:

Symetrix, Inc.
14926 35th Ave. West
Lynnwood, WA, 98037-2303
USA

The authorized representative located within the European Community is:

World Marketing Associates
P.O. Box 34
Newquay, Cornwall, TR7 1TU, U.K.

Date of issue: 1 January 1998

Place of issue: Lynnwood, Washington, USA

Authorized signature:

Dane Butcher, President, **Symetrix Incorporated**.

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