

V1.3 2004/9/15

i7200

XrossTech

User's Manual

www.phonic.com







IMPORTANT SAFETY INSTRUCTIONS

- Read these instructions before operating this apparatus.
- 2. Keep these instructions for future reference.
- 3. Heed all warnings to ensure safe operation.
- 4. Follow all instructions provided in this document.
- 5. Do not use this apparatus near water or in locations where condensation may occur.
- Clean only with dry cloth. Do not use aerosol or liquid cleaners. Unplug this apparatus before cleaning.
- Do not block any of the ventilation openings. Install in accordance with the manufacturer's instructions.
- 8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- 9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plug, convenience receptacles, and the point where they exit from the apparatus.
- 11. Only use attachments/accessories specified by the manufacturer.
- 12. Use only with a cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.



- 13. Unplug this apparatus during lighting storms or when unused for long periods of time.
- 14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.



CAUTION RISK OF ELECTRIC SHOCK DO NOT OPEN



CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK,
DO NOT REMOVE COVER (OR BACK)
NO USER SERVICEABLE PARTS INSIDE
REFER SERVICING TO QUALIFIED PERSONNEL



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 an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING: To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

CAUTION: Use of controls or adjustments or performance of procedures other than those specified may result in hazardous radiation exposure.

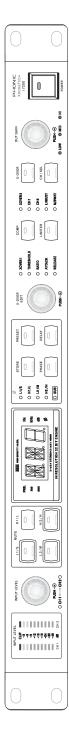


XrossTech

17200

USER'S MANUAL

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Introduction

Thank you for purchasing another one of Phonic's many superior products. The i7200 XrossTech, a quality high precision 2-way stereo, 3-way mono Digital Crossover, supplies the power and efficiency you expect to find in a quality Phonic product. As is the case with the rest of the Phonic I series of Digital Signal Processors, the i7200 XrossTech will undoubtedly provide you with the reliability needed for true professional audio processing.

The i7200 XrossTech, an extremely musical and flexible Active Digital Crossover, features a 32-bit DSP, giving it precise frequency control for stereo 2-way and mono 3-way operation. In addition to supplying great flexibility in configuring to different sound systems, the i7200 Xross-Tech also features a fully functional compressor-limiter, delay, subwoofer output, as well as individual Phase and Mute buttons. With ultra-quick gain control for all channels, plus stereo link, ensuring convenient synchronizing of functions on both stereo channels, and a factory preset program as well as 60 user-definable program slots generously incorporated, the i7200 provides you with ease and accuracy only found in Phonic products.

This user's manual is specially designed to provide you with the best possible information on using the device. We strongly suggest reading the manual carefully before even attempting to handle this device, and then store it an easily accessible place for future reference.

Features

- 24-bit A/D and D/A converters with 256/512 times oversampling for high headroom and resolution
- Internal 32/40 bit floating processing with professional 48kHz sampling rate
- Perfect flat summed amplitude response at all crossover frequencies
- Limiters and compressors with variable time parameters
- Extremely accurate attack time from zero milliseconds
- Mute buttons on all outputs for troubleshooting
- 1 factory preset and 60 user presets available
- Time/phase alignment via polarity switches and 20 millisecond time delay
- Group delay < 900µs
- Illuminated buttons and LED indicators on all important functions for easy status identification
- High precision components ensure excellent quality and accuracy of settings
- User-friendly operation plus immediate display and parameter tuning
- Balanced XLR and 1/4" TRS outputs
- Balanced combo jack inputs
- Accurate 10-segment LED level meters simplify level setting for optimal performance

Intial Setup

- 1. Use the supplied power cord to connect the i7200 to an AC power outlet of a suitable voltage.
- Connect the left and right main outputs of your mixer, or other appropriate audio output device, to the CH 1 and CH 2 analog-in ports.
- Connect the CH 1 and CH 2 analog out ports to an amplifier and, intern, a pair of speakers, or other appropriate output device.
- 4. Turn the power switch of the i7200 on look on the right side of the device. No, no, the other right. Yes, that s the one.
- 5. You're ready to go! Select a crossover frequency (or frequencies), set the input and output signal levels, compensate for out of phase operations, adjust the time delay of outputs and set compressor/limiters for a clear, distortion-free sound; or simply recall a preset. Don't know how? Well, turn the page and read on.

Why Should I Use the Phonic i7200 XrossTech?

Crossovers, like the XrossTech, are specifically used to separate different frequency ranges of audio into their own distinct outputs; ensuring the correct speakers are used to reproduce the most appropriate audio signals. For example, subwoofer speakers are best used in conjunction with low frequency sounds, as subs are specifically designed to produce the best quality bass. However, having a high frequency signal fed through to a subwoofer can not only be horrible sounding, but also, due to the greater oscillating range of higher frequencies, can cause irreversible damage to the speaker.

Enter the XrossTech. The Phonic i7200, a 2-way stereo, 3-way mono crossover, that gives you precise control over the crossover frequency (ie. the frequency at which the audio will be divided into separate frequency ranges) or frequencies, and incorporates a great number of addition features, ensuring your audio not only sounds good, but treats your speakers in a responsible manner too.

Controls and Settings



1. Level Meters

The dual LED level meters allow you to read the input signal level in dB, referenced to the internal digital maximum. This will provide an indication as to the amount of headroom available until the audio reaches the maximum digital input level and is dynamically clipped.

2. Input Level Control

By turning this control you are able to adjust the main input level at a range between -50 and +12 dB, as well as OFF (if you turn past the -50 mark). Pushing this control allows you to switch between the Channel 1 and 2 inputs, as shown by the corresponding CH1 and CH2 indicators (your alterations are, of course, made to the Channel with an illuminated LED). The level changes will be displayed on the Numeric Display, which will revert back to the preceding display two seconds after completing level alterations.

3. Mute Keys

Individual outputs can be shut completely off with the quick press of the corresponding muting buttons, which will be accompanied by an illuminated LED indicator within the button. Just a handy little feature for when you really want to deactivate those outputs in a rush!

4. 7-Segment Numeric Display

This clearly legible, numeric digit display will show details of the properties last edited, gives a clear indication of values that are being altered, and has plus/minus indicators to show whether parameters are positive or negative in value. The various parameter indicators (Hz - hertz - kHz - kilohertz - dB - decibel - PRE - preset - ms - millisecond - sec - second - and \emptyset - phase) on both sides of the display are illuminated when their corresponding applications are being displayed or edited. For example, if you raise the input or output level of any channel, the dB (decibel) indicator lights up.

5. Store Key

Any modifications made to a preset can be stored by using this key. There are sixty user-definable slots available.

6. Phase Key (Ø)

This key is used to select an in or out phase operation, allowing you to select and set each of the individual output channels. When selecting the Phasing of a channel, the indicator on the main numeric display will illuminate.

7. Preset Key (PRE.)

When the preset indicator is illuminated you are able to use the function jog wheel to select the factory preset or one of sixty of your own personally stored presets. When selecting or using a preset, the PRE. indicator on the main numeric display will illuminate.

8. Delay Key

When this key is pushed, the user is then able to adjust the delay of the corresponding channel between 0 and 20 milliseconds, for time alignment of all outputs. When selecting the delay, the ms (milliseconds) indicator on the main numeric display will illuminate.

9. XOVER / EDIT Jog Wheel

This jog wheel is used for the editing of most functions. Pushing inwards finalizes any alterations you have made. If you do not push to finalize, any changes you make with the XOVER/EDIT jog wheel will not be saved!

10. Compressor Key

This key is used to activate the inbuilt Compressor, which provides more punch to the audio, and helps avoid distortion and provides more punch to audio. After pressing the Compressor Key, you are then able to use the XOVER/EDIT jog-wheel to select the threshold, ratio, attack, and release rates, as will be explained later in the manual.

11. Limiter Key

This key is used to activate the inbuilt Limiter function, which provides maximum output, while offering extended speaker protection. Pushing the Limiter Key repeatedly allows you to alternate between the threshold and release indicators. You are then able to use the XOVER/EDIT jog wheel to select the threshold and release rates, as will be explained later in the manual.



12. X-OVER Key

This control is used to allow you to select the crossover frequency of the selected channel. Pushing it numerous times in a row allows you to alternate between XOVER 1 and XOVER 2 when set in 3-way mono. Holding the X-OVER key down for 3 seconds enters you into a menu that will allow you adjust the slope of the crossover curve between 6, 12, 18 and 24 dB per Octave.

13. CH / SEL Key

Simply pushing this key will alternate between the 2 channels when in Stereo mode. Depending on which of the CH indicators is illuminated, you are then able to alter the properties of the corresponding channel. Turning the X-OVER/EDIT jog wheel while holding this button down allows you to select either the LINK/ST or M/3WAY modes, which allow both channels to be edited simultaneously or activate 3-way mono mode, respectively.

NB. When changing to Link Stereo or 3-Way Mono mode, the device will automatically mute all output channels. These mutes must be manually deactivated.

14. OUT GAIN Jog Wheel

Used to tune the output gain level at a cut and boost rate between +12 to -50 dB. Turning past the -50 dB mark will enable a mute of the corresponding output channel, accompanied by the word OFF on the display. Pushing the OUT GAIN Jog Wheel will switch between editing the low, middle, high and subwoofer outputs (high and low only for Stereo), as indicated below this control.

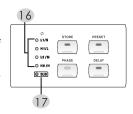
15. Power Switch

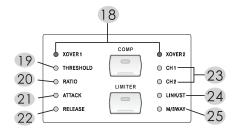
Use the Power switch to turn the XrossTech on or off simplicity at its finest.

Indicators

16. L1, L2, H1, H2 Indicators

These LEDs illuminate when selecting the Phase operation of those particular channels. They, of course, stand for Low 1, Low 2, High 1 and High 2.





17. Sub Indicator

This LED illuminates when selecting properties of the additional subwoofer output, when in 3-way mono mode.

18. XOVER1 and XOVER2 Indicators

These indicators illuminate when selecting the crossover frequency of the selected channel. XOVER2 is only used when in 3-way mono mode.

19. Threshold Indicator

This indicator is used in conjunction with the built-in Compressor and Limiter functions. When flashing, it allows the user to adjust the Threshold of the previously selected function at a range between -50 and 0 dB.

20. Ratio Indicator

This LED will flash when selecting the ratio of compression used, between 1:1 and ∞:1 (which will be displayed as INF on the Numeric Display).

21. Attack Indicator

This LED will flash when selecting the rate of Attack of the compressor function. You are then able to select the attack rate between 1 and 200 milliseconds, in 1 millisecond steps.

22. Release Indicator

This LED will flash when selecting the Release rate of the compressor or limiter functions. You are then able to select the rate of release between 10 and 500 milliseconds, in 5 millisecond steps, then between 0.5 and 5 seconds in 20 millisecond steps.

23. CH 1 and CH 2 Indicators

Either one of these will illuminate when the corresponding channel is selected using the CH Key.

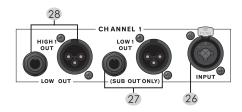
24. Link / St Indicator

When this indicator is illuminated, all changes you make to the properties of the XrossTech will be applied to both output channels. Any changes already made to channel 1 will automatically be applied to channel 2 when selected.

25. M / 3WAY Indicator

This indicator is selected to enable the 3-way mono function of the i7200.





Back Panel

26. Channel 1 Input

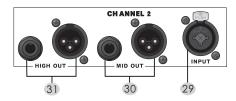
These balanced combination connectors accept either professional 3-pin XLR or 1/4 TRS inputs.

27. Channel 1 Low Output (Mono Sub Output)

Feature both professional 3-pin XLR and 1/4 TRS balanced line outputs. This output is used in conjunction with speakers suitable for low frequency reproduction of audio when in stereo mode, and acts as an optional subwoofer output when in mono operation.

28. Channel 1 High Output (Mono Low Output)

Feature both professional 3-pin XLR and 1/4 TRS balanced line outputs. This output is used to connect speakers suitable for high frequency reproduction of audio when in stereo mode, and acts as a Low frequency output when in mono mode.



29. Channel 2 Input

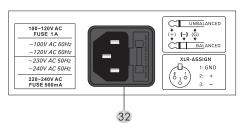
These balanced combination connectors accept either professional 3-pin XLR or 1/4 TRS inputs.

30. Channel 2 Low Output (Mono Mid Output)

Feature both professional 3-pin XLR and 1/4 TRS balanced line output. This output is used to connect speakers suitable for low frequency reproduction of audio when in stereo mode, and for mid-range speakers when in mono mode.

31. Channel 2 High Output (Mono High Output)

Feature both professional 3-pin XLR and 1/4 TRS balanced line output. This output is used to connect speakers suitable for high frequency reproduction of audio when in both stereo and mono modes.



32. AC Power Cable Connector

Connect the supplied AC power cord to this connector, and insert the power plug into a wall-socket of suitable voltage.

Using the i7200 XrossTech Selecting Stereo or Mono Mode

As you have probably worked out by now, the i7200 XrossTech is a 2-way stereo, 3-way mono digital cross-over. This means, in stereo mode, you are allowed a total of 2 output channels - each with a different user-definable crossover frequency - and in mono mode, you can choose 2 crossover frequencies for the single channel available. Mono mode, however, does feature a separate Subwoofer connection, allowing a total of 4 speaker outputs in both Stereo and Mono modes.

Link Stereo

When using stereo mode, you can alternate between channels 1 and 2 by pushing the CH/SEL Key, allowing you to adjust those particular channels properties separately (as described later in the manual). It is also possible to adjust both channels simultaneous by holding the CH/SEL button, then turn the XOVER/EDIT jog wheel to scroll down to the LINK/ST indicator. This causes any adjustments made to Channel 1 to be applied to Channel 2 also.

3-Way Mono

To select the 3-way mono function, first press and hold the CH/SEL Key, then rotate the XOVER/EDIT jog wheel to scroll down to the M/3-WAY Indicator and press the jog wheel. You are now in mono mode. To return to stereo mode, just follow the same routine, and scroll up to the CH 1, CH 2 or LINK/ST indicators.

Automatic Muting

When entering into either the link stereo or 3-way mono modes, a mute of all output channels is activated and must be manually deactivated before any audio signal will be sent through these outputs. This ensures total protection of speakers when entering into a mode that could prove potentially dangerous to them.

Selecting Crossover Frequencies

Selecting the frequency at which the audio will be divided is relatively simple. In stereo mode, you should first press the X-OVER Key, then, using the XOVER/EDIT jog wheel, adjust the frequency between 250 Hz and 10 kHz. All frequencies below your crossover frequency will be sent to the low output of the selected channel, and all frequencies above will be sent to the high output of the selected channel. In mono mode, you are actually able

to select 2 crossover frequencies on a single channel. This means you will be outputting low frequencies and high frequencies, as well as middle frequencies. To do so, first press the X-OVER Key. Doing this repeatedly will alternate between XOVER 1 and XOVER 2, as the LEDs will indicate.

NB. The Crossover frequency of XOVER 2 will not exceed that of XOVER 1, providing protection against using excessive frequencies with incorrect speakers.

A 'Butterworth' Curve

The i7200 XrossTech allows the user to select the angle of the curve (created in true Butterworth style) of every frequency range's signal (ie. the Highs, Lows and Mediums each share the same curve shape). To select the curve angle, simply press and hold the X-OVER key continuously for three seconds. The Numeric Display will then show F, followed by the currently used setting. By turning the XOVER/EDIT jog wheel, you can then select the curve from either 6, 12, 18 or 24 decibels per Octave (where 18 dB is the default setting).

Inverting the Phase

By pressing the Phase button, you are able to select from the 4 separate output channels. Continually pushing the button will allow you to scroll through these different output channels, and turning the XOVER/EDIT jog wheel enables you to invert the phase of that particular frequency. This will ensure any out-of-phase outputs are once again synchronized with one another. This is useful as to avoid having to rewire out-of-phase speakers, in correcting for differences in inappropriately positioned speakers, and in correcting differences created by the use of a delay.

NB. When selecting the Phase and Curve Shape, the XOVER/EDIT jog wheel must be pushed to confirm your setting.

Using the Compressor Function

Using the i7200's built in compressor enables you to ensure your audio is always of the highest quality and utterly free of distortion. In essence, a compressor reduces the level that the audio increases or decreases at any time, provided of course that the level is above the selected threshold. For example, if the audio signal was to be increased by 1.5 dB, it may only be increased by 1.1 dB when using a compressor - depending on the ratio chosen by the user. The compressor effectively reduces the dynamic range of the audio signal, thus avoiding speaker overload and ensuring the production of perfect, distortion-free audio, as well as add more punch to your sound.



To activate the compressor, first push the Comp Key. Pushing this button repeatedly will allow you to alternate between the Threshold, Ratio, Attack and Release indicators, and by simply rotating the XOVER/EDIT jog wheel you are then able to adjust the properties of these at the rates described below.

Threshold – the threshold is the level (selectable in dB) at which you wish to begin compression. Any frequency below your chosen threshold will be unaffected by the i7200's compressor. The Threshold level is selectable between -50 and 0 dB.

Ratio – this allows you to select the ratio at which compression will occur after the level has increased passed the threshold. For example, if your selected ratio is 2: 1, any 2 dB increase in your audio signal will only be increased by 1 dB. The ratio of the i7200's built-in compressor is selectable between 1:1 and ∞:1.

Attack – this will adjust the rate of attack, which essentially allows you to decide how long the compressor will wait after an audio signal has increased beyond the threshold until the compressor kicks into action. You are able to select the attack rate between 1 and 200 milliseconds, adjustable in 1 millisecond steps.

Release – this will adjust the compressor's rate of release, which is basically the opposite of the attack rate. The release rate is the amount of time the compressor will wait after the audio signal drops below the threshold until the compressors stops squashing your unfortunate audio signal. You are able to select the rate of release between 10 and 500 milliseconds in 5 millisecond steps, then between 500 and 5 seconds in 20 millisecond steps.

NB. When the ratio of the Compressor is set at 1:1,the compressor is then, effectively, disabled. If you wish to turn the Compressor off, this ratio should be applied. Also, when selecting the Threshold, Ratio, Attack, and Release rates, the XOVER/EDIT jog wheel must be pushed to confirm your setting.

Using the Limiter Function

A limiter is essentially a compressor with a fixed compression ratio; in the case of the i7200's limiter, the ratio is fixed as ∞:1, in essence ensuring no audio increases past the selected threshold. Setting up of the limiter is accomplished in the same way as the compressor, by first pushing the Limiter Key, followed by the use of the XOVER/EDIT jog wheel to alter the threshold and release properties.

It may be desirable to use both the compressor and limiter simultaneously, first activating the compressor, to reduce the increases in the audio level, then the limiter, actively stopping signals from increasing above a selected level.

NB. If you wish to turn the Limiter off, you should set the threshold at 0 dB, which will cut off all frequencies above this level. This will give you a great dynamic range of audio.

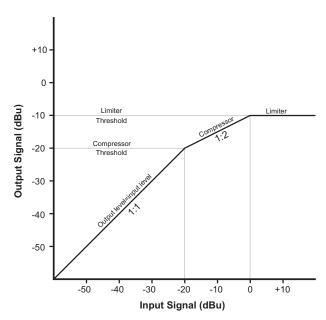
Muting Channels

Muting can be accomplished by pushing the one of the muting buttons on the face of the i7200. Pushing the mute button that corresponds with the output you wish to mute will not only halt any signal being sent to that particular output, but will also be accompanied by an illuminated LED. Pushing the same button will deactivate the muting of that channel.

Selecting the Delay

Depending on the positioning of speakers in relation to one another (among other contributing factors) it may be necessary to activate a short delay on certain output channels. The delay is selectable by first pressing the Delay button on the face of the i7200. Then, by using the XOVER/EDIT jog wheel, select the rate of delay between 0 and 20 milliseconds. This can be done separately for each individual output channel.

NB. When selecting the Delay, the XOVER/EDIT jog wheel must be pushed to confirm your setting.



Using a Subwoofer

When in 3-way mono, it is possible to connect a sub-woofer to the extra output, unused in the typical High, Mid and Low output configuration. To do this, first set the device to 3-way mono. By repeatedly pressing the OUT GAIN jog wheel in, the i7200 will alternate between the Low, Mid, High, and eventually Sub indicators. When the Sub indicator is illuminated, you can then rotate the XOVER/EDIT jog wheel to select the cut off frequency between 25 Hz and 250 Hz and press the jog wheel to finalize your selection. All frequencies below the selected cut off will be sent to the Sub output. You are also able to adjust the Output Gain of this level. To do so, simply turn the OUT GAIN control.

Recalling and Saving Presets

By first pressing the Preset Key, you are able to use the XOVER/EDIT jog wheel to select the factory preset, as well as select from sixty of your own personally stored presets. To store your own settings, first set all the properties of the i7200 to your needs. Once you have completed your settings, press the Store Key, which will cause the LCD screen to show U 1 (User Preset slot 1). You can then use the XOVER jog wheel to choose from U 1 to U 60 and click the XOVER jog wheel to save in the chosen slot. You are then able to change your settings and recall the previously saved settings at any time. The convenience of having your settings saved in the device frees you from having to spend time adjusting properties each time you use it.

If you recall a preset with a different channel setting than you are currently using (eg. If you are in Stereo Mode and choose a Mono preset) a mute of all channels will activate immediately to protect speakers from receiving the incorrect frequency ranges.

NB. When recalling presets, the XOVER/EDIT jog wheel must be pushed to confirm your setting.

Auto Saving Settings

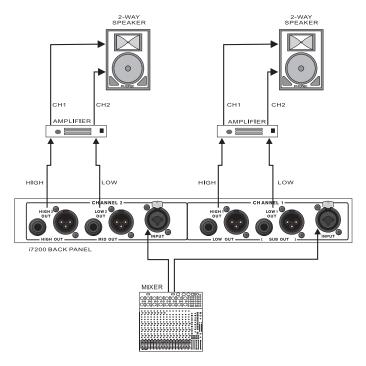
If the controls of the i7200 are not used for a ten second period, the system will automatically save your current settings, which will be stored and kept even after the device is turned off. This ensures no settings are lost in the event of power outages.

Locking the i7200

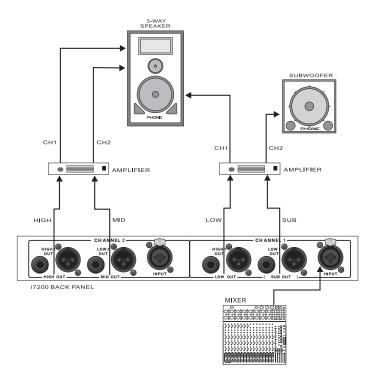
By pressing any two of the jog wheels located on the front of the i7200 simultaneously you enable a key lock that will stop any settings from being accidentally altered while the device is in use. To disable this lock, once again press any two jog wheels.

Applications

2-way Stereo



3-way Mono



Specifications

INDUTO	T
INPUTS	
Туре	Electronically balanced, RF filtered
Impedance	Balanced > 50 K ohms
Maximum Input Level	+16dBu, balanced
CMRR	>40dB
OUTPUTS	
Туре	Electronically balanced, RF filtered
Output Impedance	Balanced 200 K ohms
Maximum Output level	+16 dBu, balanced
SYSTEM PERFORMANCE	
Frequency Response	10Hz to 20KHz, +0/-3 dB
THD	< 0.006% at +4 dBu, 1 KHz
Noise	<-70dBu (20Hz to 20KHz, flat)
Crosstalk	< -80 dB, 20 Hz to 20 KHz
Processing Latency	< 1.5 ms
DIGITAL PROCESSING	
Converters	32-bit Sigma-Delta, 512/128-times oversampling
Sampling Rate	48 KHz
CROSSOVER FREQUENCIES	
Stereo Mode	
Low/High	80 Hz to 10 kHz,
Mono Mode	
3-way Low/Mid/High	80 Hz to 10 kHz,
COMPRESSOR/LIMITER	·
Threshold range	−50 to 0 dB
Attack	0 to 200 ms
Release	10 to 5000 ms
Ratio	1:1 TO 1 INF:1
Delay	
Maximum delay time	60ms, independently adjustable for each channel
LEVEL DIGITAL SELECT	
Input	Variable from - to +12dB
Output / Sub-Low-Mid-Hi	Variable from - to +12 dBu
PHASE INVERT	
Туре	+/- 180 °compensate
MUTE CONTROL	On 4 outputs, with indicator.
SUB MODE	Use output gain function to select, only in 3-way mode
Sub frequency	25Hz to 250Hz
PROGRAM	1 preset and 60 program store
DISPLAY	, proceeding on program state
Туре	7 segment numeric LED Display
Indication	3 channel status select, 2 x-over, 4 compressor-limiter, 4 phase, 1 sub, 2 delay, 5 input/output level
FRONT	12 function keys / 1 parameter edit / 2 level control select
REAR	2 INPUT (combo jack), 4 OUTPUT (XLR), 1/4 phone jack
POWER SUPPLY	
Mains voltage	100-120, 220-240V AC, 50~60Hz
Fuse	1A (100~120VAC), 500mA (200~240VAC), slow blow
Power consumption	20 W
PHYSICAL	
Dimensions (W x H x D)	51.3 x 482 x 207.6 mm (2.02" x 18.98" x 8.17")
Weight	2.6 kg (5.7 lbs)



NOTES

PHONIC

PHONIC CORPORATION

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