PHONIC

Helix Board 18 FireWire MKII
FireWire-enabled Mixing Console
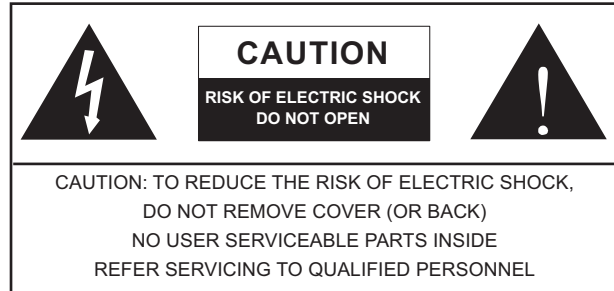

English **User's Manual**

IMPORTANT SAFETY INSTRUCTIONS

The apparatus shall not be exposed to dripping or splashing and that no objects filled with liquids, such as vases, shall be placed on the apparatus. The MAINS plug is used as the disconnect device, the disconnect device shall remain readily operable.

Warning: the user shall not place this apparatus in the confined area during the operation so that the mains switch can be easily accessible.

1. 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.

6. Clean only with dry cloth. Do not use aerosol or liquid cleaners. Unplug this apparatus before cleaning.

7. 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.

10. 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.

Helix Board 18 FireWire MKII

FireWire-enabled Mixing Console

USER'S MANUAL

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Introduction

Thank you for choosing one of Phonic's many quality compact mixers. The Helix Board 18 FireWire MKII mixing console - designed by the talented engineers that have created a variety of mixers fantastic in style and performance in the past - displays similar proficiency that previous Phonic products have shown; with the addition of such innovative features as FireWire interface. The Helix Board 18 FireWire MKII features full gain ranges, amazingly low distortion levels, and incredibly wide dynamic ranges - just showing the dominance these small machines will have in the mixing World.

The FireWire interface of the Helix Board 18 FireWire MKII allows users to stream up to 16 individual channels to any PC or Mac, allowing for recording, editing, tweaking and deletion of all tracks at will. Then, when all your mixing is done, your final product can be burnt onto CD. You can also receive 2 input channels (or returns) from the FireWire interface to monitor your mix on your Helix Board.

Also included with the Helix Board 18 FireWire MKII mixer is Steinberg Cubase LE software, giving users a taste of the operation of professional Digital Audio Workstation software by allowing users to record up to 8 tracks simultaneously. Other high performance Digital Audio Workstation software will allow upto 16 channels to be simultaneously streamed and recorded. All-in-all, the Helix Board 18 FireWire MKII will no doubt prove itself to have been a valuable investment.

We know how eager you are to get started - wanting to get the mixer out and hook it all up is probably your number one priority right now - but before you do, we strongly urge you to take a look through this manual. Inside, you will find important facts and figures on the set up, use and applications of your brand new mixer. If you do happen to be one of the many people who flatly refuse to read user manuals, then we just urge you to at least glance at the Instant Setup section. After glancing at or reading through the manual (we applaud you if you do read the entire manual), please store it in a place that is easy for you to find, because chances are there is something you missed the first time around.

Features

- 18-input small-format analog mixer with extremely low noise circuitry
- 96kHz FireWire interface for streaming 16 independent channels of audio to computer with near-zero latency
- 2 channels of monitoring from computer via FireWire interface, can be assigned to control room monitors, main mix and aux1
- Pre/post switch for swapping streaming input channels to computer from pre low cut, EQ to post EQ, post fader
- Channel 15/16 routed to Computer can be selected from main mix, group 1/2 and AUX 2/3
- DFX, our 40-bit high definition algorithm digital multi-effect processor with 100 programs plus tap delay and foot switch jacks
- Six Mic/Line channels with inserts
- 8 extremely low noise mic preamps
- Four stereo Line channels
- 3-band EQ with swept mid-range
- 75 Hz low-cut filter on mono channels
- Three AUX sends, one with Pre/Post switch
- Two stereo AUX returns with effect to monitor level control
- +48V phantom power on Mic channels
- Solo feature on each input and output
- Two true subgroups with main L and R routing switches
- Built-in switching power supply with universal connector, 100-240 VAC, 50/60 Hz
- Rack-mounting kit included
- S/PDIF digital audio output
- Compatible with Mac OSX and Windows XP
- Steinberg Cubase LE included

Package Includes

1 x Helix Board 18 FireWire MKII mixer
1 x FireWire cable
1 x CD-ROM with ASIO & WDM drivers
1 x CD-ROM with Steinberg Cubase LE
1 x Power cable
1 x Rack mounting kit

If any items are missing from your package, please contact your nearest Phonic dealer

Getting Started

1. Ensure all power is turned off on your mixer. To totally ensure this, the AC cable should not be connected to the unit.

2. All faders and level controls should be set at the lowest level and all channels switched off to ensure no sound is inadvertently sent through the outputs when the device is switched on. All levels can be altered to acceptable degrees after the device is turned on.

3. Plug all necessary instruments and equipment into the device's various inputs as required. This may include line signal devices, such as keyboards and drum machines, as well as microphones and/or guitars, keyboards, etc.

4. Plug any necessary equipment into the device's various outputs. This could include amplifiers and speakers, monitors, signal processors, and/or recording devices.

5. Plug the supplied AC cable into the AC inlet on the back of the device and a power outlet of a suitable voltage.

6. Turn the power switch on.

7. Consult the FireWire section of this manual for more information on its setup and usage.

Channel Setup

1. To ensure the correct audio level of the input channel is selected, each of the Mixer's Channel's ON buttons should be disengaged (which should turn the corresponding LED indicator off), as well as the Solo buttons on each channel and all buttons in the Control Room Source section, with exception to the Main L/R button.

2. Ensure the channel you wish to set has a signal sent to it similar to the signal that will be sent when in common use. For example, if the channel has a microphone connected to it, then you should speak or sing at the same level the performer normally would during a performance; if a guitar is plugged into the channel, then the guitar should also be strummed as it normally would be (and so on). This ensures levels are completely accurate and avoids having to reset them later.

3. Move the Channel fader and Maser fader to around the 0 dB mark.

4. Turn the Channel ON.

5. Pushing the channel's Solo button and releasing the Pre/Post button on the CTRL RM section will send the pre-fader signal of the activated channel to the Control Room / Phones mixing bus and the Level Meter will display the Control Room's signal properties.

6. Set the gain so the level meter indicates the audio level is around 0 dB (it is advisable to never let the level exceed 7 dB).

7. This channel is now ready to be used; you can stop making the audio signal.

8. You can now repeat the same process for other channels if you wish.

Making Connections

Inputs and Outputs

1. XLR Microphone Jacks

These jacks accept typical 3-pin XLR inputs for balanced and unbalanced signals. They can be used in conjunction with microphones – such as professional condenser, dynamic or ribbon microphones – with standard XLR male connectors, and feature low noise preamplifiers, serving for crystal clear sound replication. The Helix Board 18 FireWire MKII features a total of eight Microphone inputs.

NB. When these inputs are used with condenser microphones, the Phantom Power should be activated. However, when Phantom Power is engaged,single ended (unbalanced) microphones and instruments should not be used on the Mic inputs.

2. Line Inputs

This input accepts typical 1/4" TRS (balanced) or TS (unbalanced) inputs, for balanced or unbalanced signals. They can be used in conjunction with a wide range of line level devices, such as keyboards, drum machines, electric guitars, and a variety of other electric instruments.
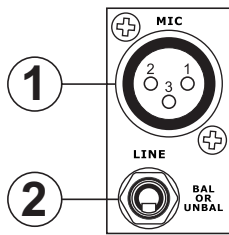
3. Stereo Channels

The Helix Board 18 FireWire MKII also features a few stereo channels, thrown in for maximum flexibility. Each of these stereo channels features two 1/4" phone jacks, for the addition of various line level input devices, such as electronic keyboards, guitars and external signal processors or mixers, as well as XLR Microphone jacks on channels 7/8 and 9/10, allowing users to option of using the channel as a microphone input channel. If you wish to use a monaural device on a stereo input, simply plug the device's 1/4" phone jack into the left (mono) input and leave the right input bare. The signal will be duplicated to the right due to the miracle of jack normalizing.
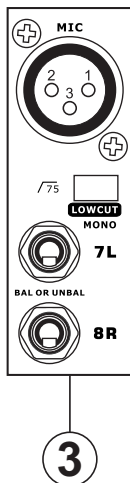
4. AUX Returns

These 1/4" TS inputs are for the return of audio to the Helix Board 18 FireWire MKII mixer, processed by an external signal processor. If really needed, they can also be used as additional inputs. The feed from these inputs can be adjusted using the AUX Return controls on the face of the mixer. When connecting a monaural device to the AUX Return 1 and 2 inputs, simply plug a 1/4" phone jack into the left (mono) input, and the signal will appear in the right as well.
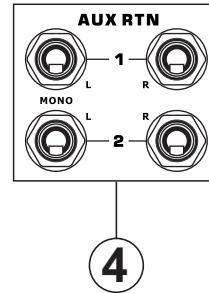
5. AUX Sends

These 1/4" TRS outputs may be used to connect to an external signal processor, or even to an amplifier and speakers (depending on your desired settings) from the mixer. The signal from the AUX Sends is controlled by the AUX master controls (on the face of the mixer), which obtain their signal from the AUX controls located on each channel strip. The Helix Board 18 FireWire MKII features a total of 3 AUX Sends. When using the FireWire interface, AUX Send 1 can be elected to receive the audio signal sent from the Computer, for monitoring or recording purposes.

6. Phones

This stereo output port is suited for use with headphones, allowing monitoring of the mix. The audio level of this output is controlled using the Control Room / Phones control.

7. Record Out

These outputs will accommodate RCA cables, able to be fed to a variety of recording devices. Also included is a mini stereo jack for the addition of recording devices such as MD players, and even laptop computers.

8. 2T Return

These RCA inputs are used to connect the mixer with parallel external devices, such as sub mixers or CD, Tape and Cassette Players. Also included are mini stereo jacks, for receiving signals from audio devices like portable CD, MD and MP3 players.
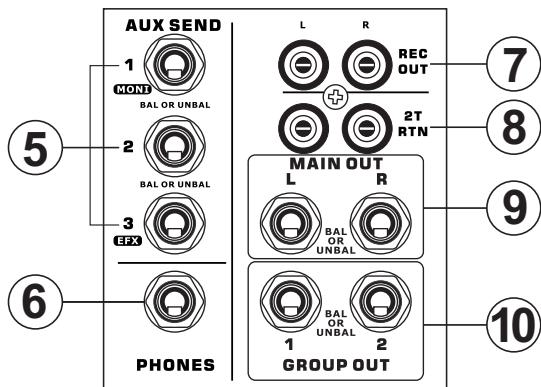
9. Main Outputs

These two 1/4" TRS balanced jacks will output the final stereo line level signal sent from the main mixing bus. The primary purpose of these jacks is to send the main output to external devices, which may include power amplifiers (and in-turn, a pair of speakers), other mixers, as well as a wide range of other possible signal processors (Equalizers, Crossovers, etcetera).

10. Group Outputs

These balanced 1/4" TRS phone jacks output the final feed from the Group 1 and 2 mix controlled by the Group level faders. These outputs can be used to feed a wide range of devices, such as mixers, signal processors, and even to connect an amplifier and speakers to be used along with the Main Speakers, for a more rounded audio experience.

Rear Panel

11. Channel Inserts

Located on the rear of the Helix Board 18 FireWire MKII, the primary use for these TRS phone jacks is for the addition of external devices, such as dynamic processors or equalizers, to mono input channels 1 through to 6. This will require a Y cord that can send (pre-fader and pre-EQ) and receive signals to and from an external processor. The tip of the TRS plug is for sending of the signal to the external device, the ring is for return of the signal to the Helix Board 18 FireWire MKII, and the Sleeve is the grounding.
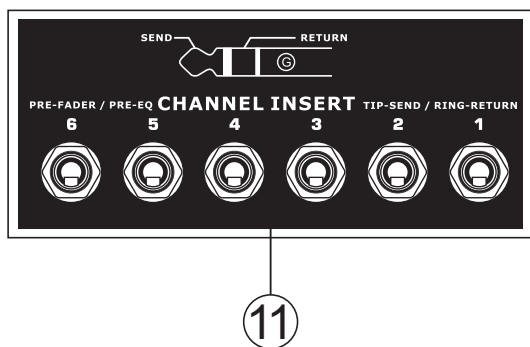
12. Control Room Outputs

These two 1/4" phone jack outputs feed the signal altered by the Control Room / Phones level control on the face of the mixer. This output has extensive use, as it can be used to feed the signal from the mixer to an active monitor, for the monitoring of the audio signal from within a booth, or, alternatively, for the addition of external signal processing devices or mixers, as well as acting as a "side fill" output, supplying audio to indoor areas that the main speakers do not reach. When using the FireWire interface, this output can be elected to be fed the audio signal from the Computer, for monitoring of recording audio.
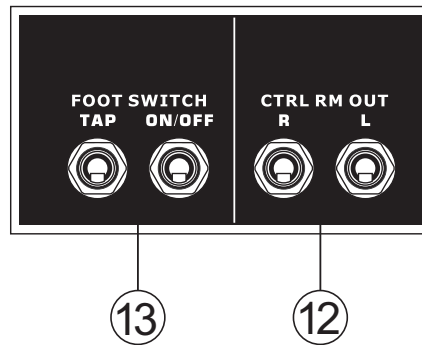
13. Foot Switch Jacks

These ports are for the inclusion of an unlatched foot switch, used to remotely adjust properties of the built-in Digital Effect processor. The jack on the right is used to turn the Digital Effects on and off, whereas the jack on the left is used for adjusting tap delay properties.

14. Main XLR Outputs

These two XLR ports will output the final stereo line level signal sent from the main mixing bus. The primary purpose of these jacks is to send the main output to external devices, which may include power amplifiers (and in-turn, a pair of speakers), other mixers, as well as a wide range of other possible signal processors (equalizers, crossovers, etcetera).
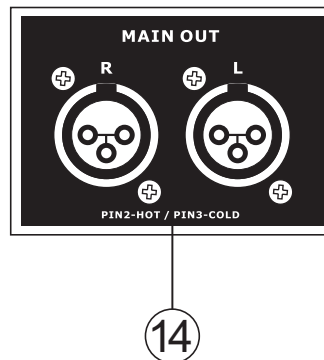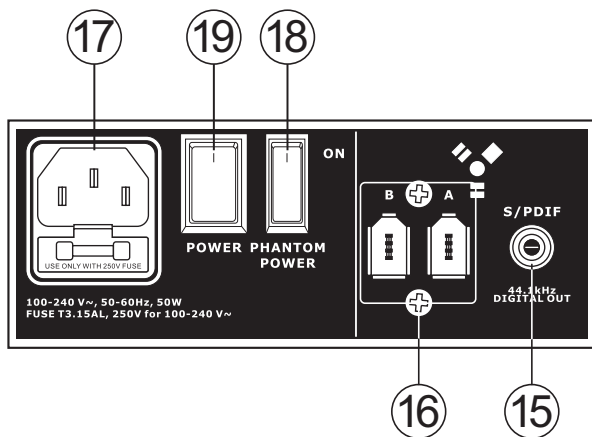
15. S/PDIF Output

This RCA S/PDIF (Sony / Phillips Digital Interface) jack is for the output of digital audio signals, allowing the Main L&R audio from the mixer to be passed to another device without having to convert the signal from digital to analog and back again. The output sampling rate is permanently set to 44.1 kHz per second when no FireWire connection is made. If the FireWire output is connected to a computer, than the S/PDIF output sampling rate will be the same as that set by the Helix Board Control Panel software.

16. FireWire Connections

The two FireWire connectors are for linking the Helix Board 18 FireWire MKII to a PC or Macintosh computer. It will allow 16 channels to be streamed to the computer (the amount of channels you are able to record simultaneously depends on the DAW software used), and 2 audio channels of the computer to be returned to the mixer. Please observe the FireWire section of this manual for more information.

17. Power Connector

This port is for the addition of a power cable, allowing power to be supplied to the mixer. Please use the power cable that is included with this mixer only. The Helix Board 18 FireWire MKII features a switching power supply, suitable for all zones.

Controls and Settings

Rear Panel

18. Phantom Power Switch

When this switch is in the on position, it activates +48V of phantom power for all microphone inputs, allowing condenser microphones (well, the ones that don't use batteries) to be used on these channels. Activating Phantom Power will be accompanied by an illuminated LED above the left channel Level Meter. Before turning Phantom Power on, turn all level controls to a minimum to avoid the possibility of a ghastly popping sound from the speakers.

NB. Phantom Power should be used in conjunction with balanced microphones. When Phantom Power is engaged, single ended (unbalanced) microphones and instruments should not be used on the Mic inputs. Phantom Power will not cause damage to most dynamic microphones, however if unsure, the microphone's user manual should be consulted.

19. Power Switch

This switch is used to turn the mixer on and off. Ensure you turn all level controls down before activating.

Channel Controls

20. Low Cult Filter (75 Hz)

This button will activate a high-pass filter that reduces all frequencies below 75 Hz at 18 dB per Octave, helping to remove any unwanted ground noise or stage rumble. On stereo channels 7/8 and 9/10, the low cut filter affects only the XLR Microphone inputs (and not the line inputs).

21. Line/Mic Gain Control

This controls the sensitivity of the input signal of the Line/Microphone input. The gain should be adjusted to a level that allows the maximum use of the audio, while still maintaining the quality of the feed. This can be accomplished by adjusting it to a level that will allow the peak indicator occasionally illuminate.

22. High Frequency Control

This control is used to give a shelving boost or cut of ±15 dB to high frequency (12 kHz) sounds. This will adjust the amount of treble included in the audio of the channel, adding strength and crispness to sounds such as guitars, cymbals, and synthesizers.
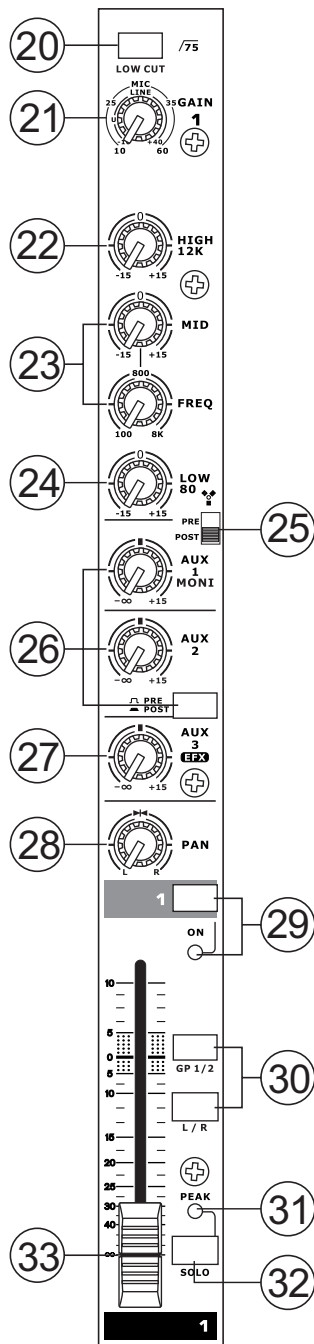
23. Middle Frequency Control

This control is used to provide a peaking style of boost and cut to the level of middle frequency sounds at a range of .±15 dB. These mixers also provide a sweep control, allowing you to select a center frequency between 100 Hz and 8 kHz. Changing middle frequencies of an audio feed can be rather difficult when used in a professional audio mix, as it is usually more desirable to cut middle frequency sounds rather than boost them, soothing overly harsh vocal and instrument sounds in the audio.

Stereo channels 11/12 and 13/14 of the Helix Board 18 FireWire MKII feature a High-Mid and Low-Mid control instead of the typical controls described above. They provide a peaking style of boost and cut to middle frequencies, where the frequencies are set at 3 kHz and 800 Hz (High-Mid is set at 3 kHz and Low-Mid is set at 800 Hz). Stereo channels 9/10 and 11/12 have a single Middle Frequency control, with the center frequency set at 2.5 KHz.

24. Low Frequency Control

This control is used to give a shelving boost or cut of +/-15dB to low frequency (80Hz) sounds. This will adjust the amount of bass included in the audio of the channel, and bring more warmth and punch to drums and bass guitars.

27. EFX Control

This control alters the signal level that is sent to the EFX send (AUX 3) output and the built-in digital effect processor. The EFX send signal can be used in conjunction with external signal processors (this signal of which can be returned to mixer via the AUX return input), or simply as an additional auxiliary output.

28. Pan / Balance Controls

This alternates the degree or level of audio that the left and right side of the main mix should receive. On mono channels, the PAN control will adjust the level that the left and right should receive (pan), where as on a stereo channel, adjusting the BAL control will attenuate the left or right audio signals accordingly (balance).

29. On Button and Indicator

This turns the channel on, allowing the user to use the feed from the channel's inputs to supply the MAIN L/R, GROUP 1/2, AUX and EFX buses. The corresponding indicator will be illuminated when turned on.

30. 1-2 and L-R Buttons

These handy buttons allow you to decide the audio path of the corresponding channel. Pushing the "1/2" button allows the signal to be sent to the Group 1/2 mix, where the "L-R" allows it to be sent to the Main L/R mix.

31. Peak Indicator

This LED indicator will illuminate when the channel hits high peaks, 6 dB before overload occurs. It is best to adjust the channel level control so as to allow the PEAK indicator to light up on regular intervals only. This will ensure a greater dynamic range of audio. This indicator also doubles as a Solo indicator, when the Solo button is engaged.

32. Solo Button

The Solo button is pushed to allow the signal of a corresponding channel to be sent to the Control Room / Phones control (pre or post fader, depending on the properties selected by the pre / post button, located by the Control Room / Phones control), for use with either headphones or studio monitors. This also allows easier setting of the input gain and tracking of audio by sound engineers. The Peak indicator above the Solo button also doubles as a Peak Indicator, illuminating when the signal reaches high peaks.

33. Channel Level Control (Fader)

This control will alter the signal level that is sent from the corresponding channel to the appropriate mixing buses (whether they are the MAIN L/R or AUX).

25. FireWire Pre/Post Switch

This switch is used to change the signal of the corresponding channel that is sent to the Computer via the FireWire interface between that of a pre-EQ, pre-fader, pre-low cut and that of a post-EQ, post-fader, post-low cut. In the upper-most position, the channel will be pre, and in the lower position post.

26. AUX Controls

These controls alter the signal level that is being sent to the auxiliary 1 and 2 mixes. The signals of these mixes are suitable for connecting stage monitors, allowing artists to listen to the music that is being played. Also included is a Pre/Post button, which alternates the feed to the AUX 2 mix between a post and pre-fader feed.

PHONIC

34. +4 / -10 Buttons

These buttons, located on each stereo input channel, are used adjust the input sensitivity of the corresponding channel, which will adapt the mixer to external devices which may use different operating levels. If the input source is -10 dBV (consumer audio standard), it is best to engage the switch, allowing the signal to be heard. If the input source is +4 dBu (professional audio standard) the corresponding input channel's button should be disengaged to ensure the integrity of the Mixer's circuitry. If you are unsure of the source's operating level, we suggest leaving the switch disengaged until you test the source's signal. You can then engage if necessary (if the level of input is obviously too low).
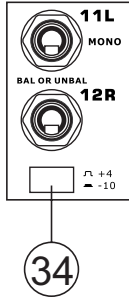
Digital Effect Section

35. Digital Effect Display

This 2-digital numeric display shows the program number that is currently applied to your EFX audio signal. When you rotate the Program control, you can scroll through different program numbers; however the display will revert back to the original program if a new program is not selected within a few seconds. For a list of available effects, please observe the Digital Effect Table.

36. Sig and Clip Indicators

Located within the Digital Effect Display are Clip and Sig LEDs. The Sig LED will light up when any signal is received by the effect processor, and the Clip LED will light up shortly before excessive signals are dynamically clipped. If the Clip LED lights up too often, it may be advisable to turn down the AUX 3/ EFX master control to ensure the signal level is not excessive.

37. Program Control

This control is used to scroll through the various effects. Turning the control clockwise will allow users to ascend into higher program numbers, and turning it counter-clockwise will allow users to descend into lower program numbers. When turning to a new program, a small LED will flash until you push the program knob down – this will apply the effect. When a tap-delay effect is selected, pressing this control will allow users to select the tap-delay time.

By pushing the button several times, the effect processor interprets the time between last two pushes and remembers this as the delay time – until the button is pushed again. This is kept even after the power is turned off. When the tap delay effect is selected, a small LED (located between the two digit display) will flash within the digital effect display window at the selected intervals.
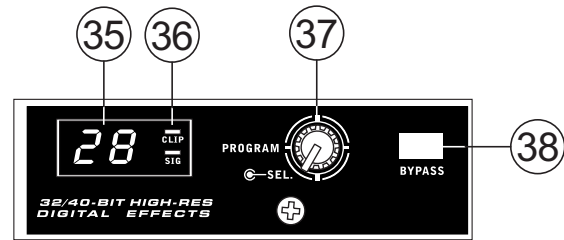
38. Effect Bypass

Use it to bypass the effects and monitor your audio before and after the effect is applied. When the effect engine is bypassed, the 2 small indicators on the digital effect display will flash.

39. AUX 3 / EFX Send Control and Solo Button

This rotary control will adjust the level of the output signal at the AUX 3 send jack, as well as determine the amount of audio the built-in effects processor will receive. When this control is set to it's minimum position, neither the AUX 3 send nor the effect processor will receive a signal. The accompanying Solo button allows the EFX Send signal to be sent to the Control Room / Phones mix.

40. To Main Control

The "to Main" control will allow users to adjust the processed signal that is sent to the Main.

41. To AUX 1/2 Controls

These controls allow users to send the signal processed by the effects processor to the AUX 1 or 2 mix, allowing for monitoring of the signal. This is called "Effect to Monitor."

Master Section

42. AUX Send Controls and Solo Buttons

These two controls are for adjusting the audio level that is sent to the corresponding AUX outputs, the signal of which is initially taken from each channel's individual AUX send controls. Pushing one of the accompanying Solo buttons will send the corresponding AUX signal to the Control Room / Phones mix (pre or post fader, depending on the Pre / Post button).
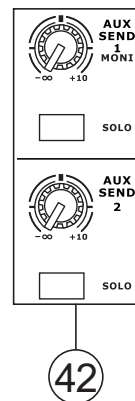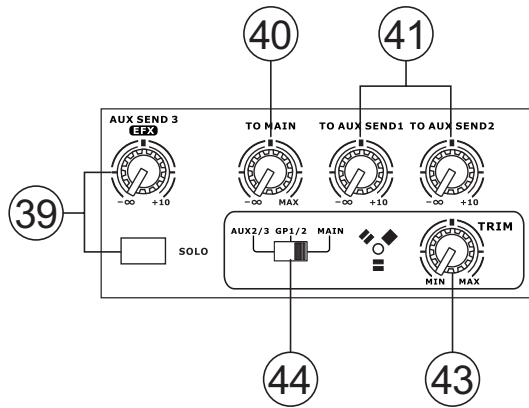
43. FireWire Trim Control

This is one of the newest features of the Helix Board 18 FireWire MKII. The FireWire trim control can be used to adjust the level of the outgoing FireWire signal (which will be received by the computer) from the AUX 2/3, Group 1/2 or Main L/R (depending on the FireWire Select switch). If the input signals received by your computer are noticeably excessive, using this control could help to attenuate the signal to an acceptable degree.

44. FireWire Select Switch

This switch determines which of the Helix Board's signals will be used for the FireWire channels 15 and 16 sent through the FireWire interface to the computer. Users can choose to send the two channel signal from the Auxiliary 2/3, Group 1/2 or Main mixes (all pre-level controls) to the computer.

45. FireWire "Assign to" Buttons

The Assign to Main and Assign to AUX 1 buttons allow users to determine the destination of the stereo FireWire return signal.
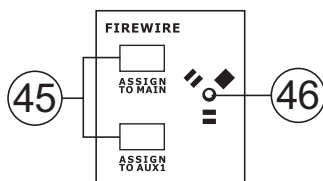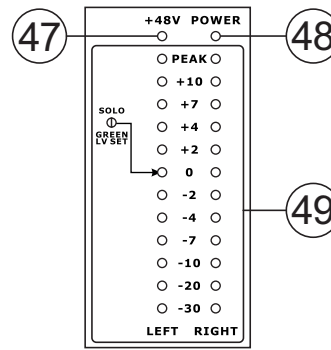
46. FireWire Indicator

This blue LED indicator will illuminate when a connection is established through the FireWire interface.

47. +48V Indicator

This indicator will illuminate when Phantom Power is activated.

48. Power Indicator

The Power Indicator will light up when the power of the mixer is on.

49. Level Meter

This dual 12 segment level meter gives an accurate indication of when audio levels of the Main L/R output reach certain levels. The 0 dB indicator illuminates is approximately equal to an output level of +4 dBu (balanced), and the PEAK indicator illuminates just before the signal is dynamically clipped. It is suggested that users set the various levels controls so that the level sits steadily around 0 dB to make full use of audio, while still maintaining fantastic clarity.

When the Solo indicator, located beside the Level Meter, is illuminated, one or more Solo buttons has been pushed. In that case, the Level meter will display properties of the Solo signal, which is helpful with setting of channel properties. If Solo indicator illuminates green, this means the Solo feed is a pre-fader signal. If the Solo indicator illuminates red, the feed is post-fader. If the no Solo buttons are activated, the Control Room source signal properties are displayed by the Level Meter.
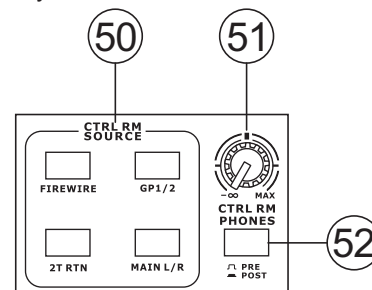
50. Control Room Source Buttons

This set of buttons allows users to select which signals they wish to send to the Control Room / Phones output. There is a button each for the FireWire, Group 1-2, 2T Return and Main mixes. These signals can be monitored simultaneously if required.

51. Control Rooms / Phones Level Control

This rotary control will allow users to adjust the audio level of the Control Room / Phones signal (received by solo signal, or as chosen in the Source Select buttons).

52. Control Room Pre / Post Button

The Pre / Post button alters the Solo signals received by the Control Room / Phones mix between Post and Pre fader signals. When set to Post, the Solo Indicator will light up red; when set to Pre, the Solo Indicator will light up green (channel level set).
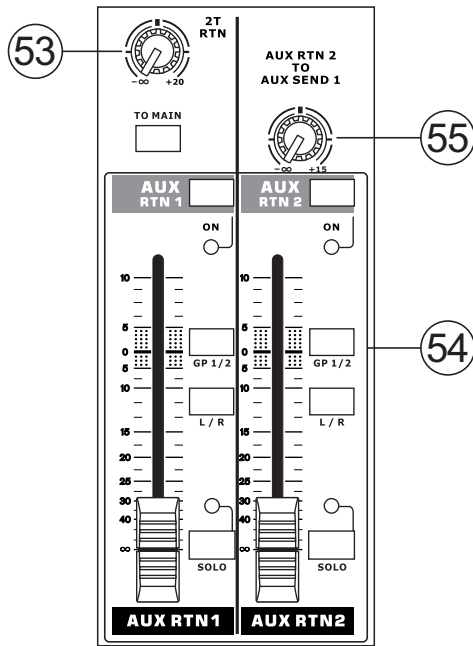
53. 2T Return Control and To Main Button

Use this rotary control to adjust the signal level received through the RCA 2T Return inputs. The To Main button allows users to send the 2T Return signal to the main mix.

54. AUX Return 1 and 2 Faders

This 60mm fader adjusts the signal level of audio fed through the stereo AUX Return input. This AUX Return features L/R, GP 1/2 assign buttons, enabling users to send the audio feed to the corresponding mixing buses. Also, features a Solo button that sends the signal directly to the Control Room / Phones mix. The On button allows you to turn the AUX Return channel on and off. Activation of the AUX Return or AUX Return Solo will be accompanied by an illuminated LED.

55. AUX Return 2 to AUX 1 Control

This rotary control allows users to adjust the level of audio that is sent from the AUX Return 2 signal to the AUX Send 1 mix.
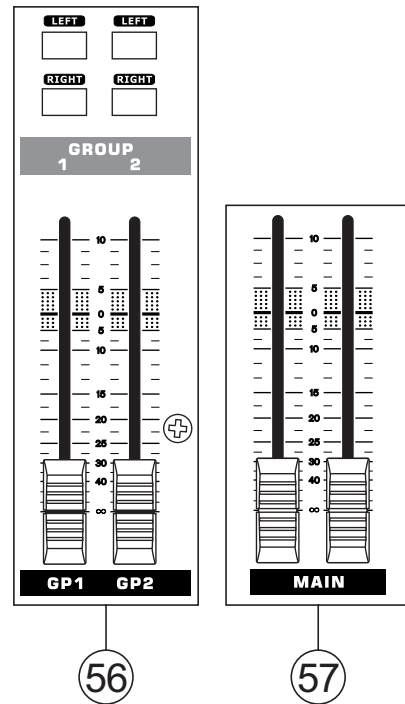
56. Group 1/2 Controls

These two faders are the final level control for the Group 1 and 2 audio feeds, sent to the Group 1 and 2 outputs. These faders can be fed a signal from the various mono and stereo channels, as well as EFX Returns, depending on your selections. When pushed all the way up, these faders provide 10 dB of gain to the signal, and, when set all the way down, effectively mute the signal.

The Group Controls also feature Left and Right buttons, which allow you to send the Group 1/2 signal to the Main Left and Right mix.

57. Main L/R Faders

These two faders are the final level control for the Main Left and Right audio feeds, sent to the Main L and R outputs. These faders are possibly fed by the various mono and stereo channels, as well as AUX and EFX returns and 2T inputs, depending on the your selections. When pushed all the way up, these faders provide 10 dB of gain to the signal, and, when set all the way down, effectively mute the signal.

FireWire Interface

System Requirements

The following are the minimum required specifications for use with the Helix Board 18 FireWire MKII mixer. If your computer does not meet these requirements, you will experience lagging of audio and possible freezing of your computer when attempting to operate the mixer.

Windows

• Microsoft® Windows® XP SP1 and SP2
• Available FireWire port (suggested FireWire Interface: ADS Pyro 64 FireWire card with TI chip)
• Intel Pentium® 4 processor or equivalent AMD Athlon processor
• Motherboard with Intel or VIA chipset
• 5400 RPM or faster hard disk drive (7200 RPM or faster with 8 MB cache recommended)
• 256 MB or more of RAM (512 MB recommended)

Macintosh

• OS X 10.3.5 or later with native FireWire support
• G4 or newer processor
• 256 MB or more of RAM

Driver Installation

To use the Helix Board FireWire mixer efficiently (or at all) on a PC, it is important to install all the necessary drivers from the included CD (ASIO and WDM drivers). It is important that users read all instructions carefully before continuing on to the each step of installation, as users will be required to unplug and plug in their FireWire device. This is not necessary for Mac users.

Windows XP (with Service Pack 1 or 2)

1. It is recommended that you quit all applications before starting the installation process.
2. Ensure the Helix Board FireWire is not yet connected to your Computer's FireWire input.
3. Insert the installation CD included with your Helix Board FireWire mixer into the CD-ROM drive of your computer. If the CD does not automatically start the installation process within a few moments, then navigate to "My Computer" → your CD-ROM drive → "Drivers and Control Panel" → double-click "setup.exe" to begin the installation manually. The Helix Board FireWire Control Panel software also will be installed at this time.
4. Follow the installation instructions.
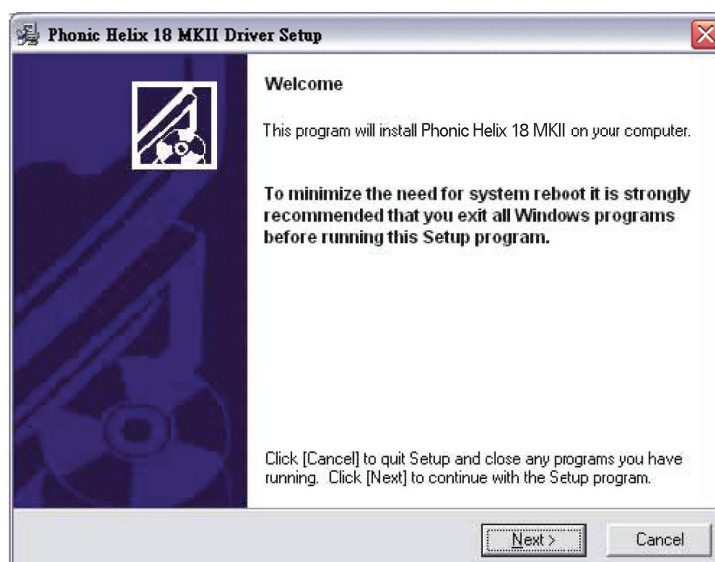
Make sure no other programs are running on your PC and that the
Helix Board 18 FireWire MKII is not connected to your PC, then click "Next".

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Read and accept the terms of the License Agreement and click "Yes" to continue.
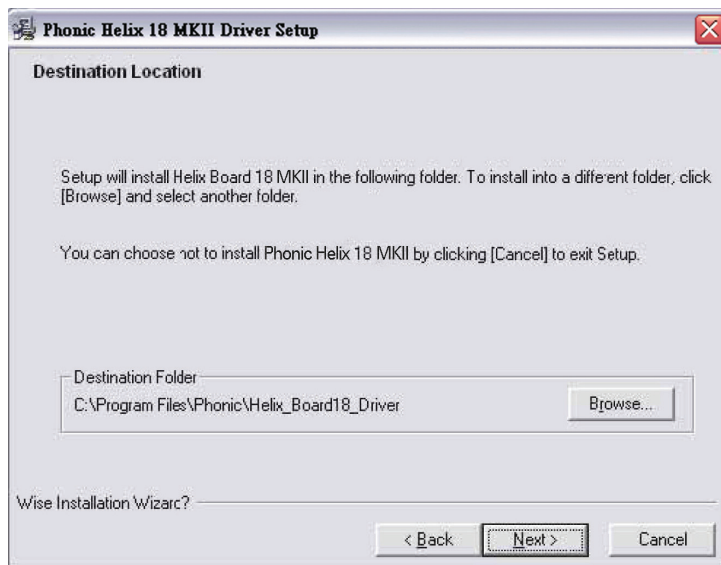
Either select a new destination for the installation, or else click "Next" to accept the default directory.
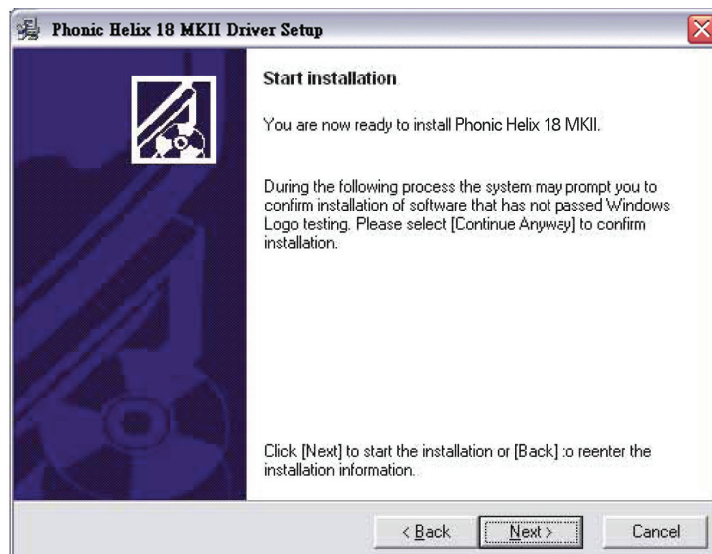
Click "Next" to begin the installation.
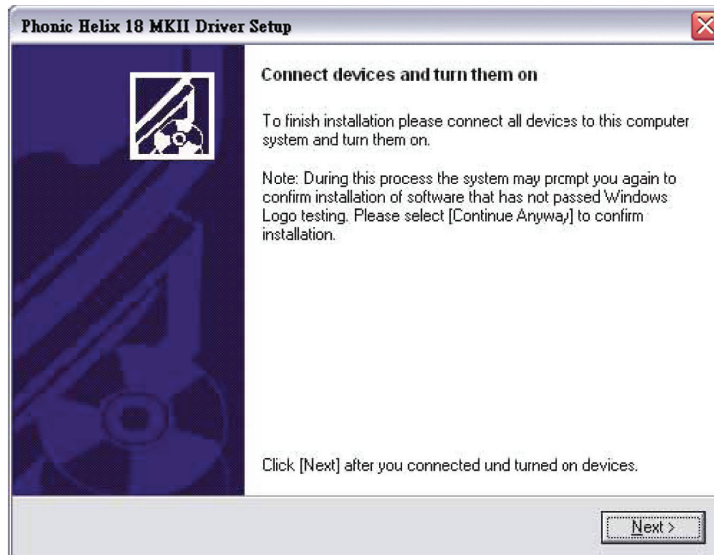
Connect the Helix Board 18 FireWire MKII to the Computer and turn the power on.

If a message is displayed indicating that the software has not passed Windows Logo test,
click "Continue Anyway".
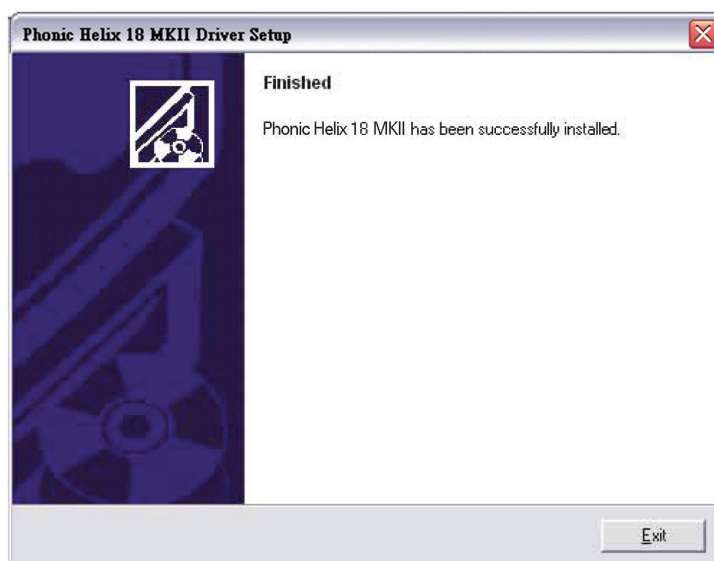
After installation is complete, users are free to use the device as they wish.

PHONIC

Macintosh OS X (10.3.5 or later)

The Helix Board 18 FireWire MKII works with the primary audio drivers of Macintosh OS X 10.3.5 and later. First verify that you are running Macintosh OS X 10.3.5 or above, then connect the Helix Board 18 FireWire MKII to a FireWire port to the computer. To ensure your Helix Board 18 FireWire MKII is working, enter the Utilities folder and double-click the Audio MIDI Setup icon.
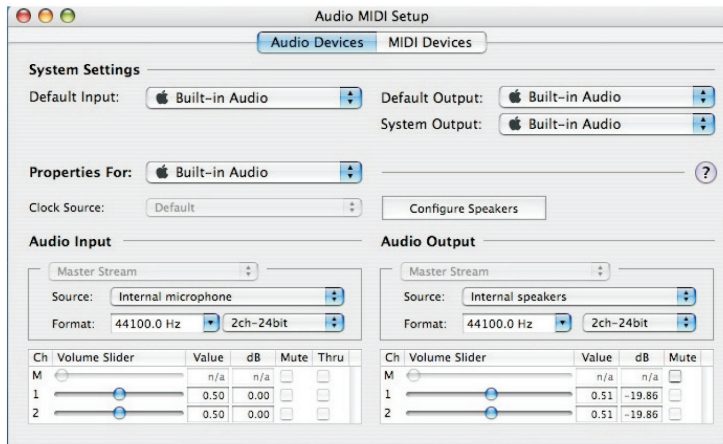
Enter the Audio Device's section. From the "Properties for" pull-down tab,
select Helix Board 18 FireWire MKII.
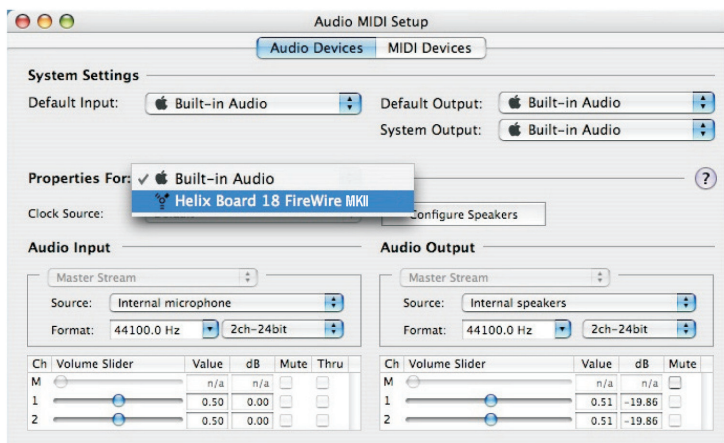
At the bottom of the window, users can edit the setup of the Helix Board 18 FireWire MKII.
Properties such as sampling rate and clock source can be altered.
Users may also opt to make the Helix Board 18 FireWire MKII their default input and/or output device.
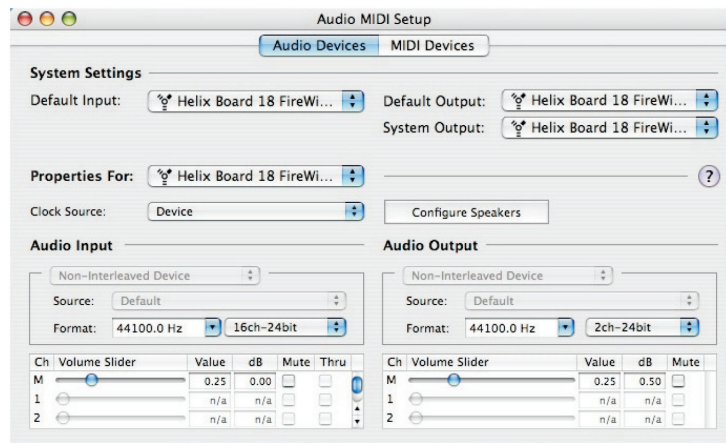
Mac users are able to use GarageBand Digital Audio Workstation Software,
in conjunction with the Helix Board 18 FireWire MKII.

Channel Assignment

When using a Digital Audio Workstation on a PC, and within the included Phonic Helix Board 18 FireWire MKII control panel software, the following names have been attributed to the input channels of the FireWire mixer. They can be altered through the control panel software included with the mixer.

FireWire Input Channel Name	Mixer Channel
Phonic HB 18 MKII CH 1	Channel 1
Phonic HB 18 MKII CH 2	Channel 2
Phonic HB 18 MKII CH 3	Channel 3
Phonic HB 18 MKII CH 4	Channel 4
Phonic HB 18 MKII CH 5	Channel 5
Phonic HB 18 MKII CH 6	Channel 6
Phonic HB 18 MKII CH 7	Channel 7 (Stereo L)
Phonic HB 18 MKII CH 8	Channel 8 (Stereo R)
Phonic HB 18 MKII CH 9	Channel 9 (Stereo L)
Phonic HB 18 MKII CH 10	Channel 10 (Stereo R)
Phonic HB 18 MKII CH 11	Channel 11 (Stereo L)
Phonic HB 18 MKII CH 12	Channel 12 (Stereo R)
Phonic HB 18 MKII CH 13	Channel 13 (Stereo L)
Phonic HB 18 MKII CH 14	Channel 14 (Stereo R)
Phonic HB 18 MKII Main L	user definable
Phonic HB 18 MKII Main R	user definable

To alter an input channel's name on your computer, open the Helix Board 18 FireWire MKII control panel software. On the left hand side of the control panel, users will find the settings categories. By clicking "Input Channels", the main window will display the titles input channels. You can then highlight the channel names and press the "Edit Channel Name" button on the bottom of the control window. A new window will appear that will allow users to adjust the channel name.

If you would like to use the Helix Board 18 FireWire MKII as your default audio output device on you PC, simply go into the Windows control panel, and select "Sound and Audio Devices". Select the Audio tab, and use the pull-down menu to select the Helix Board 18 FireWire MKII from the list of available output devices. The Helix Board 18 FireWire MKII can also be selected as the default output device for individual programs by editing said programs' settings / options.

Cubase LE

Cubase LE is a fairly powerful program provided along with the Helix Board 18 FireWire MKII mixer that allows users to record, edit, delete, and alter their tracks. Please note that only 4 tracks can be recorded at once with the version of Cubase included, and users must upgrade or find other suitable DAW software if they choose to record more tracks.

Installation
Insert the Cubase LE installation CD that came with your mixer into the CD drive of your computer. Run the installer. The serial number will be automatically entered in when installing.

Setup
After successfully completing the installation process, the following process must be followed to work efficiently with the Helix Board 18 FireWire MKII mixer.

1. Open the Cubase LE program.
2. Go to the 'Devices' pull-down menu and select 'Device Setup'. On the left, select 'VST Multitrack'.
3. From the ASIO Driver drop-down list select the "Phonic ASIO Driver". A pop-up box will ask you if you want to switch the ASIO driver. Click 'Switch'. This completes the basic installation and setup.
4. Activating audio tracks received from the Helix Board mixer.
   a. Go to the "devices" pull-down menu and select 'VST Inputs'. This will display the various inputs ("Phonic HB 18 MKII Ch 1", "Phonic HB 18 MKII Ch 2", etc.)
   b. Activate 8 of these channels by clicking the "Active" button located next to each channel name. Please note, only 8 input channels can be activated at any one time. This is a limitation of Cubase LE, and if more input channels are needed, we suggest upgrading to a higher version of Cubase, or use other DAW software.
5. For further instructions on the operation of Cubase, please consult the user manual by pressing F1 while the program is open.

If you wish to reset the Helix Board 18 FireWire MKII ASIO driver, simply go to the 'devices' pull-down menu and select 'device setup'. Simply click "reset" and select the "Phonic ASIO Driver". Click 'ok' to continue and the Helix Board 18 FireWire MKII should once again become functional.

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Helix Board Control Panel

The Helix Board FireWire control panel can be accessed at any time by entering choosing the shortcut from your Programs menu. This program will not only allow users to alter their device and channel names and properties, but will also let them correct for latency issues, change sampling rates, and so forth. When opening the software, a number of options will be available for users to select from, allowing them to adjust the available properties.
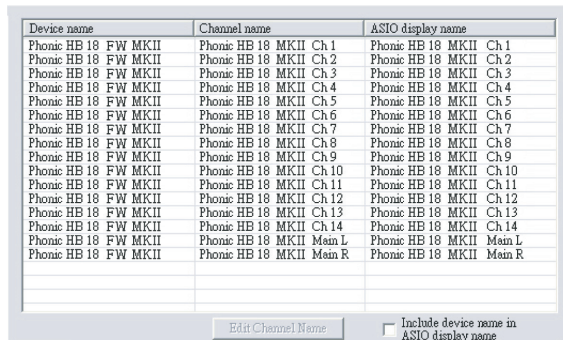
Devices

In the Devices section, users are able to view and edit the name of the Phonic FireWire Devices connected to their computer.

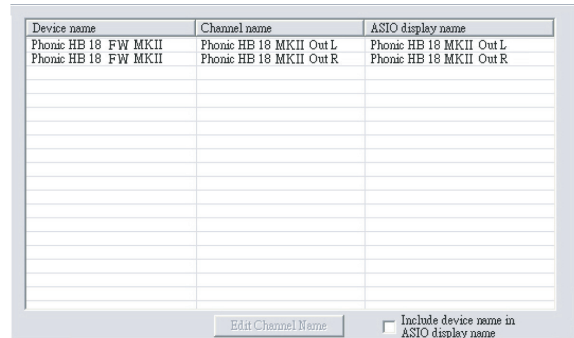| Device name	Serial number
Phonic HB 18 FW MKII	0014960000000000

Edit Device Name
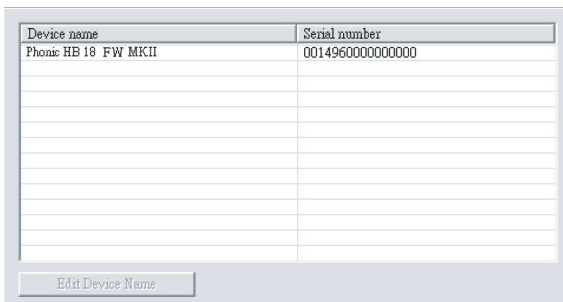
Input Channels

The Input Channels section allows users to view and edit the name of the various input channels received from the FireWire input. For a list of default channel names, please consult the table on page 16.

Device name	Channel name	ASIO display name
Phonic HB 18 FW MKII	Phonic HB 18 MKII Ch 1	Phonic HB 18 MKII Ch 1
Phonic HB 18 FW MKII	Phonic HB 18 MKII Ch 2	Phonic HB 18 MKII Ch 2
Phonic HB 18 FW MKII	Phonic HB 18 MKII Ch 3	Phonic HB 18 MKII Ch 3
Phonic HB 18 FW MKII	Phonic HB 18 MKII Ch 4	Phonic HB 18 MKII Ch 4
Phonic HB 18 FW MKII	Phonic HB 18 MKII Ch 5	Phonic HB 18 MKII Ch 5
Phonic HB 18 FW MKII	Phonic HB 18 MKII Ch 6	Phonic HB 18 MKII Ch 6
Phonic HB 18 FW MKII	Phonic HB 18 MKII Ch 7	Phonic HB 18 MKII Ch 7
Phonic HB 18 FW MKII	Phonic HB 18 MKII Ch 8	Phonic HB 18 MKII Ch 8
Phonic HB 18 FW MKII	Phonic HB 18 MKII Ch 9	Phonic HB 18 MKII Ch 9
Phonic HB 18 FW MKII	Phonic HB 18 MKII Ch 10	Phonic HB 18 MKII Ch 10
Phonic HB 18 FW MKII	Phonic HB 18 MKII Ch 11	Phonic HB 18 MKII Ch 11
Phonic HB 18 FW MKII	Phonic HB 18 MKII Ch 12	Phonic HB 18 MKII Ch 12
Phonic HB 18 FW MKII	Phonic HB 18 MKII Ch 13	Phonic HB 18 MKII Ch 13
Phonic HB 18 FW MKII	Phonic HB 18 MKII Ch 14	Phonic HB 18 MKII Ch 14
Phonic HB 18 FW MKII	Phonic HB 18 MKII Main L	Phonic HB 18 MKII Main L
Phonic HB 18 FW MKII	Phonic HB 18 MKII Main R	Phonic HB 18 MKII Main R

Edit Channel Name   ☐ Include device name in ASIO display name

Output Channels

By entering the Output Channels section, users can view and edit the names of the two output channels from the computer to the Helix Board 18 FireWire MKII mixer.

Device name	Channel name	ASIO display name
Phonic HB 18 FW MKII	Phonic HB 18 MKII Out L	Phonic HB 18 MKII Out L
Phonic HB 18 FW MKII	Phonic HB 18 MKII Out R	Phonic HB 18 MKII Out R

Edit Channel Name   ☐ Include device name in ASIO display name

Synchronization

In the Synchronization section, users can adjust the sampling rate and other synchronization properties. Many of these adjustable properties, as they are, are set for optimum performance and, unless you are sure of what you need to change, are probably best left alone.

Synchronisation Settings

Clk Master	Devices	Current Synchronisation Source
☐	PC Driver	External
☑	Phonic HB 18 FW MKII	CSP (MSU Synch Output)

Change Synchronisation Mode

○ Sampling rate is set manually
○ Sampling rate is set automatically as defined by the clock master   Apply
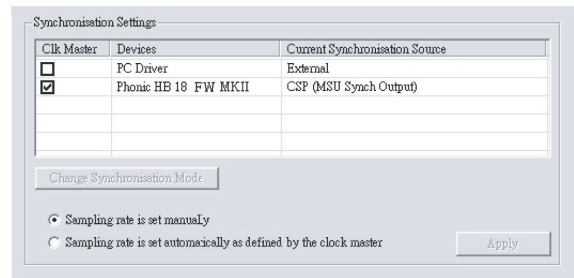
First off, the synch mode can be altered, though making this alteration is not recommended for novice users. The synch mode is basically the way the computer determines what the 'clock source' (ie. device that your computer will use to determine the timing of all digital signals received) will be. The default setting for this feature is "CSP", meaning the Helix Board 18 FireWire MKII is the "master" clock source of the device. The other options allow users to make the Helix Board 18 FireWire MKII follow the "timing" of whichever device is the clock source. Having two clock sources has the potential to create very undesireable audio, so it is best avoided. If the Helix Board 18 FireWire MKII is the only piece of digital audio equipment attached to the computer, there is no reason this option should be changed.

Users are also able to change between automatic and manual sampling rate settings. When the sampling rate is manually set, users can select between sampling rates of 44.1, 48.0, 88.2 and 96.0 kHz per second. Many devices have sampling rates that do not surpass 44.1 kHz per second, therefore, when using multiple digital devices, users are advised not to exceed this level unless they are sure the secondary device's sampling rate can .

Settings

Users are able to adjust various buffer times in the Settings section.

The Stream Buffer Depth is adjustable between 0.5 and 20 milliseconds. It adjusts the buffer used when streaming a signal from the Helix Board 18 FireWire MKII. If the depth is set too high, an obvious latency will become evident. If the depth is too low, various clicks and pops may become obvious. It is best to set the Stream Buffer Depth to a level that allows users to get the lowest latency, while still maintaining an optimal performance. The default settings are ideal for most computers.
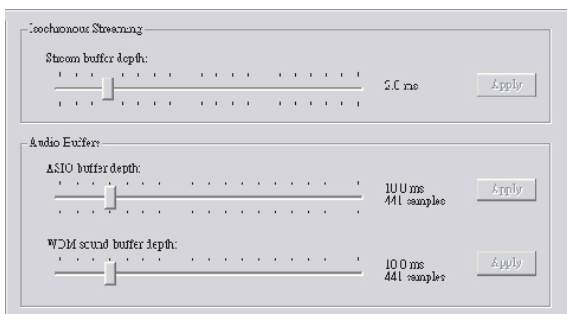
The ASIO Buffer Depth is adjustable between 4 and 40 milliseconds. This allows users to adjust the latency of the stream received by ASIO driver-based software (including Steinberg Cubase LE).

The WDM (Windows Driver Model) Sound Buffer Depth is adjustable between 4 and 40 milliseconds. This allows users to adjust the latency of the stream received by WDM based programs.

Also in this section, users are able to view their "drop out statistics", where the number of times the FireWire connection has been interrupted can be viewed.

Streams

In the Streams section, the Helix Board 18 FireWire MKII device properties can be viewed. Each input and output stream can be scrutinized, and the isochronous stream number and its supported sampling rates can be viewed.

Device name	Audio Out Plug	Audio In Plug	Synch Out Plug	Synch In Plug
Phonic HB 18 FW MKII	connected (1)	connected (0)		

Troubleshooting

Driver Installation (Windows users only)

- Phonic recommends using an **ADS Pyro 64 FireWire card with a TI chip**, as this is the most compatible FireWire card. Certain FireWire cards are incompatible with the Helix Board; it's important to purchase a quality card. There are some known FireWire card issues we've documented, including:

  Ricoh – Windows XP with SP2 is required (also see http://support.microsoft.com/kb/308374/en-us)

  Texas Instruments' TSB81BA3 will only work up to 100 Mbit/s under Windows XP SP2. You need to downgrade to SP1 to get full 400 Mbit/s speed. More information on this can be found on our website.

- Follow the instructions laid out earlier in this user's manual carefully. If you connect the Helix Board to the computer before starting the driver installation process it is likely that Windows has tried to install its own driver. This may have to be removed before continuing.

- Be sure to check if you have SP1 or SP2 installed on your version of Windows. These service packs contain fixes/patches that are necessary for the Helix Board to run.

Daisy-chaining

- Users are able to get double the number of inputs if they use two Helix Boards simultaneously. There are two methods of doing this: you can either connect one Helix Board to the other, then the second Helix Board to the computer, or simply connect both to the computer directly.

- Successfully getting the computer to recognize both Helix Boards means getting it to see both as individual devices. Some earlier model Helix Boards were shipped with identical ID numbers, meaning it may not allow you to connect two successfully. If you check the GUID number (appears in the bottom right-hand corner when you connect the device to the computer) of your Helix Boards, and they're identical, you're able to contact your Phonic dealer to get a replacement board.

- Your computer should recognize both Helix Boards and allow you to use both boards' inputs automatically.

- Daisy-chaining more than two Helix Boards is at this time not possible.

Software

- The Helix Board is compatible with the most popular Digital Audio Workstation software. This, however, does not include ProTools.

- The Helix Board comes with a free copy of Steinberg Cubase LE, able to record 8 tracks simultaneously. To make full use of the Helix Board, users are advised to upgrade Steinberg, or use other high quality DAW recording programs.

- Audacity is a freeware program that allows you to do multi-track recording through the Helix Board. It's not an attractive program, or particularly advanced, but it's available for free, online at **audacity.sourceforge.net**.

Phonic's Online Support

If your problem isn't solved from any of the previous information, you can contact the Phonic help desk at **www.phonic.com/support**.

Before contacting Phonic for any help, please check the following issues to make solving your problem much smoother:

1. Check that the FireWire cable is firmly connected to both the Helix Board and computer.

2. Uninstall other FireWire devices from your computer and try again

3. Uninstall the Helix board driver and install the latest version. Pay attention to any unusually occurrences during the installation process and inform us of them when asking for help.

4. Check if the Helix Board control panel shows all device and input and output channels correctly.

5. Try the FireWire fix that posted in Phonic website if using Windows XP with SP2.

In addition, please offer us the following information to help us determine the problem:

1. Operating System? (Windows OS (with SP1, SP2, etc.) or Mac OSX version?)

2. What DAW software or recording software are you trying to use?

3. Did you install any other FireWire devices/drivers before? Which brand/model?

4. What mother board and FireWire interface are you using?

5. Any additional information you can provide that you think may help.

Digital Effects Table

NO	PROGRAM NAME	PARAMETER SETTING	
	ROOM	REV-TIME	EARLY LEVEL
00	COMPACT ROOM 1	0.05	100
01	COMPACT ROOM 2	0.4	0
02	SMALL ROOM 1	0.45	100
03	SMALL ROOM 2	0.6	90
04	MID ROOM 1	0.9	100
05	MID ROOM 2	1	50
06	BIG ROOM 1	1.2	100
07	TUNNEL	3.85	100
	HALL	REV-TIME	EARLY LEVEL
08	JAZZ CLUB	0.9	90
09	SMALL HALL 1	1.5	72
10	SMALL HALL 2	1.75	85
11	SPRING HALL	1.9	98
12	MID HALL 1	2.3	100
13	MID HALL 2	2.45	80
14	RECITAL HALL	2.7	96
15	BIG HALL 2	3.3	88
	PLATE	REV-TIME	HPF
16	SMALL PLATE	0.9	0
17	TAIL PLATE	1.2	20
18	MID PLATE 1	1.3	0
19	MID PLATE 2	2.2	0
20	REVERSE PLATE	2.25	42
21	LONG PLATE 1	2.6	80
22	LONG PLATE 2	3	625
23	LONG PLATE 3	4.2	0
	DELAY (stereo)	DELAY AVERG.	R-LEVEL
24	SHORT DELAY 1	0.07	60
25	SHORT DELAY 2	0.14	60
26	PING PONG DELAY	0.11	55
27	MID DELAY 1	0.15	55
28	MID DELAY 1	0.3	60
29	SHORT DELAY 1 (MONO)	0.06	100
30	MID DELAY 1 (MONO)	0.13	100
31	LONG DELAY 1 (MONO)	0.18	100
	CHORUS	LFO	DEPTH
32	SOFT CHORUS	0.2	56
33	SOFT CHORUS 2	0.5	70
34	SOFT CHORUS 3	0.8	75
35	WARM CHORUS	1.8	85
36	WARMER CHORUS 1	3.2	80
37	WARMER CHORUS 2	5.2	45
38	WARMER CHORUS 3	7.8	52
39	HEAVY CHORUS	9.6	48
	FLANGER	LFO	DEPTH
40	CLASSIC FLANGER 1	0.1	44
41	CLASSIC FLANGER 2	0.3	63
42	GENTLE FLANGER	0.6	45
43	WARM FLANGER	1.6	60
44	MODERN FALANGER 1	2	85
45	MODERN FALANGER 2	2.8	80
46	DEEP FALANGER 1	4.6	75
47	DEEP FALANGER 2	10	60
	PHASER	LFO	DELAY
48	CLASSIC PHASER 1	0.1	3.6
49	CLASSIC PHASER 2	0.4	2.6
50	COOL PHASER	1.4	0.7
51	WARM PHASER	3.2	0.3
52	HEAVY PHASER 1	5	1.2
53	HEAVY PHASER 2	6	2.8
54	WILD PHASER 1	7.4	0.8
55	WILD PHASER 2	9.6	4.8

NO	PROGRAM NAME	PARAMETER SETTING	
	PAN	SPEED	TYPE
56	SLOW PAN	0.1	R-->L
57	SLOW PAN 1	0.1	R<-->L
58	SLOW PAN 2	0.4	R-->L
59	MID SHIFT	0.8	R<-->L
60	MID SHIFT 1	1.2	L-->R
61	MID SHIFT 2	1.8	L-->R
62	MID SHIFT 3	1.8	R-->L
63	FAST MOVE	3.4	R<-->L
	TREMOLO	SPEED	MODE-TYPE
64	LAZY TREMOLO	0.8	TRG
65	VINTAGE TREMOLO	1.5	TRG
66	WARM TREMOLO	2.8	TRG
67	WARM TREMOLO 1	4.6	TRG
68	HOT TREMOLO	6.8	TRG
69	HOT TREMOLO 1	9.6	TRG
70	CRAZY TREMOLO 1	15	TRG
71	CRAZY TREMOLO 2	20	TRG
	DELAY+REV	REV	DELAY
72	DELAY+REV 1	1	1
73	DELAY+REV 2	2	2
74	DELAY+REV 3	3	3
75	DELAY+REV 4	4	4
76	DELAY+REV 5	5	5
77	DELAY+REV 6	6	6
78	DELAY+REV 7	7	7
79	DELAY+REV 8	8	8
	CHORUS+REV	REV	CHORUS
80	CHORUS+REV 1	1	1
81	CHORUS+REV 2	2	2
82	CHORUS+REV 3	3	3
83	CHORUS+REV 4	4	4
84	CHORUS+REV 5	5	5
85	CHORUS+REV 6	6	6
86	CHORUS+REV 7	7	7
87	CHORUS+REV 8	8	8
	FLANGER+REV	REV	FLANGER
88	FLANGER+REV 1	1	1
89	FLANGER+REV 2	2	2
90	FLANGER+REV 3	3	3
91	FLANGER+REV 4	4	4
92	FLANGER+REV 5	5	5
93	FLANGER+REV 6	6	6
94	FLANGER+REV 7	7	7
95	FLANGER+REV 8	8	8
	GATED-REV	RELEASE	REV
96	GATED-REV-1 9	0.02	TAIL PLATE
97	GATED-REV-2 10	0.2	TAIL PLATE
98	GATED-REV-1 9	0.02	REVERSE PLATE
99	GATED-REV-2 10	0.5	REVERSE PLATE
	TAP DELAY	FB LEVEL	RANGE
A0	TAP DELAY	0	100mS - 2.7S
A1	TAP DELAY	10	100mS - 2.7S
A2	TAP DELAY	20	100mS - 2.7S
A3	TAP DELAY	30	100mS - 2.7S
A4	TAP DELAY	40	100mS - 2.7S
A5	TAP DELAY	50	100mS - 2.7S
A6	TAP DELAY	60	100mS - 2.7S
A7	TAP DELAY	70	100mS - 2.7S
A8	TAP DELAY	80	100mS - 2.7S
	TEST TONE	FREQUENCY	SHAPE
T0	LOW FREQUENCY	100Hz	SINEWAVE
T1	MID FREQUENCY	1kHz	SINEWAVE
T2	HIGH FREQUENCY	10kHz	SINEWAVE
PN	PINK NOISE	20Hz~20kHz	

PHONIC

Application

Live Band Multitrack Recording and Monitoring
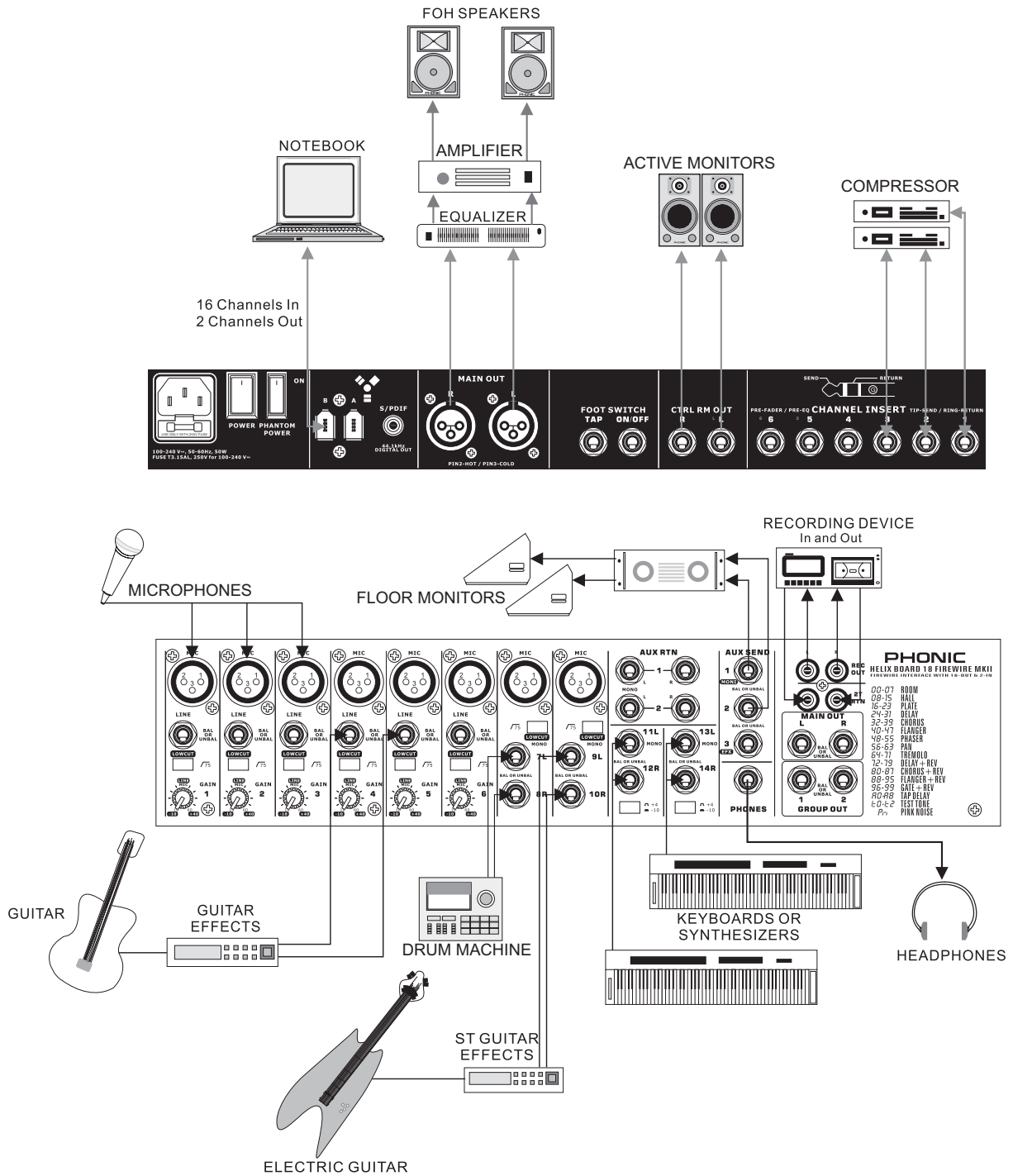
Studio Recording and Monitoring

PHONIC
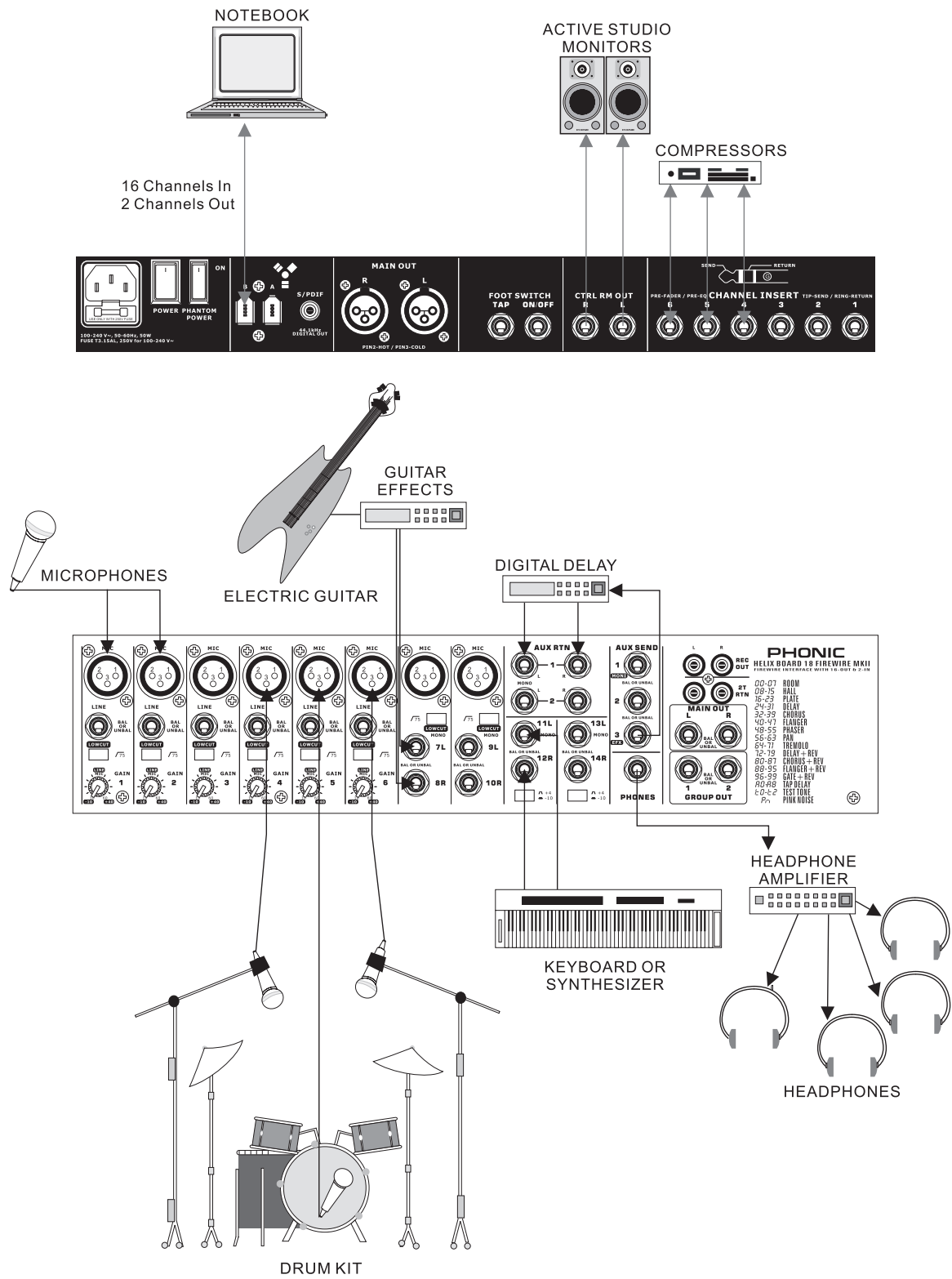
Specifications

| Inputs	
Total Channels	10
Balanced Mono Mic / Line channel	6
Balanced Mic / Stereo Line channel	2
Balanced Stereo Line Channel	2
Aux Return	2
2T Input	Stereo RCA
Outputs	
Main L/R Stereo	2 x 1/4" TRS, Bal. & 2 x XLR
Rec Out with Trim Control	Stereo RCA
CTRL RM L/R	2 x 1/4" TS
Phones	1
Firewire Interface	16 out & 2 in, 24-bit / 96 kHz
Channel Strips	10
Aux Sends	3
Pan/Balance Control	Yes
Volume Controls	60mm fader
Master Section	
FireWire channel 15/16 routing switch	Source from main mix, group 1/2, and aux 2/3
Aux Send Masters	3
Master Aux Send Solo	3
Stereo Aux Returns	2
Aux Return Assign to Subgroup	2
Effects Return to Monitor	2
Global AFL/PFL Solo Mode	Yes
Phones Level Control	Yes
Faders	Aux return 1 & 2, Subgroup 1 & 2, Main L & R
Metering	
Number of Channels	2
Segments	12
Phantom Power Supply	+48V DC
Switches	Master
Effect Processor (40-bit DSP)	High definition algorithm 100 programs plus tap delay; foot switch jcaks (effect on/off, tap)
Frequency Response (Mic input to any output)	
20Hz ~ 60KHz	+0/-1 dB
20Hz ~ 100KHz	+0/-3 dB
Crosstalk (1KHz @ 0dBu, 20Hz to 20KHz bandwidth, channel in to main L/R outputs)	
Channel fader down, other channels at unity	<-90 dB

Noise (20Hz~20KHz; measured at main output, Channels 1-4 unit gain; EQ flat; all channels on main mix; channels 1/3 as far left as possible, channels 2/4 as far right as possible. Reference=+6dBu)	
Master @ unity, channel fader down	-86.5 dBu
Master @ unity, channel fader @ unity	-84 dBu
S/N ratio, ref to +4	>90 dB
Microphone Preamp E.I.N. (150 ohms terminated, max gain)	<-129.5 dBm
THD (Any output, 1KHz @ +14dBu, 20Hz to 20KHz, channel inputs)	<0.005%
CMRR (1 KHz @ -60dBu, Gain at maximum)	80dB
Maximum Level	
Mic Preamp Input	+10dBu
All Other Input	+22dBu
Balanced Output	+28dBu
Impedance	
Mic Preamp Input	2 K ohms
All Other Input (except insert)	10 K ohms
RCA 2T Output	1.1 K ohms
All other outputs	200 ohms
Equalization	**3-band, +/-15dB**
Low EQ	80Hz
Mid EQ (mono channel)	100-8k Hz, sweepable
LMid EQ (stereo channel)	800 Hz
HMid EQ (stereo channel)	3 kHz
Hi EQ	12 kHz
Low cut filter	75 Hz (-18 dB/oct)
Physical Attributes and Power	
Built-in Power Supply	100-240 VAC, 50/60 Hz
Weight	11.2 lbs (5.1 kg)
Dimensions (WxHxD)	16" x 3.5" x 14" (407 x 89 x 357 mm)

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Dimensions
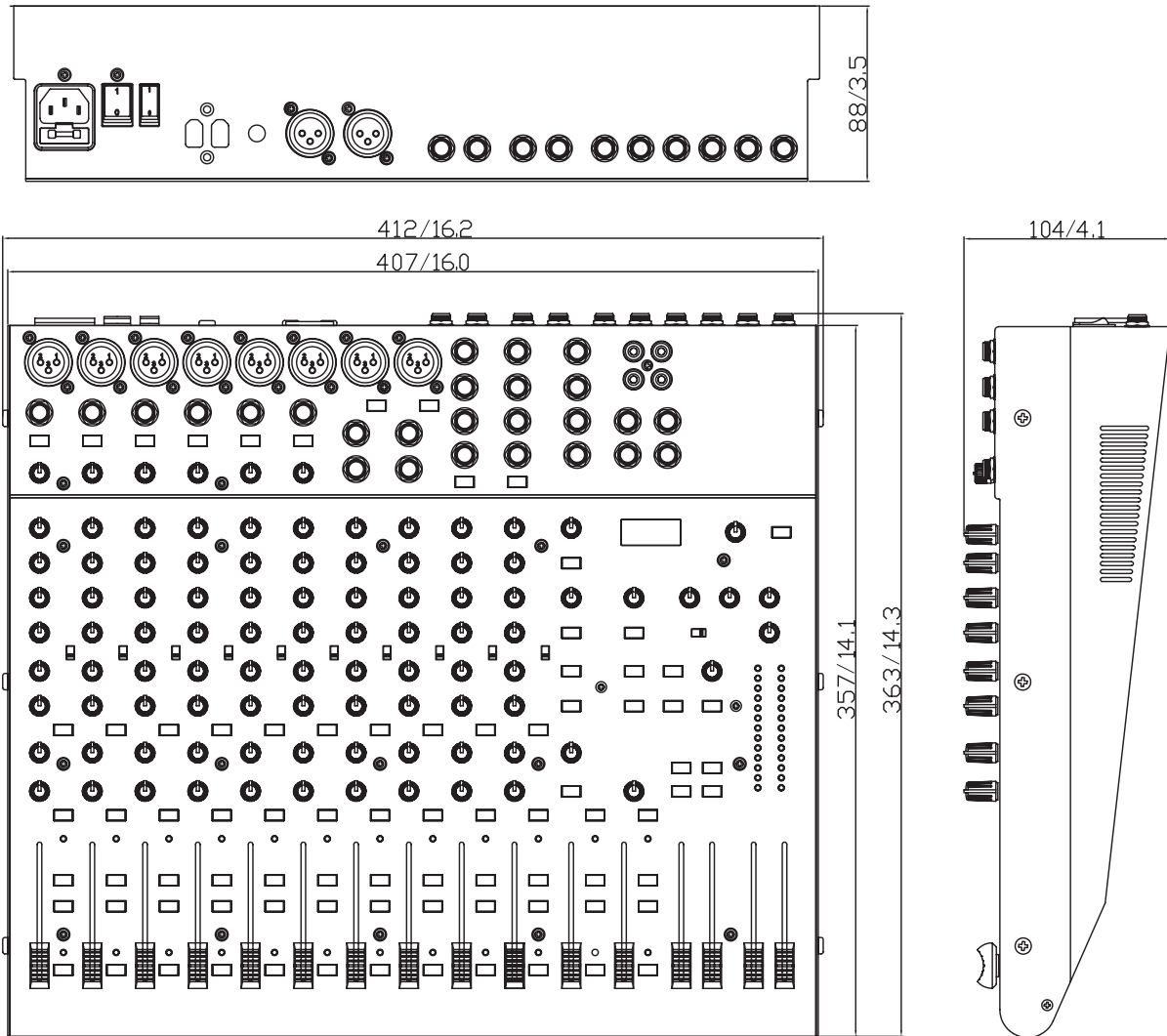
* All measurements are shown in mm/inches.

Block Diagram
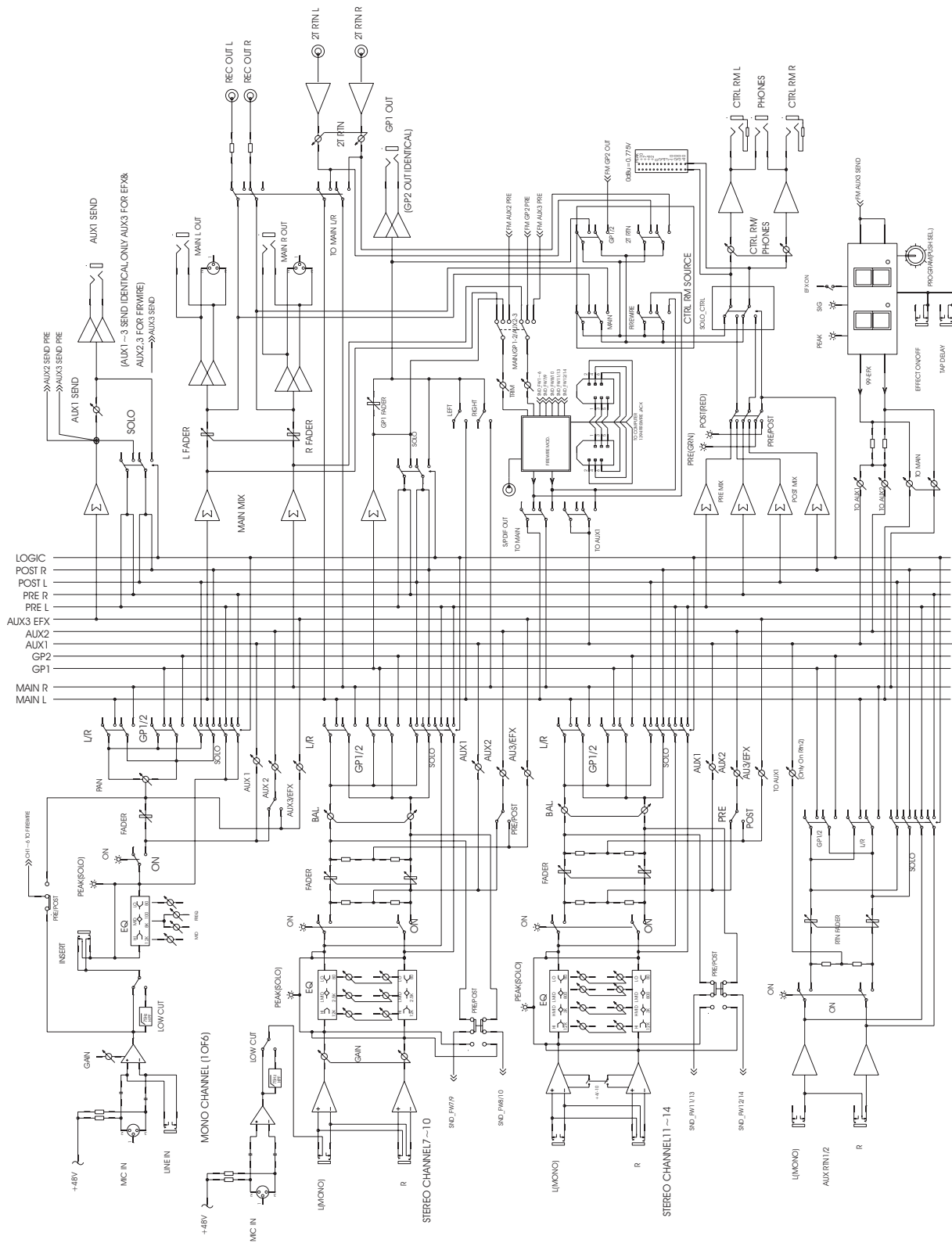
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