

DEQ830

Reference Manual

ALESIS

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Introduction

Welcome!

Thank you for purchasing the Alesis DEQ830. It is a versatile product, and whether it becomes a part of your studio or finds its place in your live setup, we know it will serve you well. Since 1984, we've been designing and building creative tools for the audio community. We believe in our products, because we've heard the results that creative people like you achieve with them.

One of the goals of Alesis is to make high-quality music technology available to everyone. This Reference Manual is an important part of that, because in it we try to present the DEQ830's features in a way that is easy to understand and remember. But even beyond explaining each feature and parameter, this manual can be a key that unlocks an application for the DEQ830 that you may not have considered. So we try to write our manuals as carefully as we build our products.

The goal of this manual is to get you the information you need as quickly as possible, with a minimum of hassle. We hope we've achieved that. If not, please drop us an email and give us your suggestions on how we could improve future editions of this manual.

We hope your investment will bring you many years of creative enjoyment and help you achieve your goals.

Sincerely,
The people of Alesis

For more effective service and product update notices, please register your DEQ830 online at:

<http://www.alesis.com/support/warranty.htm>

DEQ830 Key Features

1. Offers the best of digital technology and analog-style control: a graphic display with instant editing of any band or combination of bands, plus the ability to store programs
2. 100 user-definable programs, each of which holds 8 channels of EQ settings
3. 100 user-definable curves, each of which holds 30 bands of EQ settings
4. 48 KHz sampling rate, 24-bit A/D/A, 28-bit internal processing
5. Eight channels of equalization, independent or linkable
6. 30 EQ bands per channel, spanning 25 Hz-20 KHz in 1/3-octave increments
7. +/- 12 dB boost/cut with center detente
8. Constant Q technology for finer control of audio
9. LOCK function for “set and forget” situations, which prevents accidental reprogramming
10. Retrieve Curve mode for auditioning and selecting stored EQ curves
11. Individual Channel Level adjustment per program
12. Master Level adjustment
13. **[LINK]** button for quick creation of matched EQ curves
14. Ability to bypass any or all channels using **[BYPASS]** and **[BYPASS ALL]** buttons
15. Configurable editing modes to suit the way you work
16. Ability to copy settings from one channel to another
17. Easy-to-read 7-segment Numerical LED Display
18. More than 350 Band Gain LEDs, making it easy to read EQ curves from a distance
19. Signal Level, Clip and Bypass LEDs for each channel
20. Balanced input/output (TRS)
21. Compact 1-space rackmount profile
22. Real-time Analyzer (RTA) mode for visual feedback of incoming and outgoing audio signals, with selectable metering modes
23. ADAT Optical input/output, auto-sensing of incoming digital audio
24. Clock selectable between 44.1k and 48k sampling rates
25. MIDI in/out for program changes and sys-ex storage
26. +4 dBu/-10 dBV operating level switch on rear panel

For full operating specifications, see page 65.

How to Use This Manual

This manual is divided into the following sections describing the various functions of and applications for the DEQ830. While it's a good idea to read through the entire manual once carefully, those having general knowledge about audio equipment should use the table of contents to look up specific functions.

Chapter 1: Quick Start Guide. If you're already familiar with equalization, this will get you started using the DEQ830 right away. This section presents the essential elements of hooking up the unit and using it for the first time.

Chapter 2: Connections. This section gives detailed instructions for connecting the DEQ830 to a variety of typical audio systems.

Chapter 3: Basics of Equalization. This section describes what an equalizer does and explains the function of each of the controls.

Chapter 4: Applications. Skip to this section for tips on using the DEQ830 in a variety of settings. You'll also find a blank chart representing the DEQ830's 30 bands of EQ. You can make copies of this chart and use them to keep track of some of your favorite settings.

Chapter 5: Troubleshooting. Near the end of the manual you will find troubleshooting tips and a complete list of the DEQ830's specifications.

Helpful tips and advice are highlighted in a shaded box like this.

*The names of specific buttons on the DEQ830 are printed in a bold font and bracketed: e.g., the **[BYPASS]** button.*

 *When something important appears in the manual, an exclamation mark (like the one shown at left) will appear with some explanatory text. This symbol indicates that this information is vital when operating the DEQ830.*

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Important Safety Instructions

Important Safety Instructions (English)

Safety symbols used in this product



This symbol alerts the user that there are important operating and maintenance instructions in the literature accompanying this unit.



This symbol warns the user of uninsulated voltage within the unit that can cause dangerous electric shocks.



This symbol warns the user that output connectors contain voltages that can cause dangerous electrical shock.

Please follow these precautions when using this product:



1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a damp cloth. Do not spray any liquid cleaner onto the faceplate, as this may damage the front panel controls or cause a dangerous condition.
7. 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 are provided for your safety. When 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 plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Use only attachments or accessories specified by the manufacturer.

Continued next page



12. Use only with a cart, stand, bracket, or table designed for use with professional audio or music equipment. In any installation, make sure that injury or damage will not result from cables pulling on the apparatus and its mounting. If a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.



13. Unplug this apparatus during lightning 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 when the 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.

15. This unit produces heat when operated normally. Operate in a well-ventilated area with at least six inches of clearance from peripheral equipment.

16. This product, in combination with an amplifier and headphones or speakers, may be capable of producing sound levels that could cause permanent hearing loss. Do not operate for a long period of time at a high volume level or at a level that is uncomfortable. If you experience any hearing loss or ringing in the ears, you should consult an audiologist.

17. Do not expose the apparatus to dripping or splashing. Do not place objects filled with liquids (flower vases, soft drink cans, coffee cups) on the apparatus.

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

19. The unit is an audio device, whose power supply may be subject to surrounding electronic interference. Once installed, if you find that the unit is malfunctioning, the problem may be solved by resetting the unit, relocating the unit, or by installing a line-conditioner.

Instructions de Sécurité Importantes (French)

Symboles utilisés dans ce produit



Ce symbole alerte l'utilisateur qu'il existe des instructions de fonctionnement et de maintenance dans la documentation jointe avec ce produit.



Ce symbole avertit l'utilisateur de la présence d'une tension non isolée à l'intérieur de l'appareil pouvant engendrer des chocs électriques.



Ce symbole prévient l'utilisateur de la présence de tensions sur les raccords de sorties, représentant un risque d'électrocution.

Veillez suivre ces précautions lors de l'utilisation de l'appareil:



1. Lisez ces instructions.
2. Gardez ces instructions.
3. Tenez compte de tous les avertissements.
4. Suivez toutes les instructions.
5. N'utilisez pas cet appareil à proximité de l'eau.
6. Ne nettoyez qu'avec un chiffon humide. Il est potentiellement dangereux d'utiliser des pulvérisateurs ou nettoyeurs liquides sur cet appareil.
7. Installez selon les recommandations du constructeur.
8. Ne pas installer à proximité de sources de chaleur comme radiateurs, cuisinière ou autres appareils (dont les amplificateurs) produisant de la chaleur.
9. Ne pas enlever la prise de terre du cordon secteur. Une prise murale avec terre deux broches et une troisième reliée à la terre. Cette dernière est présente pour votre sécurité. Si le cordon secteur ne rentre pas dans la prise de courant, demandez à un électricien qualifié de remplacer la prise.
10. Évitez de marcher sur le cordon secteur ou de le pincer, en particulier au niveau de la prise, et aux endroits où se trouve l'appareil.
11. N'utilisez que des accessoires spécifiés par le constructeur.

Suite de la page suivante



12. N'utilisez qu'avec un stand, ou table conçus pour l'utilisation d'audio professionnel ou instruments de musique. Dans toute installation, veillez de ne rien endommager à cause de câbles qui tirent sur des appareils et leur support.



13. Débranchez l'appareil lors d'un orage ou lorsqu'il n'est pas utilisé pendant longtemps.

14. Faites réparer par un personnel qualifié. Une réparation est nécessaire lorsque l'appareil a été endommagé de quelque sorte que ce soit, par exemple lorsque le cordon secteur ou la prise sont endommagés, si du liquide a coulé ou des objets se sont introduits dans l'appareil, si celui-ci a été exposé à la pluie ou à l'humidité, ne fonctionne pas normalement ou est tombé.

15. Puisque son fonctionnement normale génère de la chaleur, placez cet appareil au moins 15cm. des équipements périphériques et assurez que l'emplacement permet la circulation de l'air.

16. Ce produit, utilisé avec un amplificateur et un casque ou des enceintes, est capable de produire des niveaux sonores pouvant engendrer une perte permanente de l'ouïe. Ne l'utilisez pas pendant longtemps à un niveau sonore élevé ou à un niveau non confortable. Si vous remarquez une perte de l'ouïe ou un bourdonnement dans les oreilles, consultez un spécialiste.

17. N'exposez pas l'appareil à l'égoutture ou à l'éclaboussement. Ne placez pas les objets remplis de liquides (vases à fleur, boîtes de boisson non alcoolique, tasses de café) sur l'appareil.

18. **AVERTISSEMENT:** Pour réduire le risque du feu ou de décharge électrique, n'exposez pas cet appareil à la pluie ou à l'humidité.

19. Quand ce produit est en fonction, l'alimentation secteur peut provoquer des interférences sur la fonction surround. Une fois installé, si vous détectez que le produit ne fonctionne pas correctement, le problème peut être résolu en effectuant un reset de l'appareil (débrancher l'alimentation et rebrancher la après quelques secondes) ou insérez l'alimentation de l'appareil dans une prise secteur équipée d'une masse correcte.

Lesen Sie bitte die folgende Sicherheitshinweise (German)

Sicherheit Symbole verwendet in diesem Produkt



Dieses Symbol alarmiert den Benutzer, daß es wichtige Funktionen und Wartung Anweisungen in der Literatur gibt, die diese Maßeinheit begleitet.



Dieses Symbol warnt den Benutzer der nicht isolierten Spannung innerhalb der Maßeinheit, die gefährliche elektrische Schläge verursachen kann.



Dieses Symbol warnt den Benutzer, dem Ausgabestecker Spannungen enthalten, die gefährlichen elektrischen Schlag verursachen können.

Folgen Sie bitte diesen Vorkehrungen, wenn dieses Produkt verwendet wird:



1. Lesen Sie die Hinweise.
 2. Halten Sie sich an die Anleitung.
 3. Beachten Sie alle Warnungen.
 4. Beachten Sie alle Hinweise.
 5. Bringen Sie das Gerät nie mit Wasser in Berührung.
 6. Verwenden Sie zur Reinigung nur ein weiches Tuch. Verwenden Sie keine flüssigen Reinigungsmittel. Dies kann gefährliche Folgen haben.
 7. Halten Sie sich beim Aufbau des Gerätes an die Angaben des Herstellers.
 8. Stellen Sie das Gerät nicht in der Nähe von Heizkörpern, Heizungsklappen oder anderen Wärmequellen (einschließlich Verstärkern) auf.
 9. Verfehlen Sie nicht den Zweck des grounding Terminals auf dem Netzstecker. Dieses Terminal wird für Ihre Sicherheit zur Verfügung gestellt.
 10. Verlegen Sie das Netzkabel des Gerätes niemals so, daß man darüber stolpern kann oder daß es gequetscht wird.
 11. Benutzen Sie nur das vom Hersteller empfohlene Zubehör.
- Fortsetzung auf nächster seite



12. Verwenden Sie ausschließlich Wagen, Ständer, oder Tische, die speziell für professionelle Audio- und Musikinstrumente geeignet sind. Achten Sie immer darauf, daß die jeweiligen Geräte sicher installiert sind, um Schäden und Verletzungen zu vermeiden. Wenn Sie einen Rollwagen benutzen, achten Sie darauf, das dieser nicht umkippt, um Verletzungen auszuschließen.

13. Ziehen Sie während eines Gewitters oder wenn Sie das Gerät über einen längeren Zeitraum nicht benutzen den Netzstecker aus der Steckdose.



14. Die Wartung sollte nur durch qualifiziertes Fachpersonal erfolgen. Die Wartung wird notwendig, wenn das Gerät beschädigt wurde oder aber das Stromkabel oder der Stecker, Gegenstände oder Flüssigkeit in das Gerät gelangt sind, das Gerät dem Regen oder Feuchtigkeit ausgesetzt war und deshalb nicht mehr normal arbeitet oder heruntergefallen ist.

15. Dieses Gerät produziert auch im normalen Betrieb Wärme. Achten Sie deshalb auf ausreichende Lüftung mit mindestens 15 cm Abstand von anderen Geräten.

16. Dieses Produkt kann in Verbindung mit einem Verstärker und Kopfhörern oder Lautsprechern Lautstärkepegel erzeugen, die anhaltende Gehörschäden verursachen. Betreiben Sie es nicht über längere Zeit mit hoher Lautstärke oder einem Pegel, der Ihnen unangenehm ist. Wenn Sie ein Nachlassen des Gehörs oder ein Klingeln in den Ohren feststellen, sollten Sie einen Ohrenarzt aufsuchen.

17. Setzen Sie den Apparat nicht Bratenfett oder dem Spritzen aus. Plazieren Sie die Nachrichten, die mit Flüssigkeiten (gefüllt werden Blumenvases, Getränkdosen, Kaffeetassen) nicht auf den Apparat.

18. WARNING: um die Gefahr des Feuers oder des elektrischen Schlages zu verringern, setzen Sie diesen Apparat nicht Regen oder Feuchtigkeit aus.

19. Das Netzteil des Audiogerätes kann Interferenzstörungen der Umgebung ausgesetzt sein. Sollten nach erfolgter Installation Fehlfunktionen am Gerät auftreten, können diese durch ein Zurücksetzen des Gerätes (Reset), durch einen anderen Aufstellungsortes des Gerätes oder durch den Einsatz eines Spannungsstabilisators behoben werden.

CE Declaration of Conformity

See our Web site at:

<http://www.alesis.com>

FCC Compliance Statement

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

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1 Quick Start Guide

If you can't wait to get started...

The Alesis DEQ830 is a unique product, but its basic hookup and operation are similar to other equalizers in most respects. If you're experienced with signal processors, this chapter is a “shorthand” guide for those who want to start using the DEQ830 right away. If you have questions about any of the features, don't worry – all the details will be covered in later chapters.

If you're new to signal processing, start with the more detailed instructions for hookup and operation found in the next chapter.

Step 1: Hook it up to a mixer

1. Plug the **POWER** jack on the back of the DEQ830 into a grounded AC power source with the supplied power cable.
2. Using high-quality cables, plug the left and right main outputs of a non-powered mixer into the Channel 1 and Channel 2 inputs on the back of the DEQ830. You may connect up to eight separate audio sources in the same manner.
3. Connect another pair of cables to the Channel 1 and Channel 2 outputs of the DEQ830 and plug them into your amplification system or a pair of powered monitors.
4. Press the **[POWER]** switch on the front of the DEQ830 to power up the unit.
5. You may want to link some of the channels together—Channels 1 and 2, for example. That way you'll hear the changes you make with Channel 1 affect both channels of the stereo signal at once. To do so, select Channel 1 by pressing its **[CHANNEL SELECT]** button. Then hold down the **[LINK]** button and press Channel 2's **[CHANNEL SELECT]** button at the same time. After this, any EQ changes you make to Channel 1 will be reflected in Channel 2. You may link up to eight channels together using this method.

*The DEQ830's power will turn on automatically once its AC cable is plugged in, so be sure to press the **[POWER]** switch to turn the unit off while you're connecting it to your other equipment.*

When connecting the DEQ830 to other equipment, make sure all gear has been turned off. Also, to protect your speakers, be certain your amplifier(s) are turned all the way down before turning your equipment back on.

Step 2: Try some equalization

Play some signal into the unit

While learning the unit, you should play a CD or a multitrack source into the equalizer. Choose a song or musical passage with a fairly consistent level, so you can take your time experimenting with the different features.

1. Put the mixer's main faders all the way down so you don't distort the unit by sending it too much signal.
2. Select program 00 on the DEQ830. This will call up a program with all frequencies set to 0 dB, allowing you to hear the changes you make to the audio more easily.
3. Begin playing your source material. Bring the mixer's main faders up gradually until the Channel Meters for Channels 1 and 2 begin to light up. Carefully increase the mixer's output level until the meters' green and yellow LEDs are lit most of the time. If the red CLIP LEDs at the top of the meters light up at all, back the mixer's output level down until they stop lighting up. This is important, because these red LEDs indicate that the signal is clipping on that channel.
4. Press one of the **[BAND SELECT]** buttons to select a frequency. One of the LEDs above that button will begin to blink.
5. Use the **[VALUE]** encoder to decrease or increase the chosen frequency. If desired, select another frequency and repeat this process.
6. Press the **[BYPASS]** button to hear the signal without the equalization effect. Press it again to return to the EQ'd signal.
7. Repeat steps 3 – 6 for the other audio sources you have connected to the DEQ830.

At the factory, we set all of Program 00's frequencies to 0 dB. It's a good idea to leave Program 00 this way, but if you have already overwritten it with some of your own settings, you can just create your own program with "flat" settings for the purposes of this experiment.

Remember: if the red CLIP LED at the top of a Channel Meter lights up, that means the signal is clipping. To prevent this, reduce the level being sent to the proper channel.

Step 3: Store the Program

Once you have created an interesting program, you can save it to one of the 100 user program locations. Here's how to do this:

1. Press the **[STORE]** button to enter Store mode.
2. Use the **[VALUE]** encoder to select the new location for the edited program. For your convenience, programs 25-99 have been left blank so you can store your editing experiments somewhere without fear of overwriting a program you might want to use later.
3. Press the **[VALUE]** encoder to store the program to the new location. This will preserve the EQ settings for all eight channels of audio.

Programs 25-99 have been left blank so you have somewhere to store your programs right away without overwriting the factory presets.

For a detailed explanation of how to use this mode, see page 41.

Step 4: Save an EQ Curve

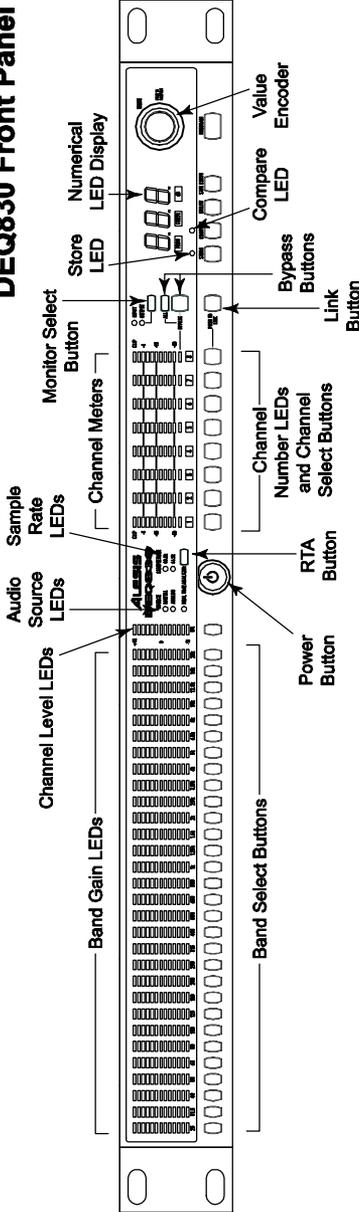
In addition to being able to save entire programs, you can also save the settings for an individual EQ curve. Here's how to do this:

1. Select the curve you wish to save by pressing that channel's **[CHANNEL SELECT]** button.
2. Press the **[SAVE CURVE]** button to enter Save Curve mode.
3. Use the **[VALUE]** encoder to select the new location for the edited curve. For your convenience, curves 50-99 have been left blank so you can save your editing experiments somewhere without fear of overwriting a curve you might want to use later.
4. Press the **[VALUE]** encoder to save the curve to the new location. You can retrieve any one of the 100 curves for use in any of the DEQ830's 100 programs.

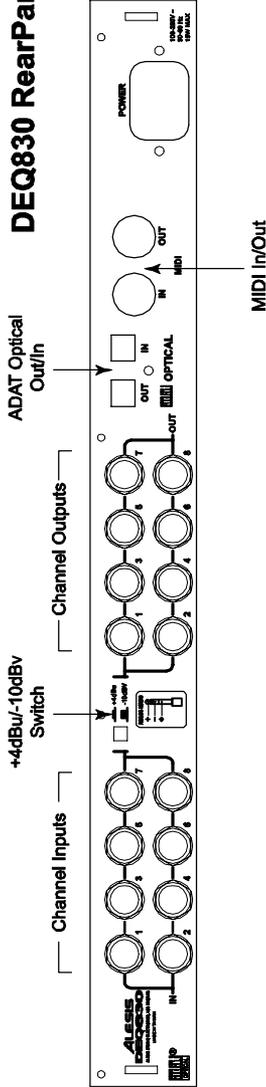
For a detailed explanation on how to use this mode, see page 41.

DEQ830 Diagram

DEQ830 Front Panel



DEQ830 RearPanel



2 Connections

Unpacking and Inspection

Your DEQ830 was packed carefully at the factory. The shipping carton was designed to protect the unit during transit. Please keep this carton in the highly unlikely event that you need to return the DEQ830 for servicing.

The shipping carton should contain the following items:

- DEQ830 with the same serial number as shown on the shipping carton
- AC power cable
- This instruction manual

Installing in a Rack

The DEQ830 may be simply set on a table, or installed in a standard 19" audio equipment rack.

Thermal Considerations in Rack Mounting

The DEQ830 can be mounted in an equipment rack (occupying one rack space) or placed on a table or shelf. When you install it, keep in mind that heat is the greatest enemy of electronic equipment. Please observe the following:

- The DEQ830 is designed to perform properly over a range of ambient temperatures from 10° C to +40° C (50° F to 104° F), in up to 80% non-condensing humidity. These are not absolute limits, but Alesis cannot guarantee that the DEQ830 will meet its published specs or remain reliable if operated outside of these ranges.
- Always allow adequate ventilation behind the DEQ830. Do not seal any enclosure that holds this unit. It is not necessary to leave an empty rack space above or below the DEQ830. However, if your environment is unusually warm and not air conditioned, space between units will help the units run cooler.

AC Power Hookup

The DEQ830 has what's known as a "switching power supply." This means it will detect any standard line voltage from 90 to 230 volts, 50-60 Hz, and adapt itself to that. All you need is the proper AC cable for the country in which you find yourself. Just plug the "female" end of the power cable into the DEQ830's **POWER** receptacle and the "male" end into a good quality, noise-free AC power source.

Using the DEQ830 in another country

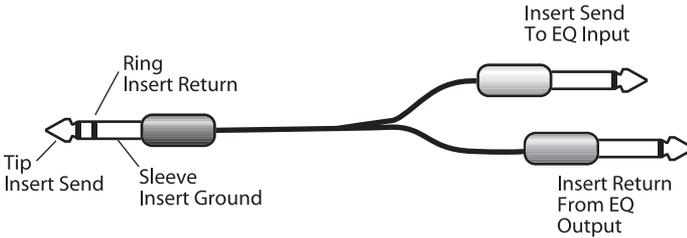
Your DEQ830 was supplied with the correct power cord for your country or local area. If you plan to travel with it to another country, obtain an Alesis AC power cord compatible with the outlets used in the other country and use it in place of the supplied cord. These can be obtained through your Alesis dealer or through the Alesis Parts department.

Connecting Inputs and Outputs

Connecting to the Channel or Main Inserts of a mixing console

Unbalanced I/O

Most mixing consoles have insert jacks near the main outputs and for each channel as well. These are typically Tip-Ring-Sleeve (TRS) jacks with the send and return on the same jack. To use the DEQ830 as an effects insert device, you will need an insert cable (not included).



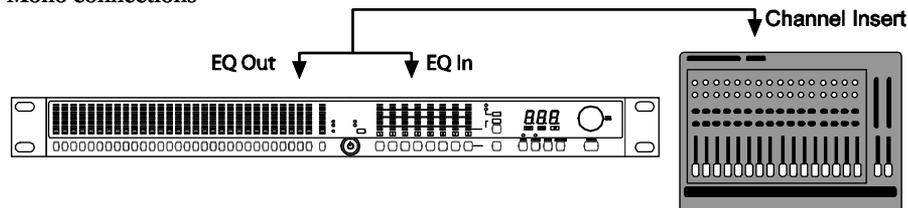
This cable splits the TRS insert jack into two unbalanced mono connectors. Usually, the tip is wired to the “Send” connector, which plugs into one input of the equalizer, and the ring is wired to the “Return” connector, which plugs into the corresponding output of the equalizer. However, the wiring of the insert jacks is different on some recording consoles, which means that the input/output relationship may be reversed. Check your mixer’s Reference Manual to be sure, or just try it both ways – this won’t damage the DEQ830.

When connecting audio cables and/or turning power on and off, please make sure that your amplifiers are turned down or off to prevent damage to your speakers.

If your mixer does not have insert jacks available at its main outputs, simply connect the main outputs of your non-powered mixer to the inputs of the DEQ830, then connect the outputs of the equalizer to the inputs of your mixdown recorder or amplified monitoring system.

Connections

Mono connections



This example shows how to connect the DEQ830 to one mono source. You can use this method to connect eight mono sources to the DEQ830. You would need eight insert cables to make all of these connections.

Stereo connections

Use two insert cables to connect the DEQ830 to the main L/R bus in the same way you would connect it to a pair of channel inserts. Simply connect one insert cable to the left main insert of the mixer, and connect the two mono jacks to the Channel 1 input and output of the DEQ830. Use another insert cable to connect the right main insert to the Channel 2 input and output of the DEQ830.

You can also simply connect the balanced main outputs of the mixer to the inputs of the DEQ830, then connect the outputs of the equalizer to the inputs of your mixdown recorder, monitor system, etc.

Balanced I/O

Some recording consoles have separate balanced jacks for the sends and returns instead of a single TRS jack. If your recording console has these connections, use a balanced TRS cable to connect the insert send to the input of the equalizer, and another balanced TRS cable to connect the equalizer output to the insert return.

Operating Levels

The DEQ830 can operate in either a +4dBu or -10dBV setting. A rear panel switch allows you to configure the unit to your audio environment.

If you are unsure about the nominal operating level of the equipment to which you will be connecting the DEQ830, refer to the Reference Manual for that equipment.

Since the DEQ830 has eight channels, you can connect eight independent sources. For example, you could use Channel 1 to EQ the rhythm guitar, Channel 2 to EQ the bass guitar, Channels 3 and 4 to EQ the left and right outputs of a keyboard, and so on.

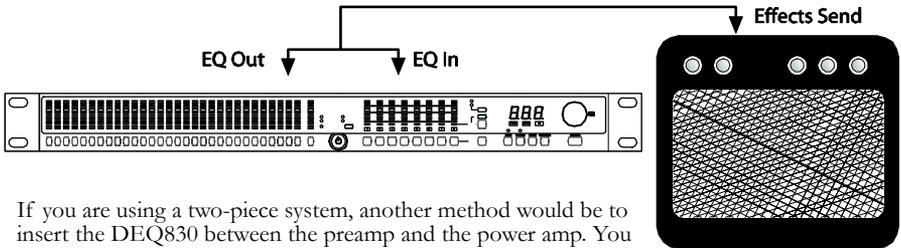
Never place the equalizer between the power amp and the speakers, as the high-powered levels created by the power amp will damage the DEQ830.

Modern production values sometimes lead to the heavy use of compression during the mastering process. When processing CD audio, you may find it necessary at times to lower the Channel Level of the active program so as to avoid clipping the output stage of the DEQ830. This will allow additional headroom for more extensive equalization. See pg. 32 for details on the Channel Level function.

Connecting to the inserts on an instrument amplifier

Unbalanced I/O

The insert sends on a guitar or bass amp are usually labeled “effects send and return” or “insert send and return.” This allows your instrument to be boosted to line level before the signal is sent to the equalizer, processed, and returned to the power amp.



If you are using a two-piece system, another method would be to insert the DEQ830 between the preamp and the power amp. You should never put the equalizer between the power amp and the speaker, as the high-powered levels created by the power amp will damage the unit.

Connecting to equipment with XLR inputs and outputs

If you are connecting the DEQ830 to a product with XLR balanced inputs and outputs, you will need to convert this signal to a TRS balanced connector. Make sure that pin 2 of the XLR connector is connected to the tip of the TRS adapter, and pin 3 is connected to the sleeve.

Connecting to equipment with ADAT Optical inputs and outputs

The DEQ830 has the capability of receiving and transmitting its audio signal in the digital domain. This is done through a pair of ADAT Optical jacks found on the rear panel. The jacks are labeled ADAT Optical In/Out. Each carries eight channels of audio, so all eight of the DEQ830's channels are handled by a single cable in each direction.

Using the ADAT Optical jacks to connect to an external device such as the Alesis ADAT HD24 is very easy, because the DEQ830 will automatically switch over to the ADAT Optical inputs when it senses that a valid digital signal is present.

There are three ways to connect the DEQ830 with another digital audio device, as explained on the next page.

Don't use line transformers! Many XLR-to-1/4" adapters sold at electronics stores are NOT adapters, but transformers (and very low quality transformers at that). Don't use these on the output of the DEQ830—they're unnecessary and generally sound awful because they don't have the headroom to handle the DEQ830's output. Get a hard-wired adapter or cable from your professional audio dealer, or make one yourself from components.

Analog Signal In, Digital Signal Out

In this configuration, the DEQ830 can be used to “translate” an analog signal to the digital domain. A likely scenario would be using the DEQ830 as an analog-to-digital converter between your submix outputs and an Alesis ADAT. In addition to acting as a “gateway,” the DEQ830 would allow you to shape the sound and send it to the ADAT digitally, without the additional noise that can be added by an analog EQ.

To use the DEQ830 in this way, connect the ADAT Optical output of the DEQ830 to the ADAT Optical input of the receiving device.

Digital Signal In, Analog Signal Out

In this setup, the DEQ830 also serves as a signal converter, making it possible to take the digital submix outputs of an 8-bus mixer, apply some EQ and then send the result as an analog signal into a sound system—the Alesis ProActive 5.1 Surround Sound System, for example, or a series of independent onstage monitors.

If an analog mixer has limited channel EQ capabilities, you could run the digital signal from an ADAT into the DEQ830, and from there take it to your mixer’s analog inputs. This would allow you to take advantage of the DEQ830’s extensive EQ and simply use the mixer for setting the levels and pan positions of the signals.

For these situations, be sure to connect the ADAT Optical output of the transmitting device to the ADAT Optical input of the DEQ830.

Digital Signal In, Digital Signal Out

In cases where every device in your audio chain has a digital audio input and output, the DEQ830 is right at home. Simply pass the audio from the transmitting device’s ADAT Optical output into the DEQ830’s ADAT Optical input, use it to sculpt the signal, and then pass the audio on to the next device by connecting the DEQ830’s ADAT Optical output to the ADAT Optical input of the receiving device.

Operating the DEQ830 in any of the three configurations described above is really no different from using it in a completely analog system. For that reason, from this point on in the manual we will make no distinction between operating the DEQ830 in the digital or analog domains.

Digital audio offers a decided advantage over analog audio when passing the signal through multiple devices. The various stages of analog circuitry can cause the quality of the signal to deteriorate rapidly; however, once a signal has been converted to the digital domain, it can be carried from device to device with a minimal loss of integrity. This is why it is advantageous to pass the signal through the DEQ830 using its ADAT Optical jacks whenever possible.

About Audio Cables

The connections between the DEQ830 and your studio are your music's lifeline, so use only high quality cables. These should be low-capacitance shielded cables with a stranded (not solid) internal conductor and a low-resistance shield. Although quality cables cost more, they do make a difference.

Route cables to the DEQ830 correctly by observing the following precautions:

- Do not bundle audio cables with AC power cords.
- Avoid running audio cables near sources of electromagnetic interference such as transformers, monitors, computers, etc.
- Do not place cables where they can be stepped on. Stepping on a cable may not cause immediate damage, but it can compress the insulation between the center conductor and shield, degrading the cable's performance and reducing the cable's reliability.
- Avoid twisting the cable or having it make sharp, right angle turns.
- Never unplug a cable by pulling on the wire itself. Always unplug by grasping the body of the plug firmly and pulling directly outward.

And most importantly, keep connectors clean. Every few months, unplug them and wipe off oxidation with a clean cloth soaked in alcohol or contact cleaner. Insert the plugs into the jacks a few times to clean the internal jack contacts.

Although Alesis does not endorse any specific product, chemicals such as Tweek (also known as Stabilant) and Cramolin, when applied to electrical connectors, are claimed to improve the electrical contact.

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3 Basics of Equalization

This section will describe how equalization works and explain the functions of the DEQ830's controls.

What is equalization?

An equalizer boosts or cuts a frequency range. The DEQ830 is a graphic equalizer, which means it has many fixed frequency bands that can be cut or boosted. The term “graphic” is appropriate because the combined settings of the bands often resemble a curve, or “graph.” Thus, it is often possible to know what the unit is doing to the sound simply by looking at it from a distance. The other type of equalizer, a parametric equalizer, can sweep the frequency bands and adjust the frequency range affected by the cut or boost of each band. Alesis sells a parametric equalizer called the PEQ-450.

The most basic level of control on a graphic equalizer is the gain setting for a band. Each of the bands represents a predetermined frequency range, and its gain setting controls the amount of boost or cut for that frequency range. A setting of 0 dB means that the signal will not be affected in the area of those audio frequencies.

Depending on the program material, boosting or cutting just one frequency can have a significant impact on the sound. When all of the frequency bands are taken together, the impact can be huge.

Equalization can be used for:

- Adjusting the timbre of an instrument, voice, mix, or effect
- Cutting or boosting frequencies to make a source easier to mix with other tracks
- Compensating for a less-than-ideal recording
- Compensating for less-than-ideal control room or auditorium acoustics
- Creating a filter effect
- Eliminating buzz, noise, or hum

Equalizers can make your recorded tracks sound polished and professional. Chapter 4 will describe some specific settings for various instruments and applications.

Basics of Equalization

Description of the Front Panel

This section will give you an overview of the front panel's features. Not all features are labeled, so you may want to refer to the diagram of the DEQ830 on page 18 as you read this section.

Band Select

There are 31 buttons side-by-side on the left half of the DEQ830's front panel. The first 30 are the **[BAND SELECT]** buttons. Above each of the **[BAND SELECT]** buttons is a number like "25" or "8k." These stand for the audio frequencies, measured in Hertz (Hz), which are selected for editing by the **[BAND SELECT]** buttons below them. The 31st button is the **[CHANNEL LEVEL]** button, which is explained below.

Channel Level

The **[CHANNEL LEVEL]** button is used to set the level of the currently selected channel or Link Group. This setting is post-EQ and pre-Master Level.

For details on the relationship between Master Level and Channel Level, see page 32.

Real Time Analyzer (RTA)

This button will put the DEQ830 into Real Time Analyzer mode, in which the unit serves as a visual aid for analyzing the audio signal. In this mode, the Band Gain LEDs "dance to the music," displaying the relative strengths of the various frequency ranges passing through the DEQ830. For more on this mode, see page 43.

Channel Select

To the right of the **[POWER]** button, you'll see the **[CHANNEL SELECT]** buttons. These eight buttons are used for selecting a channel for which the EQ settings will be displayed on the 30 Band Gain LEDs. The **[CHANNEL SELECT]** buttons are also used for creating Link Groups.

Monitor Select (INPUT/OUTPUT)

This button, located immediately above the **[BYPASS]** and **[ALL]** buttons, toggles between **INPUT** and **OUTPUT** to determine whether the Channel Meters and RTA display the input or output levels. The green LEDs above this button indicate which monitoring method is currently selected.

Bypass

When you press this button, a red LED will light immediately above the currently selected channel, indicating that this channel is in Bypass mode. As long as this LED is lit, incoming audio will pass through this channel without being affected by its EQ settings. Also, if you're on a linked channel when you press the **[BYPASS]** button, all of the linked channels will bypass at the same time. Bypass mode is useful for comparing the "equalized" signal with

*Bypass mode "hides" the effect of the EQ and Channel Level controls on the audio. However, the Master Level function from Utility mode is unaffected by the **[BYPASS]** button. For more information about the relationship between Channel Level and Master Level, see page 32.*

the original signal so you can decide if you like the edit you made. Press the button again to get out of Bypass mode and hear the effect.

Bypass All (ALL)

This button is located just above the **[BYPASS]** button. It will toggle the Bypass status of all eight channels at once. The first press of the **[ALL]** button will cause any unbypassed channels to enter Bypass mode. Subsequent presses will toggle the Bypass status of all eight channels together. The red LEDs below each channel meter will light to indicate that the channels are bypassed.

Link (PUSH TO LINK)

This button is used to link channels together so that their EQ settings are locked together. Any edits you make to a band on one channel will also be applied to that same band on all linked channels. This is useful for quickly setting up a program without having to make independent adjustments for each channel.

Store

Once you have created a program you would like to keep, press this button to enter Store mode. From there you can use the **[VALUE]** encoder to select one of the 100 memory locations to become the new home for the edited program. For more information on this function, see page 41.

Compare

This button will help you if you are editing a program and would like to hear how the program sounded before you edited it. Pressing this button will temporarily recall the original program, and pressing it a second time will restore the edited program. The green LED above this button will light to indicate that the Band Gain LEDs are now showing the EQ curve as it appeared before your edits.

*When you press **[COMPARE]**, the stored settings for all eight channels of the current program are temporarily recalled.*

Utility

If you press **[UTILITY]** while you are in Program mode, you will enter Utility mode, which lets you edit the Master Level, MIDI Settings, the internal clock rate and other global parameters. If you hold down this button at startup as the DEQ830's splash screen is displayed, you will enter Lock mode. This mode allows you to lock the front panel buttons. For more information on Utility mode, see page 50.

Save Curve

Press **[SAVE CURVE]** to save a channel's EQ curve to the DEQ830's curve bank so that it can be retrieved at a later time. We've provided 100 locations (00-99) in which to save curves. Curves 00-49 contain factory presets, and curves 50-99 are blank. Any of the 100 curves may be modified and saved. For more information on saving curves, see page 40.

Basics of Equalization

Program

If you want to cancel any action in progress and return to Program mode, just press the **[PROGRAM]** button.

Value Encoder (VALUE)

On far right side you'll find a knob marked **[VALUE]**, which is used to edit the gain amount of the frequency you have selected with the **[BAND SELECT]** buttons. (It is also possible to select and edit several frequencies at once, as you'll see later.) The **[VALUE]** encoder is also used for all sorts of data entry, such as selecting programs and curves, changing global parameter values and so forth. Changes made with the **[VALUE]** encoder are reflected in the Numerical LED Display to the left of the knob.

Numerical LED Display

The three-digit LED display you see to the left of the **[VALUE]** encoder is always showing either a value or an abbreviated name. To help you know at a glance what sort of information the display is giving you, there are three green LEDs immediately below the Numerical LED Display:

- | | |
|--------------|--|
| PROG | If this LED is lit, this means the value in the display is a program number. You will see this when the unit is in Program mode or Store mode. |
| CURVE | When lit, this LED indicates that the number in the display is telling you which curve has been chosen. |
| dB | This LED tells you that the value in the display pertains to a gain change. |

The only time that none of these LEDs will be lit is when the DEQ830 is in Utility mode.

Description of the Basic Modes

Program mode

When this manual refers to Program mode, we mean the very top level of functionality of the DEQ830. In program mode, turning the [VALUE] encoder will let you select between the 100 user-definable preset programs in the unit.

A program consists of more than just EQ settings. The things stored in memory and recalled when you select a program are:

- The gain settings of all 30 bands for channels 1 – 8
- The Link status of all 8 channels
- The actual gain settings for all non-primary channels in a Link Group. These are merely “hidden” by the Link function.
- The individual Channel Level settings for channels 1 – 8

If the DEQ830 has been in some other mode, pushing the [PROGRAM] button will return it to Program mode. If the LED above the [STORE] button is flashing, that means the program has been edited. If you’ve made any changes that you would like to keep, be sure to save them before switching to another program! To learn how to store an edited program, turn to page 41.

Edit mode

While in Program mode, pushing one of the [BAND SELECT] buttons will take you to Edit mode. You can tell you are in Edit mode when one or more of the LEDs above the [BAND SELECT] buttons are blinking. The bands with blinking LEDs are the ones that will be boosted or cut when you turn the [VALUE] encoder.

After you have edited a frequency or an Edit Group (a group of frequencies), pushing the [PROGRAM] button will return you to Program mode. If you’ve made any changes, the LED above the [STORE] button will be flashing. Be certain to save any changes that you would like to keep! This is where Store mode comes in.

Store mode

Pressing the [STORE] button takes you to Store mode. From here you can decide which of the 100 program locations will become the new home for the edited program. For information on how to perform this procedure, see page 41.

Save Curve mode

Pressing the [SAVE CURVE] button takes you to Save Curve mode. This lets you save an edited EQ curve to one of the 100 memory locations in the DEQ830’s curve bank. These curves can be recalled later and applied to any channel of any program. You can use the Curve Bank to save templates for all possible EQ applications. For example, you can save an EQ curve that generally

Basics of Equalization

works well for male vocals. Say you have two or three channels of male vocals feeding into the DEQ830. To EQ these, just retrieve the curve from the Curve Bank, apply it to each male-vocal channel and modify it slightly to fit each particular vocal.

For information on how to do this, see page 41.

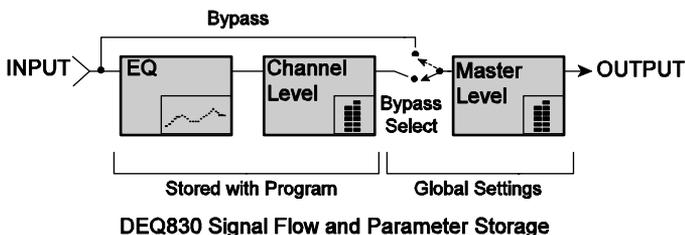
Retrieve Curve mode

This mode allows you to take a stored EQ curve from the Curve Bank and place it into the currently selected channel or Link Group. For information on how to do this, see page 41.

Bypass mode

This mode is nearly as simple as it sounds—pushing the **[BYPASS]** button will let you hear the non-equalized audio. But there's a bit more to it than that. There are also two gain adjustment stages that can be used to compensate for a reduction or increase in signal level caused by the equalization curve being used. The value for one of these stages, Channel Level, is saved along with the EQ settings when the program is stored; the value for the other stage, Master Level, is not. So what Bypass mode really is doing is causing the audio to “pass by” the processing stages that are stored as a part of the program.

The following diagram shows the relationship between each of the stages in the DEQ830's signal processing chain.



Channel Level mode

When you run a number of different instruments into the DEQ830, each channel may experience drastically different signal levels. Channel Level mode can be used to adjust the output of each channel independently.

This mode is also useful when processing a stereo signal. If the combination of the source material and extreme EQ settings is causing the output of the DEQ830 to clip, Channel Level mode can be used to adjust the output of two stereo channels simultaneously. To do this, the two channels must be linked. See page 42 for more details on Link mode.

Curve 00 is a “flat” curve. We recommend that you leave Curve 00’s gain settings at 0 so that you may use it as a “clean slate” for building new curves from the ground up.

You’ll find a description of Channel Level mode further down on this page. For a description of the Master Level function, turn to page 44.

Unlike the Master Level function in Utility mode, the settings for Channel Level mode are stored with each curve or program. For more on Channel Level mode, see page 41.

Link mode

In this mode, you can link multiple channels so that their EQ settings are locked together. To experiment with this, first select a channel with recognizable settings. Next, press and hold down the **[LINK]** button. You can then select channels to link to the original channel by pressing their **[CHANNEL SELECT]** buttons. You will see the Band Gain LEDs for each linked channel change to match the settings of the currently selected channel. (But don't worry—the original settings are still retained in memory; more about that later.)

See page 42 for more details on Link mode.

Utility mode

This is the mode you'll enter when you hit the **[UTILITY]** button. Here you can adjust a number of global settings that determine how the DEQ830 behaves.

For details on Utility mode, turn to page 45.

Real Time Analyzer mode

In this mode, the DEQ830 will display an animated representation of the frequencies found in the audio signal passing through the unit. When you press **[RTA]**, the Band Gain LEDs will begin to rise and fall as the frequencies of the signal peak and dip.

This mode also allows you to visually compare the audio signal before and after it is processed by the DEQ830. For more on Real Time Analyzer mode, see page 43.

Basics of Equalization

Basic operation: Program mode

Program mode is where to be if you want to call up another program, or if you just want to know the number of the program you are using. The DEQ830 has 100 programs in all. Programs 00-24 contain factory presets that you can use as starting points for your own programs. You can overwrite any of the 100 programs.

Navigation in Program mode is a breeze. First, if you're not in Program mode, get there by pressing the **[PROGRAM]** button. The Numerical LED Display will show you the number of the current program. All you have to do to call up a new program is turn the **[VALUE]** encoder. This enables you to quickly reach any program in the unit's memory.

If the program number flashes when you try to select another program, this means that the Fast Program Select feature is off, and you will need to press the encoder to confirm the program change. For more information, see pages 44 and 47.

Basic operation: Edit mode

If you're not already there, exit to Program mode by using the **[PROGRAM]** button. Then select Program 00 on the DEQ830 by using the **[VALUE]** encoder.

The original factory Program 00 is a “flat” program, and it's easy to see why it's called that—the gain setting for every band is 0 dB. Calling up this program is almost the same as pressing the Bypass button, in that the audio passing through the unit will not be equalized in any way. Of course, the difference is that you can edit the program and hear the changes that you make. If you don't already know what kind of EQ you're looking for, this may be a good place to start.

Just as Program 00 is a “flat” program, Curve 00 is a “flat” curve. We strongly recommend that you leave Curve 00's gain settings at 0 so that you may use it as a “clean slate” for building new curves from the ground up.

Single Band Edit

Pressing a **[BAND SELECT]** button puts the DEQ830 into Edit mode. The Numerical LED Display will now display the gain value in decibels (dB) of the band you just selected. In addition, one of the Band Gain LEDs above that **[BAND SELECT]** button will start blinking. If the gain value of that band is 0 dB, the green LED will blink. This means there is no gain change occurring in this frequency range. If it is higher or lower than that, one of the yellow LEDs will blink. This indicates that some amount of cut or boost is happening.

Use the **[VALUE]** encoder to change the gain value of that band. Turning the **[VALUE]** encoder left will lower the gain value, or “cut” the chosen frequency; turning it right will raise the gain value, or “boost” the frequency. There is an overall range of +/- 12 dB of gain change available.

Band Solo

The DEQ830 has a handy feature called Band Solo that allows you to “isolate” a given frequency while you are editing. This can help you determine exactly which band you need to highlight or de-emphasize. It’s simple to do:

1. Select a band by pressing and holding its **[BAND SELECT]** button.
2. Press the **[VALUE]** encoder. You’ll see the LED for that band jump to +12 dB.
3. Press the **[VALUE]** encoder again. The LED for that band will jump to -12 dB.
4. Release the **[BAND SELECT]** button, and the value of that band will be returned to its original setting.

This only works with one band at a time, but you’ll find it to be a very helpful feature.

To exit Edit mode, press the **[PROGRAM]** button. This will return the DEQ830 to Program mode.



If you want to keep an edited curve or program, be sure to store it. For instructions on how to do this, turn to page 40.

Band Gain Cut/Boost Ranges

Whether you are cutting or boosting a band, gain change happens in 0.5 dB increments. As you make the change, the Numerical LED Display will show you the magnitude of the gain: 0.5, 1.0, 1.5, 2.0, ... up to 12.0.

Because it’s not possible to show a minus sign in the LED display for negative gain values, you’ll see the same sequence as you turn the encoder to the left. But if there’s any doubt in your mind about which way you’re going, the Band Gain LED will clue you in. As soon as you move 0.5 dB away from 0, the LED for that band will change from green to yellow. If you are cutting the frequency, you’ll see a yellow light below the center line. If you are boosting it will be above.

Since the front panel only has thirteen gain LEDs to represent the 49 possible levels of gain in each band, you may not see the LED change when you make small adjustments to the gain. The table on the following page shows the amount of change in dB it takes to light each of the Band Gain LEDs:

<i>LED</i>	<i>Gain Change</i>
<i>+ 12 dB</i>	<i>11.5 – 12.0 dB</i>
<i>+ 10 dB</i>	<i>9.5 – 11 dB</i>
<i>+ 8 dB</i>	<i>7.5 – 9.0 dB</i>
<i>+ 6 dB</i>	<i>5.5 – 7.0 dB</i>
<i>+ 4 dB</i>	<i>3.5 – 5.0 dB</i>
<i>+ 2 dB</i>	<i>0.5 – 3.0 dB</i>
<i>0 dB</i>	<i>0 dB</i>
<i>- 2 dB</i>	<i>0.5 – 3.0 dB</i>
<i>- 4 dB</i>	<i>3.5 – 5.0 dB</i>
<i>- 6 dB</i>	<i>5.5 – 7.0 dB</i>
<i>- 8 dB</i>	<i>7.5 – 9.0 dB</i>
<i>- 10 dB</i>	<i>9.5 – 11 dB</i>
<i>- 12 dB</i>	<i>11.5 – 12.0 dB</i>

Multiple Band Edit

Selecting an Edit Group

Pressing a **[BAND SELECT]** button puts the DEQ830 into Edit mode. And until you turn the **[VALUE]** encoder to boost or cut the gain, you can keep pressing **[BAND SELECT]** buttons until you have several of them selected simultaneously. This is called selecting an Edit Group. An Edit Group can be made up of any number of bands. Another way to select an edit group is to hold down a **[BAND SELECT]** button and turn the encoder. This will allow you to select a range of bands at once.

The Relative Gain display

When you pressed the first **[BAND SELECT]** button, two things happened: the Numerical LED Display changed to show the gain value of that band, and one of the corresponding Band Gain LEDs started to blink. Then, when you pressed the second **[BAND SELECT]** button, two more things happened: the Numerical LED Display changed to show the number “0,” and a second Band Gain LED started to blink. Each additional **[BAND SELECT]** button you press adds a band and a blinking LED to the Edit Group.

But why did the Numerical LED Display change to a zero? Because, once you have selected an Edit Group, you can cut or boost the gain of all of the bands in the Edit Group at once. They will move up or down together. The zero in the display represents a “benchmark” for the amount of gain change that happens to the Edit Group. The 7-segment LEDs can't display the gain values of each band within the Edit Group all at once, so if you raise the overall level of the Edit Group by 2 dB, that's the number you will see. The function of the display in this case is to tell you the Relative Gain amount.

For the sake of clarity, when this manual describes what is shown in the 7-segment LEDs while changing the overall gain value of the Edit Group, we will refer to it as the Relative Gain display.

Here's an example: let's say you have selected the bands at 4k and 5k as your Edit Group. The initial gain value for 4k is +2 dB and the gain value for 5k is -2 dB. The Relative Gain display at this point will read “0.” If you rotate the encoder clockwise through four values, the final value of the Relative Gain display will be a “2.” The actual gain values for 4k and 5k are now +4 dB and 0 dB, respectively, which will be indicated by their Band Gain LEDs.

Proportional Gain Memory

It's possible you may see numbers as large as 24 in the Relative Gain display. This is due to a very powerful aspect of the Relative Gain feature, and it will require some careful explanation.

Here's another example. Let's say you have two bands selected. The first band is set to 0 dB, and the second band is set to -12 dB. The Relative Gain display reads “0.” If you turn the **[VALUE]** encoder to the right, you will see that number change from 0 to 12

*There's an easy way to create an Edit Group from multiple adjacent bands. Just press and hold a **[BAND SELECT]** button as you spin the **[VALUE]** encoder left or right. The farther you spin the encoder, the more bands you will select. After you release the **[BAND SELECT]** button, you can use the encoder to adjust the gain of all selected bands at once.*

For maximum preservation of fidelity of the input signal, the largest number of bands in a channel should be set to 0 dB. For example, if you have more than half of your bands set to some cut amount and the majority of those cut frequencies are at -4 dB, then select all bands and compensate by +4 dB.

Basics of Equalization

(see fig. 1 on page 38). But it won't stop at 12; it will keep racing upward until it reaches 24. This is because that's how far the band that was set to -12 dB had to travel until it hit the “ceiling,” or +12 dB (see fig. 2).

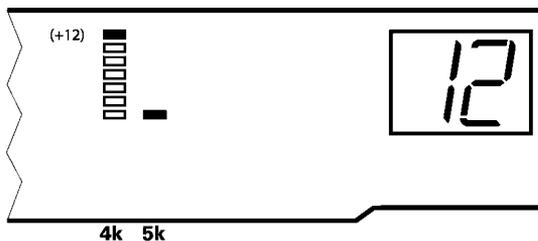


Fig. 1: Edit Group boosted 12dB

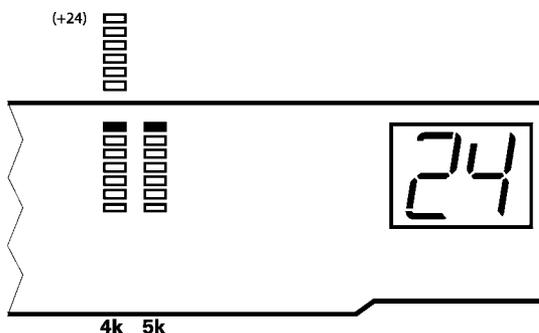


Fig. 2: Edit Group boosted 24dB

But what about the band that was set to 0 dB originally...was it boosted to +24 dB? The answer is, “Yes and no.” It was, in the sense that the DEQ830 keeps track of the proportional values of the bands, even if they exceed the +/-12 dB limit of gain change for a frequency. But the *audible* audio gain is limited to +/-12 dB.

The reason the DEQ830 keeps track of the gain relationship between the bands in the Edit Group is simple. It's so you can change your mind, pull them back down to values within the +/-12 dB limit, and still have them be the same distance apart!

For example, let's say you decided these frequencies have been boosted too much, and you cut them by 12 dB. At this point the Relative Gain display would read “12,” with the first band's Gain LED at +12 dB and the second band's Gain LED at 0 dB (as in fig. 1). So far you haven't really reduced the gain of the first band, because it's still at +12 dB. You still want to bring it down a bit, so you take both frequencies down another 3 dB. So now the Relative Gain display would read “9,” with band one's Gain value at +9 dB and band two's Gain value at -3 dB. And now you can see that the gain relationship between the two bands was preserved—they're still 12 dB apart.

One important note, though: Proportional Gain Memory is only temporary. If you run one or more bands “past” the +/-12 dB limit and then you exit Edit mode for any reason (such as to store the program), the gain value of those bands will be remembered as +/-12 dB (whichever was the value that was last reached for those bands).

The limits of Relative Gain

There will be times when the Relative Gain display will not go all of the way up or down to a value of 24. This is because the DEQ830 takes into account the gain setting of all of the bands when an Edit Group is formed. If the highest gain setting of any band in the Edit Group is + 6 dB, then from there down to -12 dB is only 18 dB. So this is the largest number you will see in the Relative Gain display if you run the relative gain value all the way down (see fig. 3 and 4).

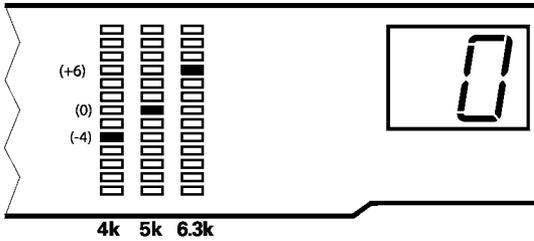
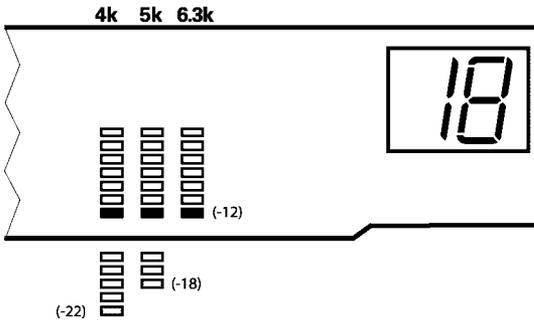


Fig.3: Edit Group first selected

Fig.4: Lower limit of Relative Gain Display for Edit group from fig.3



Basics of Equalization

Likewise, if the lowest gain setting of any band in this same Edit Group is -4 dB, then the largest number you will see in the Relative Gain display going all the way up is 16 (see fig. 5).

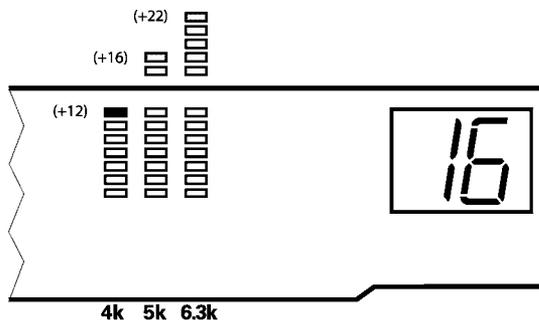


Fig.5: Upper limit of Relative Gain Display for Edit Group from fig.3

So if you run the Relative Gain display up and down repeatedly with this Edit Group, the display will hit the "ceiling" at 16 and bottom out at 18.

The Release Edit Group function

Once you have changed the value of the Edit Group, the DEQ830 will react one of two ways to further presses of the **[BAND SELECT]** buttons. To decide which option suits your working method or circumstance, experiment with the setting for the Release Edit Group function in Utility Mode.

If this function is on, the very next **[BAND SELECT]** button you press after you have changed the level of the Edit Group will "release" all of the previously selected bands. The only band that will be selected is the one you just pressed. You will know this happened because only Band Gain LED will now be blinking.

If the Release Edit Group function is set to "Off," the next **[BAND SELECT]** button you press after you have changed the level of the Edit Group will simply add that band to the Edit Group.

For a more detailed explanation of the Release Edit Group function, see page 46.

Remember, if you want to keep the edited curve or program, be sure to store it in memory. For instructions on how to do this, turn to page 41.

Basic operation: Store mode

Once you have created a program you would like to save, press the **[STORE]** button to enter Store mode. This will cause the Numerical LED Display to blink with the number of the current program.

Turning the **[VALUE]** encoder allows you to choose a program number between 00-99 as the destination for your edited program.

Once you have chosen the location you want, press the **[STORE]** button again or just press the **[VALUE]** encoder. This will store the program into the user location you selected.

Remember, if at any time you decide you do not want to save the edited program, simply press the **[PROGRAM]** button to return to Program mode. Your edited program will still be in memory, as indicated by the flashing LED above the **[STORE]** button. The destination program will not have been overwritten.

Basic operation: Save Curve mode

Saving an EQ curve is very similar to storing a program. Once you have created an EQ curve you would like to save, press the **[SAVE CURVE]** button to enter Save Curve mode. This will cause the Numerical LED Display to blink the number of the curve you've been editing.

Use the **[VALUE]** encoder to select a curve number between 00-99 as the destination for the edited curve. Once you have chosen the location you want, press the **[SAVE CURVE]** button again or just press the **[VALUE]** encoder. This will save the curve's gain settings and Channel Level setting into the location you selected.

And if at any time you decide you do not want to save the edited curve, simply press the **[PROGRAM]** button to return to Program mode. Your edited curve will still be in memory, as indicated by the flashing LED above the **[STORE]** button. The destination program will not have been overwritten.

Basic operation: Retrieve Curve mode

One of the quickest ways to create a program is to select curves from the Curve Bank and copy them one at a time into a channel or Link Group. To enter Retrieve Curve mode, hold one of the **[CHANNEL SELECT]** buttons as you turn the **[VALUE]** encoder. The Curve LED will light to indicate that the Numerical LED Display is now showing curve numbers from the Curve Bank.

As you scroll through the curves you will see the Band Gain LEDs change to reflect the settings of the curves you are passing over, but they will not be loaded into the selected channel until you release the **[CHANNEL SELECT]** button. This prevents having to listen to the audio through curves you know you don't want. As soon as you release the **[CHANNEL SELECT]** button, the channel will assume the EQ and Channel Level settings for the curve you retrieved.

As we said earlier, you should leave Curve 00's gain settings at 0 so that you may use it for building new curves. This probably will save you a lot of time and effort.

When you enter Save Curve mode, Real Time Analyzer mode is disabled. You will have to re-enter the Real Time Analyzer mode after you exit Save Curve mode.

*Curves will be applied to the channel once you release the **[CHANNEL SELECT]** button. This allows you to "audition" the curves visually before changing the audio.*

Basics of Equalization

Copying settings between channels

You can use the Link function while editing to help set up identical curves on multiple channels. But at some point the curves may need to diverge slightly (or significantly). Rather than unlinking the channels and starting all over again, you can use the Curve Bank to “bounce” the settings from one channel to another. Then you can begin diversifying the settings of the channels to match the needs of the incoming audio.

To do this, select the channel from which you wish to copy, and save it in an unused location in the Curve Bank. Then simply select the destination channel and retrieve the curve you just stored.

Basic operation: Channel Level mode

To enter Channel Level mode, just press the **[CHANNEL LEVEL]** button while you are in Program mode. This allows you to use the **[VALUE]** encoder to adjust the level of the currently selected channel or Link Group.

The DEQ830 will allow each channel to be boosted up to +12 dB or cut to -12 dB. If you want another 6 dB of gain (for a total of 18 dB), you will find that in the Master Level function in Utility mode. But remember, the settings for Channel Level mode are stored with each program. The settings for the Master Level function are not.

To exit Channel Level mode and return to Program mode, press the **[PROGRAM]** button.

Basic operation: Link mode

The ability to link channels is a very handy feature. The most common application is in setting up matching EQ curves for stereo instruments or program material, but you may link up to eight channels together if you wish. The first thing to do is decide which channels you would like to link, and then pick one of them to become the “primary” channel. All other channels that you link to the primary channel are known as “non-primary” channels. As soon as they are linked, all non-primary channels will adopt the EQ curve of the primary channel. From that point on, when you make an edit on the primary channel, an identical edit will be made to the audio passing through the non-primary channel as well. This includes changes to the Channel Level setting, also.

To make it happen, hold down the **[LINK]** button and press the **[CHANNEL SELECT]** button of the channel(s) you wish to link to the primary channel. You will know the channels are linked when you see more than one channel with a yellow Channel Number LED lit. You can now make an edit to any linked channel and it will affect all linked channels. To unlink a channel, hold **[LINK]** while pressing the linked channel’s button. Note that the primary channel cannot be unlinked from its Link Group.

Remember that a non-primary channel is “mirroring” the settings of the primary channel. When you perform an edit on a non-primary channel, you aren’t actually editing that channel; you are actually changing the primary channel, and the audio for all linked channels will be affected by the edit. But whatever settings existed on the non-primary channel before it was linked will still be there when you unlink it.

To find out which channel is the primary channel in a Link Group, press and hold the **[LINK]** button. The Channel Number LED for the primary channel will flash.

Basic operation: Real Time Analyzer mode

The DEQ830 is capable of a “light show” that is even more useful than it is entertaining. Real Time Analyzer (RTA) mode uses the Band Gain LEDs to show you exactly which frequencies are present in the audio signal that is passing through the DEQ830. This is an extremely useful tool that has been a mainstay of serious sound reinforcement engineers for decades.

To enter RTA mode, simply press the **[RTA]** button located above the **[POWER]** button. Immediately, the DEQ830 will start giving you visual feedback as to what is going on with the instrument or mix that is being processed. RTA mode can show you the frequencies present in the signal either before or after the signal is processed. To select which you want to see, use the **[MONITOR SELECT]** button, located above the **[BYPASS]** buttons, to toggle between Input and Output. The green LEDs above the button will indicate what you are seeing.

If you press a **[CHANNEL SELECT]** button while in RTA mode, the unit will remain in RTA mode, and the Band Gain LEDs will show the audio going through that channel. By switching channels while in RTA mode, you will get a better picture of what’s going on with the mix.

To exit Real Time Analyzer mode, simply tap the **[RTA]** button..

Using the **[VALUE]** encoder in RTA mode

The response of the **[VALUE]** encoder is determined by the state the DEQ830 was in prior to pressing the **[RTA]** button. It might help to think of RTA mode as a “submode” for whatever mode the unit was in before you put it into RTA mode. If you had selected an Edit Group and then entered RTA mode, the Edit Group remains active. This is extremely useful, as you can see the changes you are making to the sound as you turn the encoder! But if you were in Program mode first, i.e., if you had simply been scrolling through programs before you pressed the **[RTA]** button, then the function of the **[VALUE]** encoder at that point was, and remains, program selection. So be careful! Turning the **[VALUE]** encoder can cause the DEQ830 to exit RTA mode and select another program.

When you enter Save Curve mode, RTA mode is exited. When you finish saving the curve, you have to re-enter RTA mode manually.

***[BYPASS]** and **[ALL]** work the same in RTA mode as they do in Program mode. When you hit one of these buttons, the Bypass status of the channels will change as described on pages 28 and 29.*

*If you were in Program mode when you entered RTA mode, turning the **[VALUE]** encoder will change the program number and the DEQ830 will exit RTA mode. If you were in Edit mode when you entered RTA mode, the encoder will edit the bands you had selected.*

Basics of Equalization

Metering modes

The DEQ830 allows you to choose how the Band Gain LEDs will respond in RTA mode. This is done in Utility mode, where you can use the [VALUE] encoder to select between the four different settings of the Peak Mode function, as shown in the chart below.

Held peaks may be reset at any time by pressing the [RTA] button and holding it for about a second.

<i>Displayed Setting</i>	<i>Name</i>	<i>Description</i>
<i>0</i>	<i>No Hold</i>	<i>Peaks are not held.</i>
<i>1</i>	<i>1 Second</i>	<i>Peaks are held for one second.</i>
<i>2</i>	<i>2 Seconds</i>	<i>Peaks are held for two seconds.</i>
<i>Inf</i>	<i>Infinite</i>	<i>Peaks are held until cleared, or until you exit RTA mode.</i>

If you want to reset the peaks while they are being held, press and hold the [RTA] button for about a second.

Basic operation: Utility mode

This is where you will find some of the features that govern the way the DEQ830 operates in the other modes. They are what you would call “global” settings, in that their status is not stored with a program. No matter which program you call up, these settings will not change.

Press the **[UTILITY]** button to access Utility mode. Pressing it repeatedly will cycle through all of the functions that you may edit in this mode. An alternate selection method is to press and hold **[UTILITY]** and turn the **[VALUE]** encoder in either direction.

The following table shows the functions that are available in Utility mode:

<i>Function</i>	<i>Displayed</i>	<i>Options</i>	<i>Default Value</i>
<i>Master Level</i>	<i>M. LVL</i>	<i>+/- 6 dB</i>	<i>0 dB</i>
<i>Release Edit Group</i>	<i>REL E.G.</i>	<i>Off/On</i>	<i>On</i>
<i>Edit Time Out</i>	<i>EDIT T.O.</i>	<i>Off/On</i>	<i>Off</i>
<i>MIDI Channel</i>	<i>MIDI CH</i>	<i>All, 1-16</i>	<i>ALL</i>
<i>MIDI Program Cbg</i>	<i>PRG CHG</i>	<i>Off/On</i>	<i>On</i>
<i>MIDI Out/Thru Select</i>	<i>MIDI O/T</i>	<i>Out/Thru</i>	<i>Thru</i>
<i>Sample Rate Select</i>	<i>INTCLOCK</i>	<i>44.1/48</i>	<i>48</i>
<i>Force Analog Input</i>	<i>INPUT</i>	<i>Auto/Analog</i>	<i>Auto</i>
<i>Fast Program Select</i>	<i>PRG FAST</i>	<i>Off/On</i>	<i>On</i>
<i>Peak Mode</i>	<i>PEAK</i>	<i>0, 1, 2, INF</i>	<i>2</i>
<i>Sys-Ex Transmit</i>	<i>SND SYX</i>	<i>Send?</i>	<i>N/A</i>

Note that as you switch from one function to the next, the Numerical LED Display will change to show the value of the selected function. In each mode, you can change the value by turning the **[VALUE]** encoder. The following pages will describe what each function does.

Master Level (+/- 6 dB)

The Master Level function is one way to customize the DEQ830 to your environment. If the equipment in your setup tends to send very hot signals, you can use this function to prevent the output of the DEQ830 from clipping.

*To return to Program mode from Utility mode, press the **[PROGRAM]** button.*

In Utility mode, the Band Gain LEDs will spell out an abbreviated form of the name of each function, as shown in the “Displayed” column in the table on this page.

Basics of Equalization

When a hot line level signal comes in, the DEQ830 has plenty of headroom to deal with it. But if you perform some radical equalization on this signal, it is possible that the combination of the incoming hot signal plus the equalization you have done may put the signal “over the top” and within clipping range. The Master Level function allows you to reduce the level of the equalized signal before it reaches the final output stage of the DEQ830.

Don’t confuse this with the Channel Level settings in Edit mode. The Channel Level settings are stored with the program, and therefore may vary from program to program. The Master Level setting is global; i.e., it is always active and will affect every program. There is a diagram on page 32 that illustrates the relationship between Channel Level and Master Level.

To lower or raise the Master Level setting, use the [VALUE] encoder.

For an explanation of how to use the Channel Level control feature, see page 32.

Release Edit Group (On/Off)

Of all the Utility mode features, this is the one that will most affect the way you work with the DEQ830. The Release Edit Group setting determines the behavior of the [BAND SELECT] buttons in Edit mode.

For the sake of describing this feature, let’s review some things we already know. When you press a [BAND SELECT] button, you enter Edit mode. If you don’t turn the [VALUE] encoder right away, you can keep pressing [BAND SELECT] buttons until you have several of them selected simultaneously. This is called selecting an Edit Group.

Once you have selected an Edit Group, you can cut or boost the gain of all of the bands in the Edit Group simultaneously; they will move up or down together. The Release Edit Group feature does not affect these things; this is always how the DEQ830 operates.

However, once you make an edit, the Release Edit Group feature comes into play. If it is set to “On,” the very next [BAND SELECT] button you press will “release” all of the previously selected bands. The only band that will be selected is the one you just pressed. You will know this happened, because only that band’s Gain LED will be blinking.

If the Release Edit Group feature is set to “Off,” the next [BAND SELECT] button you press after you have changed the level of the Edit Group will simply add that band to the Edit Group. The upside of this is the convenience of being able to boost three frequencies +3 dB, for example, and then add another frequency to the pile and boost them all another +2 dB without having to reselect the first three. The downside is that you will have to deselect all four bands if you want to grab one more frequency and edit it by itself.

If you are likely to edit only one or two bands at a time when constructing a new curve, set the Release Edit Group function to On. This will enable you to move more quickly across the audio spectrum.

There are pros and cons to both ways of working. So, experiment with this feature and see which way works best for you.

To enable or disable the Release Edit Group feature from this Utility mode page, just turn the [VALUE] encoder.

Edit Time Out (On/Off)

The Edit Time Out function serves as an “auto-exit” feature. When it is enabled, if you do not change the gain value of any band or Edit Group for 30 seconds, the DEQ830 will exit automatically to Program mode.

We have included this feature so the DEQ830 can mold itself as seamlessly as possible into your working style. If you prefer not to have the unit continue reminding you it is still in Edit mode by blinking its LEDs (vying for your attention, as it were, with the VU meters on your mixer), then Edit Time Out is a feature you will appreciate.

On the other hand, if you prefer to have the DEQ830 remain in Edit mode so you will not lose your chosen Edit Group when the unit returns to Program mode, you may want keep the Edit Time Out function off.

The default setting for this function is "Off"; to enable it turn the [VALUE] encoder.

MIDI Channel (ALL, 1-16)

The setting for this function determines which MIDI channel the DEQ830 will use to send and receive program changes. The ALL setting means program changes will be received regardless of which channel they are on. When ALL is selected, program changes will be sent only on channel 1.

Use the [VALUE] encoder to select the desired setting.

MIDI Program Change (On/Off)

This function determines whether the DEQ830 responds to MIDI Program Change messages. The default setting for the MIDI Program Change function is “On.” If you want the DEQ830 not to respond to program changes, use the [VALUE] encoder to change it to “Off.”

MIDI Out/Thru Select (Out/Thru)

Sometimes it is necessary to “daisy-chain” MIDI devices so the MIDI data from one unit will be passed through one or more other pieces of MIDI gear until it is able to reach the last unit in the chain. The DEQ830 will allow you to do that; just toggle this function’s setting from Out to Thru (displayed as “thr”).

The setting on this page will not affect whether or not the DEQ830 will send its memory out the MIDI Out jack. When that

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command is initiated (Button 11), the sys-ex data will be sent in either case.

Internal Clock Sample Rate Select (44.1/48)

The DEQ830 automatically senses an incoming digital signal through its ADAT Optical input and slaves its internal clock to that, whether the rate is 44.1k or 48k. But if you need the DEQ830 to serve as an A/D converter, then it will need to be the master clock for the receiving device.

You may prefer to record the output of the DEQ830 at either 44.1k or 48k. Use the setting of this function to set the internal clock to the desired sample rate. Once your choice is confirmed, you'll see the Sample Rate LEDs change from one rate to the other.

Force Analog Input (Auto/Analog)

There may be times when you want the DEQ830 to ignore an incoming digital signal. This function gives you an solution that is easier than reaching around to the back of the rack and unplugging the cable going into the ADAT Optical input.

Auto is the default value. To force the DEQ830 to listen only to the balanced inputs, switch this setting from Auto to Analog.

Fast Program Select (On/Off)

This setting controls the behavior of the [VALUE] encoder as you use it to select programs. When this function is set to its default value of "On," the current program will change instantly when you turn the [VALUE] encoder.

When set to "Off," turning the encoder will not immediately select a program. Instead, the display will flash the program numbers as you scroll through them, but the program won't actually change until you press the [VALUE] encoder to confirm the selection. This prevents accidental program changes.

Peak Mode (0, 1, 2, Inf)

This function allows you to control the behavior of the Band Gain LEDs while in Real Time Analyzer mode, as described on page 44.

System Exclusive Transmit (Send?)

When on this page, pressing the [VALUE] encoder will cause the DEQ830 to transmit all of its programs and curves over the MIDI Out jack in "system exclusive" (sys-ex) format. This is a great way to back up your settings, and the combination of this function and the next makes it easy to configure the DEQ830 for particular applications.

Once the transmission has begun, you will see a brief message of "Sending," followed by the message "Done."

This process is not affected by the setting of the MIDI Out/Thru Select function. When you instruct the unit to Transmit, the sys-ex data will be sent whether the MIDI jack is set to Out or Thru.

Receiving System Exclusive bulk dumps

The DEQ830 is always ready to receive a new bank of programs and curves into its internal memory. Once an external device begins sending the proper sys-ex data, the DEQ830 will display the message “Rcvng,” short for “receiving.” When the sys-ex transmission is complete, the DEQ830 will let you know by displaying the message “Done.” While the bank is being received, front panel edits and mode changes will be disabled.

There is one thing you can do during this time, though. If you change your mind in the middle of the transmission and realize you’ve loaded in the wrong bank (or worse, you forgot to back up the programs and curves first), you can interrupt the transmission by pressing the **[PROGRAM]** button. The display will show the word “Aborted” and then return to Program mode. But you’d better act quickly, as the whole process takes only about 30 seconds.

And unfortunately, as soon the message “Rcvng” is displayed the DEQ830 begins overwriting the Program and Curve Banks. If you saw that message you will have lost some data. But if you interrupted the transmission, you will have managed to save *some* of the programs and curves.



Warning! Sending a sys-ex bank into the DEQ830 will overwrite the internal memory. **Make sure you have backed up internal memory before you load in a new set of programs and curves.**

The "Hidden" Modes

There are a couple of sub-levels of operation that can be accessed by pressing different buttons. We covered a number of modes on the preceding pages; here are two more “hidden” modes:

Demonstration mode

Sometimes it's fun to have a lot of little lights flashing from the stage or in the studio. The DEQ830 has a special key combination that will activate a “fireworks display” for the entertainment of your clients, audience, or children. In this mode the DEQ830 automatically cycles through the first 25 programs at a rate of 1 per second. To begin the pyrotechnics, first make sure you are in Program mode. Once you are, simultaneously press the **[UTILITY]** button and the **[CHANNEL SELECT]** button for Channel 6.

To help prevent an accidental exit from Demonstration mode, only a few controls are active in this mode. The **[MONITOR SELECT]**, **[BYPASS]** and **[BYPASS ALL]** buttons work the same way they do in Program mode (audio is bypassed by default). The **[CHANNEL SELECT]** buttons can be used to switch channels.

To exit Demonstration mode, press the **[PROGRAM]** button.

Lock mode

To access Lock mode, first you must turn off the DEQ830. Then turn the unit back on, wait until you see the letters “DEQ830” in the display, and then hold down the **[UTILITY]** button. After a couple of seconds you will see the word “Lock” appear in large letters above the **[BAND SELECT]** buttons. This mode allows you to do one simple thing—lock the DEQ830's controls. To do this, use the **[VALUE]** encoder to select “On” for the Lock function. Default is “Off,” of course.

This function enables you to choose a particular program as the only one that can be selected once the DEQ830 is powered on. After this has been done, pressing any button besides the **[POWER]** button will cause the Numerical LED Display to show “Lo” for “locked.” This is handy for environments in which the DEQ830 is used for tuning a room, for example, or whenever you don't want someone calling up a different program, editing the current program, and/or storing a different program on top of the one you have created for a particular application.

It's simple to restore the DEQ830 to full functionality (i.e., “unlock” it). Just turn the unit off and power it up in Lock mode again (turn the unit on and then hold the **[UTILITY]** button). Then use the encoder to turn this feature off. The next time you power up the DEQ830, it will operate normally.

Before you try this feature, make sure you're happy with the program you had selected prior to turning the unit off. It will be the program you are “stuck” with when you turn the unit back on after enabling the Lock feature.

Equalization Artifacts

When you apply a lot of EQ (6dB or more), you may hear some consequences on the output. Here are a few common side effects to applying a lot of equalization and some ways to avoid them.

Distortion

If you boost too many frequencies too high, you will distort the output. If this happens, the channel's red CLIP LED will light. To avoid this, turn down the signal being sent to the DEQ830. Other options include adjusting the Channel Level settings in Edit mode, or adjusting the Master Level setting in Utility mode. The best option is to try another method of achieving the desired effect: cut the highs instead of boosting the low frequencies; reduce the lows and highs instead of boosting the midrange, etc.

Noise

If you boost the high frequencies enough you may hear noise in your system that was inaudible otherwise. If this is objectionable, you may want to gate that channel when it isn't being used or automate the console so that channel is muted when that instrument isn't playing.

Phasing

You may hear some phase distortion if you apply a lot of EQ, such as boosting 12dB on several bands, for example. This is just the nature of EQ—the more you cut or boost, the more phase distortion will occur. Try getting the same effect with less EQ; try cutting instead of boosting; try a different position for the microphone. All of these suggestions can help you to achieve the desired effect with minimal phase distortion.

The potential for artifacts is highly dependent on the audio source material. A DEQ830 curve that works well for processing one source may clip when processing another source, depending on which frequencies are present. Making the curve work may be simply a matter of a slight adjustment in the gain setting for one or two bands.

Instruments usually sound better when you cut the problem frequencies instead of boosting the frequencies you want to feature.

Constant Q vs. Variable Q

What makes the DEQ830 unique?

Early graphic equalizers relied solely on a form of equalization known as “Variable Q.” The DEQ830, on the other hand, is what is known as a “Constant Q” equalizer. This method of equalization is a relatively recent development in the history of sound reinforcement and recording technology. As you will see illustrated in the charts in this section, the Constant Q method allows for a higher degree of control over the sound being processed because of its significantly greater accuracy.

Before we go any further, it’s time for some definitions:

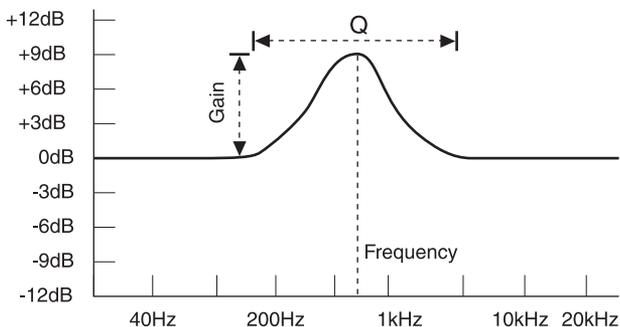
Q The range of frequencies affected by a band

Variable Q A process in which the range of frequencies affected by a band changes as the amount of gain is cut/boosted

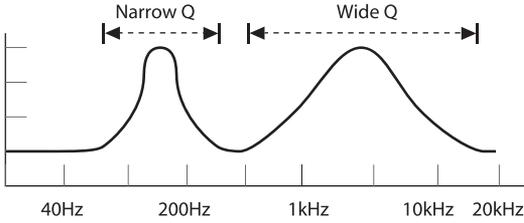
Constant Q A process in which the range of frequencies affected by a band stays the same as the amount of gain is cut/boosted

It may help to define these terms visually as well.

In the following illustration, we see the three basic terms that govern the operation of a single band. The vertical bar of the graph represents decibels of cut/boost, and the horizontal bar represents frequency in Hz. The dotted line leading to the center of the curve indicates the frequency at which this band is set. You can see that in this example, Q covers a range of frequencies from about 200 Hz to about 5 KHz.

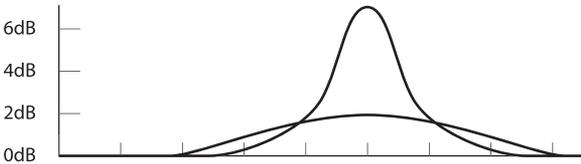


In the next illustration, the difference between a narrow Q and a wide Q is seen:



Variable Q

In the next illustration, the wider and more gradual curve represents a lower gain setting for a Variable Q equalizer. The narrower and more steep curve represents a higher gain setting at the same frequency:

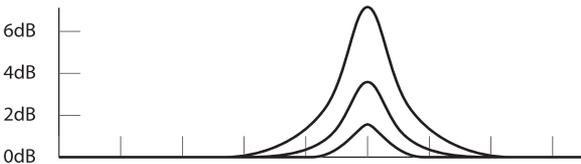


Variable Q: Bandwidth changes

The previous illustration has been exaggerated somewhat to make the point, but you can see how a lower gain setting also boosts frequencies that overlap to some extent into the regions affected by the next highest and lowest frequency band controls.

Constant Q

In contrast, a Constant Q equalizer has a more consistent range of frequencies under its control throughout its cut/boost range, as illustrated below:



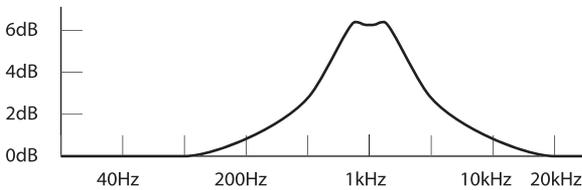
Constant Q: Bandwidth fixed

Basics of Equalization

Multi-band application and results

So far we have only dealt with cutting or boosting single frequency bands. The differences between the Constant Q and Variable Q methods become more “graphic,” if you will, when adjacent frequency bands are involved.

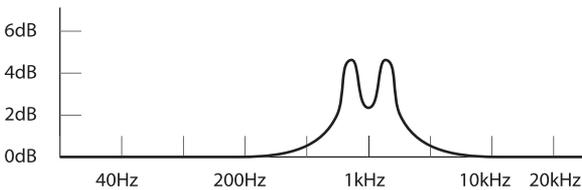
In this example, three adjacent bands are used. They have settings of +6 dB, 0 dB, and +6 dB, respectively:



Variable Q: Adjacent bands at +6, 0, and +6dB

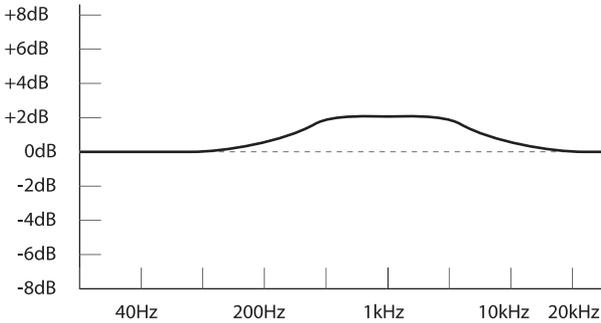
You can see how the 0 dB setting on the Variable Q equalizer merely serves to round off the top of the curve; in actuality, this translates into a boost in the range of frequencies under that band's control. You would have to cut the gain on that band significantly to reduce the unintended consequences of boosting the other two frequency ranges.

The Constant Q equalizer, on the other hand, has more precise control over each of the frequency bands. As you can see in this example, the effect on the center band is significantly lower:



Constant Q: Adjacent bands at +6, 0, and +6dB

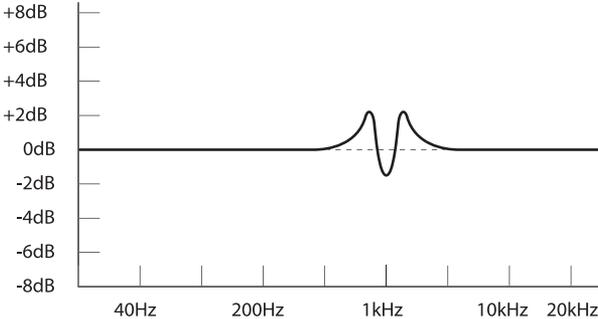
To further illustrate the differences, here is a pair of examples in which three adjacent bands have settings of +3 dB, -3 dB, and +3 dB, respectively:



Variable Q: Adjacent bands at +3, -3, and +3dB

Remember that at lower gain settings, there is an even wider Q for a given frequency band on a Variable Q equalizer. The center frequency band needs to be edited even more drastically in order for any noticeable reduction of frequencies in its range.

The corresponding illustration for the Constant Q equalizer speaks for itself:



Constant Q: Adjacent bands at +3, -3, and +3dB

We offer this information regarding the differences between Constant Q and Variable Q equalizers not as an attempt to persuade the world to reject Variable Q equalizers out of hand; in some applications either would do the job nicely. But when a greater degree of control over the program material is needed, a Constant Q equalizer like the DEQ830 offers a significant advantage.

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4 Applications

This section is designed to get you started with the DEQ830 by giving some sample settings. These are merely suggested settings; experiment and find your own once you begin to hear what the DEQ830 does to your sound.

In a way, it's absurd to suggest EQ settings without knowing what the source sounds like. EQ is a tool that's used to change the timbre of a sound, and it's impossible to suggest an EQ setting that, for example, will make all guitars sound better. So the goal of this section is to give you some ideas for using EQ on your own tracks.

General EQ tips

Rock Kick Drum

A rock and roll kick drum is usually EQ'd quite a bit to make it sound the way it does on the radio. Usually an engineer will choose to cut some of the woofy low-midrange, while boosting the high-end "slap" and maybe even some of the lows. Here is a setting to try on a close-miked kick drum:

- Select all frequencies below 80Hz and boost 3dB
- Cut 500Hz by 8dB
- Boost all frequencies above 5kHz by 4dB

You may also want to apply some compression and gating with the Alesis CLX-440.

Vocal Air

A popular effect on vocals is to boost the high frequencies to add "air" to the vocal. This is an especially popular effect on ballads sung by R&B divas. This effect is achieved by boosting the high frequencies:

- Boost 16 kHz by 6dB
- Boost 20 kHz by 6dB

Tape Hiss Removal

If a recording has a lot of tape hiss, such as one transferred from cassette, you can usually get rid of it by dropping the high frequencies a bit:

- Select all frequencies from 8kHz up and cut them by 6dB

Adjust the gain of different bands to compromise between keeping the high end of the recording and eliminating tape hiss.

Eliminating Feedback

During a live performance, you may experience feedback if a microphone is placed too close to a monitor. However, this feedback often occurs at one frequency before it happens at others. You can "ring out" the monitor by using EQ to cut the frequency that's feeding back. The following is best to try when the band and audience are not present:

1. Insert the EQ between the mixer's monitor output and the monitor amplifier.
2. Slowly and carefully raise the monitor level to the point of feedback. Notice that it always feeds back at the same frequency unless the mic is moved a lot. As soon as you hear feedback, turn the monitor level down, but not off.
3. Select a band that is near where you think the feedback is occurring. For example, if you're getting high-frequency feedback, try 6.3 kHz.
4. Slowly raise the 6.3 kHz Band Gain level while listening for feedback. If you hear feedback, cut that frequency because you guessed right.
5. If you don't hear feedback, return that band to "0" and repeat this procedure with another frequency band. Once you hear feedback, cut that frequency.

If you don't hear feedback at any frequency using this method, try boosting the monitor level a little more.

This procedure can be an effective tool in isolating and eliminating feedback in the main or house system as well.

Filtering effects

The answering machine

A popular vocal effect is to filter the voice to a limited frequency range. This "telephone" effect can be used on any instrument or mix. Here's how to get that sound on the DEQ830:

1. Press all of the **[BAND SELECT]** buttons in the ranges from 25 Hz to 630 Hz and from 6.3 kHz to 20 kHz on the channel you are using. Or you can hold down a **[BAND SELECT]** button and turn the **[VALUE]** encoder to select these frequency ranges.
2. Use the **[VALUE]** encoder to reduce all of these frequencies until their LEDs are at -12 dB.
3. Select all of the unedited frequencies and boost them as high as you can without clipping the signal.
4. Be sure to toggle the **[BYPASS]** button to compare the result with the original.

Comb filtering

You'll understand how this effect process got its name once you see the way it looks when recreated on the DEQ830. This one works especially well with two channels that carry the left and right signals from a stereo audio source:

1. Starting from the far left of the band spectrum, press every other **[BAND SELECT]** button and take those bands all the way down to -12 dB. Then select the unedited bands and boost them $+6$ dB. When you're done, look at the LEDs on the DEQ830 and remember the "comb" analogy. The bands set to $+6$ dB are the "teeth" of the comb, and those set to -12 dB are the spaces between the teeth.
2. For an even more interesting effect, unlink the first channel from the channel carrying the other side of the stereo spectrum and create the exact opposite settings. In other words, take the "odd" bands on the second channel to $+6$ dB this time and the "even" bands to -12 dB. Be sure to toggle the **[BYPASS]** and **[LINK]** status of each channel to get an idea of what is being done to the signal as it passes through the DEQ830.
3. Experiment with different sized "teeth" and "spaces." Put two adjacent frequencies down and the next one up, repeating the pattern. Try "broken" teeth (i.e., boosting some frequencies more than others)! Adjust which frequencies to emphasize/de-emphasize to suit the incoming audio.

Note: depending on the incoming audio, it may be necessary to reduce the gain on some bands to prevent clipping.

There are preset curves similar to the ones used in these examples. You may find it interesting to compare the way various audio sources are affected by somewhat similar curves.

Settings chart

We've provided the chart on the next page because we know some of you prefer to have a hard copy of your favorite settings. And thanks to the digital heart of the DEQ830, you'll always be able to reconstruct the curve exactly as it was using the numbers you write down.

A few notes about filling out the chart:

1. When a value is exact, like $+8$ or -4 , place a dot in the appropriate square above the band.
2. When the band's value is zero, or flat, draw a dash through that square instead of a dot. This will help you keep track of numbers above and below zero by giving you a visual reference point (just as the green LED does on the front panel). You'll naturally begin to draw an extended line through consecutive bands when they're all set to zero.
3. For intermediate values like $+3.5$, we suggest writing that number in the square above that band which most closely approximates the actual value.
4. Don't forget to record the Channel Level setting!

Line Conditioners and Protectors

Although the DEQ830 is designed to tolerate typical voltage variations, in today's world the voltage coming from the AC line may contain spikes or transients. These can cause audible noises, and they can stress your gear and, over time, possibly cause a failure. There are two main ways to protect against this, listed in ascending order of cost and complexity:

- **Line spike/surge protectors.** Relatively inexpensive, these are designed to protect against strong surges and spikes, acting somewhat like fuses in that they need to be replaced if they've been hit by an extremely strong spike.
- **Line filters.** These generally combine spike/surge protection with filters that remove some line noise (dimmer hash, transients from other appliances, etc.). A good example is the Isobar™ series from Tripp Lite.

Care and Maintenance

Cleaning

Disconnect the AC power supply, then use a damp cloth to clean the DEQ830's metal and plastic surfaces. For heavy dirt, use a non-abrasive household cleaner such as Formula 409™ or Fantastik™. **DO NOT SPRAY THE CLEANER DIRECTLY ONTO THE FRONT OF THE UNIT AS IT MAY DESTROY THE LUBRICANTS USED IN THE SWITCHES AND CONTROLS!** Spray onto a cloth, and then use the cloth to clean the unit.



Do not spray cleaning solution of any sort onto the front panel of the DEQ830. If a cleaning becomes necessary, spray a recommended cleaning solution onto a cloth first, and use the cloth to clean the front panel.

Troubleshooting Index

Symptoms	Cause	Solution
No audio at outputs.	No input audio. Bad cables. Destination is turned down.	Test with a known good input. Replace the cables. Check the connections and the level of the mixer or amp to which the DEQ830 is connected.
Weak output signal.	Input level weak. Output level weak. (Decide which is the case by pressing the Bypass button.)	Increase level from source into DEQ830. Boost channel levels of quiet program. Boost Master Level in Utility mode.
Clip LED lights often.	Input level too high. Output level too high. (Decide which is the case by pressing the Bypass button.)	Reduce input level at source. Reduce gain of problem bands within program. Reduce channel levels of that program. Reduce Master Level in Utility mode.
Can't select new program, display keeps blinking.	Program Fast is set to "Off."	Press encoder to confirm program selection, or change Program Fast setting in Utility mode. Refer to page 48.
Can't edit program, can't select new program.	DEQ830 is locked.	Unlock DEQ830 in Lock mode. Refer to page 50.
Numerical LED Display keeps flashing "Lo."	DEQ830 is locked.	Unlock DEQ830 in Lock mode. Refer to page 50.
Must de-select all bands in order to edit a single band.	Release Edit Group function set to Off.	Set Release Edit Group function to On in Utility mode.
Analog input is ignored	Digital signal present at ADAT Optical Input.	Change Force Analog Input setting in Utility mode.
Digital input is ignored	Force Analog Input is set to Analog in Utility mode.	Ditto.

Refer All Servicing to Alesis

We believe that the DEQ830 is one of the best signal processors that can be made using current technology, and should provide years of trouble-free use. However, should problems occur, DO NOT attempt to service the unit yourself unless you have training and experience. Service on this product should be performed only by qualified technicians. NO USER-SERVICEABLE PARTS INSIDE.

Obtaining Repair Service

Before contacting Alesis, check over all your cable connections, and make sure you've read the manual.

Customers in the USA and Canada:

If the problem persists, contact Alesis and request the Technical Support department. Make sure you have the unit's serial number with you. Talk the problem over with one of our technicians; if necessary, you will be given a return authorization (RA) number and instructions on how to return the unit. All units must be shipped prepaid and COD shipments will not be accepted.

For prompt service, indicate the RA number on the shipping label. Units without an RA will not be accepted. If you do not have the original packing, ship the unit in a sturdy carton, with shock-absorbing materials such as Styrofoam pellets (the kind without CFCs, please) or "bubble-pack" surrounding the unit. Shipping damage caused by inadequate packing is not covered by the Alesis warranty.

Tape a note to the top of the unit describing the problem, including your name and a phone number where Alesis can contact you if necessary, as well as instructions on where you want the product returned. Alesis will pay for standard one-way shipping back to you on any repair covered under the terms of this warranty. Next day service is available for a surcharge. Field repairs are not authorized during the warranty period, and repair attempts by unqualified personnel may invalidate the warranty.

Customers outside the USA and Canada:

Contact your local Alesis distributor for any warranty assistance. The Alesis Limited Warranty applies only to products sold to users in the USA and Canada. Customers outside of the USA and Canada are not covered by this Limited Warranty and may or may not be covered by an independent distributor warranty in the country of sale. Do not return products to the factory unless you have been given specific instructions to do so.

Internet Address:

Important information and advice is available on our Web site:
<http://www.alesis.com>

Email may be addressed to Support@alesis.com.

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Specifications

Rear Panel I/O (switchable)

Analog:

Input Connectors: 8 balanced 1/4" TRS jacks
Output Connectors: 8 balanced 1/4" TRS jacks

Digital:

Input Connector: 1 ADAT Optical
Output Connector: 1 ADAT Optical

Switch set to +4:

Nominal input level: +4dBu (-15dBFS)
Maximum input level: +19dBu (6.9 Vrms)

Nominal Output Level: +4dBu (-15dBFS)
Maximum Output Level: +19dBu (6.9 Vrms)

Switch set to -10:

Nominal input level: -10dBV (-16dBFS)
Maximum input level: +6dBV (2.0 Vrms)

Nominal Output Level: -10dBV (-16dBFS)
Maximum Output Level: +6dBV (2.0 Vrms)

Input impedance: 10k Ω
Output Impedance: 220 Ω

MIDI:

MIDI Input: 1 5-pin female DIN
MIDI Output: 1 5-pin female DIN

Audio Performance

Signal To Noise Ratio: >100dB A-Weighted, Analog In to Analog Out
THD+N: <0.005%, Analog In to Analog Out
Frequency Response: 22-22kHz \pm 0.50dB, Analog In to Analog Out
Power Consumption: 15 Watts Max (100-240 VAC / 50-60 Hz)

Mechanical

Size: 1.75" H x 19.0" W x 5" D
Rack Spaces: 1 Space
Weight: 3.0 lbs. (1.4 kg)

All measurements done over a 22 Hz - 22 kHz range with 1 kHz sine wave at -1dBFS input. Impedances are measured at 1 kHz.

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Warranty / Contact

Alesis Limited Warranty

ALESIS CORPORATION ("ALESIS") warrants this product to be free of defects in material and workmanship for a period of one (1) year for parts and for a period of one (1) year for labor from the date of original retail purchase. This warranty is enforceable only by the original retail purchaser and cannot be transferred or assigned. For the most effective service, the purchaser should register the purchase on the ALESIS website at <http://www.alesis.com/support/warranty.htm>.

During the warranty period ALESIS shall, at its sole and absolute option, either repair or replace free of charge any product that proves to be defective on inspection by ALESIS or its authorized service representative. In all cases disputes concerning this warranty shall be resolved as prescribed by law.

To obtain warranty service, the purchaser must first call or write ALESIS at the address and telephone number available on the Alesis Website to obtain a Return Authorization Number and instructions concerning where to return the unit for service. All inquiries must be accompanied by a description of the problem. All authorized returns must be sent to ALESIS or an authorized ALESIS repair facility postage prepaid, insured and properly packaged. Proof of purchase must be presented in the form of a bill of sale, canceled check or some other positive proof that the product is within the warranty period. ALESIS reserves the right to update any unit returned for repair. ALESIS reserves the right to change or improve design of the product at any time without prior notice.

This warranty does not cover claims for damage due to abuse, neglect, alteration or attempted repair by unauthorized personnel, and is limited to failures arising during normal use that are due to defects in material or workmanship in the product.

THE ABOVE WARRANTIES ARE IN LIEU OF ANY OTHER WARRANTIES OR REPRESENTATIONS WHETHER EXPRESS OR IMPLIED OR OTHERWISE, WITH RESPECT TO THE PRODUCT, AND SPECIFICALLY EXCLUDE ANY IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY OR OTHER IMPLIED WARRANTIES. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. IN NO EVENT WILL ALESIS BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL, INDIRECT OR OTHER DAMAGES RESULTING FROM THE BREACH OF ANY EXPRESS OR IMPLIED WARRANTY, INCLUDING, AMONG OTHER THINGS, DAMAGE TO PROPERTY, DAMAGE BASED ON INCONVENIENCE OR ON LOSS OF USE OF THE PRODUCT, AND, TO THE EXTENT PERMITTED BY LAW, DAMAGES FOR PERSONAL INJURY. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

THIS CONTRACT SHALL BE GOVERNED BY THE INTERNAL LAWS OF THE STATE OF CALIFORNIA WITHOUT REFERENCE TO CONFLICTS OF LAWS. This warranty gives you specific legal rights, and you may also have other rights required by law which vary from state to state.

This warranty only applies to products sold to purchasers in the United States of America or Canada. The terms of this warranty and any obligations of Alesis under this warranty shall apply only within the country of sale. Without limiting the foregoing, repairs under this warranty shall be made only by a duly authorized Alesis service representative in the country of sale. For warranty information in all other countries please refer to your local distributor.

For more effective service and product update notices, please register your DEQ830 online at:

<http://www.alesis.com/support/warranty.htm>

Alesis Contact Information

Alesis Distribution, LLC
Los Angeles, CA USA

E-mail: support@alesis.com
Website: <http://www.alesis.com>

Alesis DEQ830 Reference Manual
Revision A by Randy Lee, Taiho Yamada and Edwin Erdmann
Revision B by Bret Victor

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