



CFQ31M

Mono 31 Band Graphic Equalizer

Thank you and congratulations for choosing **Crossfire Car Audio**. You have selected one of the finest audio reproduction products available, the competition series CFQ31M graphic equalizer. Your purchase of this 31 band competition series equalizer shows your interest in pure sonic reproduction and the high build quality that has become a personal goal of the design and engineering teams at **Crossfire**.

Manufacturing sophisticated competition equalizers is not all **Crossfire** has accomplished. Check out our full line of amplifiers, crossovers, dynamic component systems, coaxial speakers, and of course our wide selection of high performance subwoofers. Explore the potential of **Crossfire Car Audio**, and most of all, **enjoy the music!**

IMPORTANT!

PLEASE READ ALL INSTRUCTIONS CAREFULLY BEFORE INSTALLATION!

The quality of installation may affect the performance and reliability of your **Crossfire** signal processor. Please take a few minutes to read the manual carefully. The time you spend on installation will prove to be worthwhile when it's time to listen to your investment. If you have any doubts or questions regarding installation or use, you may wish to contact your local authorized **Crossfire Car Audio** dealer or call **Crossfire** at 562-906-0800 for further assistance.

***Please note:** The CFQ31M is a mono equalizer. It was designed for maximum equalization per channel, thus creating a need for two CFQ31M's to operate in a stereo mode. Multiple units may be used for equalizing rear and center channels as well.

Specifications

Equalizer

Number of bands	31 x 1 channel, 1/3 octave
Type	Constant "Q"
Accuracy	3% of center frequency
Range	±6dB or ±12dB selectable

General

Frequency response	10Hz to 40KHz
T.H.D.01%
Signal to noise ratio	>110dB
Input impedance (Balanced).....	20Kohms
(Unbalanced)	15Kohms
Output impedance (Balanced).....	150 ohms
(Unbalanced).....	100 ohms
Input level	to 6V
Output level	to 8 VRMS
Subsonic filter	10Hz to 250Hz, 12dB/Oct.
Power fuse	3 Ampere
Dimensions.....	19(W) x 6.75(L) x 1.75(H) in.

Features

- 1. 31 Band Equalizer, 1/3 Octave**
These 31 slider pods adjust the frequency indicated up to ± 12 dB.
- 2. Range**
Depressing this button switches the slider pods to ± 6 dB or ± 12 dB of adjustment.
- 3. ± 6 dB, ± 12 dB Range and Power Indicator**
These LED's illuminate indicating the range setting of the equalizer and the power up of the unit.
- 4. Bypass**
Depressing this button allows you to bypass the equalizer section.
- 5. Bypass LED**
This LED illuminates indicating the bypass button is being utilized.
- 6. Clip**
This indicator illuminates when the output level is reaching the maximum of 8VRMS and the output is clipping.
- 7. Subsonic Filter**
This knob adjusts the variable 12dB subsonic filter to eliminate energy wasting ultra low frequency resonance caused by preceding components as well as picked up through cables.
- 8. Output Level Control**
This adjusts the output level voltage of the CFQ31M to match the input level of the next processor or amplifier.
- 9. Input Level Control**
This gain control is used to adjust the input sensitivity of the CFQ31M to match the radio's output.
- 10. $\frac{1}{4}$ " TRS Input**
This input accepts balanced line signal from the source unit utilizing TRS (Tip, Ring, Sleeve) style connectors.
- 11. XLR Input**
This input accepts balanced line signal from the source unit utilizing XLR style connectors.
- 12. $\frac{1}{4}$ " TRS Output**
Use this output if the next component accepts balanced line TRS style connectors.
- 13. XLR Output**
Use this output if the next component accepts balanced line XLR style connectors.
- 14. RCA Line Level Input**
This input accepts unbalanced signal from the output of the source unit via RCA patch cables.
- 15. RCA Line Level Output**
Use this output if the next component accepts unbalanced RCA patch cables.
- 16. Chassis Ground**
This switch is used to disconnect the signal ground from the main chassis ground if noise is present due to a possible ground-loop.
- 17. Power Input Terminals**
B+ : connect to the vehicle's positive 12 volt supply (+12 volts DC)
B- : connect to the vehicle's chassis (-12 volts DC)
Remote turn-on : connect to the remote turn-on lead of the source unit
Delayed Remote turn-on : connect to the remote turn-on leads of all signal processors and amplifiers following the CFQ31M. This will delay the turn on of these units by 2 seconds after the source unit is powered up.
- 18. Fuse**
This 3amp fuse will help protect the CFQ31M from damage in case of a short.

Mounting

Find a sturdy secure area to mount the CFQ31M. Be sure it is accessible, but not in an area where the equalizer sliders or any other adjustments may be accidentally altered. Use the faceplate of the CFQ31M as a template and mark the location of the mounting holes with a pen or pencil. Remove the unit from the mounting location to pre-drill the mounting holes. Use large enough screws to mount the equalizer tightly in place.

Power Connections

Before connecting anything, be sure to disconnect the ground terminal from your battery to prevent any damage to the audio components. Leave disconnected until all components are hooked up and the system is ready to play.

Remove the Molex power plug from the CFQ31M before fastening the wires into the correct slots as a precaution. Make sure to you are looking at the terminal with the set-screws facing **upwards** while following the instructions (see diagram).

B+

The first slot from the left is the **B+** or positive 12volt terminal. Connect to this terminal a positive 12volt lead using the same source of power used to power your amplifiers. This should eliminate noise due to voltage differences.

Whether you decide to run the power wire for the equalizer to a power distribution block or to the battery, be sure to protect both the stereo system and the vehicle's electrical system from a possible dangerous short. This can be done by placing a 3amp fuse in your power distribution block or within a few inches of the battery. Use a minimum of 16 awg stranded copper wire for this application and be sure to apply grommets whenever the power wire is ran through any metal wall.

B-

The second slot from the left is the **B-** or ground terminal. Locate a metal area of the vehicle's chassis as close to the **Crossfire** CFQ31M as possible that is a good source of ground (preferably the floor). Investigate the area you wish to use for electrical wires, vacuum lines, and brake or fuel lines. Using either a wire brush or sandpaper, eliminate unwanted paint to supply a better contact when grounding. The same gauge wire should be used for ground as is for the power. Terminate the ground wire using the correct size ring terminal and attach it to the bare metal using a #8 sheet metal screw. It is important for this connection to be solid. Silicon should now be spread over the screw and bare metal to prevent rust and moisture from entering the vehicle.

R

Moving on to the third terminal from the left is the remote turn-on marked **R**. This terminal must be connected to a switched +12 volt source. Most source units provide a remote turn-on lead, which are used to turn on and off all processors in correspondence with the source. If a radio does not have a remote turn-on, then a power antenna wire may be used.

Use a minimum of 18-gauge wire to connect the CFQ31M to the source of the switched +12 volt lead. If possible, route this wire on the same side of the vehicle as the power wire. Be cautious not to run the wire near sharp edges that may easily cut through the insulation. Make sure all connections are secure.

DR

On the far right is the last terminal marked **DR**. **DR** is the abbreviation for delayed-remote. Connect this output to the remoter turn-on input terminal of the amplifier. This output provides a delay of 2 seconds in the turn-on and off to help eliminate pop or thump noises when the source is turned on or off.

Once all the wires are in place, return to the location of the CFQ31M. Cut the power, ground, and remote input and output leads to the desired length. Strip off approximately 1/4" of the insulation on the wires. Place each wire in its appropriate slot and tighten the set-screws securely.

Signal Connections

Choose the input and output that work best in your application (balanced line XLR or TRS, or unbalanced RCA). When using XLR or ¼" TRS cables, be sure the signal wires have adequate shielding. If RCA style connectors are chosen, make sure the cables have either multiple layers of shielding or twisted pair wiring for the best noise rejection (consult your dealer).

Be extra careful when running the signal cables. Car environments are notorious for poorly insulated wires. This means that hiss, engine noise, and fan noise can easily be picked up if ran incorrectly. As a precaution, avoid placing the signal cables near large wire looms and electric fans whenever possible.

Starting at the source, connect the signal cables to the source output. Run the cables to the location of the CFQ31M avoiding entanglement between the signal cables and the power wires. Connect the signal cables to the inputs making sure you maintain correct balance (red is right and black or white is left) on both the radio and the crossover

By now you have finished installing the unit(s) into the vehicle. Reconnect your battery and install a 3-amp fuse into the fuse holder.

Level Adjustments

By now you're probably really anxious to listen to your stereo system. Before you switch on that radio, you have to complete some very important adjustments in order to fine-tune your system.

1. Check the manuals of the processor(s) following the CFQ31M for their maximum input levels (listed as input sensitivity). Most signal processors and amplifiers do not accept the 8volts RMS of input this processor can produce so signal should never reach peak output.
2. Adjust the input level of the CFQ31M to 0.
3. Preset the output level of the CFQ31M slightly above minimum gain.
4. Depress the EQ bypass switch to the off position. Set the equalizer bands flat to zero
5. Set the input levels of all processors and amplifiers to 1/4 maximum.
6. Activate the radio power. Set the tone controls, balance and fader controls to the center or flat position.

These next steps are best accomplished with the following items: a test disc or cassette with a 1Khz test tone, a digital volt meter, and a couple of very dynamic tracks on your favorite CD or cassette. Follow the level adjustments below.

1. Plug in the test CD or cassette and play the 1Khz tone. If you are using a CD, you may wish to turn on the track repeat function. If you do not have a test CD, skip to step 3 b.
2. Unplug the output signal cable of the CFQ31M(s) going into the following component(s). Connect your volt meter to the output cable as shown below and turn the volt meter to AC voltage.
3.
 - a. Turn the radio on and adjust the volume to $\frac{3}{4}$ of maximum. Adjust the output of the CFQ31M until the volt meter meets the maximum rated input acceptable into the next unit. Repeat with all CFQ31Ms making sure to maintain the same output voltage between each. Finish by placing the output signal cables back into the next component.
 - b. Turn the radio on and adjust the volume to $\frac{3}{4}$ of maximum while playing your favorite CD or cassette. Adjust the output of the CFQ31M until the onset of distortion is heard, then reduce the output level slightly. Repeat with all CFQ31Ms.
4. Set the levels for all following components as suggested by that manufacture.
5. Take a few minutes now to listen to the system using your favorite music tracks to determine if the volume is satisfactory. At $\frac{3}{4}$ maximum volume, the system should be at maximum and distortion should be faintly audible.
6. Check the clip indicator on the CFQ31M at $\frac{3}{4}$ volume. Make sure the LED is not illuminating. If the clip indicator is illuminating, reduce the output level until it completely shuts off. The level controls on the following processors or amplifiers may need adjustment as well.

Equalization

How does an equalizer work?

Simply put, an equalizer corrects deviations in frequency over a given bandwidth. The slider knobs on the CFQ31M are each numbered with the center of the frequency "Q" they adjust. By sliding these knobs you can boost or cut a particular frequency to smooth the response of your system and acquire a more desired sound.

Adjusting Your equalizer

Adjusting your CFQ31M is not an easy task. For this reason, Crossfire recommends the use of a RTA, or **Real Time Analyzer**. If you are not using a RTA, it will be hard to distinguish the dips and peaks and know how much to adjust each. Although we highly recommend using a Real Time Analyzer, it is possible to adjust the CFQ31M by ear to your own taste. However you go about tuning your system, please follow some basic steps.

1. Always start with the frequencies that need to be cut or reduced. Reason: boosting frequencies up 3,6,12 dB is often accompanied by boosted system noise of equal amount. Cutting frequencies will cut noise.
2. Remember to adjust no more than two frequency bands at one time when tuning by ear. This makes it much easier to distinguish whether the changes made an improvement or not. Since the CFQ31M is typically mounted in the trunk its important to listen to the changes in the response after each setting.
3. Always use extreme caution when boosting frequencies. For every 3dB of boost, twice the power is demanded from the amplifier at that particular frequency. For example, if your amplifier is supplying 25 watts at 0dB at a particular frequency, then at 3dB of boost it will need to supply 50 watts, and at 6dB of boost it requires 100 watts or 4 times the power. If too much boost is applied, the chances are your amplifier will clip at these frequencies and possibly damage your speakers and amplifier.
4. Avoid equalizing more than +/- 6dB. If you have this large of a deviation the chances are you have a phase problem. This could be in part due to the location of the speaker or as simple as a polarity problem with one or more speakers.

Check the Level Settings

Now that you've had your fun with equalizing, check the output level of the CFQ31M once again. Every time you made an adjustment the output level was adversely affected. Simply insert the compact disc or cassette tape used to make your initial settings. Turn the volume to 3/4 maximum setting on the radio while playing the dynamic track chosen earlier. Adjust the output level accordingly; if distortion is heard or the clip indicator LED is illuminating, turn the outputs down; if volume is lost you may wish to increase the outputs as long as the peak indicator lights are not illuminating. Be careful not to overdrive your processors and amplifiers.

Enjoy the music!

Crossfire Limited Warranty

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. This warranty is only valid on **Crossfire** products purchased in the U.S.A. from an authorized **Crossfire** dealer. All **Crossfire** amplifiers are warranted to be free from defects in materials and workmanship under normal use and serviced for a period of (2) years when the unit is installed by an authorized **Crossfire** dealer. Non-authorized dealer installed products carry a (1) year parts and labor limited warranty. The extent and conditions of **Crossfire's** limited warranty are as follows:

i. **Crossfire** will either repair or replace (at its option) any unit which crossfire has examined and found to be defective and under warranty, to the original purchaser, provided the defect occurs within (2) years of the date of purchase when the unit is installed by an authorized **Crossfire** dealer. This warranty includes both parts and labor and applies to the original purchaser only.

ii. **Crossfire** will either repair or replace (at its option) any unit which crossfire has examined and found to be defective and under warranty, to the original purchaser, provided the defect occurs within (1) year of the date of purchase when the unit is installed by a non-authorized **Crossfire** dealer. This (1) year warranty includes both parts and labor and applies to the original purchaser only.

iii. This warranty will be void to any unit found with the original factory serial number removed, altered or defaced. All units received by **Crossfire** for warranty with their original serial numbers removed will not be repaired and returned to sender freight collect.

iv. The provisions of this warranty shall not apply to products used for any industrial, professional or commercial purposes or any other uses for which it was not designed.

v. This warranty does not cover costs for removal of product for repair or reinstallation of the product after repair, nor does it cover the cost of returning the product to **Crossfire's** service center for repair.

vi. This warranty does not apply to repairs or replacements necessitated by any cause beyond the control of **Crossfire**. Including, but not limited to, any malfunction, defect or failure caused by or resulting from unauthorized service or parts, improper maintenance, operation contrary to furnished instructions, shipping or transit accidents, incorrect power line voltages, fire, flood or any other acts of nature, or normal wear and tear.

vii. The foregoing is in lieu of all other expressed warranties and **Crossfire** does not assume or authorize any party to assume for it any other obligation or liability. the duration of any warranties which may be implied by law (including the warranties of merchantability and fitness) is limited to the term of this warranty. In no event shall **Crossfire** be liable for special, incidental or consequential damages arising from obligations under this warranty due to causes beyond its control. Some states do not allow limitations on how long an implied warranty lasts and/or do not allow the exclusions or limitation of consequential damages, so the above limitations and exclusions may not apply to you.

viii. **Return policy**

Your unit will be serviced free of charges on an in-warranty basis only. If improper operation occurs, contact your authorized **Crossfire** dealer for assistance with the return and factory repair of your **Crossfire** product. If an authorized **Crossfire** dealer is not available, the following procedure must be followed: phone (562-906-0800) or fax (562-941-2284) in your name, address, telephone number and the model number of the item to be returned to receive a return authorization number. Your return authorization number must be clearly written on the outside of the packing box returned to **Crossfire**. All returned products must be accompanied with a dated purchase invoice or the product may be subject to costs of parts and labor. Return the unit, prepaid postage, in the original protective carton or a carton with ample protection. Please include a brief description of the problem and send your repair to:

CROSSFIRE

12222 Bell Ranch Dr.
Santa Fe Springs, CA 90670