
MANUAL
F.A.C.T.®
F-3
XETEC
designgroup

XETEC 3-KANAL FULL ACTIVE CROSSOVER TECHNOLOGY F.A.C.T. F-3

Thank you for buying this **XETEC** product and thank you for your confidence!

With this **XETEC** product you have purchased an innovative and professional High-End product, which will enable you to enjoy your music on a very high quality level for many years.

We have especially focused on electronic as well as product design to give you a product that will accompany you for many years, as our products are always one step ahead and will still be modern for many years.

XETEC products represent the experience our engineers have made through many years assisted by car audio magazines as well as professional installers.

Please read these instructions very carefully, to avoid unnecessary trouble and defects. In case of trouble, please contact your local dealer or check our website **www.xetec.de** for troubleshooting. There we also offer up-to-date hints and technical support for you.

XETEC F.A.C.T.fi F-3 is a State-of-the-Art 2- or 3-way active crossover designed to be used together with high-quality speaker systems, and especially matches the **XETEC Modular Speaker System. F.A.C.T.fi** means Full Active Crossover Technology and offers great improvement even to any existing speaker set.

XETEC F.A.C.T.fi F-3 additionally comes with the option of using **XETEC carEQfi** modules, that are matched to the acoustic requirements of specific car models.

XETEC F.A.C.T.fi F-3 provides everything you need to set up a 3-way active loudspeaker system.

TWEETER AND WOOFER:

The x-over frequency between tweeter and woofer is adjustable with one control.

It can be varied from 2.3 kHz to 6.5 kHz with 12 dB Linkwitz-Riley characteristics.

Center position is 4.1 kHz, the usual x-over frequency of 2-way compo speakers.

Additionally the phase shift of the tweeter channel can be adjusted and between +/- 180 degrees for each channel separately.

With the feature woofer highpass it is possible to adjust the lower woofer x-over frequency between 45 Hz to 250 Hz. Middle position is 115 Hz.

BASS CHANNEL: MIDBASS OR SUBWOOFER

The option bass highpass defines the lower x-over frequency, that means the frequency the bass range starts. (22 Hz-160 Hz) center position is 90 Hz.

The option bass lowpass defines the upper frequency, that means the frequency the bass range ends. Middle position is 90 Hz. All filter characteristics are 12 dB per octave.

The switch mode front / rear is exclusively for the use of carEQfi module, and provides selection whether the F-3 is used for a front or rear system, because the carEQfi modules are always for 4- channel use.

With the features system level , tweeter level and bass level the gain of each channel can be adjusted in order to match the different efficiencies of the drivers.

All features of **XETEC F.A.C.T.fi F-3** active crossover show the conceptional advantages of active loudspeaker management :

- All power amps connected to **XETEC F.A.C.T.fi F-3** only get the user defined frequency range, and must not reproduce the whole frequency range that would be filtered in a passive crossover. This relieves the power amps and increases the systems efficiency.

- With the **XETEC F.A.C.T.fi F-3** you get an open, modular full active crossover concept, which improves any loudspeaker solution. If you operate **XETEC F.A.C.T.fi F-3** with a **XETEC** carEQfi module, you get an outstanding performance perfectly adapted to your vehicle·s acoustical environment.

- The tweeter phase shift range can be adjusted variably and separately for each channel. This option would be impossible in passive crossover solutions.

SAFETY

Before you make any connection, the battery must be disconnected!
A main fuse must be installed into the +12 V wire within + the first 12" from the + terminal of the battery (insurance regulation!).
The fuse in the power line only protects the device itself, not the battery and the car!

Always use an in-line fuse in the +12 V power cable in max. 12" from the battery·s + terminal (value must meet the current requirements of the whole sound system, minimum value is 60 A).

1.5 The last connection is the remote wire. The headunit must always be turned off during this connection, as it might be damaged when remote output is shorted to ground!

1.6 Now you can reconnect the battery and insert the main fuse into the power cable fuse holder.

0. INSTALLATION

For safety reasons, the **XETEC F.A.C.T.fi F-3** has to be mounted properly and fixed to the car body. Please fix the device using the screws that come with your product.
Be careful when drilling holes, there might be wires, fuel lines or the gas tank behind a wall!
Never drill holes when you do not know what·s behind.
Never install signal wires close to power cables to avoid hum and alternator noise is being induced.

1. CONNECTIONS

Before you make any connections, always disconnect the battery!

1.1 First of all, connect the RCA cables coming from the radio/headunit to the respective inputs of your **F.A.C.T.fi F-3**. Always run signal cables in a distance to power cables and the vehicle·s factory wires to avoid induction of noise.

1.2 Now connect the signal cables from the outputs of **F.A.C.T.fi F-3** to the corresponding inputs of your power amplifiers. Make sure that all power amplifiers are in fullrange or bypass mode , that means that all filters are off, because otherwise the filter curves of **F.A.C.T.fi F-3** would be overlapped.

1.3 Next step is the ground connection. Check for a good grounding point using your vehicle·s chassis. Make sure that this point has good electrical contact! Some parts of the chassis might only be glued and have no contact to battery (-). Run all ground cables of the system to this point to avoid alternator whine and other noise.

1.4 In the next step, the +12 V cable has to be connected to the (+) terminal of the battery. Always be careful not to run this cable around sharp edges, the insulation might be damaged. For holes always use grommets!

1.5 Always use an in-line fuse in the +12 V power cable in max. 12" from the battery·s + terminal (value must meet the current requirements of the whole sound system, minimum value is 60 A).

1.6 Now you can reconnect the battery and insert the main fuse into the power cable fuse holder.

Caution: Always replace fuses with same value. Higher values may cause damage to your amplifier, battery or car!

2.0 CONTROLS

2.1 System level / push tweeter
This function adjusts the system volume. If you keep the switch pressed you can adjust the tweeter level in relation to the woofer level.

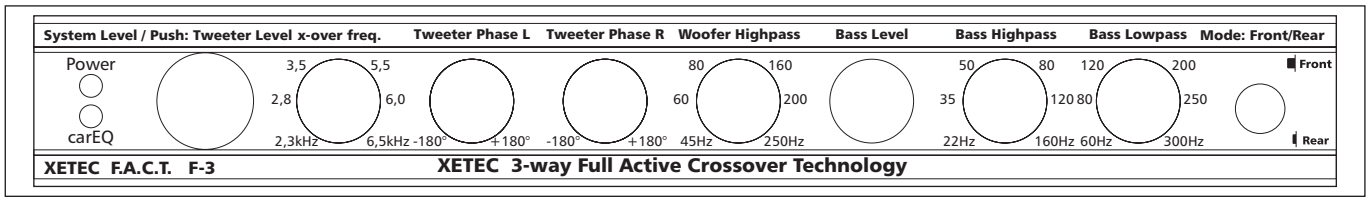
2.2 X-over Freq
Adjusts the x-over frequency between tweeter and woofer.
Center position is 4.1 KHz, adjustment range is 2.3 KHz - 6.5 KHz.

2.3 Phase tweeter left, Phase tweeter right
This feature provides phase delay correction separately for each channel. Phase correction ensures that tweeter and woofer signals reach the ear coherently.
This results in a dynamic and spatial sound reproduction.

2.4 Woofer highpass
With this control the upper frequency limit of the bass channel can be adjusted from 45 Hz to 250 Hz. Center position is 115 Hz.

2.5 Bass level
This feature adjusts the level of the bass channel.

2.6 Bass highpass
The option bass highpass defines the lower x-over frequency, that means the frequency the bass range starts at. (22 Hz-160 Hz) Center position is 90 Hz.



2.7 Bass lowpass
This option defines the upper frequency limit, that means, at what frequency the bass range rolls off. (60 Hz - 300 Hz). Middle position is 90 Hz.

2.8 Mode front / rear
The switch mode front / rear is exclusively for the use of **XETEC** car EQfi modules.

CONTROL ELEMENTS INSIDE OF THE **F.A.C.T. fi F-3.**

2.9 Ground lift
The ground lift jumper on the board near the inputs are normally set to ground connect (unbalanced).
In case of disturbances, as alternator noise, you take the alternative position called grond lift (balanced) to eleminate those disturbances.

Please note: both jumpers must be in the same position!

2.10 Woofer EQ jumper (near to woofer highpass (2.4) adjuster)
In delivery status these jumpers are in position Woofer EQ .
This causes a little sinking in the upper middletone range, which is normally overemphasized by most woofers, because of their voice coil inductance. In the position EQ off the woofer signal passes as usual.

Please note: both jumpers must be in the same position!

2.11 Option carEQfi module carEQfi is a patented signal processing and comes in a module. carEQfi modules are available for various car models. Basically they are a pre-adjusted equalizer which compensates the typical acoustical environment in a car, determined by several resonances and reflections. Using carEQfi avoids complicated measurements, and is a plug-and-play improvement for every sound system.

Who needs crossovers?

The ideal loudspeaker is working Fullrange , that means, it can reproduce all frequencies with the same quality. A dream. This problem is usually solved dividing the audio spectrum into frequency ranges that fit specially designed speakers that are able to reproduce at least a certain part of it:
Woofers for low and tweeters for high frequencies. Together they are supposed to cover the whole spectrum then
But a tweeter is unable to reproduce low frequencies, as those have high energy and it will be immediately destroyed, and a woofer is unable to reproduce high frequencies above a certain limit due to it·s inertia, it simply is too slow.

So, a new problem is caused. We must try to feed the woofer and tweeter with only the frequency spectrum they easily can handle. Thus we use a crossover network , a frequency divider or separator called crossover.
That causes the third problem: Passive crossovers are used behind the amplifier and thus need big components to handle the amplifier·s output power.

Our more intelligent way is, to accomplish the separation of high and low frequencies BEFORE they pass the amplifier. This way the possibilities of correction and perfect matching in crease significantly.
This principle is called active mode , and we have re-defined it in our **F.A.C.T.fi** concept.
Just keep your speakers ! (...and activate them with F.A.C.T.fi F-3!)

Why active ?

Active crossovers offer many options to correct and positively influence the signal. So, you can increase the performance of your existing passive system enormously.

1. Passive crossovers cause rather high losses due to their high impedances compared to the output resistance of the amplifier. Even the good damping factor of a high quality amplifier that might be 200 will be reduced by the passive crossover·s losses to ridiculous 4,8 at the woofer and even a damping factor of 1000 will be reduced to 4,9 finally . and, by the way, 10.000 will also result in only around 4,9! The damping factor is the measure for the control of the amplifier on the connected speaker. Minimum requirement is >100

2. Damping factor is very expensive, save it and use **F.A.C.T.fi F-3**!

3. Passive crossovers never match the speakers sufficiently. Their component·s tolerances around +/- 10 20% successfully prevent that. Passive components like resistors, capacitors and inductors are only available in certain values and have to be used by compromise.

4. The Tweeter Level is only roughly adjustable in passive x-overs (commonly +3, 0, -3 dB) that·s more than coarse and far away from the needs or even fine-tuning .

5. The system·s phase relations are fully determined by chance depending on the mounting locations of the speakers, their distance and relative angles. That means that phase adjust of woofer and tweeter cannot be influenced at all using passive x-overs.

6. So called subwoofer- and midbass-crossovers cause the highest losses caused by component·s impedances and high energy.

The advantages of passive crossovers:

They are free and come with the speaker set.
Simple and comprehensive due to no-features .
No special knowledge required.
Quick installation.
An average result can be accomplished easily.

The advantages of **XETEC F.A.C.T.fi F-3**:

Every single speaker, woofer, tweeter, midbass, has it·s own amplifier.
No losses caused by passive components.
The amplifier·s damping factor can take full effect.
The crossover frequency, tweeter-, woofer- and system level can be adjusted continuously instead of coarse Steps.
Left and right tweeter can independently and individually adjusted in their phase. This is impossible using passive crossovers.

How to use **F.A.C.T.fi F-3**?

XETEC F.A.C.T.fi F-3 is a State-of-the-Art 2- or 3-way active crossover designed to be used together with high-quality speaker systems, and especially matches the **XETEC** Modular Speaker System.

F.A.C.T.fi means Full Active Crossover Technology and offers great improvement even to any existing speaker set.

The **F.A.C.T.fi F-3** features :

Active 2- oder 3-Way crossover with **XETEC F.A.C.T.fi** technology.
Inputs: 2ch RCA
Outputs: 2x Tweeter, 2x Woofer, 2x Bass (Midbass or Subwoofer!) RCA
Switch Mode Power Supply (SMPS)
Balanced inputs for optimal noise cancellation.
Optional Module slot inside for the unique and patented **XETEC carEQfi** equalization!
_ DIN size
Improved 12 dB Linkwitz-Riley characteristic with excellent linearity and very low distortion
Preamp /line driver function: Input 200 mV-6 V, Output max. 8 V
Dimensions: 178 x 122 x 25 mm

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