Technologies

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iPod Connectivity

Most Clarion USB port equipped source units now feature USB iPod Audio Direct. This allows you to connect your iPod to the source unit using the dock port to USB cable that Apple supplied with the unit. USB iPod Audio Direct provides you the opportunity to select a song as sorted by song title, artist, album, genre, composer or via a playlist.

Clarion's commitment to iPod connectivity continued on in 2009 with the implimentation of the new Apple iPod authentication chip incorporated into the CCUIPOD2. This chip allows for charging and video playback from latest generation of Apple iPods, including the Apple iPhones.

Virtually from the beginning of the Apple iPod reign, Clarion was at the forefront of iPod connectivity. By offering consumers GUI's mimicking those commonly found on their iPod on multimedia command stations with high speed song and playlist search capabilities. And the ability to utilize their existing Clarion CD source units dating back as far as 2001 with their iPod.

iPod Interfaces and Cables

Please refer to the iPod Book to confirm compatibility between the source unit, iPod

EA1251B (CeNET Black Box iPod Interface)

- Compatible with 2001-2006 CeNET Source Units
- Simulates the iPod as a 6-Disc CeNET CD changer
- Requires "Clarion" playlists to be created.
- Some source units with CD-Text function have the capability to show ID3 TAG information.
- Charges the iPod battery.

CCAiPOD (Advanced CeNET iPod Interface)

- Compatible with 2007 and 2008 Advanced iPod Interface Ready source units.
- Compatible with Marine source units: M455A, M475, CMD4A, CMD5
- Category direct access: Playlist, Artist, Album, Song, Genre, Composer
- Some source units with CD-Text function have the capability to show ID3 TAG information.
- Charges the iPod battery.

CCA723 (iPod Audio Control / Video Playback Interface Cable)

- Audio control and video playback with: VX509, VX709, VZ709, NX409, NZ409, NX509, FZ409, FZ709, VRX785BT, MAX685BT
- iPod GUI (graphical user interface) on-screen display
- On-screen display of: Podcast titles, Artist names, Album titles, Song titles, Genre names, Playlist titles, Composer names
- Touch-screen direct category access to: Playlist, Artist, Album, Song, Genre, Composer
- Video playback with compatible Apple iPods
- Charges the iPod battery.

CCUIPOD1 (iPod Audio Control / Video Playback Interface Cable)

- Audio control and video playback with: VZ309, VX409, VZ409, CMS1, VRX485VD, MAX385VD
- On-screen display of: Podcast titles, Artist names, Album titles, Song titles, Genre names, Playlist titles, Composer names
- Touch-screen direct category access to: Playlist, Artist, Album, Song, Genre, Composer
- Video playback with compatible Apple iPods
- Charges the iPod battery.

CCUIPOD2 (iPod Audio Control / Video Playback Interface Cable) ***Same Features as*** **CCUIPOD1**

- Features authentication chip for charging and video playback with the latest generation of iPods.
- Audio control and video playback with: VZ309, VX409, VZ409

2009 iPod Technologies

ABC Search

For 2009, Clarion introduces ABC Search to many of USB iPod audo direct source units. ABC Search allows you to quickly navigate all the music on your iPod using the alphabet. You can select a song title, artist, album name, genre, composer or playlist by selecting a letter of the alphabet. If you want to listen to Punk music, select the genre category and set the ABC search to the letter P. You will now be able to start selecting genres that begin with the letter P - Punk, Pop, etc.

Percent Search

Clarion introduces iPod Percent search on the NX509 and VZ509. This technology allows you to navigate through the music stored on your iPod by breaking it up into groups. Depending on the sorting category selection (song title, artist, playlist, etc.) you can move to the middle or end of the group by using percent search. This is another way Clarion makes navigating your iPod easier than ever.

Video Playback Control

The VRX785BT and MAX685BT offered iPod Video playback and control. This feature is advanced for 2009 to be included on the VX509, VX709, VZ709, NX409, NZ409, NX509, FZ409 and FZ709. You can choose from TV Shows, Video Podcasts, Movies and Music Videos and start and stop or select a different video, right from the source unit interface.

Unique to the FZ409 and FZ709, when combined with the CCA723 cable, you are provided with video control, even though there is no display on the source unit. An external monitor must be used and connected to the yellow video connection on the CCA723 cable.

Quick Access Category Selection

With iPod capacities exceeding 100MB and the ability to store more than 30,000 songs, having the ability get to your music quickly has never been more important. Clarion introduces Quick Access Category Selection to many of our USB equipped CD source units. The radio station preset buttons (1-6) have been assigned direct category access. Just hit one of them and the music on your iPod is instantly sorted by that choice.

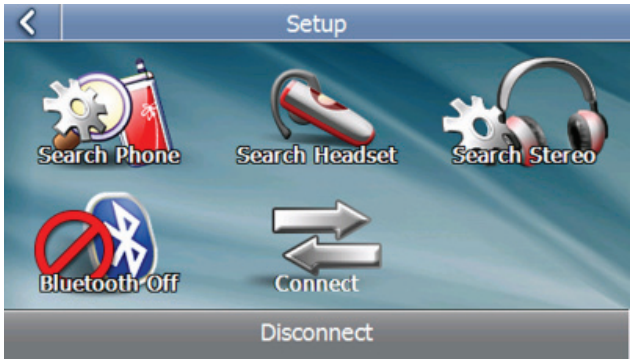
1 Playlists
2 Artists
3 Albums
4 Song Title
5 Genres
6 Composers

Technologies

Bluetooth Connectivity

In efforts to promote driver safety and the safety of others, Clarion offers several source units featuring a built-in Bluetooth interface and a universal Bluetooth transceiver. Aside from hands-free phone operation, they're also capable of Bluetooth audio streaming (A2DP) and audio/video remote control profiles (AVRCP).

Highlighting the product line up is the EZD580, a 4.3" portable navigation system. This portable navigation system allows Bluetooth operation anywhere life takes you. Whether in the car, home, office, or wandering the streets Bluetooth connectivity is right at your fingertips.



For the mobile entertainment enthusiast, Clarion offer two multimedia control stations with an integrated Bluetooth interface and six Bluetooth interface ready multimedia control stations.

In addition to those multimedia control stations, Clarion offers a mechless source unit (FZ709), a CD source unit (CZ509), and a double DIN CD source unit (CX609) featuring a built-in Bluetooth interface for handsfree phone operation. And for increased clarity an external microphone is included with each unit.

Rounding off Clarion's Bluetooth connectivity products is the BLT370, universal Bluetooth transceiver. The BLT370 can be interfaced with any source unit that features an auxiliary input or to an amplified speaker. When paired with a cell phone, the BLT370 has a dedicated wire to give commands to a "Bluetooth Ready" Clarion source unit to automatically swithch to an auxiliary input when placing or receiving a call. Additionally, it has a 2.5mm input for an optional audio device or microphone (mono).

There is no compromise for safety and that's why Clarion offers products with integrated Bluetooth connectivity and a universal Bluetooth transceiver compatible with any source unit.

Bluetooth Accessories

BLT370: Bluetooth Audio/Mobile Phone Transceiver

- Can be interfaced with any source unit with an auxiliary input.
- Bluetooth Audio Streaming (A2DP)
- Muting Circuit for Bluetooth ready Source Units
- 2.5mm auxiliary input for another audio device or microphone (mono)

RCB199: External Microphone for VX709, VZ709, VRX785BT and MAX685BT

- External uni-directional microphone cuts down much of the background noise.
- Integrated Visor Mount
- 3.5mm Mini-Jack
- 2.5mm to 3.5mm male adaptor included

Bluetooth Basics

Bluetooth wireless technology is a short-range communications technology intended to replace the cables connecting portable and/or fixed devices while maintaining high levels of security.

The Bluetooth specification defines a uniform structure for a wide range of devices to connect and communicate with each other.

Bluetooth technology has achieved global acceptance such that any Bluetooth enabled device, almost everywhere in the world, can connect to other Bluetooth enabled devices in proximity.

Bluetooth enabled electronic devices connect and communicate wirelessly through short-range, ad hoc networks known as piconets. Each device can simultaneously communicate with up to seven other devices within a single piconet. Each device can also belong to several piconets simultaneously. Piconets are established dynamically and automatically as Bluetooth enabled devices enter and leave radio proximity.

A fundamental Bluetooth wireless technology strength is the ability to simultaneously handle both data and voice transmissions. This enables users to enjoy variety of innovative solutions such as a hands-free headset for voice calls, printing and fax capabilities, and synchronizing PDA, laptop, and mobile phone applications to name a few.

Bluetooth Profiles

Advanced Audio Distribution Profile (A2DP)

A2DP describes how stereo quality audio can be streamed from a media source to a sink. A2DP defines the protocols and procedures that realize distribution of audio content of high quality in mono or stereo on ACL channels. The term “advanced audio”, therefore, should be distinguished from “Bluetooth audio”, which indicates distribution of narrow band voice on SCO channels as defined in the baseband specification.

Audio/Video Remote Control Profile (AVRCP)

AVRCP is designed to provide a standard interface to control TVs, hi-fi equipment, or other to allow a single remote control (or other device) to control all the A/V equipment that a user has access to. It may be used in concert with A2DP.

AVRCP defines how to control characteristics of streaming media. This includes pausing, stopping and starting playback and volume control as well as other types of remote control operations.

Hands-Free Profile (HFP)

HFP describes how a gateway device can be used to place and receive calls for a hand-free device. A typical configuration is an automobile using a mobile phone for a gateway device. In the car, the stereo is used for the phone audio and a microphone is installed in the car for sending outgoing audio. HFP is also used for a personal computer to act as a speakerphone for a mobile phone in a home or office environment.

Headset Profile (HSP)

The HSP describes how a Bluetooth enabled headset should communicate with a computer or other Bluetooth enabled device such as a mobile phone. When connected and configured, the headset can act as the remote device’s audio input and output interface.

Technologies

Object Exchange (OBEX)

OBEX is a transfer protocol that defines data objects and a communication protocol two devices can use to exchange those objects. OBEX is designed to enable devices supporting infrared communication to exchange a wide variety of data and commands in a resource-sensitive standardized fashion. The OBEX protocol also defines a folder-listing object, which is used to browse the contents of folders on remote device. OBEX enables applications to work over the Bluetooth technology protocol stack as well as the IrDA stack. For Bluetooth enabled devices, only connection-oriented OBEX is supported. Three application profiles have been developed using OBEX that include SYNC, FTP and OPP.

Object Push Profile (OPP)

OPP defines the roles of push server and push client. It is called push because the transfers are always instigated by the sender (client), not the receiver (server). OPP focuses on a narrow range of object formats to maximize interoperability. The most common acceptable format is the vCard. OPP may also be used for sending objects such as pictures or appointment details.

USB Connectivity

For 2009, USB connectivity continues to be the focal point in the development of eighteen multimedia and CD source units. USB connectivity enables easy music transportatoin and playback from your computer via USB Mass Storage Device (a.k.a. jump drives) or compatible music player to your Clarion source unit. In selected source units, it also provides USB iPod Direct Connect connectivity. Allowing iPod owners to connect their iPod using an USB cable with direct access to playlist, albums, artists, composers, or songs.

An additional advantage of Clarion USB ports is they're all powered. What does this mean? This means it can be used to recharge the battery of commonly used devices such as cellular phones, portable navigation units, iPods, and more through the USB port.

Many Clarion USB equipped source units also feature support for USB Digital Media Streaming from MTP (Media Transfer Protocol) devices. Support for USB MTP devices dramatically increases the number of compatible USB drives with Clarion source units.

USB Equipped Multimedia Source Units:
NX409, NX509, NZ409, VX709, VZ309, VZ409, VZ509, VZ709
USB Equipped CD Source Units:
CZ209, CZ309, CZ509, DUZ385SAT, CX609
USB Equipped Digital Media Source Units:

FZ409, FZ709
USB Equipped Marine Source Units:
M309, CMD6, CMV1, CMS1

USB Accessories:
CCAUSB: USB 2.0 Extension with Integrated Cover
- 1 Meter Cable with gold plated copper contacts providing maximum conductivity with minimal data loss.
- Requires ¾" hole for mounting

NOTE:
USB Mass Storage Class devices (a.k.a. jump drives) that require special software or contain software drivers may not be detected when connected to USB equipped source units. Check the manufacturer's specification before proceeding and try the combination before installing.

Auxiliary Inputs

For 2009, Clarion's multimedia, CD source units, mechless source units and Marine source units all feature an adjustable sensitivity auxiliary input. This eliminates the need for crude and inferior-quality FM modulation of an external audio source. These dedicated auxilliary inputs make connecting a Bluetooth interface, portable music player, satellite radio receiver, video game station, video player, or computer very simple. Merely connect a standard audio cable for the audio source into the auxiliary input on the source unit. Clarion even offers the CCUAUXEX1 3.5mm to 3.5mm stereo connecting cable.

To ensure excellent sound quality and matching of the audio levels through the various sources on head unit, Clarion has incorporated an auxiliary level sensitivity adjustment. This reduces variations in source volume while switching from the internal to an external audio source. In addition, it minimizes the audio clipping which can generate distortion and other unwanted noise.

Auxiliary Input Accessories:

CCAAUX: Female 3.5mm Stereo Mini-Jack to Male RCA Extension Cable with Integrated Cover
- 3.5mm Gold Plated Stereo Mini-Jack
- 1 Meter OFC RCA Cable with Gold Plated RCA Connectors
- Integrated Protective Cover
- Requires ¾" Hole for Mounting

CCUAUXEX1: 6' Male 3.5mm to 3.5mm Audio Cable
- 3.5mm Gold Plated Stereo Audio Cable
- Used to connect portable audio players to CCAAUX or front panel auxilliary input
- Requires ¾" Hole for Mounting

Multimedia Source Units
NX409, NX509, NZ409, VX409, VX709, VZ309, VZ409, VZ509, VZ709

CD Source Units
CZ109, CZ209, CZ309, CZ509, CX609, DUZ385SAT, FZ409, FZ709

Marine Source Units
M109, M309, CMD6, CMV1, CMS1
Note: The CMD6 and CMV1 feature dual rear Auxilliary inputs.

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OEM Remote Ready

With more and more vehicles featuring radio controls integrated in the steering wheel, it is more important than ever to offer aftermarket source units capable of interfacing with them. That's why Clarion offers a host of multimedia control stations and CD source units with the capability of adding a third party OEM steering wheel remote interface.

These third party interfaces utilize the key functions found on the steering wheel, such as volume, mute, seek, track, band, and source controls. By allowing the driver to control the primary functions of the source unit from the steering wheel, it minimizes distractions and removal of the hand from the steering wheel to adjust the source unit.

For additional information regarding OEM steering wheel interfaces, please visit: **www.pac-audio.com**, **keyword: SWI-JACK & SWI-CAN**

OEM Steering Wheel Remote Ready Multimedia Control Stations:

NX409	NX509	NZ409
VX409	VX709	VZ409
VZ509	VZ709	

OEM Steering Wheel Remote Ready CD Source Units:

CZ109	CZ209	CZ309
CZ509	CX609	DUZ385SAT

OEM Steering Wheel Remote Ready Mechless Source Units:

FZ409	FZ709

Phone Mute Input

Clarion source units feature a cellular phone muting circuit, which will attenuate the audio and pause a CD/DVD during playback while this circuit is activated.

In its normal function, when a (-) ground signal is applied to the brown wire in the radio harness, the radio will mute the audio output until the (-) ground signal is removed. This is designed to be used with cellular phone car kits.

For 2009, Clarion Bluetooth Ready source units feature a programming option that will, when enabled, switch the source unit to the auxiliary input when (-) ground is applied to the brown wire. This is for use with the BLT370 Bluetooth Interface.

In-Dash Navigation

Clarion is a world leader in the development of GPS Navigation systems, manufacturing OEM systems for the top car manufacturers in the world, including Porsche, Nissan, Infiniti, Volkswagen, Ford and more.

For 2009, Clarion offers three multimedia control stations wth built-in navigation and five navigation ready multimedia control stations. The NX409 (6.5" double DIN), NX509 (7" double DIN), and NZ409 (7" single DIN) all feature a built-in high speed 2GB flash memory navigation system. Each system contains over 12 million point of interest and various map viewing displays. In addition, text to speech street announcements, multiple route calculations, and different users modes. 3D Mapping available in select cites.

Rounding off Clarion's 2009 navigation ready multimedia control stations are the VX409 (6.5" double DIN), VX709 (7" double DIN), VZ409 (7" double DIN), VZ509 (7" single DIN), and VZ709 (7" single DIN). The VX709 and VZ709 are compatible with Clarion's already existing hard drive navigation systems, NAX970HD and NAX980HD and the new NP509 (black box navigation add-on system).

The NP509 offers the same navigation benefits as the NAX970HD/NAX980HD, but without having to connect to the vehicle's speed sense wire. The NP509 can be interfaced directly to the new VZ509 without any additional hardware. The VZ709/VX709 can also be interfaced with the NP509, but will require the CCB509 CeNET translator.

The NP509 in conjuction with a SA509 (Stand Alone Navigation Adaptation Kit) can be interfaced with the VX409, VZ409, or any monitor with a composite RCA video input. This provides a unique opportunity for RV and bus operators to view the navigation images on a larger screen. .

2-Zone Entertainment

Clarion offers four source units that offer 2-Zone Entertainment (NX509, VX709, VX709 and VZ509). This function allows front seat passengers to listen to one audio source while rear seat passengers can enjoy another through and overhead or headrest monitor with headphones.

The rear seat passengers can enjoy a DVD movie with the front seat passengers can listen to the Radio Tuner, iPod or Visual Input. Volume control over the 2-Zone output is performed by the headphones as the 2-Zone output is line-level.

Please review your source unit owner's manual for limitations pertaining to 2-Zone functionality with respect to specific accessories.

CCD Camera Input

The Clarion NX509, NX409, NZ409, VX709, VZ709, and VZ509 feature a dedicated CCD camera input jack on the rear of the source unit. When connected to the CK625E camera kit, the camera input will be triggered automatically when the vehicle is put in reverse. This makes backing up safe and secure.

A/V Inputs

This additional A/V input allows you to connect and external A/V source such as a video game system or camcorder to your multimedia source unit.

A/V Outputs

This allows you to connect the output of the internal DVD player, or Visual input to an external monitor. The A/V output features a line-level audio signal. The connected device must have its own volume control. Compatible devices include overhead or headrest monitors with wireless headphones.

Video Distribution

Any time a video signal is to be split and connected to multiple vide sources, the use of a proper electronic video distribution amplifier is required. The Clarion VA700 provides seven buffered video outputs from a single composite video input connection.

Using the VA700 will ensure that picture quality remains clear and sharp and the brightness and contrast levels are not altered. The use of Y-cables is not an option for splitting a composite video signal as the signal voltage determines the black level of the image, and will be altered when split.

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Compressed Media Formats

Transmitting audio and data via satellite spawned the need to various formats of media compression. These formats allow multiple signals to occupy the same bandwidth as an uncompressed signal. This increased efficiency, reduces cost and allows more data to be transmitted at higher speeds.

Clarion is at the forefront of compressed media file playback. For 2009, Clarion offers support for AAC, DiVX and MPEG compressed media files to our already extensive list.

WAVE Format

Wave (.wav) files are considered to be uncompressed. This is file format is used for the storage of 2-channel audio in digital form. The file is stored in PCM (Pulse Code Modulation) form and uses the standard 44,100 samples per second, 16 bits per sample times two channels. The resulting data rate is 1,411.2 kbps.

MP3 Format

MP3 files gained popularity due to their reduced file size. MP3 stands for MPEG-1 Audio Layer 3. MP3 files use perceptual encoding to reduce files sizes while limiting the effect on sound quality.

The MP3 standard allows for bitrates between 32 kbps and 320 kbps with sampling rates of 32, 44.1 and 48 kHz. A higher bitrate represents less compression and better (relative to the original) sound quality.

ID3 Tag Display

ID3 tags were created and inserted at the end of an MP3 file allow for the storage of metadata information such as song title, artist, album name, genre and year.

WMA Format

WMA (Windows Media Audio) is a compressed audio file format created by Microsoft. It is very similar in concept to MP3 files, but includes provisions for DRM (Digital Rights Management).

Microsoft originally claimed that WMA files had better sound quality than MP3 files recorded at the same bitrate. Subsequent double-blind testing have repeatedly confirmed that the file formats are very similar.

AAC Format

AAC (Advanced Audio Coding) is another lossy compression and encoding format for digital audio. The AAC format has been made popular as it is the standard format for the Apple iPod.

AAC offers more sample and bitrate options as compared to MP3 files. Sampling rates from 8 kHz to 96kHz are available) and up to 48 channels can be encoded.

AAC happens to the default audio codec used on the PlayStation 3, PSP, the Apple iTunes website and iPod products.

DivX

At the forefront of compressed video technology is the DivX codec. The latest version of this codec, called DivX 6 (or DivX Media Format) reduces the file size of digital movies while retaining support for multiple audio tracks, interactive menus, chapter points, multiple video streams and subtitles.

For 2009, the Clarion NX509, VX709, VZ709, and VZ509 support the DivX Media Format in its native form. Offering high quality, fully interactive movie playback. These units are fully DivX Certified.

CD Text

CD Text is an extension of the standard audio CD format and allows Album Name, Song Name and Artist information to be stored on a standard audio CD. Source units bearing the CD Text logo are capable of displaying this information from compatible discs. Not all store-bought CD's are encoded with CD Text information. Look for the CD Text logo on the packaging or disc to confirm proper encoding.

MPEG 1, 2 and 4

The Motion Picture Experts Group (MPEG) is a group that oversees the development of video and audio encoding standards. The various MPEG standards outline the capabilities of each compression format.

MPEG-1
This was the initial audio and video compression standard and later became the standard for the Video CD. It utilizes MP3 for the audio track.

MPEG-2
The is the standard format for audio and video broadcast for standard television. It is used for over-the-air broadcast, as well as Dish Network, digital cable and with some slight variations, on DVDs.

MPEG-4
This is an expansion of the MPEG-1 format and adds the ability to support audio/video objects, low bitrate encoding, 3D content and support for Digital Rights Management (DRM)

MP3 on DVD

Storing MP3 files on a DVD provides you with the ability to have days and days of music on hand,

Signal Processing

Clarion products remain at the forefront of sound quality and performance. Our source units have features that allows your mobile audio system to recreate sound that is closer to the original recording than ever before. These features include advanced signal restoration for compressed audio, digital equalization, advanced D/A converters and digital storage systems.

Clarion calls the concept of remaining true to the original audio recording Sound Genesis. This is at the heart of everything Clarion does.

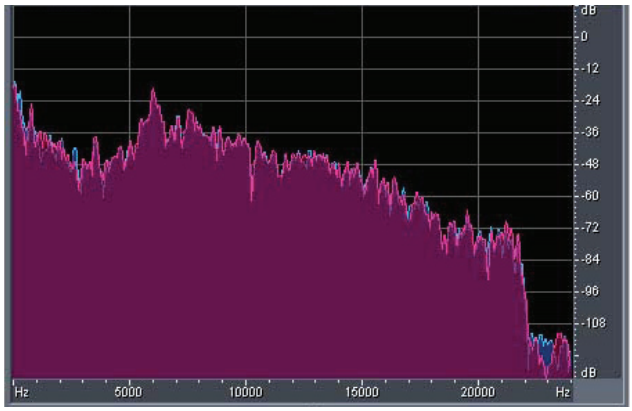
BBE MP

Compressed audio files allow a large amount of information to be stored in a small space. The drawback is that some of the audio information, particularly in the high frequency range is lost.

Clarion introduces BBE MP (Minimized Polynomial Non-Linear Saturation). This is an advanced audio processing technology that restores high frequency content to not only compressed media files (MP3, WMA and AAC), but to CD recordings as well. BBE MP can restore high frequency content all the way up to 24kHz through oversampling at 48kHz. Harmonic processing has been tailer to focus on off-ordered harmonics. This is similar to what makes vacuum-tube amplifiers sound warm and rich.

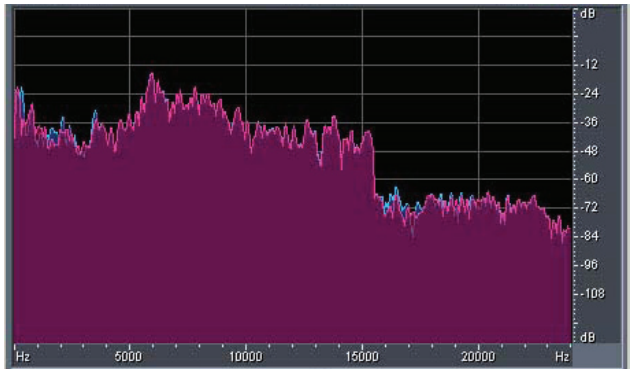
Here is a graphical example of how BBE MP processes audio data and restores high frequency information.

Audio Technologies

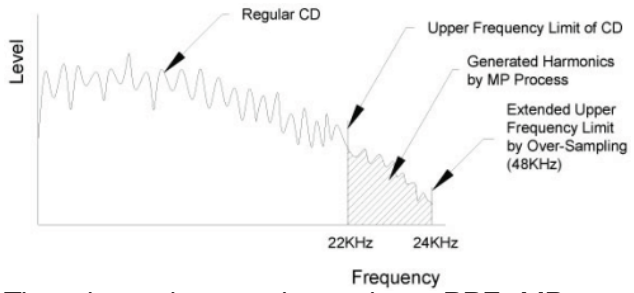


This above image shows a snapshot of the frequency response of a conventional audio CD (16-Bit, 22kHZ). You can clearly see that frequencies above 22kHz are rolled off.

The image above shows the same snapshot in time as the first image, but after the track has been compressed to a 128kbps MP3 File. There is no audio information above 16kHz.



This final image shows the exact same snapshot of time after the signal has been processed by BBE MP. You can see that high frequency content has been restored right out to 24kHz.



The above image shows how BBE MP can effectively process original CD quality recordings and add restore high frequency content that is lost due to the limitations of the CD format.

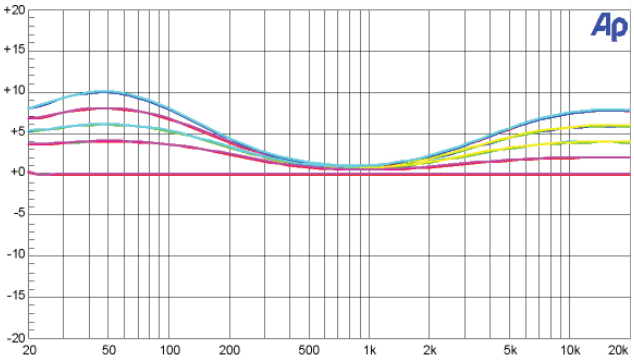
The best way to demonstrate BBE MP is to let your customers listen to an MP3 file on your display board and turn the BBE MP processing on and off.

BBE MP processing has four settings on Clarion source units - Off, Low, Mid and High. Depending on the quality of the source being listened to, you may need to adjust the BBE MP processing to achieve life-like sound.

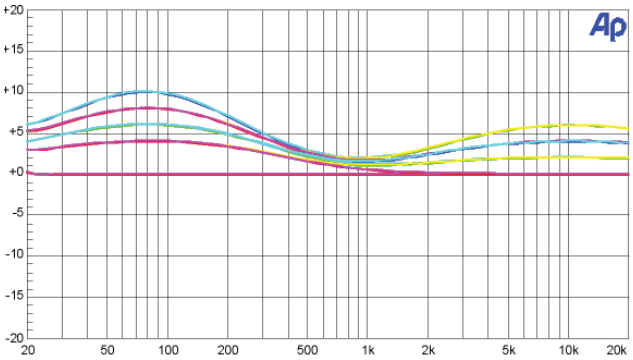
Z-Enhancer Plus

Making system tuning as easy as possible is one ning as easy as pushing a button.

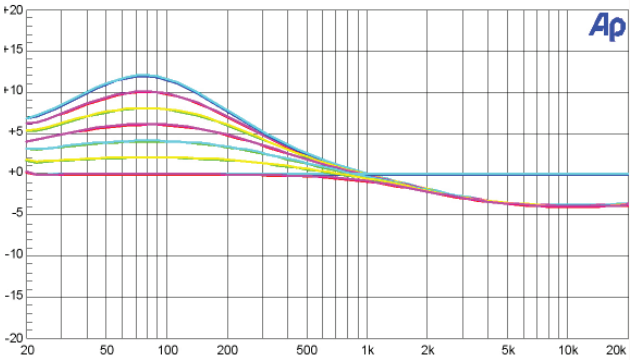
Z-Enhancer offers bass and treble equalization via three preset EQ curves, each curve is adjustable in effect level in seven steps from -3 to +3.



Excite - Emphasizes Bass and Treble while dempahsizing midrange



Impact - Emphasizes Bass and Treble

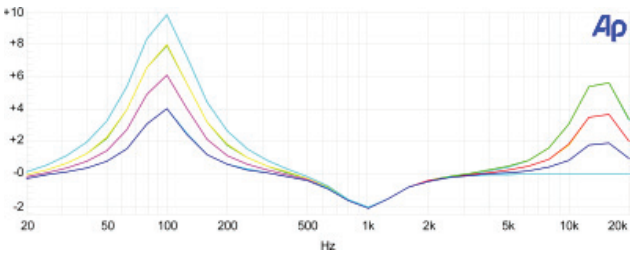


B-Boost - Emphasizes Bass

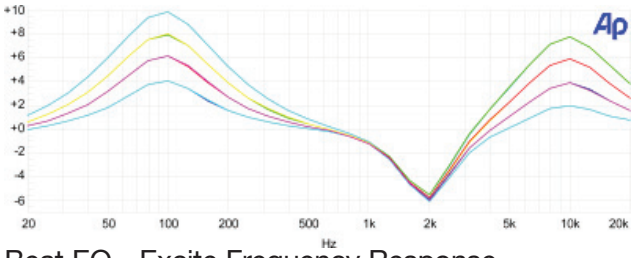
in the Custom Mode, you are given control over Bass Gain (-7 to +7), Bass frequency (60, 80, 100 or 200Hz) and Bass Q-Factor (1, 1.25, 1.5 or 2). For high frequency adjustment, you can adjust gain (-7 to +7) and center frequency (10, 12, 15 or 17.5kHz).

Beat EQ 3-Band Parametric Equalizer

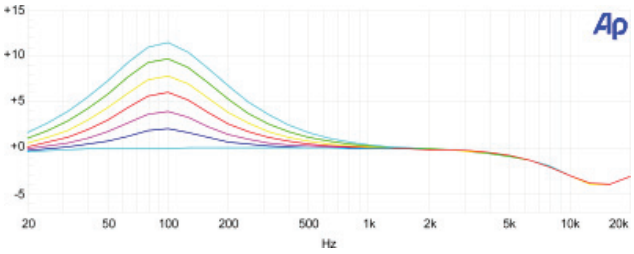
This advanced equalization system is found on the CZ509, FZ409, FZ709, VX709 and VZ709. Beat EQ has three preset frequency response curves - labelled as Impact, Excite and Bass Boost.



Beat EQ - Impact Frequency Response

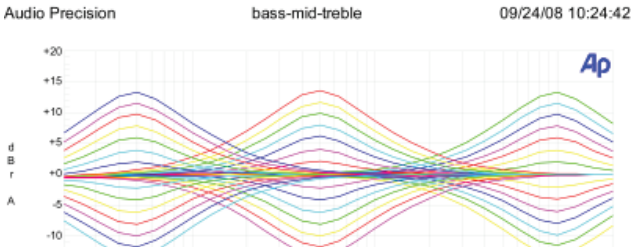


Beat EQ - Excite Frequency Response



Beat EQ - Bass Boost Frequency Response

Beat EQ also offers a custom preset. In this preset the wualizer allows you to adjust the bass, midrange and treble for Q-factor (bandwidth), Boost and Center Frequency.



Bass: Boost: -12 to +12dB
Q-Factor: 1, 1.25, 1.5 or 2
Frequency: 50, 100 or 200 Hz

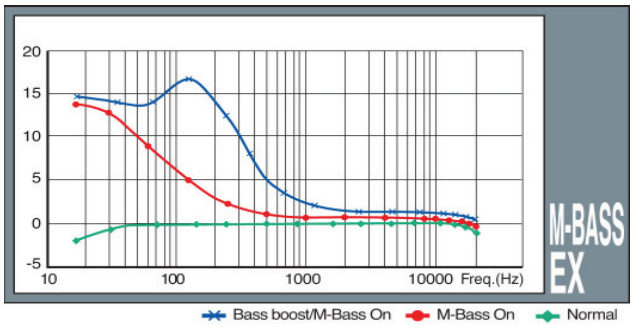
Mid: Boost: -12 to +12dB
Q-Factor: 1.5 or 2
Frequency: 700Hz, 1kHz or 2kHz

Bass: Boost: -12 to +12dB
Frequency: 8kHz or 12kHz

Magna Bass EX

Conventional loudness circuits boost bass frequencies around 100Hz. This results in a muddy over-boosted sound which is un-natural. Magna-Bass EX focuses the bass boost at 50Hz, adding warmth and richness to the sound. This 50Hz boost efffectively extends the frequency response of smaller speakers, making you system sound

larger and more capable. The result is dynamic bass performance that sounds real.



Electronic Crossovers

Electronic crossovers are designed to pass only a certain range of frequencies through a circuit. There are two types of eletronic crossovers: High-Pass and Low-Pass.

A High-Pass crossover will allow only those frequencies above (higher than) the crossover point to pass through. This type of crossover is used on tweeters to protect them from low and midrange frequencies and on midrange drivers to protect them from low frequencies.

A Low-Pass crossover will only allow those frequencies below (lower than) the crossover point to pass through. This type of crossover is used on subwoofers to keep midrange and high frequencies from being reproduced.

A combination of High- and Low-Pass crossovers may be used to fliter both and low frequencies passed to a device such as a midrange or mid-bass driver. This is called a Band-Pass crossover.

There are two important numbers to consider when considering a crossover - the cutoff frequency - fc and the crossover slope.

The crossover frequency determines the point at which the filter will start to work. For example, a High-Pass crossover set to 100Hz will attenuate the frequencies below 100Hz and pass frequencies above 100Hz.Crossover slope describes the rate at which the crossover attenuates those frequencies.

Speakers are designed to operate within a specific range of frequencies. Sending frequencies to a speaker that it was not designed to handle reduces its performance and could result in poor sound quality. For 2009, Clarion includes electronic Low-Pass and High-Pass crossovers on the CZ309, CZ509, FZ409, FZ709, CX609, NX509, VX709, and VZ709 source units.

The electronic crossovers found in Clarion source units not only affects the pre-amp outputs, but the signal being sent to the internal amplifier as well. This means you can use a high-power source unit to run your speakers, while an amplifier and subwoofer can handle low frequency output. Clarion electronic crossovers are all adjustable for frequency and are easy to implement.

The following chart outlines the crossover functionality in each unit.

Source	HPF Frequency	HPF Slope
CZ109		
CZ209		
CZ309	120Hz	12dB
CZ509	60/90/120Hz	12dB
FZ409	62/95/135Hz	12dB
FZ709	62/95/135Hz	12dB
CX609	50/80/120Hz	12dB
NX509	60/90/120Hz	12dB
VX709	50/80/120Hz	12dB
VZ709	50/80/120Hz	12dB

Source	LPF Frequency	LPF Slope
CZ109	Level Control	
CZ209	Level Control	
CZ309	50/80/120Hz	12dB
CZ509	60/90/120Hz	12dB
FZ409	55/85/120Hz	12dB
FZ709	55/85/120Hz	12dB
CX609	50/80/120Hz	12dB
NX509	60/90/120Hz	12dB
VX709	60/120/180Hz	12dB
VZ709	60/120/180Hz	12dB

D/A Converters

Converting digitally stored information (such as that found on a Compact Disc or DVD) back into an analog signal is the job of the D/A Converter.

The D/A converter reads each 16-bit word from the disc and assigns it an analog voltage. A conventional D/A Converter repeats this task 44,100 times a second.

The accuracy of the D/A Converter in terms of voltage and timing are a key component to determining the sound quality capabilities and noise output of the source unit.

1-Bit

A 1-Bit D/A converter works by comparing one bit of information to the one previous to it. If the new bit is higher than the previous one, it increases the output voltage. If the new bit is lower than the previous, then it decreases the output voltage. A filter on the output of the D/A Converter smoothes out the signal and the result a reproduction of the original audio waveform.

24-Bit

Clarion source units featuring our 24-Bit D/A converter bring new realism and detail to your music. 24-Bit D/A converters offer several benefits as compared to a conventional 1-Bit D/A converter. Primarily, a 24-Bit D/A converter significantly increases dynamic range capability, reduces quantization error and improves jitter. The result is music that sounds more realistic, especially in the high frequency range. Cymbals become clearer and more detailed. Ambience and room effects become more accurate. The entire listening experience takes a step forward in fidelity and authenticity.

This effect can be clearly heard on even the most basic of audio systems. Comparing one source unit to another, even when using four factory speakers will reveal a very significant improvement in performance.

Low Impedance Preamp Output

All Clarion preamp outputs feature low output impedance drive circuitry. Output impedance is most commonly looked at in terms of a resistance measurement, in the case of Clarion preamp outputs, this specification is ~330 Ohms.

This has several effects in terms of sound quality as compared to products that have high output impedances (1,000+ Ohms). More of the audio signal voltage is passed to the load device. The preamp is capable of driving lower impedance loads (necessary should RCA Y-cables be used). The audio signal is less succeptable to frequency response degradation caused by reactances in the RCA cables or the input stage of the amplifier or processor.

Many processors and amplifiers use DC blocking capacitors on their inputs. When a high-impedance source unit is connected to these loads, the bass and treble performance can suffer. Low impedance outputs result in flatter frequency response and more output from your amplifiers.

CD Operational Safeguards

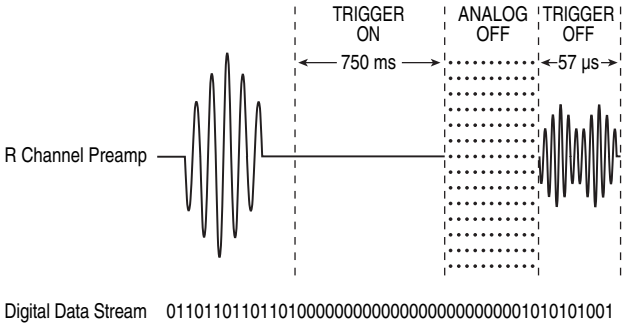
Clarion's CD operational safeguards allow the CD mechanism to detect disc size, prior disc-in-drive detection, foreign object detection, and allow for auto reload.Clarion's CD mechanism uses photosensors and LEDs to identify 3" or 5" compact discs. Clarion's CD mechanism uses a tapered roller to precisely center the CD onto the drive spindle.

A tapered loading-roller precisely centers the CD onto the drive spindle. Since the roller mechanism is tapered, only the edges of the CD are touched, thereby eliminating the possibility of scratches.

These operational safeguards allow safer CD disc handling, prevent jams from accidental loading of two CDs, and help to reduce service problems by detecting foreign objects in the drive mechanism.

Zero-Bit Detector Mute

Clarion CD Players feature a zero-bit detection mute circuit. This circuit turns off (mutes) both the line-level and speaker-level outputs when it does not see a digital signal for 750 milliseconds. Since a digital signal consists of “one” and “zero” bits, the zero-bit detector will turn off the analog audio input signal to the preamp section when it sees a series of zero bits. The purpose of this circuit is to eliminate tracking noise or background noise that is typically associated with the decoding of the digital signal to its final analog form.



The zero-bit detector mutes the preamplifier analog outputs after a series of zero bits exceeds 750-ms. Audio is restored after a period of one and zero bits is longer than 57 µs.

CEA-2006 Ratings

All new Clarion amplified products have been rated using the CEA-2006 specification. This specification was created to allow power production numbers to be compared between one brand and another without concern for measurement type.

The CEA-2006 specification states that power measured using this format will be constant through the entire specified audio bandwidth range. The power measurement will be taken with 14.4V being supplied and the distortion from the output signal can't exceed 1%.

Just as with the power ratings, Signal to Noise (S/N Ratio) measurements will follow similar guidelines. The S/N Ratio measurement will be taken at a power level of 1W into a 4 Ohm load. This means that all device measurements will be comparable, no matter how much power the product produces.

MOSFET Power IC

The MOSFET Power IC is smaller and more efficient than previous amplifier designs. MOSFET amplifiers are capable of producing more power because the output voltage can be switched closer to the rail voltage. In a head unit, with only 12V of power being supplied from the cars electrical system, this is critically important to maximizing amplification capabilities.

The solid horizontal lines denote the positive and negative amplifier power supply rail voltage.

The smaller sine wave shows the maximum undistorted output from a standard bipolar output transistor.

The larger sine wave shows the maximum undistorted output from a MOSFET output device.The net result - more voltage means more power.

Message Info

Personalization is always on our minds - we want the right clothes, the right car and the right music to match our personal style. Clarion knows this, and has included the Message Info option as one of the screen savers on our source units. Users can enter a message, up to 30 characters in length, and have it scroll across the screen.

Instant Station Recall (ISR)

Getting to where you want to go should always be as easy as simply pressing a button. When it comes to your favorite radio station, ISR has you covered. Tune in your favorite radio station, then press and hold the ISR button. You can choose AM or FM - it doesn't care. Now, any time you want, no matter what source you are listening to, a simple tap of the ISR will return you the programmed radio station.

This is a great feature to use on all-news radio stations when you want up-to-the-minute traffic reports.

Key Off Eject

Have you ever forgotten to bring your favorite CD into the house after arriving home from a trip. With Clarion's Key Off Eject feature - the disc eject function works, even when the ignition isn't turned on. Press eject and the disc pops out.

Last Position Memory

As CD players started to become popular, many people started to experience inherent drawbacks of this random access storage media. With a cassette tape - it stays where you left it when you shut off the power. Then, when you turn it back on, playback resumes from that same point. With Clarion's Last Position Memory - the same is true for your CD player. Turn the car off, do your shopping, then get back in. Your music picks up where you left off.

Amp Canceller

Taking your audio system to the next level often involves the installation of one or more external amplifiers. If your entire system is being powered by external amplifiers, simply enable the Amp Canceller feature on your head unit. When Amp Canceller is engaged, power to the internal amplifier IC is turned off. This reduces the current draw of the source unit and improves its sonic performance.

High Resolution LCD Displays

All Clarion LCD display screens use the latest in active matrix technology to give you the brightest, most detailed image available. Thin Film Transistors (TFT) are attached to each RGB, (red/green/blue) pixel to provide more control over the color being reproduced. This method helps reduce display “white-wash” associated with a conventional passive-matrix screen, and helps to ensure optimal picture quality.

By employing a “striped pixel configuration” to align RGB pixels into columns, we can use more pixels to enhance details and provide better color definition. Having the controls for brightness on the front panel allows easy adjustment of picture quality.

LCD Display Resolution

Clarions in-dash 7" LCD displays feature a screen resolution of 1440 x 234 pixels for a total of 336,960 pixels. Some companies try and confuse you by describing the number of picture elements - each of the red, green and blue picture elements. By their standards, these units would have 1,010,880 picture elements. When comparing video displays, make sure the specifications you are comparing are using the same format.

HMI Concept

Clarion has long been considered the industry leader in the development and implementation of advanced Human Machine Interface designs and concepts. Back in 2006, Clarion took the HMI concept to the next level and made it the focus of the companies products. HMI refers to the interaction, interconnection and interdependance of man, music and machine - all while being easy to use.

Capacitive Touch Interface

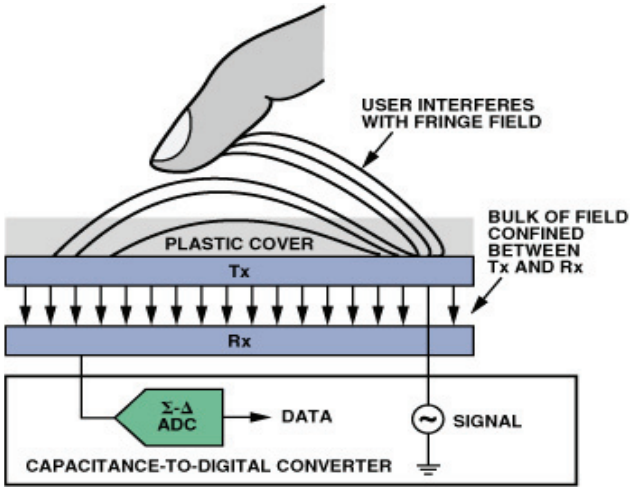
In 2004, Clarion introduced a truely innovative concept to the head unit category, a head unit with no buttons! The DXZ945MP proved to be ahead of its time, but its acceptance was huge. It offered a large monochromatic display with in touch sensitive "bean"-shape for navigation through the functionality of the head unit. With a simple swipe of the finger, you can scroll through radio preset stations, change system settings, or randomize the tracks on a CD.

Now, in 2009, Clarion felt it was time to introduce another revolutionary concept to the masses, the FZ409 and FZ709 and the new Capacitive Touch Interface. These sleek looking source units feature a smooth control panel with illuminated capacitive sensor button areas. This is an example of the intuitive H.M.I. design that minimizes the number of moving parts while maximizing functionality. Since only relevant button icons appear for the

task at hand, button-hunting is eliminated and access is more direct and responsive.

How does Capacitive Touch Interface work? Behind the fixed plastic escutcheon are two plates, one is a transmitter and the other is a receiver. The plates are designed in the shape of the 'button area'. A high frequency capacitive field is generated between the two plates and a capacitance to digital converter records the strength of the field on the receiving plate. When your fingers moves into the fringe capacitive field that leaks outside of the top plastic layer, this changes the strength of the field on the receiving layer. The Capacitance to Digital converter can sense this and sends a signal to the source units mircocontroller, which then interprets that as a 'button' push and responds in accord.

What are the benefits of the Capacitive Touch Interface? There are two primary functionality benefits. Capacitive Touch "buttons" have no moving parts. This means that they are resistant to failure. Also, with no moving parts, there is no way for contaminants to infiltrate the system and cause a malfunction. This can be anything from dust or cleaning solutions to an X-Large Double-Double from Timmies or a Venti Caramel Machiado from Starbucks. A tertiary benfit is that the designers at Clarion have been given carte-blanche to create a unique and modern cosmetic design on the FZ409 and FZ709.



728 Color Illumination

Intergration with your car means more than simply connecting to your speaker wires - it includes control and cosmetics. Clarions 728 color illumination allows you to match the radio illumination to the factory illumination in your car. Not only does this mean your radio sounds better than the one that came from the factory, but now it looks better too!

728 Color illumination can be found on the CX609, a 2-DIN Bluetooth CD/USB/MP3/WMA/AAC Receiver with CeNET control.

Touch Panel Operation

Ease of use and intuitive operation are behind our LCD touch panel operation - found on the NX509, NX409, NZ409, VX709, VZ709, FZ409, and FZ709. Source selection and control, setup menus and more are accessible by a simple touch of your finger.

Add to that the ability to navigate through DVD on-screen menus by simply touching the menu item, and using your multimedia source unit is as easy as can be.

Dimmer Input

Safety comes in many forms - but being able to concentrate on your driving is a fundamental part of the HMI concept. Driving at night adds an additional level of complexity. To make it as easy as possible, Clarion includes a dimmer input wire on many of our source units. When connected to the factory dash illumination circuit, a signal on this wire causes the deck to reduce the brightness of the radio display, preventing it from being a distraction. Safety in the form of simplicity.

ISO Mount Capability

A product designed for easy installation makes sense, not only for the staff performing the installation, but for the end user as well. When a radio looks like it belongs in the dash, all the experiences surrounding its operation just seem better.

Clarion 1-DIN source units are capable of being isntalled in ISO Mount Fashion. This means, no trim ring is required to install the radio or to have its detachable control panel function properly and be removeable. ISO mounting typically means that factory style brackets are to be used. Clarion source units feature industry standard mounting holes on the side of the radio that align perfectly with these brackets. This reduces installation time and improves the look of the final product. Many new install kits make use of this ISO mounting technique, allowing radios to be installed so they look like they belong.