

# Intravee II PXA Supplement

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# 1. Introduction

This document describes the Intravee interface when used with the Alpine PXA-H100 IMPRINT audio processor, some features are also available with the PXA-H700, PXA-H701 and PXA-H800 processors.

When a PXA-H100 is connected to the Intravee, the Intravee will emulate the BMW DSP amplifier and provide simple control via the BMW DSP amplifier menu. More comprehensive setup is performed through the Intravee on screen menus.

When a BMW radio detects the presence of the DSP amplifier it will switch into DSP mode. In DSP mode the output level of the radio is fixed at a high value, the tone characteristics are set to flat and balance and fader are fixed in the centre position. The BMW DSP amplifier, and the Intravee + PXA-H100, become responsible for changes to volume, tone, balance and fader. Using the BMW radio in this mode provides a higher quality signal with lower noise floor then using a fixed output stage and variable input.

The settings of the standard Balance and Fader sliders on the BMW Tone menu are automatically redirected to the PXA-H100. Treble and Bass settings are automatically redirected to the PXA-H100 when an Imprint Curve has been selected, in this mode most other settings on the PXA-H100 are disabled. When no Imprint Curve has been selected the Treble and Bass sliders will have no effect.

When using the Intravee, PXA-H100 and a BMW hands free phone or Voice Recognition system, the Intravee stores two volume levels. One volume level is used for regular audio, the second volume level is used only while the hands free phone or Voice Recognition prompts are active. You can only adjust the volume of the setting that is currently active.

## 2. Connections

Connections to the PXA-H100 are a little more complex than other AI-Net components that are connected to the Intravee. The PXA-H100 only has audio inputs on both AI-Net ports, in order to enable audio from all sources and control via the Intravee, a special AI-Net connection is required.

Intravee can supply a special AI-Net breakout box that will allow plug and play connection of the PXA-H100 to the Intravee, you will also require a line level output from the BMW radio module. We would recommend using a line level converter from the front speakers of the radio although it is possible to use the pre-amplifier outputs inside the radio module. The AI-Net breakout box has three AI-Net ports and a pair of RCA line level inputs.

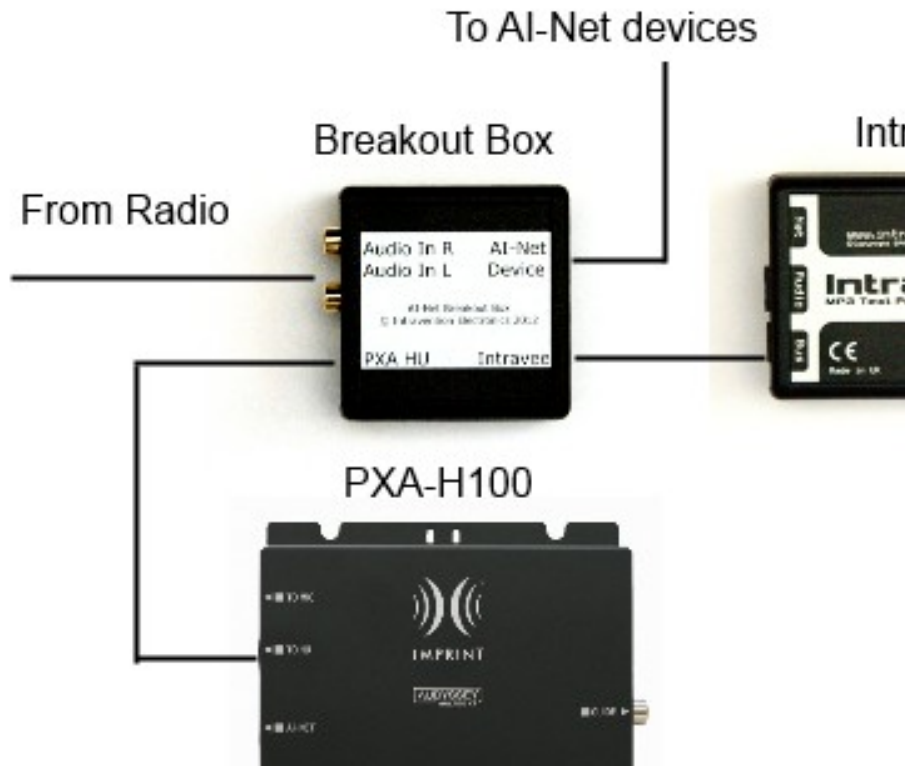
There are two ways that the H100 can be connected to the Intravee and other AI-Net devices, the connection mechanism you decide upon depends on the radio module type, the absolute quality level you require and how important Navigation Audio commands are to you.

### 2.1. All Audio through the Head Unit AI-Net port

In this mode all audio goes into the radio module, from various standard sources, then comes out and into the Head Unit AI-Net port on the PXA-H100.

With this configuration, which is the default, one AI-Net port connects to the Intravee, the second to the regular AI-Net devices (CD Changer, iPod, Tuner etc.), the third connects to the Head Unit AI-Net connection on the PXA-H100.

**Figure 1 All Audio Through Radio**



This connection mechanism can only be used with the BM53 and BM54 radio modules, it has the advantage that all audio is controlled by the radio, thus Nav commands can be mixed with the audio from any source, as they would be without the PXA-H100.

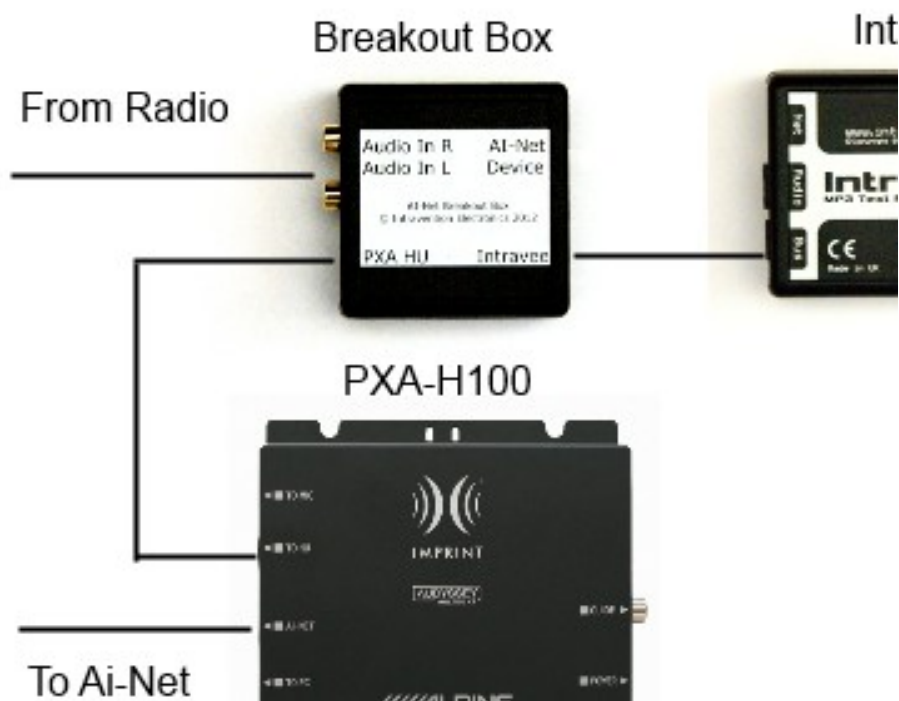
The disadvantage is that, as all audio goes through the radio module, there is more opportunity for the audio to be degraded.

## 2.2. Direct AI-Net connection of AI-Net devices

In this mode audio from all sources except AI-Net sources come from the radio. AI-Net sources bypass the radio and connect directly to the AI-Net port on the PXA-H100

In this setup one AI-Net port connects to the Intravee, the second AI-Net port is unused and the third connects to the Head Unit AI-Net connection on the PXA-H100. The AI-Net connector that would normally connect to the Intravee is connected directly to the AI-Net port on the PXA-H100.

**Figure 2 Direct AI-Net Connection**



This connection mechanism can be used with any radio module, it has the advantage that the Intravee audio is sent directly to the PXA-H100 for maximum quality. However Nav commands issued when the Intravee is the selected source cannot be heard.

This type of connection must be used when a radio module other than the BM53 or BM54 is used, for example C43 or BM24.

When using the direct AI-Net connection the Intravee must switch the audio input of the PXA-H100 between the HU and AI-Net ports, to do this use the PXA Direct menu option, see below, or the console command

pss on

to disable processor source switching, issue the command

pss off

When issuing the pss off command, make sure that the Intravee source is NOT selected, otherwise the input will be set to the AI-Net port and no radio audio will be heard.

### 3. BMW DSP Menu Interface

When the Intravee detects the existence of a PXA-H100 device it will automatically emulate the BMW DSP amplifier. When the Nav computer detects the BMW DSP amplifier it will add the DSP option to the main menu.

**Figure 3 Main Menu with DSP option**



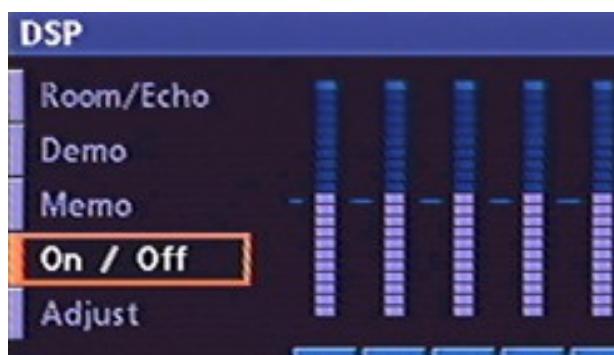
From the DSP menu it is possible to change some of the 'every day' settings of the PXA-H100. Parameters that may be changed through the DSP menu are

- Defeat Mode
- Media Expander Level
- Preset Selection
- Equaliser band adjustment

Some of the Alpine processor functions do not map exactly to the BMW DSP menu options, the following section describes how the BMW DSP controls are used.

### 3.1. Defeat Mode

**Figure 4 DSP On/Off Option**



Use the On/Off setting on the BMW DSP amplifier menu to enable or disable Defeat mode.

### 3.2. Preset Selection

**Figure 5 DSP Presets**



PXA-H100 presets can be selected using the DSP 'Memo' menu. Six presets can be selected, they are mapped as follows:

DSP Preset Name	Processor Preset
Concert Hall	Pops
Jazz Club	Jazz & Blues
Cathedral	Classical
Memo 1	User 4
Memo 2	User 5
Memo 3	User 6

Other presets can be selected from the Intravee “Eq Presets” menu.

### 3.3. Equaliser Band Adjustment

**Figure 6 DSP Equaliser Adjustment**



When the Memo 1, Memo 2 or Memo 3 preset has been selected the frequency response curve of the preset can be adjusted.

In Graphical Eq mode the sliders correspond to the levels of the PXA-H100 equaliser. In Parametric mode the 80Hz band is used to adjust the Sub level, the 200 Hz band is not used and the 500Hz through 12KHz bands adjust the 5 Parametric band levels.

In Graphical mode the frequencies of the PXA-H100 do not match the BMW DSP frequencies exactly, but they are quite close. The frequencies are mapped in the following way.

DSP Frequency Slider	PXA-H100 Frequency
80	63 Hz
200	150 Hz
500	400 Hz
1K	1 KHz
2K	2.5 KHz
5K	6.3 KHz
12K	17.5 KHz

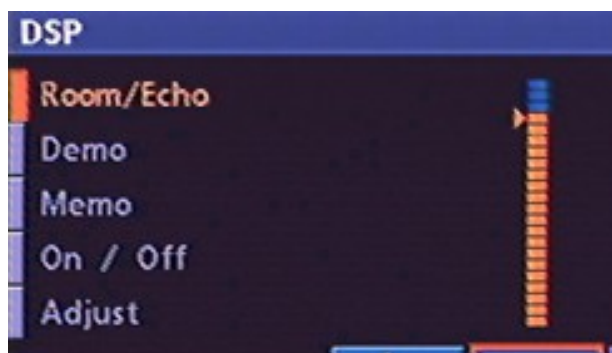
The DSP sliders have an adjustment range of +/- 10, the PXA-H100 has an adjustment range of +/- 6dB. The top 4 and bottom 4 positions of the DSP sliders will have no effect, the PXA-H100 level for that band will be set at +/-6dB accordingly.

### 3.4. Media Expander

When the Memo 1, Memo 2 or Memo 3 preset has been selected the Media Expander level may be set using the “Room” slider on the “Room/Echo” menu.



**Figure 7 Room Slider**



The Media Expander has 4 values, Off and 1-3, the Room slider has 7 positions. The bottom position of the Room slider is mapped to 'Off', each 2 increments on the Room slider then equate to a single increment in the Media Expander level. The mapping can be summarised in the table below.

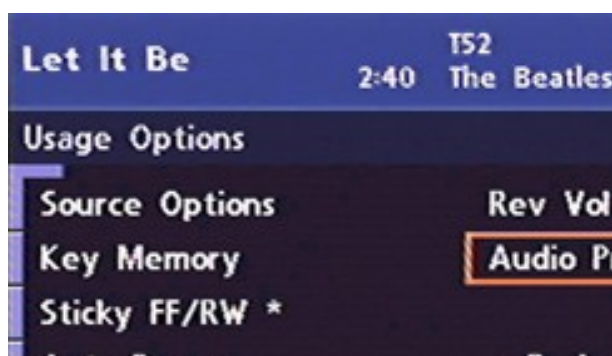
Room Slider Setting	Media Expander Level
0-1	Off
2-3	1
4-5	2
6-7	3

The 'Echo' slider has no effect.

## 4. Intravee Setup Menu

The Intravee Audio Processor menus are used to configure the PXA-H100 installation with various adjustments that are normally not changed once setup. The Audio Processor menu can only be accessed when the Intravee is the selected source and is not available when, for example the radio or built in CD drive is selected.

**Figure 8 Audio Processor option on the Usage Options menu**



When the PXA-H100 is detected the 'Audio Processor' menu option will appear in the 'Settings' 'Usage Options' menu.

In addition to the Audio Processor menu, the option 'PXA Direct' will be added to the 'Source Options' menu.

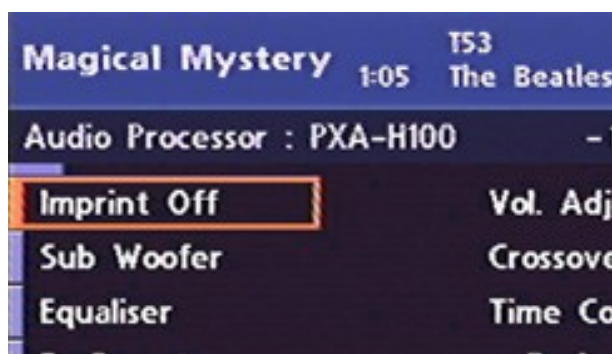
**Figure 9 Source Options menu with Audio Processor**



The PXA Direct option enables direct connection of the AI-Net devices normally connected to the Intravee to the AI-Net port on the PXA processor.

## 4.1. Audio Processor Menu

**Figure 10 Audio Processor menu**



The Audio Processor menu enables configuration of the PXA-H100 settings that are not generally used on a day to day bases.

### 4.1.1. Imprint Setting

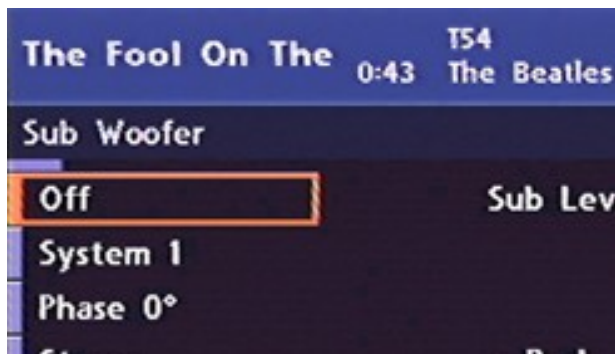
Clicking the Imprint menu option will toggle through the available 'Curves' that are set in the PXA-H100. Curves can be saved using the Alpine Imprint software and the KTX-H100 Imprint microphone. The PXA-H100 supports 2 Curves, Curve 1 and Curve 2, only Curves that have been saved can be selected, if the PXA-H100 has never been connected to the KTX-H100 then only the 'Imprint Off' setting will be available.

When Imprint is Off all other settings are available, however Bass and Treble cannot be adjusted from the 'Tone' menu.

When Curve 1 or Curve 2 is selected, most options are not active but Bass and Treble can be adjusted from the 'Tone' menu.

## 4.1.2. Sub Woofer Configuration

**Figure 11 Sub-Woofer menu On/Off**



The Sub-Woofer can be switched on or off completely.

### System

Two Sub-Woofer volume control mechanisms are available:

#### System 1

The Volume level of the Sub-Woofer changes with the main volume level.

#### System 2

The Volume level of the Sub-Woofer changes at a slightly different rate to the main volume. At low volumes the Sub-Woofer level is higher than the main volume level.

### Phase

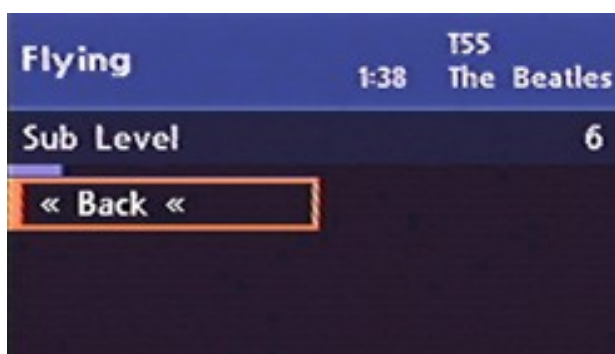
The Sub-Woofer phase can be set to 0° (in phase) or 180° (out of phase) with the main speakers.

### Channel Mode

The Sub-Woofer outputs can be set to Stereo or Mono. If you have only one Sub-Woofer input then the Mono setting should be used, otherwise use the Stereo mode.

### Sub-Woofer level

**Figure 12 Sub Woofer Level menu**



The level of the Sub-Woofer can be adjusted between 0 (almost off) and 15 (maximum).

### 4.1.3. Crossover Configuration

The PXA-H100 supports two crossover modes

#### Front/Rear/SubW Crossover mode

Figure 13 Crossover menu Front/Rear/SubW mode



In Front/Rear/SubW mode the PXA-H100 adjusts three crossover bands:

- Low Pass filter for the subwoofer.
- High pass filter for the front channel.
- High pass filter for the rear channel.

#### 3-Way Crossover mode

Figure 14 Crossover menu 3-Way mode



In 3-Way crossover mode the PXA-H100 adjusts four crossover bands:

- Low pass filter for the subwoofer.
- High pass filter for the low range of the Mid channel.
- Low pass filter for the high range of the Mid channel.
- High pass filter for the High channel.

Figure 15 Crossover configuration menu



The Crossover configuration menu is similar for each crossover band. If the 'L/R Linked' option on the Crossover menu is selected then both Left and Right channels are configured together. If the 'L/R Separate' option is selected then Left and Right channels are configured independently.

**Figure 16 Crossover Level menu**



The level for each channel may be adjusted between 0dB through -12dB. In 3-Way mode the level for the Mid-L and Mid-H channel are shared, they can not be set to different values.

**Figure 17 Crossover Frequency menu**



The values available for selection depend on the band and crossover mode of the PXA-H100.

For the Sub Band, Front Band and Rear Band the available frequencies are:

20Hz, 25Hz, 31.5Hz, 40Hz, 50Hz, 63Hz, 80Hz, 100Hz, 125Hz, 160Hz, 200Hz.

For the Mid-H Band the available frequencies are

80Hz, 100Hz, 125Hz, 160Hz, 200Hz, 250Hz, 315Hz, 400Hz, 500Hz, 630Hz, 800Hz, 1.0KHz, 1.2KHz, 1.6KHz, 2.0KHz, 2.5KHz, 3.2KHz, 4.0KHz, 5.0KHz, 6.3KHz, 8.0KHz, 10KHz, 12.5KHz, 16KHz, 20KHz.

For the High Band the available frequencies are

1KHz, 1.2KHz, 1.6KHz, 2.0KHz, 2.5KHz, 3.2KHz, 4.0KHz, 5.0KHz, 6.3KHz, 8.0KHz, 10KHz, 12.5KHz, 16KHz, 20KHz.

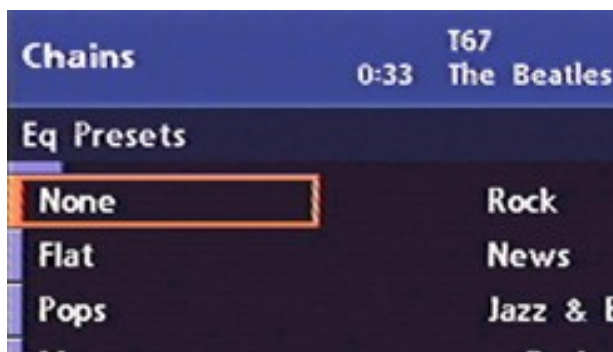
**Figure 18 Crossover Slope menu**



The crossover slope can be adjusted from Flat to 24dB per Octave in 6dB per Octave steps. For the High channel the slope must be at least 6dB per Octave to protect the tweeters from high power low frequencies.

#### 4.1.4. Equaliser Presets

Figure 19 Equaliser Presets 1 menu



The first Equaliser presets menu allows selection of the Flat, Pops, Rock, News and Jazz & Blues presets. To select the next set of presets use the 'More >>' option.

Figure 20 Equaliser Presets 2 menu



The second Equaliser presets menu allows selection of the Elec & Dance, Hip Hop & Rap, Easy Listening, Country and Classical presets. To select the next set of presets use the 'More >>' option.

Figure 21 Equaliser User Presets menu

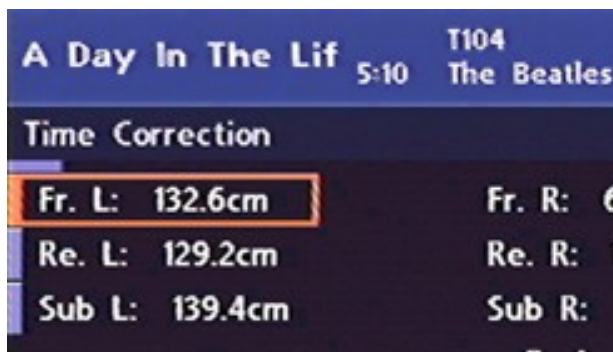


The third Equaliser presets menu allows selection of the 6 User presets. A short press on a User preset selects that preset, a long press saves the current settings in that preset. User 4, 5 and 6 can also be saved from the BMW DSP menu in Memo 1, Memo 2 and Memo 3.



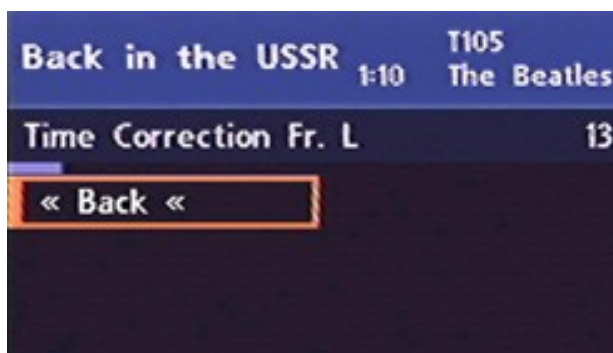
#### 4.1.5. Time Correction Settings

Figure 22 Time Correction menu



The Time Correction menu displays the current distance settings for each of the 6 channels supported by the PXA-H100 and allows you to enter the Time Correction setting menu for each speaker by clicking on the option.

Figure 23 Time Correction setting menu



Set the distance for the selected speaker, this will adjust the time delay and help give the correct sound stage location.

#### 4.1.6. Volume Adjustment

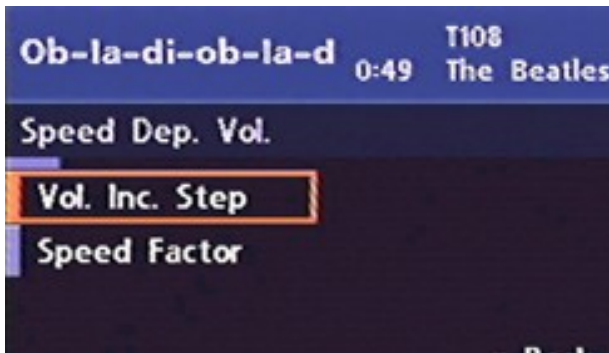
Figure 24 Volume Adjustment menu



The Intravee provides some automatic control over the volume level which replaces the standard volume level adjustments set via BMW menus.

## Speed Dependent Volume

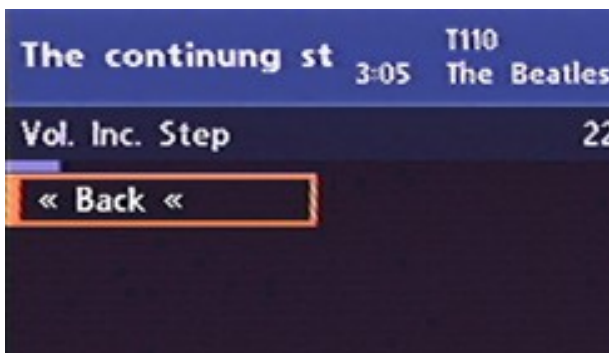
Figure 25 Speed Dependent Volume setting menu



The volume setting can be set to change as the vehicle speed changes. There are two components to the volume change, a linear component which sets the speed increment, in mph or kph, that is required to increase the volume by one step, and a non-linear offset. The non-linear offset is used to increase or decrease the rate at which the change occurs as the vehicle speed increases.

### Volume Increase Step

Figure 26 Volume Increase Step menu



The volume increase step can be adjusted in steps of 2kph from 6-60kph (3-37mph), or set to off for no speed dependent volume change. The volume increase step is linear as the vehicle speed increases.

### Speed Factor

Figure 27 Speed Factor menu

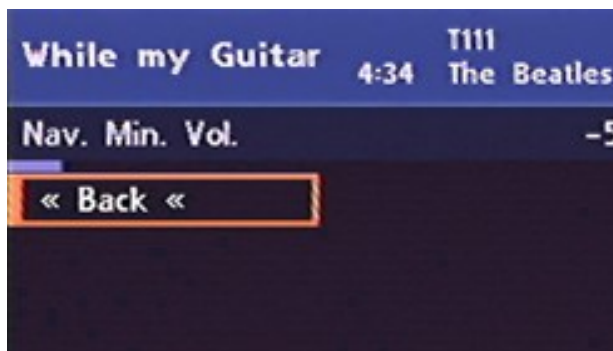


The speed factor value provides a non-linear component to the speed dependent volume control. A value of 0.0 will give a linear volume increment. A negative value will cause the volume to increase more slowly as the speed increases. A positive value will cause the volume to increase more quickly as the speed increases.



## Minimum Nav Command Volume

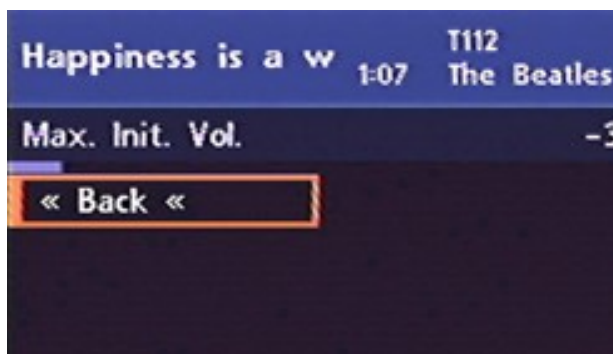
Figure 28 Minimum Nav Volume menu



The minimum volume when a Nav command is given can be set. If the volume of the radio is set to less than this value when a Nav command is issued, the volume will be temporarily increased to the set value. When the command has finished the previous volume level will be restored. If the current volume level is already greater than the set minimum, no change will be made.

## Maximum Initial Volume

Figure 29 Max Initial Volume menu

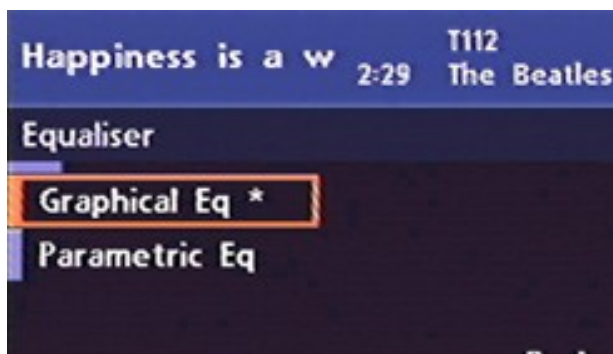


The maximum power up volume can be set. If the PXA was shut down with a volume higher than the set value then the volume will be reduced to the set value.

### 4.1.7. Equaliser

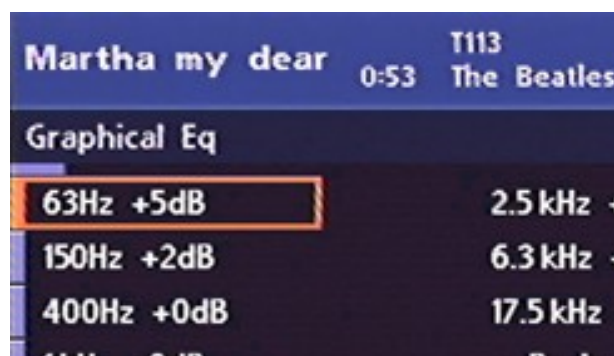
As well as being controlled from the BMW DSP menu, the Intravee menus can be used to control the Equaliser parameters directly.

Figure 30 Equaliser menu



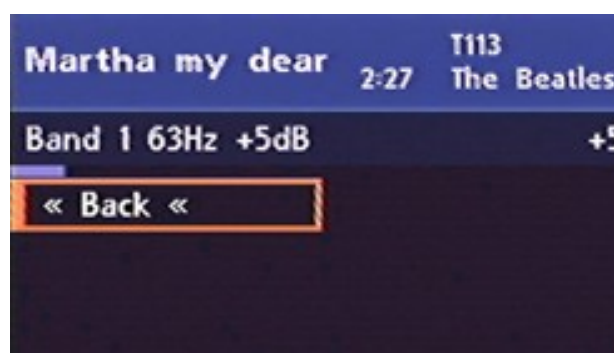
Both Graphical and Parametric mode Equaliser parameters can be adjusted. The currently selected Equaliser mode is indicated by a \* to the right of the Equaliser mode menu.

**Figure 31 Graphical Equaliser menu**



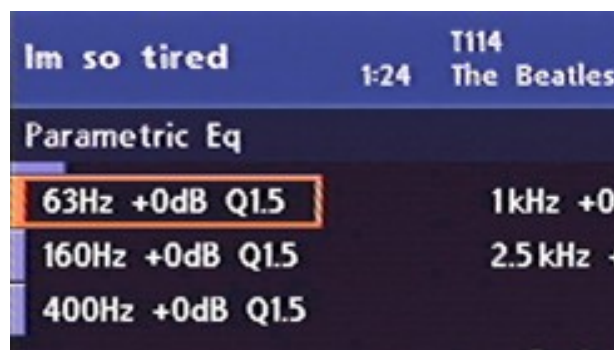
The Graphical Equaliser menu shows frequency of the 7 bands together with their current levels. Clicking on a band allows adjustment of the level of that band.

**Figure 32 Graphical Equaliser Level menu**



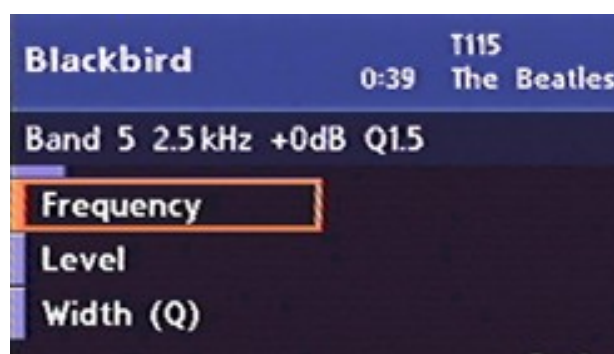
The level of each band can be adjusted using the rotary controller between -6dB and +6dB.

**Figure 33 Parametric Equaliser menu**



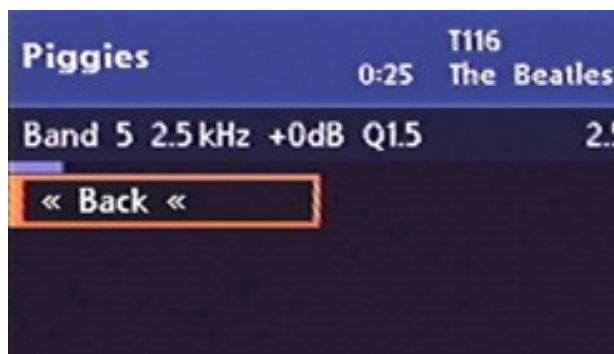
The Parametric Equaliser menu displays the frequency, level and Q value for each of the 5 bands. Selecting the band displays a menu from where the parameters of the band can be adjusted.

**Figure 34 Parametric Equaliser Band Parameters menu**



The Parametric Equaliser band parameters menu shows the band parameter summary in the header and options for adjusting the frequency, level and width (Q) of the band.

**Figure 35 Parametric Equaliser Frequency menu**



The frequency of each band may be adjusted using the rotary controller, the available frequencies depends on the band and the relative values of the adjacent bands. The range of each band is as follows:

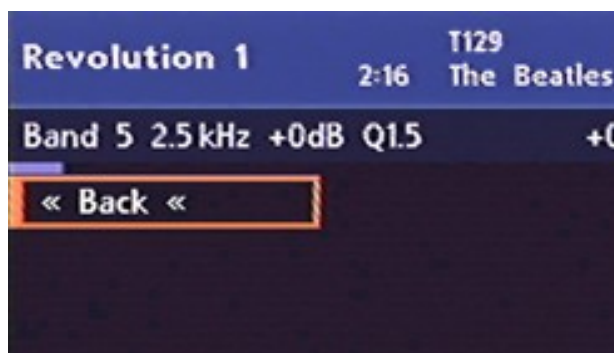
Band 1	20Hz – 80Hz
Band 2	50Hz – 200Hz
Band 3	125Hz – 3.2KHz
Band 4	315Hz – 8KHz
Band 5	800Hz – 20KHz

The frequency of a band must be at least one step clear of the band to either side. The following frequencies are available:

20Hz,	25Hz,	31Hz,	40Hz,	50Hz,	63Hz,	80Hz,	100Hz,	125Hz,
160Hz,	200Hz,	250Hz,	315Hz,	400Hz,	500Hz,	630Hz,	800Hz,	1.0KHz,
1.2KHz,	1.6KHz,	2.0KHz,	2.5KHz,	3.2KHz,	4.0KHz,	5.0KHz,	6.3KHz,	8.0KHz,
10KHz,	12.5KHz,	16KHz,	20KHz					

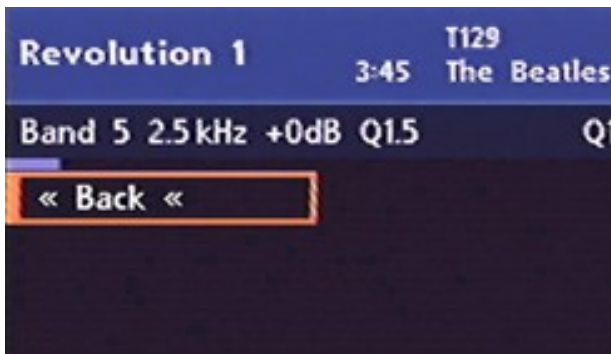
So, for example, if band 4 is set to 4.0KHz, band 3 can be set no higher than 2.5KHz and band 5 can be set no lower than 6.3KHz.

**Figure 36 Parametric Equaliser Level menu**



The level of each band can be adjusted using the rotary controller between -6dB and +6dB.

**Figure 37 Parametric Equaliser Q menu**



The width, or 'Q', of each band can be adjusted using the rotary controller. Values may be 1.0, 1.5 or 3.0. A higher Q value gives a narrower bandwidth than a low Q value.