DP226

Speaker Management System
Operating Instructions
Issue 2

XTA Electronics Ltd.

**Riverside Business Centre,
Worcester Road,
Stourport-on-Severn,
Worcs.   DY11 9BZ.
England
Tel: 01299 879977 (Intl. +44 1299 879977)
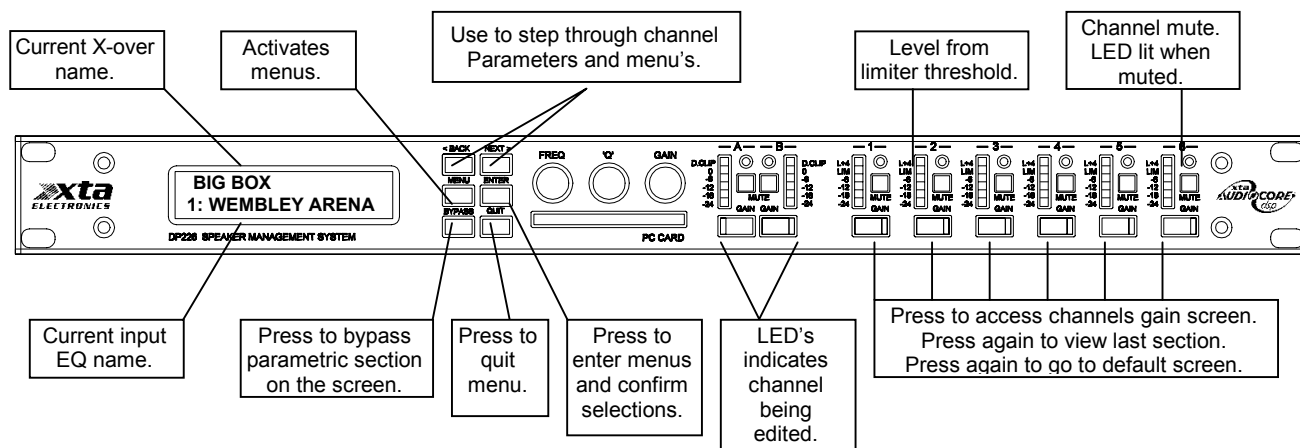Fax: 01299 879969 (Intl. +44 1299 879969)
Web: http://www.xta.co.uk/xta**

USA Distribution:

Group One Ltd.

**80, Sea Lane,
Farmingdale,
N.Y. 11735
U.S.A.
Tel: (516) 249-1399
Fax: (516) 753-1020**

DP226 Quick reference

Current X-over name.

Activates menus.

Use to step through channel Parameters and menu's.

Level from limiter threshold.

Channel mute. LED lit when muted.

BIG BOX
1: WEMBLEY ARENA

DP226 SPEAKER MANAGEMENT SYSTEM

FREQ   'Q'   GAIN

PC CARD

Current input EQ name.

Press to bypass parametric section on the screen.

Press to quit menu.

Press to enter menus and confirm selections.

LED's indicates channel being edited.

Press to access channels gain screen.
Press again to view last section.
Press again to go to default screen.

To **access a channel** press the appropriate channel's *'GAIN'* button. When you press the button once you will get that channel's gain screen. To scroll through a channels parameters, use the *'BACK'* and *'NEXT'* keys. (If you press the gain button a second time, you will get the last parameter viewed. A third press will take you back to the default screen.)

To **enter the menus,** press the *'MENU'* key. Use the *'BACK'* and *'NEXT'* keys to take you to the sub-menu you require. *'ENTER'* will take you into the sub-menu you have selected. Use the *'BACK'* and *'NEXT'* keys to select the menu you require. Press *'ENTER'* to take you into the menu selected. *'BACK'* and *'NEXT'* will then select the menu options. Use *'ENTER'* to confirm selection.

MENUS:

Input Memory SubMenu: Used for storing and recalling input EQ, input gain and base delay. Also used for storing and recalling memory sets to and from a PC card.

Input Setup SubMenu: Used for ganging input EQ and flattening input parametrics.

X-over Sub-Menu: Used for storing and recalling X-overs including format, output EQ, output delay, output gain and limiter settings. Also used for designing a new X-over.

Security Sub-Menu: Used for locking various features of the unit with a unique 4 digit code.

System Sub-Menu: Used to view reports of the units status. Other options include whether the parametrics are displayed in Q or bandwidth and if the meters are pre or post mute.

Notes.
1. **The X-over (output) settings are stored / recalled independently (using 'store / recall a X-over') from the input settings (using 'store / recall input memory').**

2. The output meters show level, in dB's, from limiter threshold. The input meters show level, in dB's, from input clip.

3. HPF's and LPF's are defined independently on each channel.

4. To get access to the limiter attack and release, select 'Auto Limiter TC' No, when designing a X-over.

5. To show parametric filters in bandwidth ('BW'), rather than Q, go into the 'system sub-menu', select 'filter Q or BW', select BW.

Contents

CE An example of this equipment has been tested and found to comply with the following European and international Standards for Electromagnetic Compatibility and Electrical Safety:

Radiated Emissions (EU):   EN55013-1 (1996)

RF Immunity (EU):   EN55103-2 (1996) RF Immunity, ESD, Burst Transient, Surge, Dips &Dwels

Electrical Safety (EU):   EN60065 (1993)

Important Safety Information

Do not remove Covers. No user serviceable parts inside, refer servicing to qualified service personnel.

This equipment must be earthed.

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

DO NOT EXPOSE TO RAIN OR MOISTURE

ATTENTION
RISQUE DE CHOC ELECTRIQUE
NE PAS ENLEVER

NE PAS EXPOSER A LA PLUIE NI A L'HUMITE

It should not be necessary to remove any protective earth or signal cable shield connections.

Do not defeat the purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wider blade and the third prong are provided for your safety. When the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

Only use this equipment with an appropriate mains cord.

In the USA the cord should comply with the requirements contained in the Standard for Cord Sets and Power Supply Cords, UL 817, be marked VW-1, and have an ampacity rating not less than the marked rating of the apparatus.

Thanks

Thank you for choosing the XTA DP226 for your application. Please spare a little time to digest the contents of this manual, so that you obtain the best possible performance from this unit.

All XTA products are carefully engineered for world class performance and reliability.

If you would like further information about this or any other XTA product, please contact us.

We look forward to helping you in the near future.

XTA Electronics Ltd.

Unpacking the DP226

After unpacking the unit please check carefully for damage. If damage is found, please notify the carrier concerned at once. You, the consignee, must instigate any claim. Please retain all packaging in case of future re-shipment.

Introduction

The DP226 is a compact and powerful DSP based audio-processing unit, ideally suited for live applications, where it combines the functions of multiple conventional products in a compact 1U high unit. To achieve this the DP226 has 2 inputs and 6 outputs, which can be configured in 5 basic modes, 3 x 2 way, 2 x 3 way, 4 way, 5 way and 6 way crossover. Each input has gain, delay and 8 bands of parametric control, each output consists of a high and lowpass filter, 5 bands of parametric equalisation, limiter, delay, gain and polarity controls. MIDI, RS232 and RS485 control and user memories are provided, and also a multi-level security 'lock-out' function for all controls. The DP226 is also available with optional AES/EBU inputs and outputs. The DP226 is designed for quick adjustment via easy-to-use front panel controls. Alternatively it can be controlled externally by XTA's *AudioCore* Windows™ control software, along with both existing and future *AudioCore* products.

Features

- **Superb audio quality:** Carefully optimised Double Precision processing plus 40 bit internal data path for exceptional dynamic range and sonic quality.

- A flexible 2 input, 6 output multi-mode format featuring a choice of 3 x 2 way, 2 x 3 way, 4 + 2 way, 5 + 1 way and 6 way crossover modes with limiters.

- Each parametric section provides +15dB to -30dB of gain at centre frequencies between 20Hz - 20kHz with a wide range of Qs from 0.4 to 128. All parameters feature fine resolution with 1/36th octave frequency steps, 0.1dB gain increments and 100 Q settings. Any parametric section can be set for LF & HF shelving response.

- Six high performance limiters are provided, featuring a wide range of control over Attack, Release and Threshold parameters. The output meters shows headroom to the limit threshold. The meter time constants track the limiter time constants to show precise power usage.

- Variable High and Low pass filters for each output can be set for 12, 18 and 24dB per octave slopes with a choice of Bessel, Butterworth or Linkwitz-Riley responses. Independent control over High & Lowpass functions allows asymmetric crossover functions to be realised.

- Three velocity-sensitive rotary encoders provide a familiar and easy to use control format with all filter information displayed simultaneously on a backlit LCD display.

- Delay of up to 650mS can be independently set for each output with a minimum increment of 2.6μS.

- Comprehensive standard specification includes 40 memories, MIDI, RS232 and RS485 for external control and multi-level security lockout function.

- The DP226 provides exceptional audio quality with a full >110dB dynamic range, high sampling rate and minimal filtering.

- AES / EBU digital inputs and outputs are available as an option.

Front Panel Functions
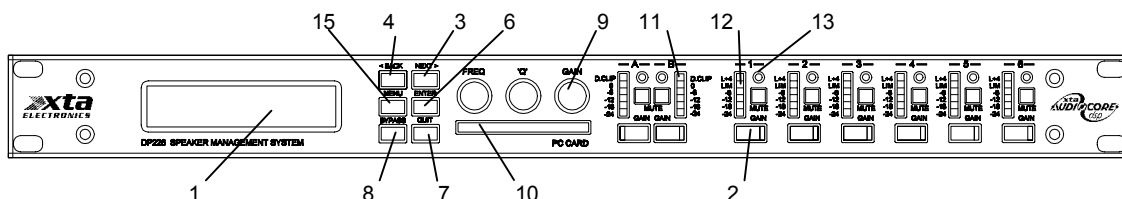
1. **LCD Display** - Shows menu options, output information and various parameters being adjusted.

2. **Gain Keys** - Two input and six-output 'gain' keys allow instant access to the gain screen for each channel. When a channel is selected the accompanying LED lights. Pressing a second time selects the last function edited.

3. **Next Key** - Moves the display forwards through the list of available parameters for the current input or output channel.

4. **Back Key** - Moves the display backwards through the list of available parameters for the current input or output channel.

5. **Menu Key** - Activates the main menu on the LCD display. Pressing a second time selects the last menu edited. Different menus are selected by pressing the *'BACK'* and *'NEXT'* keys or using the *'FREQ'* control.

6. **Enter Key** - Enters the chosen menu and confirms menu selections.

7. **Quit Key** - Exits the menu.

8. **Bypass Key** - Allows the currently displayed parametric section to be bypassed. (Note: The Highpass / Lowpass filters and limiters can not be bypassed.)

9. **Parameter Controls** - The three velocity sensitive rotary encoders allow the relevant parameter, on the LCD screen, to be adjusted.

10. **PC Card** - PCMCIA card slot allows back up of memories, crossovers and software updates.

11. **Input Meters** - Displays available headroom before input clipping occurs. The bottom five LEDs display between -24dB and 0dB of input headroom, with the orange 0dB LED set at 3dB below clipping. The top, red LED displays digital overflow and can therefore light without all the other LEDs becoming illuminated.

12. **Output Meters** - Displays headroom before limiting occurs. The bottom five LEDs display between -24dB and 0dB of headroom, with the orange 'LIM' LED set at the limiter threshold for that channel. The top, red LED indicates 4dB of limiting.

13. **Mute Keys** – Two input and six output mute keys with LED indicator.

Rear Panel Functions
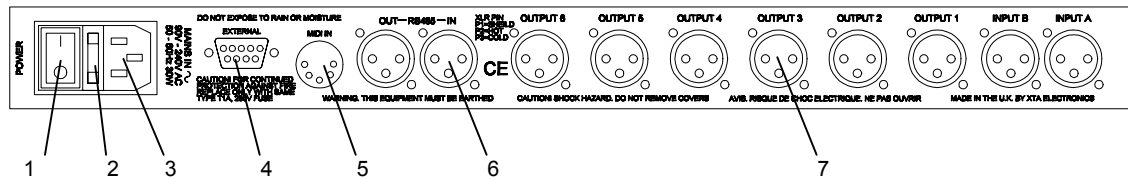
1. **Power Switch**.

2. **Mains Fuse** - Located in a finger-proof fuseholder adjacent to the mains inlet. Always replace this fuse with the correct type as shown on the rear panel legend. (N.B. A spare fuse is located in this holder.)

3. **Mains Power** - Connected via a standard IEC socket. A compatible power cord is supplied with the unit.

4. **External** - RS232 via a 9-pin DIN DEE socket, for connection to a PC. Data is converted to RS485 and relayed to 'slave' units via the RS485 XLR sockets. See page 18 for more information.

5. **MIDI in** – All units have MIDI in which can be converted to RS485 to be relayed onto slave units. See page 18 for more information

6. **RS485 IN / OUT** - All units have RS485 in and out on XLR. See page 18 for more information.

7. **XLR Inputs and Outputs** - 3 pin XLR connectors are provided for each audio input and output. All terminations are fully balanced, pin 2 Hot, pin 3 Cold and pin 1 Screen (shield). See page 23 for more information.

Operating the DP226

AudioCore Windows™ Operations

The following operating information covers control of the DP226 via front panel controls only. Please see additional information despatched with **AudioCore** software if computer control is required.

Preliminary Set-up

The following procedure should be followed when first installing the DP226.

1. Design your crossover. To do this press *'MENU'*, use the *'BACK'* or *'NEXT'* key to select 'Xover sub-menu'. Press *'ENTER'*; use the *'BACK'* or *'NEXT'* key to select 'Design a Xover'. Press *'ENTER'*, use the *'BACK'* or *'NEXT'* key to select desired configuration and follow the set-up wizard to design your X-over.

   (N.B. When in a menu use the *'BACK'* and *'NEXT'* keys to display menu options. When the required menu is shown, press *'ENTER'* to confirm selection. The current selection will be marked by a '✳' star.)

2. Use the *'GAIN'* key on each channel with the *'BACK'* and *'NEXT'* keys to select HPF, LPF, parametrics etc. Note: when designing a new crossover the HP and LP filters will be set to their defaults, see appendix 2.

Note: If no action is taken in the menu mode the unit will return to normal 'default' mode. Repeat above instructions to return to menu mode.

Menu Selections

The following menu selections are available. To access menus, see instructions under preliminary set-up above.

Memory Sub-Menu:

Memory Recall: Recalls input EQ, input gain, input ganging and base delay.

Memory Store: Stores input EQ, input gains, input ganging and base delay.

Store to PC card: TBC.

Recall from PC card: TBC.

Input Setup SubMenu:

Allows ganging of inputs and flattening input parametrics.

Xover Sub-Menu:

Load a Xover: Loads a pre-defined crossover.

Design a Xover: Setup wizard for designing a crossover.

Store a Xover: Stores all output settings as a defined crossover.

Security Sub-Menu: Locks the unit with a unique user defined 4 digit code. 4 options are available: changes only, changes + view, changes + mutes, everything. **Caution: Do not enter this menu option before reading and understanding the instructions on page 17.**

System Sub-Menu:

System Status: Displays unit information including software version and temperature.

LCD Contrast: Adjusts LCD contrast.

LED Brightness: Adjusts LED brightness.

Temperature Alarm: Sets a temperature warning value in Centigrade.

Program Update: Loads a new version of software from PC card.

Wake-up Time: Sets whether or not the unit starts up in mute.

Output Meters: Selects output meters to be pre or post mute.

Filter Q or BW: Selects whether Q or bandwidth is displayed in the parametric screens.

Unit Cloning: Stores and recalls clone information to and from PC cards.

Interface Sub-Menu:

Interface Test: Test the interface.

Interface Setup: Set-up wizard for interface control and relay to 'slave' units.

AES / EBU Sub-Menu:

Routing options: Selects various routing options.

AES clock source:

AES diagnostics: Shows the complete status of the input AES signal. Available only if the AES option is fitted.

(For more in-depth information on menu functions, refer to pages 15, 17 & 18.)

DP226 Configurations

Introduction

To simplify set-up of the DP226, 5 crossover modes are menu selectable. These all have parametric equalisers, high and low pass filters, limiters, gain and delay. For detailed information on these modes please study the block diagrams along with the following descriptions. 2 x 3 way and 3 x 2 way crossover modes have the option available to provide precise 'ganged' parameter adjustment for stereo sources.

Crossover Modes

Please see block diagram. All crossover modes feature adjustable crossover frequencies with a choice of slopes, 5 bands of driver compensation E.Q. per output and delay time plus limiters for each output. A powerful 6 band parametric equaliser is also provided on each input for room equalisation. Phase reverse is provided for each output.

Filter slopes

A choice of Bessel or Butterworth slopes at 12/18/24dB per octave and Linkwitz-Riley at 24dB per octave are provided. Since Low and High pass functions are separately adjusted, asymmetric slopes are easily achieved, if required. It should also be noted that the turnover frequency displayed on the DP226 is the -3dB point for all slopes except 24dB Linkwitz-Riley where the -6dB point is shown. If the -6dB point is to be used for the Bessel or Butterworth filter, take the required crossover frequency, multiply this by the appropriate factor from the following table and then select the closest available frequency on the DP226's display.

Filter Type	High pass filter factors	Low pass filter factors
Bessel 12dB/octave	1.45	0.69
Butterworth 12dB/octave	1.31	0.76
Bessel 18dB/octave	1.37	0.73
Butterworth 18dB/octave	1.19	0.84
Bessel 24dB/octave	1.35	0.74
Butterworth 24dB/octave	1.15	0.87

Please note that unlike conventional analogue crossovers, crossover points and slopes are set with absolute accuracy since component tolerance problems do not occur.

Time Alignment

A further advantage of the DP226 over conventional products is the provision of an independently adjustable delay section for each output. This allows the true arrival time from multiple drivers to precisely aligned rather than relying on the compromise 'phase adjust' approach. Delay time is adjustable in $2.6\mu S$ steps (1mm). To convert from units of time (i.e. milliseconds) to units of distance use the following formula: 1 millisecond = 343mm (1.126ft) @ 20°C (68°F) or to calculate time delay for a known distance, use:

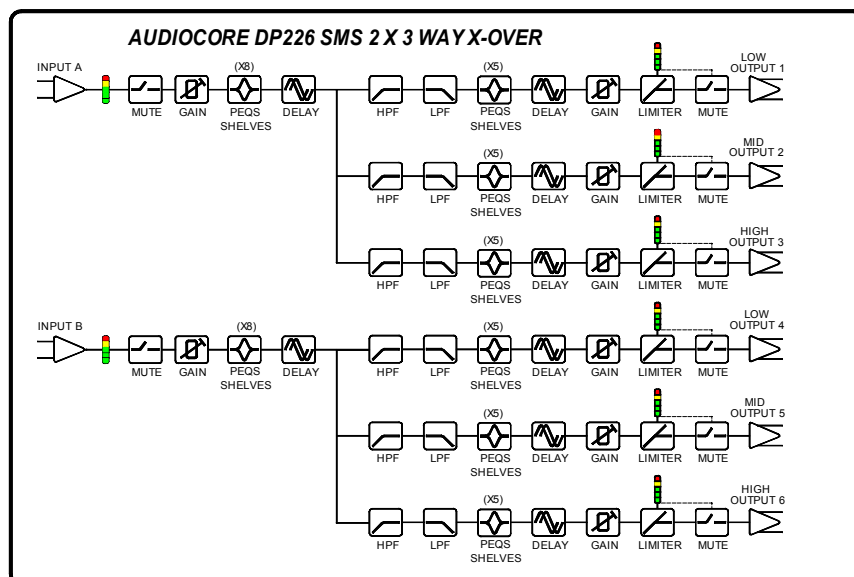$$\text{Time delay} = \frac{\text{Distance in meters}}{20.06 \times \sqrt{273} + °C}$$

Were °C is the temperature in °C.

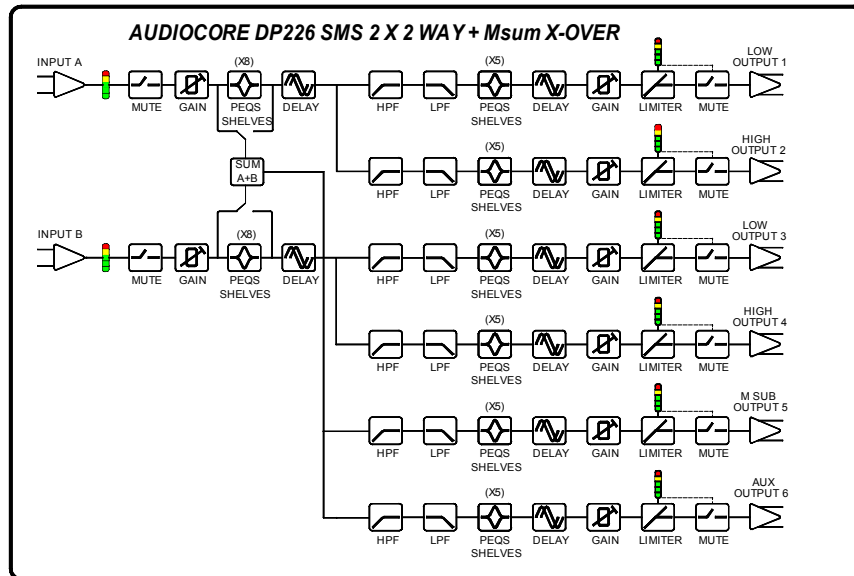Or to simplify this equation at 20°C.

Delay time in milliseconds = Distance in meters x 2.192.

Or delay time in milliseconds = Distance in feet x 0.955

(N.B. Centigrade = (Fahrenheit –32) x 0.5555.

Block Diagrams

AUDIOCORE DP226 SMS 2 X 2 WAY + Msum X-OVER

AUDIOCORE DP226 SMS 2 X 3 WAY X-OVER

AUDIOCORE DP226 SMS 4 WAY X-OVER + 2

AUDIOCORE DP226 SMS 5 WAY X-OVER + 1

AUDIOCORE DP226 SMS 6 WAY X-OVER
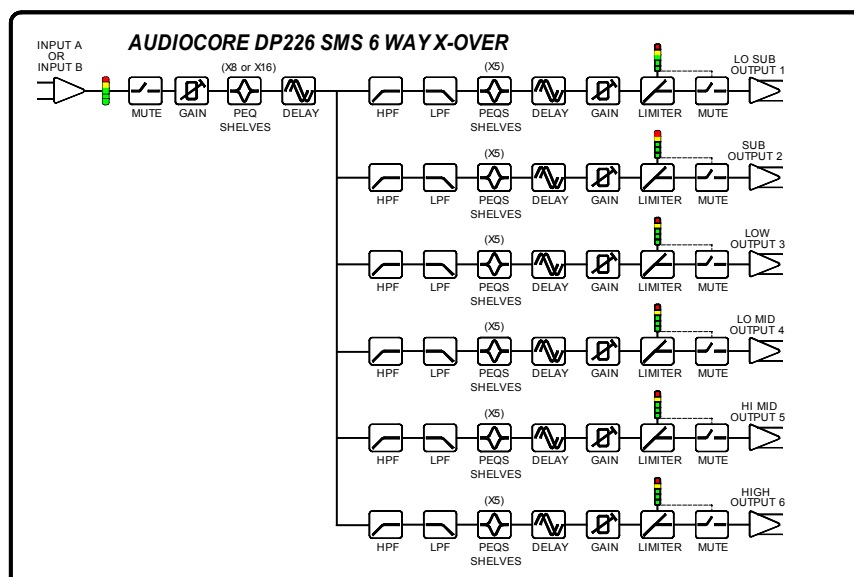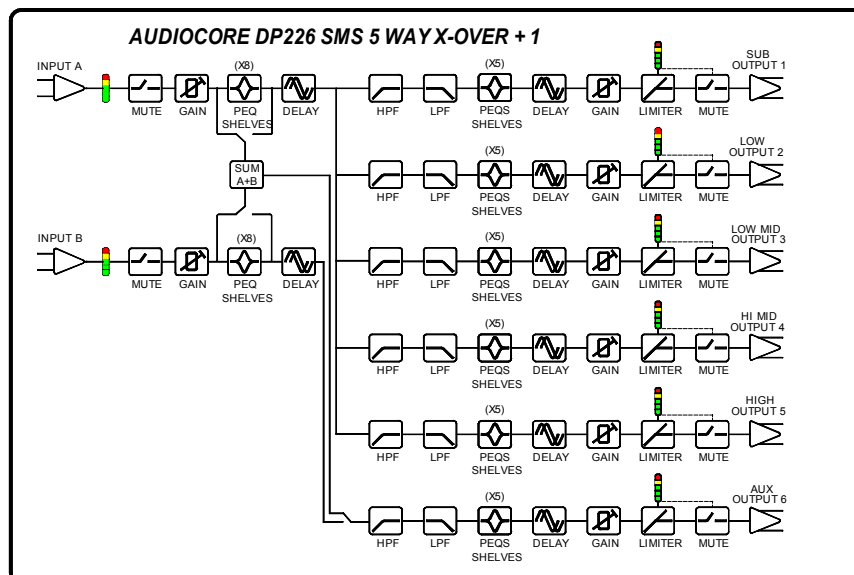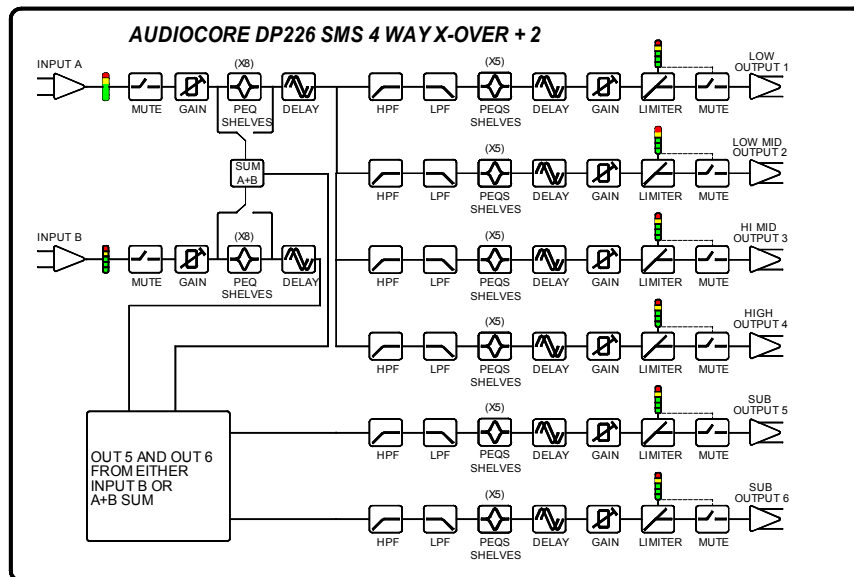
Output Limiters

High performance digital limiters are provided for each output with control over attack time, release time and threshold level parameters (see page 14). This level of control allows the user to balance the required subjective quality of the limiter against the driver protection requirements. It does also mean that an incorrectly set limiter may sound awful! In particular, as with all limiters, using too fast an attack or release time will result in excessive low frequency distortion. In the design a crossover sub-menu there is an option for automatic limiter time constants. In this mode the time constants will be automatically set from the Highpass filter frequency. See table below.

Table of automatic attack and release times.

The time constants are set by the high pass filter frequency for that channel.

High pass filter	Auto attack time	Release
<10Hz – 31Hz	45mS	x16 (720mS)
31Hz – 63Hz	16mS	x16 (256mS)
63Hz – 125Hz	8mS	x16 (128mS)
125Hz – 250Hz	4mS	x16 (64mS)
250Hz – 500Hz	2mS	x16 (32mS)
500Hz - 1kHz	1mS	x16 (16mS)
1kHz – 2kHz	0.5mS	x16 (8mS)
2kHz – 22kHz	0.3mS	x16 (4mS)

Function Screens

Parametric Equaliser Screen

```
OP1+4    Low   PEQ: 1 O
1K00Hz    B=.34    0.0dB
```
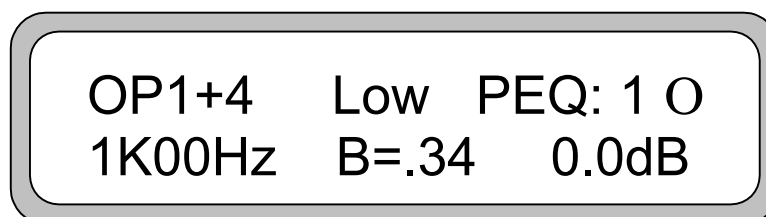
All modes feature a total of 46 bands of fully flexible parametric equalisation split between 8 per input and 5 per output, with all sections selectable to Low or High frequency shelving response.

Each parametric section can be positioned at a frequency from 20Hz to 20kHz and features a wide range of 'Qs' to produce response curves ranging from broad to notch. The gain control ranges from +15dB to -30dB in 0.1dB steps. Frequency steps are 1/36 octave resolution for precise control. Since all filtering is achieved in DSP all settings are re-settable with absolute accuracy and in ganged mode parameters track identically. Very narrow band notch filters (maximum Q of 128) can be achieved and unlike analogue filters these 'tight' Q filters are entirely stable. The maximum notch depth is -30dB.

Parametric filters are carefully implemented using Double Precision processing. This method is costly in terms of processing power but yields substantial benefits in terms of the DP226's exceptional noise performance and greatly improved low frequency stability.

To adjust parametric settings:

Use the *'FREQ'* control for the frequency.

Use the *'Q'* control for the Q.

Use the *'GAIN'* control for the gain.

(N.B. To show parametric filters in bandwidth (BW) rather than Q, go into the system sub-menu, select 'filter Q or BW', select BW.)

High and Lowpass filter Screens

```
+-----------------------------------+
|   OP1+4     Low      HPF          |
|   < 10Hz    Bessel    24dB        |
+-----------------------------------+
```

Each output has an independent high pass filter and an independent low pass filter. Both filters have a range of selectable slopes, which are Bessel 12dB, 18dB and 24dB, Butterworth 12dB, 18dB and 24dB, and Linkwitz Riley 24dB.

Highpass filters have a range of <10Hz (through) to 16kHz and Lowpass filters have a range of 22kHz (through) to 59Hz in 1/36 octave steps.

HPFs and LPFs can be asymmetrical set.

To adjust HPF/LPF settings:

Use the *'FREQ'* control for the frequency.

Use the *'Q'* control for the slope.

Limiter Screen

```
+-----------------------------------+
|   OP2+5      Mid     Limiter      |
|   Atk:4.0mS  Rx16    +22dB        |
+-----------------------------------+
```

Each output has an independent high performance limiter.

All limiters have an attack range of 0.3mS to 90mS, release times are 4, 8, 16 and 32 times the attack time and thresholds range from +22dB to −10dB in 1dB steps.

If the automatic limiter time constant option is in use, all limiter screens will say 'automatic' and the time constants will be set from the Highpass filter frequency. A table of dB to Vrms is in appendix 1.

The output meters are linked to the time constants of the limiters so true output metering is achieved.

To adjust limiter settings:

Use the *'FREQ'* control to adjust the attack time.

Use the *'Q'* control for the release time.

Use the *'GAIN'* control for the limiter threshold.

Delay Screen

```
OP1        Low
Delay   =   1.003mS
```

Each output has an independent delay time control. This can be adjusted in 2.6μS steps or in 1mS steps giving complete control over driver time alignment.

Input delay (base delay) is adjustable in 1mS steps only.

To adjust delay settings:

Use the *'FREQ'* control for coarse control. (1mS steps)

Use the *'Q'* control for fine control. (2.6μS steps)

Polarity Screen

```
OP1        Low
Polarity = [ + ]
```

Each output has an independent polarity screen. This gives the flexibility to reverse (flip by 180°) the phase of individual outputs.

(N.B. When the outputs are ganged, the polarity screens remain individual.)

To adjust the polarity:

Use the *'GAIN'* control to go between **+** and **-**.

Gain Screen

```
O/P1+3    LOW
Gain   =   0.1dB
```

Each output and input has an individual gain screen. The outputs have a range of +15dB to –40dB, adjustable in 0.1dB steps and the inputs have a range of +6dB to –40dB, again adjustable in 0.1dB steps.

To adjust the gain:

Use the *'GAIN'* control.

Memory Sub-menu

Memory Store

To store input settings to a location from the 40 user-selectable memories press *'MENU'* and select the memory sub-menu then memory store using the *'BACK'*, *'NEXT'* and *'ENTER'* keys. Select memory number to store to and then name the memory as appropriate by using the *'FREQ'* control to select a character and *'BACK'* and *'NEXT'* to move to the next character.

(N.B. This sequence must be completed for a memory to store. If after 15 seconds no store has been implemented, the unit will return to the default mode.)

When storing a memory the LCD shows the next available empty memory automatically, but any memory number can be chosen and any memory can be over written. Previously used memories are identified by a '**?**' question mark.

Memory Recall

Press *'MENU'* and select Memory Recall using the *'BACK'*, *'NEXT'* and *'ENTER'* keys. When the menu is entered, the last recalled memory will be displayed first. Use *'BACK'* and *'NEXT'* to view the other input memories and press *'ENTER'* to load selection. If after 15 seconds no recall has been implemented, the unit will return to the default mode.

The name of the last memory recalled will be displayed on the bottom line of the default screen under the crossover name. A '#' will be displayed next to the memory name when any input parameter is adjusted after a memory has been recalled. This is to show the original settings have been modified.

Store to PC card

To store all input memories to PC card press *'MENU'* and select the Input Memory Sub-Menu, then using the *'BACK'*, *'NEXT'* and *'ENTER'* keys select 'Store to PC Card'. (N.B. This function stores all input memories as a set.) Name the memory set as appropriate by using the *'FREQ'* control to select a character and *'BACK'* and *'NEXT'* to move to the next character.

Recall from PC card

To recall an input memory set from PC card press *'MENU'* and select the Input Memory Sub-Menu, then using the *'BACK'*, *'NEXT'* and *'ENTER'* keys select 'Recall From PC Card'. Using the *'BACK'*, *'NEXT'* and *'ENTER'* keys select one of stored memory sets. (N.B. Recalling a memory set will overwrite memories already stored in the unit.)

Input Setup SubMenu

Press *'MENU'* and select Input Set-up Sub-menu using the *'BACK'*, *'NEXT'* and *'ENTER'* keys. There are two options in this menu, where applicable, which are:

Gang Inputs: Gangs A and B inputs so that precise adjustments can be made to both inputs simultaneously. Both input LEDs will light when the inputs are accessed and the LCD will show A+B.

All PEQ's Flat: Resets all input parametrics to 1k00Hz, Q=3.0 and 0.0dB.

X-over Sub-Menu

Press *'MENU'* and select X-over Sub-menu using the *'BACK'*, *'NEXT'* and *'ENTER'* keys. Three options are available in this sub-menu which are:

<u>Load a Xover</u> Loads a stored crossover.

<u>Design a Xover</u> Opens a wizard to design a crossover. Options include format type, ganging of outputs, routing and automatic limiter time constants.

<u>Store a Xover</u> Stores a X-over (all output settings) to one of 9 locations. Crossovers can be named, using the same method as memories, with up to 16 characters which appear in the default screen.

Security Sub-Menu

Press *'MENU'* and select Security Sub-menu using the *'BACK'*, *'NEXT'* and *'ENTER'* keys. Press *'ENTER'* to load one of the four selections. (See below) A four-digit security code will then be asked for. This can be entered by using the *'FREQ'* control, to select a character, and the *'BACK'* and *'NEXT'* keys to move to the next character. Alternatively, the *'GAIN'* keys can be used to enter a code by pressing any combination of the eight buttons. Each *'GAIN'* key represents its channel labelling, so any combination of A, B, 1, 2, 3, 4, 5 and 6 can be used as a code.

Lock options:

Changes only: This option locks all parameters so that no changes can be made, including all menus.

Changes + view: This option locks all parameters and the viewing of them on the LCD including all menus.

Changes + mutes: This option locks all parameters, including all menus, and disables all mute keys.

Everything: This option locks all parameters and the viewing of them, including all menus, and disables all mute keys.

To 'unlock' the security system, press the *'MENU'* key and enter correct code.

IMPORTANT - <u>Please Note</u> that once the security system is initiated only re-entering the correct code will 'unlock' the DP226's functions. Please note the code! If the security code number is inadvertently lost contact your local XTA sales office.

System Sub-Menu

Press *'MENU'* and select X-over Sub-menu using the *'BACK'*, *'NEXT'* and *'ENTER'* keys. Several options are available in this sub-menu which are:

System Status: Displays unit information including software version and temperature. *Curr. Temp.* = current temperature in degrees Celsius.

Max1. Temp. = maximum temperature this session.

Max2. Temp. = maximum temperature ever reached.

LCD Contrast: Adjusts the LCD contrast from 0 to 100.

LED Brightness: Adjusts the LED brightness from 1 to 15.

Temperature Alarm: Sets a temperature warning between 20 and 80°C. The default screen will flash 'ALARM. Temp = n°C' when the specified temperature is reached. (N.B. the warning does not affect the units' performance in any respect.)

Program Update: Loads a new version of software from a PC card.

Wake-up Time: Sets how the unit starts up with one of the following options.

0 to 60 seconds: Waits the specified time before unit wakes up.

Mute hold: Turns on and holds all output mutes when turned on.

(N.B. Wake-up is a slow ramp in level for about 5 seconds.)

Output Meters: Selects whether the output meters are pre or post mute.

Filter Q or BW: Selects whether 'Q' or Bandwidth is displayed in the parametric screens.

Interface Sub-Menu

Press *'MENU'* and select X-over Sub-menu using the *'BACK'*, *'NEXT'* and *'ENTER'* keys.

Interface Setup

Opens a wizard to configure the remote interface. Options include master/slave, master source, baud rate (RS232/485), MIDI relay and remote ID No.

(For more in-depth information on interface setups, see page 19.)

AES / EBU Sub-Menu

Connection of AES/EBU signals is via the existing rear panel XLR connectors.

Menu Selections

With the AES/EBU option fitted, AES Receive and Diagnostic modes are provided.

Interface Operation

The DP226 has as standard three external interface systems MIDI, RS232 and RS485. This allows complete control over the DP226 via computer (cable or radio) and MIDI 'Program Change' command. Setting up the Interface depends on whether the unit is in a single unit system or a multiple unit system.

Single Unit System

Select the following options in the Interface Setup menu:

Extern: Master.

Master Source : RS485 , RS232 or MIDI (Select the Interface you wish to use.)

If 'Master Source' is 'RS485' or 'RS232', the following option will appear.

MIDI Relay: 'No' or 'Yes'. If you wish the unit to simultaneously accept MIDI 'Program Change' commands select 'Yes'.

If MIDI Relay is 'Yes' the following option will appear.

MIDI Channel: 1-15 + Omni (select the required MIDI channel for the 'Program Change' command.)

If 'Master Source' is 'RS485' or 'RS232', the following option will appear.

RS232/485 Baud: 2400, 4800, 9600, 19200, 38400 (Select the baud rate, this should correspond to the baud rate set on the computer.)

If 'Master Source' is 'RS232', the following option will appear.

RS485 Baud: 38400 (Select this baud rate).

Remote ID Num = 1-32 (Select the ID number, normally 1 for single unit operation. This should correspond to the ID number in the *AudioCore* software.)

Multiple Unit System

For multiple unit systems one unit is set as a master, this is the unit connected to the computer and or the MIDI controller. This unit should be set-up as for a single unit system. The remaining units should be set as slaves and connected via RS485 XLR connectors in a chain to the master unit.

Select the following options in the Interface Setup menu:

Extern: Slave.

RS485 Baud: 2400, 4800, 9600, 19200, 38400 (Select the same as the RS485 baud rate set on the master unit).

Remote ID Num = 1-32 (Select the ID number, this should correspond to the ID number for the relevant unit in the *AudioCore* software.)
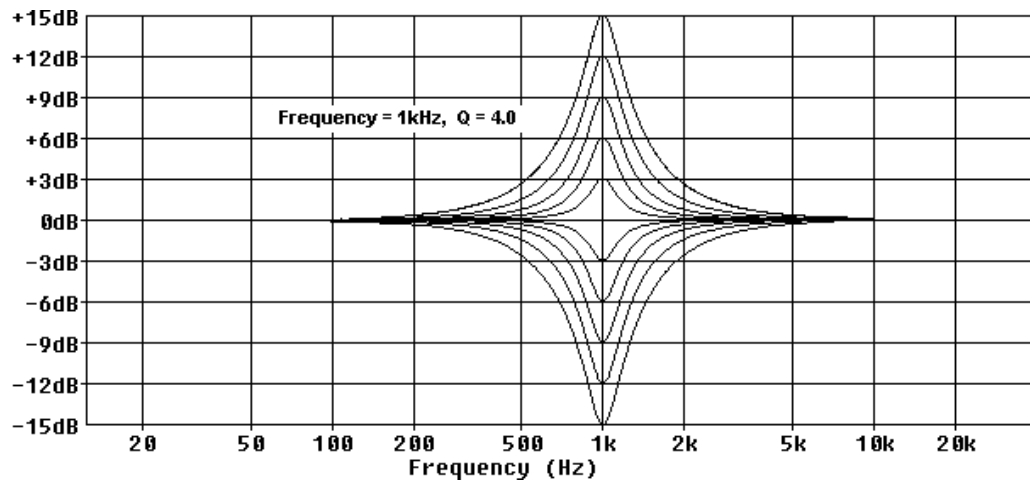
Equalisation Curves
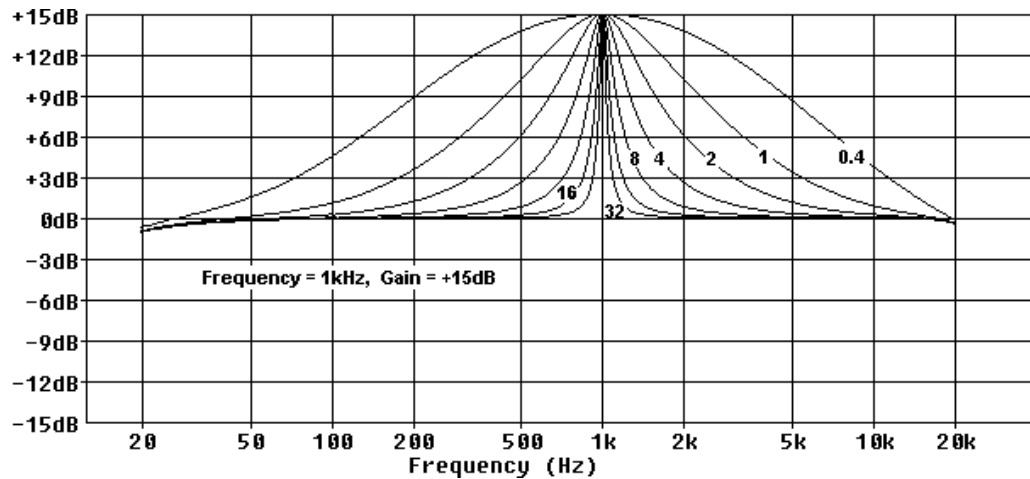

Figure 1 - Parametric filter gain curves.

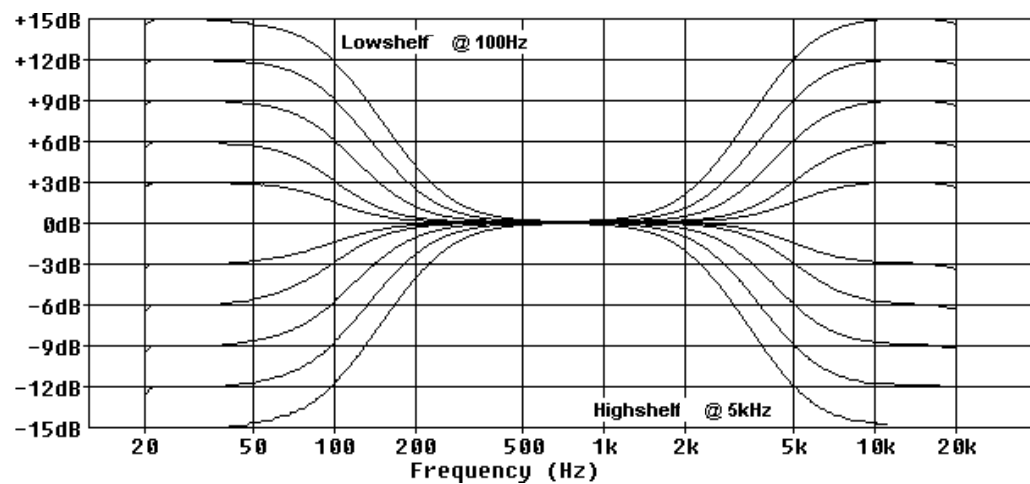*Figure 2 - Parametric filter 'Q' curves.*

Figure 3 - Parametric filter High and Low shelf curves.
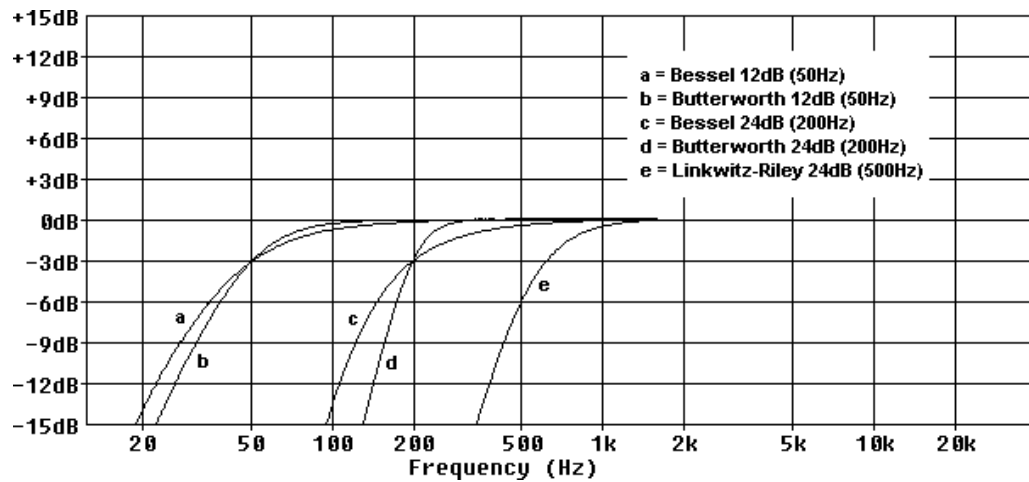
Figure 4 - Highpass filter curves.

a = Bessel 12dB (50Hz)
b = Butterworth 12dB (50Hz)
c = Bessel 24dB (200Hz)
d = Butterworth 24dB (200Hz)
e = Linkwitz-Riley 24dB (500Hz)
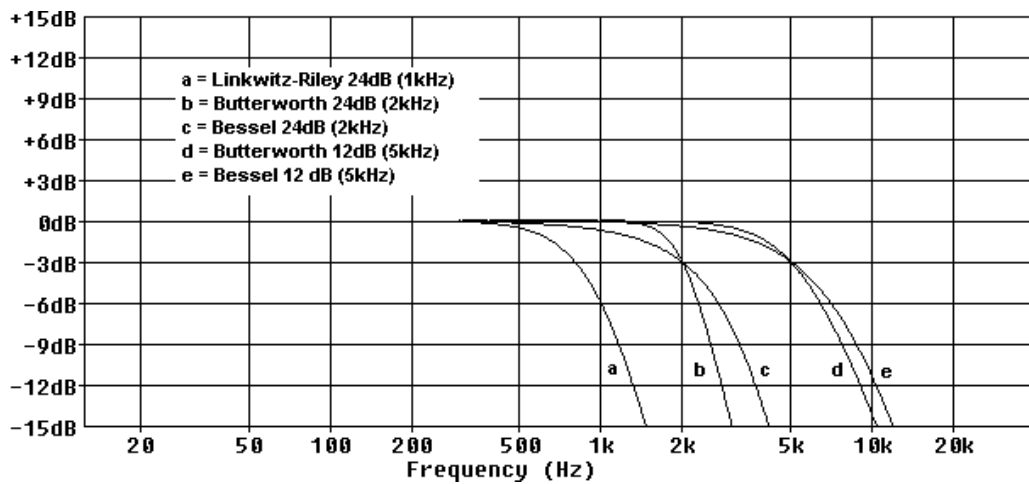
Figure 5 - Lowpass filter curves.

a = Linkwitz-Riley 24dB (1kHz)
b = Butterworth 24dB (2kHz)
c = Bessel 24dB (2kHz)
d = Butterworth 12dB (5kHz)
e = Bessel 12 dB (5kHz)
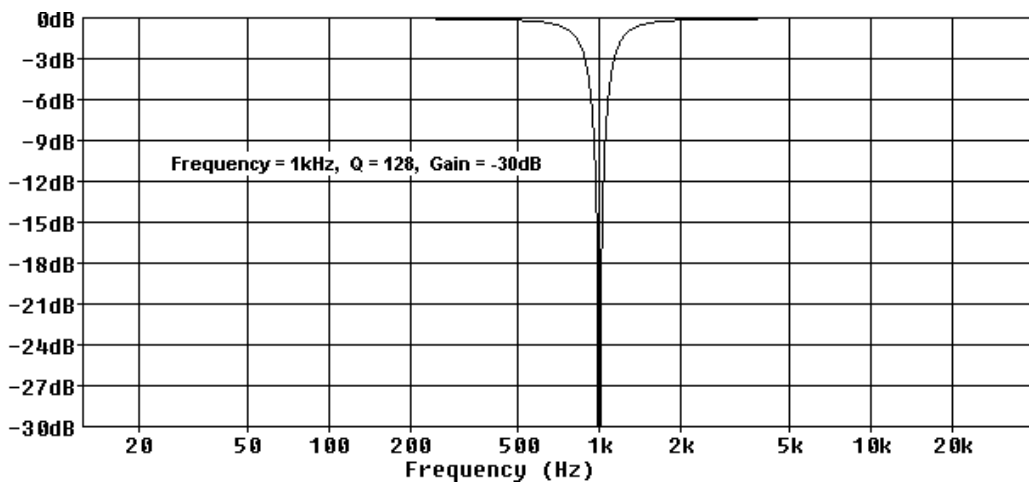
Figure 6 - Parametric filter with high 'Q' to achieve notch response.

Frequency = 1kHz, Q = 128, Gain = -30dB

Specifications

Inputs	Two electronically balanced. ◆
Impedance	> 10k ohms.
CMRR	>65dB 50Hz - 10kHz.
Outputs	Six electronically balanced. ◆
Source Imp	< 60ohms.
Min. Load	600ohm.
Max. Level	+20dBm into 600 ohm load.
Frequency Resp.	±0.5dB 20Hz - 20kHz.
Dynamic Range	>110dB 20Hz -20kHz. Unwtd.
Distortion	< 0.02% @ 1kHz, +18dBm.
Maximum Delay	650 mS. (Increment 2.6 μS)
Output gain	adjustable +15dB to -40dB in 0.1dB steps and mute.
Input gain	Adjustable +6dB to -40dB in 0.1dB steps.

Parametric Equalisation

Filters	5 Sections per output / 8 per Input.
Filter gain	+15dB to -30dB in 0.1dB steps.
Centre frequency	20Hz - 20kHz, 1/36 octave steps. (368 positions)
Filter Q / BW	0.4 to 128 / 2.5 to 0.008

(Sections switched to shelving response)

Low frequency	20Hz - 1kHz
High frequency	1kHz - 20kHz
Shelf gains	±15dB in 0.1dB steps.

High and Lowpass Filters

Filters	1 of each per output.
Frequency (HPF)	10Hz - 16kHz, 1/36 octave steps.
Frequency (LPF)	60Hz - 22kHz, 1/36 octave steps.
Response	Bessel / Butterworth 12/18/24dB per octave and Linkwitz-Riley 24dB per octave.

Limiters

Threshold	+22dBu to -10dBu.
Attack time	0.3 to 90 milliseconds.
Release time	4, 8, 16 or 32 times the attack time.
Display	2 x 20 character backlit LCD.
Input meter	2 x 6 point, -24dB to digital clip.
Output meter	6 x 6 point, -24dB to +4dB into limit.
Connectors	
Inputs	3 pin female XLR.
Outputs	3 pin male XLR.
MIDI In	5 pin DIN.
External	9 pin DEE connector (RS232)
RS485	3 pin male XLR (out.) 3 pin male XLR (in.)
Power	3 pin IEC.
Power	60 to 250V ±15% @ 50/60Hz.
Consumption	< 20 watts.
Weight	3.5kg. Net (4.8kg. Shipping)
Size	1.75"(1U) * 19" * 11.8" (44 * 482 * 300mm) excluding connectors.
Optional Interfaces	Radio link.
Options	◆ = Transformers available.

Due to continuing product improvement the above specifications are subject to change.

Operating Notes

Operating Level

With any audio signal processing equipment it is necessary to ensure adequate signal level is used through the device, to avoid sacrificing noise performance. The DP226 features a menu selectable choice of operating levels to reduce this problem, (see page 7). It is suggested that the operating level chosen should give adequate level to just light the -6dB LED on the headroom meter with maximum program level being used. Since the meter is deliberately set to 'over-read' by 3dB, this still provides 9dB of headroom before clipping occurs. With equalisation in use it may be necessary to further reduce the input level, as gain within the unit may cause digital clipping, indicated by the top red LED's lighting.

It should be noted that the figure quoted for the maximum input level options is the clipping point for that option (not a safe operating level). Always ensure that this clipping point is no lower than that for the following equipment in the signal chain, and allow extra margin if equalisation sections are boosted.

Grounding

The Screen (shield) pins on all audio connectors are normally connected directly to the ground pin of the IEC mains inlet. The chassis is also directly connected to this pin. Never operate this unit without the mains safety ground connected. Signal ground (0V) is in turn connected to the chassis ground.

To avoid ground loops, cable shields should be connected to ground at one end only. The normal convention is that the shield is only connected at the output XLR. Provision is also made for separately isolating each input and output shield pin permanently within the DP226 by breaking the appropriate PCB track, where marked with a box and an arrow next to each XLR connector using a small drill bit or cutter. See the following diagram for details.
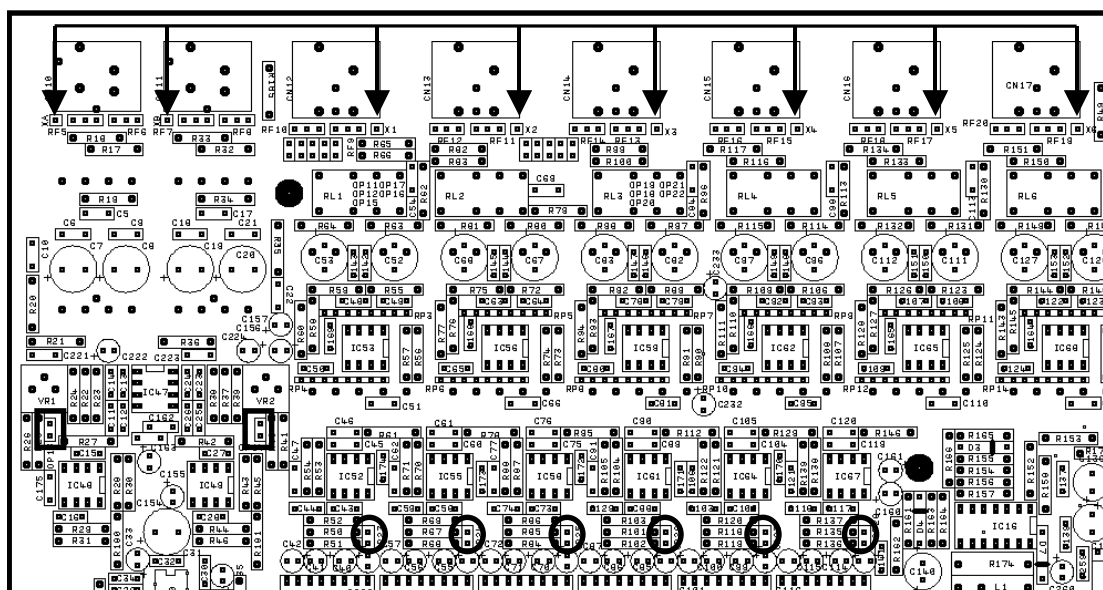

Figure 7 - XLR pin 1 Isolation points and 10dB pads

Warranty

This product is warranted against defects in components and workmanship only, for a period of one year from the date of shipment to the end user. During the warranty period, XTA will, at it's discretion, either repair or replace products which prove to be defective, provided that the product is returned, shipping prepaid, to an authorised XTA service facility.

Defects caused by unauthorised modifications, misuse, negligence, act of God or accident, or any use of this product that is not in accordance with the instructions provided by XTA, are not covered by this warranty.

This warranty is exclusive and no other warranty is expressed or implied. XTA is not liable for consequential damages.

Appendices

Appendix 1

Limiter threshold in dB to Vrms lookup table.

dB	Vrms	dB	Vrms
+22	9.75	+5	1.38
+21	8.69	+4	1.23
+20	7.75	+3	1.09
+19	6.90	+2	0.98
+18	6.15	+1	0.87
+17	5.48	0	0.77
+16	4.89	-1	0.69
+15	4.36	-2	0.62
+14	3.88	-3	0.55
+13	3.46	-4	0.49
+12	3.08	-5	0.44
+11	2.75	-6	0.39
+10	2.45	-7	0.35
+9	2.18	-8	0.31
+8	1.95	-9	0.27
+7	1.73	-10	0.24
+6	1.55		

Calculation:

$Vrms = 0.7746 \times 10 \char`\^ (dBu \div 20)$

Appendix 2

Default X-over settings and names for all formats.

X-over	Output 1	Output 2	Output 3	Output 4	Output 5	Output 6
2x2 way+Ms	Low	High	Low	High	Msub	Aux
	120Hz – 1k82Hz	1k82Hz – 22kHz	120Hz – 1k82Hz	1k82Hz – 22kHz	24.8Hz – 120Hz	<10Hz – 22kHz
2 x 3 way	Low	Mid	High	Low	Mid	High
	22.1Hz – 120Hz	120Hz – 1k82Hz	1k82Hz – 22kHz	22.1Hz – 120Hz	120Hz – 1k82Hz	1k82Hz – 22kHz
4 way + 2	Low	LoMid	HiMid	High	Aux	Aux
	15Hz – 149Hz	149Hz – 1k31Hz	1k31Hz – 8kHz	8kHz – 22kHz	20.1Hz – 22kHz	20.1Hz – 22kHz
5 way + 1	Sub	Low	LoMid	HiMid	High	Aux
	15Hz – 80.3Hz	80.3Hz – 180Hz	180Hz – 1k31Hz	1k31Hz – 8kHz	8kHz – 22kHz	20.1Hz – 22kHz
6 way	LoSub	Sub	Low	LoMid	HiMid	High
	15Hz – 80.3Hz	80.3Hz – 149Hz	149Hz – 1kHz	1kHz – 4kHz	4kHz – 10k1Hz	10k1Hz – 22kHz

Note: All filters set to 24dB Linkwitz-Riley.