DACsys II
DIGITAL AUDIO CONTROL SYSTEM

DP-0202

DP-0204

TOA's New DP-0204SR Touring Sound DSP

DP-0202 Digital Signal Processor (2 in/2 out)
DP-0204 Digital Signal Processor (2 in/4 out)
DP-0204SR Touring Sound Digital Signal Processor (2 in/4 out)

DESCRIPTION

The DACsys II DP-0202, DP-0204, and DP-0204SR are DSP processors that provide more than 20 different types of all-digital signal processing functions for audio system signals between the mixer output and the power amplifiers. They are designed to provide highly flexible configurations to meet a wide variety of applications including performing art centers, houses of worship, sports facilities, theaters and, now, touring sound applications with the DP-0204SR. Incorporating a wide range of sophisticated parameter control for the various processing functions, TOA's DSPs set the standard for digital processing in both quality and quantity of tools available to the user. For example, you can have up to 68 full parametric EQ filters simultaneously on-line in one DP-0204. Each unit, or a system comprised of up to 30 devices, is controlled using an intuitive, user friendly graphic PC interface. This software allows easy access and changes to any of the processing functions and configurations to meet almost almost any system requirement. In addition, it provides off-line editing and data file storage of system set-up. The signal flow and parameter settings can also be easily stored in and recalled from each device's 16 non-volatile memories. The hardware is space efficient and is designed to prevent unauthorized changes to the processing via multiple levels of security. By using units either singly or linked in multiples, systems of almost any size or configuration can easily be designed, set-up, and installed.

FEATURES

- Electronically balanced analog and AES/EBU digital inputs and outputs.
- Easy set-up of signal flow and processing functions.
- Individualized selection of signal flow and processing as needed for unique requirements.
- Signal processing and configuration set via software.
- 16 on-board memories store and recall presets.
- Remote control of memory presets by PC or logic switching via multi-pin connection on rear panel.
- One rack-space unit (1-3/4").

UNIQUE FEATURES OF DP-0204SR

- Gold-plated internal connectors will not oxidize or corrode.
- Ruggedized chassis for touring.
- Rear rack-mounting ears for touring.

DACsys II SERIES PRODUCTS

DP-0202	Digital Signal Processor (2 in/2 out)
DP-0204	Digital Signal Processor Unit (2 in/4 out)
DP-0204SR	Touring Sound Digital Signal Processor (2 in/4 out)
DX-0808	8 x 8 Digitally controlled routing and level control matrix

PC Control Software (Included with each product)

PROGRAMMABLE INPUT/OUTPUT CONFIGURATIONS

- ◆ DP-0202:   1 in/2 out
                    1 in/1 out + 1 in/1 out
- ◆ DP-0204:   1 in/4 out
                    1 in/3 out + 1 in/1 out
                    1 in/2 out + 1 in/2 out
- ◆ DP-0204SR: 1 in/4 out
                    1 in/3 out + 1 in/1 out
   1 in/2 out + 1 in/2 out

PROGRAMMABLE SIGNAL PROCESSING FUNCTIONS

- ◆ 1/3 Octave or 2/3 Octave Graphic Equalizers, or 16-band full-function parametric equalizers
- ◆ 3, 4, and 7-Band multi-function filter sets with the following functions:
  - Full function parametric filtering
  - Low and High-Pass Filtering
  - Low and High-Frequency Shelving
  - All-Pass Filtering
  - High Frequency Horn Boost EQ
  - Notch Filtering
- ◆ Signal Delay
- ◆ Full Function Compressor/Limiter
- ◆ Attenuation
- ◆ Gain
- ◆ Output Muting
- ◆ Symmetric and Asymmetric Crossover Filters
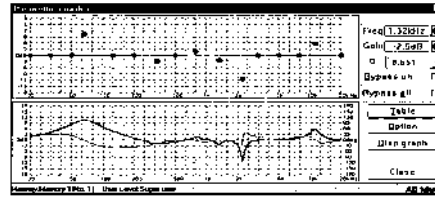- ◆ Noise Gate
- ◆ Polarity Inverter

OTHER FUNCTIONS

- ◆ Graphic displays of Frequency and Phase Response
- ◆ System Lock and Password Protection
- ◆ Input and Output analog Gain and Padding
- ◆ Muting of all Outputs
- ◆ Storage of 16 Presets in Memories with Numeric Indicator
- ◆ Input Level Meters
- ◆ Output Level Meters
- ◆ PC Communication using RS-485 or RS-232C
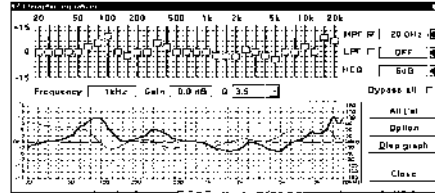
APPEARANCE AND DIMENSIONAL DIAGRAMS

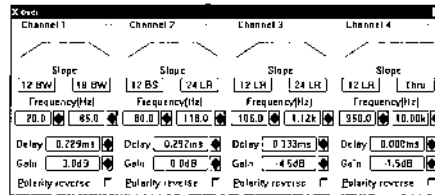
DP-0202

DP-0204

DP-0202
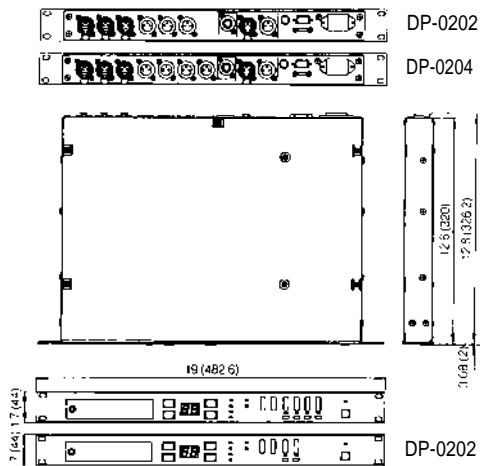
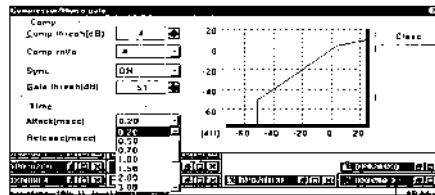Unit: in. (mm)

TYPICAL PC SOFTWARE SCREENS
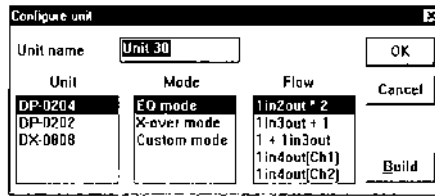

16 Band Parametric Equalizer

1/3 Octave Graphic Equalizer

Crossover Filter

Compressor/Limiter/ Noise Gate

Configure Unit

DP-0204SR

Rear View

Top View

Side View

Front View
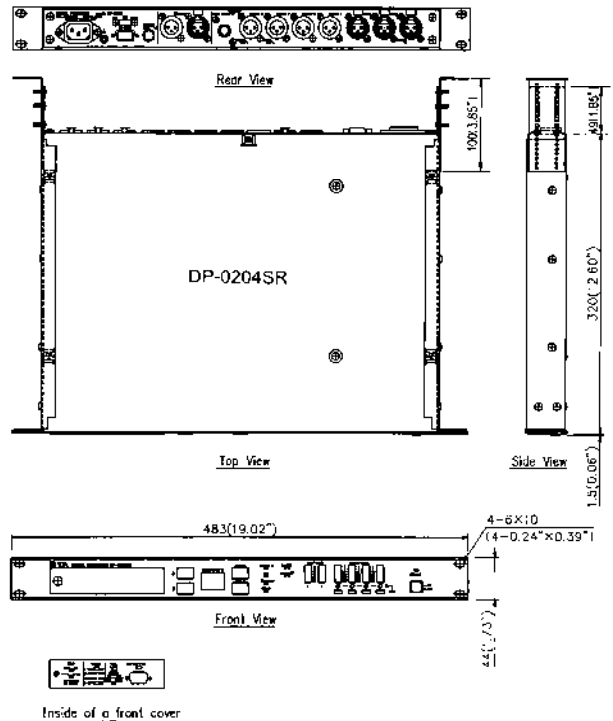
Inside of a front cover

UNIT:Mm   SCALE: 1/4

SIGNAL FLOW EXAMPLES

DP-0202

EQ Mode 1in 1out x 2   EQ Mode 1in 2out   X-over Mode 1in 2out

DP-0204

EQ Mode
1in 2out x 2   1in 3out + 1   1 in 4out

X-overMode
1in 2out x 2   1in 3out + 1   1in 4out

☐ Signal Processing Modules   ☐ X-over Modules
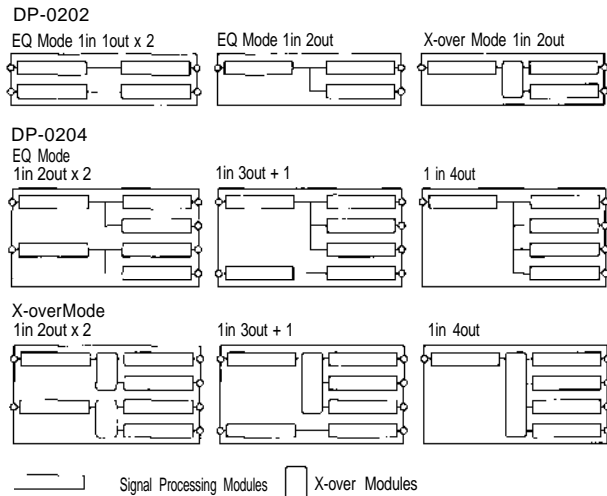
EXAMPLES OF AVAILABLE FUNCTIONS

DP-0202

EQ Mode 1in 1out x 2

X-over Mode 1 in 2out

DP-0204

EQ Mode 1in 2out x 2

X-over Mode 1in 2out x 2

X-over Mode 1in 3out + 1
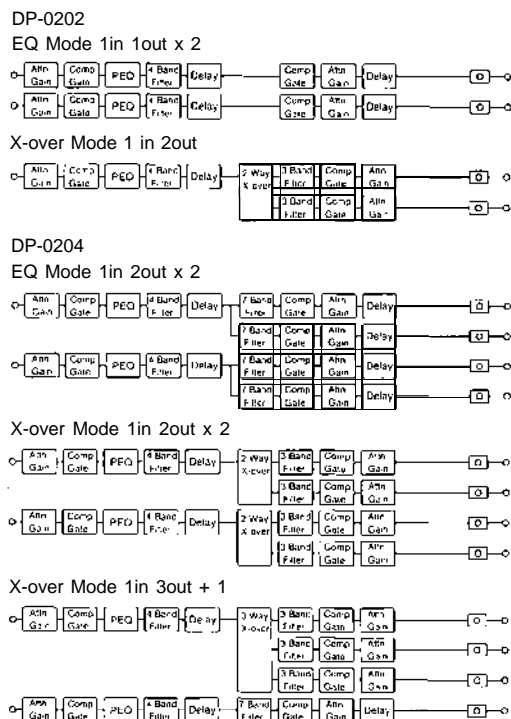
DACsys II SERIES PC CONTROL SOFTWARE FEATURES

- ◆ Single software program controls all DACsys II products
- ◆ Sets configurations and all parameters of up to 30 units in real time
- ◆ Configurations and memory presets can be designed off-line in the office for later downloading
- ◆ User-friendly graphic displays
- ◆ Easy access to each processing function with graphic, simultaneous display of all parameter settings
- ◆ Display of frequency/phase response for each filter set and each output channel for DSP processors
- ◆ Unlimited storage of signal-flow configurations and signal processing parameter settings of each device in data files on hard or floppy disks for archiving and downloading to the hardware units

ARCHITECT'S AND ENGINEER'S SPECIFICATIONS

The unit shall be an all-digital signal processing system providing comprehensive post-mixer signal processing for sound reinforcement, production systems and touring sound applications. The unit shall have 2 inputs and 4 [2] outputs for analog or digital audio signals. There shall be 16 non-volatile memory presets for storage and recall of different processing parameter settings. The unit shall incorporate all solid state circuitry.

Nominal analog input sensitivity shall be: +4dBu (maximum +23dBu), 10k ohm input impedance, electronically balanced. Maximum gain shall be 18dB (6dB analog plus 12dB digital). Hum and noise shall be at least 105dB IHF-A below maximum output. Frequency response shall be +0/-1dB (ref 1kHz) from 20Hz to 20kHz. Analog power outputs shall be nominal +4dBu (maximum +24dBu) into a 600 ohm load, electronically balanced with less than 0.05% THD at 1 kHz. Analog to digital and digital to analog conversions shall be done with full 20-bit resolution.

The inputs shall be switchable to accept either analog or digital audio signals. The outputs, independently of the inputs, shall be switchable to emit either analog or digital audio signals. Digital inputs and outputs shall be provided with a TTL level sensitivity and 75 ohm input impedance.

The signal processing functions shall be inscribed in replaceable firmware (EPROM) within the unit. This will allow upgrades to and changes in the unit's signal processing functions. Digital processing functions shall include: gain; attenuation; polarity inversion; parametric and graphic equalization; signal delay; compression; limiting; noise gate; low and high frequency shelving boost filters; low and high frequency shelving cut filters; crossover filter slope and type; all-pass filtering; notch filtering; and uniform directivity horn EQ. Parameters and parameter ranges for processing functions typically shall be quantitatively variable in ways beyond what is normally available for similar analog functions.

All signal flow and processing functions shall be externally configured, programmed and controlled through the RS-232C or RS-486 ports. The RS-485 ports shall provide the means to link up to 30 units together with control by one external computer. With the external computer control disconnected, the memory preset selection can be made globally for all units by changing the preset on the designated master unit. The RS-232C port shall allow external control of a single unit. Units may be subsequently linked using the RS-485 ports for global memory changes and full control of all units.

Computer software for use with a PC shall be provided to configure, program and control the units. The software shall be a graphical Windows-based program that allows downloading and uploading of configuration and parameter settings and has the capability to store settings as binary files. The program shall provide graphical representations of the configuration showing the signal flow and signal processing functions; dialog boxes showing all parameter setting for each processing function; listing of units in the system; and listings of memory presets. a graphical plot of both frequency and phase response shall be provided for individual equalizer processing functions, and for input-to-output for each output channel. The software shall provide functional lock-outs under hardware switch settings and password protection to prevent unauthorized changes.

The AC line mains shall be 50/60Hz, 100V-240V and power consumption shall be 36W. The digital signal processor shall be enclosed in a durable, painted, black, 0.04 in steel enclosure mechanically reinforced by a 0.08 in. thick, black anodized, aluminum front panel. Overall dimensions shall be 19" w x 1.74" h x 12.9" d. Weight shall be 11 lbs. Standard E.I.A. rack-mount hole spacing shall be included. The digital Signal Processor shall be the TOA model DP-0204 [DP-0204SR, DP-0202].

SPECIFICATIONS**

Model Number DP-0202, DP-0204, DP-0204SR

Performance	
Frequency Response	20Hz to 20kHz, +0dB, -1.0dB
Total Harmonic Distortion	Less than 0.05% at 1 kHz, +4dBu*
Crosstalk	Less than -8odBu* at 1 kHz
Propagation Delay	2.37msec. plus equivalent analog filtering delay

Input and Output	
Analog Input	+4dBu*(Maximum +23dBu*), l0k ohms, Electrically balanced, XLR-3-31 type connector
Analog Output Electrically	+4dBu*(Maximum +24dBu*), 600 ohms, balanced, XLR-3-32 type connector
Digital Input/Output	AES/EBU format, XLR-3-31/3-32 type connector
A/D Converter	20 bit
D/A Converter	20 bit
Dynamic Range	at least 105dB (IHF-A Weighted)
Sampling Frequency	48kHz
Number of Inputs and Outputs	
DP-0202	2-in/2-out
DP-0204	2-in/4-out
DP-0204SR	2-in/4-out

Signal Processing	
Gain/Attenuation	+12.0dB to -60.0dB (-∞ dB) 0.5dB steps with polarity inverter
Compressor/Noise Gate	
Compressor Threshold	24dBu* to -16dBu*, 1 dB steps
Compressor Ratio	1:1, 2:1, 3:1, 4:1, 8:1, 12:1, 20:1, ∞:1
Attack/Release Time	0.02msec to 100msec/10 to 5000msec
Noise Gate Threshold	-72dBu* (-∞ dB) to-26dBu*, 1dB steps
Parametric Equalizer	
Number of Bands	16 points
Center Frequency	20 Hz to 20kHz continuously variable type
Gain	+150dB to -15.0dB, 0.5dB step
Q	0.267 to 34.620, 8 step selectable
1/3 Octave Graphic Equalizer	
Number of Bands	31(Maximum 16 bands used simultaneously)
Center Frequency	20 Hz to 20kHz, ISO standard
Boost/Cut	+15dB/-15dB
Q	3.5, 5.0, 7.0 (Selectable)
High Pass Filter	20Hz to 18kHz, -12dB/Oct.
Low Pass Filter	20Hz to 18kHz, -12dB/Oct.
Horn Equalization	0dB to + 18dB at 20kHz, 1dB step, +6dB/Oct.
2/3 Octave Graphic Equalizer	
Number of Bands	16
Center Frequency	20 Hz to 20kHz, ISO standard
Boost/Cut	+15dB/-15dB
Q	3.5, 5.0, 7.0 (Selectable)
High Pass Filter	20Hz to 18kHz, 12dB/Oct.
Low Pass Filter	20Hz to 18kHz, 12dB/Oct.
Horn Equalization	0dB to +18dB at 20kHz, 1dB step, +6dB/Oct.
3, 4 and 7 Band Filter	
Low Pass Filter	20Hz to 20kHz, Q=0.5 or 0.7
High Pass Filter	20Hz to 20kHz, Q=0.5 or 0.7
All Pass Filter	20Hz to 20kHz, Q=0.267 to 34.620 (8 Steps Selectable)
High Boost Filter	Shelving type, 6.0kHz to 20kHz 0dB to +12dB (0.5dB Step)
High Attenuation Filter	Shelving type, 20kHz to 500kHz 0dBu* to -12dBu* (0.5dB Step)
Low Boost Filter	Shelving type, 20kHz to 500kHz 0dB to +12dB (0.5dB Step)
Low Attenuation Filter	Shelving type, 20kHz to 500kHz 0dB to -12dB (0.5dB Step)
Notch Filter	20Hz to 20kHz, Q=8.65 to 69.25 (4 steps selectable)
Parametric Filter	Full-function Parametric Filter
Horn Equalization	0dB to +18dB at 20kHz, 1db step filter +6dB/Oct.

Signal Delay	
Delay Time	0 to 1.365sec
Reference Unit	Millisecond, meter, inch, feet (Selectable)
Delay Steps	2lµsec (Fine), 5.333msec (Coarse) switchable
Crossover Network	2-way (DP-0202) 2-way, 3-way, 4-way (DP-0202/DP-0204SR)
Type/Slope	Bessel, 12dB/Oct., 18dB/Oct., 24dB/Oct. Butterworth, 12dB/Oct., 18dB/Oct.,24dB/Oct. Linkwitz-Riley, 12dB/Oct., 24dB/Oct.
Crossover Frequency	20Hz to 10kHz, symmetric and asymmetric, 1/12 Oct. steps
Delay Time	0 to 682msec, 21µsec step
Gain/Attenuation	+12.0dB to -60.0dB (-∞ dB) 0.5dB steps with polarity inversion

Mute	Individual output mute, All output mute
Others	
Parametric Link	Up to 256 groups
Parameter Comparison	Between edited and memory preset parameters
Other Functions	
Memories	16 Hardware Memory Presets
Analog Input Gain	0, +6dB (Switchable)
Analog Output Padding	0, -6dB, -12dB (Switchable)
Security	
Hardware	3 status switch settings; Off: All function available 1; Lock all but memory 2; Lock all functions
Software	Password protected; configuration lock only, configuration and parameter edit lock

Control	
Communication Ports Connectors	
	RS-485, RS-232C (On/Off)
	XLR-3-31 type, RS-485 input
	XLR-3-32 female, RS-485 output
	Two DB9 female RS-232C (Front and rear panel)
Programming Software System Requirement	
Hardware	PC compatible 80386 or higher, Math Co-processor recommended for the frequency and phase response graphic display 4MB of memory or higher 1MB HDD space VGA Color Monitor recommended Mouse Recommended
Software	Windows 3.1 or later
Memory Input/Output	
Connector	8 pin, mini DIN
Function	Logic level memory control input and memory status output
Word Clock External Input	TTL level, 75 ohms, BNC connector

Panel Functions (Front Panel)	
Input Selector	Analog inputs/digital inputs, switchable
Output Selector	Analog outputs/digital outputs, switchable
Word Clock Selector	Internal/external, switchable
Memory Selection	Up/down keys
ID Number Setting	Momentary slide switch and up/down keys
Display	2-digits, 7-segment LED display, memory number and unit number, switchable up/down key selection
Operating Status LEDs	DIGITAL IN (green), RUN (green), EMPHASIS (green), ERROR (red), MASTER (green), OVERFLOW (red)

Level Meters	
Headroom Indication	7 LEDs bar graph meter, 0dB (red) 6/18/24/30/42/60dB (green)
Input	2 Channels
output	2 Channels(DP-0202) 4 channels (DP-0204, DP-0204SR)
Mute Switches	Each output w/LED (green)
Power Switches	Power ON/OFF w/LED (green)

Panel Functions (Rear Panel)	
Ground Lift Switch	Normal/lift
Power Inlet	3 pin, IEC-320 standard
Power Requirement	AC100V to AC240V, 50/60Hz
Power Consumption	36 watts maximum

Physical	
Dimensions	19"w x 1.75"h x 12.9"d, EIA 1 rack unit size
Color	Black, anodized aluminum (Front Panel), black painted steel (Chassis)
Weight	11 lbs.
Accessories	(1) AC power Cord (1) Tamper Proof Screw for front security cover (Replaces a standard Phillips head screw) (2) Instruction Manuals (l-hardware, l-software) (1) Software Diskette (2HD, 3.5")

*0dBu=0.775V RMS

**Specifications are subject to change without notice

ZTOA