

Product Review

Monarchy SM-70 Pro Power Amplifier

Reviewed by Gary Galo

Monarchy Audio SM-70 Pro Power Amplifier, DIP 24/96 Jitter Suppressor, and DR-1 Digital Interconnect Cable. Monarchy Audio, 380 Swift Ave., #21, South San Francisco, CA 94080, 650-873-3055, FAX 650-588-0335, monarchy@earthlink.net, www.monarchyaudio.com. Prices: SM-70 Pro—\$980, DIP 24/96—\$249.99, DR-1 Cable—\$239.

In *Audio Electronics* 5/00, I reviewed the first power amplifiers from Monarchy Audio, the SM-70 and SE-100 Deluxe. Monarchy has been working steadily to improve their power amp designs, and has recently introduced an upgraded version of the SM-70. Also new from Monarchy is an improved version of their high-value Digital Interface Processor clock jitter suppressor.

SM-70 PRO

The SM-70 Pro is the latest version of Monarchy's "zero-feedback" power amplifier design (*Photos 1 and 2*). The new "Pro" version is very similar in design to the original SM-70, with a couple of important changes. The number of output MOSFETs has been doubled—there are now four per channel in a push-pull parallel arrangement. To accommodate the additional heat, Monarchy has increased the chassis and heatsink size. The SM-70 Pro is now the same size as the SE-100 Deluxe.

The power supply has been improved in three ways. First, the SM-70 Pro has a larger toroidal power transformer than its predecessor, raising the raw supply rails to $\pm 32V$ DC. Second, Monarchy supplies each amp with a pair of low-noise Shindengen D6SB60L rectifier bridges (the original amp had only one rectifier bridge). These are the same rectifiers I described in my *AE* 5/2000 article, "Upgrading Monarchy's Converters and Amplifiers." Finally, power-supply filter capacitance has



PHOTO 1: The SM-70 Pro power amp, front and rear. Like its predecessor, this stereo power amp performs best when used as a balanced-input monoblock.



PHOTO 2: Inside the SM-70 Pro. A pair of low-noise Shindengen D6SB60L rectifier bridges are standard equipment in the new amp.

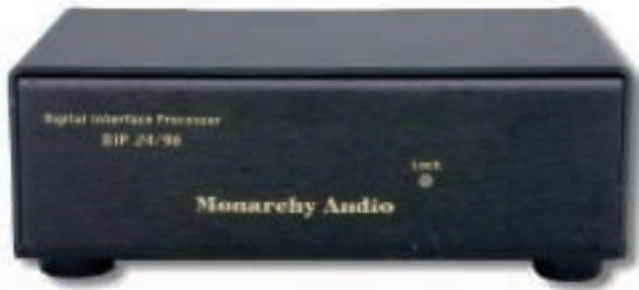


PHOTO 3: Front view of the DIP 24/96. The new DIP chassis includes a digital lock light on the front panel.



PHOTO 4: Rear view of the DIP 24/96. Both coax and Toslink optical inputs are included, along with coax S/PDIF and AES/EBU outputs.

been increased to a total of 60mF (millifarads); the original had 40.

Monarchy originally used one half of a Burr-Brown OPA2604 op amp to supply the voltage gain for each amplifier. The Pro version uses two OPA2604 chips, one per stereo channel. One half of the op amp is used for voltage gain, and the other half is used as a unity-gain buffer/driver for the MOSFET output stage. The DC supply rails for the OPA2406 op amp have been regulated at $\pm 24V$ DC with an LM317/337 pair.

In my 5/00 review I noted that the SM-70 failed to deliver its rated power of 25W/channel stereo and 75W in the bridged mono mode. The new SM-70 Pro amps are rated at 25W/channel stereo and 80W bridged mono into an 8 Ω load; mono output into 4 Ω is rated at 120W. I was able to verify the manufacturer's power output ratings for both of the SM-70 Pro review samples. Monarchy's doubling of the output transistors, along with the addition of the unity gain buffer, allows the new amps to make their rated power.

The op amps are configured with conventional feedback techniques. The "zero-feedback" designation refers to the lack of global feedback from MOSFET output stage back to the input stage. The op-amp gain stages and buffers use conventional feedback techniques.

Like the original SM-70, the SM-70 Pro has rather high voltage gain. In the stereo mode, each channel has a voltage gain of 28.25, or 29dB. As bridged monoblocks, the voltage gain is 53.75, or 34.6dB.

The high gain makes these amplifiers suitable for use with passive "pre-amps." However, the use of a passive preamp will probably preclude operation of the SM-70 Pro amplifiers in the fully-balanced mode, which is where

they perform at their best. The new amplifiers are extremely well-constructed, and weigh in at a chunky 24 lbs each.

I did all of my listening to the pair of SM-70 Pro review samples operated as monoblocks using both balanced and unbalanced sources. The SM-70 Pro amplifiers are superb sonic performers. Sonically, they are remarkably similar to the original SM-70 amps, and are among the most musical amplifiers I have heard.

Excellent inner detail has always been a hallmark of Monarchy products, and the SM-70 Pro is no exception. The famous Monarchy "layering" and excellent delineation of instruments within a complex orchestral fabric is ever-present in these new amps. Like the SM-70, the Pro version is somewhat euphonic, with a warm and slightly sweet sonic presentation, and a slightly richer-than-life harmonic palette. The heftier output stage and power supply have resulted in improved dynamic contrasts, and

a punchier low end than the original SM-70. Overall, the changes made in the SM-70 design have been extremely worthwhile.

The SM-70 Pro offers the best sonic performance when fed from a fully balanced source, such as Monarchy's Model 22B or Model 33 D/A converters. As before, the amplifiers take on an extra measure of transparency in the fully balanced mono mode. Sonically the SM-70 Pro amplifiers offer extremely high value, and will compete favorably with many of the megabucks amps currently on the market.

The SM-70 Pro comes with a grounded power cord but, like its predecessor, the amp hums unless the ground pin is lifted, even with no input connected. The original SM-70s were silent with the ground pin lifted, but the new amps still have a trace of background hum even with the ground pin lifted, though the hum is lower in level without the ground pin. The hum remains with or

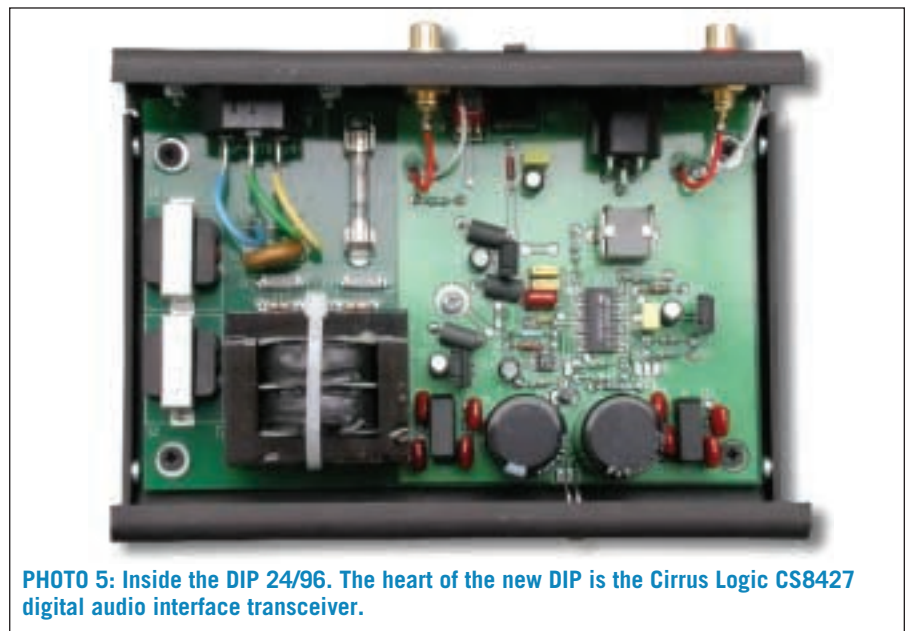


PHOTO 5: Inside the DIP 24/96. The heart of the new DIP is the Cirrus Logic CS8427 digital audio interface transceiver.



PHOTO 6: Monarchy DR-1 75Ω interconnect cable. The DR-1 is an extremely stiff cable with a solid Teflon® dielectric.

without an input connected, and is essentially at the same level with balanced or unbalanced inputs connected.

With my Audio Concepts Sapphire III/Sub-1 loudspeaker system, I needed to have my ear within a few inches of the mid-bass driver in order to hear the hum. At normal listening distances, the hum was not audible. These amps still appear to have a grounding anomaly that hasn't been totally worked out. I don't recommend the SM-70 Pro amps for use with high-sensitivity loudspeakers. This is unfortunate, since these low-power amplifiers would otherwise seem well-suited to high-sensitivity speakers.

DIP 96/24

The DIP 96/24 is the latest product in Monarchy's series of Digital Interface Processors for suppression of clock jitter (*Photos 3, 4 and 5*). The heart of the DIP 96/24 is the Cirrus Logic/Crystal Semiconductor CS8427 Digital Audio Interface Transceiver. Previous input receiver/re-clocking chips from Cirrus, such as the CS8412, did not incorporate a transmitter chip (the CS8402 transmitter was the chip normally used in conjunction with the CS8412). The new chip combines both transmitter and receiver functions in a 24-pin SOIC package.

The CS8427 also operates at 96kHz sampling rates, and at bit rates as high as 24-bit. You can custom-tailor the phase-locked loop (PLL) in the CS8427 to offer optimum performance over a wide range of sampling rates—as low as 8Hz. However, jitter performance is reduced if the PLL is designed to accommodate extremely low sampling rates.

Cirrus Logic's data sheet includes a chart specifying external PLL component values for an 8–96kHz range, and a 32–96kHz range. Monarchy has custom-tailored the PLL component values for sampling rates between the CD standard of 44.1kHz and 96kHz, improving jitter performance even further (Monarchy believes that the audiophile com-

munity is not likely to use this product at sampling rates lower than 44.1kHz). The DIP 96/24 is fully compatible with variable-pitch CD transports, and has no problem maintaining lock as the pitch control on my transport is run through the full $\pm 12\%$ range (dropping the pitch by 12% lowers the sampling rate to 38.8kHz).

Monarchy has been extremely careful in designing a proper operating environment for the CS8427. Monarchy has designed their own power-line filter rather than using a stock IEC power cord connector with a built-in filter. They have also used a dual-bobbin power transformer, which further attenuates high-frequency power-line noise.

The CS8427 has three power-supply pins—two digital and one for the PLL. Monarchy has supplied separate 7805 regulators for each of the three 5V supplies. They have also included three ferrite beads in the DC supply lines to provide additional rejection of high-frequency supply noise.

The PLL supply has its own rectifier bridge and raw DC filter cap. The DIP 96/24 has both S/PDIF RCA and Toslink optical inputs. Two outputs are also included—S/PDIF and AES/EBU. Monarchy has coupled the outputs with an extremely high-quality pulse transformer.

The DIP 96/24 is a superb performer. In my review of The Parts Connection's DAC 3.0 in *AE 6/00*, I noted that any outboard jitter boxes I tried actually degraded the performance of this reference-quality DAC. Monarchy's DIP 96/24 is the first outboard device I have used with the DAC 3.0 that actually improves its performance.

This was a shock to me at first, since I really thought I had reached sonic nirvana with the DAC 3.0, and wondered just how much better the sound could really become. Inserting the DIP 96/24 improves soundstage width and depth, both in size and precision of localization. Inner detail and articulation is improved, and the treble region takes on an even more open and airy quality. These improvements are also readily apparent when I used the DIP 96/24 with my DVD player and the 96/24 PCM discs from Classic Records (especially the Rachmaninoff *Symphonic Dances*, DAD 1004).

With permission of Monarchy Audio owner C.C. Poon, I changed the input and output RCA connectors to Canare 75Ω BNC jacks. The DIP 96/24 is refined enough to really allow you to hear the difference between the stock RCA connectors and the BNCs. For those willing to go the extra mile, switching to BNC connectors will allow you to extract the last ounce of performance from your digital audio system.

The DIP 96/24 is a terrific performer. At the factory-direct price of \$249, the new DIP continues Monarchy's tradition of offering the best buys in outboard clock jitter suppression. Highly recommended!

DIGITAL CABLES

Monarchy Audio also manufactures interconnect cables, including several for digital audio. Some time ago, Mr. Poon sent me the DR-1 Digital Reference for evaluation (*Photo 6*). It is a $\frac{1}{2}$ " diameter, 1m cable featuring a solid Teflon® dielectric, silver-plated conductors, and a triple shield. The DR-1 is fitted with gold-plated, Teflon®-insulated RCA connectors.

In my listening evaluations the DR-1 provided excellent performance—better, in fact, than any RCA-type digital interconnect I've heard in my system. But, I still prefer the extra transparency and airiness of the DH Labs D-75 fitted with 75Ω Canare BNC connectors. The DR-1 is extremely stiff and rather a beast to use. You may need to physically separate the components you intend to connect, since even moderate bends in the cable are difficult. Connecting a DIP unit to a D/A converter, if they are stacked one on top of the other, may prove to be a challenge.

The DR-1 retails for \$239, which certainly isn't cheap. But, if you price the competition in RCA-based digital cables, the DR-1 offers very competitive performance.

Monarchy also makes several other digital and analog interconnects worth investigating, including the thinner and more flexible DR-2 digital interconnect (\$119) and the AR-2 Analog Reference (\$239/1.5 meter pair). Both feature a solid Teflon® dielectric, silver-plated conductors, and gold-plated RCA connectors with OFC center pins. ❖