

# BAG END GEM SERIES

## SOUND REINFORCEMENT LOUDSPEAKERS

A decade after introducing the TA-12—an innocuous little two-way speaker that set a new standard for MI enclosures—Bag End has done it again. Building on the more recent success of its ELF subwoofer technology, the company has introduced a three-model line of high-power concert P.A. enclosures that offer value, simplicity and accuracy. The first of the new series—dubbed the Gem Collection—is the 12-inch, two-way Sapphire, a floor monitor that doubles as a stand-mountable, full-range enclosure. The Sapphire first was presented at the New York AES over a year ago. At the last NSCA show, two other family members were unveiled: the Crystal and the Quartz.

### ABUSED IN KEY LARGO

The system we reviewed consisted of two of the new Crystal double-12 full-range enclosures and a single quad-18 Quartz subwoofer that employs Bag End's ELF technology to provide solid lows down to 20 Hz. We powered the system with two QSC PowerLight 4.0 amps and used and abused it for several months in Portland, Oregon's well-known Key Largo club, which has a capacity of roughly 300. The system's frequency and phase response as measured on the SIM II system is smooth and flat and needed little or no EQ—say a couple dB at 5k, 1k and at 200 Hz, though we ran it with no graphic inserted on most nights. It sounds great, relying on a processor only for the phenomenal low end, and it's quite compact for the SPL produced. The system sounded as good or better than most high-priced processor-based speakers on the market and puts out much more sound than many other similarly sized systems.



Two additions to Bag End's Gem Series: the Quartz (above) and Crystal (top) speakers

All three models in the Gem Collection are constructed of 3/4-inch Finland birch plywood, finished with a rugged black urethane and fitted with attractive powder-coated steel grilles. The dual-12 Crystal (\$2,750 list) has the same components as the smaller, single-12 Sapphire: two 3-inch voice coil 12-inch woofers and a titanium-diaphragm compression driver fitted to a 1.5-inch throat, with an oval-mouthed waveguide offering 50deg.x40deg. dispersion. An internal



1.9kHz passive crossover is used to Time Align® the two 12s with the compression driver. The Crystal weighs 100 pounds, and is 39 inches high, 16 inches deep and only 18 inches wide. It has two different trapezoidal side angles, one of which allows it to be used on its side as a 45deg. angle floor monitor. The Crystal has Anca fly points on the top, back and bottom, and a 35mm stand-adaptor. Off-the-shelf rigging products are also available from ATM Flyware. Two similar adaptors on the Quartz sub allow it to be used with short poles in a double-mast configuration supporting two Crystals for a complete system that sets up quickly, covering 100deg. of horizontal dispersion. Because of the compact size, the combination makes for a high-power, van-sized "no-crew" sound system.

The Quartz ELF subwoofer (\$3,500 list) is a powerful, compact sub-bass solution for those seeking a solid building block for any full-range system.

ELF is an acronym for Extended Low Frequencies. The principle behind the ELF technology is both simple and elegant. The ELF transducers are not the kind of 18s that would be installed into a ported cabinet, but a low-compliance woofer designed for a sealed cabinet. As the cabinet is not tuned to a specific low frequency using a port, the woofers can be relatively small. Such a sealed speaker, by itself, exhibits a falling response at lower frequencies. Make no mistake—the ELF technology requires special speakers and an ELF Integrator to work.

The other half of the ELF system is the processor, or Integrator, that has a response that increases inversely with frequency at 12 dB per octave, providing the complement to the response of the sealed-chamber woofers below their resonance. At higher frequencies, the falling response of the integrator attenuates the woofer. This approach provides very low frequency response without the larger frequency-dependent delay inherent in traditional lowpass crossover filters. An ELF cabinet also presents the amplifier with a load that it's happier driving, as the transducer's resonant frequency is nearly out of the operating band. I won't go into all the details, as they are available in a Bag End technical paper on the subject. Suffice it to say that ELF subwoofers sound tight and musical in a way that's just not possible with traditional ported bass reflex subs. Sound Image of Southern California incorporated ELF technology into its five-way touring P.A. several years ago, and the first time I heard live music on the system I marveled at the in-your-face clarity and detail in the low end of the bass guitar and kick drum.

### ENTER THE INTEGRATOR

There are three versions of the ELF Integrator processor, which connects into an audio system in the same place an active two-way electronic subwoofer crossover would. The ELF-1 (\$2,460 list) is a full-featured model with 45 DIP switches (behind a security panel) for individual channel adjustment. The switches permit precise adjustment to tailor the response of ELF enclosures and match them to any full-range speaker system. All you can see after the steel security panel is in place is three pairs of large LEDs

that indicate signal presence and thresholds for low and high frequency protection for each channel. Because of its daunting control surface, the ELF-1 is best used with the same speaker system on a regular basis, whether touring or installed.

The ELF-M (\$895) is a much simpler version that runs on 11 to 18 VDC that can be supplied by the provided wall wart or from other DC sources for creative applications (e.g. custom car audio systems). The ELF-M has balanced stereo inputs, and unbalanced outputs for the stereo highpass and mono ELF signal, and is typically installed in the amp rack. The crossover frequency is preset at 130 Hz, but this can be changed by doing some math and swapping several internal resistors on plug-in sockets. The ELF-M2 (\$1,095) is identical, with the addition of limiters to the stereo highpass outputs. Though the functionality and packaging of the ELF-1 is impressive, users will find the less expensive processors adequate for all but full-blown professional touring applications and installs.

The compact Quartz quad-18 sub measures 40 inches high and 30 inches deep. It is 30 inches wide at the front, six inches wider than at the back. It weighs 225 pounds, has four casters on the back and, on its wheels, presents two recessed handles on each side. The Quartz has two pairs of side-ways-mounted transducers, each in its own sealed enclosure and facing each other into a shared mouth. There is a pair of Neutrik NL4 connectors for each pair of 400-watt, 8-ohm transducers, presenting two 4-ohm, 800-watt loads.

Our review system was generously powered with QSC PowerLight 4.0 amps running nominal 4-ohm loads on all channels, full-range and subs, with plenty of headroom all around, and we could have easily doubled the loads down to 2 ohms, had we wanted.

The output from the single Quartz in our review system was more than enough to keep up with the two Crystal full-range enclosures, and I dare say that a 1-to-2 ratio of these subs will work with any full-range speaker on the market. If you don't need an entire new front end, this radical sub may be the simplest way to upgrade the impact of your mains without replacing everything. Together, the Bag End Gem Series

speaker products offer sound vendors the ability to put together a wide variety of system designs from a very simple inventory.

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