



# Bradley

B R O A D C A S T

Catalog Supplement

August 1992

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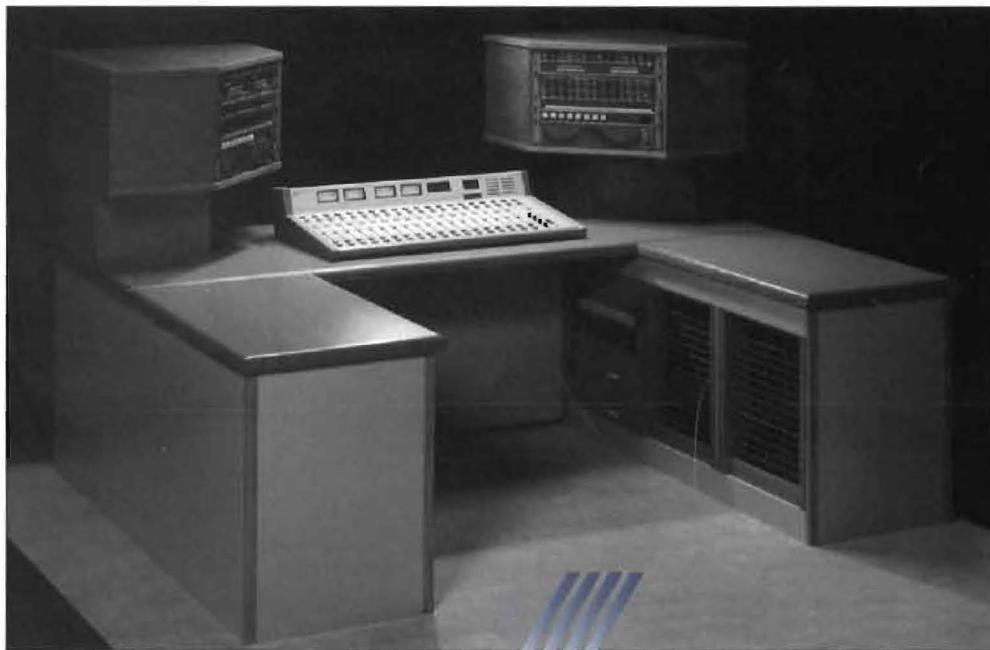
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## Audioarts Makes Interiors Attractive and Functional



An attractive furniture solution that's functional, flexible, and fiscally feasible. Audioarts brings their renowned design staff to task with a line of studio furniture that is some of the best we've ever seen. Clean, open design is modern in concept, but timeless in that it will never be out of style. This is an investment that you'll be able to live with as long as you have it.

W

heatstone has a rock solid reputation with their Audioarts products. New to the line are the R-10 console, and a line of furniture that is guaranteed to give any facility a face and functionality lift.

### Audioarts R-10 Console

It's another price/performance breakthrough for Audioarts. The R-10 console includes such high value features as gold contact audio switches, gold edge card connections, conductive plastic faders and pots, socketed IC's , and fully modular construction in a console priced under \$4500.00. The R-10 comes standard with 10 inputs, and may be configured for any combination of mic inputs, stereo line inputs, or blank panels. An optional rear panel is available to bring all inputs, outputs, and communication ports out to XLR and DB-25 connectors for fast field hookup.

This is the console value for small stations, or larger stations needing a remote or utility console with real broadcast specs and performance.

**R-10** *MFR LIST* **\$4495.00**



### Audioarts Engineering Furniture Systems

Gone forever are the days when studio furniture selection was a complex and confusing process. Audioarts Engineering provides 25 readily understandable, standard furniture configurations at affordable prices, with highest furniture quality. All configurations include under console cabinet racks and punch block housings. Virtually any conceivable studio design can be selected, and augmented with options such as cart or CD rackmount storage, reel to reel slope tops, 7 or 12 inch high drawers, or stand-up height configuration. The beauty of the Audioarts furniture system is its fully integrated design, which insures that any configuration you choose will be fully and properly engineered, with no last-minute glitches to mar your installation.



*Audioarts furniture is as well thought out from behind as it from the front.*



Construction is of the latest in steel structurally reinforced cabinetry, with high grade hardwood protected corners and counter edging. Seamless, horizontal grade laminated surfaces prevent dirt buildup and chipping. All furniture is built with generous wire passages and large removable access panels, for speedy installation and simple wiring and equipment changes.

Contact your Bradley sales professional for a complete brochure and specifications on all standard furniture systems from Audioarts Engineering.



## Otari DTR7 DAT Recorder

Otari has been the trusted name in reel to reel machines for many years throughout the audio industry. Now comes the latest advance in Otari digital technology, the DTR7 recorder. This deck is a simply designed recorder providing all the essential features for audio production. A full complement of inputs and outputs are provided, including balanced analog in and out, plus AES/EBU and SPDIF digital interfaces.

A sampling monitor feature is provided, to allow input signal monitoring through the A/D and D/A converters. Combined with precise dB indication of margin to peak levels, these features insure that you may readily obtain optimum record levels. Other standard features are rack mount (3U) and wireless remote control. The DTR7 supports record and playback at 48, 44.1, and 32kHz sample rates.



Call your Bradley professional today for a great introductory deal on the DAT machine for the 90's and beyond.

**DTR-7** *MFR LIST* **\$1695**

## Marantz CDR-600 CD Recorder

The Marantz CDR-600 is a complete CD recording and playback system featuring stop/start recording, full Red and Orange book compatibility, and state of the art A/D and D/A converters. Because the CDR-600 can create and read a temporary table of contents, recording can be stopped and resumed at a later time.

Analog inputs are Balanced XLR, and SPDIF and optical digital I/O are also provided. Radio stations can compile up to 74 minutes of jingles and sound bites for use on air. Programming services can create master discs prior to mass production. Archivists can use the CDR600 to conserve old recordings, providing sonic purity and safer long-term storage.

Only your imagination limits the possibilities that can be found for this economically priced recorder. Virtually any serious station, studio, or production facility should own a CDR600. Call Bradley Broadcast for a great introductory price on this revolutionary recorder from Marantz.



**Marantz  
Recordable CD  
Technology!**

**CDR-600** *MFR LIST* **\$7500.00**

## Marantz PMD-700 Portable DAT Recorder

You can achieve outstanding results with this compact Marantz Portable DAT Recorder. It offers a full range of capabilities needed by the audio professional, yet it is the smallest and lightest DAT recorder available. Features include both AES/EBU and SPDIF protocols for use with all digital equipment. Capable of recording in absolute time, the PMD700 is SCMS free, has balanced XLR line microphone inputs, and supports digital playback and record at 32 kHz, 44.1 kHz, and 48 kHz sample rates. Weighing under 3 lbs. with batteries, this is the DAT for all your remote needs.

**PMD-700** *MFR LIST* **\$2500**



## Denon DN-951FA CD Cart Player

Building upon the revolutionary design of the DN-950FA, this new CD Cart player adds a host of new user demanded features. First is the new auto track select system. By reading bar-coded labels, the player can lock out play of a specific track, enable play of only one track, or auto-cue to one specific track while allowing manual selection of other tracks. The DN-951FA also allows selectable fixed speed increase of up to 3% over normal speed, in .2% increments. Three units may be rack mounted side-by-side, at an angle up to 30 degrees from level. Other features provided on this new machine include end monitor, to automatically preview the end of a selection, and EOM signal with a preselectable (5 to 35 second) alert point. In addition to balanced outputs to drive 600 Ohm balanced lines, the DN-951FA provides AES/EBU digital audio output, for direct digital interconnect.

*Also available:*

### Denon DN-961FA Drawer Loading CD Player

This new player provides many of the features of the DN-951FA, for those stations who prefer not to use to use the CD Cart system. The DN-961FA provides smooth, fast drawer loading and unloading, with Eject Lock during play to prevent accidental ejection. Except for auto track selection, this unit provides all of the features found on the DN-951FA.

DN-951FA	MFR LIST	\$1350.00
DN-961FA	MFR LIST	\$1350.00



## SKB Rack Mount Cases

Constructed of polyethylene with welded frames, these racks are extremely durable with less than half the weight of comparable wooden racks. The draw-tight latch front and rear covers are gasket sealed to keep out moisture and dirt. Structural rigidity is built-in, so that your equipment takes less abuse in travel. These racks meet Airline Transport Association (ATA) specs and are manufactured in the USA by SKB. Bradley purchased a large quantity and is passing the savings along to you.

Rack mount cases have removable front and rear covers and front mounting rails. Cases have two carrying handles and stack.

2 space	\$75.00	8 space	\$120.00
4 space	\$85.00	10 space	\$135.00
6 space	\$95.00	12 space	\$150.00

*All cases are 15" deep.*



*Also available:*

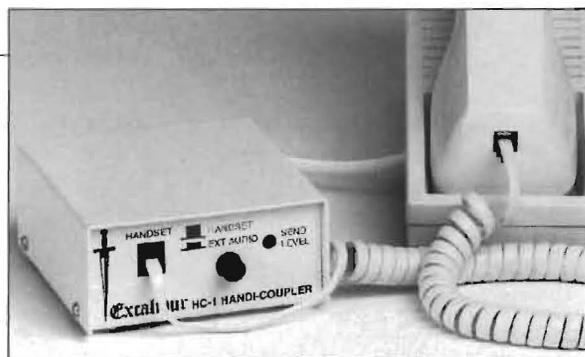
Need a case to stash those odds and ends? The SBK-1713 is the answer. It offers the same rugged construction, but is carried briefcase style. Top lid is hinged at the back. 17" X 13" x 12".

**Utility case \$ 69.00**

### Excalibur HC-1 Handi-Coupler

The HC-1 Handi-Coupler gives you the simplest, quickest, most convenient way to connect audio to a telephone. The HC-1 connects in series with the handset of any telephone using modular connectors. Since a connection to the telephone line is not required, the HC-1 can be used with almost any telephone, single or multi-line, modern electronic or older key systems. Pressing the front panel button disconnects the handset and connects the external audio in/out jacks to the telephone. Releasing the button reconnects the handset, allowing normal use of the phone. External audio is connected via separate in and out jacks. Both inputs and outputs are TRS jacks wired so that you may connect either balanced or unbalanced connectors into them.

The Handi-Coupler is ideal for use in many locations around the station: on-air, production, the newsroom, the sales office, etc. Its low price lets you put an HC-1 everywhere one is needed.



**HC-1 Handi-Coupler \$99.00**

### Telfax "Game of the Week" Packages

Select either the Telfax GX-300 or GX-400 remote mixer and Bradley will fit it with two AKG Q-34 headsets with connectors at a very special price.

**Valued at \$1305.00 Package 9209 w/GX-300 \$1109.00**  
**Valued at \$1405.00 Package 9210 w/GX-400 \$1196.00**



### Telfax "Championship Series" Packages

These deluxe systems offer your choice of the Telfax GX-400 or GX-440 remote mixer, two pairs of Shure SM2 headsets with connectors, and a large Porta-Brace run bag. Of course, we will give you a great deal on a package you design, too.

**Valued at \$1652.00 Package 9211 w/GX-300 \$1317.00**  
**Valued at \$1797.00 Package 9212 w/GX-400 \$1455.00**

*Great for Campaign Coverage!*



### Zercom MAX-Z II Remote Console

MAX-Z II is an elegant unit for remote broadcast situations. Its basic features include two mic/line inputs (one switchable to cue), plus 1/8" tape input, two headset outputs, and 24 hours continuous duty on one battery charge. Front panel indicators display battery and AC status, power on, line active, cue active, and VU indications. A tone/pulse touch pad features last number recall. Weighing only 6 pounds, this compact unit comes complete with carrying case so it is road-ready for your remote requirements.

**MAX-Z II MFR LIST \$600.00**

**Also available:**

MAX-Z includes four mic/line inputs with front panel level controls and rear panel trim pots, clock with set controls, and timer. Buttons are provided for channels 3 and 4 which divert audio to the cue buss for "spotters" or other cuing needs. The complete MAX-Z system includes a custom carrying case, built-in rechargeable battery, and 110/220VAC operation. Size: 13" x 17" x 5"; weight: 15 lbs.

**MAX-Z MFR LIST \$1095.00**

**Special Zercom "Game of the Week" Packages**



Get a Zercom remote console with carrying case and two Beyer DT109 headsets with straight cables and connectors at a very special price. Put together your own combination by calling or faxing us today.

**Valued at \$1127.00 Max-Z II Package 9213 \$947.00**  
**Valued at \$1622.00 Max-Z Package 9214 \$1397.00**



### Audio Control Industrial SA3050A Real Time Analyzer

Until the Audio Control Industrial SA3050A real time spectrum analyzer came along you had to pay a ransom for a serious measurement grade RTA. In sound reinforcement applications, the SA3050A is used to acoustically test and adjust overall frequency response by using the supplied calibrated microphone and built-in pink noise generator. It can just as easily and accurately test frequency response of an electrical audio source like a tape recorder, telco program circuit, mixing console, or any other device via its balanced, bridging, wide input range line input. For critical, intra-circuit measurements there is a 1 megohm BNC input, also with a wide input level range.

The LED display simultaneously shows the amplitude of each of the 30 ISO third octave frequencies between 20Hz and 20kHz. Three response times allow analysis of transient, average, or integrated response. Results of acoustical or electrical response tests using the digital pink noise generator, whose response is flat to within 0.25dB, can be viewed instantly on this simultaneous 30 band display. An individual response curve can be frozen on the display, and the SA3050A can store up to six different frequency response curves in its internal memory.

An internal back-up battery maintains the contents of the memory for up to one year, even with the AC power disconnected. Acoustical noise spectral distribution and absolute sound pressure level measurements are also in a day's work for the SA3050A. No station, studio, sound reinforcement company, chief, or consulting engineer should be without the SA3050A real time analyzer, especially at this price. Available as a basic unit or loaded with both an internal, rechargeable battery with 5 hour life and a parallel printer interface for use with your printer.



**Basic unit** *MFR LIST* **\$995.00**

**Deluxe unit** with rechargeable battery and printer interface  
(Printer not included.) *MFR LIST* **\$1300.00**

**Accessories:**

**RM-10 rack mount adapter** requires 3 rack spaces (5.25").

*MFR LIST* **\$55.00**

**SC-10 soft carrying case** with pocket for mic and cables.

*MFR LIST* **\$59.00**

**AC-10 in line filter** for "A" weighted measurements.

*MFR LIST* **\$44.00**

### LX-1 Six-Input Stereo Selector

The LX-1 Stereo Switcher from Burk allows you to integrate all studios through one master control unit. With the LX-1 the transition from studio to studio is smooth and quiet and levels remain constant. The LX-1 can be connected to your remote control system for remote program switching. Matches -10 IHF to +4 PRO inputs, so no external matching equipment is needed. Additionally, the LX-1 allows mixing of two studio sources, or lockout of all audio sources. Tally indications are provided for each source, making it clear which one is on the air. Individual start and stop pulses are also available for each source, making it easy to start a fill tape, reset automation, or activate an EBS generator.



**LX-1** *MFR LIST* **\$1295.00**

### Crown CSL Amplifiers

Crown's reputation for sonic accuracy and bullet-proof performance is obvious in the 460-CSL and 800-CSL. A computer designed heat sink/fan combination dissipates heat efficiently to protect the amps, while Crown circuitry provides full protection from output shorts, mismatched loads, RF burnout, input DC, and input overload. The 460-CSL puts out 200 watts per channel into 8 ohms, and the 800-CSL puts out 320 watts per channel into 8 ohms. Other specifications, which are common to both units, are S/N ratio 103dB @ full output and 26dB gain; response ±0.5dB, 20Hz to 20kHz; harmonic distortion, less than 0.1% at rated output into 8 ohms, both channels driven; IM distortion, less than 0.05% at rated output into 8 ohms, both channels driven; and damping factor greater than 1100. Input connectors are 1/4" TRS jacks and output connectors are binding posts.



**460-CSL** *MFR LIST* **\$849.00**

**800-CSL** *MFR LIST* **\$1079.00**



### Rebate Adds to New Products' Appeal

If the audio quality and features of our new digital hybrids have not convinced you to purchase them, **Bradley Broadcast** will entice you further with a factory rebate. From now through September 30, you can get back \$250 on the purchase of a **Telos 100 Delta** and \$100 on a **Telos ONE plus ONE**.



Telos 100 Delta (top) and Telos ONE plus ONE

The **Telos 100 Delta** uses our fourth generation DSP-based hybrid. Full-duplex, natural sounding conversation is possible on even the most difficult phone lines. Unique to the **100 Delta** is dynamic, digital equalization to correct phone line frequency response problems. Digital acoustic ducking and pitch shifting provide greater gain before feedback when using open speakers to monitor callers. The advanced digital AGC used in the **100 Delta** is very smart and very fast so that processing is only as dense as required for consistent caller levels. Our level processing, like your ears, relates to loudness on a logarithmic (dB) scale yielding processing that is consistent across all audio levels.

The **100 Delta** includes two mixed inputs (one line level and one selectable for mic or line) and two outputs (one with caller audio and the other a continuously adjustable mix of caller and mix-minus). This configuration simplifies creation of external mix-minuses. **DUPLEX DEPTH** can be adjusted for full-duplex, half-duplex, or any point in between. Two **DEPTH** settings can be stored and

*Continued on page 4*

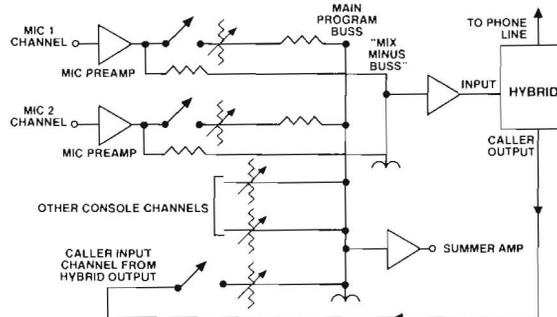
### Mix-Minus Does Not Have to Be "Headache-Plus"

"Mix-minus" is one of the terms most often used during the installation of a broadcast-to-telephone interface. Unfortunately, it is also one of the most confusing. The following is a brief primer on mix-minus to help you avoid frustrations during your next installation. For complete details, call or fax **Bradley Broadcast** for your free copy of *Telos' Mix-Minus Questions & Answers*.

Mix-minus refers to the signal which feeds the hybrid "send" input. The "send" is the audio that is fed back down the phone line to the caller. It's called mix-minus because it is the

*mix* of all the sources you want to feed the phone *minus* the phone hybrid output. Note that the hybrid output is the caller audio.

There are two related reasons you need this special



signal. First, you want to feed the caller an audio signal so that he or she can hear what is going on in the studio. Most stations feed the entire on-air mix except, of course, the caller. This allows the caller to hear everything over-the-air listeners hear. Others set up a special mix to use as a mix-minus that may consist only of the host's mic or selected mics.

The other reason for a mix-minus is the nature of the telephone hybrid. The hybrid is designed to separate the caller audio from the signal being fed from the studio to the caller. The hybrid's output should consist of as much caller audio and as little studio audio as possible. If caller audio is fed into the hybrid send input, the hybrid is unable to properly perform this "subtraction." Sending the caller audio into the hybrid input also creates a "feedback loop" similar to

*Continued on page 4*

### Inside...

- **Electronic phone systems. Can they be integrated into the broadcast studio? We provide the answer.** **Page 3**
- **Our Telephone Q&A explores multi-line, multi-hybrid call-in systems.** **Page 2**

Direct Connection is provided by Bradley Broadcast to keep our customers up-to-date on using the dial-up telephone network in broadcast applications. Copyright © 1992, TLS Corporation.

# Q & A

## Questions and Answers about Multi-Line, Multi-Hybrid Systems

### ***We want to set up a multi-line, multi-hybrid call-in system. What are my options?***

Telos makes two interfaces for selection and control of multiple telephone lines in broadcast systems. The **1A2 Interface Module** makes use of standard 1A2 key telephone equipment. The **Direct Interface Module**, as its name implies, connects directly to ordinary telephone lines. Both allow use of multiple Telos hybrids and can be controlled by a variety of control surfaces.

### ***Key systems? Aren't those pretty ancient?***

You're right, key systems have been around for a long time. But they do offer broadcasters several advantages. They are readily available at low cost featuring zero noise, no distortion, and excellent reliability. Spare parts are cheap and you can keep them around for quick and easy repairs.

The fancy features of most new phone systems are unnecessary in an on-air application. Experienced technicians typically prefer a simple one-to-one correspondence between lines and buttons rather than any kind of concentration or stacking.

### ***How is the 1A2 Interface installed?***

It is connected to your key system as if it were a multi-line phone. Each **1A2 Interface** uses a 50 pin "blue ribbon" connector in a standard 10 button/9 line configuration. Spare wires allow connection of a 10th phone line. Many users who already have an installed key system can connect the **1A2 Interface** with little or no rewiring of the phone system by using the bridging block we provide with the installation kit.

Standard 10- and 20-button telephone sets can be used for call screening. They are simply installed in parallel to the **1A2 Interface**.

### ***What about the Direct Interface?***

This unit is an electronic PBX designed specifically for broadcast applications. The **Direct Interface** boasts low noise and distortion, flat frequency response, minimal "impedance bump," and clean, quiet switching. Up to 10 telephone Central

Office lines are connected using standard RJ11C connectors.

The **Direct Interface** has an XLR music-on-hold input with automatic gain control. Full featured electronic Mitel® Superset 4 telephones are used for call screening.

### ***How do I control these interfaces?***

Our desk top **Switch Console** is our most popular choice. Large, high-quality illuminated buttons are used for line selection and special functions. Telos provides each **Switch Console** user with personalized film labeling so that phone lines are designated accurately and neatly. It also includes a tone pad for dialing. The **Switch Console** can handle up to 20 phone lines.

A number of panels are available that allow logical line selection and dialing functions to be accomplished at panels mounted within popular broadcast consoles. Panels are available for consoles from Pacific Recorders & Engineering, Broadcast Electronics, Auditronics, and other manufacturers. Various models handle 10, 20, or 30 phone lines and several have unique features.

### ***How many phone lines can these interfaces handle and how many callers can I put on the air at once?***

Each individual **1A2 Interface** can handle up to 10 lines. Multiple units can be configured to handle up to thirty lines. For example, depending on the number of hybrids and type of control surfaces you want to use, a twenty line system could require either two or four

**1A2 Interfaces**. There are several software versions, available at no extra charge, to accommodate different conferencing schemes and control surfaces. Up to four hybrids may be used at once.

The **Direct Interface** is limited to 10 lines, two hybrids, and two call screener phones. Some broadcasters "stretch" this capability by dedicating one or more "hot" phone lines to a dedicated hybrid to handle calls placed from the studio. This limits the lines on the interface to only the lines taken on-the air.

We advise the use of a separate hybrid for each caller on-air at any given time. This allows maximum caller-to-caller gain, so that all callers hear each other clearly. Several callers can be assigned to a single hybrid if you want to place more callers on-air than you have hybrids, but it is not recommended.

### ***Are there other features I should know about?***

Both the **1A2 Interface** and **Direct Interface** have an RS-232 port. This allows integration with computerized call screening systems such as our **Call Screen Manager**.

*1A2 Interface Module front and back*



*Direct Interface Module front and back*

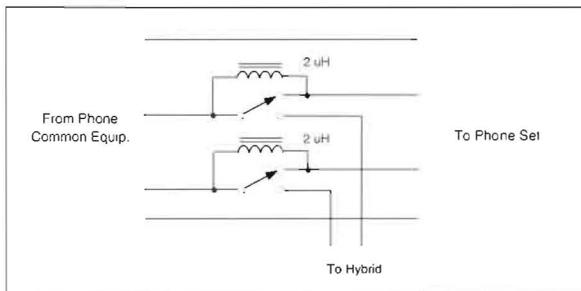


by Steve Church,  
President,  
Telos Systems

The Q&A on the previous page describes our interfaces for multi-line applications. We believe these provide the most flexible and best sounding broadcast phones. Many stations, however, use electronic phone systems for general office use and we are frequently asked about using our hybrids with electronic phones. In this article, we will look at the various styles of phone systems available and how these might be integrated into the broadcast studio.

## Electronic Telephone Systems

"Electronic" phones can be recognized by the "thin-wire" two- to eight-conductor wiring used to connect them. While the systems are tremendously



If the center two wires on your electronic phone system convey audio, they may be used to feed broadcast equipment. The inductors bypass power to the phone set when the studio interface is active.

varied, most have cables from each phone set to the common equipment that conveys power to operate the phone, a two-way data path to signal user actions from the set to the switch and operational and display status from the switch to the set, and the speech audio.

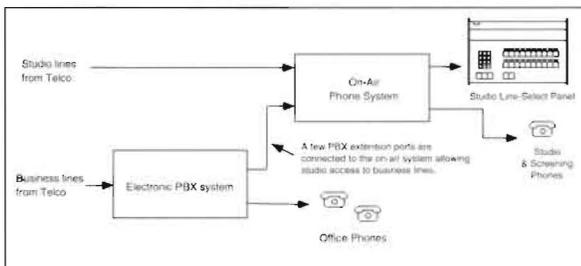
There are several approaches for electronic phone wiring and communication:

**Separate Pair per Function** Separate pairs are used for each of the three functions, and thus requires three or more pairs. The center pair is usually the audio.

**Two-Pair, Phantom Power** This is the most common approach. It places talk and data each on one of the two pairs. The power is applied between the two pairs in a way similar to the method used for phantom powering condenser mics.

**Two-Pair, Power not Phantom** Some two-pair systems put power on either the data pair or the audio pair. In the

later case, the audio pair resembles a central office line so that the phone ports may be universal; either single-line sets or feature phones can be plugged-in without hardware changes in the PBX.



One way to integrate the on-air system with the station business phone system. Ports intended for single-line phone sets are used as input to the on-air system.

**Data Over Voice** Some phones use a unique scheme that requires only one pair for all three functions. The data is amplitude shift modulated onto a 32kHz carrier "over voice" and then the combined voice and data are AC coupled across the DC power voltage.

**Digital** The most advanced systems use a pure digital bit stream for both voice and data. The phone set contains the CODEC for conversion to and from the analog and digital domains.

## Interfacing to Electronic Phone Equipment

The techniques that follow may compromise the broadcast-to-telephone interface and are best reserved for casual use of the phone such as for the occasional request or contest winner call. A significant potential problem is audio quality. The primary impediment is usually noise, most often the result of the data signals cross-talking into the audio. Buzz from the power supply sometimes finds its way into the audio. Often, frequency response is limited. Poorly designed digital systems may suffer from quantization and aliasing noise and distortion.

Additionally, when using the techniques below, Telos' auto-nulling digital hybrids cannot determine when a new call is selected, so it can't adjust its null to the new line before the conversation starts. However, since the hybrid can null on voice during conversation, null is achieved after a few seconds. Another shortcoming of the direct-to-electronic phone approach is that the line switching "clunk" is not muted.

**Direct Connection to the "Skinny Wire"** When the phone system uses the separate-pair approach, the center two wires on the modular plug are usually the audio path. Since the phone's control functions stay active even when these connections are broken, it is possible to intercept the audio signal here for feed to the interface. All Telos hybrids provide a "loop-through" connection which feeds the phone line back out when it's not active. Thus, the unit may be series connected with the audio pair.

When the phone uses the two-pair phantom approach described above, again the audio is likely to be present on the inner pair and may be intercepted for interfacing use — if the DC connection is maintained. One way to do this is to provide a bypass for DC with inductors.

**Special System Ports: Pseudo Central Office Line** Since FAX machines and modems need connections which look like central office lines, many systems provide ports for this use. They may be connected to broadcast interfacing gear as if they were CO lines. Unfortunately, with most PBX systems, awkward operation may result, since the only way to move a call from a phone set to the port may be to transfer it using multiple button punches. Taking calls in sequence on-air may be extremely difficult or impossible.

**Intercepting the Serial Data Stream** Why can't we just emulate an electronic phone set by generating and decoding the phone system's serial data? It does seem that this would be a good solution. However, phone system manufacturers insist upon maintaining their data protocols a deep secret. That means that broadcast manufacturers are unable to design direct emulation equipment. Of course, even if we had the protocols, there is the problem of accommodating the dozens of communication methods employed by PBX designers.

## Telos Tidbits...

- The **Telos 100 Delta** was selected by **Broadcast Engineering** magazine as one of the Pick Hits of the 1992 NAB Convention. We appreciate the recognition from **BE** and the engineers who served as judges.

- The **NAB 8th Edition Engineering Handbook** is one of the heavyweights of the industry...both in content and physical size. **Steve Church**, president of Telos Systems, contributed the article *Telephone Network Interfacing*.

- **Steve Church** can also be found in print in **Radio Guide** magazine. The May and June issues carry a two-part article *Solve Your On-Air Phone Problems*. It explains the reasons for and offers solutions to a wide range of phone line problems. The articles can help you work with the phone company and guide you to select the right equipment for your facility. Reprints are available at no charge by calling or faxing **Bradley Broadcast**.

### "MIX-MINUS" Continued from page 1

the effect encountered when you send the output of a recording tape machine to its input.

Audio signals used for the mix-minus buss should be "pre-fader" so that levels remain constant. If possible, mic processors should not be included in the mix-minus buss as their automatic gain control (AGC) can "fight" the AGC performed by the hybrid. Note that Telos digital hybrids use software to set the level of the audio sent back down the phone line at the maximum permitted by the FCC. Unlike analog couplers, increasing the level of the input to the hybrid does not send more signal down the line. Therefore it is important to send proper, consistent level to the hybrid.

If you are installing more than one hybrid, you need to create a separate feed for each hybrid. Keep in mind that you want each caller to hear all of the other callers. The best place to start is to create a mix-minus just as you would for a single hybrid. Then for each hybrid add the outputs of all the other hybrids. For your program mix, treat the hybrid outputs as simply additional audio sources. It can get a little complicated, but we have found that a quick signal flow sketch before starting installation can be a big help.

Most modern broadcast consoles make some provision for at least one mix-minus. Don't panic when confronted with a console with insufficient mix-minus capabilities! There are a number of inexpensive, off-the-shelf "splitter/mixer" products that can take care of your needs.

The **Telos ONE plus ONE** has an internal mix-minus matrix that cross couples the outputs of the two hybrids. In a dual hybrid application, you only need to send the **ONE plus ONE** a single mix-minus. All Telos hybrids have dual outputs to help create multiple mix-minuses.

### "REBATE" Continued from page 1

remotely selected. This allows switching from a setup requiring maximum feedback suppression to one where feedback is not a concern and maximum duplex conversation is desired.

The **Telos ONE plus ONE** starts with two, industry standard **Telos ONE** digital hybrids in a single rack unit chassis. Each hybrid functions completely independently. A unique internal mix-minus matrix cross couples the outputs of the two hybrids. In a dual hybrid application, you only need to send the **ONE plus ONE** a single mix-minus. All of the **Telos ONE** features such as mic/line input, dual outputs, remote control of hybrid ON/OFF, set up metering, and caller override control are included. Of course, you get natural sounding, two-way conversation without up-cutting and the ability to monitor callers through open speakers without feedback.



*Telos users are mighty happy with their hybrids and their rebates!*

## Two rebate programs available

Our **Repeat Buyers' Rebate** aims to reward all of the current owners of Telos hybrids. After all, in the 8 years since Telos delivered the first DSP-based telephone interface, you have provided us with a wealth of helpful ideas. Many of these have been incorporated into our latest generation hybrids. To claim your **Repeat Buyers' Rebate**, you will need to send a copy of the invoice for your new hybrid purchase along with the serial number of a Telos hybrid you purchased prior to April 13, 1992.

The **New Buyers' Rebate** allows those who are using hybrids from other manufacturers to more easily upgrade to Telos. To claim your **New Buyers' Rebate**, you will need to send a copy of the invoice for your new hybrid purchase along with the first page of the manual for a telephone hybrid you own from another manufacturer.

Contact **Bradley Broadcast** for complete conditions and restrictions. Both programs allow you to get a rebate of \$250 on as many **100 Deltas** and \$100 back on as many **ONE Plus ONEs** as you like. Whichever hybrid you choose, you can have the best sounding call-in segments and a few bucks back. There has never been a better time to experience the pleasure of great phones.

## Next Issue...

- **Jeanne Dickson** discusses how **ISDN** has helped her psychic predictions.
- **Telos** now offers three hybrid models. We'll provide all the details on each to help you select the one right for you.



## Bradley Broadcast

Gaithersburg, MD • Phone (800) 732-7665  
MD & DC (301) 948-0650 • Fax (301) 330-7198

## Tascam DA-30 DAT Recorder

The front panel of the DA-30 is as familiar as the face of an old friend. When you see and hear it perform, you'll wonder where it has been your whole life.

The DA-30 is an affordable, full function DAT recorder that combines outstanding audio performance with Tascam reliability. The A/D converters employ 64 times oversampling Delta Sigma modulation, and 18 bit, 8 times oversampling D/A converters are used. Recording is offered at 48kHz and 44.1kHz sampling frequencies.

Features include 150 millisecond cue increments, AES/EBU digital input/output, start ID positioning, and both +4dBm and -10dBV analog inputs and outputs. The provided wired remote control allows control of all DA-30 functions, and includes numeric keys for direct search and playback programming. The clean layout and clearly marked controls make operation of the DA-30 a breeze.

**DA-30** *MFR LIST* **\$1299.00**



**SPECIAL!**

## TDK Package

**Special Package: Purchase the DA-30 for only \$999.00 and get 10 FREE TDK R-120 R-DAT Cassettes!**



## Teac DA-P20 Portable DAT Recorder

Only a few years ago, an audio recorder with 90dB S/N ratio, THD less than 0.008%, and a frequency response of 10Hz to 22kHz within 1dB would cost over \$10,000 and weigh 100 pounds. Today, DAT technology provides this performance level in a battery powered unit that weighs 3lbs for less than one-tenth the price!

The Teac DA-P20 can dramatically change the quality of your field recordings without changing the way you work. XLR balanced mic/line inputs, headphone jack with level control, multifunction LCD time counter, cue and review, and a host of other features make this DAT recorder a breeze to use. An end position detect function lets you quickly locate the end of the recorded portion of the tape from which to continue recording. ID subcodes may be written automatically or manually, making it easy for you to keep track of important selections.

Recording sampling rates are 48kHz using the analog inputs and 44.1kHz using the SP/DIF digital input. Playback sampling is at 48kHz or 44.1kHz using either the analog phono outputs or the digital output. Power your DA-P20 for two hours with the included rechargeable battery pack or the provided AC adapter.

**DA-P20** *MFR LIST* **\$999.00**



### Accessories:

**Soft Carrying Case** *MFR LIST* **\$60.00**  
**Spare Rechargeable Battery** *MFR LIST* **\$100.00**

## Bradley Digital "Bring it Back Pack"

Digital recording quality, compact equipment, and a great package price...this is the package to have on hand to capture late breaking stories. This Teac DA-P20 system includes carrying case and spare battery pack, an Audio-Technica AT825 stereo microphone with windscreen, and two 25' XLR cables with Cord-Lox. Want the package modified for your personal needs? Call Bradley today.

Valued at over \$1600.00 **Package 9202** **\$1157.00**



## Radio Design Labs Stick-On Series

Each Stick-On is only 1/2" x 1 1/2" x 3" and can be attached anywhere with its adhesive backing. All products are designed to work in high RF environments and carry a 3 year limited warranty. \* Indicates that a Power Supply is required. Power Supplies are priced separately.

**ST-DA3 Distribution Amplifier** allows bridging of any line and driving almost any load. Master gain adjustment provides up to 20db of gain. Available as a single 1x3, or as a stereo or dual mono 2x6 sharing a single power supply.

**ST-DA3 mono 1x3\*** MFR LIST \$103.95

**Also available:**

**STM-DA3** feeds 1-150 ohm mic signal to 3-isolated inputs.

**STM-DA3** MFR LIST \$109.95

**STA-1M Audio Line Amplifier** has a gain range of -14dB to +7dB when using the balanced I/O. When using the unbalanced I/O, the gain range is -7dB to +14dB. Single channel.

**STA-1M\*** MFR LIST \$88.95

**ST-SH1 Stereo Headphone Amp** is designed to feed either low or high impedance stereo headphones. The input is bridging and accepts either a balanced or unbalanced source.

**ST-SH1\*** MFR LIST \$99.95

**ST-MX3 Line Level Mixer** has three adjustable line level inputs and a single output. It allows you to combine signals of different levels, impedances, or balanced/unbalanced configurations.

**ST-MX3\*** MFR LIST \$99.95

**Also available:**

**ST-MMX3 Mic to Line Level Mixer** is similar, but inputs are at mic level while the output is line level.

**ST-MMX3\*** MFR LIST \$109.95

**ST-PH1 Stereo Phono Preamp** makes it easy to preamplify phono levels close to the turntable for best audio performance. Equalization follows the RIAA curve and is accurate and quiet.

**ST-PH1\*** MFR LIST \$109.95

**STM-1/STM-2 Microphone Preamplifiers** provide 150/600 ohm balanced inputs with phantom power available, and two outputs, one 600 ohm balanced, the other 10k unbalanced. The STM-1 has a fixed gain of 50dB, while the STM-2 has a variable gain to 65dB. Specifications include 0.05% THD and response 50Hz to 30kHz, ±1dB.

**STM-1\*** MFR LIST \$81.95

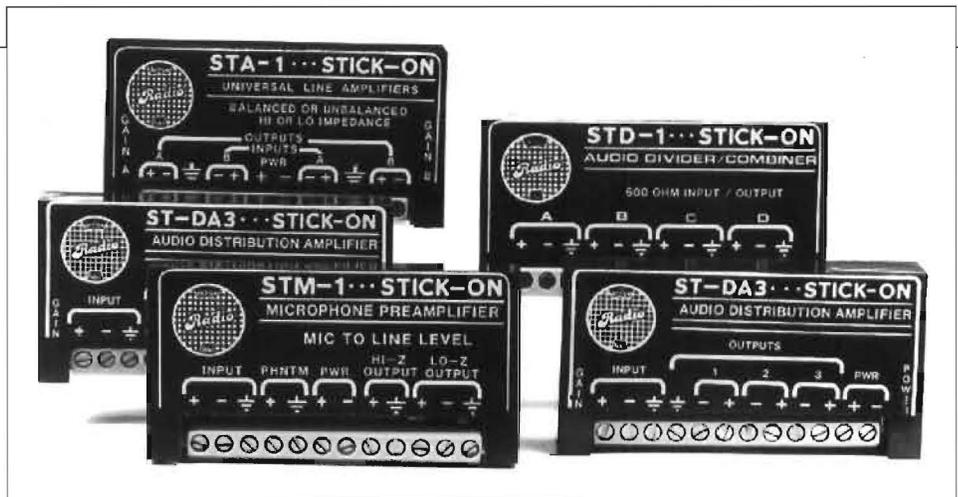
**STM-2\*** MFR LIST \$114.95

**ST-MPA2 Mic Phantom Adapter** adds phantom power ranging from 6 volts to 52 volts to one or two mic lines. Any mic can be safely powered.

**ST-MPA2\*** MFR LIST \$64.95

**STP-1 Attenuator** is useful for reducing input levels to improve headroom, or other applications. Each STP-1 has two variable modified "H" pads providing up to 85dB attenuation. A 15 turn trim pot allows precise adjustment of levels.

**STP-1** MFR LIST \$34.95



## NEW FROM RADIO DESIGN LABS

Contact your Bradley professional for details on these new RDL products, or for a current price quotation on any of RDL's products.

**ST-PA2\*** 2-watt Utility Power Amplifier  
MFR LIST \$44.95

**ST-PA6\*** 6-watt Utility Power Amplifier  
MFR LIST \$59.95

**ST-MLX3\*** Mic/Line Mixer MFR LIST \$94.95

**STM-3\*** Microphone Preamplifier  
MFR LIST \$119.95

**ST-AMC3\*** Active Mic Combiner MFR LIST \$89.95

**ST-VP1\*** Voice Over/Page Module  
MFR LIST \$99.95

**ST-EQ3\*** 3-Band Equalizer MFR LIST \$69.95

**ST-CL1\*** Compressor/Limiter MFR LIST \$109.95

**ST-SSR1\*** Solid State Audio Relay  
MFR LIST \$69.95

**STA-1 Electronic Transformer Pair** combines an electronic line transformer and adjustable 20dB gain amplifier. There are two circuits in each unit for stereo operation. Typical applications include: balanced to unbalanced interface, unbalanced to balanced bridging amp, monaural combiner, stereo splitter, and Hi-Z amplifier.

**STA-1\*** MFR LIST \$114.95

**STD-1 Divider/Combiner** is a passive, four channel device where any channel may be an input or output. It may be used to branch a 600 ohm line to three inputs, combine stereo signals to a mono input, branch or combine 150 ohm mic signals, or divide a mono signal to apply stereo inputs.

**For 150 ohms** MFR LIST \$34.95

**For 600 ohms** MFR LIST \$34.95

**For 10k ohms** MFR LIST \$34.95

**ST-GCA1/ST-GCA-2 Gain Control Amplifiers** offers gain reduction (compression) for positive control of peak levels. The slow AGC of the ST-GCA1 makes a 20dB level adjustment in 8 seconds. The ST-GCA2 has an AGC with fast action, offering nearly instantaneous audio reduction makes it ideal for use in systems prone to loud bursts of audio. Both accept nearly any input.

**ST-GCA1 slow AGC\*** MFR LIST \$94.95

**ST-GCA2 fast AGC\*** MFR LIST \$94.95

**ST-VCA1 Voltage Controlled Amplifier** allows you to remotely control audio with a DC voltage. The built-in mic preamp allows any combination of mic or line level inputs and outputs. A standard 10k linear taper pot (not included) is used for control.

**ST-VCA1\*** MFR LIST \$86.95

**ST-ACR Audio Controlled Relay** allows you to control switching from any audio signal. The multiturn sensitivity adjustment covers the range from mic to line level. Relay release can be adjusted from 1/2 to 5 seconds. Double-pole, double-throw switching contacts are provided. A "slave" terminal connects Stick-On logic controlled relays (see below).

**ST-ACR** MFR LIST \$80.95

**ST-LCR1/ST-LCR2 Logic Controlled Relays** provide double-pole, double-throw switching contacts, open-collector outputs, and an LED indicator of relay closure. Dual inputs.

**ST-LCR1 momentary action\*** MFR LIST \$56.95

**ST-LCR2 alternate action\*** MFR LIST \$91.95

**Accessory:**

**STR-19 Rack Mount Kit** Holds up to 12 Stick-Ons behind its 5 1/4" hinged panel.

**STR-19** MFR LIST \$99.95

**PS24 Power Supply** Powers any of the above units.

**PS24** MFR LIST \$12.95



## DigiStor Digital Message Storage System

NEW

**DigiStor** is the only digital message storage system designed specifically for use in radio and TV information lines. It will automatically answer a phone line and play its message when called. DIGISTOR can be programmed to play continuously or until the caller hangs up, and with no re-cue time the caller always hears the message from the beginning. Storage time is dependent upon the selected sampling rate. The standard DIGISTOR will record up to 2:08 with good quality, or 4:16 minutes with "voice only" quality.

For applications requiring higher fidelity, the DIGISTOR-HF offers wider bandwidth with lower background noise and distortion. Using the XM option (extra memory) in conjunction with the HF will allow memory time of 5:30 with 3.5kHz top end response. All DIGISTOR units accept line or mic input, and drive both a 600 ohm load, and also provide a monitor output for headphones or small speaker. Remote functions include stop, start, record, and tally function. Call Bradley today, and your listeners will never miss the beach report again.

<b>DigiStor</b>	<i>MFR LIST</i>	<b>\$395.00</b>
<b>DigiStor HF</b>	<i>MFR LIST</i>	<b>\$420.00</b>



<b>DigiStor XM</b>	<i>MFR LIST</i>	<b>\$595.00</b>
<b>DigiStor XM-HF</b>	<i>MFR LIST</i>	<b>\$620.00</b>

## Alps Audio and Video Storage Cabinets

Feeling like you're being buried by CD's, cassettes, or video tapes? Bradley comes to the rescue with the Alps line of high density storage cabinets. Each cabinet has a footprint of only 2 feet by 4 feet, yet stores hundreds of tapes or CD's. Base cabinets are available in heights of 40" and 58", and stackable top cabinets are 44".

Models are available to store CD's, audio cassettes, DAT, broadcast audio cartridges, and open reel tapes in all widths. Cabinets with partitions for all video formats are available to hold both raw and boxed tapes. Partitions can be mixed among drawers in a single unit. Cabinets come in white, almond, and gray laminates.

Prices listed illustrate the value of these cabinets. Truck freight is additional. Your Bradley professional can help configure a cabinet to meet your exact requirements. Give him a call today.

**Five drawer base unit**  
holding 2160 CD's  
**\$1000.00**

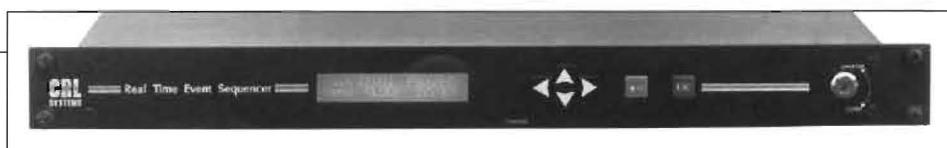
**Four drawer top unit**  
holding 2592 CD's  
**\$1150.00**

**Eight drawer base unit**  
holding 3456 CD's  
**\$1250.00**



## CRL Real Time Event Sequencer

Ideal for processing dayparting, pattern change requirements, or any other function requiring time of day switching, the CRL Event Sequencer provides the answer. It can control up to eight outputs, via open collector contacts, and store up to 200 events on a 7 day clock. Programming is accomplished via a front panel keypad. The sequencer can be programmed to provide latching outputs, or half/one second contact closures. In addition, the eight outputs may be binary encoded to control up to



255 addresses. The event sequencer features a high accuracy crystal time-base, with battery backup for program memory. In addition, its clock recognizes both leap years and daylight savings time.

<b>RTES</b>	<i>MFR LIST</i>	<b>\$895.00</b>
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## Middle Atlantic WRK Series Racks

Solid. Functional. Attractive. We're not talking about just any equipment enclosure; this one is built by Middle Atlantic.

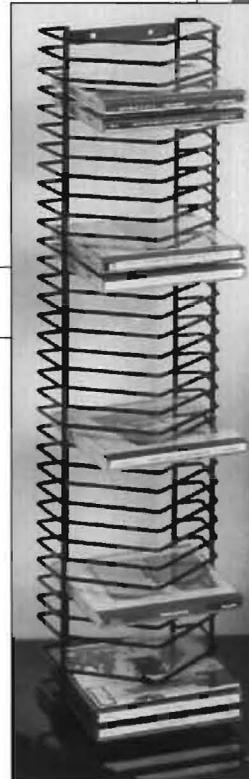
These racks have 77" (44 rack units) of mounting height and have fully welded construction of 16 gauge steel. Bottom corner braces are 10 gauge for extra strength and threaded for optional leveling feet or casters. Front and rear pre-tapped rails are included and the distance between them is adjustable up to 21". Front rails can be set to one of three fixed positions for stability during transport. Welded studs in the rear of the rack make it a breeze to install cable duct and power strips. Knock out plates are provided on both the top and bottom of the rack for electrical plates and fans.

The WRK-44SA is a stand-alone, closed sided rack with removable, perforated ventilation windows located on the side panels for efficient convection. The WRK-44 is open sided for ganging to other racks and has flush perforated vent windows on the sides. The optional double wall door has "oil lite" bushings for smooth operation and a locking, spring loaded slam latch. The door can be used at the front or rear and set to swing left or right.

**WRK-44SA** Stand alone, closed sided rack **\$699.00**  
**WRK-44** Gangable, open sided rack **\$699.00**

### Accessories:

**Flush Door** fits front or rear **\$170.00**  
**Leveling Feet** (Set of four) **\$50.00**  
**Power Distribution Box** **\$66.00**  
**Ganging Brackets** for WRK-44 **\$22.00**  
**Solid Side Panels** for WRK-44 **\$144.00**  
**Perforated Side Panels** w/foam inserts for WRK-44 **\$184.00**



## Bradley Wire and Metal CD/ Cassette Storage

These unique, attractive, and durable wire racks provide an easy and inexpensive solution to your CD storage needs. Each wire tower CD holder keeps 31 single and two double CD cases stored safely in free-standing, table, or wall configuration. At less than 50 cents per unit, these racks may well be the most economical CD storage method ever. Metal versions are available for CD and cassette storage, for stackable, freestanding storage.

CD wire tower 35 capacity **\$16.00**  
 CD metal module 25 capacity **\$27.00**  
 Cassette module 19 capacity **\$27.00**



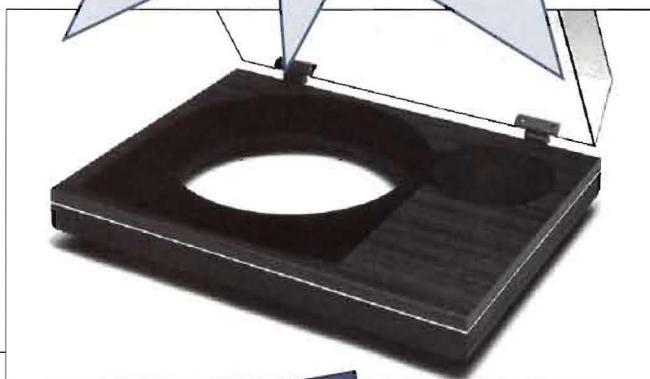
## Base Motivation

### ATTENTION ALL OWNERS OF TECHNICS SP10, SP15, OR SP25 TURNTABLES!!!!

Let's face it.... you've always wanted to have the original Technics base for your turntable, but, well, the price was just a bit dear: they used to cost over \$300.00. Bradley Broadcast has acquired a limited quantity of these quality turntable bases at a closeout price, and we want to pass the incredible savings on to you! While quantities last, you may purchase a base for any of the above turntables for the incredible low price of **\$29.00!**

These are brand-new bases in original factory packing, with no defects or blemishes. They provide full anti-resonance protection, and are available in rosewood or black. Act now so you don't miss out. Only **\$29.00**, plus S&H brings you the base you've always wanted for these fine turntables.

Original Technics  
Turntable Base  
**\$29.00**  
plus S&H



## Clearance Values

As always, Bradley Broadcast provides you with the opportunity to purchase demonstration and used equipment at great savings. Look at some of the bargains available:

Item	Quantity	List	Clearance
JBL Control 10 monitors	2	599.00	<b>399.00</b>
INR Rack 28 Space Black	4	495.00	<b>229.00</b>
Fostex D-20 DAT recorder	1	8000.00	<b>5900.00</b>
Cutting Edge Vigilante Processor	1	3000.00	<b>1500.00</b>
Gentner Lazer 2.0 Processor	1	6000.00	<b>4000.00</b>
Denon DN970FA CD Player	1	3000.00	<b>1100.00</b>
Revox PR99 Reproducer Only	1	2595.00	<b>1500.00</b>
Rane HC-6 Headphone Amp	1	399.00	<b>225.00</b>
Tascam CD-701 CD Player	1	1495.00	<b>895.00</b>
Tascam RC-701 Remote/CD701	1	895.00	<b>495.00</b>
TOA BA400 4 deck cassette player	1	995.00	<b>625.00</b>

SALE



Denon DN970 CD Player \$1100.00

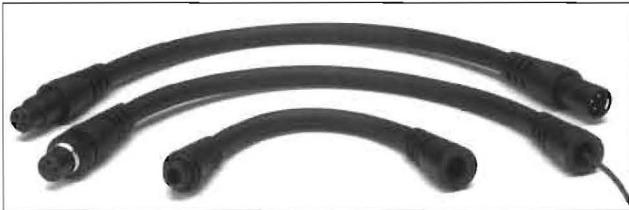


28 Space INR Rack \$229.00



# Goosenecks with Plugability

At last... a gooseneck with great-quality XLR connectors built right in. Plus, these "Rubbernecks" don't creak or make noise when you flex them, so they're perfect for podium use!



**XLR to XLR 12 or 18" MicEze Rubberneck \$49.95**  
Call your Bradley professional for other configurations

# They Won BIG With Bradley!



Congratulations to the winners of Bradley's NAB drawing. Thanks to all who participated!

The Casio Portable DAT Machine went to:

**Ronald D. Weyer**

Westinghouse Hanford Co., Richland, WA

Sennheiser HD-450 Headphones went to:

**Ralph Beaver**, Edens Broadcasting, Tampa, FL

**Frank L. Wells**, Masterfonics, Nashville, TN

**Marvin Born**, WBNS TV, Columbus, OH

**Jim Hemingway**, WGAJ Radio, Deerfield, MI



**Bradley**  
B R O A D C A S T

8101 Cessna Avenue  
Gaithersburg, MD 20879-4177

**Toll Free: 800-732-7665**

MD & DC: 301-948-0650 • FAX: 301-330-7198

#### Attention Government Customers

Bradley Broadcast Sales Inc. provides GSA Contract pricing for the following product lines under GSA Schedule # GS03F2031A.

ATI Audio Technologies, Inc. • Excalibur Electronics • Gentner Communications Inc. Middle Atlantic Products • Orban Associates, Inc. Division of AKG Acoustics Telos Systems.

Qualified GSA purchasers may buy the products of these manufacturers under GSA schedule pricing. Call or write on official stationery for your copy of our GSA price list.

- NET 30 AND COD ARE AVAILABLE TO ESTABLISHED ACCOUNTS.
- DISCOVER, MASTERCARD, AND VISA ARE WELCOME.
- SALES OFFICE HOURS ARE 9:00 AM TO 6:00 PM, EASTERN TIME.
- PRICES AND SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.
- SALE PRICES ARE VALID THROUGH SEPTEMBER 30, 1992 UNLESS OTHERWISE INDICATED.

PLEASE SHARE THIS ANNOUNCEMENT WITH OTHERS AT YOUR FACILITY.

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