3 Ways To Measure An Equipment Supplier

Integrity . . .

A company with integrity exhibits honesty and fairness at all times. Repeat customers are a good indication of a company's level of integrity. For 17 years, BSW has been providing audio equipment to broadcasters and other audio professionals worldwide. Thousands of repeat customers continue to put their trust in us daily for all their audio equipment requirements.

Accessibility . . .

When you need equipment or information critical to your operation, time is of the essence. Your equipment supplier must be accessible to respond to you immediately. No company is better qualified than BSW. We maximize accessibility by staying open 12 hours daily, having professional sales assistance constantly available and our toll-free number means you never pay for the call.

Dependability . . .

Deadlines are a given in broadcasting. When the pressure's on, you need a company you can depend on. Put your trust and confidence in BSW. We are continuously expanding our order entry, warehousing, and shipping departments to offer unmatched speed and accuracy. The bottom line is we won't promise if we can't deliver.

Call us for your next equipment purchase and see how well BSW measures up.

OPEN 12 HOURS DAILY

MONDAY THRU FRIDAY

1-800-426-8434

PACIFIC	MOUNTAIN	CENTRAL	EASTERN
6:00 - 6:00	7:00 - 7:00	8:00 - 8:00	9:00 - 9:00

Nationwide and Canada **800-426-8434**
Local and International **206-565-2301**
Fax 206-565-8114 **Telex 910-441-2617**

NO MINIMUM ORDER

FOB: Point of Origin
Actual shipping charges with minimal handling fee will apply to each order.

Prices and specifications shown in catalog are subject to change without notice and should be verified prior to ordering. BSW actual selling prices are routinely discounted below manufacturer suggested list prices. Additional discounts may apply depending on size of order or payment terms.

TERMS: NET 30 DAYS ON APPROVED CREDIT

Personal checks up to $1,000.00 accepted with Telecheck approval.
LEASING AVAILABLE

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BSW
BROADCAST SUPPLY WEST
America's Full-Time Broadcast Supplier

7012 27th STREET WEST
TACOMA, WA 98466

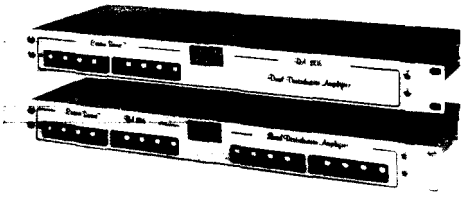
Associate Member

Sustaining Member

Amplifiers

1-800-426-8434

ATI

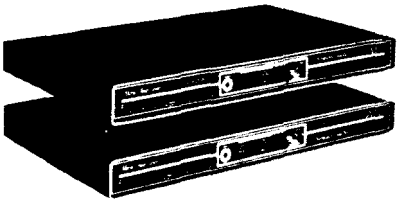


MODEL DA208, DA416
DISTRIBUTION AMPLIFIERS

Two or four inputs, each driving four individually adjustable, active balanced outputs gives you twice the channels for the price — twice the performance in most applications. Need more outputs? Just parallel inputs for up to 1 X 16 operation. Drive everything from balanced 600 ohm lines to Hi-Z IHF phono jack inputs without matching pads or noise compromises. Transparent performance, RF protected.

MODEL DA208 (Dual 1x4)
MFG. LIST $329.00 ..... CALL FOR BSW PRICE

MODEL DA416 (Quad 1x4)
MFG. LIST $469.00 ..... CALL FOR BSW PRICE



MODEL DA1008-1/DA2016-1
DISTRIBUTION AMPLIFIERS

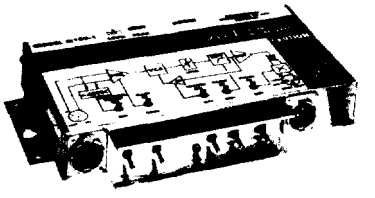
Easily match differing line level requirements with these high output DAs with 8 or 16 individually adjustable outputs. Active and transformer balanced outputs at +22 or +30 dBm. A LED meter with three selectable OVU settings allow you to set nominal line levels and monitor peak headroom. Includes input clipping LEDs and a boosted headphone output.

MODEL DA1008-1 (1 in, 8 out)
MFG. LIST $850.00 ..... CALL FOR BSW PRICE

MODEL DA2016-1 (Dual 2 in, 8/16 out)
MFG. LIST $1,195.00 ..... CALL FOR BSW PRICE

BSW handles the entire ATI line. Many items are in stock for immediate delivery.

Toll Free 1-800-426-8434



MODEL ULTIMIKE™ M100
MICROPHONE AMPLIFIER

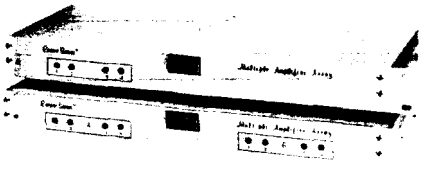
Eliminate dimmer noise, RF pickup and hum loops by mounting this small, rugged, full featured preamp right near the audio source. The unusually quiet, direct balanced, instrumentation amplifier input has impressive hum and RF rejection and accepts +20 dBm maximum input. Features switchable and adjustable gain, limiter, lo-cut filter, 48 volt phantom power and a phase reversing switch. A unique output driver provides the many advantages of the true transformer isolation with no performance compromises. XLR in and out, dual rack mountable.

MFG. LIST $299.00 ..... CALL FOR BSW PRICE

MODEL DP-100 DISCPATCHER™
BALANCING AMPLIFIER

A uni-directional stereo interface for playback only applications. It is designed specifically to convert the unbalanced IHF outputs of digital compact disc players to transformer balanced and isolated 600 ohm line levels with no compromise or degradation of the superb performance available from the digital audio source. The DiscPatcher™ is equally at home on a newsroom desk to interconnect field ENG cassette recorders into broadcast systems for dubbing.

MFG. LIST $209.00 ..... CALL FOR BSW PRICE



MODEL MAA SERIES
DISTRIBUTION AMPLIFIERS

ATI's Multiple Amplifier Arrays are great problem solvers for audio distribution. Choose mic or line level units with either 4 or 8 channels. Use as a distribution amplifier, mono summing networks, combine high and low level inputs for a single balanced output, the list is limited only by your imagination. Audio specifications are outstanding.

CALL FOR PRICING INFORMATION

orban

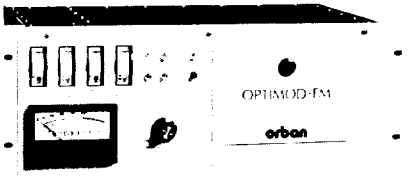
Model 424A
Compressor/Limiter

Here is one of the most complete, multi-function, audio processors available for the studio. The dual channel 424A features a compressor, limiter, and de-esser all in one package. Professional studios worldwide depend on the 424A for all their dynamic range control requirements.

Features:

- Defeatable gate with adjustable threshold
- Compressor has adjustable attack and release time
- Extensive use of VCA's for low distortion
- Better than 25 dB de-ess gain reduction

Mfg. List $1,095.00 ..... Call For BSW Price



Model 8100A/1 OPTIMOD™
FM Audio Processor/Stereo Generator

The standard in FM audio processing.

25-30% discount

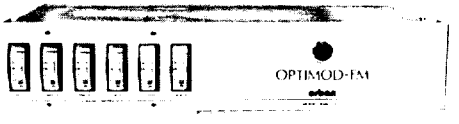
Performance Highlights/Features:

- Multiband compressor/limiter/stereo generator
- Multiband or wideband operation plus versatile setup controls permit precise "tuning" for different formats
- Freedom from processing artifacts and distortion
- Optimum voice/music balances
- Excellent high frequency power handling for brightest sound
- State-of-the-art stereo generator
- Overshoot compensator permits full modulation at all frequencies, yet doesn't increase low frequency IM distortion

Plus

- Dual chassis (studio/transmitter) option
- Plug-in card construction for easy maintenance
- Built-in crosstalk test generator
- Rigorous RFI shielding
- True VCA gain control
- True peak reading gain reduction meter
- Low stereo generator output impedance permits longer baseband cable runs

Mfg. List $4,995.00 ..... Call For BSW Price



Model 8100A/XT2
Six-Band Limiter Accessory Chassis

The 8100A/XT2 works with any 8100A OPTIMOD™-FM and features two high frequency equalizer controls: Presence and Brilliance.

The XT2 also excels in the most difficult of processing tradeoffs — delivering loudness on music while keeping speech free from clipping distortion. Credit this uniquely capable performance to Orban's patented multiband distortion cancelled clipping system.

The XT2 lets you have it all: natural sound, source to source consistency, loudness, clean voice and adjustability that lets you tailor bass and treble to your taste and format requirements. And thanks to its efficient single chassis construction and its use of the main 8100A power supply, it lets you have the next step in OPTIMOD™ processing at an exceptionally reasonable price.

Mfg. List $2,075.00 ..... Call For BSW Price

Model 222A
Stereo Spatial Enhancer

The Orban 222A stereo spatial enhancer can augment your station's spatial image the way your audio processor maximizes loudness and brightness. Your stereo image will become magnified and intensified; your listeners will also hear more loudness, brightness, dynamics and depth.

Highlights:

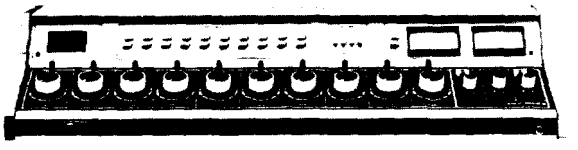
- Proprietary, patent pending technique detects and enhances psychoacoustic directional cues which are present in all stereo program material.
- Front panel enhancement and width limit controls allow tailoring of processing to user requirements.
- No increase in FM multipath distortion, no unnatural exaggeration of reverberation, and no increase in sensitivity to vertical tracing distortion in disc playback.
- Full mono compatibility.

Mfg. List $995.00 ..... Call For BSW Price

BSW is a full line Orban dealer and we offer a terrific "try before you buy" program.

Consoles

Broadcast Electronics Inc.



Series 250A — Model 10S250A
Audio Consoles

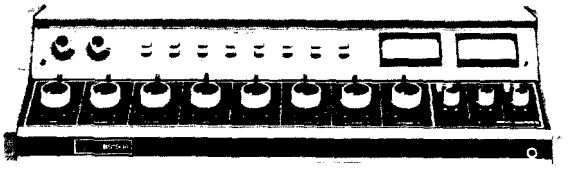
With their two-tone technical white and gray finish and solid oak end bells, the 250A Series consoles are sure to accent any studio. But don't let their stylish exteriors fool you. These consoles are tough performers! Broadcast Electronics has specifically designed the 250A Series for rugged, reliable service in any demanding on-air or production application.

The quality features of the 250A Series consoles include ladder-type step attenuators (with cue detent) for long life and easy maintenance, roller-cam key switches to designate individual channel assignments.

Each mixer preamplifier offers the flexibility of selecting either a microphone or high level input for each channel. Every 250A Series console also features separate monitor, headphone and cue channels. (Mono/stereo mode switching is optional on all stereo consoles.) All front panel graphics are protected by a laminated polycarbonate overlay.

Model 5S250A (5 Mixer Stereo) ..... Mfg. List $3,895.00
Model 8S250A (8 Mixer Stereo) ..... Mfg. List $4,995.00
Model 10S250A (10 Mixer Stereo) ..... Mfg. List $6,095.00

Call For BSW Prices



Series 150A — Model 8S150A
Audio Consoles

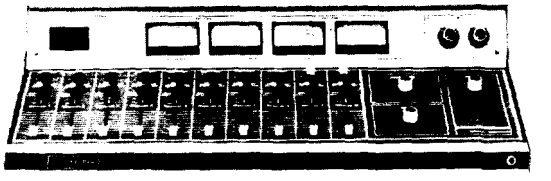
The 150A Series consoles offer full featured versatility without straining your budget. Each console features the elegant technical white and gray finish with solid oak end bells. Durable, sealed potentiometers are used in each mixing control with detent cue buss.

Each mixing channel accommodates two pushbutton selectable inputs and may be preset for either microphone or high level service.

Monitor, headphone and cue amplifiers give you full monitoring capability.

Model 5S150A (5 Mixer Stereo) ..... Mfg. List $3,095.00
Model 8S150A (8 Mixer Stereo) ..... Mfg. List $3,795.00
Model 10S150A (10 Mixer Stereo) ..... Mfg. List $5,395.00

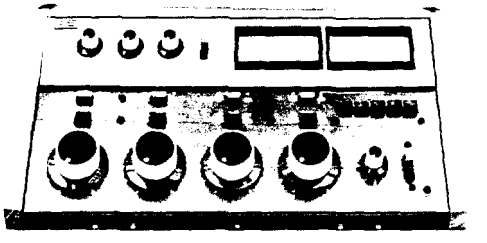
Call For BSW Prices



Model 10S350A
Audio Console

The 350A Series consoles offer the smooth reliability of Penny & Giles precision faders. Each Penny & Giles fader features convenient dual cue switching through the use of a detent "drop cue" or Cue/Program Audition/Off switch. The 350A's also offer separate audition and program metering. This allows simultaneous monitoring of Audition and Program channel levels. The stereo 10S350A console provides four meters (audition right and left plus program right and left). It is attired in a two-tone technical white and gray finish with a laminated polycarbonate overlay.

Mfg. List $6,295.00 ..... Call For BSW Price



Model 4S50A
Audio Console

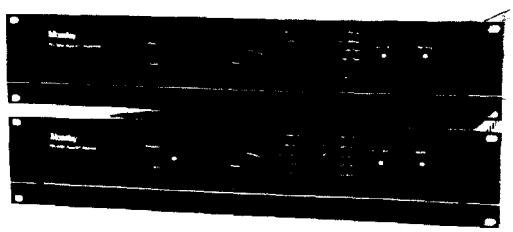
The 4S50A sets the standard for compact stereo consoles. Featuring excellent stereo performance, the 4S50A lends itself well to either production or on-air use. Each of the first three channels accept two high or low level stereo inputs. Channel four can be pre-selected for a single high or low level stereo input, or for one of five high level remote/utility stereo inputs. Each channel mixer control incorporates sealed dual-potentiometers fitted with detent cue switches.

Mfg. List $2,195.00 ..... Call For BSW Price

Leasing equipment saves working capital. Talk to your BSW Sales Representative on the advantages of leasing your next equipment purchase from BSW.

1-800-426-8434

Moseley



Model PCL 6000 Series
Composite STL System

As leaders in STL technology for the past 25 years, Moseley has always provided the highest quality program conveyance. Not wanting to design just another STL, Moseley engineered the PCL Series to offer unique and innovative features.

Both the PCL 6010 transmitter and PCL 6020 and 6030 receivers employ a synthesized reference oscillator to eliminate fixed-frequency crystals.

Now, monaural or composite operation is available from a single system. By selecting appropriate jumpers, you can enable wideband composite stereo or 15 kHz monaural basebands. Two PCL 6000 systems can be used in a dual discrete configuration to transmit right and left stereo programs with no measurable crosstalk.

Receiver IF bandwidth can be factory or field set for channel spacing of 100 kHz to 500 kHz. Which system is right for you? If you have no adjacent channel interference, the PCL 6020 will offer superior performance. The PCL 6030 is designed for hostile RF environments.

25-30% Discount

PCL 6020 System
Mfg. List $7,800.00

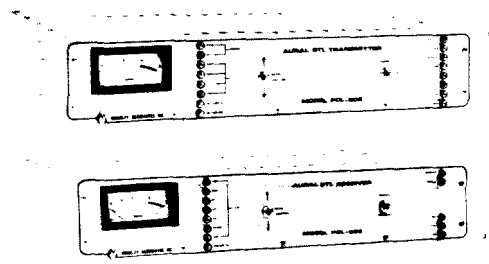
PCL 6030 System
Mfg. List $8,800.00

Call For BSW Price

Model SCG-8
Multiplex FM Subcarrier Generator

SCG-8 Subcarrier Generator, with automatic muting and front panel peak deviation meter, including self contained power supply. Available for operation at any standard frequency in the 26 kHz to 185 kHz spectrum. Specify operating frequency when ordering.

Mfg. List $1,490.00 ..... Call For BSW Price



Model PCL-606/C
Composite STL System

You're scrupulous about quality. You're running compact discs mastered on digital equipment. You've bought the best console you can afford. Your processing plant is as clean as a whistle. Don't compromise now! Deliver your signal with the only STL that's totally transparent. The composite stereo PCL-606/C or the mono PCL-606. Find out why Moseley STL's outsell all others.

Frequency response:	Composite: ±0.1 dB or better 30 Hz to 53 kHz, ±0.3 dB or better 53 kHz to 73 kHz
THD & IMD Distortion: Narrow (Wide) I.F. Filter	0.3% (0.2%) or less 30 Hz to 53 kHz, typically better than 0.1% (0.7%) at 1 kHz
Stereo Separation	48 dB or better, 50 Hz to 15 kHz (typically 50 dB or better)
Nonlinear Crosstalk: Subchannel to Mainchannel Mainchannel to Subchannel: Narrow (Wide) to I.F. Filter	50 dB (54 dB) or better
Signal-to-Noise Ratio	72 dB or better (typically 75 dB) below 100% modulation, demodulated, de-emphasized left or right

Model PCL-606/C Transmitter And Receiver
Mfg. List $10,700.00 ..... Call For BSW Price

Model SCD-8
Multiplex FM Subcarrier Demodulator

Model SCD-8 Multiplex FM Subcarrier Demodulator was developed as a companion to the SCG-8 generator. Front panel peak deviation, automatic muting, self contained power supply, meter, all electronic squelch and audio low-pass filter are standard equipment. Operating frequency easily changed with plug-in filters from 26 kHz to 185 kHz spectrum.

Mfg. List $1,490.00 ..... Call For BSW Price

ENTNER

THE TOTAL REMOTE CONTROL SYSTEM

ODEL VRC-2000
MOTE CONTROL SYSTEM

The VRC-2000 Remote Control System provides a total solu-n for controlling your broadcast transmitter from anywhere a ephone line, radio link, data link, or bi-directional audio link is ailable.

This unit provides several ways to gain access to your ansmitter. For instance, you may access your transmitter from ıy Touch Tone® telephone to communicate with the VRC-)00's synthesized voice. The VRC-2000 will provide full-time ata and automatic logging capabilities on a terminal or an IBM® r compatible personal computer. If there are no telephone lines ɔ your transmitter, you can use a radio link, or any bi-directional .udio link.

The VRC-2000 Remote Control System will watch your trans-nitter for you. It's like having a person on duty at the transmitter :ontinually. The VRC-2000 will notify you when something goes out of tolerance, when security is breached, or if it had to turn on the stand-by because the main failed.

The VRC-2000 Remote Control Unit features 16 single-ended analog input channels for use in metering, 16 TTL compatible input channels for use as status monitors, and 32 "open collector" transistor outputs for use as remote "switches" to generate control commands. The 32 outputs are configured as 16 separate "Command Channels" with 2 outputs per channel.

The unit can be used to automatically monitor conditions at a remote site, automatically log regular reports to a printer, take corrective action based on monitored conditions, and notify a human operator via telephone or radio links should an undesired condition occur.

The VRC-2000 has an outstanding list of options and accessories that make installation and operation easy and efficient.

MFG. LIST $3,195.00 ..... CALL FOR BSW PRICE

Leasing?

Leasing equipment saves working capital. Talk to your BSW Sales Representative on the advantages of leasing your next equipment purchase from BSW.

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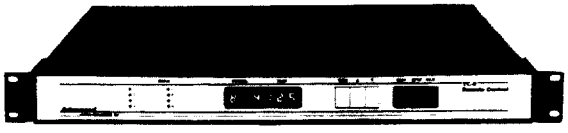
BURK TECHNOLOGY



MODEL TC-8
REMOTE CONTROL

The TC-8 is a full featured remote control system from Advanced Micro Dynamics.

The TC-8 requires only 1¾" of rack space and provides 8 metering channels, 8 status inputs and 8 pair of control outputs. Studio and transmitter units communicate via telco loops or STL/SCA subcarriers. Specify which you prefer at time of ordering.

Status inputs accept 5 to 28 V signals and metering channels accept inputs of either polarity from 0.25 to 4 V, ensuring easy interface with all broadcast equipment. Status LED's and the large dot matrix metering display can be read from across the room.

CRT display, logging and fully automatic operation is possible using the optional RS-232 interface.

MFG. LIST $2,495.00 ..... CALL FOR BSW PRICE

MODEL ARC-16
16-CHANNEL REMOTE CONTROL

Now, you have a choice: full-time studio control, dial-up telephone control — or both. And because of modular design, the ARC-16 offer features never before available in a 16-channel remote control system.

With the studio controller you have a constant link to your transmitter, for instant response to any problem. The 32-character LCD display shows out-of-tolerance conditions at a glance, and it's simple to make adjustments, with clear-text prompting to guide you.

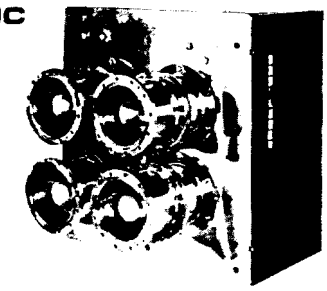
Call the ARC-16 from any tone phone: the Digital Speech Unit (DSU) lets you take control using your telephone keypad. It can be used as the only control — or in addition to the studio controller — and can be installed in the transmitter or the studio unit.

Features:

- Full-time studio control, dial-up control, or both
- Studio controller displays clear text prompts for non-technical operators
- Dial-up speech unit features digitally-recorded human voice
- Built-in subcarrier generators at no extra charge
- Built-in alarms
- Optional computer interface
- Control multiple sites with a single unit

PRICES BASED ON CONFIGURATION

DIELECTRIC



80 Series High Powered Motorized Switches

Model 80 Series
High Power Motorized Switches

The 80 series of motorized 4 port* cold break coaxial switches is a U-link type (with silver plated contacts) capable of high isolation and high power handling. Your choice of $4^1/_{16}$", $6^1/_8$", and $8^3/_{16}$".

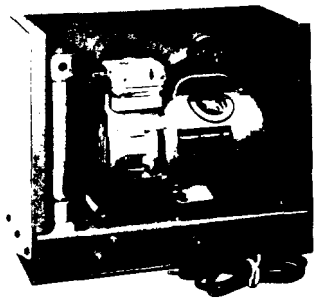
Switch position is indicated with a rotating arrow and with auxiliary switches. The auxiliary switches are for readout and interlocking circuits. In the closing mode, the interlock switches do not activate and are ready to accept full power. In the opening mode, the interlock switches open prior to the RF contacts to prevent the breaking of the RF contacts while under power.

Manual operation is provided for through the use of a hand lever. Terminations are EIA fixed flanges with non-removable inner conductors.

**For SPDT applications, one port is not used.*

BSW Offers The Complete Dielectric Line. Call Your BSW Representative For Details. 1-800-426-8434

Cablewave Systems



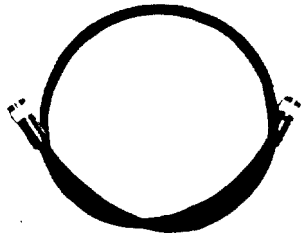
Model APD-20
Automatic Pressurization Dehydrator

The APD-20 Automatic Pressurization Dehydrator is designed for reliable pressurization of elliptical waveguide, coaxial cable, waveguide, and rigid line systems. The dehydrator utilizes the pressure swing absorption drying system with completely automatic operation eliminating the need for replacement or manual reactivation of the desiccant.

Mfg. List $1,470.00 ..... Call For BSW Price

BSW Handles The Complete Cablewave Line. Call Us Toll Free For All Your Cablewave Requirements. 1-800-426-8434

MPM
INDUSTRIES



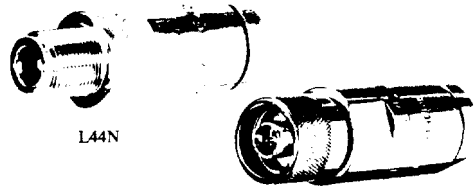
Model JC3
Jumper Cable

3 foot RG8U jumper cable. N male to N male connectors. Custom lengths available.

BSW Price $12.17

ANDREW

LDF4-50A



L44N

L44W

Model LDF4-50A
Heliax® Coaxial Cable

These low loss Heliax foam-dielectric cables provide a combination of strength and efficiency not available in other cables. Applications include STL's, RPU and lower power transmitter. 1⅝", ⅞", and ½" Foam Dielectric. Prices upon application.

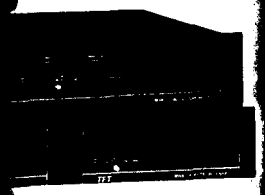
Model LDF4-50A ..... Mfg. List $2.15 per ft.

Model L44N (female connector) ..... Mfg. List $28.80

Model L44W (male connector) ..... Mfg. List $28.80

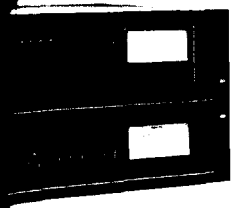
BSW Is A Full Line Distributor For Andrew And Cablewave Products. Call Us Toll Free For Your Requirements.

BSW's experienced sales staff is dedicated to meeting the needs of today's broadcasters.
Call toll free 1-800-426-8434
or Fax 206-565-8114



Transmitter and Model 8701
igned to convey one way data or
Ideally suited for remote control
via external modems, eliminates
or SCA channel at FM stations.
provides a data link many times
nnel.
o bandwidth of 300 Hz to 3 kHz
mission from a modem for either
nctions. Provisions are made on
a microphone (transmitter) and
voice applications.

..... CALL FOR BSW PRICE



STUDIO TRANSMITTER LINK
RF SIGNAL ENVIRONMENT

ed for the major market's RF signal
increasingly difficult to operate com-
ber of signals present in the 940-960
echnology and components, such as
nt end gain, variable bandwidth IF
F shielded housings for critical cir-
o design one of the best STL systems
try for aural program transmission.
d accessories such as IF Repeater,
CA capability make the 8300 System

..... CALL FOR BSW PRICE

..... CALL FOR BSW PRICE

GENTNER

THE TOTAL REMOTE CONTROL SYSTEM

MODEL VRC-2000
REMOTE CONTROL SYSTEM

The VRC-2000 Remote Control System provides a total solution for controlling your broadcast transmitter from anywhere a telephone line, radio link, data link, or bi-directional audio link is available.

This unit provides several ways to gain access to your transmitter. For instance, you may access your transmitter from any Touch Tone® telephone to communicate with the VRC-2000's synthesized voice. The VRC-2000 will provide full-time data and automatic logging capabilities on a terminal or an IBM® or compatible personal computer. If there are no telephone lines to your transmitter, you can use a radio link, or any bi-directional audio link.

The VRC-2000 Remote Control System will watch your transmitter for you. It's like having a person on duty at the transmitter continually. The VRC-2000 will notify you when something goes out of tolerance, when security is breached, or if it had to turn on the stand-by because the main failed.

The VRC-2000 Remote Control Unit features 16 single-ended analog input channels for use in metering, 16 TTL compatible input channels for use as status monitors, and 32 "open collector" transistor outputs for use as remote "switches" to generate control commands. The 32 outputs are configured as 16 separate "Command Channels" with 2 outputs per channel.

The unit can be used to automatically monitor conditions at a remote site, automatically log regular reports to a printer, take corrective action based on monitored conditions, and notify a human operator via telephone or radio links should an undesired condition occur.

The VRC-2000 has an outstanding list of options and accessories that make installation and operation easy and efficient.

MFG. LIST $3,195.00 ..... CALL FOR BSW PRICE

Leasing?

Leasing equipment saves working capital. Talk to your BSW Sales Representative on the advantages of leasing your next equipment purchase from BSW.

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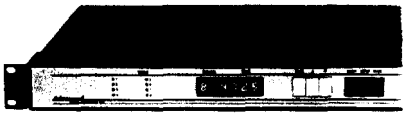
BURK TECHNOLOGY



MODEL TC-8
REMOTE CONTROL

The TC-8 is a full featured remote control s
Advanced Micro Dynamics.

The TC-8 requires only 1¾" of rack space an
metering channels, 8 status inputs and 8 pair of con
Studio and transmitter units communicate via te
STL/SCA subcarriers. Specify which you prefe
ordering.

Status inputs accept 5 to 28 V signals and meter
accept inputs of either polarity from 0.25 to 4 V. e
interface with all broadcast equipment. Status LI
large dot matrix metering display can be read fro
room.

CRT display, logging and fully automatic oper
sible using the optional RS-232 interface.

MFG. LIST $2,495.00 ..... CALL FOR

MODEL ARC-16
16-CHANNEL REMOTE CONTROL

Now, you have a choice: full-time studio con
telephone control — or both. And because of modul
ARC-16 offer features never before available in
remote control system.

With the studio controller you have a constant
transmitter, for instant response to any proble
character LCD display shows out-of-tolerance co
glance, and it's simple to make adjustments, wi
prompting to guide you.

Call the ARC-16 from any tone phone: the Digital
(DSU) lets you take control using your telephone k
be used as the only control — or in addition t
controller — and can be installed in the transmitter
unit.

Features:

- Full-time studio control, dial-up control, or both
- Studio controller displays clear text prompts for n
  operators
- Dial-up speech unit features digitally-recorded n
- Built-in subcarrier generators at no extra charge
- Built-in alarms
- Optional computer interface
- Control multiple sites with a single unit

PRICES BASED ON CONFIGURATION

DECLARATION

I, Darrell Bryan, under penalty of perjury state that:

1. I have reviewed the foregoing Bryan exhibit No. 8, entitled "Testimony of Darrell Bryan", which constitutes my direct testimony in this proceeding.

2. It is true and correct to the best of my knowledge and belief.

Darrell Bryan

Darrell Bryan

7-6-94

Date

EXHIBIT NO. 9

ORIGINAL

Testimony of Richard H. Mertz
Engineering Statement

This statement has been prepared on behalf of Mr. Darrell Bryan ("Bryan"), to rebut allegations raised by SBH Properties, Inc. ("SBH") in comparative hearings for permission to construct an FM station on Channel 276A in Tusculum, Tennessee. SBH has alleged that Bryan is not financially qualified to construct and operate the station proposed in BPH-920109MA ("Application"). SBH supported their assertions using information provided by Mr. William Seaver ("Seaver"). These allegations resulted in the addition of a financial issue as part of the comparative hearing process.

SBH alleges that Bryan underestimated the construction costs for the proposed facility. Seaver claims that Bryan, in the Application, proposes to use a two bay antenna. Seaver further claims that the use of a two bay antenna requires the use of a substantially larger transmitter than Bryan anticipated in his estimate. This larger transmitter and accompanying equipment including 1 5/8" transmission line, according to Seaver, would cost more than the equipment budget estimated by Bryan. SBH employs sophistry to imply that Bryan has not considered the additional cost of a larger transmitter. These "unconsidered" costs, if correct, would raise SBH's estimated construction cost above the amount of funding available to Bryan.

Required Estimate

The instructions that accompany FCC Form 301, specifically page 6, Paragraph D(1)(a),

Federal Communications Commission

Docket No. 93-241 Exhibit No. 9

Presented by Bryan

Disposition { Identified 7-26-94
Received 7-26-94
Rejected

Reporter Jeffrey M. Gentzler

Date 7/26/94

requires the applicant to estimate[1] the initial costs of constructing and operating the facility proposed in the application. Bryan's 1992 application makes a good faith effort to estimate the cost of constructing the proposed station. While SBH "nit picks" at the details of the estimate, the substance of the requirement is to establish whether or not the applicant is able to construct the proposed facility with the funds available.

How many antenna bays are required or specified?

The foundation of SBH's argument is based on Seaver's assumption that Bryan's Application reflects the use of a two bay antenna for the proposed facility. Seaver has not stated how he arrived at this assumption other than to refer to the antenna sketch in the Bryan Application.

An examination of Section V-B of the FCC Form 301 filed by Bryan reveals only that a non-directional antenna has been specified. There is no reference in the application to the number of bays[2]. Although sketch E-2 shows two antenna bays, the drawing is merely a visual graphic, not to scale, that shows the specified antenna radiation center placement and pertinent heights and information for the structure. It may not be concluded, in any way, that the sketch is a specification of the proposed antenna type, design, or configuration. Section V-B, paragraph 8 of FCC Form 301 specifically says:

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[1] **Black's Law Dictionary defines the word estimate as "A valuing or rating by the mind, without actually measuring, weighing, or the like. A rough or approximate calculation only."**

[2] **The Commission routinely permits licensees, pursuant to § 73.1690(c)(1), to change non-directional FM antennas without prior authorization, and regardless of the number of bays, as long as the effective radiated power is maintained and the center of radiation of the new antenna is within 2 meters of that specified in the station's authorization.**

"8. Attach as an Exhibit sketch(es) of the supporting structure, labelling all elevations required in Question 7 above, except item 7(b)(3). If mounted on an AM directional-array element, specify heights and orientations of all array towers as well as location of FM radiator."

Although the commission formerly required submission of detailed antenna information, that requirement was eliminated in the 1970's.

SBH's Estimate and Bryan's Estimate

The basis for SBH's estimate is centered on the erroneous assumption that a two bay antenna will be used in the construction of the proposed facility. Since, as shown above, any number of bays can be used, the size and nature of the major components used to construct the facility can be selected to fit the economic constraints. In designing this installation, the use of a four bay antenna is recommended. The Henry transmitter on which Bryan's estimate was based is a 6 kW unit and would provide sufficient power to attain 6 kW effective radiated power with a four or six bay antenna.

As stated above, the FCC requires the applicant to prepare an estimate of construction costs. Bryan's original estimate, prepared at the end of 1991, indicated that some of the equipment would be second-hand (previously owned). SBH alleges that Bryan did not receive written estimates nor did he make any agreements with suppliers to provide equipment that was listed on Bryan's estimate as "used." The "used" equipment market is much like the used car market. Most items are "one of a kind" or only a few are available. Substitution of used equipment is normally made when the desired items are unavailable. The equipment available in 1992 when the original estimate was prepared has, more than likely, been sold. The price Bryan estimated in the preparation of his estimate was valid at that time. It is not common

(or good) business practice for a used equipment vendor to contract and retain in inventory for the pendency of the FCC application process a specific piece of equipment designated for a particular customer. However, experience has shown that there is a continuing supply of used equipment available for purchase.

SBH has presented as its cost estimate a "Broadcast Sales Proposal" from Continental Electronics Corporation ("Continental"), a manufacturer/vendor, based on the faulty assumption that a two bay antenna would be used. The estimate that SBH presents is thus inaccurate. Additionally, the "sales proposal" presented as an estimate by SBH and Seaver, shows unnecessary items Continental is selling that further inflate the already bloated costs. Page 1 of Continental's proposal number 14587, adds two unnecessary transmitter spare parts kits to SBH's estimate. Page 5 of the Continental proposal adds an quarter wavelength stub for the antenna. This antenna enhancement is not needed for proper operation of the station. Page 5 shows, as item 11, an Andrew 1261B 1 5/8" gas barrier for use with rigid line. There is no rigid line associated with the components SBH has specified. This device is useless in this application. Page 7 of the Continental estimate shows, as item 17, a nitrogen tank assembly. This device is used to regulate the pressure flow of nitrogen, an inert drying agent, from a storage tank to pressurized "air" dielectric cable. SBH has specified "foam" dielectric cable which does not require pressurization. This item is also superfluous. SBH has added $2141.00 of unnecessary and unusable items to their estimate of transmitter, coaxial cable, and antenna costs. Additionally, SBH failed to include the customary discount page normally offered with sales presentations of this type. By not submitting this page, SBH did not show the initial discount that Continental normally offers on equipment packages.

SBH also makes an "apples and oranges" comparison of Bryan's estimated tower cost. Bryan originally estimated the tower cost at $18,000.00 and has secured an estimate from a company who has, in writing, presented a quotation of $16,000 for the installation of a 300 foot Rohn 45G tower. The Rohn 45G tower is an 18" face, triangular shaped tower usually provided with tubular steel legs. Continental has specified for SBH a World Tower Company 300 foot 24" SR tower with solid steel legs. This tower is also a triangular shaped tower, however, the tower face is 6" (30%) larger than that specified in Bryan's estimate. Additionally, the World tower has solid steel legs while the Rohn tower uses tubular steel leg construction. The World tower's larger face width and solid leg construction requires more raw material than does the Rohn tower. This additional material adds to the tower cost. Since SBH has specified a larger tower and one of different design than that proposed by Bryan, their cost comparison is, therefore, not valid. The larger tower specified by SBH is not necessary.

Page 12 of the Continental estimate shows item 43, a Belar RF amplifier. Seaver claims that an RF amplifier will be required for use with the modulation monitors. If the modulation monitors are located at the transmitter site, this item is unnecessary.[3]

As has been demonstrated above, SBH's two bay antenna argument is meaningless as a basis for questioning the validity of Bryan's estimate. SBH's "padding" or adding of unnecessary equipment and comparison of dissimilar equipment only serves to discredit the SBH claim that Bryan underestimated his construction

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[3] **While the FCC places the responsibility for maintaining transmitter modulation levels as prescribed in Section 73.1570 of the Rules on the licensee, the requirements governing the use of "type approved" modulation monitors and the requirement that modulation meters be in view of the operator on duty were deleted as part of deregulation over ten years ago. The method of measuring modulation levels and the placement of the measurement equipment is left to the discretion of the permittee or licensee.**

costs.

Coaxial Cable Issues

SBH notes that Bryan has cited costs for 7/8" coaxial cable. SBH further notes that Bryan's engineer, Mr. Garrett G. Lysiak ("Lysiak"), has, in an engineering exhibit, called for the use of 1 5/8" coaxial cable, thus, allegedly compounding the cost underestimation. A review of Lysiak's statement shows that it did not specify the use of 1 5/8" coaxial cable for this particular facility. Lysiak's statement was a comparison of the transmitter requirements for various antenna bay configurations written in response to the two bay FM antenna specification issue raised by SBH. The coaxial cable efficiency is shown as a constant value in order to make a fair comparison of the transmitter requirements.

Specification of coaxial cable for use in the FM broadcast service varies from engineer to engineer. The "rule of thumb" that is normally applied is that the transmitter output power should be no greater than 80 to 85% of the average power capability of the coaxial cable. Some engineers prefer a more conservative approach and specify a larger coaxial cable. Experience has shown that the "rule of thumb" stated above performs adequately. Applying this "rule" to the present situation, 7/8" air dielectric coaxial cable has an average power capability of 6.4 kilowatts at 100 MHz[4]. For this example, using a 4 bay antenna and 280 feet of coaxial cable, the calculated transmitter power required will be 3.6 kW. Dividing 3.6 kW by 6.4 kW yields a ratio of 56%. At this ratio, 7/8" coaxial cable is sufficient for this application. SBH's continued claim that larger cable is required is groundless. Also, the 1 5/8"

[4] This value was take from Andrew catalog number 35, page 389. The power chart does not specify the average power capability at all frequencies. 100 MHz was selected as the closest to the proposed station's frequency.

cable only costs $2472.90 more that the 7/8" cable.

A Revised Estimate

An updated construction cost estimate has been prepared by this office. In order to prepare the updated estimate, the facility was designed in accordance with normal engineering practices. Not specified in this estimate was an EBS monitor and studio generator. Bryan owns these items and they are available for use at the new station. Bryan's original estimate did not provide brand names for all items. In some cases, the manufacturer Bryan originally specified was used. In other instances, equipment of equivalent type but from a different manufacturer was specified. The estimate specifies only new equipment and does not take into account the possibility of purchasing used equipment at a lower price or the use of any other equipment that Bryan now owns other than an EBS monitor and the studio generator. Equipment specifications were determined after review of Bryan's FCC application. Cable lengths, size, and accessories were based on typical installation techniques for the specific configuration described herein. The generator, building and tower estimates were supplied by Bryan and Mr. Walter Stone. Mr. Stone is president of American Aviation Inc. and has provided Bryan with a written estimate of tower and building costs.

Table 1 is an estimate that has been prepared using the categories originally used by Bryan. To the left of the vertical line on the Table is Bryan's original equipment list. To the right of the vertical line are items that are the same or equivalent. The source for the pricing information is shown at the bottom of the second page. Shown is the current "rack" or list price with expected vendor discounts. Adjusting the

original 1992 estimated construction costs for inflation, it would appear that both estimates are similar in value. It can, therefore, be concluded that Bryan's original estimate was reasonable for determining construction cost. It appears that Bryan does have adequate funds available to construct the proposed facility.

Table 2 is identical to Table 1 with the exception that 1 5/8" coaxial cable has been specified. As can readily be seen, regardless of the coaxial cable, Bryan has sufficient fund to construct the facility.

TABLE 1 - TUSCULUM, TENNESSEE FM STATION

Item Number	Original Budget Equipment Description	Quantity	Original Estimated Cost	Updated Estimate Equipment Description	Quantity		List Price	Extended List Price	Price Source
1	Transmitter/Exciter	1	$16,000.00	QEI Exciter	1		$2,200.00	$2,200.00	RFS
				Henry 6 kW RF amplifier	1		$17,000.00	$17,000.00	RFS
2	Antenna System (6 Bay)	1	$4,500.00	4 Bay Shively 6813NX	1		$5,900.00	$5,900.00	Shively
3	Transmission Line	1	$450.00	Andrew HJ5-50 7/8" Heliax cable	280	ft	$7.54	$2,111.20	AND
4	Connectors		$100.00	Andrew 75 AR 7/8" EIA Flange	1		$128.00	$128.00	AND
				Andrew 75 AG 7/8" Gas Barrier Flange	1		$190.00	$190.00	AND
				Andrew 1860A 7/8" to 1 5/8" adapter	1		$208.00	$208.00	AND
				Andrew 42396A-5 Hanger kits	9		$41.00	$369.00	AND
				Andrew 204989-2 Grounding kits	3		$29.00	$87.00	AND
				Andrew 19256B Hoisting grip	1		$43.50	$43.50	AND
				Andrew 31670-2 Round member adapter	12		$25.00	$300.00	AND
5	BE Audio Console	1	$1,595.00	Ramsa WR-5208	1		$1,750.00	$1,750.00	NE
6	Orban Optimod	1	$3,500.00	Hnat/Hindes UltraMod	1		$3,000.00	$3,000.00	RFS
7	ITC Stereo Play Carts	3	$4,000.00	Tapecaster 900PS Stereo Cart Machines	3		$1,195.00	$3,585.00	NE
8	Various length carts	120	$425.00	Fidelipac	120		$4.90	$588.00	RFS
9	Technics Turntables	2	$1,250.00	Technics SL1200 MKII Turntables	2		$449.95	$899.90	NE
10	Technics Amps	2	$400.00	Shure M64 Phono preamps	2		$125.00	$250.00	NE
				Stanton 500A MKII Phono cartridges	2		$37.50	$75.00	NE
11	EV Microphone & Amp	1	$825.00	EV 635A Microphone	1		$145.00	$145.00	NE
				Fostex 6301 Amplified speakers (pair)	1		$350.00	$350.00	NE
12	Moseley STL PKG (used)	1	$5,500.00	Marti Composite STL (new)	1		$6,500.00	$6,500.00	RFS
13	Scala Paraflector Ant (used)	1	$500.00	Scala MF-950 miniflectors	2		$320.00	$640.00	NE
14	Transmission line		$200.00	Andrew LDF4-50 1/2" heliax (foam)	200	ft	$2.50	$500.00	AND
				Andrew L44N n jacks	4		$31.70	$126.80	AND
				Andrew 43211 Hanger kits	6		$31.00	$186.00	AND
				Andrew 204989-1 Grounding kits	4		$23.00	$92.00	AND
				Andrew 43094 Hoisting Grip	2		$29.00	$58.00	AND
15	Gentner VRC Remote Control	1	$3,860.00	Gentner VRC-2000	1		$3,359.00	$3,359.00	NE
				Gentner command relay unit	1		$679.00	$679.00	NE

TABLE 1 - TUSCULUM, TENNESSEE FM STATION

Item Number	Original Budget Equipment Description	Quantity	Original Estimated Cost	Updated Estimate Equipment Description	Quantity	List Price	Extended List Price	Price Source
				Gentner setup software	1	$99.00	$99.00	NE
16	Belar stereo monitor	1	$879.00	Belar FMS-2 Stereo modulation monitor	1	$1,650.00	$1,650.00	NE
				Belar FMM-2 FM Modulation monitor	1	$1,450.00	$1,450.00	NE
17	Tascam 32 Reel Recorder	1	$1,200.00	Tascam 32 Reel Recorder	1	$1,799.00	$1,799.00	NE
18	ITC Delta recorder (used)	1	$2,500.00	Tapecaster 900 RPS Stereo cart recorde	1	$1,995.00	$1,995.00	NE
19	Distribution Amplifier	1	$425.00	Radio Systems DA-16	1	$425.00	$425.00	NE
18	8' Equipment rack	1	$80.00	Equipment rack	1	$400.00	$400.00	RFS
19	IGM Automation		$7,500.00	Digital automation	1	$10,000.00	$10,000.00	RFS
				TOTAL Vendor items list price			$69,138.40	
				Cost with expected 10% package discount			$62,224.56	
20	Generators	2	$9,000.00	Generators	1	$9,000.00	$9,000.00	Bryan-note 1
21	Installation (generators)		$8,000.00	Generator installation	1	$8,000.00	$8,000.00	Bryan
22	Equipment installation		$1,500.00	Equipment installation	1	$1,500.00	$1,500.00	Bryan
23	Studio furniture		$800.00	Studio Furniture	1	$800.00	$800.00	Bryan
24	Office furniture		$500.00	Office furniture	1	$500.00	$500.00	Bryan
25	300 foot tower	1	$18,000.00	Rohn 300 foot tower installed	1	$16,000.00	$16,000.00	Stone
26	Transmitter building	1	$5,000.00	Transmitter building	1	$3,800.00	$3,800.00	Stone
Mr. Bryan's original estimated cost of construction			$98,489.00	Current estimated construction costs			$101,824.56	
				Percent increase over original estimate			3.28%	

NOTES: 1. Only one generator has been priced. Bryan already owns the second generator.
2. Bryan owns an EBS monitor so none was listed.

Pricing Source Legend

AND	Andrew U.S. Price List for Catalog 35	Shively	Shively price list from consultant's catalog
NE	Northeast Broadcast Lab, Inc. Catalog #2	Bryan	Mr. Darrell Bryan's original estimate of costs
RFS	RFS Specialties Mid-Atlantic Office	Stone	Mr. Walter Stone, American Aviation, Inc.

TABLE 2 - TUSCULUM, TENNESSEE FM STATION (1 5/8" COAXIAL CABLE SPECIFIED)

Item Number	Original Budget Equipment Description	Quantity	Original Estimated Cost	Updated Estimate Equipment Description	Quantity	List Price	Extended List Price	Price Source
1	Transmitter/Exciter	1	$16,000.00	QEI Exciter	1	$2,200.00	$2,200.00	RFS
				Henry 6 kW RF amplifier	1	$17,000.00	$17,000.00	RFS
2	Antenna System (6 Bay)	1	$4,500.00	4 Bay Shively 6813NX	1	$5,900.00	$5,900.00	Shively
3	Transmission Line	1	$450.00	Andrew HJ7-50A 1 5/8" Heliax cable	280 ft	$16.22	$4,541.60	AND
4	Connectors		$100.00	Andrew 87R 1 5/8" EIA Flange	1	$260.00	$260.00	AND
				Andrew 87G 1 5/8" EIA Gas Barrier Flange	1	$300.00	$300.00	AND
				Item deleted - not needed with 1 5/8" cable	1	$0.00	$0.00	AND
				Andrew 42396A-2 Hanger kits	9	$41.00	$369.00	AND
				Andrew 204989-4 Grounding kits	3	$30.00	$90.00	AND
				Andrew 24312A Hoisting grip	1	$51.00	$51.00	AND
				Andrew 31670-2 Round member adapter kit	12	$25.00	$300.00	AND
5	BE Audio Console	1	$1,595.00	Ramsa WR-5208	1	$1,750.00	$1,750.00	NE
6	Orban Optimod	1	$3,500.00	Hnat/Hindes UltraMod	1	$3,000.00	$3,000.00	RFS
7	ITC Stereo Play Carts	3	$4,000.00	Tapecaster 900PS Stereo Cart Machines	3	$1,195.00	$3,585.00	NE
8	Various length carts	120	$425.00	Fidelipac	120	$4.90	$588.00	RFS
9	Technics Turntables	2	$1,250.00	Technics SL1200 MKII Turntables	2	$449.95	$899.90	NE
10	Technics Amps	2	$400.00	Shure M64 Phono preamps	2	$125.00	$250.00	NE
				Stanton 500A MKII Phono cartridges	2	$37.50	$75.00	NE
11	EV Microphone & Amp	1	$825.00	EV 635A Microphone	1	$145.00	$145.00	NE
				Fostex 6301 Amplified speakers (pair)	1	$350.00	$350.00	NE
12	Moseley STL PKG (used)	1	$5,500.00	Marti Composite STL (new)	1	$6,500.00	$6,500.00	RFS
13	Scala Paraflector Ant (used)	1	$500.00	Scala MF-950 miniflectors	2	$320.00	$640.00	NE
14	Transmission line		$200.00	Andrew LDF4-50 1/2" heliax (foam)	200 ft	$2.50	$500.00	AND
				Andrew L44N n jacks	4	$31.70	$126.80	AND
				Andrew 43211 Hanger kits	6	$31.00	$186.00	AND
				Andrew 204989-1 Grounding kits	4	$23.00	$92.00	AND
				Andrew 43094 Hoisting Grip	2	$29.00	$58.00	AND
15	Gentner VRC Remote Control	1	$3,860.00	Gentner VRC-2000	1	$3,359.00	$3,359.00	NE
				Gentner command relay unit	1	$679.00	$679.00	NE

TABLE 2 - TUSCULUM, TENNESSEE FM STATION (1 5/8" COAXIAL CABLE SPECIFIED)

Item Number	Original Budget Equipment Description	Quantity	Original Estimated Cost	Updated Estimate Equipment Description	Quantity	List Price	Extended List Price	Price Source
				Gentner setup software	1	$99.00	$99.00	NE
16	Belar stereo monitor	1	$879.00	Belar FMS-2 Stereo modulation monitor	1	$1,650.00	$1,650.00	NE
				Belar FMM-2 FM Modulation monitor	1	$1,450.00	$1,450.00	NE
17	Tascam 32 Reel Recorder	1	$1,200.00	Tascam 32 Reel Recorder	1	$1,799.00	$1,799.00	NE
18	ITC Delta recorder (used)	1	$2,500.00	Tapecaster 900 RPS Stereo cart recorder	1	$1,995.00	$1,995.00	NE
19	Distribution Amplifier	1	$425.00	Radio Systems DA-16	1	$425.00	$425.00	NE
18	8' Equipment rack	1	$80.00	Equipment rack	1	$400.00	$400.00	RFS
19	IGM Automation		$7,500.00	Digital automation	1	$10,000.00	$10,000.00	RFS
				TOTAL Vendor items list price			$71,613.30	
				Cost with expected 10% package discount			$64,451.97	
20	Generators	2	$9,000.00	Generators	1	$9,000.00	$9,000.00	Bryan-note 1
21	Installation (generators)		$8,000.00	Generator installation	1	$8,000.00	$8,000.00	Bryan
22	Equipment installation		$1,500.00	Equipment installation	1	$1,500.00	$1,500.00	Bryan
23	Studio furniture		$800.00	Studio Furniture	1	$800.00	$800.00	Bryan
24	Office furniture		$500.00	Office furniture	1	$500.00	$500.00	Bryan
25	300 foot tower	1	$18,000.00	Rohn 300 foot tower installed	1	$16,000.00	$16,000.00	Stone
26	Transmitter building	1	$5,000.00	Transmitter building	1	$3,800.00	$3,800.00	Stone
Mr. Bryan's original estimated cost of construction			$98,489.00	Current estimated construction costs			$104,051.97	
				Percent increase over original estimate			5.35%	

NOTES: 1. Only one generator has been priced. Bryan already owns the second generator.
2. Bryan owns an EBS monitor so none was listed.

Pricing Source Legend

AND	Andrew U.S. Price List for Catalog 35	Shively	Shively Price List from Consultant's Catalog
NE	Northeast Broadcast Lab, Inc. Catalog #20	Bryan	Mr. Darrell Bryan's original estimate of costs
RFS	RFS Specialties Mid-Atlantic Office	Stone	Mr. Walter Stone, American Aviation, Inc.

Certification

The undersigned hereby certifies under penalty of perjury that the foregoing statement was prepared by him or under his direction, and that it is true and correct to the best of his knowledge and belief. Mr. Mertz is a principal in the firm of Suffa & Cavell, Inc., and has submitted numerous technical materials to the Federal Communications Commission. His qualifications are a matter of record with that agency. Mr Mertz has been a radio engineer for over 25 years. He has designed and constructed many studio and transmitter facilities. He is the author of a column that appears monthly in Radio World Magazine. Mr. Mertz has published several papers which have been presented during the engineering conference at various NAB conventions. The most recent was a paper which dealt with the maintenance of safe RF exposure levels during tower modifications.

Richard H. Mertz

July 7, 1994