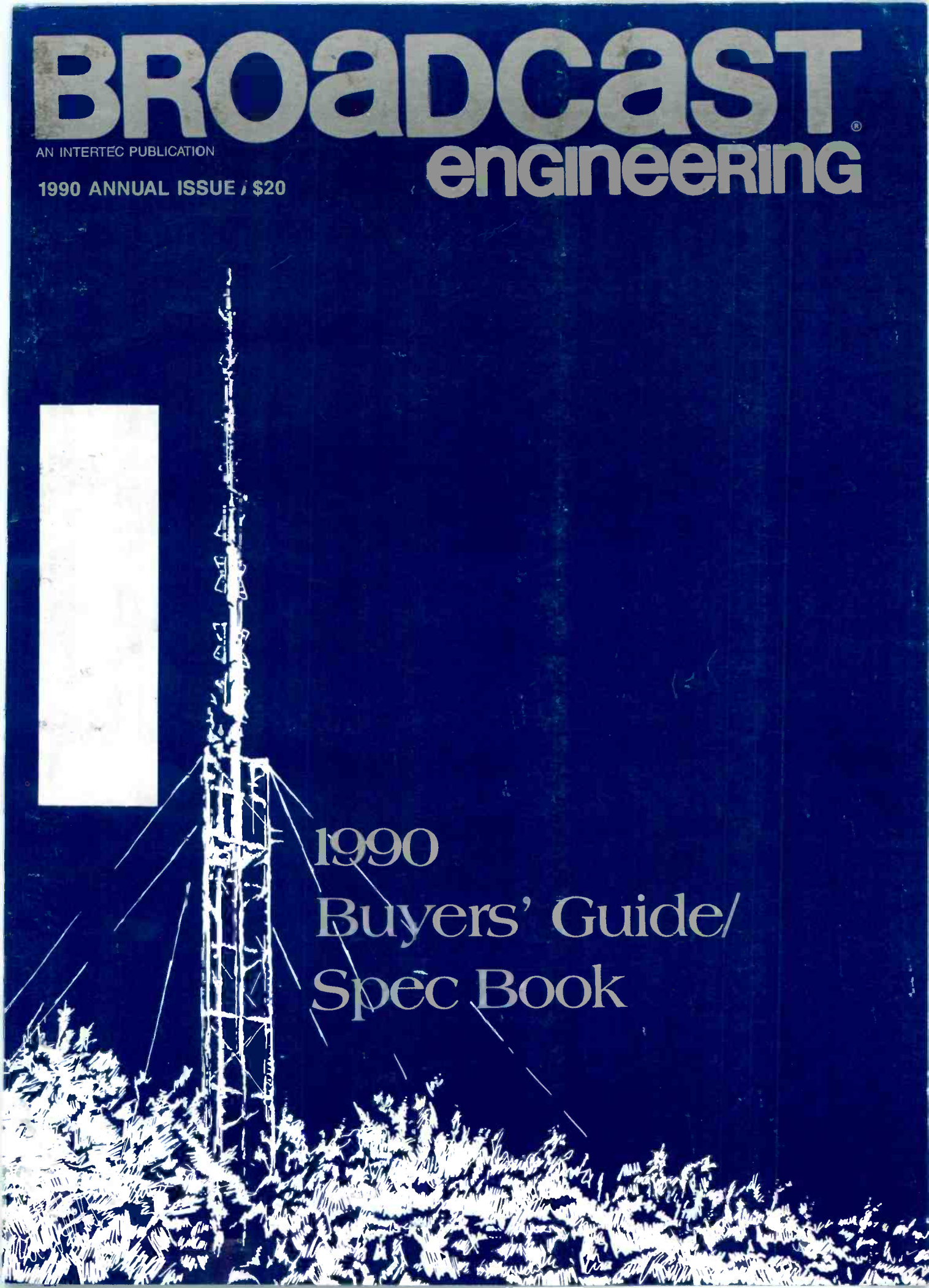


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1990
Buyers' Guide/
Spec Book



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The new FP42 Stereo Production Mixer — the stereo counterpart to our M267. Four channels with independent center detented pan pots and cuing. Headphone amplifier. Adjustable limiters.

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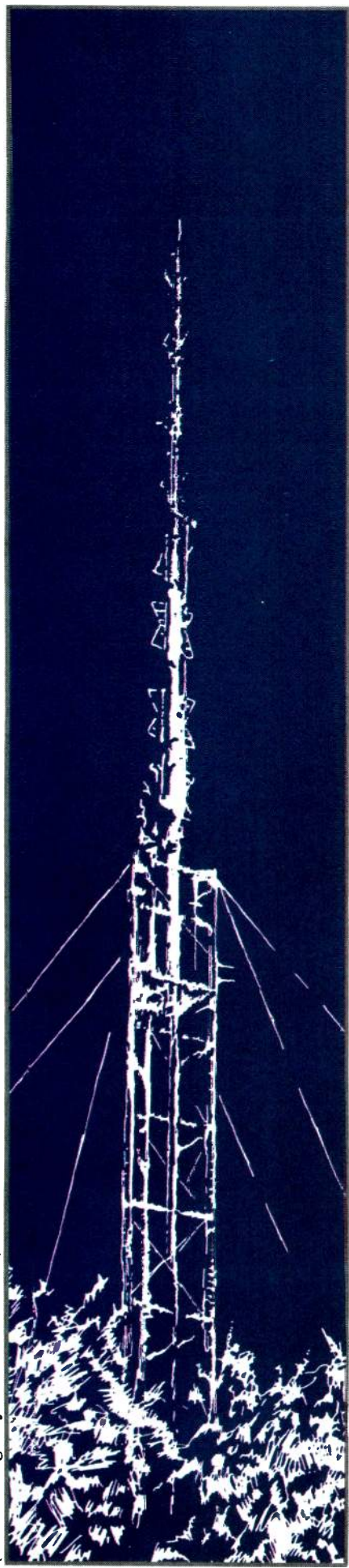
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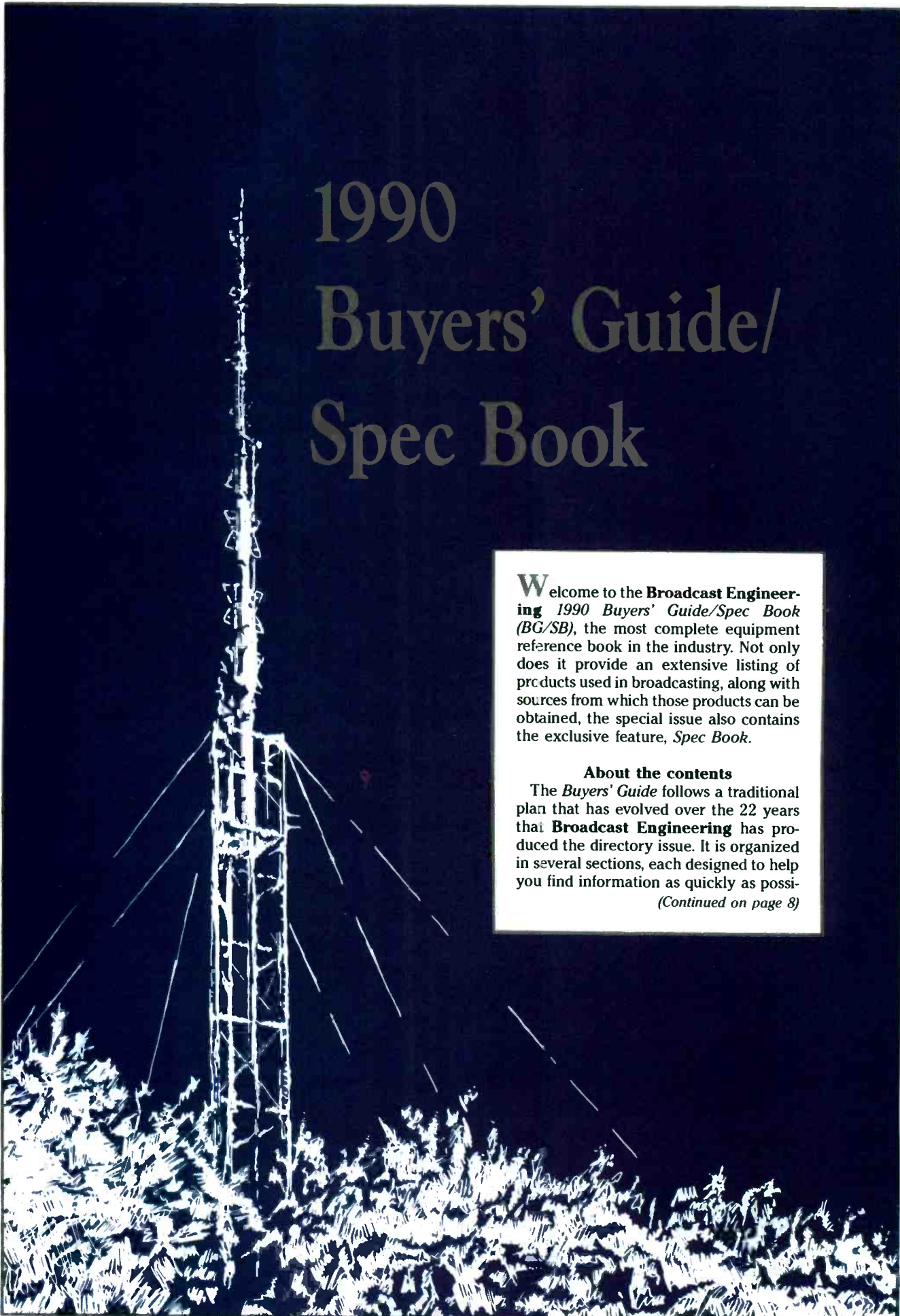
the workhorse for "on-air" editing and field production work.

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BROADCAST PRODUCTS



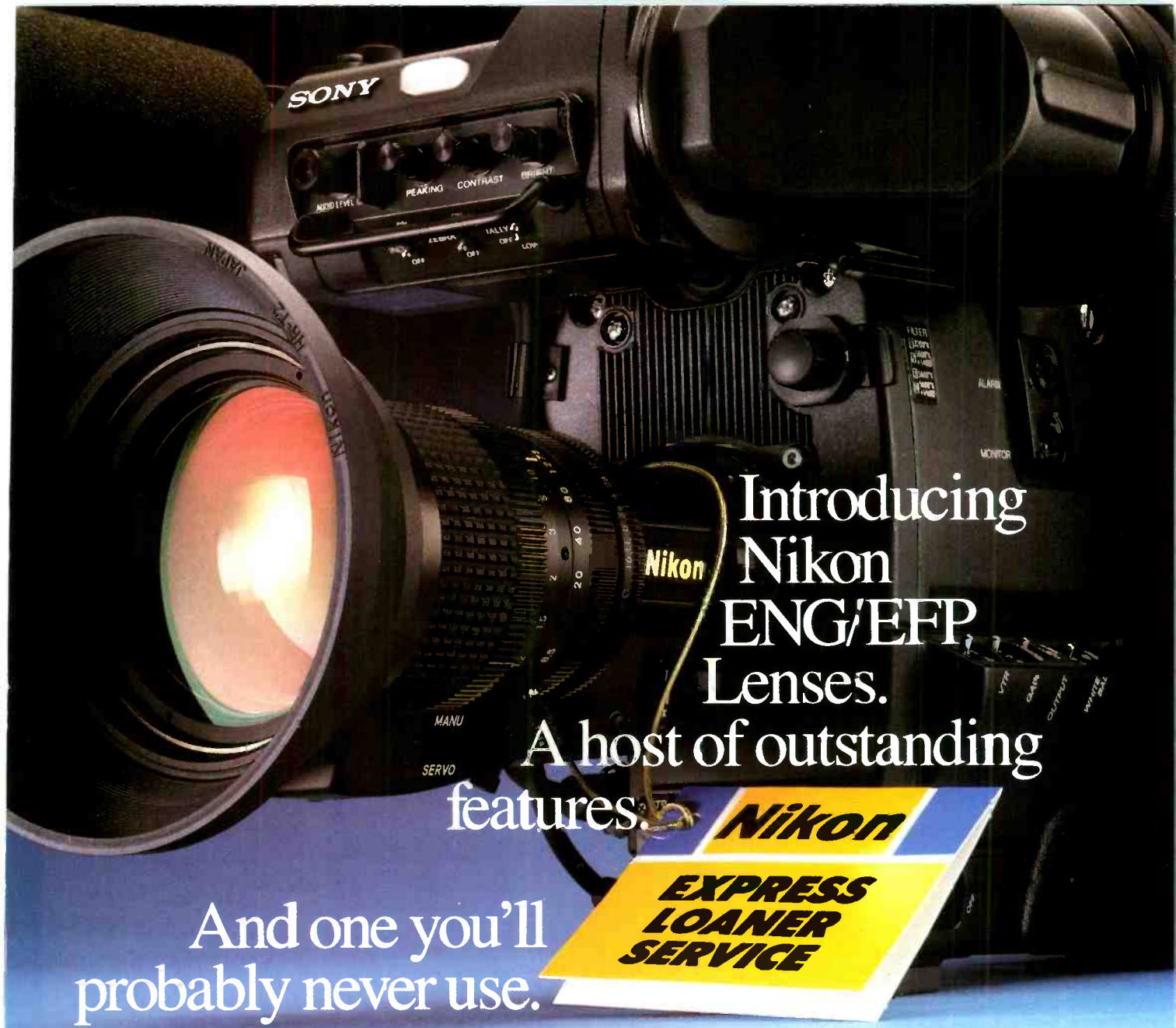
1990 Buyers' Guide/ Spec Book

Welcome to the **Broadcast Engineering 1990 Buyers' Guide/Spec Book (BG/SB)**, the most complete equipment reference book in the industry. Not only does it provide an extensive listing of products used in broadcasting, along with sources from which those products can be obtained, the special issue also contains the exclusive feature, *Spec Book*.

About the contents

The *Buyers' Guide* follows a traditional plan that has evolved over the 22 years that **Broadcast Engineering** has produced the directory issue. It is organized in several sections, each designed to help you find information as quickly as possible.

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Introducing Nikon ENG/EEP Lenses.

A host of outstanding
features.

And one you'll
probably never use.

Selecting an ENG/EEP lens for your $\frac{2}{3}$ " CCD camera is a creative decision. It should be lightweight, responsive and zoom smooth as silk at any speed. Its design should utilize Extra-low Dispersion Glass to minimize chromatic aberration. It should include an anti-reflection coating for improved spectrum transmission ratio. And it should have an advanced design that improves corner resolution and produces a high, flat MTF curve. In short, it should be a Nikon.

But selecting an ENG/EEP lens is also a business decision. And on that score we provide something almost as compelling as Nikon quality — our unique Express Loaner Service. Simply register the Warranty, then in the unlikely event your lens needs service we'll get you a loaner lens overnight. All your investment in equipment

and crews is more secure than ever before.

A service like this is remarkable in itself. But not quite as remarkable as our lenses.

As with all Nikon products, our new ENG/EEP lenses have all our renowned quality, tradition and technology built right in. Our growing line is also fully accessorized, including adapters that allow the use of your entire arsenal of Nikkor 35mm SLR camera lenses for special effects.

To find out more, call Nikon Electronic Imaging at (516) 222-0200 or write for our complete brochure: Nikon Electronic Imaging, Dept. D1 101 Cleveland Avenue, Bayshore, NY 11706.

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ELECTRONIC IMAGING

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Circle (5) on Reply Card

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ble. Fold-out tab pages provide a rapid index to the different sections. The sections include:

► **Product Listings**—A compilation of the manufacturers for the many different types of equipment. These types are subdivided into the seven general areas of *audio, video, RF, monitoring/test & measurement, automation/computer-related, ancillary products* and *services*.

► **Manufacturers' Addresses**—A listing of all manufacturers responding to our requests for current information. Each entry includes phone numbers and, when provided by the companies, fax numbers for fast, direct contact with sales and service departments. The number of manufacturers in the list is more than 1,100.

► **Dealers and Distributors**—A compilation of many of the manufacturers' representatives offers possible sources of products and services more convenient to your locality than the original manufacturers' locations. This section organizes companies by states according to their addresses and includes information about the regions they serve as well as generic product areas supported.

Spec Book

Now in its ninth year, *Spec Book* presents various specifications that charac-

terize a selected group of products. The product categories chosen for this presentation are those with relatively high purchase prices. With product areas including audio, video, RF and test & measurement, we do not attempt to tell all about every product in existence. In the space allotted, we attempt to bring you the widest possible variety of models. Note that the companies in this section are those that responded to requests for current information. Note also that the contents does not include every product from all of those companies.

More than 40 product types are defined in *Spec Book*. The side-by-side presentation of information is designed to allow prospective equipment buyers to locate models that most closely match the requirements of pending studio and facilities construction projects. Because a good deal of importance is placed on signal quality in today's broadcast and production facilities, frequency bandwidth, noise characteristics and distortion figures are among those specifications for nearly all products. In cases where features available with one product are significantly different among a product area, an indication of such features is also provided. Prices of products are not included, because we think that is a subject that must be discussed privately between you and

the equipment supplier.

Finally, in the introduction to last year's *BG/SB* publication, we noted that changes were being considered for this year's edition. Although not all of the ideas were incorporated into the 1990 edition, you will find areas where additional data are included. For future issues, however, we will continue to provide the most possible information for your use.

The staff of **Broadcast Engineering** hopes that the *1990 Buyers' Guide/Spec Book* serves your needs for the coming year. We appreciate the chance to bring you this book of reference information and always are open to your suggestions of ways that we can offer you assistance in your equipment purchasing needs and serving requirements.

Pat Blanton

Pat Blanton, editor
Buyers' Guide

Carl Bentz

Carl Bentz, editor
Spec Book

BROADCAST engineering

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BROADCAST ENGINEERING (ISSN 0007-1794) is published monthly (except in the fall, when two issues are published) and mailed free to qualified persons within the United States and Canada in occupations described here by Intertec Publishing Corporation, 9221 Quivira Road, Overland Park, KS 66215. Second-class postage paid at Shawnee Mission, KS, and additional mailing offices. POSTMASTER: Send address changes to **Broadcast Engineering**, P.O. Box 12960, Overland Park, KS 66212.

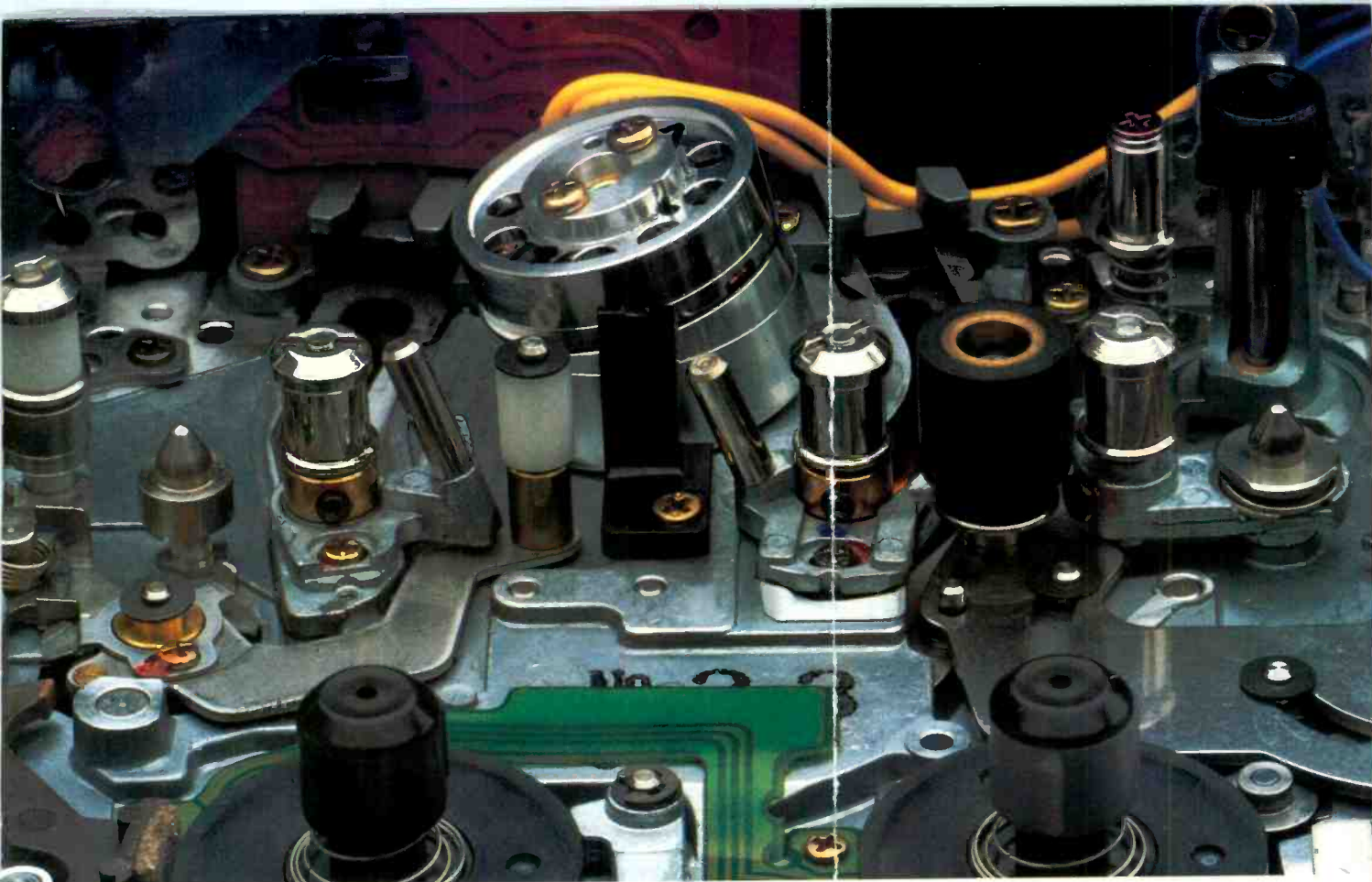
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PUBLISHING**



Your head is no place for information.

You want the sounds you record to stay where you can get at them and where they'll be safe. Not clogging the heads of someone's transport.

In the digital domain we don't hear the sound of the tape. Differences heard in sound are in the machine's abilities to interpret the stored data. So, your recording is unaffected by the character of the recording medium. However if your recording (data) is clinging to the heads of the recorder it is not much use. Furthermore it will cause write as well as read errors.

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In addition to being of high quality, Panasonic DAT tape comes with our exclusive *One Year Road Hazard Warranty**. No matter what happens, if you can scrape up enough tape to send some back, we'll replace it. Guaranteed.

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* If Panasonic DAT tape fails to operate, for any reason, within a year of original purchase, send tape and proof of purchase to Panasonic AVSG, 6555 Katella Avenue, Cypress, CA 90630 © 1989 PIC.

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Dolby SR improves the medium for your message.

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Dolby SR dramatically reduces noise, increases headroom, and lowers distortion from initial production to final transmission. That means you can deliver your message today with the clarity you've been expecting from the technology of tomorrow.

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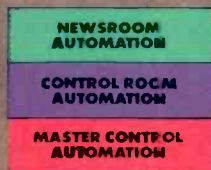
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WE'VE SEEN THE FUTURE AND IT FITS.

Just when broadcasters and professional users are shifting from one-inch and 3/4-inch video tape systems to 1/2-inch analog component video, along comes the specter of 19mm D2. First they made it smaller; now they want to make it bigger again.

When Panasonic set out to design Composite Digital recording systems, we had a big responsibility — to keep it small. Our customers have a right to expect their investment in 1/2-inch to be preserved. We know that a change in technology means more than a change in equipment; walls, racks, layouts, suites, vans and tape storage are all long-term investments that shouldn't have to be re-done every time there's a new chip on the block.

Panasonic's new Composite Digital system not only delivers superior multi-generation capability, long-term signal stability and unprecedented operating ease. It is designed to fit right where it should — into your existing facilities.

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mind. Our editing recorders and systems work with all of today's existing standards for video, audio and control. When you're ready to convert your editing suite to Composite Digital video, Panasonic will fit in.

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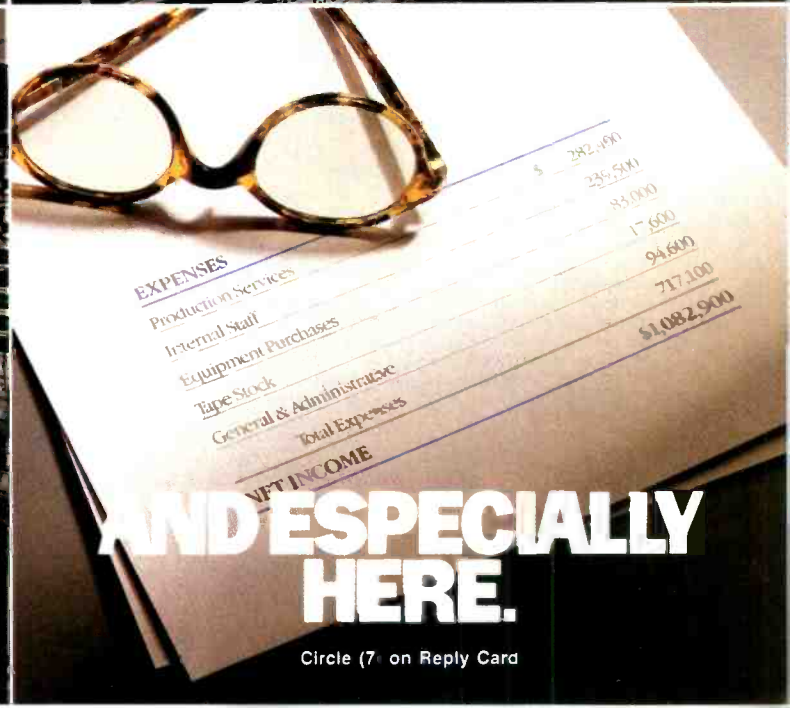
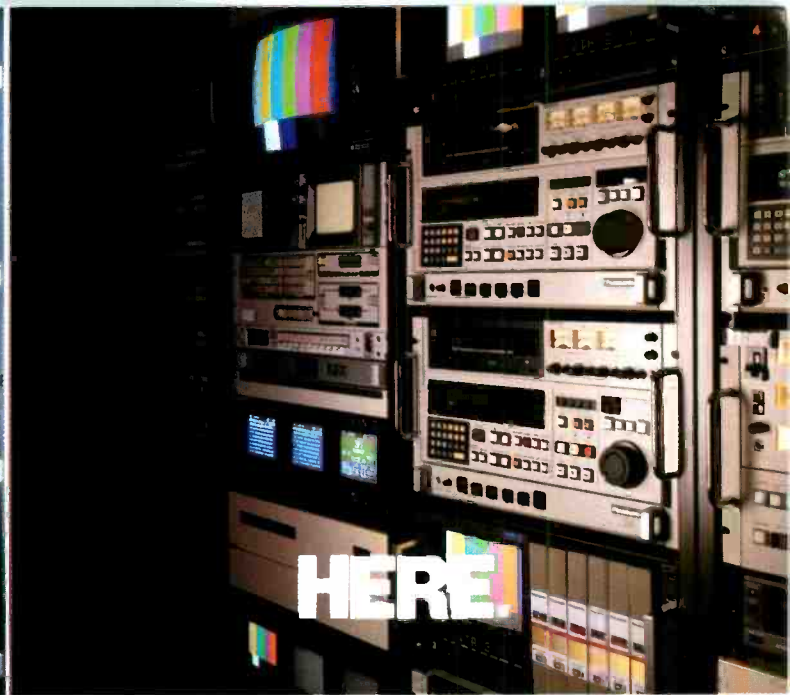
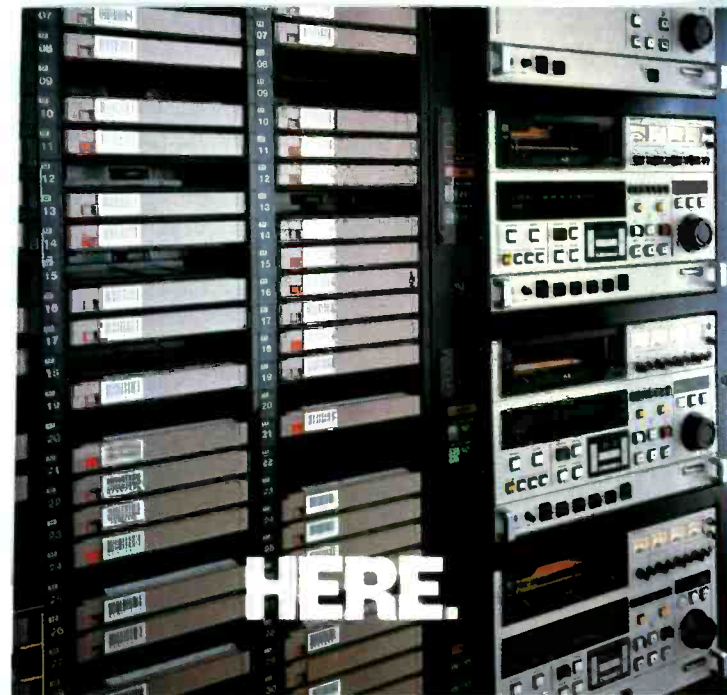
Today's mobile teleproduction requirements include everything from commercial production to fast-breaking news. That's why our system design is built around interchangeable components and true portability — and will remain so from today to digital to HDTV.

Here's the bottom line. Television in the 1990's demands technical advances and innovations — digital video and HDTV. But *your* demands are for systems that permit smarter, leaner operations. And that is why Panasonic's broadcast equipment, both for today and tomorrow, is designed to fit into your plant, your vision and your budget.

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EXPENSES	
Production Services	\$ 282,000
Internal Staff	285,500
Equipment Purchases	85,000
Tape Stock	17,600
General & Administrative	94,600
Total Expenses	717,100
NET INCOME	\$1,082,900

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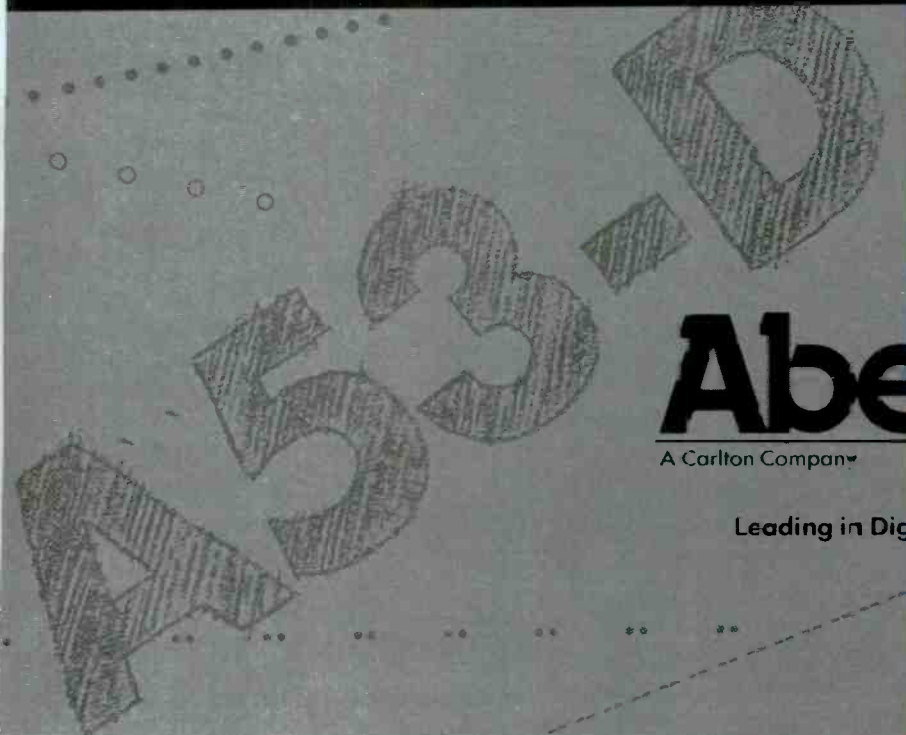
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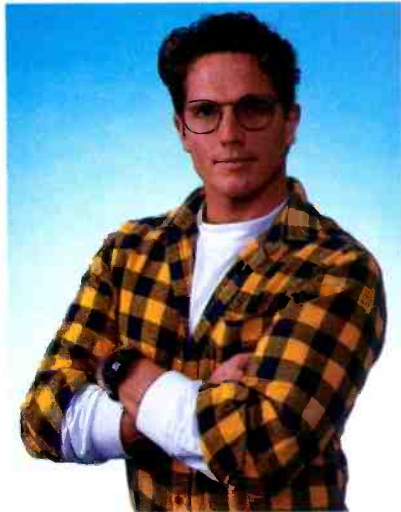
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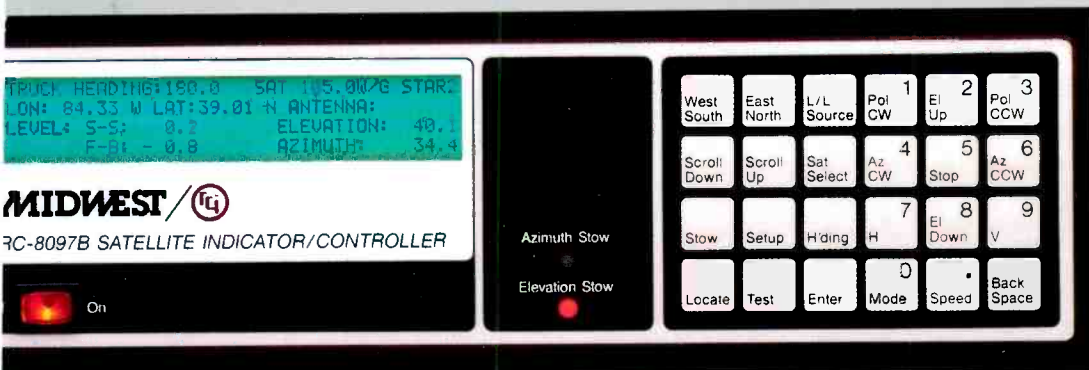
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So only Midwest can so confidently challenge you to beat our time. From power-on to final antenna positioning in three minutes or less.

With an accuracy of $\pm 2^\circ$ of elevation and $\pm 1.5^\circ$ of azimuth.

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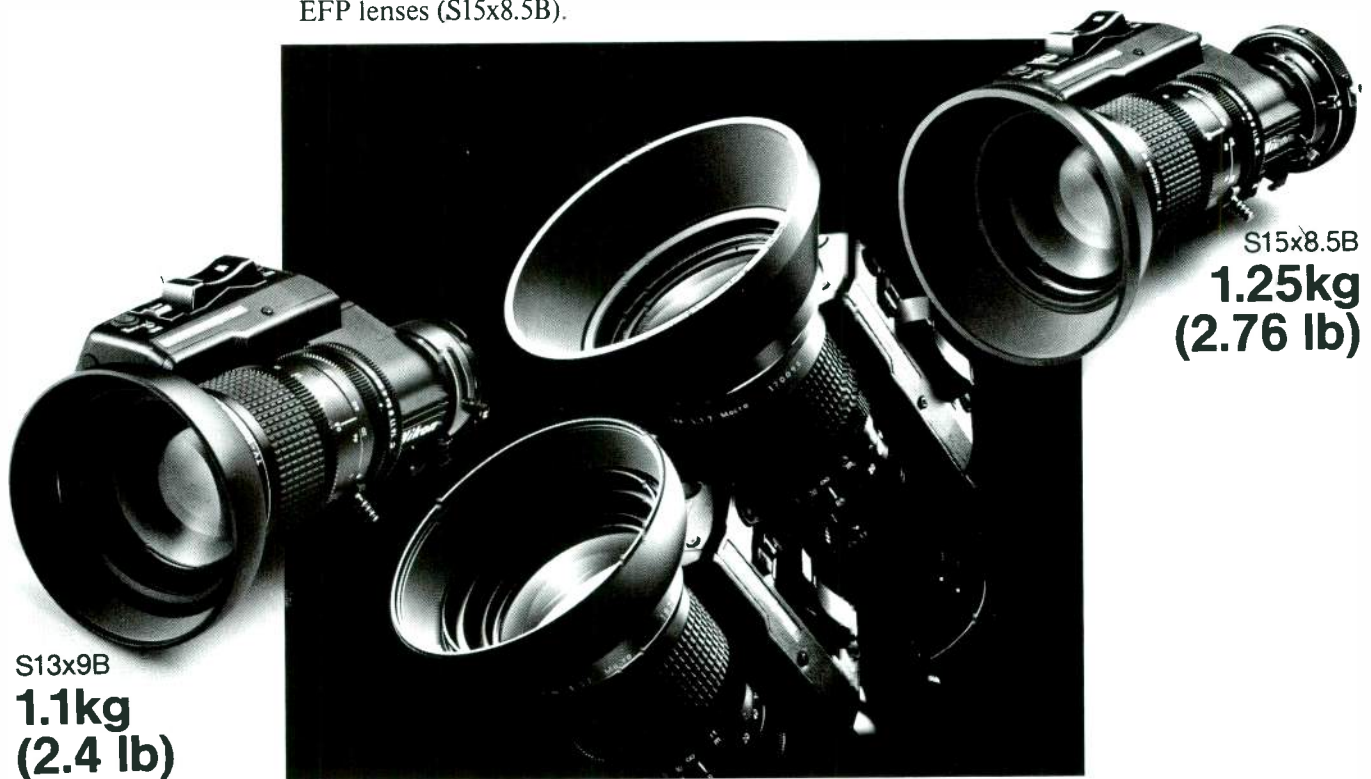
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Varian Microwave Equipment Div.
Varian TVT, a Div. of Varian
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Vector Technology
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Comtech Antenna Div. Comtech
Systems, Inc.
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Bogner Broadcast Equipment Co.
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Electron Processing
Potomac Instruments, Inc.

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Electron Processing
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Kathrein-Werke KG
Microwave Radio Corp.
Scala Electronic Corp.
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Thomson-LGT

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Marti Electronics
Microwave Radio Corp.
Moseley Associates, Inc.
Nurad, Inc.
Rood Megatronics B.V.
Scala Electronic Corp.

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Racon
Radiation Systems, Inc. Mark
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Scala Electronic Corp.
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SWR, Inc.
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Micro Communications, Inc.
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Scala Electronic Corp.
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Varian TVT, a Div. of Varian
Associates, Inc.

ATTENUATORS, RF

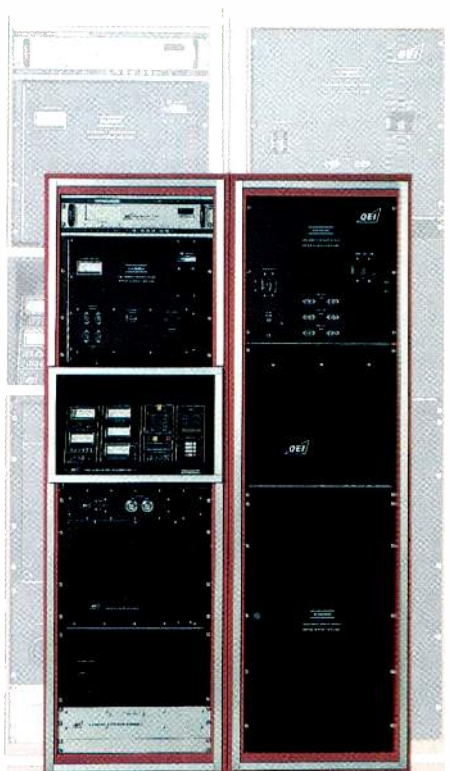
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3.5-5-10 kW

WATTS

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20-30 kW

Circle (17) on Reply Card

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Dynatech Microwave Technology	EXCITERS, FM	M/A-COM Mac, Inc.	
Eagle Radio Frequency Filters	AEG Bayly Inc.	Microwave Development Labs, Inc.	
International Microwave Corp.	Bext Inc.	Microwave Filter Co., Inc.	
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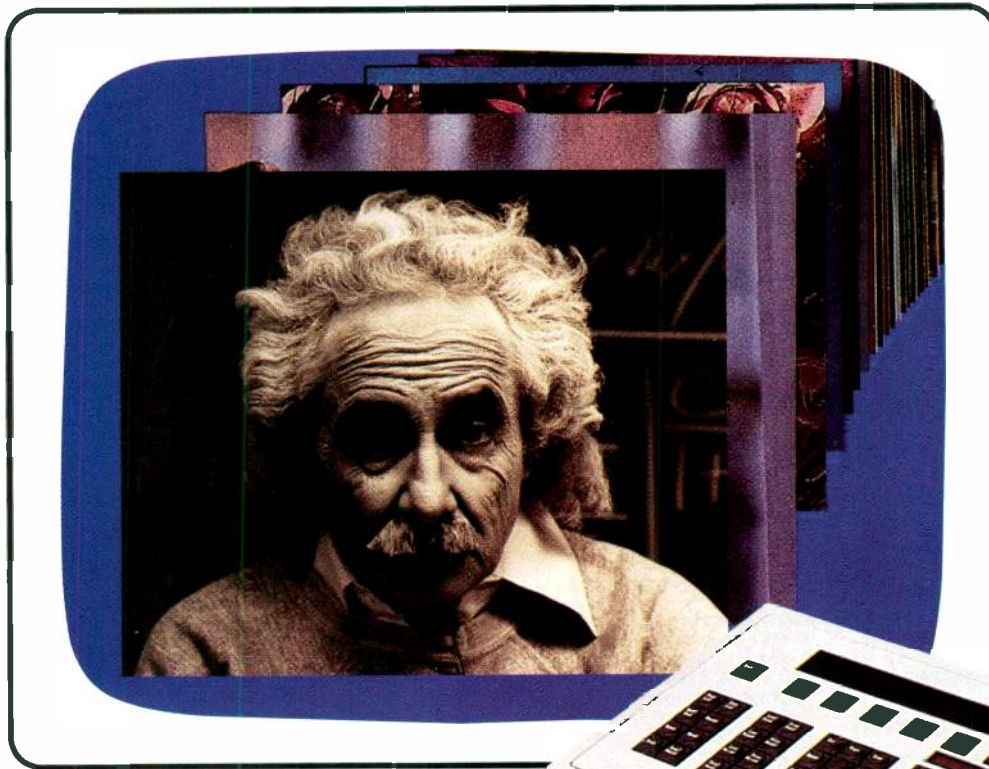
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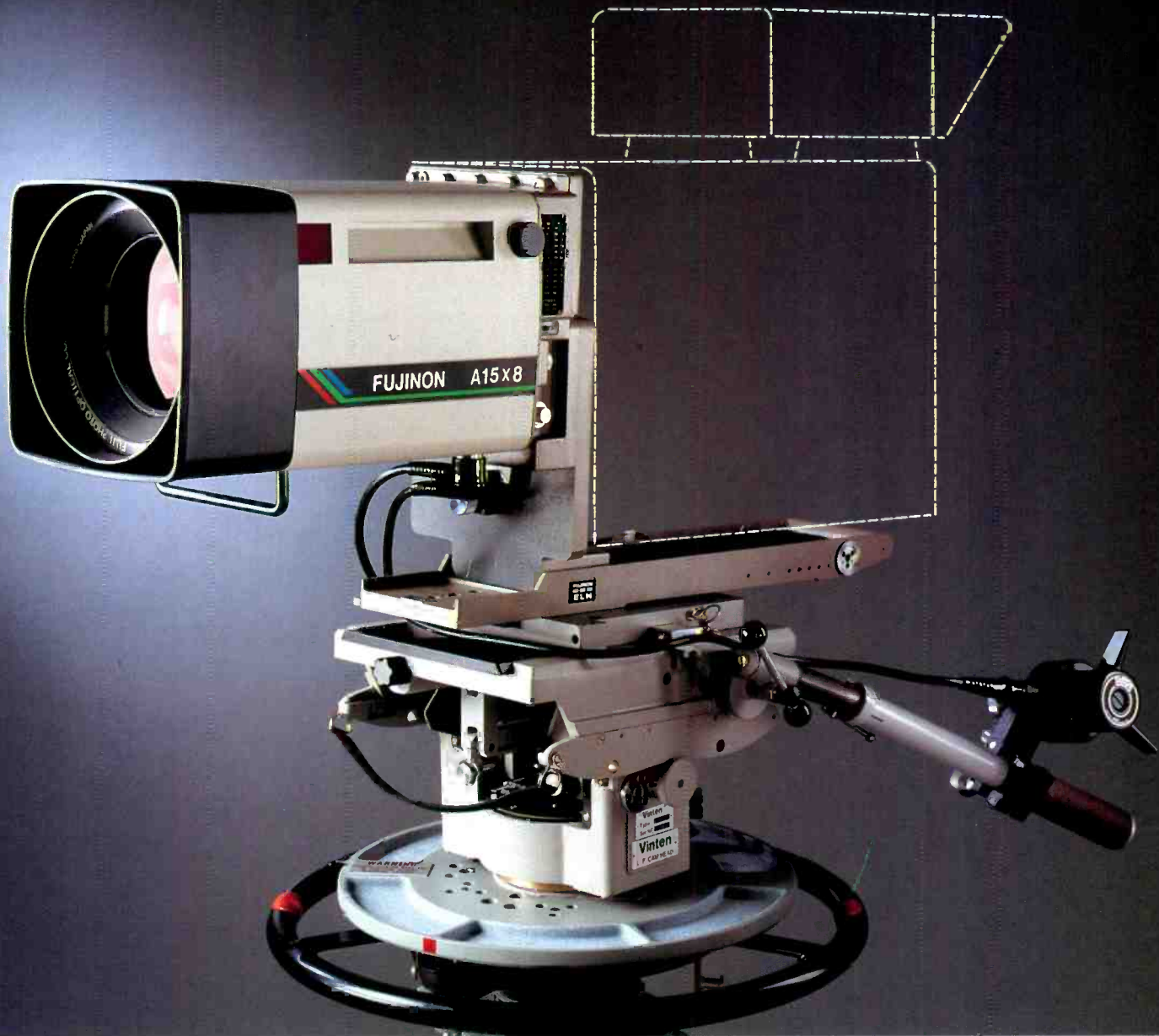
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*Except for the A34 x 20.5 ESM, these 2/3" format lenses are also available in 1/2" format.

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SuperNTSC™


The Faroudja LD-1 Line Doubler, CTE-2 Encoder and CFD-N Decoder comprise the basic building blocks of the **fully compatible SuperNTSC™** ATV system.

* Patent Pending

** Patent Numbers 4,030,121 and 4,262,304

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RPG Difussor Systems, Inc.
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Neumade Products Corp.
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MISCELLANEOUS PRODUCTS

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CABLE TOOLS Audio Visual Systems Bi-Tronics, Inc. Cam-Lok Inc. Canare Cable, Inc. Nemal Electronics Int'l. Paladin Corp. Penstock, Inc. Reliance Comm/Tec Roll-A-Reel Co. Inc. Techni-Tool Inc. 3M Electrical Specialties Div. Trompeter Electronics, Inc. Veam/Litton Systems, Inc. Western Electronic Products Co. Wireworks Corp.	CASES, FILM/TAPE Aarmor Case Co. Anvil Cases Unit of Zero Halliburton 85 Bagton (USA) Ne, Inc. Canford Audio plc Dago Cases Excalibur Industries Neumade Products Corp. Plastic Reel Corp. of America Polyline Corp. Professional Label Services Reliance Plastics & Packaging Div. Star Case Techni-Tool Inc. 3M Professional Audio/Video & Specialty Products Tiffen Mfg. Corp.	DEGAUSSERS, HEAD R.B. Annis Co., Inc. AVSC, Inc. Geneva Group of Companies, Inc. Microtran Co. Inc. Teac Corp. of America Weircliffe	FIBER-OPTIC PRODUCTS AMP Anritsu America, Inc. Artel Communications Corp. Catel Telecommunications, Inc. Chromatic Technologies COMLUX Comrex Corp. Current Technology Inc. Dukane Corp. Electron Processing Grass Valley Group Intraplex, Inc. 91 LEMO USA Inc. Math Associates MERET, Inc. Mohawk Wire & Cable Corp. 163 Mosses & Mitchell (Plasmech Systems Ltd.) Orchard Communications Ortel Corp. Paladin Corp. PCO, Inc. RF Technology, Inc. Selco Products Co. Siecor Corp. Sigma Electronics, Inc. Telemet Div. A Geotel, Co. Thomson-LGT Time Service Systems Inc. Veam/Litton Systems, Inc. Vicon Industries, Inc. Professional Products Div.
CAPACITORS, HIGH VOLTAGE EEV Energy-Onix Jennings A Lear Siegler Co. Plastic Capacitors, Inc. Surcom Associates, Inc.	CIRCUIT BREAKERS/FUSES Bryant Electric/Westinghouse	CONTACT CLEANING, TREATMENT PRODUCTS Caig Labs, Inc. Chemtronics Inc. DW Electrochemicals Mosses & Mitchell (Plasmech Systems Ltd.)	GENERATORS, POWER CONVERTER/INVERTER Dynamote Corp. Fiskars Electronics Corp. William A. McIntire Enterprises Nexus Engineering Corp. Reliance Comm/Tec Sola/General Signal
CARTS, EQUIPMENT Advance Products Co. Apollo Audio Visual/Lighting Audipak, Inc. Bretford Mfg., Inc. Cartridge Technology Excalibur Industries Ferno Washington, Inc. General Devices Co., Inc. Hand Tool Industries Keystone Metal Products, Inc. K&H Products-Porta-Brace Kikusui International Corp. Luxor Corp. Marathon Products Co. MPO Videotronics Nalpak Video Sales Inc. Neumade Products Corp. Parsons Mfg. Corp. Peerless Sales Co. Professional Sound Corp. Schafer World Communications Corp. Sonifex Ltd. Techni-Tool Inc. Wheelit, Inc. Winsted Corp.	CLOCKS, MASTER TIME Apogee Electronics Corp. Audiolab Electronics, Inc. 153 Beaveronics, Inc. Bogen Communications, Inc. Canford Audio plc Dukane Corp. DYMA Engineering, Inc. ESE 161 Kinometrics/Truetime Leitch Video 69 Lindburg Enterprises, Inc. Time Service Systems Inc. Torpey Controls & Eng. Ltd. Vistek Electronics Ltd. Vortex Communications, Inc. Vortex Communications Ltd.	CRYSTALS, QUARTZ PERROTT Engineering Labs Inc. 86	GENERATORS, POWER (Engine, Motor, Solar, Thermoelectric, Wind) Mole-Richardson Co. Northern Power Systems Teledyne Energy Systems
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 Panduit Corp.
 Patch Bay Designation
 Professional Label Services
 United Ad Label Co., Inc.

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 Lamp Technology Inc.
 Mole-Richardson Co.
 Professional Sound Corp.
 Titus Technological Labs

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 Pivottelli/USA
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 Broadcast Electronics, Inc.
 Canare Cable, Inc.
 Daily Electronics Corp.
 Dynatech Communications
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 Geleco Electronics, Ltd.
 H&E Micro Trak
 International Microwave Corp.

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 Lamp Technology Inc.
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 Richardson Electronics, Ltd.
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 3M Electrical Specialties Div.
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 Neutrik USA, Inc.
 Radio Systems Inc.
 Sescom, Inc.
 Shively Labs Div. of Howell Labs, Inc.
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 Switchcraft Inc.
 Techni-Tool Inc.
 Trimm Inc.
 Trompeter Electronics, Inc.
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 PHASE**

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 Energy-Onix
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 FSR Inc.
 Furman Sound, Inc.
 H&E Micro Trak
 Hewlett-Packard Co.
 International Music Co.
 ITI Electronics, Inc.
 Kikusui International Corp.
 William A. McIntire Enterprises
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 Neumade Products Corp.
 Opamp Labs, Inc.
 Professional Sound Corp.
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 Sola/General Signal
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 Geneva Group of Companies, Inc.
 Kalglo Electronics
 Nova Electric, Inc.
 Perma Power Electronics, Inc.
 Reliance Comm/Tec
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 Sola/General Signal
 Sorensen Co., Div. of Switchcraft A
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 Staco Energy Products
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 Tungstone Batteries Inc.

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 Hamaphot KG
 Ortofon Inc.

**RECORDER REPLACEMENT
 MOTORS**

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 Canare Cable, Inc.
 Connectronics Corp.
 Dago Cases
 Hannay Reels
 Lee Dan Communications, Inc.
 Mole-Richardson Co.
 Techni-Tool Inc.

REELS, TAPE

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 Magnasync/Moviola Corp.
 Neumade Products Corp.
 Otari Corp. 170
 Plastic Reel Corp. of America
 Polyline Corp. 100
 Teac Corp. of America
 3M Professional Audio/Video &
 Specialty Products

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 Hipotronics Inc. Power Products Div.
 Reliance Comm/Tec
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 Toko America Inc.

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 General Devices Co., Inc.
 LEA Dynatech, Inc.
 Perma Power Electronics, Inc.
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 Zippertubing Co.

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 Gennum Corp.
 Lucas Semiconductors
 Motorola Inc. AM Stereo
 NEC America, Inc. Broadcast
 Equipment Div.
 Penstock, Inc.

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Powerex Inc. (Joint Venture of GE,
 Mitsubishi & Westinghouse)
 TRW LSI Products Inc.

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 ENVIRONMENTAL CONTROL
 AND GROUNDING PRODUCTS**

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 Enviro-Buildings, Inc.
 Lyncole XIT Grounding
 William A. McIntire Enterprises
 Techni-Tool Inc.
 3M Static Control Systems Div.

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 SYSTEMS REEL/CONTAINER**

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 Halliburton 85
 Broadcast Electronics, Inc.
 Dago Cases
 Lipsner-Smith Co.
 Nalpak Video Sales Inc.
 Neumade Products Corp.
 Plastic Reel Corp. of America
 RTI-Research Tech. Int'l.
 Storeel Corp.
 Video Storage Concepts
 Western Int'l. Communications
 Ltd. Aristocart Div. 112
 Winsted Corp.

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 Walter Brewer Corp.
 Hoffend & Sons, Inc.
 Lumitrol, Ltd.
 Theatre Service & Supply Corp.

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 CARTRIDGE/CASSETTE**

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 Channelmatic, Inc.
 Marathon Products Co.
 National Video Service
 Neumade Products Corp.
 Otari Corp. 170
 Singer Products, Inc.
 3M Professional Audio/Video &
 Specialty Products

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 Black Audio Devices
 Broadcast Electronics, Inc.
 J-Lab Co.
 Nakamichi America Corp.
 Otari Corp. 170
 Panasonic Broadcast Systems
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 Sonifex Ltd.
 Sony Magnetic Products Co.
 Teac Corp. of America
 3M Broadcasting & Related Products
 VideoLab

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 Black Audio Devices
 Canare Cable, Inc.
 Chemtronics Inc.
 Contact East
 Hand Tool Industries
 HMC-Hub Material Co.
 Jensen Tools Inc.
 Paladin Corp.
 Panasonic Broadcast Systems
 Co. 14-15
 Panduit Corp.
 Siecor Corp.
 Techni-Tool Inc.
 Brian R. White Co., Inc.

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VANS, ENG/EFP/SNV

Antennas For Communications, Inc.
 Audio Visual Systems
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 BAF Communications Corp.
 Brabury International
 Ellis & Watts Div. of Dynamics Corp.
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 E-N-G Mobile Systems, Inc.
 GE Broadcast Systems
 Integration107
 Giant Boom Box Industries
 Harris Corp. Broadcast Div.201
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 Microdyne Corp.
 Motorola Inc., Communications Sector
 Northern Power Systems
 Fred A. Nudd Corp.
 Allen Osborne Associates, Inc.
 Radio Systems Inc.
 ROHN
 S.G. Communications Inc.
 Southern Illinois Antennas
 Telefunken Sendertechnik GmbH
 Teletech, Inc.
 Tenco Tower Co.
 Transmission Structures, Ltd.
 Utility Tower Co.
 World Tower Co.

GEE Broadcast Systems Ltd.
 Alan Gordon Enterprises Inc.
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 Omega International
 ROHN
 Rosner TV Systems, Inc.
 U.S. Instrument Rentals

Planet Blue
 RADMAR, Inc.
 Roscor Corp.
 Sencore Inc.
 Sure Shot Teleproductions &
 Transmission
 Turner Engineering, Inc.
 Vac Systems Corp.
 V.D.O. Ltd.

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Bird Electronic Corp.
 Boonton Electronics Corp.
 John J. Davis & Associates Consulting
 Engineers
 John Fluke Mfg. Co., Inc.
 Philips Elektronik Ind. A/S
 Rohde & Schwarz89
 Sencore Inc.
 Standard Frequency Measuring
 Service
 Tektronix Inc.195,196
 U.S. Instrument Rentals
 Wandel & Goltermann GmbH & Co.

EMPLOYMENT SERVICES

Key Systems
 Lighting & Shadows A Div. of
 Phoebus
 James Lloyd Group
 Solid Rock Video Inc.

**ENGINEERING CONSULTING,
 DESIGN/PLANS**

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 Acoustic Systems
 Adelphon, Inc.
 John P. Allen Airspace Consultant
 Alpha Tower Design, Inc.
 Eric Neil Angevine, P.E.
 Antenna Technology Corp.
 Audio Visual Systems
 AVEC
 John H. Battison, P.E.
 Franklyn R. Beemish & Co.
 Lawrence Behr Associates Inc.
 Blair Benson Engineering Consultant
 Bowen Broadcast Service Co.
 Walter Brewer Corp.
 Broadcast Technology of Colorado
 BTS119,143

**EDITING/TELEPRODUCTION
 FACILITIES**

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 Circuit Studios
 Comsat Video Enterprises
 Conus Communications Satellite
 Services Div.
 Cycle-Sat, Inc.
 GE Broadcast Systems
 Integration107
 Industrial Acoustics Co.
 Johnson-Nyquist Productions Inc.
 METROPOST
 Montage Group, Ltd.

BUILDINGS, EQUIPMENT

Andrew Corp.
 Franklyn R. Beemish & Co.
 Lawrence Behr Associates Inc.
 Buygroup Ltd.
 John J. Davis & Associates Consulting
 Engineers
 Enviro-Buildings, Inc.

SERVICES

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 INSTALLATIONS/
 MAINTENANCE**

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Manufacturers' Addresses begin on page 61

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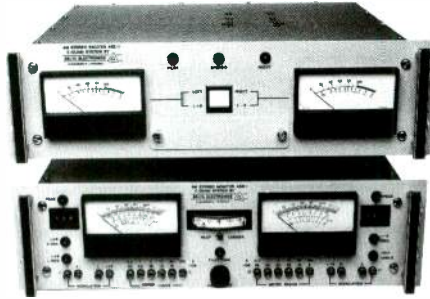
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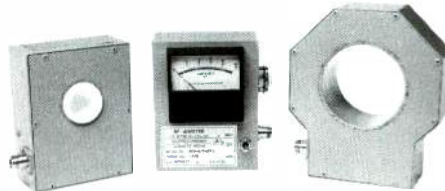
C-QUAM® AM Stereo — The Above Standard Industry Standard is easy to install and maintain with its modular design and construction. Offers standard features other manufacturers charge as options. A sound value, built to last.



High Power Pulse Reflectometer — Strong interfering fields that would destroy time domain reflectometers are virtually ignored by the PRH-1. This instrument can handle up to 1,000 watts of induced power on an intermittent basis as it locates faults on transmission lines. Provides a visual representation of the transmission or sample line, STL coax, or antenna, using your oscilloscope.



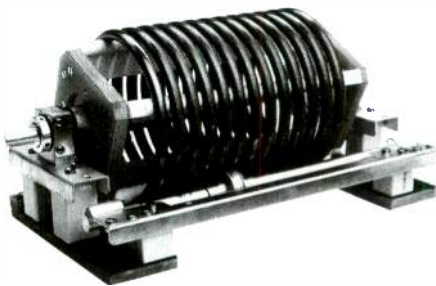
Coaxial Transfer Switches — These 1 7/8" and 3 1/8" motorized four port switches are designed to switch between antennas, transmitters, or dummy loads both quickly and efficiently. The switches can also be operated manually and are fully interlocked.



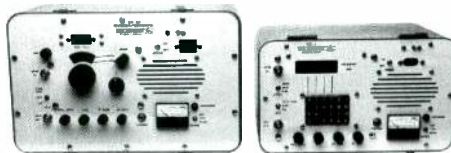
RF Ammeters and Sampling Toroids — Precision toroidal current transformers (TCTs) provide stable antenna monitor sampling while eliminating the problems associated with loops. TCTs also work well in supplying additional modulation monitor or test sample RF outputs. The transformer coupled ammeter (TCA) offers stable base or common point current readings, independent of modulation. The dual and single scale meters also provide remote DC outputs.



Low Power RF Ammeters — When every milliamp of current counts, depend on the accuracy of the TCA-Jr. This portable RF ammeter is designed to plug into either a Delta MJ-50 Meter Jack (pictured above), or a standard J-plug jack. Two current ranges are available: 0.2 to 1.0 Ampere, or 0.4 to 2.0 Amperes.



Rotary Variable Inductor — Where long life and high reliability are required, specify the RVI. Designed to provide long life, even under continuous rotation, the RVI is available in either 12 μ H or 10 μ H versions (maximum inductance). Other values by special order.



RF Receiver/Generator — A rugged, high output (2 watts) generator and correlation detector receiver virtually eliminate false nulls caused by interfering signals. The RG-3A operates from 0.5 to 1.65 MHz, and the expanded range of the RG-4 generates signals from 100 kHz to 30 MHz.



Transmitter Power Controller — Your insurance against over- and under-power citations. Continuously monitors transmitter power levels, compensating for AC power line sag by adjusting the transmitter to 100% power.



Digital Controlled Processor — This inexpensive, stereo tri-band processor boasts user-friendly controls and an aggressive sound. Mono stations can take a step toward AM Stereo, at a price that won't break the budget.



Impedance Bridges — At last, a means of measuring your impedance under full power. Both portable and in-line bridges are available, with a variety of features, for both AM broadcast and HF applications. The in-line Common Point Bridge can be supplied with a TCA RF Ammeter to permit precise current and impedance measurements.

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Industry Standards.

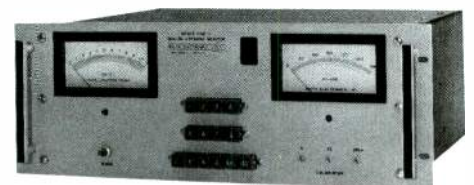
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AM Antenna Monitors — These are true ratio monitors which deliver a ratio reading without the need to continually reset the reference tower to 1.000. This simple operation reduces errors by non-technical personnel and makes tuning an array easier.

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Richard W. Burden Associates
 Central Tower Inc.
 Colorado Video Inc.
 Comsat Video Enterprises
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 Services Div.
 Current Technology Inc.
 Dataworld
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 DKW Systems
 DSI Communications, Inc.

East Coast Video Systems
 EDX Engineering, Inc.
 Evans Associates Consulting Telecom,
 Engineers
 FSR Inc.
 Future Productions, Inc.
**GE Broadcast Systems
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 Motorola Inc., Communications Sector

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 Old Dominion Broadcast Eng. Service
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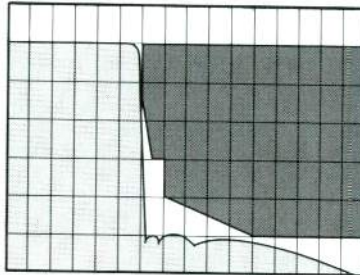
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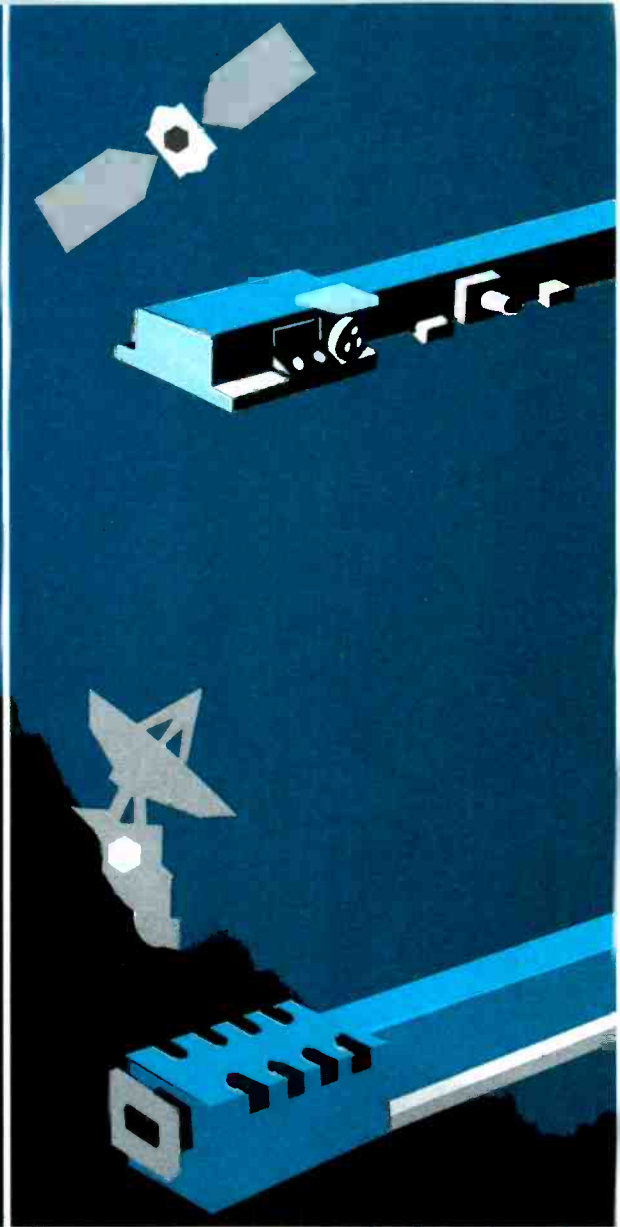
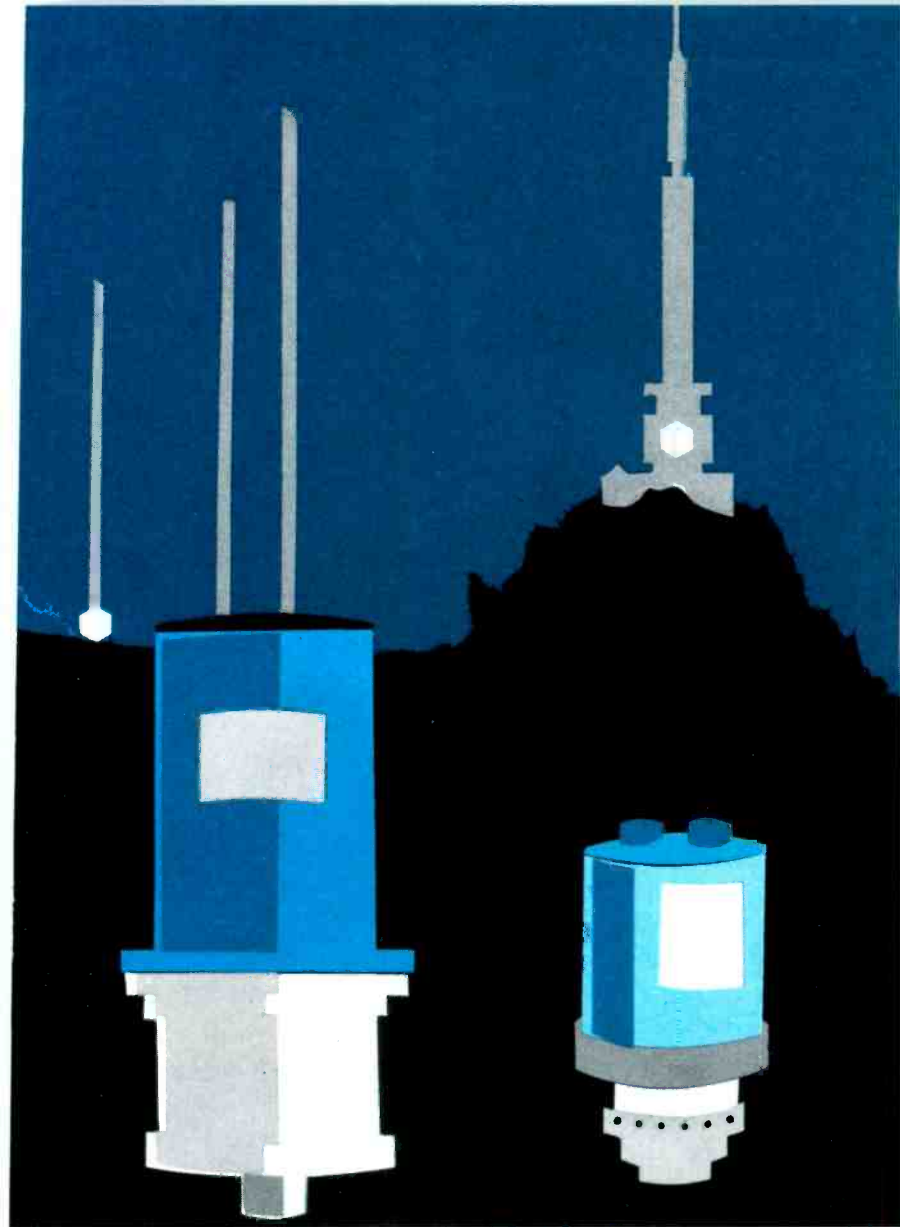
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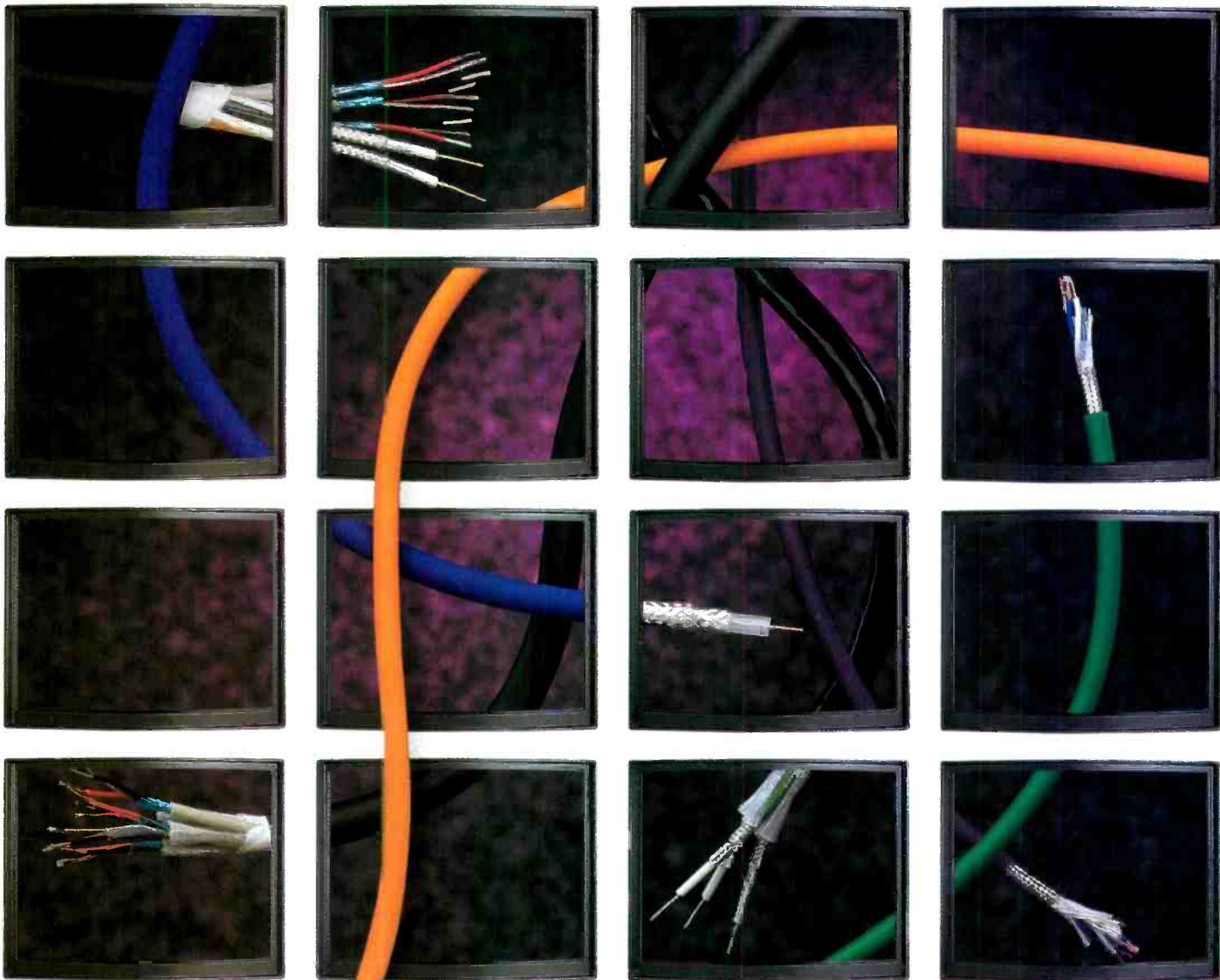
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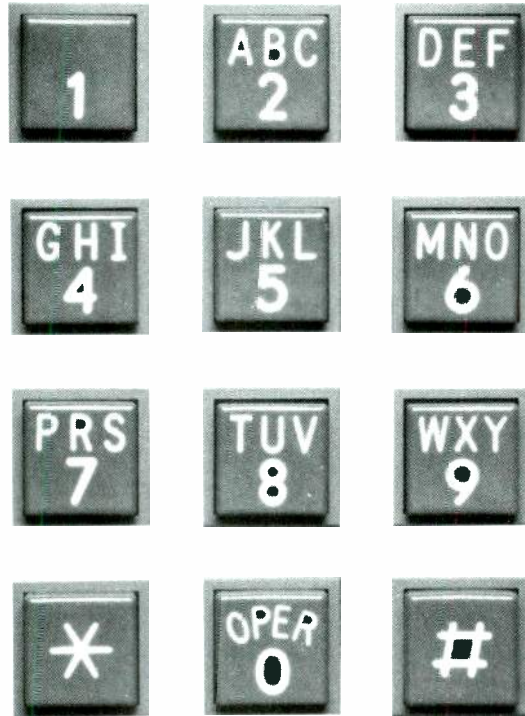
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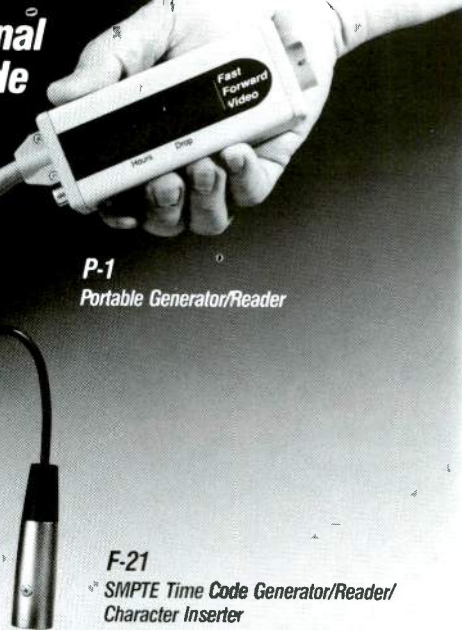
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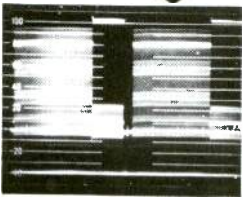
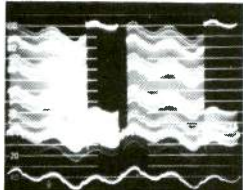
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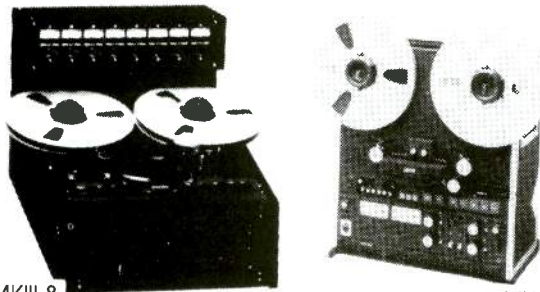
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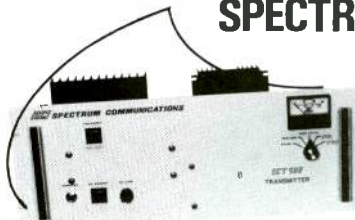
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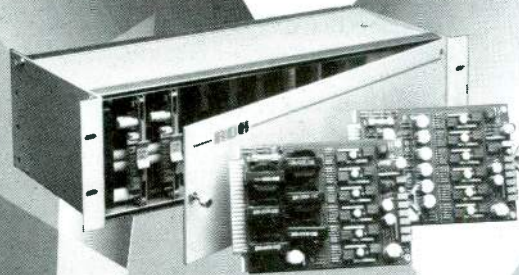
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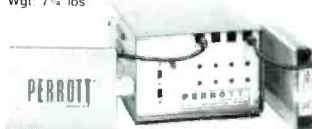
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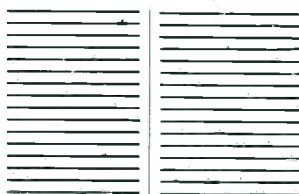
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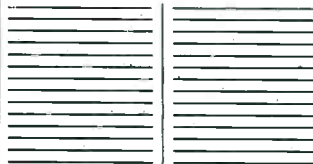
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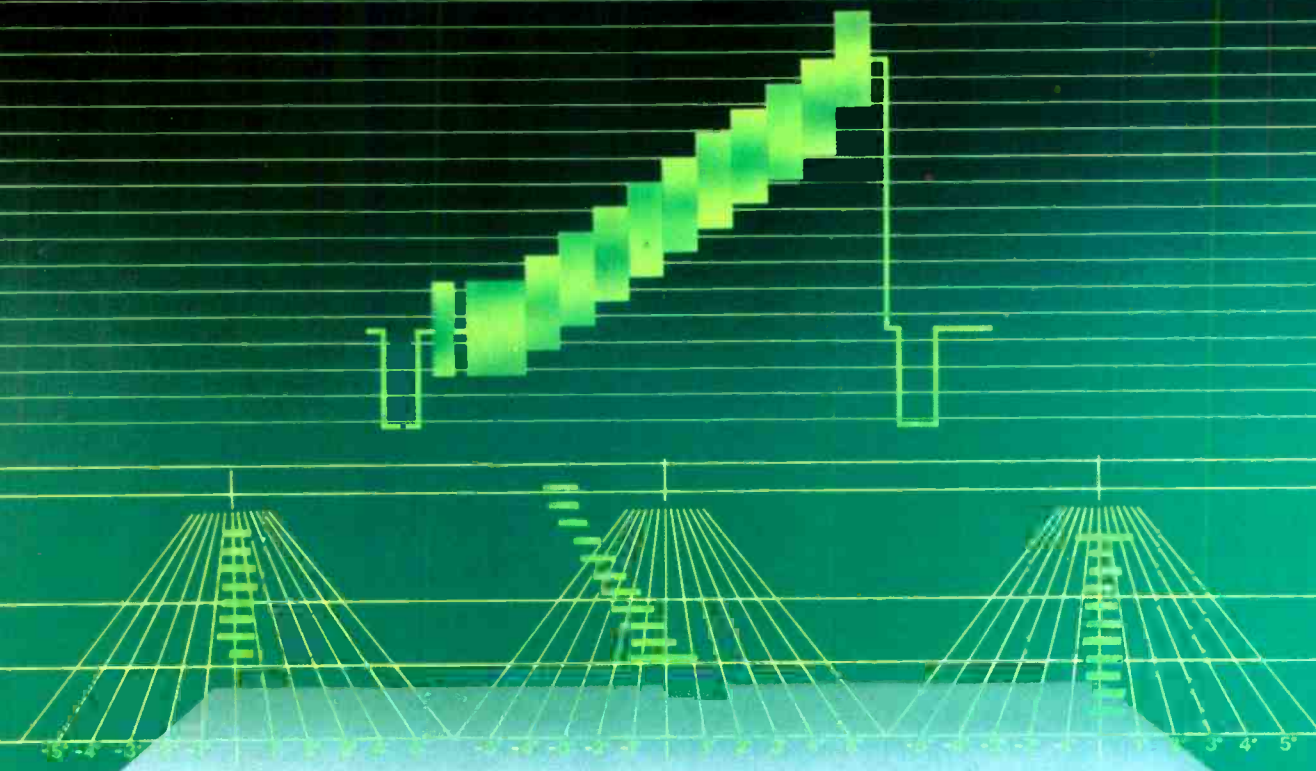
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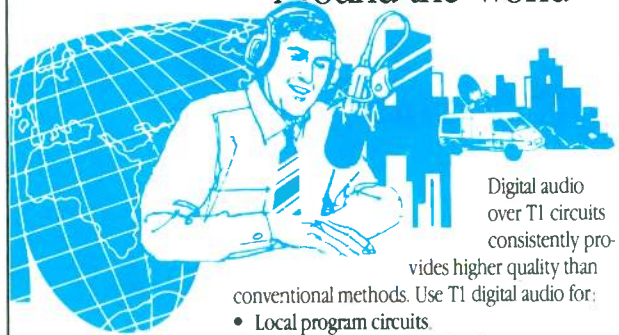
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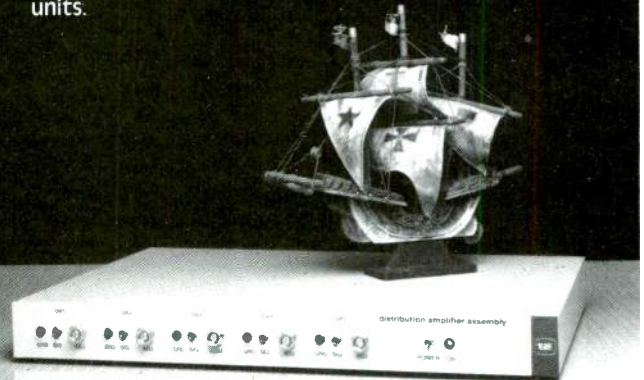
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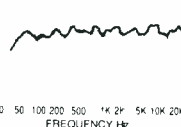
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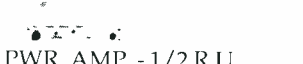
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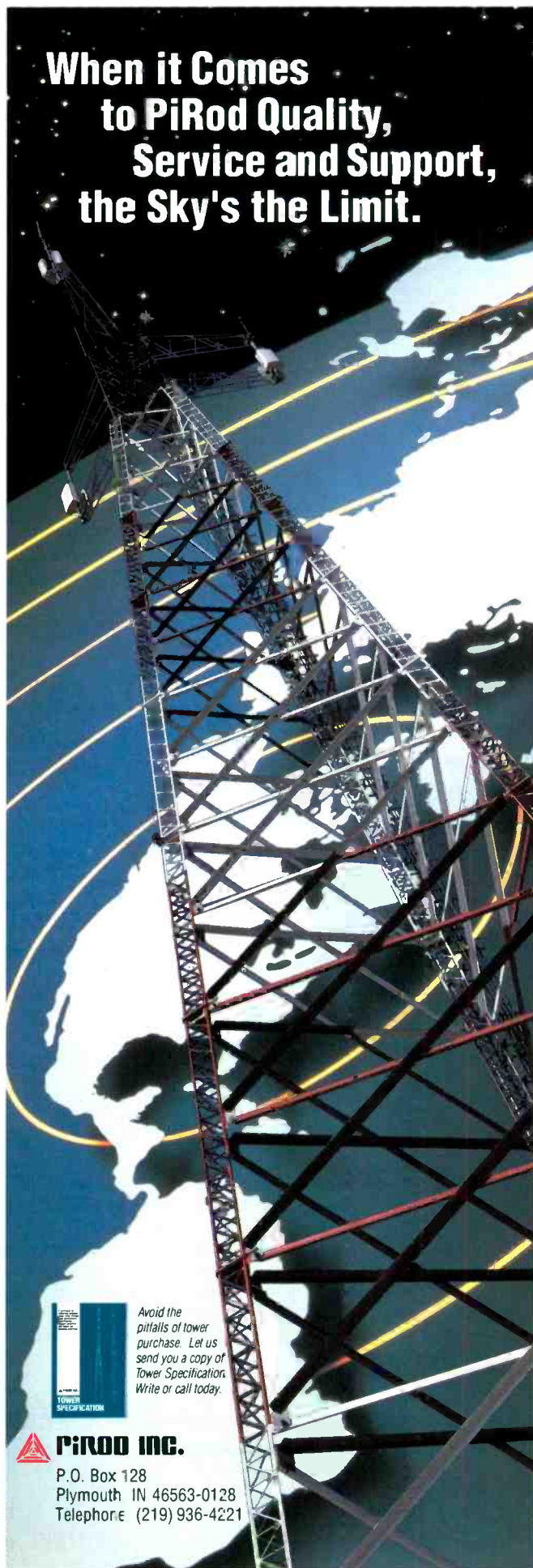
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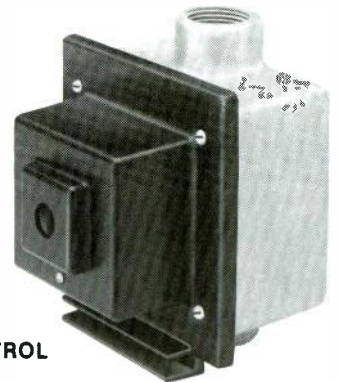
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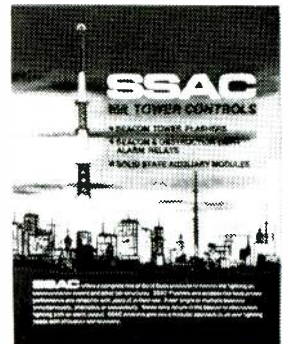


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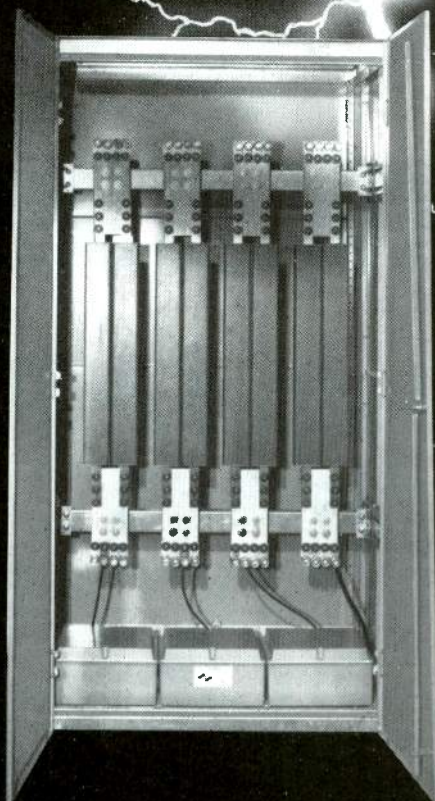
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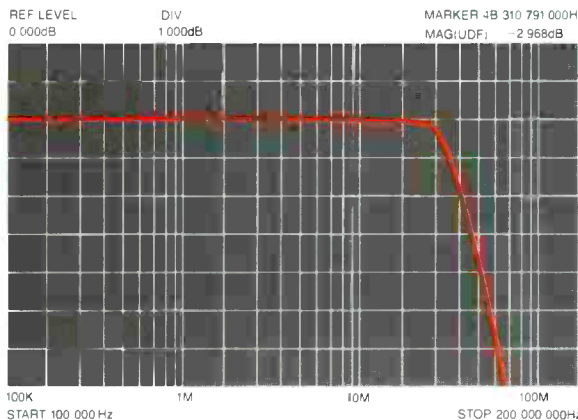
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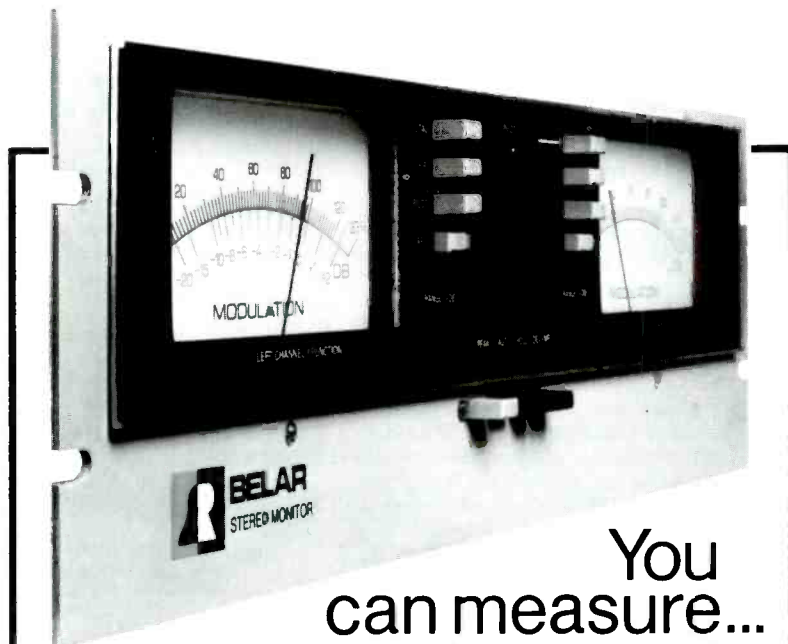
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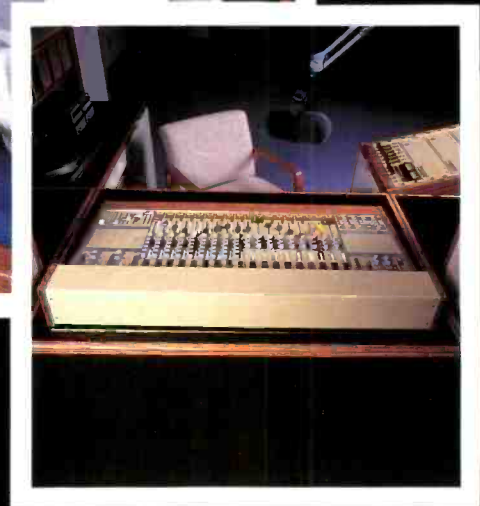
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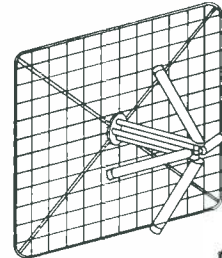
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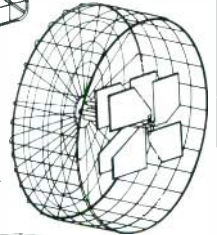


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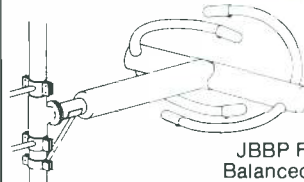
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Penstock Inc., 520 Mercury Drive, Sunnyvale, CA 94086-4018 (408-730-0300; 800-255-6788) USA & Canada, RF & Microwave Active & Passive Components; Cable assemblies & Connectors; Connectors, Cable & Assemblies

See advertisement on page 103

Radio Equipment Distributors, 972 N. Vermont Ave., Los Angeles, CA 90029 (213-664-5353) South-AZ & CA, HI, NV, OR, WA, Audio, Video, Test & Measurement Equip.; Vacuum Tubes; System Design; Wire, Cable & Connectors

RAG Electronics, Inc., 21418 Parthenia St., Canoga Park, CA 91304 (818-998-6500) Nationwide, Test & Measurement Equip.; New & Used Equip.

RF Specialties of California, 3463 State St., Suite 229, Santa Barbara, CA 93105 (805-682-9429) AZ, CA, NV, Transmitters, Antennas & Transmission Systems; Test Equip.; Audio Equip.

Sprague Magnetics, Inc., 15720 Stagg St., Van Nuys, CA 91406 (818-994-6602) Worldwide, Replacement Tape Heads; Recorder Care Products; Head Refurbishment Services

See advertisement on page 103

SSL Industries Inc., P.O. Box 3410, Camarillo, CA 93011 (805-482-9884) AZ, CA, CO, HI, NV, OR, Audio & Video Equip.; Test & Measurement Equip.; Tape; Service & Repair; System Design, Installation & Sales; Fiber Optics

System Associates, 10375 Jefferson Blvd., Culver City, CA 90232 (213-836-1111) North America, Brokers of Used Broadcast TV Equip.; Video Equip.; Test & Measurement Equip.; Film Equip.; Vans & Accessories

Televideo San Diego, 4783 Ruffner St., San Diego, CA 92111 (619-268-1100) USA, Pro video & audio equip. for broadcast, industry, science & surveillance. Interactive systems; Telecommunications

Tenco Tower Co., 9723 Folsom Blvd., Suite A, Sacramento, CA 95827-1326 (916-638-8833) AK, AZ, CA, HI, NV, OR, WA, Transmitters, Antennas & Transmission Systems; Service & Repair Towers; Antennas; Transmission Line; Service & Sales

Videomedia, Inc., 211 Weddell Drive, Sunnyvale, CA 94089 408-745-1700 AZ, CA, CO, ID, MT, NV, NM, OR, UT, WA, WY, Editing Systems; Color Cameras; Monitors; Time Base Correctors; Video Tape Recorders, Projectors & Tape; Time Code, Sync & Character Generators; Lighting; System Design, Fabrication & Training; Still Video Systems; Other TV Products

Videotape Products, Inc., 320 N. Madison Ave., Los Angeles, CA 90004 (213-664-1144; 800-422-2444) Worldwide, All Formats of video & audio tape. Pro Industrial Video Equip.; Test & Measurement Equip.; Sales & Service

Western Broadcast Systems Inc., 3350 Scott Blvd., Building 5, Santa Clara, CA 95054 (408-727-9898) AK, CA, HI, NV, OR, WA, Audio & Video Equip.; Test & Measurement Equip.; Tape; Film Equip.; Service & Repair; System Design

Whitehouse Audio Visual, 11511 W. Pico Blvd., Los Angeles, CA 90064 (213-479-8313) AZ, CA, CO, KY, MI, NV, OR, WA, WY, Video Equip.; Test & Measurement Equip.; Film Equip.; Service & Repair; Used Equip.

Didier Broadcast Associates, 8528 W. Dartmouth Plaza, Lakewood, CO 80227 (303-987-0256) CO, ID, KS, MT, NE, NM, UT, WY, Audio & Video Equip.; Test & Measurement Equip.; Transmitters, Antennas & Transmission Equip.

Film/Video Equipment Service Co., 800 S. Jason, Denver, CO 80223 (303-778-8616) AK, AZ, CA, CO, DC, FL, KS, LA, MN, MS, MO, MT, NE, NV, NM, ND, SD, TN, TX, UT, WY, Audio & Video & Film Equip.; Service & Accessories

Penstock Rocky Mountain, 9940 E. Costilla Ave., Suite L, Englewood, CO 80112 (303-792-0777) CO, RF & Microwave Active & Pas-

sive Components; Cable Assemblies & Connectors

CONNECTICUT

Infotronics, Inc., P.O. Box 935, Woodbury, CT 06798 (203-263-5350) National, Video Equip.
National Video Services, 18 Commerce Road, Newtown, CT 06470 (203-792-3862) CT, DC, ME, MA, NH, NJ, NY, PA, RI, VT, Video Equip.; Camera Tubes; Service & Repair; System Design; Manufacture a Wide Band Video Recorder for Medical Use

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Barbizon Delta Corp., 2401 Kenn-wood Road, West Palm Beach, FL 33409 (407-844-5973) FL, GA, SC, PR, Specialized lighting equip. for stage, studio, television, still & video lighting with complete range of expendable supplies

Beattie & Associates, Inc., 3317 Barrow Hill Trail, Tallahassee, FL 32312 (904-893-1382) AL, FL, GA, Audio & Video Equip.; Transmitters, Antennas & Transmission Systems; Sales, Service & Installation. Turnkey LPTV Systems; All Solid State FM Transmitters up to

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Bencsik Associates Inc., 3730 N.E. 42nd Ave., Ocala, FL 32670 (904-732-9775) FL, PR, Pro Audio Equip.; CCTV

Broadcasters General Store, Inc., 2480 S.E. 52nd St., Ocala, FL 32671 (904-622-9058) USA, Audio, Test & Measurement Equip.; Antennas & Transmission Systems; Tape; AM & TV Stereo Equip.; Anything for Audio

Conex Worldwide Corp., 1645 N.W. 79th Ave., Miami, FL 33126 (305-594-0850) Worldwide, MMDS/ITFS Systems; Satellite Earth Stations & Associated Origination Equip.; Engineer, Furnish &

Install

Control Technology, Inc., 2950 S.W. 2nd Ave., Fort Lauderdale, FL 33315 (305-761-1106; Outside FL 800-327-4121) U.S.A., Audio Tape Recorders; Consoles, Mixers; Turntables, Preamps; Mics & Accessories; Power Amps; Speakers, Audio Processing & Loggers; Heads & Accessories; Studio Furniture; STL Systems; Transmitters, Transmission & Antennas; Automation Sys./Equip.

Electrex Co., 18620 N.E. Second Ave., Miami, FL 33179 (305-651-5752) USA and Latin America, Audio Equip.; Test &

Measurement Equip.; Transmitters, Antennas & Transmission Systems; Tape, Vacuum Tubes; System Design

Gendra International Inc., Broadcast & Communications Div., 2800 Biscayne Blvd., Suite 700, Miami, FL 33137 (305-372-8845) FL, Caribbean, So. America, Audio, Video & Test Equip.; Transmissions; Microwave

See advertisement on page 117

Lauderdale Electronic Labs, 16 S.W. 13th St., Fort Lauderdale, FL 33315 (305-764-7755) USA and Canada, PR, VI, Audio, Test & Measurement Equip.; Tape

Media Concepts, Inc., 559 49th St. S., St. Petersburg, FL 33707 (813-321-2122) Worldwide, Audio & Video Equip.; Tape; Service & Repair; System Design; VHS Tape Duplication

Midwest Communications Corp., 8875 N.W. 23rd St., Miami, FL 33172 (305-592-5355) FL

Midwest Communications Corp., 3305 Bartlett Blvd., Orlando, FL 32811 (407-841-0602) FL

Midwest Communications Corp., 6302 Benjamin Road, Suite 403, Tampa, FL 33634 (813-885-9308) FL, Audio & Video Equip.; Test & Measurement Equip.; Transmitters, Antennas & Transmission Systems; Tape; Vans & Accessories; Service & Repair; System Design

MPCS Video South, 4100 North 28th Terrace, Hollywood, FL 33021 (305-923-3446) USA, Full service distributor of industrial & broadcast video equip. Rental; Production, post-production & duplication. System Design & Installation. Specializers in network, call letter, cable stations, corporations, educational, legal & medical institutions

Nemal Electronics Int'l. Inc., 12240 N.E. 14th Ave., North Miami, FL 33161 (305-899-0900) Worldwide, Audio & Video Wire, Cables, Connectors; Transmitters, Antennas Wire, Cables, Connectors and Accessories; Patch Panels

Stage Equipment & Lighting, Inc., 4602 S.W. 35th St., Orlando, FL 32811 (407-425-2010) AL, FL, GA

Stage Equipment & Lighting, Inc., 12231 N.E. 13th Court, Miami, FL 33161 (305-891-2010) AL, FL, GA, Caribbean, Central & South America, Video Lighting Equip.; Service & Repair; Used Equip.; Film Equip.

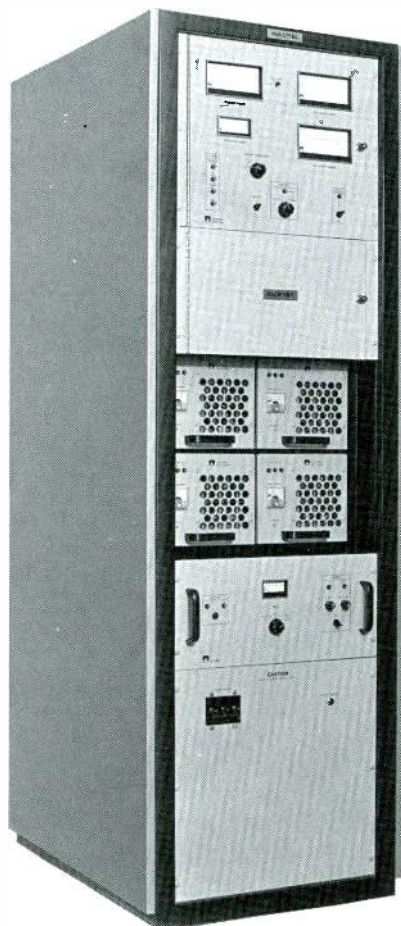
Vaughn Broadcast Rentals, Vaughn Duplication Service, 5426 Beaumont Center Drive, Suite 330, Tampa, FL 33634 (813-887-3141) FL, Audio, Video, Test & Measurement Equip.; Audio & Video Tape; Vacuum Tubes; Service & Repair; Rental Equip.; Duplications



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Broadcasters General Store, Inc., 1805 Kimberly Drive, Marietta, GA 30060 (404-425-0630) USA, Audio, Test & Measurement Equip.; Antennas & Transmission Systems; Tape; AM Stereo Equip.

Victor Duncan, Inc.-Atlanta, 1575 Northside Drive N.W., Suite 355, Atlanta, GA 30318 (404-355-3001) USA and Canada, Audio, Film, & Video Equip.; Test & Measurement Equip.; Tape; Vans & Accessories; Service & Repair; System Design; Used Equip.; Over 300 Line of Pro Equip.

Midwest Communications Corp., 522 Armour Circle, Atlanta, GA 30324 (404-875-3753) USA, GU, PR, VI, Audio & Video Equip.; Test & Measurement Equip.; Transmitters, Antennas & Transmission Systems; Tape; Vans & Accessories; Service & Repair; System Design

MPCS Video Industries Atlanta, 2258 Northwest Parkway, Suite E, Marietta, GA 30067 (404-955-5550) USA, Full service distributor of industrial & broadcast video equip. Rental; Production, post-production & duplication. System Design & Installation. Specializers in network, call letter, cable stations, corporations, educational, legal & medical institutions

Technical Industries Inc. of Georgia, 6000 Peachtree Road, N.E., Atlanta, GA 30341 (404-455-7610; 800-554-5440) GA, SC, Audio & Video Equip.; Test & Measurement Equip.; Tape; Vans & Accessories; Service & Repair; System Design

Vica Associates, Inc., 4296-A Memorial Drive, Decatur, GA 30032 (404-292-7506) AL, FL, GA, MS, NC, SC, TN, Audio & Video Equip.; Test & Measurement Equip.

Video Display Corp., 1868 Tucker Industrial Drive, Tucker, GA 30084 (404-938-2080; 800-241-5005; Fax 404-493-3903) USA & Europe, Replacement CRT's for broadcast quality monitors & computers. Both color & Monochrome

HAWAII

John J. Harding Co., Ltd., 2825 Ualena St., Honolulu, HI 96819 (808-836-0941) HI and Pacific area, Audio & Video Equip.; Test & Measurement Equip.; Transmitters, Antennas & Transmission Systems; Tape; Vacuum Tubes; System Design

Omega Pacific, 222 Kaelepu Drive, Kailua, HI 96734 (808-263-4212) HI, Video Equip.; Transmitters, Antennas & Transmission Systems

ILLINOIS

Allied Broadcast Equipment, 5215 Old Orchard Road, Suite 970, Skokie, IL 60077 (312-470-0303) IL, IA, MI, MN, MO, NE, ND, SD, WI, Audio Equip.; Test & Measurement Equip.; Transmitters & Antennas; Tape; Service & Repair; System Design

Broadcasters General Store, Inc., 746 Cypress Lane, Carol Stream, IL 60188 (312-231-7120) USA, Audio Equip.; Transmitters, Antennas & Transmission Systems; Service & Repair; System Design; Tape; Test & Measurement Equip.

Columbia Audio/Video, The Columbia Building, 1741 Second St., Highland Park, IL 60035-3599 (312-433-8217) IL, IN, IA, MI, WI, Video Equip.; Tape

Victor Duncan, Inc., 661 N. LaSalle St., Chicago, IL 60610-3770 (312-943-7300) USA and Canada, Audio, Film, Lighting &

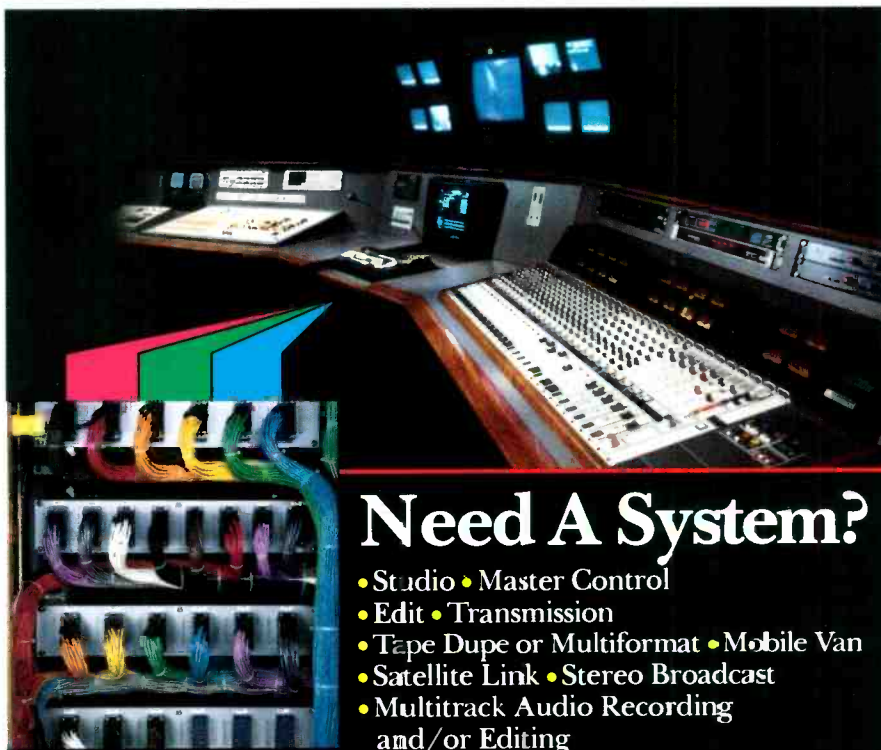
Video Equip.; Test Equip.; Tape; Vans & Accessories; Used Equip. Over 300 Lines of Pro Equip.

ESV, Inc., 525 Court St., Pekin, IL 61554 (309-347-6685; 800-992-5267) USA, PR, Projection, Stage, Studio & Miniature Lamps; Studio Fixtures; Sockets & Connectors; Tape; Gaffers Tape; Batteries; Retrofits for PL, Quads & MR16 Lamps; Diffusion & Color Correction Materials

GO Video Sales, Inc., 1195 S. Wilson Drive, Lake Forest, IL 60045 (312-295-6726) IL, Davenport-IA, MN, ND, SD, WI, Video

Joseph Electronics, 8830 N. Milwaukee Ave., Niles, IL 60648 (312-297-4200; 800-323-5925) IL, IN, WI, National by Mail Order, Test Equip.; Tools; Cases; Wire; Connectors; Batteries; Camera Tubes; Hardware; Components; Chemicals; Cabinets; Solder & Equip.; Audio & Video Products

Penstock, Midwest, 1250 W. Northwest Highway, Palatine, IL 60067 (312-934-3700) IL, IN, IA, KS, KY, MI, MN, MO, NE, ND, OH, PA, SD, WI, RF & Microwave Active & Passive Components; Cable Assemblies & Connectors



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Drive, Mount Prospect, IL 60056
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MI, OH, WI, Audio & Video Equip.;
Test & Measurement Equip.; Tape;
Vans & Accessories; Film Equip.;
Service & Repair; System Design;
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mission Systems; Tape; Vans &
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Allied Broadcast Equipment, 3712
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**Allied Broadcast Equipment, Satellite
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IN 46237 (317-784-3870) IN,
RF & Microwave Active & Passive
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Audiovisual Inc., 415 S.W. Eighth
St., Des Moines, IA 50309
(515-282-4800) IA, Broadcast
& Professional Audio & Video
Equip.; Microwave Equip.; Test &
Measurement Equip.; Tape; Film
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Design; Used Equip.

Sitler's Supplies, Inc., 702 E. Wash-
ington, Washington, IA 52353 (IA
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RSC Electronics, Inc., 131 Laura, Wi-
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5213) KS, OK, TX, Audio & Video
Equip.; Test & Measurement
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Smith Audio-Visual, Inc., 1410 S.
Kansas Ave., Topeka, KS 66612
(913-235-3481) KS, Western-
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ters, Antennas & Transmission
Systems; Tape; Service & Repair;
System Design; Used Equip.

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Bruce L. Dawson & Associates,
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sion Systems

**Midwest Communications Corp.,
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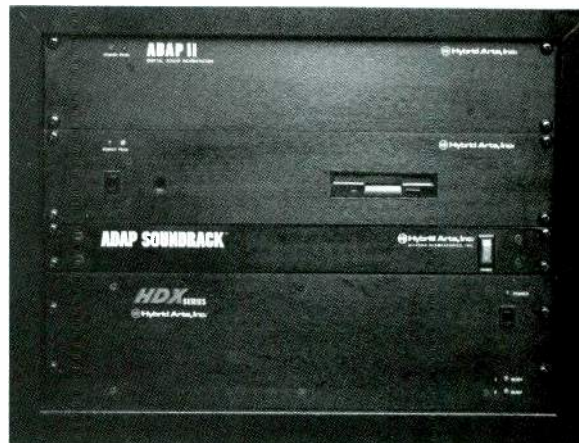
Hybrid Arts' ADAP II™ is the affordable digital audio recording and editing system that lets you record and edit up to two hours of stereo 16-bit, CD-quality audio directly on a hard disk.

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Tape; Vans & Accessories; Service & Repair; System Design

MARYLAND

Bradley Broadcast Sales Inc., 8101 Cessna Ave., Gaithersburg, MD 20879 (800-732-7665; 301-948-0650) Nationwide, Audio Equip.; Transmitters, Antennas & Transmission Systems; Tape; Test & Measurement Equip.

David H. Brothers Co., Inc., 2893 Baltimore Blvd., Finksburg, MD 21048 (301-833-0920) DC, MD, VA, Audio & Video Equip.; Tape; Microphones

Print Products International, 8931 Brookville Road, Silver Spring, MD 20910 (301-587-7824; 800-638-2020; Fax 800-545-0058) USA and Canada, Equip., Tools, Supplies, Training for Electronic PC Boards Maintenance & Repair

Radio Resources, 7483 Candlewood Road, Hanover, MD 21076 (301-859-1500; 800-547-2346) USA, Radio Broadcast Equip. & Supplies

Sel-Tronics, Inc., 9311 Annapolis Road, Lanham, MD 20706 (301-731-8080) DC, MD, VA, Audio & Video Equip.; Test & Measurement Equip.

Theatre Service & Supply Corp., 1792 Union Ave., Baltimore, MD 21211 (301-467-1225) USA, Lighting Equip. for Studio & Location; Studio Curtains & Track Systems; Projection Screens; Dimming Equip. & Electrical Distribution; Motorized & Manual Rigging Equip.

Wiltronix, Inc., P.O. Box 364, Washington Grove, MD 20880 (301-258-7676; Fax 301-963-8624) DE, DC, FL, GA, KY, MD, NC, PA, SC, VA, WV, Audio & Video Equip.; Test & Measurement Equip.; Transmission Systems; Production, EFP, & Editing Equip.

MASSACHUSETTS

BAF Communications Corp., 17 Everberg Road, Woburn, MA 01801 (617-932-3232; 800-633-8223) USA, Canada, Europe, Audio, Video & RF Equip.; Earth Stations; Microwave Equip.; SNVs; Mobile Satellite Uplinks; Ku-Band & C-Band; ENG & EFP Vehicles

Barbizon Light, 3 Draper St., Woburn, MA 01801 (617-935-3920) CT, DC, FL, GA, ME, MD, MA, NH, NY, RI, VT, Video & Film Lighting Equip. & Supplies; Studio Dimming & Curtain Installation

Contact East Inc., 335 Willow St. S., North Andover, MA 01845 (508-682-2000) USA, Precision hand tools, test instruments, tool kits, soldering supplies

H&E Micro Trak, 165 Front St., Chicopee, MA 01013 (413-733-8743) USA & Canada, Audio Equip.

HMC-Hub Material Co., 33 Springdale Ave., Canton, MA 02021 (617-821-1870) USA, Test Equip.; Tool Kits & Cases; Soldering Supplies

Lake Systems Corp., 287 Grove St., Newton, MA 02166 (617-

244-6881) Worldwide, Turnkey design & construction of broadcast radio & TV stations. Production & Post Production Facilities; Teleconferencing Systems; Local Area Networks, Conference & Boardrooms

Landy Associates, Inc., 330 Bear Hill Road, Waltham, MA 02154 (617-890-6325) CT, DE, DC, ME, MD, MA, NH, NJ, NY, PA, RI, VT, VA, Audio & Video Equip.; Test & Measurement Equip.; Film Equip.; Tape; Vacuum Tubes; Service & Repair; System Design & Installation; Transmitters, Antennas & Transmission Systems, VTR's

See advertisement on page 114

QSI Systems, Inc., 12 Linscott Road, Woburn, MA 01801 (617-938-1403) CT, ME, MA, NH, RI, VT, Video Equip.; Tape; Service & Repair; System Design; Projectors; Television Large Screen

MICHIGAN

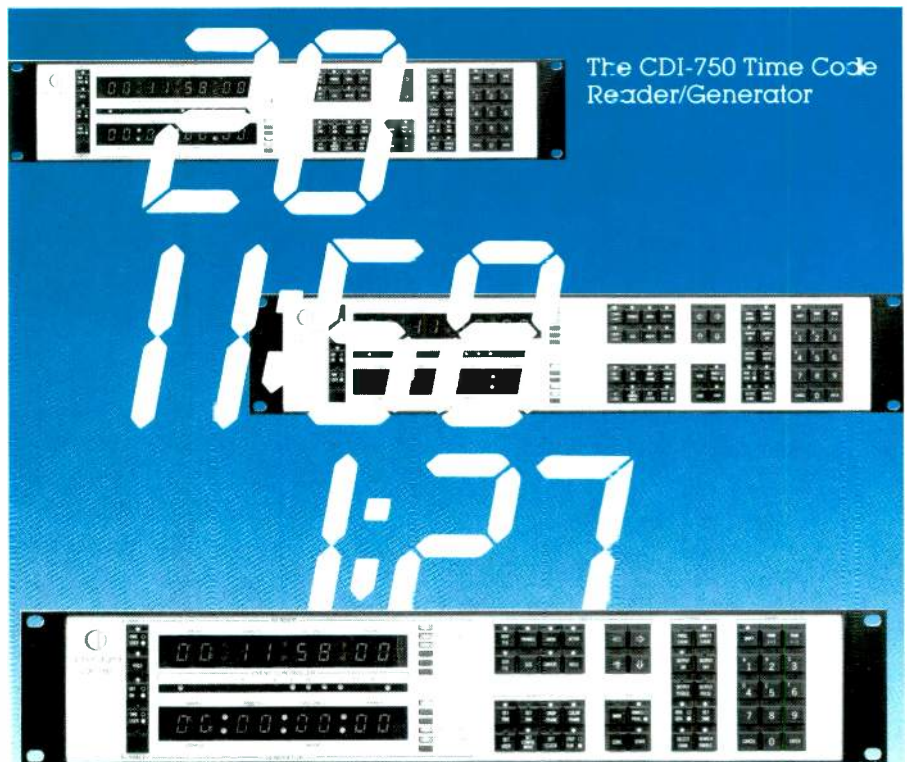
Audio Broadcast Group, Inc., 2342 S. Division Ave., Grand Rapids, MI 49507 (616-452-1596) USA, Studio Systems for AM-FM-TV Audio; Over 100 Equip. Lines; Studio Furniture - Turnkey Systems

CM Sales, Inc., 31700 W. 12 Mile Road, Suite 206, Farmington Hills,

MI 48018 (313-553-8070) MI, Audio & Video Equip.

Communications Systems Group, General TV Network, 13355 Capital Ave., Oak Park, MI 48237 (313-399-2000) MI, Northwest-OH, Audio & Video Equip.; Test & Measurement Equip.; Tape; Film Equip.; Vans & Accessories; Service & Repair; System Design; Used Equip.

Cruse Communications Co., 4903 Dawn Ave., East Lansing, MI 48823 (517-332-3579/792-8800; 313-961-3579; 616-363-0252) IN, MI, OH, Audio, Video, Test & Measurement Equip.; Service & Repair; System Design; In-



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Installation and Sales

Victor Duncan, Inc., 23801 Industrial Park Drive, Suite 100, Farmington Hills, MI 48024 (313-471-1600) USA and Canada, Audio, Film & Video Equip.; Test Equip.; Tape; Vans & Accessories; Service & Repair; System Design; Used Equip. Over 300 Lines of Pro Equip.

H. M. Dyer Electronics, Inc., 2982 Wixom Road, Milford, MI 48042 (313-685-2560) IL, IN, IA, MI, MN, MO, OH, WI, Audio & Video Equip.; Test & Measurement Equip.; Transmitters, Antennas & Transmission Systems; Used Equip.

Midwest Communications Corp., 21683 Melrose Ave., Southfield, MI 48075 (313-350-3038) USA, GU, PR, VI, Audio & Video Equip.; Test & Measurement Equip.; Transmitters, Antennas & Transmission Systems; Tape; Film Equip.; Vans & Accessories; Service & Repair; System Design; Satellite Up-links, Mobile & Fixed

Sound Solutions Inc., 5701 Canton Center Road, Canton, MI 48187 (313-455-5557) IL, IN, MI, OH, Audio Equip.; Tape; System Design; Test & Measurement Equip.; Used Equip.

Thalner Electronic Labs, Inc., 7235 Jackson Road, Ann Arbor, MI

48103 (313-761-4506; Area 313 Only 800-686-7235) MI, OH, Audio & Video Equip.; Tape; Test & Measurement Equip.; Service & Repair; System Design; Used Equip.

MINNESOTA

Digi-Key Corp., 701 Brooks Ave. S., Thief River Falls, MN 56701-0677 (800-344-4539) USA, Electronic Components

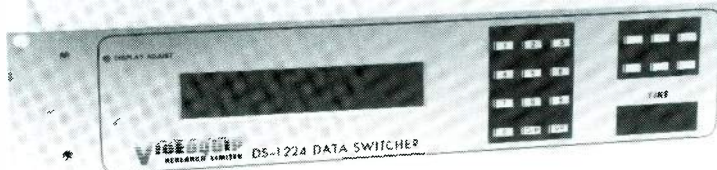
Emmons Associates, Inc., 1121 Riverwood Drive, Burnsville, MN 55337 (612-890-8920) IA, MN, ND, SD, WI, Audio & Video

Equip.; Test & Measurement Equip.; STL Transmission Systems; Service & Repair

T. R. Pitts Co., 458 W. Sanborn St., Winona, MN 55987 (507-452-2629; 800-533-8092) USA, Complete equip. & supplies for the cable TV industry including some services. Satellite Equip.

Vaughn Communications, Video Midwest/AVC Systems, 7951 Computer Ave. S., Minneapolis, MN 55435 (612-832-3232) IL, IA, MN, SD; Rental & Duplication Nationwide, Audio & Video Equip.; Test & Measurement Equip.; Video & Audio Tape; Vacuum Tubes; Service & Repair; System Design; Used & Rental Equip.; Duplications

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Lines Video Systems, 219 S. Jefferson, Springfield, MO 65806 (417-862-5533; Outside MO-800-641-4674; Fax 417-862-1829) AR, IL, IA, KS, KY, LA, MO, NE, OK, TN, TX, Television Production, Test & Measurement Equip.; ENG & Production Vans; Service Repair; System Design & Installation; Video Tape; Used Equip.

Television Engineering Corp., 580 Goddard Ave., Chesterfield, MO 63005 (314-532-4700) USA and Canada, Audio & Video Equip.; Test & Measurement Equip.; Tape; System Design; Used Equip.; Vans & Accessories

Video Masters, Inc., P.O. Box 419963, Kansas City, MO 64141 (816-474-8530) AR, IL, IA, KS, MO, NE, Audio & Video Equip.; Test Equip.; Transmitters, Antennas & Transmission Systems; Tape; Vacuum Tubes; Service & Repair; System Design

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The Source Inc., 320 Sixth St. S.; P.O. Box 2487, Great Falls, MT 59403 (406/761-2420) MT, Northern-WY, Audio & Video Equip.; Test & Measurement Equip.; Tape; Antennas

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Cinema Services, 4445 S. Valley View Blvd., Suite 7, Las Vegas, NV 89103 (702-876-4667) AZ, NV, NM, UT, Video Equip.; Film Equip.; Used Equip.

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Associated Systems, P.O. Box 5211, Manchester, NH 03108 (603-472-2297) CT, ME, MA, NH, RI, VT, Video & Test Equip.

Northeast Broadcast Lab, Inc., P.O. Box 406, Auburn, NH 03032 (603-483-1002) Continental USA, Complete AM & FM systems including audio, transmitting & antenna equip.

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Comprehensive Video Supply Corp., 148 Veterans Drive, Northvale, NJ 07647 (201-767-7990) Worldwide, Audio & Video Equip.; Test & Measurement Equip.; Tape; Custom Cases & Accessories; Computer Software for Video & Film

East Coast Video Systems, 52 Ralph St., Belleville, NJ 07109 (201-751-5655) CT, DE, DC, FL, GA, ME, MD, NH, NJ, NY, NC, SC, VT, VA, Audio & Video Equip.; System Design

Holzberg Inc., P.O. Box 323, Sea Bright, NJ 07760 (201-530-8555; 800-242-7298; Fax 201-842-7552) CT, DE, DC, ME, MD, MA, NH, NJ, NY, PA, RI, VT, Audio & Video Equip.; Test & Measuring Equip.; Transmitters, Antennas & Transmission Systems; Tape; Vacuum Tubes; Film Equip.; Vans & Accessories, System Design; Turnkey Systems Installed

Landy Associates, Inc., 1890 E. Marlton Pike, Cherry Hill, NJ 08003 (609-424-4660) CT, DE, DC, ME, MD, MA, NH, NJ, NY, PA, RI, VT, VA, Video & Audio Equip.; Test & Measuring Equip.; Film Equip.; Tape; & Accessories; Service & Repair; System Design & Installations; Transmitters, Antennas & Transmission Systems; VTR's
See advertisement on page 114

Penstock East, 180 North St., Teterboro, NJ 07608 (201-288-7313) NJ, RF & Microwave Active & Passive Components; Cable Assemblies & Connectors

Radio Systems Inc., 110 High Hill Road, Bridgeport, NJ 08014-0458 (609-467-8000) USA, Audio Equip.; Tape; Transmitters, Antennas & Transmission Systems; System Design; Service & Repair; Turnkey Installation; Studio Furniture; Digital Audio Tape Recorder/Players

Tele-Measurements, Inc., 145 Main Ave., Clifton, NJ 07014 (201-473-8822) CT, DE, DC, NJ, NY, PA, VA, Audio & Video Equip.; Test & Measurement Equip.; Satellite Communications; Tele-Conferencing; Service & Repair; System Design

Thor Electronics Corp., 321 Pennsylvania Ave., Linden, NJ 07036 (201-486-3300) Worldwide, Vacuum Tubes

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DYMA Engineering, Inc., P.O. Box 1535, Los Lunas, NM 87031 (505-865-6700) AZ, CA, CO, KS, NV, NM, OK, TX, UT, Audio & Video Equip.; Test Equip.; Transmitters, Antennas & Transmission Systems; Tape; Film Equip.; Vans & Accessories; System Design; Some Used Equip. as well as documentation and installation

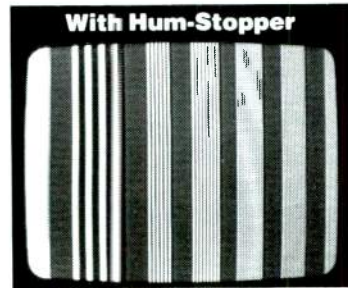
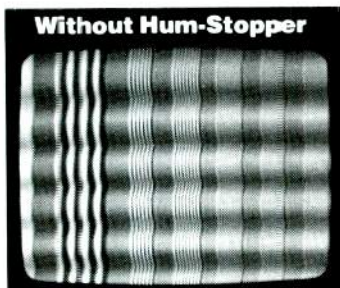
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Adcom Communications Inc., 555 West 57th St., New York, NY 10019 (212-265-1760) CT, NJ, NY, Video Equip.; Test & Measurement Equip.; Service & Repair; System Design; Used Equip.; Rental Equip.; Computer Graphic Paint; Animation Systems

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Avtech Electronics Inc., 22-60 46th St., Astoria, NY 11105 (718-956-1200; 800-221-1300) Worldwide, Audio & Video Equip.; Tape; Vacuum Tubes
Barbizon Electric Co., Inc., 426 West 55th St., New York, NY 10019 (212-586-1620) AL, CT, DE, DC, FL, GA, IL, IN, KY, ME, MD, MA, MI, MS, NH, NJ, NY, NC, OH, PA, RI, SC, TN, VT, VA, WV, WI, All Types of Lamps and Sockets; Gaffer's Tape; Hot Mill Gloves; Light Control & Diffusion Media;

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Bi-Tronics, Inc., 76 Main St., Tuckahoe, NY 10707 (800-666-0996) USA and Canada, Cable and Assemblies; Audio & Video Connectors
BJM Electronics Ltd., 2008 Victory Blvd., Staten Island, NY 10314 (718-442-0223; Outside NY-800-342-5256) Continental USA, Audio, Video, Test & Measurement Equip.; Vacuum Tubes; Audio/Video Accessories; Cables & Connectors; Resistors; Full line of electronic parts

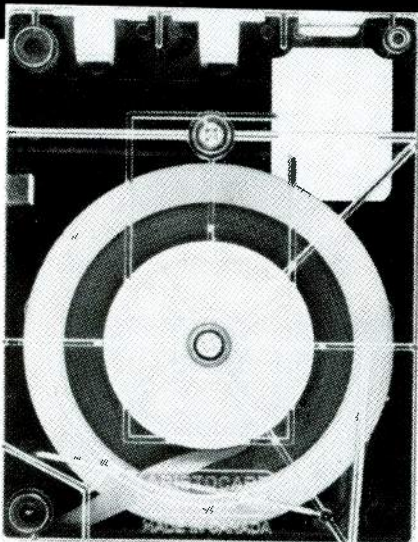
Burlington Audio/Video Tapes, Inc., 106 Mott St., Oceanside, NY 11572 (516-678-4414; 800-331-3191; Fax 516-678-8959) Nationwide, Audio/Video Tapes & Related Accessories
The Camera Mart, Inc., 456 West 55th St., New York, NY 10019 (212-757-6977) AZ, CA, CT, DE, DC, IN, MA, NV, NH, NJ, NY, PA, VT, Audio & Video Equip.; Test & Measurement Equip.; Tape; Film Equip.; System Design; Used Equip.
CeCo Div., Richardson Electronics, Ltd., 2115 Avenue X, Brooklyn, NY 11235 (718-646-6300; 800-221-0860) Worldwide, Broadcast Tubes; Electron

Tubes-Semiconductors; Broadcast Types, High Power Transmitting Tubes; Receiving Tubes; Industrial Tubes; Vacuum Tubes; Video Equip. Eimac, RCA, Amperex, GE
Communication Marketing & Consulting Ltd., 601 Chestnut Ridge Road, Chestnut Ridge, NY 10977 (914-356-5300) NJ, NY, East-PA, Security & Accessories; Audio & Video Accessories
Fusion Electronics Inc., 15 Main St., East Rockaway, NY 11518-0170 (516-599-6400; 800-645-2300) USA, Audio & Video Equip.; Test & Measurement Equip.; Vacuum Tubes; Camera Tubes (Plumbicons, Saticons, Vidicons), Transmitting Tubes; Klystrons; Video Tape; Cameras, Monitors, Lenses; Broadcast Accessories
Future Productions, Inc., 630 Ninth Ave., Suite 403, New York, NY 10036 (212-333-3606) Worldwide, Video Equip.; Tape; Service & Repair
Hudson Audio Video Enterprises, Inc., 309 Power Ave., Hudson, NY 12534 (518-828-2000) Nationwide, Audio & Video Equip.; Test & Measurement Equip.; Tape; Service & Repair; System Design; Used Equip.; Duplication-Video
LCA Sales Co., 76 Main St., Tuckahoe, NY 10707 (212-402-6600; 914-961-4700; 800-522-7377) DE, DC, MD, NJ, Metro-NY, East-PA, VA, Audio & Video Equip.; Transmission Systems; System Design
Lee Dan Communications, Inc., 155 Adams Ave., Hauppauge, NY 11788-3699 (516-231-1414; NY: 800-231-1414; USA: 800-Lee-Dan-1) USA, Intercom Systems; Speakers & Enclosures; Wire & Cable, Annunciators; Sony Video Equip. Authorized Distributor
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Markertek Video Supply, 145 Ulster Ave., Saugerties, NY 12477 (800-522-2025; 914-246-3036) Nationwide, Audio, Video, Test & Measurement Equip.; Tape; Vans & Accessories
Martin Audio/Video Corp., 423 West 55th St., New York, NY 10019 (212-541-5900) CT, DE, DC, ME, MD, MA, NH, NJ, NY, PA, PR, RI, VT, VI, NB, NF, NS, Ont, PEI, Que, Audio & Video Equip.; Test & Measurement; Tape; System Design; Rentals; Service & Repair
Miller Associates Ltd., L. Matthew, 48 West 21st St., New York, NY 10010 (212-741-8011; 800-221-9328) USA, PR, Audio & Video Equip.; Test & Measurement Equip.; Tape; Service & Repair; System Design; Used Equip.
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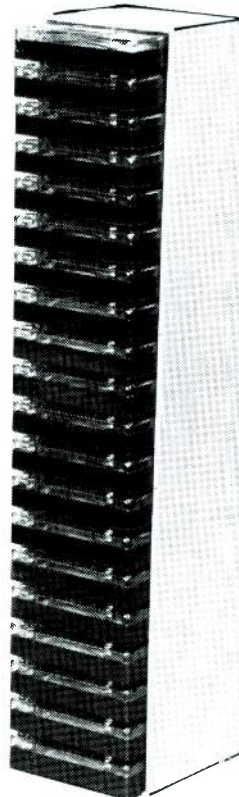
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Technical Video Systems, Inc., 215 N. Broad St., Winston-Salem, NC 27101 (919-748-0916) NC, SC, TN, Video Equip.

Audiovisual Inc., 1818 E. Broadway, Bismarck, ND 58502 (701-258-6360) CO, ID, IA, KS, MN, MT, NE, ND, SD, WY, Audio & Video Equip.; Test & Measuring Equip.; Transmitters; Tape; Vacuum Tubes; Film Equip.; Service & Repair; System Design; Used Equip. Rentals

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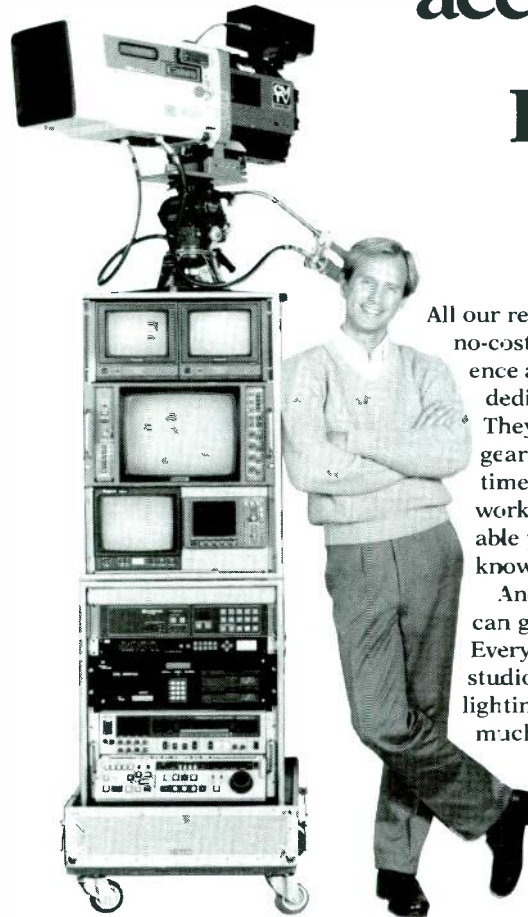
7474; 800-433-7668; Fax 817-483-9952) Worldwide, Complete Line of Broadcast & Recording Equip. & Supplies

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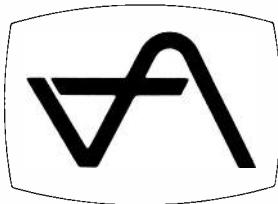
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See advertisement on page 114

Midwest Communications Corp., 2730 Ayliff Road, Norfolk, VA 23513 (804-262-5788) USA, Audio & Video Equip.; Test & Measurement Equip.; Transmitters & Antennas, Tape; Vans & Accessories; Service & Repair; System Design

Old Dominion Broadcast Eng. Service, 9505 Lakewater Court, Richmond, VA 23229 (804-740-4717) Worldwide, Audio Equip.; Test & Measurement Equip.; Transmitters, Antennas & Transmission Systems; Tape; Vacuum Tubes; Service & Repair; System Design; Used Equip.

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Systems Wireless Ltd., 465 Herndon Parkway, Herndon, VA 22070 (800-542-3332) USA, Microphones, Intercoms & Two-way Radios

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Broadcast Supply West, 7012 27th St. W., Tacoma, WA 98466 (206-565-2301; 800-426-8434) Worldwide, Audio Equip.; Test & Measurement Equip.; Tape; Transmitters, Antennas & Transmission Systems
See advertisement on page 102

If your company is not listed in this Buyers' Guide, please contact:

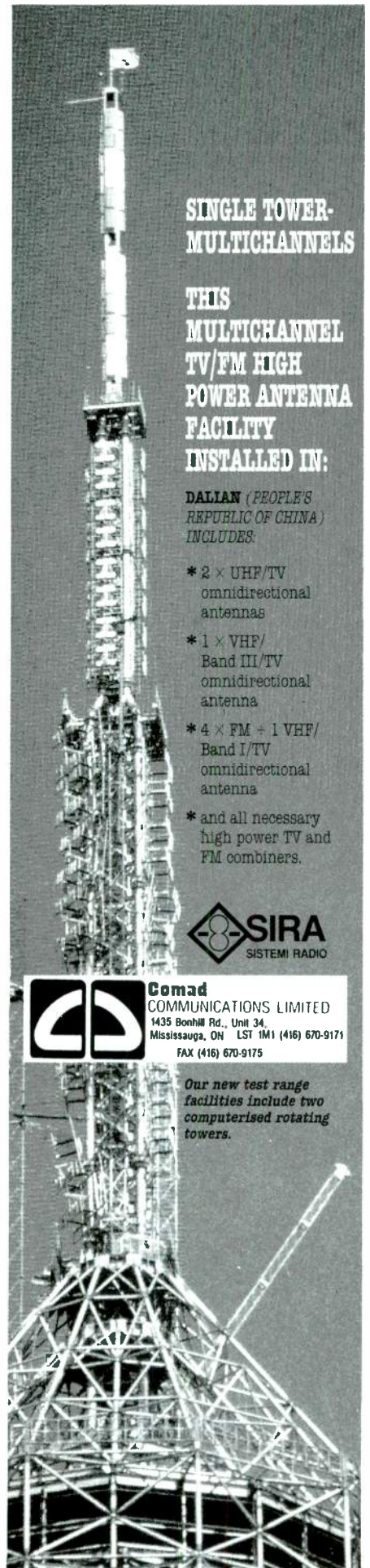
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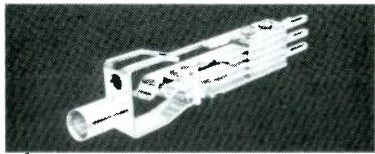


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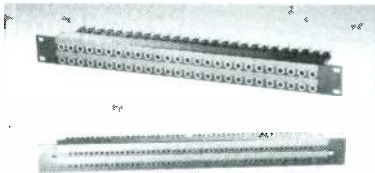
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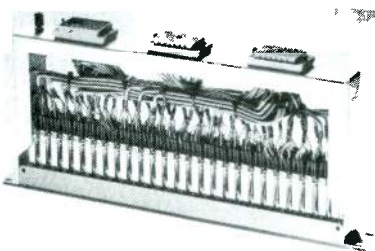
PATCH-BAY PRODUCTS



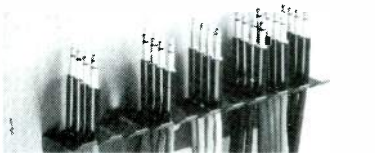
- 1/4" Long-frame and Mini Telephone Jacks



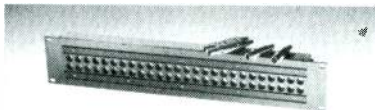
- Jack Panels with Jacks in both sizes
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Penstock Northwest, 10800 N.E. Eighth St., Suite 800, Bellevue, WA 98004 (206-454-2371) ID, OR, WA, Alta, BC, Sask, RF & Microwave Active & Passive Components; Cable Assemblies & Connectors

RF Specialties of Washington, Inc., 19237 Aurora Ave. N., Seattle, WA 98133 (206-546-6546) AK, ID, MT, OR, WA, Transmitters, Antennas & Transmission Systems; Complete line of RF & audio products.

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Full Compass Systems, Ltd., 5618 Odana Road, Madison, WI 53719 (608-271-1100; 50 states: 800-356-5844) Worldwide, Audio & Video Equip.; Test & Measurement Equip.; Tape; Service & Repair; System Design; Used Equip.; Film Equip.; Theatrical Lighting; Color Media
See advertisement on page 84

Vaughn Broadcast Rentals/Vaughn Duplication Services, 700 W. Michigan Ave., Suite 270, Milwaukee, WI 53233 (414-276-6511) WI, Rental Equip.; Duplications; Audio & Video Equip.; Test & Measurement Equip.; Tape; Duplications

Video Images-Madison, 2137 S. Stoughton Road, Madison, WI 53716 (608-221-8888) IL, IA, MI, WI

Video Images-Milwaukee, 285 N. Janacek Road, Waukesha, WI 53186 (414-785-8998) IL, IA, MI, WI, Audio & Video Equip.; Test & Measurement; Transmitters, Antennas & Transmission Systems; Tape; Vacuum Tubes; Vans & Accessories; Service & Repair; System Design; Used Equip.

CANADA

Allied Broadcast Equipment, Canada Ltd., 10 W. Pearce St., Unit 6, Richmond Hill, Ont., Canada L4B 1B6 (416-731-3697) Canada, Independent distributor of audio, RF broadcast & professional equip.

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Multi Electronic Services Ltd., 190 Don Park Road, Unit 5, Markham, Ont., Canada L3R 2V8 (416-475-5068) Ont., Que., Audio & Video Equip.; Service & Repair; System & Design

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The new TVS/TAS-3000 video/audio distribution switcher from BTS handles standard bandwidth switching in stride. But the fact is, standard bandwidth may not be the standard much longer. And that's why the TVS/TAS-3000 is not your standard switcher.

With the advent of wide bandwidth video, you'll need a switcher that can handle the new higher bandwidth signals. The 3000 will. It provides a video bandwidth of more than 50 MHz, measured with a full-amplitude sine wave or video signal. Which makes it upwardly compatible with HDTV or computer graphics—no matter what the standard.

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And if high bandwidth capacity isn't a require-

ment, BTS still has you covered with our best-selling switcher, the TVS/TAS-2000. The 2000 represents the same advanced technology and quality as the 3000 in a standard bandwidth switcher. BTS also offers a full-range of control panels and distribution amplifiers for a complete system designed, tested and guaranteed by one supplier.

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Dependable, performing switchers from BTS. Anything else is substandard. Call for information and technical specifications today: **1-800-562-1136, ext. 21.**

BTS

The name behind what's ahead.

BTS is Broadcast Television Systems, a joint company of Bosch and Philips, P.O. Box 30816, Salt Lake City, UT 84130-0816.

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Analog still stores won't give you the picture quality of our new digital ESS 5S, but look at the money you'll save.



Not only is our new digital still store "just pennies" more than old-fashioned analog versions, it's thousands of dollars less than its nearest digital competitor!

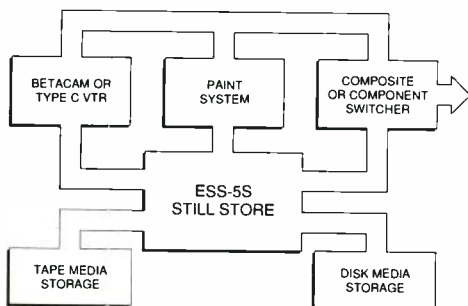
And the ESS™5S has a direct upgrade path to graphics. You can use it to do layered graphics *without* a paint system, external video effects system, or switcher.

But if a full graphics suite *is* what you've got, (or expect to have someday) the ESS 5S system's CCIR-601

digital or analog component I/O makes for easy interface to other devices in your studio, like RGB paint systems, composite or component switchers, telecines, or Betacam.



You can review random stills or your entire library 12 stills at a time.



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BE-099-ESS5

Video equipment specs

Color Television Cameras

The equipment in this section consists of cameras for studio, OB, EFP and ENG applications, using three pickup devices. Image enhancement in all systems is based on information derived from the green channel. Some also use detail information derived from red and blue to create the enhancement correction. Standards are abbreviated: NTSC N; PAL P (variations in PAL form will follow); SECAM S.

Manufacturer	Ampex Corporation	BTS				
Model	CVC-70	KCF-1/KCB-1	LDK6/6A (26A)	LDK54	KCH-1000 HDTV	KCM-125 (-318)
Composite output	Yes	Yes	Yes	Yes	No	Yes
RGB output	Yes	Yes	Yes	Yes	Yes	Yes
Y/R-Y/B-Y output	Yes	Yes	Yes	Yes ¹	No	Yes
S-VHS/Y-C output	No	No	No	No	No	Yes
μP setup control	No	No	Yes	Yes	Yes	Yes
Direct-to-VTR cable	Yes	Yes	No	Yes	No	No
# of intercom circuits	3	.....	.....	.....	Yes	Yes
# color balance-shot memories	.....	Yes	4	Yes	.....	Yes
Program audio circuits	Yes	.....	Yes	Yes	Yes	Yes
Lens correction memories	No	.....	Yes	No	Yes	Yes
Coaxial cable operation	Yes	.....	.....	.....	.....	.....
Triaxial cable operation	Yes	.....	Yes	Yes	.....	Yes
Multicore cable operation	Yes	Yes	Yes	Yes	Yes	Yes
Docking VCR	Yes	Yes	No	Yes	No	No
Applications	ENG EFP OB Studio	ENG	Studio, OB	ENG	Studio OB	Studio, OB
Standards	N, P	N P/M S	N P/M S	N P/M S	Any HDTV	N P/M S
Pickup size/type	2 1/2"	1/2" LOC PbO	1", 1 1/4" (2 1/2")	2 1/2" HS PbO	2 1/2" mixed field	1" (2 1/2")
CCD array size/type	FIT	.....	PbO	(high stability)	tubes	DG PbO (HS PbO)
Sensitivity (Lux, f/, +dB)	2000 5.6 90	700 1/2	700 2 8 60%	900 3	1000	630(800) 1.6
Limiting sensitivity	15 1.4 +18dB	85 +12dB	46 2.8 12dB	24 18dB	100	30 (25) 1.6 18dB
Low light gain	18dB, 0dB 2 steps	.....	.....	0-18dB, 3-step	.....	.....
S/N ratio	62dB NTSC/59dB PAL	54dB N, 52dB P/S	58dB N, 56dB P	59dB N, 57dB P	47dB	58dB N 56dB P/S
Limiting resolution	700 TVL	.....	400TVL adj	650TVL	600TVL 16:9	> 700 TVL
Depth of modulation	.....	40% 4MHz	.....	.....	50%	(60% mod 5MHz)
Electronic shutter	1/2000S 6-step	No	No	No	No	No
Registration error %	0.05%	.....	< 25ns, 40ns, 40ns	.....	0.04%	μP corrected
Error in ns	.....	< 40ns, 80ns, 120ns	< 25ns, 40ns, 40ns	< 30ns, 60ns, 100ns	.....	.....
Color correction type	.....	Optical	Optical	Optical	4-position	Optic, electronic
Camera head weight	7.7 lbs	15 lbs	94.6 (79) lbs	9.35 lbs	.....	73 (17.6)
Reader Service No.	1131	1132	1133	1134	1135	1136

¹ Composite signal is based on YUV matrixing.

Manufacturer	BTS			Hitachi Denshi America		
Model	LDK 910 (LDK 91) ²	LDK900 (LDK90) ³	LDK54A	FP-C2	SK-F700/710	SK-F3/F3A
Composite output	Yes	Yes (No)	Yes	Yes	Yes	Yes
RGB output	Yes	Yes	Yes	Yes	Yes	Yes
Y/R-Y/B-Y output	Yes	Yes	YUV	Yes	Option	Yes
S-VHS/Y-C output	No	No	No	Yes	Option	Option
μP setup control	Yes	Yes	Option	Yes	Yes	Yes
Direct-to-VTR cable	(Y)	Yes ³	Yes	Yes	.....	Yes
# of intercom circuits	2	.....	.....	2	2	2
# color balance-shot memories	2	.....	.....	2	Yes ⁴	Yes ⁴
Program audio circuits	Yes	Yes	Yes	Yes	Yes	Yes
Lens correction memories	.....	.....	.....	Yes	Yes	Yes
Coaxial cable operation	Yes	.....	.....	Option	Yes	Yes
Triaxial cable operation	Yes	Yes	Yes	Option	Yes	Yes
Multicore cable operation	.....	Yes	Yes	Yes	Yes	Yes
Docking VCR	(Y)	BCB5SP	BCB5SP	Yes	Option	Yes
Applications	Studio OB & (ENG)	Studio OB & (ENG)	ENG	ENG EFP OB Studio	OB Studio	ENG EFP OB Studio
Standards	N, P/M	N P/M S	N P/M S	N P	N P	N P
Pickup size/type	3 FT CCD	3 2/3" FT CCD	3 2/3" HS PbO	2 1/2" IT CCD	2 1/2" FIT CCD	2 1/2" FIT CCD
CCD array size/type	806x504 NTSC	610x492 NTSC	.....	8.9x6.75mm	6.6x8.8mm	6.6x8.8mm
Sensitivity (Lux, f/, +dB)	1250 1.4 90%	1750 1/4 90R	900 1/3	2000 5.6 90	2000 5.6 90	2000 5.6 90
Limiting sensitivity	40 1.4 +12dB	54 1.4 12dB (2.5fc)	24 18dB	25 1.8 +18	15 1.4 +18	15 1.4 +18
Low light gain	-6, +12 3 steps	.....	.....	+18 0 2-step	+18 0 3-step	+18 0 3-step
S/N ratio	59dB N, 57dB P	58dB N 56dB P/S	59dB N 57dB P/S	60dB N, 57dB P	60dB N, 57dB P	62dB N, 59dB P
Limiting resolution	> 700	650TVL	> 650TVL	660 TVL G center	700 TVL	700 TVL
Depth of modulation	55% 5MHz RGB	45% 5MHz	45% 5MHz	67% 4MHz G center	60% 5MHz	60% 5MHz
Electronic shutter	to 1/500S	Yes	No	.....	1/2000S 6-step	1/2000S 6-step
Registration error %	0.05% all zones	0.1, 0.1, 0.15%	.....	0.05% all zones	0.05% all zones	0.05% all zones
Error in ns	< 25ns	< 25ns	< 30ns, 60ns, 100ns	.....	.....	.....
Color correction type	Optical filters	Optical (electr)	Optical	Elect, Optical	Elect, Optical	Elect, Optical
Camera head weight	56 lb (5 lb)	55 (9, 15 w/VCR)	9.35 lbs	8.7 lbs	7.5 lbs	6.6 lbs
Reader Service No.	1137	1138	1139	1140	1141	1142

² Full compatibility with LDK 90/900 cameras.

³ KCB590SP includes docking BCB5SP.

⁴ 32 memories with setup control unit.

Manufacturer	Hitachi Denshi America			Megami Electronics		
Model	SK-F1/F1A	Z-3/SX	FP-C1	CK-2B	HC-240	HC-200
Composite output	Yes	Yes	Yes	Yes	Yes	Yes
RGB output	Yes	Yes	Yes	Yes	Option	Option
Y/R-Y/B-Y output	Yes	Yes	Option	Yes	Option	Option
S-VHS/Y-C output	Option	Yes	Yes	Yes	Yes	Yes
μP setup control	Yes	Yes	Yes	Yes	Yes	Yes
Direct-to-VTR cable	Yes	Yes	Yes	Yes	Option	Option
# of intercom circuits	2	2	2	2	1	1
# color balance-shot memories	Yes ⁵	2	2	2	4	3
Program audio circuits	Yes	Yes	Yes	Yes	Yes	Yes
Lens correction memories	Yes	Option	Yes	Yes	No	No
Coaxial cable operation	Yes	Option	Option	Option	No	No
Triaxial cable operation	Yes	Option	Option	Option	No	No
Multicore cable operation	Yes	Yes	Yes	Yes	Option	Option

Docking VCR	Yes	Option	Option	Yes	Yes	Yes
Applications	ENG EFP OB Studio	ENG EFP OB Studio	ENG EFP OB Studio	ENG EFP OB Studio	NG FP OB St	ENG, EFP
Standards	N P	N P	N P	N P	N P	N P
Pickup size/type	2/3" FIT CCD	2/3" Saticon	2/3" IT CCD	2/3" IT CCD	1/2" CCD	1/2" CCD
CCD array size/type	6.6x8.8mm	.....	8.9x6.74mm	8.9x6.75mm	FIT 492x772	IT 500x582
Sensitivity (Lux, f/, +dB)	2000 5.6 90	2006 4 90	2000 5.6 90	2000 5.6 90	2klux 5.0 89.9	2klux 5.0 89.9%
Limiting sensitivity	15 1.8 +18	50 1.8 +18	23 1.7 +18	25 1.8 +18	20 lux 1.4 +18	20lux 1.4 +18dB
Low light gain	+18 0 3-step	+18 0 2-step	+18 0 2-step	+18 0 2-step	+18, -3, 6-step	+18, 0dB, 3-step
S/N ratio	60dB N, 57dB P	61dB N, 58dB P	60dB N, 57dB P	60dB N, 57dB P	60dB N 58dB P/S	58dB N, 56dB P/S
Limiting resolution	650 TVL	850 TVL G center	660 TVL G center	660 TVL G center	650 TVL	≥530TVL
Depth of modulation	45% 5MHz G center	48% 5MHz G center	67% 4MHz G center	67% 4MHz G center	70%, 5.0MHz	50%, 5.0 MHz
Electronic shutter	1/2000s 6-step	.....	.....	.....	1/2000s 6-step	1/1000s 3-step
Geometric error	0 all zones	1%, 1%, 1.5%	0 all zones	0 all zones	0	0
Registration error %	0.05% all zones	0.1%, 0.2%, 0.3%	0.05% all zones	0.05% all zones	0.05%	0.05%
Color correction type	Elect, Optical	Elect Optical	Elect, Optical	Elect, Optical	Elect, OF	Elect, OF
Camera head weight	7.5 lbs	10.9 lbs	9.7 lbs	9.2 lbs	5.5 lbs, 2.6 kg	5.5 lgs/2.5 kg
Reader Service No.	1143	1144	1145	1146	1147	1148

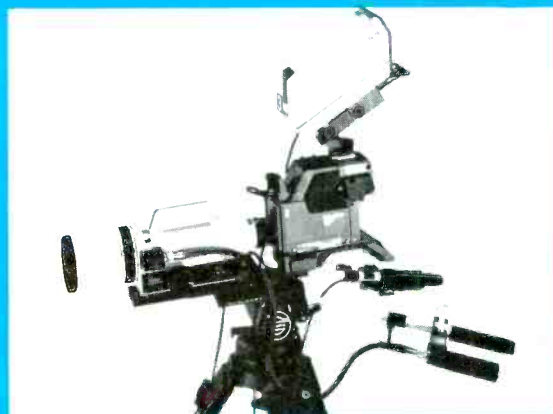
⁵ 32 memories with setup control unit.

Manufacturer	Ikegami Electronics					
Model	HK-355	HK-355P	HK-323	ITC-735	HC-230	HL-1125 HDTV
Composite output	Yes	Yes	Yes	Yes	Yes	No
RGB output	Yes	Yes	Yes	Yes	Option	Yes
Y/R-Y/B-Y output	Option	Option	Option	Yes	Option	Yes
S-VHS/Y-C output	No	No	No	Yes	Yes	No
μP setup control	Yes	Yes	Yes	Yes	Yes	Yes
Direct-to-VTR cable	No	No	No	Option	Option	No
# of intercom circuits	2	1	2	1	1	1
# color balance-shot memories	4	4	4	4	3	1
Program audio circuits	Yes	Yes	Yes	Yes	Yes	No
Lens correction memories	Yes	Yes	Yes	No	No	Yes
Coaxial cable operation	Yes	Yes	Yes	NO	NO	Yes
Triaxial cable operation	Yes	Yes	Yes	No	No	No
Multicore cable operation	Yes	Yes	Yes	Option	Option	Yes
Docking VCR	No	No	No	No	Yes	No
Applications	EF OB St	EF OB St	FP OB St	NG FP OB St	NG/FP/OB/St	ENG, EFP, OB St
Standards	N P	N P	N P	N P	N P	HDTV
Pickup size/type	2/3 CCD	2/3 CCD	2/3, 1" PbO MS MM SS tube types	2/3" Saticon	1/2" CCD	2/3 Harpicon
CCD array size/type	FIT 492x855	FIT 492x772	.....	.....	485x670	.....
Sensitivity (Lux, f/, +dB)	2klux 5.6 89.9	2klux 5.6 89.9	2klux 5.6 89.9	2klux 4.0 89.9	2000lux f/4.5 89.9%	200 lux 2.8 90%
Limiting sensitivity	30lux 1.6 +12	20lux 1.6 +18	20lux 1.6 +18	40lux f/1 +18dB	30 lux 1.4 +18	12 lux 1.6 +12dB
Low light gain	+12, -3 5-step	+12, -3 5-step	+12, -3 5-step	+18dB 0dB 3-step	+18, -3, 6step	12, 0, 4-step
S/N ratio	62dB N 60dB P/S	62dB N 60dB P/S	60dB N, 58 P/S	58dB N 56dB P/S	60dB N, 58dB P/S	48dB HDTV
Limiting resolution	800 TVL	700 TVL	700 TVL	750TVL	600 TVL	1000TVL
Depth of modulation	60% 5.0MHz	60% 5.0MHz	60%, 5.0MHz	60% 5.0MHz	50% 5.0 MHz	35%, 10.0MHz
Electronic shutter	1/5000s unlimited	1/5000s 6-step	.....	.....	1/1000s, 3-step	.....
Geometric error	00-	00-	≤ 1%	± 1%, 1.5%, 1.5%	0	0
Registration error %	0.02%	0.02%	0.05, 0.1, 0.2%	0.1, 0.2, 0.3%	0.05	0.1, 0.2, 0.3%
Color correction type	Elect OF	Elect OF	Elect, OF	Elect OF	Elect, OF	Elect, OF
Camera head weight	55 lbs 25 kg	8.5lbs 3.8kg	57 lbs, 26 kg	10.36 lbs/4.7 kg	5.5 lb/2.4kg	14.3, 6.5 kg
Reader Service No.	1149	1150	1151	1152	1153	1154

Manufacturer	Ikegami Electronics					
Model	HL-55	HK-322	HK-327	HL-791	DC-1125 HDTV	HK-327P
Composite output	Yes	Yes	Yes	Yes	No	Yes
RGB output	Yes	Yes	Yes	Yes	Yes	Yes
Y/R-Y/B-Y output	Yes	No	Yes	Yes	Yes	Yes
S-VHS/Y-C output	No	No	No	No	No	No
μP setup control	Yes	Yes	Yes	Yes	Yes	Yes
Direct-to-VTR cable	Option	No	No	Option	No	Option
# of intercom circuits	1	2	2	1	1	1
# color balance-shot memories	3	8	Unlimited	3	1	Unlimited
Program audio circuits	Yes	Yes	Yes	Yes	No	Yes
Lens correction memories	Yes	Yes	Yes	Yes	Yes	Yes
Coaxial cable operation	Yes	Yes	Yes	Option	No	Yes
Triaxial cable operation	Option	Yes	Yes	Option	No	Yes
Multicore cable operation	Option	Yes	Yes	Option	Yes	Yes
Docking VCR	Yes	No	No	Yes	No	No
Applications	NG FP OB St	OB St	OB, St	NG FP OB St	EFP, BO St	OB, St, ENG, EFP
Standards	N P	N P S	N P	N P	HDTV	N P
Pickup size/type	2/3" CCD	1, 1-1/4" PbO	1-1/4" MS PbO	1-1/4" PbO	1-1/4" PbO	2/3" PbO
CCD array size/type	FIT 492x772	.....	.....	.....	.....	.....
Sensitivity (Lux, f/, +dB)	2klux 5.6 89.9	1.5klux 4.0 89.9	1.5klux 5.6 89.9	2klux 4.5 89.9	2klux 1/5.6 90	2klux 4.5 89.9
Limiting sensitivity	20 lux 1.6 +18	40 lux 1.6 +12dB	12 lux 1.4 +12dB	20 lux 1.6 +18	35 lux 2 +12	+12, 1.6 +18dB
Low light gain	18, 0, 5-step	+12, -3 5-step	+12, -3, 5-step	+12, -3dB 4-step	12, 0, 5-step	+12, -3, 5-step
S/N ratio	62dB N, 60dB P/S	58dB N 56dB P/S	59dB N, 57dB P/S	61dB N 59dB P/S	48dB HDTV	61dB N, 59dB P/S
Limiting resolution	700 TVL	800 TVL	800 TVL	≥ 650 TVL	1000TVL	≤ 650 TVL
Depth of modulation	60%, 5.0MHz	60%, 5.0MHz	60%, 5.0MHz	55%, 5.0MHz	40%, 10.0MHz	55%, 5.0MHz
Electronic shutter	1/2000s, 6-step	.....	.....	.....	.....	.....
Geometric error	0	± 0.1%	± 0.1%	± 1%, 1%, 1%	0.05%	± 1%
Registration error %	0.05%	0.05%	0.05%	0.05, 0.1, 0.3%	0.05%	0.05, 0.1, 0.3%
Color correction type	Elect OF	Elect OF	Elect, OF	Elect OF	Elect, OF	Elect, OF
Camera head weight	6.8 lb 3.1kg w/VF	94.7 lb 43 kg	79 lbs 36 kg	11.6 lbs 5.3 kg w/VF	66 lbs, 30 kg	11.6 lbs 5.3kg
Reader Service No.	1155	1156	1157	1158	1159	1160

Manufacturer	Ikegami Electronics			JVC Professional Products		
Model	HL-53	HK-323P	KY-17U	KY-80U	KY-25U	KY-75U
Composite output	Yes	Yes	Yes	Yes	Yes	Yes
RGB output	Yes	Yes	Yes	No	Yes	No
Y/R-Y/B-Y output	Yes	Option	Yes	Yes	Yes	Yes
S-VHS/Y-C output	No	No	Yes	Yes	Yes	Yes
μP setup control	Yes	Yes	Yes	Yes	Yes	Yes
Direct-to-VTR cable	Option	Option	Yes	Yes	Yes	Yes
# of intercom circuits	1	1	1	1	1	1
# color balance-shot memories	4	4	2	2	2	2
Program audio circuits	No	Yes	No	No	No	No
Lens correction memories	Yes	Yes	No	No	No	No

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Coaxial cable operation	No	Yes	No	No	No	No
Triaxial cable operation	Option	Yes	No	No	No	No
Multicore cable operation	Option	Yes	Yes	Yes	Yes	Yes
Docking VCR	Yes	Yes	Yes	Yes	Yes	Yes
Applications	NG FP OB St	FP, OB, St	ENG EFP	ENG EFP Studio	ENG EFP Studio	ENG EFP Studio
Standards	N P	N, P	NTSC	NTSC	NTSC	NTSC
Pickup size/type	2/3" CCD	2/3" PbO	1/2" IT	2/3" PbO	2/3" IT	2/3" Plumbicon
CCD array size/type	IT 492x772	.....	683x492	.....	726x492	.....
Sensitivity (Lux, f/, +dB)	2klux 5.6 89.9	2klux 4.5 89.9	2000 4.0	2000 4.5 89.9	2000 5.6	2000 4.5 89.9
Limiting sensitivity	20 lux 1.6 +18	30 lux 1.6 +18	32 1.5 +18	38 1.7 +18dB	23 1.7 +18	38 1.7 +18
Low light gain	+18 0dB 5-step	-3 +18 5-step	+18, +9, 2 step	+18, +9 2-step	+18, +9 2-step	+18 +9 2 step
S/N ratio	62dB N, 60dB P/S	60dB N, 58dB P/S	59dB NTSC	59dB	60dB	58dB
Limiting resolution	700 TVL	700 TVL	640TVL	700TVL	700 TVL	700 TVL
Depth of modulation	60% 5.MHz	55% 5.MHz	.....	.....	.....	.....
Electronic shutter	1/2000s 6-step	.....	1/1000s 3 step	.....	1/1000s 3-step	.....
Geometric error	0	≤1%	.....	.....	.....	.....
Registration error %	0.05%	0.05, 0.1, 0.2%	.....	0.05%, 0.1%, 0.3%	0.05% overall	0.05, 0.1, 0.3%
Color correction type	Elect, OF	Elect, OF	Optical	.....	Optical	Optical
Camera head weight	6.8 lb 3.1kg w/VF	15 lbs 6.8 kg	6.6 lbs	10.0 lbs	6.6 lbs	10 lbs
Reader Service No.	1161	1162	1163	1164	1165	1166

Manufacturer	NEC America		Panasonic		
Model	EP-3	SP-30	AK-400 (450)	AQ-10 (AQ-20) ⁶	WV-300CLE (-200CLE)
Composite output	Yes	Yes	Yes	Yes	Yes
RGB output	Yes	Yes	Yes	Yes	.....
Y/R-Y/B-Y output	Yes	Yes	Yes	Yes	Yes
S-VHS/Y-C output	.....	Yes	.....	Yes	Yes
μP setup control	No	No	.....	Yes	.....
Direct-to-VTR cable	Yes	Yes	Yes	Yes	Yes
# of intercom circuits	1	1	.....	.....	.....
# color balance-shot memories	8	8	Yes	Yes	Yes
Program audio circuits	No	No	.....	.....	.....
Lens correction memories	No	No	.....	.....	.....
Coaxial cable operation	No	No	Yes	Yes	No
Triaxial cable operation	Yes	No	Yes	Yes	No
Multicore cable operation	Yes	Yes	Yes	Yes	Yes
Docking VCR	Yes	Yes	AU-400	AU-400/500U	w/ adapter
Applications	ENG EFP Studio	ENG EFP	ENG/EFP	ENG/EFP studio	ENG/EFP/studio
Standards	NTSC	NTSC	NTSC	NTSC	NTSC
Pickup size/type	2/3"	2/3" FIT CCD	2/3" 3 FIT CCDs	2/3" 3 FIT CCDs	2/3" 3 FIT CCDs
CCD array size/type	FIT CCD	.....	450,000 pixels	400k (300k) pixels	.....
Sensitivity (Lux, f/, +dB)	2000 5.6 89.9	2000 6.2 89.9	2000 lux 1/5.6	2000 lux 1/5.6	2000 lux 1/5.6
Limiting sensitivity	.....	.....	20 lux	20 lux	25 lux
Low light gain	.....	.....	to +18dB	.....	to +18dB gain
S/N ratio	62dB NTSC	60dB	60dB (62dB)	> 60dB (62dB)	> 60dB
Limiting resolution	>700 TVL	700 TVL	650 (800) TVL	650 (750) TVL	700 (600) TVL
Depth of modulation	.....	.....	.....	.....	.....
Electronic shutter	1/500s 7-step	1/500s 7 step	Yes	Yes	Yes
Registration error %	0.05% all zones	0.06% all zones	0.05% overall	< 0.05% overall	< 0.05% overall
Color correction type	.....	.....	Filter wheel	.....	Filter wheel
Camera head weight	7.3 lbs	.....	7.5 lbs	.....	11.9 lbs
Reader Service No.	1167	1168	1170	1171	1172

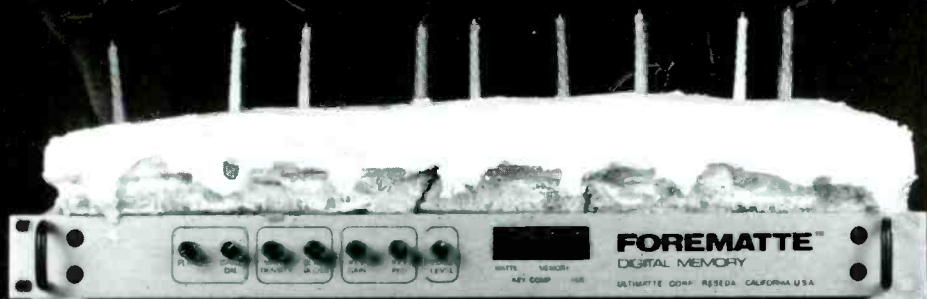
⁶ These cameras use digital image processing techniques internally.

Manufacturer	Sony Communications Products					
Model	BVW-20 ⁷	BVP-370	BVP-7	BVP-50	BVW-300 ⁷	BVP-5
Composite output	Yes	Yes	Yes	Yes	Yes	Yes
RGB output	No	Yes	No	Yes	No	No
Y/R-Y/B-Y output	No	Yes	Yes	Yes	No	Yes
S-VHS/Y-C output	No	No	No	No	No	No
μP setup control	Yes	Yes	Yes	Yes	Yes	Yes
Direct-to-VTR cable	No	Option	Yes	Yes	Yes	Yes
# of intercom circuits	0	2	1	1	0	.....
# color balance-shot memories	.....	64	8	8	8	8
Program audio circuits	Yes	Yes	Yes	Yes	Yes	No
Lens correction memories	No	Yes	No	No	No	No
Coaxial cable operation	Yes	No	Yes	Yes	Yes	No
Triaxial cable operation	No	Yes	Yes	Yes	No	No
Multicore cable operation	No	No	Yes	Yes	No	No
Docking VCR	Integral	No	Yes	Yes	Integral	Yes
Applications	ENG	OB Studio	ENG EFP OB	ENG	ENG EFP	ENG
Standards	NTSC	NTSC, PAL	N P	NTSC	NTSC	NTSC
Pickup size/type	2/3" IT	2/3" FIT	2/3" IT	2/3" IT	2/3" IF	2/3" IT
CCD array size/type	510x492	768x494	768x493	510x492	768x493	510x492
Sensitivity (Lux, f/, +dB)	2000 5.6 90%	2000 5.6 90%	2000 90%	2000 5.6 90%	2000 5.6 90%	2000 5.6 90%
Limiting sensitivity	15 1.4 +18dB	15 1.4 +18dB	15 1.4 +18dB	15 1.4 +18dB	15 1.4 +18dB	15 1.4 +18dB
Low light gain	18dB 0dB, 3-steps	18dB, 0dB, 2 step	21dB 0dB 3 step	18dB, 0dB, 3 steps	18dB, 0dB, 3-step	+18dB, 0, 3 steps
S/N ratio	58dB NTSC	62dB NTSC	62dB N, 59dB P	60dB NTSC	62dB NTSC	58dB NTSC
Limiting resolution	500 TVL	700 TVL	700 TVL	550TVL	670 TVL	550 TVL
Depth of modulation	.....	65% 5MHz	.....	.....	.....	.....
Electronic shutter	.....	1/2000s 6-step	1/2000s 6-step	1/2000s	1/2000s 6-step	.....
Geometric error	0% all zones	n/a	0% all zones	0% all zones	0% all zones	0% all zones
Registration error %	0.05% all zones	0.05% all zones	0.05% all zones	0.05% all zones	0.05% all zones	0.05% all zones
Color correction type	Elect/Opt filt	Opt fit	Elect/Opt Fit	Elect/Opt Fit	Elect Opt fit	Elect/Opt filt
Camera head weight	10.67 lbs	44 lbs	<7.5 lbs	<7.5 lbs	10.78 lbs	7.1 lbs
Reader Service No.	1173	1174	1175	1176	1177	1178

⁷ One-piece camcorder, weight represents operating unit with CVR.

Manufacturer	Sony					
Model	BVP-270	DXC-3000A	BVP-T7	BVP-70	DXC-M7	HDC-3000
Composite output	Yes	Yes	Yes	Yes	Yes	No
RGB output	Yes	Yes	No	Yes	Yes	Yes
Y/R-Y/B-Y output	Yes	Option	Yes	Yes	Yes	Y1
S-VHS/Y-C output	No	Yes	No	No	Yes	No
μP setup control	Yes	Yes	Yes	Yes	Yes	Yes
Direct-to-VTR cable	Option	Yes	Yes	Yes	Yes	No

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# of intercom circuits	1	1	1	1	1	1
# color balance-shot memories	<T64	1	8	8	8	4
Program audio circuits	Yes	01	Yes	Yes	01	Yes
Lens correction memories	Yes	Option	No	No	Option	Yes
Coaxial cable operation	No	Yes	Yes	Yes	Yes	No
Triaxial cable operation	Yes	Option	Yes	Yes	Option	No
Multicore cable operation	No	Yes	Yes	Yes	Yes	Yes
Docking VCR	No	Option	Yes	Yes	Option	No
Applications	OB Studio	ENG EFP OB Studio	ENG EFP OB	ENG EFP OB Studio	ENG EFP OB Studio	EFP OB Studio
Standards	NTSC, PAL	NTSC	NTSC	NTSC	NTSC	HDTV 1125/60
Pickup size/type	2/3" IT	2/3" IT	2/3" IT	2/3" FIT	2/3" IT	STAT/STAT Saticon
CCD array size/type	768x493	510x492	768x493	768x494	768x493	.....
Sensitivity (Lux, f/, +dB)	2000 5.6 90%	2000 5.6 89.9%	2000 5.6 90%	2000 5.6 90%	2000 5.6 89.9	2000 4.7 90%
Limiting sensitivity	15 1.4 +18dB	17 1.4 +18	15 1.4 +18dB	15 1.4 +18dB	16 1x 1.4 +18	.....
Low light gain	18dB, 0dB, 2 steps	18dB, 0dB, 2 steps	21dB, 0dB, 3-step	21dB, 0dB 3-step	+18dB, 0dB, 2 steps	+6dB,-6dB 5gam step
S/N ratio	62dB NTSC	58dB NTSC	62dB NTSC	62dB NTSC	60dB NTSC	44dB unwt'd 30MHz
Limiting resolution	700 TVL	560 TVL	700 TVL	700 TVL	700 TVL	1200TVL
Depth of modulation	65% 5MHz	.....	.....	.....	.....	35% @ 800 TVL
Electronic shutter	1/2000s 6-step	.....	.....	1/2000s 7-step	1/2000s 5-steps	.....
Geometric error	n/a	Negligible	0% all zones	0% all zones	Negligible	.....
Registration error %	0.05% all zones	0.05% all zones	0.5% all zones	0.05% all zones	0.05% all zones	0.025, 0.05, 0.05%
Color correction type	.....	Optical filter	.....	Elect/Opt fit	Electronic, optical	Elect/Opt fit
Camera head weight	44 lbs	7.25 lbs	1.65 lbs	<7.5 lbs	7.9 lbs	18 lbs
Reader Service No.	1179	1180	1181	1182	1183	1184

⁸ Playback audio presented. ⁹ Y/Pb/Pr color difference signals.

Manufacturer	Sony Communications Products		Thomson Video Equipment			
Model	EVO-120 (9100)	DXC-325	PROSCAN 16/9	TTV 1645 Sportcam	TTV 1532	TTV 1647
Composite output	Yes	Yes	No	Yes	Yes	Yes
RGB output	No	Yes	Yes	Yes	Yes	Yes
Y/R-Y/B-Y output	No	Option	No	Yes	Yes	Yes
S-VHS/Y-C output	N(Y)	Yes	No	No	.....	.....
µP setup control	No	Yes	Yes	.....	182-pt setup	182-pt setup
Direct-to-VTR cable	No	Yes	.....	w/ adapter	No	No
# of intercom circuits	.....	1	Yes	Yes	Yes	Yes
# color balance-shot memories	.....	1	Yes	Yes	Yes	Yes
Program audio circuits	No	No ¹⁰	.....	Yes	Yes	Yes
Lens correction memories	No	Option	Yes	.....	.....	.....
Coaxial cable operation	No	Yes	.....	.....	.....	.....
Triaxial cable operation	No	Option	.....	.....	.....	.....
Multicore cable operation	No	Yes	Yes	Yes	Yes	Yes
Docking VCR	No	Yes	No	No	No	w/adapter
Applications	ENG	ENG EFP OB Studio	HDTV	ENG EFP studio	Studio/OB ¹¹	ENG/EFP ¹²
Standards	NTSC	NTSC	Progressive scan	N P S	N P S	N P S
Pickup size/type	2/3" IT	1/2" IT	3 2/3" PbO or SAT	3 CCD	2/3" DG LOC	3 CCD
CCD array size/type	10x8.2mm	510x492	Static deflection	440,000 pixel	.....	400,000 pixel
Sensitivity (Lux, f/, +dB)	.....	2000 lx 5.0 89.9	2000 lux f/4 89%	1100 lux f/4	1300 lux f/4	1100 lux f/4
Limiting sensitivity	5 1.6 (1.4)	20 lx 1.4 +18dB	.....	12 lux 21dB	2 fc +18dB	15 lux +18dB
Low light gain	.....	18dB/0dB/2dB steps	.....	21dB max	+18dB	+18dB
S/N ratio	.....	58dB NTSC	> 49dB unwt'd	59dB	> 58dB	59dB
Limiting resolution	.....	530TVL	625Vx960-pixel H	> 550TVL	> 400 TVL	>550 TVL
Depth of modulation	.....	.....	60% 11MHz	.....	50%	50%
Electronic shutter	1/2000-5(1/10000-7)	1/2000s 5-step	.....	Yes	.....	.....
Geometric error	.....	Negligible	Negligible	.....	Negligible	<0.1% overall
Registration error %	.....	0.05% all zones	Elec correction	.....	Negligible	0.05% overall
Color correction type	.....	Optical	Electronic	Optical filters	Optical	Optical
Camera head weight	2.86 (<4) lbs	6.63 lbs	.....	<7.7 lbs	62 lbs	7.7 lbs
Reader Service No.	1185	1186	1187	1188	1189	1190

¹⁰ Playback audio. ¹¹ Camera can operate in 4:3 or 16:9 aspect ratio. Control panels may also be used with TTV 1647 CCD or TTV 1624 tube cameras.

Television Zoom Lenses

These camera lenses are grouped by image format. All systems include focus, zoom and iris servos. If a diascope is available, the model number is followed by a dagger (†). Use of lenses not noted as "CCD optimized" should be discussed with the manufacturer prior for applicability with CCD cameras. Lens applications are abbreviated to 2-letter codes as follows: **ENG**, **EFP**, **Studio**, **SP**orts, **OB**, and **HD**TV.

Television Zoom Lenses, 1/2"

Manufacturer	Angenieux			Fujinon	
Model	14x6	20x7† ²	14x7	S8.5x4.2ERM/ERD†	S14x6.4ERM/ERD†
Application	NG FP OB	ST FP OB	NG FP OB	NG FP	NG FP
CCD optimized	Yes	Yes	Yes	Yes	Yes
Zoom range (mm)	6-84	7-140	7-98	4.2-36	6.4-90
Wide-Tele f/	1.4-1.6	1.2	1.4-1.6	1.4-1.5	1.4-1.5
MOD distance	31"	0"	31"	11"	29.1"
MOD area (HxV)	61x46mm	110x83mm	52x39mm	46.9x35.1mm	75.1x56.3mm
Wide-Tele H angle	58°-4.5°	51.5°-2.75°	52°-4°	74°-10°	53°-4°
Back focus (mm)	Adjustable	Adjustable	Adjustable	.....	.....
Extender(s)	2x, 0.64x ¹	2x ³	2x, 0.8 ⁴	1.7x	2x
Macrofocus	Yes	to 0" MOD	to 0" MOD	Yes	Yes
Adjustment access	On surface	Access door	On surface	On surface	On surface
Operating wt	4.2 lbs	39 lbs	3.1 lbs	4 lbs	2.81 lbs
Reader Service No.	501	502	503	504	505

¹ Wide angle attachment. ² Optional integral shutter. ³ Other extenders available: 1.2x, 1.4x, 1.6x, 1.8x. ⁴ Wide-angle attachment; 1.66xtele adapter available.

Manufacturer	Schneider		
Model	TV71	TV58	TV59 Apo-Varon

Application	NG FP OB	NG FP	NG FP
CCD optimized	Yes	Yes	....
Zoom range (mm)	5-100	4.7-55(11.5x)	6.5-91(HM14X)
Wide-Tele f/	1.2-1.5	1.4-1.6	1.4-3
MOD distance	12.7"	12.7"	31.5"
MOD area (HxV)	28.7x21.5mm	43.6x32.7mm	53x40mm
Wide-Tele H Angle	69.9°-4.0°	73.3°-3.75°	53°-4°
Back focus (mm)	....	Adjustable	35.5
Aperture (F,B)	157 front	....	70.5, 30.5mm
Extender(s)	1.4x, 2.0x	2x	2
Macrofocus	....	Yes	Yes
Adjustment access	Access doors	On surface	On surface
Operating wt	65.3 lbs	4.31 lbs	3.95 lbs
Reader Service No.	506	507	508

Television Zoom Lenses, 2/3"

Manufacturer	Angenieux				Canon USA	
Model	20x8.5†	14x8	14x9	40x9.5†	J40x9.5BIE†	J15x9.5BIRS
Application	ST FP OB	NG FP OB	NG FP OB	ST FP OB	SP OB	NG FP
CCD optimized	Yes	....	....	Yes	Yes	Yes
Zoom range (mm)	8.5-170	8-112	9-126	9.5-380	9.5-380	9.5-143
Wide-Tele f/	1.3	1.6-2	1.6-2	1.3-2.1	1.4-2	1.8-2.3
MOD distance	0"	31"	31"	0"	8.2"	34.6"
MOD area (HxV)	121.9x91.7mm	61x46mm	52x39mm	55x41.5mm ⁵	205x154mm	86.2x64.7mm
Wide-Tele H angle	55°-3°	58°-4.5°	52°-4°	49.75°-1.33°	49.7°-1.2°	49.7°-3.5°
Back focus (mm)	Adjustable	Adjustable	Adjustable	Adjustable	Adjustable	Adjustable
Aperture (F,B)	....	....	....	....	200, 37	....
Extender(s)	2x ²	2x, 0.6 ³	2x, 0.8x ⁴	1.45x, 2.1x	2x, 1.5x	2x
Macrofocus	to 0" MOD	to 0" MOD	to 0" MOD	No	No	Yes
Adjustment access	Access door	On surface	On surface	Remove cover	Remove cover	On surface
Operating wt	39 lbs	3.9 lbs	3.1 lbs	43 lbs	66 lbs	3.3 lbs
Reader Service No.	509	510	511	512	513	514

¹ Optional integral shutter. ² Other extenders include 1.2x, 1.4x, 1.6x, 1.8x. ³ Wide-angle attachment. ⁴ Wide-angle attachment; 1.55x tele adapter available. ⁵ Based on MOD of 2.5m.

Manufacturer	Canon USA			Fujinon		
Model	J20x7.5†	J18x8.5IRS†	J50x9.5BIE†	J13x9BIE-II†	A16x9.5ERM†	A12x9ERM†
Application	FP ST	NG FP	FP SP OB	NG	NG FP	NG FP
CCD optimized	Yes	Yes	Yes	Yes	Yes	Yes
Zoom range (mm)	7.5-150	9-126	9.5-475	9-117	9.5-152	9-108
Wide-Tele f/	1.5-1.9	1.7-2.4	1.4-3.0	1.6-1.9	1.8-2.2	1.7-1.9
MOD distance	21.8"	35"	2"	29.1"	37.4"	5.4"
MOD area (HxV)	89x67mm	86.2x64.6mm	180x136cm	....	817x613mm	877x658mm
Wide-Tele H angle	61.9°-3.3°	54.7°-3.3°	49.7°-1.1°	52.1°-4.3°	49°-3°	52°-4°
Back focus (mm)	Adjustable	Adjustable	Var, man adj	Var, man adj	....	....
Aperture (F,B)	....	82.8, 31.2	....	72.6, 31.7	....	....
Extender(s)	2x, 1.5x	2x	2x	2x	2x	2x
Macrofocus	Yes	Yes	Yes	Yes	Yes	Yes
Adjustment access	Remove cover	Remove cover	On surface	Remove cover	On surface	On surface
Operating wt	35lb	3.48 lbs	35.1 lbs	2.84 lbs	3.2 lbs	3.2 lbs
Reader Service No.	515	516	517	518	519	520

Manufacturer	Fujinon					
Model	HA14x8RD	A44x9.5ESM†	A55x9.5ESM†	A15x8ESM†	A24x11.5ERD†	A8.5x5.5ERM/ERD†
Application	HD	FP	FP	FP	NG FP	NG FP
CCD optimized	Yes	Yes	Yes	Yes	Yes	Yes
Zoom range (mm)	8-112	9.5-420	9.5-525	8-120	11.5-276	5.5-47
Wide-Tele f/	1.7-2.1	1.4-2.5	1.4-2.9	1.5-1.7	2.0-2.7	1.7-1.9
MOD distance	43.3"	7.2"	7.8"	27.5"	5.9"	11.8"
MOD area (HxV)	1086x611mm	1863x1397mm	2028x1521mm	915x686mm	1296x972mm	492x369mm
Wide-Tele H angle	57°-4°	49°-1°	49°-0°	57°-4°	41°-1°	77°-10°
Extender(s)	....	2x	2x	2x	2x	1.7x
Macrofocus	....	No	No	No	Yes	Yes
Adjustment access	....	On surface	On surface	On surface	On surface	On surface
Operating wt	6.2 lbs	31.9 lbs	36.9 lbs	28.6 lbs	6.38 lbs	4 lbs
Reader Service No.	1231	1232	1233	1234	1235	1236

Manufacturer	Fujinon					
Model	A14x8.5ERM/ERD†	A20x7ESM†	A18x8ESM†	A18x8.5ERM/ERD†	A34x10ESM†	A34x20.5ESM†
Application	NG FP	FP	FP	NG FP	FP	FP
CCD optimized	Yes	Yes	Yes	Yes	Yes	Yes
Zoom range (mm)	8.5-119	7-140	8-144	8.5-153	10-340	20.5-700
Wide-Tele f/	1.7-2.0	1.4-1.6	1.5-2.0	1.7-2.3	1.6-2.4	2.4-3.5
MOD distance	31.5"	29.5"	27.5"	35.4"	5.9"	16.4"
MOD area (HxV)	777x583mm	1166x874mm	915x686mm	879x659mm	1446x1085mm	2000x1500mm
Wide-Tele H angle	54°-4°	64°-3°	57°-3°	54°-3°	47°-1°	24°-0°
Extender(s)	2x	2x	2x	2x	2x	2x
Macrofocus	Yes	No	No	Yes	No	No
Adjustment access	On surface	On surface	On surface	On surface	On surface	On surface
Operating wt	2.8 lbs	33 lbs	28.6 lbs	3.34 lbs	28.6 lbs	42.9 lbs
Reader Service No.	521	522	523	524	525	526

Manufacturer	Nikon			Schneider		
Model	S13x9B	S15x8.5B	TV61	TV85† ⁶	TV66	TV56 Apo-Varon
Application	NG FP	NG FP	NG FP OB	OB SP	FP	NG FP
CCD optimized	Yes	Yes	Yes	....	....	....
Zoom range (mm)	9-117	8.5-127.5	6.5-130	11-385	8.8-130	9-126(HM14X)
Wide-Tele f/	1.7-2.0	1.4-1.9	1.4-1.9	1.4-2.6	1.4-3.4	1.7-4.2
MOD distance	31.5"	31.5"	13.7"	9.8"	17.7"	31.5"
MOD area (HxV)	72.2x54.2mm	76.4x57.5mm	30.4x22.8mm	67.9x50.2mm	43x32mm	54x41mm
Wide-Tele H angle	52.1°-4.3°	54.7°-4.0°	69.3°-4.0°	42.5°-4.4°	56°-4°	53°-4°
Back focus (mm)	Adjustable	Adjustable	....	Manualadj	43.6	42.5-27.6
Aperture (F,B)	....	2x	157 front	....	134, 35.8	72, 29.5
Extender(s)	2x	No	1.4x, 2.0x	2x	2	2
Macrofocus	Yes	Yes	....	No	....	....
Adjustment access	On surface	On surface	Access doors	Remove cover	On surface	On surface
Operating wt	2.42 lbs	2.75 lbs	65.3 lbs	50.6 lbs	41.8 lbs	3.96 lbs

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Manufacturer	Schneider	Schwem Technology	Tamron
Model	TV55 TV80	Gyrozoom FP-1	Model 47HD 466H(H14x9B1)
Application	NG FP OB ST	NG FP OB SP	CCTV NG
CCD optimized	Yes	.....	.....
Zoom range (mm)	6-70(11.5x)	8.5-150	8-16 9-126
Wide-Tele f/	1.7-2.3	1.4-4	1.6 1.6-1.9
MOD distance	13.7"	27.5"	10' 39.37"
MOD area (HxV)	43.6x32.7mm	53x40mm	.....
Wide-Tele H angle	73.3°-3.75°	55.5°-3.4°	8.38°-1.68° 57.62°-30-75°
Back focus (mm)	Manual adj	42.4	10.85mm 38.98mm
Aperture (F,B)	.....	133-33	26-9.4 76.5-24.8
Extender(s)	2x	2	No None
Macrofocus	Yes	.....	No Yes
Adjustment access	On surface	On surface	On surface
Operating wt	4.3 lbs	33 lbs	7.4 lbs 0.21 lbs
Reader Service No.	533	534	535 536 537

Television Zoom Lenses 1"

Manufacturer	Angenieux	Fujinon				
Model	40x14†	HR11x11SD†	R20x10.5ESM†	R34x29.5ESM†	R44x13.5ESM†	HR14x12.5ESt
Application	ST FP OB	HD	FP ST OB SP	FP ST OB SP	FP ST OB SP	HD
CCD optimized	Yes	No	No	No	No	No
Zoom range (mm)	14-560	11-121	10.5-210	29.5-1000	13.5-600	12.5-175
Wide-Tele f/	1.9-3	1.8-2.0	1.6-2.1	3.5-5.0	1.8-3.0	1.6-1.7
MOD distance	0"	3.9'	29.5"	18.7'	8.2'	4.6'
MOD area (HxV)	55x41.5mm1	1179x663mm	1168x876mm	2021x1516mm	2181x1636mm	1058.6x595.5mm
Wide-Tele H angle	49.75°-1.33°	64°-6°	62°-3°	24°-0°	50°-1°	58°-4°
Back focus (mm)	Adjustable	.....	.....	.....	.....	.....
Extender(s)	1.45x, 2.1x	.....	2x, 1.5x	2x	2x	2x
Macrofocus	to 0" MOD	No	No	No	No	No
Adjustment access	Remove cover	.....	Access holes	Access holes	Access holes	.....
Operating wt	43 lbs	18.7 lbs	45.1 lbs	45.1 lbs	55 lbs	45.1 lbs
Reader Service No.	538	539	540	541	542	543

Manufacturer	Fujinon				Schneider
Model	HR12x11SD†	HR22x18ESt	R17x12.5ESM†	HR6x12.5SD†	TV64†
Application	HD	HD	FP ST OB SP	HD	ST OB
CCD optimized	No	No	No	No	No
Zoom range (mm)	15-180	18-400	12.5-215	12.5-75	13-190
Wide-Tele f/	1.8-2.0	1.8-2.7	1.6-2.0	1.5	1.7-3.4
MOD distance	5.2'	18'	29.5"	3.9'	15.7"
MOD area (HxV)	982x589mm	3644x2050mm	987x174mm	1013x570mm	43.3x32.5
Wide-Tele H Angle	49°-4°	42°-2°	54°-3°	58°-10°	54°-4°
Back focus (mm)	.....	.....	.....	.....	71.6
Aperture (F,B)	.....	.....	.....	.....	134, 43
Extender(s)	.....	2x	2x, 1.5x	.....	2
Macrofocus	No	No	No	No	No
Adjustment access	.....	.....	Access holes	.....	Remove cover
Operating wt	16.5 lbs	57.2 lbs	42.9 lbs	15 lbs	41.8 lbs
Reader service no.	544	545	546	547	548

Television Zoom Lenses 1 1/4"

Manufacturer	Fujinon				Schneider
Model	P20x14ESM†	HP5x16SD†	P44x18ESM†	P17x16.5ESM†	TV65†
Application	FP ST OB SP	HD	FP ST OB SP	FP ST OB SP	ST OB
Zoom range (mm)	14-280	16-80	18-800	16.5-280	16.5-240
Wide-Tele f/	2.1-2.8	1.4	2.4-4.0	2.1-2.7	2.2-6.4
MOD distance	29.5"	47.2"	98.4"	29.5"	15.7"
MOD area (HxV)	1171x878mm	1055x594mm	2181x1636mm	1000x750mm	45.3x34
Wide-Tele H Angle	62°-3°	60°-13°	50°-1°	54°-3°	54°-4.2°
Back focus (mm)	.....	.....	.....	.....	71.5
Aperture (F,B)	.....	.....	.....	.....	134, 37.5
Extender(s)	2x, 1.5x	2x, 1.5x	2x, 1.5x	2x, 1.5x	2
Adjustment access	Access holes	.....	Access holes	Access holes	Remove cover
Operating wt	45.1 lbs	31.9 lbs	55 lbs	42.9 lbs	41.8 lbs
Reader Service No.	549	550	551	552	553

Video Monitors

These color monitor units include video as well as computer graphics display models, in addition to some receiver/monitor systems. Models providing for S-VHS inputs, either standard or optional, are noted with a dagger (†). CRT types are abbreviated as follows: **ILD** in-line dot; **ILS** in-line slot; **TRIN** Trinitron; **DGDD** Delta-Gun/Delta-Dot; **BF** beam feedback circuitry; **PIL** precision in-line. NTSC, PAL and SECAM are abbreviated as **N**, **P** and **S**, respectively.

Manufacturer	ASACA/ShibaSoku						
Model	CM95A1 (93A1)† ¹	CM99A	CM65B6	CMM 11 series†	CMM 7 series	CM 23/43†	
Application	Grade 1	Grade 2	.....	Grade 1	Grade 2	Grade 2	
CRT diagonal	14" (20")	9"	26"	20" (14")	20" (14", 26")	21" (15")	
CRT type	ILD/BF	ILD	DG/DD	DG/DD	ILD	ILD	
Dot, stripe pitch	0.31mm (0.44)	0.3mm	0.37mm	0.44mm	0.44mm	0.42mm	
Aperture correction	Yes	Yes	.....	Yes	Yes	Yes	
X-Y display output	No	No	No	Opt	Opt	No	

JTSC test matrix	Yes	No	No	Yes	No	No
Blue gun only test	Yes	No	No	No	No	No
Over/underscan	Yes	Yes	Yes	Yes	Yes	Yes
Crosspulse display	Yes	Yes	Yes	Yes	Yes	Yes
# composite inputs	3	2	4 component	3	2	3
RGB inputs	Yes	Yes	Yes	Opt	Opt	Yes
Y/R-Y/B-Y inputs	Yes	No	No	Opt	No	No
Audio amp/speaker	No	Yes	No	No	No	No
Resolution at center	600 TVL	400 TVL	1000TVL	600TVL	600 TVL	550TVL
Luminance bandwidth	7 MHz	7MHz	±3dB 30MHz	7MHz	6MHz	7MHz
Chrominance bandwidth	-2dB 1.3MHz I	0.5MHz	±3dB 30MHz	1.3MHz I channel	1.3 MHz	0.5MHz
Demod axes	I/Q	R-Y/B-Y	N.A.	I/Q	R-Y/B-Y	R-Y/B-Y
Standards	NTSC, PAL	NTSC, PAL	HDTV 1125/1050/525	N/P/S	N/P/S	NTSC, PAL
Decoder	.....	Comb filter, notch	.....	Comb filter, notch	Comb filter, notch	Comb filter, Notch
Reader Service No.	679	680	681	682	683	684

¹ Auto setup module option available.

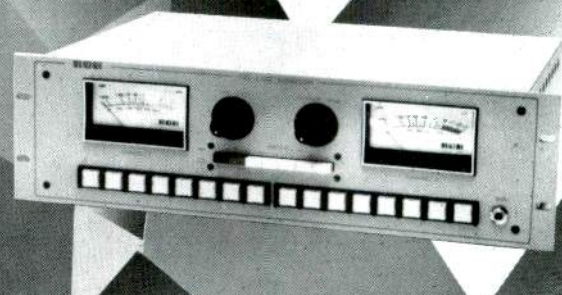
Manufacturer	Barco						BTS
Model	CVS 51/1H/Q	CVS 51/FS† (37/FS)	CVS 37(51)/1H/ASP/Q	CM 22/HR/NTSC	HDM 5153	LDH6200 (LDK7020)	
Application	Grade 1	Grade 1	Grade 1	Grade 1	HDTV	Grade 1, 2	
CRT diagonal	14", 20"	14", 20"	14", 20"	14"	90mm	14", 20" (20")	
CRT type	ILD/BF	ILS/BF	ILD/BF	ILD/BF	ILD	ILD	
Dot, stripe pitch	0.31mm	0.75mm	0.31mm	0.3mm	0.26mm	0.65mm (0.4)	
Aperture correction	Yes	Yes	Yes	No	No	Yes	
X-Y display output	No	No	No	No	No	No	
NTSC test matrix	No	No	No	No	No	No	
Blue gun only test	Yes	Yes	Yes	Yes	Yes	Yes	
Over/underscan	Yes	Yes	Yes	Yes	No	Yes	
Crosspulse display	Yes	Yes	Yes	Yes	Yes	Yes	
# composite inputs	2 ²	3	2 ²	2	0	3	
RGB inputs	Yes	Opt ³	Yes	Yes	Yes	Yes	
Y/R-Y/B-Y inputs	Opt	Opt	Opt	No	No	No	
Audio amp/speaker	Opt	Opt	Opt	Yes	No	No	
Resolution at center	900 TVL	500 TVL	680 TVL	450 TVL	1000 TVL	>310 (>650)	
Luminance bandwidth	±0.5dB 6MHz	6MHz	±0.5dB 6MHz	6MHz	30MHz	5MHz	
Chrominance bandwidth	0.6MHz	0.6MHz	0.6MHz	0.6MHz	.....	0.9MHz
Demod axes	R-Y/B-Y	R-Y/B-Y	R-Y/B-Y	R-Y/B-Y	.....	R-Y/B-Y
Standards	N/P/S ²	NTSC, PAL	N/P/S ²	NTSC or PAL	Any HDTV	N/P/S	
Decoder	Comb filter, notch	Comb filter, notch	Comb filter, notch	Comb filter, notch	.....	Comb filter
Reader Service No.	685	686	687	688	689	690	

² Upgrade options with input extension boards for 17 inputs, including NTSC-4.43, PAL-M/N.

³ All options available on one board.

Manufacturer	Conrac	Ikegami Electronics				
Model	6545†	Series 9	Series 19 (Ser. 9)	Series 16†	Series 15	Series 10
Application	Grade 1	Gr I	Grade 1	Gr II	Gr I	Gr I
CRT diagonal	19" (13")	9", 14", 20"	14", 19" (& 9")	14" 19"	14", 19"	10, 14, 19

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Circle (94) on Reply Card

CRT type	ILD/BF	ILD	ILD/BF	ILS	ILD/BF	DGDD/BF
Dot, stripe pitch	0.43mm (0.31mm)	0.31, 0.43	0.31, 0.43	0.39, 0.47	0.31, 0.43	0.31, 0.43
Aperture correction	Yes	Yes	Yes	Yes	Yes	Yes
X-Y display output	Opt	Yes	Yes	No	Yes	Yes
NTSC test matrix	Yes	Yes	Yes	No	Yes	Yes
Blue gun only test	No	Yes	No (Yes)	No	No	Yes
Over/underscan	Yes	Yes	Yes	Yes	Yes	Yes
Crosspulse display	Yes	Yes	Yes	Yes	Yes	Yes
# composite inputs	3	3	3	2	3	3
RGB inputs	Yes	Opt	Opt	Yes	Yes	Opt
Y/R-Y/B-Y inputs	Opt	Opt	Opt	No	Opt	Opt
Audio amp/speaker	No	No	No	No	No	No
Resolution at center	800 TVL RGB	700 TVL	700 TVL	500 TVL	700 TVL	800 TVL
Luminance bandwidth	13MHz	8MHz	8 MHz	6MHz	8MHz	8 MHz
Chrominance bandwidth	2MHz	1.3MHz	1.3 MHz	1.3MHz	8MHz	1.3MHz
Demod axes	R-Y/B-Y	R-Y/B-Y	R-Y, B-Y	R-Y, B-Y	R-Y, B-Y	I/Q
Standards	NTSC, PAL	NTSC	NTSC	NTSC	NTSC	NTSC
Decoder	Comb filter or notch	CF/Notch	CF Notch	CF, Notch	CF, Notch	CF, Notch
Reader Service No.	691	692	693	694	695	696

Manufacturer	Ikegami Electronics		JVC Professional Products			
Model	PM 14-3 (9-5A)	TM-R9U (-91SU)⁴	GD-H3220USL	TM-R14U (-1400SU)⁵	TM-2000SU[†]	VM-R1450SU[†]
Application		Monitor/receiver	Graphics	Monitor/receiver	Monitor/receiver	Grade 2
CRT diagonal	14 and (9)	9"	19"	14"	20" (14", 9")	14" (19")
CRT type		ILD		ILD	ILD	ILD
Dot, stripe pitch		0.47mm	0.31	0.43mm (0.499)	0.62mm	0.43mm
Aperture correction	No	No	No	Yes (No)	Yes	Yes
X-Y display output	No	No	No	No	No	No
NTSC test matrix	No	No	No	No	No	No
Blue gun only test	No	-R9U	No	Yes	No	Yes
Over/underscan	Yes	-R9U	Yes	Yes	No	Yes
Crosspulse display	Yes	-R9U	No	No (Yes)	No	Yes
# composite inputs	2	2 (1)	None	2	2	2
RGB inputs	No	No	Yes	No	No	Yes
Y/R-Y/B-Y inputs	No	No	No	No	No	No
VCR 8-pin input	No	No (Yes)	No	No (Yes)	Yes	Yes
Audio amp/speaker	No	Yes	No	Yes	Yes	No
Resolution at center	800 TVL	310 (300)		400	500 TVL	500 TVL (600)
Luminance bandwidth	10MHz	5MHz (. . . .)	30MHz			
Chrominance bandwidth		0.5MHz	30MHz			
Demod axes		R-Y/B-Y		(R-Y/B-Y)	R-Y/B-Y	R-Y/B-Y
Standards		NTSC		NTSC	NTSC	NTSC
Decoder	NTSC	Comb filter		Notch (Comb)	Comb filter	Comb filter
Reader Service No.	697	698	699	700	701	702

⁴ TM-22U & TM-63U are similar with 5" diagonal CRTs. ⁵ TM-13U 13" Monitor/receiver.

Manufacturer	Melford Electronics	Mitsubishi Electric	Panasonic			
Model	DU5-20C (-16C)[†]	DU6-20 (DU6 range)[†]	AM-3501R[†]	CT2081Y/VY[†] 7	CT 1331Y[†]	CT 1030M (1400)
Application	Gr I	Gr II	Graphics, Mon/Rcvr	Utility	Utility	Utility (data)
CRT diagonal	20" (16)	20" (9/12/14/16) ⁸	35"	20 (25, 13)	13, 20, 25	10, 13 (14)
CRT type	ILD/BF	ILD/BF	ILD	ILS flat screen		ILD
Dot, stripe pitch	0.41mm (0.31)	0.41, 0.31mm	1.0mm center			
Aperture correction	No	No		Yes		Yes
X-Y display output	No	No			No	No
NTSC test matrix	No	No			No	Yes
Blue gun only test	Yes	Yes			No	No
Over/underscan	Yes	Yes	Yes	Yes	Yes	No
Crosspulse display	Opt	Opt			No	No
# composite inputs	2	2	3	Yes	A/B	A/B
RGB inputs	Yes	Opt	Yes	No	No	No (Yes)
Y/R-Y/B-Y inputs	Opt	Opt	Yes	No	No	
VCR 8-pin input	Opt	Opt	Yes	Yes	Yes	Yes
Audio amp/speaker	No	No	Yes	VY mon/receiver		Yes
Resolution at center	850 TVL	800 TVL	600 TVL	450 lines	Medium resolution	300TVL (580)
Luminance bandwidth	10MHz	8MHz		4.2MHz	3.9MHz	4.2MHz
Chrominance bandwidth	2.6MHz	2.7MHz		1.5MHz	1.5MHz	1.2MHz
Demod axes	R-Y/B-Y	R-Y, B-Y		S-video	R-Y/B-Y	R-Y/B-Y
Standards	NTSC/PAL	PAL	NTSC	NTSC, S-VHS	NTSC, S-VHS	NTSC (RGB/TTL)
Decoder	Notch	Notch		Notch, comb fltr		Notch, comb
Reader Service No.	703	704	705	706	707	708

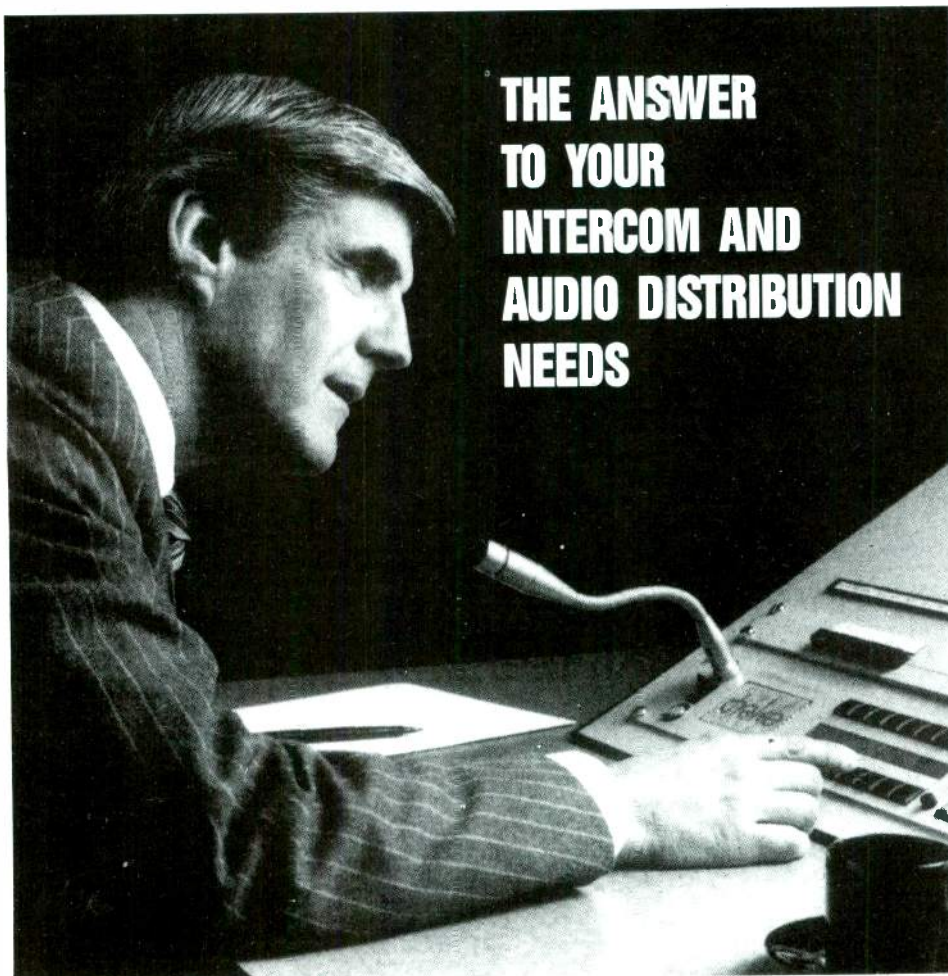
⁸ 22", 24" diagonal CRTs available with in-line slot masks. ⁷ Series includes CT-2580 25"; CT-1381Y, 1381VY 13" models.

Manufacturer	Panasonic	PESA	Philips Test & Measuring/BTC	Sony		
Model	BT-M1030Y (-D1910Y)	AT-H1900 (-H1300)⁸	BM-4300 series	PM 5625	PVM-1342Q (-440)⁹	HDM-1220 (-1820)
Application	Utility	HR	Grade 2	Grade 2	Grade II, graphics	Grade 1
CRT diagonal	13 (19)	13 (19)	9", 14", 20"	14"	13" (19")	12" (18") ¹⁰
CRT type	ILD	ILD	PIL 90° blackstripe	In-line	TRIN/BF	TRIN/BF
Dot, stripe pitch	0.39mm (0.55)	0.31mm (0.44)	0.31, 0.44mm	0.65mm	0.25mm	0.26 (0.31)
Aperture correction	Yes	Yes		Yes	Yes	Yes
X-Y display output	No	No	No	No	No	No
NTSC test matrix	No	Yes	No	No	No	No
Blue gun only test	Yes		No	Yes	Yes	No
Over/underscan	±5%	Yes	Yes	Yes	Yes	Yes
Crosspulse display	Yes	Yes	Yes	Yes	Yes	Yes
# composite inputs	A/B		A B sync	2	2	
RGB inputs	Y/C, YCC opt	Yes	No	Yes	Yes	2 sets
Y/R-Y/B-Y inputs	Yes	Yes	No	No	No (Yes)	YPP
VCR 8-pin input	Yes	No	No	No	Yes	No
Audio amp/speaker			No	No	Yes	No
Resolution at center	550TVL		>450, >600	Equiv of 0.65mm	600 TVL	600 (760)
Luminance bandwidth	4.2MHz	4.2MHz	±0.5dB 5MHz	5MHz	8MHz	30MHz
Chrominance bandwidth	1.5MHz	1.5MHz		to Fsc	2MHz	30MHz
Demod axes	R-Y/B-Y	R-Y/B-Y		R-Y, B-Y	I/Q 90°	
Standards	NTSC	NTSC, M-II	NTSC, PAL	NTSC/PAL SECAM opt	N P S	HDTV1126/60
Decoder	Notch, comb fltr	Notch, comb fltr		Notch filter	Comb-filter	
Reader Service No.	709	710	711	712	713	714

⁸ Auto setup kit available with multiple white balance memories. ⁹ PVM-1942Q and -1944Q are 19" versions with and without Y/R-Y/B-Y inputs. ¹⁰ Also 28" and 38" sizes.

		Sony Communications Products					
Manufacturer		HDM-2830 (-3830)	PVM-4300†	PVM-5310	PVM-1340 (-1341)†	PVM-8221	BVM-1310 (1410P)
Model		HDM-2830 (-3830)	PVM-4300†	PVM-5310	PVM-1340 (-1341)†	PVM-8221	BVM-1310 (1410P)
Application		Grade I	Grade II	Grade I'	Grade II, graphics	Grade II	Grade I, graphics
CRT diagonal		28" (39")	43"	5"×3	13"	8"	13"
CRT type		TRIN/BF	TRIN/BF	TRIN	TRIN/BF	TRIN	TRIN/BF
Aperture correction		Yes	Yes	No	Yes	No	Yes
Dot, stripe pitch		0.35 (0.46)	...	...	0.37mm	0.25mm	0.25mm
X-Y display output		No	...	No	No	No	Yes
NTSC test matrix		No	...	No	No	No	Yes
Blue gun only test		No	...	No	Yes	Yes	Yes
Over/underscan		Yes	...	No	Yes (No)	Yes	Yes
Crosspulse display		Yes	...	No	Yes (No)	Yes	Yes
# composite inputs		...	3	13	2	2	2
RGB inputs		2 sets	Yes	No	Yes	No	Yes
Y/R-Y/B-Y inputs		YPP	No	No	No	No	Yes
VCR 8-pin input		No	Yes	No	Yes	No	No
Audio amp/speaker		No	Yes	No	Yes	No	No
Resolution at center		1000 TVL	560H/450V	220TVL	450 TVL	400TVL	> 700 TVL
Luminance bandwidth		30MHz	...	...	8MHz	5.5MHz	±1dB to 8MHz
Chrominance bandwidth		30MHz	...	...	...	...	1.5MHz
Demod axes		...	...	R-Y/B0Y	I/Q 90°	I/Q	R-Y/B-Y
Standards		HDTV 1125/60	NTSC	NTSC	N P S	NTSC	N/P/S
Decoder		...	Comb-filter	...	Comb-filter	Comb filter	CF/1-CF/3-CF/notch
Reader Service No.		715	716	717	718	719	720

		Sony Communications Products				Videotek	
Manufacturer		BVM-8021 (9021P)	BVM-1920 (2010P)	BVM-1315 (1415P)	BVM-1912	Studio 13	RM-8
Model		BVM-8021 (9021P)	BVM-1920 (2010P)	BVM-1315 (1415P)	BVM-1912	Studio 13	RM-8
Application		Grade I, graphics	Grade I, graphics	Grade I, graphics	Grade I, graphics	Grade 1	Mon/Rcvr
CRT diagonal		8" (13", 19")	19" (8", 13")	13"	19" (8", 13")	13"	8" (13/19/21/27)
CRT type		TRIN/BF	TRIN/BF	TRIN/BF	TRIN/BF	TRIN	TRIN
Dot, stripe pitch		0.25mm	0.30mm	0.25mm	0.30mm	0.25mm	...
Aperture correction		Yes	Yes	Yes	Yes	No	No
X-Y display output		No	Yes	No	Yes	No	No
NTSC test matrix		No	No	Yes	Yes	No	No
Blue gun only test		Yes	Yes	Yes	Yes	Yes	Yes
Over/underscan		Yes	Yes	Yes	Yes	Yes	Opt
Crosspulse display		Yes	Yes	Yes	Yes	Yes	Opt
# composite inputs		2	2	2	2	3	2
RGB inputs		No	Yes	Yes	Yes	No	No
Y/R-Y/B-Y inputs		No	Yes	Yes	Yes	No	No
VCR 8-pin input		Yes	No	No	No	No	Yes
Audio amp/speaker		No	No	No	No	No	Yes
Resolution at center		400 TVL	900 TVL	>600 TVL	900 TVL	380TVL	260TVL
Luminance bandwidth		7MHz	10MHz	8MHz	10MHz	3.2MHz	3MHz
Chrominance bandwidth		1.5MHz	1.5MHz	1.5MHz	1.5MHz	...	1MHz
Demod axes		R-Y/B-Y	R-Y/3-Y	R-Y/B-Y	R-Y/B-Y	R-Y/B-Y	R-Y/B-Y



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Standards	NTSC	N/P/S	N/P/S	N/P/S	NTSC	NTSC
Decoder		CF/1-CF/3-CF/notch	CF/1-CF/3-CF/notch	CF/1-CF/3-CF/notch	Comb filter, Notch	Notch
Reader Service No.	721	722	723	724	725	726

Manufacturer	Videotek			Vistek Electronics ¹¹
Model	AVM-13SC†	VM-13 PRO	AVM-19S	GM7100 (7200, 7300)
Application	Grade 2	Grade II	Grade 2	Grade 1 (2, 3)
CRT diagonal	13"	13"	10"	14, 20 (6.5 10) ¹²
CRT type	ILS	TRIN	ILS	ILD
Dot, stripe pitch	0.25mm	0.25mm	0.25mm	0.39/0.44 (0.3, 0.28)
Aperture correction	No	No	No	No
X-Y display output	No	No	No	No
NTSC test matrix	No	No	No	No
Blue gun only test	Yes	Yes	Yes	No
Over/underscan	Yes	Yes	Yes	Yes
Crosspulse display	Yes	Yes	Yes	No (Yes)
# composite inputs	3	3	3	A/B
RGB inputs	No	No	No	Yes
S-VHS inputs	Yes	No	No	No
Y/R-Y/B-Y inputs	No	No	No	Yes
VCR 8-pin input	Yes	No	Yes	No
Audio amp/speaker	Yes	No	Yes	No
Resolution at center	400TVL	260TVL	380 TVL	>580/600(300/440)
Luminance bandwidth	4.2MHz	3.2MHz	3MHz	±0.5dB 6MHz (±3dB)
Chrominance bandwidth	1MHz	1.5MHz	1MHz	1.3MHz
Demod axes	R-Y/B-Y	R-Y/B-Y	R-Y/B-Y	Per NTSC, PAL
Standards	NTSC	NTSC	NTSC	PAL, NTSC
Decoder	Comb filter	Notch	Comb filter, notch	Notch filter
Reader Service No.	727	728	729	730

¹¹ Represented in US by Merlin Engineering. ¹² 7200 available for NTSC-3.58/4.43, PAL or SECAM; 7300 uses in-line slot 15", 21", 25", 28" CRTs. 4MHz bw, 6MHz for RGB; NTSC, PAL SECAM.

Digital Video Effects Systems

Manufacturer	Abekas Video Systems		ALTA Group	Ampex Corporation		CEL Electronics Grunder Assoc P164 series
Model	A52	A53-D	Pictoris	ADD 100	ADD 2000	
# inputs channels	1 basic 2 exp	1 basic 2 exp	1 basic	2 basic 4 exp	2 basic 8 exp	4 basic 8 exp
# output channels	1 basic 2 exp	1 basic 2 exp	1 basic	1 basic 2 exp ⁴	1 basic 4 exp ⁴	1 basic 2 ext
# image planes	.....	.....	2 fore & background	.....	.....	2
Control system	Prop CPU/Ctl Pnl	Prop CPU/Ctl Pnl	CtlPnl	Prop. CPU, Ctl Pnl	Prop. CPU, Ctl Pnl	Proprietary/CtlPnl
Instruction memory form	RAM EPROM DataKey	RAM EPROM DataKey	Floppy disk	FD for effects	FD	FD
Parameter display	On Ctl Pnl	On Ctl Pnl	.....	Real Numbers	Real Numbers	LCD/TouchScreen
Y/C, S-VHS in/output	No	No	I/O	Analog I/O	Analog I/O	I/O Std
Component in/output	No	I/O	.....	I/O C /C	I/O C /C	I/O Std
Digital in/output	I/O Composite	I/O Composite ¹	.....	.....	.....	I/O Opt
Dub in/output	No	No	No	No	No	Input Std
Still store functions	No	No	No	No	No	Option
TBC functions	No	No	No	No	No	Yes
Remote protocol	RS-232/422/GPI	RS-232/422/GPI ²	GPI	GPI LAN	RS-422 GPI ESBUS	GPI
System S/N ratio	52dB	52dB	55dB	.....	.....	56dB
Diff phase, gain	2°, 2%	2°, 2%	2°, 2%	.....	.....	2°, 2%
Sample rates, bits	14.3MHz, 8-bit	14.3MHz 8-bit ³	13.5MHz 8-bit	.....	13.5MHz 8-bit	13.5MHz 8-bit
Image size variation	0x min, 99x max	0x min, 99x max	Any size ratio	.....	.....	0x-8x
Image compression ratio	.....	.....	Infinite	Zero	Zero	.....
Image expansion ratio	.....	.....	None	Zero	Zero	.....
Rotation around axes	X Y	X Y Z	None	X Y Z	X Y Z	X Y
Image freeze	Yes	Yes	Yes	Yes	Yes	Yes
Strobe	Yes	Yes	No	.....	.....	Yes
Iterative effects	Yes	No	No	.....	Option	Yes
Perspective effects	No	Yes	No	.....	Option	Option
Curvilinear effects	No	Yes	No	Option	Yes	Yes
Picture splits	H V	H V Opt	Option	.....	Yes	Yes
Mirror effects	No	No	No	.....	.....	H
Push on off	N V Diagonal	H V Opt	Option	Y V	H V	H V
Solarize	Yes	Yes	H V Diag	H V	H V Option	H V Diag
Posterize	Yes	Yes	No	Yes	Yes	Yes
Mosaic tiling	Yes	No	Yes	Yes	Yes	Yes
Programmed sequences	Yes	Yes	Yes	Yes	Yes	Yes
Reader Service No.	1040	1041	1042	1043	1044	1045

¹ Also available for digital components. ² Serial from various editing controllers. ³ Also 13.5MHz sampling clock. ⁴ Key channel standard.

Manufacturer	Digital FX	DSC/Digital Services Corporation			Fougerolle Video	GML/GML Grove
Model	DFX 200	Illusion	Eclipse 5500C	Paragon	MPV 4000	System DVP
# inputs channels	2 basic	1 basic	1 basic	1 basic 4 exp	1 basic 4 exp	1 exp to 2
# output channels	1 basic	1 basic	1 basic	1 basic 4 exp	1 basic 4 exp	1 exp to 2
# image planes	1	1	1	1	Multiplane	1
Control system	Prop CPU/Ctl Pnl	Prop CPU Ctl/Pan	Prop CPU/CtlPnl	Prop CPU CtlPnl	Proprietary	Dedicated
Instruction memory form	HD FD RHD	PROM	Floppy disk	Floppy disk	FD option	Non volatile
Parameter display	HR 1024x800	7-seg LED	CRT	CRT	Fluorescent panel	Lighted keys
Y/C, S-VHS in/output	No	.....	.....	.....	PAL or SECAM	No
Component in/output	I/O	.....	.....	.....	RGB R-Y/B-Y	No
Digital in/output	I/O component	.....	I/O	I/O Component	D-1 interface	No
Dub in/output	No	.....	.....	.....	No	No
Still store functions	Yes	No	No	No	No	No
TBC functions	Yes	No	No	No	& synchronizer	Dual frame store
Remote protocol	RS-422 GPI LAN	GPI	GPI	RS-422 GPI	RS-422, GPI	GPI, RS-232/422
System S/N ratio	.....	52dB	52dB	52dB	.....	58dB
Diff phase, gain	.....	2°, 2%	2°, 2%	2°, 2%	.....	2°, 2%
Sample rates, bits	13.5MHz 32-bit	14.3MHz 8-bit	14.3MHz, 8-bit	14.3MHz 8-bit	13.5MHz 8-bit	8-bit
Image size variation	Unlimited	.....	.....	.....	.....	.....
Image compression ratio	Unlimited	.....	.....	.....	1 to infinite	.....
Image expansion ratio	Unlimited	.....	.....	.....	.....	.....
Rotation around axes	X Y Z	X Y Z	X Y Z	X Y Z	X Y Options	.....
Image freeze	Yes	Yes	Yes	Yes	Yes	Yes
Strobe	Yes	Yes	Yes	Yes	Yes	Yes
Iterative effects	No	No	No	Opt	Yes	Yes

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Circle (97) on Reply Card

Perspective effects	Yes	Yes	Yes	Yes	Yes	Yes
Curvilinear effects	Yes	No	Yes	Yes	Yes	Yes
Picture splits	No	H V	H V	H V	H V	H V
Mirror effects	No	H V	H V	H V	H V	H V
Push on off	No	.....	.....	.....	.....	.....
Solarize	No	No	No	.....	Yes	H V
Posterize	No	Yes	Yes	.....	Yes	Yes
Mosaic tiling	No	Yes	Yes	Yes	Yes	Yes
Programmed sequences	No	Yes	Yes	Yes	Yes	Yes
Reader Service No.	1046	1047	1048	1049	1050	1051

Manufacturer Model	Grass Valley Group					
	GML/GML Grove X-Calibre (II)	Kaleidoscope DP	DPM-100	Genesis Act 3	Microtime RP-1 3D	NEC America DVE System 10
# inputs channels	1 exp to 2	1 base, 5 exp	1 base, 2 exp	1 basic 2 exp	1 basic 2 exp	2 basic 4 exp
# output channels	1 exp to 2	1 base, 4 exp	1 base, 1 exp	1 basic 2 exp	1 basic 2 exp	1 basic 1 exp
# image planes	1	5	.....	2	2	1
Control system	Dedicated, soft keys	Prop CPU/ctl pnl	Prop CPU/ctl pnl	Prop CPU Ctl Pnl	Prop CPU Ctl Pnl	Prop CPU/CtlPnl
Instruction memory form	ROM, FD opt	FD	FD	EAROM	FD	FD
Parameter display	Ctl pnl	Fluorescent/CRT opt	Y 2x40-character	Vacuum fluorescent	CRT	B/W monitor
YC, S-VHS in/output	.....	I O	I O	I/O	I/O	I/O
Component in/output	YUV/YIQ/RGB	I O C C	I O C C	.....	I/O component	I/O/composite
Digital in/output	.....	N	N	.....	.....	.....
Dub in/output	.....	N	Option	No	.....	.....
Still store functions	No	N	N	No	No	No
TBC functions	Dual frame sync	N	N	No	No	No
Remote protocol	GPI, RS-232/422	RS-422, GPI	RS-232/422/GPI ⁵	GPI	RS-232/422/GPI	GPI
System S N ratio	58dB	.....	55dB	58dB	58dB	> 50dB
Diff phase, gain	2°, 2%	< 0.25°, 0.25%	2°, 2%	3°, 3%	2°, 2%	2°, 2%
Sample rates, bits	8-bit	13.5MHz, 8-bit	13.5/14.3 8-bit	8MHz 8-bit	13.5MHz 8-bit	14.3MHz 8-bit
Image size variation	1/2 & infinite	0x min, 999x max	0x min, 100x max	.....	.....	.....
Image compression ratio	1/2 & infinite	0:1	infinite	Infinite:1	Infinite:1	Infinite
Image expansion ratio	1/2 & infinite	1:infinite	1:100	2:1	Infinite:1	.....
Rotation around axes	X Y Z	X Y Z	X Y Z	X Y Z	X Y Z	X Y Z
Image freeze	Yes	Yes	Yes	Yes	Yes	Yes
Strobe	Yes	Yes	Opt	Yes	Yes	Yes
Iterative effects	Yes	Yes	Opt	No	Option	No
Perspective effects	Yes	Yes	No	Yes	Yes	Yes
Curvilinear effects	Yes	Yes	No	Yes	Yes	Yes
Picture splits	H V	NV	HV	H V	H V	.....
Mirror effects	Y V	H V	H V	H V	H V	.....
Push on off	H V	NVD	HV	H V diagonal	H V diagonal	.....
Solarize	Yes	Yes	Yes	Yes	Yes	.....
Posterize	Yes	Yes	Yes	Yes	Yes	Yes
Mosaic tiling	Yes	Yes	Yes	Yes	Yes	Yes
Programmed sequences	Yes	Yes	Yes	Yes	Yes	Yes
Reader Service No.	1052	1053	1054	1055	1056	1057

⁵ ESbus, Model 100/200 interface.

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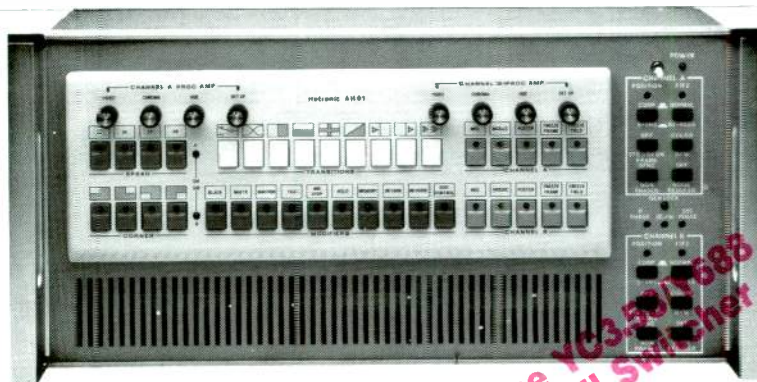
Manufacturer	NEC America	Pinnacle Systems	Quantel	Sony	
Model	DVE System 100	PRIZM	2100 Series	DVE5800 Encore	DME 450 ⁶
# inputs channels	2 basic 4 exp	1 basic	1 basic	1 basic	1 basic
# output channels	1 basic 1 exp	1 basic	1 basic	1, expandable	1 basic
# image planes	1	3	2	1, expand to 15	1
Control system	Prop CPU Ctl/Pnl	PC compatible	IBM/AT-based	Dedicated, softkeys	PropCPU Ctl pnl
Instruction memory form	FD	FD/HD	FD (HO in 2010)	FD, HD, RAM	ROM >280 effects
Parameter display	None	Menu driven	Menu driven	External CRT	LED of effect #
Y/C, S-VHS in/output	.....	No	.....	No	No
Component in/output	.....	I/O	In/Dut	I/O	I/O
Digital in/output	.....	No	No	I/O	No
Dub in/output	.....	No	No	No	No
Still store functions	No	Option	Yes (in 2010)	.....	N
TBC functions	No	No	No	No	Integral
Remote protocol	GPI	RS-232/422/GPI/Ebus	RS-232/422/GPI/ESbus	RS-422	52dB ⁶
System S/N ratio	50dB	58dB	58dB	.....	<3 ⁶
Diff phase, gain	2°, 2%	2°, 2%	2°/2%	.....	8-bit 455H sampling
Sample rates, bits	14.3MHz 8-bit	10MHz 8-bit	10MHz 8-bit	13.5MHz	.....
Image size variation	.....	0x-Infinity	0x-8x	Continuous	.....
Image compression ratio	.....	Infinite	Aspect ratio adj	Infinite	.....
Image expansion ratio	.....	Infinite	8:1	Infinite	.....
Rotation around axes	X Y	X Y Z	X Y	X Y Z	X Y Z
Image freeze	Yes	Yes	Yes	Field, frame	Yes
Strobe	No	Yes	Yes	.....	No
Iterative effects	No	Yes	Yes	Yes	No
Perspective effects	No	Option	Option	Float viewpoint	Yes
Curvilinear effects	No	Yes	Option	Yes	No
Picture splits	H V	H/V	H/V	H/V/diagonals	HV
Mirror effects	.....	H V	H V	No	H V
Push on off	H V Diag	No	No	Yes	HV
Solarize	Yes	Yes	No	.....	.....
Posterize	Yes	Yes	Yes	.....	Yes
Mosaic tiling	Yes	Yes	Yes	.....	Yes
Programmed sequences	Yes	Yes	Yes	Yes	No
Reader Service No.	1058	1059	1060	1061	1063

⁶ Foreground path at full size; 3-input switcher w/title key, dual matte generators, BVS-3000 and editor interface.

Editing Controllers

These editing control products include video and audio editing equipment. Some include videodisc equipment as an input. Abbreviations describing equipment interfaces includes: **AFM** audio mixer; **VDX** video switcher; **STL** still store; **EFX** digital video effects; **MATR** multitrack audiotape; **CG** character generator/titler; **SER** serial interface; **PAR** parallel interface; **TLC** telecine. **FD** refers to floppy disk, **PT** is paper tape; **PC** is personal computer.

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Manufacturer	Abekas Video	Ampex	Amтел Systems	BHP Inc	BTS	Cinedco
Model	A34 Solo ¹	ACE 25	E-Pix	TouchVision 8909N	BBE-900 ⁵	Ediflex, Cinedflex
Suggested for	On-line	On, Off-line	Off-line	Off-line	On-/off-line	Off-line
Editing type	Linear	Linear	Non-linear	Non-linear	.....	Non-linear
Transports controlled R/P	2-R, 4-P	1R, 3P	8 R, 8 P	.....	1R, 3P	1-R, 12-P
Videodisc interface	No	No	Yes	No	No	No
Control μ P type	Centralized	80286 PC	Distributed	Distributed, PC	Centralized 8-bit	Distributed
# events (internal storage)	512	1000	2000	1600	128	> 1000
External event storage	FD	FD dual 3.5"	Floppy disk	Floppy disk	None	Floppy disk
Edit decision list	Yes	Yes	Yes	Yes	Yes	Yes
Edit data display	CRT	CRT	CRT	CRT	CRT	CRT
Printer interface	3.5" disk on PC	RS-232 ser/par	Centronics parallel	Centronics	None	Centronics
Command entry via	Keyboard	Keyboard	Keyboard	KB, Touch screen	Keyboard	Light pen
Deck motion control via	KB, Joystick ²	Keyboard, Knob	Joystick	Shuttle Knob	Keyboard, knob	Light pen
Assemble edit	Yes	Yes	Yes	Yes	Yes	Yes
Insert edit	Yes	Yes	Yes	Yes	Yes	Yes
Split A/V edits	Yes	Yes	Yes	Yes	Yes	Yes
A/B sync roll	Yes	Yes	Yes	Yes	Yes	Yes
Animation mode	No	No	Yes	No	.....	Yes
Integral TC reader	No	No	No	Yes	Yes	Yes
Integral TC generator	No	No	No	Yes	No	Yes
Time reference support for	LTC VITC Ctl-Trk	LTC VITC Ctl-Trk	LTC VITC	VITC Ctl-Trk	LTC VITC Ctl-Trk Sync	LTC
Color framing	Yes	Yes	Yes	Yes	NTSC, PAL	No
Editing accuracy	1 TC \pm 2 CtlTrk ³	0 TC, \pm 0-1 Ctl-Trk	\pm 0 TC	\pm 0 TC	\pm 0 TC, \pm 2 CTL	\pm 0 TC
Interfaces available	AFM, VDX, EFX	AFM, VDX, MATR Ser, Par ⁴	AFM, VDX, GPI MATR, CG	VDX	AFM, VDX GPI equipment	AFM, VDX
Control protocol	RS-422, GPI	RS-232, RS-422, GPI	RS-232/422/GPI	RS-422	RS-422, ESub, GPI	ProBus
Reader Service No.	901	902	903	904	905	906

¹ An integrated system which combines editing control with 8-input A/V switcher, 2-D digital effects, 3 TBCs, flying bus, luma and DSK keying. ² Or thumbwheel control. ³ Accuracy dependent upon VTRs in use. ⁴ ACE-MIF, Digital effects systems on GPI. ⁵ BBE-600 is a scaled down version with fewer VTRs and reduced effects type control.

Manufacturer	Cipher Digital	CMX
Model	CDI-5000 Softouch II	DCI-4790 Softouch ⁶
Suggested for	On-line	On-line
Editing type	Linear	Linear
Transports controlled R/P	4-R, 4-P	4-R, 4-P
Videodisc interface	No	No
Control μ P type	Multiple	Distributed
# events (internal storage)	16	4
External event storage	3.5" FD	Removable RAM-Pac
Edit decision list	Multi per 3.5" FD	No
Edit data display	CRT	LED
Printer interface	RS-232, parallel	.....
Command entry via	Keyboard	Keyboard
Deck motion control via	Keyboard	Keyboard
Assemble edit	.....	.....
Insert edit	[Audio editing	.....
Split A/V edits	[stores user setup	.....
A/B sync roll	[w/edit list	.....
Animation mode	[interface to four	.....
Integral TC reader	[Shadow II and	.....
Integral TC generator	[CDI-750 G/R.	.....
Time reference support for	LTC	LTC
Color framing	.....	LTC/VITC/Film
Editing accuracy	0.01 frame w/TC	0.01 frame w/TC
Interfaces available	.....	VTR
Control protocol	RS-232, GPI	RS-232/GPI
Reader Service No.	907	908

⁶ controller for Shadow II synchronizer used for audio, audio-for-video editing. ⁷ 12 1/2-hour disk, picture or sound. ⁸ Possible upgrade to CMX3100B and CMX3600. ⁹ Upgradable to CMX 3600.

Manufacturer	CMX	Convergence
Model	300	3600 advanced
Suggested for	On-/Off-line	On-line
Editing type	Linear	Linear
Transports controlled R/P	1 R/3 P	6 R/6 P
Videodisc interface	Option	Option
Control μ P type	Centralized	Distributed
# events (internal storage)	999	999
External event storage	FD	FD, HD
Edit decision list	Yes	Yes
Edit data display	CRT	CRT
Printer interface	Parallel	RS-232
Command entry via	Keyboard/console	Keyboard, Gismo
Deck motion control via	Keyboard/Gismo	Keyboard, Gismo
Assemble edit	Yes	Yes
Insert edit	Yes	Yes
Split A/V edits	Yes	Yes
A/B sync roll	No	Yes
Animation mode	No	Yes
Integral TC reader	No	Option
Integral TC generator	No	Option
Time reference support for	LTC/VITC/CtlTrk	LTC/VITC/CtlTrk/Film
Color framing	NTSC/PAL	NTSC/PAL
Editing accuracy	0 TC	0,0
Interfaces available	AFM, VDX	AFM, VDX, TLC MATR, EFX
Control protocol	RS-422, GPI	RS-232/422/GPI/CMX
Reader Service No.	913	914

Manufacturer	Convergence	CV Technologies	Editing Machines Corp	Grass Valley Group
Model	EMME	Edit Master	VPE-151	VPE-141
Suggested for	On, Off-line	Off-line	On-line	On, Off
Editing type	Linear	Linear	Non-linear	Linear
Transports controlled R/P	9 total	2 R, 4 P	Opt configs	1-R, 6-P
Videodisc interface	No	No	Option	.....
Control μ P type	Distributed	PC	PC	Distributed
# events (internal storage)	750	900	.....	2,000

External event storage	FD PT	FD PT	FD	FD, PT	FD, PT	FD
Edit decision list	Yes	Yes	Yes	Yes	Yes	Yes
Edit data display	CRT	CRT	RGB CRT	CRT	CRT	CRT
Printer interface	RS-232	PC dependent	RS-232	RS-232	RS-232	RS-232
Command entry via	Keyboard	Keyboard	KB TB	KB	KB	Keyboard
Deck motion control via	Knob	Keyboard, Joystick	KB TB	KB	KB	Keyboard
Assemble edit	Yes	Yes	Option	Yes	Yes	Yes
Insert edit	Yes	Yes	Yes	Yes	Yes	Yes
Split A/V edits	Yes	Yes	Yes	Yes	Yes	Yes
A/B sync roll	Yes	Yes	No	Yes	Opt	Opt
Animation mode	Yes	Yes	No	No	No	No
Integral TC reader	Yes	Yes	No	No	No	No
Integral TC generator	Yes	Yes	No	No	No	No
Time reference support for	LTC CtlTrk VITC	LTC VITC	LTC	L, V, CT	L/V/CT	L/V/CT
Color framing	Yes	Yes	Yes	Yes	Yes	Yes
Editing accuracy	±0 TC ±1 CtlTrk	VTR dependent	±0 TC, ±1 CT	±0 TC, ±1 CT	±0 TC, ±1 CT	±0 TC, ±1 CT
Interfaces available	AFM, VDX, MATR	Video switcher	AFM, VDX, STL MATR, CG, EFX	AFM, VDX, STL MATR, CG, EFX RS-422	AFM, VDX, STL MATR, CG, EFX RS-422	AFM, VDX, STL MATR, CG, EFX RS-422
Control protocol	Parallel VTR, GPI RS-232/422	RS-232/422/GPI				
Reader Service No.	1219	1220	919	920	921	922

Manufacturer	JVC Professional Products			Paltex		
Model	RM G86U	RM G850U	RM-G810U (-410U)	Elite	Abner	Esprit Plus
Suggested for	Off-line	Off-line	Off-line	On-, Off-line	On-, Off-line	On-, Off-line
Editing type	Linear	Linear	Linear	Linear	Linear	Linear
Transports controlled R/P	1-R, 1-P	1-R, 2-P	1R, 1P	3/3 or any 3 of 6	1 R, 2 P	8/8, any 8 of 16
Videodisc interface	No	No	No	Option	No	Option
Control μ P type				Multiple	Centralized	Multiple
# events (internal storage)	1 event	1 event	1	250	20	700
External event storage	None	None	N.A.	FD PT	FD PT	FD PT
Edit decision list	No	No	No	Yes	Yes	Yes
Edit data display	LED display	LED display	LED display	CRT	CRT	CRT
Printer interface				RS-232	RS-232	RS-232
Command entry via	Keyboard	Keyboard	Keyboard	Keyboard	Keyboard	Keyboard
Deck motion control via	Knobs	Knobs	Knobs	Keyboard, knob	Keyboard, knob	Keyboard, knob
Assemble edit	Yes	Yes	Yes	Yes	Yes	Yes
Insert edit	Yes	Yes	Yes	Yes	Yes	Yes
Split A/V edits	No	No	No	Yes	Yes	Yes
A/B sync roll	No	No	No	Yes	Yes	Yes
Animation mode	No	No	No	Yes	Yes	Yes
Integral TC reader	No	No	No	Yes	Yes	Yes
Integral TC generator	No	No	No	No	No	No
Time reference support for	CtlTrk	LTC CtlTrk	Ctl Trk	LTC CtlTrk VITC	LTC CtlTrk	LTC CtlTrk VITC
Color framing	No	No	No	No	No	No
Editing accuracy	±2 Ctl-Trk	±0 TC ±2 Ctl-Trk	±2 (±6); frms CtlTrk	±0 TC, ±1 CtlTrk ¹⁰	±0 TC, ±1 CtlTrk ¹⁰	±0 TC, ±1 CtlTrk ¹⁰
Interfaces available			None	AFM, VDX, TLC, STL MATR, CG, EFX	GPI	AFM, VDX, TLC, STL MATR, CG, EFX
Control protocol	Other	RS-422	Other	RS-422/232/GPI/Par	RS-422/GPI/Parallel	RS-422/232/GPI/Par

A Memo to C.E.'s About Audio Switchers

Anyone who has researched the routing switcher market has uncovered "The Problem": Audio switchers are small or they are large, but they aren't mid-size. And even when they are small, the price is still large—to cover the upgrade path that's always built in.

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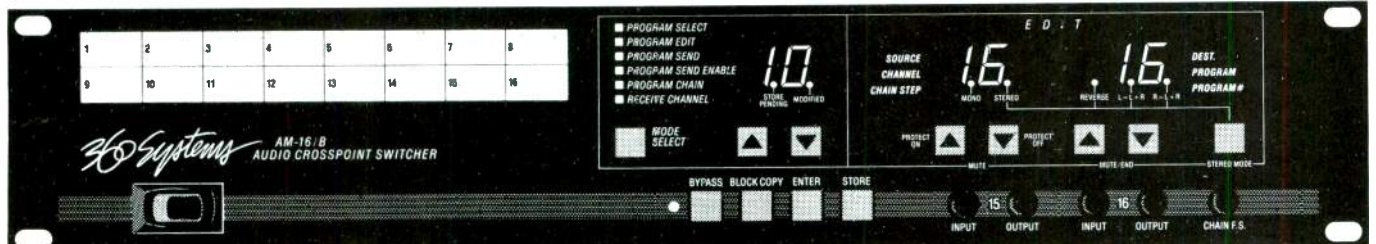
- Balanced inputs and outputs
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Circle (100) on Reply Card

Reader Service No.	923	924	925	926	927	928
¹⁰ Edit accuracy is dependent upon the VTR/VCR being used.						
Manufacturer	Pallex			Panasonic	Sony Communications Products	
Model	ELAN	ES/D	ES/P	AU-A65	RM-450	BVE-9000
Suggested for	On-, Off-line	On-, Off-line	On-, Off-line	On, Off-line	On-line	On & Off line
Editing type	Linear	Linear	Linear	Linear	Non-linear	Non-linear
Transports controlled R/P	4/4, any 4 of 8	6/6, any 6 of 12	4/4, any 4 of 12	1R, 3P	1-R, 1-P	2-R/12-P1
Videodisc interface	Option	Option	Option	.....	No	Option
Control μ P type	Multiple	Multiple	Multiple	Yes	Centralized	Central, Distributed
# events (internal storage)	326	500	998	250 event	N.A.	1000
External event storage	FD PT	FD PT	FD PT	floppy disk	None	Floppy disk
Edit decision list	Yes	Yes	Yes	Yes	No	Yes
Edit data display	CRT	CRT	CRT	LED/CRT	LED	CRT
Printer interface	RS-232	RS-232	RS-232	36-pin	N.A.	RS-232
Command entry via	Keyboard	Keyboard	Keyboard	Keyboard	Keyboard	Keyboard
Deck motion control via	Keyboard, knob	Keyboard, knob	Keyboard, knob	Jogging knobs	Keyboard	Keyboard
Assemble edit	Yes	Yes	Yes	Yes	No	Yes
Insert edit	Yes	Yes	Yes	Yes	Yes	Yes
Split A V edits	Yes	Yes	Yes	Yes	Yes	Yes
A B sync roll	Yes	Yes	Yes	Yes	No	Yes
Animation mode	Yes	Yes	Yes	Possible	No	Yes
Integral TC reader	Yes	Yes	Yes	.....	No	Option
Integral TC generator	No	No	No	.....	No	Option
Time reference support for	LTC CtlTrk VITC	LTC CtlTrk VITC	LTC CtlTrk VITC	LTC, VITC CtlTrk	LTC VITC CtlTrk	LTC VITC CtlTrk
Color framing	No	No	No	4-field NTSC	No	Yes (Opt)
Editing accuracy	± 0 TC, ± 1 CtlTrk ¹¹	± 0 TC, ± 1 CtlTrk ¹¹	± 0 TC, ± 1 CtlTrk ¹¹	.....	0 TC, ± 2 CtlTrk	0 TC, ± 2 CtlTrk
Interfaces available	AFM, VDX, TLC, STL MATR, CG, EFX	AFM, VDX, TLC, STL MATR, CG, EFX	AFM, VDX, TLC, STL MATR, CG, EFX	GPI 15-pin, RS-422	None	AFM, VDX, MATR, EFX
Control protocol	RS-422/GPI/Par RS-232	RS-422/GPI/Par RS-232	RS-422/GPI/Par RS-232	RS-232C	RS-422, GPI, Par for VO/SLO VTRs.	RS-422, GPI
Reader Service No.	929	930	931	932	933	934
¹¹ Accuracy is dependent upon the VTR/VCR in use.						

Manufacturer	Sony	United Media	Videomedia
Model	BVE-600 (BVE-900)	Commander series¹²	Mickey Edit Control
Suggested for	On (& Off) line	On, Off-line	On/Off line
Editing type	Non-linear	Linear	Linear
Transports controlled R/P	1-R/2-P, 1-R/3-P	8 R, 8 P ¹³	R/P
Videodisc interface	No	Yes	Option
Control μ P type	Centralized	Multi Distributed	Distributed
# events (internal storage)	N.A. (998)	600 ¹⁴	500
External event storage	Floppy disk	Floppy disk	Floppy disk
Edit decision list	No (Yes)	Yes	Yes
Edit data display	LED (CRT)	CRT	CRT
Printer interface	RS-232	RS-232	RS-232
Command entry via	Keyboard	Keyboard	Keyboard
Deck motion control via	Keyboard	Keyboard	Keyboard
Assemble edit	No (Yes)	Yes	Yes
Insert edit	Yes	Yes	Yes
Split A/V edits	Yes	Yes	Yes
A/B sync roll	No (Yes)	Yes	Yes
Animation mode	No (Yes)	Yes	Yes
Integral TC reader	No (Opt)	Yes	Option
Integral TC generator	No (Opt)	Yes	No
Time reference support for	LTC VITC CtlTrk	LTC VITC CtlTrk Tmr	LTC VITC CtlTrk Tmr
Color framing	Yes (Opt)	Yes	Yes
Editing accuracy	0 TC, ± 2 CtlTrk	± 0 TC ± 2 CtlTrk	± 0 TC, ± 2 CtlTrk
Interfaces available	AFM, VDX, MATR, EFX	AFM, VDX, MATR	AFM, VDX
Control protocol	RS-422, GPI	RS-232/-422 GPI	RS-232/-422/GPI
Reader Service No.	935	936	938
¹² Commander II 8-VTR; Mini-Comm 6-VTR; Comm-ette 3-VTR. ¹³ Commander II 8R/8P; Mini-Comm 6R/6P; Comm-ette 3R/3P. ¹⁴ Commander II & Mini-Comm 500; Comm-ette 250. ¹⁵ MT-30 3-VTR, MT-60 6-VTR, MT-90 9-VTR. ¹⁶ MT-30 3R/3P, MT-60 6R/6P, MT-90 9R/9P. ¹⁷ MT-30 1000; MT-60 2000; MT-90 3000. ¹⁸ Series includes 420-2VTR, 430-3VTR, 440-4VTR.			

Electronic Graphics Paint Systems

Abbreviations for 2D, 3D features and modeling include: **WF** wireframe, **ML** multiple lights, **PHG** Phong, **GOU** Gouraud, **TM** texture mapping, **PR** primitives, **RT** ray tracing, **PNT** paint, **AN** animation, **GRF** graphs; under storage: **FD** floppy disk, **HD** hard disk/Winchester, **RHD** removable hard disk, **ST** streaming tape, **ROD** removable optical disk; under animation: **LT** lights, **CAM** camera, **OBJ** objects.

Manufacturer	Aurora Systems	BTS	Circuit Studios	ColorGraphics Systems
Model	System 225 (220)	FGS-4500¹	Velocity	Artstar 30 Plus
Base computer	80286 (80386)	68000 series P	68030 ³	68020
Internal memory	12-plane buffer	8MByte std	8MByte/140MByte HD	8MB RAM/190MB disk
Memory architecture	32-bit RGBA	16-/32-bit	32-bit	32-bit
Off line storage	FD/HD/ST	RHD, FD, ST	WD, ST	Streaming tape
Image resolution	512x486/13.5MHz	4000x4000	768x486	756x482
Image sources	RGB, Modem, Tablet, Ethernet	RGB tablet, library	NTSC & RGB optional	NTSC, digital data
Output driver	RGB, frame buffer, NTSC, film recorder	RGB, Scitex Digital video	NTSC	NTSC, film
Standards	NTSC	NTSC PAL SECAM Film	PAL option	PAL opt
Encoder, decoder	External	External	External	Internal
Sync generator	External	External	Internal	Internal
Operator interface	Tablet, keyboard	Keyboard, tablet	Mouse KB Tablet	Tablet, Keyboard
VTR controller	.....	External, BTS	Lyon Lamb ext	Integral
Frame buffer used	.....	Proprietary	AT&T Pixel	Proprietary 32-bit
2D features	Full feature	Text, editor	.....	PNT, AN, Type, GRF
3D modeling	Options	WF, GOU, PHO ²	Yes	WF, TM, ML
Animation	Options	Choreographer	PR, TM, ML, RT	LDU, PHG
Real time output	.....	.....	GOU, PHG	LT, CAM, OBJ
Render engines supported	.....	.....	Yes	Yes
CRTs used for	Canvas, system	Canvas status	2 systems	No
Multiple users	.....	.....	Canvas, menus	Terminal Menu Canvas
			Terminal, menu	No
			No	No

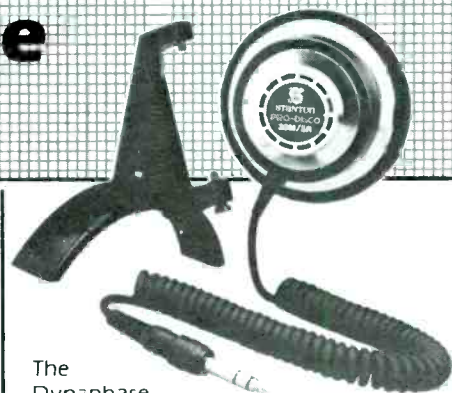
Remote,data input protocol RS-232 Ethernet, WX Ethernet Ethernet, RS-232³ N.A. Proprietary Proprietary
Reader Service No. 1106 1107 1108 1109 1110 1111
¹ Associated systems and equipment includes EPIC Expandable Performance Image Computer, Pixelator rendering engine, FGS-4500 Satellite Modeler and FGS-4500 Illustrator 3-D paint system. ² Aisc provides full color rendering. ³ And various standard graphic formats. ⁴ Both Sun workstation, AT&T Pixel Machine required.

Manufacturer	ColorGraphics Systems	Commodore Business Machines	Digital Arts	Digital F/X	Dubner Computer Systems	
Model	DP 4:2:2	AMIGA 2000HD (2500)	DGS system	Composium	DPS-1 Turbo	D-1 Painter
Base computer	Proprietary	Proprietary	PC XT/AT	Proprietary	68020	68020
Internal memory	8MB RAM/320MB disk	1MB, 40MB HD (2MB)	640k RAM, 40M HD	400MB HD	4MB RAM, 20MB disk	4MB RAM, 20MB disk
Memory architecture	32-bit	16/32-bit	32-bit	32-bit	32-bit	32bit
Off line storage	Optical disk	Floppy disk	FD, RHD	FD, HD, RHD	HD, RHD	HD, RHD
Image resolution		768x486-pixel	4096x4096	720x486	760x486	760x486 pixel
Image sources	0-1	NTSC, Y-C	NTSC, Betacam	NTSC, Betacam D-1	NTSC, digital data	D1, RGB, YUV, DATA
Scanner		Scanner	Digital data	D2, Scanner	Scanner	
Output driver	D-1	NTSC, Y-C	F.R. NTSC, Betacam	NTSC, Betacam D-1	NTSC, D-2, data	D-1, Data, RGB, YUV
Digital data				Digital data		
Standards	525-line Opt	PAL option	PAL opt	PAL opt		
Encoder, decoder	External	External	External	Internal	Internal	External
Sync generator	Internal	External	External	Internal	External	External
Operator interface	Tablet, Keyboard	Mouse, Tablet, KB	Mouse, Tablet, KB	Mouse, Tablet, Keyboard	Tablet, Keyboard	Tablet, Keyboard
VTR controller	Integral	External	Lyon Lamb MiniVAS	Integral	Integral	Integral
Frame buffer used	Proprietary 32-bit	Various 3rd party	TARGA, AT Vista	Proprietary	Patented 4-field	Patented 4-field
2D features	PNT, AN, Type	PNT, AN, Type, GRF	Paint	PNT, AN, Type	PNT, AN, Type, GRF	PNT, AN, Type, GRF
3D modeling	WF, TM, ML	WF PR TM ML RT	WF, PR, TM	Perspective digital effects		
	GOU, PHO	GOU, PHO	ML, GOU, PHG			
Animation	LT, CAM, OBJ	LT, CAM, OBJ	LT, CAM, OBJ	Yes	LT, CAM, OBJ	LT, CAM, OBJ
Real time output	Yes	Yes	N	No	Yes	Yes
Render engines supported	No	3rd party	T800 transputer	Terminal	Terminal, Menu	Menu
CRTs used for	Terminal Menu Canvas	Term Menu Canvas	T/M/C	No	No	No
Multiple users	No	(No)		Ethernet TCP/IP		
Remote,data input protocol	Proprietary	RS-232C/-422				
Reader Service No.	1112	1113	1114	1115	1116	1117

Manufacturer	Dubner Computer Graphics Factory 40	Getris Images VENICE	Harris Video Systems Harris Vws 3-D ⁵	Laird 1540 Paint	Microtime Image Plus	Pinnacle Systems 3000 series
Base computer	68020	PC XT/AT	Harris Vws WkSt per order	68010	80386P AT	IBM/AT
Internal memory	16MB RAM/20MB disk	110MByte RAM	32-bit	2.5MByte RAM	8MB RAM, 80MB disk	640k min to 2M ⁶
Memory architecture	32-bit	4x32 + 8-bit	32-bit	16-bit	32-bit	32-bit
Off line storage	HD, RHD	FD, RHD	FD, Worm	FD WD	RHD	
Image resolution	760x486 pixel	1024x1024	220x486 pixel	1506x483	720x486	768x484 pixel
Image sources	NTSC, D1/D2, Scanner	Composite, component	NTSC, Y-C, D-1	NTSC	NTSC, Betacam	NTSC, Betacam
Scanner	Digital data	D-1/D-2, scanner	RGB		Hi-Res scanner	
Output driver	NTSC, D1, D2, Digita	Composite, component	NTSC, Y-C, D-1	NTSC Y-C opt	Film, NTSC	NTSC, Betacam
Digital data	Digital data	D-1/D-2, data	RGB		Betacam	
Standards	PAL option	PAL option		NTSC	PAL option	PAL opt
Encoder, decoder	External, internal	External	Internal	Ext	External	Internal



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Circle (99) on Reply Card

Sync generator	External	Internal	Internal	Ext	Internal	Internal
Operator interface	Tablet Keyboard	Tablet	Mouse Tablet KB	Tablet, Keyboard	Tablet, KB	Mouse, tablet, KB
VTR controller	Integral	Integral	External	.....	Integral	Integral
Frame buffer used	4-field patented	Proprietary	Harris	Yes	Targa or Vista	VISTA
2D features	PNT, AN, Type, GRF	PNT, AN	See note ⁵	PNT, AN, Type, GRF	PNT, AN, Type	.....
3D modeling	.....	WF, PR, TM, ML	WF, PR, TM, ML	.....	WF, PR, TM	WF, PR, TM, ML
Animation	LT, CAM, OBJ	LT, CAM, OBJ	RT, GOU, PHG	.....	ML, GOU, PHG	GOU, PHG
Real time output	Yes	Yes	LT, CAM, OBJ	No	LT, CAM, OBJ	LT, CAM, OBJ
Render engines supported	.....	.....	No	No	.....	No
CRTs used for	Menu	.....	Yes	No	Also off-line render	.....
Multiple users	2 users	No	Menu/canvas combined	Menu, Canvas	Menu, canvas	Menu
Remote data input protocol	.....	.....	No	No	Yes	No
Reader Service No.	1118	1119	.....	RS-422	Proprietary	8 > RS-232
					1122	1123

⁵ Titler, Composition and Paint stations available. Variations include: 2-D Typography for character generator; 2-D Paint features for Composition station; Paint system provides 2-D Paint, Animation, Typography. 95MByte HD with 200MByte HD in PAL version.

Manufacturer	Quantel	Spaceward	Thomson Video Equipment
Model	Paintbox V series	Matisse	MAXIPAINT
Base computer	Proprietary	Proprietary	IBM AT-286/386
Internal memory	185MByte HD	640k, HD	8MByte RAM
Memory architecture	ASIC DRAM	4:4:4	8-bit
Off line storage	2MByte 3.5", tape	FD, HD	FD, HD, ST, ROD
Image resolution	per CCIR 601	720x486 NTSC	720x576
Image sources	Composite, component	RGBS, Tablet, 4:2:2	Betacam, D-1, RGBK-N10
Output driver	Composite, component	RGB, YCrCb, 4:2:2	Y-C, D-1, RGBK
Standards	NTSC, PAL	NTSC, PAL	PAL, SECAM opts
Encoder, decoder	Opt	Ext	Int, Ext
Sync generator	Opt	Internal	Internal
Operator interface	Tablet, keyboard ⁷	Tablet, stylus	Tablet
VTR controller	Yes ⁸	.....	.....
Frame buffer used	Proprietary	Proprietary	2048x1024
2D features	Full feature	All features	Paint, Type
3D modeling	Yes	Various	.....
Animation	Yes ⁸	.....	.....
Real time output	.....	.....	Yes
Render engines supported	Proprietary	Proprietary	.....
CRTs used for	Menus, canvas	Menu, system	Menu-Canvas, Terminal
Multiple users	Yes	.....	No
Remote data input protocol	Yes	RS-232	PC/MS DOS, Ekernet
Reader Service No.	1124	1125	1126

⁷ Cordless stylus available for use with graphics tablet.

⁸ Interface available for Harry editor and Carousel Ramcorder

Graphic Titlers, Character Generators

These products are designed for the generation and placement of titles and captions in the video image. Abbreviations in this section include: under type styles, **S** Serif, **N-S** Non-Serif, **SC** script, **IT** italic; to designate the scope of some attributes, **Char** refers to a character. Page formats are described by the number of characters **C** and the number of lines **L** on the screen, with a height in TV lines (TVL) of those characters. Stored media includes **HD** hard disk, **FD** floppy disk, **ST** streaming tape; **ENC** refers to composite video, while **CVD** is component video.

Manufacturer	Abekas Video	Ampex	Aston Electronics	Audio Visual Systemes	BTS	
Model	A72	ALEX	Caption	Aston 4	S161-CG-T ¹	VidMont II
Subtitling	Variable	Variable	Variable	Variable	Variable position	Variable
Tab	Yes	Yes	Yes	Yes	No	Yes
Underlining by	Char/word/line	Char/word/line	Yes	Yes	No	Yes
Page format	Free form	Free form	Free form	54 C/14 L	32Cx16L-32TVL	64-Cx31-L
Resolution	5.5MHz bw	4.6ns	< 10ns	10ns	100ns	48ns
Anti-aliasing	Hardware, 256 lvl	Hardware, software	Software	Software, hardware	None	Hardware, software
On-line type faces	Unlimited	30	Multiple	8	1	8
Character planes	Unlimited	16	.....	4	.....	32
Background planes	1	1	Yes	Yes	.....	Yes
Animation by	Char/word/line	Char/word/line	Yes	Yes	No	Yes
Type styles	S, N-S	S/N-S	Multiple	Multiple	.....	N/N-S/SC/IT
Italicize by	Variable angle	Variable	Yes	Yes	No	Yes
Rotation	None	360°	.....	.....	No	No
Sizing, scaling	Yes	Yes	Yes	Yes	No	Yes
Non Arabic faces	.....	.....	Yes	Yes	No	Yes
Type face storage	FD, HD, ST	RAM FD HD	Disk	Disk	PROM (RAM)	FD, RAM
Face font compose	No	Option	Option	Logo opt	No	Option
Display flash by	No	Char/word/line	Yes	Yes	Character	Yes
Edging effects	Surround, shadow	Surround, shadow	Yes	Yes	Surround, shadow	Yes
Auto centering	H, V	H, V	Yes	Yes	No	Yes
Roll, crawl control	Variable	Infinite variation	Yes	8 each	.....	Yes
Keyer colorizer	2 encoders std	Integral or external	External	External	No	Integral
Color palette	16.7M/screen	16.7M, 1024/screen	16.7M	4096, 40/s	.....	4096, 64/s
S-VHS output	No	No	.....	No	No	No
Integral still store	No	No	No	No	No	Graphic Store opt
Internal memory	4:4:4/13.5MHz	4:4:4:4 pipeline	24-bit	24 pages	.....	300 page
Off-line storage	FD, ST	FD, HD	Disk	FD, HD	.....	FD, HD
Access time per page	.....	Per complexity	< 1s	< 1s	.....	< 0.9s
Remote control	RS-232	.....	RS-232/422	RS-232/422	No	RS-232/-422
Image sources	RGB	ENC/CVD, Tablet	ENC, LogoMaster	.....	ENC video	RGB, ENC video
		CCIR-601 CVD	Draw	.....	
Multi-user system	No	2 user	.....	2-station	No	2 Keyboards
Automation interface	RS-232	Ethernet	RS-232/422	RS-232/422	RS-232, RS-422	No
Paint system interface	No	No	.....	.....	No	.....
Reader Service No.	953	954	955	956	957	958

¹ The unit provides several different modes of operation: -HC clock/counter inserter; -S logo; -V VU meter; -GC character generator.

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LDK 910 CCD Studio Camera

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LDK 91 CCD Portable Camera

by advanced electronic shutter control. It's also ready to shoot when you are — no waiting for warm up.

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Adding to the value of this exceptional camera is the ease in which it can be used with a Betacam SP® or MII® VCR without an adaptor.

The HL-53 is one more addition to Ikegami's outstanding UNICAM® family of cameras and is compatible with all HL-95 accessories, providing maximum operational flexibility and versatility in the ENG/EFP or studio configuration.

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For further information, contact your regional sales office of the Ikegami Dealer near you.

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Ikegami Electronics (USA), Inc.

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Midwest: (708)834-9774 Hawaii: (808)946-5955

Betacam SP® is a registered trademark of Sony. MII® is a registered trademark of Panasonic.

Manufacturer	Chyron					
Model	VP-1	RGU-2	Chyron IW4200 w/1	ACG	VP-2	INFINITI
Subtitling	Variable	Lower 3rd	Lower 3rd	Variable	Variable	Variable
Tabs	Yes	Yes	Yes	Yes	Yes	Yes
Underlining by	Character	All	All	All	Character	All
Page format	Free form	64C×24L 18TVL	64L×24L 18TVL	Free form	Free form	Free form
Resolution	35ns	27ns	27ns	35ns	35ns	5ns
Anti-aliasing	.....	.....	.....	Hardware	.....	Software
On-line type faces	6	4	12	8	36	8
Character planes	Unlimited	2	2	Unlimited	Unlimited	Unlimited
Background planes	1	2	2	1	1	3
Animation by	.....	All	All	All	.....	All
Type styles	S/N-S	.....	S/N-S	S/N-S	S/N-S	S/N-S
Italicize by	Variable angle	No	Yes	Yes	Variable Angle	Yes
Rotation	No	No	Yes	Row, page	.....	Yes
Sizing, scaling	Yes	Yes	Yes	No	No	Yes
Non Arabic faces	Cyrillic, Korean	Cyrillic	Cyrillic	.....	Cyrillic, Korean	Cyrillic
Type face storage	PROM	RAM	RAM	RAM	PROM	RAM
Face font compose	No	Yes	Yes	Option	No	No
Display flash by	C L W	All	All	All	Char/word/line	All
Edging effects	Surr/Shadow/Offset	Surround Shadow	Surround, shadow	Surr shad to 16lines	Sur, Shad, offset	Surround, Shadow
Auto centering	Horizontal	Horizontal	Horizontal	H V	H V	H V
Roll, crawl control	3-speed roll	4 speed	4 speeds	9 speeds	4 speeds	9 speeds
Keyer colorizer	Integral	External	External	Integral	Integral	Integral
Color palette	512 8/s	64 64/s	512 200/s	16.7M 527/s	16.7M 16/s	16.7M 16.7/s
S-VHS output	No	No	No	Option	No	No
Integral still store	No	No	No	No	No	Yes
Internal memory	Proprietary	Proprietary	Proprietary	Proprietary	Proprietary	Proprietary
Off-line storage	.....	FD	FD HD	FD HD RHD	FD	FD HD RHD
Access time per page	.....	.....	.....	.....	.....	.....
Remote control	RS-232	RS-232	RS-232	RS-232 MODEM GPI	GPI	RS-232, Modem
Image sources	ENC video	ENC video	ENC, Data, WX svc	Tablet	.....	CVD, Tablet,
Multi-user system	No	Yes	Yes	No	No	Yes
Automation interface	RS-232	RS-232/-422	RS-232/-422	RS-232 GPI	.....	RS-232/-422/ARCNET
Paint system interface	No	No	Yes	No	Yes	Yes
Reader Service No.	959	960	961	962	963	964

Manufacturer	Chyron	Dubner Computer Systems		ESE	Laird	
Model	Scribe JNR	Graphics Factory -30	30-K	ES-CG89	1500 PROM	Legend GX (Turbo)
Subtitling	Variable	Any location	Any location	Lower 1/3	Variable	Variable
Tabs	Yes	Yes	Yes	.....	Yes	Yes
Underlining by	All	Character	Character	.....	Character	Character
Page format	64C×24L 10TVL/free	Free form	Free form	20×5	Free form	Free form
Resolution	10ns	760×486	760×486	70ns	35ns 1506×483	35ns 1506×483
Anti-aliasing	Software	Software	Software	Software	.....	Hardware/software ²
On-line type faces	8	Infinite	Infinite	8	6+6 opt	16
Character planes	Unlimited	2	2	.....	1/unlimited overlap	1/unlimited overlap
Background planes	1	Infinite	Infinite	.....	1	1
Animation by	Line	Char/word/line	Char/word/line	.....	Character	Character
Type styles	S/N-S	S/N-S	S/N-S	N-S	S/N-S	S/N-S 35 faces
Italicize by	Yes	Variable	Variable	No	Variable	Variable
Rotation	Yes	360°	360°	.....	H V flip	360° by <1° step
Sizing, scaling	Yes	Yes	Yes	No	No	No
Non Arabic faces	Cyrillic	Cyrillic	Cyrillic Chinese	No	No	No
Type face storage	RAM	RAM FD Bernoulli	RAM FD Bernoulli	RAM	ROM	RAM, FD
Face font compose	No	Yes	Yes	No	No	Yes
Display flash by	All	C	Character	Character	Character	Character
Edging effects	All	Surround, shadow	Surround/shadow	Surround	Surround, shadow	Surround, shadow
Auto centering	H, V	H V	H & V	Horizontal	Horizontal	Horizontal
Roll, crawl control	9 speeds	9 speeds	9 speeds	1 speed	9R, 6C	9R, 6C
Keyer colorizer	Integral	Integral	Integral	Integral	External	Integral
Color palette	16.7M 667/s	16.7M, 256	16.7M /256	16/16	65,536/966	65,536/966
S-VHS output	No	No	No	No	Option	Option
Integral still store	No	Option	No	No	No	No
Internal memory	Proprietary	16MByte, 32-bit	8MBytes 32-bit	.....	via PC connection	FD, HD
Off-line storage	FD/HD/RHD	HD, Bernoulli	FD/HD/Bernoulli/SCSI	.....	1s average	1s average
Access time per page	.....	.....	.....	100ms	RS-422	RS-422
Remote control	RS-232, Modem	RS-232	RS-232	No	ENC	ENC, tablet
Image sources	CVD, tablet	ENC, CVD, WX data	Tablet WX data	ENC video	ENC	ENC, tablet
Multi-user system	Yes	2 users	2 users	No	No	No
Automation interface	RS-232, ARCNET	RS-232, -422, GPIB	RS-232, 422, GPI	.....	RS-422, GPIB	RS-422, GPIB
Paint system interface	Yes	Option	Option	.....	Upgrade option	Option
Reader Service No.	965	966	967	968	969	970

Manufacturer	Laird		3M Broadcasting/Related Products			
Model	Legend-LX	Legend (Turbo)	1450	CG 7000 (7000 YC)	D-3600	D-6000
Subtitling	Variable	Variable	Variable	Variable	Variable	Variable
Tabs	Yes	Yes	Yes	No	Yes	Yes
Underlining by	Character	Character	Character	.....	Character	Character
Page format	Free form	Free form	Free form	39×16 24TVL	Free form	Freeform
Resolution	35ns 1506×483	35ns 1506×483	35ns 1506×483	80ns	35ns	712×483
Anti-aliasing	Hardware/software	Hardware/software ³	.....	Hardware	Hardware	Hardware
On-line type faces	16	16	6 + 6 opt	1	5	15
Character planes	2/unlimited overlap	w/unlimited overlap	1/unlimited overlap	1	1	4
Background planes	2	1	1	1	1	4
Animation by	Character	Character	Character	Line	.....	Character
Type styles	S/N-S 35 faces	S/N-S 35 faces	S/N-S	Non-serif std ⁴	.....	.....
Italicize by	Variable	Variable	Variable	No	Yes	Yes
Rotation	360° by <1°/step	H/V flip opts	H/V flip	No	.....	.....
Sizing, scaling	Yes	Option	No	4 sizes/face	Yes	Yes
Non Arabic faces	No	No	No	No	.....	.....
Type face storage	RAM, FD, HD	RAM, FD	ROM	ROM cartridge	RAM	FD
Face font compose	Yes	Option	No	No	No	Yes
Display flash by	Character	Character	Character	Character	Character	Character
Edging effects	Surround, shadow	Surround, shadow	Surround, shadow	Surround/shadow	Surround	Surround
Auto centering	Horizontal	Horizontal	Horizontal	H, V	H, V	H, V
Roll, crawl control	9R, 6C	9R, 6C	9R, 6C	4C	100 speeds	4 speeds
Keyer colorizer	Integral	Integral	Integral	Integral	Integral	Integral
Color palette	65,536/65,536	65,536/966	65,536/966	Analog 2/screen	496, 32/s	128, 16/s
S-VHS output	Option	Option	Option	7000YC only	No	No

Integral still store	No	No	No	No	No	No
Internal memory	FD, HD	FD, HD	via PC connection	Non Vol RAM module	FD	20Mbyte
Off-line storage	FD, HD	FD, HD	via PC connection	Non Vol RAM module	FD	FD
Access time per page	1s average	1s average	1s average	1.4s		
Remote control	RS-422	RS-422	RS-422	GPI & (Proprietary)	RS-232	
Image sources	ENC video, tablet	ENC video, tablet	ENC video	ENC video (Y-C)	ENC video	ENC video, tablet
Multi-user system	No	No	No	No	No	No
Automation interface	RS-422, GPIB	RS-422, GPIB	RS-422, GPIB	GPIB	RS-232	RS-232
Paint system interface	Yes	Option	No	No	No	Integral
Reader Service No.	971	972	973	974	975	976

³ Requires optional hardware. ⁴ Serif option; 18 type styles available for 7000.

Manufacturer	3M Broadcast & Related Products	PESA	Quanta Corporation			
Model	D-2200	CG-4711 (CG-4722)	QCG-304 (QCG-38)	Orion	Microgen Plus	Delta 1
Subtitling	Variable	(Opt)	Lower third	Lower third	Lower third	Lower third
Tabs	8 tabs	8 tabs	Yes	Yes	No	Yes
Underlining by	Yes	None	None	Character	None	Character
Page format	32 char x 16 line	32 char x 16 line	40 C 13 L	64 C 36 L/10-126TVL	32C x 12 L	Free form
Resolution	70ns	35ns	55ns (18ns)	5ns	50ns	0.289ns
Anti-aliasing			None	Software	None	Hardware
On-line type faces	8	4 (8) in RAM	4 (8)	250	4	Unlimited
Character planes	1	1	1	1	1	Unlimited
Background planes			1	1	1	Unlimited
Animation by	No	No	None	Character	None	Character
Type styles	Various	Various	S NS	S NS	S NS	S NS
Italicize by	Line	Line	No	Variable	No	Variable
Rotation	No	No	None	360° by font	None	360° by font
Sizing, scaling	Yes	Yes	Yes	Yes by font	No	Yes
Non Arabic faces		Script, designer	None	None	None	None
Type face storage	RAM	3.5" disk	ROM	FD	ROM	RAM, HD
Face font compose	No	Option -4722	No	Option	Character	Yes
Display flash by	Character	Yes	Character	Character	Character	Character
Edging effects	Surround	Full control	Surround (& shadow)	Surround, shadow ⁵	Surround shadow	Surround, shadow
Auto centering	H, V	H, V	Horizontal	H	Horizontal	H, V
Roll, crawl control	10 speeds	8 speeds	9 speeds	99 speeds	9 speeds	2560 roll, 10 crawl
Keyer colorizer	Integral	Integral	Integral	Integral	Integral	Integral
Color palette	512, 16/s	121, 121/s	512 54/s	16.7million 1000/s	256 24/s	16.7million
S-VHS output	No	No	No	No	No	No
Integral still store	No	No	No	No	No	Yes
Internal memory	256kbyte	15 pg/4096 lines	8-bit 600 row RAM	2.5MB, 16/64-bit	8-bit 600 row RAM	4MB, 32-bit
Off-line storage	FD	3.5" floppy	None	HD, FD	None	HD, FD ST RHD
Access time per page			0.5ms	0.5ms	4ms	0.65s
Remote control		RS-232, timecode	RS-232	RS-232/-422	RS-232	RS-232
Image sources	ENC video	ENC video	ENC video	ENC video	ENC video	ENC video, CVD
Multi-user system	No	-4722 dual channel	No	No	Option	No
Automation interface	RS-232	RS-232	RS-232	RS-232/-422	RS-232	None
Paint system interface	No		No	No	No	Option
Reader Service No.	977	978	979	980	981	982

⁵ Also outline, highlighting effects.

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Manufacturer	Quanta Corporation	Quantel	Ryley Comm.	Telemet div/Geotel
Model	QCG-500	Cypher Sports ⁸	CAPGEN series 2	Telemet 2000
Subtitling	Lower third	Variable	Variable	Lower 3rd
Tab	Yes	Yes	Yes	No
Underlining by	Character	.....	Word	Char/line/word
Page format	64 C 24 L	Free form	Free form	20x5
Resolution	29ns	per CCIR 601	11ns	50ns
Anti-aliasing	None	Yes	Hardware	Software
On-line type faces	3, 28 on disk	Multiple	8	4
Character planes	1	Multiple	1	2
Background planes	1	Yes	1	1
Animation by	Character	Yes	.....	Char/word/line
Type styles	S/N-S	Foundry type	S N-S	Serif
Italicize by	Variable	Yes	Yes	No
Rotation	None	Yes	.....	None
Sizing, scaling	Yes	Yes	Yes	Yes
Non Arabic faces	Cyrillic/Tamil/Thai ⁶	Yes	Roman	.....
Type face storage	Floppy disk	Int HD	RAM	RAM
Face font compose	Option	Yes	No	Yes
Display flash by	Character	Yes	Word	C L W
Edging effects	Surround, shadow ⁷	Yes	Surround	Surround, shadow
Auto centering	H, V	Yes	H, V	Horizontal
Roll, crawl control	9 speeds	Yes	9 speeds	Unlimited speeds
Keyer colorizer	Integral	Option	External	Integral
Color palette	16.7million 48/s	16.7 million	64, 64	Unlimited-16/s
S-VHS output	No	No	No	No
Integral still store	No	50-image	No	Yes
Internal memory	128kByte, 8/16-bit	Hard disk	.....	.....
Off-line storage	None	Removable HD	FD	FD, HD, Cartridge
Access time per page	0.5ms	.....	500ms	.....
Remote control	RS-232	Yes	.....	RS-232
Image sources	Enc video	ENC, CVD video	.....	ENC video
Multi-user system	No	.....	No	No
Automation interface	RS-232	Yes	.....	RS-232
Paint system interface	No	Option	No	Yes
Reader Service No.	983	984	985	986

⁶ Sinhalese, Greek sets available. ⁷ Outline effects also possible. ⁸ Cypher Sprint is a slightly down-scaled version which can present material prepared on the Sports model.

Video Processing Systems

This section contains a variety of products designed for signal correction, signal format conversion and standards conversion. YC_RC_B refers to any of Y/R-Y/B-Y, YIQ and YUV forms.

Manufacturer	A.C.E./Midwest Communications			Accom, Inc			
	Model	205N/204N encoder ¹	660JN corrector ²	ACC200 converter	D-Bridge 221	DIE-125 enhancer	D-Bridge 122 Encoder
Standards conversion	No	No	No	No	No	No	No
Supports NTSC	Yes	Yes	No	Yes	Yes	Yes	Yes
Supports PAL	No	No	No	No	.....	.....	Yes
Supports SECAM	No	No	No	No	No	No	No
Format conversion	No	No	Yes	Yes	Yes	Yes	Yes
Supports Y/C-358	No	No	No	No	No	No	No
Supports Y/C-688	No	No	No	No	No	No	No
Supports RGB	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supports YC _R C _B	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supports D-1 CCIR 601	No	No	No	Yes	Yes	Yes	Yes
Supports D-2	No	No	No	Yes	Yes	No	Yes
Dubbing applications	No	Yes	Yes	Yes	Yes	Yes	Yes
Production applications	Yes	Yes	Yes	Yes	Yes	Yes	Yes
On-air applications	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Enhancement horizontal	Yes	No	.....	Yes	Yes	Yes	No
Enhancement vertical	No	No	.....	Yes	Yes	Yes	No
Noise reduction	No	No	.....	No	Yes	Yes	No
Color correction	No	Yes	.....	No	No	No	Yes
Contrast correction	No	Yes	.....	No	No	No	Yes
Sync regeneration	Yes/No	No	.....	Yes	Yes	Yes	Yes
Full proc amp control	Yes/No	No	.....	No	No	No	Yes
Programmable system	No	No	.....	Yes	Yes	Yes	Yes
Time code control	No	Yes	.....	No	No	No	No
RS 232 422 control	No	No	.....	Yes	Yes	Yes	Yes
Composite encoder	Yes	No	.....	No	No	No	Yes
Improved NTSC encoding	No	No	.....	No	No	No	Yes
Video bandwidth	6MHz	5 MHz	6MHz	to 5.75MHz	to 5.75MHz	to 5.75MHz	to 5.75MHz
Video S/N ratio	60dB	65dB	60dB	65dB	65dB	65dB	65dB
Envelope delay	1100ns	450ns	30ns	5ns	5ns	5ns	5ns
Differential phase, gain	0.5°, 0.5%	.....	.....	0.2°, 0.2%	0°, 0%	0.2°, 0.2%	0.2°, 0.2%
Reader Service No.	1064	1065	1066	1067	1068	1069	1069

¹ 205N includes genlock. ² 600JN is similar for composite video color correction.

Manufacturer	Model	AVS Ltd ³			Broadcast Video Systems	
		ISIS	AVS-6500	ADAC	#740, 750 ⁴	EN300, 350, 450
Standards conversion	No	Yes	Yes	Yes	No	No
Supports NTSC	Yes	Yes	Yes	Yes	No	Yes
Supports PAL	Yes	Yes	Yes	Yes	No	Yes(N, N)
Supports SECAM	No	Yes	Yes	Yes	No	No
Format conversion	Yes	Yes	Yes	Yes	Yes	No(Y, Y)
Supports Y/C-358	No	Yes	No	No	No	No(Y, Y)
Supports Y/C-688	No	No	No	No	No	No
Supports RGB	No	Yes	Yes	Yes	Yes	Yes
Supports YC _R C _B	No	Yes	No	Yes	Yes	No(Y, Y)
Supports D-1 CCIR 601	Yes	Yes	No	Yes	No	No
Supports D-2	Yes	No	No	No	No	No
Dubbing applications	Yes	Yes	Yes	Yes	Yes	No(Y, Y)
Production applications	Yes	Yes	Yes	Yes	Yes	Yes

On-air applications	Yes	Yes	Yes	Yes	No	Yes
Enhancement horizontal	No	Yes	Yes	Yes	No	No
Enhancement vertical	No	Yes	No	Yes	No	No
Noise reduction	No	Yes	Yes	Yes	No	No
Color correction	No	Yes	No	Yes	No	No
Contrast correction	No	Yes	Yes	Yes	No	No(Y, Y)
Sync regeneration	Yes	Yes	Yes	Yes	Yes	No
Full proc amp control	No	Yes	Yes	Yes	Yes	No
Programmable system	No	Yes	No	Yes	No	No
Time code control	No	No	No	No	No	No
RS-232/422 control	No	Yes	No	Yes	No	No
Composite encoder	Yes	Yes	No	Yes	No	Yes
Improved NTSC encoding	Yes	Yes	No	Yes	No	No
Video bandwidth	10-bit data	5.5MHz PAL	-3dB 3.5MHz	5.5MHz PAL	10MHz	5, 5.5, 6MHz
Video S/N ratio		>50dB unwt'd		>50dB unwt'd	46dB	45, 45, 60dB
Envelope delay		5ns		5ns	4ns delay	±15, 15, 10ns
Differential phase gain		<1.5%, <1.5%		<1.5%, <1.5%		
Reader Service No.	1070	1071	1072	1073	1074	1075

³ Represented in the US by AF Associates. ⁴ Model #740 RGB to Y_RC_B; #750 Y_RC_B to RGB.

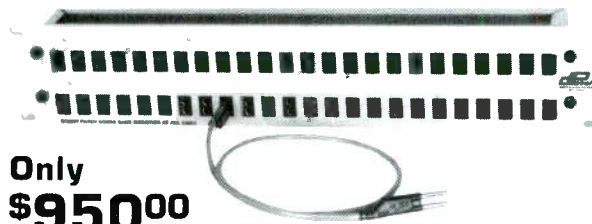
Manufacturer	Broadcast Video Systems		BTS		CEL Electronics/Grunder Associates	
Model	# 100, 300 ⁵	#735 proc amp ⁶	DNR7 noise reducer ⁷	CNR7 noise reducer	P165	P164
Standards conversion	No	No	No	No	Yes	No
Supports NTSC	No	No	Yes	Yes	Yes	Yes
Supports PAL	No	No	Yes	Yes	Yes	Yes
Supports SECAM	No	No	Yes	Yes	Yes	Yes
Format conversion	Yes	No	Yes	Yes	Yes	No
Supports Y/C-3.58	Yes	No	No	Yes	Yes	Yes
Supports Y/C-688	No	No	No	Yes	Yes	Yes
Supports RGB	No	Yes	Yes	Yes	No	No
Supports Y _R C _B	Yes	Yes	Yes	Yes	Yes	Yes
Supports D-1 CCIR 601	No	No	Yes	Yes	Yes	Yes
Supports D-2	No	No	No	Yes	No	No
Dubbing applications	Yes	Yes	Yes	Yes	Yes	Yes
Production applications	Yes	Yes	Yes	Yes	Yes	Yes
On-air applications	No	No	Yes	Yes	Yes	Yes
Enhancement horizontal	No	No	Yes	Yes	Yes	Yes
Enhancement vertical	No	No	Yes	Yes	Yes	Yes
Noise reduction	No	No	C/L	Yes	No	No
Color correction	No	Yes	Yes	Yes	Yes	Yes
Contrast correction	No	Yes	Yes	Yes	Yes	Yes
Sync regeneration	No	Yes	per CCIR	TBC	Yes	Yes
Full proc amp control	No	Yes	Yes	Yes	Yes	Yes
Programmable system	No	No	Yes	Yes	No	No
Time code control	No	No	Yes	Yes	No	No
RS-232/422 control	No	No	Yes	Yes	No	No
Composite encoder	No	No	Yes1	Yes	Yes	Yes
Improved NTSC encoding	No	No	Yes	Yes	No	No
Video bandwidth	6MHz		per CCIR	-3,+0.5dB 4MHz	5.5MHz	5.5MHz

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Circle (108) on Reply Card

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Circle (109) on Reply Card

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Circle (106) on Reply Card

Video S/N ratio	46dB	56dB	56dB
Envelope delay	Adjustable	Adj.	Adj.
Differential phase, gain	.....	.....	.....	2°, 2%	2°, 2%
Reader Service No.	1076	1077	1078	1079	1081

⁵ #100 Y/C-3.58-YC_RC_B; #300 YC_RC_B-Y/C-3.58. ⁶ Component/RGB signal processing amp. ⁷ Integration into various production configurations through CD7 encoder, DC7 decoder.

Manufacturer	CEL/Grunder		Central Dynamics		Faroudja Laboratories		
	Model	P156-2	STAGE *1 ENTSC	VHP-N/P detail proc	CTE-2 Encoder	DFC-N Decoder	CTC-2 transcoder
Standards conversion	Yes	No	No	No	No	No	No
Supports NTSC	Yes	Yes	Yes	Yes	Yes	Yes	No
Supports PAL	Yes	No	Yes	Yes	No	No	No
Supports SECAM	Yes	No	Yes	Yes	No	No	No
Format conversion	Yes	Yes	Yes	No	Yes	Yes	Yes
Supports Y/C-3.58	Yes	Yes	No	No	Yes	Yes	No
Supports Y/C-688	No	No	No	No	No	No	No
Supports RGB	No	Yes	Yes	No	Yes	Yes	Yes
Supports YC _R C _B	Yes	Yes	No	Yes	Yes	Yes	Yes
Supports D-1 CCIR 601	No	Yes	No	No	No	No	No
Supports D-2	No	Yes	No	No	No	No	No
Dubbing applications	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Production applications	Yes	Yes	Yes	Yes	Yes	Yes	Yes
On-air applications	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Enhancement horizontal	No	Yes	Yes	Yes	Yes	Yes	No
Enhancement vertical	No	Yes	Yes	Yes	Yes	No	No
Noise reduction	No	No	No	No	No	No	No
Color correction	Yes	No	No	No	No	No	Yes
Contrast correction	Yes	No	Yes	No	No	No	Yes
Sync regeneration	Yes	Yes	No	No	Yes	No	Yes
Full proc amp control	Yes	No	No	No	Yes	No	No
Programmable system	No	Yes	No	No	No	No	No
Time code control	No	No	No	No	No	No	No
RS-232/422 control	No	Yes	No	No	No	No	No
Composite encoder	Yes	Yes	No	No	Yes	No	No
Improved NTSC encoding	No	Yes	No	No	Yes	No	No
Video bandwidth	4.5MHz	5.5MHz	4.2MHz	6MHz	.....	.....	8MHz
Video S/N ratio	53dB	>60dB	>60dB	>60dB	.....	.....	>60dB
Envelope delay	Adj.	<10ns	<20ns	<25ns	.....	.....	<50ns
Differential phase, gain	3°, 3%	.....	2.5°, 2.5%	1°, 1%	.....	.....	.....
Reader Service No.	1082	1083	1084	1085	1086	1087	1087

Manufacturer	Faroudja Laboratories For-A		Fougerolle Video		Leitch Video	Merlin Snell & Wilcox	
	Model	LD-1 line doubler	CT-600	MPV 2030 encoder	MPV 2040 encoder	VPA-330/331 (310P)	ME 9900 series ⁸
Standards conversion	Yes	No	No	No	No	No	Yes
Supports NTSC	Yes	Yes	Yes	No	No	Yes	Yes
Supports PAL	No	Yes	Yes	No	Yes	310P	Yes
Supports SECAM	No	.....	Yes	Yes	No	No	Yes
Format conversion	Yes	No	No	No	No	No	Yes
Supports Y/C-3.58	No	Yes	Yes	No	No	No	Yes
Supports Y/C-688	No	Yes	Yes	No	No	No	Yes
Supports RGB	Yes	Yes	Yes	Yes	Yes	No	Yes
Supports YC _R C _B	Yes	No	Yes	Yes	Yes	No	Yes
Supports D-1 CCIR 601	No	No	No	No	No	No	.....
Supports D-2	No	Yes	No	No	No	No	.....
Dubbing applications	No	Yes	Yes	Yes	Yes	Yes	Yes
Production applications	Yes	Yes	Yes	Yes	Yes	Yes	Yes
On-air applications	No	No	Yes	Yes	Yes	Yes	Yes
Enhancement horizontal	Yes	No	No	No	No	No	Yes
Enhancement vertical	Yes	No	No	No	No	No	Yes
Noise reduction	Yes	No	No	No	No	Yes	Yes
Color correction	No	No	No	No	No	Yes	Yes
Contrast correction	Yes	No	No	No	No	Yes	Yes
Sync regeneration	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Full proc amp control	No	Yes	No	No	Yes	Yes	Yes
Programmable system	No	No	No	No	No	No	Yes
Time code control	No	No	No	No	No	No	.....
RS-232/422 control	No	No	No	No	No	No	Yes
Composite encoder	No	No	Yes	Yes	Yes	No	Yes
Improved NTSC encoding	No	.....	No	No	No	No	.....
Video bandwidth	9MHz	5MHz	3MHz	6MHz	±0.1dB 5MHz	±0.1dB 5MHz	±1dB 3.3MHz NTSC
Video S/N ratio	.....	>60dB	56dB	56dB	>60dB	>60dB	56dB unwt'd
Envelope delay	.....	.....	700ns	390ns	N.A.	N.A.	Adjustable
Differential phase, gain	.....	1°, 1%	.....	<2°, 2%	<0.2°, 0.5%	<0.2°, 0.5%	.....
Reader Service No.	1088	1089	1090	1091	1092	1093	1093

⁸ ME9910, ME9930; includes PAL-M/N, NTSC-4.43; 4-field, 4-line with Advanced Motion Processing.

Manufacturer	Merlin Snell & Wilcox		OKI Electric Industry		Quantel		
	Model	ME 8800 series	DIP 9800	ME 2001 ⁹	LT 1200	LT 1250	Satin/Satin 601
Standards conversion	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supports NTSC	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supports PAL	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supports SECAM	Yes	Yes	Yes	Yes	No	No	Yes
Format conversion	Yes	No	.....	No	No	No	No
Supports Y/C-3.58	Yes	No	No	Yes	No	No	.....
Supports Y/C-688	Yes	No	No	No	No	No	.....
Supports RGB	Yes	Yes	.....	No	No	No	Yes
Supports YC _R C _B	Yes	.....	.....	No	No	No	.....
Supports D-1 CCIR 601	.....	.....	.....	Yes	No	No	Yes
Supports D-2	.....	.....	.....	No	No	No	.....
Dubbing applications	Yes	Yes	Yes	Yes	No	No	Yes
Production applications	Yes	Yes	.....	No	No	No	Yes
On-air applications	Yes	Yes	.....	No	No	No	Yes
Enhancement horizontal	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Enhancement vertical	Yes	Yes	Yes	Yes	Yes	No	Yes
Noise reduction	Yes	Yes	Yes	Yes	Yes	No	Yes
Color correction	Yes	Yes	Yes	Yes	Yes	Yes	.....
Contrast correction	Yes	Yes	Yes	Yes	Yes	Yes	.....
Sync regeneration	Yes	Yes	Yes	Yes	Yes	Yes	TBC function
Full proc amp control	Yes	Yes	Yes	Yes	No	No	Yes
Programmable system	Yes	Yes	No	No	No	Yes
Time code control	No	No	No



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RS-232/422 control	Yes	No	No	RS-422
Composite encoder	Yes	Yes	Yes	Yes	Yes	Yes
Improved NTSC encoding	.....	.....	.....	No	No	.....
Video bandwidth	> 3.3MHz NTSC	> 3.3MHz NTSC	.....	to 5.2MHz	3MHz	> 4.2MHz NTSC
Video S/N ratio	.....	.....	.....	50dB	48dB	.....
Envelope delay	.....	.....	.....	.....	.....	.....
Differential phase, gain	.....	.....	.....	3°, 3%	5°, 5%	.....
Reader Service No.	1094	1095	1096	1097	1098	1099

⁹ HDTV downconverter; supports 1125/60 SMPTE & SONY, 1050/59.94, 1250/50 HDTV inputs for NTSC, PAL/M/N, SECAM, NTSC-4.43 outputs.

Manufacturer	Sierra Video Systems		Video International	VisteK Electronics			
	Model	CIK-1 Keyer/Mixer ¹⁰	Delta Series	DTC 2504 ¹¹	V4000 series ¹²	V4401 ¹³	V1010 series ¹⁴
Standards conversion	No	No	No	Yes	Yes	Yes	No
Supports NTSC	No	No	No	Yes	Yes	Yes	No
Supports PAL	No	No	No	Yes	Yes	Yes	YUV
Supports SECAM	No	No	No	Yes	Yes	Yes	No
Format conversion	No	Yes	No	No	No	No	Yes
Supports Y/C-3.58	No	No	No	Yes	No	No	No
Supports Y/C-688	No	No	No	Yes	No	No	No
Supports RGB	Yes	Yes	No	Yes	Yes	Yes	Yes
Supports Y _R C _B	Yes	Yes	No	No	Yes	Yes	Yes
Supports D-1 CCIR 601	No	No	No	No	Yes	No	No
Supports D-2	No	No	No	No	No	No	No
Dubbing applications	No	No	Yes	Yes	Yes	Yes	Yes
Production applications	Yes	No	Yes	Yes	Yes	Yes	Yes
On-air applications	Yes	No	.....	Yes	Yes	Yes	NO
Enhancement horizontal	No	No	Yes	.....	.....	.....	No
Enhancement vertical	No	No	Yes	.....	.....	.....	No
Noise reduction	No	No	Yes	Yes	Yes	Yes	No
Color correction	No	No	No	No	No	No	No
Contrast correction	No	No	.....	.....	.....	.....	No
Sync regeneration	No	No	Yes	Yes	Yes	Yes	No
Full proc amp control	No	No	No	Yes	Yes	Yes	No
Programmable system	No	No	No	.....	.....	.....	No
Time code control	No	No	No	No	No	No	No
RS-232/422 control	No	No	No	Rmt Ctl	Rmt Ctl	Rmt Ctl	No
Composite encoder	No	No	.....	Yes	Yes	Yes	No
Improved NTSC encoding	No	No	No	.....	.....	.....	No
Video bandwidth	30MHz	20MHz	3.5MHz	±1dB 6MHz	±1dB 6MHz	±1dB 6MHz	> 0.1dB 5.5MHz
Video S/N ratio	60dB	60dB	54dB	.....	.....	.....	> 66dB unwt'd
Envelope delay	5ns	5ns	N.A.	< 20ns	.....	.....	Adjustable
Differential phase, gain	.....	N.A.	2°, 5%	.....	.....	.....	.....
Reader Service No.	1100	1101	1102	1103	1104	1105	1105

¹⁰ Component video, true linear keyer. ¹¹ Four-field interpolating system, includes Y/C I/O. ¹² V4001 PAL-I/B/-G to SECAM; V4002 NTSC to PAL-M; V4003 PAL-M to NTSC. Envelop delay value represents luminance/chrominance timing inequality. ¹³ Auto or manual selection of standard from input signal and supports HDTV. ¹⁴ Models include E/A 525/60 and CCIR 625/50 systems with conversion between RGB(S) to Y(S)PbPr, a YUV type signal.

Still Store Systems

Storage media for this equipment may include **HD** hard disk, **RHD** removable hard disk, **ST** streaming tape, **M-O** magneto-optical, **R-O** read only.

Manufacturer	Abekas Video	ALTA Group	Amplex	ASACA/ShibaSoku	Aston Electronics	Dubner Computer Systems
Model	A42	Centaurus	ESS-5	ADS-300 (ADS-6000)	Wallet	DSS-4
Storage medium	HD on-line, ST	HD, RHD	HD, RHD, ST, WORM	Magneto-Optical	HD cartridge.	HD, RHD, M-O, R-O
# simul out channels	2	1	2 (.....)	2 (.....)	3	1
Multiple control worstations	No	Yes	No	No	1	Yes
Standards	NTSC	NTSC, PAL	NTSC, PAL	NTSC (1125/60)	NTSC/PAL	NTSC
Stills catalog	Optional library	.....	Proof-sheet	.....	Disk directory	.....
Integral digital effects	No	Yes	No	.....	.....	Yes
Edit control port	GPI/RS-422	Yes	GPI	.....	No	GPI, GVG
Switcher control port	GPI/RS-422	Option RS-232/422	.....	.....	No	GPI, GVG
Video response	±0.25dB 4.2MHz	-3dB 5.5MHz	0.5dB 5.9MHz	±0.5dB 60-5.5M	[System uses	0.5dB 5MHz
Y/CrCb sample rate	.....	14.3MHz	13.5MHz	.....	[CCIR 601 4:2:2	.....
Differential phase, gain	2°, 2%	2°, 2%	2°, 2%	≤ 2°, ≤ 2%	[sampling with	1°, 1%
Chroma Luma delay	±10ns	.....	< 25ns	.....	[processors for	0ns
External TBC required	No	Dual TBC/FS	No	.....	[NTSC/PAL output	No
Composite digital	Yes w/D-2 opt	Y/C 3.58 (S-VHS)	.....	.....	.....	D-2
Component digital	.....	.....	D-1	.....	RGB/YUV	.....
Integral input A/D conversion	Yes	Yes	Yes	.....	Yes	Yes
Integral output D/A conversion	Yes	Yes	Yes	.....	Yes	Yes
Storage per disk	700 fids/350 frm ¹	170 fids, 85 frms	80-100 frames	3200 fids/1600 frms	39-42	1,000 images
# of drives maximum	3	4	4 HD, 7 SCSI	14	14	14
Worst case access time	750ms	2.1s/frame	1.5s	0.9s	≤ 2s	1ms
Sequence, loop programming	Yes	Yes	Yes	.....	Yes	Yes
Reader Service No.	941	942	943	944	945	946

¹ Optional smaller disk drive for 200 fields/100 frames.

Manufacturer	Harris Video Systems	Leitch Video	Quantel	Rank	Cinteli	
Model	IRIS II Plus	HarrisVws 5000 (1000)	Still File	Library systems	Pocket	Slide File
Storage medium	HD, RHD	FD & (HD)	HD, ST, MO, RO	Winchester	HD, RHD	HD, ST
# simul out channels	to 72	2 (1)	4 I/O	2 pgm/1 prvw (1 pgm)	2	to 4
Multiple control worstations	Yes	Yes	Yes	2 (1)	No	Yes
Standards	NTSC	NTSC	NTSC	NTSC, PAL, SECAM	NTSC, PAL	NTSC, PAL
Stills catalog	Data list	20 field database	Data list/3x3 ²	Data list/proofsheet	Title list/index	Polyphoto/index
Integral digital effects	Option	Option (No)	Yes	Yes (No)	Yes	Yes
Edit control port	Yes	Option	Various protocol	RS-422	Proprietary	Auto Preview, A/B
Switcher control port	Yes	Option	Various Protocol	Yes	No	A/B tally
Video response	0.4dB to 4.2MHz	0.4dB(0.5) to 4.2MHz	±0.15dB 4.5MHz	[CLL 6000 accesses	13.5MHz/6.75MHz	13.5MHz/6.75MHz
Y/CrCb sample rate	.....	.....	N.A.	[more than 100,000	.....	.....

Differential phase, gain	≤ 2° ≤ 2%	≤ 2° ≤ 2% (n.a.)	< 1° 2%	[frames from with	.....	.....
Chroma Luma delay	5ns	5ns (< 20ns)	< ±10ns	[networked work	.....	.....
External TBC required	No	No (Yes)	Integral synch	[stations.	No	No
Composite digital	.....	.....	D-2	Yes	No	No
Component digital	D-1	D-1 (.....)	N.A.	Y Cr Cb	D-1	D-1
Integral input A/D conversion	Yes	Yes	Yes	.....	Yes	Yes
Integral output D/A conversion	Yes	Yes	Yes	.....	Yes	Yes
Storage per disk	200 fields	748 (422) frames	1500/3000/5000 fids	800	40 frames	400 frames
# of drives maximum	32	25	4 for 10,000 frames	40 possible	2	1
Worst case access time	1s	1.9s	0.6s	0.5s	1.7ms	1
Sequence, loop programming	Yes	Yes	Yes	Yes	Yes	Yes
Reader Service No.	947	948	949	950	951	952

² Integrated management system; 2 users/station; Ethernet networking; color frame storage.

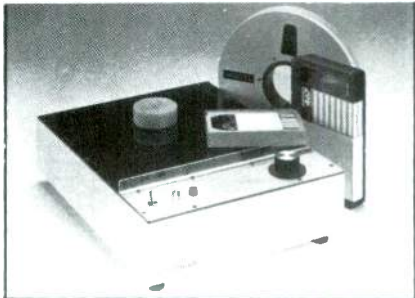
Routing Switchers

These systems are matrix-type switching systems, not utility routers stacked with looping inputs. Various systems designed for applications using component video are included and considered as a matrix in which all levels are required to function simultaneously with related signals.

Manufacturer	A.C.E./Midwest Communications	Arrakis Systems	Audio Visual Systemes	Auditronics	BSM Systems	
Model	Array routers	1100 series	S193/S194	S84 (S314 Onyx)	1900 IFB Mix-Minus	MODULA ser. 5000
Audio, Video, Combined	Audio/video	Audio only	Separate A & V	A & V	Audio	A/V
Basic crosspoint matrix	16x16	16x8 stereo	8x1	10x1 (16x8)	16x8	8x8
Typical system size	128x64	16x8	8x8	40x1 (128x128)	32x8	256x256
Audio response (±dB Hz-kHz)	±0.2dB 20-20k	0.5dB 20-20k	±0.5dB 20-20k	±0.5dB 20-20k	±0.5dB, 20-20k	±0.2dB 10-50k
Harmonic distortion	0.1%	0.01%	< 0.03%	< -0.03% 40-15k	0.01%	< 0.1%
S/N ratio	90dB	80dB	> 95dB	99dB (≥ 80dB) unwt'd	-91dB	80dB
Audio crosstalk (worst)	-80dB 1kHz 0dBm	-80dB 20kHz 20dB	< -80dB 1kHz 4dB	< -80dB 1kHz +4(22)dB	-88dB 1kHz +4dB	-80dB 30kHz 0dB
Video response	±0.1dB, 5.5MHz	.....	±0.2dB 12MHz	±0.2dB 12MHz	.....	±1.0dB 30MHz
Differential phase, gain	0.1°, 0.1%	.....	< 0.5°, < 0.5%	< 0.5°, < 0.5%	.....	< 0.2°, < 0.05%
Chroma Luma delay	±5ns	.....	< 5ns	< 5ns	.....	19ns
Video S/N ratio	70dB	.....	> 65dB	65dB	.....	65dB
Video crosstalk (worst)	-60dB @ 4.0MHz	.....	< -54dB 4.43MHz	-54dB 4.43MHz	.....	-65dB 3.58MHz
Control format	RS-422	4-bit BCD	RS-232, 4-bit BCD	RS-232/BCD (& -422)	.....	RS-232 Ethernet LAN
Multilevel audio control	Yes	No	S194	Yes	.....	Yes
Suitable for component video	Yes	No	S193	Yes	.....	Yes
Reader Service No.	767	768	769	770	771	772

Manufacturer	BSX-350V	BSB-3000 Patchbox	DRS 7	BTS	TVS/TAS-2000	TVS/TAS-3000	BVS-350C
Audio, Video, Combined	Video only	Audio only	Digital video	A/V	A/V	Component video

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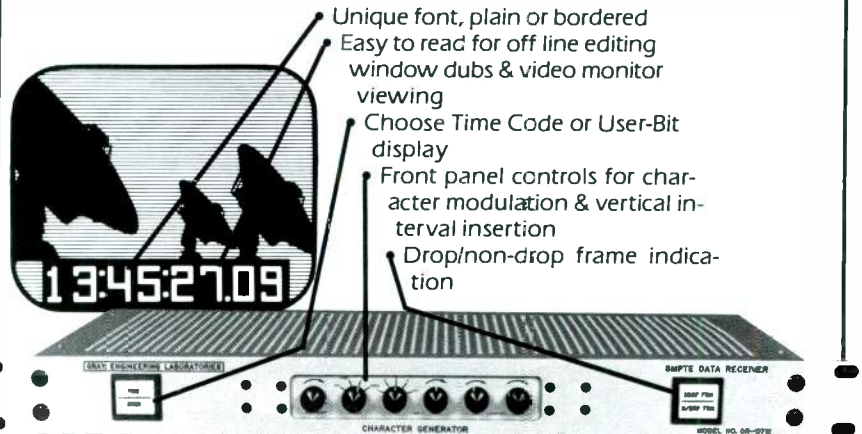
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Circle (112) on Reply Card

Basic crosspoint matrix	10×10	9×9	8×4	10×10	10×10	10×1
Typical system size	10×10	9×9	8×8, ×12, ×16	450×450 max	200×200 max	3×10×1-3×20×1
Audio response (±dB Hz-kHz)		±0.1dB 20-20k	[This product is directed toward	±0.1dB 20-20k	±0.1dB 20-20k	
Harmonic distortion		<0.002% 20-20k	CCIR 601 4:2:2	<0.005% +10dBv	<0.005% +10dBv	
S/N ratio		95dBu	[digital video, per CCIR 601	85dB Hum & noise	85dB	
Audio crosstalk (worst)		<-95dB 20kHz		<-90dB to 20kHz	<-90dB to 20kHz	
Video response	±1.5dB 15MHz	[Matrix is 4A +		-1,+0.5dB to 30MHz	-1,+0.5dB to 30MHz	±0.7dB 30MHz
Differential phase, gain	<0.1%	[1TC from VTR in		<0.10°, <0.10%	<0.15°, <0.15%	<0.1°, <0.15%
Chroma Luma delay	<±1°	[and out with		±1° Differential delay	±1° Differential delay	<±1.5° Differential delay
Video S/N ratio	>75dB	[4A from audio		>75dB	70dB	>75dB
Video crosstalk (worst)	<-60dB Fsc	[routing switcher		>55dB DC-4.43	>55dB DC-4.43	<-56dB w/Fsc
Control format	RS-232/-422	Front panel control programmable		15-pin RS-422	15-pin RS-422	Serial, partyline
Multilevel audio control				7-level breakaway	7-level breakaway	
Suitable for component video		N.A.	Digital	Yes	Yes	Yes
Reader Service No.	773	774	775	776	777	778

Manufacturer	CEL Electronics Grunder Associates	Central Dynamics	Datatek	Di-Tech		
Model	P169 series	SDS-2+	D-2400	D-2000	5616/5618	Model 5661/5662
Audio, Video, Combined	A/V	Audio/video	A/V	A/V	A/V	A/V
Basic crosspoint matrix	8×4	16×8	160×20	50×25	16×8	32×2
Typical system size	8×4	32×32	100×100, 800×800 max	50×50, 250×500 max	16×16	64×32
Audio response (±dB Hz-kHz)	-3dB 10-100k	-2dB 50-100k	±0.5dB 20-20k	±0.1dB 20-20k	±0.1dB 20-20k	±0.1dB 20-20k
Harmonic distortion		0.1%	0.005%	0.05%	<0.05%	<0.05%
S/N ratio	90dB	+100dB	113dB	105dB	>94dB	>94dB
Audio crosstalk (worst)	-70dB 20kHz 0dBm	-80dB 15kHz 0dB	-85dB 10kHz 30dB	-85dB 20kHz 30dB	<-75dB	<-75dB
Video response	0.1dB 6MHz	-3dB to 20MHz	0.25dB 20MHz ¹	0.25dB 10MHz	-1.5dB to 20MHz ²	-1.5dB 20MHz ²
Differential phase, gain	0.2°, 0.2%	0.1°, 0.1%	0.1°, 0.1%	0.15°, 0.15%	<0.25°, 0.25% ³	<0.25°, 0.25% ³
Chroma Luma delay	N.A.	≤10ns	±5ns	5ns	10ns	10ns
Video S/N ratio	+80dB	+66dB	70dB	60dB	<-70dBV	>70dBV
Video crosstalk (worst)	-55dB 4.5MHz	-65dB 5MHz	-60dB, 5MHz	-60dB 4.43MHz	<-60dB 4.5MHz	-60dB 4.5MHz
Control format	RS-232	RS-232/-422	RS-232, -422, coax	RS-422/-232, Coax	9002 Virtual Matrix Controller	9002 Virtual Matrix Controller
Multilevel audio control	No	Yes	Yes	Yes	Yes	Yes
Suitable for component video	Yes	Yes	Yes	Yes	Yes	Yes
Reader Service No.	779	780	781	782	783	784

¹ Response is -3dB at 40MHz. ² 30MHz version available. ³ ≤0.1°, ≤0.1% typical.

Manufacturer	Di-Tech	DYNAMITE	DYNASTY 100	DYNASTY	20-TEN	Horizon DHX-532 ⁹
Model	Model 5864/5865					
Audio, Video, Combined	A/V	A/V	A/V	A/V	A/V	Video only
Basic crosspoint matrix	32×2	10×10	10×10	10×10	20×10	8×8
Typical system size	32×24	30×10	50×100	100×100	20×10-20×20	32×32
Audio response (±dB Hz-kHz)	±0.1dB 20-20k	±0.1dB 30-20k	±0.1dB 20-20k	±0.1dB 20-20k	±0.1dB 20-20k	[Conforms to
Harmonic distortion	<0.05%	0.25%	0.25%	0.25%	0.05%	[SMPTe RP125
S/N ratio	>94dB	99dB	99dB	99dB	120dB	[CCIR 601 MOD F
Audio crosstalk (worst)	<-75dB	>80dB 15kHz +24dBm	>80dB 15kHz +24dBm	>80dB 15kHz +24dBm	-80dB 20kHz +24dBm	[and EBU 3246-E
Video response	-1.5dB to 20MHz ⁴	±0.3dB to 8MHz ⁵	±1.0dB 50MHz ⁷	±0.3dB 20MHz ⁶	±0.5dB 10MHz	[standards.
Differential phase, gain	<0.25°, 0.25% ⁵	0.05°, 0.05%	0.25°, 0.25%	0.05°, 0.05%	0.2°, 0.1%	
Chroma Luma delay	10ns	<5ns		<5ns	20ns	
Video S/N ratio	<-70dBV	80dB 10MHz bw	65dB, 10MHz bw	80dB, 10MHz bw	75dB	
Video crosstalk (worst)	<-60dB, 4.5MHz	>60dB 5MHz	>50dB 5MHz ⁸	>60dB 5MHz	-50dB 10MHz	
Control format	Model 9002 Virtual Matrix Controller		RS-232/422/423	RS-232/422/423	RS-485	RS-232/422, Horizon C-Bus Control
Multilevel audio control	Yes	Yes	Yes	Yes	Yes	N.A.
Suitable for component video	Yes	No	Yes	Yes	Yes	No
Reader Service No.	785	786	787	788	789	790

⁴ 30MHz bandwidth available. ⁵ <0.1°, <0.1% typical. ⁶ Based on 40MHz bandwidth. ⁷ Based on 100MHz bandwidth. ⁸ Measures 25dB at 100MHz. ⁹ Digital signal routing system.

Manufacturer	Grass Valley Group	HEDCO	Image Video	JNS Electronic Industries	Kaitronics Corporation	
Model	Horizon systems ¹	HD-16X(A)/HD-16X(V)	9520 (9521)	9000 series	RS-1000 LC (HDTV)	RS-1000RGB
Audio, Video, Combined	A/V	Separate A & V	Video (Dual audio)	A only	A/V	Video
Basic crosspoint matrix	8×16	16×4, 16×8	20×10	15×8 stereo	10×10	10×10
Typical system size	128×128	16×16 to 64×64	20×10	(15×16 mono)	10×10	10×10
Audio response (±dB Hz-kHz)	±0.2dB 20-20k	-0.5, 0dB, 10k	-1, 0dB 20-100k	<±0.2dB 10-20k	±0.1dB 20-20k	[CT φ <0.25°
Harmonic distortion	<0.05%	<0.02% 20k 30dBu	<0.2%, +24dBm	<0.01% 10-100k	0.01%	[CT gain <0.05% ¹¹
S/N ratio	100dB	-84dBu 30kHz BW	>96dB	-90dB 10-10k +8dBm	70dB	[CT error <5ns
Audio crosstalk (worst)	-80dB 20kHz +24dBm	<-86dB 20k 30dBu	<-75dB 20kHz	<-90dB stereo	-70dB 10kHz +8dB	[Ampl acc'y +0.5%
Video response	±0.15dB 5MHz	3dB BW >30MHz	-1, 0dB 20MHz		+1dB to 50MHz	3dB to 50MHz
Differential phase, gain	<0.1°, 0.1%	<0.3°, 0.2%	<0.15°, 0.15%		0.1°, 0.1%	0.1°, 0.1%
Chroma Luma delay	10ns				1ns	
Video S/N ratio	>75dB	>76dB unwt'd 10MHz	<70dB hum-noise		+70dB	70dB
Video crosstalk (worst)	-60dB 6MHz	>60dB 3.58MHz			-68dB @ 5MHz	-68dB @ 5MHz
Control format	RS-232/-422	RS-422/-485/-232	RS-232/-422, BCD	RS-232, modem	RS-232/422	RS-232/-422
Multilevel audio control	Yes	8-level				No
Suitable for component video	Yes	Yes			Yes (HDTV-50MHz)	All formats.
Reader Service No.	791	792	793	794	795	796

¹⁰ Series consists of HX-16, HX-32, HX-48, HX-64 and HX-128 models. ¹¹ Lum ramp lin. <1% shallow ramp lin+1mV.

Manufacturer	3M Broadcasting/Related Products	3M/International Tapetronics	Omicron Video	Shintron	
Model	Series H 256×32 ¹²	15× series	Model 40×	553-20/10-4VA	12×S4 (-VA/-C4)
Audio, Video, Combined	A/V	A/V	A/V	Audio only	A (V)
Basic crosspoint matrix	256×32	15×12	40×20	16×16	12×4
Typical system size	256×256	15×12	40×20	64×48 mono	20×10 4V/1A

The 16X Router Series offers:

— system compatibility —

This latest family of broadcast quality 16 x 16 switchers allows video, audio and data routing in the same system, all operating on a common control bus.

Fill your routing requirements now and add on as you grow. Single or multiple units up through 8 levels can be controlled from one or more locations with a variety of control panels or the optional RS-232 interface.

FEATURES

Video

- Available in 16 x 16, 16 x 8, 16 x 4, 8 x 8, and 4 x 4 composite; 8 x 8, 5 x 5 and 4 x 4 component
- Vertical interval switching
- Terminating inputs
- Differential inputs/outputs
- Expandable to 64 x 64 with 8 levels

Audio

- Available in 16 x 16, 16 x 8, 16 x 4, 8 x 8, and 4 x 4
- Stereo, dual, or monaural in 1 RU
- Balanced Inputs/Outputs
- Expandable to 64 x 64 with 8 levels

Data*

- True 4-wire system providing 2-way digital paths for routing of RS-422 signals
- ANSI/SMPTE 207M-1984 interface standard pin-out using 9-pin subminiature "D" connector
- Regenerative, operationally transparent
- Expandable to 64 x 64 with 8 levels

Control

- Proprietary RS-485 compatible
- Panels available in local/remote 16 x 16, 16 x 8, 16 x 4, 8 x 8, 4 x 4, single/dual bus, and breakaway
- Alpha-numeric remote
- Thumbwheel (single, dual or triple bus)
- Optional RS-232 interface module

* HD-16 Data Router available only in 16 x 16

Contact your HEDCO dealer^o for information or call:

HEDCO (800) 433-2648
Fax: 916-273-6948

HEDCO

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HEDCO P.O. Box 1985, Grass Valley, Ca 95945



Audio response (\pm dB Hz-kHz)	± 0.15 dB, 20kHz	± 0.5 dB 20-20k	± 0.25 dB 20-20k	± 0.1 dB 20-20k	± 0.5 dB 30-20k
Harmonic distortion	0.15%	< 0.5%	< 0.3%	0.01%	< 0.1% 18dBm	0.3%
S/N ratio	76dB	85dB	80dB	95dB	> 105dBm 25dBv out	82dB
Audio crosstalk (worst)	< -80dB	< -80dB	< -70dB	< -95dB 1kHz +20dB	< -80dB 15kHz	-74dB 20kHz
Video response	-1.5,+0.5dB 20MHz	± 0.5 dB 12MHz	± 0.5 dB 12MHz	± 0.2 dB 300k-5MHz	-46 5MHz/-3 30MHz
Differential phase, gain	0.1°, 0.1%	< 0.5°, 0.5%	< 0.4°, 0.4%	.....	< 0.25°, < 0.25%	0.25°, 0.25%
Chroma Luma delay	± 10 ns	.....	.....	.....	.....	10ns
Video S/N ratio	73dB	60dB	60dB	.....	> 65dB	63dB
Video crosstalk (worst)	-60dB 3.58MHz	-52dB 3.58MHz	-60dB 3.58MHz	.....	< -60dB F/SC	-60dB 5MHz
Control format	RS-232	4-bit BCD	RS-232	RS-232	RS-232/422	RS-422
Multilevel audio control	Yes	Yes	Yes	Yes	.....	No/.....
Suitable for component video	Yes	Yes	Yes	.....	Possible	No/Yes
Reader Service No.	797	798	799	800	801	802

¹² Other systems in the series include: H 64 64x64; H32 32x32; H 128 128x128 which have essentially the same performance characteristics.

Manufacturer	Sierra Video Systems				Utah Scientific
Model	MAXIN series	Series 5 Component	Series 32 ¹³	Series 16 (8)	AVS-2
Audio, Video, Combined	Video only	Video only	A/V	A/V	Audio/video
Basic crosspoint matrix	16x4	5x1x3	32x8-V, 32x16-A	16x4 (8x8)	10x10
Typical system size	32x4 to 80x4	5x1x3	32x32, 32x64	16x8, 16x16 (8x8)	50x50
Audio response (\pm dB Hz-kHz) . . . . .	.....	.....	0.1dB 20-15k	0.1dB 20-15k	0.05dB 30-20k
Harmonic distortion . . . . .	.....	.....	0.1%	0.1%	0.05%
S/N ratio . . . . .	.....	.....	100dB	100dB	-85dBm
Audio crosstalk (worst) . . . . .	.....	.....	-80dB 15kHz	-80dB 15kHz	-90dB, 20k, 24dBm
Video response	3dB 30MHz	3dB 30MHz	3dB to 300MHz	3dB to 300MHz	0.5dB 30MHz
Differential phase, gain	0.25°, 0.25%	0.25°, 0.25%	0.25°, 0.25%	0.25°, 0.25%	0.05°, 0.05%
Chroma Luma delay	5ns	5ns	5ns	5ns	0.05ns
Video S/N ratio	60dB	60dB	60dB	60dB	-80dB
Video crosstalk (worst)	-50dB 3.58MHz	-55dB 3.58MHz	-50dB, 3.58MHz	-50dB, 3.58MHz	-60dB @ 4.43MHz
Control format	RS-232, keypad Control panel	RS-232, local/remote pushbutton control	RS-232, various control panels	RS-232, various control panels.	RS-232/422/digital
Multilevel audio control	No	No	Yes	Yes	Yes
Suitable for component video	Yes	Yes	Yes	Yes	Yes
Reader Service No.	803	804	805	806	807

¹³ Series 42 is designed for routing of data and SMPTE RS-422 signals; its base matrix is 16x16 and can be expanded to 64x64, with similar control facilities as the Series 32.

Video Switchers, Master Control & Production

These video switching systems are designed for television production and master control applications. Abbreviations used in this section include **N** NTSC, **P** PAL, **S** SECAM; for wipe effects: **ROT** rotary, **S-E** soft-edged, **Adj-E** adjustable edge; **External Ext**, **Internal Int**; **Encoded** is used to mean Composite; **Comp** refers to the various color component formats.

Manufacturer	A.C.E./Midwest Communications	Abekas Video	Ampex	BTS	Central Dynamics	
Model	TBN	ARENA	AB4 Digital Post	AVC Vista series	MCS-2000	Strata-10
Control application	Production	Production	Post production	Production	Master control	Production
Standard	PAL	NTSC	CCIR 601	NTSC, PAL C/C	NTSC, PAL	N/P analog ³
# inputs	8	13	12	10	to 250	24, 16, 30 ³
Integral matte source	3 generators	6 generators	Yes	1 generator	4 generators	16 generators
Key sources	2 ext, 8 int	4 ext, 13 int	12 ext 12 int	2 ext 10/18 int	Ext, int	Int, Ext
Chroma keys	3 RGB, 1 Encoded	1 RGB	8 RGB	3 RGB/2 comp ¹	.....	RGB, Encoded
Downstream keyer	Yes	Yes	No	Yes	Yes	w/1 of 2 titler
Switching buses	2 prime, 1 aux	4 prime, 1 aux	3	4 prime, 4 aux	3	7 prime, 3 aux
# switcher M/E amps	2	3	8 layer capability	1.5	.....	2
# pattern generators	2 gen w/89	2 gen w/89	3	1 w/32 patterns	None	4, > 100 patterns
Wipe effects	ROT, S-E, Adj-E	ROT, S-E, Adj-E	ROT, S-E, Adj-E	S-E, adj.	No	ROT, S-E, Adj-E
Spotlight effects	Yes	Yes	.....	Yes	No	Yes
Border effects	Yes	Yes	Yes	Opt	Yes	Yes
Shadow effects	Yes	Yes	Yes	Opt	Yes	Yes
Programmable routines	64	Yes	Yes	24 routines	Yes	> 100 routines
Memory backup battery	Yes	Yes	Yes	No	No	Yes
Diagnostic software	No	No	Yes	Yes	Yes	Yes
Digital effects port	Yes	Yes	Yes	Digi-Loop ²	.....	Yes
Automation port	RS-422	RS-422	From edit control	GPSI/PIP Option	BTS-2300 system	ESbus
Input timing adjustment	No	No	Yes	.....	.....	No
Path length, deviation	300ns	440ns	.....	1.5°	$\pm 1^\circ$	1°
Crosstalk at subcarrier	-56dB	-50dB	.....	-55dB	< -60dB	< -56dB
Link to rack electronics	1-line, digital	1-line, digital	1-line, digital	Multicore cable	.....	1-line, digital
Audio preview function	No	No	No	Option	Yes	No
Audio metering	No	No	No	Option	Yes	No
Audio level control	No	No	No	Option	Yes	No
Audio mixer interface	No	No	No	Option	.....	Yes
Edit control interface	Yes	Yes	Yes	Option	No	Yes
Reader Service No.	731	732	733	734	735	736

¹ Three SpectraKey systems are included. ² Fully integrated ADO-100 option. ³ Models available with 20, 12 and 26 inputs; inputs may include component signals.

Manufacturer	ECHO Lab Inc			For-A	Grass Valley Group	
Model	CV-5	DV-7	SE-6	CVM-500 (CVM-600*)	Model 300 2A/2B	200-2 Composite
Control application	Production	Production	Production	Production	Production	Production, post
Standard	NTSC, PAL	NTSC, PAL	NTSC, PAL	NTSC (RGB, R-Y/B-Y)	NTSC, PAL	NTSC, PAL
# inputs	10	6	10	6 (12)	18/26	17
Integral matte source	3 generators	3 generators	3 generators	2 generators	5 generators	9 generators
Key sources	4 ext, 10 int	3 ext, 1 int	5 ext 20 int	4 ext, 2 int	6/31 Ext 18/26 int	16 ext, 20 int
Chroma keys	RGB, Encoded opts	RGB opt	RGB, Comp opts	1 RGB	6 RGB, 14/22 Comps	8 RGB, YUV
Downstream keyer	Yes	Yes	Yes	Yes	Yes	Standard
Switching buses	3 primary	3 primary	4 primary 1 aux	2 prime	9 prime 5 aux ⁵	8 prime, 4 aux
# switcher M/E amps	1 1/2	1	2 1/2	1	2	2
# pattern generators	1 1/2, 39 patterns	1, 10 patterns	2, 40 patterns	1 w/24 patterns	2 w/44 patterns ⁶	2 gen 56 patterns ⁷
Wipe effects	ROT, Adj-E	Soft-edge	Adj. edges	Adj. edges	ROT, S-E, Adj-E	ROT, S-E, Adj-E
Spotlight effects	Yes	No	Yes	No	Standard	Standard
Border effects	Yes	Yes	Yes	Yes	Yes	Yes
Shadow effects	Opt	No	Opt	Yes	Yes	Yes
Programmable routines	1 std, 5 opt	No	10, 297 keyframes	160 routines	20 per M/E	50+disk storage
Memory backup battery	Yes	No	Opt	No	Yes	Yes

THE GRASS ISN'T ALWAYS GREENER.



DYNAIR introduces the DYNA MITE small routing switcher. And suddenly the competition's switchers are looking a little wilted.

Perhaps that's because DYNA MITE is available in 10 X 10, 20 X 10. And 30 X 10. In video or audio. As

well as in a 10 X 10 single-unit A/V package. No doubt it has something to do with DYNA MITE's modular design, too. Which lets you expand all the way to 30 X 10 video or audio.

And as your needs grow, DYNA MITE continues to protect your routing switcher investment. By allowing you to stack units. And make the move to component video or stereo audio. You can even use DYNA MITE modules within our

larger Dynasty frame for almost unlimited expansion. Even beyond 30 X 10. And with a full

40 MHz bandwidth, DYNA MITE delivers high-performance output now. While covering your future HDTV needs. Plus DYNA MITE's 2 RU frame

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Our prices? Let's just say they're competitive. Very competitive. Even when compared to narrow-band switchers.

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For a more in-depth look, call 800-854-2831.

	10, 20 or 30 Inputs	Fully Expandable	40 MHz HDTV Ready	Built-In Control Panel
Grass Valley	NO	NO	NO	NO
DYNAIR DYNA MITE	YES	YES	YES	YES

Graphic evidence that the DYNA MITE routing switcher outperforms the competition.



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Diagnostic software	Yes	Yes	No	No	Yes	Yes
Digital effects port	Yes	No	No	No	Yes
Automation port	No	No	No	RS-422	Editor option	Serial editor opt
Input timing adjustment	±0.001ms	±0.001ms	±0.001ms	±1ms	No	.....
Path length, deviation	1°	1°	1°	1°	≤1.5°	1.5°
Crosstalk at subcarrier	-52dB	-51dB	-51dB	-60dB	-54dB	≤-54dB
Link to rack electronics	2 coaxial	1-line, digital	Multicore cable	Multicore	Multicore cables	1-cable 2-port serial
Audio preview function	No	No	No	Option	No	No
Audio metering	No	No	No	Option	No	No
Audio level control	No	No	No	Option	No	No
Audio mixer interface	No	No	No	Option	Option	No
Edit control interface	GPI Opt	Opt	No	Yes (Opt)	Option	Option
Reader Service No.	737	738	739	740	741	742

⁴ CVM-600 is designed for use with component video as well as NTSC Encoded. ⁵ 12 bus aux optional. ⁶ Programmability for more than 1000 patterns. ⁷ Programmable ((20+4)×16)+32.

Manufacturer	Grass Valley Group					Image Labs
Model	MASTER 21	Model 100 (100CV)	Model 200-1	200-2CV	Model 300 3A/3B	ES 2000
Control application	Master control	Production, Post	Production, post	Production, post	Production	Production
Standard	NTSC, PAL	N/P (RGB/YUV)	NTSC, PAL	Y,R-Y,B-Y, YUV	NTSC, PAL	NTSC, PAL
# inputs	16	8	17	17	18/26	2
Integral matte source	1 Int generator	3 generators	6 generators	9 generators	7 generators	No
Key sources	4 ext std, 5 opt	2 ext 8 int	10 ext, 20 int	16 ext, 20 int	6/31 Ext 18/26 Int	.....
Chroma keyers	1 RGB opt	1 compos (1 RGB)	8 RGB or YUV	.....	6 RGB, 14/22 Comps	.....
Downstream keyer	Y	Yes	Yes	Yes	Yes	No
Switching buses	2 prime	3 prime	4 aux	8 prime, 4 aux	12 prime 2 aux ¹¹	1 prime
# switcher M/E amps	1 opt	1	1	2 M/Es	3	1
# pattern generators	1 w/10 patterns	1 gen, 10 patterns ⁸	1 w/56 patterns ⁹	2 gen, 56 patterns ⁹	3 w/44 patterns ¹²	1 w/2 patterns
Wipe effects	S-E, Adj-E	S-E, Adj-E	ROT, S-E, Adj-E	ROT, S-E, Adj-E	ROT, S-E, Adj-E	S-E, Adj.
Spotlight effects	Option	Yes	Yes	Yes	Yes	No
Border effects	Option	Yes	Yes	Yes	Yes	No
Shadow effects	Option	Yes	Yes	Yes	Yes	No
Programmable routines	No	16 optional	50+disk storage	50	20 per M/E	4 routines
Memory backup battery	Yes	Yes	Yes	Yes	Yes	No
Diagnostic software	Yes	Yes	Yes	Yes	Yes	No
Digital effects port	Opt w/GVG DPM-100	No	No	No	Yes	No
Automation port	RS-422	Serial editor	Serial editor opt	Serial editor opt	Editor option	No
Input timing adjustment	No	No	.....	.....	No	.....
Path length, deviation	100ns length	<1.5° (Unspecified)	<1.5°	Not applicable	≤1.5°	.....
Crosstalk at subcarrier	56dB	-54dB DC-5MHz	≤-54dB	≤-56dB DC-4MHz	-54dB	.....
Link to rack electronics	Multicore cable	Multicore	1-line digital ¹⁰	1-line digital ¹⁰	Multicore cables	N.A.
Audio preview function	Yes	Option	No	No	No	No
Audio metering	Yes	Option	No	No	No	No
Audio level control	Yes	Option	No	No	No	No
Audio mixer interface	No	Option	No	No	Option	No
Edit control interface	No	Option	Option	Option	Option	No
Reader Service No.	743	744	745	746	747	748

⁸ Patterns include modifiers. ⁹ Programmable ((20+4)×16)+32. ¹⁰ Single cable dual-port serial. ¹¹ 12 bus aux option. ¹² Programmability for more than 1000 patterns.

Manufacturer	Intergroup Technologies			JVC Professional Products		
Model	Model 8020	Model 9500 series ¹³	9310 (9410) [9420]	Model 9624	KM-1200U	KM-2500U (3000U)
Control application	Master Control	Production	Production	Production	Production	Production
Standard	NTSC, PAL	NTSC, PAL	NTSC, PAL	NTSC, PAL	NTSC	NTSC
# inputs	19	22	9 [19]	22	4	8
Integral matte source	1 generator	6 generators	1 generator [2]	6 generators	1 generator	2 gen w/DSK
Key sources	4 ext	6 ext, 24 int	2 ext, 10 [20] int	12 ext, 24 int	Ext, Int	Ext, Int
Chroma keyers	None	2 RGB	1 RGB	3 RGB	RGB, Encoded	RGB
Downstream keyer	Yes	Option	Option (Yes)	Yes	Yes	Yes
Switching buses	2 prime	6 prime 2 aux	4 (6) prime 0 aux	6 prime, 2 aux	4 prime	8 prime 1 aux
# switcher M/E amps	Option	2	2	2	.....	.....
# pattern generators	.....	2 w/42 patterns	1(2) w/14(16) pat.	2 w/42 patterns	6 patterns	13 patterns (23)
Wipe effects	None	ROT, S-E, Adj-E	S-E, Adj-E	ROT, S-E, Adj-E	Yes	S-E, Adj
Spotlight effects	No	Yes	Yes	Yes	No	No
Border effects	No	Yes	Yes	Yes	No	Yes
Shadow effects	No	Yes	Yes	Yes	No	No
Programmable routines	No	250 routines	100 option	250 routines	No	No (16)
Memory backup battery	Yes	Yes	Option	Yes	N.A.	No (Yes)
Diagnostic software	Yes	Yes	Yes	Yes	Yes	No
Digital effects port	No	Yes	No	Yes	No	No
Automation port	RS-422	RS-422	RS-422 opt	RS-422	.....	No
Input timing adjustment	±5ms	±5ms	±5ms	±5ms	.....	.....
Path length, deviation	2°	2°	2°	2°	.....	.....
Crosstalk at subcarrier	-55dB	-56dB	-56dB	-56dB	.....	.....
Link to rack electronics	1-line, digital	1-line, digital	Multicore cables	1-line, digital	N.A.	1-line, digital
Audio preview function	Yes	Option	Option	Option	No	No
Audio metering	Yes	Option	Option	Option	No	No
Audio level control	Yes	Option	Option	Option	No	No
Audio mixer interface	No	Option	Option	Option	No	No (Yes)
Edit control interface	No	Option	Yes	Option	No	GPI opt (& serial)
Reader Service No.	749	750	751	752	753	754

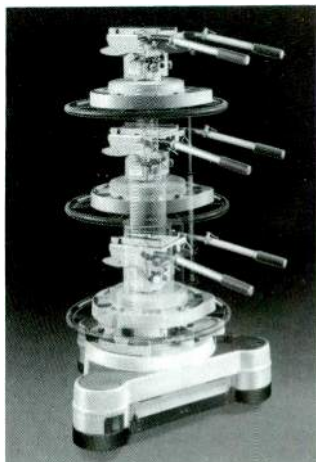
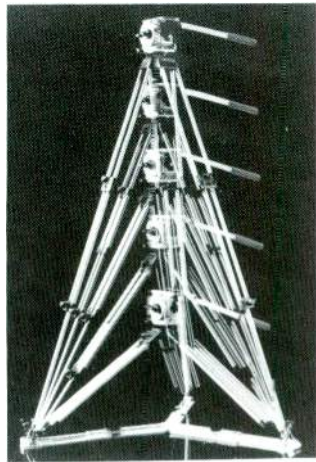
¹³ Members of series include 9512S, 9512D, 9524D.

Manufacturer	Omicron Video	Prime Image	Ross Video Ltd	Sony Communications Products		
Model	507 series	# 600 S-Switch	Model 416	Model 210A/216A	BVS 3100 (3100P)	BVS 3200 (3200C ¹⁸)
Control application	Master control	Production	Production	Production	Production	Production
Standard	NTSC or PAL	NTSC	NTSC, PAL	NTSC, PAL	NTSC, PAL	NTSC, PAL
# inputs	10/15/30	14	6	8/14	8	8 Encoded ¹⁸
Integral matte source	Options	3 generators	6	3 generators	3 generators	4 generators
Key sources	Yes	1 Ext 8 int	6-E, 14-I	3-E, 8/14-I	3 ext, 8 int ¹⁵	3 ext, 8 int ¹⁵
Chroma keyers	.....	Encoded, Y/C	4-RGB, 1-Encoded	RGB & Encoded	1 RGB	1 RGB
Downstream keyer	Yes	Option	Option	Y	Yes	Yes
Switching buses	Pgm, Prset	2 prime, 1 aux	6 prime, aux avail	3 prime	3 prime 0 aux	4 prime 0 aux
# switcher M/E amps	1	1 M/E	2	1	1	1
# pattern generators	None	16 w/16 patterns	2 w/64 patterns	1 w/53 patterns	1 w/18 patterns	1 w/18 patterns

Wipe effects	None	S-E, Adj-E	ROT, S-E, Adj-E	S-E, Adj-E	S-E, Adj-E	S-E, Adj-E
Spotlight effects	None	No	No	No	No	No
Border effects	None	Yes	Option	Yes	Yes	Yes
Shadow effects	Integral	No	No	No	Yes	Yes
Programmable routines	Fade-black	No	Opt ¹⁴	N	E-File registers ¹⁶	E-File registers ¹⁶
Memory backup battery	No	No	Yes	Yes	No	No
Diagnostic software	No	No	Yes	Yes	Yes	Yes
Digital effects port	No	No	Yes	Yes	Yes ¹⁷	Yes ¹⁷
Automation port	Ser/par opts	No	RS-422 opt	RS-422 option	No	No
Input timing adjustment	.....	±3ms	No	No	No	No
Path length, deviation	.....	2°	±1°	±1°	≤1.5°	≤1.5°
Crosstalk at subcarrier	< -56dB FSC	-50dB	-53dB	-53dB	-54dB	-54dB
Link to rack electronics	.....	N.A.	Dig 1-line	Digital/RS-422	Digital/RS-422	Digital/RS-422
Audio preview function	Yes	Yes	.....	.....	No	No
Audio metering	.....	No	.....	.....	No	No
Audio level control	Manual/stereo opt	No	.....	.....	No	No
Audio mixer interface	No	Yes	.....	.....	No	No
Edit control interface	No	Yes	Option	Option	Yes	Yes
Reader Service No.	755	756	757	758	759	760

¹⁴ Disk-based offers unlimited number of routines. ¹⁵ Any input on key bus may be assigned as an internal key source. ¹⁶ 10 E-File registers std, may be sequenced from editor. ¹⁷ Dedicated RS-422 control of DME 450. ¹⁸ Model 3200C is designed for RGB/Betacam component use.

Manufacturer	Thomson Video Equipment		Utah Scientific	VGV	Videotek	Vistek Electronics
Model	TTV5645	IMPULS	MC-500 series	D2500	Prodigy	Series 5000
Control application	Production (16:9)	Production	Master	Production	Production	Production
Standard	Analog comp	4:2:2 digital	NTSC, PAL	D-2 Digital	NTSC, PAL	CCIR R-601 4:2:2
# inputs	16	16	30	20	8	8, expandable ²¹
Integral matte source	Yes	Yes	Y/I gen	8 ¹⁹	1 generator	Yes
Key sources	Int, Ext	Int, Ext	3E, 1I	10 ext 20 int	3 ext 3 int	3 ext, 4 int
Chroma keyers	Yes	Yes	None	RGB, R-Y/B-Y	RGB Opt	CCIR 601
Downstream keyer	Yes	.....	None	.....	Yes	No
Switching buses	.....	5 prime	2 prime, 1 aux	5 prime, 4 aux	3 prime	3 prime 1 aux
# switcher M/E amps	1 w/4 effects buses	Multiple	1	3	1 ME	1
# pattern generators	4 generators	Multiple digital	1 w/4 patterns	6 w/100 patterns	24 pat/programmable	1 programmable
Wipe effects	Various	Yes	Soft-edge	ROT, S-E, Adj-E	S-E, Adj-E	16 ROT ²²
Spotlight effects	Yes	Yes	No	Yes	Yes	Yes
Border effects	Yes	Yes	Yes	Option	Yes	No
Shadow effects	Yes	Yes	Yes	Option ²⁰	No	Yes
Programmable routines	Yes	Yes	Opt 99 routines	More than 100	100 routines	Eight
Memory backup battery	Yes	Yes	Yes	Yes	Yes	Yes
Diagnostic software	Yes	Yes	Yes	Yes	Option	Option
Digital effects port	Yes	Yes	No	Yes	Option	RS-232
Automation port	.....	Yes	Yes	RS-422	.....	Synchronizer, ±32μs
Input timing adjustment	.....	Automatic	No	No	.....	5μs insertion delay
Path length, deviation	±1° dev	3200ns	≤0.5°	No applicable
Crosstalk at subcarrier	[Performs 4:3	-60cB	N.A.	<-60dB	



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Circle (115) on Reply Card

Link to rack electronics	aspect ratio	N.A.	Multicore	1-line digital	Multicore cable
Audio preview function	[conversion on	N.A.	Yes	N.A.	Yes	No
Audio metering	[analog signals	N.A.	Yes	N.A.	No	No
Audio level control	[to 16:9 CCIR	N.A.	Yes	N.A.	No	No
Audio mixer interface	[signal format.	N.A.	No	N.A.	No	No
Edit control interface	Yes	Yes	No	Option	Yes	Option
Reader Service No.	761	762	763	764	765	766

¹⁹ Including complex functions. ²⁰ Flying total screen. ²¹ Accepts analog and digital component video signals per CCIR 601, 656. ²² Soft edge and other adjustable edge controls.

Time Base Corrector/Frame Synchronizer

These products are designed to correct video signal timing instabilities resulting from VTR/VCR mechanical variations and other sources of timing variation.

Manufacturer	ALTA Group	Ampex	BTS	Digital Processing Systems/Midwest Communications		
Model	Cygnus (Cygnus 5.5)	ZEUS	DSY7	DPS-170	DPS-375	DPS-275
Integrated video production	No	No	No	No	No	No
Function (TBC/Synchronizer)	TBC/FS	TBC	Synchronizer	TBC	BC/Synchronizer	TBC/Synchronizer
Standards (/c composite)	NTSC, PAL Composite	NTSC/c	CCIR 601	NTSC/c	PAL/c	NTSC/c
Format	(Y/C-358)	.....	Digital component	.....	Y/C-688, Y/C-4.43 ¹	Y/C-358, Y/C-688 ¹
Format conversion	(Yes)	No	With options	No	Yes	Yes
Sampling frequency, bits	14.3MHz 8-bit	14.3MHz 9-bit	4:2:2 8/9/10-bit	14.3MHz, 8-bit	16MHz, 8-bit	14.3MHz, 8-bit
Correction window	262 TVL, 1 field	60 TVL	.....	16 TVL	1 frame	1 frame
Video bandwidth	290 line (5.5MHz)	5.0 MHz	Per CCIR 601	to 4.5MHz	to 6 MHz	to 6MHz
S/N ratio	55dB NTSC/PAL	46dB NTSC	.....	+58dB NTSC	+58dB PAL	+58dB NTSC
Differential phase, gain	3°, 3% (2°, 2%)	<2°, 2%	.....	<2°, 2%	1°, 1%	<1°, 1%
Residual error (/C chroma, /M luminance)	.....	±2.5ns C, ±10ns M	.....	2ns/c, 15ns/m	2ns/C, 15ns/M	2ns/C, 15ns/M
Advanced sync output	No	Yes	AF delay ctl	Yes	Yes	Yes
Coherent subcarrier	No	No	No	Yes	No	No
Composite input, output	Yes	Yes	w/options	Yes	Yes	Yes
Component input, output	(Y/C 358 I/O)	D-2 out	Digital	No	Yes	Yes
Velocity compensation	No	Yes	No	No	No	No
Processing type	Heterodyne	Heterodyne	[Auto select of	Direct, hetero	Heterodyne	Heterodyne
Servo, non-servo capstan	Servo	Servo opt	[525/625 line	Servo	Non servo	Non servo
Supports dynamic tracking	Yes	AST	[standard ref.	Yes	No	No
Noise reduction mode	No (Chroma)	Yes	[to input sync.	No	Chrominance	Chrominance
Image enhancement mode	Yes (No)	.....	.....	No	Yes	Yes
Production effects	Yes	No	No	No	Variable, strobe	Variable, strobe
Source switching features	A/V switching	Video	Yes	No	No	No
Proc amp capability	Full adj	Full	.....	Full	Full	Full
Reader Service No.	987	988	989	990	991	992

¹ Other formats include Y/R-Y/B-Y, M-II, Betacam.

Manufacturer	Digital Processing Systems/Midwest Communications			For-A		
Model	DPS-370	DPS-175A	DPS-270	FA-210	FA-800	FA-450
Integrated video production	No	No	No	No	Yes	No
Function (TBC/Synchronizer)	TBC	TBC/synchronizer	TBC	TBC, Frame sync	TBC, Synchronizer	TBC, Frame sync
Standards (/c composite)	PAL/c	NTSC/c	NTSC/c	TBC/c/composite	NTSC	NTSC
Format	Y/C-4.43	.....	Y/C-358	.....	.....	Y/C688, YIQ, RGB
Format conversion	Yes	No	Yes	No	No	Yes
Sampling frequency, bits	16MHz, 8-bit	14.3MHz, 8-bit	14.3MHz, 8-bit	13.5MHz 8-bit	13.5MHz 8-bit	13.5MHz 8-bit
Correction window	16 TVL	1 frame	16 TVL	1 frame	1 frame	1 frame
Video bandwidth	to 5.5MHz	to 4.5MHz	to 5.5MHz	4MHz	5.5MHz	5.5MHz
S/N ratio	+58dB PAL	+58dB NTSC	-58dB NTSC	56dB	58dB	56dB
Differential phase, gain	<2°, 2%	<2°, 2%	<2°, 2%	2°, 2%	2°, 2%	2°, 2%
Residual error (/C chroma, /M luminance)	2ns/C 15ns/M	2ns/C, 15ns/M	2ns/C 15ns/M	.....	25ns/C	±15ns/C
Advanced sync output	Yes	Yes	Yes	Yes	Yes	Yes
Coherent subcarrier	.....	Yes	Yes	No	Yes	No
Composite input, output	Yes	Yes	Yes	Yes	Yes	Yes
Component input, output	Yes	No	Yes	No	Yes	Yes
Velocity compensation	No	No	No	No	Yes	No
Processing type	Heterodyne	Direct, hetero	Direct	Heterodyne	Direct	Direct
Servo, non-servo capstan	Servo	Servo, Non servo	Servo	Servo, Non servo	Servo, Non servo	Servo, non servo
Supports dynamic tracking	No	Yes	No	No	No	Yes
Noise reduction mode	Yes	No	Chrominance	Luminance	Luminance	Luminance
Image enhancement mode	No	No	No	No	No	No
Production effects	No	No	No	Freeze	Freeze	Freeze
Source switching features	No	No	No	No	Video	Video
Proc amp capability	Full	Full	Full	Full adj.	Full adj.	Full adj.
Reader Service No.	993	994	995	996	997	998

Manufacturer	For-A			Fougerolle Video	Harris Video Systems	
Model	FA-420	FA-746S dual	FA-300	MPV 1060	VS-3	Model 642
Integrated video production	No	Yes	No	No	No	No
Function (TBC/Synchronizer)	TBC, Frame sync	TBC, synchronizer	TBC, Frame sync	TBC, synchronizer	TBC/synchronizer	TBC/synchronizer
Standards (/c composite)	NTSC/c	NTSC/c	NTSC/c	PAL/c	NTSC/c	NTSC/c
Format	.....	Y/C 358	Y/C358, Y/R-Y/B-Y	RGB, YUV	.....	.....
Format conversion	No	Yes	Yes	Yes	No	No
Sampling frequency, bits	13.5MHz 8-bit	13.5MHz 8-bit	13.5MHz 8-bit	13.5MHz 8-bit	14.3MHz 8-bit	14.3MHz 8-bit
Correction window	1 frame	1 frame	1 frame	625 line, 2 frame	>525 TVL	1 frame
Video bandwidth	4.2MHz	4.2MHz	5MHz	5.75MHz	0.5dB, 4.2MHz	0.5dB, 4.2MHz
S/N ratio	58dB	56dB	56dB	56dB PAL	56dB NTSC	56dB NTSC
Differential phase, gain	2°, 2%	2°, 2%	2°, 2%	<2°, 2%	≤2°, 2%	≤2°, 2%
Residual error (/C chroma, /M luminance)	±10ns/M	15ns	.....	<2ns/c, 2ns/m	2ns/C, 20ns/M	2ns/C
Advanced sync output	Yes	Yes	Yes	No	Yes	Yes
Coherent subcarrier	Yes	No	No	No	Yes	Yes
Composite input, output	Yes	Yes	Yes	Yes	Yes	Yes
Component input, output	No	Yes	Yes	Yes	No	No
Velocity compensation	No	No	No	Yes	Yes	No
Processing type	Direct, hetero	Direct, hetero	Direct, hetero	Heterodyne	Direct, hetero	Heterodyne
Servo, non-servo capstan	.....	Servo, non servo	Servo, non servo	Non servo	Servo, non servo	Servo
Supports dynamic tracking	No	No	No	Yes	No	Yes

Noise reduction mode	No	Luminance	Luminance	No	No	Yes
Image enhancement mode	No	No	No	No	No	No
Production effects	Freeze	Extensive	Freeze	No	No	No
Source switching features	No	Yes	No	No	No	Yes
Proc amp capability	Full adj.	Full adj.	Full adj.	Full	Full	Full
Reader Service No.	999	1000	1001	1002	1003	1004

Manufacturer	Harris Video Systems	Hotronic				
Model	Model 634	AL82	AF71B (AF71)	AH91	AE61S	AF75
Integrated video production	Nn	No	No	Yes	No	Nn
Function (TBC/Synchronizer)	TBC/Synchronizer	TBC/Synchro	TBC/Sync	TBC/Frame synch	TBC	TBC/Sync
Standards (/c composite)	NTSC/c	NTSC/c	NTSC/c	NTSC/c	NTSC/c	NTSC/c
Format	RGB	NTSC/c	NTSC/c	Y/C 3.58, Y/C-6881	Y/C-358	Y/C-358
Format conversion	Yes	No	No	Yes	Yes	Yes
Sampling frequency, bits	14.3 8-bit	No	14.3MHz 8-bit	14.3MHz 8-bit	14.3MHz 8-bit	14.3MHz 8-bit
Correction window	1 frame	1 frame	2 frames	1 frame	16 TVL	1 frame
Video bandwidth	0.4dB, 4.2MHz	5.5MHz	2.5MHz (5.5)	5.5MHz	5.5MHz	5.5MHz
S/N ratio	57dB	+58dB	+58dB	+58dB	+58dB	+58dB
Differential phase, gain	≤2°, 2%	1°, 1%	1°, 1%	1°, 1%	1°, 1%	1°, 1%
Residual error (/C chroma, /M luminance)	10ns/C	10ns/C 1°/L	10ns/C 1°/L	10ns/C 1°/L	10ns/C, 1°/L	10ns/C 1°/L
Advanced sync output	No	Yes	Yes	Yes	Yes	Yes
Coherent subcarrier	No	Yes	No (Yes)	Yes	Yes	No
Composite input, output	Yes	Yes	Yes	Yes	Yes	Yes
Component input, output	Yes	No	No	No	No	No
Velocity compensation	Yes	No	No	No	No	No
Processing type	Heterodyne	Direct & hetero	Hetero (& direct)	Direct & hetero	Hetero & direct	Heterodyne
Capstan type	Nonservo, servo	.....	Servo, non-servo	Servo, nonservo	Servo, nonservo	Servo, nonservo
Supports dynamic tracking	No	No	No	No	No	No
Noise reduction mode	Luma, Chroma	No	No	Chrominance	No	No
Image enhancement mode	No	No	No	No	No	No
Production effects	No	Yes	No	Yes	No	No
Source switching features	No	A/V	No	A/V	No	No
Proc amp capability	Full	Full	Full	Full	Full adj	Full adj
Reader Service No.	1005	1006	1007	1008	1009	1010

Manufacturer	Hotronic	I-DEN Videotonics	JVC Professional Products			
Model	AE61B (AE61)	IVT-9 Plus	IVT-9	KM-F250U	SA-T310U	SA-T400U
Integrated video production	No	No	No	No	No	No
Function (TBC/Synchronizer)	TBC	TBC/Synchronizer	TBC/Synchronizer	TBC/synchronizer	TBC	TBC
Standards (/c composite)	NTSC/c	NTSC/c	NTSC	NTSC	NTSC/component	NTSC/component
Format	Composite	Y/C Y/C358 Y/C688	Y/C, Y/C358	R-Y/B-Y C358 C688	Y/R-Y/B-Y	R-Y/B-Y C358 C688
Format conversion	No	Yes	Yes	Yes	No	Yes
Sampling frequency, bits	14.3MHz 8-bit	13.5MHz 8-bit	13.5MHz 8-bit	13.5MHz 8-bit	32	13.5MHz 8-bit
Correction window	16 TVL	1 frame	525 line/1 frame	1 frame	.....	1 frame
Video bandwidth	2.5MHz (5.5)	5MHz in F.S. mode	±3dB 3MHz	5MHz	4.5MHz	5MHz
S/N ratio	+58dB	53dB	58dB	58dB	54dB	56dB
Differential phase, gain	1°, 1%	2°, 2%	2°, 2%	15ns/M	2°, 2%	2° 2%
Residual error (/C chroma, /M luminance)	10ns C, 1° M	±2°/C, ±15ns/M	±2°/C, ±15ns/M	Yes	15ns/M
Advanced sync output	Yes	Yes	No	Yes

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Coherent subcarrier	No (Yes)	Yes	Yes
Composite input, output	Yes	Yes	Yes	Yes	Out	Yes
Component input, output	No	Yes	No	Yes	I/O	Output
Velocity compensation	No	No	No	No	.....	.....
Processing type	Hetero (& direct)	Heterodyne	Heterodyne	.....	.....	.....
Servo, non-servo capstan	S N-S	Non-servo	Non-servo	.....	.....	.....
Supports dynamic tracking	No	Yes	No	No	No	No
Noise reduction mode	No	L/C	Chroma	No	No	No
Image enhancement mode	No	No	No	No	No	No
Production effects	No	No	No	No	No	No
Source switching features	No	No	No	No	No	No
Proc amp capability	Full adj	Full adj	Full adj	Partial	Partial	Partial
Reader Service No.	1011	1012	1013	1014	1015	1016

Manufacturer	Marconi Comm.	Microtime			NEC America	
Model	B2022 PAL	AB Effects TBC	Tx4 Component	Tx3 FIT ²	S-134 (S-234)	FS-19
Integrated video production	No	Yes	Option	Option	No	No
Function (TBC/Synchronizer)	Synchronizer	TBC	TBC	TBC	Frame sync (& TBC)	Synchronizer
Standards (/c composite)	PAL	NTSC, PAL/c	NTSC, PAL/c	NTSC, PAL/c	NTSC & (PAL)	NTSC
Format	Composite	Y/C, C358, C688, C629	Y/C, C358, C688, C629	Y/C, C358, C688, C629	.....	.....
Format conversion	.....	Yes	Yes	Yes	No	N
Sampling frequency, bits	3x Fsc, 9-bit	14.3MHz 8-bit	14.3MHz 8-bit	14.3MHz 8-bit	14.3MHz 8-bit	10-bit
Correction window	2-field	1 frame	1 frame	1 frame	2 frames	.....
Video bandwidth	±0.25dB 5MHz	5.2MHz	5.2MHz	5.2MHz	5.5MHz (5.2)	.....
S/N ratio	.....	+58dB	58dB N, +58dB PAL	+58dB	+58dB	60dB NTSC
Differential phase, gain	< 2° 3%	2° 2%	2° 2%	2° 2%	2° 2%	1°, 1%
Residual error (/C chroma, /M luminance)	±2°	2° C, 15ns L	2° C 15ns L	2° C, 15ns L	.....	.....
Advanced sync output	No	Yes	Yes	Yes	No (Yes)	Yes
Coherent subcarrier	No	Yes	Yes	Yes	Yes	.....
Composite input, output	Yes	Yes	Yes	Yes	Yes	Yes
Component input, output	No	Yes	Output	Yes	No	No
Velocity compensation	No	No	No	No	No	Yes
Processing type	.....	Hetero component	Hetero/component	Hetero component	Direct (& hetero)	.....
Servo, non-servo capstan	.....	Non-servo	Non-servo	Non-servo	..... (Non-servo)	.....
Supports dynamic tracking	No	Yes	Yes	Yes	No	No
Noise reduction mode	No	Luma/Chroma	Luma/Chroma	Luma/Chroma	No	.....
Image enhancement mode	No	Yes	No	No	No	No
Production effects	Black on input fail	Yes	Option	Option	No	No
Source switching features	.....	A/V	Video	Video	No	No
Proc amp capability	Full	Full adj	Full	Full adj	Full adj.	.....
Reader Service No.	1017	1018	1019	1020	1021	1022

Manufacturer	NEC America	Nova Systems				
Model	FS-18	Nova 502 EFP/TBC	Nova 700	NovaSync	Nova 620 (620S)	900S Super TBC
Integrated video production	No	No	No	No	No	No
Function (TBC/Synchronizer)	Frame synchronizer	TBC Portable	TBC	Frame Synchronizer	TBC/Synchronizer	TBC Synchronizer
Standards (/c composite)	NTSC/c	NTSC	NTSC/c	NTSC/c	NTSC	NTSC, PAL/c
Format	.....	VTR-SC only	.....	Composite	Y/C-3.58 (VTR-SC)	Y/C, Y/C-3.58
Format conversion	No	NO	No	No	Yes	Yes
Sampling frequency, bits	8-bit	14.3 MHz 8-bit	14.3 8-bit	14.3MHz 8-bit	14.3MHz 8-bit	13.5MHz, 8-bit
Correction window	.....	6 TVL	32 TVL	1 frame	1 frame	262 TVL, 1/2 frame
Video bandwidth	.....	5.5MHz	5.5MHz	5.5MHz	5.5MHz	5.5MHz
S/N ratio	53dB NTSC	58dB	58dB NTSC	58dB NTSC	58dB NTSC	58dB NTSC, PAL
Differential phase, gain	2° 2%	2° 2%	2° 2%	2° 2%	2° 2%	2° 2%
Residual error (/C chroma, /M luminance)	.....	±10ns C	±10ns c	±10ns	±10ns C	±10ns C
Advanced sync output	Yes	Yes	Yes	.....	Yes	Yes
Coherent subcarrier	.....	Yes	No	.....	Yes	No
Composite input, output	Yes	Yes	Yes	Yes	Yes	Yes
Component input, output	No	No	No	No	Input	Yes
Velocity compensation	Yes	No	No	.....	No	No
Processing type	.....	Direct	Heterodyne	Direct	Direct/Hetero	Heterodyne Y/C
Servo, non-servo capstan	.....	Servo	Servo	.....	Nonservo, servo	Servo, nonservo
Supports dynamic tracking	No	No	No	.....	No	No
Noise reduction mode	.....	No	No	No	Chrominance	No
Image enhancement mode	No	No	No	No	No	No
Production effects	No	No	No	No	Freeze	Yes
Source switching features	No	No	No	Yes	Video	Yes
Proc amp capability	.....	.....	Full	Full	Full	Full
Reader Service No.	1023	1024	1025	1026	1027	1028

Manufacturer	Nova Systems	Panasonic		Prime Image		
Model	Nova 710S wideband	TBC-100 (-200)	AU-TB50	HR600+ (810, 811)	S-TBC+ 100S/150S ⁵	HR600+ (800, 801)
Integrated video production	N	No	No	No	No	No
Function (TBC/Synchronizer)	TBC	TBC	TBC	TBC	TBC	TBC
Standards (/c composite)	NTSC	NTSC	NTSC	NTSC/composite	NTSC/composite	NTSC/composite
Format	Y/C-3.58 composite	S-VHS	M-II	Y/C, 3.58, 688 ³	Y/C, Y/C-3.58	Y/C, 3.58, 688 ³
Format conversion	Yes	Yes	Yes	Yes	Yes	Yes
Sampling frequency, bits	14.3 8-bit	14.3(13.5)MHz 8-bit	13.5MHz 8-bit	18MHz, 8-bit	14.3MHz 8-bit	18MHz, 8-bit
Correction window	32 TVL	16-line	32-line	16	16 TVL	16
Video bandwidth	5.5MHz	5.5MHz Y/2.2MHz C	4.5MHz Y, 1.5MHz C	7.5MHz	4.2MHz	7.5MHz
S/N ratio	58dB NTSC	58dB	> 54dB component	58dB	58dB	58dB
Differential phase, gain	2° 2%	2° 2%	1° 1%	1.5°, 1.5%	1.5°, 1.5%	1.5°, 1.5%
Residual error (/C chroma, /M luminance)	±10ns C	.....	.....	15ns chroma	15ns	15ns chroma
Advanced sync output	Yes	Yes	10H-21H adj	Yes	Yes	Yes
Coherent subcarrier	Yes	No	.....	Yes	Yes	Yes
Composite input, output	Yes	Y/3.58, Y/629	CTCM Y/C YPrPb	Yes	Yes	Yes
Component input, output	Input	Y/3.58, Y/629	YPrPb	Yes	Yes	Yes
Velocity compensation	No	.....	.....	No	No	No
Processing type	Direct/Hetero	.....	.....	Heterodyne	Heterodyne	Heterodyne
Servo, non-servo capstan	Servo	.....	.....	Servo	Servo	Servo
Supports dynamic tracking	No	No	-1, +2x	No	Yes	No
Noise reduction mode	No	For chroma	.....	Luma, chroma	Luma, Chroma	Luma, chroma
Image enhancement mode	No	In chroma	No	No	No	No
Production effects	No	No	No	Yes, 8112	Yes on 150S	Yes for 801
Source switching features	Yes	.....	No	No	No	No
Proc amp capability	Full	Full control	Full adjustment	Full	Full	Full
Reader Service No.	1029	1030	1031	1032	1033	1034

³ Also Y/R-Y/B-Y and RGB component forms. ⁴ Effects on 810 model limited. ⁵ TBC+ series 100 & 150 with same specs, except S-VHS capability.

Manufacturer	Prime Image	Sony	Tektronix	Videotek	
Model	DUB-TBC+ 160/165	S TBC-SYNC+200S-250S ⁶	BKH-3010 (-3050) ¹	110-S	VDP-8000 (-8400)
Integrated video production	No	No	No	No	No
Function (TBC/Synchronizer)	TBC	TBC, synchronizer	TBC	TBC/synchronizer	Frame synchronizer
Standards (I/c composite)	NTSC/c	NTSC/c	NTSC/c	NTSC	NTSC/c
Format	Y/C-688, Y/R-Y/B-Y	Y/C, Y/C-3.58	.....	.....	No
Format conversion	Yes	Yes	No	.....	.....
Sampling frequency, bits	14.3MHz 8-bit	14.3MHz 8-bit	14.32MHz 8-bit	14.3MHz, 10-bit	14.3MHz 8-bit
Correction window	16 TVL	525 L, 1 frame	15 TVL	Infinite	1 (2) frames
Video bandwidth	4.2MHz	4.2MHz	4.5MHz	to 4.2MHz	4.2MHz
S/N ratio	58dB	58dB	49dB NTSC	60dB unwt'd	58dB NTSC
Differential phase, gain	1.5°, 1.5%	1.5°, 1.5%	< 4°, 4%	1°, 1%	≤ 2°, 2%
Residual error (I/C chroma, /M luminance)	15ns	15ns	± 2.5ns C, < ± 15ns M	.....	.....
Advanced sync output	Yes	Yes	No	No	No
Coherent subcarrier	Yes	Yes	Yes	No	No
Composite input, output	Yes	Yes	Yes	Yes	Yes
Component input, output	Yes	Yes	No	No	No
Velocity compensation	No	No	Yes	No	No
Processing type	Heterodyne	Heterodyne	Direct	Heterodyne	.....
Servo, non-servo capstan	Servo	Servo	Servo & non servo	Servo, nonservo	.....
Supports dynamic tracking	Yes	No	Yes	No	No
Noise reduction mode	No	Luma, Chroma	No	No	No
Image enhancement mode	No	No	No	No	No
Production effects	Yes on 165	Yes on 250S	No	No	No
Source switching features	No	Yes	No	No	Video
Proc amp capability	Full	Full	Full	Full	Full
Reader Service No.	1035	1036	1037	1038	1039

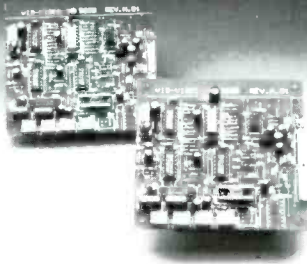
⁶ TBC SYNC+ series (200, 250) have same specs, but do not have S-VHS capability. ⁷ Units designed for use with BVH-3000/-3100 VTRs.

Time Code Systems

These time code products include generators, readers and character generator-keyer units. All products listed support drop frame and non-drop frame operation.

Manufacturer	Adams-Smith	ADx Systems	AXON	Cipher Digital		
Model	System 2600	ADx-22 (ADx-25)	ADx-02 (ADx-03)	TCG 80 w/TCI 80	TCG-R40	CDI-4810 Phantom ³
Portable unit	No	No	No	Yes	Yes	No
Generator function	Yes	Yes	Yes	Yes	Yes	No
Reader function	Yes	Yes	Yes	Yes	Yes	Yes
TC/UB display	LED ¹	No	LED	LCD, 0.5"	No	.....
Character generator-keyer	Yes	Yes	Yes	No, Yes	No	No
Keyed window display	Adj	Multiline	Adj	Yes	No	No
Internal reference	Yes	Yes	Yes	Yes	No

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Supports color framing	Yes	Yes	Yes	Yes	Yes
Supports jam sync	Yes	Yes	Yes	Yes	Yes
Supports LTC	I/O	I/O	I/O	Yes	Yes	No
Supports VITC	I/O	No	(-03 only)	Yes	Yes	Input
Editor interface	Yes	(-25 only)	(-03 only)	.....	No	No
TC entry, comparisons	Yes	Yes	Yes (-03 only)	Yes,	Yes,	No, Yes
UB entry, comparisons	Yes	Yes	Yes,	Yes,	Yes,	No
Synchronizer function	Yes	Yes	.....	No	No	Yes
Reading speed range	1-100x	1/32-80x	1/32-80x	0-100x	1x	Yes
LTC output signal	1Vp-p ²	10dBm	10dBm	0-8dBm	0-1.5V 1kΩ	1/32-50x
Power requirement	110/220Vac	110Vac	110Vac	110/230Vac	6-12Vdc	.....
Reader Service No.	834	835	836	837	838	839

¹ Various size displays used. ² Output adjustable with 500Ω impedance. ³ Interface to single video or audio transport, makes it appear as VPR-3 or BVH-2000 RS-422 serial machine.

Manufacturer	Cipher Digital					
Model	CDI-735L	CDI-735V	CDI-750	CDI-4800 Shadow II	CDI-716A	CDI-710A
Portable unit	No	No	No	No	No	No
Generator function	No	No	Yes	No	Yes	No
Reader function	Yes	Yes	Yes	Yes	Yes	Yes
TC/UB display	LED, 0.7"	None	LED, 0.7"	.....	LED, 0.7"	LED, 0.7"
Character generator-keyer	No	Yes	No	No	Yes	Yes
Keyed window display	No	Adjustable	Adj	No	No	Adj
Internal reference	No	No	Yes	Yes	Yes	No
Supports color framing	Yes	Yes	Yes	.....	Yes	Yes
Supports jam sync	No	No	Yes	No	Yes	No
Supports LTC	No	I/O	I/O	Input	I/O	I/O
Supports VITC	I/O	No	No	No	No	No
Editor interface	Yes	Yes	Yes	Yes	Yes	No
TC entry, comparisons	No	No	Yes	No, Yes	Yes, No	No
UB entry, comparisons	No	No	Yes,	No	Yes, No	No
Synchronizer function	No	No	No	Yes ⁴	No	No
Reading speed range	1/32-80x	1/32-80x	1/32-80x	1/32-50x	1/32-15x	1/32-80x
LTC output signal	+4dBm 600Ω	+4dBm 600Ω	+4dBm 600Ω	.....	+4dBm 600Ω	+4dBm 600Ω
Power requirement	110/220Vac	110/220Vac	110/220Vac	110/220Vac	110/220Vac	110/220Vac
Reader Service No.	840	841	842	843	844	845

⁴ Will synchronize and control 1 master and 1 slave.

Manufacturer	ESE					
Model	ES956	ES263	ES488	ES727	ES456	ES452
Portable unit	No	Yes	No	No	No	No
Generator function	No	Yes	Yes	No	No	.....
Reader function	Yes	No	Yes	Yes	Yes	Yes
TC/UB display	LED, 2"	.....	LED, 0.56"	LED, 0.4"	LED, 0.56"	Video, 5% V
Character generator-keyer	No	No	Yes	No	No	Yes
Keyed window display	No	No	Adj	No	No	Multiline
Internal reference	No	Yes	Yes	Yes	No	No
Supports color framing	No	Yes	Yes	No	No	No
Supports jam sync	No	No	Yes	No	No	No
Supports LTC	In	Out	I/O	In	In	In
Supports VITC	No	No	No	No	No	No
Editor interface	No	No	No	No	No	No
TC entry, comparisons	Yes, No	Yes, No	Yes, No	Yes	Yes, No	Yes, No
UB entry, comparisons	Yes, No	Yes, No	Yes, No	Yes	Yes, No	Yes, No
Synchronizer function	No	No	No	No	No	No
Reading speed range	1/32-30x	.....	1/32-30x	1/32-30x	1/32-30x	No
LTC output signal	.....	1V, 0dBm 75Ω	1V 0dBm 75Ω	.....	.....	1x
Power requirement	110Vac	Rechargeable bat	110Vac	110Vac	110Vac	110Vac
Reader Service No.	846	847	848	849	850	851

Manufacturer	ESE					Evertz Microsystems	
Model	ES455	ES257	ES453	ES461	7200	4015	
Portable unit	No	No	No	No	No	No	
Generator function	No	No	No	Yes	No	Yes	
Reader function	Yes	Yes	Yes	No	Yes	No	
TC/UB display	Video, 5-30% V	LED, 0.4"	LED, 0.56"	LED, 0.56"	.....	LED, 0.75"
Character generator-keyer	Yes	No	No	No	No	Yes	
Keyed window display	Adj	No	No	No	No	.....
Internal reference	Yes	Yes	No	Yes	No	.....
Supports color framing	No	No	No	Yes	No	Yes	
Supports jam sync	No	No	No	Yes	Yes	Yes	
Supports LTC	In	In	No	Yes	No	No	
Supports VITC	No	No	No	I/O	I	Opt	
Editor interface	No	No	Yes	No	I	Opt	
TC entry, comparisons	Yes, No	Yes	Yes, No	Yes, No	Yes	No	
UB entry, comparisons	Yes, No	Yes	Yes, No	Yes, No	No	Yes, No	
Synchronizer function	No	No	No	No	No	Yes, No	
Reading speed range	1/32-30x	1x	1x	.....	0-70x	No
LTC output signal	.....	.....	.....	1V 0dBm 75Ω	.....	-20, +12dBm
Power requirement	110Vac	110Vac	110Vac	110Vac	12Vdc	110/220Vac	
Reader Service No.	852	853	854	855	856	857	

Manufacturer	Evertz Microsystems ⁵					
Model	3600D	ECM 4010	Emulator 7100	4900	3700D	VCG 1260
Portable unit	No	No	No	No	No	No
Generator function	Yes	Yes	Yes	No	Yes	No
Reader function	Yes	Yes	Yes	Yes	Yes	Yes
TC/UB display	LED, 0.75"	LED, 0.75"	LED, 0.75"	LED, 0.75"	LED, 0.75"	LED, 0.75"
Character generator-keyer	Yes	Yes	No	Yes	Yes	Yes
Keyed window display	.....	.....	No	Yes	Yes	Yes
Internal reference	Yes	Yes	No	No	.....	.....
Supports color framing	Yes	Yes	Yes	No	Yes	Yes
Supports jam sync	Yes	Yes	Yes	No	Yes	Yes
Supports LTC	I/O	I/O	I/O	I/O	I/O	No
Supports VITC	No	IO	No	In	No	In
Editor interface	No	No	Yes	No	No	No
TC entry, comparisons	Yes, No	Yes, No	Yes, No	No	Yes, No	No
UB entry, comparisons	Yes, No	Yes, No	Yes, No	No	Yes, No	No

Synchronizer function	No	No	Yes	No	No	No
Reading speed range	1/30-70x	0-70x	1/30-70x	0-70x	1/30-70x	NA
LTC output signal	-20,+12dBm	-20,+12dBm	-20,+12dBm	+6dBm	-20,+12dBm	...
Power requirement	110/220Vac	110/220Vac	110/220Vac	110/220Vac	110/220Vac	110/220Vac
Reader Service No.	858	859	860	861	862	863

⁵ Everetz products are available through Amtel Systems.

Manufacturer	Everetz Microsystems	Fast Forward Video	For-A	Fougerolle Video	Gray Engineering	Horita
Model	Chaser 7000	P1 (F21)	TGR-2000	TGR series	DT-213/VID-225	WG-50
Portable unit	No	Yes (No)	No	No	No	Yes
Generator function	Yes	Yes	Yes	Yes	Yes	No
Reader function	Yes	Yes	Yes	Yes	Yes	Yes
TC/UB display	LED, 0.75"	LCD (LED), 0.55"	LED, adj	...	LED, 0.6"	...
Character generator-keyer	No	No (Yes)	Yes	...	Yes	Yes
Keyed window display	No	No (Adj)	Adj	...	Adj	Adj
Internal reference	Yes	Yes	Yes	Yes	Yes	No
Supports color framing	Yes	No	Yes	...	Yes	No
Supports jam sync	Yes	Yes	Yes	...	Yes	...
Supports LTC	IO	I/O	I/O	Yes	I/O	I/O
Supports VITC	I	No	No	Yes	I/O	No
Editor interface	No	No	Yes	Yes	Yes	No
TC entry, comparisons	Yes	Yes, No	Yes, No	...	Yes	No
UB entry, comparisons	Yes, No	No	Yes, No	...	Yes	No
Synchronizer function	Yes	No	No	Yes	No	No
Reading speed range	0-70x	1x (1/30-15x)	1/30-30x	Various	10x 100x	0.9-1.1x
LTC output signal	-20,+12dBm	0dBm (0.5-8V)	2.2Vp-p	Yes	+8dBm 600Ω adj	1V/-6dBm 2kΩ
Power requirement	110/220Vac	12Vdc (110Vac/9Vdc)	110Vac	AC power	100/220Vac	110Vac, 9-12Vdc
Reader Service No.	864	865	866	867	868	869

Manufacturer	Horita	JVC	Skotel
Model	EP-50	TG-P49	TCG-132
Portable unit	Yes	Yes	No
Generator function	Yes	Yes	No
Reader function	Yes	No	Yes
TC/UB display	...	LCD	LED, 0.3"
Character generator-keyer	Yes	No	Yes
Keyed window display	Adj	Adj	Adj
Internal reference	No	No	No
Supports color framing	No	No	Yes
Supports jam sync	Yes	Yes	Yes
Supports LTC	IO	IO	I/O
Supports VITC	No	No	No
Editor interface	No	No	Input
TC entry, comparisons	Yes, No	Yes, No	No
UB entry, comparisons	Yes, No	Yes, No	No
Synchronizer function	No	No	No
Reading speed range	0.9-1.1x	...	0.9-1.1x
LTC output signal	1V/-6dBm 2kΩ	1V/-6dBm 2kΩ	0.5-5V 100Ω

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Power requirement	110Vac/9-12Vdc	110Vac, 9-12Vdc	110Vac/9-12Vdc	12Vdc	ac/dc	ac/dc
Reader Service No.	870	871	872	873	874	875

⁶ Range is 0-50x for VITC.

Manufacturer	Skotel					
Model	TCG-313	TCG-132c	TCR-80V/114	TCR-80/114	TCG-80N-FT	TCG-311
Portable unit	No	No	No	No	No	N
Generator function	Yes	No	No	No	Yes	Y
Reader function	Yes	Yes	Yes	Yes	Yes	Y
TC/UB display	LED, 0.6"	.....	LED, 0.3"	LED, 0.3"	LED, 0.3"	LED, 0.6"
Character generator-keyer	Yes	Yes	Yes	Yes	Yes	N
Keyed window display	Adj	Adj	Adj	Adj	Adj	N
Internal reference	Yes	No	No	No	No	Y
Supports color framing	Yes	Yes	Yes	Yes	Yes	Y
Supports jam sync	Yes	No	No	No	Yes	Y
Supports LTC	I/O	I/O	I/O	I/O	I/O	I/O
Supports VITC	No	Input	Input only	No	.....	N
Editor interface	No	Yes	No	No	No	N
TC entry, comparisons	Yes, No	No	No	No	Yes, No	Yes, No
UB entry, comparisons	Yes, No	No	No	No	Yes, No	Yes, No
Synchronizer function	No	No	No	No	No	N
Reading speed range	1/40-80x	1/40-80x LTC ⁷	1/20-40x	1/20-40x	0.9-1.1x	1/40-80x
LTC output signal	0.5-5V 100Ω	0.5-5V 100Ω	0.5-5V 100Ω	0.5-5V 100Ω	0.5-5V 100Ω	0.5-5V 100Ω
Power requirement	ac/dc	ac/dc	ac/dc	ac/dc	ac/dc	ac/dc
Reader Service No.	876	877	878	879	880	881

⁷ Range is 0-50x for VITC.

Manufacturer	Skotel			Telcom Research		
Model	TCR-111 (111c)	TCG-80N-F7/008	TCR-112	TCR 660	T5010	TCR-500 ⁸
Portable unit	No	No	No	Yes	No	No
Generator function	No	Yes	No	No	Yes	No
Reader function	Yes	Yes	Yes	Yes	Yes	Yes
TC/UB display	LED, 0.6"	LED, 0.3"	.....	LED, 0.6"	LED, 0.8"	1"
Character generator-keyer	No	Yes	No, Yes	No, Yes	Yes	Yes
Keyed window display	No	Adj	Adj	No	Adj	Adj
Internal reference	No	No	No	N.A.	Yes	No
Supports color framing	Yes	Yes	Yes	Yes	Yes	Yes
Supports jam sync	No	Yes	No	N.A.	Yes	No
Supports LTC	I/O	I/O	I/O	Input	I/O	In
Supports VITC	No	Output	No	No	No	No
Editor interface	N (Y)	No	No	No	No	No
TC entry, comparisons	No, No (Yes)	Yes, No	No	.....	Yes, No	No
UB entry, comparisons	No, No (Yes)	Yes, No	No	.....	Yes, No	No
Synchronizer function	No	No	No	No	No	No
Reading speed range	1/40-80x	0.9-1.1x	1/40-80x	1/50-10x	1/50-8x	1/5-5x
LTC output signal	0.5-5V 100Ω	0.5-5V 100Ω	0.5-5V 100Ω	.....	11dBm 600Ω	1Vp-p
Power requirement	ac/dc	ac/dc	ac/dc	110/220Vac	110/220Vac	110Vac
Reader Service No.	882	883	884	885	886	887

⁸ Also available through Amtel Systems.

Manufacturer	Telcom Research				Time Line
Model	Model 800 ⁹	T 7000A	T6010	TCG-550	Lynx TC module
Portable unit	Yes	Yes	No	Yes	No
Generator function	Yes	Yes	No	Yes	Yes
Reader function	Yes	Yes	Yes	No	Yes
TC/UB display	LED	LED, 0.3"	LED, 0.8"	LED, 0.6"	LED, 0.3"
Character generator-keyer	No	No	Yes	No	No
Keyed window display	No	No	Adj	No	No
Internal reference	Yes	Yes	.....	Yes	N.A.
Supports color framing	Yes	Yes	Yes	Yes	N.A.
Supports jam sync	Yes	Yes	.....	No	N.A.
Supports LTC	I/O	I/O	I/O	Out	Input
Supports VITC	I/O	No	No	No	No
Editor interface	No	No	No	No	No
TC entry, comparisons	Yes, No	Yes, No	.....	Yes, No	.....
UB entry, comparisons	Yes, No	Yes, No	.....	No	.....
Synchronizer function	No	No	No	No	.....
Reading speed range	1x only	1/50-8x	1/50-83x	.....	1/50-8x
LTC output signal	+3dBm	11dBm 600Ω	.....	11dBm 600Ω	.....
Power requirement	110Vac, 9Vdc	6-16Vdc	110/220Vac	110/220Vac	8-16Vdc
Reader Service No.	888	889	890	891	892

⁹ Also available through Amtel Systems.

Manufacturer	United Media	Shintron
Model	Model 505	Model 515 TCR/CG
Portable unit	Yes	Yes
Generator function	Yes	No
Reader function	Yes	No (Yes)
TC/UB display	LED, 4"	LED, 4"
Character generator-keyer	Yes	Yes (No)
Keyed window display	Multiline Adj	LED (LCD) 1/4"
Internal reference	Yes	1/2"
Supports color framing	Yes	Adj
Supports jam sync	Yes	Yes
Supports LTC	I/O	Yes (No)
Supports VITC	I/O	..... (No)
Editor interface	Yes	Yes
TC entry, comparisons	Yes	Yes (No), No
UB entry, comparisons	No	No
Synchronizer function	No	No
Reading speed range	1/20-50x	No
LTC output signal	0.5-4Vp-p	1/20-40x (.....)
Power requirement	110-220Vac	(1Vp-p, 0dBm 30Ω)
Reader Service No.	894	895

Small Format VCRs

This section lists information regarding 1/2" Betacam-SP, M-II, S-VHS and 3/4" U-matic video recording and playback equipment. General performance characteristics for 1/2" products are described below, followed by a chart listing manufacturers' model numbers for equipment within suggested applications. Reader service numbers are provided to get information about a series of equipment. Because material previously recorded on Betacam can be reproduced on -SP equipment, only -SP information is given. Betacam SP and M-II use "metal" tape; S-VHS uses oxide tape.

Video format	Betacam SP	M-II	S-VHS
Video parameters:			
Luminance response	-6,+0.5dB, 4.1MHz	-3,+0.5dB, 4.5MHz	-3,+0.5dB, 4.5MHz
Chrominance response	-3,+0.5dB, 1.5MHz	-3,+0.5dB, 1.5MHz	-3,+0.5dB, 1.5MHz
Resolution	Unspecified	Unspecified	400 TVL
Video S/N ratio	NTSC (>50dB PAL)	...	...
Y-composite	> 49dB	> 48dB	> 46dB
Y-component	> 51dB	> 50dB	> 47dB
C AM/PM	> 53dB	> 50dB	Unspecified
Composite standards	NTSC, PAL, SECAM	NTSC	NTSC
Component formats	YCRCB, Y/C	YCRCB	Y/C-3.58
Audio parameters:			
Audio response	-3, 1.5dB 50Hz-15kHz	-2, 1dB 20Hz-20kHz	20Hz-20kHz
Audio S/N ratio	> 53dB w/o NRS	> 80dB	> 44dB
THD distortion	> 1%	> 0.6%	> 0.6%
Dynamic range	...	...	90dB
Wow/flutter	...	...	0.005%
# audio tracks	2 linear, 2 AFM	2 linear, 2 AFM	2 linear, 2 HiFi

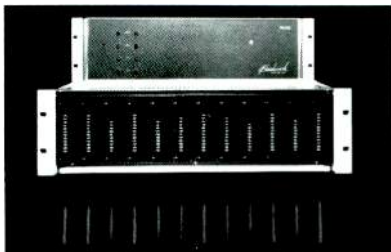
Video format	Betacam SP				M-II		S-VHS	
Manufacturer	Ampex	BTS	Sony	Thomson	JVC	Panasonic	JVC	Panasonic
Application/Model No.								
1-piece camcorder	CVR-200/300	...	BVW-200/300	TTV1240/1247	...	...	...	AG450/460
Docking recorder	CVR-505/550	BCB-5	BV5	TTV3505 S/P ²	KR-M260U	AU-400	BR-S410UN	AG-7450
	CVR-507/570	...	...	...	...	...	...	...
Playback adapter	VA-500	BVA-5	VA-500	VA-500 P	Not required	Not required	Not required	Not required
Portable/field player	CVR-21	...	BVW-21	...	...	AU-505	...	...
Field record/play unit	CVR-35	BCB-35	BVW-35	TTV-3535 P/S ²	KR-M460U	AU-500	...	AG-7400
Office player	CVR-22	BCB-22	BVW-22	TTV 3522	...	...	...	...
Studio player	CVR-60 ¹	BCB-60 ¹	BVW-60 ¹	TTV-3560	...	AU-620 ¹	...	AG-7100/7110/7510
Studio player/VT	CVR-65 ¹	BCB-65 ¹	BVW-65 ¹	TTV-3565	...	AU-630 ¹	...	...
Studio editor	CVR-70 ¹	BCB-70 ¹	BVW-70 ¹	TTV-3570	KRM-800/810	AU-640 ¹ /X80 ¹	BR-S810U	AG7300/7330E/1960
	...	...	...	...	KRM-860	...	...	...
Studio editor/VT	CVR-75 ¹	BCB-75 ¹	BVW-75 ¹	TTV-3575	...	AU-650 ¹ /660 ¹	...	AG-7500
Duplicator	...	...	...	...	...	...	BR-S711U	...
Reader Service No.	1202	1203	1204	1205	1206	1207	1208	1209

¹ These units typically include integral TBC facilities.

² Available in PAL or SECAM only.

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3/4" U-matic

The U-matic format has a video response of 340 TVL luma, 260 TVL chroma, and video S/N ratio 49dB luma, 47dB chroma. Several features of interest are noted below as well as model numbers for generalized applications.

Manufacturer	Alpha A/V	JVC	Sony
Portable recorder	[Alphatized VCRs	CR-4900U	BVU-150
Studio player/recorder	[modified Series 5, 6	CR-600U	BVU-900/920
Studio editor	[7, 9 VCRs	CR-850U	BVU-950
Video tracking meter	Yes	Yes	Yes
Video input meter	Yes	Yes	Yes
Variable tracking	Yes	Yes	(920 only)
LTC modules available	Yes	No	No
VITC modules available	No	No	Yes
Dedicated LTC track	2 tracks	Yes	No
# audio channels	2	2	2
Audio input	Bal 600Ω	Bal 10kΩ	Bal 600Ω/3kΩ
Audio output	Bal	Bal	Balanced
Audio S/N ratio	48dB	48dB	52dB
Audio distortion	3%	...	2%
Reader Service No.	1211	1212	1213

1" Videotape Recorders

These reel-to-reel videotape recorders are types B or C systems. N, P and S stand for NTSC, PAL, and SECAM, respectively.

Manufacturer	Ampex	BTS	Nagra Kudelski	Sony
Model	VPR-3	BCN-51	BCN-52/53	VPR-5 portable
Type	C	B	B	C
Supports	N, P/-M, S	N, P/-M, S	N, P/-M, S	N P S1
Video bandwidth	4.2MHz	4.2MHz	4.2MHz	±0.5dB 5MHz
S/N ratio	47dB	47dB	44dB	-43dB p-p/RMS noise
Differential phase	≤ 4°	< 4°, 4%	> 4°, 4%	≤ 4° blank-white
Differential gain	4%	4%	4%	≤ 4% blank-white
K factor 2T	≤ 1%	< 1.5%	< 20ns	≥ 1%
AF response	±2dB 50-18k	-3,+2dB 40-14k	-3,+2dB 40-14k	±1dB 500-10k2
AF S/N ratio	≥ 56dB +8dBm	57dB	> 57dB	56dB3
AF distortion	≤ 1% 1kHz	< 3%	< 3%	1% max at ref.
LTC reader, generator	Yes	Integral	Integral	Yes
VITC reader, generator	Yes	External	External	No
Time code display	Yes	Yes	Yes	Yes
Video confidence head	Yes	Yes	Yes	A/V
# audio channels	4	3	3 or 2A+1TC	2
Dolby noise reduction	Yes	Yes	Yes	No
Integral editor	Full feature	Full feature	Full feature	Partial
Diagnostic software	Yes	No	No	Yes
Remote control type	RS-232/422	RS-423, simple	RS-423, simple	Simple
TBC	Zeus ext.	Integral	w/4-field framestore	External
Supports variable speed	Yes	1/4x, +1/2x	1/4, 1/2	No
Supports slow motion	Yes	No	No	No
Single frame, animation mode	Yes	Yes	No	No
Maximum reel diameter	14" 3 hour	12" 196 min	12.5" 2 1/2 1/2hr	9"
Packaging	Rack-mount	Free standing w/rack	-52 freestanding ¹	15 lbs, 6.8 kg
Reader Service No.	1197	1198	1199	1200

¹ Model -53 available in rack-mount configuration.

² Information is given for PAL system; ±2dB 50-15k; S/N ratio given for 8dB above reference.

³ Internal selection of BKH-3010 or 3050 TBC modules.

Automated Cassette Players

These videotape automation systems are designed for 1/2" media as integrated systems with playback decks and control computer, not controllers to be interfaced to an array of available player units. Manual override is available at all times; as-run logs are generated with event verification and cassettes are automatically cued.

Manufacturer	Ampex Corporation	ASACA ShibaSoku	Odetics Broadcast	Panasonic Broadcast	Sony Broadcast Products
Model	ACR-225	ACL-6000C	TCS 2000	M.A.R.C. II	BVC-10 Betacart
Video record format	D-2	Betacam/SP M-II	D-2/Betacam/SP/M-II	M-II	Betacam SP
# playback decks	3-4	4-5	6 internal max	5 max	To 4
Specific playback model	No	No	TCP 1000	Std M-II deck ²	BVW-95
Output channels	4 simultaneous	...	3 simultaneous	2+monitor	3 simultaneous
# record decks	3-4	1	All available	1 or 2	to 4
Editing features	Full feature	...	Limited by VCR	Full feature	Full feature
Control computer	IBM PC compatible	Charles River	IBM/PC	IBM PC/AT	Proprietary
Control protocol	RS-323/422	RS-422	RS-422/EthernetESbus	RS-422	RS-422
Master automation port	Future opt	Yes	Yes	Option	Yes
Record, delay play feature	Future opt	No	Yes	Yes	Yes
Cassette ID type	Barcode	Barcode	Barcode or TC/UB	Barcode/TC/UB	Barcode, TC/UB
Integral TC reader	LTC	...	LTC	Reader	LTC/VITC
Integral TC generator	LTC	...	LTC	...	LTC/VITC
Storage magazine	D-1S 256 cassettes	600 max	1832 max SP/M-II ¹	107+ ³	40 Beta-SP
Shortest segment	7s w/our transports	...	1s in 6-events	10-15s	10s
System TBC	Integral	...	In VCR	AU-TB50	Integral
Reader Service No.	1191	1192	1193	1194	1195

¹ 1495 D2 capacity. ² AU-IA10 protocol interface allows control of VTRs using RS-422 SMPTE bus protocol, including 1" VTRs; provides handshaking necessary for automation. ³ Optional 352-cassette rotary bin expansion units may be added for 472, 824 and 1176-cassette capacities. ⁴ DVC-1000S provides similar performance parameters using D-2 component digital media.

Audio equipment specs

Audio Mixers, On-Air

Audio mixing systems designed for radio and TV on-air control rooms, although they may serve some production applications. Speaker muting is a typical feature. Products marked with a dagger (†) are prepared for automation installations; models with a double dagger (‡) do not include talkback facilities. Abbreviations used in this section include: **AB** active balanced; **TB** transformer balanced; **UB** unbalanced; **BR** bridging; **HP** high pass; **LP** low pass. In all references to audio frequencies, **Hz** is understood.

Manufacturer	AMEK Systems	Arrakis Systems	ATI Audio Technologies	Audiotronics	Broadcast Audio	Broadcast Electronics
Model	BC II†‡	12,000 series ²	Vanguard BC8/BC12†‡	200 series	Series VI† ³	250A series
Modular system	Yes	Yes	Yes	Yes	Yes	No
Cue amp	Yes	Yes	Yes	Yes	Yes	Yes
Solid-state bus switching	No	Yes	Yes	No	Yes	Yes
VCA gain control	Opt	Yes	Yes	Yes	No	No
Machine starts/stops	Yes	Yes	Opt	Yes	Yes	No
# of inputs (total)	12 (20, 28, 36)	56	12 (24, 20, 32)	24, 12, 18	24 (72)	20 (16, 10)
# of mixing buses	6 (6, 6, 6)	6	4	2	2 (4)	2
Fader type	Slider	Slider	Rotary, slider	Slider	Slider	Rotary
Meter type	VU, PPM, LED	VU, PPM	VU, PPM, LED peak	VU	VU, LED peak	VU
Filters	HP	AB	AB 20kΩ	AB 1kΩ/50kΩ	AB/TB 150Ω/20kΩ	AB > 54kΩ
Input connection	AB/TB 1kΩ/20kΩ	-20, +20dB	-60, +4dBu nominal	-65dBu, +8dBu	-60, +10dBv	-65, +20dBv
Input range	-70, +26dBu	AB	AB 400Ω	AB 50Ω	TB 150Ω	TB 600Ω
Output connection	AB/TB < 50Ω	+26dBV	+24dBm	+30dBm	+28dBm	+18dBm
Output level max	+26dBu	0.5dB 20-20k	±0.25dB 20-20k	0, -1dB 20-20k	±0.5dB, 20-20k	-1dB 30-20k
AF response (±dB Hz-kHz)	±1.0dB 20-20k	0.03/20dBu/20-15k	0.15/18dBm/20-20k	0.01/24dBm/20-20k	0.007/28dBm/1k	0.5/18dBm/30-20k
THD %/+dB/Hz	±128dBm/86dB	-127dBm/75dB	-124dBm/95dB	-128.5dBm/86dB	80dB	-120dBm/68dB
S/N Mic EIN/Line dB	Per configuration	-75dB/20k	-74dB/10k/+14	-63dB/20k/+4dB	-80dB/15k/+8	
Crosstalk (-dB/kHz/+dBm)	301	302	303	304	305	306
Reader Service No.						

¹ Configurations for production, portable available.

² Production configurations available.

³ Also production applications

Manufacturer	Broadcast Electronics	Dorrough Electronics	EELA Audio	Harris/Broadcast Division
Model	150A series	Model 700 dual mono	S-120 (S.R.M.)	Medalist series
Modular system	No	No	Y	Yes
Cue amp	Yes	Yes	Opt	Yes
Solid-state bus switching	Yes	No	Yes	Yes
VCA gain control	No	No	Yes	Yes
Machine starts/stops	No	No	Yes	Opt
# of inputs (total)	20 (16, 10)	18	8, 12, 18, 24	36, 30, 24
# of mixing buses	2	3	2	2, 2, 2
Fader type	Rotary	Rotary	P&G slider	Rotary, slider
Meter type	VU	VU	VU, PPM, LED Peak	VU
Filters	None	None	HP	None
Input connection	AB	AB 150Ω UB 10kΩ	AB 2kΩ, 13kΩ (1.7kΩ)	AB 5kΩ
Input range	-65, +20dBv	Mic/line	-55, +20 (-72, +22)dB	-60dBv +8dBm
Output connection	600Ω	TB < 40Ω	TB < 60Ω (50Ω)	AB 20Ω
Output level max	+18dBm	+26dBm	+21dB (+6dB)	+24dBm
AF response (±dB Hz-kHz)	-1dB 30-20k	-1.0dB 20-20k	-1.0dB 20-20k	-0.5, 0dB, 20-20k
THD %/+dB/Hz	0.5/18dBm/30-20k	< 0.03/6	< 0.03/6	0.05/8dBm/20-20k
S/N Mic EIN/Line dB	-120dBm/68dB	85dB (80dB)	87dB (85dB)	-127dBm
Crosstalk (-dB/kHz/+dBm)		< -60dB/20-20k/+6dB	< -70dB/20-20k/+6dB	-85dB/15k/18dB
Reader Service No.	307	308	309	311

Manufacturer	Howe Technologies	ITAME	LPB Inc	MBI Broadcast Systems Ltd
Model	Series 10K On-Air	Sierra 13S (13M)	SIGNATURE III series	Series 12
Modular system	Yes	Yes	Yes	No
Cue amp	Yes	Yes	Opt	Yes
Solid-state bus switching	Yes	Yes	No	No
VCA gain control	Yes	Yes	No	No
Machine starts/stops	Yes	No	Yes	Yes
# of inputs (total)	28 (40, 52, 64)	16	18 (24, 30, 36)	12
# of mixing buses	13	8	2 (2, 2, 2)	3
Fader type	Slider	Slider	Rotary	Slider
Meter type	VU, PPM	VU, PPM	VU	VU, PPM
Filters	HP, LP	HP, LP	HP	HP
Input connection	AB/TB 2kΩ/20kΩ	TB 600Ω	TB	TB
Input range	-80, +24dBm	-30, +20dB	-65, -10dBm	
Output connection	50Ω	TB	600Ω	TB
Output level max	+28dBm	+15dB	+22dBm	
AF response (±dB Hz-kHz)	-3dB 2-50k	0.1dB 30-20k	1dB 20-20k	
THD %/+dB/Hz	0.005/24dBm/20-20k	0.1	0.05/8dBm	
S/N Mic EIN/Line dB	Typically 90dB	75dB	75dB	
Crosstalk (-dB/kHz/+dBm)	-76dB/10k/0dB	-80dB/400Hz/12dB	-61dB/1k/8dB	
Reader Service No.	313	314	315	316

► Note that the labels dBm, dBu, dBv and sometimes dBV are used liberally with audio equipment. **dBm** is defined as 1mW of power across a 600Ω load resistance, which is equivalent to 0.775V. **dBV** originated as a voltage reference, where 0dBV = 1Vrms. Confusion resulted when people did not distinguish correctly between dBV and dbv. The zero reference for dBV is different, that is, 0dBv = 0.775Vrms. Now **dBu** is preferred over dBv and is defined as the voltage obtained when the level measurement is made across 600Ω. The 'u' stands for 'unloaded'.

Feature Shock!

Otari's new MX-50. Built around the premise that you can have everything you ever wanted in a two-track tape machine, and still stay within your budget. For example:

The Transport

—DC quartz PLL capstan motor with front panel selection of operating speeds (from either a 15/7.5 or 7.5/3.75 ips speed pair).

—Capstan speed variable by $\pm 7\%$ from the front panel, and by $\pm 50\%$ from SMPTE

time-code external controllers via an Otari-standard 37-pin connector.

—Optional remote control.

The Electronics

—Lighted VU meters with peak-reading LED indicators.

—Transformerless active balanced inputs with X1-type connectors.

—Optional Voice Editing Module (VEM) for twice normal play speed with normal pitch.



A built-in tape timer displays current tape position in hours, minutes, and seconds, and includes a search-to-cue locator with cue point and zero location memories.

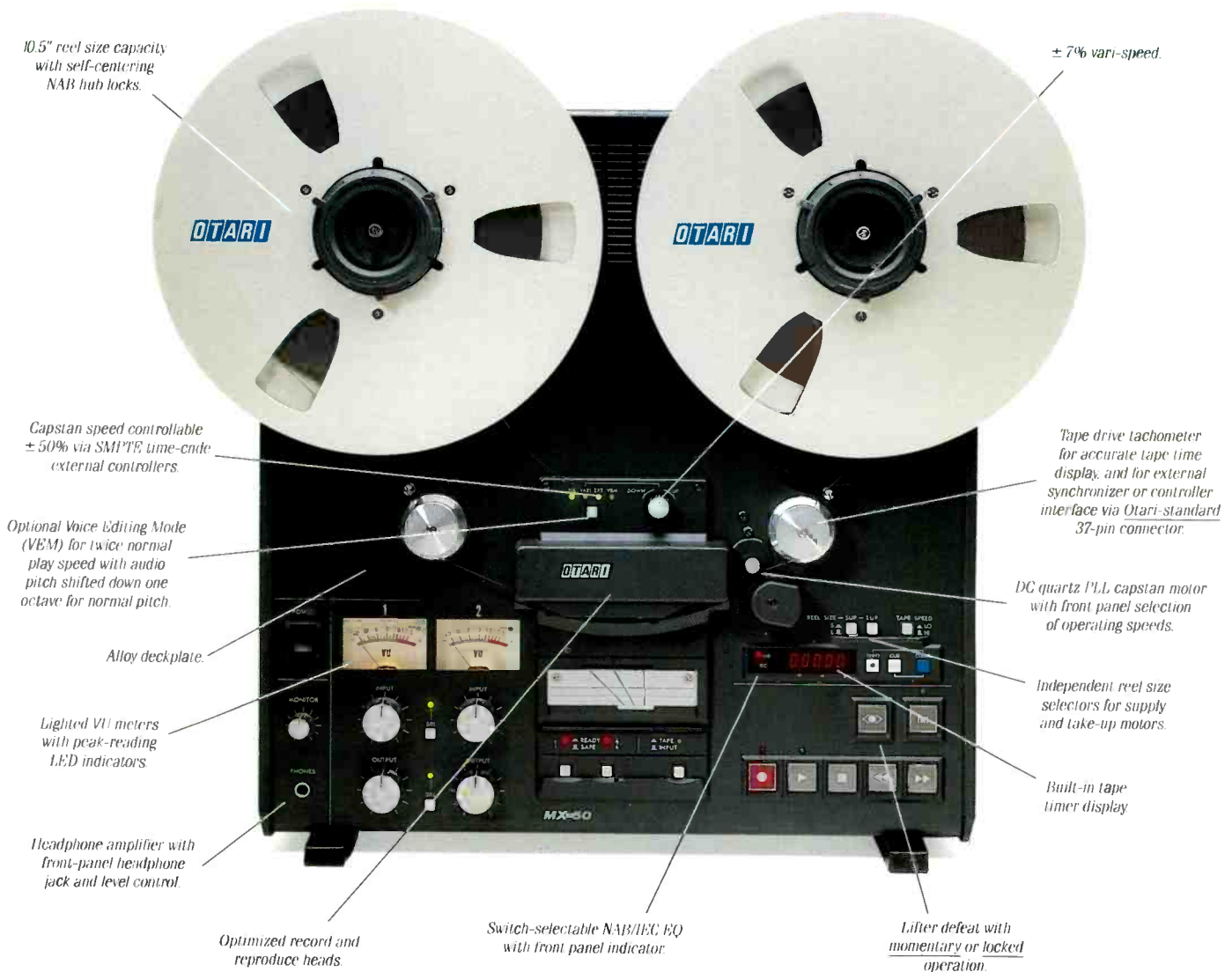
Otari's MX-50. For whenever or wherever you need a professional

audio machine at an affordable price.

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OTARI

AUDIO SPECS



Circle (122) on Reply Card

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Manufacturer	McCurdy Radio Industries	Pacific Recorders & Engineering			Radio Systems	
Model	S series	STX	StereoMixer	Radiomixer	BMX Series II (III)	RS-6 (-12, -18)
Modular system	Yes	Yes	Yes	Yes	Yes	No
Cue amp	No	Yes	Yes	Yes	Yes	Yes
Solid-state bus switching	Yes	Yes	Yes	No	No	Yes
VCA gain control	No	No	No	Yes	No	Yes
Machine starts/stops	Yes	Yes	Yes	Yes	Yes	Yes
# of inputs (total)	12 (18, 26)	252 (204, 156)	16	24 (40)	52 (44, 36, 28, 20)	12 (24, 36)
# of mixing buses	6 (6, 6)	15	1	6	3	3
Fader type	Slider	Slider	Rotary	Slider	Slider	Slider
Meter type	VU, PPM	VU, PPM	VU	VU	VU (& PPM)	VU, LED Peak
Filters	.....	HP, LP	HP, LP	.....	.....	.....
Input connection	AB 20kΩ	AB 40kΩ	AB 40kΩ	AB 40kΩ	AB (40kΩ)	AB 10kΩ
Input range	-20,+8dBu	-15,+10dBv	-10,8dBv	-10,8dBv	-40,8dBv (-10,+8)	-60,+10dBm
Output connection	AB 60Ω	AB 30Ω	AB 80Ω	AB 30Ω	AB 30Ω	AB 100Ω
Output level max	+28dBu	+28dBm	+24dBm	+26dBm	+26dBm (+28)	+22dBm
AF response (±dB Hz-kHz)	±0.5dB 20-20k	-0.9,0dB 20-20k	-0.7,0dB 20-20k	-0.8,0dB 20-20k	-0.8,0dB 20-20k	±0.25dB 20-20k
THD %/+dB/Hz	0.01/+18dBu/20k	<0.01/28dBm/20-20k	<0.01/24dBm/20-20k	<0.01/24dBm/20-20k	<0.01 (<0.008)	0.02/4dBm/1k
S/N Mic EIN/Line dB	-12.5dBm/90dB	-12.7dBm/88dB	-12.6dBm/88dB	-12.6dBm/88dB	-12.7dBm/88dB	-12.4dBm/88dB
Crosstalk (-dB/kHz/+dBm)	-65dB/15k/+18	-80dB/1k/+28dB	-70dB/1k/24dB	-80dB/1k/26dB	-85dB/1k/+28dB	<-75dB/20k
Reader Service No.	319	320	321	322	323	324

Manufacturer	Radio Systems	Solid State Logic	Sonosax Switzerland	Soundcraft	Studer Revox	Ward-Beck Systems
Model	ESA-10	SL 4000G series⁴	SX-V	SAC 200	Studer 970	Series R/R1400⁵
Modular system	No	Yes	Yes	Yes	Yes	Yes
Cue amp	Yes	Yes	No	No	Yes	Yes
Solid-state bus switching	Yes	No	No	No	Yes	Yes
VCA gain control	Yes	Yes	Opt	Yes	.....	Yes
Machine starts/stops	Yes	Opt	Opt	Yes	Yes	Yes
# of inputs (total)	36	24-96	10	16 (24)	18, expand by 9 s	14 (16, 22)
# of mixing buses	2	4	3	3 stereo	Various config	..
Fader type	Slider	Slider	Slider	Slider	Slider	Slider
Meter type	LED	VU, PPM, bargraph	VU, LED peak	VU, PPM, LED peak	VU, Peak LED	VU, PPM
Filters	.....	HP, LP	HP	HP, LP	HP, LP	HP
Input connection	AB 10kΩ	TB/AB 1kΩ/10kΩ	AB 10kΩ	AB 1kΩ/10kΩ	AB/TB ≥ 1.6kΩ/10kΩ	AB 20kΩ
Input range	-60dBv +30dBm	-80,+24dBu	-85,+6dBu	-80,+30dBu	-60,+21dBu	-60,+15dBm
Output connection	AB 200Ω	AB 75Ω	AB/TB <50Ω	AB	TB ≤ 40Ω	AB
Output level max	+25dBm	+29dBu	+24dBu	+26dBu	+6,+15dBu	100Ω
AF response (±dB Hz-kHz)	±0.1dB 20-20k	±0.5dB 20-20k	±0.5dB 30-20k	±0.5dB 20-20k	-1,+0.5dB 4.5-45k	±0.5dB 20-20k
THD %/+dB/Hz	0.02/22dBm/1k	0.02/8dBu/1k	0.01/+6dBu/20-20k	0.02/10dBu/1k	<0.03/31.5-16k	0.005/24/1k
S/N Mic EIN/Line dB	-12.8dB/90dB	-12.7.5dBm	-12.9.2dBm	-12.8dBm	≤ -12.5dBu/ ≥ 95dB	-12.7dBm/90dB
Crosstalk (-dB/kHz/+dBm)	-90dB/1k	-70dB/1k/+4dB	80dB/20k/0dB	-66dB/10k	> 80dB	> 90dB/30-15k
Reader Service No.	325	326	327	328	329	330

⁴ Also configures for production work.
⁵ Also R1600, R2200.

Manufacturer	Wheatstone Corporation		
Model	TV-500⁶	A-20/32	A-500
Modular system	Yes	Yes	Yes
Cue amp	No	No	No
Solid-state bus switching	No	No	No
VCA gain control	Opt	No	No
Machine starts/stops	Yes	Yes	Yes
# of inputs (total)	2 mic+1 line/fader	2 inputs/fader	2/position
# of mixing buses	2 stereo/1 mono	2 stereo	4 stereo ⁷
Fader type	Slider	Slider	Slider
Meter type	VU, custom	VU	VU, custom
Filters	LP, HP	.....	.....
Input connection	AB/BR, Xfmr iso	AB/BR 50kΩ	AB/TB 20kΩ BR ⁸
Input range	Mic/ line	Mic/ line	Mic/ line
Output connection	AB	AB	AB
Output level max	+30dBu	+26dBu	+26dBu
AF response (±dB Hz-kHz)	±0.25dB 10-40k	0.2 L, 0.5 M	0.1 Line 0.5 Mic
THD %/+dB/Hz	≤ 0.007/24dBu/20-20k	< 0.003/20dBm	< 0.003/18dBm/1k
S/N Mic EIN/Line dB	.....	-12.8dBm/88dB	-12.8dBm/90dB
Crosstalk (-dB/kHz/+dBm)	-86dB/20k/24dB	.....	-85dB/1Hz/+4dB
Reader Service No.	331	332	333

⁶ Applicable for live production.
⁷ Program bus split music/speech.
⁸ Mic is transformer-isolated.

Audio Mixers, Portable

This category lists audio control systems from ENG mic mixers to smaller format production consoles; many are easily carried by one person. Each accommodates mic and line level inputs either through switchable or separate input circuits. Integrated compression and limiting circuitry are noted with a dagger (†). Abbreviations used in this section include: **AB** active balanced; **TB** transformer balanced; **UB** unbalanced; **HP** high pass; **LP** low pass. In references to audio frequencies, **Hz** is understood.

Manufacturer	Barco EMT	Broadcast Audio	Fastex	Furman Sound	Panasonic/RAMSA	
Model	EMT MM standard†	System 6RM¹	2016	MM-4AB (MM-8AB)	WR-S20B (212/216)	WR-133
Modular system	Yes	Yes	No	Yes	No	No
Cue amp	Yes	Yes	No	No	Yes	No
Mono mix output	Opt	No	No	Yes	Yes	Yes
VCA gain control	Opt	No	No	No	No	No
Pan pots	Yes	No	Yes	Yes	Yes	Yes
Speaker muting	Opt	Yes	No	.....	No	No
Tone oscillator	Yes	No	No	No	Yes	No
# of inputs (total)	60	12	36	4-M/1-S (11)	8+8 (12, 16)	8+3
# of mixing buses	18	2	4	3	5	4
Fader type	Slider	Rotary	Rotary	Rotary	Slider	Slider
Meter type	Bar graph	VU	LED peak	..... (LED)	LED	VU
EQ/filters	.....	.....	.....	HP filter, ...	Swept EQ	Fixed bass/treble
Input connection (Ω/kΩ)	2kΩ, 10kΩ	AB/TB	Unbal 10kΩ	AB (600Ω)	AB 5kΩ	AB
Output connection Ω	<35Ω	TB	Unbal 10kΩ	AB (200Ω)	50Ω	TB

Output level max	+20dBm	+28dBm	.....	+23dBV (21)	+20dBu	+20dBu
AF response (\pm dB Hz-kHz)	-1,05dB 30-15k	\pm 0,5dB 20-20k	20-20k	-3,0dB 20-20k	-1, +0,5dB 20-20k	-2, +0,5dB 20-20k
THD	0,08% +6dBm 1kHz	0,1% +8dBm 20-20k	0,01%	0,02% +23dBV 20-20k	0,03% +18dBu 50-15k	0,1% 18dBu 20-20k
S/N Mic EIN/Line	-126dBm/85dB	80dB	80dB	-126dBm/-118dBV	-128dBm	-129dBm
Crosstalk (worst case)	-70dB 15kHz +6dB	-80dB/15k/+8dBm	65dB	-40dB/20k/0dB	-60dB 1kHz	-45dB/10kHz
Weight (portable) lb	61.6 lbs	25 lbs	.....	6 lbs	33 lbs	22 lbs
Power source	90Vac	115Vac	.....	115/230Vac	120Vac	120Vac 14W
Reader Service No.	334	335	336	337	338	339

¹ Configures for on-air applications; automation capability available.

Manufacturer	Professional Sound Corporation	Shure Brothers			Sonosax Switzerland	
Model	MX-4-S†	M267†	FP 32 (FP 31)†	FP 51 (FP 42)†	SX-S 6 (8, 10)†	SX-PR series†
Modular system	No	No	No	No	Yes	Yes
Cue amp	Yes	No	No	No	No	No
Mono mix output	Yes	Yes	No (Yes)	Yes (No)	Yes	No
VCA gain control	Yes	Yes	Yes	Yes	No	No
Pan pots	Yes	No	Yes (No)	No (Yes)	Yes	Yes
Speaker muting	No	.....	.....	.....	No	No
Tone oscillator	Yes	Yes	No (Yes)	Yes	Yes	Yes
# of inputs (total)	4	4	3	4	6, 8, 10	2, 4, 6
# of mixing buses	2	1	2 (1)	1 (2)	3	2
Fader type	Rotary	Rotary	Rotary	Rotary	Slider	Rotary
Meter type	.....	VU	VU	VU	VU, LED peak	VU, LED peak
EQ/filters	Swept EQ, HP	HP filter	HP filter	HP filter	Swept EQ, HP	HP filter
Input connection (Ω /k Ω)	AB 173 Ω	TB 150 Ω	TB 1k Ω	TB 1k Ω	AB 10k Ω	AB > 10k Ω
Output connection Ω	AB	150 Ω	330 Ω (TB 150)	TB 185 Ω	AB/TB < 50 Ω	AB < 50 Ω
Output level max	.....	+18dBm	+18dBm	+18dBm	+24dBu	+21dBu
AF response (\pm dB Hz-kHz)	.....	\pm2dB 30-20k	-3, +1(\pm 2)dB 30-15k	\pm 2(-3,1)dB 30-20k	\pm 0,5dB 30-20k	\pm 0,5dB 30-20k
THD	0,03%, 1kHz	0,35% +15dBm 30-20k	0,25% +4dBm 50-15k	0,4%, +15dBm 30-20k	0,01% +6dBu 20-20k	0,01% +6dBu 20-20k
S/N Mic EIN/Line dB	.....	-129,5dBm	-129dBm EIN	-129dBm EIN	-129,2dBm	-129,6dBm
Crosstalk (worst case)	.....	.....	45dB 1kHz	..... (-50dB/1kHz)	-80dB/20k/0dB	80dB/20Hz/0dB
Weight (portable) lb	12 lbs	5 lbs	2.5 lbs (2.2)	6 lbs	14,8lbs	4,88 lbs
Power source	48Vdc	120/240Vac, 27Vdc	18Vdc	120/240Vac, 27Vdc	9-15Vdc	3Vdc
Reader Service No.	340	341	342	343	344	345

Manufacturer	Soundtracs PLC	Studer			TASCAM	
Model	SPA reinforcement	961/962†	C279 Compact	Studer A779²	M308 (M312/M320)	M06 (M06 ST)
Modular system	Yes	Yes	No	No	No	No
Cue amp	Yes	Yes	Yes	Yes	No	No
Mono mix output	Yes	Yes	No	No	No	No
VCA gain control	Yes	.....	Yes	Yes	No	No
Pan pots	Yes	Yes	Yes	Yes	Yes	Yes
Speaker muting	Yes	.....	.....	.....	.....	No
Tone oscillator	Yes	Yes	Opt	No	No	No
# of inputs (total)	48, 24, 32, 40	18	12	6	8 (12/20)	6 (6 stereo)
# of mixing buses	8	6	4	2	.....	No
Fader type	Slider	Slider	Slider	Slider	Slider	Slider
Meter type	VU, LED Peak	VU or PPM	LED w/peak	LED peak	VU, Peak LED	VU
EQ/filters	HP filter	Parametric EQ, HP	HP filter	Swept EQ, HP/LP	Swept EQ, HP	Swept EQ
Input connection (Ω /k Ω)	AB > 5k Ω TB opt	Bal 1,6k Ω 10k Ω	Bal > 1,2k Ω -M 47k Ω -L	AB/TB > 47k Ω	AB 2,8k Ω , 22k Ω	Unb 100k Ω
Output connection Ω	AB < 75 Ω	Bal \leq 40 Ω	Bal < 50 Ω , Unb < 1k Ω	AB/TB < 50 Ω	100 Ω	Unb 220 Ω
Output level max	+24dBV	+24dBm	+24dBv bal	+24dBV	20dBV	0dBu nominal
AF response (\pm dB Hz-kHz)	-1,5,0dB 20-20k	-1, +0,5dB 4.5-45k	\pm 1dB 20-20k	\pm 1dB 20-20k	-2,1dB 20-25k	-2,1dB 20-20k
THD	0,02% 0dB 100-10k	> 0,03%	> 0,03%	0,03% -6dBV 1kHz	0,025%	0,025%
S/N Mic EIN/Line dB	-127dBm	\leq -125dBu EIN, \leq 95dB	-125dBv EIN, < 86dB	-65dB/86dB	83dB	51dB (78dB)
Crosstalk (worst case)	-85dB 1kHz 0dB	< -90dB	.....	.....	< -60dB	< -60dB
Weight (portable) lb	290-475 lbs	55/75 lbs	24.2 lbs	24.2 lbs	18,75 lbs	5,73 lbs
Power source	120/240Vac	110/220Vac	100-240Vac 50W	110/220Vac	110/220Vac	110/220Vac
Reader Service No.	346	347	348	349	350	351

² Automation port available.

Manufacturer	TASCAM		Yamaha Music Corporation		
Model	M208 (M216/M224)	M-106	M406	MR1642 (1242, 842)³	DMP7 (-7D, -11)†⁴
Modular system	No	No	No	No	No
Cue amp	No	No	No	Yes	No
Mono mix output	No	No	No	Yes	No
VCA gain control	No	No	No	No	Yes
Pan pots	Yes	Yes	Yes	Yes	Yes
Speaker muting	No	.....	No	No	.....
Tone oscillator	No	No	No	No	No
# of inputs (total)	8 (16/24)	6	6	16 (12, 8)	8
# of mixing buses	4	4	2	4 [2]	0
Fader type	Slider	Slider	Rotary	Slider	Slider
Meter type	VU, Peak LED	VU	VU, LED peak	VU, LED peak	PPM
EQ/filters	Swept	Swept	.....	Swept	Parametric, HP/LP
Input connection (Ω /k Ω)	AB 2,8k Ω , 22k Ω	Unb 100k Ω	3k Ω	10k Ω [4k Ω]	15k Ω
Output connection Ω	100 Ω	Unb 100 Ω	150 Ω	150 Ω	150 Ω
Output level max	20dBV	18dBV	+24dB	+24dBV	+18dBV
AF response (\pm dB Hz-kHz)	-2,1dB 20-25k	-2,1dB 20-20k	-3,0dB 20-20k	-3,1dB 20-20k	-3,1dB 20-20k
THD	0,025%	0,01%	0,1% 20dB 70-20k	0,1% 14dBu 20-20k	0,03% 17dBV 1kHz
S/N Mic EIN/Line dB	83dB	70dB	95dB	90dB [92dB]	80dB
Crosstalk (worst case)	< -60dB	< -60dB	-60dB/1kHz	-60dB	.....
Weight (portable) lb	18,75 lbs	15,4 lbs	21 lbs	.....	23,1 lbs
Power source	110/220Vac	110/220Vac	120Vac	.....	120Vac
Reader Service No.	352	353	354	355	356

³ Models MC1602, 1202, 802 have similar characteristics for production use. ⁴ Model includes digital control system and digital signal processing.

Audio Mixers, Studio Production

These audio mixers are designed for studio applications. All support mic and line level inputs. Most provide a mono mix output. Nearly all models use slider faders for controlling signal levels. A dagger (†) indicates no machine start/stop provision. A double dagger (‡) indicates no provision for talkback. Abbreviations include: **AB** actively balanced; **TB** transformer balanced; **HP** high pass; **LP** low pass; **P†** pre-fader; **AF** after-fader; **IP** in-place.

Manufacturer	Allen & Heath	AMEK Systems & Controls	AMS Industries	Arrakis Systems
Model	SABER series	System 8 series†	SIGMA series†	Classic
Modular system	Yes	No	Yes	Yes
Cue amp	Yes	Yes	Yes	Yes
Automation port	Yes	No	Yes	Yes
Digital control	Yes	No	Yes	Opt
Solid-state bus switching	No	No	No	No
Compressor/limiter	No	No	No	Opt
Pan pots	Yes	Yes	Yes	Yes
Speaker muting	Yes	Yes	Yes	Yes
Tone oscillator	Yes	Yes	Yes	Yes
Patch points	Yes	Yes	Yes	Yes
# of inputs (total)	40 (16, 24, 32)	24 (16)	32 (24, 40, 44)	32 (48, 64)
# of direct outputs	40 (16, 24, 32)	24 (16)	32 (24, 40, 44)	40 (56, 82)
# of mixing buses	16	8	24	28 (28, 28)
# of groups/subgroups	16 G/16 S (8)	8 G/8 S	In line	2 ST/ 8 ST
# of sends/returns	6 S/4 R	3 S/2 R	32 S/32 R	8 mono/8 stereo
VCA gain control	No	No	Opt	Opt
Solo type	PF, IP	PF	PF, AF, IP	PF, AF, IP
Meter type	VU, LED peak	VU	VU, LED peak	VU, PPM, LED peak
EQ types	Swept	Swept	Parametric	Parametric
Filters	HP	HP	HP, LP	LP, HP
Input connection (Ω/kΩ)	AB 3kΩ	AB 3kΩ	AB 3kΩ	AB 1kΩ/20kΩ
Output connection Ω	AB 50Ω	AB 50Ω	AB, 50Ω	AB, TB <50Ω
Output level max	+27dBu	+27dBu	+27dBu	+26dBu
AF response (±dB Hz-kHz)	-1.0dB, 20-20k	±1dB, 20-20k	-0, +1dB 20-20k	±1dB 20-20k
THD (at dB output, frequency)	<0.02% +20dBu 1kHz	0.05% +4dB 30-20k	<0.02% +20dBu 1kHz	0.03% +20dBu 30-20k
S/N Mic EIN/Line dB	-127dBm	-127dBm	-127dBm	-127dBm/85dB
Crosstalk (worst case)	-65dB 1kHz +4dB	60dB	-70dB	System dependent
Reader Service No.	357	358	359	360

1 Digitally assignable system. 2 Impedance per customer request.

Manufacturer	Auditronics	Barco	EMT	Broadcast Audio	Broadcast Electronics
Model	310 series	400 series	EMT MMC	EMT MM40	Series IV
Modular system	Yes	Yes	Yes	Yes	No
Cue amp	Yes	Yes	Yes	Yes	Yes
Automation port	Yes	Yes	Opt	No	No
Digital control	No	No	Opt	No	No
Solid-state bus switching	Yes	Yes	Yes	Yes	Yes
Compressor/limiter	Yes	Yes	Opt	Yes	No
Pan pots	Yes	Yes	Yes	Yes	Opt
Speaker muting	Yes	Yes	Opt	Yes	Yes
Tone oscillator	Yes	Yes	Yes	Yes	Opt
Patch points	Yes	Yes	Yes	Yes	No
# of inputs (total)	40, 16, 24, 32	30, 18, 24	60	18, 24, 36, 48	22
# of direct outputs	40, 16, 24, 32	30, 18, 24	1/channel	1/channel	0

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# of mixing buses	8, 4	8, 4	40	32	2, 3, 4, 4	2
# of groups/subgroups	4 groups	4 groups	24 G/16 S	24 G/6 S	User defined
# of sends/returns	4 S/4 R	2 S/2 R	8 G/16 S	12 S/8 R	2 R/Definable sends	.....
VCA gain control	Yes	Yes	Opt	Opt	No	No
Solo type	In-place	In-place	.....	.....	PF	.....
Meter type	VU	VU, LED peak	Bar graphs	Bar graph	VU, peak LEDs	VU
EQ types	Swept	Swept	.....	.....	Swept	.....
Filters	LP, HP	LP, HP	.....	.....	.....	.....
Input connection ($\Omega/k\Omega$)	AB 1k Ω /50k Ω	AB 1k Ω /50k Ω	2k Ω /10k Ω	2k Ω /10k Ω	AB TB 150 Ω /20k Ω	AB
Output connection Ω	AB 60 Ω	AB 60 Ω	<35 Ω	<35 Ω	TB 150 Ω	TB
Output level max	+24dBv	+24dBm	+20dBm	+20dBm	+28dBm	+18dBm
AF response (\pm dB Hz-kHz)	-0.5,0dB 20-20k	0.5dB 20-20k	-1,+0.5dB 30-15k	-1,+0.5dB 30-15k	\pm 0.5dB 20-20k	-1dB 30-20k
THD (at dB output, frequency)	0.05% 24dBv 20-20k	0.05% 24dBm 20-20k	0.08% +6dBm 1kHz	0.08% +6dBm, 1kHz	0.007% +28dBm	0.5% +18dBm 20-20k
S/N Mic EIN/Line dB	-129dBm/84dB	-127.5dBm/84dB	-126dBm/92dB	-126dBm/85dB	80dB	-120dBm/68dB
Crosstalk (worst case)	-65dB/20k/+18dB	-65dB/20k/+18dB	-70dB/15Hz/+6dB	-70dB/15Hz/+6dB	-80dB 1.5kHz +8dBm	.....
Reader Service No.	363	364	365	366	367	368

Manufacturer	Broadcast Electronics	For-A	Fostex	Grass Valley Group	Howe Technologies	ITAME
Model	Mix Trak-90	AFV-500†‡	1240 (1840, 2440)†‡	AMX-170S†‡ ³	Series 10K Studio	Sierra 19S (19M)†
Modular system	Yes	Yes	No	No	Yes	Yes
Cue amp	Yes	Yes	No	No	Yes	Yes
Automation port	Yes	Yes	No	Yes	Opt	Yes
Digital control	Yes	Yes	No	Yes	Opt	No
Solid-state bus switching	No	.....	No	Yes	Yes	Yes
Compressor/limiter	No	No	No	No	Yes	Yes
Pan pots	Yes	Yes	Yes	No	Yes	No
Speaker muting	Yes	Yes	No	Yes	Yes	Yes
Tone oscillator	No	Yes	No	Yes	Opt	No
Patch points	Yes	Opt	No	No	Yes	No
# of inputs (total)	36, 24, 42, 48	8	24 (36, 48)	8, 16	28, 40, 52, 64	26
# of direct outputs	3	2	12 (18, 24)	.....	4 stereo	26
# of mixing buses	6	2	4	4	13	14
# of groups/subgroups	.....	.....	4	2	PFL cue solo	1
# of sends/returns	.....	.....	4	4	.....	2
VCA gain control	Yes	.....	No	Yes	.....	Yes
Solo type	.....	.....	IP	.....	RF, IP	IP
Meter type	VU, PPM, LED peak	VU, LED peak	PPM	VU, PPM, LED peak	VU, PPM	VU, PPM
EQ types	Parametric	.....	Parametric	Fixed freq	.....	Parametric
Filters	HP, LP	.....	.....	LP, HP	HP, LP	HP, LP
Input connection ($\Omega/k\Omega$)	AB >10k Ω	AB 600 Ω	AB 7k Ω	AB Hi-Z	AB/TB 2k Ω /20k Ω	TB
Output connection Ω	AB <100 Ω	.....	.....	AB 60 Ω	AB/TB 50 Ω	TB
Output level max	+26dBu	0,+24dB	+15dBV	+20dBm	+28dBm	+15dB
AF response (\pm dB Hz-kHz)	-0.25dB 20-20k	.....	\pm1dB 20-20k	0,-0.3dB 20-20k	-3dB 2-50k	0.1dB 30-20k
THD (at dB output, frequency)	0.05% 0dBu 20-20k	0.15% +20dB 15kHz	0.05% 1Hz	0.03% +4dB 20-20k	0.005% +24dBm 20-20k	0.1%
S/N Mic EIN/Line dB	-128dBm/90dB	<90dB	52dB (50, 48)	89dB	Typically 90dB	75dB
Crosstalk (worst case)	<-80dB 20-20k 0dB	\leq -20dB 30Hz	-65dB 1kHz	-75dB/20kHz/+4dB	-75dB/10kHz/0dB	-80dB/400Hz/12dB
Reader Service No.	369	370	371	372	373	374

³ Editing suite mixer system.

Manufacturer	LPB inc	McCurdy Radio Industries	Neve	Pacific Recorders & Engineering	Panasonic/RAMSA
Model	CITATION II‡	SS 8800E ⁴	51 series, V Post	ABX (AMX) ⁵	WR-842B
Modular system	Yes	Yes	Yes	Yes	Yes
Cue amp	Yes	Yes	Opt	Yes	Yes
Automation port	No	No	Opt	No	No
Digital control	No	No	Opt	No	No
Solid-state bus switching	No	Yes	No	Yes	No
Compressor/limiter	No	Opt	Opt	Opt	No
Pan pots	No	Yes	Yes	Yes	Yes
Speaker muting	Yes	Yes	Yes	Yes	No
Tone oscillator	No	Opt	Yes	Yes	Yes
Patch points	No	Opt	Opt	Yes	Yes
# of inputs (total)	30	20, 32, 40, 48	60, 24, 36, 48	68, 52, 36 ⁵	28+24 (16+16)
# of direct outputs	6	.....	60, 24, 36, 48	34, 26, 18	28+15 (16+6)
# of mixing buses	2	6, 6, 6, 6	8, 2, 4, 6	12 (3)	10 (6)
# of groups/subgroups	.....	.....	48 G (4, 8)	9 (.....)	4 G/4 S
# of sends/returns	1	.....	8 S/8 R (4, 4)	4/2 (2/1)	4+28 S/2+28 R1
VCA gain control	No	No	No	No	No
Solo type	.....	.....	PF, AF, IP	Pre-fader	PF, AF
Meter type	VU	VU, PPM, LED peak	VU PPM Led peak	VU, PPM	VU, LED
EQ types	Parametric	Param, Swept	Parametric, swept	Param/Swept	Parametric (quasi param)
Filters	.....	.....	HP, LP	HP, LP	HP
Input connection ($\Omega/k\Omega$)	TB	AB 20k Ω	AB/TB 10k Ω	AB 40k Ω	AB 5k Ω
Output connection Ω	TB	AB 600 Ω	AB/TB 30 Ω	AB 30 Ω	AB 50 Ω
Output level max	+22dBm	+24dBm	+26dBm	+28dBm	+24dBu
AF response (\pm dB Hz-kHz)	1.0dB 20-20k	\pm 0.5dB 30-15k	.....	-0.8,0dB 20-20k	-1.5,+0.5dB 20-20k
THD (at dB output, frequency)	0.03% 8dBm	<0.1% +18dBm 20-20k	.....	<0.008% 28dB 20-20k	0.05%, +20dBu
S/N Mic EIN/Line dB	75dB	-125dBm/90dB	.....	-127dBm/88dB	-125dBm (-125)
Crosstalk (worst case)	-65dB/1kHz/8dB	-65dB 15k +18dB	.....	-85dB 1kHz 28dB	-60dB 10kHz
Reader Service No.	375	376	377	378	380

⁴ Can also be used for on-air applications. ⁵ Expands with groups of 8 with 2 inputs per fader.

Manufacturer	Panasonic/RAMSA	Scantex	Solid State Logic	Sonosax Switzerland
Model	WR-M10A‡	WR-T820B†	AFDM-208†‡	SL 6000 G series ⁶
Modular system	No	No	Yes	Yes
Cue amp	Yes	Yes	Yes	Yes
Automation port	No	No	Yes	Yes
Digital control	No	No	Yes	Yes
Solid-state bus switching	No	No	No	Yes
Compressor/limiter	Yes	No	Yes	Yes
Pan pots	No	Yes	No	Yes
Speaker muting	Yes	No	No	Yes
Tone oscillator	No	Yes	Yes	Yes
Patch points	No	Yes	Yes	Yes
# of inputs (total)	4+8	20+20	16	24 to 96
# of direct outputs	3	20+10	16	Opriion
# of mixing buses	2	14	16	6
				32

# of groups/subgroups	2 G/1 S	8 G/4 S	.....	1-32/1-32	Variable	8
# of sends/returns	1 S/1 R	4+20 S/8+20 R	.....	6 S/8 R	8 S/# of channels	2
VCA gain control	No	No	Yes	Yes	Yes	Opt
Solo type	.....	AF	.....	PF, AF, IP	PF, AF, IP	PF, AF, IP
Meter type	LED Peak	VU, LED peak	VU	VU PPM, Plasma BrGrF	VU/PPM, LCD	VU, LED peak
EQ types	Fixed bass/treble	Swept	.....	Parametric	Parametric	Swept
Filters	.....	HP	.....	HP, LP options	HP, LP	HP
Input connection (Ω/kΩ)	AB 5kΩ	AB 5kΩ	600Ω/10kΩ	TB/AB 1kΩ/10kΩ	TB/AB 10kΩ	.....
Output connection Ω	TB 50Ω	AB 50Ω	40Ω	AB 75Ω	AB 30Ω	AB/TB
Output level max	+4dBu	+4dBu	+25dBm	+29dBu	+28dBu	+24dBu
AF response (±dB Hz-kHz)	-1,+0.5dB 20-20k	-0.8,+0.5dB 20-20k	±0.1dB 20-20k	±0.5dB 20-20k	±0.5dB 20-20k	±0.5dB 20-20k
THD (at dB output, frequency)	0.1% +18dBu 20-20k	0.08% +18dBu 20-20k	0.03% 24dBu 20-20k	0.02% +8dBu 1kHz	0.08% +24dBu 1kHz	0.01% 6dBu 20-20k
S/N Mic EIN/Line dB	-125dBm EIN	-128dBm EIN	75dB	-127.5dBm	-125 dBm	-129.2dBm
Crosstalk (worst case)	-65dB	-60B 1kHz	-70dB 15kHz	-70dB/1kHz/+4dB	-80dB/15kHz/+4dB	-80dB/20k/0dB
Reader Service No.	381	382	383	384	385	386

* Configurations for on-air operations.

Manufacturer	Sony	Soundtracs		Studer	TASCAM	
	Model	InLine IL4832 (3632)†	ERIC series	Model 963 ⁹	902 (900 series) ¹⁰	M512 (M520)†
Modular system	Yes	Yes	Yes	Yes	Yes	Yes
Cue amp	Yes	No	No	Yes	Yes	No
Automation port	Yes ⁷	No	No ⁸	No	Yes	Yes
Digital control	Yes ⁷	No	Yes	.....	Yes	No
Solid-state bus switching	No	No	Yes	.....	Yes	No
Compressor/limiter	Yes	No	No	Yes	Yes	No
Pan pots	Yes	Yes	Yes	Yes	Yes	Yes
Speaker muting	Yes	Yes	Yes	Yes	Yes	No
Tone oscillator	Yes	Yes	Yes	Yes	Yes	Yes
Patch points	Yes	Yes	Yes	Yes	Yes	Yes
# of inputs (total)	36 (26, 16)	48 (36)	48 (32, 40)	56 mono +4 line	28	12 (20)
# of direct outputs	36 (26, 16)	48 (36)	48 (32, 40)	56	24	12 (20)
# of mixing buses	4+2	32	24 (8, 16)	2 master, 4 aux	24	8 (8)
# of groups/subgroups	4+2-G, 4 R	32 In line	24 (8, 16)	4 or 8	8	8
# of sends/returns	4 S, 4 R	8 S	8	Various config.	Various config	4
VCA gain control	Yes	No	No	.....	Yes	No
Solo type	PF, AF	PF, AF, IP	PF, AF, IP	AF	PF, AF	PF, AF, IP
Meter type	VU PPM Peak Led	LED Peak	LED peak	VU, bar graph	VU	VU, LED peak
EQ types	Swept	Parametric	Parametric	3-band	Parametric	Swept
Filters	HP	HP	Swept HP	HP	HF roll-off	.....
Input connection (Ω/kΩ)	AB/TB 10kΩ	AB	AB 710kΩ	TB >5kΩ	TB/AB ≥1.6kΩ, 10kΩ	AB 2kΩ, 100kΩ
Output connection Ω	AB/TB 50Ω	AB	AB <75Ω	TB <50Ω	TB ≤50Ω	AB 100Ω
Output level max	+25dBm	+25dBm	+24dBV	+24dBm	+24dBm	+28dBm
AF response (±dB Hz-kHz)	±0.5dB 30-20k	-2.0dB 20-20k	-2.0dB 20-20k	-1,-0.5dB 4.5-40k	-1,-0.5dB 30-20k	±1dB 20-20k
THD (at dB output, frequency)	0.05% 20dB 1kHz	0.008% 0dB 1kHz	0.008% 0dB 1kHz	0.03% 4dBm 30-15k	≤0.1%	0.025% 1kHz
S/N Mic EIN/Line dB	-126dBm EIN	-127dBm	-127.5dBm	≤-125dBu ≥95dB	-125dBm/ <100dB	87dB unwt'd
Crosstalk (worst case)	60dB 15kHz	-82dB/1kHz/0dB	-82dB/1kHz/0dB	<-90dB	<-85dB	<-70dB 1kHz
Reader Service No.	387	388	389	390	391	392

⁷ Through edit interface device.

⁸ ERIC III—moving fader automation.

⁹ Configurations of 24-60 inputs.

¹⁰ Custom configurations available.

Manufacturer	TASCAM	Trident Audio	Ward-Beck Systems	Wheatstone Corporation	Yamaha Music	
	Model	Vector 432	Series ST/ST2442 ¹¹	SP-6	SP-5†	PM2800M-40 (32)†
Modular system	Yes	Yes	Yes	Yes	Yes	Yes
Cue amp	No	Opt	Yes	No	No	No
Automation port	Yes	Yes	Opt	No	No	No
Digital control	No	No	Yes	No	No	No
Solid-state bus switching	No	Yes	No	No	No	No
Compressor/limiter	No	Yes	Opt	No	No	No
Pan pots	Yes	Yes	Yes	Yes	Yes	Yes
Speaker muting	No	Yes	Yes	Yes	Opt	Yes
Tone oscillator	Yes	Yes	Yes	Yes	Yes	Yes
Patch points	Yes	Yes	Yes	Yes	Yes	Yes
# of inputs (total)	162 (40)	40, 48, 56, 64	24 (36, 48)	Per channel config	..... t line	40 (32)
# of direct outputs	32	40, 48, 56, 64	20	Per channel config	Per # mono inputs	40 (32)
# of mixing buses	16	4, 4, 4, 8	23	1 st/2 mono out	1 stereo/1 mono	12
# of groups/subgroups	16 (32)	32 G/32 S	4 stereo submaster	8 M/4 ST groups	8 M/4 S groups	8/8
# of sends/returns	4/6 (8/8)	8 S/8 R	2-mono, 2 stereo	4 S/4 R	4/4	4/4
VCA gain control	No	Opt	Opt	No	No	Yes
Solo type	PF, AF, IP	PF AF IP	IP	PF	PF	PF
Meter type	VU, LED peak	VU, PPM, Peak LEI	VU/PPM per req.	VU, custom	VU, Custom	VU, LED peak
EQ types	Swept	Parametric, swept	Parametric, swept	Swept	Swept	Parametric
Filters	..... (HP, LP)	HP, LP	.....	HP	HP	HP, LP
Input connection (Ω/kΩ)	AB 2kΩ, 100kΩ	AB/TB <10kΩ	AB 20kΩ, TB 1.5kΩ	AB BR 20kΩ†	AB 20kΩ	AB 3kΩ
Output connection Ω	AB 100Ω	AB/TB 600Ω	AB <100Ω	AB	AB	AB 150Ω
Output level max	+28dBm	+28dBu	+30dBm	+29dBu	+28dBu	+24dBu
AF response (±dB Hz-kHz)	±1dB 20-20k	±0.5dB, 10-50k	±0.5dB 20-20k	±.5dB 15-50k	±.5dB 20-20k	-3,+1dB 20-20k
THD (at dB output, frequency)	0.015% 1kHz	0.03%	0.05% +24dBm 20-20k	0.005% +18dBm 20-20k	≤0.01% 20-20k +18dB	0.1% 14dBu 20-20k
S/N Mic EIN/Line dB	88dB unwt'd	-127dBm/+70dB	-127dBm EIN, 90dB	-129dBm/90dB	-129dBm/90	95dB
Crosstalk (worst case)	<-60dB 1kHz	<-80dB/0dB	>90dB 30-15k	-90dB/1kHz/+4dB	-90dB 1kHz	60dB 1kHz 14dB
Reader Service No.	393	394	600	396	397	398

¹¹ Larger input capabilities with ST3642, ST4882.

Manufacturer	Yamaha Music Corporation			
	Model	MC2404 (1604/1204)†	PM1800-40 (32/24/16)†	PM3000-24 (32/40C)†
Modular system	Yes	Yes	Yes	Yes
Cue amp	Yes	No	No	No
Automation port	No	No	No	No
Digital control	No	No	No	No
Solid-state bus switching	No	No	No	No
Compressor/limiter	No	No	No	No
Pan pots	Yes	Yes	Yes	Yes
Speaker muting	Yes	Yes	Yes	Yes
Tone oscillator	Yes	Yes	.....	Yes
Patch points	Yes	Yes	Yes	Yes
# of inputs (total)	24, 16, 12	40 (32, 24, 16)	16	40 (32, 24)
# of direct outputs	24, 16, 12	40 (32, 24, 16)	16	40 (32, 24)
# of mixing buses	10, 10, 10	8	11	16
# of groups/subgroups	2/2	8/4	6/5	8



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# of sends/returns	4/4	4/4	2/2
VCA gain control	No	Yes	No	Yes
Solo type	AF PF IP	PF	PF, AF	PF, AF, IP
Meter type	VU, LED peak	VU, LED peak	VU	VU, LED peak
EQ types	Swept	Parametric	Swept	Parametric
Filters	.....	HP, LP	HP	HP, LP
Input connection ($\Omega/k\Omega$)	AB	AB 3k Ω	AB 800 $\Omega/4k\Omega$	AB 3k $\Omega/1k\Omega$
Output connection Ω	AB	AB 150 Ω	.....	.....
Output level max	+22dBV	+24dBu	+24dBv	+24dBu
AF response (\pm dB Hz-kHz)	-3,+1dB 20-20k	-3,+1dB 20-20k	-3,+1dB 20-20k	-3,+1dB 20-20k
THD (at dB output, frequency)	0.1% 4dBm 20-20k	0.1% 14dBm 20-20k	0.5% 10dBu 20-20k	0.1% 14dBu 20-20k
S/N Mic EIN/Line dB	86dB	93dB	95dB	95dB
Crosstalk (worst case)	-60dB/1kHz/4dB	-60dB 1kHz 14dB	-60dB 1kHz	70dB 1kHz 14dB
Reader Service No.	399	400	401	402

Compact Disc Players

These audio CD players are designed for the more strenuous environment of broadcast and production facilities.

Manufacturer	Barco	EMT	Denon America	Panasonic Pro Audio	Pioneer
Model	EMT 981	EMT 980	DN-950FA	SL-4300	PD-7300 (6300)
Configuration	Single	Single player	Single player	Single	Single player
Player trays	.....	.....	1	1	1
Programmable events #	4-event	No	No	20-event	Yes
Output connection (Ω)	Balanced	Balanced	Balanced	Unbalanced	Unbalanced
Output level	+6dB	+6dB	+4dB	-10dBu	2.0V
Digital output (kHz)	Yes 44.1kHz	No	No	No	Optical & (coaxial)
Digital resolution	16-bit	16-bit	16 bit	16-bit	18-bit
Oversampling factor	x4	x2	4x	4x	8x
AF response (\pm dB Hz-kHz)	\pm 0.2dB 40-20k	\pm 0.5dB 20-19.8k	20-20k	\pm 0.5dB 2-20k	\pm 0.5dB 4-20k
Distortion	0.04%	0.03%	< 0.01%	0.003%	0.0025% (0.0035%)
Dynamic range	98dB	90dB	92dB A wtd	94dB	98dB
Crosstalk (worst case)	< -75dB	-60dB	N.A.	.....	106dB separation
S/N ratio	+105dB RMS	+94dB RMS	92dB	96dB	110dB (104dB)
Access time (worst)	3.5s	4s	3s	.....	.....
Reader Service No.	403	404	405	406	408

Manufacturer	Pioneer	Sony Pro Audio	Studer	Revox	TASCAM	
Model	PD-4300/4350	CDP series	Studer A727 Pro	Studer A730 Pro	CD 701	CD 401/CD 501
Configuration	Single player	Single, multiplayers	Single	Single	Single player	Single player
Player trays	1	Per model	1	1	1	1
Programmable events #	Yes	Yes	No	3-event	Yes	via Rmt Ctl
Output connection (Ω)	Unbalanced	Bal 600 Ω	Bal/unbal	Bal/unbal < 50 Ω	Balanced	Balanced
Output level	1.8V	4dBm nominal	+15dBm	15dBm	+4dBm +18dBm max	0dBm
Digital output (kHz)	Coaxial & optical	.....	Yes	Yes	Yes	Yes
Digital resolution	18-bit	.....	16-bit	16-bit	16-bit	16-bits
Oversampling factor	4x	.....	4x	4x	Yes	Yes
AF response (\pm dB Hz-kHz)	-1,+0.5dB 4-20k	-1,0.5dB 20-20k	\pm 0.1dB 20-20k	\pm 0.1dB 20-20k	.....	\pm3dB 5-20k
Distortion	.....	0.01%	0.006%	< 0.006%	0.008%	0.0025%
Dynamic range	90dB	> 94dB	> 100dB	> 100dB	.....	96dB
Crosstalk (worst case)	95dB separation	> 90dB 1kHz	< -90dB	< -90dB	-80dB	-95dB
S/N ratio	102dB	.....	> 100dB	> 100dB	96dB	96dB
Access time (worst)	.....	< 2s	< 3s	< 3s	2s	.....
Reader Service No.	409	410	411	412	413	414

Audio Cassette Decks

Stereo audio record/play systems using Philips-type cassettes.

Manufacturer	Fostex	Nakamichi America	Studer Revox	TASCAM	
Model	160 (260)	X-26	MR-2 (MR-1)	Model 102 (103)	122 MK II
Deck control logic	Mechanical	Mechanical	μ P	TTL	TTL
Timer	Tape counter	Tape counter	Tape counter	Min/sec	Min/sec, Index
Cue track	No	No	No	No	Yes
Autolocator	No	No	1 system	2 available	.....
Capstan motor, drive	DC servo	DC servo	DC servo, direct	2 dc servo, direct	FG servo
Reel motors	DC servo	DC servo	DC servo	2 dc servo	DC
Play speeds	3 $\frac{1}{2}$ ips	1 $\frac{7}{8}$ ips	1 $\frac{7}{8}$ \pm 0.5% ¹	1 $\frac{7}{8}$ ips	1 $\frac{7}{8}$ \pm 12%
# of heads	2	2	2 (3)	2 (3)	3
Meter types	LED bargraph	LED bargraph	LED bar graph	Dual LED bargraph	VU Peak LEDs
Input connection	Unb 10k Ω	Unb 20k Ω	Bal/Unbal	Bal > 10k Ω	Unbal
Input level range	.....	.....	-20,+9.5dBv	-5,+15dBv	-10dBV,+4dBm
Output connection	Unbal 10k Ω	Unbal 10k Ω	Bal, unbal	Bal < 50 Ω	Bal
Output level response	.....	.....	+9.5dBm (+20dBm)	+24dBm	-10dBV,+4dBm
AF response (\pm dB Hz-kHz)	40-14k	40-12.5k	\pm 3dB 20-20k	-3,+2dBm 20-20k	\pm 3dB 25-17k
referred to	.....	.....	200nWb/m 70/120 EQ	160nWb/m 70 μ s	160nWb/m
S/N ratio	70dB	58dB	> 68dB (> 70dB)	57dB NR off ²	> 80dB
Distortion	1.5%	2%	< 1.0% (< 0.9%)	1.5%	0.1%
Crosstalk (worst case)	-50dB	-45dB	< -60dB	< -40dB	-45dB
Wow, flutter	0.1%	0.15%	< 0.06 (< 0.027)%	0.1%	0.04%
Equalizations (in μ s)	IEC	IEC	Type I, II, IV	120 μ s, 70 μ s	3180 +70, 120
Noise reduction	Dolby C	Dolby B	Dolby B, C	Dolby B, C	Dolby B/C
Reader Service No.	434	435	436	437	438

¹ Allows \pm 6% pitch control. ² Measures 71dB with Dolby C in operation.

Manufacturer	TASCAM	Yamaha Music Corporation		
Model	Model 112	MT100 (MT2X)	MT2X	C300
Deck control logic	TTL	Mechanical (& μ P)	Mechanical, μ P	μ P
Timer	Min/sec	Tape counter	Tape counter	Min/sec

Cue track	No	No	No	No	No
Autolocator	1	3	1	1	1
Capstan motor, drive	DC servo	DC servo	.....	.....	DC servo
Reel motors	DC servo	DC servo	.....	.....	DC servo
Play speeds	1 7/8 ips	3 3/4 ips	1 7/8 ± 10%, 3 3/4 ips	1 7/8 ± 10%, 3 3/4 ips	1 7/8 ips
# of heads	2	2	2	2	3
Meter types	VU Peak LEDs	VU Peak LEDs	LED bargraphs	LED bargraphs	2 LED bargraphs
Input connection	Unbal	Unbal 30kΩ	Unbal 1kΩ/10kΩ	Unbal 1kΩ/10kΩ	Bal/Unbal 600Ω/30kΩ
Input level range	-10dB	-10dBV	-56,-10dBv	-56,-10dBv	0.04-0.4V
Output connection	.....	Unbal	Unbal 1kΩ	Unbal 1kΩ	Bal/Unbal 600Ω/1.2kΩ
Output level response	-10dBV	-10dBv	-10dBv	-10dBv	+4dBm
AF response (±dB Hz-kHz)	±3dB 25-17k	±3dB 30-16k	±3dB 40-18k	±3dB 40-18k	±3dB 20-20k
referred to	160nWb/m	.....	.....	.....	.....
S/N ratio	> 93dB	> 80dB	85dB w/tbx	85dB dbx	95dB dbx/CrO ₂
Distortion	0.1%	0.8%	< 1%	< 1%	0.5%
Crosstalk (worst case)	-45dB	-50dB	-55dB	-55dB	.....
Wow, flutter	0.04%	0.04%	0.05%	0.05%	0.03%
Equalizations (in μs)	3180 +70, 120	3180 +70	.....	.....	.....
Noise reduction	Dolby B/C	dbx	dbx	dbx	Dolby B/C, dbx
Reader Service No.	440	441	442	443	444

Audio Cartridge Decks

Audio cartridge recorder/player units using NAB-type 1/4" continuous-loop media for spot announcements or longer program material.

Manufacturer	Audi-Cord Corporation			Broadcast Electronics	
Model	"S" Series	DL series	DT-90RPS	2100C	5304C/5310C
Deck control logic	CMOS	CMOS	TTL	CMOS	CMOS
Remote control type	Simple remote	Simple remote	48-pin D	Simple remote	96-pin D
Replay inhibit	Yes	Yes	Yes	No	Yes
Record timer	Yes	Yes	No	No	No
Sec/Tert tones	Yes/Yes	Yes/Opt	Yes/Yes	Yes/Yes	Yes/Yes
Sec/Tert cue outputs	Solid-state	Solid-state	Relay closure	Relay closure	Relay closure
Phase correction	No	No	No	No	No
Capstan motor	AC hysteresis	AC hysteresis	AC synchronous	AC synchronous	AC synchronous
Capstan drive	Direct	Direct	Direct	Direct	Direct
Play speed	7.5ips	7.5ips	7.5ips	7.5ips	7.5ips
Meter types	VU	VU	LED bar graph	VU taut-band	VU taut-band
Monaural model	S-21	DL-RM	DT-90P	2100RP	5303C/5309C
Play only model	S-11	DL-PM	DT-90PS	2100C RPS	5304C
Multideck model	.....	DL-DM	None	None	All 5300 series
Input connection	TB 5kΩ	TB 5kΩ	AB 600Ω	AB 75kΩ	AB 50kΩ
Input level range	-12, +10dBm	-12, +10dBm	.....	-20, +20dBm	-70, +20dBm
Output connection	TB 150Ω/600Ω	TB 150Ω/600Ω	75Ω	TB 600Ω	TB 600Ω
Output level max	+18dBm	+18dBm	+20dBm	+10dBm	+17dBm
AF response (±dB Hz-kHz)	±2dB 50-15k	±2dB 50-15k	±2dB 40-16k	±2dB 50-15k	±2dB 40-15k
referred to	160nWb/m	160nWb/m	250nWb/m	250nWb/m	250nWb/m
S/N ratio	+52dB	+52dB	54dB	54dB	56dB
Crosstalk (L-R)/Pgm-Cue	-50/-50dB	-50/-50dB	-50/-50dB	-50/-50dB	-50/-50dB
Distortion	0.5%	0.5%	1.5%	< 2%	2%
Wow, flutter	0.15%	0.15%	0.12%	0.15%	0.15%
Reader Service No.	415	416	417	418	419

Manufacturer	Broadcast Electronics			Fidelipac	
Model	PT-90RP	5404C/5410C	CTR-10 series	CTR-30 series	CTR-100 series
Deck control logic	CMOS	CMOS	CMOS	CMOS	CMOS
Remote control type	48-pin D	96-pin D	D-connector	D-connector	D-connector
Replay inhibit	Yes	Yes	Yes	Yes	Yes
Record timer	Yes	No	No	No	Yes
Sec/Tert tones	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
Sec/Tert cue outputs	SS, RC	Relay closure	Relay closure	Relay closure	Solid-state, relay
Phase correction	Yes ¹	No	No	No	No
Capstan motor	DC servo	AC synchronous	AC servo	DC servo	DC servo
Capstan drive	Direct	Direct	Direct	Direct	Direct
Play speed	7.5/3.75/15/var	7.5ips	7.5ips	7.5ips	3.75/7.5/15/Var
Meter types	LED bar graph	VU taut-band	LED bar graph	LED bar graph	LED bar graph
Monaural model	PT-90P	5403C/5409C	CTR-11 P, CTR-13 R	CTR-33 3-deck	.....
Play only model	PT-90PS	5400C	CTR-12 P, CTR-14 R	.....	.....
Multideck model	None	All 5400 series	.....	CTR-34 Stereo 3-deck	.....
Input connection	AB 10kΩ	AB 50kΩ	AB 10kΩ	AB 10kΩ	AB 10kΩ
Input level range	-18, +20dBm	-17, +20dBm	-17, +20dB	-17, +20dBm	-17, +26
Output connection	AB 600Ω	TB 600Ω	AB 440Ω	AB 440Ω	AB 440Ω
Output level max	+24dBm	+17dBm	+20dB	+20dBm	+20dBm
AF response (±dB Hz-kHz)	±2dB 40-16k	±2dB 40-15k	±2dB 50-16k	±2dB 50-16k	±2dB 50-16k
referred to	250nWb/m	250nWb/m	250nWb/m	250nWb/m	250nWb/m
S/N ratio	58dB	56dB	+55dB	+55dB	+55dB
Crosstalk (L-R)/Pgm-Cue	-50/-50dB	-50/-50dB	-50dB/.....	-50dB/.....	-50dB/.....
Distortion	1%	2%	0.1%	0.1%	0.05%
Wow, flutter	0.12%	0.15%	0.12%	0/15%	0.12%
Reader Service No.	420	421	422	423	424

¹ Continuous electronic correction is provided.

Manufacturer	3M/International Tapetronics			Otari Corporation	Pacific Recorders & Engineering
Model	OMEGA series	99B series	DELTA series	CTM-10S series	Micromax
Deck control logic	μP	μP	μP	μP	CMOS
Remote control type	Simple remote	50-pin D	50-pin D	Yes	Simple remote
Replay inhibit	Yes	Yes	Yes	Yes	Yes
Record timer	No	No	No	Yes	No
Sec/Tert tones	Yes/No	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
Sec/Tert cue outputs	Solid-state	S-S, relay close	S-S, relay close	Solid-state	Solid-state
Phase correction	No	ELSA system	No	None	No
Capstan motor	DC servo	DC servo	DC servo	DC servo	DC servo
Capstan drive	Direct	Direct	Direct	Direct	Belt
Play speed	3.75/7.5ips	3.75/7.5/15ips	3.75/7.5/15ips	3.75/7.5/15ips	7.5ips
Meter types	VU Taut-band	VU, taut-band	VU Taut-band	VU, peak LEC	VU
Monaural model	Yes	Yes	DELTA I/II/IV	CTM-10M	Yes

Play only model	Yes	Yes	DELTA I/III	CTM-10	Yes
Multideck model	No	No	DELTA III	None	No
Input connection	TB 20kΩ	AB, TB 20kΩ	AB, TB 20kΩ	AB 10kΩ	AB 40kΩ
Input level range		-20,+10dBm	-18,+10dBm	+26dBv max	0-8dBv
Output connection	TB 600Ω	TB 600Ω	AB, TB 600Ω	AB 5Ω	AB 150Ω
Output level max	+18dBm	+25dBm	+18dBm	+26dBv into 200Ω	+24dBm
AF response (±dB Hz-kHz)	±2dB 50-16k	±1dB 31.5-16k	±1dB 50-16k	±2dB 20-16k	±1dB 40-16k
referred to	250nWb/m	250nWb/m	250nWb/m	.....	250nWb/m
S/N ratio	58dB	58dB	62dB	53dB	58dB
Crosstalk (L-R)/Pgm-Cue	-50/-50dB	-50/-50dB	-50/-50dB	<-48/-48dB 1kHz	-50/-50dB
Distortion	1.5%	0.8%	1.5%	<0.8% 1kHz	0.9%
Wow, flutter	0.15% R/P	0.15% R/P max	0.15% R/P	<0.15% 7.5ips	0.08%
Reader Service No.	425	426	427	428	429

Manufacturer	Pacific Recorders & Engineering	Sonifex Ltd		
Model	TOMCAT	HS 200 R.X2	Micro HS 200R	CQ 20 R
Deck control logic	μP	CMOS	CMOS	CMOS
Remote control type	Simple remote	Yes	Yes	Yes
Replay inhibit	Yes	Yes	No	No
Record timer	No	Yes	No	No
Sec/Tert tones	Yes/Yes	Yes/Yes	Yes/Yes	Yes/No
Sec/Tert cue outputs	Solid-state	Solid-state	Solid-state	Solid-state
Phase correction	No	No	No	No
Capstan motor	DC servo	DC servo	DC servo	DC servo
Capstan drive	Belt	Belt	Belt	Belt
Play speed	7.5/15ips	7.5ips	7.5ips	7.5ips
Meter types	VU	VU	VU	LED bar graph
Monaural model	No	None	Micro HS 100R	CQ 10 R
Play only model	Yes	HS 200 X.2	HS 100, HS 200	CQ 10, CQ 20
Multideck model	No	No	None	None
Input connection	AB 20kΩ	TB 10kΩ	AB 10kΩ	Unbal 10kΩ
Input level range	-13,+9dBv	-22,+22dBv	-22,+22dBv	-22,+22dBv
Output connection	AB 90Ω	TB 50 Ω	AB 50 Ω	Unbal 50Ω
Output level max	+54dBm	+24dBv	+22dBv	+20dBv
AF response (±dB Hz-kHz)	±1dB 40-16k	±1.5dB 40-16k	±1.5dB 40-16k	±2.5dB 40-16k
referred to	250nWb/m	160nWb/m	160nWb/m	160nWb/m
S/N ratio	62dB	61dB ref 900nWb/m ²	61dB	60dB ref 900nWb/m
Crosstalk (L-R)/Pgm-Cue	-50/-50dB	-50/-50dB	-50/-50dB	-50/-50dB
Distortion	0.9%	0.8% ref 160nWb/m	0.8% ref 160nWb/m	0.08% ref 160nWb/m
Wow, flutter	0.1%	0.6%	0.07%	0.08%
Reader Service No.	430	431	432	433

² Rated 63dB DNR unwtld.

Audio Recorders, Reel-to-Reel

Manufacturer	Fostex				Lyrec Manufacturing	
Model	E2	E16	E22	R8 (E8)	P-4400 Loopmaster	FRIDA
# of tracks	2	16	2	8	4	2
Tape width	1/4"	1/2"	1/2"	1/4"	1/2"	1/4"
Time code track	Yes	No	Yes	No	No	No
Deck control logic	μP	μP	μP	μP	μP	μP
Edit control interface	Synchronizer and autolocator	Synchronizer and autolocator	Synchronizer and autolocator	Synchronizer and autolocator	None	Rmt Ctl
Recording timer	Min/sec	Min/sec	Min/sec	Min/sec	Tape counter	Min/Sec
Cue track	Yes	No	Yes	No	No	No
Phase correction	No	No	No	No	No	Yes
Capstan motor, drive	DC servo/Direct	Direct	DC servo/Direct	DC servo (Direct)	DC servo, direct	DC servo, belt
Reel motors	DC servo	DC servo	DC servo	DC servo	DC servo	DC servo
Tape speeds	7.5, 15ips	15ips	7.5, 15ips	15ips	480ips	3.75, 7.5, 15
# of heads, type	3 Permalloy ferrite	2 Permalloy ferrite	3 Permalloy ferrite	2 Permalloy ferrite	2 ferrite	3 metal
Metering types	VU	LED bargraph	VU	Bargraph, Peak LED	VU	LED bar graph
Equalization	NAB1	NAB	NAB	IEC1 (NAB)	NAB	NAB, AES, CCIR
Input connection	Bal/Unbal 40kΩ	Unbal 30kΩ	Bal/Unbal 40kΩ	Unbal 30kΩ	Playback only	AB 10kΩ
Input level range						-10,+26
Output connection	Bal/unbal 10kΩ	Unbal 10kΩ	Bal/unbal 10kΩ	Unbal 10kΩ	Unb 5Ω	AB 40Ω
Output level maximum					+60dB	+26dB
AF response (±dB Hz-kHz)	±3dB 30-20k	±3dB 40-18k	±3dB 30-30k	±3dB 40-18k	-2,+2 2k-1280k	-2,+2dB 30-28k
S/N ratio	74dB	80dB	74dB	78dB (80dB)	+60dB	+60dB
Distortion	<1%	<1%	<1%	1%	0.1%B	0.1%
Crosstalk Pgm-Pgm	-80dB	-55dB	-80dB	-70dB (-55dB)	-80dB	-40dB
Crosstalk Pgm-Cue	-77dB		-77dB			
Wow, flutter	0.05% 15ips	0.05% 15ips	0.05% 30ips	0.06 (05)% 15ips	0.06% 480ips	0.06% 15ips
Reader Service No.	445	446	447	448	449	450

Manufacturer	Lyrec Manufacturing		Nagra Kudelski			
Model	TR 533 multitrack	FRED ¹	Nagra IV-SJ	Nagra E	NAB T-Audio TC	Nagra 4.2
# of tracks	24	2	2 + 1 TC	1	2 + 1 TC	1
Tape width	2"	1/4"	1/4"	1/4"	1/4"	1/4"
Time code track	No	No	.....	w/Neopilot	Yes	w/Neopilot
Deck control logic	TTL	TTL	.....	.....	μP, TTL	.....
Edit control interface	Rmt Ctl and Autolocator	None	.....	.....	RS-422, Rmt Ctl and SMPTE, Sync/Autoloc	.....
Recording timer	Min/Sec	Min/Sec	Min/meter counter	Minutes/meters	Min/Sec, counter	Min/meters, counter
Cue track	No	No	FM modulation	No	No	No
Phase correction	Yes	No	No	No	Yes	No
Capstan motor, drive	DC servo, direct	No capstan	DC servo	DC servo	DC servo	DC servo
Reel motors	AC servo	DC servo	Belt drive reels	Belt drive reels	DC servo	Belt drive reel
Tape speeds	15, 30	7.5, 15	1.5, 3.75, 7.5, 15	3.75, 7.5, 15 ²	3.75, 7.5, 15, 30	3.75, 7.5, 15
# of heads, type	3 metal	1 metal	4	4	5 ³	4
Metering types	VU	None	Modulometer	VU	VU, Peak LED	VU
Equalization	NAB, AES, CCIR	NAB, CCIR	NAB, CCIR	NAB, CCIR	NAB, AES, CCIR	NAB, CCIR
Input connection	TB 8kΩ	Play only deck	UB 100kΩ	UB 100kΩ	T 10kΩ	UB 100kΩ Bal opt
Input level range	-6,+24	.....	-10mV min	-0.4,+100V	-390mV, +4.4V	-0.37,+127V
Output connection	TB 40Ω	UB 50Ω	UB 600Ω	UB 600Ω, Bal opt	T 30Ω	Bal 600Ω
Output level maximum	+24	.....	1V	4.4V	+24VdBm	0dB=4.4V r 320nWb/m
AF response (±dB Hz-kHz)	-2,+2, 50-20k	.....	±2dB 25-35k 15ips	±2dB 50-15k 7.5ips	±1dB 30-20k	±2dB 30Hz-15kHz 7.5

THE AUDIO POST ROOM



DIGITAL AUDIO FOR VIDEO AND FILM

A state of the art audio-for-vision editing suite usually requires considerable investment in equipment, but above all, the patience and dexterity of skilled engineers to manipulate several tape sources to VT and film. Miracles can be performed, but the editor is often constrained from creative experimentation by the limitations of both time and his facilities.

Solid State Logic conceived ScreenSound to put more creative power and time into the hands of the editor by

eliminating logistical problems. Instead, we provide an entire editing suite in one integrated unit, with a simple pen and tablet control surface, enabling rapid editing, laying up and track-slipping,

all with the digital sound integrity necessary to meet today's broadcast standards.

ScreenSound provides the first working environment built around the editor, not the equipment, leaving him free to use his creative skills on the final soundtrack.



ScreenSound

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Circle (124) on Reply Card

S/N ratio	+63dB	62dB	64dB	+70dB tape dep.	71dB
Distortion	<0.1%	2%	1%	1.5%*	1.5%
Crosstalk Pgm-Pgm	-46dB			-88	
Crosstalk Pgm-Cue					
Wow, flutter	0.04% 15ips	0.25%, 15ips	0.05% 15ips	0.025% 15ips	0.07% 7.5ips
Reader Service No.	451	452	453	454	455

¹ Editing tape deck, playback only. ² Also 2.38, 4.75 ips available; all units are single speed. ³ 2-audio, 1-TC, 2-erase, opt Neopilot. ⁴ 2 3rd harm. max peak level 510nWb/m.

Manufacturer	Nagra Kudelski	Otari Corporation		Sony		
Model	Nagra IV-S TC	MX-55 series ⁵	ARS-1000 DC-DS	MX-50	PCM-3402	PCM-3202
# of tracks	2+1 TC	1, 2, 2TC, 4	4	2	2	2
Tape width	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"
Time code track	Yes	MX-55TM	No	No	Yes	Yes
Deck control logic	Mechanical	μP		TTL	μP	μP
Edit control interface				None	RS-422 SMPTE	SMPTE, sync autolocator
Recording timer	Min/meter mechanical	Yes		Yes	Min/sec	Min/sec
Cue track	for FM modulation	Search 0/cue/3-cue	No	Search 0+1 cue	Yes	Yes
Phase correction	Yes	No	No	No		
Capstan motor, drive	DC servo	DC servo, belt	Synchronous	DC servo, belt	DC servo	DC servo
Reel motors	Belt drive reels	Induction torque	Induction	AC synchronous	DC servo	DC servo
Tape speeds	3.75, 7.5, 15	3.75-30ips ⁶	3.75, 7.5	3.75, 7.5, 15, var	7.5, 15	15 ips
# of heads, type	4	ERP, P		4 ERP	5 ⁸	4 ⁹
Metering types	VU	VU w/peak LED	[Playback only system	VU, peak LED	Peak LED	Peak LED
Equalization	NAB, CCIR	NAB, IEC		NAB, IEC	DASH	DASH
Input connection	UB, 0-10kΩ	AB >10kΩ		AB >10kΩ	AB 10kΩ	AB 10kΩ
Input level range	250mV, +24V	-10dBV/+4dBm nom		-20,-10/0,+10dBm	-2,+10dBs	-6,+10dBs
Output connection	UB, 600Ω	AB 200Ω load		UB 600Ω	AB 50Ω	AB 120Ω
Output level maximum	1V	+26dBm max bal.		+4dBm nominal	+22dBm 600Ω load	+24dBs
AF response (±dB Hz-kHz)	±2dB 30-20k	±2dB 30-20k		±2dB 50-18k	±2dB 20-20k	-1,+0.5dB 20-20k
S/N ratio	72dB	71dB 7.5ips		63dB 7.5ips	54dB	90dB
Distortion	2%	<0.3% 1kHz		<0.15% 250nWb/m	<0.3%	0.05%
Crosstalk Pgm-Pgm	-50dB	<-55dB 1kHz		<-50dB 1kHz	-55dB 1kHz OVU	-80dB
Crosstalk Pgm-Cue	-45dB	<-55dB 1kHz		N.A.		
Wow, flutter	0.07% 7.5ips	<0.08% 7.5ips		0.06% 7.5ips		
Reader Service No.	457	458	459	460	461	462

⁶ MX-55N, MX-55NM, MX-55TM operate 3.75-7.5 or 7.5-15 ips; MX-55N-HS 7.5-15 or 15-30 ips. ⁸ Digital Rec/PB/E, AR/P/Sync Rec

Manufacturer	Sony Professional Audio			Stellavox Digital Audio		Studer Revox
Model	APR-5002W	APR-5003V	APR-24	TD 9N	SP 9 Pro portable	Revox PR99 Pro
# of tracks	2	3	24	4 (2) [2]	2	2
Tape width	1/4"	1/4"	2"	1/2" (1/2) [1/4]	1/4"	1/4"
Time code track	No	Yes	Yes	Yes (No)	Yes	No
Deck control logic	μP	μP	μP	μP	Mechanical	μP
Edit control interface	RmtCtl Autolocator	RS-422 RmtCtl SMPTE	RmtCtl SMPTE	RS-232/422/Rmt ctl	None	via rmt ctl
Recording timer	Min/sec, counter	Min/sec, counter	Min/sec, counter	Min/sec	Stellalock III	Min/sec
Cue track	No	Yes	Yes	Yes (No)	Tape counter	No
Phase correction	No	Yes	Yes	Yes	Yes	No
Capstan motor, drive	DC servo	DC servo	DC servo	DC servo belt	DC servo, direct	ac servo
Reel motors	DC servo	DC servo	DC servo	DC servo		ac servo
Tape speeds	7.5, 15, 30	7.5, 15, 30	15, 30	3.75, 7.5, 15, 30		
# of heads, type	3	4	3 amorphous	3/ERP	3.75, 7.5, 15	3 Revox metal
Metering types	VU	VU	VU LED bar graph	4/ERP	VU	VU, Peak LED
Equalization	NAB/AES	NAB, AES	NAB, AES	All	Any	NAB
Input connection	Bal 10kΩ	AB 10kΩ	AB 10kΩ	TB 10kΩ	... TB	TB >5kΩ
Input level range	Variable	Variable	Variable	22dBm	074,-60Bm	-10,+10dBv
Output connection	AB 120Ω	AB 120Ω	AB 120Ω	TB 9Ω	TB 10Ω	TB 50Ω
Output level maximum	+24dBm	+24dBs	+24dBs	+25dBm	+13dBm	+22dBm
AF response (±dB Hz-kHz)	-3,+0.75dB 50-28k	-2,+0.75dB 30-24k ⁷	-3,0.75dB 25-24k	±2dB 30-20k	±2dB 30-18k	-3,+2dB 30-22k
S/N ratio	70dB 30ips	70dB	+66dB	69dB (71dB)	67dB	66dB
Distortion	0.35% 30ips	0.035%	0.15%	<1%	>2%	0.3%
Crosstalk Pgm-Pgm				-55dB		
Crosstalk Pgm-Cue				-80dB		
Wow, flutter	0.025% 30ips	0.025%	0.03% 30ips	0.04% 15ips	0.07% 19ips	<0.06%, 15ips
Reader Service No.	463	464	465	466	467	468

⁷ Response rated at 15ips; S/N, distortion, wow/flutter rated at 30ips.

Manufacturer	Studer Revox					
Model	Revox B77 Pro	Studer A827-24	Revox C270 (274/278)	A820 series (A812)	Studer A807 2/2 VU ¹²	Studer A807 HS
# of tracks	2	24-track	2 (4, 8)	2-24 (2)	2	4
Tape width	1/4"	2"	1/4" (1/4", 1/2")	1/4"-2" (1/4")	1/4"	1/2"
Time code track	No	No ⁸	[C270 TC model] ⁹	Yes	No (2)	No
Deck control logic	μP	μP	μP	μP, TTL, CMOS	μP	μP
Edit control interface	via rmt ctl	RS-232/422/RC SMPTE	RS-232, rmt ctl ¹⁰	RS-232/422/RC SMPTE	RS-232 Rmt Ctl	RS-232 Rmt Ctl SMPTE
Recording timer	Tape counter	Autolocator Synchro	autoloc (& synchro)	Autolocator Synchro	Autolocator ¹³	Autolocator Synchro
Cue track	No	No	No	Min/sec	Min/sec	Min/sec
Phase correction	No	Yes	Yes	SMPTE ¹¹	No	No
Capstan motor, drive	ac servo	DC servo brushless	dc servo	Yes	Yes	Yes
Reel motors	ac servo	DC servo	ac servo	DC servo brushless	DC servo	DC servo
Tape speeds	3.75/7.5/15	7.5 15 30	3.75/7.5/15	DC servo	3.75 7.5 15 30	7.5 15 30
# of heads, type	3 Revox metal	3 amorphous metal	3 Revox metal	3.75-30±7 semitones	3 amorph mtl ¹⁴	3 Studer amorph mtl
Metering types	VU, peak LED	VU	VU (LED bargraphs)	3 or 4 (3)	VU, Peak LED	VU, Peak LED
Equalization	NAB	NAB, CCIR IEC1 AES	NAB	VU	NAB, CCIR	NAB, CCIR
Input connection	Unbal >200kΩ	TB >10kΩ	TB >5kΩ (AB)	AB TB >10kΩ	TB >10kΩ	TB >10kΩ
Input level range		+24dBu	-10,+10dB	+24dBu max	-30,+12dBu	-30,+12dBu
Output connection	Unbal	<50±AB	TB <60Ω (AB 150Ω)	TB AB 50Ω	TB <50Ω	TB <50Ω
Output level maximum	1.55V	+26dBm	+22dBm	+24dBm	+24dBm	+24dBm
AF response (±dB Hz-kHz)	-3,+2dB 30-22k	±2dB 50-20k	-2,+2dB 30-22k	±2dB 30-16k	±2dB 30-20k	±2dB 30-20k
S/N ratio	>68dB	64dB 30ips	64dB (61dB)	>65dB 7.5ips 1/4"	68dB	68dB
Distortion	0.2%	≤1.0% 510nWb/m	<1% 0.8%	≤0.5% 1kHz per NAB	<1.0%	<1.0%
Crosstalk Pgm-Pgm	<-45dB 1kHz	-60dB	<-50dB (<-55dB)	<-55dB 1kHz stereo		
Wow, flutter	0.06% 15ips	0.04% 30ips	0.05% 15ips	0.06% 7.5ips	0.05% 15ips	0.05% 15ips
Reader Service No.	469	470	471	472	473	474

⁸ Also Time Code FM NEO model. ⁹ Center track for SMPTE time code. ¹⁰ Also time code control. ¹¹ Also five Locstart memories available. ¹² Also VU+K, VUK and TC models. ¹³ TC center time code model includes synchronizer and SMPTE. ¹⁴ Time Code head is ferrite material.



Face the Truth.

The only sure way to know if a DAT recorder meets your professional needs is to turn it around and see if it has the right connections.

The Fostex D-20 does. It operates just like much more expensive open reel 2-channel recorders with SMPTE/EBU capability.

Synchronize • Monitor Tape • Punch-In/Out • Control Pitch

You can post-stripe time code on an existing DAT tape (recorded on any DAT machine), or you can record time code and stereo audio on the D-20 and play that tape back on any other DAT machine with complete compatibility.

The 20-pin synchronizer port allows interface with our synchronizer system (others as well) and there's an RS-422 port for control which requires serial communication.

Then there's an external sync input for composite video, plus Word Sync Input and Output capability - all standard on the D-20.

In our unique 4-head system, two pairs of heads are positioned around the drum at 91.5° intervals. One pair is for record, the other for reproduce; but it's the revolutionary ability to reverse functions that opens up the format for true professional use.

Thus the D-20 features off-the-tape monitoring - a very important feature considering the DAT's ability to record for two straight hours (no more multiple reels and alignment hassles).

You'll be able to control all transport functions by remote control - including instant punch-in/out. Built-in cross-fade timing gives you seamless punches.

There's even a pitch control complete with digital read-out. It's on our front panel (not shown), along with other professional touches.

The D-20 has been shipping since last year and it's being used daily in audio and video post-production suites. It works.

And it will keep on working as future software is developed, thanks to the built-in flexibility of the DIP switches and an additional 40-pin connector.

Most important of all, the D-20 sounds great. It records and reproduces all the music completely, faithfully, and better than analog alternatives.

So when it comes down to professional *performance*, plug into the digital master recorder that faces the truth, back against the wall.

D-20

Digital Master Recorder

FOSTEX®

Complete technical information is available in the form of reprints of "A Professional R-DAT Recorder", presented at the 85th AES Convention, November 6, 1988. Please send a check or money order in the amount of \$2.00 to cover shipping and handling.

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Circle (125) on Reply Card

Manufacturer		Studer Revox		TASCAM			
Model	Studer A810 2/2VUK ¹⁵	30 30	TSR 8	MSR 16 (MSR 24)	ATR 80-24 (80-32)	ATR 60 series	
# of tracks	2	2	8	16 (24)	24 (32)	2T, 2N, 2HS, 8, 16	
Tape width	1/4"	1/4"	1/4"	1/2" (1")	2"	1/4", 1/2", 1"	
Time code track	Yes	No	No	No	....	Yes
Deck control logic	μP	TTL	μP	μP	μP	μP	
Edit control interface	RS-232 Rmt Ctl SMPTE Autolocator Synchro	None	SMPTE synchronizer autolocator	SMPTE synchronizer autolocator	SMPTE synchronizer autolocator	SMPTE synchronizer autolocator	
Recording timer	Min/sec	Min/sec	Min/sec, tape ctr	....	....	Min/sec
Cue track	No	Yes	Yes	RTZ, STC	RTZ, STC	Yes	
Phase correction	Yes	No	No	No	No	No	
Capstan motor, drive	AC servo	DC servo	DC servo belt	DC servo direct	DC servo direct	DC servo	
Reel motors	AC servo	DC servo	DC servo	DC servo	DC servo	DC servo	
Tape speeds	3.75 7.5 15 30	7.5, 15 ips	15 ips	15 ips	30 ips	7.5, 15, 30 ips	
# of heads, type	3 Studer metal	3	2	2	3	3	
Metering types	VU, Peak LED	VU, LED peak	LED bar graph	Bargraph	VU, Peak LED	VU, LED peak	
Equalization	NAB, CCIR	NAB, IEC1	IEC1, CCIR	NAB IEC1 CCIR	NAB IEC1 CCIR	NAB, IEC1, CCIR	
Input connection	TB >10kΩ	AB or AU 10kΩ	Unbal 40kΩ, -10dBV	Unbal 50kΩ	AB 10 kΩ	AB 10kΩ	
Input level range	-30, +12dBu	-72, +4dB	....	....	-10, +4dB	to 28dBm
Output connection	TB <50Ω	AB or AU 100Ω	100Ω	Unbal -10dBV	Bal or unbal +28dB	AB 20Ω	
Output level maximum	+24dBm	....	+24dBV	+24dBV	+28dB	+28dBm
AF response (±dB Hz-kHz)	±2dB 30-20k	±2dB 40-22k	±3dB 40-20k	±3dB 40-20k	±2dB	±2dB 30-15k	
S/N ratio	68dB	68dB	68dB	>65dB	69dB	72dB	
Distortion	<1.0%	0.6%	0.8%	0.8%	0.8%	0.8%	
Crosstalk Pgm-Pgm	....	<-55dB	-62dB	-80dB	-55dB	<-55dB
Wow, flutter	0.05% 15ips	....	....	....	0.05%	0.05% 15ips
Reader Service No.	475	476	477	478	479	480	

¹⁵ Also Time Code FM NEO model.

Audio Processors, Dynamics Control

Processing by these units includes compression, expansion, limiting and other types to maintain audio signal levels between controllable limits, thus avoiding overdriving of subsequent equipment in the signal chain. **AB** active balanced, **TB** transformer balanced, **GR** indicates gain reduction.

Manufacturer	Aphex Systems		ATI Audio Technologies Inc	Barco EMT		
Model	Dominator 700	Compellor 300 (301)	EM1000 Emphasizer	EMT 261	EMT 277	EMT 268X
Compression	Yes	Yes	Yes	Yes	Yes	No
Expansion	No	No	Yes	Yes	Yes	No
Peak limiting	Yes	Yes	Yes	Yes	Yes	Yes
Asymmetric limiting	No	No	No	No	Yes	No
AGC	Yes	Yes	Yes	Yes	Yes	Yes
Loudness control	Yes	Yes	Yes	No	No	No
Stereo system	Yes	Yes (No)	No	Yes	No	Yes
Digital processing	No	No	No	No	No	No
Programmable	No	No	Yes	No	Yes	....
Multiband processing	3-band	No	No	No	No	No
Metering	Pk GR	VU Peak GR In/Out	Peak GR Output	G.R.	G.R.	G.R.
Input connector	AB servo 160kΩ	AB servo 160kΩ	AB/TB > 3kΩ/30kΩ	TB 10kΩ	TB 5kΩ	TB 5kΩ
Output connector	AB 20Ω	AB servo 65Ω	AB or TB 150Ω	TB <40Ω	TB <40Ω	TB <40Ω
Input level range	-30, +24dB	-30, +27dBm	-30, +24dB	-10, +6dB	-20, +15dB	-20, +15dB
Output level maximum	+2-dBu	+27dBm	+24dBm	+21dB	+22dB	+22dB
AF response (±dB Hz-kHz)	±0.2dB 20-50k	-0.2dB 5-100k	±0.25dB 30-20k	±0.5dB 40-15k	±0.3dB 30-15k	±0.3dB 30-15k
Distortion	<0.01% in op	0.002% in op	0.5% in op 10dB ¹	<0.5% in op	0.25% in ops	0.2% in op
S/N ratio	80dB below peak	87dB	80dB	73dB RMS	72dB RMS	92dB RMS
Reader Service No.	601	602	603	604	605	606

¹ Compression, 30-20k; bypass 0.2% +22dB out.

Manufacturer	CRL Circuit Research Labs				Dorrough Electronics	
Model	SEC-800	BAP-2000	SMP-850	PMC-450	SGC-800	610-A
Compression	Yes	Yes	Yes	Yes	No	Yes
Expansion	No	No	....	No	No	Yes
Peak limiting	No	Yes	Yes	Yes	No	Yes
Asymmetric limiting	No	No	No	Yes	No	No
AGC	Yes	Yes	Yes	Yes	Yes	Yes
Loudness control	No	No	No	No	No	Yes
Stereo system	Yes	No	Yes	No	Yes	Yes
Digital processing	No	No	No	No	No	Yes
Programmable	No	No	No	No	No	No
Multiband processing	4-band	2-band	2-band	3-band	2-band	3-band
Metering	Peak Input	Peak GR Output	Peak Input	Peak Input	Peak Input	VU Pk G.R. I/O
Input connector	AB 600Ω/10kΩ	AB, TB opt 600Ω/10kΩ	AB 600Ω/10kΩ	AB 600Ω/10kΩ	AB 600Ω/10kΩ	AB 10kΩ
Output connector	AB 200Ω	AB, TB opt 100Ω	AB 100Ω	AB 200Ω	AB 100Ω	AB 30Ω
Input level range	-30, +20dB	-20, +20dB	-10, +20dB	-10, +20dB	-30, +20dB	-25, +24dB
Output level maximum	+20dB	+20dB	+20dB	+20dB	+20dB	+22dB
AF response (±dB Hz-kHz)	±0.1dB 50-20k	±1dB 50-15k	±1dB 50-15k	-3, +0.5dB 50-9.5k ²	±0.5dB 50-20k	±0dB 15-15k
Distortion	0.25%	0.15% in op	0.25%	0.25%	0.15%	0.005% in ops ³
S/N ratio	70dB	75dB	80dB	85dB	80dB	75dB
Reader Service No.	607	608	609	610	611	612

² Meets NRSC standard. ³ Under clipping threshold.

Manufacturer	Eventide	Furman Sound	Gentner Electronics	Inovonics
Model	Omnipressor	LC-6B (LC-XB)	QN-44B Quad Gate	Audio Prim
Compression	Yes	Yes	No	Yes
Expansion	Yes	Yes	Yes	No

Peak limiting	Yes	Yes	No	Yes	Yes	Yes
Asymmetric limiting	.....	No	No	No	No	Yes ⁴
AGC	.....	Yes	No	Yes	Yes	Yes
Loudness control	.....	No	No	Yes	No	No
Stereo system	.....	Yes	No	Opt	Yes	Yes
Digital processing	.....	No	No	No	No	No
Programmable	Yes	No	No	Yes	No	Yes
Multiband processing	.....	No	No	4-band	No	5-band
Metering	I/O Gain	GR (GR I/O)	None	Peak GR	GR	GR
Input connector	AB xfmr opt	AB	AB	AB	AB	AB
Output connector	Unbal xfmr opt	AB	AB	AB	AB	AB
Input level range	+20dBm max	-40(-60), +18dB	-60, +18dB	0, +12dB	-20, +10dB	-20, +10dB
Output level maximum	+18dBm max	+23dBV (+24)	+23dBV	+1-dB	+24dB	+24dB
Input impedance (load) Ω	.....	20k Ω	20k Ω	600 Ω /10k Ω	10k Ω	10k Ω
Output impedance (source) Ω	.....	100 Ω (400 Ω)	100 Ω	600 Ω	600 Ω	600 Ω
AF response (\pm dB Hz-kHz)	-0.5dB 20-15k	\pm 0.5dB 20-20k	-0.25, 0dB 20-20k	-3, +2dB 20-18k	\pm 0.5dB 10-15k	\pm 0.5dB 10-15k
Distortion	0.5%	0.1% in op (.015%)	0.01% in op	<0.1% in op	0.5% in op	0.5% in op
S/N ratio	90dB	115dB (110dB)	112dB	-80dB	70dB	75dB
Reader Service No.	613	614	615	616	617	618

⁴ Asymmetric in AM version only.

Manufacturer	Inovonics	ITAME	JBL/UREI			
Model	255	222 NTSC	90A	1176LN/1178	7110	LA-4
Compression	Yes	No	Yes	No	Yes	Yes
Expansion	No	No	Yes	No	No	No
Peak limiting	Yes	Yes	Yes	Yes	Yes	No
Asymmetric limiting	No	Yes	Yes	No	No	No
AGC	Yes	No	Yes	No	No	No
Loudness control	No	No	No	No	.....	No
Stereo system	Yes	No	Yes	1178 (2-1176LN)	No	w/2 units
Digital processing	No	No	No	No	No	No
Programmable	No	No	No	No	Adj	No
Multiband processing	3-band	No	3-band	No	No	No
Metering	GR	GR	VU Peak I/O	VU	LED Ladder	VU
Input connector	AB 10k Ω	AB 10k Ω	TB 600 Ω	AB bridging 10k/20k Ω	Bal bridging 20k Ω	Bal bridging 40k Ω
Output connector	AB 600 Ω	AB 600 Ω	TB 600 Ω	TB \geq 600 Ω 150 Ω	TB or unbal 600 Ω	TB \leq 600/150 Ω
Input level range	-15, +15dB	-20, +10dB	-20, +18dB	+20dBu max	+22dBu	+20dB max
Output level maximum	+24dB	+20dB	+20dB	+24dBm	+22dBm	+24dBm 600 Ω
AF response (\pm dB Hz-kHz)	\pm 0.5dB 20-20k	-1, +0.5dB 10-10k	\pm 1dB 50-15k	\pm 1dB 20-20k	\pm 0.5dB 20-20k	\pm 0.5dB 20-20k
Distortion	1% in op	1% in op	0.7%	<0.5%	N.A.	<0.25% 30-15k
S/N ratio	70dB	70dB	70dB	>81dB at threshold	N.A.	-90dB EIN
Reader Service No.	619	620	621	622	623	624

Manufacturer	Klark-Teknik	Marti Electronics	Orban			
Model	DN504 Quad	DN500 Dual	Model 800-278	8100A-11 Optimod FM	9105 Optimod-HF	9100B Optimod-AM
Compression	Yes	Yes	Yes	Yes	Yes	Yes
Expansion	No	Yes	Yes	No	No	No
Peak limiting	No	Yes	.....	Yes	Yes	Yes
Asymmetric limiting	No	No	.....	No	No	Yes
AGC	No	No	.....	Yes	Yes	Yes
Loudness control	Yes	Yes	.....	Yes	Yes	Yes
Stereo system	Yes ⁵	Yes	.....	Yes	No	Yes
Digital processing	No	No	.....	No	No	No
Programmable	No	No	.....	No	Yes	No
Multiband processing	No	No	.....	3-band	6-band	6-band
Metering	LED PPM, GR I/O	LED GR In/out	Gain reduction	VU GR I/O	VU PPM GR I/O	VU GR I/O
Input connector	AB 20k Ω	AB 20k Ω	Active bal	AB 10k Ω	AB 10k Ω	AB 10k Ω
Output connector	Unb, Xfmr opt > 60 Ω	Unbal Xfmr opt > 60 Ω	.....	AB 470 Ω	AB 35 Ω	AB 290 Ω
Input level range	.....	.....	.....	-30, +10dB	-30dB, +10dB	-30, +10dB
Output level maximum	+21dBm	+21dBm	.....	4Vp-p composite	+20dB	+20dB
AF response (\pm dB Hz-kHz)	\pm 0.5dB 20-20k	\pm 0.5dB 20-20k	\pm 1.5dB 50-10.5k	\pm 0.75dB 30-15k	\pm 1dB 50-4.5k	\pm 1dB 50-9.5k ⁶
Distortion	<0.03% +4 1kHz	>94dBm 20-20k unwdt	1.5% in ops	0.25% in op	0.1% bypass	0.2% bypass
S/N ratio	>94dBm unwdt	.....	70dB	75dB	65dB	75dB
Reader Service No.	625	626	627	628	629	630

⁵ Switchable to 2 stereo pairs. ⁶ Per NRSC-1 std.

Manufacturer	Orban	Orban Pro				
Model	8100A/XT2 limiter	8182 Optimod-TV	414A	412A	464A	787A
Compression	No	Yes	Yes	Yes	Yes	Yes
Expansion	No	No	No	No	No	Yes
Peak limiting	Yes	Yes	Yes	Yes	Yes	Opt
Asymmetric limiting	No	No	No	No	No	.....
AGC	No	Yes	No	No	Yes	.....
Loudness control	Yes	Yes	No	No	No	.....
Stereo system	Yes	Yes	Yes	No	Yes	Opt
Digital processing	No	No	No	No	No	No
Programmable	No	No	No	No	No	Yes
Multiband processing	6-band	3-band	No	No	No	No
Metering	VU GR	VU GR I/O	GR	GR	GR Output peak	GR Output peak
Input connector	AB 10k Ω	AB 10k Ω	AB >10k Ω	AB >10k Ω	AB >10k Ω	AB >10k Ω
Output connector	AB 370 Ω	AB 370 Ω	AB 100 Ω	AB 100 Ω	AB 93 Ω	AB 30 Ω
Input level range	.....	-30, +10dB	-15, +21dB	-15, +21dB	-10, +23dB	-10, +23dB
Output level maximum	.....	+21dB	+20dBm	+20dBm	+20dBm	+20dBm
AF response (\pm dB Hz-kHz)	\pm 1dB 30-15k	\pm 0.75dB 50-15k	\pm 0.25dB 20-20k	\pm 0.25dB 20-20k	\pm 0.25dB 20-20k	\pm 0.25dB 20-20k
Distortion	0.15% in op	0.25% bypass	<0.05% in op	<0.05% in op	<0.03% in op	<0.1% in op
S/N ratio	70dB	75dB	85dB	85dB	85dB	85dB
Reader Service No.	631	632	633	634	635	636

Manufacturer	Orban Pro	Solid State Logic	Symetrix			
Model	422A (424A)	Logic FX G384	#525 gated	528 voice processor	501 Peak RMS	#544 Quad Gated
Compression	Yes	Yes	Yes	Yes	Yes	No
Expansion	No	No	Yes	Yes	No	Yes
Peak limiting	Yes	No	No	No	Yes	No
Asymmetric limiting	No	No	No	No	No	No
AGC	No	No	No	No	No	No
Loudness control	No	No	No	No	No	No
Stereo system	No (Yes)	Yes	Yes	No	Opt	No
Digital processing	No	No	No	No	No	No

Programmable	No	No	No	No	No	No
Multiband processing	No	No	No	No	No	No
Metering	GR Output peak	GR	Gain reduction	VU GR In/Out	Gain reduction	Gain Reduction
Input connector	AB >10kΩ	AB 20kΩ	AB >40kΩ	AB 3kΩ/>10kΩ	AB >10kΩ	AB >40kΩ
Output connector	AB 100Ω	AB 75Ω	Single-ended <100Ω	AB 100Ω	AB/TB opt 200Ω	Single ended 100Ω
Input level range	-15dB	-11,+19dBu	-50,+20dB	-80dB,+18dB	-40,+10dB	-40,+20dB
Output level maximum	+26dBm	+26dBm	+18dBm 600Ω	+24dBm 600Ω	+24dBm 600Ω	+19dBm 600Ω
AF response (±dB Hz-kHz)	±0.25dB 20-20k	±0.2dB, 20-20k	-1dB, 20-20k	-1dB 20-20k	-1dB 20-20k	-1dB 20-20k
Distortion	<0.03% in op	0.005%	0.025% in op	0.35% in op	0.025% in op	0.025% in op
S/N ratio	85dB	94dB	85dB	>86dB	85dB	86dB
Reader Service No.	637	638	639	640	641	642

Manufacturer	Valley International					
Model	#610	Model DDP (DCE) ⁷	#816 Leveller	#400 mic processor	GateX	#810 Kepex II
Compression	Yes	Yes	No	Yes	No	No
Expansion	Yes	Yes	No	Yes	Yes	Yes
Peak limiting	Yes	Yes	Yes	No	No	No
Asymmetric limiting	No	No	No	No	No	No
AGC	Yes	Yes	No	Yes	No	No
Loudness control	Yes	Yes	Yes	Yes	No	No
Stereo system	Yes	Yes	No	No	No	No
Digital processing	No	Yes	No	No	No	No
Programmable	No	Yes	No	No	No	No
Multiband processing	No	8(No)	No	No	No	No
Metering	GR	VU GR I/O	GR VU I/O	GR VU I/O	GR	GR
Input connector	AB >90kΩ	SDIF-2, VIF, B/U	AB 100kΩ	AB >40kΩ	AB 90kΩ	AB 100kΩ
Output connector	AB ≤50Ω	SDIF-2, VIF, BV	AB ≤50Ω	AB ≤50Ω	AB 50Ω	AB 20Ω
Input level range	-40,+24.5dB	[Processing is	-16,+24dB	-40,+26dB	-40,+21dB	-40,+24.5dB
Output level maximum	+24dB	16-bit PCM	+24dB	+26dB	+21dB	+21dB
AF response (±dB Hz-kHz)	±0.5dB 20-20k	±0dB 20-20k	±0.5dB 20-20k	±0.5dB 20-20k	±0.5dB 20-20k	±0.5dB 20-20k
Distortion	≤0.05% in op	N.A.	≤0.04% in op	≤0.01% in op	≤0.06% in op	≤0.05% in op
S/N ratio	82dB ref 0dB	94dB ref 0dB	83dB ref 0dB	82dB ref 0dB	83dB ref 0dB	83dB ref 0dB
Reader Service No.	643	644	645	646	647	648

⁷ DDP Digital Dynamics Processor; DCE Digital Compressor Expander.

Manufacturer	Valley International				Wheatstone Corporation
Model	#430 Dynamite	#811 GainBrain II	#440	#817 Commander	1202 stereo
Compression	Yes	No	Yes	Yes	Yes
Expansion	Yes	No	Yes	Yes	No
Peak limiting	Yes	Yes	Yes	No	Yes
Asymmetric limiting	No	No	No	No	No
AGC	Yes	No	Yes	Yes	No
Loudness control	Yes	Yes	Yes	Yes	Yes
Stereo system	Yes	No	No	No	No
Digital processing	No	No	No	No	No
Programmable	No	No	No	No	No
Multiband processing	No	No	No	No	No
Metering	GR	GR	GR VU I/O	GR	VU GR Output
Input connector	AB 94kΩ	AB 150kΩ	AB 100kΩ	AB 100kΩ	AB 20kΩ
Output connector	AB ≤40Ω	AB ≤40Ω	AB 40Ω	AB ≤50Ω	AB 10Ω
Input level range	-40,+21dB	-44,+24dB	-40,+24dB	-40,+24dB	-20dB,+26dB
Output level max	+21dB	+21dB	+24dB	+24dB	+22dB
AF response (±dB Hz-kHz)	±0.5dB 20-20k	±0.5dB 20-20k	±0.5dB 20-20k	±0.5dB 20-20k	±0.5dB 20-50k
Distortion	≤0.05% in op	≤0.025% in op	≤0.05% in op	≤0.04% in op	≤0.04% in op ⁸
S/N ratio	82dB ref 0dB	83dB ref 0dB	82dB ref 0dB	83dB ref 0dB	90dB
Reader Service No.	649	650	651	652	653

⁸ Distortion measured 0.006% by-pass.

Audio Delay Systems

These products are designed for simple audio delay and reverb to complex special effects. Time compensation (expansion, compression) systems are included as an addendum in this category.

Manufacturer	AMS Industries		Barco EMT			Eventide
Model	RMX16 Reverb	SDMX 1580	EMT 246	EMT 445	EMT 252	BD 955
Talkshow delay	No	No	No	Yes	No	Yes ¹
Plate, room simulation	Yes	Yes	Yes	No	Yes	No
Reverb, echo	Yes	No	Yes	No	Yes	No
Pitch change	No	Yes	No	No	Yes	No
Phasing, flanging	No	Yes	Yes	No	Yes	No
Time reversal	No	Yes	No	No	No	No
Monophonic summing	Yes	Yes	No	No	No	No
AF contouring	No	No	No	No	No	No
Multiband	No	No	No	No	No	No
Stereo	Yes	Yes	Yes	Yes	Yes	w/2 units
Programmable system	Yes	Yes	Yes	Yes	Yes	Yes
Remote control	Yes	Yes	Yes	Yes	Yes	Yes
Delay type	Digital	Digital	Digital	Digital	Digital	Digital
Delay range		0-52s	1ms-999ms	1ms-21.8s	0-444ms	0-6.4s
AF response (±dB Hz-kHz)	-3.0dB 20-18k	-3.0dB 20-18k	-1,+3dB 30-12k	-1,+0.5dB 30Hz-20kHz	-3,+1dB 30-15k	7.5-15k
Dynamic range	90dB	90dB Active	88dB in delay	88dB	75dB in delay	90dB
Input connection	Active	Active	Active	Active	Active	AB bridged
Output connection	Active	Keyboard, RS-422	AB	Active	TB	AB
Interfaces	Keyboard, barcode	MIDI	None	....	....	None
Reader Service No.	654	655	656	667	658	659

¹ With delay catchup feature.

Manufacturer	Eventide		Lexicon			
Model	BD980	BD 941 (BD 942)	LXP-1	Model 200	PCM-70	PCM-42
Talkshow delay	Yes ²	Yes	....	No	Yes	Yes
Plate, room simulation	No	No	Yes	Yes	Yes	....
Reverb, echo	No	No	Yes	Yes	Yes	....
Pitch change	....	No	....	No	No	....

Phasing, flanging	No	No	Yes	No	Yes	Yes
Time reversal	No	No	.....	Yes	.....	.....
Monophonic summing	No	No	.....	Yes	.....	.....
AF contouring	No	No	.....	No	.....	.....
Multiband	No	No	.....	No	.....	.....
Stereo	Yes	(BD 942)	.....	Yes	.....	.....
Programmable system	Yes	No	Yes	Yes	Yes	.....
Remote control	Yes	Yes	Option	Option	.....	.....
Delay type	Digital	Digital	Digital	Digital	Digital	Digital
Delay range	0-105s	3-12s	0.1024ms	.....	0-900ms	0-4800ms
AF response (\pm dB Hz-kHz)	\pm 1dB 7.5-20k	\pm 1dB 7.5-20k	\pm 1dB 20-15k	\pm 0.2dB 20-10k	\pm 1dB 20-15k	\pm 1dB 20-15k
Dynamic range	90dB	90dB	85dB	81dB	85dB	85dB
Input connection	AB	AB	Unbal	AB	AB	AB
Output connection	AB	AB	Unbal	TB	Unbal	Unbal
Interfaces	RS-232/422	.....	MIDI	.....	MIDI	.....
Reader Service No.	660	661	662	663	664	665

² Includes catch-up feature.

Manufacturer	Lexicon	Sony	Tektronix	Yamaha Music		
Model	480L	Model 1300	LXP-5	DDU-2100	118-AS ⁴	R100
Talkshow delay	No	No	.....	No	No	Yes
Plate, room simulation	Yes	No	Yes	No	No	Yes
Reverb, echo	Yes	No	Yes	No	No	Yes
Pitch change	Yes	No	Yes	No	No	Yes
Phasing, flanging	Yes	No	Yes	No	No	Yes
Time reversal	Yes	.....	.....	No	No	No
Monophonic summing	Yes	No	.....	No	.....	Yes
AF contouring	Yes	No	.....	No	.....	No
Multiband	Yes	No	.....	No	.....	Yes
Stereo	Yes	Yes	.....	8-channel	No	Yes
Programmable system	Yes	Yes	Yes	No	No	Yes
Remote control	Yes	Yes	Option	No	Yes	Option
Delay range	0-1.2s	0-4.96s	0-1044ms	0-170ms	160ms expandable	1-150ms
AF response (\pm dB Hz-kHz)	\pm 0.5dB 2-20k	\pm 0.5dB 20-20k	\pm 1dB 20-15k	\pm 0dB 0-24k	20kHz \pm 1dB 20-12k	80dB
Dynamic range	100dB	> 90dB	85dB	> 112dB	100dB	Unbal
Input connection	AB, TB	TB	A Unbal	.....	Balanced	Unbal
Output connection	AB, TB	TB	Unbal	.....	Balanced	Unbal
Interfaces	MIDI, RS-422	Keyboard ³	MIDI	.....	To TEK 110-S	MIDI
Reader Service No.	666	667	668	669	670	671

³ Control interfacing also via RS-232/422, TTL, Frame pulse.

⁴ Unit used with companion video synchronizer; purpose is resynchronizing audio and video after variable transmission delays.

Manufacturer	Yamaha Music Corporation		
Model	SPX1000 ⁵	REV5	FMX500
Talkshow delay	Yes	Yes	Yes
Plate, room simulation	Yes	Yes	Yes
Reverb, echo	Yes	Yes	Yes
Pitch change	Yes	Yes	Yes
Phasing, flanging	Yes	Yes	Yes
Time reversal	No	No	No
Monophonic summing	Yes	Yes	Yes
AF contouring	Yes	Yes	Yes
Multiband	Yes	Yes	Yes
Stereo	Yes	Yes	Yes
Programmable system	Yes	Yes	Yes
Remote control	Opt	Yes	Option
Delay range	1-5200ms ⁵	1ms-2900ms	1-740ms
AF response (\pm dB Hz-kHz)	\pm 1dB 20-20k	\pm 1dB 20-20k	\pm 1dB 20-20k
Dynamic range	90dB	> 84dB	85dB
Input connection	Unbal	AB	.....
Output connection	Unbal	AB	.....
Interfaces	MIDI	MIDI	MIDI
Reader Service No.	672	673	674

⁵ Other SPX models include: SPX900, with actively balanced input/output connections, delay range to 1980ms; SPX500, with unbalanced connections, delay range to 500ms.

Time Modification Equipment

These stereo products allow duration of play time to be manipulated to make material fit into preallocated time slot.

Manufacturer	AMS Industries	Eventide	Lexicon
Model	TimeFlex	H3000 Ultra Harmonizer	2400/2400 TCF ⁷
Plate, room simulation	No	Yes	No
Reverb, echo	No	Yes	No
Pitch change	No	Yes	Yes
Phasing, flanging	No	Yes	No
Time reversal	No	Yes	No
Time compression amount	\pm 0.5 times original	87.5%	33%
Time expansion amount	0-2 \times original	100%	25%
Monophonic summing	Yes	Yes	No
AF contouring	No	Yes	No
Multiband	No	Yes	No
Programmable system	Yes	Yes	Yes
Remote control	Yes	Option	Option
Delay type	Digital	Digital	Digital
Delay range	0.5-2 \times	0-1400ms	.....
AF response (\pm dB Hz-kHz)	-3.0dB 14-18k	\pm 1dB 5-20k	\pm 0.25% 20-15k
Dynamic range	90dB	92dB	90dB
Input connection	Active	AB	AB/TB
Output connection	Active	AB	AB/TB
Interfaces	Keyboard ⁶	Keyboard, MIDI	RS-422 on 2400
Reader Service No.	676	677	678

⁶ As well as RS-422, Frame pulse. ⁷ 2400 TCF includes time code follow capability.

Intercom Systems—Matrix

These products are based on a central matrix control station. [It is difficult to use a single form to properly characterize these divergent systems. As a result, this section is not an in-depth coverage of the products. For that reason, should you be in search of intercom systems, please contact the manufacturers to discuss your needs.] Abbreviations used in this section include: W/C wire per channel; TWPR twisted pair; 2-W, 4-W 2- or 4-wire; DSC daisy chain; SHLD shielded; SHLDPR shielded pair; Dir, Indir direct, indirect; KBD keyboard; KPD keypad; UNB unbalanced; BAL balanced.

Manufacturer	Audio Visual Systemes	Clear-Com Intercom	Heikki Malkki Ltd	HM Electronics	McCurdy Radio Industries	
Model	S70 (S69)	Matrix Plus	ODDS-intercom	RP755 station	RP753 station	CS9500¹
Matrix size range	12 (8-16) sets	50x50	11x11-100x100	6x12	6x12	2x2-50x50
# of stations standard	12 max (16 max)	2 expand to 50	30 expand to 300	64 w/call, 200 w/o	64 w/call, 200 w/o	to >150x150
Status display	None	LCD panel	LEDs	Switch position	Switch position	CRT, LEDs
Party line function	No	Yes	Yes	Yes	Yes	16 lines
Programmable grouping	No	Yes	Yes	Yes	Yes	6 lists
Configuration storage	No	Yes	Yes	No	No	EEPROM HD FD MT
Simultaneous conversations	12 (16)	25	110-9000	6	6	Unlimited
System control	μP, PC/compatible	μP, PC/compatible	μP, PC, terminal	Manual	Manual	Integral
Station priority	Yes	Yes	Not needed	No	No	3-level
Station selection	Keyboard	KPD, KBD	KPD/station	Y-Y button	Y-Y button	.....
Channel selection	Keyboard	KPD, KBD	KPD/station	X-Y button	X-Y button	X-Y/KPD/KBD
Wiring (matrix)	4-wire	Star, TWPR, 2-/4-W	Star SHLDPR	W/C, SHLDPR	W/C, SHLDPR	4-W, star, 3 pr/station
Wiring (party line)	.....	W/C, DSC, star, SHLD 2-W	Star SHLDPR	DSC, SHLDPR	DSC, SHLDPR	.....
Wiring (control)	.....	Star, TWPR, 2-W00	Star SHLDPR	.....	.....	.....
Voice processing	Analog	Analog & digital	Analog	Analog	Analog	Analog, digital cti
Camera interface	Indirect	Dir/Ind	Dir/Ind	Indirect	Indirect	Direct 4-W ²
Wireless interface	.....	Dir/Ind	Direct	Indirect	Indirect	Direct
Telco interface	.....	Dir/Ind	Indirect	Indirect	Indirect	Option
IFB interface	.....	Dir/Ind	Direct	Direct	Direct	24 circuits
2-way radio interface	.....	Dir/Ind	Direct	Indirect	Indirect	8 w/TX cti lines
Program audio	No	Option	Yes	Yes	Yes	Yes
Call waiting	No	Yes	Not needed	No	No	Yes
Caller tally	No	Yes	Option	No	No	Yes
Reader Service No.	808	809	810	811	812	813

¹ System supported wired user stations as well as optional wireless stations. ² Internally controlled 16-camera ISO optional.

Manufacturer	McCurdy Radio	Microset	PESA	Philip Drake Electronics	RTS Systems	
Model	CS9400+	Digicom 50	TB-8000 series	PD 6000 series	PD 8000 series	848A
Matrix size range	2x2-25x40	50x50	8x8-64x64	16x16-128x128	4x4-24x24	2x2-24x24
# of stations standard	expand > 640x640	50	Multiples of 8	16 expand to 128	4 expand to 12	2 expand to 24
Status display	CRT, LEDs	LCD panel	LEDs on panel	LEDs, LCD panel	LEDs	VDT
Party line function	80 lines	.....	Yes	Yes	Yes	Yes
Programmable grouping	48 lists	Yes	Yes	Yes	Yes	Yes
Configuration storage	HD, bus ctns	Yes	Yes	Yes	No	Yes
Simultaneous conversations	Unlimited	.....	Multiple	As # of stations	Per # of stations	14
System control	HP 9000 #310 32-bit	μP	Multi-μP, PC	PC/compatible	Pin-patch program	μP, PC, modem
Station priority	3-level	Yes	Yes	Yes	No	Yes
Station selection	.....	Keypad	Panel switch	KPD, X-Y button	X-Y buttons	.....
Channel selection	X-Y/KPD/KBD	Keypad	Panel switch	KPD, X-Y button	X-Y buttons	.....
Wiring (matrix)	4-W, star, 3 pr/station	TWPR, UNSHLD	Ribbon cable	Star, TWPR, 4-W	W/C, TWP, 4-W	W/C TWP
Wiring (party line)	.....	.....	.....	Star, TWPR, 4-W	W/C, TWP, 4-W	W/C, SHLDPR
Wiring (control)	.....	.....	Ribbon cable	Star, TWPR, 4-W	W/C, TWP	SHLDPR
Voice processing	Analog, dig cti	Digital	Analog	Analog	Analog	Analog
Camera interface	Direct 4-W ³	Direct	Adapter	Direct	Direct	Indirect
Wireless interface	Direct	Yes	Adapter	Direct	Direct	Indirect
Telco interface	Option	8 ports/dialer	Adapter	Indirect	Indirect	Indirect
IFB interface	80 circuits	Yes	Adapter	Direct	Direct	Indirect
2-way radio interface	48 w/TX cti lines	8 ports	Adapter	Direct	Direct	Indirect
Program audio	Yes	Yes	Adapter	Yes	Yes	No
Call waiting	Yes	.....	.....	Yes	No	Yes
Caller tally	Yes	.....	Yes	Yes	Yes	Yes
Reader Service No.	814	815	816	817	818	819

³ System supported wired user stations as well as optional wireless stations.

Manufacturer	RTS Systems	Ward-Beck Systems
Model	810-AA (810)	MicroCom II
Matrix size range	2x2-10x10	48x48-960x960
# of stations standard	2 expand to 10	24 max
Status display	Lighted button	CRT dot matrix
Party line function	No	Option
Programmable grouping	No	Yes
Configuration storage	No	Yes
Simultaneous conversations	5	1/2 matrix inputs
System control	.....	μP, PC compatible
Station priority	No	Option
Station selection	X-Y button	KBD, KPD
Channel selection	X-Y button	Keypad
Wiring (matrix)	W/C, TWP	4-W
Wiring (party line)	.....	SHLDPR
Wiring (control)	.....	2-W
Voice processing	Analog	Analog
Camera interface	Indirect	Dir/Ind
Wireless interface	Indirect	Direct
Telco interface	Indirect	Direct
IFB interface	Indirect	Dir/Ind
2-way radio interface	Indirect	Direct
Program audio	No	Option
Call waiting	No	Yes
Caller tally	Yes	Yes
Reader Service No.	820	821

Manufacturer	MinICOM
Matrix size range	24x36
# of stations standard	24 max
Status display	CRT dot matrix
Party line function	Option
Programmable grouping	Yes
Configuration storage	Yes
Simultaneous conversations	12
System control	μP, PC compatible
Station priority	Option
Station selection	KBD, KPD
Channel selection	Keypad
Wiring (matrix)	4-W
Wiring (party line)	SHLDPR
Wiring (control)	SHLDPR
Voice processing	Analog
Camera interface	Dir/Ind
Wireless interface	Direct
Telco interface	Direct
IFB interface	Dir/Ind
2-way radio interface	Direct
Program audio	Yes
Call waiting	Yes
Caller tally	Yes
Reader Service No.	822

Intercom Systems—Conference/Party Line

The products included in this section are those based on a conference line/party line configuration. As noted in the previous section, should you require intercom system information, check with the manufacturers or their representatives for particulars about any specific system.

Manufacturer	Clear-Com	HM Electronics	Philip Drake	RTS Systems
Model	Party line series	RP743 power station	RP733 (RP735 ²)	PD 5001
Communications line	3-W SHLD UNB	3-W UNB	3-W UNB	4-W BAL
Maximum cable length	1 mile	100	12	500 ft
# of stations maximum	100	64 w/call (200 w/o)	32 w/call (100 w/o)	12
# of channels	Unlimited	4	2	12
Bridging, terminating imped Ω	715k Ω , 200 Ω	...../200 Ω	...../200 Ω	< <10k Ω , 600 Ω
Full duplex capability	Yes	Yes	Yes	Yes
AF response (Hz-kHz)	100-12k	120-12k	120-12k	50-8k
Variable sidetone	Yes	Yes	Yes	.....
Visual signalling	DC powered	dcV powered	dcV powered	Yes
State-stage announce	Yes	No	No	Option
Selectable program feed	Yes	Yes	Yes	No
Microphone type	Dynamic ¹	Dynamic, electret	Dynamic, electret	Dynamic
Remote mic mute	Yes	No	No	No
Mic control	PTT/footstch/latch	Latch	Latch	PTT, latch
Volume control	Conf line/Pgm	Program	Program	Conf line/Pgm
Stereo operation	Option	No	No	Yes
Camera interface	Option	No	No	Option
IFB cue interface	Option	No	No	Yes
Telco interface	Option	No	No	Option
Wireless interface	Option	No	No	Yes
2-way radio interface	Option	No	No	Option
Speaker stations	Yes	Yes	Yes	Yes
Belt packs	1-1/2-channel	1-1/2-channel	1-1/2-channel	1-1/2-channel
Belt pack weight	0.5 lb	0.69 lbs	0.69 lbs	0.75 lb
Reader Service No.	823	824	825	827

¹ Electret and carbon mic options.

² System RP735 includes a speaker in the power station.

Manufacturer	RTS Systems	Telex Communications	Ward-Beck Systems
Model	810-CL/810-5CTL	824	802
Communications line	2-W BAL	2-W BAL	2-4-W BAL
Maximum cable length	5000 ft	5000 ft	5000 ft
# of stations maximum	30	30	30
# of channels	10	24	12
Bridging, terminating imped Ω	10k Ω , 200 Ω	10k Ω , 200 Ω	10k Ω , 300 Ω
Full duplex capability	Yes	Yes	Yes
			IC-2 MAX (BP-1/BP-2)
			M8220/IPH-2
			2-W, SHLD, Bal
			BAL
			5280 ft
			50
		
			10k Ω , 300 Ω
			Yes
			2-W, SHLD, UNB
			UNB
			1000 ft
			15
			2
			150 Ω
			Yes

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AF response (Hz-kHz)	100-10k	100-10k	100-10k	200-20k	250-5k
Variable sidetone	Yes	Yes	Yes	BP-1/BP-2 units	Yes
Visual signaling	No	No	ac powered	ac powered	No
Slate-stage announce	Yes	No	Yes	Yes	Yes
Selectable program feed	No	No	Yes	.....	No
Microphone type	Carbon, dynamic	Carbon, dynamic	Carbon, dynamic	Dynamic, electret	Dynamic
Remote mic mute	Yes	No	Yes	Yes	No
Mic control	PTT/Latch/footxtch	PTT/Latch/footxtch	PTT/Latch/footxtch	Latch	.....
Volume control	Conf line	Conf line	Conf line/Pgm	.....	Conf line/Pgm
Stereo operation	No	No	Yes	No	Yes
Camera interface	No	No	Option	No	Yes
IFB cue interface	No	No	Option	No	Yes
Telco interface	No	Option	Option	No	Yes
Wireless interface	No	Option	Option	No	No
2-way radio interface	No	Option	Yes	No	No
Speaker stations	Option	Yes	Yes	Option	Option
Belt packs	.....	.....	.....	1-2-channel	2-channel
Belt pack weight	.....	.....	.....	1 lb	3 lbs
Reader Service No.	829	830	831	832	833

Telephone Bandwidth Extenders

These units are designed to improve remote audio pick-up frequency response on standard telephone lines. **AB** indicates Actively Balanced.

Manufacturer	Comrex Corporation				Gentner Electronics
Model	3XP/3XR	LX/T, LX/R basic	PLXmicro/TH-X	2XP/2XR	EFT-3000
System type	3-line	1-line	1-line duplex	2-line	3-line duplex
Processing type	Analog	Analog	Analog	Analog	Digital
Offset (L1/L2/L3 Hz)	250/2k/2k	250	250	250/2k	320/2820/5320
Translation error	±0.02Hz	±0.02Hz	±0.02Hz	±0.02Hz	±0Hz
AF response (dB/Hz)	±0.5 50-10k	±0.5 50-5k	±0.5 50-5k	±0.5 50-5k	±0.5 50-7.5k
System transmitter:	3XP	LX-T	PLX micro	2XP	EFT-3000G
AF input range	+4dBm 600Ω	-20,+8dBm 600Ω	-60,+9dBm 150/10kΩ	+4dBm 600Ω	10dBm 150/600Ω
AF input connection	Line bal	Line	M/L bal	Line bal	M/L bal
Telco connection	Xfmr bal 600Ω	Xfmr bal 600Ω	Xfmr bal 600Ω	Xfmr bal 600Ω	Xfmr bal 600Ω
Output level, impedance	-9dBm	-9dBm	-9dBm	-9dBm	+10dBm
Packaging	Portable	Tabletop, rack	Portable	Portable	Tabletop, rack
Power required	120/240Vac	120Vac	120Vac, ±15Vdc	120/240Vac	117/234Vac
System receiver:	2XR	LX-R	TH-X	2XR	EFT-3000
Telco connection	Xfmr bal 600Ω	Xfmr bal 600Ω	Xfmr bal	Xfmr bal 600Ω	Xfmr bal
Telco input range	-40,+8dBm	-40,+8dBm	-40,+8dBm	-40,+8dBm	0dBm 600Ω
Input attenuator	Automatic	Yes	Automatic	Automatic	No
AF connection	AB 600Ω	AB 600Ω	AB 600Ω	AB 600Ω	AB 600Ω
AF output range	0dBm	0dBm	0dBm	0dBm	10dBm
Packaging	Rack mount	Tabletop, rack	Rack mount	Rack mount	Tabletop, rack
Reader Service Number	481	482	483	484	485

Manufacturer	Gentner Electronics			Rood Megatronics BV	
Model	EFT-100¹	EFT-900A¹	EFT-1000A¹	BAX 110	BAX 111
System type	1-line	1-line	1-line	2-line	1-2-line duplex
Processing type	Digital	Digital	Digital	Analog & digital	Analog & digital
Offset (L1/L2/L3 Hz)	250	250	250	350/2.1k	350/2.1k
Translation error	±0Hz	±0Hz	±0Hz	±0.5Hz	±0.5Hz
AF response (dB/Hz)	±0.5 50-3k	±0.5 50-3.5k	±0.5 50-3.5k	±1 50-4.95k	±1 50-4.95k
System transmitter:	EFT-100	EFT-900A	EFT-1000A	BAX110/m	BAX111/m
AF input range	-10,0dBm >10kΩ	-55,0dBm 150/600Ω	-55,0dBm	±6dBm 600/10kΩ	±6dBm 600/10kΩ
AF input connection	Bal line	M/L bal	M/L bal	M/L bal, M unbal	M/L bal, M unbal
Telco connection	Ext hybrid 600Ω	600Ω	600Ω	Xfmr bal 600Ω	Xfmr bal 600Ω
Output level, impedance	-12,0dBm	-15dBm	-15dBm	±12dBm	±12dBm
Packaging	Tabletop, rack	Portable	Portable	Tabletop, rack	Tabletop, rack
Power required	117/234Vac	117/234Vac, battery	117/234Vac, battery	110/220Vac	110/220Vac
System receiver:	EFT-100	EFT-900A	EFT-1000A	BAX 110/d	BAX 111/d
Telco connection	Ext hybrid	Xfmr bal	Xfmr bal	Xfmr bal	Xfmr bal
Telco input range	-20,0dBm 600Ω	-35,+4dBm 600Ω	-35,+4dBm 600Ω	-30,+17dBm 600Ω	-30,+17dBm 600Ω
Input attenuator	Yes	Yes	Yes	Yes	Yes
AF connection	AB 600Ω	AB 600Ω	AB 600Ω	AB 600Ω	AB 600Ω
AF output range	-10,0dBm	-60,0dBm	0dBm	0,+12dBm	0,+12dBm
Packaging	Tabletop, rack	Portable	Portable	Tabletop, Rack	Tabletop, Rack
Reader Service Number	486	487	488	489	490

Manufacturer	Rood Megatronics BV		
Model	BAX 112	BAX 114	BAX 2010
System type	1-line	1-2-line	2-line
Processing type	Analog & digital	Analog & digital	Analog & digital
Offset (L1/L2/L3 Hz)	350	350/2.1k	350/2.1k
Translation error	±0.5Hz	±0.5Hz	±0.5Hz
AF response (dB/Hz)	±1 50-3.05k	±1 50-4.95k	±1 50-4.95k
System transmitter:	BAX112/m	BAX114/m	BAX 2010
AF input range	±6dBm 600/10kΩ	±12dBm 600/12kΩ	±12dBm 600/12kΩ
AF input connection	M/L bal, M unbal	M/L bal, M unbal	M/L bal, M unbal ²
Telco connection	Xfmr bal 600Ω	Xfmr bal 600Ω	Xfmr bal 600Ω
Output level, impedance	-6dBm	±9dBm	12dBm
Packaging	Portable	Portable	Attache case
Power required	6Vdc int batteries	90-270Vac	110/220Vac
System receiver:	BAX 112/d	BAX 110/d	BAX 110/d
Telco connection	Xfmr bal	Xfmr bal	Xfmr bal
Telco input range	-30,+17dBm 600Ω	-30,+17dBm 600Ω	-30,+17dBm 600Ω
Input attenuator	Yes w/auto EQ	Yes	Yes
AF connection	AB 600Ω	AB 600Ω	AB 600Ω
AF output range	0,+12dBm	0,+12dBm	0,+12dBm
Packaging	Tabletop, Rack	Tabletop, Rack	Tabletop, Rack
Reader Service Number	491	492	493

²2-mic/1-line mixer

Wireless Microphone Systems

Manufacturer	AKG Acoustics
Model	WMS wireless
RF range	174-216MHz
Modulation control	Compression
Companding function	Low noise
System AF response	±1dB 40-16k
System S/N ratio	95dB
System distortion	0.5%
Transmitter model:	T 185
Transmitter package	Handheld
RF output level	25-35mW
FM deviation	±15kHz
Mic types	Electret, dynamic
Auxiliary line input	Yes
Power source	9Vdc
Operating weight	13.6 oz
Receiver model:	SR 185.10 (185.11)
Sensitivity (µV-dB quieting)	1µV 60dB
Spurious rejection	60dB
Antenna type(s)	Whip
Diversity receiving	Option
Multichannel capability	No
Audio output range	-20, +6dBm
Power source	15-27Vdc, 117Vac
Metering	AF, RF, V
Metering types	LEDs
Reader Service No.	554

Audio-Technica
ATW1031/ATW1032
169-216 MHz
Compression
2:1
±1dB 40-16k
95dB
0.5%
ATW-T31 UniPak¹
Pocket unit
>30mW
±15kHz
AT831A/ATM73A ²
No
9Vdc
3.2oz
ATW-R10
1µV 60dB
60dB
Whip furnished
Yes
No
-8dBV Unbal ³
120Vac, 12-18Vdc
AF, RF
LEDs
555

beyerdynamic
TS 190
174-225MHz
Compression
Low noise
±3dB, 50Hz-15kHz
+85dB
> 1%
TS 190
Pocket unit
>30mW
±12kHz
Electret ⁴
No
9Vdc
160 oz
NE 185-11
1µV, 55dB
85dB
Whip or Dipole
Yes
Option
-20, +6dBm
15-27Vdc, 110Vac
AF, RF, V
LEDs
556

SEM 186
174-225MHz
Compression
Low noise
±3dB, 50-15k
+85dB
> 1%
SEM186
Handheld
>25mW
±12kHz
Electret, ribbon ⁵
No
9Vdc
160 oz
NE 185/US
1µV 55dB
85dB
Whip or Dipole
Yes
No
-20, +6dBm
15-26Vdc 110Vac
AF, RF, V
LEDs
557

Model 180
169-216 MHz
Compression
2:1
±2dB 50-15k
95dB
0.05%
M-72
Pocket
35mW
±30kHz
Elect Dynam Rio
Yes
9Vdc
11 oz
MR-180
1µV 50dB
80dB
Whip, dipole ⁶
Option
Yes
-40, +10dBm
6-12Vdc 50hr
AF, V
LEDs
558

Comtek
Model 182
169-216MHz
Compression
2:1 companding
±2dB 40-15k
95dB
0.05%
M-182
Handheld
50mW
±30kHz
Electret
No
3-AA
11 oz
MR-182
1µV 50dB
90dB
Whip dipole ⁶
Option
Yes
-40, +10dBm
Int, 12Vdc 110Vac
AF, RF, V
LEDs
559

¹ ATW-T32 Handheld. ² Also AT875A or any low-Z mic; T32 uses dynamic only. ³ -20dB balanced output. ⁴ MCE 5, 6, 10; ECM 50, 55, 66, 77; MKE 2, SM 83, 84. ⁵ Element MCE 81 or M500.
⁶ Or multiple element accessories.

Manufacturer	HM Electronics
Model	535 (535I)
RF range	169-216MHz
Modulation control	Compression
Companding function	Dynamic expansion
System AF response	±3dB 100-15k
System S/N ratio	> 2%
System distortion	< 2%
Transmitter model:	TX530
Transmitter package	Pocket unit
RF output level	per FCC
FM deviation	15MHz max
Mic types	EM43 lapel
Auxiliary line input	Yes
Power source	9Vdc
Operating weight	4.5 oz
Receiver model:	RX522
Sensitivity (µV-dB quieting)	1µV 30dB
Spurious rejection	> 50dB
Antenna type(s)	Whip BNC
Diversity receiving	No
Multichannel capability	No
Audio output range	-4dBV
Power source	120Vac, 12-16Vdc
Metering	Vdc, RF
Metering types	LEDs
Reader Service No.	560

Pro-STD-T (-L)
150-216MHz
Compression
2:1
±1dB 50-15k
96dB A wtd
0.7%
T185 (M185)
Handheld (Pocket)
50mW
±15kHz
SM58 (Electret ⁷)
No (Yes)
9Vdc
13.2oz (5.3oz)
R185
0.5µV 20dB
> 100dB
Whip furnished ⁸
No
No
-65.0dBm
9-16Vdc, 120Vac
AF, RF, Vdc
LEDs
561

Pro-Mini-L (-H)
150-216MHz
Compression
2:1
±1dB 50-15k
96dB A wtd
0.7%
M185 (H185)
Pocket (Plug-on)
50mW
±15kHz
Electret, dynamic
Yes (No)
9Vdc
5.3oz (13.2oz)
DR185
0.5µV 20dB
> 100dB
Whip furnished ⁸
Yes
No
-65.0dBm
12Vdc, 120Vac
AF, RF, Vdc
LEDs
563

PRO-DIV-L (-T)
150-216MHz
Compression
2:1
±dB 50-15k
96dB A wtd
0.7%
M185/H185
Handheld or pocket
50mW
±15kHz
Electret or dynamic
Yes
9Vdc
5.3oz (13.2oz)
CR185/CDM4
0.6µV 20dB
> 100dB
Whip furnished ⁸
No
4-chagnel
-65.0dBm
9-16Vdc, 120Vac
AF, RF, Vdc
LEDs
564

⁷ M185 also supports dynamic mic units. ⁸ Dipole antenna available as an added accessory.

Manufacturer	Micron Audio Products
Model	MDS-2
RF range	169-216MHz
Modulation control	Limiting
Companding function	CNS type
System AF response	±2dB 50Hz-15kHz
System S/N ratio	115dB
System distortion	< 0.3% THD
Transmitter model:	TX-501 (503)
Transmitter package	Pocket (handheld)
RF output level	50mW
FM deviation	±15kHz
Mic types	Elec, dyn (AKG)
Auxiliary line input	Yes (No)
Power source	9Vdc
Operating weight	8.5 oz (11 oz)
Receiver model:	MDR-540
Sensitivity (µV-dB quieting)	2µV 60dB
Spurious rejection	> 80dB
Antenna type(s)	Dipole furnished ⁹
Diversity receiving	No
Multichannel capability	Yes
Audio output range	0dB line
Power source	10-22Vdc, 120Vac
Metering	AF, RF, Vdc
Metering types	LEDs
Reader Service No.	566

CTR-501H
169-216MHz
Limiting
CNS type
±2dB 50Hz-15kHz
115dB
< 0.3% THD
TX-503
Handheld
50mW
±15kHz
AKG element
Yes
9Vdc
11 oz
MDR-510
2µV 60dB
> 80dB
Whip furnished
Yes
No
-53dBV mic 0dBv hne
10-22Vdc, 120vac
AF, RF, Vdc
LEDs
567

Nady Systems
Model 101/201
170-216MHz
Compression
Yes
±0.3dB 25-20k
115dB
0.3%
< 0.5% 400Hz
HT/LT/GT
HH, Lav, Instr
50mW
Electret
No
9Vdc
8.5oz
101/201
60dB
Furnished
201 only
Yes
Yes
12Vdc
RF
LEDs
568

Samson Technologies
Stage 22 series
174-199MHz
Compression
NRS dbx I/II
±3dB 30-18k
> 115dB
< 0.5% 400Hz
CH-2 (CT-2)
Handheld (Beltpack)
50mW
±15kHz
Various ¹⁰
No
9Vdc
4.2 oz
SR-22
15µV, 60dB S/N
60dB ±60Hz
Dual whips
Yes
10
Bal/unbal 8dBm
110/220Vac
Vdc RF A/B
LEDs
569

⁹ Multiple element antenna options. ¹⁰ Various mics supported including: Electro-Voice, Shure, Sony, Audio-Technica, Sennheiser, AKG dynamic and condenser types.

Manufacturer	Sennheiser Electronics					Shure Brothers
Model	UHF 2B (UHF 2H)	UHF 1B (UHF 1H)¹¹	UHF 2EB (UHF 2EH)	VHF 2B-90 (2H-90)	VHF 1B-90 (1H-90)¹¹	W-series
RF range	450-960MHz	450-960MHz	450-960MHz	174-216MHz	174-216MHz	150-216MHz
Modulation control	Compress (limit)	Compress (limit)	Compress (limit)	Compress (limit)	Compress (limit)	.....
Companding function	Hi-Dyn	Hi-Dyn	Hi-Dyn	HiDyn	HiDyn	Yes
System AF response	±3dB 40(70)-20k	±3dB 40(70)-20k	±3dB 40(70)-20k	±0.3dB 40-20kHz	±3dB 40(70)-20k	±1dB 50-15k
System S/N ratio	94dB	94dB	94dB	+92dB A wtd (94)	+92dB A wtd (94)	.....
System distortion	<2%	<2%	<2%	<2%	<2%	0.5%
Transmitter model:	SK-2012-TV(SKM 4031)	SK-2012-TV(SKM 4031)	SK-2012-TV(SKM 4031)	SK 2012-90(SKM-4031)	SK-2012-90(4031-90)	W15HT (W10BT)
Transmitter package	Pocket (handheld)	Pocket (handheld)	Pocket (handheld)	Pocket (handheld)	Pocket (handheld)	Handheld (pocket)
RF output level	20mW	20mW	20mW	30mW	30mW	50mW
FM deviation	±40kHz	±40kHz	±40kHz	±40kHz nom.	±40kHz nom.	±12kHz
Mic types	Electret MKE-2/-40	Electret MKE-2/-40	Electret MKE-2/-40	Electret MKE-2/-40	Electret MKE-2/-40	Dynam & (elec) ¹⁴
Auxiliary line input	No	No	No	No	No	No
Power source	4.5V 3-AAA cells	4.5V 3-AAA cells	4.5V 3-AAA cells	4.5Vdc 3-AAA	4.5Vdc 3-AAA	9Vdc
Operating weight	7 oz (9 oz)	7 oz (9 oz)	7 oz (9 oz)	7 oz (9 oz)	7 oz (9 oz)	16oz (6 oz)
Receiver model	EM 2003-TV	EK-2012-TV¹¹	EM-2003-TV¹²	EM-2003-90¹³	EK-2012-90¹³	W20R (W25DR)
Sensitivity (µV-dB quieting)	<10µV 40dB	<20µV 40dB	<10µV 40dB	<10µV 40dB	<20µV 40dB	0.5µV 12dB
Spurious rejection	>80dB	>70dB	>80dB	>100dB	>70dB	>80dB
Antenna type(s)	Whip furnished	Whip furnished	Whip furnished	Whip, ground plane	Whip furnished	Whip furnished
Diversity receiving	Yes	No	Yes	Yes	No	No (Yes)
Multichannel capability	Yes	Option	Option	No	No	No
Audio output range	-28,+12dBm	-26,+6dBm	-28,+12dBm	-28,+12dBm	-26,+26dBm	0dBV (M/L switch)
Power source	12-24Vdc 117Vac	4.5Vdc 3-AAA cells	12Vdc	117Vac	4.5Vdc	13.5Vdc
Metering	AF, RF	None	RF, AF, Vdc	AF, RF	None	AF, RF, V
Metering types	LEDs	N.A.	LEDs	LEDs	N.A.	Meter (2 meters)
Reader Service No.	572	573	574	575	576	577

¹¹ Camera mounted receiver. ¹² Includes ENG 2003 carrying case, antenna system, NiCad battery. ¹³ EM-2003-90 offers diversity reception; EK-2012-90 is a camera mount receiver. ¹⁴ W15HT uses SM58 dynamic or SM87 electret; W10BT uses WL83 electret.

Manufacturer	Shure Brothers	Sony Professional Audio		Swintek	Telex Communications
Model	L-series	VHF systems	UHF systems	MK50A HI-FI-S¹⁷	ENG Wireless
RF range	169-216MHz	176-215MHz	947-952MHz	49-470MHz	165-216MHz
Modulation control	.....	Compression	Limit/compress	Limit/compression	.....
Companding function	Yes	Yes	Switchable ¹⁵	Yes	Selectable
System AF response	±2dB 50-15k	±2.5dB 100-15k	±1.5dB 75-15k	±3dB, 60-20k	±1dB 100-15k
System S/N ratio	.....	>60dB	57dB linear A-wtd	80dB	104dB companded
System distortion	0.3%	<0.7%	0.3% linear ¹⁶	≥1%	.....
Transmitter model:	L1	WRT410/420	WRT-28	MK50A HI-FI	WT-400
Transmitter package	Pocket	Handheld, pocket	Pocket	Pocket	Belt-pack
RF output level	50mW	50mW	30mW (to 500mW)	50mW	50mW
FM deviation	±15kHz	±1.9kHz 94dB SPL	±2.4kHz ²	±20kHz	±12kHz
Mic types	Electret 839W	Elec Dyn ECM-77BC	Elec Dyn ECM-77BC	E D Sony ECM50	Electret
Auxiliary line input	No	No	No	Y	.....
Power source	9Vdc	3Vdc	3Vdc	9Vdc	9Vdc
Operating weight	5.5oz	14 oz	4.6 oz	5 oz	5.5 oz
Receiver model	L3 (L4)	WRR410/WRR420	WRR-28/37	QDC HI-FI	ENG-4
Sensitivity (µV-dB quieting)	0.35(.45)µV 12dB	>65µV 20dB	20dBµV 30dB S/N	1µV 12dB	0.5µV 12dB
Spurious rejection	75dB	<70dB	>70dB	80dB	70dB
Antenna type(s)	Whip furnished (2)	Whip	Whip	Whip	Rubber ducky whip
Diversity receiving	No (Yes)	Option	Option	0	No
Multichannel capability	No	Yes	Yes	0	Yes
Audio output range	0dBm	-58dB mic level	-58dBs 600Ω	56dBm,+10dBm	-7,-21dBm
Power source	12-18Vdc	9Vdc 6-AA cells	3 or 10-17Vdc	9Vdc	.....
Metering	AF, RF, V (Div)	AF, RF	AF, RF	AF, RF, V	AF, RF, V
Metering types	LEDs	LEDs	LEDs	LEDs	Meter
Reader Service No.	578	579	580	581	582

¹⁵ Linear or companded; >60dB SNR w/companding; 0.7% distortion w/companding. ¹⁶ Per 1kHz linear mode; ±9.4kHz/1kHz, companded. ¹⁷ Video camera system.

Shotgun Microphone Systems

Manufacturer	AKG Acoustics	AMS Industries	Audio-Technica US			
Model	CK8X capsule	C568	ST205	AT4073	AT835	AT815a
AF response Hz-kHz	30-18k	20-20k	.....	30-20k	40-20k	40-20k
Polar pattern(s)	Hypercardioid	Hypercardioid	Variable ¹	Narrow directional	Narrow directional	Narrow directional
Output impedance	.....	600Ω	.....	250Ω	600Ω	600±
Output level (mV/Pa)	.....	.....	.....	52mV/Pa -25.7dBm	9.0mV/Pa -45.5dBm	9.0mV/Pa -44.5dBm
Maximum SPL (dB-% distortion)	7dB 0.5%	128dB 0.5%	140dB 0.5%	129dB 1% distortion	115dB 3% distortion	120dB 3% distortion
Output noise	15dB	18dB DIN 45412-A	20dB per pattern spc	16dB	17dB	18dB
S/N ratio	79dB	76dB	.....	>75dB	>70dB	>70dB
Mic capsule type	Electret	Electret	.....	Ext polarized cap.	Fixed-charge cap.	Fixed-charge cap.
Stereo design	No	No	M/S or L/R	No	No	No
Power source	.....	9-45Vdc	48Vdc or ac	12-48Vdc	1.5Vdc, AA cell	1.5Vdc AA-cell
Filters	.....	.....	Bass rolloff	High-pass	High-pass	High-pass
Weight	4.2gm	6.2gm	.....	4.2oz	7.5 oz	9.2oz
Reader Service No.	583	584	585	586	587	588

¹ Patterns from omni through cardioids to Figure-eight.

Manufacturer	Audio-Technica	beyerdynamic		Electro-Voice		
Model	AT4071	MCE 86 S	MC 737-PV	MC 736-PV	RE45N/D	DL42
AF response Hz-kHz	30-20k	50-18k	40-20k	40-20k	150-15k	50-12k
Polar pattern(s)	Lobar	Hypercardioid lobe	Hypercardioid lobe	Hyper	Cardioid-line	Hypercardioid
Output impedance	250Ω	190Ω	150Ω	150Ω	600Ω	150Ω
Output level (mV-Pa)	62mV/Pa, -24.2dBm	4.2mV/Pa -47dBm	30mV/Pa -33dBm	30mV/Pa -33dBm	5mV/Pa 1kHz	-50dB
Maximum SPL (dB-% distortion)	127dB 1% distortion	138dB 0.7% dist	135dB 0.5% dist	135dB 0.5% dist	.....	.....
Output noise	15dB	25dB A wtd	13dB A wtd	13dB A wtd	130dBm hum pickup	-125dBm hum pickup
S/N ratio	>75dB	61dB	74dB	74dB	.....	.....
Mic capsule type	Ext polarized cap.	Electret	RF condenser	RF condenser	Dynamic	Dynamic
Stereo design	No	N	N	N	No	No
Power source	12Vdc-48Vdc	8-48Vdc	12-48Vdc	12Vdc	Not required	Not required
Filters	High-pass	.....	B r/o, 6dB attn	B r/o, 6dB attn	.....	.....
Weight	5.8oz	2.5 oz	7 oz	4 oz	7.5 oz	13 oz
Reader Service No.	589	590	591	592	593	594

Manufacturer	Georg Neumann ²		Sennheiser	Electronics	Shure Brothers
Model	RSM1901 MS-stereo ³	KMR8 1(KMR821)	MKH 70 P48	ME 80+K3U	SM89
AF response Hz-kHz	40-18k	40-18k (40-20k)	70-Hz-20kHz	50-50k	60Hz-20kHz
Polar pattern(s)	Hypercardioid	Hypercardioid	Super cardioid lobe	Super cardioid	LOBAR
Output impedance	50Ω	150Ω	150Ω	130Ω	100Ω
Output level (mV/Pa)	23mV/Pa	18mV/Pa (21mV/Pa)	40mV/Pa	.....	122mV/Pa -53dBV
Maximum SPL (dB-% distortion)	4mV/Pa	>128dB	124dB	.....	127dB 0.5% dist
Output noise	.....	.....	10dB/DIN 45500	.....	16dB A wtd
S/N ratio	78dB M/72dB S	82dB	.....	>67dB CCIR 468-2	79dB
Mic capsule type	.....	.....	RF condenser ⁴	Electret	Electret
Stereo design	Yes	No	No	No	No
Power source	48Vdc±4V	46Vdc±4V	48Vdc	5.6Vdc	11-52Vdc
Filters	.....	.....	Bass rolloff ⁵	Bass rolloff	Bass rolloff
Weight	300 g	145 g	180 grams	165 grams	6.9oz
Reader Service No.	595	596	597	598	599

² Represented in US by Gotham Audio. ³ Uses MTX 190i matrix amplifier. ⁴ Symmetric push-pull transducer. ⁵ Brilliance control Included.

Audio Distortion Analyzers

The primary design objective of these products is measurement of total harmonic distortion in audio signals. Some include capabilities of measuring intermodulation distortion (IMD). Abbreviations used in this section include: **AB** actively balanced; **TB** transformer balanced; **AU** active unbalanced; **TU** transformer unbalanced. In references to audio frequencies, Hz is understood.

Manufacturer	Amber Electro Design		ASACA/ShibaSoku	Audio Precision	Panasonic	Rohde & Schwarz
Model	Model 5500 ¹	Model 3501	AD725C	System One	VP-7722P	UPA analyzer
Auto level set	Yes	Yes	Yes	Yes	Yes	Yes
Auto null set	Yes	Yes	Yes	Yes	Yes	Yes
μP-control	Yes	No	No	Yes	Yes	Yes
Auto ranging	Yes	No	Yes	Yes	Yes	Yes
X-Y display output	Opt	No	No	No	No	Yes
Printer/plotter output	Opt	No	No	Yes	Yes	Yes
Automation bus port	Yes	No	Yes	Yes	Yes	Yes
Audio recorder tests	Yes	Yes	No	Yes	.....	Yes
Transmit-receive units	Yes	Yes	Opt	Yes	No	No
Portable unit	Yes	Yes	No	No	.....	Yes
AF range (fundamentals)	10-100k	10-100k	5-110k	10-200k	10-110k	10-100k
Range (on harmonics)	10-500k	10-300k	5-110k	10->500k	to 10th harmonic	300k
Input level range	-30dBm,+40dBm	-30dBm,+40dBm	0.1V-100V	-90dBu, 140Vrms	0.05-110Vrms	12mV-400V
Input impedance	100kΩ	100kΩ	100kΩ	100kΩ	100kΩ	600Ω, 10kΩ
Input connection	AB/AU	AB/AU	UB	Bal/Unbal	BNC floating	Bal, unbal
Fundamental rejection	>100dB	>100dB	120dB	.....	>140dB	N.A.
THD minimum	0.001%	0.0008%	0.001% f.s.	0.0004% 20-20k	0.001%	-90dB range
THD accuracy	±1%	±1%	.....	0.5dB	per SMPTE	±1dB to 100kHz
IMD measurements per	SMPTE/DIN45045/CCIF	SMPTE/DIN45045/CCIF	.....	SMPTE/DIN45045 ²	per SMPTE	No
IMD accuracy	±1%	±2%	.....	±1dB	±1dB	.....
IMD minimum	0.001%	0.003%	.....	10mV	0.01%	.....
AC voltage range	10μV-100V	<3μV-100V	110V-230V±10%	300μV-160Vrms	0.316mB-100V±2%	10μV-300V unbal
Audio noise range	<1μV-100V	<1μV-100V	.....	75μ-180Vrms	0-130dB SNR	0-120dB SNR
Signal generator range	<-80dBm,+30dBm	<-60dBm,+28dBm	.....	10Hz-204.775kHz	10-110k	UPA-B6 opt 10-100k
Generator output	TB, TU	TB, TU	.....	Bal/Unbal Xfmr	BNC floating	Bal, unbal
Frequency counter range	10->500k	10->500k	5-500k	10-≥500k	Yes	8-250k
Meters/displays	LED	Mechanical	LED	CRT	7-seg LEDs	LCD displays
Reader Service No.	1439	1440	1441	1442	1443	1444

¹ AudioCheck package allows control from PC for automated measurement system. ² DIN45043; CCIR IEC 2683 IHF A202.

Manufacturer	Rohde & Schwarz	Sound Technology		Tektronix	
Model	SUN-2 system	1530A analyzer	1510A ⁴	3200B/3100B ⁵	AA501
Auto level set	Yes	Yes	Yes	Yes	Yes
Auto null set	Yes	Yes	Yes	Yes	Yes
μP-control	Yes	Yes	Yes	Yes	Yes
Auto ranging	Yes	Yes	Yes	Yes	Yes
X-Y display output	Yes	Yes	Yes	Opt	Yes
Printer/plotter output	Yes	Yes	Yes	Yes	Yes
Automation bus port	Yes	Opt	Opt	Yes	Yes
Audio recorder tests	Yes	No	Yes	Yes	No
Transmit-receive units	No	Opt	Yes	Yes	No
Portable unit	Yes	Yes	Yes	Yes	No
AF range (fundamentals)	10-100k	20-40k	20-40k	1-102.39k	10-100k
Range (on harmonics)	.....	100-5k	315-1k	10-300k	to 300k
Input level range	-84,+32dB	100μV-40V RMS	100μV-40V	10mV-100V	60mV-200V 100kΩ
Input impedance	1MΩ	100kΩ	100kΩ	100kΩ	100kΩ
Input connection	TB, unbal	AB	.....	.....	AB
Fundamental rejection	>65dB	.....	.....	.....	10dB ⁶
THD minimum	0.06%	0.05% ³	0.05% ⁵	0.001%	0.0025%
THD accuracy	±0.1dB	5%	5%	±10%	±10%
IMD measurements per	DIN method	SMPTE	.....	SMPTE	Opt CCIF/DIN/SMPTE
IMD accuracy	.....	5%	.....	1.0%	±10%
IMD minimum	.....	0.1%	.....	0.002%	0.0018%
AC voltage range	Yes	100μV-40V	300μV-40V	30μV-100V	-108,+48dBm ±2% fs
Audio noise range	Yes	-92,-10dBV	-92,-10dBV	<4μV	-108dBm
Signal generator range	SUN-2/S 10-100k	-80,+30dBm	-80,+30dBm	-90,+30dBm ⁷	10-100k 28dBm
Generator output	Telco jack	AB	AB	AB	28dBm Bal
Frequency counter range	.....	20-40k	20-40k	10-500k	No
Meters/displays	LED displays	CRT	CRT	LED ⁷	LED displays
Reader Service No.	1445	1446	1447	1448	1449

³ Measures 2nd, 3rd harmonics separately. Includes precision 10.396Hz for Bessel Null adjustment. ⁴ Audio signal and recording test system. ⁵ Measures 2nd, 3rd harmonic separately. ⁶ Two unit package for programmable transmission path tests. ⁷ From 3100B programmable generator with LED metering displays. ⁸ Value is below specified residual THD & noise or actual THD, whichever is greater.

Remote Pickup Equipment

Equipment designed for aural program pickup from remote locations using a 1-way link only.

Manufacturer	ITAME	Martl Electronics			Moseley Associates
Model	TM-90A/UHF 450F4	RPT-30/CR-10	RPT-15/DR-10	RPT-2/AR-10	RPL 4000
RF range	400-450MHz	148-470MHz	148-470MHz	148-470MHz	400-512MHz
Typical range (miles)	40	25	15	6	30
Modulation control	Limiting	Limit/compress	Limit/compress	Limit/compress	Compression
Companding function	No	2:1 companding	2:1 companding	2:1 companding	2:1 companding
System AF response	±0.5dB 40-15k	±1.5dB 50-8k	±1.5dB 50-8k	±1.5dB 50-11k	±0.4dB 50-15k
System S/N ratio	70dB	65dB	65dB	65dB	72dB
System distortion	0.3%	2%	2%	2%	0.4%
Transmitter model:	TM-90A	RPT-15	RPT-15	RPT-2	RPL 4000
Package	Portable	Portable	Portable	Portable	.....
RF output level	20W	45W	15W	2.5W	20W
FM deviation	±75kHz	±8kHz	±8kHz	±8kHz	±5.±35kHz
Auto relay encoder	No	27Hz	27Hz	27Hz	27Hz & DTMF
Supports mic types	.....	Dynamic	Dynamic	Dynamic	.....
Integral audio mixer	3 input TB	4 inputs AB	2 inputs UB	2 inputs	Yes
Metering functions	V/A/F/R/F-R	RF/V/compression	RF/F-R/V/A/F/Comp	.....	RF/Comp/V/A/F/F-R
Power supply	13.5Vdc	13Vdc, 120Vac	13Vdc, 115/230Vac	.....	.....
Unit weight	8.8 lbs	9 lbs	12 lbs	5 lbs	8 lbs
Receiver model:	UHF 450F4	DR-10	CR-10	AR-10 Portable	RPL 4000
RF sensitivity	30µV 65dB quieting	1µV 48dB quieting	1µV 48dB quieting	1µV 48dB quieting	0.7µV 20dB quieting
Spurious rejection	70dB	70dB	90dB	90dB	60dB
Audio output range	0-25dBm	8dBm	10dBm	+4dBm	10dBm
Auto relay decoder	No	27Hz	27Hz	27Hz	Yes
Power requirement	220Vac	13Vdc, 120Vac	13Vdc, 120Vac	13Vdc, 120Vac	13.6Vdc, 120/240Vac
Metering	AF, RF, Vdc	AF, RF, V	AF, RF, V	AF, RF, V	AF, RF, Vdc
displayed on	Meter	LEDs, meter	LEDs, meter	LEDs, meter	LEDs, Meters
Reader Service No.	1434	1435	1436	1437	1438

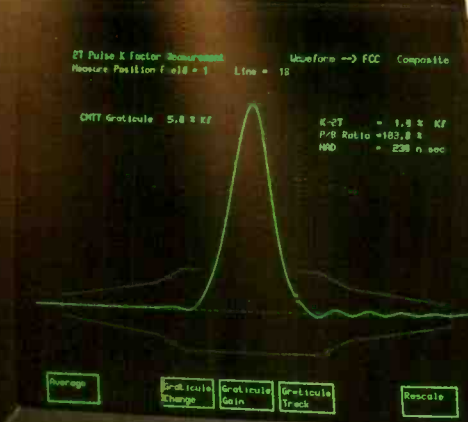
Digital Audio Workstations

Manufacturer	AKG Acoustics	AMS Industries	Digital Audio Research	For-A	Fougerolle Video
Model	DSE 7000	AudioFile	Sound Station II/VPP	Sirius—100	Daisy
System architecture	Open-ended, Ring	Open-ended, Ring	Open-ended, Star	Closed, No network	....., No network
Disk type, access	HD, Random	RHD, continuous	HD, Optical, random	HD	HD, continuous
Simultaneous outputs	8, 8 cues	8, 8 cues	8, 4-8 cues	8	12 tr, multi cues
Storage/channel/track	1 hr	> hours	> hours	16 hours	12 hr 32kHz
Digital output speed	2x	8x	4x mono	Real time	.....
Archiving, backup	Streaming tape	RCM, R-DAT	R-DAT, optical	Streaming tape	RHD
Control surface	Custom keyboard	Custom keyboard	Touch screen, console	Custom keyboard	Keyboard
Operations display	HR color CRT	HR color CRT	Gas Plasma	Dot-matrix display	Color CRT
Digital interfaces	AES/EBU	AES/EBU/R-DAT/3324 P	AES/EBU, 1610/1630	.....	EBU/AES
Time references	SMPTE/EBU	CMF1/601/701 1610/30	SMPTE/EBU	No	LTC, VITC
Lockup speed	N.A.	SMPTE/EBU	<1s	DNA	.....
Time compression	N.A.	1s	Real time	.....	Yes
Level, pan, balance	Real time	Real time	In edit decision list	.....	Yes
Variable speed (range)	0-8x normal	50-200%	In real time	.....	Yes
Scrub, waveform edits	Yes, No	Yes, Yes	0-4x	.....	Yes
DC offset removal	Yes	Yes, Yes	Yes,	No, No	Yes, Yes
Auto dialog replacement	Yes	Yes	Yes	Yes	Yes
Project "Reels"	Yes	Yes	No	No	Yes
Segment time modification	No	Yes	Yes	No	.....
Dynamic range	92dB	96dB	108dB	.....	16-bit PCM
AF response (±dB, Hz-kHz)	±1dB 20-20k	0.5dB 20-20k	±0.25dB 20-20k	±0.75dB 20-15k	≥ 16kHz
THD, IMD	0.005%, 0.005%	0.03%	<0.03%	0.15%	N.A.
Phase error	≤ 4°	.....	±15s 20-20k	5°	.....
Channel separation	90dB	< -90dB	> 80dB 8kHz	80dB	.....
Reader Service No.	1221	1222	1223	1224	1225

Manufacturer	Lexicon	New England Digital		Solid State Logic	Symetrix
Model	OPUS (OPUSe)	PostPro	Direct-to-Disk	D1 Production Centre	DPR-100
System architecture	Open-ended, Star	Open-ended, Star	Open-ended, Star	Closed	Open-ended
Disk type, access	FHD, random	HD, Optical, random	HD, Optical, random	HD, random	....., Random
Simultaneous outputs	8, 8 cues	16, 4 cues	16, 4 cues	3 stereo	8,
Storage/channel/track	> 6 hr	2 hr	2 hr	2 hrs	1 hr
Digital output speed	Twice speed	Real time	Real time	Real time	2x speed
Archiving, backup	8mm	Streaming tape	Streaming tape	8mm, SCSI port	8mm
Control surface	Console/keyboard	Custom, PC, Rmt Box	Custom KB/PC/RmtBox	Custom, mixer/editor	PC keyboard
Operations display	Monochrome CRT1	Color CRT	Color	LCD EL screen	HR CRT
Digital interfaces	AES/EBU, R-DAT, 1610 1630, 3324	AES/EBU, 1610/1630	AES/EBU 1610/1630	AES/EBU	AES/EBU, R-DAT
Time references	SMPTE/EBU	SMPTE/EBU, MIDI	SMPTE/EBU, MIDI	SMPTE/EBU	SMPTE/EBU, MIDI, VITC
Lockup speed	3s	5ms	5ms	1s	.....
Time compression	Real time	To new file	To new file	.....	To new file
Level, pan, balance	Real time	.....	.....	Real time	Real time
Variable speed (range)	0-2x	.....	.....	.....	.....
Scrub, waveform edits	Yes, Yes	Yes, Yes	Yes, Yes	Yes, No	Yes, Yes
DC offset removal	Yes	Yes	Yes	Yes	.....
Auto dialog replacement	Yes	No	No	No	No
Project "Reels"	Yes	Yes	Yes	Yes	Yes
Segment time modification	Yes	Yes	Yes	Yes	Yes
Dynamic range	≥ 98dB	96dB	96dB	84dB	85dB
AF response (±dB, Hz-kHz)	-0.5dB, 0.25dB 20-20k	0.5dB 20-20k	0.5dB 20-20k	±0.5dB 20-20k	.....
THD, IMD	0.007%, 0.03%	0.02%, 4dBm	<0.02%, 4dBm	0.04%	.....
Phase error	±4µs	0° error	None	5° 20kHz	.....
Channel separation	> 86dB	< -80dB 20-20k	< -80dB min 20-20k	80dB	.....
Reader Service No.	1226	1227	1228	1229	1230

Tek does it again!

A second Emmy, recognizing our contributions to digital excellence in professional broadcast monitors, is just one more reason to rely on Tektronix for the best measure of quality, value and behind-the-scenes excellence in television technology. We're committed to it.



1987-1988 OUTSTANDING ACHIEVEMENT IN ENGINEERING DEVELOPMENT
TEKTRONIX INC.
IN RECOGNITION OF THEIR ENGINEERING CONTRIBUTION AND
DEVELOPMENT OF SYSTEMS USING DIGITAL INTELLIGENCE TO MEASURE
MONITOR AND RECORD DISTORTIONS IN A TELEVISION SIGNAL

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COMMITTED TO EXCELLENCE

Circle (130) on Reply Card

TRANSMITTER/TEST &
MEASURING SPECS

PERFECT MATCH

FOR COMPONENT/NTSC SYSTEMS

With the introduction of the new WFM300A Component/Composite Waveform Monitor and TSG-370 Component/NTSC Generator, Tek has the ideal combination, ideally priced, for operation and maintenance requirements of mixed-format television.

X Y mode is useful for stereo audio phase measurements.

You can monitor composite waveforms with the WFM300A and display composite vectors on a companion 1720 Vectorscope.

Tek's 1700F05 Dual Rack-mount use offers adjustable mounting depths.

Vector center dot clamping makes it easy to detect residual subcarrier on a signal.

The 1720 is precalibrated for 100%/75% color bars.

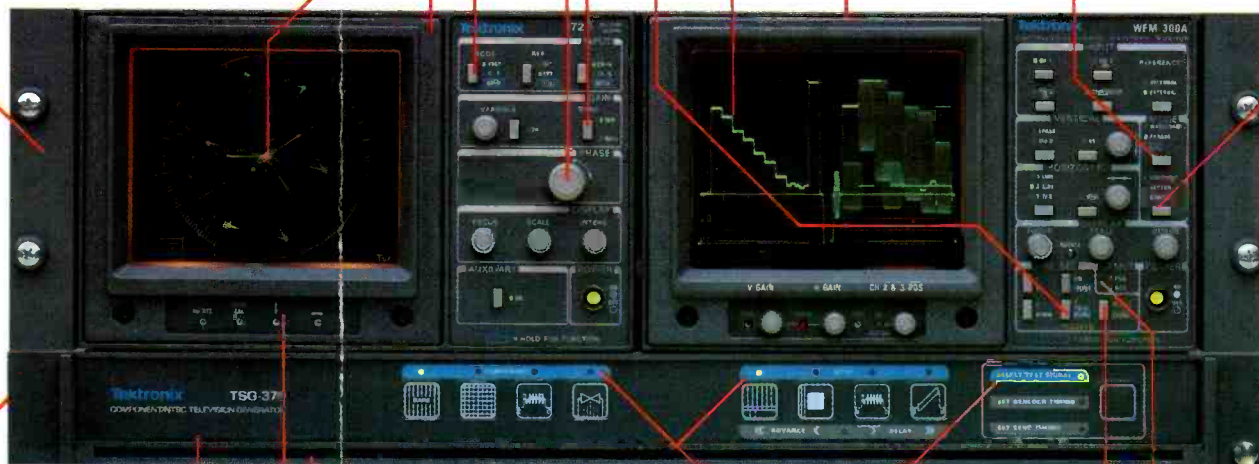
Precision phase control permits excellent resolution around a full 360 degrees.

On-screen menus are used to select electronic graticules for different component formats and 525/60 or 625/50 line/field rates.

The WFM300A offers separate GBR and composite picture monitor outputs.

Tek's innovative Lighting display allows monitoring of important component parameters using conventional color bars.

Bowtie mode uses the TSG-370's Bowtie timing test signal to ensure precise system timing.



The TSG-370 provides six component and five composite test signals to satisfy routine equipment setup and maintenance requirements.

R-Y output is included for differential phase measurements.

Six black burst outputs, a comp sync and comp blanking output are provided for equipment synchronization.

The new TSG-370 has completely independent component and composite test signal generators. Both use 10-bit signal generation in all channels.

The TSG-370 is available in Betacam®/NTSC and MII/NTSC versions.

Full color genlock simplifies integration of the TSG-370 into an existing system.

Front panel user recalls promote fast, efficient operation.

Color gamut violation indication is given if limits are exceeded.



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RF transmission & Test/measurement equipment

AM/SW Radio Transmitters

These transmitters use amplitude modulation for use in the Broadcast Band (550-1650kHz) or on International Broadcast frequencies in the spectrum of 3-30MHz. Systems not using a solid-state IPA design are noted with a dagger (†). Models requiring a separate power supply are marked with a double dagger (‡). Auto recycling is standard on models rated more than 1kW. A 50Ω monitoring connection is available on all systems.

Manufacturer	CCA Electronics			Continental Electronics/Varian		
Model	High power series† ¹	AM5000D(10000D)	XL-301	4180-2†‡	419F-2 (420B)†‡	316F-1
Band of service	Broadcast	Broadcast	Broadcast	Shortwave	Shortwave	Broadcast
RF output	to 55kW	5kW (10kW)	1kW	100kW	250kW (500kW)	10kW
RF output connection	.....	.....	L/C, type N	6" 75Ω/300Ω	9" 75Ω/300Ω	1 1/2"
Carrier stability	5Hz	5Hz	±5Hz	±1×10 ⁶ Hz	±1×10 ⁶ Hz	±5Hz
Carrier shift	.....	.....	0.5% 100% mod	<5%	<5%	<2% 100% mod
Modulation maximum	100%	100%	125%	100%	100%	125%
Audio input connection	Bal 600Ω	600Ω	Act bal	Bal/Unbal	Bal/Unbal	Act bal
Audio response	1.5dB 50-10k	1dB 50-7.5k	±1dB 20-12k	±1dB 50-7.5k	±1dB 50-7.5k	1.5dB 10-15k
Audio distortion	<3%, 95% mod	<3% 95% mod	<2% 100%	<3% 95%	<3% 95% (<4%)	<3% 100% 50-10k
AM noise figure	-55dB	-60dB	<-60dB unwt'd	<-60dB unwt'd	<-55dB unwt'd	<-60dB unwt'd
Final amplifier device	4CX15000-4CX35000	3CX2500F3(10000A)	Solid-state	4CV100000C	4CV250000B ²	4CX15000A
Modulation final device	Varies	Various	Solid-state	2-4CV100000C	2-4CV250000B ²	Solid-state
Input AC power	460V 3φ	208V 3φ (230-380)	180-250V 1φ	480V 3φ	480V 3φ (4160V)	208/230V 3φ
Power consumption	to 140kVA	13.5kW (27kW)	2.6kWWW	275kVA	625kVA (1075kVA)	28.4kW
Power factor	.....	.....	.....	0.9	0.9	0.93
System efficiency	.....	.....	>57%	>55%	60% (70%)	53%
Applicable for stereo	.....	.....	Yes	No	No	Yes
Fault logic	.....	.....	Digital, relay	Relay	Relay (μP system)	Relay
Fault diagnosis	.....	.....	Option	No	No	No
Floor space required	.....	.....	69H×22W×26D"	20m×2	35m×2 (42m×2)	78H×67W×26D"
Reader Service No.	1394	1395	1396	1397	1398	1399

¹ Some models may include a tube-type IPA driver. ² 420B uses 4CM400000C tubes in PA and modulator final.

Manufacturer	Continental Electronics		CSI	Harris/Broadcast Division		
Model	315-R1†	317C-3†	T-1-A1 (10A1) series	DX-series	SW-B series†	SX-A series
Band of service	Broadcast	Broadcast	Broadcast	Broadcast	Shortwave	Broadcast
RF output	5kW	50kW	1kW to 10kW	50kW (25, 10kW)	100kW (50kW)	5kW (2.5, 1)
RF output connection	1 1/2"	3 1/2"	Various	3 1/2" 50Ω (3 1/2, 1 1/2)	Stud 300Ω bal	7/8" 50Ω (Type N)
Carrier stability	±5Hz	±5Hz	5Hz	±10Hz	±1×10 ⁶ Hz	±10Hz
Carrier shift	<2%	<2%	.....	<1%	<2% 98% mod	<2%
Modulation maximum	125%	125%	.....	145%	100%	125%
Audio input connection	Act bal	Act bal	600Ω	50/150/600Ω bal	600Ω bal	600Ω bal
Audio response	±1dB 20-7.5k	±0.5dB 20-7.5k	±1.5dB 50-10k	-0.9...0.1dB 30-10k	±1.5dB 50-10k	-1,+0.5dB 20-10k
Audio distortion	<2% 100%	<2% 100%	<2.5% 95% mod	<1% 95% mod	<3% 95% mod	<1% 95%
AM noise figure	<-60dB unwt'd	<-60dB unwt'd	-55dB	-55dB	55dB	<60dB
Final amplifier device	3CX3000F7	4CX35000C	7527A-3CX10000A	MOSFET	4CV100000E/P	MOSFET
Modulation final device	3CX3000F7	3CX3000A	.....	Digital	4CV100000E/P	MOSFET
Input AC power	208-250V 3φ	460V 3φ	Per power level	480V 3φ (240V)	480V 3φ	240V 3φ (1φ)
Power consumption	12.8kVA	118kVA	3.75kW-27kW	88kW (44kW, 17kW)	250kW (130kW)	11.6kW (5.8, 2.2)
Power factor	0.95	.....	.....	0.98	0.95	0.95
System efficiency	>55%	60%	.....	85%	55%	>65%
Applicable for stereo	Yes	Yes	.....	Yes	No	Yes
Fault logic	Relay	Relay	.....	Solid-state	Relay	Solid-state
Fault diagnosis	No	No	.....	Yes	Yes	Yes
Floor space required	69H×35W×34"	78H×144W×54"	.....	33×120(×120,×72")	4.5'×12'	30×28"
Reader Service No.	1400	1401	1402	1403	1404	1405

Manufacturer	ITAME			LPB Inc	Marconi Communications	
Model	TAURO S series†	TAURO S series†	TAURO S series†	AM-100P(-5/-30P-60P)	B6138 (6131, 6125)	B6040
Band of service	Broadcast	Broadcast	Broadcast	Broadcast	Shortwave	Broadcast
RF output	2kW (500W-1kW-1.5kW)	5kW (3kW)	10kW (7kW)	100W/5/30/60	500kW (250k, 300k)	10kW
RF output connection	LC 50Ω	LC 50Ω	1 1/2" 50Ω	SO-239 UHF 50Ω	300Ω bal	Coax cable
Carrier stability	5Hz	5Hz	5Hz	±10Hz	< 1 ppm/year	±10Hz
Carrier shift	<3%	<3%	<3%	<2%	<5%	<5%
Modulation maximum	160% PDM	160% PDM	160% PDM	+125%	100%	100%
Audio input connection	Bal 600Ω	Bal 600Ω	Bal 600Ω	600Ω	Bal 600Ω	Bal 600Ω
Audio response	±1dB 20-10k	±1dB 20-10k	±1dB 20-10k	±1.0dB 20-15k	±1dB 50-6k	±1dB 50-6k
Audio distortion	2%, 99%	2%, 99% mod	2%, 99% mod	<2%, 95% mod	4%, 90% mod	3%, 90% mod
AM noise figure	-60dB	-60dB	-60dB	55dB	<-56dB	-55dB
Final amplifier device	3CX1200A7	3CX3000A7	3CX10000A7	Solid-state	TH 558 (TH 537)	2 4CX5000A
Modulation final device	3CX1200A7	3CX3000A7	4CX15000A	Solid-state	TH 537 (TH 555)	.....
Input AC power	220/380V	220/380V	220/380V	117V 1φ	11kV 3φ	380/415V 3φ
Power consumption	5.5kVA	13.5kVA	23.5kVA	400W (45/150/250)	.....	30kVA

Output impedance/connector	50Ω, Type N	50Ω, type N	50Ω BNC	50Ω Type N	50Ω, N, 7/8"	50Ω, Type C
Harmonic/spurious suppression	73dB, 90dB	70dB, 70dB	≤1mW, ≤1μW	per FCC/CCIR	≤75dB, 80dB	≥70dB H, 95dB S
Frequency stability	±200Hz	±300Hz	.....	±500Hz	±40Hz	±300Hz
Frequency control	PLL/100kHz	PLL/100kHz	PLL	PLL/100kHz	Xtal	PLL/1kHz
Modulation capability	±200kHz	±150kHz	±100%	Per FCC/CCIR	±130kHz	±100kHz dev
Modulation indication	Meter std	Meter	Meter	Meter	Meter, LCD	Digital display
AF response (mono)	±0.5dB 50-15k	±0.5dB 30-15k	±0.25dB 40-15k	±0.5dB 30-15k	±0.2 40-43k	±0.5dB 30-15k
Amplitude response (composite)	±0.01dB 30-75k	±0.01dB 30-75k	±0.3dB to 100k	±0.8dB 30-100k	±0.3 40-75k	±0.2dB 30-75k
Phase response	±0.1° 30-75k	±0.1° 30-75k	.....	.....	.....	.....
THD/IMD/TIM	0.025/0.25/0.25%	0.25/...../.....%	.....	< 0.3/0.05/0/1%	0.4/0.2/.....%	0.3/0.7/.....%
FM noise (mono/stereo)	-70dB/-75dB	-70dB	≤-68dB ±40kHz dev	70dB below ±75kHz	70dB below ±40kHz	68dB/66dB ±40kHz
FM noise (composite)	70dB	-70dB	.....	70dB below ±75kHz	64dB below ±40kHz	66dB
Stereo separation	60dB	.....	Integral (GC003)	> 40dB	< 55dB	46dB
Reader Service No.	1352	1353	1354	1355	1356	1357

Manufacturer	TELEFUNKEN Sendertechnik	Television Technology Corporation	Thomson-LGT	Varian TVT Ltd	Vector Technology
Exciter model	S2333	8090X	Emetteur 30W†	1248/13 stereo	FMT-03
Power output range	2-20W	to 30W	3-30W	4-15W	8W-30W
Output impedance/connector	50Ω, Type C	50Ω Type N	50Ω, Type N	50Ω Type TNC	50Ω, Type N
Harmonic/spurious suppression	≥70dB, 95dB	>80dB, >80dB	≥80dB, 90dB	≤-60dB, -70dB	≤70dB
Frequency stability	±300Hz	±100Hz	±200Hz	±150Hz	±100Hz
Frequency control	PLL/1kHz	PLL/2.5kHz	PPL/10kHz	PPL/50kHz	PLL/2.5kHz
Modulation capability	±100kHz dev	±150kHz	±150kHz dev	±150kHz	±200kHz
Modulation indication	Digital display	LED ladder	LCD display	Meter	Meter
AF response (mono)	±0.5dB 30-15k	±0.5dB 25-15k	±0.2dB 40-15k	±0.5dB 30Hz-15kHz	±0.2dB 30-15k
Amplitude response (composite)	±0.3dB 30-75k	±0.5dB 25-100k	±0.5dB 10-75k	±0.5dB 30Hz-100kHz	±0.2dB 30-100k
Phase response	.....	.....	.....	±3°	.....
THD/IMD/TIM	0.3/0.1/.....%	0.5/0.5/0.5%	0.3/...../.....%	0.3/0.3/.....%	0.2/0.15/.....%
FM noise (mono/stereo)	68dB/66dB	80dB/.....	80dB/74dB	-75dB/-72dB	-80dB/.....
FM noise (composite)	66dB	80dB	.....	-75dB ref ±75kHz dev	.....
Stereo separation	46dB	.....	50dB (100Hz-10kHz)	40dB	50dB
Reader Service No.	1358	1359	1360	1361	1363

FM broadcast power amplifiers

Units listed generally are greater than 1kW output rating. If models rated at lesser powers are available, a foot note indicates available levels.

Manufacturer	Broadcast Electronics	CCA Electronics	Continental Electronics/Varian
Transmitter model	FM-60B (-70B) ¹	FM-5B (-5B/S) ²	FM-10B (-20B)
Applicable exciter	FX-50	FX-50	FX-50
Rated output power	15-60kW (20-70kW)	2.5-5.5kW	4.5-11kW (7.5-22)
PA output device	2-4CX20000A	4CX3500A	4CX7500A(-12000A)
PA circuit type	Grid-driven	Grid driven	Grid-driven
RF output connection	6 1/8" EIA	3 1/8" EIA	3 1/8" EIA
IPA device	Solid-state	Solid-state	Solid-state
Asynchronous AM S/N	55dB w/o mod	55dB w/o FM mod	55dB w/o mod
Synchronous AM S/N	50dB 1kHz ±75kHz	40dB ±75kHz 1kHz	45(50)dB 1kHz ±75kHz
Harmonic spurious suppression	per FCC/DOC/CCIR	per FCC/DOC/CCIR	per FCC/DOC/CCIR
Floor space WxD	56.5x31.5"	34.5x37.25"	33.7x37.2" ³
Typical power input	208/240Vac 3φ	208/240Vac 3φ (1φ)	208/240Vac 3φ
Typical power factor	0.94	0.92 (0.98)	0.94 (0.97)
Power consumption	91kW (106kW)	8.3kW (9.6kW)	15.8kW (30kW)
μP diagnostics	Option	Option	Option
Integral harmonic filter	Yes	Yes	Yes
Automatic power control	Yes	Yes	Yes
Integral remote control	Option	Option	Option
Automatic modulation control	No	No	No
Reader Service No.	1364	1365	1366

¹ These 60kW and 70kW transmitters are dual configurations of the FM-30B and FM-35B, respectively, with power consumption of the dual configuration slightly more than that of the single 30kW and 35kW systems. Floor space required for each is approximately the same, including separate power supplies. Specifications beyond power level and power requirements are essential identical for all four systems. ² Similar models include the FM-3.5B 3.5kW, FM-1.5B 1.5kW and FM-1B and 1kW systems. Another similar series using total solid-state designs includes FM-300B, 90-400W; FM-250B, 250W; and FM-100B, 100W. Technical Specifications beyond power level differences are identical. ³ A separate power supply requires 22.7x37.2". Space requirements for Model FM-20B is 50.5x31.5" with 28.5x31.5" power supply. ⁴ Model FM-500G has similar characteristics for LPPM and is rated 200-600W.

Manufacturer	Continental Electronics/div of Varian	Energy-Onix
Transmitter model	817A	816R-5B (817R-5B)
Applicable exciter	802A	802A
Rated output power	60kW	35kW (70kW)
PA output device	4CX40000G	9019/YC130 (Dual)
PA circuit type	Grounded screen	Grounded screen
RF output connection	6 1/8"	3 1/8" (6 1/8")
IPA device	Solid-state	Solid-state
Asynchronous AM S/N	55dB	55dB
Synchronous AM S/N	40dB	40dB
Harmonic spurious suppression	-80dB	-80dB
Floor space WxD	128x40"	72x28" (160x28")
Typical power input	250Vac 3φ	250Vac 3φ
Typical power factor	> 0.95	> 0.92
Power consumption	99kVA	57kVA (114kVA)
μP diagnostics	No	No
Integral harmonic filter	Yes	Yes
Automatic power control	Yes	Yes
Integral remote control	Yes	Yes
Automatic modulation control	.....	.....
Reader Service No.	1370	1371

⁵ Other members of this series includes: 816-3 25kW; 816-4 27.5kW; 817R-1 50kW; 817R-4 55kW. ⁶ The series also includes models MK-5.5 5.5kW, MK-3.5 3.5kW and MK-1.5 1.5kW. ⁷ Series includes SST-100 0.1kW; SST-300 0.3kW.

Manufacturer	Harris/Broadcast Division	ITAME	QEI Corporation
Transmitter model	HT 20FM (HT 25FM) ⁵	100BT, 300BT Europa	FMQ-30000
Applicable exciter	THE-1	Integrated	675 Std (695 Opt)

Rated output power	20 (25)kW	800 to 10kW	0.1kW, 0.3kW	10kW/30kW	1kW/3kW/5kW	30kW
PA output device	8990 tetrode	4CX3500A/4CX7500A	Solid-state	4CX7500A/20000C	4CX1000A/3500A/5000A	3CX15000A7
PA circuit type	Grounded cathode ⁹	Grounded cathode ⁹	.....	.....	.....	Grounded-grid
RF output connection	3 1/8"	1 1/8"/3 1/8"	Type N	1 1/8"/3 1/8"	LC1 1/8"/1 1/8"	3 1/8"
IPA device	SS w/FlexPatch	Solid-state	Solid-state	Solid-state	Solid-state	3CX3000A7
Asynchronous AM S/N	55dB	55dB	55dB	55dB below carrier	55dB below carrier	55dB
Synchronous AM S/N	50dB	50dB	40dB	40dB below carrier	40dB below carrier	53dB
Harmonic spurious suppression	> 80dB, >80dB	> 80dB, >80dB	80dB, 80dB	80dB, 80dB	80dB, 80dB	80dB, 90dB
Floor space WxD	34x31"	33x44"	34x40cm	115x98cm	79x85cm-115x98cm	72x30"
Typical power input	195-250Vac 3φ	197-250Vac 1-3φ	220Vac 1φ	220-380Vac 3φ	220/380Vac 3φ	208-240Vac 3φ
Typical power factor	0.95 3φ	0.85 1φ/0.95 3φ	.....	0.98	0.98	> 0.94
Power consumption	46kW (52kW)	7/9/13/17kW	0.22kW, 0.65kW	17.5kW, 43kW	2.5kW/7kW/9.8kW	50kW
μP diagnostics	Yes	No	No	No	No	Opt
Integral harmonic filter	No	3.5/5 int, 7.5/10 ex	Yes	Yes	Yes	N.A.
Automatic power control	No	Yes	No	Yes	Yes	Std
Integral remote control	No	No	No	Yes	Yes	Opt
Automatic modulation control	No	No	No	No	No	Std
Reader Service No.	1376	1377	1378	1379	1380	1381

Manufacturer	QEI Corporation	Rohde & Schwarz	TELEFUNKEN Sendertechnik GmbH
Transmitter model	FMQ-10000	FMQ-5000	NU series
Applicable exciter	675 Std (695 Opt)	675 Std (695 opt)	SU115 ¹¹ , SU 155 R2
Rated output power	10kW	5.5kW	100W-20kW
PA output device	YU-148	3CX3000A7	SS-RS2024CL tetrode
PA circuit type	Grounded-grid	Grounded grid	Parallel modules
RF output connection	1 1/8"	1 1/8"	BNC-air ² 1/8"
IPA device	Solid-state	Solid-state	Solid-state
Asynchronous AM S/N	55dB	55dB	.....
Synchronous AM S/N	55dB	55dB	.....
Harmonic spurious suppression	80dB, 90dB	90dB, 90dB	.....
Floor space WxD	24x30"	24x30"	to 1.8m x 2.5m
Typical power input	208-240Vac (3φ opt)	208/240Vac 3φ opt	110-380Vac 1-3φ
Typical power factor	> 0.94	> 0.94	> 0.8 > 0.95
Power consumption	17kW	9.4kW	240W-40kW
μP diagnostics	Opt	Opt	Yes
Integral harmonic filter	Std	Std	Yes
Automatic power control	Std	Std	Yes
Integral remote control	Opt	Opt	Yes
Automatic modulation control	Std	Opt	Yes
Reader Service No.	1382	1383	1384

¹¹ Integral stereocoder with SU 115 exciter. ¹² Models S3169, -75, 085 and -68 cover a range of 0.5-3kW and are prepared for 1φ or 3φ 220Vac power source, per customer request. They differ in that 0.5kW solid-state modules are used in the amplifier.

Manufacturer	Television Technology Corporation	Thomson-LGT	Varian TVT Ltd	Vector Technology
Transmitter model	FMS-8000 (-4000) ¹³	FM-2500J ¹⁴	Emetteur 10kW	FMT-40 (FMT-30) ¹⁵
Applicable exciter	8090X	8090X	Emetteur 30W	FMT-03
Rated output power	8kW (4kW)	25kW	10kW	42kW (30kW)
PA output device	MRF151G	4CX15000A	MOSFET	YL1530 (3CX10000A7)
PA circuit type	Solid-state	Grounded grid	Solid-state	Grnd-screen &(grid)
RF output connection	1 1/8"	3 1/8"	.....	3 1/8"
IPA device	Solid-state	4CX250B	MOSFET	SS (5CX1500A/B)
Asynchronous AM S/N	70dB	60dB	-50dB @ 100% mod	-60dB
Synchronous AM S/N	60dB	60dB	-40dB @ 100% mod	.....
Harmonic spurious suppression	70dB, 70dB	70dB, 70dB	80dB, 90dB	-80dB
Floor space WxD	46x31"	24.5x38/30.5x48"	7.2x0.8m	38x34"
Typical power input	240Vac 1φ	240Vac 3φ	.....	480Vac (230Vac) 3φ
Typical power factor	.....	.....	0.9	0.9
Power consumption	13kW (6.5kW)	38kW	20kW	75kW (66kW)
μP diagnostics	.....	No	No	No
Integral harmonic filter	Yes	No	Yes	No
Automatic power control	Yes	No	Yes	Yes
Integral remote control	Yes	No	Yes	Yes
Automatic modulation control	No	No	No	No
Reader Service No.	1388	1389	1390	1392

¹³ Similar models FMS-2000/FMS-1000 rated for 2kW/1kW output, respectively. ¹⁴ The interim power level of 11kW is served model FM-10000J, based on a 4CX11000D tetrode. ¹⁵ Transmitters of similar design include 1237, rated 0.3kW and 1238, rated 0.5kW. Model 1248 at 1kW serves as an exciter for the higher power systems and uses model 1239 as its exciter. ¹⁶ Models FMT-20, 22kW and FMT-25, 27.5kW are of similar design based on the 3CX10000A7 triode with a 5CX1500A/B driver. FMT-20 available in 1φ version. ¹⁷ Model FMT-12, rated 13kW, uses a YL-148 device with similar operational performance.

VHF Television Transmitters

Manufacturer	Acrodyne Industries	Harris/Broadcast Division	LDL/LARCAN
Model	TR series	TV-30H/35H/60H ¹	TTSS5M/TTSS10M
Frequency band	VHF Lo/Hi CCIR I/III	VHF-Lo CCIR I	CCIR I/III
Visual peak power	30kW (20, 10, 5)	30kW (60kW)	5kW (10kW)
Carrier level regulation	3%	2%	2%
Modulation capability	3%	0%	0%
Response vs brightness	±0.75dB	±0.75dB	±0.75dB
Low frequency linearity	0.45dB	< 1dB	0.5dB
ICPM, uncorrected	±2°	±1.5° corrected	±1°
Diff phase, gain	±1.5°, 3%	1°, 3%	±1°, ±3%
S/N ratio	1%	55dB	55dB
K factor for 2T, 12.5T	2%, 5%	1%, 3%	1%, 3%
Harmonics below visual	-60dB	-80dB	-80dB
Visual PA VHF	Tetrode	9007 tetrode	MOSFET SS
Aural output power	10% of visual	6kW (12kW)	500W (1kW)
Carrier deviation	100kHz	±120kHz	±200kHz
Audio response	±0.1dB 50-50k	±0.5dB 30-15k	±0.5dB
Applicable to stereo	BTSC	BTSC	BTSC ³
Harmonic distortion	0.5%	0.5%	0.05%
AM, FM noise	-50dB, -60dB	-55dB, -60dB	-60dB, -62dB

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Aural PA VHF	Common to visual	3CX10000A7 triode	8807 tetrode	Solid-state	MOSFET SS
Cooling system	Forced air	Forced air	Forced air	Forced air	Forced air
Input AC power	208Vac	208-240/380/415Vac3 [‡]	208-240/380/415Vac3 [‡]	208, 380/415Vac 3 [‡]	380-440Vac 3 [‡]
Power consumption	68kVA (39, 31, 21)	60kVA (132 kVA)	61kVA (78, 107)	60kVA (per model)	9.5kW (17.5kW)
Reader Service No.	1303	1304	1305	1306	1307

¹ Dual configurations rated 60, 70, 100kW also available. ² 20% aural option. ³ European stereo on request.

Manufacturer	LDL Communications/LARCAN		Marconi Communications	NEC	America
Model	TTS22M/TTP44M	TTS30M/TTP60M	B7530 series	PCN-1435 AH/I	PCN-1430 AL/I
Frequency band	VHF	VHF	VHF Hi-band CCIR III	VHF Hi CCIR III	VHF Lo CCIR I
Visual peak power	22kW (44kW)	30kW (60kW)	1kW (30kW)	35kW (5-50kW)	30kW (from 5kW)
Carrier level regulation	2%	2%	±1%	2%	2%
Modulation capability	0%	0%	3%	0%	0%
Response vs brightness	±0.75dB	±0.75dB	±0.5dB	±0.5dB	±0.5dB
Low frequency linearity	0.5dB	0.5dB	90%	...	...
ICPM, uncorrected	±1°	±1°	±4°	±3°	±3°
Diff phase, gain	±1° ±3%	±1° ±3%	±3° 0.95dB	±3° ±3%	±3° ±3%
S/N ratio	55dB	55dB	60dB	> 50dB	> 50dB
K factor for 2T, 12.5T	1%, 3%	1%, 3%	2% for 2T	1.5%	1.5%
Harmonics below visual	-80dB	-80dB	60dB	-60dB	-60dB
Visual PA VHF	MOSFET SS	MOSFET SS	SS-1kW(tetrode 30kW)	Tetrode	Tetrode
Aural output power	2.2kW (4.4kW)	3kW (6kW)	0.1kW (3kW)	3.5kW (10%)	3kW (10%)
Carrier deviation	±200kHz	±200kHz	±50kHz	±100kHz	±100kHz
Audio response	±0.5dB	±0.5dB	±1dB 30-15k	±0.5dB	±0.5dB
Applicable to stereo	BTSC	BTSC	BTSC or European	BTSC	BTSC
Harmonic distortion	0.05%	0.05%	0.5%	0.5%	0.5%
AM, FM noise	-60dB, -62dB	-60dB, -62dB	-50dB, -60dB	-50dB, -60dB	-50dB, -60dB
Aural PA VHF	MOSFET SS	MOSFET SS	SS-1kW (tetrode)	Solid-state	Solid-state
Cooling system	Forced air	Forced air	Forced air	Forced air	Forced air
Input AC power	208-242Vac 3 [‡]	208-242Vac 3 [‡]	380-415Vac 3 [‡]	240Vac	240Vac
Power consumption	36kW (80kW)	55kW (120kW)	4.9kW (59.5kW)	70kW	60kW black
Reader Service No.	1308	1309	1310	1311	1312

Manufacturer	PESA	Rohde & Schwarz	Television Technology Corporation	Thomson-LGT	Toshiba Corporation
Model	TT5000 VHF series	NT VHF series	XL 1000 MV	EVHF1000/50001	Series 2000
Frequency band	CCIR I/III	VHF CCIR III	VHF/CCIR I-III	VHF Hi/Lo CCIR I-III	VHF CCIR I, III
Visual peak power	1W-20W	100W-20kW	1kW	1kW/5kW ⁴	To 64kW
Carrier level regulation	±1%	±0.3dB	3%	...	±2%
Modulation capability	1% of sync	>75%	2%	...	12.5%±2%
Response vs brightness	<5%	<0.3dB	1dB	...	<10%
Low frequency linearity	<5%	...	0.8dB	5%	<2%
ICPM, uncorrected	...	...	3°	<3°	±3%
Diff phase, gain	<±3°, <5%	±3°, 5%	4°, 5%	±3°, 95%	±3%, ±5% 10-90%
S/N ratio	>60dB	>63dB	>55dB	...	>50dB
K factor for 2T, 12.5T	2%	<2% 20T	2%, 2%	±1.5%	<1.5%
Harmonics below visual	-60dB	±-60dB	-65dB	-60dB	<-60dB 1mW max
Visual PA VHF	SS and tube types	Adjustable	Solid-state	Solid-state	RF MOSFET array
Aural output power	Adjustable	1/10-1/20 visual	5% of visual	0.1kW, 0.5kW ⁵	10%, 20% visual
Carrier deviation	±25kHz, ±50kHz	±50kHz	±25kHz	50kHz	±100kHz
Audio response	±1dB 30-15k	±0.3dB to 60kHz	1dB 30-a5k	±0.5dB 40-20k	±0.5dB 30-15k
Applicable to stereo	Dual carrier	Dual carrier	BTSC	BTSC or European	BTSC
Harmonic distortion	±1% 30-15k	±0.4% ±50kHz	1%	0.5%	<0.5% 30-15k
AM, FM noise	-55dB, 52dB unwt'd	±46dB, ±56dB unwt'd	-55dB, -55dB	>50dB, >60dB	>50dB, >60dB
Aural PA VHF	SS and tube types	SS or tetrode	Solid-state	Solid-state	RF MOSFET array
Cooling system	Forced air	Per PA type	Forced air	Forced air	Forced air
Input AC power	Output dependent	220-380Vac 3 [‡]	240Vac	380Vac or 208Vac	220Vac 3 [‡]
Power consumption	Output dependent	1kVA-52kVA	1.98kVA	6.5kVA (9.5kVA ⁶)	...
Reader Service No.	1313	1314	1315	1316	1317

⁴ Additional model ratings: EVHF-10000, 10kW; EVHF-20000, 20kW. ⁵ 1kW, 2kW on 10kW and 20kW visual power systems. ⁶ 19kVA, 40kVA for 10kW and 20kW visual power units, all referred to a 50% APL.

UHF Television Transmitters

Manufacturer	Acrodyne Industries	Comark Communications
Model	TL series	TRU/1000
Visual peak power	1kW (100W)	1kW
Carrier level regulation	3%	3%
Modulation capability	3%	97%
Response vs brightness	±0.75dB	±0.75dB
Low frequency linearity	0.45dB	0.45dB
ICPM, uncorrected	±2°	±2°
Diff phase, gain	±1.5° 5%	±1.5° 3%
S/N ratio	1%	1%
K factor for 2T, 12.5T	3%	2%, 5%
Harmonics below visual	-60dB	-60dB
Visual PA UHF	Solid-state	Solid-state
Aural output power	10% of visual	100@
Carrier deviation	100kHz	100kHz
Audio response	±0.1dB 50-50k	±0.1dB 50-50k
Applicable to stereo	BTSC	BTSC
Harmonic distortion	1%	0.5%
AM, FM noise	-50dB, -60dB	-50dB, -60dB
Aural PA UHF	Solid-state	Solid-state
Cooling system	Forced air	Forced air
Input AC power	120Vac (120/230)	230Vac
Power consumption	4.4kVA (1.2kVA)	4.4kVA
Reader Service No.	1318	1320

Manufacturer	Harris/Broadcast Division	Information Transmission System	Marconi Communications
Model	TV-60UX (120/240)	TV-60UM (120/240)	ITS-230
			ITS-242(-235)
			ITS-220
			B7540 series

Visual peak power	60KW (120, 240)	60KW (120, 240)	1kW	10kW (5kW)	100W	10kW to 60kW
Carrier level regulation	3%	3%	2%	2%	5%	±1%
Modulation capability	0%	0%	1%	1%	3%	3%
Response vs brightness	±0.75dB	±0.75dB	±0.5dB	±0.5dB	±0.7dB	±0.5dB
Low frequency linearity	<1.0dB	<1.0dB	5%	5%	10%	95%
ICPM, uncorrected	±2.0°	±2.0°	±2°	±2°	±3°	±4°
Diff phase, gain	3°, <0.5dB	3°, <0.5dB	±2°, 5%	±1°, 5%	±3°, 5%	3°, 0.95
S/N ratio	55dB	55dB	55dB	55dB	55dB	60%
K factor for 2T, 12.5T	2%, 3%	2%, 3%	2%, 4%	2%, 4%	2%, 5%	2% for 2T
Harmonics below visual	-60dB	-60dB	-60dB	-60dB	-70dB	-60dB or 20mW
Visual PA UHF	Klystron ext	Klystron MSOC	9017 tetrode	TH582 (382) tetrode	Solid-state	Klystron Ext
Aural output power	12kW (24, 48)	12kW (24, 48)	100W	1kW (500W)	5W	1kW to 6kW
Carrier deviation	±120kHz	±120kHz	±120kHz	±75kHz	±75kHz	±50kHz
Audio response	±0.5dB 30-15k	±0.5dB 30-15k	±0.5dB 30-15k	±0.5dB 30-15k	±0.5dB 30-50k	±1dB 30-15k
Applicable to stereo	BTSC	BTSC	BTSC	BTSC	Yes	BTSC or European
Harmonic distortion	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
AM, FM noise	-55dB, -60dB	-55dB, -60dB	-50dB, -60dB	-50dB, -60dB	-50dB, -60dB	-50dB, -60dB
Aural PA UHF	Klystron ext	Klystron MSOC	Int Diplex	S-S Int Diplex	S-S Int Diplex	SS or Ext Klystron
Cooling system	Vapor	Water	Forced air	VP & (F A)	Convection	Vapor
Input AC power	480Vac ±5% 3φ	480Vac ±5% 3φ	208/240Vac 1φ	208/240Vac 1-3φ	117Vac	380-415Vac 3φ
Power consumption	137kVA (253, 460)	90kVA (160, 290)	5kW 50% APL	26kW (19kW) 50%APL	0.75kW	38kW to 129kW
Reader Service No.	1324	1325	1326	1327	1328	1329

Manufacturer	NEC America	PESA	Rohde & Schwarz	Technologix Midwest Corporation	Television Technology Corporation	
Model	PCU-960HC	TT5000 series	NT UHF series	TX series	UHF-30SK	UHF-5TA (1TA)
Visual peak power	60KW (30-240KW)	1W-20KW	100W-40KW	30kW to 300KW	30KW	5KW (1kW)
Carrier level regulation	2%	≤1%	≤0.3dB	±2%	3%	3%
Modulation capability	0%	1% of sync	>75%	1%	2%	2%
Response vs brightness	±0.5dB	<5%	<0.3dB	±1dB	1dB	1dB
Low frequency linearity	.....	<5%	.....	10%	0.8dB	0.8dB
ICPM, uncorrected	±3°	.....	.....	.....	3°	3°
Diff phase, gain	±3°, 0.5dB	< ±3°, L5%	≤3°, 5%	±3°, 5%	4°, 5%	4°, 5%
S/N ratio	60dB	>60dB	>63dB	>55dB	>55dB	>55dB
K factor for 2T, 12.5T	1.5%, 5%	2%	<2% 20T	2%, 5%	2%, 2%	2%, 2%
Harmonics below visual	-80dB	-60dB	≤-60dB	≤-60dB	-65dB	-65dB
Visual PA UHF	Klystron ext	SS and tube models	SS tetrode klystron	Klystron, ext	Klystron ext	Tetrode
Aural output power	6KW (10%)	Adjustable	1/10-1/20 visual	Per request	10% of visual	10% of visual
Carrier deviation	±150kHz	±25kHz, ±50kHz	±50kHz	±25kHz	±25kHz	±25kHz
Audio response	±0.5dB	±1dB 30-15k	±0.3dB to 60kHz	±0.5dB 30-15k	1dB 30-15k	1dB 30-15k
Applicable to stereo	BTSC	Dual carrier	Dual carrier	BTSC	BTSC	BTSC
Harmonic distortion	0.5%	≤1% 30-15k	≤0.4% ±50kHz	<0.5%	1%	1%
AM, FM noise	-50dB, -60dB	-55dB, -52dB unwt'd	≥46dB, ≥56dB unwt'd	≤-50B, ≤-60dB	-55dB, -55dB	-55dB, -55dB
Aural PA UHF	Klystron ext	SS and tube models	SS tetrode klystron	Klystron ext	Klystron ext	Tetrode
Cooling system	Water/vapor	Forced air	Per PA type	Water/glycol	Forced air	Forced air
Input AC power	480Vac	.....	220-380Vac 3φ	460-500Vac 3φ	480Vac	240Vac
Power consumption	132kVA (per model)	.....	1.8kVA-119kVA	Var per model	81kVA	18 (4.8)kVA
Reader Service No.	1330	1331	1332	1333	1334	1335

Manufacturer	Television Technology Corporation				Thomson-LGT	Varian TVT Division
Model	XL 1200MU (-100)	UHF-10SA	UHF-10MA (-120MA) ¹	UHF-60MS ² 1	EUHF1000/5000/10000	VISTA Type 1890
Visual peak power	1.2kW (100W)	10kW	10kW (120kW)	60kW	1kW/5kW/10kW	240kW (120, 60kW)
Carrier level regulation	3%	3%	3%	3%	.....	±2%
Modulation capability	2%	2%	2%	2%	.....	to 0.5% peak sync
Response vs brightness	1dB	1dB	1dB	1dB	1dB	±1.0dB
Low frequency linearity	0.8dB	0.8dB	0.8dB	0.8dB	5%	≤0.8dB
ICPM, uncorrected	3°	3°	3°	3°	<3°	≤3°
Diff phase, gain	4°, 5%	4°, 5%	4°, 5%	4°/5%	±3° 95%	≤±3°, 0.4%
S/N ratio	>55dB	>55dB	>55dB	55dB	.....	60dB
K factor for 2T, 12.5T	2%, 2%	2%, 2%	2%, 2%	2%/2%	±1.5%	<2%, <2%
Harmonics below visual	-65dB	-65dB	-65dB	-65dB	-60dB	-70dB
Visual PA UHF	Tetrode	Klystron ext	Klystrode	MSDC Klystron	Solid state	Klystron MSDC ExtCav
Aural output power	10% of visual	10% of visual	10% of visual	.....	0.1kW, 0.5kW, 1kW	24kW (12, 6kW)
Carrier deviation	±25kHz	±25kHz	±25kHz	±25kHz	50kHz	>100kHz
Audio response	1dB 30-15k	1dB 30-15k	1dB 30-a5k	1dB 30-15k	±0.5dB 40-20k	0.5dB 30-15k
Applicable to stereo	BTSC	BTSC	BTSC	BTSC	BTSC or European	BTSC IRT, 728 NICAM
Harmonic distortion	1%	1%	1%	1%	0.5%	0.5%
AM, FM noise	-55dB, -55dB	-55dB, -55dB	-55dB, -55dB	-55dB, -55dB	-50dB	-50dB, -60dB
Aural PA UHF	Tetrode	Klystron ext	Klystrode	MSDC Klystron	Solid-state	Klystron MSDC E/C
Cooling system	Forced air (conv)	Forced air	Forced air	.....	Forced air	Forced air, water
Input AC power	230Vac	480Vac	480Vac	480Vac	300Vac or 208Vac	460Vac or 480Vac
Power consumption	4.8 (0.5)kVA	27kVA	22.2 (265)kVA	100kVA	7.5kVA (17kVA) ³	309kVA (155, 79kVA)
Reader Service No.	1336	1337	1338	1339	1340	1339

¹ Series includes UHF-30MA, rated 30kW and consuming 66.6kVA, and UHF-60MA, rated 60kW and consuming 133.3kVA. ² UHF-120MS rated 120kW consumes 196.7kVA; UHF-180MS rated 180kW consumes 295 kVA; UHF-240MS rated 240kW consumes 393.4kVA. ³ Power consumption for the EUHF 10000 is 34kVA with 50% APL.

Manufacturer	Varian TVT Division			
Model	Type 1790 range	Type 1781	Type 1741-1742	Type 1780
Visual peak power	240kW (120, 60kW)	10kW	30kW (20, 15, 10)	5kW (3kW)
Carrier level regulation	±2%	±2%	±2%	±2%
Modulation capability	to 0.5% peak sync	to 0.5% peak sync	to 0.5% peak sync	to 0.5% peak sync
Response vs brightness	±1.0dB	±1.0dB	±1.0dB	±1.0dB
Low frequency linearity	≤0.8dB	≤0.8dB	≤0.8dB	≤0.8dB
ICPM, uncorrected	≤±3°	≤±3°	≤±3°	≤±3.0°
Diff phase, gain	≤±3°, 0.4%	≤±3°, 0.4%	≤±3°, 0.4%	≤±3°, 0.4%
S/N ratio	60dB	60dB	60dB	60dB
K factor for 2T, 12.5T	<2%, <2%	<2%, <2%	<2%, <2%	<2%, <2%
Harmonics below visual	-70dB	-70dB	-70dB	-70dB
Visual PA UHF	Klystron Ext Cav	TH382 tetrode	Klystron Ext Cav	TH328 tetrode
Aural output power	24kW (12, 6kW)	1.0kW	3kW (2, 1.5, 1.0)	0.5W (0.3W)
Carrier deviation	>100kHz	>100kHz	>100kHz	>100kHz
Audio response	0.5dB 30-15k	0.5dB 30-15k	0.5dB 30-15k	0.5dB, 30-15k
Applicable to stereo	BTSC IRT, 728 NICAM	BTSC, IRT, 728 NICAM	BTSC IRT, 728 NICAM	BTS IRT & 728 NICAM
Harmonic distortion	0.5%	0.5%	0.5%	0.5%
AM, FM noise	-50dB, -60dB	-50dB, -60dB	-50dB, -60dB	-50dB, -60dB
Aural PA UHF	Klystron Ext Cav	TH327 tetrode	Klystron Ext Cav	Internal diplex
Cooling system	Forced air, vapor	Forced air	Forced air	Forced air
Input AC power	460Vac or 480Vac	380Vac or 415Vac	380Vac or 415Vac	380Vac or 415Vac
Power consumption	553kVA (278, 140kVA)	25kVA	81kVA (57, 45, 33)	23kVA
Reader Service No.	1342	1343	1344	1345

AM Modulation Monitors

Manufacturer	Belar Electronics Laboratory			Harris/Broadcast	Motorola	TFT
Model	AMM-3	AMM-2B	AMM-3V	AM-90	1410 AM/Stereo	753/755A
Frequency range	200k-160MHz direct	200k-160MHz	200k-160MHz	450k-30MHz	530-1620kHz	500k-4MHz
Off-air RF range	100 μ V-300mV w/RFA2	100 μ V-300mV w/RFA2	N.A.	Uses ext RF amp	.....	100 μ V-10V
Direct input range	5-10Vrms	5-10Vrms	5-10Vrms	1-10Vrms	500mV-15V RMS	1-10V 50 Ω
Input attenuator range	Continuous	Continuous	Continuous	0,+50dB 10dB steps	0-30dB 5 steps	0,-50dB 10dB steps
Modulation range	0-133% ¹	0-133% ¹	0-133% ¹	0-140%	-0,+133%	0,+133%
Peak modulation indicator	Programmable	Adjustable	Programmable	Adjustable	Adjustable	Adj & 100%/125%
Peak flasher accuracy	1%	2%	1%	\pm 1%	2%	\pm 10%
Audio output level	+10dBm 600 Ω	+10dBm 600 Ω	+10dBm 600 Ω	+10dB 600 Ω	10dBm 600 Ω	0dBm
Audio output connection	Unbal active	Unbal active	Bal Xfmr	Bal	AB	Bal/Unbal
AF response (mono) \pm dB Hz-kHz	\pm 0.5dB 20-25k	\pm 0.5dB 20-25k	\pm 0.5dB 20-25k	0,-0.5dB 20-20k	\pm 2dB, 30-20k	\pm 5% 20-25k
AF distortion (mono)	0.25% 99% mod	0.25% 99% mod	0.25% 99% mod	0.15%	0.25%	0.15%
Audio S/N ratio (mono)	75dB	75dB	75dB	75dB	+67dB	75dB
Meter, display type	Analog meters	Analog meters	Analog meters	Neon bar graph	Analog meter	Analog meter
Oscilloscope test output	Yes	Yes	Yes	Yes	Yes	No
Remote metering output	Yes	Yes	Yes	Yes	Yes	Yes
Failure alarms	Carrier +5,-10%; Modulation opt	Carrier off; Modulation opt	\pm 30% carrier; Modulation opt	Carrier off Modulation low	.....	Carrier off; Modulation low
Reader Service No.	1487	1488	1489	1490	1491	1492

¹ To 199% on positive peak indicators.

FM Modulation Monitors

Manufacturer	Belar Electronics Laboratory	TFT	
Model	FMM-2	844A	884
FM channel selection	Xtal (RFA-4 opt) ¹	Preselector	Preselector
Off-air RF range	50 μ V-300mV	250 μ V-100mV	50 μ V-100mV
Direct input range	1V-10V	100mV-10V	0.5mV-100mV
Input attenuator range	Continuous	0,-50dB 10dB steps	0,-50dB 10dB steps
AGC circuitry	Yes	Yes	Yes
Modulation range	0-133% on meter	0,+133%	0,133%
AF response/meter (\pm dB Hz-kHz)	\pm 0.1dB 10-100k	\pm 0.25dB 50-15k	\pm 0.25dB 50-15k
Peak mod. adjust range	199%	50-199%	50-199%
Peak flasher accuracy	1% 75kHz dev	1% 5kHz	20% 75kHz
Residual AM monitor	Integral	Integral	Integral
Audio connection	AB +10dBm	600 Ω bal 0dBm	Bal 600 Ω 0dBm
Audio distortion	\pm 0.01dB 10-50k	\pm 0.5dB 30-120k	\pm 0.5dB 50-15k
S/N ratio, monaural	0.003% THD/IMD	0.1%	0.2%
Composite output level	90dB	75dB	70dB
Meter, display type	1.5Vrms 75kHz dev	5Vrms, 75kHz dev	50Vrms 75kHz
Oscilloscope test output	Analog	Analog meter	Analog meter
Modulation failure alarm	Yes	Yes	Yes
Stereo monitor	Options	Yes	No
SCA monitor	FMS-2, 4-channel	Dual TFT 845	Dual TFT 845
Reader Service No.	1493	1494	1495

¹ Optional preselector.

TV Aural Modulation Monitors

Manufacturer	Belar Electronics Laboratory	Tektronix	TFT	
Model	TVM-101 (-100)	751 BTSC	701 (Mono) ²	850
RF range/channel	Any on request	Any US channel	Ch 2-83	Ch 2-38
Off-air RF range	200 μ V-1V 50 Ω	from 1450-1 demod	250 μ V-5mV 75 Ω	200 μ V-5mV 50 Ω
AGC circuitry	Yes	per Demod	Yes	Yes
Modulation range	0-133% on meter ¹	100% 73kHz max	0, 133%	0, 133%
AF response (meter) (\pm dB Hz-kHz)	\pm 0.1dB 10-100k	\pm 0.7kHz total	\pm 0.2dB 50-15k	\pm 2.0dB 50-120k
Audio output	+10dBm 600 Ω bal	+8dBm 600 Ω	2Vrms, 600 Ω	1.5Vrms 600 Ω
AF response (out) (\pm dB Hz-kHz)	\pm 0.01dB 10-50k	\pm 0.1dB 50-15k	0.2dB 15-15k	\pm 0.5dB 50-50k
AF distortion (mono)	0.003% THD/IMD	<0.1dB main ch.	0.25%	0.1% 1kHz
S/N ratio (mono)	80dB	>70dB	-65dB	70dB
Composite output (V Ω /dev)	1.5V 75 Ω 75kHz dev	No	.....	1.5V 75 Ω
Meter display types	Analog (& digital)	EL bar graph digital	.....	Analog meter
ATS compatible	Yes	.....	No	Yes
Oscilloscope output	Yes	.....	No	Yes
Carrier alarms	Low level	Loss/unlocked pilot	Off frequency	Low lv ¹ , lost lock
Modulation alarms	Mod loss option	Stereo phase reverse	Loss of modulation	Loss of modulation
Stereo monitor	TVM-210	Integral	No	Integral
SCA monitor	SCM-2 4-channel	SAP, PRO integral	Single	Option TFT855 for
PRO, SAP monitors	PRO SAP opt	.....	.....	SAP & PRO
Reader Service No.	1496	1497	1498	1499

¹ Switched for mono, BTSC stereo; Integral residual AM, FM noise meter; split sound, quasi-parallel detection.

² RF frequency counter, intercarrier frequency error measurement, remote metering.

Waveform Monitors

Equipment designed for monitoring of video signal level and quality. Available in rack-mount and bench-case packages, some include an oscilloscope function with test probe. Some are battery operated for portable use. Abbreviations used in this section include: N NTSC, P PAL, (-M/-N denote variations of PAL, S SECAM; LP low pass. Under Time Base, Vm and Hm indicate vertical and horizontal magnification.

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Circle (133) on Reply Card

Manufacturer	Electronic Visuals ¹	Hamlet Video Int'l ²	Leader Instruments
Model	EV4042 (EV4031)	EV4050 Component	5860C (5860H)
Display size	8x10cm	8x10cm	8x10cm
Graticule	Int. illuminated	Internal	Internal
Standards supported	N, P-M, S	N, P, S	NTSC
Internal calibrator	Yes	Yes	Yes
Vertical response	Chroma, LP, δ G, Flat	Chroma, LP, Flat	Chroma, LP, Flat
Time bases	H 2H 2Hm V 2V 2Vm	H 2H 2Hm V 2V 2Vm	H 2H 2Hm V 2V 2Vm
Time base magnification	1 μ s, 200 μ s/div	Yes	\times 10 H, \times 20V
RGB-YRGB displays	Yes (No)	Yes	Yes
DC restore	Back porch	Back porch	Back porch
VITS line select	7-22 (No)	No	Back porch
Programmable	No	No	No (Yes)
Remote control	No	No	No
Composite inputs	Yes	No	No
Component inputs	No	A B	Yes
Line strobe pulse	No	No	No
Vectorscope function	No	No	No (Yes)
AF stereo phase mode	No	Yes	No
Waveform comparison	No	No	No
Reader Service No.	1451	1452	1455

¹ Represented in the US and Canada by Broadcast Video Systems. ² Represented in the US by BPI/Brabury PortaPattern International. ³ Generates waveform and vectorscope patterns for display on standard video monitor. ⁴ Expanded 512 lines \times 34 μ s. ⁵ 5860H does not include Linearity response or 1-line H or 1-line V timebase.

Manufacturer	Magni Systems	Philips Test & Measuring/BTC
Model	WV 560/561	PM5661 Combo (5662)
Display size	4" \times 3.25"	8x10cm
Graticule	Internal illuminated	Internal
Standards supported	NTSC, PAL	NTSC, PAL
Internal calibrator	Yes	Yes
Vertical response	Chroma LP Flat	Chroma LP Flat δ G
Time bases	H 2H 2Hm V 2V 2Vm	H 2H 2Hm V 2V 2Vm
Time base magnification	\times 10 (H/2H); \times 25 (2V)	\times 10, \times 20
RGB-YRGB displays	Yes	Yes
DC restore	Back porch	Back porch, sync
VITS line select	Yes	Any line
Programmable	Yes	No
Remote control	Yes	Yes
Composite inputs	Yes	Yes
Component inputs	Yes	Yes
Line strobe pulse	Yes	No
Vectorscope function	Yes	Yes
AF stereo phase mode	No	Yes (w/SC-H ϕ)
Waveform comparison	Yes	No
Reader Service No.	1457	1461

⁶ Also performs SC/H measurement, simultaneous A/B signal displays and full line select. ⁷ Model 5872 uses same specifications as 5870, 5871 but with out features of Note 6. ⁸ Also accepts Betacam inputs. ⁹ Star mode, Gamut, RGB out.

Manufacturer	Systems Video ¹⁰	Tektronix
Model	1258	1750 series combo
Display size	10x10cm	8x10cm
Graticule	Internal	Ext/ill/Int/Select
Standards supported	NTSC, PAL	NTSC, PAL
Internal calibrator	Yes	Yes
Vertical response	Chroma LP Flat δ G	Chr LP Flat Luma
Time bases	H 2H 2Hm V 2V 2Vm	H 2H 2Hm V 2V 2Vm
Time base magnification	\times 10, \times 20	\times 5 10 20 25 50 100
RGB-YRGB displays	Yes	Yes
DC restore	Back porch, sync	Back porch Sync tip
VITS line select	Any line	1H or 15H
Programmable	No	Yes
Remote control	Yes	Yes
Composite inputs	Yes	RS-232/422
Component inputs	A, B	A B1 B2 B3 ¹²
Line strobe pulse	Yes	A B1 B2 B3
Vectorscope function	No	Yes
AF stereo phase mode	No	Yes
Waveform comparison	Overlays	Yes
Reader Service No.	1463	1466

¹⁰ Represented in the US by AF Associates. ¹¹ SC/H polar display, Diff Phase, Diff Gain. ¹² Auxiliary in/out. ¹³ Transcoders for YIQ, YCC available.

Manufacturer	Tektronix	Videotek
Model	1480 series	1730 (1730-HD-D2)¹⁴
Display size	8x10cm	8x10cm
Graticule	Int, ext	Internal
Standards supported	N, P-M, S	N, P (multistd)
Internal calibrator	Yes	Yes
Vertical response	Flat, chroma, LP	Flat LP chroma (30MH
Time bases	H 2H 2Hm V 2V 2Vm	H 2H 2Hm V 2V 2Vm
Time base magnification	\times 5 10 20 25 50	\times 10, 20, 25
RGB-YRGB displays	Yes	Yes
DC restore	Back Porch Sync tip	Back porch
VITS line select	1L & 15L	Any (& 14-line)
Programmable	No	Yes
Remote control	Yes	Yes
Composite inputs	A, B	A, B
Component inputs	No	No

Line strobe pulse	Yes	Yes	.....	No	No	Yes
Vectorscope function	No	No	$\delta\phi$ in R-Y mode	No	No	Yes
AF stereo phase mode	No	No	No	No	No	No
Waveform comparison	Overlay, parade	Parade, overlay	Parade display	No	No	Yes
Reader Service No.	1469	1470	1471	1472	1473	1474

¹⁴ D-2 model for use with digital D-2 has all same features.

¹⁵ For -HD model, additional time bases include 10ns/div and 1-/2-/3-line.

Vectorscopes

Equipment for measurement of the relative phase angles and amplitudes of color information in video signals. All units are available in rack-mount or bench-case packages.

Manufacturer	Electronic Visuals ¹	Hamlet Video Int ¹²	Leader Instruments	Magni Systems
Model	EV4021	HVI 203 VIDEO³	5851V	VS 560/561
Display size	8x10cm	128 linesx8.5 μ s ⁴	8x10cm	4x3.25"
Graticule	Internal	Electronic	Internal	Internal
Waveform mode	No	Yes	No	No
Standards	NTSC, PAL/-M	NTSC, PAL, SECAM	PAL	NTSC PAL
Function control	Manual	Manual	Manual	Manual & WFM530/560
Integral calibrator	No	Yes	Yes	Test mode
# composite inputs	A, B	2	2	6 composite ⁶
Subcarrier reference	Yes	A B Black	A B Black	A B C Black
Sync reference	A/B/Black/Composite	A B Blackburst	A B Blackburst	A B C Blackburst
Display reference	A/B/Ext	A B Ext	A B Ext	A B C Ext
Diff phase, gain measurements	2°, 2%	1°, 1%	1°, 1%	< 1°, < 1%
VITS line select (range)	No	Full line range	Yes ⁵	w/WFM530/560
Luminance measurements	No	Yes	No	No
Reader Service No.	1475	1476	1477	1478

¹ Represented in the US and Canada by Broadcast Video Systems.

² Represented in the US by BPI Group/Brabury PortaPattern International.

³ Unit displays vectorscope and waveform patterns on standard video monitor; freeze, store functions; dual standard opt.; outputs can be recorded or transmitted.

⁴ Expanded mode to 512 linesx34 μ s.

⁵ Determined by companion line select waveform monitor.

Also provides component inputs

Manufacturer	Magni Systems	Phillips Test & Measuring/BTC	Systems Video ⁷	Tektronix	Videotek
Model	VS 530/531	PM5667	PM5668	1255	VSM-60
Display size	4x3.25"	8x10cm	8x10cm	10x10cm	8x10cm
Graticule	Internal	Internal	Internal	Internal	Internal etched
Waveform mode	No	Vector, $\delta\phi$	Vector, $\delta\phi$, SC/H ϕ	No	Vector only
Standards	NTSC, PAL	NTSC PAL-G/-M/-N	NTSC PAL-G/-M/-N	NTSC, PAL	NTSC PAL/-M
Function control	Manual or WFM530/560	Manual, remote	Manual, remote	μ P control panel	Manual
Integral calibrator	Test mode	Yes	Yes	Yes	Yes
# composite inputs	3	A, B	2	A, B	2
Subcarrier reference	A B C Black	A B Blk CompSync	A B Blk CompSync	A B Ext Int	A B Sync
Sync reference	A B C Black	A B Blk CompSync	A B Blk CompSync	A B Ext Int	.....
Display reference	A B C Ext.	A B External	A B External	Int, Ext	A B Ext
Diff phase, gain measurements	2°, 2%	0.2°	0.2°	$\leq 2^\circ, \leq 2\%$	$\pm 10^\circ, \pm 10\%$
VITS line select (range)	Yes w/WFM 530/560	from 5665 WFM	from 5665 WFM	From 1730 WFM	No
Luminance measurements	No	No	No	No	No
Reader Service No.	1481	1482	1483	1484	1486

⁷ Represented in the US by AF Associates.

⁸ With 1407 $\delta\phi/\delta G$ measurement option.

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Television Demodulators

These products are precision instruments designed for demodulation of the broadcast television signal and subsequent measurement of video and audio parameters.

Manufacturer	Hans Plisch	Philips Test & Measuring/BTC	Rohde & Schwarz	Tektronix	Telemet
Model	FME 488/499 ¹	PM 5560	EMFT	1450-1	5401-B series
Service-band	VHF, UHF, CATV	VHF UHF IF	V/UHF IF CATV	IF, VHF, UHF	VHF, UHF
CCIR designations	III/IV/V, S2-37	Band I/III/IV/V	CCIR I-V	CCIR I/III/IV/V	III/III/IV/V
Channel select	PLL	PLL synthesized	Xtal, PLL, D/C	Fixed & tunable	Xtal, down converter
RF input impedance	50Ω	50Ω	50/75Ω	50Ω	50/75Ω
Direct input range		3V max	0.5-100mV	80μV-5V	500mV
Off-air input range	30-126μV	> 100mV	0.5-100mV	80mV-5V	5-50mV
IF input range		70mV ±3dB	5-100mV	80μV-22mV	N.A.
Input level indicator	LED	Analog meter	Yes	LED display	Meter
Intercarrier input	Yes	Yes	Yes	50Ω	....
Split carrier mode	....	Yes	Yes	Yes	Yes
Zero-carrier reference	....	Int/Ext	Internal	Yes	Internal
Envelope detector	Yes	Yes	Yes	Int, ext	Yes
Synchronous detector	Yes	No	Yes	Yes	Yes
Quadrature detection	....	Yes	Yes	Yes	No
Aural signal reject	....	Yes	Yes	Yes	No
SAW filter design	Yes	No	Yes	Yes	Yes
# video outputs	1	3	1	Yes	No
Aural deviation out	Yes	75kHz	±25kHz	2 75Ω	2
Audio line out	+6dBm ±0.5dB	0-6dBm var.	Yes	50mV/kHz 600Ω	75kHz
Speaker out	Yes	....	Yes	....	+3dBm
Video clamp position	Sync, back porch	Backporch/sync	Backporch	Yes	No
Carrier failure alarm	....	Yes	Yes	Sync, blank, other	....
Modulation fail alarm	....	No	Yes	....	Yes
Stereo audio type	Dual carrier	BTSC ²	BTSC & dual sound	BTSC system	BTSC
Reader Service No.	1295	1296	1297	1298	1299

¹ Base unit contains picture CRT; modules for Teletext measurements; for CCIR B, G, I standards. ² Also supports dual aural and Nicam 728 systems.

Manufacturer	Telemet dtv/Geotel	Videotek
Model	4500-B series	3713-B series
Service-band	CATV	VHF, UHF
CCIR designations	....	....
Channel select	Xtal, down converter	Xtal, down converter
RF input impedance	75Ω	50/75Ω
Direct input range	....	2.2V
Off-air input range	300μV-30mV	5mV-350mV
IF input range	....	N.A.
Input level indicator	No	Digital readout
Intercarrier input	No	No
Split carrier mode	No	Yes
Zero-carrier reference	No	Internal
Envelope detector	Yes	Yes
Synchronous detector	No	No
Quadrature detection	No	Yes
Aural signal reject	Yes	No
SAW filter design	No	No
# video outputs	2	Yes
Aural deviation out	No	6
Audio line out	Yes	75kHz
Speaker out	No	+3dBm
Video clamp position	....	Yes
Carrier failure alarm	No	Back porch
Modulation fail alarm	No	No
Stereo audio type	Mono only	BTSC
Reader Service No.	1300	1301

Model	DM-1415
Service-band	VHF, UHF, CATV
CCIR designations	....
Channel select	Synthesized
RF input impedance	75Ω
Direct input range	....
Off-air input range	100μV-630mV
IF input range	....
Input level indicator	No
Intercarrier input	No
Split carrier mode	Yes
Zero-carrier reference	No
Envelope detector	No
Synchronous detector	Yes
Quadrature detection	No
Aural signal reject	No
SAW filter design	Yes
# video outputs	2
Aural deviation out	No
Audio line out	+4dBm
Speaker out	Yes
Video clamp position	Back porch
Carrier failure alarm	No
Modulation fail alarm	No
Stereo audio type	BTSC
Reader Service No.	1302

Aural STL Systems

Manufacturer	ITAME	Marti Electronics	Moseley Associates
Model	UHF 900A/450A/80C	STL-10	PCL 6020
System type	Composite	Dual (SCPC)	Composite Mono
Frequency bands	140-170/400-470 ¹	800-960 MHz ⁴	300-330/440-470 ⁹
Audio response	±0.5dB 30-60k	±0.2dB 20-15k	±0.3dB 30-15k
Distortion	0.6%	0.2%	0.2%
S/N ratio	70dB	78dB	72dB
Stereo separation	60dB	78dB	75dB
Hot standby system	Yes	Yes	N.A.
Transmitter Model:	....	STL-10	6010
RF power output	10W (7.5W 900MHz) ²	15W (10W ³)	7-15W
RF output connector	....	Type N	Type N
Frequency stability	0.0001%	0.00025%	0.00025%
AM noise rating	-60dB	-60dB	-60dB
Input audio level	12dBm/3.3Vp-p 22kΩ	8dBm, 600Ω	8dBm, 600Ω
Metering	RF Fwd-Rev/dCV/Main VSWR/RF Final ³	RF F/R V Main Mux	RF F/R, Vdc Main
Rack space requirement	19"	RF final Driver I	RF final Driver I Mux
Receiver Model:	....	R-10	6030
Receiver type	Single conversion	Single conversion	Triple conversion
Sensitivity	30μV 65dB S/N	8μV 60dB S/N	20μV, 60dB S/N
Bandwidth	100kHz	180kHz	100kHz ¹⁰
Metering	RF lvl, dCV, AF	RF, V, LO Subc AF	RF Vdc LO Subc AF
Rack space requirement	19"	3.5"	3.5"
Reader Service No.	1425	1426	1429

¹ UHF 80C covers 830-960MHz spectrum. ² 20W output option. ³ Also Driver current and multiplex modulation. ⁴ Also 200-260, 280-340, 530-800MHz. ⁵ In 530-960 MHz service. ⁶ 4-channel FDM capability. ⁷ Valid for each of four channels. ⁸ Also 200-340 and 400-480MHz. ⁹ Also 890-960MHz, 140-176, 200-240MHz for 6020. ¹⁰ 3dB bw. selectable between 100-500kHz.

Manufacturer		TFT Inc	
Model	8300	7700	8600¹⁵
System type	Composite	Composite	Dual
Frequency bands	110-250/300-375 ¹¹	490-960, 140-160 ¹³	940-960MHz
Audio response	0.1dB 30-53kHz ¹²	50Hz-75kHz	±2.0dB 30-15k
Distortion	0.1%	0.2%	0.2%
S/N ratio	75dB	70dB	65dB
Stereo separation	50dB	50dB	-----
Hot standby system	Yes	Yes	-----
Transmitter Model:	8300	7700	8600
RF power output	12-14W	12W	6W
RF output connector	Type N	Type N	-----
Frequency stability	0.0001%	±1 ppm/yr	0.0001%
AM noise rating	-65dB	-65dB	-65dB
Input audio level	0.53V 10kΩ 1.24V 3kΩ	1.24V	1.25V 3kΩ
Metering	RF fwd/rev Vdc Main RF final, MUX mod	RF I/r, Vdc main RF final muxmod	RF fwd-rev Vdc Main Mux mod
Rack space requirement	5"	3.5"	3.5"
Receiver Model:	8301	7705/7707¹⁴	8601
Receiver type	Triple	Triple conversion	Triple
Sensitivity	40µV 60dB S/N	40µV 60dB S/N	14µV 55dB S/N
Bandwidth	320kHz	320kHz 3dB bw	6dB at 125kHz
Metering	RF Vdc AF	RF Vdc AF	RF Ivl Vdc AF
Rack space requirement	3.5"	3.5"	3.5"
Reader Service No.	1431	1432	1433

¹¹ 400-450, 900-960MHz.

¹² 0.3dB 50-75kHz wideband response.

¹³ 220-240, 300-330, 420-470MHz systems.

¹⁴ 7705 mono, 7707 stereo.

¹⁵ Interfaces to autochangeover combiner-splitter, in-

tegral phase/gain adjustments.

Automatic TV Test Systems

Manufacturer	Audio Visuel Systemes
Model	S 159
Standards supported	PAL, SECAM
Control computer	Proprietary
Manual control mode	No
Programmable control	Yes

Manufacturer	Magni Systems
Model	2015 PCATS (2021¹)
Standards supported	NTSC/PAL/CAV/HDTV
Control computer	MS/PC-DOS
Manual control mode	Yes
Programmable control	from PC/compatible

Manufacturer	Marconi/BTC
Model	2924 video analyzer
Standards supported	NTSC PAL SECAM
Control computer	2-80188
Manual control mode	Yes
Programmable control	Yes

Manufacturer	PESA
Model	SWAT 2000
Standards supported	NTSC, PAL-B
Control computer	Proprietary
Manual control mode	Yes
Programmable control	Yes

Manufacturer	Rohde & Schwarz
Model	RMS100
Standards supported	NTSC, PAL
Control computer	Any IBM/PC compat.
Manual control mode	Yes
Programmable control	Yes

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Video test signal source	Ext. S198 generator	Multistandard	PM 5654 generator	Video	Integrated generator
Measurements per spc	CCIR 569	Any reference	FCC/RS-170, NTC-7	EIA, CCIR	C569 CBC NTC ²
Line(s) used for test	F1/17-330, F2/22-335	Any line	Any line	Full field	Line 17
Automatic logging	No	No	Yes	Possible	Yes
Waveform display/plot	No	Yes	On VT100 terminal	CRT/LCD display	No
Data storage	None	Yes	Ext. int	Printout or PC	Internal
Set parameter limits	Yes	No	3 upper, 3 lower	Yes	Yes
Out-of-tolerance alarm	Yes	No	Yes	LED, ext. video	Yes
Carrier failure alarm	No	No	Yes	Yes	Yes
Modulation fail alarm	Yes	No	Yes	Yes	Yes
Reader Service No.	1287	1288	1289	1290	1291

¹ Model 2010 is designed from standalone operation with front panel controls. ² Also per EIA 250B, CCIR 560 specifications.

Manufacturer	Systems Video³
Model	WATCHDOG 2000
Standards supported	NTSC/PAL dual ⁴
Control computer	Proprietary
Manual control mode	Yes
Programmable control	9-/15-way D
Video test signal source	Ext 2360/2461 units
Measurements per spc	EBU/CCIR/FCC
Line(s) used for test	Various
Automatic logging	EX800 Epson
Waveform display/plot	# 2207 display ⁵
Data storage	Yes
Set parameter limits	All adjustable
Out-of-tolerance alarm	Alarms
Carrier failure alarm	
Modulation fail alarm	
Reader Service No.	1292

³ Represented in the US by AF Associates. ⁴ Unit automatically identifies standard of the signal. ⁵ Dual vector/waveform display unit.

Tektronix
VM700 set
NTSC, PAL
Motorola 68020
Yes
Yes
No
RS170A/NTC7/RS250B
Any line (picture mode)
via RS-232C
Raster scan display
Int, ext
User programmed
On-screen messages
No
No
1293

Thomson Video
TTV8400 Thom-CAT
NTSC, PAL
Apple
Yes
Yes
TTV8410 Prodigie
CCIR-569
1-line, 1-field
Yes
Yes
Floppy disk
Yes
User defined
Printer, CRT
No
1294

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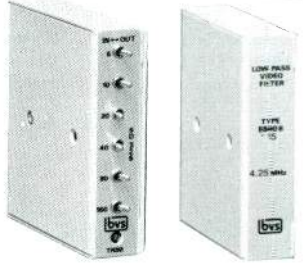
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1. Which statement best describes your role in the purchase of equipment components and accessories?

- A Make final decision to buy a specific make or model.
- B Specify or make recommendation on make or model.
- C Have no part in buying or specifying.

2. Please check the ONE type of facility or operation that best describes your business classification.

- 20 TV Station
- 21 AM Station
- 22 FM Station
- 23 AM & FM Station
- 24 TV & AM Station
- 25 TV & FM Station
- 26 TV, AM & FM Station
- 19 Low Power TV Station
- 27 CATV Facility
- 28 Non-Broadcast TV including Closed Circuit TV (CCTV)
- 29 Recording Studio
- 30 Teleproduction Facility
- 31 Microwave, Relay Station or Satellite Company
- 32 Government
- 33 Consultant (Engineering or Management)
- 34 Dealer, Distributor or Manufacturer
- 35 Other _____

(Please specify)

3. Which of the following best describes your title? Write the number in the box (select one number only):

- A **Company Management** — (1) Chairman of the Board, (2) President, (3) Owner, (4) Partner, (5) Director, (6) Vice President, (7) General Manager (other than in charge of Engineering or Station Operations Mgt.), (8) Other Corp./Financial Officials.
- B **Technical Management & Engineering** — (9) Technical Director/ Mgr., (10) Chief Engineer, (11) Other Engineering or Technical Titles.
- C **Operations & Station Management/Production & Programming** — (12) VP Operations, (13) Operation Mgr./Director, (14) Station Mgr., (15) Production Mgr., (16) Program Mgr., (17) News Director, (18) Other Operations Title.
- D **Other:** Specify _____

4. If you checked 20 through 26 above, which of the following best describes your over-the-air station? (check only one):

- A Commercial
- B Educational
- C Religious
- D Campus Low Frequency
- E Community
- F Municipally Owned

5. What is your annual budget for equipment purchases? (check only one):

- A Less than \$25,000
- B \$25,000 to \$49,999
- C \$50,000 to \$99,999
- D \$100,000 to \$249,999
- E Over \$250,000

6. What is the ADI Rank of your station?

- A Top 20
- B 21 to 50
- C 51 to 100
- D Over 100

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160	201	242	283	324	365	406	447	488	529	570	611	652	693	734	775	816	857	898	939	980	1021	1062	1103	1144	1185	1226	1267	1308	1349	1390	1431	1472
161	202	243	284	325	366	407	448	489	530	571	612	653	694	735	776	817	858	899	940	981	1022	1063	1104	1145	1186	1227	1268	1309	1350	1391	1432	1473
162	203	244	285	326	367	408	449	490	531	572	613	654	695	736	777	818	859	900	941	982	1023	1064	1105	1146	1187	1228	1269	1310	1351	1392	1433	1474
163	204	245	286	327	368	409	450	491	532	573	614	655	696	737	778	819	860	901	942	983	1024	1065	1106	1147	1188	1229	1270	1311	1352	1393	1434	1475
164	205	246	287	328	369	410	451	492	533	574	615	656	697	738	779	820	861	902	943	984	1025	1066	1107	1148	1189	1230	1271	1312	1353	1394	1435	1476
165	206	247	288	329	370	411	452	493	534	575	616	657	698	739	780	821	862	903	944	985	1026	1067	1108	1149	1190	1231	1272	1313	1354	1395	1436	1477
166	207	248	289	330	371	412	453	494	535	576	617	658	699	740	781	822	863	904	945	986	1027	1068	1109	1150	1191	1232	1273	1314	1355	1396	1437	1478
167	208	249	290	331	372	413	454	495	536	577	618	659	700	741	782	823	864	905	946	987	1028	1069	1110	1151	1192	1233	1274	1315	1356	1397	1438	1479
168	209	250	291	332	373	414	455	496	537	578	619	660	701	742	783	824	865	906	947	988	1029	1070	1111	1152	1193	1234	1275	1316	1357	1398	1439	1480
169	210	251	292	333	374	415	456	497	538	579	620	661	702	743	784	825	866	907	948	989	1030	1071	1112	1153	1194	1235	1276	1317	1358	1399	1440	1481
170	211	252	293	334	375	416	457	498	539	580	621	662	703	744	785	826	867	908	949	990	1031	1072	1113	1154	1195	1236	1277	1318	1359	1400	1441	1482
171	212	253	294	335	376	417	458	499	540	581	622	663	704	745	786	827	868	909	950	991	1032	1073	1114	1155	1196	1237	1278	1319	1360	1401	1442	1483
172	213	254	295	336	377	418	459	500	541	582	623	664	705	746	787	828	869	910	951	992	1033	1074	1115	1156	1197	1238	1279	1320	1361	1402	1443	1484
173	214	255	296	337	378	419	460	501	542	583	624	665	706	747	788	829	870	911	952	993	1034	1075	1116	1157	1198	1239	1280	1321	1362	1403	1444	1485
174	215	256	297	338	379	420	461	502	543	584	625	666	707	748	789	830	871	912	953	994	1035	1076	1117	1158	1199	1240	1281	1322	1363	1404	1445	1486
175	216	257	298	339	380	421	462	503	544	585	626	667	708	749	790	831	872	913	954	995	1036	1077	1118	1159	1200	1241	1282	1323	1364	1405	1446	1487
176	217	258	299	340	381	422	463	504	545	586	627	668	709	750	791	832	873	914	955	996	1037	1078	1119	1160	1201	1242	1283	1324	1365	1406	1447	1488
177	218	259	300	341	382	423	464	505	546	587	628	669	710	751	792	833	874	915	956	997	1038	1079	1120	1161	1202	1243	1284	1325	1366	1407	1448	1489
178	219	260	301	342	383	424	465	506	547	588	629	670	711	752	793	834	875	916	957	998	1039	1080	1121	1162	1203	1244	1285	1326	1367	1408	1449	1490
179	220	261	302	343	384	425	466	507	548	589	630	671	712	753	794	835	876	917	958	999	1040	1081	1122	1163	1204	1245	1286	1327	1368	1409	1450	1491
180	221	262	303	344	385	426	467	508	549	590	631	672	713	754	795	836	877	918	959	1000	1041	1082	1123	1164	1205	1246	1287	1328	1369	1410	1451	1492
181	222	263	304	345	386	427	468	509	550	591	632	673	714	755	796	837	878	919	960	1001	1042	1083	1124	1165	1206	1247	1288	1329	1370	1411	1452	1493
182	223	264	305	346																												

Which one advertisement in this issue was of most interest to you?

Advertiser's name _____ Circle No. _____

Your comments on this issue:

NO ENVELOPE NECESSARY
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BROADCAST[®]
engineering

P.O. BOX 12902
OVERLAND PARK, KANSAS 66212-0902

Circulation Department



BROADCAST engineering

For FREE LITERATURE on products in this issue, complete this form.

For issue of SB/BG 1990 Use until September 1990

IMPORTANT: Do you wish to receive/continue to receive your free subscription? Yes No

Your signature is required _____ Date _____

Please answer all the following questions. Please print or type:

Name _____

Title _____

Company _____

Co. Address _____

City _____ State _____ Zip _____

Phone (____) _____

FASTER ACTION!

If you have immediate interest in any products in this issue, write in the number(s) below and check all the appropriate boxes.

I am interested in these items ▼	Immediate Need	Have Sales-person Call	Name Nearest Dealer	Send Literature	For Future Reference
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
#					
#					
#					
#					

1. Which statement best describes your role in the purchase of equipment components and accessories?

- A Make final decision to buy a specific make or model.
- B Specify or make recommendation on make or model.
- C Have no part in buying or specifying.

2. Please check the ONE type of facility or operation that best describes your business classification.

- 20 TV Station
- 21 AM Station
- 22 FM Station
- 23 AM & FM Station
- 24 TV & AM Station
- 25 TV & FM Station
- 26 TV, AM & FM Station
- 19 Low Power TV Station
- 27 CATV Facility
- 28 Non-Broadcast TV including Closed Circuit TV (CCTV)
- 29 Recording Studio
- 30 Teleproduction Facility
- 31 Microwave, Relay Station or Satellite Company
- 32 Government
- 33 Consultant (Engineering or Management)
- 34 Dealer, Distributor or Manufacturer
- 35 Other _____ (Please specify)

3. Which of the following best describes your title? Write the number in the box (select one number only):

- A **Company Management** — (1) Chairman of the Board, (2) President, (3) Owner, (4) Partner, (5) Director, (6) Vice President, (7) General Manager (other than in charge of Engineering or Station Operations Mgt.), (8) Other Corp./Financial Officials.
- B **Technical Management & Engineering** — (9) Technical Director/ Mgr., (10) Chief Engineer, (11) Other Engineering or Technical Titles.
- C **Operations & Station Management/Production & Programming** — (12) VP Operations, (13) Operation Mgr./Director, (14) Station Mgr., (15) Production Mgr., (16) Program Mgr., (17) News Director, (18) Other Operations Title.
- D **Other:** Specify _____

4. If you checked 20 through 26 above, which of the following best describes your over-the-air station? (check only one):

- A Commercial
- B Educational
- C Religious
- D Campus Low Frequency
- E Community
- F Municipally Owned

5. What is your annual budget for equipment purchases? (check only one):

- A Less than \$25,000
- B \$25,000 to \$49,999
- C \$50,000 to \$99,999
- D \$100,000 to \$249,999
- E Over \$250,000

6. What is the ADI Rank of your station?

- A Top 20
- B 21 to 50
- C 51 to 100
- D Over 100

SEND ME MORE INFORMATION ABOUT PRODUCTS OR SERVICES I HAVE CIRCLED.

148	189	230	271	312	353	394	435	476	517	558	599	640	681	722	763	804	845	886	927	968	1009	1050	1091	1132	1173	1214	1255	1296	1337	1378	1419	1460
149	190	231	272	313	354	394	436	477	518	559	600	641	682	723	764	805	846	887	928	969	1010	1051	1092	1133	1174	1215	1256	1297	1338	1379	1420	1461
150	191	232	273	314	355	396	437	478	519	560	601	642	683	724	765	806	847	888	929	970	1011	1052	1093	1134	1175	1216	1257	1298	1339	1380	1421	1462
151	192	233	274	315	356	397	438	479	520	561	602	643	684	725	766	807	848	889	930	971	1012	1053	1094	1135	1176	1217	1258	1299	1340	1381	1422	1463
152	193	234	275	316	357	398	439	480	521	562	603	644	685	726	767	808	849	890	931	972	1013	1054	1095	1136	1177	1218	1259	1300	1341	1382	1423	1464
153	194	235	276	317	358	399	440	481	522	563	604	645	686	727	768	809	850	891	932	973	1014	1055	1096	1137	1178	1219	1260	1301	1342	1383	1424	1465
154	195	236	277	318	359	400	441	482	523	564	605	646	687	728	769	810	851	892	933	974	1015	1056	1097	1138	1179	1220	1261	1302	1343	1384	1425	1466
155	196	237	278	319	360	401	442	483	524	565	606	647	688	729	770	811	852	893	934	975	1016	1057	1098	1139	1180	1221	1262	1303	1344	1385	1426	1467
156	197	238	279	320	361	402	443	484	525	566	607	648	689	730	771	812	853	894	935	976	1017	1058	1099	1140	1181	1222	1263	1304	1345	1386	1427	1468
157	198	239	280	321	362	403	444	485	526	567	608	649	690	731	772	813	854	895	936	977	1018	1059	1100	1141	1182	1223	1264	1305	1346	1387	1428	1469
158	199	240	281	322	363	404	445	486	527	568	609	650	691	732	773	814	855	896	937	978	1019	1060	1101	1142	1183	1224	1265	1306	1347	1388	1429	1470
159	200	241	282	323	364	405	446	487	528	569	610	651	692	733	774	815	856	897	938	979	1020	1061	1102	1143	1184	1225	1266	1307	1348	1389	1430	1471
160	201	242	283	324	365	406	447	488	529	570	611	652	693	734	775	816	857	898	939	980	1021	1062	1103	1144	1185	1226	1267	1308	1349	1390	1431	1472
161	202	243	284	325	366	407	448	489	530	571	612	653	694	735	776	817	858	899	940	981	1022	1063	1104	1145	1186	1227	1268	1309	1350	1391	1432	1473
162	203	244	285	326	367	408	449	490	531	572	613	654	695	736	777	818	859	900	941	982	1023	1064	1105	1146	1187	1228	1269	1310	1351	1392	1433	1474
163	204	245	286	327	368	409	450	491	532	573	614	655	696	737	778	819	860	901	942	983	1024	1065	1106	1147	1188	1229	1270	1311	1352	1393	1434	1475
164	205	246	287	328	369	410	451	492	533	574	615	656	697	738	779	820	861	902	943	984	1025	1066	1107	1148	1189	1230	1271	1312	1353	1394	1435	1476
165	206	247	288	329	370	411	452	493	534	575	616	657	698	739	780	821	862	903	944	985	1026	1067	1108	1149	1190	1231	1272	1313	1354	1395	1436	1477
166	207	248	289	330	371	412	453	494	535	576	617	658	699	740	781	822	863	904	945	986	1027	1068	1109	1150	1191	1232	1273	1314	1355	1396	1437	1478
167	208	249	290	331	372	413	454	495	536	577	618	659	700	741	782	823	864	905	946	987	1028	1069	1110	1151	1192	1233	1274	1315	1356	1397	1438	1479
168	209	250	291	332	373	414	455	496	537	578	619	660	701	742	783	824	865	906	947	988	1029	1070	1111	1152	1193	1234	1275	1316	1357	1398	1439	1480
169	210	251	292	333	374	415	456	497	538	579	620	661	702	743	784	825	866	907	948	989	1030	1071	1112	1153	1194	1235	1276	1317	1358	1399	1440	1481
170	211	252	293	334	375	416	457	498	539	580	621	662	703	744	785	826	867	908	949	990	1031	1072	1113	1154	1195	1236	1277	1318	1359	1400	1441	1482
171	212	253	294	335	376	417	458	499	540	581	622	663	704	745	786	827	868	909	950	991	1032	1073	1114	1155	1196	1237	1278	1319	1360	1401	1442	1483
172	213	254	295	336	377	418	459	500	541	582	623	664	705	746	787	828	869	910	951	992	1033	1074	1115	1156	1197	1238	1279	1320	1361	1402	1443	1484
173	214	255	296	337	378	419	460	501	542	583	624	665	706	747	788	829	870	911	952	993	1034	1075	1116	1157	1198	1239	1280	1321	1362	1403	1444	1485
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177	218	259	300	341	382	423	464	505	546	587	628	669	710	751	792	833	874	915	956	997	1038	1079	1120	1161	1202	1243	1284	1325	1366	1407	1448	1489
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180	221	262	303	344	385	426	467	508	549	590	631	672	713	754	795	836	877	918	959	1000	1041	1082	1123	1164	1205	1246	1287	1328	1369	1410	1451	1492
181	222	263	304	345	386	427	468	509	550	591	632	673	714	755	796	837	878	919	960	1001	1042	1083	1124	1165	1206	1247	1288	1329	1370	1411	1452	1493
182	223	264	305	346	387	428	469	510	551	592	633	674	715	756	797	838	879	920	961	1002	1043	1084	1125	1166	1207	1248	1289	1330	1371	1412	1453	1494
183	224	265	306	347	388	429	470	511	552	593	634	675	716	757	798	839	880	921	962	1												

Which one advertisement in this issue was of most interest to you?

Advertiser's name _____ Circle No. _____

Your comments on this issue:

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Place
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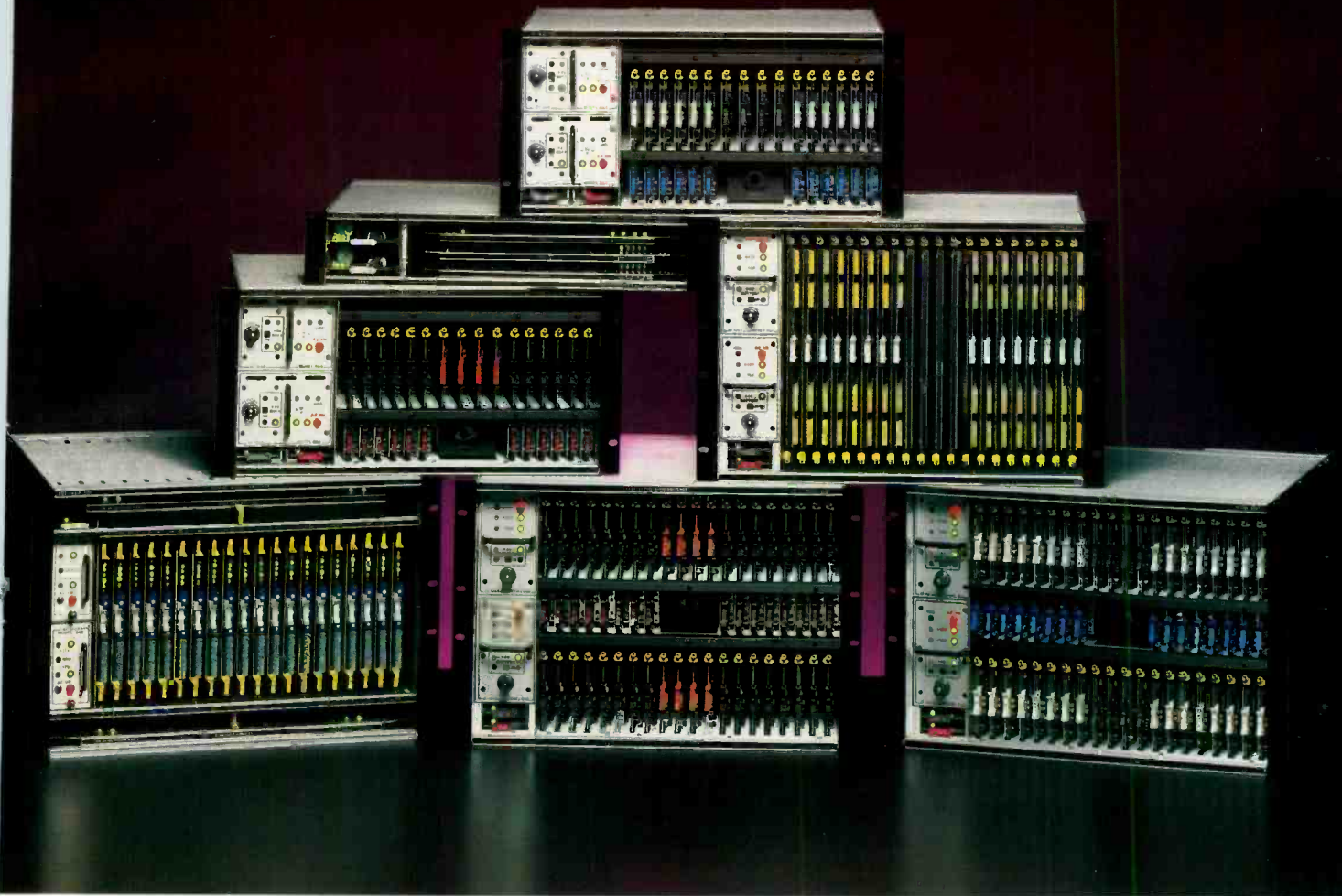
BROADCAST[®] engineering

P.O. BOX 12902
OVERLAND PARK, KANSAS 66212-0902

Circulation Department



SWITCHING TO A HIGHER LEVEL



Where will it end?

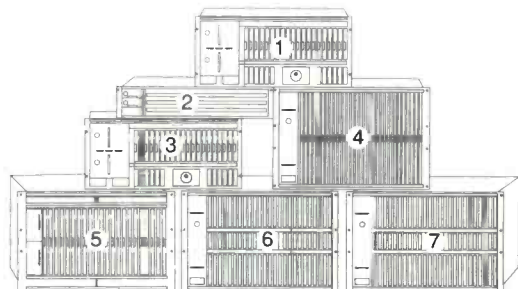
You know the problem. A master grid with video and 3 audio levels is no longer enough. Today's facilities already require HDTV-ready matrices, RS232/422, RGB, Key switching and more! You might say new requirements seem to be piling up all the time.

Di-Tech's growing family of routing switchers now includes a wide range of products to suit your application and budget. Naturally, these switchers are all compatible with industry standard, **Model 9002** Eight Level Virtual Matrix Control System.

With 30 MHz products, and field expansion to 256x256, uncertainty about the future ends with your call to our factory.

Models Illustrated

(1)	5865	32x24	stereo audio
(2)	5616	16x16	stereo audio
(3)	5864	32x24	video
(4)	5863	32x32	4 wire data
(5)	5856	20x20	RGB, HDTV
(6)	5862	64x32	stereo audio
(7)	5861	64x32	video

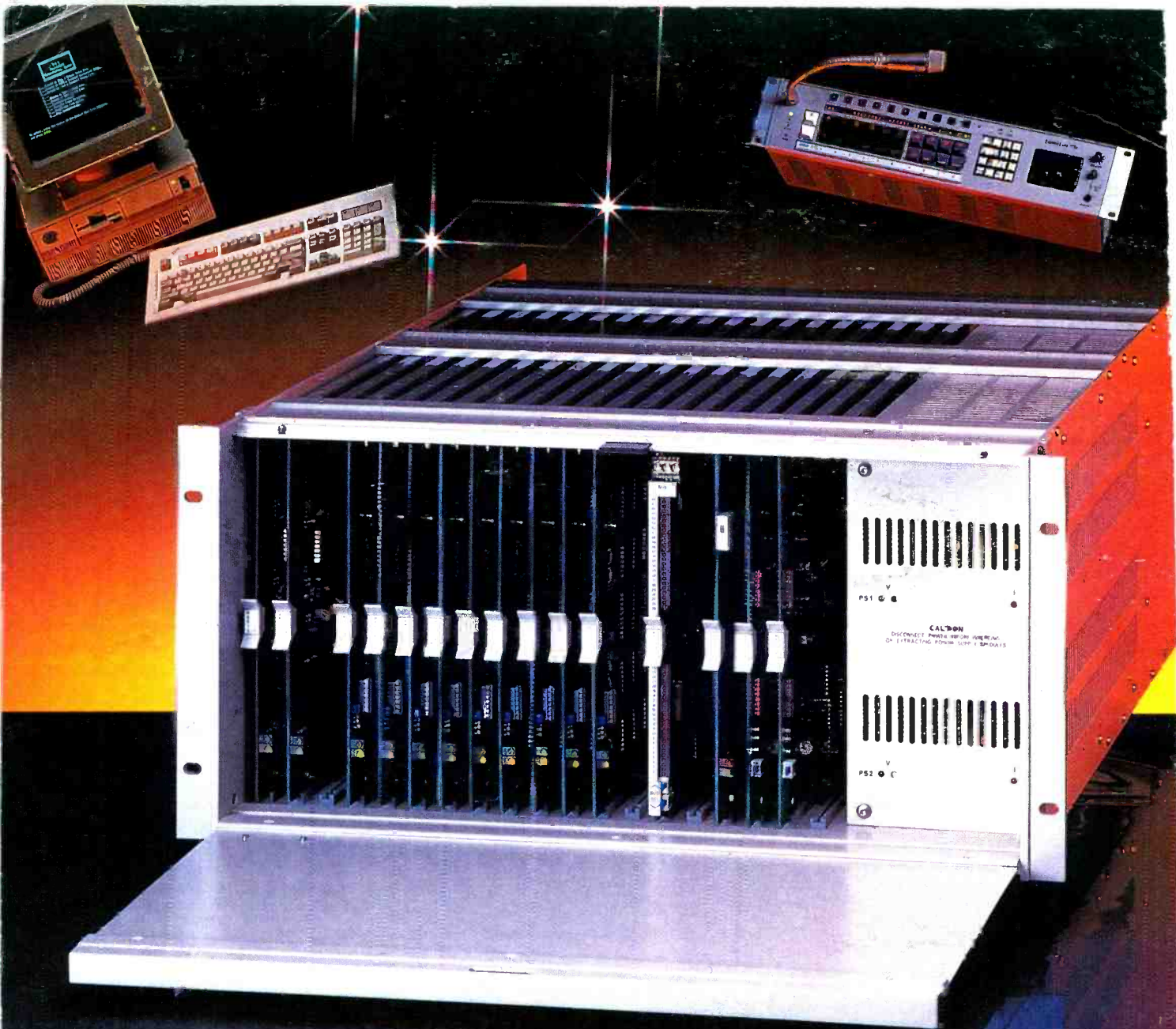


Circle (2) on Reply Card

di di-tech inc.

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MiniCOM® brings a totally new dimension to professional communications!

Until now setting up a production communications system required bulky hardware and plenty of space.

MiniCOM® changes all that! It delivers mainframe performance in a "desktop" sized package. A 24 x 36 matrix in just 8³/₄" of rack space (5 rack units).

And, because we've been able to put all that traditional Ward-Beck quality and performance into such a compact frame, the price has come down to "desktop" proportions too!

No need to dream any more about having a MicroCOM System sometime in the future... You really can afford one today!



WARD-BECK SYSTEMS

Ward-Beck Systems Ltd., 841 Progress Avenue, Scarborough, Ontario, Canada M1H 2X4.
Tel: (416) 438-6550. Fax: (416) 438-3865.