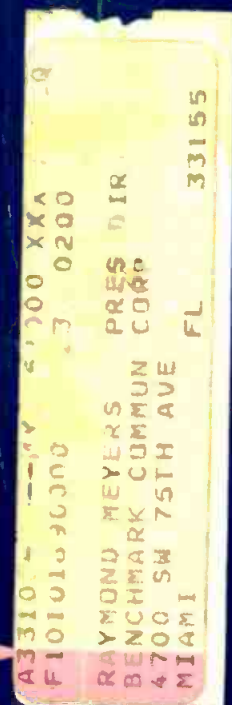


BROADCAST[®] engineering

AN INTERTEC PUBLICATION

1990 ANNUAL ISSUE / \$20



1990
Buyers' Guide/
Spec Book



Rev into stereo— With the remarkable new FP32 ENG Mixer.

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Stereo adds incredible dimension and realism to sports and news coverage. And Shure's new compact FP32 Stereo Mixer makes ENG and EFP applications easy and economical.

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(Cover design by Kristi Sherman.)



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IN ADVANCED CCD CAMERAS
IS CLEARER THAN EVER.
THE NEW SK-F3 AND SK-F700.**

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THE TV SERIES YOU'LL BE WATCHING



There's more digital from the master.

Sony now brings you two new D-2 recorders, the full-featured DVR-18 and a new portable unit, to stand alongside the familiar DVR-10.

The DVR-18 can record continuously for three hours. And its unique "fast formatting" approach to pre-stripping cuts the preparation time for insert editing by two-thirds.

The DVR-18 has two plug-

in options: one for serial digital signal transmission, one for time compression with built-in digital pitch-corrected audio.

Plus all the advantages of digital recording. Such as 20 or more generations of transparent

CHING FOR YEARS TO COME.



digital dubbing. Four channels of PCM digital audio. And write-after-read editing.

Sony's new portable DVR-2 can record up to 94 minutes, with full error correction and concealment in playback.

Each of these recorders is taking its place in a growing Sony D-2 family, destined to be

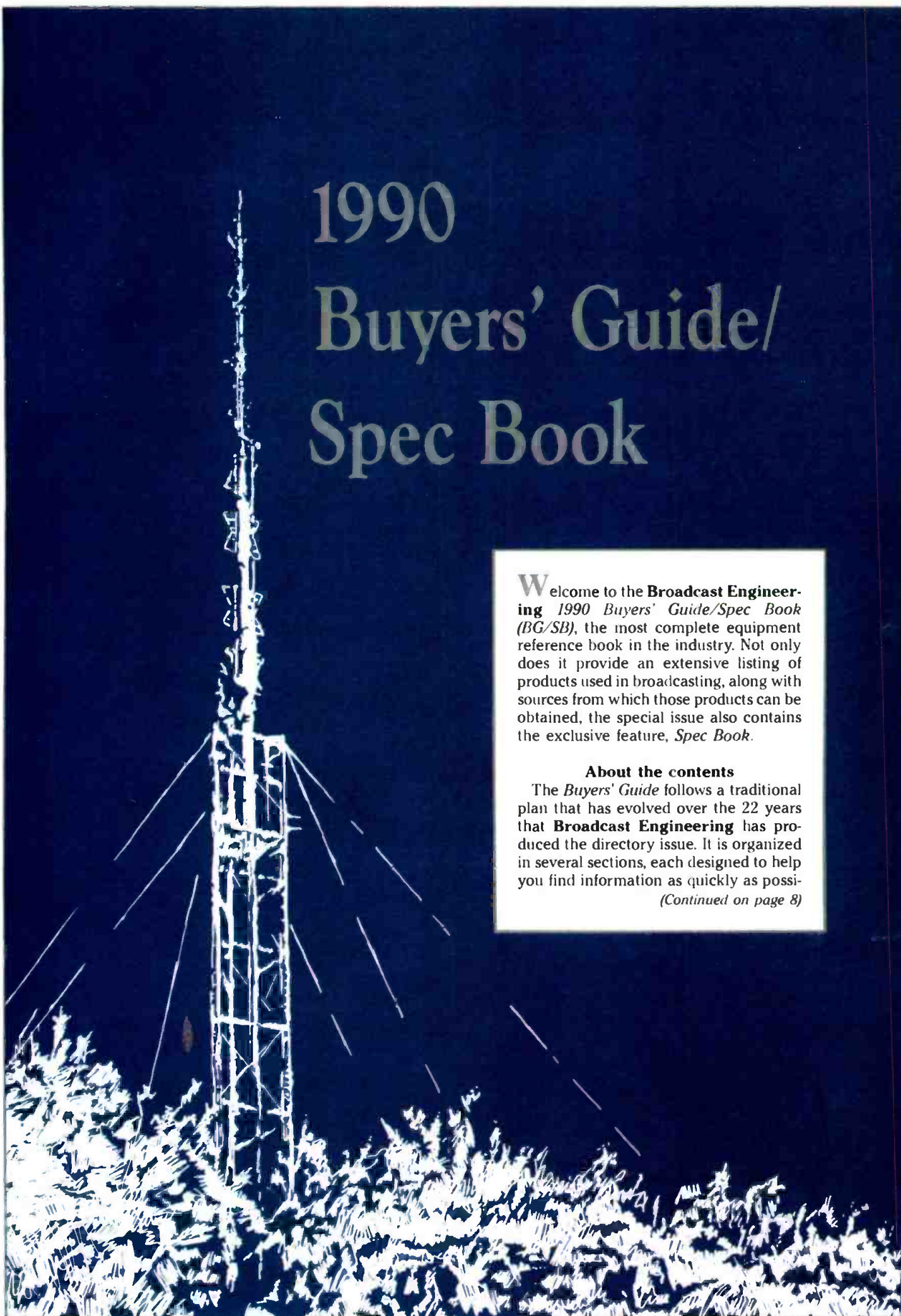
the workhorse for "on-air" editing and field production work.

To find out more, contact your Sony Broadcast Sales Engineer. Or call (800) 635-SONY.

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BROADCAST PRODUCTS



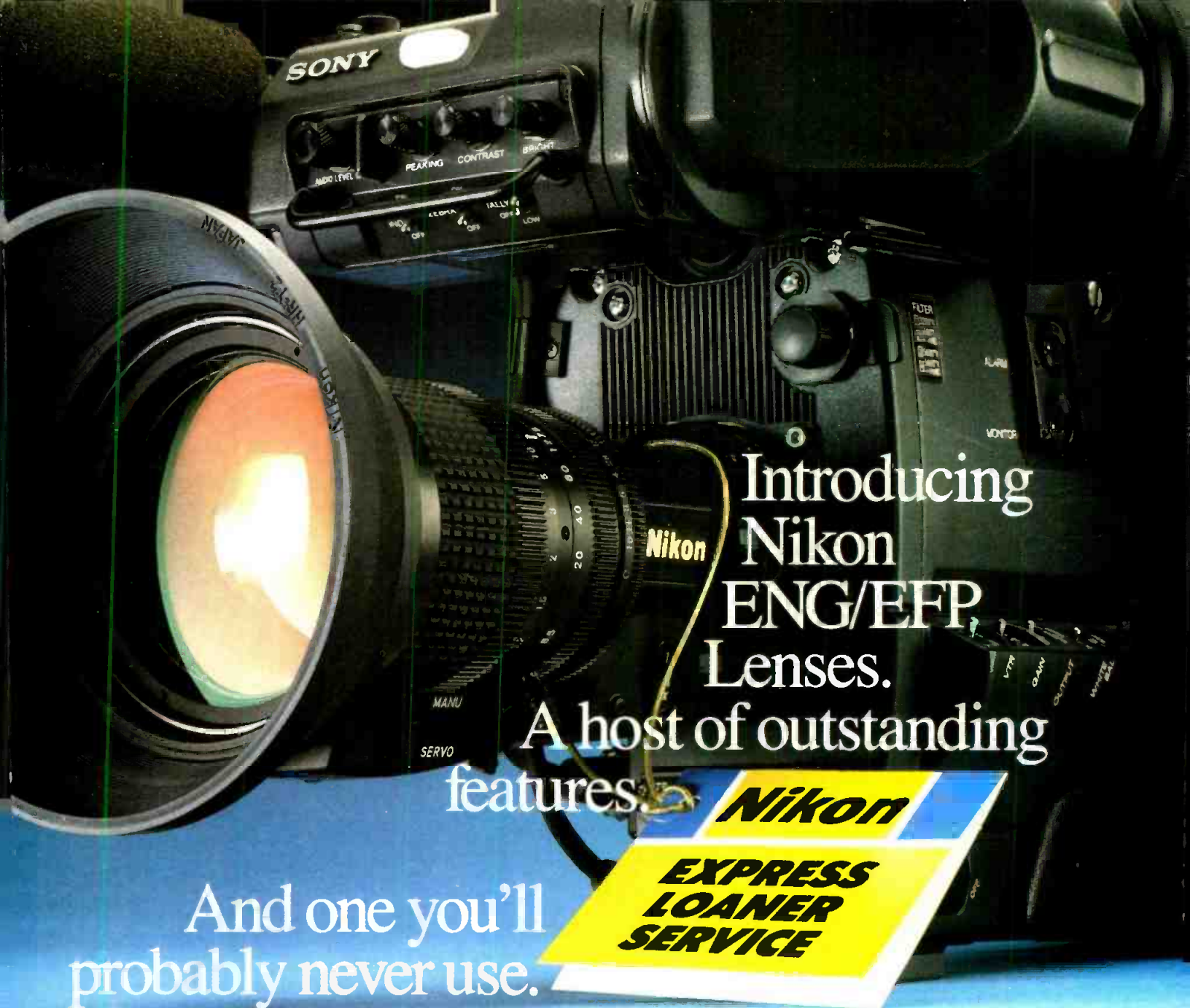
1990 Buyers' Guide/ Spec Book

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 possi-

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Introducing Nikon ENG/EFP Lenses.

A host of outstanding
features.

And one you'll
probably never use.

Selecting an ENG/EFP 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/EFP 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/EFP 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.

Nikon
ELECTRONIC IMAGING

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Circle (5) on Reply Card

(Continued from page 6)

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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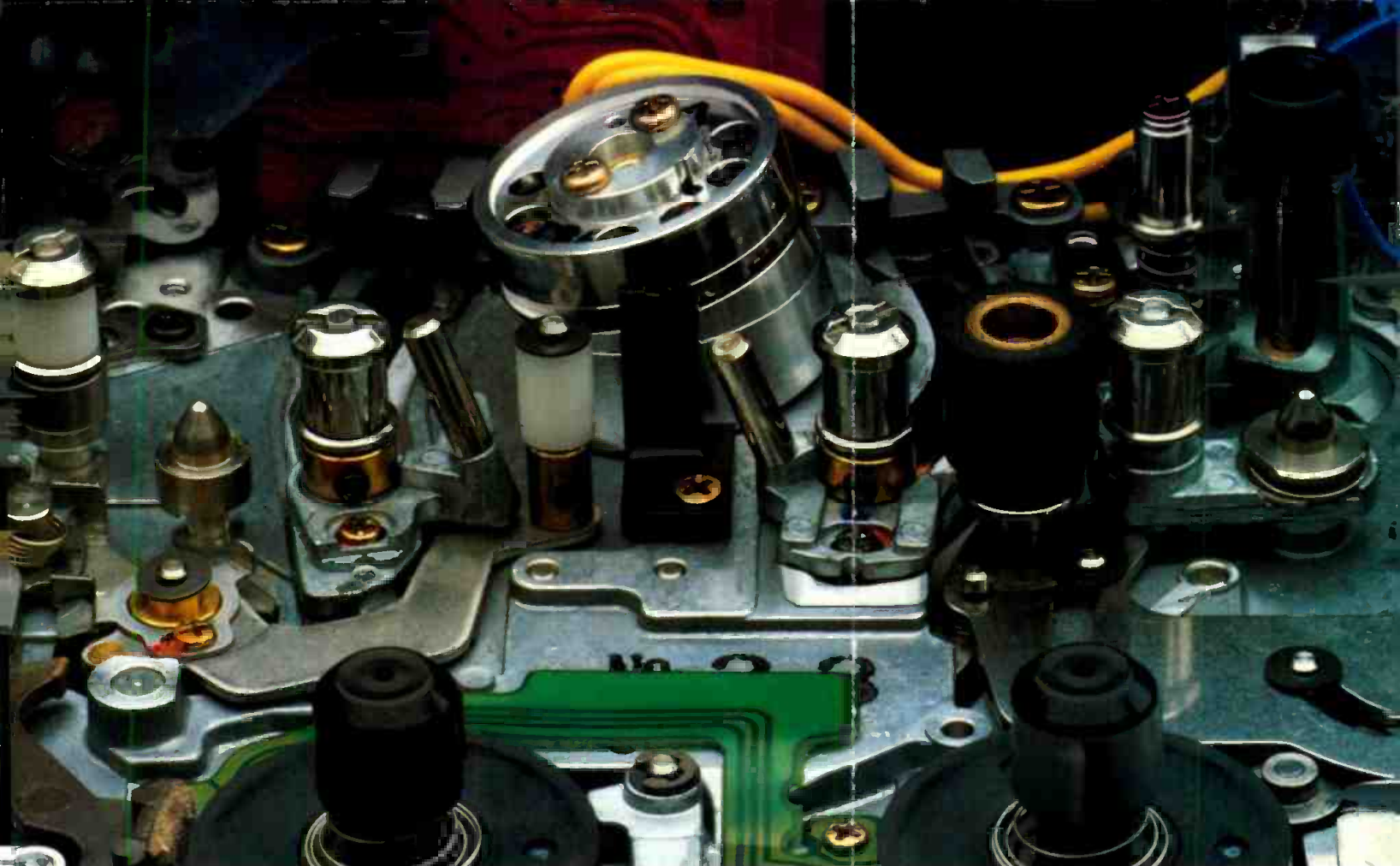
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Your head is no place for information.

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.

The old judgments on tape sonic performance become obsolete. *Quality* becomes critical: Quality tape with efficient binder and backing systems and quality equipment.

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.

Don't settle for the false economy of inexpensive DAT tape. You have too much at stake. Visit a Panasonic dealer and tell him your head is no place for information.

* 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.

Panasonic
Professional Audio Systems

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Dolby SR improves the medium for your message.

TAPE RECORDERS

Dolby SR provides the performance attributed to digital systems while maintaining such analog virtues as economy, editing ease, and tape interchange.

CARTS

Along with their familiar ruggedness and all-around utility, carts with Dolby SR capture the full dynamics of all your source material, digital or analog.

1-INCH VTR'S

With Dolby SR, video can sound as good as it looks. Signal purity is maintained through the multiple tape generations necessary in today's post-production techniques.



DISCRETE STL'S AND RPU'S

Dolby SR improves headroom and lowers noise, while suppressing the effects of interference and fade.

TV STL AUDIO SUB-CARRIERS

With Dolby SR, there's no need to re-allocate subcarrier frequencies or replace existing equipment in order to deliver high quality audio to the transmitter.

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Dolby SR improves analog channels without audible side effects yielding performance rivaling digital systems.

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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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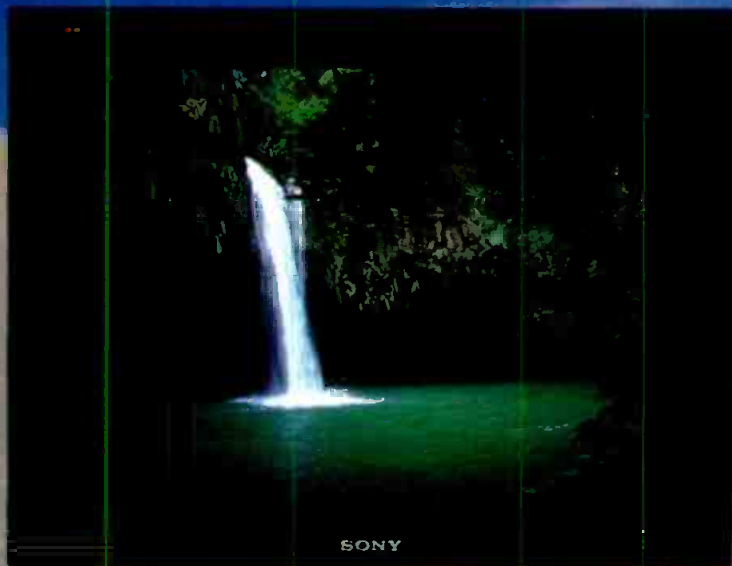
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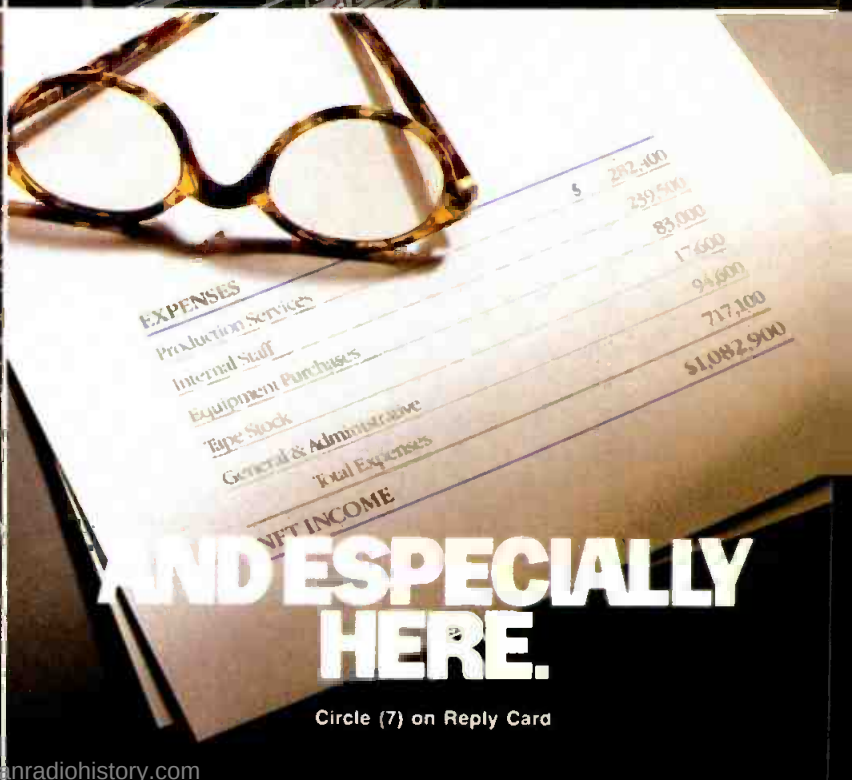
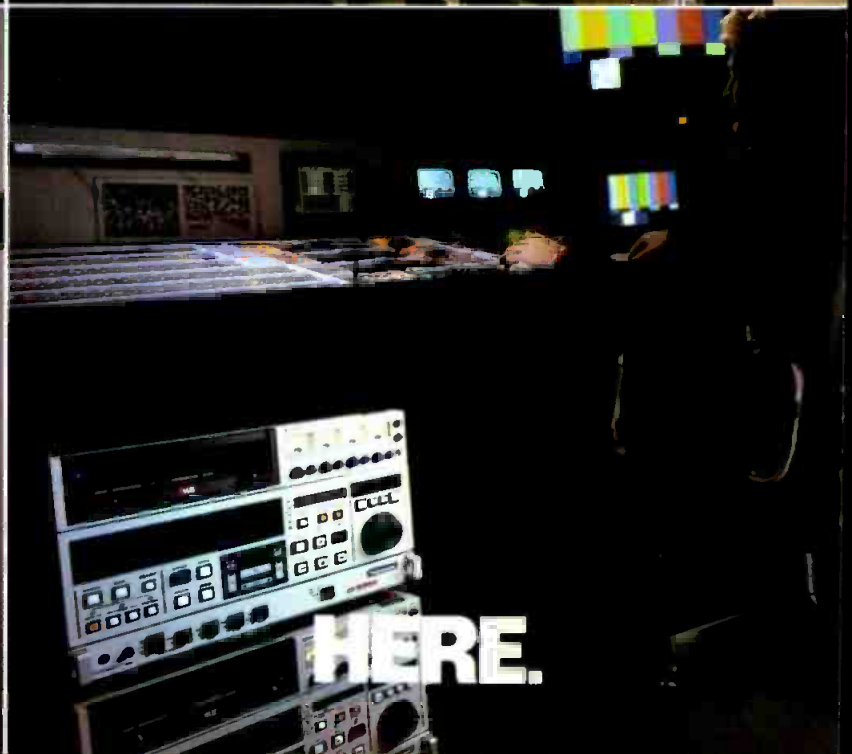
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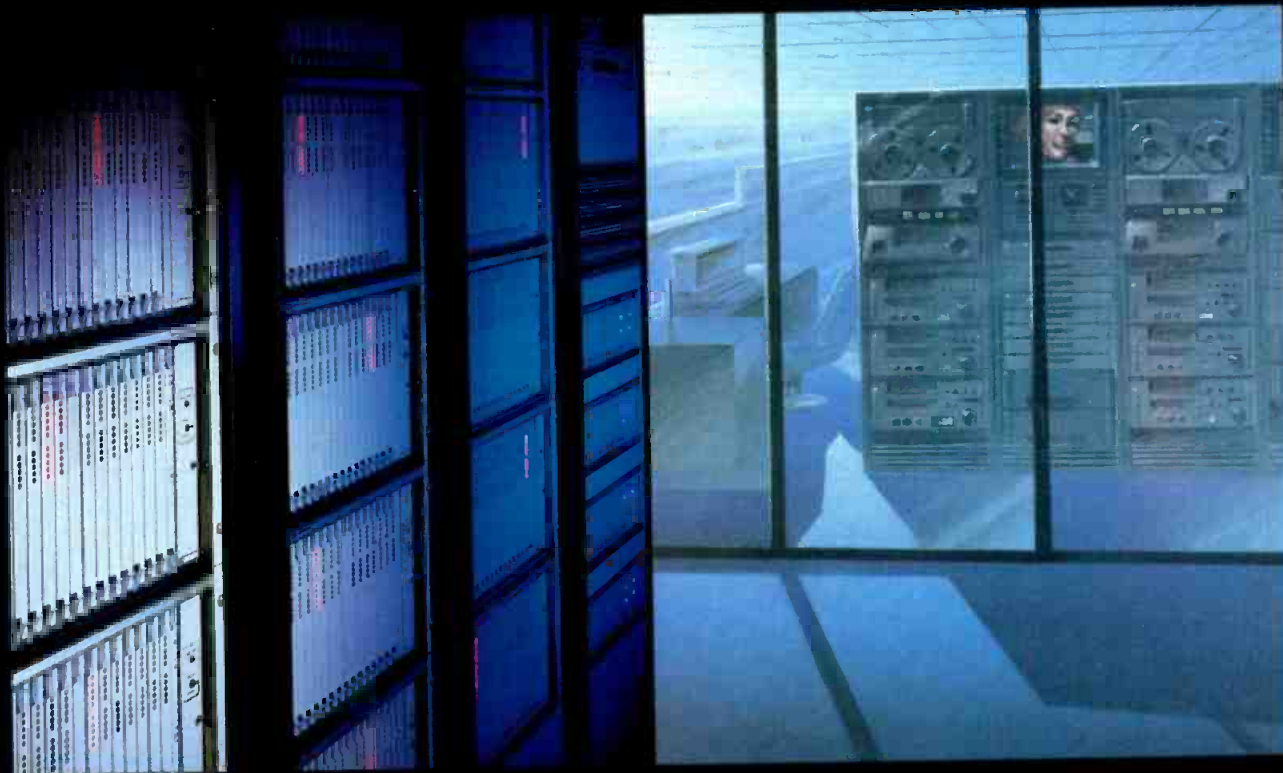
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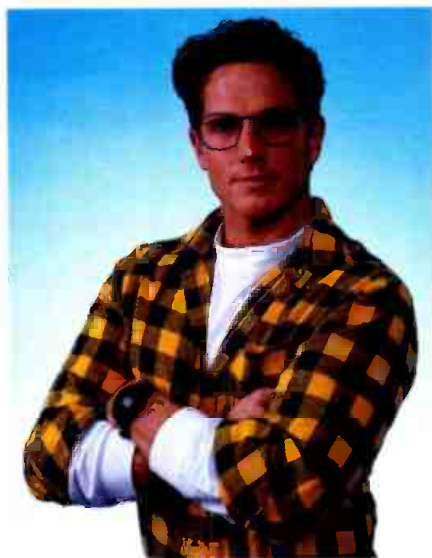
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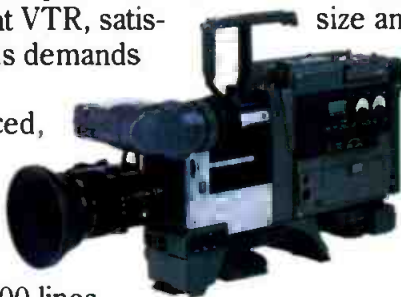
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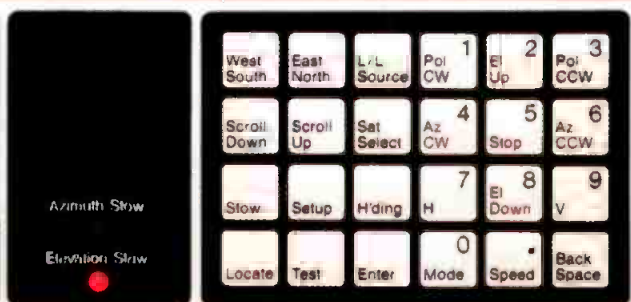
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Motorola Inc., Communications Sector
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RF Technology, Inc.
TFT Inc.

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DX Communications, Inc.
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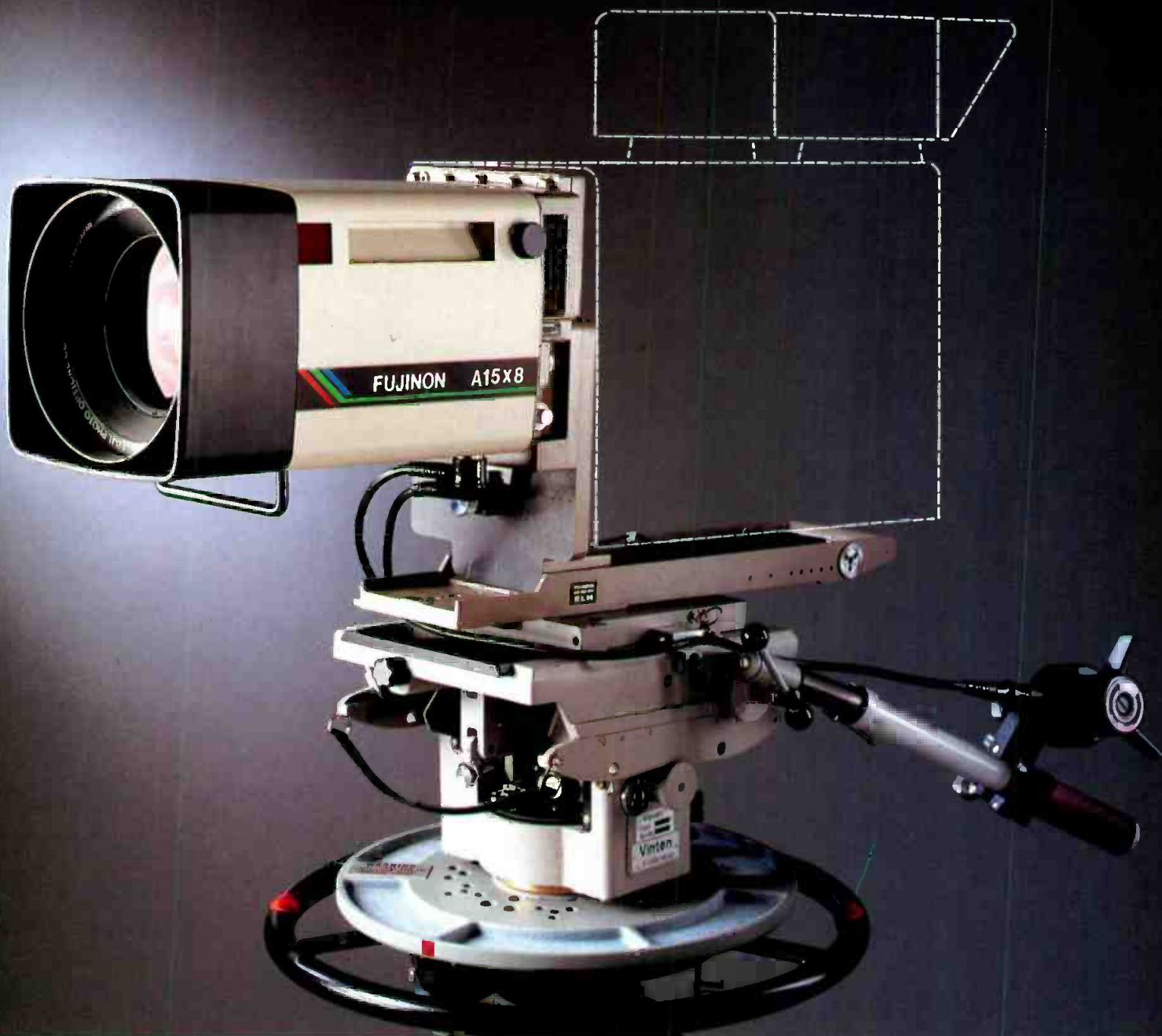
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SuperNTSC™

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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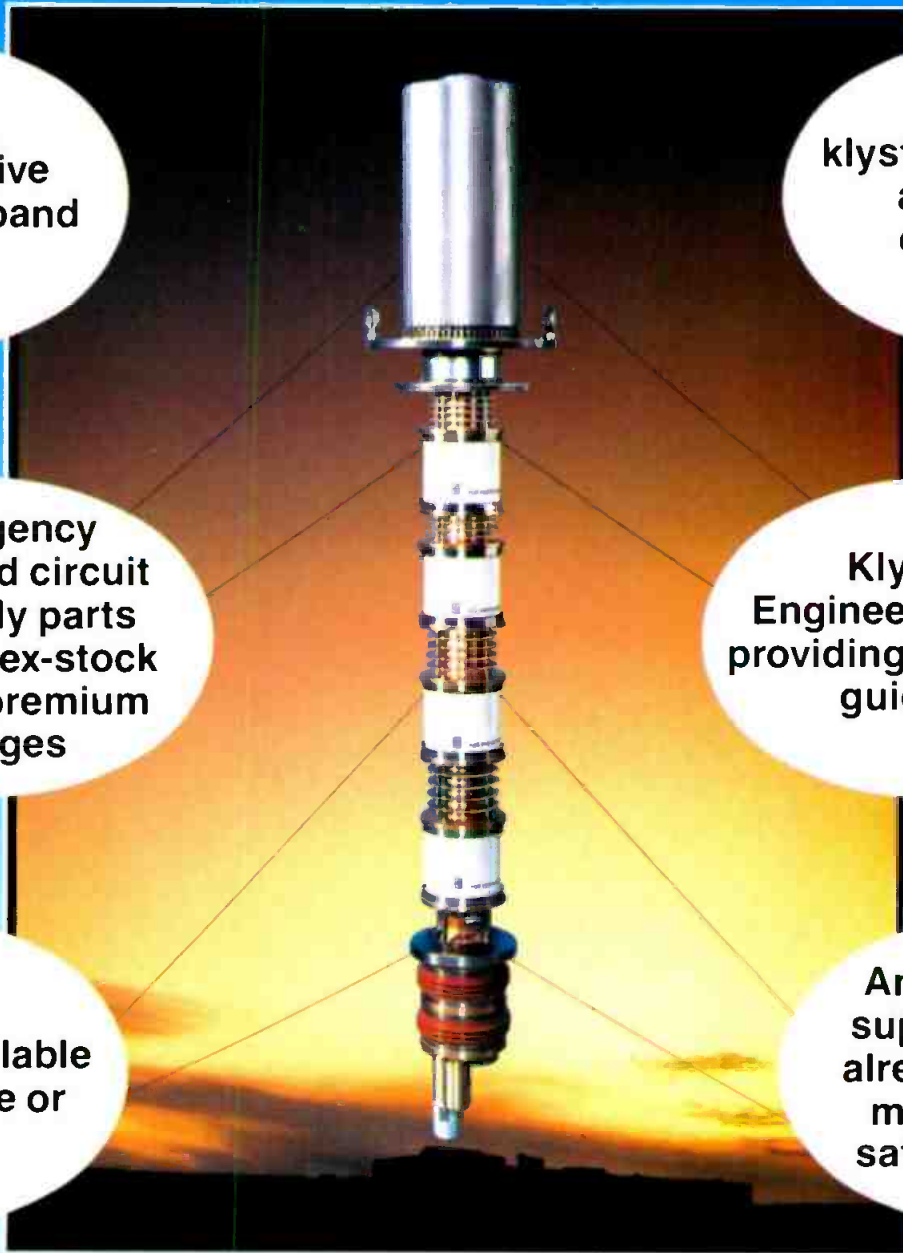
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PHASE**

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Furman Sound, Inc.
H&E Micro Trak
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International Music Co.
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Sola/General Signal
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Systems (Topaz)
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The Superior Electric Co.
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Transtector Systems Inc.
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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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Furman Sound, Inc.
Hipotronics Inc. Power Products Div.
Reliance Comm/Tec
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Perma Power Electronics, Inc.
3M Electrical Specialties Div.
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Broadcast Electronics, Inc.
Gennum Corp.
Lucas Semiconductors
Motorola Inc. AM Stereo
NEC America, Inc. Broadcast
Equipment Div.
Penstock, Inc.

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

**STATIC SUPPRESSORS/
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AND GROUNDING PRODUCTS**

Current Technology Inc.
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
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Walter Brewer Corp.
Hoffend & Sons, Inc.
Lumitrol, Ltd.
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Channellmatic, Inc.
Marathon Products Co.
National Video Service
Neumade Products Corp.
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3M Professional Audio/Video &
Specialty Products

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ACCESSORIES**

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J-Lab Co.
Nakamichi America Corp.
Otari Corp. 170
Panasonic Broadcast Systems
Co. 14-15
Sonifex Ltd.
Sony Magnetic Products Co.
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3M Broadcasting & Related Products
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Contact East
Hand Tool Industries
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Jensen Tools Inc.
Paladin Corp.
Panasonic Broadcast Systems
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Siecor Corp.
Techni-Tool Inc.
Brian R. White Co., Inc.

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	Radio Systems Inc.	Wandel & Goltermann GmbH & Co.	Acoustic Systems
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	S.G. Communications Inc.	EDITING/TELEPRODUCTION FACILITIES	John P. Allen Airspace Consultant
	Southern Illinois Antennas	Associated Production Music 105	Alpha Tower Design, Inc.
	Telefunken Sendertechnik GmbH	Circuit Studios	Eric Neil Angevine, P.E.
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	World Tower Co.	Industrial Acoustics Co.	Franklyn R. Beemish & Co.
		Johnson-Nyquist Productions Inc.	Lawrence Behr Associates Inc.
		METROPOST	Blair Benson Engineering Consultant
		Montage Group, Ltd.	Bowen Broadcast Service Co.
			Walter Brewer Corp.
			Broadcast Technology of Colorado
			BTS 119,143

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Allied Tower Co., Inc.
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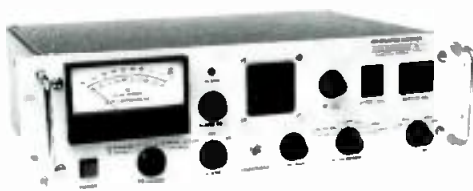
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Manufacturers' Addresses begin on page 61

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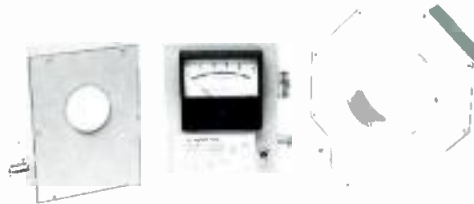
C-QUAM[®] AM Stereo—The Above Standard Industry Standard is easy to install and maintain with its modular design and construction. Offers standard features other manufacturers charge as options. A sound value, built to last.



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, ST1, coax, or antenna, using your oscilloscope.



Coaxial Transfer Switches—These 1 1/8" 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 (TCT's) provide stable antenna monitor sampling while eliminating the problems associated with loops. TCT's 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.

The Above Standard
Industry Standards.

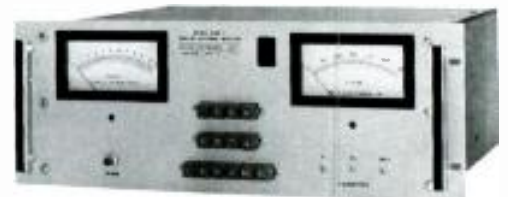
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P.O. Box 11268 • Alexandria, VA 22312 • U.S.A.
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AM Antenna Monitors—These are true ratio monitors which deliver a ratio reading without the need to continually reset the reference tower to 1,000. This simple operation reduces errors by non-technical personnel and makes tuning an array easier.

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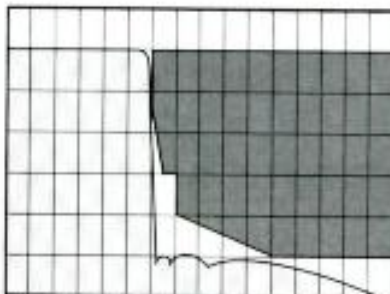
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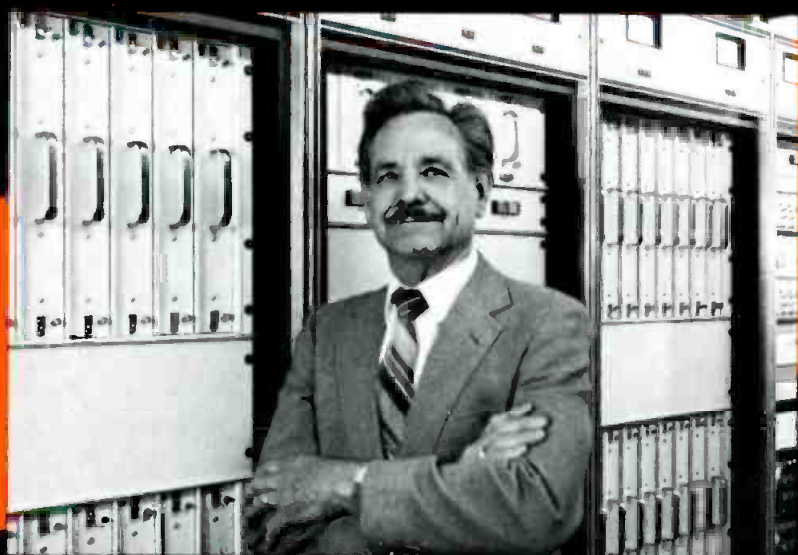
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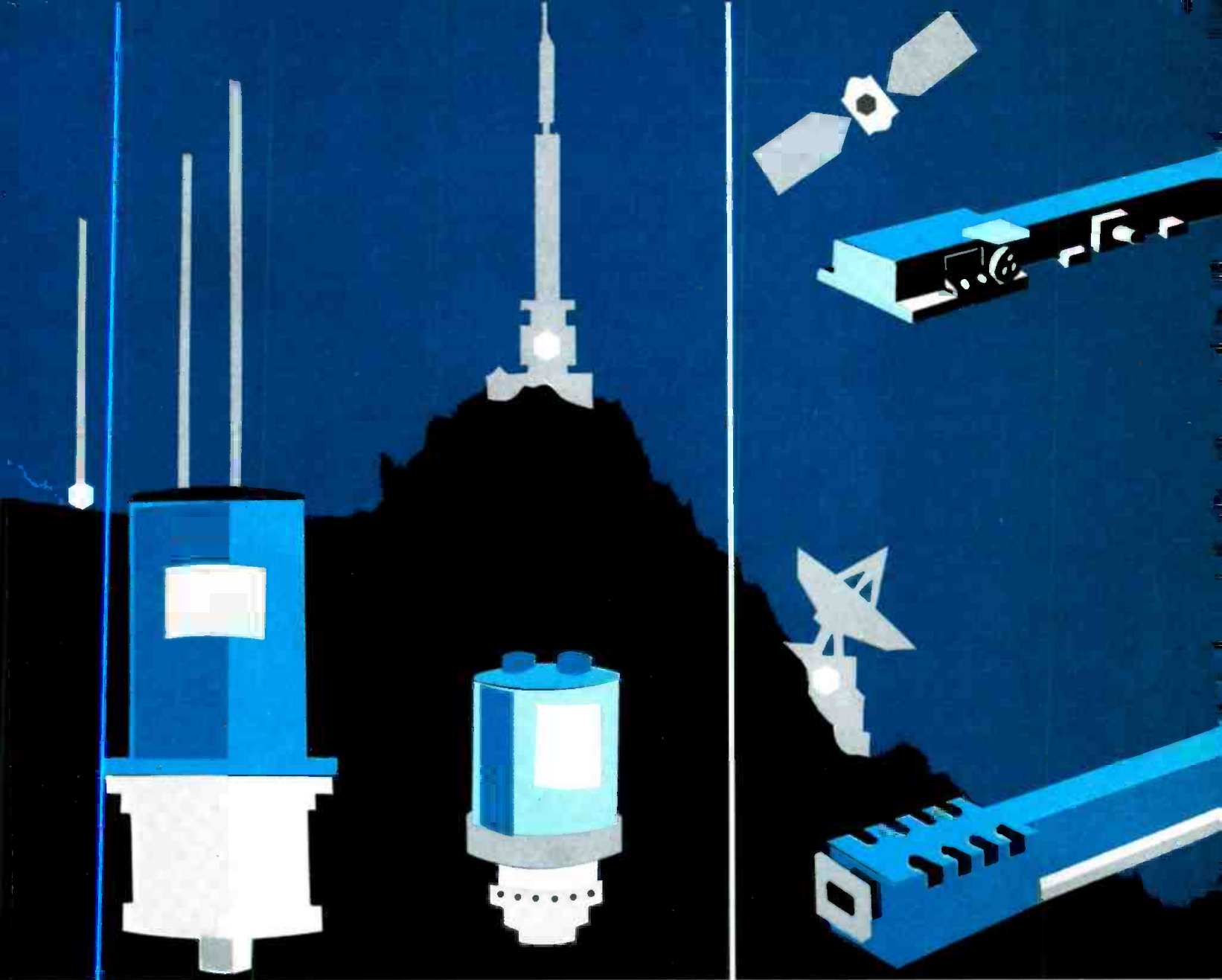
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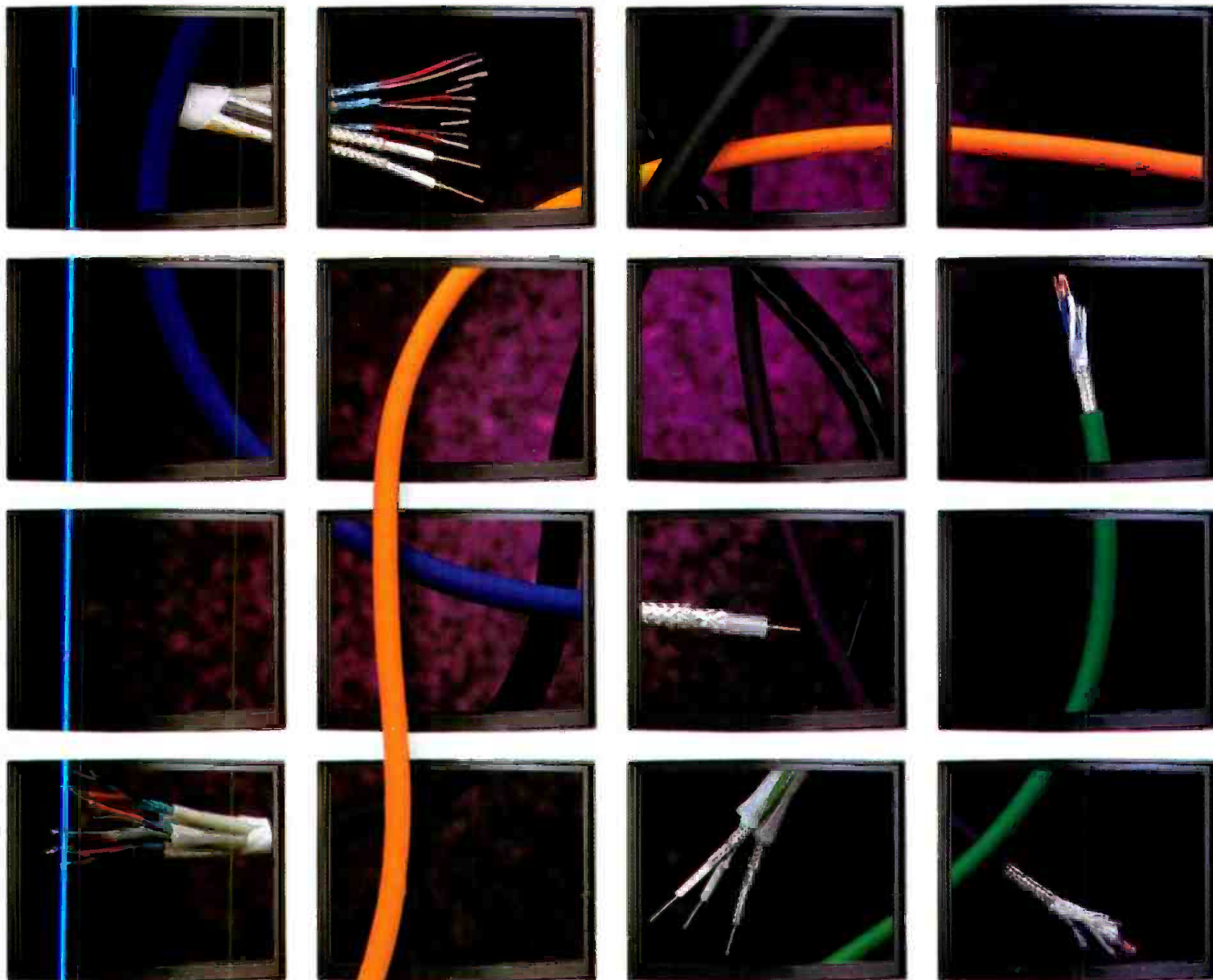
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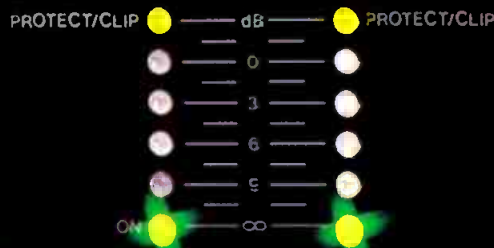
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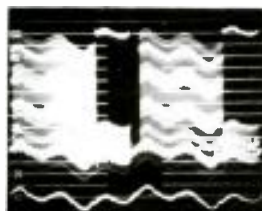
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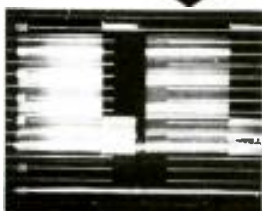
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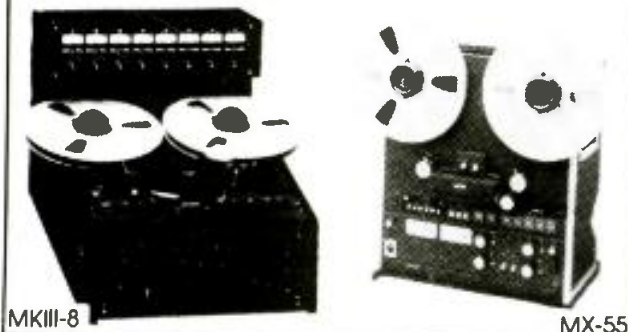
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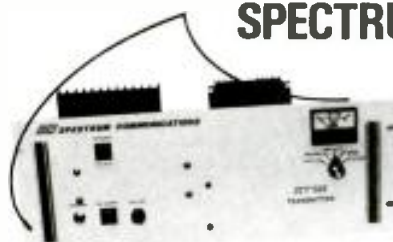
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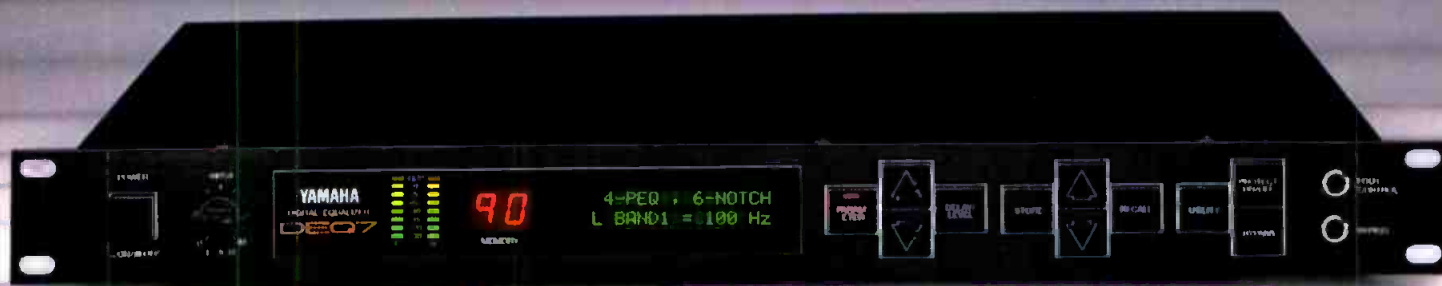
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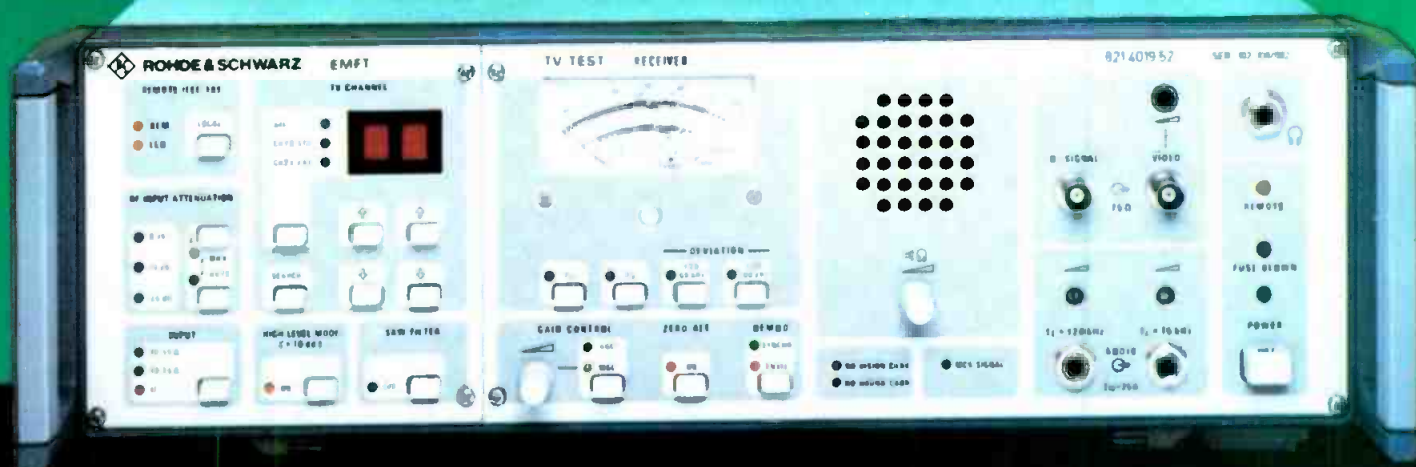
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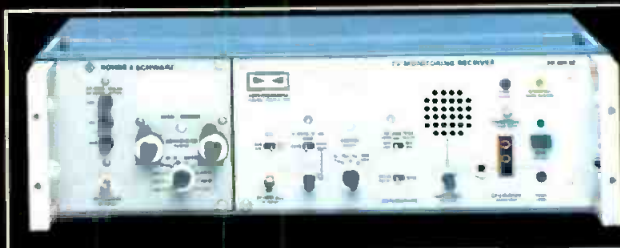
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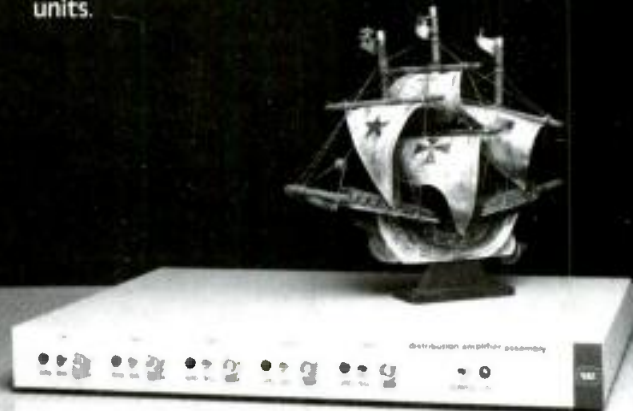
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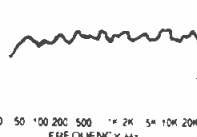
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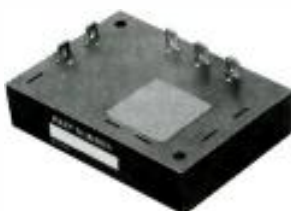
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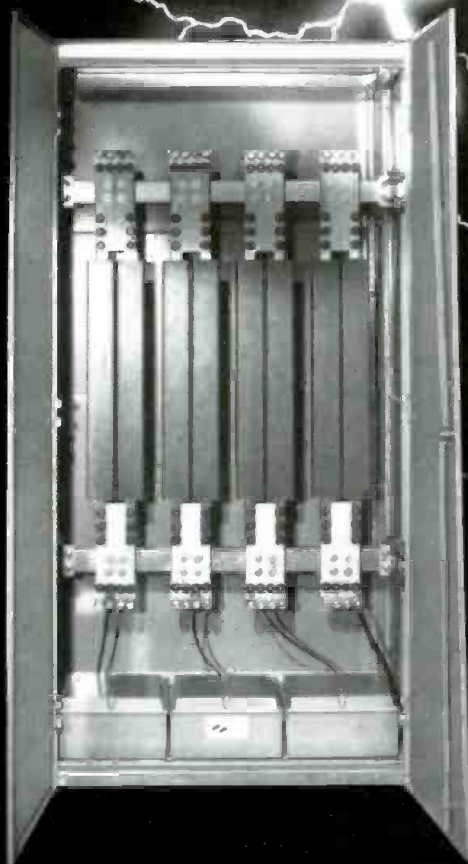
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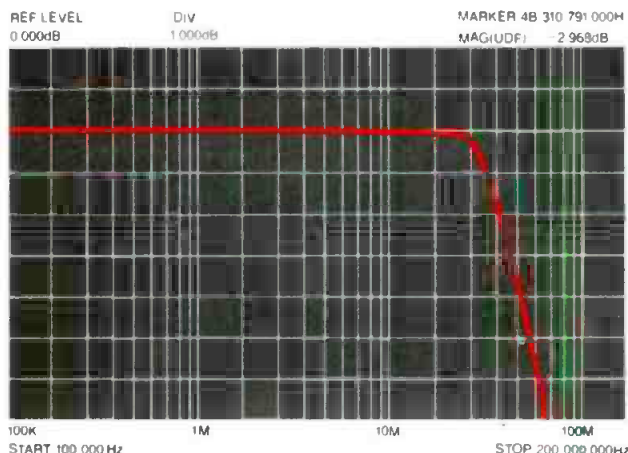
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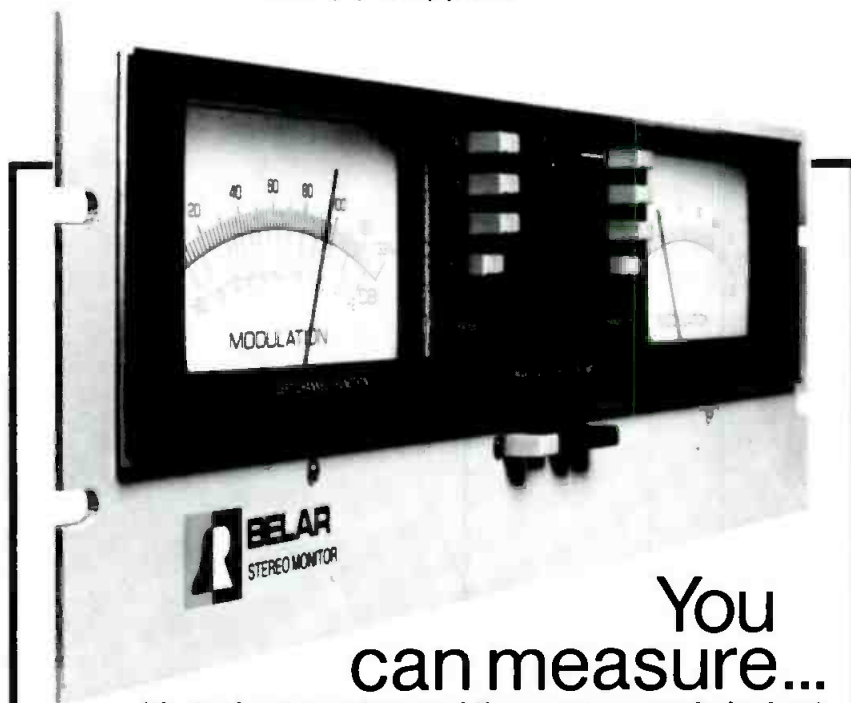
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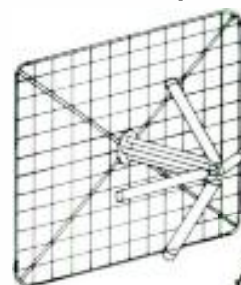
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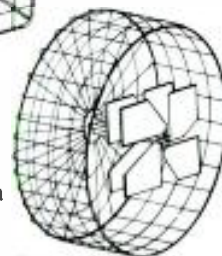


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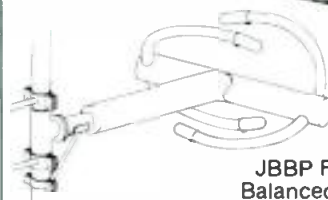
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Penstock Inc., 520 Mercury Drive, Sunnyvale, CA 94086-4018 (408-730-0300; 800-255-6788) USA & Canada, RF & Microwave Active & Passive Components; Cable assemblies & Connectors; Connectors, Cable & Assemblies

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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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

MISSISSIPPI

Broadcast Equipment Sales & Engineering Inc., P.O. Box 20331, Jackson, MS 39289-1331 (601-857-8573) AL, AR, FL, LA, MS, TN, Audio Equip.; Transmitters, Antennas & Transmission Systems; Tape; Service & Repair; System Design; New & Used Equip.; Refurbishing Available

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Centurian Marketing Associates, P.O. Box 1011, Ballwin, MO 63022-1011 (314-227-7229) Southern-IL, IA, KS, MO, NE, Audio Professional Products

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

MONTANA

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

NEVADA

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.

NEW JERSEY

A.F. Associates, 100 Stonehurst Court, Northvale, NJ 07647 (201-767-1201) Worldwide, Audio & Video Equip.; Test & Measurement Equip.; Vans & Accessories; System Design

Avtec Industries, Inc., 5 Audrey Place, Fairfield, NJ 07006 (201-882-9460; Fax 201-882-9468) USA, Middle East, Audio & Video Equip.; Test Equip.; Tape; Film Equip.; Service & Repair; System Design

Broadcast Video Marketing Corp., 275 Route 18, East Brunswick, NJ 08816 (201-390-0770) CT, DE, DC, MA, MD, NJ, NY, PA, RI, VA, Video Equip.; Cases; Test & Measurement Equip.; Audio Time Compression; Audio Delay Synthesizer; Character Generators; Degausers; Video Delay Systems; Intercoms; Standards Converters; Master Clocks; D2 Switchers & DA's

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

NEW MEXICO

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

NEW YORK

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

Audio-Video Corp., 213 Broadway, Menands, NY 12204 (518-449-7213) FL, ME, MA, NH, NJ, NY, PA, VT, Audio, Video Test & Measurement Equip.; Tape; Service & Repair; System Design; Used Equip.

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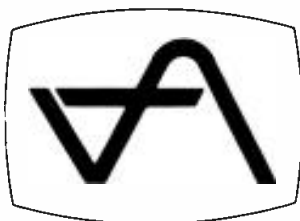
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RIA Corp., 50 E. Malvern, Salt Lake City, UT 84115 (801-486-8822 or 484-1701; Fax 801-486-2741) AZ, CA, CO, ID, LA, MS, MO, MT, NV, OK, TX, UT, WY, Audio & Video Equip.; Test & Measurement Equip.; Transmitters, Antennas & Transmission Systems; Film Equip.; Tape; Service & Repair; System Design

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Avec Electronics Corp., 711 Grandy St., Norfolk, VA 23510 (804-627-3502) DC, NC, VA

Avec Electronics Corp., 2002 Staples Mill Road, Richmond, VA 23230 (804-359-6071) DC, VA

Avec Electronics Corp., 2009 Williamson Road, Roanoke, VA 24012 (703-344-6288) NC, VA, WV, Audio, Video, Test & Measurement Equip.; Service & Repair, System Design; Tape; Vacuum Tubes

Broadcast Services Co., P.O. Box 309, Front Royal, VA 22630 (703-635-1413; 919-934-6869) DC, MD, NC, PA, SC, VA, WV, Full line of Broadcast Audio & Radio RF Equip.; Cellular Phones & Systems

Hall Electronics, 1712 Allied St., Charlottesville, VA 22901 (804-977-1100; Fax 804-979-0978) USA & Canada, New, Used & Rebuilt Equip.; Audio Equip., Transmitters, Antennas, Transmission Systems; Test & Measurement Equip.; Tape; Vacuum Tubes; Cart Machines
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.

Schafer World Communications Corp., P.O. Box 31, Marion, VA 24354 (703-783-2000) Worldwide, Audio & Video Equip.; Transmitters, Antennas & Systems; Tubes; Service Repair; System Design; Used Equip.

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

WASHINGTON

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:

Pat Blanton
Broadcast Engineering Buyers' Guide
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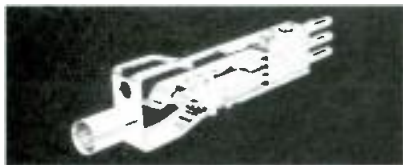
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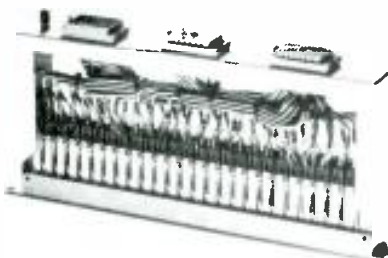
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Dealer/Distributors

Northshore Marketing, 16 W. Harrison St., Suite 205, Seattle, WA 98119 (206-284-9699) AK, ID, MT, OR, WA, Audio, Test & Measurement Equip.; Projection Video Equip.

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.

DKW Systems, 9919 105th St., Suite 730, Edmonton, Alta, Canada T5K 1B1 (403-426-1551) USA & Canada, Audio Computer Equip.; Live Assist & Automation Software & Hardware

GERR Electro Acoustics, 363 Adelaide St. E., Toronto, Ont., Canada M5A 1N3 (416-868-0528) Canada, Audio & Video Equip.; Test & Measurement Equip.; Service & Repair; System Design

Lumitrol, Ltd., 253 Merton St., Toronto, Ont., Canada M4S 1A7 (416-485-4817; Fax 485-4826) Canada, Video Studio; Lights, Dimmers, Drapes; Studio Grids, Power Distribution

M.S.C. Electronics Ltd., 147 W. Beaver Creek Road, Richmond Hill, Ont., Canada L4B 1C6 (416-731-9500) Canada, Audio & Video Equip.; Test & Measurement Equip.; Transmitters, Antennas & Transmission Systems; Vacuum Tubes; System Design

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

Penstock Canada, 133 W. Fifth Ave., Vancouver, BC, Canada V5Y 3X1 (604-662-3475) Alta, BC, Yuk., RF & Microwave Active & Passive Components; Cable Assemblies & Connectors

Tele-Tech Electronics Ltd., 920 Denison St., Unit 11, Markham, Ont., Canada L3R 3K5 (416-475-5646) Canada, Audio & Video Equip.; Test & Measurement Equip.; Tape; Used Equip.; SMPTE & Midi Equip.; Software

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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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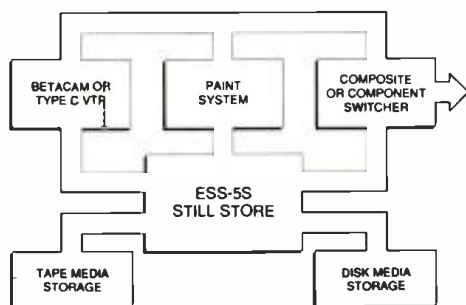
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BE-099-ESS5

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 HOTV	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	Yes	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	4	Yes	Yes	Yes
# color balance-shot memories	Yes	Yes	Yes	Yes	Yes	Yes
Program audio circuits	Yes	Yes	Yes	Yes	Yes	Yes
Lens correction memories	No	Yes	Yes	No	Yes	Yes
Coaxial cable operation	Yes	Yes	Yes	Yes	Yes	Yes
Triaxial cable operation	Yes	Yes	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	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	OG 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	40% 4MHz	400TVL adj	650TVL	600TVL 16:9	> 700 TVL
Depth of modulation	....	....	....	....	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 CCO	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 1/2000s	Yes	No	....	1/2000s 6-step	1/2000s 6-step
Registration error %	0.05% all zones	0.1, 0.1, 0.15%	<25ns	0.05% all zones	0.05% all zones	0.05% all zones
Error in ns	<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 LOK 90/900 cameras.

³ KCB590SP includes docking BCB5SP.

⁴ 32 memories with setup control unit.

Manufacturer	Hitachi Denshi America			Ikagami 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

Model	Yes	No	Yes	No	Yes	No
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	$\frac{2}{3}$ " CCD	$\frac{2}{3}$ " PbD	$\frac{1}{2}$ " IT	$\frac{2}{3}$ " PbO	$\frac{2}{3}$ " IT	$\frac{2}{3}$ " 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	600 TVL	640TVL	700TVL	700 TVL	700 TVL
Depth of modulation	60% 5.MHz	55% 5.MHz				
Electronic shutter	$\frac{1}{5000}$ S 6-step		$\frac{1}{1000}$ S 3 step		$\frac{1}{1000}$ S 3-step	
Geometric error	0	$\leq 1\%$				
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	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
μ P 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	$\frac{2}{3}$ "	$\frac{2}{3}$ " FIT CCD	$\frac{2}{3}$ " 3 FIT CCDs	$\frac{2}{3}$ " 3 FIT CCDs	$\frac{2}{3}$ " 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	$\frac{1}{500}$ 7-step	$\frac{1}{500}$ S 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
μ P 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	$\frac{2}{3}$ " IT	$\frac{2}{3}$ " FIT	$\frac{2}{3}$ " IT	$\frac{2}{3}$ " IT	$\frac{2}{3}$ " IF	$\frac{2}{3}$ " 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		$\frac{1}{2000}$ S 6-step	$\frac{1}{2000}$ S 6-step	$\frac{1}{2000}$ S	$\frac{1}{2000}$ S 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 fit
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-17	BVP-70	DXC-M7	HDC-3000
Composite output	Yes	Yes	Yes	Yes	Yes	No
RGB output	Yes	Yes	No	No	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
μ P 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 1/2" IT	2 1/2" IT	2 1/2" IT	2 1/2" FIT	2 1/2" 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 lx 1.4 +18	.....
Low light gain	18cB, 0cB, 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 unwdt 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	0.05% all zones	0.05% all zones	0.05% all zones	0.025, 0.05, 0.05%
Color correction type	.....	Optical filter	.....	Elect/Opt flt	Electronic, optical	Elect/Opt flt
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

^a Playback audio presented. ^b 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	.....	Yes	Yes	Yes
Multicore cable operation	No	Yes	Yes	Yes	Yes	Yes
Docking VCR	No	Yes	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 1/2" IT	1 1/2" IT	3 2 1/2" PbO or SAT	3 CCO	2 1/2" OG LOC	3 CCO
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 1/4 89%	1100 lux 1/4	1300 lux 1/4	1100 lux 1/4
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 unwdt	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 **HDT**V.

Television Zoom Lenses, 1/2"

Manufacturer	Angenieux			Fujinon	
Model	14x6	20x7† ²	14x7	S8.5x4.2EARM/EAD†	S14x6.4EARM/EAD†
Application	NG FP OB	ST FP OB	NG FP OB	NG FP	NG FP
CCO 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; 1.66x tele adapter available.

Manufacturer	Schnelder		
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†	J40x9.58IE†	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	2x0.6 ³	2x0.8x ⁴	1.45x, 2.1x	2x, 1.5x	2x
Macrofocus	to 0" MOD	to 0" MOD	to 0" MOD	to 0" MOD	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†	J50x9.58IE†	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	S13x98	S15x8.5B	TV81	TV85†	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	1.7-2.2	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		Schweh Technology	Tamron	
Model	TV55	TV80	Gyrozoom FP-1	Model 47HD	466H(H14x9BI)
Application	NG FP	OB ST	NG FP OB SP	CCTV	NG
CCD optimized	Yes	Yes	Yes	Yes	Yes
Zoom range (mm)	6-70(11.5x)	8.5-150	60-300	8-16	9-126
Wide-Tele f/	1.7-2.3	1.4-4	1/8.2	1.6	1.6-1.9
MOD distance	13.7"	27.5"	10'	39.37"	39.37"
MOD area (HxV)	43.6x32.7mm	53x40mm	53x40mm	53x40mm	53x40mm
Wide-Tele H angle	73.3°-3.75°	55.5°-3.4°	8.38°-1.68°	57.62°-30-75°	52°-4°
Back focus (mm)	Manual adj	42.4	42.4	10.85mm	38.98mm
Aperture (F,B)	133-33	133-33	133-33	26-9.4	76.5-24.8
Extender(s)	2x	2	2	No	None
Macrofocus	Yes	Yes	No	No	Yes
Adjustment access	On surface	On surface	On surface	On surface	On surface
Operating wt	4.3 lbs	33 lbs	7.4 lbs	0.21 lbs	3.33 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†	HR14x12.5ES†
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	Adjustable	Adjustable	Adjustable	Adjustable	Adjustable
Extender(s)	1.45x, 2.1x	2x	2x, 1.5x	2x	2x	2x
Macrofocus	to 0" MOD	No	No	No	No	No
Adjustment access	Remove cover	Remove cover	Access holes	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†	HR22x18ES†	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)	Adjustable	Adjustable	Adjustable	Adjustable	Adjustable
Aperture (F,B)	134, 43	134, 43	134, 43	134, 43	134, 43
Extender(s)	2x	2x	2x, 1.5x	2x	2
Macrofocus	No	No	No	No	No
Adjustment access	Remove cover	Remove cover	Access holes	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)	Adjustable	Adjustable	Adjustable	Adjustable	Adjustable
Aperture (F,B)	71.5	71.5	71.5	71.5	71.5
Extender(s)	2x, 1.5x	2x, 1.5x	2x, 1.5x	2x, 1.5x	2
Adjustment access	Access holes	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	CM6586	CMM 11 series†	CMM 7 series	CM 23/43†
Application	Grade 1	Grade 2	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	Yes
X-Y display output	No	No	No	Opt	Opt	No

NTSC 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	Yes	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	No		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	Dpt	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
Application	Grade 1	Gr I	Grade 1	Gr II	Gr I
CRT diagonal	19" (13")	9", 14", 20"	14", 19" (& 9")	14" 19"	14", 19"

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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	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†
Application	.....	Monitor/receiver	Graphics	Monitor/receiver	Monitor/receiver
CRT diagonal	14 and (9)	9"	19"	14"	20" (14", 9")
CRT type	.....	ILD	.....	ILD	ILD
Dot, stripe pitch	.....	0.47mm	0.31	0.43mm (0.499)	0.62mm
Aperture correction	No	No	No	Yes (No)	Yes
X-Y display output	No	No	No	No	No
NTSC test matrix	No	No	No	No	No
Blue gun only test	No	-R9U	No	Yes	No
Over/underscan	Yes	-R9U	Yes	Yes	Yes
Crosspulse display	Yes	-R9U	No	No (Yes)	No
# composite inputs	2	2 (1)	None	2	2
RGB inputs	No	No	Yes	No	No
Y/R-Y/B-Y inputs	No	No	No	No	Yes
VCR 8-pin input	No	No (Yes)	No	No (Yes)	No
Audio amp/speaker	No	Yes	No	Yes	Yes
Resolution at center	800 TVL	310 (300)	.....	400	500 TVL
Luminance bandwidth	10MHz	5MHz (.....)	30MHz	.....	500 TVL (600)
Chrominance bandwidth	.....	0.5MHz	30MHz	.....	.....
Demod axes	.....	R-Y/B-Y	.....	(R-Y/B-Y)	R-Y/B-Y
Standards	.....	NTSC	.....	NTSC	NTSC
Decoder	NTSC	Comb filter	.....	Notch (Comb)	Comb filter
Reader Service No.	697	698	699	700	701

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

Manufacturer	Melford Electronics	Mitsubishi Electric	Panasonic		
Model	DUS-20C (-16C)†	DU6-20 (DU6 range)†	AM-3501R†	CT2081V/VY† ⁷	CT 1331Y†
Application	Gr I	Gr II	Graphics, Mon/Rcvr	Utility	Utility (data)
CRT diagonal	20" (16)	20" (9/12/14/16) ⁸	35"	20 (25, 13)	13, 20, 25
CRT type	ILD/BF	ILD/BF	ILD	ILS flat screen	.....
Dot, stripe pitch	0.41mm (0.31)	0.41, 0.31mm	1.0mm center	.....	.....
Aperture correction	No	No	.....	Yes	.....
X-Y display output	No	No	.....	.....	Yes
NTSC test matrix	No	No	.....	.....	No
Blue gun only test	Yes	Yes	.....	.....	No
Over/underscan	Yes	Yes	Yes	Yes	Yes
Crosspulse display	Opt	Opt	.....	Yes	No
# composite inputs	2	2	3	.....	No
RGB inputs	Yes	Opt	Yes	Yes	A/B
Y/R-Y/B-Y inputs	Opt	Opt	.....	No	No
VCR 8-pin input	Opt	Opt	Yes	Yes	No (Yes)
Audio amp/speaker	No	No	Yes	Yes	.....
Resolution at center	850 TVL	800 TVL	600 TVL	VY mon/receiver	Yes
Luminance bandwidth	10MHz	8MHz	.....	450 lines	.....
Chrominance bandwidth	2.6MHz	2.7MHz	.....	4.2MHz	Medium resolution
Demod axes	R-Y/B-Y	R-Y, B-Y	.....	1.5MHz	300TVL (580)
Standards	NTSC/PAL	PAL	NTSC	S-video	4.2MHz
Decoder	Notch	Notch	NTSC	NTSC, S-VHS	1.2MHz
Reader Service No.	703	704	705	Notch, comb fltr	R-Y/B-Y
					NTSC (RGB/TTL)
					Notch, comb
					708

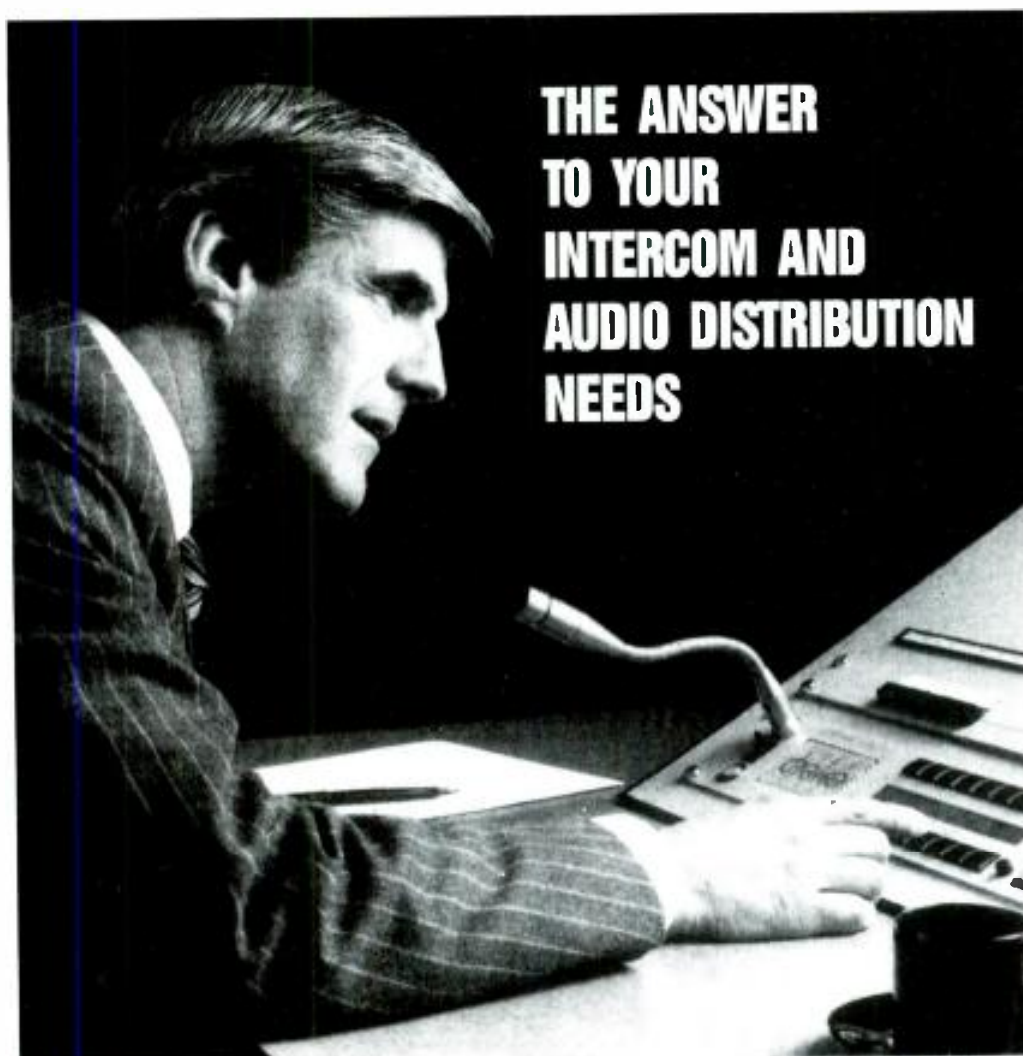
⁸ 22", 24" diagonal CRTs available with in-line slot masks. ⁷ Series includes CT-2580 25"; CT-1381V, 1381VY 13" models.

Manufacturer	Panasonic	PESA	Philips Test & Measuring/BTC	Sony	
Model	BT-M1030Y (-D1910Y)	AT-H1900 (-H1300)† ⁸	8M-4300 series	PM 5625	PVM-1342Q (-44Q)† ⁹
Application	Utility	HR	Grade 2	Grade 2	Grade II, graphics
CRT diagonal	13 (19)	13 (19)	9", 14", 20"	14"	13" (19")
CRT type	ILD	ILD	PIL 90° blackstripe	In-line	TRIN/BF
Dot, stripe pitch	0.39mm (0.55)	0.31mm (0.44)	0.31, 0.44mm	0.65mm	0.25mm
Aperture correction	Yes	Yes	.....	Yes	Yes
X-Y display output	No	No	No	No	No
NTSC test matrix	No	Yes	No	No	No
Blue gun only test	Yes	.....	No	Yes	No
Over/underscan	±5%	Yes	Yes	Yes	Yes
Crosspulse display	Yes	Yes	Yes	Yes	Yes
# composite inputs	A/B	.....	A B sync	2	Yes
RGB inputs	Y/C, YCC opt	Yes	No	Yes	2 sets
Y/R-Y/B-Y inputs	Yes	Yes	No	No	YPP
VCR 8-pin input	Yes	No	No	No	No
Audio amp/speaker	.....	.....	No	No	No
Resolution at center	550TVL	.....	>450, >600	Equiv of 0.65mm	Yes
Luminance bandwidth	4.2MHz	4.2MHz	±0.5dB 5MHz	5MHz	600 TVL
Chrominance bandwidth	1.5MHz	1.5MHz	.....	to Fsc	8MHz
Demod axes	R-Y/B-Y	R-Y/B-Y	.....	R-Y, B-Y	2MHz
Standards	NTSC	NTSC, M-II	NTSC, PAL	NTSC/PAL SECAM opt	I/Q 90°
Decoder	Notch, comb fltr	Notch, comb fltr	.....	Notch filter	N P S
Reader Service No.	709	710	711	712	Comb-filter
					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						
Application	Grade I	Grade II	Grade II	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	No	Yes
NTSC test matrix	No	No	No	No	Yes	Yes
Blue gun only test	No	No	No	Yes	Yes	Yes
Over/underscan	Yes	No	No	Yes (No)	Yes	Yes
Crosspulse display	Yes	No	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/B-Y	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/nolch
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						
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/B-Y	R-Y/B-Y	R-Y/B-Y	R-Y/B-Y	R-Y/B-Y



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Standards Decoder	NTSC	N/P/S CF/1-CF/3-CF/notch	N/P/S CF/1-CF/3-CF/notch	N/P/S CF/1-CF/3-CF/notch	NTSC Comb filter, Notch	NTSC Notch
Reader Service No.	721	722	723	724	725	726
Manufacturer	Videotek			Vistek Electronics¹¹		
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 (65 10) ¹²		
CRT type	ILS	TRIN	ILS	ILD		
Dot, stripe pitch		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	ADO 100	ADO 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	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				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		Option	Yes
Iterative effects	Yes	No	No		Option	Option
Perspective effects	No	Yes	No	Option	Yes	Yes
Curvilinear effects	No	Yes	Option		Yes	Yes
Picture splits	H V	H V Opt	No		Yes	H
Mirror effects	No	No	Option	Y V	H V	H V
Push on off	N V Diagonal	H V Opt	H V Diag	H V	H V Option	H V Diag
Solarize	Yes	Yes	No	Yes	Yes	Yes
Posterize	Yes	Yes	Yes	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 F/X	DSC/Digital Services Corporation			Fougerolle Video	GML/GML Grove
Model	DFX 200	Illusion	Eclipse 5500CC	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		I/O	I/O	RGB R-Y/B-Y	No
Digital in/output	I/O component			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	No
Remote protocol	RS-422 GPI LAN	GPI	GPI	RS-422 GPI	RS-422, GPI	Dual frame store
System S/N ratio		52dB	52dB	52dB		GPI, RS-232/422
Diff phase, gain		2°, 2%	2°, 2%	2°, 2%		58dB
Sample rates, bits	13.5MHz 32-bit	14.3MHz 8-bit	14.3MHz, 8-bit	14.3MHz 8-bit	13.5MHz 8-bit	2°, 2%
Image size variation	Unlimited					8-bit
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

Introducing the Canon J20x7.5B IE SUPER.



Without a doubt, the new Canon J20x SUPER is the finest of the new generation of CCD lenses designed specifically for CCD cameras. Offering the kind of versatility to make it a star performer in any size studio.

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Perspective effects	Yes
Curvilinear effects	Yes
Picture splits	No
Mirror effects	No
Push on off	No
Solarize	No
Posterize	No
Mosaic tiling	No
Programmed sequences	No
Reader Service No.	1046

Yes
No
H V
H V
No
Yes
Yes
Yes
Yes
1047

Yes
Yes
H V
H V
No
Yes
Yes
Yes
Yes
1048

Yes
Yes
H V
H V
Yes
Yes
Yes
Yes
Yes
1049

Yes
Yes
H V
H V
Yes
Yes
Yes
Yes
Yes
1050

Yes
H V
H V
H V
Yes
Yes
Yes
Yes
Yes
1051

Manufacturer Model	GML/GML Grove X-Calibre (II)	Kaleidoscope DP	Grass Valley Group 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
Y/C, S-VHS in/output			N			
Component in/output	YUV/YIQ/RGB	I O	I O	I/O	I/O	I/O
Digital in/output		I O C C	I O C C		I/O component	I/O/composite
Dub in/output			N			
Still store functions	No	N	Option	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	Yo
Iterative effects	Yes	Yes	Opt	No	Option	No
Perspective effects	Yes	Yes	No	Yes	Yes	No
Curvilinear effects	Yes	Yes	No	Yes	Yes	Yes
Picture splits	H V	NV	HV	H V	H V	Yes
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	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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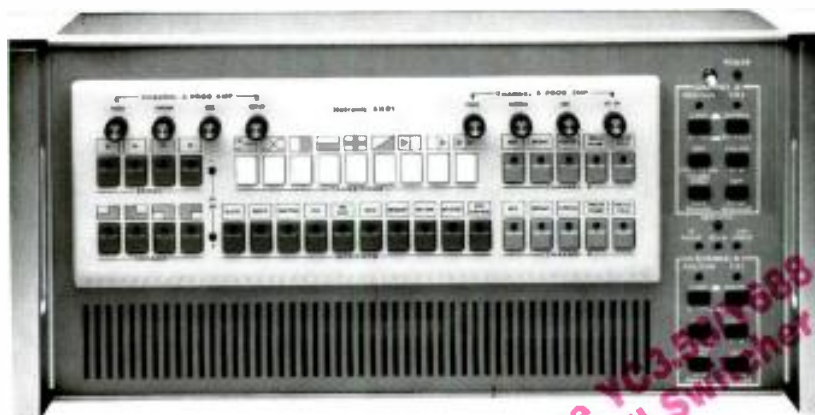
Manufacturer	Model	NEC America DVE System 100	Pinnacle Systems PRIZM	2100 Series	Quantel DVM8000	DPE5800 Encore	Sony DME 450 ^g
# inputs channels		2 basic 4 exp	1 basic	1 basic	1. expandable	1. expand to 15	1 basic
# output channels		1 basic 1 exp	1 basic	1 basic			1 basic
# image planes		1	3	2			1
Control system		Prop CPU CtlPnl	PC compatible	IBM/AT-based	Dedicated, softkeys	Dedicated, softkeys	PropCPU Ctl pnl
Instruction memory form		FD	FD/HD	FD (HD in 2010)	FD, HD, RAM	FD, HD, RAM	ROM > 280 effects
Parameter display		None	Menu driven	Menu driven	External CRT	Keyboard, CRT	LED of effect #
Y/C, S-VHS in/output			No	No	No	No	No
Component in/output			I/O	In/Out	I/O	I/O	I/O
Digital in/output			No	No	I/O	I/O	No
Dub in/output			No	No	No	No	No
Still store functions		No	Option	Yes (in 2010)	No	No	N
TBC functions		No	No	No	No	No	Integral
Remote protocol		GPI	RS-232/422/GPI/Esbus	RS-232/422/GPI/Esbus	RS-422	RS-422	52dB ^g
System S/N ratio		50dB	58dB	58dB			<30 ^g
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	13.5MHz	
Image size variation			0x-Infinity	0x-8x	Continuous	Continuous	
Image compression ratio			Infinite	Aspect ratio adj	Infinite	Infinite	
Image expansion ratio			Infinite	8:1	Infinite	Infinite	
Rotation around axes		X Y	X Y Z	X Y	X Y Z	X Y Z	X Y Z
Image freeze		Yes	Yes	Yes	Field, frame	Field, frame	Yes
Strobe		No	Yes	Yes		Yes	No
Iterative effects		No	Yes	Yes		Float viewpoint	Yes
Perspective effects		No	Yes	Option	Yes	Yes	No
Curvilinear effects		No	Yes	Option	Yes	H/V/diagonals	HV
Picture splits		H V	H/V	H/V	No	No	H V
Mirror effects			H V	H V	Yes	Yes	HV
Push on off		H V Diag	No	No			
Solarize		Yes	Yes	Yes		256 lvl false color	Yes
Posterize		Yes	Yes	Yes		Yes	Yes
Mosaic tiling		Yes	Yes	Yes		Yes	No
Programmed sequences		Yes	Yes	Yes	Yes	Yes	No
Reader Service No.		1058	1059	1060	1061	1062	1063

^g 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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- Audio Switcher

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Digital Effects



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Manufacturer	Abekas Video	Ampex	Amtel Systems	BHP Inc	BTS	Cinedco
Model	A34 Solo ¹	ACE 25	E-Plx	TouchVision 8909M	BBE-900 ⁵	EdiMax, 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 Ctl-Trk 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	AFM, VDX, GPI	VDX	AFM, VDX	AFM, VDX
Control protocol	RS-422, GPI	RS-232, RS-422, GPI	RS-232/-422/GPI	RS-422	GPI equipment	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	CMX-6000	330A/330S ⁶	3100B ⁶	CASS-1 (-1E)
Suggested for	On-line	On-line	Off-line	On-/Off-line	On-line	On/off-line audio
Editing type	Linear	Linear	Non-linear	Linear	Linear	Linear
Transports controlled R/P	4-R, 4-P	4-R, 4-P	1 R/12 P ⁷	1 R/3 P	6 R/6 P	6 R/6 P
Videodisc interface	No	No	Yes	Option	Option	No
Control μ P type	Multiple	Distributed	Multiple	Distributed	Distributed	Multiple μ P (PC)
# events (internal storage)	16	4	10,000+	999	999	999
External event storage	3.5" FD	Removable RAM-Pac	FD, HD	FD	FD	FD/HD
Edit decision list	Multi per 3.5" FD	No	Yes	Yes	Yes	Yes
Edit data display	CRT	LED	CRT, LED display	CRT	CRT	CRT
Printer interface	RS-232, parallel	.....	RS-232	RS-232	RS-232	RS-232
Command entry via	Keyboard	Keyboard	KB/touch pad/Console	Keyboard, Gismo	Keyboard, Gismo	Keyboard
Deck motion control via	Keyboard	Keyboard	.....	Keyboard, Gismo	Keyboard, Gismo	Keyboard
Assemble edit	.....	.....	[Trim, splice	Yes	Yes	Yes
Insert edit	[Audio editing	.....	[Insert, lift	Yes	Yes	Yes
Split A/V edits	[stores user setup	.....	[Clip functions	Yes	Yes	Yes
A/B sync roll	[w/edit list	.....	[Multicam, source/	Yes	Yes	Yes
Animation mode	[Interface to four	.....	[master interlock	Yes	Yes	No
Integral TC reader	[Shadow II and	.....	.....	Option	Option	Yes
Integral TC generator	[CDI-750 G/R.	.....	.....	Option	Option	No
Time reference support for	LTC	LTC	LTC/VITC/Film	LTC/VITC/CtlTrk	LTC/VITC/CtlTrk/Film	LTC/VITC/CtlTrk/Film
Color framing	.....	.....	.....	NTSC/PAL	NTSC/PAL	.....
Editing accuracy	0.01 frame w/TC	0.01 frame w/TC	0	0 TC,	0.0	Per ATR used
Interfaces available	.....	.....	VTR	AFM, VDX, TLC,	AFM, VDX, TLC	AFM, MATR
Control protocol	RS-232, GPI	RS-232/GPI	RS-232/422	MATR, EFX	MATR, EFX	RS-232/-422
Reader Service No.	907	908	909	910	911	912

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	ECS-90 (90XL)	ECS-900 (900 3i)	ECS-195 (195 3i)	ECS-205
Suggested for	On-/Off-line	On-line	Off-line	On/Off-line	Off-(& on-line)	On & off-line
Editing type	Linear	Linear	Linear	Linear	Linear	Linear
Transports controlled R/P	1 R/3 P	6 R/6 P	1 R 1 P	6 any function	1 R 2 P	8 any function
Videodisc interface	Option	Option	No	No	No	No
Control μ P type	Centralized	Distributed	 (Centralized)	Multiple	 (Multiple)	Multiple
# events (internal storage)	999	999	1	1000	450 (1000)	1000
External event storage	FD	FD, HD	FD PT	FD, PT	FD PT	FD PT
Edit decision list	Yes	Yes	 (No)	Yes	Yes	Yes
Edit data display	CRT	CRT	CRT	CRT	CRT	CRT
Printer interface	Parallel	RS-232	RS-232	RS-232	RS-232	RS-232
Command entry via	Keyboard/console	Keyboard, Gismo	Keyboard	Keyboard	Keyboard	Keyboard
Deck motion control via	Keyboard/Gismo	Keyboard, Gismo	Joystick	Joystick	Joystick	Joystick
Assemble edit	Yes	Yes	Yes	Yes	Yes	Yes
Insert edit	Yes	Yes	Yes	Yes	Yes	Yes
Split A/V edits	Yes	Yes	No	Yes	Yes	Yes
A/B sync roll	No	Yes	No	Yes	Yes	Yes
Animation mode	No	Yes	No (Yes)	Yes	No (Yes)	Yes
Integral TC reader	No	Option	Yes	Yes	Yes	Yes
Integral TC generator	No	Option	Yes	Yes	Yes	No
Time reference support for	LTC/VITC/CtlTrk	LTC/VITC/CtlTrk/Film	LTC CtlTrk	LTC CtlTrk	LTC CtlTrk	LTC CtlTrk
Color framing	NTSC/PAL	NTSC/PAL	No	Yes	Yes	Yes
Editing accuracy	0 TC,	0.0	± 0 TC ± 1 CtlTrk	± 0 TC ± 1 CtlTrk	± 0 TC, ± 1 CtlTrk	± 0 TC, ± 1 CtlTrk
Interfaces available	AFM, VDX	AFM, VDX, TLC	None	AFM, VDX, CG	AFM, VDX, CG	AFM, VDX, CG
Control protocol	RS-422, GPI	MATR, EFX	Parallel VTR (& RS-232)	MATR	MATR/	MATR
		RS-232/422/GPI/CMX		RS-232/-422/GPI	RS-232/-422/GPI	RS-232/-422/GPI
			Parallel VTR	Parallel VTR	Parallel VTR	Parallel VTR
Reader Service No.	913	914	915	916	917	918

Manufacturer	Convergence	CV Technologies	Editing Machines Corp	Grass Valley Group		
Model	EMME	Edi Master	VPE-151	VPE-141	IPS-100 system	
Suggested for	On, Off-line	Off-line	Off-line	On-line	On, Off	On, Off
Editing type	Linear	Linear	Non-linear	Linear	Linear	Linear
Transports controlled R/P	9 total	2 R, 4 P	Opt configs	1-R, 6-P	1-R, 6-P	1-R, 6-P
Videodisc interface	No	No	Option	.....	No	No
Control μ P type	Distributed	PC	PC	Distributed	Distributed	Distributed
# events (internal storage)	750	900	.....	16,000	2,000	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	Yes	Yes	Opt	Opt
Animation mode	Yes	Yes	No	Yes	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
Interfaces available	AFM, VDX, MATR	Video Switcher		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	Yes	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	No	No
Integral TC generator	No	No	No	No	LTC CtlTrk	LTC CtlTrk VITC
Time reference support for	CtlTrk	LTC CtlTrk	Ctl Trk	LTC CtlTrk VITC	No	No
Color framing	No	No	No	No	No	No
Editing accuracy	± 2 CtlTrk	± 0 TC ± 2 CtlTrk	$\pm 2 (\pm 6)$ 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 RS-422/232/GPI/Par	GPI	AFM, VDX, TLC, STL MATR, CG, EFX RS-422/232/GPI/Par
Control protocol	Other	RS-422	Other	RS-422/232/GPI/Par	RS-422/GPI/Parallel	RS-422/232/GPI/Par

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Reader Service No.	923	924	925	926	927	928
¹⁰ Edit accuracy is dependent upon the VTR/VCR being used.						
Manufacturer	ELAN	Paltex		Panasonic	Sony Communications Products	
Model	Model	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	FO PT	FO PT	FO 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, VOX, TLC, STL MATR, CG, EFX	AFM, VOX, 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 series ¹²	MultiTasking series ¹⁵	UMI 400 series ¹⁸	VLC-32 Environment	Mickey Edit Control
Suggested for	On (& Off) line	On, Off-line	On, Off-line	On, Off-line	On/Off line	On/Off line
Editing type	Non-linear	Linear	Linear	Linear	Linear	Linear
Transports controlled R/P	1-R/2-P, 1-R/3-P	8 R, 8 P ¹³	9 R, 9 P ¹⁶	1 R, 3 P	R/P	R/P
Videodisc interface	No	Yes	Yes	Yes	Option	Option
Control μ P type	Centralized	Multi Distributed	Multi distributed	Multi distrib	Distributed	Distributed
# events (internal storage)	N.A. (998)	600 ¹⁴	3000 ¹⁷	250	500	400
External event storage	Floppy disk	Floppy disk	Floppy disk	Floppy disk	FD	FD
Edit decision list	No (Yes)	Yes	Yes	Yes	Yes	Yes
Edit data display	LED (CRT)	CRT	CRT	CRT	CRT	CRT
Printer interface	RS-232	RS-232	RS-232	RS-232	RS-232	RS-232
Command entry via	Keyboard	Keyboard	Keyboard	Keyboard joystick	Keyboard	Keyboard, Mouse
Deck motion control via	Keyboard	Keyboard	Keyboard	Keyboard	Keyboard	Mouse
Assemble edit	No (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	No (Yes)	Yes	Yes	Yes	Yes	Yes
Animation mode	No (Yes)	Yes	Yes	Yes	Yes	No
Integral TC reader	No (Opt)	Yes	Yes	Yes	Option	Option
Integral TC generator	No (Opt)	Yes	Yes	Yes	No	No
Time reference support for	LTC VITC CtlTrk	LTC VITC CtlTrk Tmr	LTC VITC CtlTrk Tmr	LTC VITC CtlTrk Tmr	LTC/VITC/CtlTrk	LTC/VITC/CtlTrk
Color framing	Yes (Opt)	Yes	Yes	Yes	Yes	Yes
Editing accuracy	0 TC, ± 2 CtlTrk	± 0 TC, ± 2 CtlTrk	± 0 TC, ± 2 CtlTrk	± 0 TC, ± 2 CtlTrk	N.A.	N.A.
Interfaces available	AFM, VDX, MATR, EFX	AFM, VDX, MATR	AFM, VDX, MATR	AFM, VDX	AFM, VDX, EFX, MATR	N.A.
Control protocol	RS-422, GPI	RS-232/-422 GPI	RS-232/-422 GPI	RS-232/-422 GPI	RS-232/-422 GPI	RS-232/-422 GPI
Reader Service No.	935	936	937	938	939	940

¹² Commander II 8-VTR; Mini-Comm 6-VTR; Comm-ette 3-VTR.
MT-60 6-VTR, MT-90 9-VTR.

¹³ Commander II 8R/8P; Mini-Comm 6R/6P; Comm-ette 3R/3P.
MT-30 3R/3P, MT-60 6R/6P, MT-90 9R/9P.

¹⁴ Commander II & Mini-Comm 500; Comm-ette 250.
Series includes 420-2VTR, 430-3VTR, 440-4VTR.

¹⁵ MT-30 3-VTR,
MT-30 1000; MT-60 2000; MT-90 3000.

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-4500 ¹	Alias/2	Velocity	Artstar 30 Plus
Base computer	80286 (80386)	68000 series P	68000 series	68030 ³	68020
Internal memory	12-plane buffer	8MByte std	8MByte expandable	8MByte/140MByte HD	8MB RAM/190MB disk
Memory architecture	32-bit RGBA	16-/32-bit	16-/32-bit	32-bit	32-bit
Off line storage	FD/HD/ST	RHD, FD, ST	FD, HD, ST	WD, ST	Streaming tape
Image resolution	512x486/13.5MHz	4000x4000	1024x768 pixels	768x486	756x482
Image sources	RGB, Modem, Tablet, Ethernet	RGB tablet, library	NTSC, tablet, camera	NTSC & RGB optional	NTSC, digital data
Output driver	RGB, frame buffer, NTSC, film recorder	RGB, Scitex Digital video	NTSC, Betacam, Film Digital video	NTSC	NTSC, film
Standards	NTSC	NTSC PAL SECAM Film	NTSC, PAL, Film	PAL option	PAL opt
Encoder, decoder	External	External	Internal, not req.	Internal	Internal
Sync generator	External	External	Internal	Internal	Internal
Operator interface	Tablet, keyboard	Keyboard, tablet	Keyboard, tablet	Mouse KB Tablet	Tablet, Keyboard
VTR controller	.....	External, BTS	Lyon Lamb VAS-5	Lyon Lamb ext	Integral
Frame buffer used	.....	Proprietary	Proprietary	AT&T Pixel	Proprietary 32-bit
2D features	Full feature	Text, editor	Full 2D editing	.....	PNT, AN, Type, GRF
3D modeling	Options	WF, GOU, PHO ²	Yes	PR, TM, ML, RT GOU, PHG LT, CAM, OBJ	WF, TM, ML GOU, PHG LT, CAM, OBJ
Animation	Options	Choreographer	SDL language	Yes	Yes
Real time output	.....	.....	No	Yes	Yes
Render engines supported	.....	.....	2 systems	AT&T Pixel Machine	No
CRTs used for	Canvas, system	Canvas status	Canvas, menus	Terminal, menu	Terminal Menu Canvas
Multiple users	.....	.....	.....	No	No

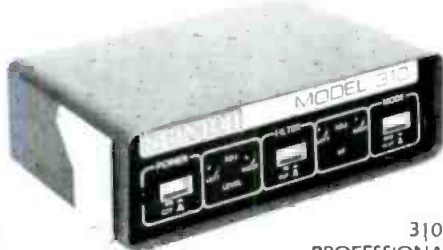
Remote data input protocol RS-232 Ethernet, WX Ethernet RS-232³ N.A. Proprietary Proprietary
 Reader Service No. 1106 1107 1108 1109 1110 1111
¹ Associated systems and equipment includes EPIC Expandable Performance Image Computer, Pixelator rendering engine, FGS-4500 Satellite Modeler and FGS-4500 Illustrator 3-D paint system. ² Also 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	Composlum	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	320bit
Off line storage	Optical disk	Floppy disk	FD, RHD	FD, HD, RHD	HD, RHD	HD, RHD
Image resolution		768x480-pixel	4096x4096	720x486	760x486	760x486 pixel
Image sources	D-1	NTSC, Y-C	NTSC, Betacam	NTSC, Betacam D-1	NTSC, digital data	D1, RGB, YUV, DATA
Output driver	D-1	Scanner	Digital data	D2, Scanner	Scanner	Scanner
		NTSC, Y-C	F.R. NTSC, Betacam	NTSC, Betacam D-1	NTSC, D-2, data	D-1, Data, RGB, YUV
Standards	525-line Dpt	PAL option	PAL opt	PAL opt		
Encoder, decoder	External	External	External	Internal	Internal	External
Sync generator	Internal	External	External	Internal	External	Tablet, Keyboard
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	PNT, AN, Type, GRF
2D features	PNT, AN, Type	PNT, AN, Type, GRF	Paint	PNT, AN, Type	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		1115	1116	1117
Reader Service No.	1112	1113	1114			

Manufacturer	Dubner Computer	Getris Images	Harris Video Systems	Laird	Microtime	Pinnacle Systems
Model	Graphics Factory 40	VENICE	Harris Vws 3-D ⁵	1540 Paint	Image Plus	3000 series
Base computer	68020	PC XT/AT	Harris Vws WkSt	68010	80386P AT	IBM/AT
Internal memory	16MB RAM/20MB disk	110MByte RAM	per order	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 WO	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
Output driver	Digital data	D-1/D-2, scanner	RGB	NTSC Y-C opt	Hi-Res scanner	
	NTSC, D1, D2, Digita	Composite, component	NTSC, Y-C, D-1		Film, NTSC	NTSC, Betacam
	Digital data	D-1/D-2, data	RGB		Betacam	
Standards	PAL option	D-1/D-2, data		NTSC	PAL option	PAL opt
Encoder, decoder	External, Internal	PAL option	Internal	Ext	External	Internal



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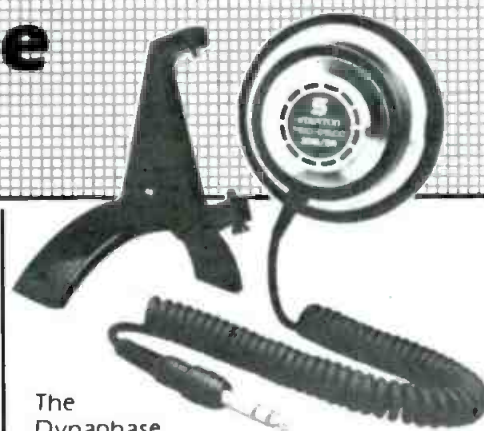


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101 Sunnyside Blvd., Plainview, NY 11803



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500AL ... For heavy duty on-the-air use with wide tracking force range.

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
		RT. GDU. PHG	RT. GDU. PHG		ML. GDU. PHG	GOU. PHG
Animation	LT. CAM. DBJ	LT. CAM. DBJ		No	LT. CAM. DBJ	LT. CAM. OBJ
Real time output	Yes	Yes	No	No		No
Render engines supported			Yes	No	Also off-line render	.....
CRTs used for	Menu		Menu/canvas combined	Menu, Canas	Menu, canvas	Menu
Multiple users	2 users	No	No	No	Yes	No
Remote.data input protocol		GPI		RS-422	Proprietary	B > RS-232
Reader Service No.	1118	1119	1120	1121	1122	1123

⁵ Tiler, 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 HO in PAL version.

Manufacturer	Quantel	Spaceward	Thomson Video Equipement
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	4.4:4.4	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	Dpt	Ext	Int. Ext
Sync generator	Dpt	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	S161-CG/T ¹	Vidifont II
Subtitling	Variable	Variable	Variable	Variable position	Variable
Tab	Yes	Yes	Yes	No	Yes
Underlining by	Char/word/line	Char/word/line	Yes	No	Yes
Page format	Free form	Free form	Free form	32Cx16L-32TVL	64-Cx31-L
Resolution	5.5MHz bw	4.6ns	<10ns	100ns	48ns
Anti-aliasing	Hardware. 256 lvl	Hardware. software	Software	None	Hardware. software
On-line type faces	Unlimited	30	Multiple	1	8
Character planes	Unlimited	16		4	32
Background planes	1	1	Yes	Yes	Yes
Animation by	Char/word/line	Char/word/line	Yes	No	Yes
Type styles	S. N-S	S/N-S	Multiple		N/N-S/SC/IT
Italicize by	Variable angle	Variable	Yes	No	Yes
Rotation	None	360°		No	No
Sizing, scaling	Yes	Yes	Yes	No	Yes
Non Arabic faces			Yes	No	Yes
Type face storage	FD. HD. ST	RAM FD HD	Disk	PRDM (RAM)	FD. RAM
Face font compose	No	Option	Option	No	Option
Display flash by	No	Char/word/line	Yes	Character	Yes
Edging effects	Surround. shadow	Surround. shadow	Yes	Surround. shadow	Yes
Auto centering	H. V	H. V	Yes	No	Yes
Roll, crawl control	Variable	Infinite variation	Yes		Yes
Keyer colorizer	2 encoders std	Integral or 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
Internal memory	4.4:4.4/13.5MHz	4.4:4.4 pipeline	24-bit		Graphic Store opt
Off-line storage	FD. ST	FD. HD	Disk	FD. HD	FD. HD
Access time per page		Per complexity	<1s		<0.9s
Remote control	RS-232		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		No	2 Keyboards
Automation interface	RS-232	Ethernet	RS-232/422	RS-232. RS-422	No
Paint system interface	No	No		No	.....
Reader Service No.	953	954	955	956	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

What you've always wanted in a tube camera is the best picture possible. But now you get the best picture in a CCD Camera — the new BTS LDK 910. And you'll never miss the tubes. Because the LDK 910 meets or beats the picture quality of tube cameras with a new CCD sensor that employs over 800 pixels per line, and over 406,000 total picture elements.

In addition to excellent resolution, the LDK 910 has a high signal-to-noise ratio, high sensitivity and accurate colorimetry. Along with a few other things you don't get with tubes. Such as BTS's frame-transfer technology, which eliminates smear. A high dynamic contrast range without blooming or burn-in. And excellent dynamic resolution enhanced



LDK 91 CCD Portable Camera

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

And here's another reason you won't miss the missing tubes. Not only is the LDK 910 priced competitively with tube cameras, but it costs less than you'd probably spend replacing worn out tubes over the life of a studio camera.

But of course, big ideas also come in small packages. The LDK 91, a lightweight, easy-to-handle ENG/EFP camera, is the LDK 910's portable companion. Singled out by *Broadcast Engineering* magazine as one of the ten "Pick Hits" of NAB '89, it has the same CCD sensor and the same top picture quality as the LDK 910.

Together, these fully compatible CCD cameras will make your old ideas about picture quality go right down the tubes. For complete information and technical specifications on the new LDK 910 and LDK 91, call BTS at 1 800-562-1136, ext. 11.

BTS

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A professional broadcast video camera, the Ikegami HL-53, is shown from a side-front perspective. It features a large, black, cylindrical lens assembly with a silver-colored front element. The camera body is black with various controls, including a viewfinder on top and a control panel on the side. A microphone is visible on the top. The background is dark and out of focus.

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If you're in the market for a broadcast quality chip camera that combines outstanding performance with outstanding price, consider Ikegami's HL-53.

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Weighing only 6.8lbs with viewfinder, the HL-53 features a six speed electronic shutter to assure high resolution under



various shooting conditions, a newly developed optical low-pass filter for reduction of noise, high sensitivity (+24dB) and much more.

The HL-53 viewfinder provides complete set-up data, an incredibly clear picture, and can add or delete a safe title area box, cross hairs and audio bar graph.

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.

Accessory compatibility is just one more reason to stay with Ikegami, where quality combines with economy. The finest value in broadcast chip cameras is the HL-53. When a better value comes along, it will also be an Ikegami.

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

Ikegami

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
Tab	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	Surround/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	Integral	Integral	Integral	Integral
Color palette	512 8/s	64 64/s	512 200/s	16.7M 527/s	512 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
Tab	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 overiap	1/unlimited overiap
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	Yes
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	.....	.....	.....
Off-line storage	FD/HD/RHD	HD, Bernoulli	FD/HD/Bernoulli/SCSI	.....	via PC connection	FD, HD
Access time per page	.....	.....	.....	100ms	1s average	1s average
Remote control	RS-232, Modem	RS-232	RS-232	No	RS-422	RS-422
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	No	Upgrade option	Option
Reader Service No.	965	966	967	968	969	970

² Requires optional hardware.

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
Tab	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 overiap	1/unlimited overiap	1/unlimited overiap	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	4R, 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 FD
Off-line storage	FD, HD	FD, HD	1s average	1 4s		
Access time per page	RS-422	RS-422	RS-422	GPI & (Proprietary)	RS-232	
Remote control	ENC video, tablet	ENC video, tablet	ENC video	ENC video (Y-C)	ENC video	ENC video, tablet
Image sources	No	No	No	No	No	No
Multi-user system	RS-422, GPIB	RS-422, GPIB	RS-422 GPIB	GPIB	RS-232	RS-232
Automation interface	Yes	Option	No	No	No	Integral
Paint system interface	971	972	973	974	975	976
Reader Service No.						

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

Manufacturer	3M Broadcast & Related Products	PESA	Quanta Corporation	Quanta Corporation	Quanta Corporation
Model	D-2200	CG-4711 (CG-4722)	QCG-304 (QCG-38)	Orion	Microgen Plus
Subtitling	Variable	(Opt)	Lower third	Lower third	Lower third
Tab		8 tabs	Yes	Yes	No
Underlining by		Yes	None	Character	None
Page format		32 char x 16 line	40 C 13 L	64 C 36 L/10-126TVL	32C x 12 L
Resolution	70ns	35ns	55ns (18ns)	5ns	50ns
Anti-aliasing			None	Software	None
On-line type faces	8	4 (8) in RAM	4 (8)	250	4
Character planes			1	1	1
Background planes			1	1	1
Animation by		No	None	Character	None
Type styles		Various	S NS	S NS	S NS
Italicize by		Line	No	Variable	No
Rotation		No	None	360° by font	None
Sizing, scaling	Yes		Yes	Yes by font	No
Non Arabic faces		Script designer	None	None	None
Type face storage	RAM	3 5" disk	ROM	FD	ROM
Face font compose	No	Option -4722	No	Option	No
Display flash by	Character	Yes	Character	Character	Character
Edging effects	Surround	Full control	Surround (& shadow)	Surround, shadow ⁵	Surround shadow
Auto centering	H, V	H, V	Horizontal	H	Horizontal
Roll, crawl control	10 speeds	8 speeds	9 speeds	99 speeds	9 speeds
Keyer colorizer	Integral	Integral	Integral	Integral	Integral
Color palette	512, 16/s	121 121/s	512 34/s	16 7million 1000/s	256 24/s
S-VHS output	No	No	No	No	No
Integral still store	No	No	No	No	No
Internal memory	256kbyte	15 pg/4096 lines	8-bit 600 row RAM	2 5MB, 16/64-bit	8 bit 600 row RAM
Off-line storage	FD	3 5 floppy	None	HD, FD	None
Access time per page			0.5ms	0.5ms	4ms
Remote control		RS-232, timecode	RS-232	RS-232/-422	RS-232
Image sources	ENC video	ENC video	ENC video	ENC video	ENC video
Multi-user system	No	-4722 dual channel	No	No	Option
Automation interface	RS-232	RS-232	RS-232	RS-232/-422	RS-232
Paint system interface	No		No	No	No
Reader Service No.	977	978	979	980	981
					982

⁵ Also outline, highlighting effects.

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Circle (104) on Reply Card

Manufacturer	Quanta Corporation	Quantel	Ryley Comm.	Telemet div/Gaotel
Model	QCG-500	Cypher Sports ⁸	CAPGEN series 2	Telemet 2000
Subtitling	Lower third	Variable	Variable	Lower 3rd
Tabs	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	Fioppy 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 HO	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	Yes	No	No
Automation interface	RS-232	Option	No	RS-232
Paint system interface	No	.....	Yes	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
Supports NTSC	Yes	Yes	No	Yes	Yes	Yes
Supports PAL	No	No	No	No	.....	Yes
Supports SECAM	No	No	No	No	No	No
Format conversion	No	No	Yes	Yes	Yes	Yes
Supports Y/C-3.58	No	No	No	No	No	No
Supports Y/C-688	No	No	No	No	No	No
Supports RGB	Yes	Yes	Yes	Yes	Yes	Yes
Supports YC _R C _B	Yes	Yes	Yes	Yes	Yes	Yes
Supports D-1 CCIR 601	No	No	No	Yes	Yes	Yes
Supports D-2	No	No	No	Yes	No	Yes
Dubbing applications	No	Yes	Yes	Yes	Yes	Yes
Production applications	Yes	Yes	Yes	Yes	Yes	Yes
On-air applications	Yes	Yes	Yes	Yes	Yes	Yes
Enhancement horizontal	Yes	No	.....	Yes	Yes	No
Enhancement vertical	No	No	.....	Yes	Yes	No
Noise reduction	No	No	.....	No	Yes	No
Color correction	No	Yes	.....	No	No	Yes
Contrast correction	No	Yes	.....	No	No	Yes
Sync regeneration	Yes/No	No	.....	Yes	Yes	Yes
Full proc amp control	Yes/No	No	.....	No	No	Yes
Programmable system	No	No	.....	Yes	Yes	Yes
Time code control	No	Yes	.....	No	No	No
RS 232 422 control	No	No	.....	Yes	Yes	Yes
Composite encoder	Yes	No	.....	No	No	Yes
Improved NTSC encoding	No	No	.....	No	No	Yes
Video bandwidth	6MHz	5 MHz	6MHz	to 5.75MHz	to 5.75MHz	to 5.75MHz
Video S/N ratio	60dB	65dB	60dB	65dB	54dB	65dB
Envelope delay	1100ns	450ns	30ns	5ns	5ns	5ns
Differential phase, gain	0.5°, 0.5%	.....	.....	0.2°, 0.2%	0°, 0%	0.2°, 0.2%
Reader Service No.	1064	1065	1066	1067	1068	1069

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

Manufacturer	Ampex	AVS Ltd ³			Broadcast Video Systems	
Model	DST-300	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-3.58	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
Sync regeneration	Yes	Yes	Yes	Yes	Yes	No(Y. Y)
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	Yes	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° <15%		<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
Enhancement horizontal	No	No		Yes	Yes	Yes
Enhancement vertical	No	No		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
Sync regeneration	No	Yes	per CCIR	TBC	Yes	Yes
Full proc amp control	No	Yes	Yes	Yes	Yes	Yes
Programmable system	No	No			No	No
Time code control	No	No		No	No	No
RS-232/422 control	No	No		No	No	No
Composite encoder	No	No	Yes1	Yes	Yes	Yes
Improved NTSC encoding	No	No			No	No
Video bandwidth	6MHz		per CCIR	-3. +0.5dB 4MHz	5.5MHz	5.5MHz

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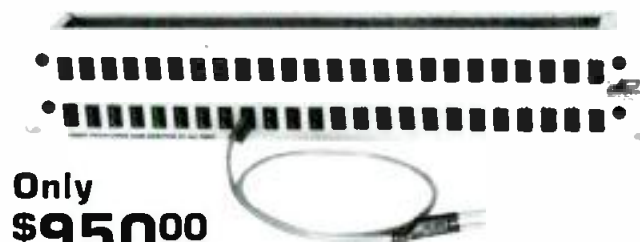
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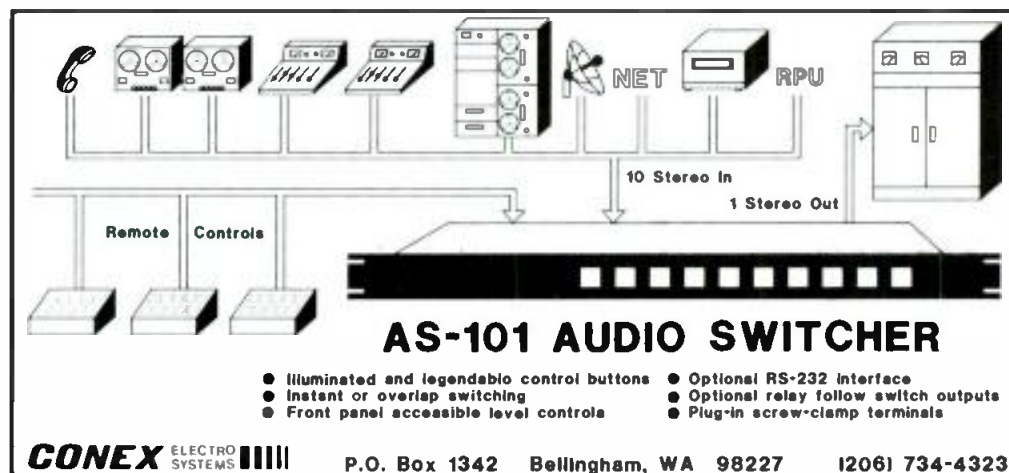
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Video S/N ratio	46dB				56dB	56dB
Envelope delay				Adjustable	Adj.	Adj.
Differential phase gain					2°, 2%	2°, 2%
Reader Service No.	1076	1077	1078	1079	1080	1081

⁵ #100 Y/C-3.58-YC_{RGB}; #300 YC_{RGB}-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
Supports NTSC	Yes	Yes	Yes	Yes	Yes	No
Supports PAL	Yes	No	Yes	No	No	No
Supports SECAM	Yes	No	Yes	No	No	No
Format conversion	Yes	Yes	No	Yes	Yes	Yes
Supports Y/C-3.58	Yes	Yes	No	Yes	Yes	No
Supports Y/C-688	No	No	No	No	No	No
Supports RGB	No	Yes	No	Yes	Yes	Yes
Supports YC _{RGB}	Yes	Yes	No	Yes	Yes	Yes
Supports D-1 CCIR 601	No	Yes	No	No	No	No
Supports D-2	No	Yes	No	No	No	No
Dubbing applications	Yes	Yes	Yes	Yes	Yes	Yes
Production applications	Yes	Yes	Yes	Yes	Yes	Yes
On-air applications	Yes	Yes	Yes	Yes	Yes	Yes
Enhancement horizontal	No	Yes	Yes	Yes	Yes	No
Enhancement vertical	No	Yes	Yes	Yes	No	No
Noise reduction	No	No	No	No	No	No
Color correction	Yes	No	No	No	No	Yes
Contrast correction	Yes	No	Yes	No	No	No
Sync regeneration	Yes	Yes	No	Yes	No	Yes
Full proc amp control	Yes	No	No	Yes	No	No
Programmable system	No	Yes	No	No	No	No
Time code control	No	No	No	No	No	No
RS-232/422 control	No	Yes	No	No	No	No
Composite encoder	Yes	Yes	No	Yes	No	No
Improved NTSC encoding	No	Yes	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

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	Yes
Supports NTSC	Yes	Yes	No	No	Yes	Yes
Supports PAL	No	Yes	No	Yes	310P	Yes
Supports SECAM	No		Yes	No	No	Yes
Format conversion	Yes	No	No	No	No	Yes
Supports Y/C-3.58	No	Yes	No	No	No	Yes
Supports Y/C-688	No	Yes	No	No	No	Yes
Supports RGB	Yes	Yes	Yes	Yes	No	Yes
Supports YC _{RGB}	Yes	No	Yes	Yes	No	Yes
Supports D-1 CCIR 601	No	No	No	No	No	
Supports D-2	No	Yes	No	No	No	
Dubbing applications	No	Yes	Yes	No	Yes	Yes
Production applications	Yes	Yes	Yes	Yes	Yes	Yes
On-air applications	No	No	Yes	Yes	Yes	Yes
Enhancement horizontal	Yes	No	No	No	No	Yes
Enhancement vertical	Yes	No	No	No	No	Yes
Noise reduction	Yes	No	No	No	No	Yes
Color correction	No	No	No	No	Yes	Yes
Contrast correction	Yes	No	No	No	Yes	Yes
Sync regeneration	Yes	Yes	Yes	Yes	Yes	Yes
Full proc amp control	No	Yes	No	No	Yes	Yes
Programmable system	No	No	No	No	No	Yes
Time code control	No	No	No	No	No	
RS-232/422 control	No	No	No	No	No	Yes
Composite encoder	No	No	Yes	Yes	No	Yes
Improved NTSC encoding	No		No	No	No	
Video bandwidth	9MHz	5MHz	3MHz	6MHz	±0.1dB 5MHz	±1dB 3.3MHz NTSC
Video S/N ratio		> 60dB	56dB	> 60dB	> 60dB	56dB unrwtd
Envelope delay			700ns	390ns	N.A.	Adjustable
Differential phase gain		1°, 1%		< 2°, 2%	< 0.2°, 0.5%	
Reader Service No.	1088	1089	1090	1091	1092	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	LJ 1200	LJ 1250	Satin/Satin 601
Standards conversion	Yes	Yes	Yes	Yes	Yes	Yes
Supports NTSC	Yes	Yes	Yes	Yes	Yes	Yes
Supports PAL	Yes	Yes	Yes	Yes	Yes	Yes
Supports SECAM	Yes	Yes	Yes	Yes	No	Yes
Format conversion	Yes	No		No	No	No
Supports Y/C-3.58	Yes	No	No	Yes	No	
Supports Y/C-688	Yes	No	No	No	No	
Supports RGB	Yes	Yes		No	No	Yes
Supports YC _{RGB}	Yes			No	No	
Supports D-1 CCIR 601				Yes	No	Yes
Supports D-2				No	No	
Dubbing applications	Yes	Yes	Yes	No	No	Yes
Production applications	Yes	Yes		No	No	Yes
On-air applications	Yes	Yes		No	No	Yes
Enhancement horizontal	Yes	Yes	Yes	Yes	Yes	Yes
Enhancement vertical	Yes	Yes	Yes	Yes	No	Yes
Noise reduction	Yes	Yes	Yes	Yes	No	Yes
Color correction	Yes	Yes	Yes	Yes	Yes	
Contrast correction	Yes	Yes	Yes	Yes	Yes	
Sync regeneration	Yes	Yes	Yes	Yes	Yes	TBC function
Full proc amp control	Yes	Yes	Yes	No	No	Yes
Programmable system	Yes	Yes		No	No	Yes
Time code control				No	No	



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Basic crosspoint matrix	10x10	9x9	8x4	10x10	10x10	10x1
Typical system size	10x10	9x9	8x8, x12, x16	450x450 max	200x200 max	3x10x1-3x20x1
Audio response ($\pm$ dB Hz-kHz)		$\pm$ 0.1dB 20-20k	[This product is directed toward CCIR 601 4:2:2 [digital video, per CCIR 601	$\pm$ 0.1dB 20-20k	$\pm$ 0.1dB 20-20k	....
Harmonic distortion		<0.002% 20-20k		<0.005% +10dBv	<0.005% +10dBv	....
S/N ratio		95dBu		85dB Hum & noise	85dB	....
Audio crosstalk (worst)		<-95dB 20kHz		<-90dB to 20kHz	<-90dB to 20kHz	$\pm$ 0.7dB 30MHz
Video response	$\pm$ 1.5dB 15MHz	[Matrix is 4A + [1TC from VTR in [and out with [4A from audio [routing switcher		-1,+0.5dB to 30MHz	-1,+0.5dB to 30MHz	<0.1°, <0.15%
Differential phase, gain	<0.1%			<0.10°, <0.10%	<0.15°, <0.15%	< $\pm$ 1.5° Differential delay
Chroma Luma delay	< $\pm$ 1°			$\pm$ 1° Differential delay	$\pm$ 1° Differential delay	>75dB
Video S/N ratio	>75dB			>75dB	70dB	<-56dB w/Fsc
Video crosstalk (worst)	<-60dB Fsc			>60dB DC-4.43	>55dB DC-4.43	Serial, partyline
Control format	RS-232/-422	Front panel control programmable	ESbus, X/Y, or button/crosspoint	15-pin RS-422	15-pin RS-422	
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	Model 5861/5862
Audio, Video, Combined	A/V	Audio/video	A/V	A/V
Basic crosspoint matrix	8x4	16x8	160x20	16x8
Typical system size	8x4	32x32	100x100, 800x800 max	16x16
Audio response ($\pm$ dB Hz-kHz)	-3dB 10-100k	-2dB 50-100k	$\pm$ 0.5dB 20-20k	$\pm$ 0.1dB 20-20k
Harmonic distortion	....	0.1%	0.005%	<0.05%
S/N ratio	90dB	+100dB	113dB	>94dB
Audio crosstalk (worst)	-70dB 20kHz 0dBm	-80dB 15kHz 0dB	-85dB 10kHz 30dB	<-75dB
Video response	0.1dB 6MHz	-3dB to 20MHz	0.25dB 20MHz ¹	-1.5dB to 20MHz ²
Differential phase, gain	0.2°, 0.2%	0.1°, 0.1%	0.15°, 0.15%	<0.25°, 0.25% ³
Chroma Luma delay	N.A.	$\leq$ 10ns	$\pm$ 5ns	10ns
Video S/N ratio	-80dB	+66dB	70dB	<-70dBV
Video crosstalk (worst)	-55dB 4.5MHz	-65dB 5MHz	-60dB, 5MHz	<-60dB 4.5MHz
Control format	RS-232	RS-232/-422	RS-232, -422, coax	RS-422/-232, Coax
Multilevel audio control	No	Yes	Yes	Yes
Suitable for component video	Yes	Yes	Yes	Yes
Reader Service No.	779	780	781	782

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

Manufacturer	Di-Tech	DYNASTY Electronics	Grass Valley Group
Model	Model 5864/5865	DYNAMITE	DYNASTY 100
Audio, Video, Combined	A/V	A/V	A/V
Basic crosspoint matrix	32x2	10x10	10x10
Typical system size	32x24	30x10	100x100
Audio response ($\pm$ dB Hz-kHz)	$\pm$ 0.1dB 20-20k	$\pm$ 0.2dB 30-20k	$\pm$ 0.1dB 20-20k
Harmonic distortion	<0.05%	0.25%	0.25%
S/N ratio	>94dB	99dB	99dB
Audio crosstalk (worst)	<-75dB	>80dB 15kHz +24dBm	>80dB 15kHz +24dBm
Video response	-1.5dB to 20MHz ⁴	$\pm$ 0.3dB to 8MHz ⁵	$\pm$ 0.3dB 50MHz ⁶
Differential phase, gain	<0.25°, 0.25% ⁵	0.05°, 0.05%	0.25°, 0.25%
Chroma Luma delay	10ns	<5ns	<5ns
Video S/N ratio	<-70dBV	80dB 10MHz bw	80dB, 10MHz bw
Video crosstalk (worst)	<-60dB, 4.5MHz	>60dB 5MHz	>60dB 5MHz
Control format	Model 9002 Virtual Matrix Controller	....	RS-232/422/423
Multilevel audio control	Yes	Yes	Yes
Suitable for component video	Yes	Yes	Yes
Reader Service No.	785	786	788

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)
Audio, Video, Combined	A/V	Separate A & V	Video (Dual audio)	A only	A/V
Basic crosspoint matrix	8x16	16x4, 16x8	20x10	15x8 stereo	10x10
Typical system size	128x128	16x16 to 64x64	20x10	(15x16 mono)	10x10
Audio response ($\pm$ dB Hz-kHz)	$\pm$ 0.2dB 20-20k	-0.50dB, 100k	-1.0dB 20-100k	< $\pm$ 0.2dB 10-20k	$\pm$ 0.1dB 20-20k
Harmonic distortion	<0.05%	<0.02% 20k 30dBu	<0.2% +24dBm	<0.01% 10-100k	0.01%
S/N ratio	100dB	-84dBu 30kHz BW	>96dB	-90dB 10-10k +8dBm	70dB
Audio crosstalk (worst)	-80dB 20kHz +24dBm	<-86dB 20k 30dBu	<75dB 20kHz	<-90dB stereo	-70dB 10kHz +8dB
Video response	$\pm$ 0.15dB 5MHz	3dB BW >30MHz	-1.0dB 20MHz	....	+1dB to 50MHz
Differential phase, gain	<0.1°, 0.1%	<0.3°, 0.2%	<0.15°, 0.15%	....	0.1°, 0.1%
Chroma Luma delay	10ns	....	<70dB hum-noise	....	1ns
Video S/N ratio	>75dB	>76dB unwt'd 10MHz	....	....	+70dB
Video crosstalk (worst)	-60dB 6MHz	>60dB 3.58MHz	....	....	-68dB @ 5MHz
Control format	RS-232/-422	RS-422/-485/-232	RS-232/-422, BCD	RS-232, modem	RS-232/422
Multilevel audio control	Yes	8-level	....	....	....
Suitable for component video	Yes	Yes	....	....	Yes (HDTV—50MHz)
Reader Service No.	791	792	793	794	795

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 256x32 ¹²	Model 40x	553-20/10-4V/A	12x-S4 (-V4/-C4)
Audio, Video, Combined	A/V	A/V	A/V	A (V)
Basic crosspoint matrix	256x32	40x20	10x1	12x4
Typical system size	256x256	40x20	20x10 4V/1A	

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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 , ± 0.5 dB 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	A84 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	.....	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	Yes	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	GPSU/PIP Option	BTS-2300 system	ESbus
Input timing adjustment	No	No	Yes	.....	.....	No
Path length, deviation	300ns	440ns	.....	1.5°	± 1°	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	ECHOLab 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 ³	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 ⁹	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	Yes	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

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	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

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Diagnostic software	Yes	Yes	No	No	Yes	Yes
Digital effects port	Yes	No	No	No	Yes	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	.....	-54dB	-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/OSK
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	No	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	-53dB	-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 ¹⁴)
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	6	14	8/14	8	8 Encoded ¹⁴
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 ¹⁸	E-File registers ¹⁸
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	Dig 1-line	Digital/RS-422	Digital/RS-422
Audio preview function	Yes	Yes	...	...	No	No
Audio metering	Illuminated VU	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	Prodigy	Series 5000
Control application	Production (16:9)	Production	Master	Production	Production
Standard	Analog comp	4:2:2 digital	NTSC, PAL	D-2 Digital	CCIR R-601 4:2:2
# inputs	16	16	30	20	8, expandable ²¹
Integral matte source	Yes	Yes	Y/I gen	1 generator	Yes
Key sources	Int, Ext	Int, Ext	3E, 1I	3 ext 8 Int	3 ext, 4 int
Chroma keyers	Yes	Yes	None	RGB Opt	CCIR 601
Downstream keyer	Yes	...	None	Yes	No
Switching buses	...	5 prime	2 prime, 1 aux	3 prime	3 prime 1 aux
# switcher M/E amps	1 w/4 effects buses	Multiple	1	1 ME	1
# pattern generators	4 generators	Multiple digital	1 w/4 patterns	24 pat/programmable	1 programmable
Wipe effects	Various	Yes	Soft-edge	S-E, Adj-E	16 ROT ²²
Spotlight effects	Yes	Yes	No	Yes	Yes
Border effects	Yes	Yes	Yes	Option	Yes
Shadow effects	Yes	Yes	Yes	Option ²⁰	No
Programmable routines	Yes	Yes	Opt 99 routines	More than 100	100 routines
Memory backup battery	Yes	Yes	Yes	Yes	Yes
Diagnostic software	Yes	Yes	Yes	Yes	Yes
Digital effects port	Yes	Yes	No	Option	Option
Automation port	...	Yes	Yes	Option	Option
Input timing adjustment	...	Automatic	No	...	RS-232
Path length, deviation	...	...	±1° dev	≤0.5°	Synchronizer, ±32μs
Crosstalk at subcarrier	(Performs 4:3	...	-60dB	<-60dB	5μs insertion delay
					No applicable



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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	8C/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 cti	Yes	Yes	Yes
Coherent subcarrier	No	Yes	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	Nonservo	Nonservo
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	NTSC/c/composite	NTSC	NTSC
Format	Y/C-4.43	.....	Y/C-358	.....	Y/C688, YIQ, RGB	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	No	Yes
Velocity compensation	No	No	No	No	Yes	No
Processing type	Heterodyne	Direct, hetero	Direct	Heterodyne	Direct	Direct
Servo, non-servo capstan	Servo	Servo, Nonservo	Servo	Servo, Nonservo	Servo, Nonservo	Servo, nonservo
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	No	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, nonservo	Servo, nonservo	Nonservo	Servo, nonservo	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 sync	TBC	TBC/Sync
Standards (/c composite)	NTSC/c	NTSC/c	NTSC/c	NTSC/c	NTSC/c	NTSC/c
Format	RGB	RGB	NTSC/c	Y/C 3.58, Y/C-6881	Y/C-3.58	Y/C-3.58
Format conversion	Yes	No	No	Yes	Yes	Yes
Sampling frequency, bits	14.3 8-bit	14.3MHz 8-bit	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	Yes	Yes	Yes
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	.....	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	.....	13.5MHz 8-bit
Correction window	16 TVL	1 frame	525 line/1 frame	1 frame	32	1 frame
Video bandwidth	2.5MHz (5.5)	5MHz in F.S. mode	± 3dB 3MHz	5MHz	4.5MHz	5MHz
S/N ratio	+58dB	58dB	58dB	58dB	54dB	56dB
Differential phase, gain	1°, 1%	2°, 2%	2°, 2%	.....	2°, 2%	2°, 2%
Residual error (/C chroma, /M luminance)	10ns C, 1° M	± 2°/C, ± 15ns/M	± 2°/C, ± 15ns/M	15ns/M		15ns/M
Advanced sync output	Yes	Yes	No	Yes		Yes

MASTER TIMING SYSTEMS

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ES199 — WWV ACCURACY — \$1687
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Coherent subcarrier	No (Yes)	Yes	Yes	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)	F3-19
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

² Format Interchange TBC.

Manufacturer	NEC America	Nova Systems				
Model	F3-18	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	2.5MHz	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	.....	Non servo, servo	Servo, non servo
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	HR800+ (810, 811)	S-TBC+ 100S/150S ⁵	HR800+ (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	No	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-T8C+ 160/165	S T8C-SYNC+200S -250S ⁶	8KH-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			
Format conversion	Yes	Yes	No		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 unwid	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 & non servo	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.

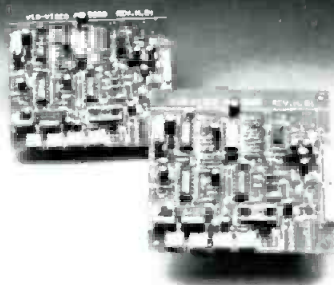
⁷ Units designed for use with BVH-3000/-3100 VTRs.

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	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

TIME CODE: \$900



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Circle (117) on Reply Card

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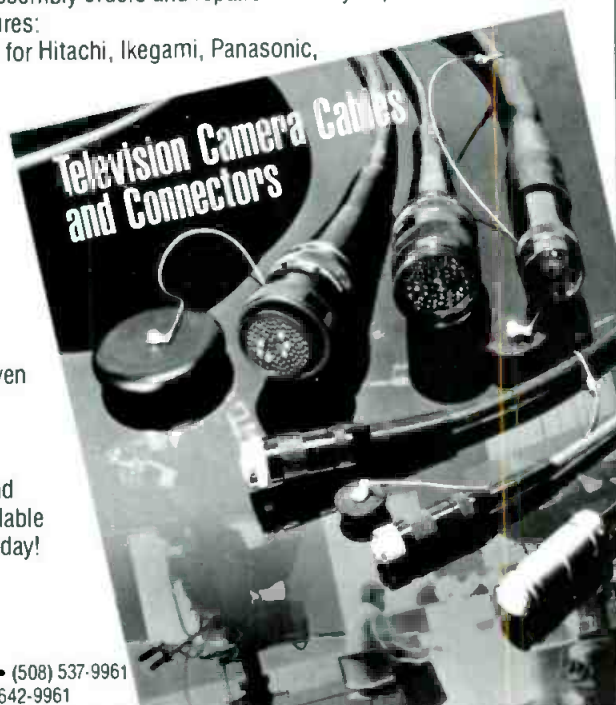
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Circle (118) on Reply Card

Supports color framing	Yes	Yes	Yes	Yes	Yes	---
Supports jam sync	Yes	Yes	Yes	Yes	Yes	No
Supports LTC	I/O	I/O	I/O	Yes	Yes	Input
Supports VITC	I/O	No	(-03 only)	Yes	No	No
Editor interface	Yes	(-25 only)	(-03 only)	---	No	Yes
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	1/50-50x
LTC output signal	1Vp-p ²	10dBm	10dBm	0-8dBm	0-1.5V 1Ω	---
Power requirement	110/220Vac	110Vac	110Vac	110/230Vac	6-12Vdc	110/220Vac
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	Yes	No	No	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	I/O	I/O	I/O	Input	I/O	I/O	
Supports VITC	No	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	1/30-80x	1/30-80x	1/30-80x	1/30-50x	1/30-15x	1/30-80x	
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	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	Dut	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	1/30-30x	.....	1/30-30x	1/30-30x	1/30-30x	1x	
LTC output signal	.....	1V 0dBm 75Ω	1V 0dBm 75Ω	.....	.....	.....	
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	No
Generator function	No	No	No	Yes	No	No	Yes
Reader function	Yes	Yes	Yes	No	Yes	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	No	Yes
Keyed window display	Adj	No	No	No	No	No	---
Internal reference	Yes	Yes	No	Yes	No	Yes	Yes
Supports color framing	No	No	No	Yes	Yes	No	Yes
Supports jam sync	No	No	No	Yes	No	No	No
Supports LTC	In	In	In	I/O	I	Dpt	Dpt
Supports VITC	No	No	No	No	I	I	Dpt
Editor interface	No	No	Yes	No	Yes	No	No
TC entry, comparisons	Yes, No	Yes	Yes, No	Yes, No	No	Yes, No	Yes, No
UB entry, comparisons	Yes, No	Yes	Yes, No	Yes, No	No	Yes, No	Yes, No
Synchronizer function	No	No	No	No	Yes	No	No
Reading speed range	1/30-30x	1x	1x	---	---	0-70x	---
LTC output signal	---	---	---	1V 0dBm 75Ω	---	---	---
Power requirement	110Vac	110Vac	110Vac	110Vac	12Vdc	20. +12dBm	110/220Vac
Reader Service No.	852	853	854	855	856	857	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	No		
Internal reference	Yes	Yes	Yes	No	Yes	Yes
Supports color framing	Yes	Yes	Yes	No	Yes	Yes
Supports jam sync	Yes	Yes	Yes	No	Yes	No
Supports LTC	I/O	I/O	I/O	I/O	I/O	In
Supports VITC	No	I/O	No	In	No	No
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	Everez Microsystems	Fast Forward Video	For-A	Fougerolle Video	Gray Engineering	Horita
Model	Chaser 7000	P1 (F21)	TGR-2000	VIPSY 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	I/O	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		Yes	No	No
Reading speed range	0-70x	1x (1/30-15x)	1/30-80x	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	TG-50	EP-50	TRG-50	TG-P49	TCG-80N/104	TCG-132
Portable unit	Yes	Yes	Yes	Yes	No	No
Generator function	Yes	Yes	Yes	Yes	Yes	No
Reader function	Yes	Yes	Yes	No	Yes	Yes
TC/UB display				LCD	LED, 0.3"	
Character generator-keyer	Yes	Yes	Yes	No	Yes	Yes
Keyed window display	Adj	Adj	Adj	No	Adj	Adj
Internal reference	No	No	No	No	No	No
Supports color framing	No	No	No	No	Yes	Yes
Supports jam sync	Yes	Yes	Yes	No	Yes	No
Supports LTC	I/O	I/O	I/O	Out	I/O	I/O
Supports VITC	No	No	No	No	No	Input
Editor interface	No	No	No	No	No	No
TC entry, comparisons	Yes, No	Yes, No	Yes, No	Yes, No	Yes, No	No
UB entry, comparisons	Yes, No	Yes, No	Yes, No	Yes, No	Yes, No	No
Synchronizer function	No	No	No	No	No	No
Reading speed range	0.9-1.1x	0.9-1.1x	1/15-11x		0.9-1.1x	1/10-80x LTC ⁶
LTC output signal	1V/-6dBm 2kΩ	1V/-6dBm 2kΩ	1V/-6dBm 2kΩ		0.5-5V 100Ω	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	Skotek					
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, 0.3"	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	Skotek			Telcom Research		
Model	TCR-111 (111c)	TCG-80N-FT/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	1/40-10x	1/40-8x	1/40-5x
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	TCR 680	Lynx TC module
Portable unit	Yes	Yes	No	Yes	Yes	No
Generator function	Yes	Yes	No	Yes	No	Yes
Reader function	Yes	Yes	Yes	No	Yes	Yes
TC/UB display	LED	LED, 0.3"	LED, 0.8"	LED, 0.6"	Video	LED, 0.3"
Character generator-keyer	No	No	Yes	Yes	Yes	No
Keyed window display	No	No	Adj	No	Adj	No
Internal reference	Yes	Yes	....	Yes	N.A.	Yes
Supports color framing	Yes	Yes	Yes	Yes	N.A.	No
Supports jam sync	Yes	Yes	....	No	N.A.	Yes
Supports LTC	I/O	I/O	I/O	Dut	Input	I/O
Supports VITC	I/O	No	No	No	No	No
Editor interface	No	No	No	No	No	Yes
TC entry, comparisons	Yes, No	Yes, No	....	Yes, No	....	Yes, No
UB entry, comparisons	Yes, No	Yes, No	....	No	....	Yes, No
Synchronizer function	No	No	No	No	....	Yes
Reading speed range	1x only	1/40-8x	1/40-83x	....	1/40-8x	1/40-60x
LTC output signal	+3dBm	11dBm 600Ω	....	11dBm 600Ω	....	-1dBm 200Ω adj
Power requirement	110Vac, 9Vdc	6-16Vdc	110/220Vac	110/220Vac	8-16Vdc	110/220Vac
Reader Service No.	888	889	890	891	892	893

⁹ Also available through Amtel Systems.

Manufacturer	United Media		Shintron	
Model	Model 505	Model 515 TCR/CG	846 (847)	850 (890)
Portable unit	Yes	Yes	No	No
Generator function	Yes	No	No (Yes)	Yes
Reader function	Yes	Yes	Yes (No)	Yes
TC/UB display	LED, 4"	LED, 4"	LED (LCD) 1/4"	1/2"
Character generator-keyer	Yes	Yes	No	Yes
Keyed window display	Multiline Adj	Multiline Adj	No	Adj
Internal reference	Yes	Yes	Yes (No)	Yes
Supports color framing	Yes	Yes	 (No)	Yes
Supports jam sync	Yes	Yes	 (No)	Yes
Supports LTC	I/O	I/O	I/O (Out only)	I/O
Supports VITC	I/O	I/O	No	(I/O)
Editor interface	Yes	Yes	No (Yes)	Yes
TC entry, comparisons	Yes	Yes	Yes (No), No	Yes
UB entry, comparisons	No	No	No	Yes
Synchronizer function	No	No	No	No
Reading speed range	1/40-50x	1/40-50x	1/40-40x (....)	1/40-80
LTC output signal	0.5-4Vp-p	0.5-4Vp-p	(1Vp-p 0dBm 30Ω	1Vp-p, 0dBm 600Ω
Power requirement	110-220Vac	110-220Vac	110-220Vac	110-220Vac
Reader Service No.	894	895	896	897

Small Format VCRs

This section lists information regarding $\frac{1}{2}$ " Betacam-SP, M-II, S-VHS and $\frac{3}{4}$ " U-matic video recording and playback equipment. General performance characteristics for $\frac{1}{2}$ " 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 CVR-507/-570	BCB-5	BVW5	TTV3505 S/P ²	KR-M260U	AU-400	BR-S410UN	AG-7450
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 KRM-860	AU-640 ¹ /X80 ¹	BR-S810U	AG7300/7330E/1960
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	[Alphabetized VCRs	CR-4900U	BUV-150
Studio player/recorder	[modified Series 5, 6	CR-600U	BUV-900/920
Studio editor	[7, 9 VCRs	CR-850U	BUV-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
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/RS-422
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	Yes	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/TCUB	Barcode, TC/UB
Integral TC reader	LTC	...	LTC	Reader	LTC/VITC
Integral TC generator	LTC	...	LTC	...	...
Storage magazine	D-1S 256 cassettes	600 max	1832 max SP/M-II ¹	107+ ³	40 Beta-SP
Shortest segment	7s w/tour 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	Auditronics	Broadcast Audio	Broadcast Electronics
Model	BC II † ¹	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	HP	...	...	...	...
Input connection	AB/TB 1k Ω /20k Ω	AB	AB 20k Ω	AB 1k Ω /50k Ω	AB/TB 150 Ω /20k Ω	AB > 54k Ω
Input range	-70, +26dBu	-20, +20dB	-60, +4dBu nominal	-65dBu, +8dBu	-60, +10dBv	-65, +20dBv
Output connection	AB/TB < 50 Ω	AB	AB 400 Ω	AB 50 Ω	TB 150 Ω	TB 600 Ω
Output level max	+26dBu	+27dBV	+24dBm	+30dBm	+28dBm	+18dBm
AF response ($\pm$ dB Hz-kHz)	$\pm$ 1.0dB 20-20k	0.5dB 20-20k	$\pm$ 0.25dB 20-20k	0-1dB 20-20k	$\pm$ 0.5dB, 20-20k	-1dB 30-20k
THD %/+dB/Hz	0.03/20dBu/20-15k	0.01/18/20k	0.15/18dBm/20-20k	0.01/24dBm/20-20k	0.007/28dBm/1k	0.5/18dBm/30-20k
S/N Mic EIN/Line dB	-128dBm/86dB	-127dBm/75dB	-124dBm/95dB	-128.5dBm/86dB	80dB	-120dBm/68dB
Crosstalk (-dB/kHz/+dBm)	Per configuration	-75dB/20k	-74dB/10k/+14	-63dB/20k/+4dB	-80dB/15k/+8	...
Reader Service No.	301	302	303	304	305	306

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	8	20 (8, 2)
Fader type	...	Rotary	P&G slider	P&G slider
Meter type	VU	VU	VU, PPM, LED Peak	VU, PPM, LED Peak
Filters	...	HP	HP	HP
Input connection	AB	AB 150 Ω , UB 10k Ω	AB 2k Ω , 13k Ω (1.7k Ω)	AB 1.5k Ω , 12k Ω
Input range	-65, +20dBv	Mic/line	-55, +20 (-72, +22)dB	-70, -4dB
Output connection	...	600 Ω	TB < 40 Ω	TB < 60 Ω (50 Ω)
Output level max	+18dBm	+26dBm	+21dB (+6dB)	> +20 (+6, +12)dB
AF response ($\pm$ dB Hz-kHz)	-1dB 30-20k	...	-1.0dB 20-20k	-1.0dB 20-20k
THD %/+dB/Hz	0.5/18dBm/30-20k	...	< 0.03%	< 0.03%
S/N Mic EIN/Line dB	-120dBm/68dB	...	85dB (80dB)	87dB (85dB)
Crosstalk (-dB/kHz/+dBm)	...	...	< -60dB/20-20k/+6dB	< -70dB/20-20k/+6dB
Reader Service No.	307	308	309	310

Manufacturer	Howe Technologies	ITAME	LPB Inc	MBI Broadcast Systems Ltd
Model	Series 10K On-Air	Sierra 13S (13M)	SIGNATURE III series	Series 16
Modular system	Yes	Yes	Yes	Yes
Cue amp	Yes	Yes	Yes	Opt
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)	42 (62)
# 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, LED peak
Filters	HP, LP	HP, LP	...	HP
Input connection	AB/TB 2k Ω /20k Ω	TB 600 Ω	TB	AB
Input range	-80, +24dBm	-30, +20dB	-65, -10dBm	...
Output connection	50 Ω	TB	600 Ω	AB
Output level max	+28dBm	+15dB	+22dBm	...
AF response ($\pm$ 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 600 Ω 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 600 Ω . The 'u' stands for 'unloaded'.

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

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—Transformerless active balanced inputs with XL-type connectors.

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OTARI



Manufacturer	McCurdy Radio Industries	Pacific Recorders & Engineering				Radio Systems
Model	S series	STX	Stereo mixer	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, +10dBu	-10, 8dBu	-10, 8dBu	-40, 8dBu (-10, +8)	-60, +10dBm
Output connection	AB 60Ω	AB 30Ω	AB 80Ω	AB 30Ω	AB 30Ω	AB 100Ω
Output level max	+28dBm	+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/+18dB/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	-125dBm/90dB	-127dBm/88dB	-126dBm/88dB	-126dBm/88dB	-127dBm/88dB	-124dBm/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	E8A-10	SL 4000G series ⁴	SL-V	SAC 200	Studer 970	Series R/R1400 ⁵
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	Dpt	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	-60dBu +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	-128dB/90dB	-127.5dBm	-129.2dBm	-128dBm	≤ -125dBu/≥ 95dB	-127dBm/90dB
Crosstalk (-dB/kHz/+dBm)	-90dB/1k	-70dB/1k/+4dB	80dB/20k/0dB	-68dB/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-500 ⁶	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 8R 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	.....	-128dBm/88dB	-128dBm/-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	Forstex	Furman Sound	Panasonic/RAMSA	
Model	EMT MM standard†	System 8RM ¹	2016	MM-4AB (MM-8AB)	WR-S206 (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	No	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)	-1.0.5dB 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	Yes	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)		$\pm$ 2dB 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	4.8 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 A779 ²	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	Parametric EQ, HP	HP filter	Swept EQ, HP/LP	Swept EQ, HP	Swept EQ	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; PF 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	Virtual console ¹	10.000 series
Modular system	Yes	No	Yes	Yes	Yes	Yes
Cue amp	Yes	Yes	Yes	Yes	Yes	Yes
Automation port	Yes	No	Yes	Yes	Yes	Yes
Digital control	Yes	No	Yes	Opt	Yes	Yes
Solid-state bus switching	No	No	No	No	Yes	Yes
Compressor/limiter	No	No	No	Opt	Yes	Yes
Pan pots	Yes	Yes	Yes	Yes	Yes	Yes
Speaker muting	Yes	Yes	Yes	Yes	Yes	Yes
Tone oscillator	Yes	Yes	Yes	Yes	Yes	Yes
Patch points	Yes	Yes	Yes	Yes	Yes	Yes
# of inputs (total)	40 (16, 24, 32)	24 (16)	32 (24, 40, 44)	32 (48, 64)	128 (48, 72)	48
# of direct outputs	40 (16, 24, 32)	24 (16)	32 (24, 40, 44)	40 (56, 82)	16	24
# of mixing buses	16	8	24	28 (28, 28)		8
# of groups/subgroups	16 G/16 S (8)	8 G/8 S	In line	2 ST/ 8 ST	8 (8, 16)	8
# of sends/returns	6 S/4 R	3 S/2 R	32 S/32 R	8 mono/8 stereo	24 Sends	4
VCA gain control	No	Opt	Opt	Opt	Yes	Yes
Solo type	PF, IP	PF	PF, AF, IP	PF, AF, IP	AF, PF, IP	PF, AF
Meter type	VU, LED peak	VU	VU, LED peak	LED VU/Peak, PPM	VU, PPM, LED peak	VU, PPM
EQ types	Swept	Swept	Parametric	Parametric	Parametric	Parametric
Filters	HP	HP	HP	HP, LP	LP, HP	HP
Input connection (Ω /k Ω)	AB 3k Ω	AB 3k Ω	AB 3k Ω	AB 1k Ω /20k Ω	AB 10k Ω ²	AB
Output connection Ω	AB 50 Ω	AB 50 Ω	AB, 50 Ω	AB, TB < 50 Ω	TB 600 Ω	AB
Output level max	+27dBu	+21dBv	+27dBv	+26dBu	+22dBu	+27dBv
AF response ($\pm$ dB Hz-kHz)	-1.0dB, 20-20k	$\pm$ 1dB, 20-20k	-0. +1dB 20-20k	$\pm$ 1dB 20-20k	0.5dB 20-20k	0.5dB 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	0.02% +8dBu 30-18k	0.01% +18dB 20kHz
S/N Mic Ein/Line dB	-127dBm	-125dBm	-127dBm	-127dBm/85dB	-126dBm/80dB	-127dBm/75dB
Crosstalk (worst case)	-65dB 1kHz +4dB	60dB	-70dB	System dependent		-75dB 20Hz 20dB
Reader Service No.	357	358	359	360	361	362

¹ Digitally assignable system ² Impedance per customer request

Manufacturer	Audiotronics		Barco	EMT	Broadcast Audio	Broadcast Electronics
Model	310 series	400 series	EMT MMC	EMT MM40	Series IV	350A†
Modular system	Yes	Yes	Yes	Yes	Yes	No
Cue amp	Yes	Yes	Yes	Yes	Yes	Yes
Automation port	Yes	Yes	Opt	No	Yes	No
Digital control	No	No	Opt	No	No	No
Solid-state bus switching	Yes	Yes	Yes	Yes	Yes	Yes
Compressor/limiter	Yes	Yes	Opt	Yes	No	No
Pan pots	Yes	Yes	Yes	Yes	Opt	No
Speaker muting	Yes	Yes	Opt	Opt	Yes	Yes
Tone oscillator	Yes	Yes	Yes	Yes	Opt	No
Patch points	Yes	Yes	Yes	Yes	Yes	No
# of inputs (total)	40, 16, 24, 32	30, 18, 24	60	60	18, 24, 36, 48	22
# of direct outputs	40, 16, 24, 32	30, 18, 24	1/channel	1/channel	3, 7, 7, 7	0

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# of mixing buses	8, 4	8, 4	40	32	2, 3, 4, 4	2
# of groups/subgroups	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 (Ω /k Ω)	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)	-0.5dB 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	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 (Ω /k Ω)	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	.....	$\pm$1dB 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)	$\leq$ -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 8800E⁴	51 series, V Post	ABX (AMX)⁵	WR-8428
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	No	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, 36⁵	28+24 (16+16)
# of direct outputs	6	.....	60, 24, 36, 48	34, 28, 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	PF, AF	Pre-fader
Meter type	VU	VU, PPM, LED peak	VU PPM Led peak	VU, PPM	VU
EQ types	.....	Param, Swept	Parametric, swept	Param/Swept	Swept (quasi param)
Filters	.....	.....	HP, LP	HP, LP	HP
Input connection (Ω /k Ω)	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	.....	-0.8dB 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‡	AFDM-208†‡	SL 6000 G series⁵	SX-T⁵
Modular system	No	Yes	Yes	Yes
Cue amp	Yes	No	Yes	Yes
Automation port	No	Yes	Yes	Opt
Digital control	No	Yes	Yes	Opt
Solid-state bus switching	No	Yes	No	Yes
Compressor/limiter	Yes	No	Yes	Opt
Pan pots	No	Yes	Yes	Yes
Speaker muting	Yes	No	Yes	Yes
Tone oscillator	No	Yes	Yes	Yes
Patch points	No	Yes	Yes	Yes
# of inputs (total)	4+8	16	24 to 96	10, 12, 16, 24, 32
# of direct outputs	3	16	Option	8, 16
# of mixing buses	2	16	6	8, 16

# 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	+20dBu	+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

⁶ Configurations for on-air operations.

Manufacturer	Sony	Soundtracs			Studer	TASCAM
Model	MXP-2000	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, 4 R	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	LEO peak	VU, bar graph	VU	VU, LEO 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	+26dBV	+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% 0dBV 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	M600 (M700)†	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 20kΩ1	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	-128dBm/v+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)†	M916†	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 (Ω /k Ω)	AB	AB 3k Ω	AB 800 Ω /4k Ω	AB 3k Ω /1k Ω
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	Denon America	Panasonic Pro Audio	Pioneer
Model	EMT 981	DN-950FA	SL-4300	PD-7300 (6300)
Configuration	Single	Single player	Single	Single player
Player trays	.....	1	1	1
Programmable events #	4-event	No	20-event	Yes
Output connection (Ω)	Balanced	Balanced	Unbalanced	Unbalanced
Output level	+6dB	+4dB	-10dBu	2.0V
Digital output (kHz)	Yes 44.1kHz	No	No	Optical & (coaxial)
Digital resolution	16-bit	16 bit	16-bit	18-bit
Oversampling factor	$\times 4$	$4\times$	$4\times$	$8\times$
AF response ($\pm$ dB Hz-kHz)	± 0.2 dB 40-20k	± 0.5 dB 20-19.8k	± 0.5 dB 2-20k	± 0.5 dB 4-20k
Distortion	0.04%	0.03%	0.003%	0.0025% (0.0035%)
Dynamic range	98dB	92dB A wtd	94dB	98dB
Crosstalk (worst case)	< -75dB	N.A.	.....	106dB separation
S/N ratio	+105dB RMS	92dB	96dB	110dB (104dB)
Access time (worst)	3.5s	4s	.....	.....
Reader Service No.	403	405	406	408

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

Manufacturer	Studer Revox	TASCAM
Model	CD 701	CD 401/CD 501
Configuration	Single player	Single player
Player trays	1	1
Programmable events #	Yes	via Rmt Ctl
Output connection (Ω)	Balanced	Balanced
Output level	+4dBm +18dBm max	0dBm
Digital output (kHz)	Yes	Yes
Digital resolution	16-bit	16-bits
Oversampling factor	Yes	Yes
AF response ($\pm$ dB Hz-kHz)		± 3 dB 5-20k
Distortion	0.008%	0.0025%
Dynamic range	> 100dB	96dB
Crosstalk (worst case)	< -90dB	-95dB
S/N ratio	> 100dB	96dB
Access time (worst)	< 3s	.....
Reader Service No.	412	413

Audio Cassette Decks

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

Manufacturer	Fostex	Nakamichi America	Studer Revox	TASCAM
Model	160 (260)	MR-2 (MR-1)	Studer A721 Pro	Model 102 (103)
Deck control logic	Mechanical	μ P	μ P	TTL
Timer	Tape counter	Tape counter	Min/sec	Min/sec, Index
Cue track	No	No	No	Yes
Autolocator	No	No	1 system	.....
Capstan motor, drive	DC servo	DC servo, direct	2 dc servo, direct	FG servo
Reel motors	DC servo	DC servo	2 dc servo	DC
Play speeds	3 $\frac{3}{4}$ ips	1 $\frac{7}{8}$ ips $\pm 0.5\%$ ¹	1 $\frac{7}{8}$ ips	1 $\frac{7}{8}$ ips $\pm 12\%$
# of heads	2	2 (3)	3	3
Meter types	LED bargraph	LED bar graph	Dual LED bargraph	VU Peak LEDs
Input connection	Unb 10k Ω	Bal/Unbal	Bal > 10k Ω	Unbal 50k Ω
Input level range	.....	-20,+9.5dBv	-5,+15dBv	Unbal 50k Ω
Output connection	Unbal 10k Ω	Bal, unbal	Bal < 50 Ω	Unbal 50k Ω
Output level response	.....	+9.5dBm (+20dBm)	+24dBm	0.43V
AF response ($\pm$ dB Hz-kHz)	40-14k	± 3 dB 20-20k	-3,+2dBm 20-20k	± 3 dB 25-17k
referred to	.....	200nWb/m 70/120 EQ	200nWb/m 70 μ s	160nWb/m
S/N ratio	70dB	> 68dB (> 70dB)	57dB NR off ²	> 80dB
Distortion	1.5%	< 1.0% (< 0.9%)	1.5%	0.1%
Crosstalk (worst case)	-50dB	< -60dB	< -40dB	-45dB
Wow, flutter	0.1%	< 0.06 (< 0.027)%	0.1%	0.04%
Equalizations (in μ s)	IEC	Type I, II, IV	120 μ s, 70 μ s	3180 +70, 120
Noise reduction	Dolby C	Dolby B, C	Dolby B, C	Dolby B/C
Reader Service No.	434	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)
Deck control logic	TTL	Mechanical (& μ P)
Timer	Min/sec	Tape counter

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 8-track	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	.....	.....	.....	95dB dbx/CrO ₂
S/N ratio	>93dB	>80dB	85dB w/dbx	85dB dbx	0.5%
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	-70, +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 LED	VU
Monaural model	Yes	Yes	DELTA I/III/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, +18dBm	+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	±2dB 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	None	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	

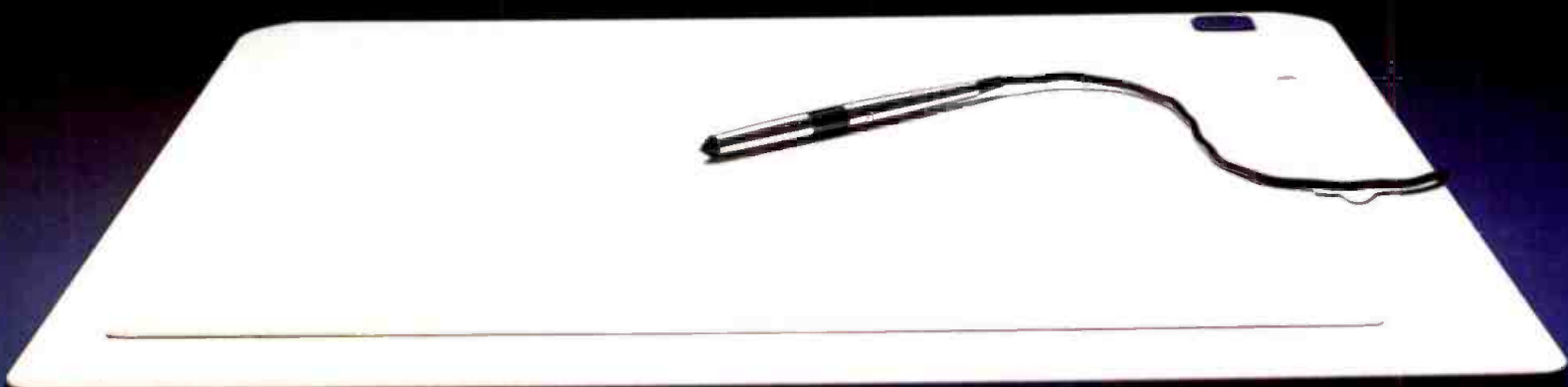
² Rated 63dB DNR unwrld.

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	+69dB
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	448	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	.....	TV	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

SSL DIGITAL

Begbroke, Oxford, England OX5 1RU (0865) 842300

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U.S. TOLL FREE NUMBER 800 343 0101

Circle (124) on Reply Card

S/N ratio	+63dB		62dB	64dB	+70dB tape dep.	71dB
Distortion	<0.1%	.....	2%	1%	1.5% ⁴	1.5%
Crosstalk Pgm-Pgm	-46dB	.....	.....	.....	-88	.....
Crosstalk Pgm-Cue	.....	.....	.....	.....	.....	.....
Wow, flutter	0.04% 15ips	0.25% 15ips	0.05% 15ips	0.07% 7.5ips	0.025% 15ips	0.07% 7.5ips
Reader Service No.	451	452	453	454	455	456

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
# of tracks	2+1 TC	1, 2, 2TC, 4	4	2	2
Tape width	1/4"	1/4"	1/4"	1/4"	1/4"
Time code track	Yes	MX-55TM	No	No	Yes
Deck control logic	Mechanical	μP	.....	TTL	μP
Edit control interface	.....	.....	.....	None	RS-422 SMPTE
Recording timer	Min/mer mechanical	Yes	.....	Yes	Sync. autoloc
Cue track	for FM modulation	Search 0/cue/3-cue	No	Search 0+1 cue	Yes
Phase correction	Yes	No	No	No	.....
Capstan motor, drive	DC servo	DC servo, belt	Synchronous	DC servo, belt	DC servo
Reel motors	Belt drive reels	Induction torque	Induction	AC synchronous	DC servo
Tape speeds	3.75, 7.5, 15	3.75-30ips ⁵	3.75, 7.5	3.75, 7.5, 15, var	7.5, 15
# of heads, type	4	ERP, P	.....	4 ERP	5 ⁶
Metering types	VU	VU w/peak LED	[Playback	VU, peak LED	Peak LED
Equalization	NAB, CCIR	NAB, IEC	[only system	NAB, IEC	DASH
Input connection	UB, 0-10kΩ	AB >10kΩ	.....	AB >10kΩ	AB 10kΩ
Input level range	250mV, +24V	-10dBV/+4dBm nom	.....	-20,-10/0,+10dBm	-2,+10dBs
Output connection	UB, 600Ω	AB 200Ω load	UB 600Ω	AB < 5Ω	AB 50Ω
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,+0.5 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 0VU	-80dB
Crosstalk Pgm-Cue	-45dB	<-55dB 1kHz	N.A.	<-55dB 1kHz	-80dB
Wow, flutter	0.07% 7.5ips	<0.08% 7.5ips	0.06% 7.5ips	0.06%	.....
Reader Service No.	457	458	459	460	461

⁵ 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.

⁶ 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"	1/4" (1/4) [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 cti	None	via rmt cti
Recording timer	Min/sec, counter	Min/sec, counter	Min/sec, counter	Sync. Autolocator	Stellalock III	Min/sec
Cue track	No	Yes	SMPT	Min/sec	Tape counter	No
Phase correction	No	Yes	Yes	Yes (No)	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	3.75, 7.5, 15	3.75/7.5/15
# of heads, type	3	4	3 amorphous	3/ERP	4/ERP	3 Revox metal
Metering types	VU	VU	VU LED bar graph	Per request	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,-6dBm	-10,+10dBv
Output connection	AB 120Ω	AB 120Ω	AB 120Ω	TB 9Ω	TB 10Ω	TB 50Ω
Output level maximum	+24dBm	+24dBs	+24dBs	+25dBm	+22dBm	+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	-55dB	.....
Crosstalk Pgm-Cue	.....	.....	.....	-80dB	-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 877 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"	1/4"
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 cti	RS-232/422/RC SMPTE	RS-232, rmt cti ¹⁰	RS-232/422/RC SMPTE	RS-232 Rmt Cti	RS-232 Rmt Cti SMPTE
Recording timer	Tape counter	Autolocator Synchro	Autolocator (& synchro)	Autolocator Synchro	Autolocator ¹³	Autolocator Synchro
Cue track	No	Min/sec	Min/sec	Min/sec	Min/sec	Min/sec
Phase correction	No	No	No	SMPT ¹¹	No	No
Capstan motor, drive	ac servo	Yes	Yes	Yes	Yes	Yes
Reel motors	ac servo	DC servo brushless	dc servo	DC servo brushless	DC servo	DC servo
Tape speeds	3.75/7.5/15	DC servo	ac servo	DC servo	DC servo	DC servo
# of heads, type	3 Revox metal	7.5 15 30	3.75/7.5/15	3.75-30±7 semitones	3.75 7.5 15 30	7.5 15 30
Metering types	VU, peak LED	3 amorphous metal	3 Revox metal	3 or 4 (3)	3 amorph mtl ¹⁴	3 Studer amorph mtl
Equalization	NAB	VU	VU (LED bargraphs)	VU	VU, Peak LED	VU, Peak LED
Input connection	NAB, CCIR	NAB, CCIR IEC1 AES	NAB	NAB, CCIR	NAB, CCIR	NAB, CCIR
Input level range	Unbal >200kΩ	TB ≥10kΩ	TB >5kΩ (A8)	AB TB ≥10kΩ	TB >10kΩ	TB >10kΩ
Output connection	Unbal	+24dBu	-10,+10dB	+24dBu max	-30,+12dBu	-30,+12dBu
Output level maximum	1.55V	<50±AB	TB <60Ω (A8 150Ω)	TB AB 50Ω	TB <50Ω	TB <50Ω
AF response (±dB Hz-kHz)	-3,+2dB 30-22k	±2dB 50-20k	+26dBm	+24dBm	±2dB 30-20k	±24dBm
S/N ratio	>68dB	64dB 30ips	-2,+2dB 30-22k	±2dB 30-16k	±2dB 30-20k	±2dB 30-20k
Distortion	0.2%	≤1.0% 510nWb/m	64dB (61dB)	>65dB 7.5ips 1/4"	68dB	68dB
Crosstalk Pgm-Pgm	<-45dB 1kHz	-60dB	<1% 0.8%	≤0.5% 1kHz per NAB	<1.0%	<1.0%
Crosstalk Pgm-Cue	<-55dB 1kHz	<-50dB (<-55dB)	<-50dB (1kHz stereo)	<-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.

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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

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Manufacturer	Studer Revox	TASCAM				
Model	Studer A810 2/2VUK ¹⁵	30 30	T3R 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"	1/2"	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	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	Bal or unbal	AB 20Ω
Output level maximum	+24dBm	.....	-10dBV	-10dBV	+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%	0.6%	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 266X
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	No	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 80kΩ	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	-60, +24dB	-10, +6dB	-20, +15dB	-20, +15dB
Output level maximum	+2-dBu	+27dBm	+24dBm	+21dB	+21dB	+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 ops
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	3-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	65dB	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-68 (LC-XB)	QN-44B Quad Gate	Audio Prism
Compression	Yes	Yes	No	Yes
Expansion	Yes	Yes	Yes	No

Peak limiting	Yes	Yes	No	Yes	Yes	Yes
Asymetric 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	-0.25dB 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
Compression	Yes	No	No
Expansion	No	No	No
Peak limiting	Yes	Yes	Yes
Asymetric limiting	No	Yes	No
AGC	Yes	No	No
Loudness control	No	No	No
Stereo system	Yes	Yes	1178 (2-1176LN)
Digital processing	No	No	No
Programmable	No	No	No
Multiband processing	3-band	3-band	No
Metering	GR	VU Peak I/O	VU
Input connector	AB 10k Ω	AB 10k Ω	AB bridging 10k/20k Ω
Output connector	AB 600 Ω	AB 600 Ω	TB $\geq$ 600 Ω , 150 Ω
Input level range	-15, +15dB	-20, +10dB	+20dBu max
Output level maximum	+24dB	+20dB	+24dBm
AF response ($\pm$ dB Hz-kHz)	$\pm$ 0.5dB 20-20k	$\pm$ 1dB 50-15k	$\pm$ 1dB 20-20k
Distortion	1% in op	0.7%	<0.5%
S/N ratio	70dB	70dB	>81dB at threshold
Reader Service No.	619	620	621

Manufacturer	Klark-Teknik	Marti Electronics	Orban
Model	DN504 Quad	DN500 Dual	Model 800-278
Compression	Yes	Yes	Yes
Expansion	No	Yes	No
Peak limiting	No	Yes	Yes
Asymetric limiting	No	No	No
AGC	No	No	Yes
Loudness control	Yes	Yes	Yes
Stereo system	Yes ⁵	Yes	No
Digital processing	No	No	No
Programmable	No	No	Yes
Multiband processing	No	No	3-band
Metering	LED PPM, GR I/O	LED GR In/out	VU GR I/O
Input connector	AB 20k Ω	AB 20k Ω	AB 10k Ω
Output connector	Unb. Xfmr opt >60 Ω	Unbal Xfmr opt >60 Ω	AB 35 Ω
Input level range			-30, +10dB
Output level maximum	+21dBm	+21dBm	4Vp-p composite
AF response ($\pm$ dB Hz-kHz)	$\pm$ 0.5dB 20-20k	$\pm$ 0.5dB 20-20k	$\pm$ 0.75dB 30-15k
Distortion	<0.03% +4 1kHz	<0.03% +4 1kHz	0.25% in op
S/N ratio	>94dBm unwt'd	>94dBm 20-20k unwt'd	75dB
Reader Service No.	625	626	627

⁵ Switchable to 2 stereo pairs.

⁶ Per NRSC-1 std.

Manufacturer	Orban	Orban Pro
Model	8100A/XT2 Limiter	8182 Optimod-TV
Compression	No	Yes
Expansion	No	No
Peak limiting	Yes	Yes
Asymetric limiting	No	No
AGC	No	Yes
Loudness control	Yes	Yes
Stereo system	Yes	Yes
Digital processing	No	No
Programmable	No	No
Multiband processing	6-band	3-band
Metering	VU GR	VU GR I/O
Input connector		AB 10k Ω
Output connector		AB 370 Ω
Input level range		-30, +10dB
Output level maximum		+21dB
AF response ($\pm$ dB Hz-kHz)	$\pm$ 1dB 30-15k	$\pm$ 0.75dB 50-15k
Distortion	0.15% in op	0.25% bypass
S/N ratio	70dB	75dB
Reader Service No.	631	632

Manufacturer	Orban Pro	Solid State Logic	Symetrix
Model	422A (424A)	Logic FX G384	#525 gated
Compression	Yes	Yes	Yes
Expansion	No	No	Yes
Peak limiting	Yes	No	No
Asymetric limiting	No	No	No
AGC	No	No	No
Loudness control	No	No	No
Stereo system	No (Yes)	Yes	No
Digital processing	No	No	No

Programmable	No	No	No	No	.....	No
Multiband processing	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	+29dBu	+18dBm 600Ω	+24dBm 600Ω	+19dBm 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	86dB	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 Kapex II
Compression	Yes	Yes	No	Yes	No	No
Expansion	Yes	Yes	No	Yes	Yes	Yes
Peak limiting	Yes	Yes	Yes	Yes	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 Dynomite	#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	.....
Stereo system	Yes	No	No	No	Yes
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 ^a
S/N ratio	82dB ref 0dB	83dB ref 0dB	82dB ref 0dB	83dB ref 0dB	90dB
Reader Service No.	649	650	651	652	653

^a 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		..
AF contouring	No	No	No	No	No		...
Multiband	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	1mm-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	AB	Active	TB		AB bridged
Output connection	Active	Keyboard, RS-422	AB	Active	TB		AB
Interfaces	Keyboard, barcode	MIDI	None	.....	.....		None
Reader Service No.	654	655	656	567	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 (±dB Hz-kHz)	± 1dB 7.5-20k	± 1dB 7.5-20k	± 1dB 20-15k	± 0.2dB 20-10k	± 1dB 20-15k	± 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.	668	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 (±dB Hz-kHz)	± 0.5dB 2-20k	± 0.5dB 20-20k	± 1dB 20-15k	± 0dB 0-24k	20kHz± 1dB 20-12k	....
Dynamic range	100dB	> 90dB	85dB	> 112dB	100dB	80dB
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 (±dB Hz-kHz)	± 1dB 20-20k	± 1dB 20-20k	± 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	± 0.5 times original	87.5%	33%
Time expansion amount	0-2× 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×	0-1400ms	....
AF response (±dB Hz-kHz)	-3.0dB 14-18k	± 1dB 5-20k	± 0.25% 20-15k
Dynamic range	90dB	92dB	90dB
Input connection	Active	AB	AB/TB
Output connection	Active	AB	AB/TB
Interfaces	Keyboard ⁸	Keyboard, MIDI	RS-422 on 2400
Reader Service No.	676	677	678

⁸ As well as RS-422, Frame pulse.

⁷ 2400 TCF includes time code follow capability.

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	Hi-Dyn	Hi-Dyn	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 (W108T)
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 (W250R)
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; W108T uses WLB3 electret.

Manufacturer	Shure Brothers	Sony Professional Audio		Swintek	Telex Communications
Model	L-series	VHF systems	UHF systems	MK50A HI-II-S ¹⁷	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%	≥1%
Transmitter model:	L1	WRT410/420	WRT-28	MK50A HI-II	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-II	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	CKBX capsule	C568	ST205	AT4073	AT835
AF response Hz-kHz	30-18k	20-20k	....	30-20k	40-20k
Polar pattern(s)	Hypercardioid	Hypercardioid	Variable ¹	Narrow directional	Narrow directional
Output impedance	....	600Ω	....	250Ω	600Ω
Output level (mV/Pa)	....	....	....	52mV/Pa -25.7dBm	9.0mV/Pa -45.5dBm
Maximum SPL (dB-% distortion)	7dB 0.5%	128dB 0.5%	140dB 0.5%	129dB 1% distortion	119dB 3% distortion
Output noise	15dB	18dB DIN 45412-A	20dB per pattern spc	16dB	17dB
S/N ratio	79dB	76dB	....	>75dB	>70dB
Mic capsule type	Electret	Electret	....	Ext polarized cap.	Fixed-charge cap.
Stereo design	No	No	M/S or L/R	No	No
Power source	....	9-45Vdc	48Vdc or ac	12-48Vdc	1.5Vdc, AA cell
Filters	....	....	Bass rolloff	High-pass	High-pass
Weight	4.2gm	6.2gm	....	4.2oz	7.5 oz
Reader Service No.	583	584	585	586	587

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
AF response Hz-kHz	30-20k	50-18k	40-20k	40-20k
Polar pattern(s)	Lobar	Hypercardioid lobe	Hypercardioid lobe	Hyper
Output impedance	250Ω	190Ω	150Ω	150Ω
Output level (mV-Pa)	62mV/Pa -24.2dBm	4.2mV/Pa -47dBm	30mV/Pa -33dBm	30mV/Pa -33dBm
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
S/N ratio	>75dB	61dB	74dB	74dB
Mic capsule type	Ext polarized cap.	Electret	RF condenser	RF condenser
Stereo design	No	N	N	N
Power source	12Vdc-48Vdc	8-48Vdc	12-48Vdc	12Vdc
Filters	High-pass	....	B r/o, 6dB atten	B r/o, 6dB atten
Weight	5.8oz	2.5 oz	7 oz	4 oz
Reader Service No.	589	590	591	592

Model	RE45N/D	DL42
AF response Hz-kHz	150-15k	50-12k
Polar pattern(s)	Cardioid-line	Hypercardioid
Output impedance	600Ω	150Ω
Output level (mV-Pa)	5mV/Pa 1kHz	....
Maximum SPL (dB-% distortion)	....	130dBm hum pickup
Output noise	....	-125dBm hum pickup
S/N ratio	....	....
Mic capsule type	Dynamic	Dynamic
Stereo design	No	No
Power source	Not required	Not required
Filters	....	....
Weight	7.5 oz	13 oz
Reader Service No.	593	594

Manufacturer	Georg Neumann ²		Sennheiser Electronics		Shure Brothers
Model	RSM190i MS-stereo ³	KMR8 1i(KMR82i)	MKH 70 P48	ME 80-K3U	SM80
AF response Hz-kHz	40-18k	40-18k (40-20k)	70-Hz-20kHz	50-50k	60Hz-20kHz
Polar pattern(s)	Hypercard/Fig-8	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	....	22mV/Pa -53dBV
Maximum SPL (dB-% distortion)	4mV/Pa	>128dB	124dB	....	127dB 0.5% dist
Output noise	....	....	10dBA/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	48Vdc±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	100Ω	100Ω	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%	-90,0dB range
THD accuracy	±1%	±1%	....	0.5dB	<±2%	±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-160Vrms	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 DIN45403; 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	No
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	....	AB
Fundamental rejection	>65dB	....	....	....	10dB ⁶
THD minimum	0.06%	0.05% ³	0.05% ⁶	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 Besse! 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	Marti 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/R/RF/F-R	RF/V/compression	RF/V/R/V/A/R/Comp	.....	RF/Comp/V/A/R/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

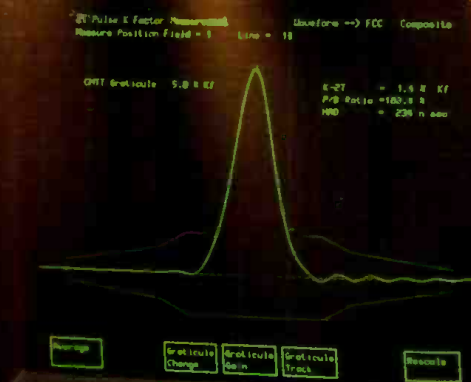
Digital Audio Workstations

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	4 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 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	In edit decision list	.....	Yes
Level, pan, balance	Real time	Real time	In real time	.....	Yes
Variable speed (range)	0-8x normal	50-200%	0-4x	.....	Yes
Scrub, waveform edits	Yes, No	Yes, Yes	Yes,	No, No	Yes, Yes
DC offset removal	Yes	Yes	Yes	Yes	Yes
Auto dialog replacement	Yes	Yes	No	No	Yes
Project "Reels"	Yes	Yes	No	No	.....
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	Laxicon	New England Digital		Solid State Logic	Symetrix
Model	OPUS (OPUS/e)	PostPro	Direct-to-Disk	01 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	AES/EBU, 1610/1630	AES/EBU 1610/1630	AES/EBU	AES/EBU, R-DAT
Time references	1630, 3324	SMPTE/EBU, MIDI	SMPTE/EBU, MIDI	SMPTE/EBU	SMPTE/EBU, MIDI, VITC
Lockup speed	3s	5 ms	5ms	1s	.....
Time compression	Real time	To new file	To new file	Real time	To new file
Level, pan, balance	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

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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.



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IN RECOGNITION OF THEIR ENGINEERING CONTRIBUTION AND
DEVELOPMENT OF SYSTEMS USING DIGITAL INTELLIGENCE TO MEASURE
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Circle (130) on Reply Card

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 for matched-system 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.

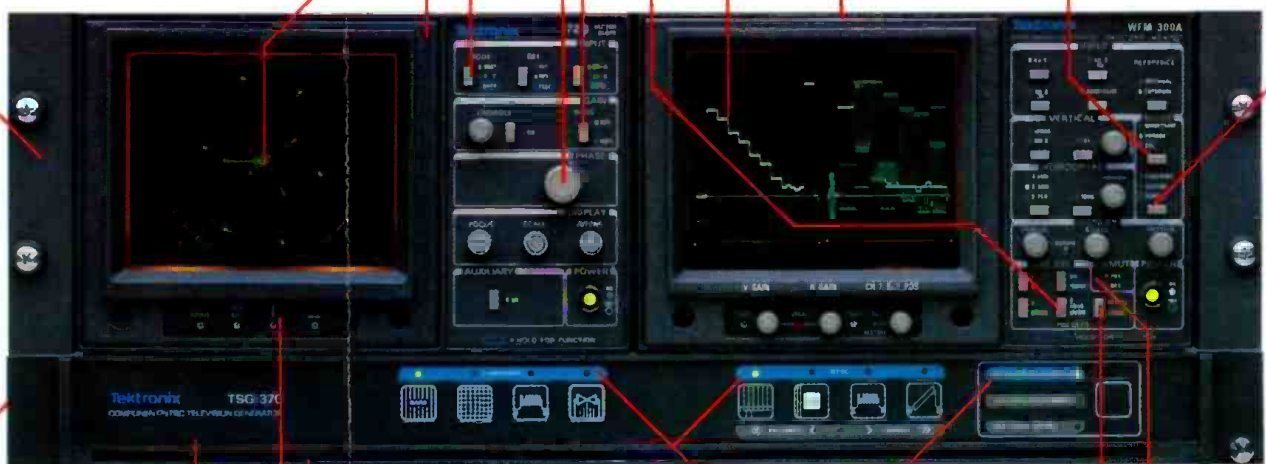
Precision phase control permits excellent resolution around a full 360 degrees.

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 Lightning 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.

Front panel user recalls promote fast, efficient operation.

Color gamut violation indication is given if limits are exceeded.

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



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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†	AM5000D(10000D)	XL-301	418D-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	1½"
Carrier stability	5Hz	5Hz	±5Hz	±1×10 ⁸ Hz	±1×10 ⁸ 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)	2.6kW	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	5kW	1kW to 10kW	50kW (25, 10kW)	100kW (50kW)	5kW (2.5, 1)
RF output connection	1½"	3½"	Various	3½" 50Ω (3½", 1½")	Stud 300Ω bal	7/8" 50Ω (Type N)
Carrier stability	±5Hz	±5Hz	5Hz	±10Hz	±1×10 ⁻⁸ 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	-65dB	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 (14)
Power consumption	12.8kVA	118kVA	3.75kW—27kW	88kW (44kW, 17kW)	250kW (130kW)	11.6kW (5.8, 2.2)
Power factor	0.95	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, 6126)	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	1½" 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

Power factor	.....	.....	.....	0.9	0.9	0.9
System efficiency	40% (65%)	40% (65%)	46% (65%)	25%	65% (64%)	No
Applicable for stereo	Yes	Yes	Yes	Yes	No	No
Fault logic	Solid-state, relay	Solid-state, relay	Solid-state, relay	Relay	Solid-state, relay	Solid-state
Fault diagnosis	Yes	Yes	Yes	No	Yes	Yes
Floor space required	115x95cm	115x95cm	115x95cm	Wall-mount	72m x 2 (85m x 2)	65" x 33"
Reader Service No.	1406	1407	1408	1409	1410	1411

Manufacturer	Marconi Communications			Nautel		
Model	B 6038	B6140 (6141/6142)	AMPFET 1 (2.5)	AMPFET 50 (25, 100)	AMPFET ND 10 (5)	AMPFET P400
Band of service	Broadcast	Shortwave	Broadcast	Broadcast	Broadcast	Broadcast
RF output	1kW	3kW (7.5k, 12.5k)	1kW (2.5kW)	50kW (25, 100)	10kW (5kW)	0.4kW
RF output connection	7/16" 50Ω	50Ω unbal	Stud, 50Ω	3/8" 50	1 3/8" 50Ω	Type N 50Ω
Carrier stability	±10Hz	<1ppm/year	±5Hz	±5Hz	±5Hz	±5Hz
Carrier shift	<5%	.....	<3%	<1%	<1%	<1%
Modulation maximum	100%	100%	140%	140% at 50kW	140% at 10kW	125%
Audio input connection	Bal 600Ω	Bal 600Ω	Bal 600Ω	600Ω bal	Bal 600Ω	600Ω bal
Audio response	±2dB 40-10k	-2, +1dB 60Hz-6kHz	±0.5dB 30-10k	±0.5dB 30-10k	±0.5dB 30-10k	±0.5dB 30-10k
Audio distortion	<3% 90% mod	2.5% 90%	2% at 95% mod	<1%, 95% mod	<1% 95% mod	1%, 95% mod
AM noise figure	-50dB	-55dB	60dB	60dB	60dB	60dB
Final amplifier device	Solid-state	Power tetrode	IRF 130	TRF 140	IRF 140	TRF 140
Modulation final device	Solid-state	Solid-state	IRF 130	TRF 130	IRF 140	TRF 130
Input AC power	230V 3φ	110-250/380-440V 3φ	240V 1φ	480V 3φ (as req.)	208V 3φ (var.)	115V 1φ
Power consumption	3.5kVA	.....	2.14kVA	100kVA at 100% mod	20kVA	0.92kVA at 100% mod
Power factor	0.9	0.9	0.82	0.98	0.98	0.8
System efficiency	48%	.....	70%	75%	75%	65%
Applicable for stereo	No	No	Yes	Yes	Yes	Yes
Fault logic	Solid-state	MDS TTL Relay	Solid-state	Solid-state	Solid-state	Solid-state
Fault diagnosis	Yes	Yes	Yes	Yes	Yes	Yes
Floor space required	32x22	59x28" (118x40")	24x24"	159x24"	48x24"	10.75" in 19"-rack
Reader Service No.	1412	1413	1414	1415	1416	1417

Manufacturer	Radio Systems	TELEFUNKEN Sendertechnik GmbH		Television Technology Corp	
Model	TR-20	S4005/4003/4001† ³	S4006/4004/4002† ³	AM-10000 (-1000)† ⁵	AM-25000†
Band of service	Broadcast (LP)	Shortwave	Broadcast/MW	Broadcast	Broadcast
RF output	20W	500kW (300, 100kW)	600kW (300, 100kW)	10kW (1.4kW)	25kW
RF output connection	50Ω, UHF SD-239	50Ω, 100/230 ⁴	50Ω, 66/152 ⁵	1 3/8" (LC)	1 3/8" 50Ω
Carrier stability	±0.002%	<0.5x10 ⁻⁸ /year	<0.5x10 ⁻⁸ /year	1kHz	1kHz
Carrier shift	2%	≤3%, 1kHz tone	≤3%, 1kHz tone	3%	3%
Modulation maximum	100%	100% (75% pgm cont)	100% (75% pgm cont)	125%	125%
Audio input connection	Bal 600Ω	600Ω B	600Ω B	600Ω bal.	600Ω bal.
Audio response	1dB 20-15k	±1dB 40-4.5kHz	±1dB 40-4.5k	1.5dB 40-10k	1.5dB 40-10k
Audio distortion	2% 99% mod	≤3% 80% mod	≤2% 80% mod	<3%	<3%
AM noise figure	-60dB	>55dB unwtld ⁶	>55dB unwtld ⁶	-55dB	-55dB
Final amplifier device	Solid-state	1-TH558(573, 555)	1-TH558(573, 581)	4CX3000A (4-400)	4CX20000B
Modulation final device	Solid-state	1-TH558(573, 555)	1-TH558(573, 581)	3CX2500 (4-400)	4CX10000D
Input AC power	100V 1φ	To 36kV(36kV, 400V)	To 36kV(36kV, 400V)	240/460V 3φ ⁷	240/460V 3φ
Power consumption	0.1kVA	1103kVA(672, 231)†	1253kVA(643, 217)†	27 (4)kVA	60kVA
Power factor	.....	>0.9	>0.9	0.9	0.9
System efficiency	27%	68% (67, 65)	73% (70, 69)	80% (70%)	80%
Applicable for stereo	Yes	No	No	Yes	Yes
Fault logic	Yes	Solid-state	Solid-state	Solid-state, relay	Solid-state, relay
Fault diagnosis	No	Yes	Yes	No	No
Floor space required	Wall-mount	5.5x5.6m(6.6x2m) ⁸	5.5x5.6m(6.6x2m) ⁸	40x42 (34x38)	114x38"
Reader Service No.	1418	1419	1420	1421	1422

³ PDM/PANTEL modulation. ⁴ 66/152(IEC50-155), 45/103(IEC50-105) ⁵ 44/103 (IEC50-105) ⁶ >65dB w/d DIN/IEC 244 ⁷ DAM system (Vol dep carrier control, allows 30-50% energy dependent on pgm characteristics. ⁸ Additional space required for separate cooling equipment and HT transformers. ⁹ Series includes: AM2500 rated 3kW and AM5000 rated 5kW; input power requirements for -1000 system is 240V 1φ.

FM Broadcast Transmitters

The equipment in this section is divided into two parts. The first includes FM exciters, most which may also be used for low power FM transmitter applications. The second part lists power amplifiers operable with the exciters as a full power broadcast system.

FM Exciters, LPFM transmitters

All systems use direct modulation techniques, unless noted with a dagger (†) indicating modulation at IF levels.

Manufacturer	Broadcast Electronics	CCA Electronics	Continental Electronics div of Varian	Energy-Onix	Harris/Broadcast	ITAME
Exciter model	FX-50	FM 20G	Type 802A	SST-30	THE-1	FM90D SUPERTAURO
Power output range	3W-50W	5W-20W	5-50W	0-30W	3-55W	5-25W
Output impedance/connector	50Ω, BNC	50Ω Type N	50Ω BNC	50Ω, Type N	50Ω BNC	50Ω Type N
Harmonic/spurious suppression	per FCC/DDC/CCIR	≥60dB, 60dB	≤-60dB/ ≤-60dB	.....	per FCC/DDC LPFM	≤60dB, 80dB
Frequency stability	±300Hz	±500Hz	±250Hz	±200Hz	±300Hz	±250Hz
Frequency control/steps	PLL/10kHz	PLL/10kHz	PLL/10kHz	PLL/100kHz	PLL/50kHz	PPL/2.5kHz
Modulation capability	> ±350kHz dev	±150kHz	±200kHz	±100kHz	±200kHz	±200kHz
Modulation indication	LED ladder	Meter	LED ladder	Meter	Meter	Meter
AF response (mono)	±0.5dB 30-15k	±1dB 50-15k	±0.5dB 20-15k	±0.2dB 30-15k	±0.5dB 30-15k	±0.3dB 30-15k
Amplitude response (composite)	±0.025dB 30-53k	±1dB 50-100k	±0.1dB 20-100k	±0.2dB 30-100k	±0.1dB 30-53k	±0.2dB 30-55k
Phase response	±0.1°	.....	0.5%	.....	-1, +0.5° 20-53k	.....
THD/MD/TIM	0.003/0.003/0.01%	<0.25/.....%	0.08/0.08/0.1%	.....	0.08/0.02/0.05%	0.09/0.045/0.1%
FM noise (mono/stereo)	93dB ±75kHz	<70dB/.....	78dB/72dB	-70dB	-80dB/ <-70dB	80dB
FM noise (composite)	93dB ±75kHz	.....	78dB	-70dB below ±75kHz	80% ±75kHz	80dB
Stereo separation	60dB	.....	≥50dB	≥50dB	80%	65dB
Reader Service No.	1346	1347	1348	1349	1350	1351

Manufacturer	OEI Corporation		Rohde & Schwarz	RVR/BEXT	TELEFUNKEN Sendertechnik	
Exciter model	695	Model 675	SU 115 (SU 155 R2)	PTX 20 (TEX 20)	S3161	S3231
Power output range	5-20W	5-20W	10W (50W)	2-30W	10W	10-100W

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	±40Hz
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	±0.8dB 30-15k	±0.2 40-43k	±0.5dB 30-15k
Amplitude response (composite)	±0.01dB 30-75k	±0.01dB 30-75k	±0.3dB 10-100k	±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/...../.....%	≤0.4/...../.....%	<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 Senderttechnik	Television Technology Corporation	Thomson-LGT	Varian TVT Ltd	Vector Technology
Exciter model	S3233	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	±0.2dB 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 rel ±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-50B (-70B) ¹	FM-5B (-5B/S) ²	FM-10B (-20B)	FM 12000G (27500G)	Medium Power "G" ⁴	814R-1 (814B/815A)
Applicable exciter	FX-50	FX-50	FX-50	FM 20 G	FM 20 G	802A
Rated output power	15-60kW (20-70kW)	2.5-5.5kW	4.5-11kW (7.5-22)	12kW (27.5kW)	0.5kW to 10kW	2.4kW (4.3/5kW)
PA output device	2—4CX20000A	4CX3500A	4CX7500A(-12000A)	3CX10000A7 (15000A7)	3CX800A7-3CX10000A7	5CX1500B (4CX3500A)
PA circuit type	Grid-driven	Grid driven	Grid-driven	Ground grid	Grounded grid	Grounded screen
RF output connection	6 1/8" EIA	1 1/8"	3 1/8" EIA	.....	N to 1 1/8" EIA	1 1/8"
IPA device	Solid-state	Solid-state	Solid-state	Tube	3CX8000A7 triode	Solid-state
Asynchronous AM S/N	55dB w/o mod	55dB w/o FM mod	55dB w/o mod	<55dB	55dB	40dB
Synchronous AM S/N	50dB 1kHz ±75kHz	40dB ±75kHz 1kHz	45(50)dB 1kHz ±75kHz	.....	.....	40dB
Harmonic spurious suppression	per FCC/DOC/CCIR	per FCC/DOC/CCIR	per FCC/DOC/CCIR	80dB, 80dB	80dB, 80dB	-80dB
Floor space WxD	56.5x31.5"	34.5x37.25"	33.7x37.2 ³	.....	38x34 max	35x24" (35x34")
Typical power input	208/240Vac 3φ	208/240Vac 3φ (1φ)	208/240Vac 3φ	208Vac 3φ	230Vac 1φ	250Vac 1φ
Typical power factor	0.94	0.92 (0.98)	0.94 (0.97)	.....	.....	>0.94 (>0.92)
Power consumption	91kW (106kW)	8.3kW (9.6kW)	15.8kW (30kW)	.....	per model	4.9kVA (7.6/9.7)
μP diagnostics	Option	Option	Option	.....	No	No
Integral harmonic filter	Yes	Yes	Yes	.....	No	Yes
Automatic power control	Yes	Yes	Yes	.....	Yes	Yes
Integral remote control	Option	Option	Option	.....	No	Yes
Automatic modulation control	No	No	No	.....	No	.....
Reader Service No.	1364	1365	1366	1367	1368	1369

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 LPFM and is rated 200-600W.

Manufacturer	Continental Electronics/div of Varian			Energy-Onix	
Transmitter model	817A	816R-5B (817R-5B)	816-2B (817R-2B) ⁵	MK-7.5 (-15/-12) ⁶	SST-1000 (500) ⁷
Applicable exciter	802A	802A	802A	SST-30	SST-30
Rated output power	60kW	35kW (70kW)	20kW (40kW)	7.5kW (15kW, 12kW)	1kW (0.5kW)
PA output device	4CX40000G	9019/YC130 (Dual)	4CX15000A	YU-148 (3CX10000A7)	MRF-150
PA circuit type	Grounded screen	Grounded screen	Grounded screen	Grounded grid	Broadband SS
RF output connection	6 1/8"	3 1/8" (6 1/8")	3 1/8" (6 1/8")	1 1/8" (3 1/8")	7/8" (Type N)
IPA device	Solid-state	Solid-state	Solid-state	Solid-state	Solid-state
Asynchronous AM S/N	55dB	55dB	55dB	60dB	60dB
Synchronous AM S/N	40dB	40dB	40dB	60dB	60dB
Harmonic spurious suppression	-80dB	-80dB	-80dB	80dB/80dB	70dB, 80dB
Floor space WxD	128x40"	72x28" (160x28")	72x28" (160x28")	26x37"	19x19"
Typical power input	250Vac 3φ	250Vac 3φ	250Vac 3φ	230 Vac 1φ or (3φ)	230Vac (115) 1φ
Typical power factor	>0.95	>0.92	>0.92	0.9	0.9 (0.95)
Power consumption	99kVA	57kVA (114kVA)	33.5kVA (67.3kVA)	11.5kW (24kW)	2kW, 1kW
μP diagnostics	No	No	No	Yes	Yes
Integral harmonic filter	Yes	Yes	Yes	Yes	Yes
Automatic power control	Yes	Yes	Yes	Yes	Yes
Integral remote control	Yes	Yes	Yes	Yes	Yes
Automatic modulation control	.....	.....	.....	No	No
Reader Service No.	1370	1371	1372	1373	1374

⁵ Other members of this series includes: 816-3 25kW; 816-4 27.5kW; 817R-1 50kW; 817-R4 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) ⁸	HT 3.5/5/7.5/10FM	100BT, 300BT Europa	FM TAURO series	FM TAURO series ¹⁰
Applicable exciter	THE-1	THE-1	Integrated	FM 90D SUPERTAURO	FM 90D SUPERTAURO
					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 ⁸	Grounded cathode ⁸	.....	.....	.....	Grounded-grid
RF output connection	3 1/4"	1 1/2"/3 1/4"	Type N	1 1/2"/3 1/4"	LC/1 1/2"/1 1/4"	3 1/4"
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 3 ϕ	197-250Vac 1-3 ϕ	220Vac 1 ϕ	220-380Vac 3 ϕ	220/380Vac 3 ϕ	208-240Vac 3 ϕ
Typical power factor	0.95 3 ϕ	0.85 1 ϕ /0.95 3 ϕ	.....	0.98	0.98	> 0.94
Power consumption	46kW (52kW)	79/13/17kW	0.22kW, 0.65kW	17.5kW, 43kW	2.5kW/7kW/9.8kW	50kW
μ P 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.	1378	1377	1378	1379	1380	1381

⁸ Models HT 40FM and HT 50FM are constructed of paralleled 20kW and 25kW transmitter units. ⁹ Uses 1/4 cavity. ¹⁰ Related to this series are models 500ES 0.5kW, 1000ES 1kW and 2000ES 2kW, which are total solid-state designs.

Manufacturer	QEI Corporation	Rohde & Schwarz	TELEFUNKEN Sendertechnik GmbH
Transmitter model	FMO-10000	FMO-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 1/4"	1 1/4"	BNC-air ²⁶ / ₃₂
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 (3 ϕ opt)	208-240Vac 3 ϕ opt	110-380Vac 1-3 ϕ
Typical power factor	> 0.94	> 0.94	> 0.8 - > 0.95
Power consumption	17kW	9.4kW	240W-40kW
μ P diagnostics	Opt	Opt	Yes
Integral harmonic filter	Std	Std	Yes
Automatic power control	Std	Std	Yes
Integral remote control	Dpt	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 1 ϕ or 3 ϕ 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	Gmd-screen &(grid)
RF output connection	1 1/4"	3 1/4"	.....	3 1/4"
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	-60dB
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 1 ϕ	240Vac 3 ϕ	.....	480Vac (230Vac) 3 ϕ
Typical power factor	.....	.....	0.9	0.9
Power consumption	13kW (6.5kW)	38kW	20kW	75kW (66kW)
μ P diagnostics	.....	No	Yes	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 1 ϕ 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-30L (TVD-60L)	TV-30H/35H/60H ¹
Frequency band	VHF Lo/Hi CCIR I/III	VHF Lo/Hi CCIR I	VHF Lo/Hi CCIR I-III
Visual peak power	30kW (20, 10, 5)	30kW (60kW)	30kW (35, 50)
Carrier level regulation	3%	2%	2%
Modulation capability	3%	0%	0%
Response vs brightness	$\pm$ 0.75dB	$\pm$ 0.75dB	$\pm$ 0.75dB
Low frequency linearity	0.45dB	< 1dB	< 1dB
ICPM, uncorrected	$\pm$ 2°	$\pm$ 1.5° corrected	$\pm$ 1.5° corrected
Diff phase, gain	$\pm$ 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	Solid-state
Aural output power	10% of visual	6kW (12kW)	3kW (100W-6kW) ²
Carrier deviation	100kHz	$\pm$ 120kHz	$\pm$ 200kHz
Audio response	$\pm$ 0.1dB 50-50k	$\pm$ 0.5dB 30-15k	$\pm$ 0.5dB 30-15k
Applicable to stereo	8TSC	8TSC	8TSC ³
Harmonic distortion	0.5%	0.5%	0.2%
AM, FM noise	-50dB, -60dB	-55dB, -60dB	-55dB, -60dB

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Circle (132) on Reply Card

Aural PA VHF	Common to visual	3CX1000A7 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 ϕ	208-240/380/415Vac3 ϕ	208, 380/415Vac 3 ϕ	380-440Vac 3 ϕ
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	87530 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%	$\pm 1\%$	2%	2%
Modulation capability	0%	0%	3%	0%	0%
Response vs brightness	± 0.75 dB	± 0.75 dB	± 0.5 dB	± 0.5 dB	± 0.5 dB
Low frequency linearity	0.5dB	0.5dB	90%	...	...
ICPM, uncorrected	$\pm 1^\circ$	$\pm 1^\circ$	$\pm 4^\circ$	$\pm 3^\circ$	$\pm 3^\circ$
Diff phase, gain	$\pm 1^\circ, \pm 3\%$	$\pm 1^\circ, \pm 3\%$	$\pm 3^\circ, 0.95$ dB	$\pm 3^\circ, \pm 3\%$	$\pm 3^\circ, \pm 3\%$
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	± 200 kHz	± 200 kHz	± 50 kHz	± 100 kHz	± 100 kHz
Audio response	± 0.5 dB	± 0.5 dB	± 1 dB 30-15k	± 0.5 dB	± 0.5 dB
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 ϕ	208-242Vac 3 ϕ	380-415Vac 3 ϕ	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	$\leq 1\%$	≤ 0.3 dB	3%	...	$\leq 2\%$
Modulation capability	1% of sync	> 75%	2%	...	12.5% $\pm 2\%$
Response vs brightness	< 5%	< 0.3dB	1dB	...	...
Low frequency linearity	< 5%	...	0.8dB	5%	< 10%
ICPM, uncorrected	...	...	3°	< 3°	$\pm 2\%$
Diff phase, gain	< $\pm 3^\circ, < 5\%$	$\leq 3^\circ, 5\%$	4°, 5%	$\pm 3^\circ, 95\%$	$\pm 3\%, \pm 5\% 10-90\%$
S/N ratio	> 60dB	> 63dB	> 55dB	...	> 50dB
K factor for 2T, 12.5T	2%	< 2% 20T	2%, 2%	$\pm 1.5\%$	< 1.5%
Harmonics below visual	-60dB	≤ -60 dB	-65dB	-60dB	< -60dB 1mW max
Visual PA VHF	SS and tube types	...	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	± 25 kHz, ± 50 kHz	± 50 kHz	± 25 kHz	50kHz	± 100 kHz
Audio response	± 1 dB 30-15k	$\leq \pm 0.3$ dB to 60kHz	1dB 30-15k	± 0.5 dB 40-20k	± 0.5 dB 30-15k
Applicable to stereo	Dual carrier	Dual carrier	BTSC	BTSC or European	BTSC
Harmonic distortion	$\leq 1\%$ 30-15k	$\leq 0.4\%$ ± 50 kHz	1%	0.5%	< 0.5% 30-15k
AM, FM noise	-55dB, 52dB unwt'd	≥ 46 dB, ≥ 56 dB unwt'd	-55dB, -55dB	-50dB	> 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 ϕ	240Vac	380Vac or 208Vac	220Vac 3 ϕ
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	TR series	TRU/1000	S-series	Klystron Equipped
Visual peak power	1kW (100W)	25kW (10kW 5kW)	1kW	1kW	360kW (10kW-360kW)
Carrier level regulation	...	3%	3%	5%	3%
Modulation capability	3%	3%	3%	97%	3%
Response vs brightness	± 0.75 dB	± 0.75 dB	± 0.75 dB	± 0.75 dB	± 0.75 dB
Low frequency linearity	0.45dB	0.45dB	0.45dB	1.0dB	1.0dB
ICPM, uncorrected	$\pm 2^\circ$	$\pm 2^\circ$	$\pm 2^\circ$	< 2°	2°
Diff phase, gain	$\pm 1.5^\circ, 5\%$	1.5°, 3%	$\pm 1.5^\circ, 3\%$	$\pm 3^\circ, 5\%$	$\pm 3^\circ, 5\%$
S/N ratio	1%	1%	1%	55dB	55dB
K factor for 2T, 12.5T	3%	2%, 5%	2%, 5%	2%, 5%	2%, 5%
Harmonics below visual	-60dB	-60dB	-60dB	≥ -60 dB	-60dB
Visual PA UHF	Solid-state	Tetrode	Solid-state	Solid-state	Klystron ext
Aural output power	10% of visual	10% of visual	100@	100W	36kW (10% visual)
Carrier deviation	100kHz	100kHz	100kHz	± 75 kHz	± 75 kHz
Audio response	± 0.1 dB 50-50k	± 0.1 dB 50-50k	± 0.1 dB 50-50k	± 0.5 dB 30-15k	± 0.5 dB 30-15k
Applicable to stereo	BTSC	BTSC	BTSC	Yes	Yes
Harmonic distortion	1%	0.5%	0.5%	0.5%	0.5%
AM, FM noise	-50dB, -60dB	-50dB, -60dB	-50dB, -60dB	-50dB, -60dB	-50dB, -60dB
Aural PA UHF	Solid-state	Common to visual	Solid-state	Solid-state	Klystron ext
Cooling system	Forced air	Water (5kW air)	Forced air	Forced air	Forced air/water
Input AC power	120Vac (120/230)	208Vac	230Vac	230Vac	...
Power consumption	4.4kVA (1.2kVA)	46kVA (26, 16)	4.4kVA	...	...
Reader Service No.	1318	1319	1320	1321	1322

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

87540 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%	1%	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 MSDC	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	±75kHz	±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	Yes	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 MSDC	Int Diplex	Int diplex	S-S Int Diplex	SS or Ext Klystron
Cooling system	Water/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°, 1.5%	≤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	EUHF-60MS ² 1	VISTA Type 1890
Visual peak power	1.2kW (100W)	10kW	10kW (120kW)	60kW	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	±1.0dB
Low frequency linearity	0.8dB	0.8dB	0.8dB	0.8dB	≤0.8dB
ICPM, uncorrected	3°	3°	3°	3°	≤ ±3°
Diff phase, gain	4°, 5%	4°, 5%	4°, 5%	4°/5%	≤ ±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%	<2%, <2%
Harmonics below visual	-65dB	-65dB	-65dB	-65dB	-70dB
Visual PA UHF	Tetrode	Klystron ext	Klystrode	MSDC Klystron	Klystron MSDC Ext/Cav
Aural output power	10% of visual	10% of visual	10% of visual	.....	24kW (12, 6kW)
Carrier deviation	±25kHz	±25kHz	±25kHz	±25kHz	>100kHz
Audio response	1dB 30-15k	1dB 30-15k	1dB 30-15k	1dB 30-15k	0.5dB 30-15k
Applicable to stereo	BTSC	BTSC	BTSC	BTSC	BTSC IRT, 728 NICAM
Harmonic distortion	1%	1%	1%	1%	0.5%
AM, FM noise	-55dB, -55dB	-55dB, -55dB	-55dB, -55dB	-55dB, -55dB	-50dB, -60dB
Aural PA UHF	Tetrode	Klystron ext	Klystrode	MSDC Klystron	Klystron MSDC E/C
Cooling system	Forced air (conv)	Forced air	Forced air	.....	Forced air, water
Input AC power	230Vac	480Vac	480Vac	480Vac	460Vac or 480Vac
Power consumption	4.8 (0.5)kVA	27kVA	22.2 (265)kVA	100kVA	309kVA (155, 79kVA)
Reader Service No.	1336	1337	1338	1339	1341

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, vapor	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% [†]	0-133% [†]	0-133% [†]	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 Xlfr	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%	0.15%	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

[†] 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) [†]	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

[†] 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 per Demod	250 μ V-5mV 75 Ω	200 μ V-5mV 50 Ω
AGC circuitry	Yes	Yes	Yes	Yes
Modulation range	0-133% on meter [†]	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 lvl, 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 SAP & PRO
PRO, SAP monitors	PRO SAP opt	....	....	....
Reader Service No.	1496	1497	1498	1499

[†] 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

	Page Number	Reader Service Number	Advertiser Hotline		Page Number	Reader Service Number	Advertiser Hotline
A.F. Associates Inc.	65	38	201/767-1201	Invonics, Inc.	54	63	408/458-0552
Abekas Video Associates	19	9	415/369-5111	Intraplex, Inc.	91	61	617/486-4072
Advanced Video Associates	210	119	415/792-8684	Jampro Antennas Inc.	103	75	916/383-1177
ADX Systems USA	90	59	800/444-4239	Jem-Fab Group	149	105	516/867-8510
AKG Acoustics, Inc.	49		203/348-2121	JVC Professional Product Co.	23	11	800/582-5825
Alamar Electronics USA, Inc.	136	98	408/866-9373	Key Systems	149	107	717/283-1041
Ampex Corp (AVSD)	120		415/367-2911	Landy Associates, Inc.	114		608/424-4660
Ampex Corp (MTD)	60	36	415/367-2911	LDL Communications	56	32	301/498-2200
Anvil Cases, Inc.	85	51	818/575-8614	Leader Instruments Corp	59	35	800/645-5104
Arrakis Systems, Inc.	101	13	303/224-2248	Lectrosonics, Inc.	95	66	800/821-1121
Associated Production Music	105	77	800/543-4276	Leitch Video of America Inc.	69	40	804/424-7290
Audio Accessories, Inc.	118	90	603/446-3335	Lowell-Light Mfg., Inc.	114	86	718/921-0600
Audio Technologies Inc.	173	123	215/443-0330	Magni Systems, Inc.	151	110	503/626-8400
Audio-Video Engineering Co.	82	47	516/546-4239	MCG Electronics, Inc.	90	27	516/586-5125
Audiolab Electronics	153	111	916/485-0500	Midwest Communication Corp	1,27	3,14	800/543-1584
Avitel Electronics Corp	99	70	801/977-9553	Mohawk Wire & Cable	163	118	800/422-9961
Basys	13	6	800/869-7009	Myat	209	135	201/767-5380
BCS Video	189	30	818/845-1999	Nautel	106	78	902/823-2233
Belar Electronics Laboratory Inc.	99	71	215/687-5550	Nikon Corporation	31	16	516/222-0200
Belden Wire and Cable	63	37	800/BEL-DEN4	Nikon Corporation	7	5	516/222-0200
Benchmark Media Systems	167	120	315/452-0400	North Hills Electronics, Inc.	111	83	516/671-5700
Berc	123	92	818/841-3000	Nova Systems, Inc.	147	104	203/693-0238
Best Power Technology	88	56	800/356-5794	O'Connor Engineering	97	68	714/979-3993
Broadcast Services Co.	165	127	919/937-6869	Odetics, Inc.	71	41	800/243-2001
Broadcast Supply West	102	74	800/426-8434	Omicron Video	88	57	818/700-0742
Broadcast Video Systems Ltd.	210	136	416/764-1584	Opamp Labs Inc.	165	126	213/934-3566
Bryston Vermont	100	73	215/628-4255	Orban Associates Inc.	17	8	800/227-4498
BTS Broadcast Television Systems	119,143	91,102	801/972-8000	Otari Corp	170	122	415/592-8311
Cablewave Systems	25	12	203/239-3311	Panasonic Broadcast Systems Co.	14-15	7	201/348-7336
Camera Mart, Inc.	113,115	85,87	212/757-6977	Panasonic AVSG	9	22	714/895-7278
Canon USA Inc., Broadcast Lens	135	97	516/488-6700	Penstock Inc.	103		800/255-6788
Carver Corporation	73	42	818/442-0782	Perrott Engineering	86	53	703/532-0700
Cine 60	165	138	212/586-8782	Pirod	93	64	219/936-4221
Cipher Digital, Inc.	109	81	301/695-0200	PolyLine Corp	100	72	312/297-0955
Clear-Com Intercom Systems	37	19	415/527-6666	QEI	33	17	800/334-9154
Comad Communications	117	89	800/387-4991	ROH	85,131	52,95	800/262-4671
Comark	205	133	215/822-0777	Rhode & Schwarz, Inc.	89	58	301/459-8800
Conex Electro Systems	149	106	206/734-4323	RTS Systems, Inc.	50	28	818/843-7022
Continental Electronics, Div of Varian	58	34	214/381-7161	Shintron Electronics	131	94	508/486-3900
Control Concepts Corp	98	69	607/724-2484	Shure Brothers Inc.	1FC	1	312/866-2553
Daily Electronics Corp	149,165	109,128	213/774-1255	Snell & Wilcox	75	43	415/856-0900
Delta Electronics	53	29	703/354-3350	Solid State Logic Ltd.	181	124	800/343-0101
Denon	35	18	201/575-7810	Sony Communication Prod/ Broadcast Div	4-5		800/635-SONY
Di-Tech Inc.	IBC	2	516/667-6300	Sony Communications Prod/ Pro Audio Div.	176-177		800/635-SONY
Dolby Labs Inc.	10	23	415/558-0200	Sony Communications Products/Pro Video	128-129		800/523-SONY
Drake Electronics Ltd.	133	96	800/343-0101	Spectrum Communications	84	50	215/631-1710
Dubner Computer Systems	39	20	219/264-0931	Sprague Magnetics, Inc.	103		818/994-6602
Dynair Electronics Inc.	157	114	619-263-7711	SSAC Inc.	94	65	315/638-1300
EEV, Inc.	45	25	914/592-6050	Standard Tape Laboratory, Inc.	149	108	415/786-3546
Emcor Products	55	31	507/289-3371	Stanton Magnetics	141	99	516/349-0235
ESE	161	116	914/592-6050	Tektronix Inc.	195,196	130,131	800/452-1877
Faroudja Laboratories Inc.	43	24	408/245-1492	Telemetrics Inc.	96	67	201/427-0347
Fast Forward Video	82	46	714/852-8404	Tennaplex Systems Ltd.	86	54	613/226-5870
For-A Corp of America	47	26	213/402-5391	Tentel	207	134	800/538-6894
Fostex Corp. of America	183	125	213/921-1112	Thomson Tubes Electroniques	57	33	201/812-9000
Fujinon Inc.	41	21	201/633-5600	TTC-Television Technology Corporation	81	45	303/665-8000
Full Compass Systems	84	49	800/356-5844	Ultimate Corp	125	93	818/345-5525
Garner Industries	104	76	800/228-0275	Utah Scientific Inc.	21	10	800/453-8782
Ge Broadcast Systems Integration	107	79	215/583-6800	Vid Video	163	117	818/845-1515
Gendra International Inc.	117		305/372-8845	Video Accessory Corp	91	62	303/443-4950
Gentner Electronics Corp	67	39	801/268-1117	Videomedia	83	48	408/745-1700
Gray Engineering Laboratories	153	112	912/883-2121	Videoquip Research Ltd.	110	82	416/293-1042
Hall Electronics	114		804/977-1100	Videotek, Inc.	29	15	602/997-7523
Harris Corp	201	132	800/4HA-RRIS	Vinten Equipment Inc.	159	115	516/273-9750
Harrison Systems Ltd	167	121	301/731-5677	Ward-Beck Systems Ltd.	BC		416/438-6550
Hedco	155	113	800/433-2648	Western Internat'l Communications Ltd.	112	84	604/526-3214
Hitachi Denshi America Ltd	3	4	800/645-7510	Wohler Technologies, Inc.	92	60	415/285-5426
HM Electronics, Inc.	77	44	619/535-6060	Yamaha International Corp.	87	55	
Hotronic, Inc	137	101	408/378-3883	360 Systems	139	100	818/342-3127
Hybrid Arts	108	80	213/841-0340				
IGM Communications	189	129	206/733-4567				
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(5)	5856	20x20	RGB, HDTV
(6)	5862	64x32	stereo audio
(7)	5861	64x32	video



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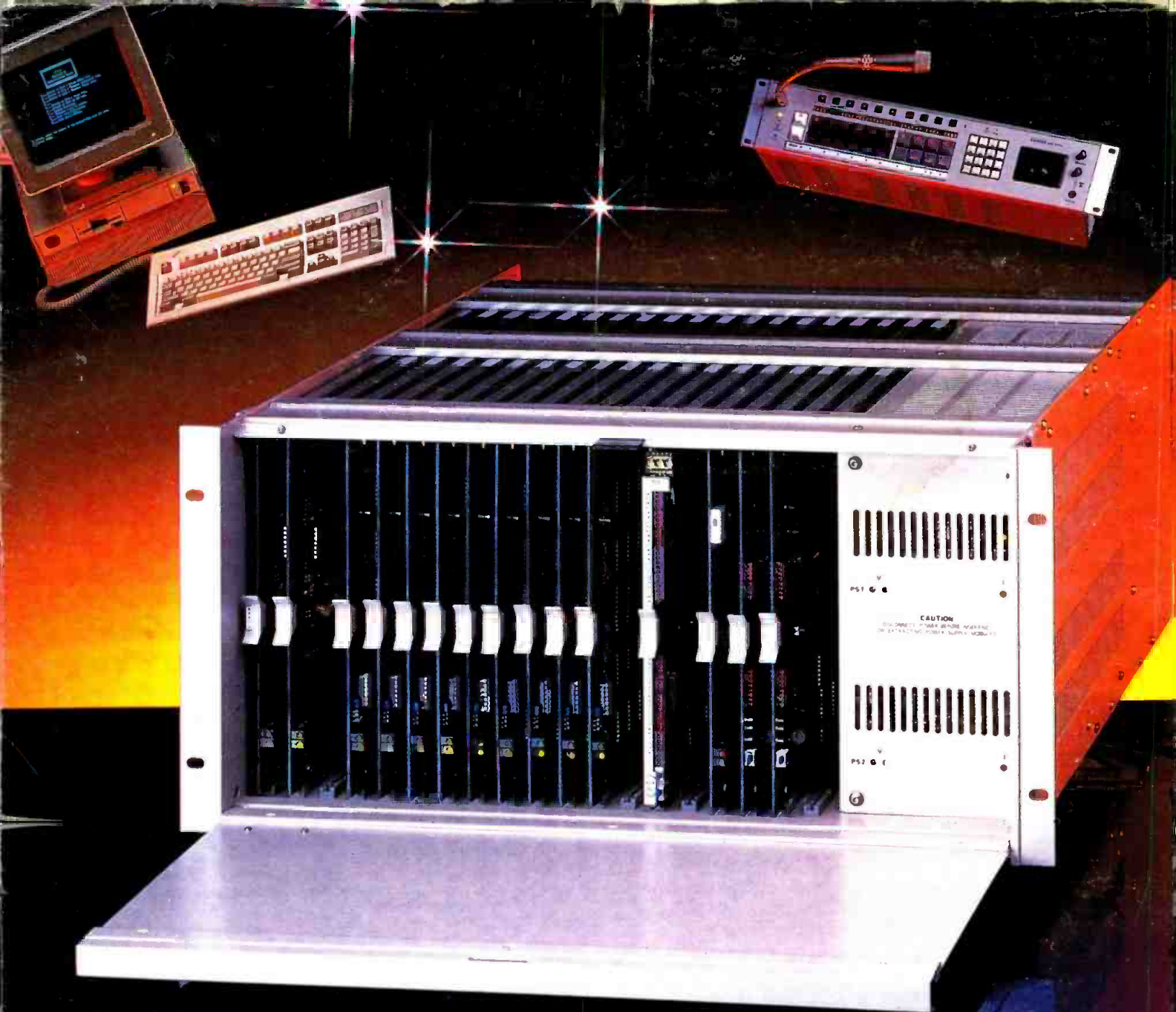


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