

BROADCAST[®] engineering

AN INTERTEC PUBLICATION

1991 ANNUAL ISSUE/\$20

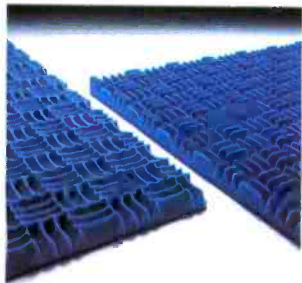
91

*Equipment
Reference
Manual*

THE MOST IMPORTANT AUDIO CONTROL EQUIPMENT WORKS FROM HERE TO HERE



Keeping sound clean and accurate can make or break your audio projects. SONEX from illbruck ensures that you're getting the sound you want. Our complete line of acoustical materials gives you total control—in the studio, the control room, or wherever sound quality is critical. There's a reason SONEX continues to lead—nothing works better. Put the leader to work for you; call today for all our performance specs and application guides—800-662-0032.



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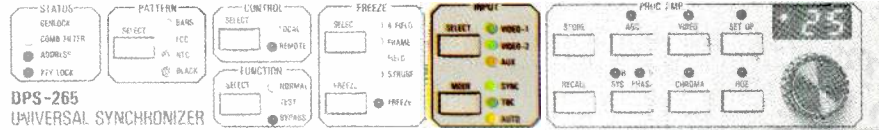
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In MN: 612-521-3555

The Whole is Greater Than the Sum of Its Parts.

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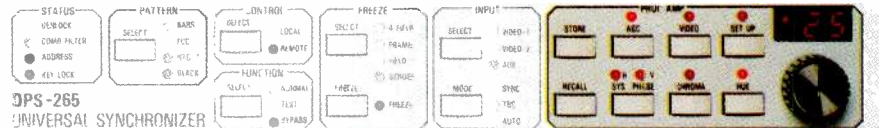
Starting with a Four-Field Wide Band Synchronizer for \$5,995.*



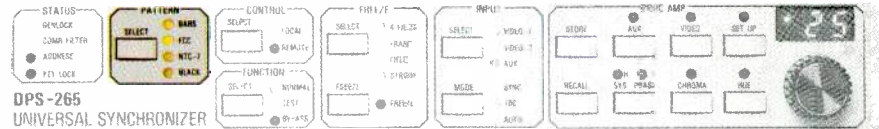
An infinite window TBC for \$4,995.*



A Digital Proc Amp with AGC, Black/White Clip and 10 memory presets for \$2,580.*



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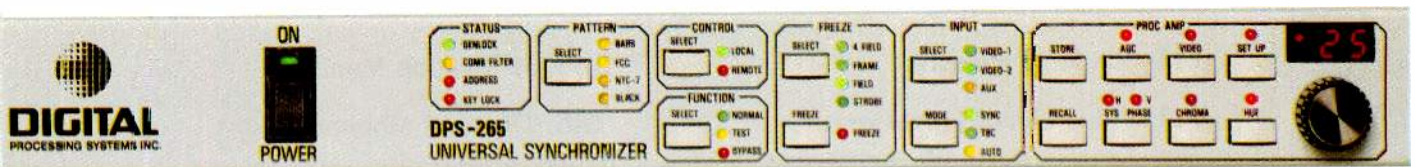


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But now you can have all these capabilities. And more. In a single unit. For a single low price.

The DPS-265 Universal Synchronizer TBC. Everything you need. And more. For \$13,000 less.

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(606) 781-2200

*Based on published list price of leading industry manufacturers.

Circle (3) on Reply Card

6 Letter from the Editors

8 Product directory

A listing of more than 1,000 broadcast manufacturers provides you with the companies that offer the equipment you need. The blue listings indicate advertisers in this issue and the page number of their ads.

58 Manufacturers' addresses

If you ever need the address and/or telephone number to contact a company, this directory provides the most up-to-date information.

95 Dealers/distributors

This directory puts you in close contact with the dealers and distributors within particular states that carry the equipment you need.

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The annual Equipment Reference Manual is a comprehensive directory for radio and TV broadcasters. This special BE publication can be used as a guidebook whenever an equipment purchase is being planned. Keep this annual publication on your desk for reference throughout the year. (Cover design courtesy of AT&T Graphics Software Labs. Artwork created by Katherine Hanley, using the RIO software package.)



One of Our CCD Cameras Should Be One of Yours

Presenting the Hitachi SK-F Series...
A Line-up of Five High Performance
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Hitachi Denshi America, Ltd

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"We chose Ikegami Cameras with an

When it comes to attracting future business to their remote mobile units, NEP understands the critical importance of selecting the right equipment.

Not surprisingly, when it came to selecting Studio Chip Cameras, they chose Ikegami's HK-355.

A long time Ikegami camera user, NEP's national recognition and quality reputation has been earned on such diverse productions as: *The Cosby Show*, *The Goodwill Games*, *Farm Aid Concert*, *The Tyson-Douglas Heavyweight Championship*, and *The Academy of Country Music Awards*.

When it comes to CCD technology, the right equipment for NEP is Ikegami.

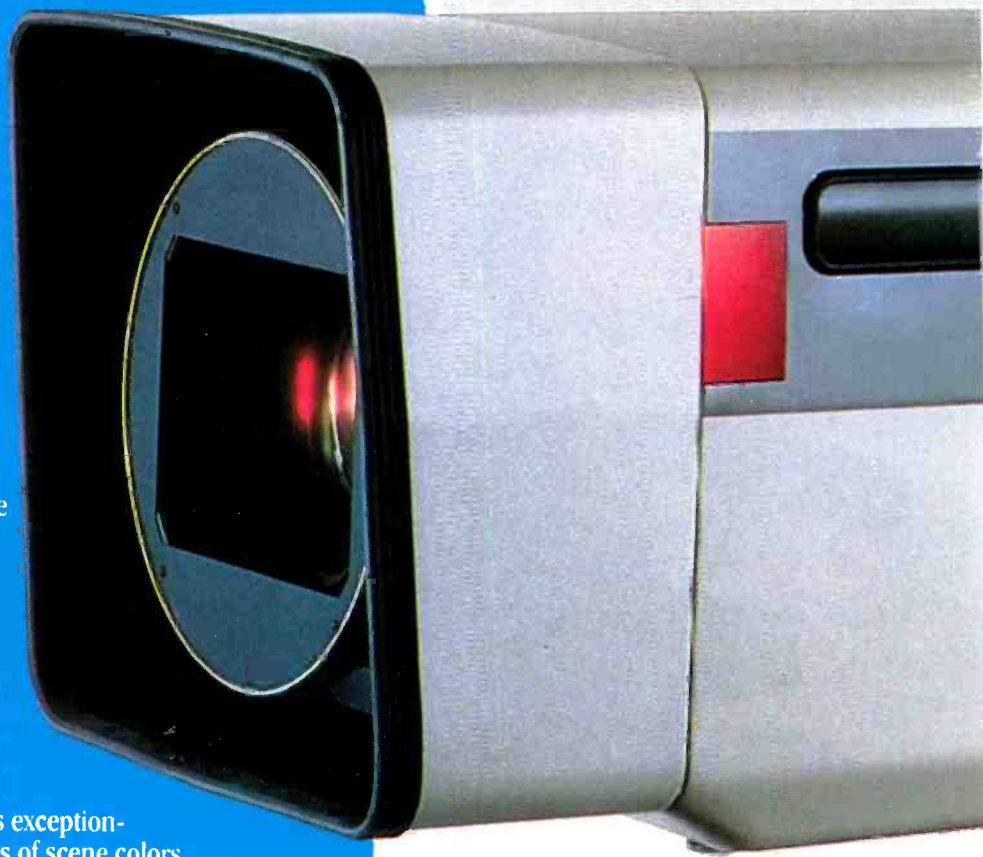
The HK-355 Studio Chip Camera offers many exceptional features:

- Three 2/3" FIT CCDs each with 450,000 pixels, deliver a resolution of 800 TVL and S/N ratio of 62 dB.
- 6-vector Color Corrector provides remote control of camera colorimetry-including a unique Auto Color facility to produce matching colorimetry accurately and automatically.
- Computer Control System enables complete remote control, Full Auto Setup, extensive Diagnostics, and Multiple Filing System.
- Full 3 Channel Detail System reproduces exceptionally fine details in entire picture, regardless of scene colors.
- A hand-held version, the HK-355P, offers extensive remote control, Auto Setup and Diagnostics.

For more information, contact your Regional Ikegami Sales office.

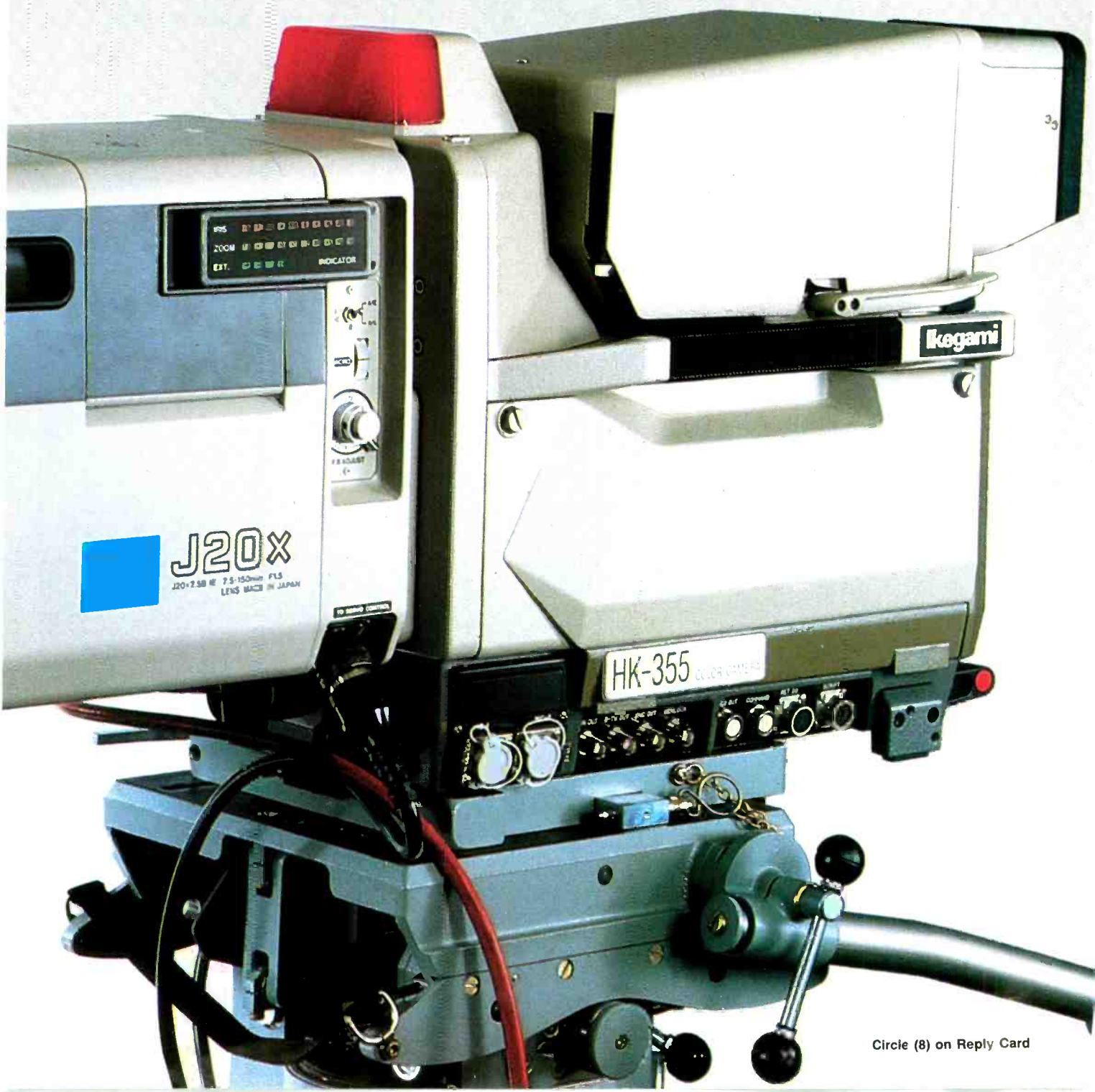
Ikegami

Ikegami Electronics (U.S.A.) Inc., 37 Brook Ave., Maywood, NJ 07607
East Coast: (201) 368-9171 West Coast: (213) 534-0050
Southeast: (305) 735-2203 Southwest: (214) 869-2363
Midwest: (708) 834-9774 Hawaii: (808) 946-5955



HK-355 Studio Chip eye on the future.”

-George Wensel, V.P. Operations, NEP



Circle (8) on Reply Card

1991 Equipment Reference Manual

Tradition continues with the **Broadcast Engineering 1991 Equipment Reference Manual**. Over the past 23 years, we have brought you the most extensive guide to product sources for the industry. Even though many changes have taken place in the industry, the 1991 edition of our annual directory remains the most complete guide we know of. It represents all new information provided by those companies responding to our request for information. Requests were directed to all participants of previous directories, to new companies exhibiting at trade shows and to those appearing in our *New Products* columns during the year. If a company is missing from this compendium, it is because we received no information from that company after repeated requests.

It was 10 years ago, when **Broadcast Engineering** first brought you the *Spec Book*, a unique presentation of com-

parative specifications for a variety of most-sought types of equipment. First, a stand-alone book, the *Spec Book* was later logically incorporated into the *Buyers' Guide*. As part of the long tradition of offering you as much information toward buying decisions as possible, the equipment specifications are included in this volume. These, too, represent new material from responding companies.

Fold-out tab pages quickly guide you to the different sections of this issue: *Buyers' Guide product listings*, *Manufacturers' addresses* and *Dealers & Distributors*. Throughout the product listings, color highlighting alerts you to advertisements in this issue. In addition, fold-outs are used to designate the beginning of *Audio Products*, *Video Products* and *RF & Test Products*. Within the specifications comparisons, company names are color highlighted to indicate advertisers.

As always, the staff of **Broadcast Engineering** is interested in serving you to the best of our ability. We enjoy bringing you this reference information and remain open to your suggestions of ways that we can help you in streamlining your research in future equipment purchases.

Pat Blanton

Pat Blanton, directory editor

Carl Bentz

Carl Bentz, special projects editor

BROADCAST ENGINEERING

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- Society of Broadcast Engineers
- Society of Motion Picture and TV Engineers

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Association of Business Publishers

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BPA

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Advertising offices listed on page 143.

**INTERTEC
PUBLISHING**

The Orban Family of Broadcast Products

OPTIMOD-FM



8100A1 OPTIMOD-FM Audio Processor: The dominant choice for highest quality FM audio processing, on all continents.



XT2 Six Band Limiter: Accessory to OPTIMOD-FM. Adds more competitive loudness, punch, and brightness.



222A Stereo Spatial Enhancer: Gives your station the competitive *leading edge* sound by naturally magnifying the stereo image.

OPTIMOD-AM/HF



9100B OPTIMOD-AM Audio Processor: Achieves extraordinarily natural audio quality on both voice and music, with loudness, intelligibility, remarkable source-to-source consistency, and FM-like brightness. Mono or stereo.



9105A OPTIMOD-HF Short-wave Audio Processor: Louder than OPTIMOD-AM; punches through noise, fading, and interference with outstanding intelligibility.

OPTIMOD-TV



8182A OPTIMOD-TV Audio Processor: For both stereo and mono television; works with all stereo systems (BTSC, NICAM, dual-carrier, EIAJ). Controls levels from any source artfully and automatically, without audible processing artifacts. Effectively controls loudness of commercials.

BTSC TV Stereo (for NTSC countries): BTSC TV Stereo, Second Audio Program (SAP) and Professional Channel (PRO) Generators. Meets the highest specifications.

AND OUR NEW TRANSMISSION LIMITER



4000A Transmission Limiter: We aimed for undetectable peak limiting... And we reached our goal. The sound is so transparent that you can't hear it work.

Orban OPTIMOD products are used by tens of thousands of broadcast stations all around the world, by local broadcasters and the world's most influential national broadcast organizations. Orban products are known for their high standard of construction and reliability. We're proud of our products and stand behind them with technical support from broadcast engineers who understand your needs.

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LISTEN TO THE DIFFERENCE.

Buyers' Guide product listings

Audio Products

Color highlighting denotes advertisers and ad page numbers

AMPLIFIERS, DISTRIBUTION

1-in/N-out; stand-alone, modular, rack frame with power supply; may include multiple sections.

Acron Ltd.
 ADA Signal Processors
 Advanced Video Associates
 AEQ-Aplicaciones Electronicas Quasar
 Aiphone Intercom Systems
 Allen Avionics
 Aphex Systems Ltd.
 API-Audio Products
 Arrakis Systems 93
 ATI-Audio Technologies 165
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 LPB
 MBI Broadcast Systems Ltd.
 McCurdy Radio Industries
 McCurdy Telecommunication Products
 McMartin
 Modular Audio Products/Modular
 Devices
 MTC/Mycomp Technologies Corp.
 Multidyne Electronics

Neumade Products Corp.
 NTP Elektronik
 NVision
 Omicron Video 100
 Opamp Labs
 OpTex
 Pacific Recorders & Eng. Corp.
 Peavey Electronics
 Pro-Bel Ltd.
 ProTech Audio Corp.
 Radio Systems
 Ram Broadcast Systems
 Ramko Research
 Rane Corp.
 Reliance Comm/Tec
 Richmond Sound Design
 ROH Products
 ROOD Megatronics B.V.
 RTS Systems/Telex Communications
 Scantex Labs
 Schafer World Communications Corp.
 Seem Audio
 Sescom
 Shintron Co.
 Sigma Electronics
 Skotel Corp.
 Societe Anonyme Des Techniques
 Digitales Digitec S.A.
 Solutec (H.A.)
 Soundmaster USA
 Spectra Sonics
 Summit Audio
 Target Technology
 Tech Electronics
 Telex Communications
 Video Accessory Corp.
 Videoquip Research Ltd.
 Videotek
 Vortex Communications Ltd.
 Ward-Beck Systems Ltd. BC
 Wheatstone Corp.

AMPLIFIERS, MONITOR, POWER

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 Dukane Corp.
 DYMA Engineering
 EDCOR
 Electro-Voice
 FM Acoustics Ltd.
 Furman Sound

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 IRP, A Knowles Div.
 ITAME, S.A. 75
 ITI Electronics
 JBL Professional
 JNS Electronics
 KINTEK
 Logitek Electronic Systems
 McCurdy Radio Industries
 McCurdy Telecommunication Products
 McMartin
 Mobile-Cam Products
 Modular Audio Products/Modular
 Devices
 Multidyne Electronics
 Numark Electronics
 Opamp Labs
 Peavey Electronics
 ProTech Audio Corp.
 QSC Audio Products
 Ram Broadcast Systems
 Ramko Research
 Ramsa/Panasonic 9
 Rane Corp.
 Renkus-Heinz
 Richmond Sound Design
 ROH Products
 RTS Systems/Telex Communications
 Schafer World Communications Corp.
 Seem Audio
 Sescom
 Societe Anonyme Des Techniques
 Digitales Digitec S.A.
 Spectra Sonics
 Symetrix
 Target Technology
 Tech Electronics
 Telex Communications
 TOA Electronics
 UREI, JBL Professional
 US Audio
 Videoquip Research Ltd.
 Wohler Technologies 169
 World Video
 Yamaha/Professional Audio

CABLE, AUDIO, MIC

1-/multiple-pair, shielded.
 Arcor Broadcast Products
 Audio-Technica U.S.
 AVS France
 Barco-EMT
 Berk-Tek
 Beyer Dynamic
 Bi-Tronics
 Black Audio Devices
 C.A.E.
 Canare Cable 143
 Canford Audio plc
 Chester Cable/Alcatel n.a.
 Clark Wire & Cable
 Comprehensive Video Supply Corp.
 Connectronics Corp.
 Crouse-Hinds CAM-LOK Products
 Discrete Technology Labs
 Dukane Corp.
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 Nema Electronics International
 Neutrik USA
 OpTex
 Peavey Electronics

Ramko Research
 Seam-Tech
 Sescom
 Teledyne Thermatics
 TOA Electronics
 Videoquip Research Ltd.
 Whirlwind
 Wireworks Corp.

CD PLAYERS

Barco
 Barco-EMT
 Broadcast Automation
 Canford Audio plc
 Carver Professional
 Century 21 Programming
 Denon America
 Discrete Technology Labs
 DKW Systems
 Leonardo Software
 Numark Electronics
 Ram Broadcast Systems
 Ramsa/Panasonic 9
 Sony Business & Professional
 Group 14-15, 128-129
 Studer Revox America
 TASCAM/Teac Corp. of America

DELAY SYSTEMS

Systems and devices introducing audio delays to compensate for signal delays in video processing; excludes audio effects, reverb.

AMS Industries
 Audio/Digital
 Barco-EMT
 Digital Audio Research
 Eventide
 IRP, A Knowles Div.
 Klark-Teknik
 Leitch Video 87
 Lexicon 77
 MacroMedia Design
 Urban Associates/AKG
 Acoustics 7, 146
 Peavey Electronics
 Ram Broadcast Systems
 Spectra Sonics
 TC Electronic
 Tektronix 119, 171, 172
 Yamaha/Professional Audio

DUPLICATORS, AUDIO

Accurate Sound Corp.
 Canford Audio plc
 Gauss
 Lyrec Mfg. A/S
 Magnetax International
 Otari Corp.
 RTS Systems/Telex Communications
 TASCAM/Teac Corp. of America
 Telex Communications

DYNAMICS PROCESSORS

Including compression, limiting, expansion, noise reduction, de-essing, spectral enhancements.

AKG Acoustics 146
 Antex Electronics
 Aphex Systems Ltd.
 Ashly Audio
 ATI-Audio Technologies 165
 Audio Animation 59
 Audio Developments Ltd.

Is your company missing from this directory? Either your company is not on our mailing list or someone failed to respond to requests for material. To be on the list for the 1992 edition, send a note to: **BE Directory Editor, PO Box 12901, Overland Park, KS 66212.**

or
as CES...

First,
there were
patchbays...

Then,
there were
routing switchers...

Now,
there's
AutoPatch™

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: 5 Hz-

: mic in and
d line out)

l analog)

EAK-

l control

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- ❖ **4YDM:** field expandable in increments of 4: 4x4 thru 32x128

❖ **8YDM:** field expandable in increments of 8: 8x8 thru 64x256

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Dolby Laboratories 13
Dorrough Electronics
Electro-Voice
Eventide
FM Systems
Focusrite Audio Eng. Ltd.
Furman Sound
Gentner Electronics Corp. 149
GML George Massenburg Labs
Gotham Audio Corp.
Hit Design
Inovonics 38
ITAME 75
JNS Electronics
Kahn Communications
Klark-Teknik
Lectrosystems 91
Logitek Electronic Systems
McCurdy Telecommunication Products
Modular Audio Products/Modular Devices
Multidyne Electronics
Neve
NTP Elektronik
Numark Electronics
Opamp Labs
Optical Disc Corp.
Orban Associates/AKG Acoustics 7, 146
Peavey Electronics
ProTech Audio Corp.
Quest Marketing
Ram Broadcast Systems
Rane Corp.
Richmond Sound Design
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MacroMedia Design
MotionWorks
New England Digital Corp.
Otari Corp.
Schafer World Communications Corp.
Solid State Logic
Soundmaster USA
Studer Editech
Studer Revox America
Symetrix
Time Logic
Wheatstone Corp.

EFFECTS PROCESSORS

Plate/room simulation, reverb, flanging, chorus functions; profanity delays; may include simple delay function but excludes delay-only compensation.

AKG Acoustics 146
AKG Akustische u. Kino-Geräte
AMS Industries
Audio Developments Ltd.
Barco-EMT
BBE Sound
D&R Electronica b.v.
Eventide
Gotham Audio Corp.
Klark-Teknik
Lexicon 77
Numark Electronics
Peavey Electronics
Soundmaster USA
Studio Technologies
TC Electronic
TOA Electronics
Yamaha/Professional Audio

EQUALIZERS

HP-/LP-Filters, parametric, psophometric, swept.
AKG Acoustics 146
AMEK Systems & Controls
API-Audio Products
Ashly Audio
Audio Developments Ltd.
Biamp Systems
Carvin Corp.
CRL Systems-Circuit Research Labs
D&R Electronica
dbx Professional Products/AKG Acoustics 146
Discrete Technology Labs
Dukane Corp.
Electro-Voice
Focusrite Audio Eng. Ltd.
Furman Sound
GML George Massenburg Labs
Hamison by GLW
Hit Design
Industrial Strength Industries
IRP, A Knowles Div.
ITAME 75
JBL Professional
JNS Electronics
Klark-Teknik
Lectrosystems 91
Matthey Electronics
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MicroAudio
Modular Audio Products/Modular Devices
NTP Elektronik
Numark Electronics
Opamp Labs
Orban Associates/AKG Acoustics 7, 146
Peavey Electronics
Ram Broadcast Systems
Rane Corp.

Richmond Sound Design
Rocktron/RSP Technologies
Sescom
Spectra Sonics
Summit Audio
Symetrix
TC Electronic
TOA Electronics
Trident Audio USA
TTE
UREI, JBL Professional
Valley International
Vortex Communications Ltd.
Wheatstone Corp.
White Instruments Div. of C. Van R.
Yamaha/Professional Audio

FADERS, ATTENUATORS

Console replacement and automated faders; audio attenuator pads.
AMEK Systems & Controls
Canford Audio plc
D&R Electronica b.v.
GML George Massenburg Labs
Henry Engineering
IGM Communications
Intelix Corp.
McCurdy Telecommunication Products
Neve
NTP Elektronik
Penny & Giles
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Richmond Sound Design
Schafer World Communications Corp.
Shallco
Spectra Sonics
Vortex Communications Ltd.

HEADPHONES, HEADSETS

AKG Acoustics 146
AKG Akustische u. Kino-Geräte
Audio-Technica U.S.
Beyer Dynamic
Birns & Sawyer
Broadcast Electronics 17
Canford Audio plc
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Clark Co., David
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Countryman Associates
Drake Electronics Ltd., Philip 52
Dynatech Tatical Communication
EDCOR
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 Harris Allied Broadcast Equipment
 Hit Design
 ITI Electronics
 Jensen Transformers
 JNS Electronics
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 McMartin
 Modular Audio Products/Modular Devices
 Multidyne Electronics
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NAB; includes digital products emulating standard cart machines.

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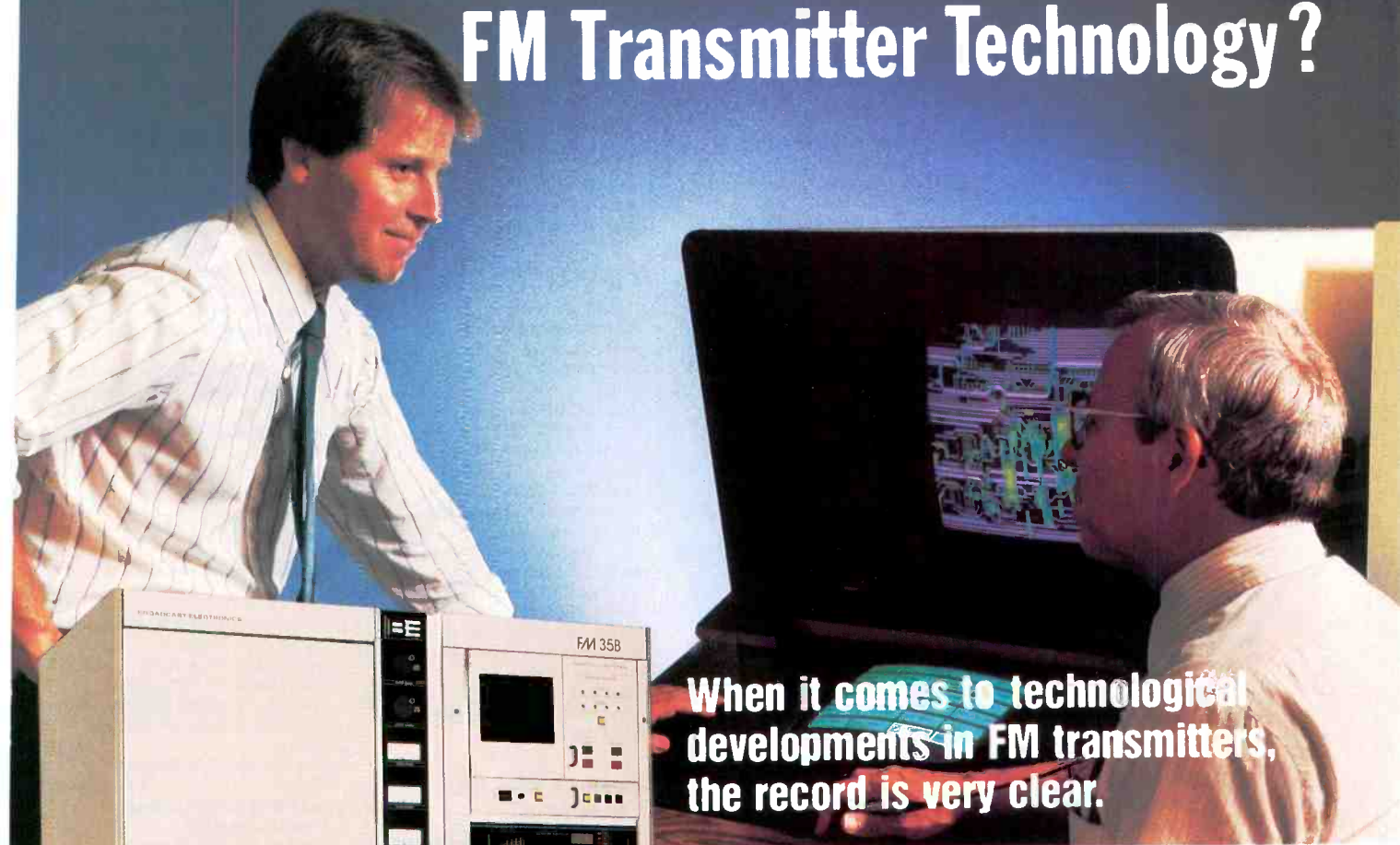
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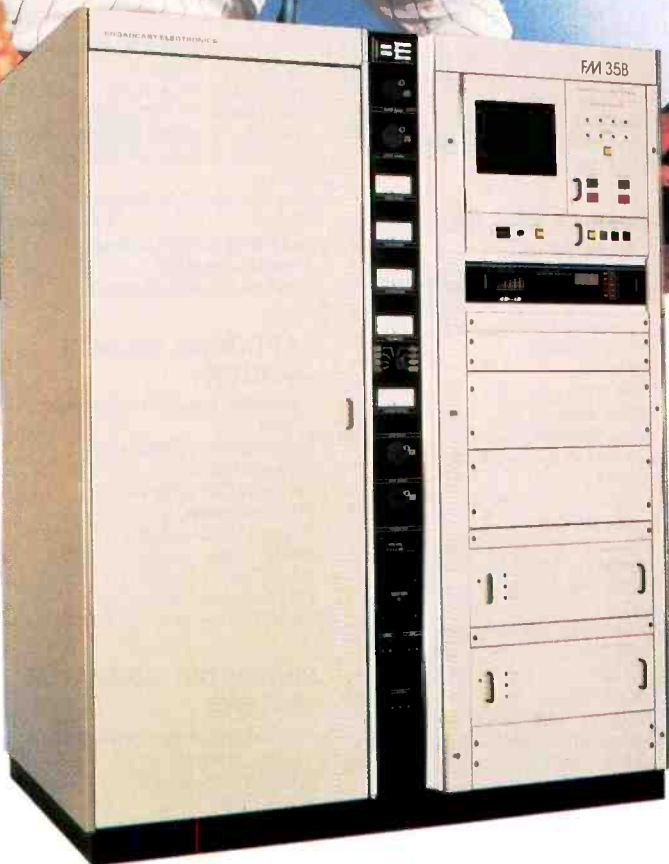
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Includes integrated amplifier-speaker units.
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Who's Setting The Pace For FM Transmitter Technology?



When it comes to technological developments in FM transmitters, the record is very clear.



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Broadcast Electronics has the largest and most skilled engineering staff dedicated to the radio broadcast equipment industry. Significant FM transmitter design patents awarded to B.E.:

- Folded Half-wave Output Cavity, patented 1982.
- Internal Second Harmonic Suppressor, patented 1982.
- Broadband Input Impedance Matching Circuit, patented 1985.

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First to introduce a single tube 35kW FM Transmitter with a 4CX3500A tube.

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Broadcast Electronics is the only major FM transmitter manufacturer who designs and builds its own solid state intermediate power amplifier (IPA).

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1-piece camera recorder products;
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image vibration, operator or mount-
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CAMERAS, STUDIO TV

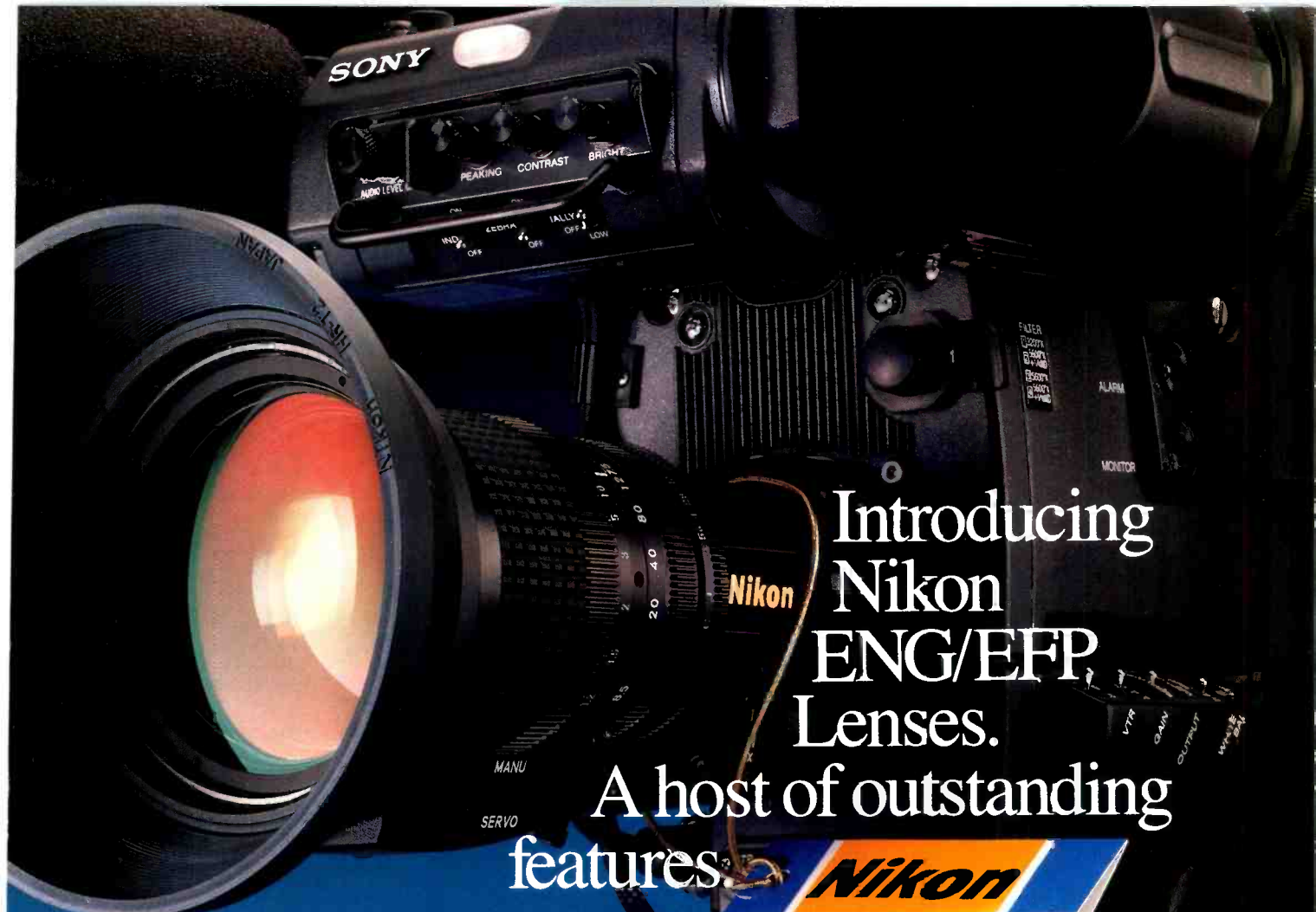
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Includes Teletext, Videotext equip-
ment.
Aston Electronic Designs Ltd.
Colorado Video
Computer Prompting Corp.
EEG Enterprises
Jasmin Electronics Ltd.
Norpak Corp.
Skotel Corp.
VG Electronics Ltd.
Video Data Systems

CHARACTER GENERATOR, TITLERS

Video titling systems; excludes time
code character insertion.
Abekas Video Systems 23
Amplex Corp. 112
Aston from Paltex Imaging Systems
AVS Broadcast Ltd.
AVS France
BTS 111
CCTV Corp.
Chyron Corp.
Comprehensive Video Supply Corp.
Croma Research Ltd.
Dubner Computer Systems
ESE 169
Evertz Microsystems Ltd.
FOR.A Corp. of America 73
Getris Images
Grass Valley Group
Hamaphot KG
Jasmin Electronics Ltd.
Laird Telemedia
Lazerus



Introducing Nikon ENG/EFP Lenses.

A host of outstanding
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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 or write for our complete brochure: Nikon Electronic Imaging, Dept. D1, 101 Cleveland Avenue, Bayshore, NY 11706, (516) 222-0200 Ext. 324. Or call 1-800-NIKON-US (645-6687) for the dealer nearest you.

Nikon
ELECTRONIC IMAGING

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Video Products

MFJ Enterprises
MPB Technologies
Multidyne Electronics
Multiplex Technology
Nexus Engineering Corp.
OpTex
PESA America
Polar Video Ltd.
QSI Systems
Quanta Corp.
Quantel
Ram Broadcast Systems
Ryley Communications
Sigmacon Industries
Teledac
VG Electronics Ltd.
Video Data Systems
Vortex Communications Ltd.
World Video

COLOR CORRECTION EQUIPMENT

Providing color balance, component level adjustments, color enhancement.

Allen Avionics
Broadcast Systems Design
Croma Research Ltd.
Dynatech ColorGraphics
Electrocraft Consultants Ltd.
Faroudja Labs
FOR.A Corp. of America 73
Grunder & Associates, James
Intelvideo
Laird Telemedia
MFJ Enterprises
Quantel
Rank Cintel
Rank Cintel-Unimedia
Thomson Broadcast
Thomson Video Equipment
VGV
Vidicraft

DELAYS, PULSE/VIDEO

Includes simple delay-lines and packaged delay systems.

Allen Avionics
Avitel Electronics Corp.
Brabury International
Broadcast Video Systems 167
Di-Tech IBC
Drake Electronics Ltd., Philip 52
DYMA Engineering
Eventide
Intelvideo
Leitch Video 87
Matthey Electronics
Omicron Video 100
Pro-Bel Ltd.
RF Technology
Shintron Co.
Sigma Electronics
Television Equipment Associates
Vortex Communications Ltd.

DIGITAL EFFECTS SYSTEMS

Abekas Video Systems 23
AKG Akustische u. Kino-Geräte
Alta Group
Ampex Corp. 112
CEL Electronics 25
Chyron Corp.
Digital Support Group
ECHOlab
Electronic Graphics
FOR.A Corp. of America 73
Fougerolle Video
Grass Valley Group

Hotronic
I-Den Videotronics Corp.
Imaging Systems
Jazz Systems Electrohome
Lazerus
Leitch Video 87
Microtime
MPB Technologies
Nova Systems 125
Numark Electronics
Pinnacle Systems
Prime Image
Processor Sciences
Quantel
Sony Business & Professional Group 14-15, 128-129
Thomson Video Equipment
Videoplex
Vistek Electronics Ltd.

DUPLICATORS, VIDEO

Cavendish Co., Dwight
Hamaphot KG
JVC Professional Products Co. 21
Matco Mfg. & Test Co. 98
Panasonic Broadcast Systems 64-65
Recortec
Sharp Electronics/Professional Products
Tech Electronics

EDITING CONTROLLERS

Includes cuts-only, A/B roll, large scale on-line, off-line; ATR and transport synchronizer (not frame synchronizer) equipment.

Abekas Video Systems 23
Adams-Smith
ADX Systems
Ampex Corp. 112
Amtel Systems
Audio Kinetics UK Ltd.
BASYS
BHP
BTS 111
CEL Electronics 25
Channelmatic
Chyron Corp.
Cipher Digital 109
CMX
Comprehensive Video Supply Corp.
Convergence Editing/Paltex Int'l
CV Technologies
Ediflex Systems
Editing Machines Corp.
Ensemble Designs
FOR.A Corp. of America 73
Grass Valley Group
Hamaphot KG
JVC Professional Products Co. 21
M&R Data Services
NEC America Broadcast Equipment
NTSC Productions
OpTex
Paltex Editing Systems
Panasonic Broadcast Systems 64-65
Panasonic Industrial A/V Systems Group 46-47
Quantel
Sigmacon Industries
Sony Business & Professional Group 14-15, 128-129
Time Logic
TimeLine
United Media
Vac Systems Corp.
Videomedia

ENCODERS, DECODERS

Scan conversion; component-to-composite, composite-to-com-

ponent; computer-to-video.

Accom
Acron Ltd.
Allen Avionics
Asaca/Shibasoku Corp. of America
BFE AG
BPI/Porta-Pattern
Brabury International
Broadcast Systems Design
Broadcast Video Systems 167
BTS 111
CEL Electronics 25
Central Dynamics
Cox Associates Ltd.
Croma Research Ltd.
Electrocraft Consultants Ltd.
Faroudja Labs
FOR.A Corp. of America 73
Fougerolle Video
Grunder & Associates, James
Icon Electronics Corp.
Ikegami Electronics (USA) 4-5
Intelvideo
Jasmin Electronics Ltd.
Kryptocom
Laird Telemedia
Leitch Video 87
Magni Systems 79
Omicron Video 100
Optical Electronics
Polar Video Ltd.
RGB Spectrum
Shintron Co.
Sierra Video Systems 101
Sigma Electronics
System Video
Thomson Video Equipment
VGV
Vistek Electronics Ltd.
Vortex Communications Ltd.

FILM CAMERAS/EDITORS

Includes motion picture film cameras and editing equipment.

Arriflex Corp.
Birns & Sawyer
CMX
Ediflex Systems
J&R Film
Mitchell Camera Corp.
MPB Technologies
Neumade Products Corp.
OpTex
Pioneer Technology Corp.
Roberts Film Services, Mark
Steenbeck
Time Logic

FILTERS, OPTICAL

Includes visual effect, ND illumination level compensation and color correction.

Birns & Sawyer
Hamaphot KG
Lee Filters Ltd.
OpTex
The Great American Market
Tiffen Mfg. Corp.

FORMAT TRANSLATORS

For inter-format conversions among video component types.

Avitel Electronics Corp.
Brabury International
Broadcast Systems Design
Broadcast Video Systems 167
Cox Associates Ltd.
Digital Processing Systems
I-Den Videotronics Corp.
Nova Systems 125
Omicron Video 100

Panasonic Broadcast Systems 64-65
Shintron Co.
Sierra Video Systems 101
Vistek Electronics Ltd.

GENERATORS, SAFE AREA/SOURCE ID

Asaca/Shibasoku Corp. of America
AVS France
Boland Communications
Broadcast Video Systems 167
Cox Associates Ltd.
Digital Processing Systems
Gray Engineering Labs 107
Icon Electronics Corp.
Leitch Video 87
Magni Systems 79
Multidyne Electronics
OpTex
Polar Video Ltd.
QSI Systems
Queue Systems
Rohde & Schwarz 159
Sigma Electronics
Target Technology
Video Data Systems
Videolequip Research Ltd.
Vortex Communications Ltd.

GRAPHICS SYSTEMS

Dedicated and PC-based products; software packages

Accu-Weather
Advanced Designs Corp.
Artel Communications Corp.
Aston Electronic Designs Ltd.
Aydin Controls
Chyron Corp.
Commodore Business Machines
Comprehensive Video Supply Corp.
Computer Graphics Lab
Digital Arts
Dubner Computer Systems
Dynatech ColorGraphics
Electronic Graphics
Getris Images
Imaging Systems
Kavouras
Laird Telemedia
Lazerus
Media Computing
MPB Technologies
Pinnacle Systems
Processor Sciences
Quantel
Recortec
Stardent Computer
Thomson Video Equipment
Time Arts
Video Data Systems

HARDCOPY PRINTERS, VIDEO

Hitachi Denshi America 3
Mitsubishi Electronics America Pro Electronics Div.
Nikon Photo/Electronic Imaging Products 19
Sharp Electronics Corp. Professional Products Div.
Sony/Still Image Systems

HDTV, ATV EQUIPMENT

Forming images of more than 1,000-line structure; interlace, sequential scans; excludes computer CAD and non-video products.

A.F. Associates 97
Adrienne Electronics Corp.

No Camcorder Compares...



... In size and weight

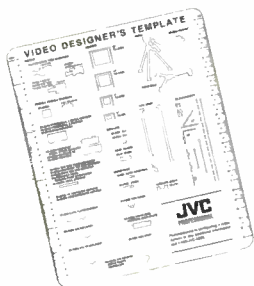
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... In cost

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PROFESSIONAL

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 Barco
 BTS 111
 Chyron Corp.
 Di-Tech IBC
 Electronic Visuals Ltd.
 Faroudja Labs
 FOR.A Corp. of America 73
 Fujinon
 Grass Valley Group
 Hitachi Denshi America 3
 Ikegami Electronics (USA) 4-5
 Kaitronics Corp.
 Magni Systems 79
 Melford Electronics Ltd.
 NVision
 Omicron Video 100
 Opamp Labs
 Pro-Bel Ltd.
 Quantel
 Rank Cintel
 Rank Cintel-Unimedia
 Shintron Co.
 Sigma Electronics
 Snell & Wilcox 94
 Sony Business & Professional
 Group 14-15, 128-129
 Tektronix 119, 171, 172
 Thomson Broadcast
 Thomson Video Equipment

KEYERS

DSK, chroma, linear, luminance,
 compositing
 Aston from Paltex Imaging Systems
 Automation Associates
 AVS France
 Beaveronics
 Broadcast Video Systems 167
 Central Dynamics
 Cox Associates Ltd.
 Florical Systems
 Getris Images
 Graham-Patten Systems
 Imaging Systems
 Omicron Video 100
 OpTex
 Paltex Editing Systems
 Polar Video Ltd.
 Sierra Video Systems 101
 Thomson Video Equipment
 ULTIMATTE Corp.
 Videotek
 Vistek Electronics Ltd.
 Vortex Communications Ltd.

LAMPS

Light sources for telecine projectors,
 studio lighting equipment.
 Apollo Audio Visual/Lighting
 Birns & Sawyer
 Cine 60
 Gray Supply Co.
 Lamp Technology
 Lumitrol
 Mole-Richardson Co.
 Nelson Sales Corp., L.E.
 Neumade Products Corp.
 OpTex
 Packaged Lighting Systems

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BE Directory Editor, PO Box 12901, Overland Park, KS 66212.

Philips Lighting
 RADMAR
 Snell Associates, George R.
 Strand Lighting

LENS SYSTEMS

Fixed and zoom units for video
 cameras, including adapters, ex-
 tenders.
 Birns & Sawyer
 Buhl Optical Co.
 Canon USA Broadcast Equipment Div.
 CCTV Corp.
 Century Precision Optics
 Film/Video Equipment Service Co.
 Fujinon
 Hamaphot KG
 Innovision Optics
 Neumade Products Corp.
 Nikon Photo/Electronic Imaging
 Products 19
 OpTex
 Peter Lisand
 Tamron Industries
 Tiffen Mfg. Corp.
 VMI-Visual Methods

LIGHTING CONSOLES, DIMMERS

Includes dimmer units and control
 systems.
 CAE
 Celco
 Crouse-Hinds CAM-LOK Products
 Electronics Diversified
 Lee Colortran
 Lumitrol
 Mole-Richardson Co.
 Omni Q
 OpTex
 Packaged Lighting Systems
 Peavey Electronics
 Strand Lighting
 The Great American Market
 Threatre Vision
 Union Connector Co.
 Videssence

LIGHTING INSTRUMENTS, KITS

Arriflex Corp.
 Birns & Sawyer
 Brabury International
 Broadcast Marketing International
 CAE
 Celco
 Cine 60
 Cool-Lux Lighting Industries
 Dedotec USA
 Frezzolini Electronics
 Hamaphot KG
 Innovision Optics
 Lee Colortran
 Lee Filters Ltd.
 Lowel-Light Mfg.
 LTM Corp. of America
 Lumitrol
 Matthews Studio Equipment
 Mole-Richardson Co.
 OpTex
 Packaged Lighting Systems
 Paco Electronics USA
 PERROTT Engineering Labs
 Sachtler AG
 Sachtler Corp. of America
 Strand Lighting
 The Great American Market
 Threatre Vision
 VDO-PAK
 Videssence

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 Asaca/Shibasoku Corp. of America
 Aydin Controls
 Barco
 Brabury International
 BURL INDUSTRIES 137
 CCTV Corp.
 Conrac Display Products Group
 Cromma Research Ltd.
 Delcom USA
 Dotronix
 Electronic Visuals Ltd.
 Hitachi Denshi America 3
 Hoodman Corp.
 Ikegami Electronics (USA) 4-5
 JVC Professional Products Co. 21
 Melford Electronics Ltd.
 MicroTouch Systems
 Mitsubishi Electronics America Pro
 Electronics Div.
 Panasonic Broadcast Systems 64-65
 Panasonic Industrial AV Systems
 Group 46-47
 Recortec
 Sharp Electronics Corp. Professional
 Products Div.
 Sony Business & Professional
 Group 14-15, 128-129
 Video Display Corp.
 Videoplex
 Videotek
 Vistek Electronics Ltd.
 World Video

NOISE REDUCTION SYSTEMS

A.F. Associates 97
 Accom
 Allen Avionics
 BTS 111
 CEL Electronics 25
 Control Concepts Corp. 42
 Deerfield Lab
 Digital Processing Systems
 Electrocraft Consultants Ltd.
 FM Systems
 I-Den Videotronics Corp.
 Industrial Acoustics Co.
 North Hills Electronics 44
 Nova Systems 125
 Optical Electronics
 Ram Broadcast Systems
 Rank Cintel
 Rank Cintel-Unimedia
 Transtector Systems
 Video Accessory Corp.

PAN/TILT HEADS, CONTROLS

Including automated camera
 positioning products.
 Arriflex Corp.
 BURL INDUSTRIES 137
 Canon USA Broadcast Equipment Div.
 CCTV Corp.
 Davis & Sanford Co.
 Fujinon
 Heitz, Karl
 Innovision Optics
 Matthews Studio Equipment
 Miller Fluid Heads (USA)
 Mitchell Camera Corp.
 Mobile-Cam Products
 Neilson-Hordell Ltd.
 O'Connor Engineering
 Penny & Giles
 Precision Specialties
 Radamec EPO Ltd.
 Roberts Film Services, Mark

Sachtler AG
 Sachtler Corp. of America
 Telemetrics 45
 TSM
 ULTIMATTE Corp.
 Vicon Industries Professional Products
 Vinten Broadcast 63
 Will-Burt Co., The

PEDESTALS, TRIPODS, DOLLIES

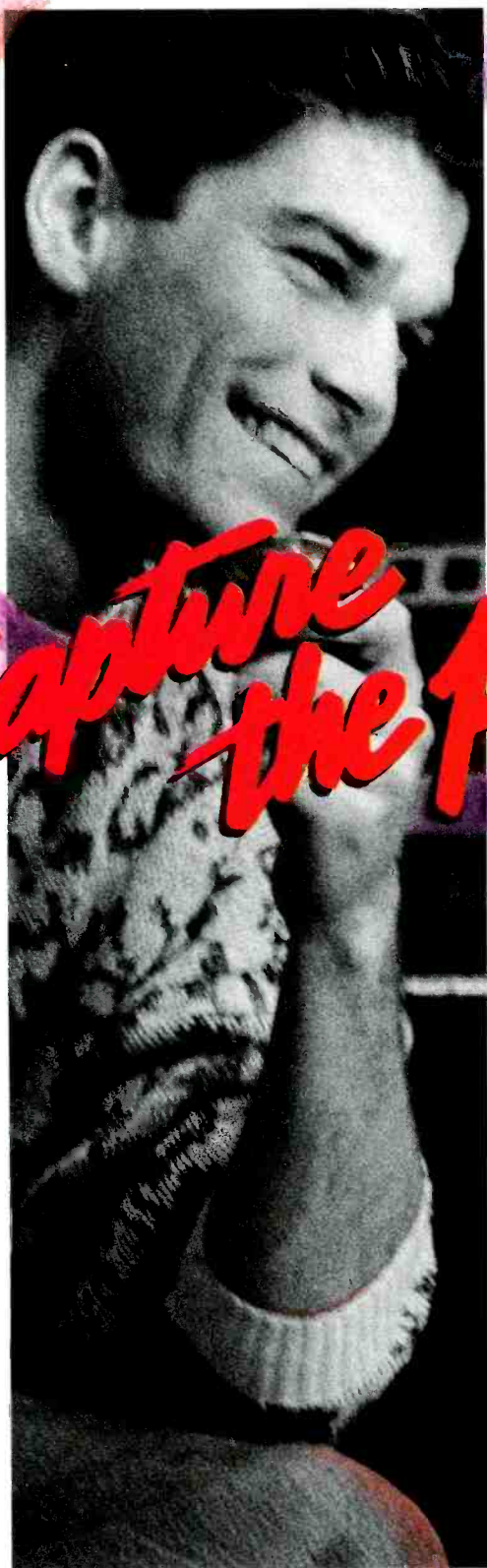
Including automated camera sup-
 port products.
 Arriflex Corp.
 Bencher
 Birns & Sawyer
 Bogen Photo Corp.
 Broadcast Microwave Services
 Canon USA Broadcast Equipment Div.
 Davis & Sanford Co.
 Heitz, Karl
 Matthews Studio Equipment
 Miller Fluid Heads (USA)
 Mitchell Camera Corp.
 Neilson-Hordell Ltd.
 O'Connor Engineering
 OpTex
 Panther Corp. of America
 Peter Lisand
 Precision Specialties
 Radamec EPO Ltd.
 Sachtler AG
 Sachtler Corp. of America
 Technology Resource Group
 Telemetrics 45
 TSM
 Velbon International Corp.
 Vinten Broadcast 63

PRODUCTION SYSTEMS, INTEGRATED

May include functions of time base
 correction, switching, effects,
 graphics.
 FOR.A Corp. of America 73
 Getris Images
 Grass Valley Group
 MPB Technologies
 Pro-Bel Ltd.
 Quantel
 Thomson Video Equipment
 Utah Scientific
 Vistek Electronics Ltd.

PROJECTORS, VIDEO

Large screen systems using CRT,
 LCD light sources.
 Barco
 Buhl Optical Co.
 Delcom USA
 EEV 71
 GE Co., Projection Display Products
 Gretag Image Systems
 Hitachi Denshi America 3
 Ikegami Electronics (USA) 4-5
 Lazerus
 Mitsubishi Electronics America Pro
 Electronics Div.
 Neumade Products Corp.
 Nytone
 Panasonic Industrial AV Systems
 Group 46-47
 RADMAR
 RTS Systems/Telex Communications
 Sharp Electronics Corp. Professional
 Products Div.
 Snell Associates, George R.
 Sony Business & Professional
 Group 14-15, 128-129
 Telex Communications



Capture the power

1:45 Wednesday, having fun.
Your client cracks you up.
One hour into the session he
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A82 Composite Digital Switcher

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Dedicated and PC-based.
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 Beacon Software
 Blue Feather Co.
 Broadcast Developments/Autoscript
 Comprehensive Video Supply Corp.
 Comprompter
 Computer Prompting Corp.
 Listec Video Corp.
 maney_logic
 Media Computing
 MPB Technologies
 OpTex
 Q-TV
 Tekskil Industries
 Telescript
 Video Data Systems

RECORDERS, 1/2"

All formats.
Ampex Corp. 112
AVEC
BTS 111
Hitachi Denshi America 3
 Instant Replay
JVC Professional Products Co. ... 21
 Mitsubishi Electronics America Pro
 Electronics Div.
 OpTex
Panasonic Broadcast Systems 64-65
Panasonic Industrial A/V Systems
Group 46-47
 Sharp Electronics Corp. Professional
 Products Div.
 Thomson Video Equipment
 Wide Range Electronics Corp.

RECORDERS, 3/4"

AVEC
OpTex
Sony Business & Professional
Group 14-15, 128-129
 Thomson Video Equipment
 Wide Range Electronics Corp.

RECORDERS, 1"

Ampex Corp. 112
BTS 111
Hitachi Denshi America 3
Sony Business & Professional
Group 14-15, 128-129
 Wide Range Electronics Corp.

RECORDERS, DIGITAL

D-1, D-2 and 1/2"
Abekas Video Systems 23
Ampex Corp. 112
BTS 111
 Dynatech ColorGraphics
Hitachi Denshi America 3
Panasonic Broadcast Systems 64-65
Sony Business & Professional
Group 14-15, 128-129
 Thomson Video Equipment

RECORDERS, STILL STORES

Includes still video reproduction
 products; optical and magnetic
 videodisc systems.
Abekas Video Systems 23
Accom
 Asaca/Shibasoku Corp. of America
 Aston from Paltex Imaging Systems
 Chyron Corp.

Leitch Video 87
 Logica Communications/Broadcast
Nikon Photo/Electronic Imaging
Products 19
 Oktel, LP
 Optical Disc Corp.
 Quantel
 Rank Cintel
 Sony/Still Image Systems
Sony Business & Professional
Group 14-15, 128-129
 TEAC Div. of Teac Corp. of America
 Thomson Video Equipment
 Wide Range Electronics Corp.

RECORDING HEADS

Ampex Corp. 112
 CMC Technology/ Datatape
 International Electro-Magnetics
 JRF Magnetic Sciences
Panasonic Broadcast Systems 64-65
 Saki Magnetics
 Wide Range Electronics Corp.

RECORDING TAPE

Agfa Corp.
Ampex Recording Media Corp. ... 60
 Cine 60
 CoarcVideo
 Fuji Photo Film Magnetic Products Div.
JVC Professional Products Co. ... 21
Panasonic Broadcast Systems 64-65
 Polyline Corp.
 Sony Magnetic Products Co.
 3M Professional A/V & Specialty
 Products

SIGNAL ENHANCERS

Detail correction, enhancement
 equipment.
 Digital Processing Systems
 Faroudja Labs
 Geneva Group of Companies
 Intelvideo
 Multidyne Electronics
 Optical Electronics
 Shintron Co.
 Vidicraft

STANDARDS CONVERTERS

Inter-standard conversion between
 composite video; NTSC, PAL/-N/-M,
 SECAM; may include video com-
 ponent input and output capabilities.
A.F. Associates 97
 Allen Avionics
 AVS Broadcast Ltd.
CEL Electronics 25
 Fougerolle Video
 Grunder & Associates, James
 I-Den Videotronics Corp.
 Instant Replay
Leitch Video 87
 LNR Communications
 OKI Electric Industry Co.
 Quantel
Snell & Wilcox 94
Sony Business & Professional
Group 14-15, 128-129
 Thomson Video Equipment
 Video International Development Corp.
 Vistek Electronics Ltd.
 Vortex Communications Ltd.

SWITCHERS, MASTER CONTROL

TV on-air switching.
AVS France

BASYS
BTS 111
 Channelmatic
Drake Electronics Ltd., Philip ... 52
 Grass Valley Group
 Image Video Ltd.
 IRIS Technologies
 Kaitronics Corp.
 Key Video Ltd.
Omicron Video 100
 Pro-Bel Ltd.
 Tech Electronics
 Thomson Video Equipment
 Utah Scientific

SWITCHERS, PRODUCTION

Studio, edit suite video mixers.
Abekas Video Systems 23
Alta Group
Ampex Corp. 112
AVS France
BTS
 Central Dynamics
 Cox Associates Ltd.
 ECHOlab
 Electrocraft Consultants Ltd.
FOR.A Corp. of America 73
 Grass Valley Group
 Grunder & Associates, James
 Jazz Systems Electrohome
JVC Professional Products Co. ... 21
 Multidyne Electronics
Panasonic Broadcast Systems . 64-65
 Polar Video Ltd.
 Prime Image
 Pro-Bel Ltd.
 Ross Video Ltd.
Sony Business & Professional
Group 14-15, 128-129
 Thomson Broadcast
 Thomson Video Equipment
 Universal Video Electronics
 Utah Scientific
 VGV
 Videotek
 Vistek Electronics Ltd.

SWITCHERS, ROUTING

Video distribution; includes A/V, data
 types, excludes audio-only.
 Adrienne Electronics Corp.
 Allen Avionics
 Arnel Systems
 Artel Communications Corp.
 Asaca/Shibasoku Corp. of America
AutoPatch/XN Technologies 10
 Avitel Electronics Corp.
AVS France
 Barco
 Brabury International
Broadcast Video Systems 167
BTS 111
CEL Electronics 25
 Central Dynamics
 Channelmatic
 Cox Associates Ltd.
Datatek Corp. 69
Di-Tech IBC
Drake Electronics Ltd., Philip ... 52
DYNAIR Electronics 35
 ETI Systems
 FSR
 Gennum Corp.
 Grass Valley Group
HEDCO 43
 Image Video Ltd.
 IMC/Akai
 Integrated Switching Systems
 Intelvideo
 IRIS Technologies
 Jem-Fab Corp.
 Kaitronics Corp.

Key Video Ltd.
 Laird Telemedia
Leitch Video 87
 Melford Electronics Ltd.
 Monroe Electronics
 Multidyne Electronics
 Novadyne
Omicron Video 100
 Opamp Labs
 Patch Bay Designation
 PESA America
 Pro-Bel Ltd.
 Professional Sound Corp.
 Shintron Co.
Sierra Video Systems 101
 Sigma Electronics
Sony Business & Professional
Group 14-15, 128-129
 System Video
 Target Technology
 Thomson Broadcast
 Thomson Video Equipment
 Utah Scientific
 VGV
 Videotek
 Videotek
 Videotek
 Videotek
 Videotek
 Videotek
 Vortex Communications Ltd.

SYNC/PATTERN GENERATORS

Produces video drive pulses, subcar-
 rier, blackburst, color bar, test pat-
 terns.
 Acron Ltd.
 Asaca/Shibasoku Corp. of America
AVS France
 Brabury International
 BTC Test & Measurement
 Cox Associates Ltd.
 Digital Processing Systems
 Electrocraft Consultants Ltd.
 Faroudja Labs
 Grass Valley Group
HEDCO 43
 Horita Co.
 Icon Electronics Corp.
Leitch Video 87
Magni Systems 79
 Multidyne Electronics
Omicron Video 100
 Optical Electronics
 PESA America
 Philips TV Test Equipment
 QSI Systems
Rohde & Schwarz 159
 Shintron Co.
 Sigma Electronics
 System Video
Tektronix 119, 171, 172
 Telcom Research
 Thomson Video Equipment
 Video Accessory Corp.
 Videotek
 Vortex Communications Ltd.

TBCs, SYNCHRONIZERS

Video signal timing correction equip-
 ment.
 Alta Group
Ampex Corp. 112
 Broadcast Systems Design
CEL Electronics 25
 Digital Processing Systems
 Electrocraft Consultants Ltd.
 Ensemble Designs
FOR.A Corp. of America 73
 Fougerolle Video
 Grunder & Associates, James
 Hotronic
 I-Den Videotronics Corp.
JVC Professional Products Co. ... 21

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of our range means we can fulfil all requirements; the depth of our research means you can rely on our technology. And the efficiency of our design makes outstanding quality – and some unique features – available at a remarkably low price. The high level of modularity of our products gives you the room to evolve your own system as your needs expand.

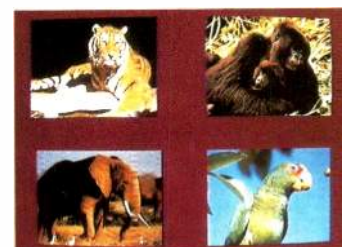
Meanwhile, at CEL the evolution continues – by design.

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 Nova Systems 125
 Polar Video Ltd.
 Prime Image
 Tektronix 119, 171, 172
 TimeLine
 Videotek
 Vistek Electronics Ltd.

TELECINE SYSTEMS

Film-to-video presentation, transfer systems.
 BTS 111
 Buhl Optical Co.
 Ikegami Electronics (USA) 4-5
 Image Transform
 Laird Telemedia
 Marconi Communication Systems Ltd.
 RADMAR
 Rangertone Research
 Rank Cintel
 Rank Cintel-Unimedia
 SONDOR Willy Hungerbuhler AG
 Steenbeck
 Tamron Industries
 Thomson Video Equipment
 Time Logic
 Wide Range Electronics Corp.

TELECONFERENCING SYSTEMS

American Laser Systems
 Artel Communications Corp.
 Canon USA Broadcast Equipment Div.
 DMC Digital Video Div. of Digital Microwave Corp.
 DYNAIR Electronics 35
 Fujinon
 Microdyne Corp.
 Nytone
 Orchard Communications
 PESA America
 Radamec EPO Ltd.
 Snell Associates, George R.
 Telemetrics 45
 Telos Systems
 Vortex Communications Ltd.

TEST CHARTS, SLIDES

Includes illuminators.
 Asaca/Shibasoku Corp. of America
 Birns & Sawyer
 BPI/Porta-Pattern
 Brabury International
 Nalpak Video Sales
 OpTex

TEST, ALIGNMENT TAPES

Ampex Corp. 112
 Geneva Group of Companies
 Tentel

TIME CODE EQUIPMENT

Generators, readers, character insertion; film frame counting, film data products.
 Adams-Smith
 Adrienne Electronics Corp.
 ADX Systems
 Audio Kinetics UK Ltd.
 Avitel Electronics Corp.
 AVS France
 Calculated Industries
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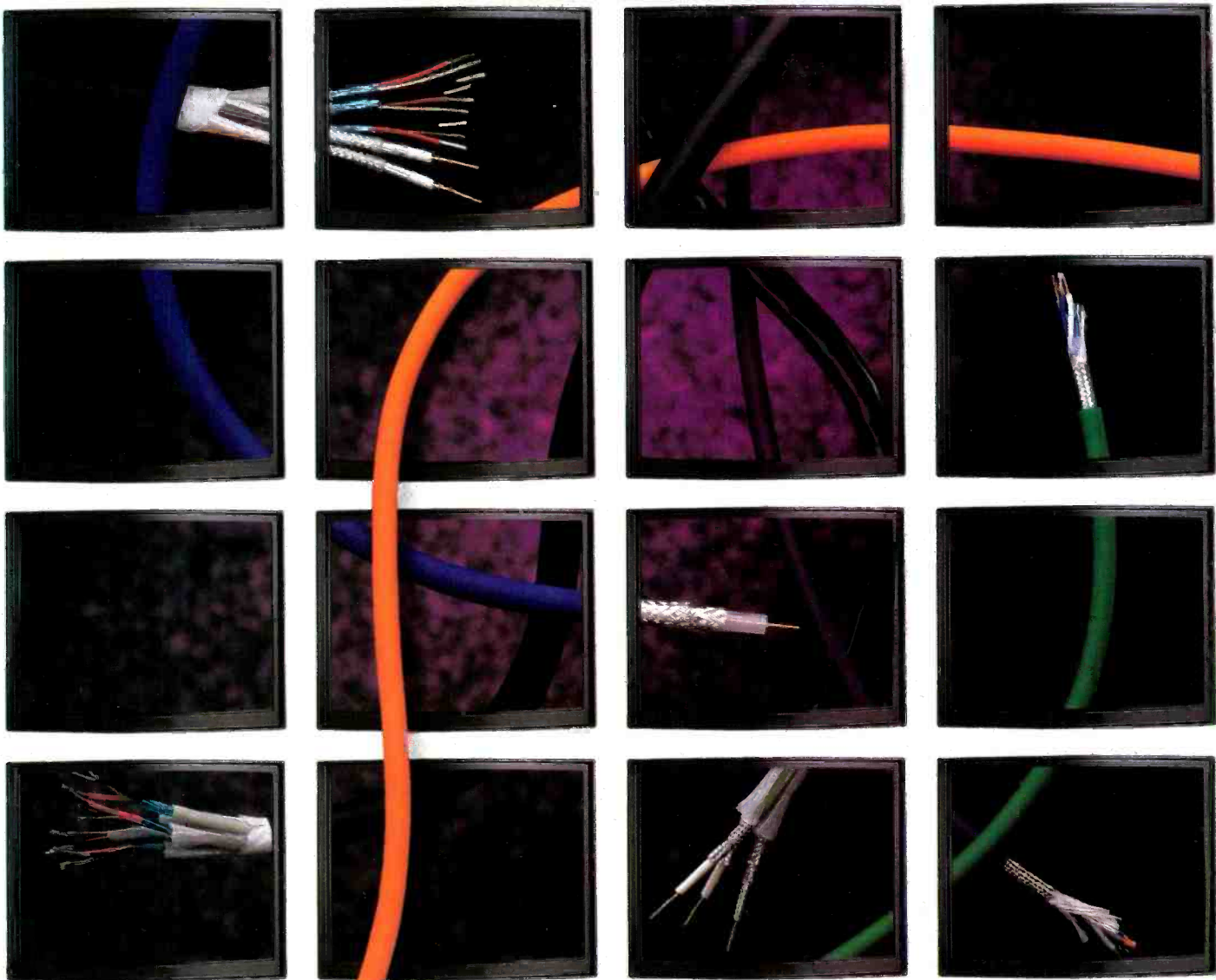
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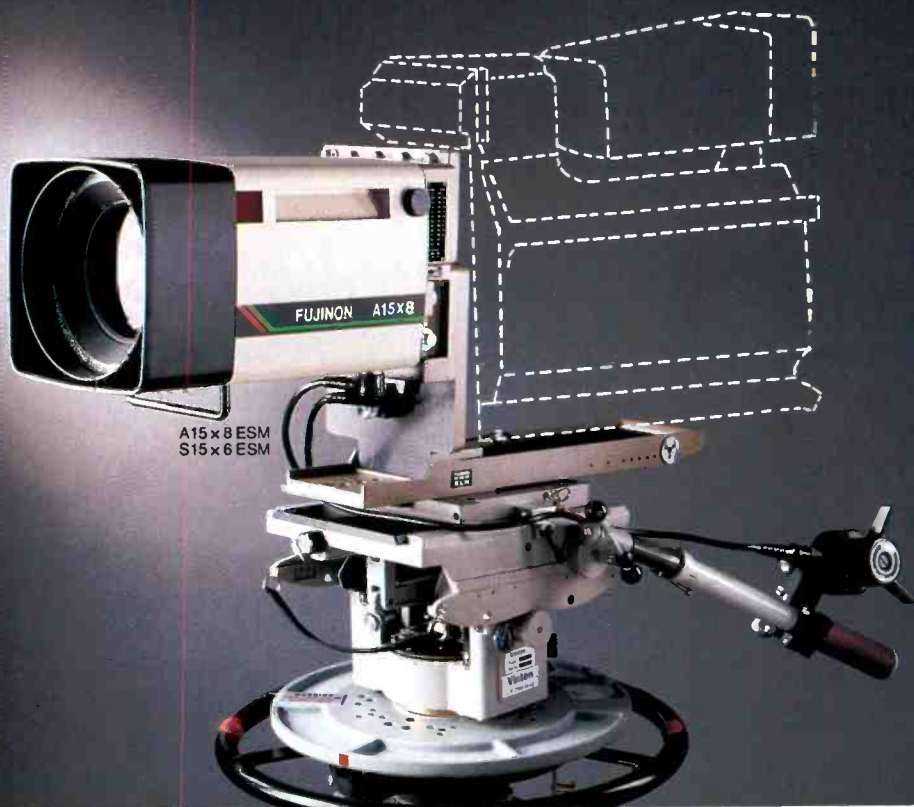
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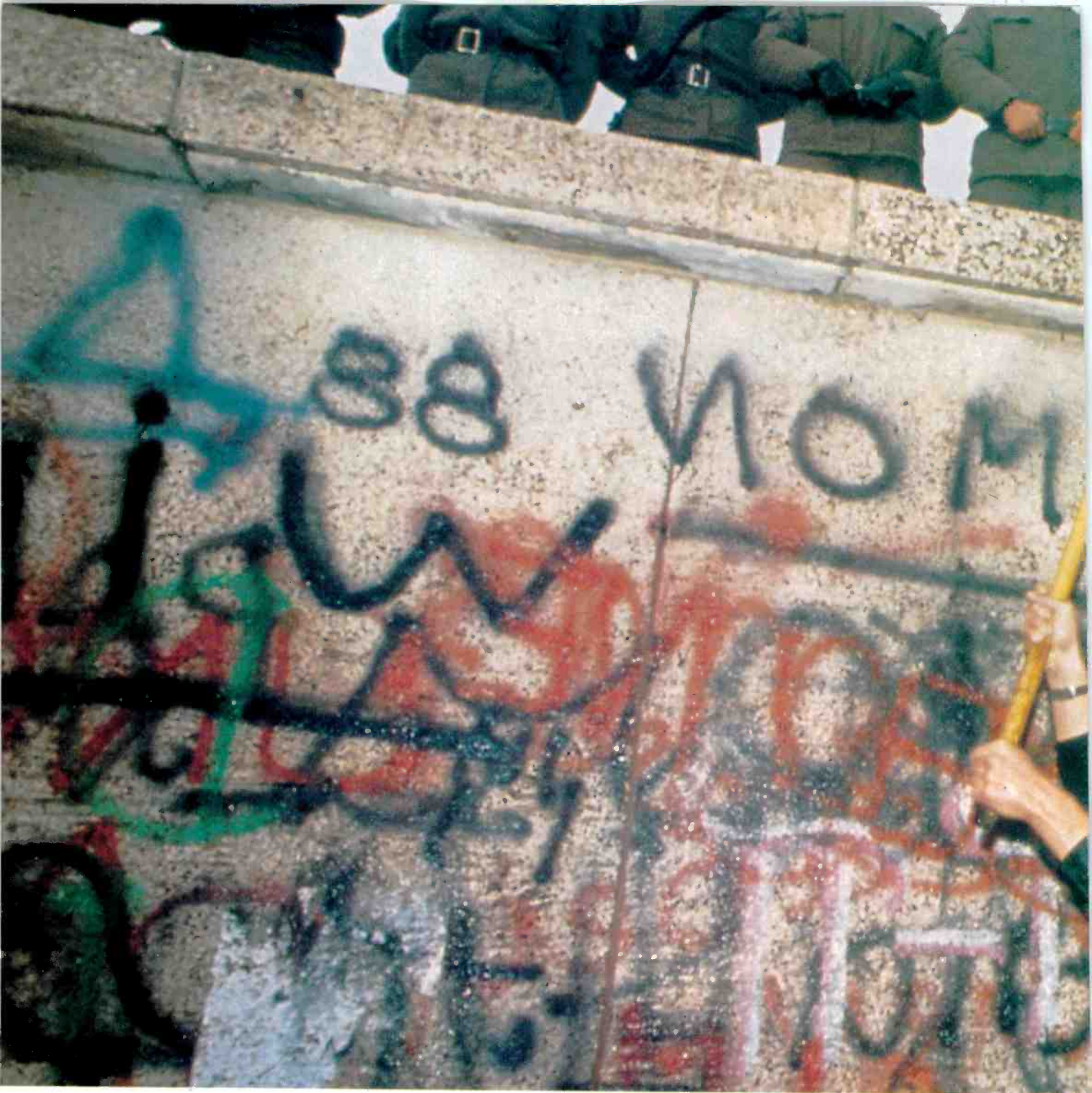
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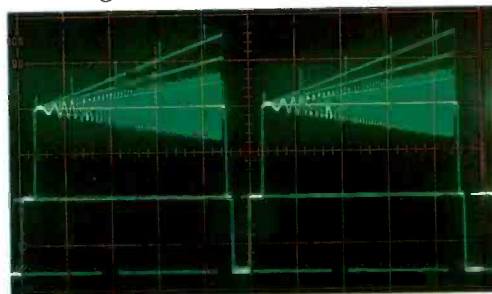
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Automation

BAR CODE EQUIPMENT

And supporting software.
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Sony Business & Professional Group 14-15, 128-129

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VCR sequencing systems; includes

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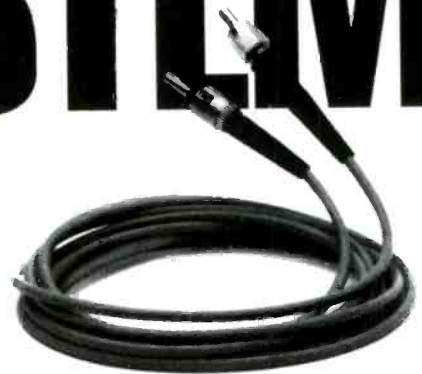
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Includes PCs, VDT terminals, touch-screen control adaptations, other control accessories; engineering management, maintenance and non-production software.
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AVS France
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Century 21 Programming
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Sentry Systems
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Systemation Corp.
Time Logic
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Time Logic
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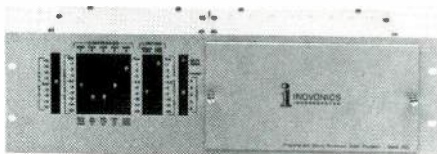
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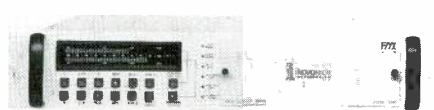
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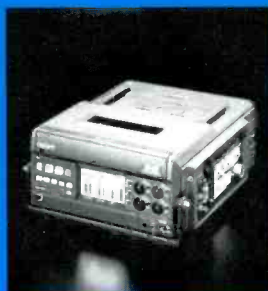
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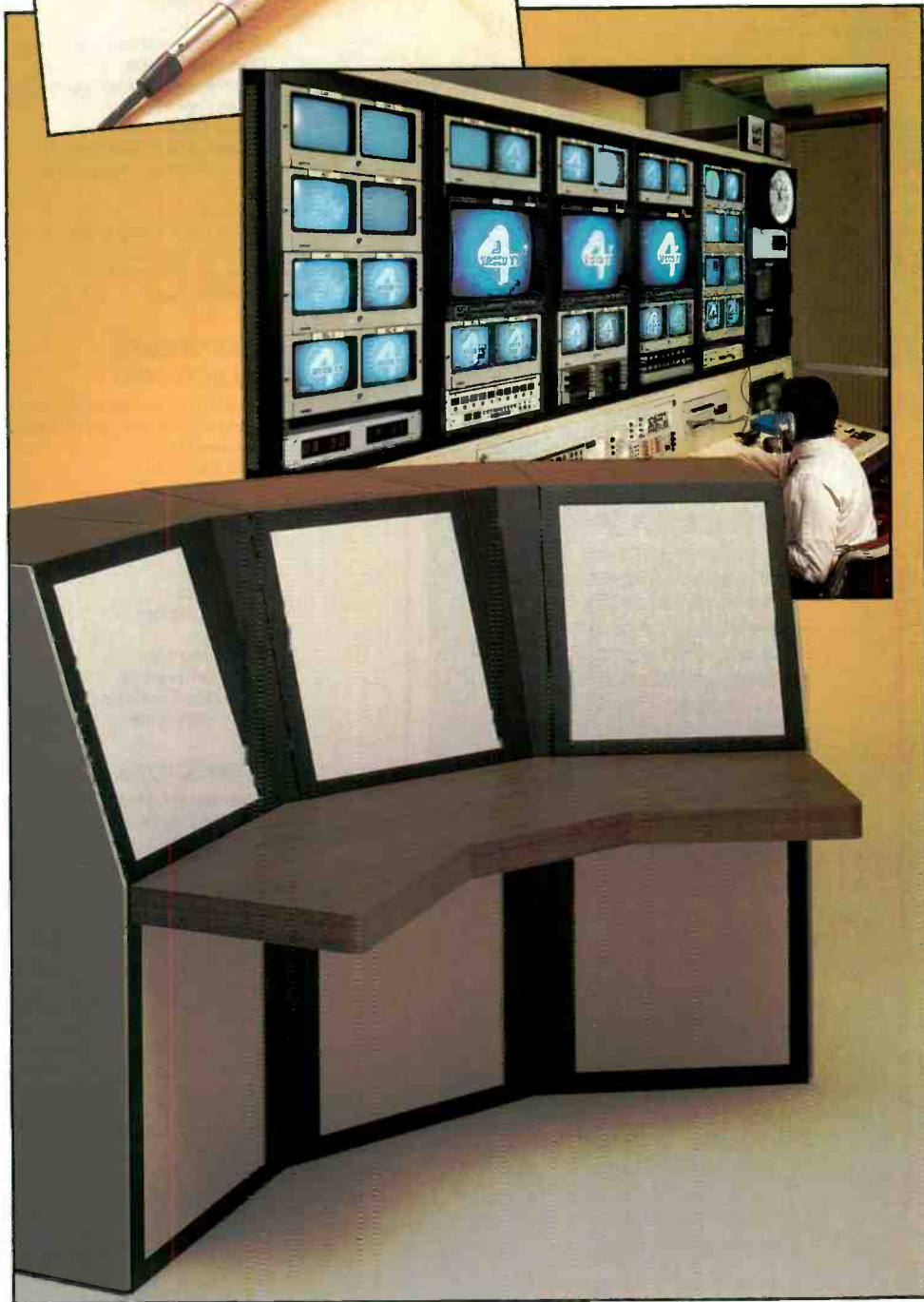
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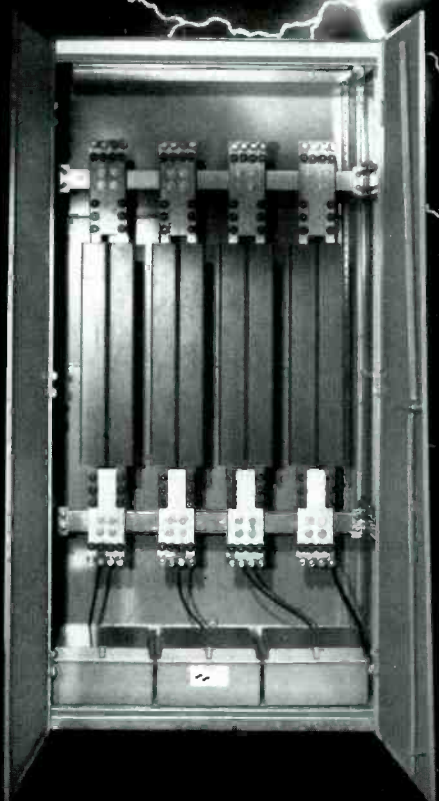
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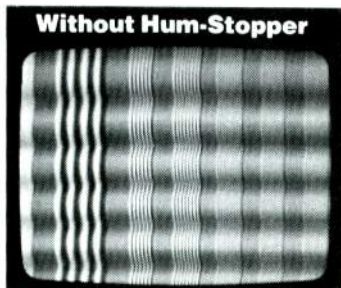
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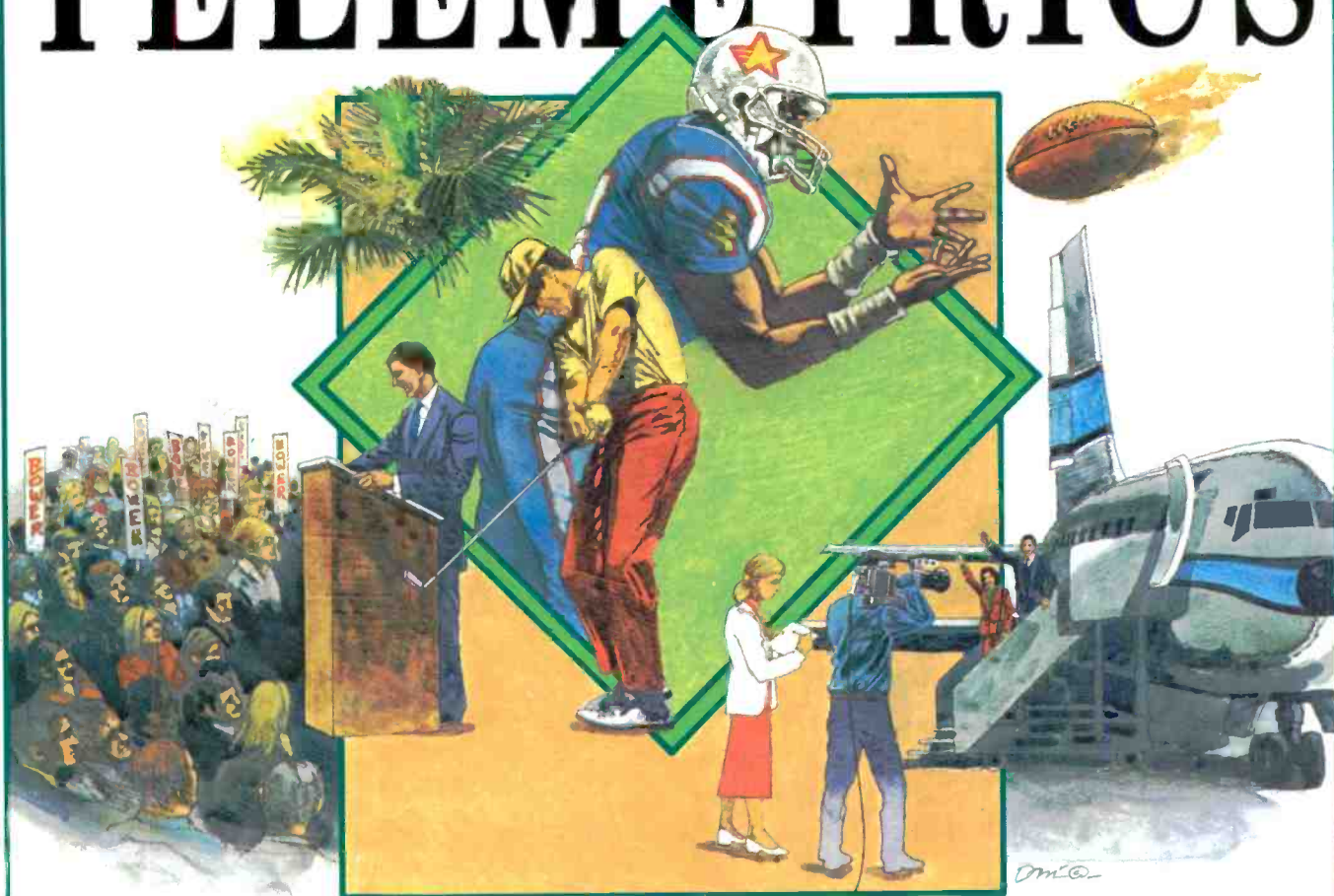
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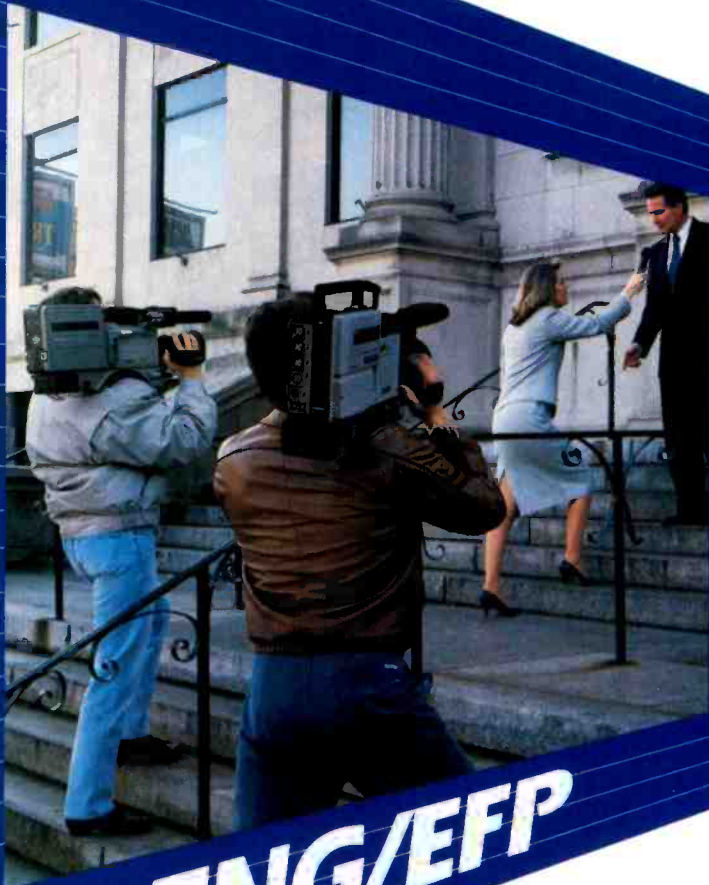
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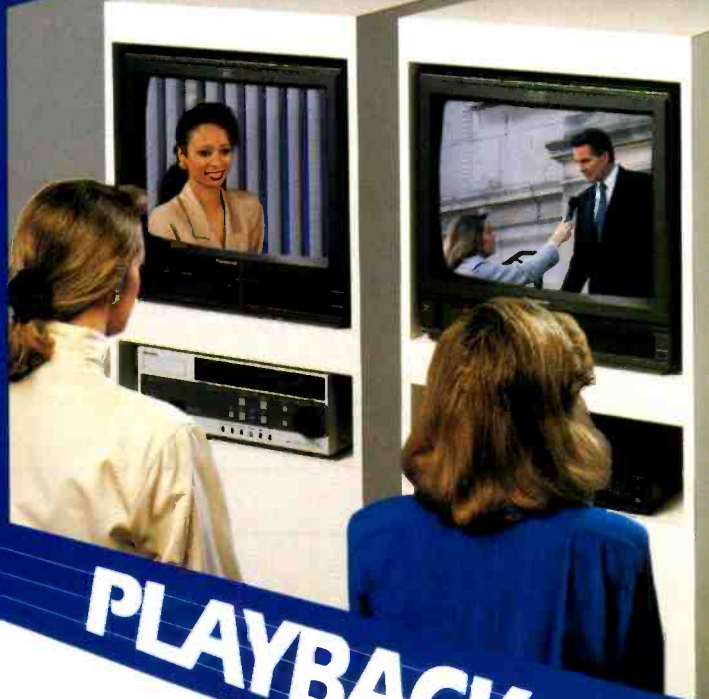
Panasonic also captures all the details in the studio. With CCD cameras that feature component outputs to take full advantage of the SVHS recording format. And to make sure all the action you're recording looks its absolute best, Panasonic monitors allow you to easily analyze any video signal from any video source. A safeguard you'll appreciate during postproduction and final playback.

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EDITING



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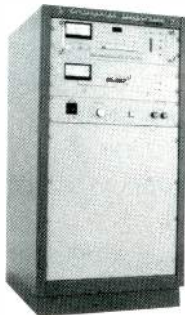
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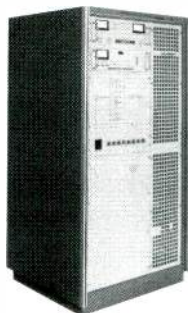
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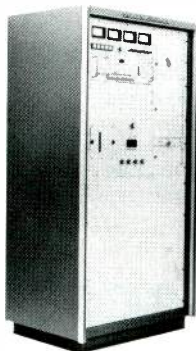
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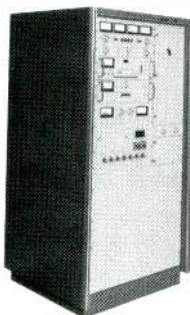
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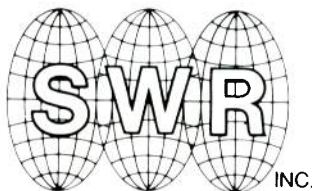
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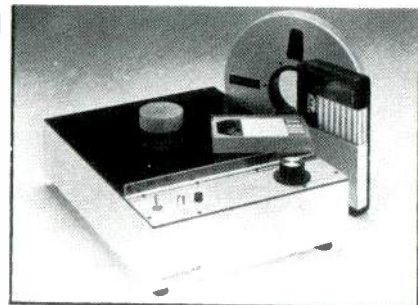


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There's even a pitch control complete with digital read-out. It's on our front panel (not shown), along with other professional touches.

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

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

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

D-20

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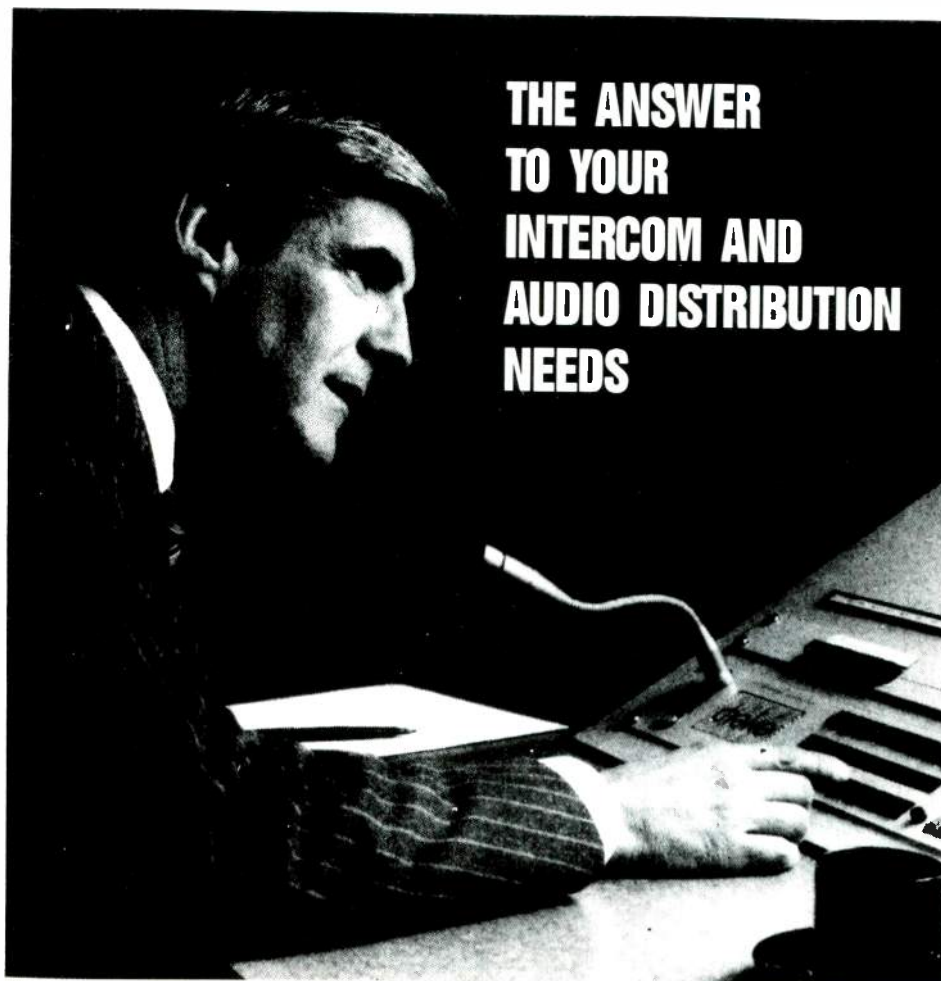
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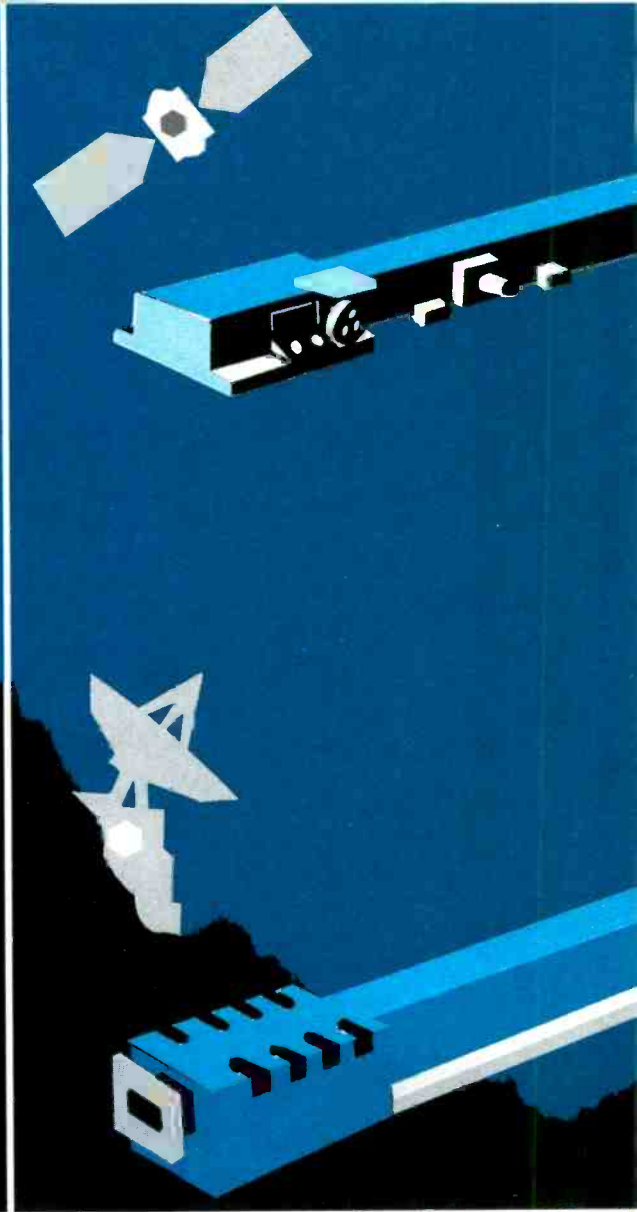
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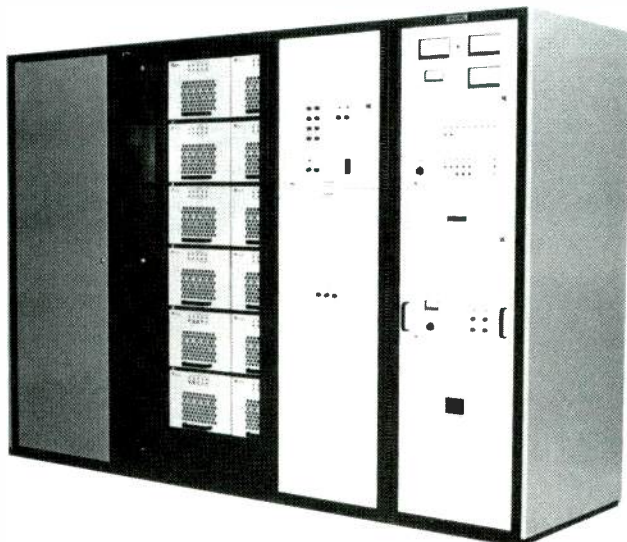
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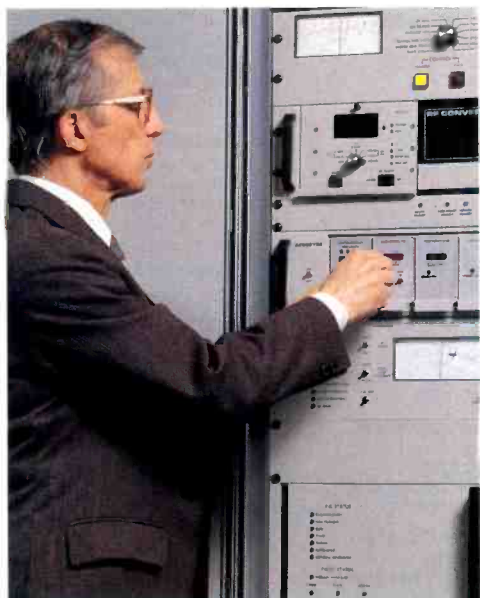
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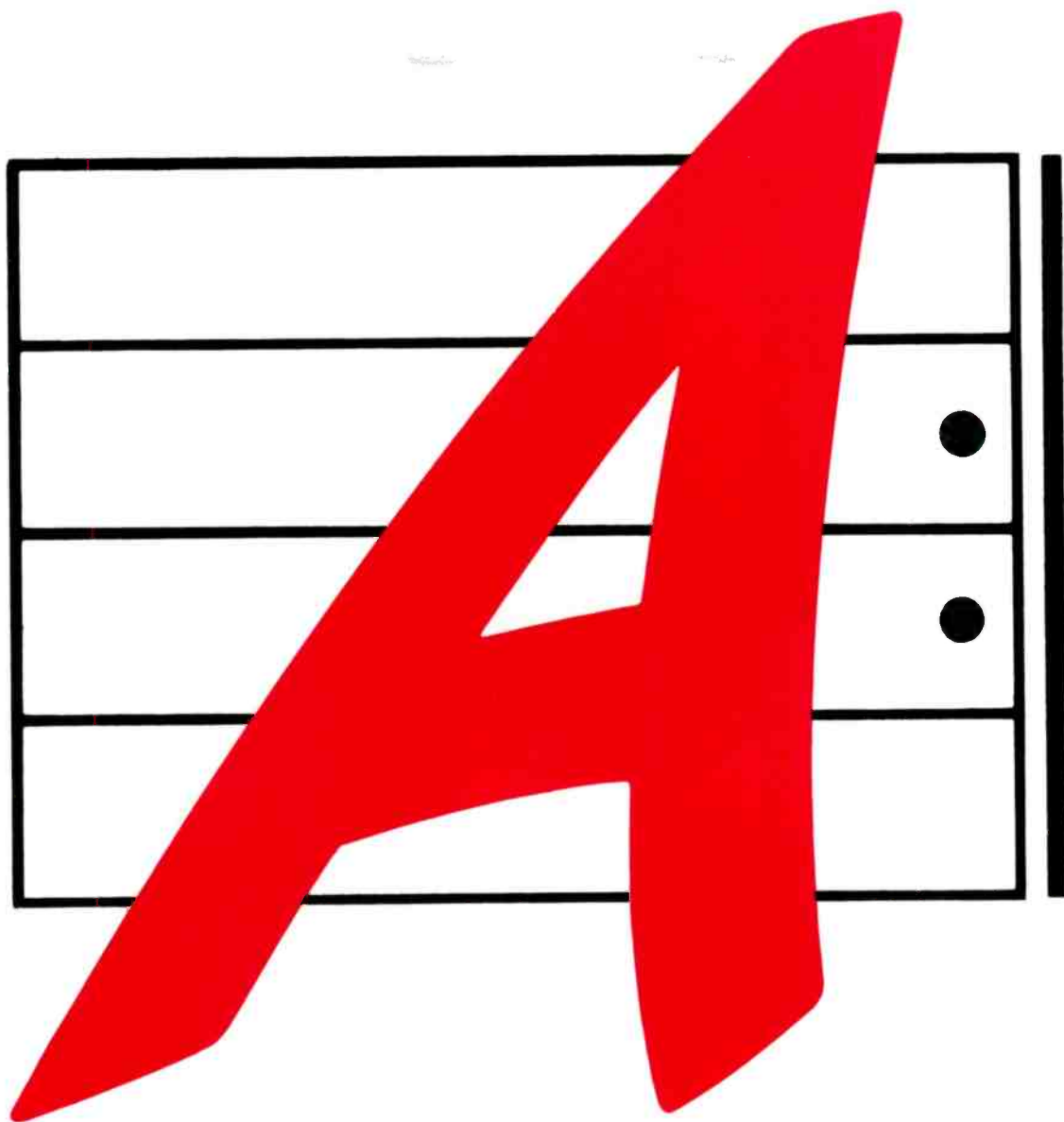
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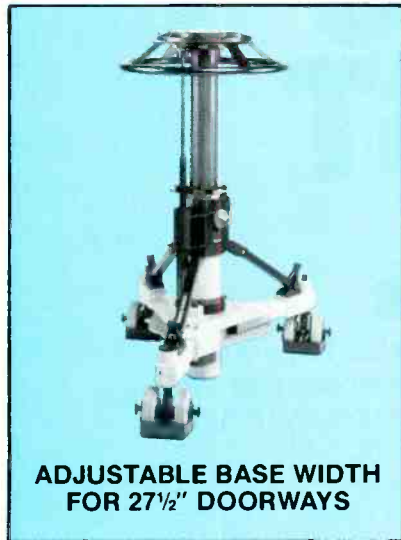
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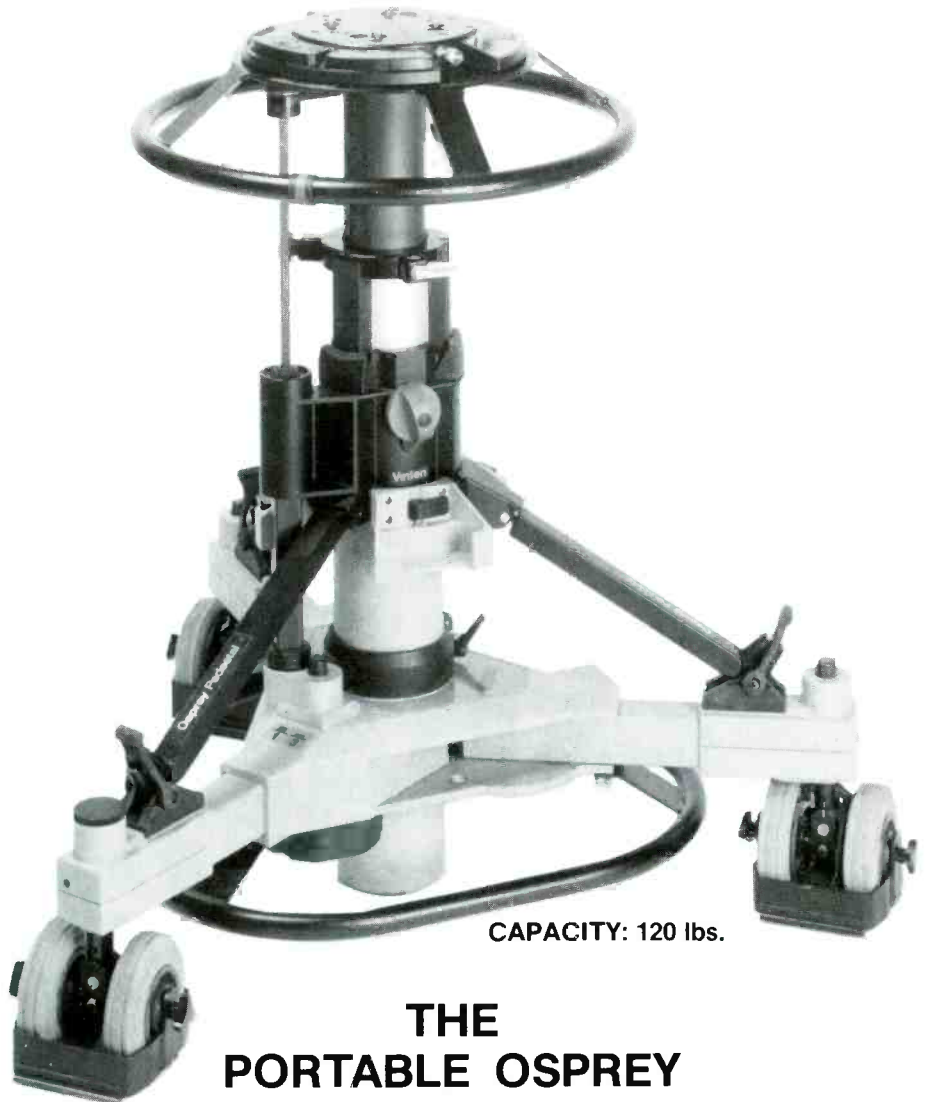
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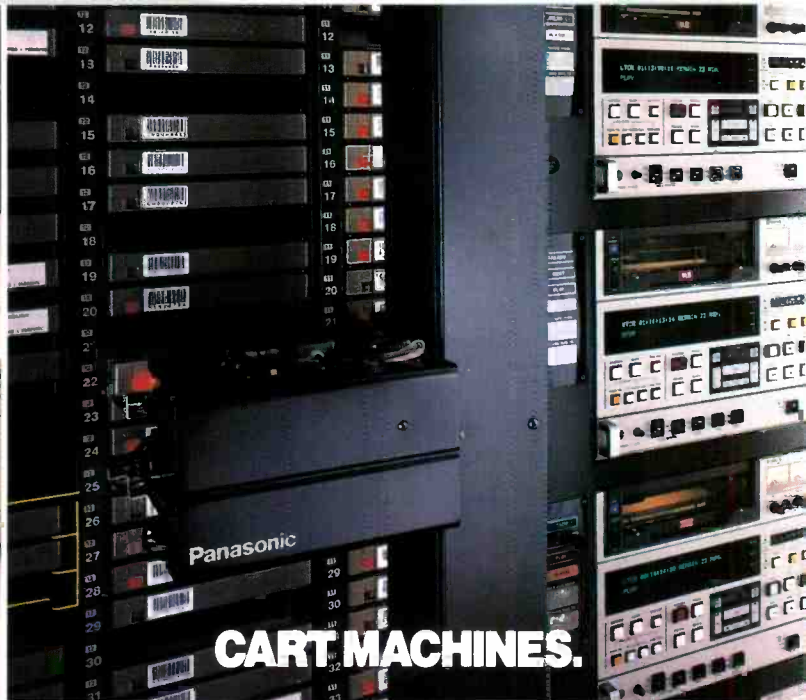
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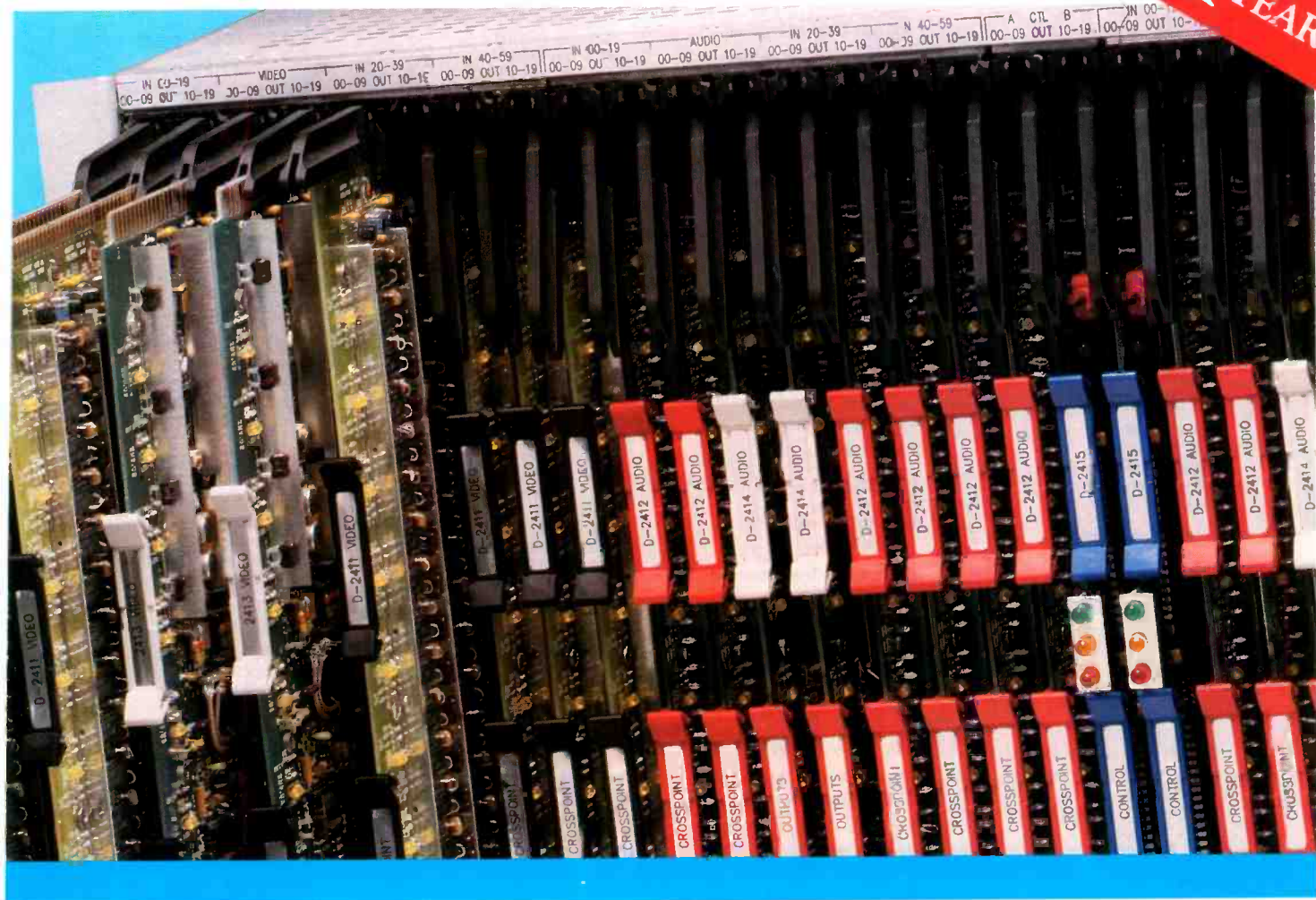
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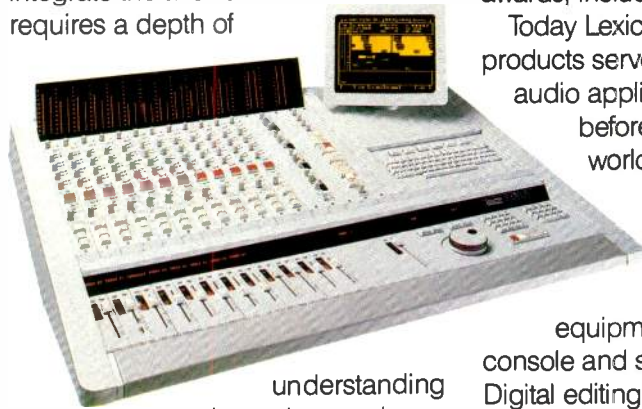
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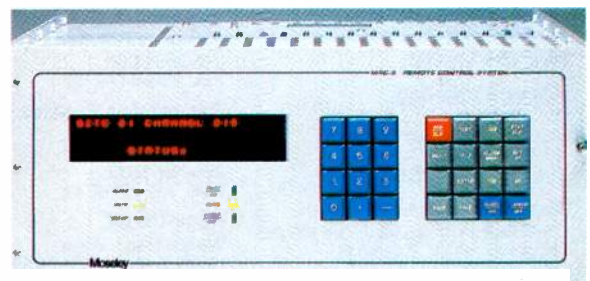
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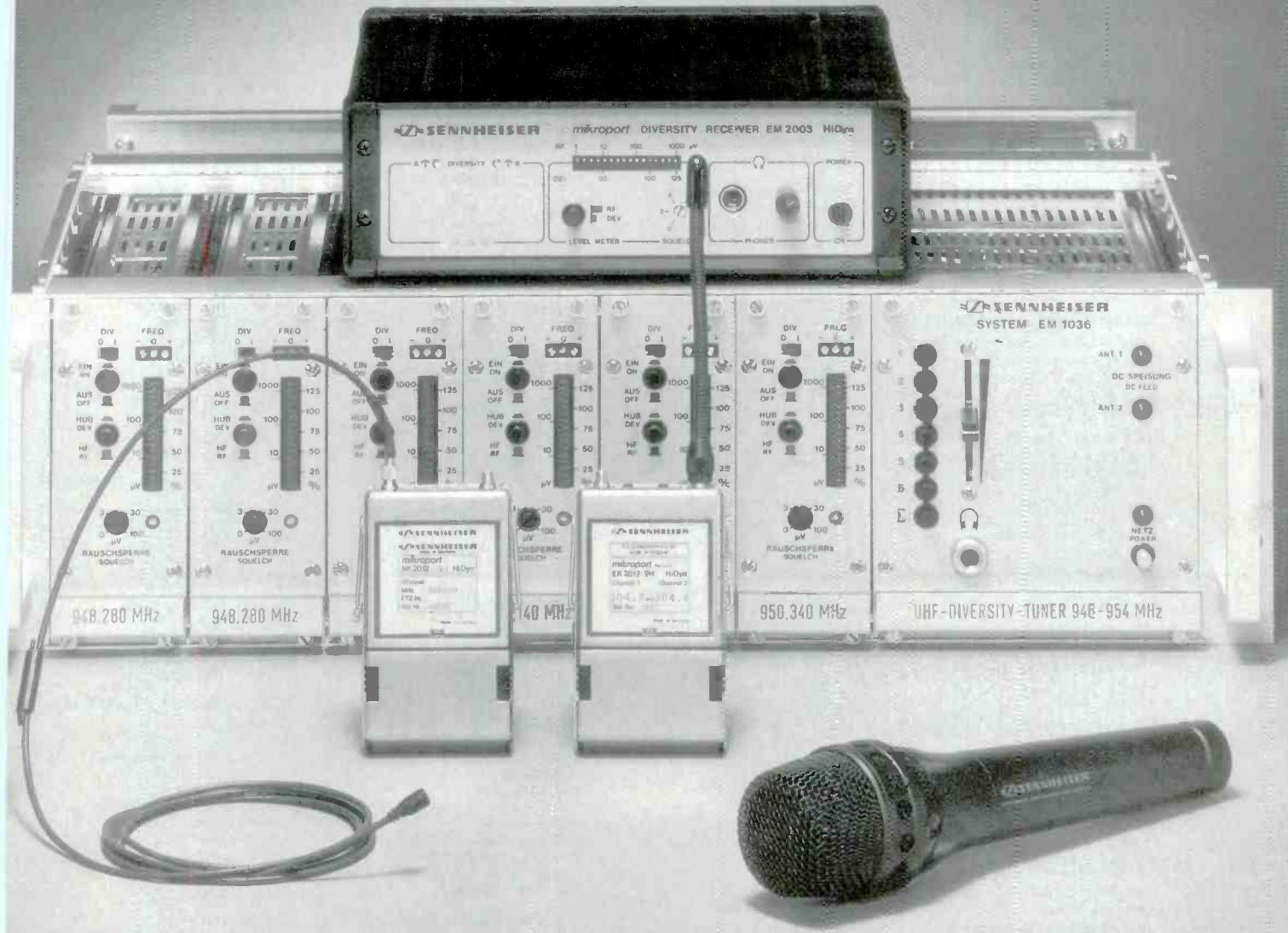
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213-726-0303

Tayo Industries

7510 Sunset Blvd., Suite 537
Hollywood, CA 90046
818-765-0782
Fax: 213-874-3393

TC Electronic A/S

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45-86262800
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412-661-2629

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215-825-4990
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Fax: 708-381-4360

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Kingston, NY 12401
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Concord, CA 94527
415-798-2222
Fax: 415-798-2224

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604-589-1100
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503-627-4697
Fax: 503-627-4486

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416-681-2450

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301-353-1550; 800-638-2049
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718-651-8900
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Winsted Corp.

10901 Hampshire Ave. S.
Minneapolis, MN 55438
612-944-8556; 800-447-2257
Fax: 612-944-1546

Wireworks Corp.

380 Hillside Ave.
Hillside, NJ 07205
201-686-7400; 800-642-9473
Fax: 201-686-0483

Wohler Technologies, Inc.

1349 Kansas St.
San Francisco, CA 94107
415-285-5462
Fax: 415-821-6414

Wolf Coach, Inc.

7 "B" St.
Auburn, MA 01501
508-791-1950
Fax: 508-799-2384

World Video Inc.

P.O. Box 117
Boyertown, PA 19512
215-754-6700

Wynford Technologies Inc.

424 Mt. Pleasant Road
Toronto, Ont.
Canada M4S 2L7
416-322-0931

X**Xymox Systems**

6251 Chimineas
Reseda, CA 91335
805-492-1355

Y**Yamaha Corp. of America
Professional Audio Div.**

P.O. Box 6600
Buena Park, CA 90620
714-522-9312
Fax: 714-539-2680

Yamashita Engineering

559-1 Funako Atsugi-City
Kanagawa 243, Japan
81-44-0462-28-8692
Fax: 81-44-0462-29-1944

Z**Zero Stantron Cabinets**

6900-6918 Beck Ave.
North Hollywood, CA 91605
818-841-1825
Fax: 818-841-8892

Ziehl Electronic Service

8611 Dale Road
Gasport, NY 14067
716-772-7800

Zonal Ltd.

Holmethorpe Ave.
Redhill, Surrey
England RH11 2NX
0737-767171
Fax: 0737-767610

Is your company's name missing from this directory? In June 1990, questionnaires were mailed to all companies on the Broadcast Engineering Mailing List. If your company is not represented, either the name was not on our mailing list or we did not receive the questionnaire sent in June 1990, requesting new information. If you would like to be included in the 1992 Broadcast Engineering Equipment Reference Manual, write before May 1, 1991, to:

**BE Directory Editor
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Overland Park, KS 66212**

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Arrakis audio console products are designed by broadcast engineers for broadcasters at reasonable prices. Our products sell themselves. Study our features, specs., and prices. Compare and you will find what thousands have found — The Arrakis Advantage —

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 - 150 SCT-6S \$2495
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 - 500 SCT-8M \$3495
 - 500 SCT-8S \$3595
- 8 Channel Linear (22 Inputs)
 - 1500 SCT-8M \$4395
 - 1500 SCT-8S \$4495
- 12 Channel Linear (24 Inputs)
 - 2000 SCT-12M \$4895
 - 2000 SCT-12S \$4995
- 12 Channel Linear (34 Inputs)
 - 2100 SCT-12M \$5895
 - 2100 SCT-12S \$5995

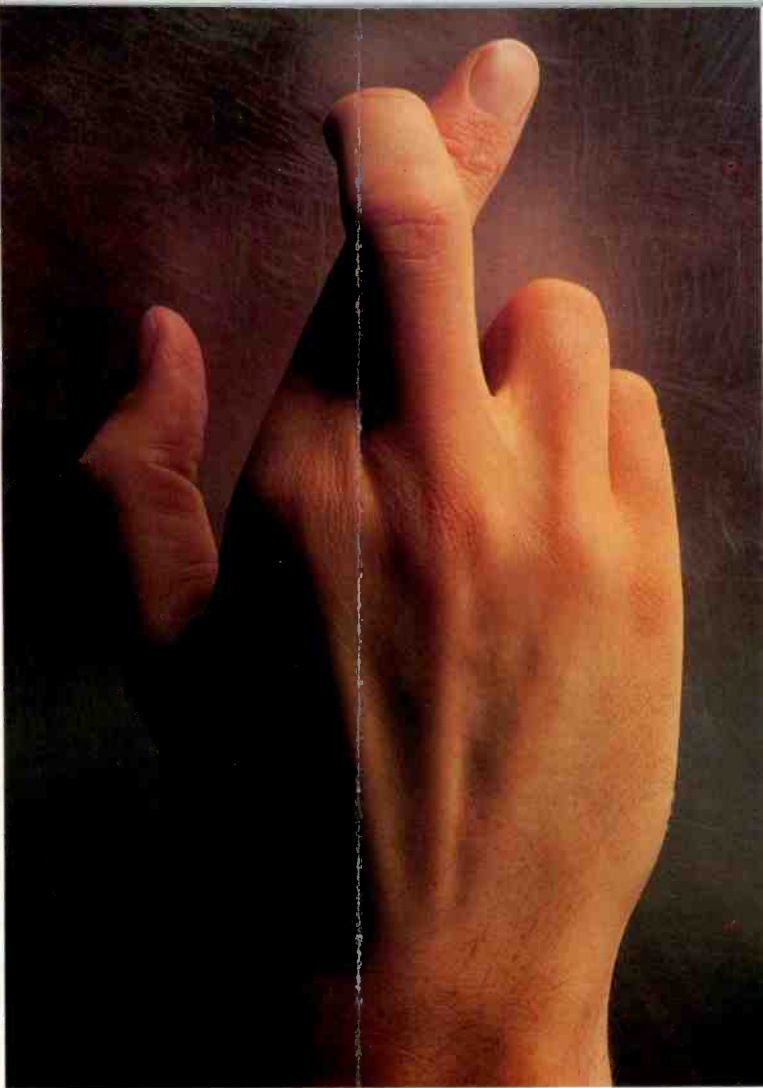
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Antenna Technology Corp., 1140 E. Greenway St., Mesa, AZ 85203, 602-264-7275, Fax: 602-898-7667; *Satellite antennas, up-/downlink equipment.*

EAR Professional Audio-Video, 2641 E. McDowell, Phoenix, AZ 85008, 602-267-0600, Fax: 602-275-3277; *Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; Recording media, all audio & video formats.*

Jensen Tools Inc., 7815 South 46th St., Phoenix, AZ 85044, 602-968-6231, Fax: 602-438-1690; *Test & measurement equipment.*

ROH'S, Inc., 2922 N. Campbell Ave., Tucson, AZ 85719, 602-795-8573, Fax: 602-325-0169; *Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; Recording media, all audio & video formats.*

Spencer Broadcast, Inc., 7003 W. Union Hills Drive, Glendale, AZ 85308, 602-242-2211, Fax: 602-843-2860; *Audio mixers, mics, recorders, processing equipment; RF transmitters, antennas, towers, waveguide, STL/MDS microwave equipment; Test & measurement equipment; Recording media, all audio & video formats.*

CALIFORNIA

Advanced Marketing, P.O. Box 97, Redwood City, CA 94064, 415-365-3944, Fax: 415-365-1630; *Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; Test & measurement equipment.*

Audio Services Corp., 10639 Riverside Drive, North Hollywood, CA 91602, 818-980-9891, Fax: 818-980-9911; *Audio mixers, mics, recorders, processing equipment.*

Audio Video Supply, 4674 Cardin St., Suite D, San Diego, CA 92111, 619-565-1101; *Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; Test & measurement equipment; Production acces-*

sories; Camera tubes, CRTs, rectifiers, all RF power devices; Recording media, all formats.

Barrett Associates Inc., 3205 Production Ave., Oceanside, CA 92054, 619-433-5600, Fax: 619-433-1590; *Audio mixers, mics, recorders, processing equipment; RF transmitters, antennas, towers, waveguide, STL/MDS microwave equipment; Test & measurement equipment; Camera tubes, CRTs, rectifiers, all RF power devices; Recording media, all audio & video formats.*

BCS, 4525 Valerio St., Burbank, CA 91505, 818-845-7000, 212-268-8800, Fax: 818-845-9483; *Video cameras, recorders, monitors, effects, editing, lighting equipment; RF transmitters, antennas, towers, waveguides, STL/MDS microwave equipment; Recording media, all audio & video formats.*

BERC, 4545 Chermak, Burbank, CA 91505, 818-841-3000, Fax: 818-841-7919; *Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; Test & measurement equipment; Production vehicles & accessories.*

Birns & Sawyer Inc., 1026 N. Highland Ave., Hollywood, CA 90038, 213-466-8211, Fax: 213-466-7049; *Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment.*

Black Audio Devices, P.O. Box 106, Ventura, CA 93002, 805-653-5557; *Audio mixers, mics, recorders, processing equipment.*

Broadcast Cartridge Service, 15131 Triton Lane, Suite 108, Huntington Beach, CA 92649; *Recording media, all audio & video formats.*

C.A.E., 11552 Knott St., Unit 1, Garden Grove, CA 92641, 714-895-1887, Fax: 714-895-3827; *Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; RF transmitters, antennas, towers, waveguides, microwave equipment.*

Cal-Scope, 473-707 Macara Ave., Sunnyvale, CA 94086, 408-730-4573, 800-828-3547, Fax: 408-730-9537; *Audio*

mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; transmitters, antennas, towers, waveguide, STL/MDS microwave equipment; Test & measurement equipment.

CMTV, Inc., 3407 Winona Ave., Burbank, CA 91504, 818-843-6644, Fax: 818-843-2478; *Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; RF transmitters, antennas, towers, waveguides, STL/MDS microwave equipment; Test & measurement equipment; Recording media, all audio & video formats.*

Daily Electronics Corp., 909 N. Alameda St., Compton, CA 90220, 213-774-1255, 800-346-6667, Fax: 213-603-1348; *Camera tubes, CRTs, rectifiers, all RF power devices.*

ESP-Extraordinarily Superior Products, 7210 Jordan Ave., Suite B-45, Canoga Park, CA 91303, 818-883-2138, 818-704-5601, Fax: 818-347-4366; *Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; Test & measurement equipment.*

Funke & Associates, 908 Marilyn Drive, Campbell, CA 95008, 408-866-0648, 800-748-6308, Fax: 408-866-1975; *Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; transmitters, antennas, towers, waveguides, STL/MDS microwave equipment; Test & measurement equipment.*

Gordon Enterprises Inc., Alan, 1430 Cahuenga Blvd., Hollywood, CA 90028, 213-466-3561, 800-825-MOVI, Fax: 213-871-2193; *Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, edit-*

ing, lighting equipment; Recording media, all audio & video formats.

Jensen Transformers Inc., 10735 Burbank Blvd., North Hollywood, CA 91601, 213-876-0059, Fax: 818-763-4574; *Audio mixers, mics, recorders, processing equipment.*

JP Associates, Inc., 3115 Kashiwa St., Torrance, CA 90505, 213-539-8533, Fax: 213-539-8634; *Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; RF transmitters, antennas, towers, waveguides, STL/MDS microwave equipment; Test & measurement equipment; Camera tubes, CRTs, rectifiers, all RF power devices.*

Magnetic Communications Systems, Inc., 1929 Main St., Suite 106A, Irvine, CA 92714, 714-756-1989, Fax: 714-756-2031; *Recording media, all audio & video formats.*

Marcom, P.O. Box 66507, Scotts Valley, CA 95066, 408-438-4273, Fax: 408-438-6617; *RF transmitters, antennas, towers, waveguides, STL/MDS microwave equipment.*

Meyer & Ross, Inc., 1485 Rollins Road, Burlingame, CA 94010, 800-888-9906, Fax: 415-348-5296; *Audio mixers, mics, recorders, processing equipment.*

Mobile-Cam Products, 340-F Vernon Way, El Cajon, CA 92020, 619-441-1295, Fax: 619-441-9263; *Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; RF transmitters, antennas, towers, waveguides, STL/MDS microwave equipment; Production vehicles & accessories.*

Northern Video Systems, 4234 N. Freeway Blvd., Sacramento, CA 95834, 916-646-0033, Fax: 916-646-1221; *Audio*

Is your company's name missing from this directory? If so, either the name is not on our mailing list or someone did not respond to repeated requests for information. If you wish to be included in the 1992 issue, write a letter, before May 1, to:

BE Directory Editor
PO Box 12901
Overland Park, KS 66212

mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; Test & measurement equipment; Camera tubes, CRTs, rectifiers, all RF power devices; Recording media, all audio & video formats.

NTSC Productions, 3208 Cahuenga Blvd. W., Suite 333, Hollywood, CA 90068, 818-505-9430, Fax: 818-505-1223; *Video cameras, recorders, monitors, effects, editing, lighting equipment.*

Pacific Coast Marketing, 14125 Capri Drive, Los Gatos, CA 95030, 408-370-3505, Fax: 408-370-7926; *Test & measurement equipment.*

Pacific Radio Electronics, 1351 Cahuenga Blvd., Hollywood, CA 90028, 213-462-1393, Fax: 213-462-3964; *Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; RF transmitters, antennas, towers, waveguides, STL/MDS microwave equipment; Test & measurement equipment; Recording media, all audio & video formats.*

Pacific Recorders & Eng. Corp., 2070 Las Palmas Drive, Carlsbad, CA 92009, 619-438-3911, Fax: 619-438-9277; *Audio mixers, mics, recorders, processing equipment.*

Penstock So. CA, 11050 Strathmore Drive, Suite 416, Los Angeles, CA 90024, 213-383-6100, Fax: 213-208-4471; or

Penstock, Inc., 520 Mercury Drive, Sunnyvale, CA 94086-4018, 408-730-0300, 800-PENSTOCK, Fax: 408-730-4782; *transmitter, antenna, tower, waveguide, STL/MDS microwave equipment.*

Pioneer Technology Corp., 1021 N. Lake St., Burbank, CA 91502, 818-842-7165, Fax: 818-842-0921; *Film cameras, processing and projection equipment.*

Professional Sound Corp., 10639 Riverside Drive, North Hollywood, CA 91602, 818-760-6544, Fax: 818-980-9911; *Audio mixer, mic, recorder, processors; Camera, recorders, monitors, effects, editing, lighting equipment.*

Provideo Inc. (A VIP Co.), 10635 Vanowen St., Burbank, CA 91505, 818-762-9671, Fax: 818-762-7356; *Cameras, recorders, monitors, effects, editing, lighting equipment; Test & measurement equipment.*

RAG Electronics, Inc., 21418 Parthenia St., Canoga Park, CA 91304, 818-998-6500, Fax: 818-407-5559; *Test, measurement equipment.*

RF Specialties of California, 3463 State St., Suite 229, Santa Barbara, CA 93105, 805-682-9429, Fax: 805-682-5170; *Audio mixers, mics, recorders, processing equipment; transmitters, antennas, towers, waveguides, STL/MDS microwave equipment.*

ROH Products, 1101-A Air Way, Glendale, CA 91201, 818-500-0269, 800-999-5260, Fax: 818-240-1828; *Audio mixers, mics, recorders, processing equipment; Test & measurement equipment.*

Sprague Magnetics, Inc., 15720 Stagg St., Van Nuys, CA 91406, 818-994-6602; *Audio mixers, mics, recorders, processing equipment; Recording media, all audio & video formats.*

SSL Industries Inc., P.O. Box 3410, Camarillo, CA 93011, 805-482-9884; *Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; Test & measurement equipment; Recording media, all audio & video formats.*

Strand Lighting, Inc., 18111 S. Santa Fe Ave., Rancho Domingue, CA 90221, 213-637-7500, Fax: 213-632-5519; *Video cameras, recorders, monitors, effects, editing, lighting equipment.*

Televideo San Diego, 4783 Rufner St., San Diego, CA 92111, 619-268-1100, Fax: 619-268-1790; *Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; RF transmitters, antennas, towers, waveguides, STL/MDS microwave equipment; Test & measurement equipment; Production vehicles & accessories; Camera tubes, CRTs, rectifiers, all RF power devices; Recording media, all audio & video formats.*

Time Arts Inc., 1425 Corporate Center Parkway, Santa Rosa, CA 95407, 707-576-7722, Fax: 707-576-7731; *Video graphics software.*

Videomedia, Inc., 211 Weddell Drive, Sunnyvale, CA 94089, 408-745-1700, Fax: 408-745-6721; *Video cameras, recorders, monitors, effects, editing, lighting equipment.*

Videotape Products Inc., 320 N. Madison Ave., Los Angeles, CA 90004, 213-664-1144, Fax: 213-661-2177; *Cameras, recorders, monitors, effects, editing, lighting equipment; Test & measurement equipment; Recording media, all audio & video formats.*

Western Broadcast Systems Inc., 3350 Scott Blvd., Building 5, Santa Clara, CA 95054, 408-727-9898, Fax: 408-727-9927; *Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; Test & measurement equipment; Recording media, all audio & video formats.*

Whitehouse Audio Visual, 2696 Lavery Court, Suite 8, Newbury Park, CA 91320, 805-498-4177, Fax: 805-499-7947; *Film cameras, processing and projection equipment.*

COLORADO

Didier Broadcast Associates, 8528 W. Dartmouth Plaza, Lakewood, CO 80227, 303-987-0256; *Audio mixers, mics, recorders, processing equipment; camera, recorder, monitor, effect, editing, lighting equipment; RF transmitters, antennas, towers, waveguides, STL, MDS microwave equipment; Recording media, all audio & video formats.*

Film/Video Equipment Service Co., 800 S. Jason, Denver, CO 80223, 303-778-8616, Fax: 303-778-8657; *Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment.*

Television Technology Corp., P.O. Box 1385, Broomfield, CO 80020-8385, 303-665-8000, Fax: 303-673-9900; *RF transmitters, antennas, towers, waveguides, STL/MDS microwave equipment.*

CONNECTICUT

Infotronics, Inc., P.O. Box 935, Woodbury, CT 06798, 203-263-5350; *Video cameras, recorders, monitors, effects, editing, lighting equipment.*

DISTRICT OF COLUMBIA

Computer Prompting Corp., 3408 Wisconsin Ave. N.W., Suite 201, Washington, DC 20016, 202-966-0980, Fax: 202-966-0981; *Camera, recorder, monitor, prompter, editing, lighting equipment.*

FLORIDA

Bencsik Associates Inc., 3730 N.E. 42nd Ave., Ocala, FL 32670, 904-732-9775; *Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment.*

Broadcasters General Store, Inc., 2480 S.E. 52nd St., Ocala, FL 32671, 904-622-9058, Fax: 904-622-9058; *Audio mixers, mics, recorders, processing equipment; RF transmitters, antennas, towers, transmission line, waveguide, STL/MDS microwave equipment.*

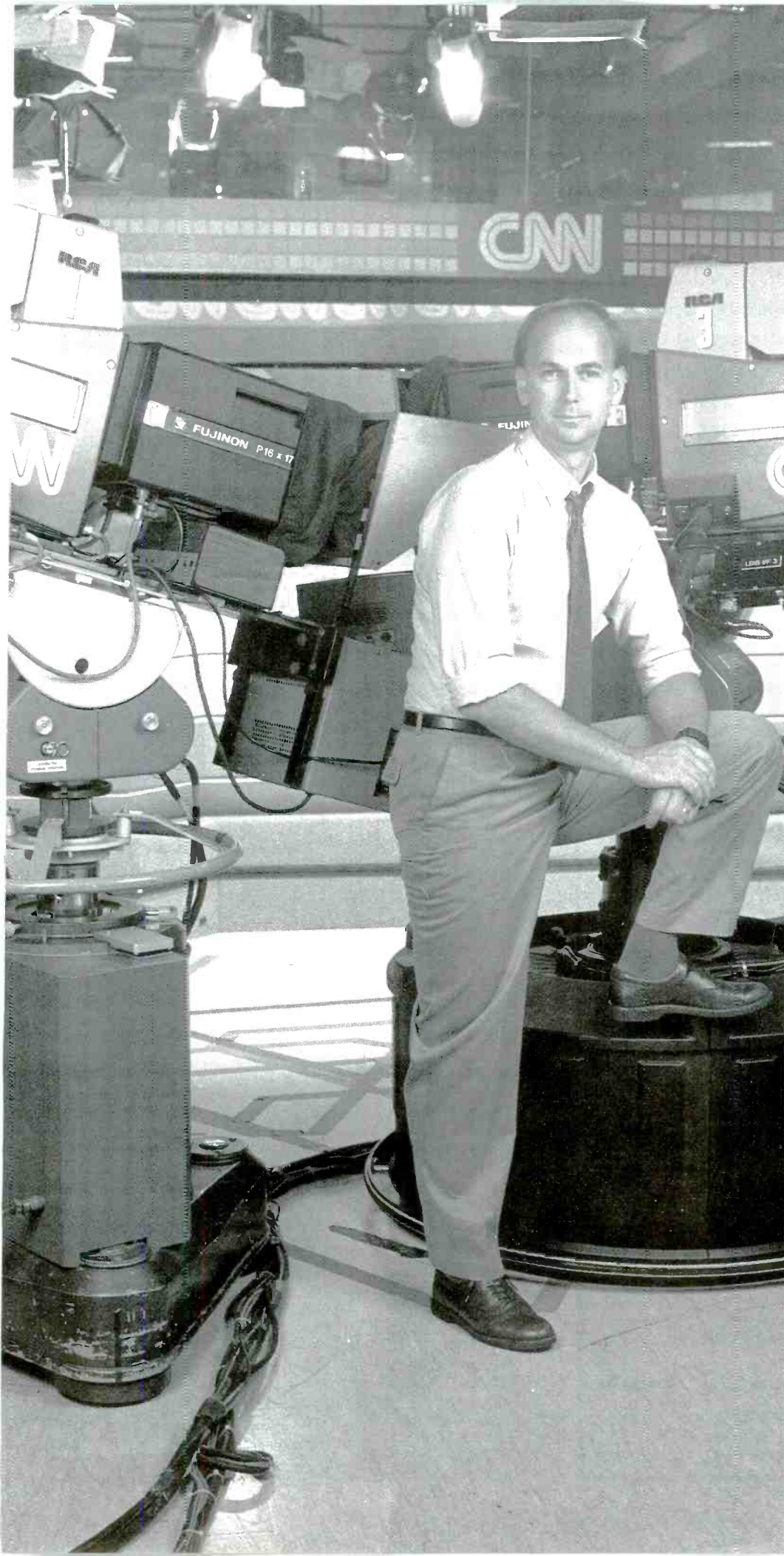
Camera Mart Inc., International Div. 8200 N.W. 27th St., Miami, FL 33122, 305-591-8118, Fax: 305-591-8880; *Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; Microwave equipment; Test & measurement equipment; Recording media, all audio & video formats.*

Control Technology, Inc., 2950 S.W. Second Ave., Fort Lauderdale, FL 33315, 800-327-4121, Fax: 305-764-3298; *Audio mixers, mics, recorders, processing equipment; RF transmitters, antennas, towers, transmission line, waveguide, STL/MDS microwave equipment; Production vehicles & accessories.*

Electrex Co., 18620 N.E. Second Ave., Miami, FL 33179, 305-651-5752, Fax: 305-654-1386; *Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; RF transmitter, antenna, tower, waveguide, transmission line, STL/MDS microwave equipment; Test & measurement equipment; Camera tubes, CRTs, rectifiers, all RF power devices; Recording media, all audio & video formats.*

Family Marketing Group Inc., 3638 S.E. 46th Place, Ocala, FL 32671, 904-629-9410, Fax: 904-622-9058; *Audio mixers, mics, recorders, processing equipment; transmitters, antennas, towers, waveguides, MDS microwave equipment.*

Gendra International Inc., Broadcast & Communications Div., 2800 Biscayne Blvd., Suite 700, Miami, FL 33137, 305-372-8845; *Test & measurement equipment.*



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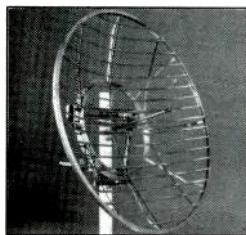
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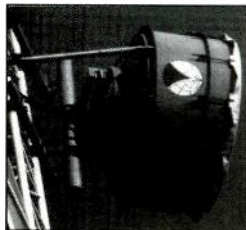
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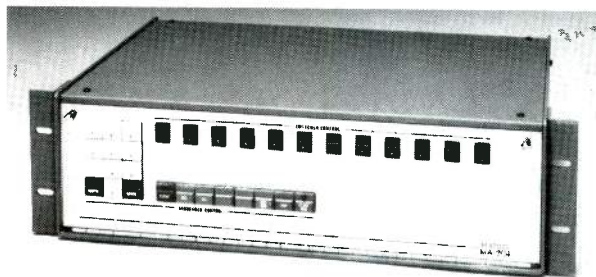
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FL 33315, 305-764-7755, Fax:
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mics, recorders, processing
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recorders, monitors, effects, edit-
ing, lighting equipment;
Recording media, all audio &
video formats.

Media Concepts, Inc., 559 49th
St. S., St. Petersburg, FL
33707, 813-321-2122, 800-
330-DUPE, Fax: 813-321-
2272; *Audio mixers, mics, re-*
recorders, processing equip-
ment; Video cameras, re-
recorders, monitors, effects, edit-
ing, lighting equipment;
Recording media, all audio &
video formats.

Midwest Communications
Corp., 8875 N.W. 23rd St.,
Miami, FL 33172, 305-592-
5355, Fax: 305-592-5114; *or*

Midwest Communications
Corp., 4803 George Road,
Suite 350, Tampa, FL 33634,
813-885-9308, Fax: 813-888-
6801; *or*

Midwest Communications
Corp., 3305 Bartlett Blvd., Or-
lando, FL 32811, 407-841-
0602, Fax: 407-423-2150;
Audio mixers, mics, recorders,
processing equipment; Video
cameras, recorders, monitors,
effects, editing, lighting equip-
ment; RF transmitters, anten-
nas, towers, waveguides,
STL/MDS microwave equip-
ment; Test & measurement
equipment; Production vehicles
& accessories; Camera tubes,
CRTs, rectifiers, all RF power
devices; Recording media, all
audio & video formats.

MPCS Hollywood, 4100 North
28th Terrace, Hollywood, FL
33020, 305-923-3446, Fax:
305-923-3449; *or*

MPCS Orlando, 5422 Carrier
Drive, Suite 100, Orlando, FL
32819, 407-351-0660, Fax:
407-351-0502; *Audio mixers,*
mics, recorders, processing
equipment; Video cameras, re-
recorders, monitors, effects, edit-
ing, lighting equipment; Test &
measurement equipment;
Recording media, all audio &
video formats.

Singer Products, Inc., 1840
West 49th St., Suite 402,
Hialeah, FL 33012, 305-558-
3000, Fax: 305-558-2801;
Audio mixers, mics, recorders,
processing equipment; Video
cameras, recorders, monitors,
effects, editing, lighting equip-
ment; RF transmitters, anten-
nas, towers, waveguides,
STL/MDS microwave equip-
ment; Test & measurement

equipment; Camera tubes,
CRTs, rectifiers, all RF power
devices; Recording media, all
audio & video formats.

Stage Equipment & Lighting,
Inc., 4602 S.W. 35th St., Orlan-
do, FL 32811, 407-425-2010,
Fax: 407-648-2604; *Video*
cameras, recorders, monitors,
effects, editing, lighting equip-
ment.

Topham Audio, Inc., 4403
Vineland Road, Suite B-3, Or-
lando, FL 32811, 407-649-
6444, Fax: 407-648-1352;
Audio mixers, mics, recorders,
processing equipment.

GEORGIA

Broadcasters General Store,
Inc., 58 S. Park Square, Suite
E, Marietta, GA 30060, 404-
425-0630, Fax: 404-427-0562;
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transmitters, antennas, towers,
waveguides, STL/MDS micro-
wave equipment; Test & mea-
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MPCS Video Industries Atlanta,
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C, Marietta, GA 30067, 404-
955-5581, Fax: 404-955-6231;
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cameras, recorders, monitors,
effects, editing, lighting equip-
ment; Test & measurement
equipment; Recording media,
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Technical Industries Inc. of
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Road N.E., Atlanta, GA 30341,
404-455-7610, Fax: 404-458-
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ment; Video cameras, re-
recorders, monitors, effects, edit-
ing, lighting equipment; RF
transmitters, antennas, towers,
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ment; Test & measurement
equipment; Production vehicles
& accessories; Camera tubes,
CRTs, rectifiers, all RF power
devices; Recording media, all
audio & video formats.

Vica Associates, Inc., 4296-A
Memorial Drive, Decatur, GA
30032, 404-292-7506, Fax:
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equipment; Video cameras, re-
recorders, monitors, effects, edit-
ing, lighting equipment; RF
transmitters, antennas, towers,
waveguides, STL and MDS
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Victor Duncan, Inc.-Atlanta,
3752 DeKalb Technology
Parkway, Atlanta, GA 30340,
404-457-4550, Fax: 404-457-
4758; *Audio mixers, mics, re-*

corders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; Production vehicles & accessories.

Video Display Corp., 1868 Tucker Industrial Drive, Tucker, GA 30084, 404-938-2080, 800-241-5005, Fax: 404-493-3903; Camera tubes, CRTs.

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Omega Pacific, 222 Kaelepula Drive, Kailua, HI 96734, 808-263-4212; Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; RF transmitters, antennas, towers, waveguides, STL/MDS microwave equipment; Test & measurement equipment; Camera tubes, CRTs, rectifiers, all RF power devices.

ILLINOIS

Audico Chicago, Inc., 7206 W. Grand Ave., Elmwood Park, IL 60635, 708-456-0003, Fax: 708-456-0418; Recording media, all audio & video formats.

Broadcasters General Store, Inc., 746 Cypress Lane, Carol Stream, IL 60188, 708-231-7120, Fax: 708-231-7246; Audio mixers, mics, recorders, processing equipment; RF transmitters, antennas, towers, waveguides, STL/MDS microwave equipment.

Center Video Industrial Co. Inc., 5615 W. Howard St., Niles, IL 60648, 708-647-8700, 800-621-4354, Fax: 708-647-8707; Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; Test & measurement equipment.

Clark Wire & Cable, 1801 Holste Road, Northbrook, IL 60062, 708-272-9889; Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; RF

transmitters, antennas, towers, waveguides, STL/MDS microwave equipment.

Discount Video Warehouse, P.O. Box 36, Mount Prospect, IL 60056, 708-299-5258, 800-323-8148, Fax: 708-299-4206; Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; Test & measurement equipment; Recording media, all audio & video formats.

Joseph Electronics, 8830 N. Milwaukee Ave., Niles, IL 60648, 708-297-4200, Fax: 708-297-6923; RF transmitters, antennas, towers, waveguides, STL/MDS microwave equipment; Test & measurement equipment; Camera tubes, CRTs, rectifiers, all RF power devices.

Pennstock Midwest, 1250 W. Northwest Highway, Palatine, IL 60067, 708-934-3700, Fax: 708-934-3748; RF transmitters, antennas, towers, waveguides, STL/MDS microwave equipment.

RADMAR, Inc., 1263-B Rand Road, Des Plaines, IL 60016, 708-298-7980, Fax: 708-298-1248; Video cameras, recorders, monitors, effects, editing, lighting equipment; Recording media, all audio & video formats.

Richardson Electronics Ltd., 40W267 Keslinger Road, LaFox, IL 60147, 708-208-2200, 800-348-5580, Fax: 708-208-2550; Camera tubes, CRTs, rectifiers, all RF power devices.

Roscor Corp., 1061 Feehanville Drive, Mount Prospect, IL 60056, 708-299-8080 Ext, Fax: 708-299-4206; Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; RF transmitters, antennas, towers, waveguides, STL/MDS microwave equipment; Test & measurement equipment; Production vehicles & accessories; Camera tubes, CRTs, rectifiers,

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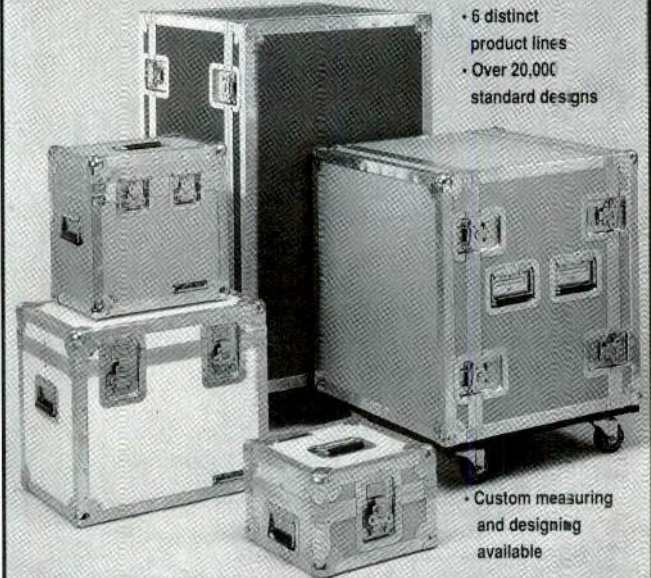


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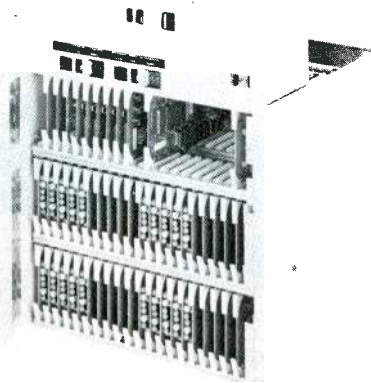
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Swiderski Electronics, Inc., 1200 Greenleaf Ave., Elk Grove Village, IL 60007, 708-364-1900, Fax: 708-364-5019; Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; RF transmitters, antennas, towers, waveguides, STL/MDS microwave equipment; Test & measurement equipment; Production vehicles & accessories; Camera tubes, CRTs, rectifiers, all RF power devices; Recording media, all audio & video formats.

Victor Duncan, Inc., 661 N. La-Salle St., Chicago, IL 60610-3770, 312-943-7300, Fax: 312-943-9043; Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; Production vehicles & accessories.

Video Images-Chicago, 1121 Tower Lane, Bensenville, IL 60106, 708-766-1100, Fax: 708-766-1106; Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; RF transmitters, antennas, towers, waveguides, STL/MDS microwave equipment; Test & measurement equipment; Production vehicles & accessories; Camera tubes, CRTs, rectifiers, all RF power devices; Recording media, all audio & video formats.

INDIANA

Allied Broadcast Equipment, P.O. Box 1487, Richmond, IN 47375, 317-962-8596, Fax: 317-962-8961; Audio mixers, mics, recorders, processing equipment; Recording media, all audio & video formats.

Central Tower Inc., 2855 Highway 261, Newburgh, IN 47630, 812-853-0595, Fax: 812-853-

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Harris Allied Broadcast Equipment, 3712 National Road W., Richmond, IN 47374, 317-962-8596, Fax: 317-962-8961; Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; RF transmitters, antennas, towers, waveguides, STL/MDS microwave equipment; Test & measurement equipment; Recording media, all audio & video formats.

Harris Allied International, P.O. Box 1487, Richmond, IN 47375, 317-935-1704, Fax: 317-966-0402; Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; RF transmitters, antennas, towers, waveguides, STL/MDS microwave equipment; Test & measurement equipment; Recording media, all audio & video formats.

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Penstock Indiana, 4030 S. Southport Road, Suite 27, Indianapolis, IN 46237, 317-784-3870, Fax: 317-784-4250; RF transmitters, antennas, towers, waveguides, STL/MDS microwave equipment.

IOWA

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1525, Fax: 319-322-5920; Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; Test & measurement equipment; Production vehicles & accessories; Recording media, all audio & video formats.

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KANSAS

Computer Concepts Corp., 8375 Melrose Drive, Lenexa, KS 66214, 913-541-0900, 800-255-6350, Fax: 913-541-0169; Audio mixers, mics, recorders, processing equipment.

Penstock Midwest, 302 S. Clairborne, Suite 1 Office 4, Olathe, KS 66062, 913-829-9330, Fax: 913-829-9331; RF transmitters, antennas, towers, waveguides, STL/MDS microwave equipment.

Professional Studio Distributors, 1059 Porter, Wichita, KS 67203, 316-267-1573; Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; Recording media, all audio & video formats.

RSC Electronics, Inc., 131 Laura, Wichita, KS 67201, 316-267-5213, Fax: 316-267-8917; Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; RF transmitters, antennas, towers, waveguides, STL/MDS microwave equipment; Test & measurement equipment; Camera tubes, CRTs, rectifiers, all RF power devices; Recording media, all audio & video formats.

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KENTUCKY

Dawson & Associates, Bruce L., 1752 Frankfort Ave., Louisville, KY 40206, 502-896-2266, 800-633-0195, Fax: 502-895-8736; Video cameras, recorders, monitors, effects, editing, lighting equipment; Recording media, all audio & video formats.

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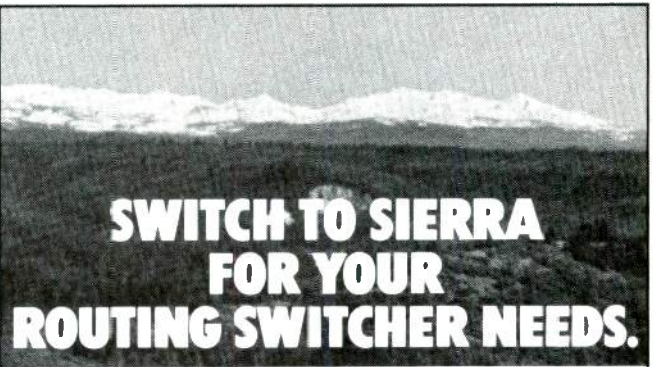
Brothers Co. Inc., David H., 2893 Baltimore Blvd., Finksburg, MD 21048, 301-833-0920, 301-861-8364; Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment.

Harrison Systems Ltd., RF Systems Engineering, 6802 Industrial Drive, Suite 204, Beltsville, MD 21114, Fax: 301-937-2968; RF transmitters, antennas, towers, waveguides, STL/MDS microwave equipment.

Penta Labs, 10820 Guilford Road, Suite 211, Annapolis Junction, MD 20701-9973, 800-852-1033, 800-783-2555; Camera tubes, CRTs, rectifiers, all RF power devices.

Print Products International, 8931 Brookville Road, Silver Spring, MD 20910, 800-638-2020, Fax: 800-545-0058; Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; Test & measurement equipment.

Radio Resources, 7483 Candlewood Road, Hanover, MD 21076, 301-859-1500, 800-547-2346, Fax: 301-859-3042; Audio mixers, mics, recorders, processing equipment; RF transmitters, anten-



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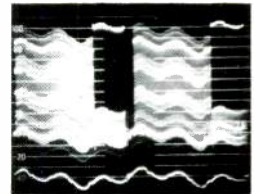
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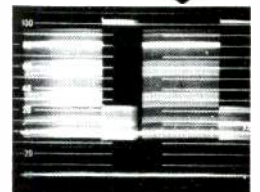
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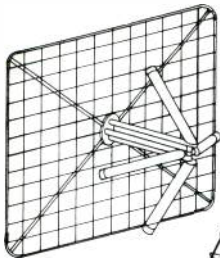
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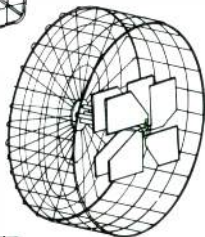


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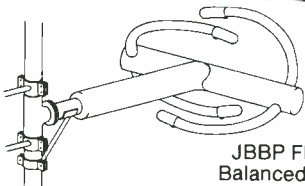
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CM Sales, Inc., 31700 W. 12 Mile Road, Suite 206, Farmington Hills, MI 48018, 313-553-8070, Fax: 313-553-8043; Audio mixers, mics, recorders, processing equipment.

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Victor Duncan, Inc., 23801 Industrial Park Drive, Suite 100, Farmington Hills, MI 48024, 313-471-1600, Fax: 313-471-1940; Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; Production vehicles & accessories.

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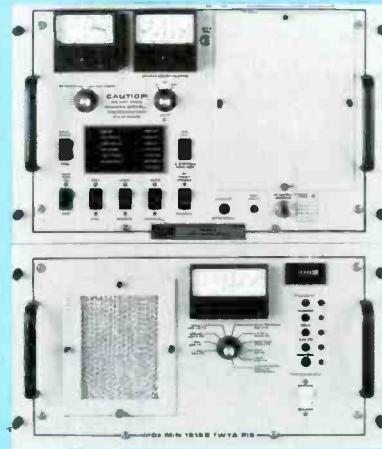
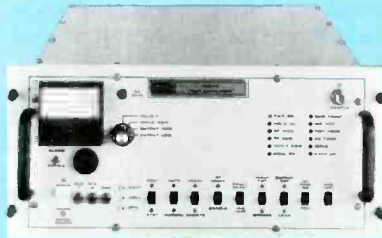
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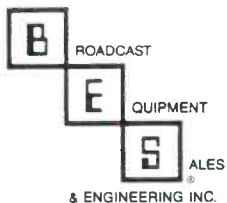


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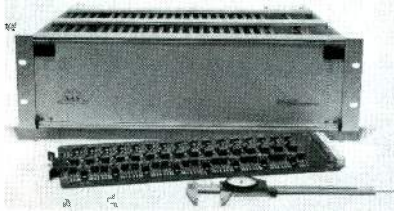
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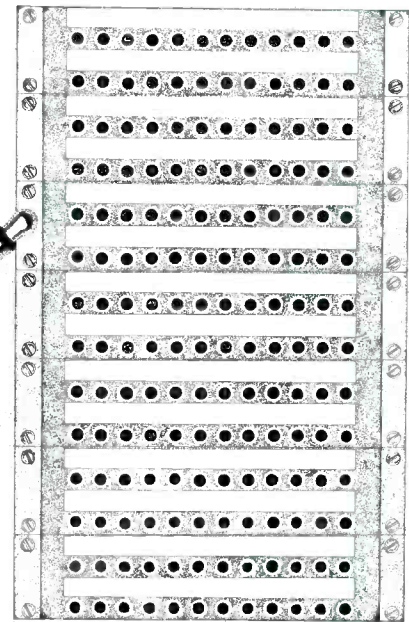
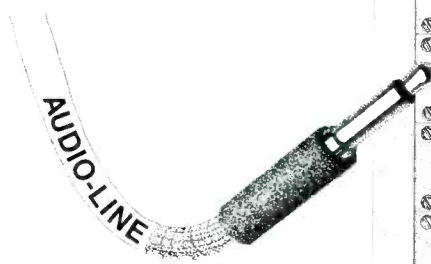
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Professional Audio Supply, 5700 East Loop 820 South, Fort Worth, TX 76119-7099, 817-483-7474, Fax: 817-483-9952; *Audio mixer, mic, recorder, processor equipment; transmitters, antennas, towers, waveguides, microwave equipment; Test & measurement equipment; Camera tubes, CRTs, rectifiers, all RF power devices; Recording media, all audio & video formats.*

RF Specialties of Texas, P.O. Box 7630, Amarillo, TX 79114, 806-372-4518, Fax: 806-373-8036; *Audio mixers, mics, recorders, processing equipment; RF transmitters, antennas, towers, waveguides, STL/MDS microwave equipment; Test & measurement equipment; Camera tubes, CRTs, rectifiers, all RF power devices; Recording media, all audio & video formats.*

Victor Duncan, Inc., 6305 N. O'Connor, Building 4, Irving, TX 75039, 214-869-0200, Fax: 214-869-9810; *Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; Production vehicles & accessories.*

UTAH

RIA Corp., 50 E. Malvern, Salt Lake City, UT 84115, 801-486-8822, Fax: 801-486-2741; *Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equip-*

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VIRGINIA

Alpha Audio, 2049 W. Broad St., Richmond, VA 23220, 804-358-3852, Fax: 804-358-9496; Audio mixers, mics, recorders, processing equipment.

Avec Electronics Corp., 711 Grandy St., Norfolk, VA 23510, 804-627-3502, Fax: 804-627-1710; or

Avec Electronics Corp., 2009 Williamson Road, Roanoke, VA 24012, 703-344-6288, Fax: 703-344-0081; or

Avec Electronics Corp., 2002 Staples Mill Road, Richmond, VA 23230, 804-359-6071, Fax: 804-359-5609; Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; Test & measurement equipment; Camera tubes, CRTs, rectifiers, all RF power devices; Recording media, all audio & video formats.

Broadcast Services/EME, P.O. Box 309, Front Royal, VA 22630, 703-635-1413, Fax: 703-635-9762; Audio mixer, mic, recorder, processor equipment; Video camera, recorder, monitor, effects, editing, lighting equipment; transmitters, antennas, towers, waveguides, STL/MDS microwave equipment; Test, measurement equipment; Recording media, audio & video.

Hall Electronics, Inc., 1305-F Seminole Trail, Charlottesville, VA 22901, 804-974-6466, Fax: 804-974-6450; Audio mixers, mics, recorders, processing equipment; RF transmitters, antennas, towers, waveguides, STL/MDS microwave equipment; Test & measure-

ment equipment; Camera tubes, CRTs, rectifiers, all RF power devices; Recording media, audio & video formats.

Old Dominion Broadcast Eng. Service, 9505 Lakewater Court, Richmond, VA 23229, 804-740-4717; Audio mixers, mics, recorders, processing equipment; transmitters, antennas, towers, waveguides, STL/MDS microwave equipment; Test & measurement equipment; Camera tubes, CRTs, rectifiers, all RF power devices; Recording media, all audio & video formats.

Schafer World Communications Corp., P.O. Box 31, Marion, VA 24354, 703-783-2000, Fax: 703-783-2064; Audio mixer, mic, recorder, processing equipment; transmitters, antennas, towers, waveguides, STL/MDS microwave equipment; Recording media, audio & video formats.

Systems Wireless Ltd., 465 Herndon Parkway, Herndon, VA 22070, 703-471-7887, 800-542-3332, Fax: 703-437-1107; Audio mixers, mics, recorders, processing equipment.

WASHINGTON

Audio Control Industrial, 22313 70th Ave. W., Mountlake Terrace, WA 98043, 206-775-8461, Fax: 206-778-3166; Test & measurement equipment.

Broadcast Supply West, 7012 27th St. W., Tacoma, WA 98466, 800-426-8434, Fax: 206-565-8114; Audio mixers, mics, recorders, processing equipment; transmitters, antennas, towers, waveguides, STL/MDS microwave equipment; Test & measurement equipment; Recording media, all audio & video formats.

Northshore Marketing, 16 W. Harrison St., Suite 205, Seattle, WA 98119, 206-284-9699, Fax: 206-285-9412; Audio mixers, mics, recorders, processing equipment.

Omni Q Inc., P.O. Box L, Blaine, WA 98230, 206-384-1750;

Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment.

Penstock Northwest, 10800 N.E. Eighth St., Suite 800, Bellevue, WA 98004, 206-454-2371, Fax: 206-451-9418; RF transmitters, antennas, towers, waveguides, STL/MDS microwave equipment.

RF Specialties of Washington, Inc., 19237 Aurora Ave. N., Seattle, WA 98133, 206-546-6546, Fax: 206-546-2633; Audio mixers, mics, recorders, processing equipment; RF transmitters, antennas, towers, waveguides, STL/MDS microwave equipment.

WISCONSIN

Full Compass Systems, Ltd., 5618 Odana Road, Madison, WI 53719, 608-271-1100, 800-356-5844; Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; Test & measurement equipment; Production vehicles & accessories; Recording media, all audio & video formats.

Vaughn Broadcast Rentals Vaughn Duplication Services, 700 W. Michigan Ave., Suite 270, Milwaukee, WI 53233, 414-276-6511, Fax: 414-276-0555; Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; Production vehicles & accessories; Recording media, all audio & video formats.

Video Images-Milwaukee, 285 N. Janacek Road, Waukesha, WI 53186, 414-785-8998, Fax: 414-785-9264; Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; transmitters, antennas, towers, waveguides, STL/MDS microwave equipment; Test & measurement equipment; Produc-

tion vehicles & accessories; Camera tubes, CRTs, rectifiers, all RF power devices; Recording media, all audio & video formats.

CANADA

DKW Systems, 9919 105th St., Unit 730, Edmonton, Alta, Canada, T5K 1B1, 403-426-1551, Fax: 403-426-1551; Audio mixers, mics, recorders, processing equipment.

GERR Electro Acoustics Ltd., 363 Adelaide St. E., Toronto, Ont., Canada, M5A 1N3, 416-868-0528, Fax: 416-868-6419; Audio mixers, mics, recorders, processing equipment.

Harris Allied Broadcast-Canada, 10 W. Pearce St., Unit 6, Richmond Hill, Ont., Canada, L4B 1B6, 416-731-3697, Fax: 416-764-0729; Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; RF transmitters, antennas, towers, waveguides, STL/MDS microwave equipment; Test & measurement equipment; Recording media, all audio & video formats.

Lumitrol, Ltd., 253 Merton St., Toronto, Ont., Canada, M4S 1A7, 416-485-4817, Fax: 416-485-4826; Video cameras, recorders, monitors, effects, editing, lighting equipment.

M.S.C. Electronics Ltd., 147 W. Beaver Creek Road, Richmond Hill, Ont., Canada, L4B 1C6, 416-731-9500, Fax: 416-731-5195; Audio mixers, mics, recorders, processing equipment; Video cameras, recorders, monitors, effects, editing, lighting equipment; transmitters, antennas, towers, waveguides, STL/MDS microwave equipment; Test & measurement equipment; Camera tubes, CRTs, rectifiers, all RF power devices; Recording media, audio & video formats

Is your company's name missing from this directory? If so, either the name is not on our mailing list or someone did not respond to repeated requests for information. If you wish to be included in the 1992 issue, write a letter, before May 1, to:

BE Directory Editor
PO Box 12901
Overland Park, KS 66212



George Spiro Dibie on BTS LDK-90 cameras...

“BTS's LDK-90 video cameras are really the top performers on all of my shoots. They make multi-camera video productions look like film. Tube-type cameras have problems with resolution, hot spots and comet tailing. But thanks to BTS frame-transfer CCD chip technology, I light for my video cameras exactly the way I light for film cameras.”



Name: George Spiro Dibie

Profession: Senior Director of Multicamera Photography for Warner Brothers Television.

Current Credits:
Growing Pains
Just The Ten Of Us

Organizations:
President, International Photographers Guild, Local 659, Hollywood; member, Directors Guild of America (DGA); member, Society of Motion Picture and Television Engineers (SMPTE), TV Academy, A.S.L.D. and S.O.C.

Awards:
Winner of three Emmys.
Gold Award (Houston International Film Festival)
Chris Statuette (Columbus Film Festival)

George Spiro Dibie on Production Lighting:

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KARK	CCTV	KJTV	KGBT	KSEE	WGAL	KVV
KELO	VOK	WISN	KRGV	KRMA	KOAT	KPH
WCBS	TTV	WCVB	KTXS	WOFL	WUTR	WHM
WDVM	RAI	WAKA	WSLS	WATL	WCET	WAV
WTOL	KBC	KSTS	WHME	WHO	WSYX	WXE
WEHT	BTQ-7	WJCL	WJZY	WGN	WCAU	WOW
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These stations had to pay us to get on this list.

KETK	STW-9	WIPB	WETK	WTVW	WNEP	WEC
WLVI	BCV-8	WTVJ	KHJ	WPSD	WVIA	WMH
KETK	KBS	KGUN	KARK	KPLC	WIS	KWT
CFCF	CSSR	KCOY	WYAH	WJZ	WSMV	KAB
CFQC	BBC	WHCT	WTTV	KMOV	KCOS	WSA
CFMT	WABI	WMAZ	KFME	WFIE	KPRC	WBT
CBFT	WCCB	WBAL	KLTV	WHAS	KTRK	WFM
CITV	WETM	WBFF	WSFA	KLFY	WWCP	WCP
CKVR	WXXI	KSPR	KPNX	WDSU	WYFF	WCIV
CKVU	KEZI	WPTZ	KICU	WMAR	KBTX	KUTV
CJOH	WTAE	WHYY	KSBW	WLOS	KFDM	KUSA
CBUT	KSFY	KLRN	KCNC	WXII	KSAT	KXLY
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AMPEX

Video equipment specs

Color Television Cameras

These cameras typically use three pickup devices in Studio, Outside broadcast, ENG and EFP applications. All models derived image enhancement from the green channel, while some also use enhancement from red and blue channels. All units, except HDTV products, are available for NTSC, most in PAL and SECAM, as well. Abbreviations N, P, S may be used. All units include one or more black/white balance memories. Signal formats supported by some models may require an adapter for that operation. Cameras designed for EFP and studio typically include intercom and return video capability, as well as a program audio channel for a camera-mounted mic. Sensitivity reflectance is typically 89.9%; light is given in lux. All provide for highlight compensation. [Camcorder (1-piece) systems are identified in the video recorder section of this reference guide.] Under filters, read C for color, N for neutral density.

Manufacturer	Ampex			BTS			
	CVC-50 (-5)	CVC-7(-70) ¹	CVC-7000HS ²	KCH 1000 ³	KCM-125 (KCM-318)	LDK 90 (900)	LDK 91 (910)
Model	CVC-50 (-5)	CVC-7(-70) ¹	CVC-7000HS ²	KCH 1000 ³	KCM-125 (KCM-318)	LDK 90 (900)	LDK 91 (910)
Composite output	Yes	Yes	Yes	Any HDTV	Yes N P S	Yes N P S	Yes N P
RGB output	Yes (No)	No	No	Yes	Yes	Yes	Yes
Y _C C _B output	Yes	Yes	Yes	Yes	...	Yes	Yes
S-VHS/Y-C output	No	No	No	No	Yes	No	No
μP in camera head	No	Yes	Yes	Yes	Yes	Yes	Yes
Direct VCR cable	Yes	Yes	Yes	No	No	Yes	Yes
Coax/Triax/Fiber Optic Cable	-50 only	C/T/FO	C/T/FO	Triax	Yes	Triax	Triax
Multicore cable	-50 only	Yes	Yes	No	Yes	Yes	Yes
Docking VCR	Yes	Yes	Yes	No	No	Yes	Yes
Color balance memories	Yes	Yes	Yes	Scenes	Yes	Yes	Yes
ND/color filters	4C-2N	4C-2N	4C-2N	4-position	Optic/electronic	(4-position)	(4-position)
Application ENG EFP Studio OB	ENG/EFP	ENG/EFP	ENG/EFP	HDTV	Studio	E & (F/S)	E & (F/S)
Pickup size/type	FIT CCD	2 $\frac{2}{3}$ IT (FIT)	IT CCD	30mm PbO	1 (2 $\frac{2}{3}$)	3 FT CCD 1/2	3 FT CCD 1/2
CCD array size/type	510x492	768x493	768x493	or 24mm SAT	DG PbO (HS PbO)	610x492 (2 $\frac{2}{3}$)	806x504
Standard sensitivity	2000 :6	2000; 5.6	200; 5.6	800; 4 PbO	630(800); 1.6	1750; 4.0	1750; 4.0
Limiting sensitivity	15; 1.4	15; 1.4	1.5; 1.4	70; 2	30(25); 1.6	27; 1.4 (54)	13; 1.4
Maximum video gain	18	18	18	9	18	12; 18 opt	18 (24 opt)
S/N ratio	60dB (58)	62dB NTSC	62dB NTSC	...	58dB/N; 56dB P/S	58dB	61dB
Limiting resolution	550 TVL	700 lines	370 lines	1200 50% 600TVL	>700 TVL (60%)	>650 (45% 5MHz)	>700 50% 5MHz
Electronic shutter	7-speed on -50	6-sp to 1/2000s	...	No	No	2-speed	2-speed
Registration error %	0.05%	0.005%	0.01/2.5%	0.02%	μP corrected	0.05%	0.05%
Color corection matrix	Option	Option	No	Yes	Yes	... (Yes)	... (Yes)
Remote control panel	Option	Option	...	Yes	Yes	Yes	Yes
Camera control unit	Option	Option	...	Yes	Yes	Yes	Yes
Multi-camera panel	...	...	...	Yes	Yes	.. (Yes)	... (Yes)
Operating power	10.5-17V	10.5-17V	10.5-17V	350W	...	11W (110W)	11W (170W)
Camera head weight lbs	7.5	7.5	9.9	72.6	73 (17.6)	7.5 (<40)	7.5 (<40)
Reader Service No	565	566	567	568	569	570	571

¹ T7 has separable optical block & lens for special purposes. ² Image intensifier for low light use. ³ Software adjustable to all current HDTV proposals.

Manufacturer	BTS		Hitachi Denshi				
	LDK6/6A (54)	FP-C1 (-C2)	SK-F1 (-F3) ⁴	SK-F700/710	SK-F750(-760) ⁵	SK-H500 (-H50) ⁶	Z-One (CK-2B)
Model	LDK6/6A (54)	FP-C1 (-C2)	SK-F1 (-F3) ⁴	SK-F700/710	SK-F750(-760) ⁵	SK-H500 (-H50) ⁶	Z-One (CK-2B)
Composite output	Yes N P S	Yes	Yes	Yes	Yes	Yes	Yes
RGB output	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Y _C C _B output	(LDK-54)	No	Yes	Option	Option	Yes	Yes
S-VHS/Y-C output	No	Yes	Option	Option	...	..	Yes
μP in camera head	Yes	...	Yes	Yes	Yes	Yes	...
Direct VCR cable	No	Yes	Yes	Yes	...	:(Yes)	Yes
Coax/Triax/Fiber Optic Cable	Triax	...	C/T	Triax	Triax	C/T	...
Multicore cable	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Docking VCR	No	Yes	Yes	No	No	No	Yes
Color balance memories	Yes	Yes	32 scenes	32 data files	32 scenes	...	Yes
ND/color filters	Optical	1N-3C	2N-2C	4N-3C	4N-4C	4N-4C	1N-3C
Application ENG EFP Studio OB	S & (O E F)	ENG/EFP	ENG/EFP	OB/S	Studio/EFP	D/F/S	ENG/EFP
Pickup size/type	1 : 1/4 PbO	3 2 $\frac{2}{3}$	2 $\frac{2}{3}$ FIT CCD	2 $\frac{2}{3}$ FIT CCD	2 $\frac{2}{3}$ FIT CCD	-harpicon	3 2 $\frac{2}{3}$ CCD
CCD array size/type	(PbO 2 $\frac{2}{3}$)	574x499	300kpixel	400kpixel	450kpixel	...	754x485 (x499)
Standard sensitivity	700; 2.8 (900)	2000; 5.6	2000; 5.6	2000; 5.6	2000; 5.6	200; 4	2000; 5.6
Limiting sensitivity	46; 2.8 (24)	23; (25) 1.7	15	15; 1.4	15; 1.4	17; 1.8	23 (25); 1.7
Maximum video gain	12 (18)	18	18	21 3-step	18 3-step	18	18
S/N ratio	58dB/N; 56dB/P	60dB	60dB (62dB)	60dB/N/ 57dB/P	62dB	57dB	60dB
Limiting resolution	400TVL (>650)	660	650 (700)	700 TVL	800 TVL	700	750 (660)
Electronic shutter	No	No	6-sp to 1/2000	No	6-st to 1/2000	Mech. to 1/200	5-(6)sp 1/2000
Registration error %	<25/40/40ns	...	0.05% all zones	0.05% all zones	0.05% all zones	<0.1%	0.05%
Color corection matrix	Yes	No	Option	Yes	Yes	Option	No
Remote control panel	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Camera control unit	Yes	No	Option	Yes	Yes	Yes	No
Multi-camera panel	Yes	No	Option	Yes	Yes	Yes	No
Operating power	...	12Vdc 11W	10.5-17V 14W	300VA	300VA	250VA	12Vdc 11W
Camera head weight lbs	94.6 (9.35)	8.7 (9.2)	7.5	66	66	...	7.7 (9.2)
Reader Service No	572	573	574	575	576	577	578

⁴ SK-F2 uses 400k IT CCD for 700TVL resolution. ⁵ CCD version of SK-971/970D. ⁶ H50 is portable companion unit.

Color Television Cameras

Manufacturer	Ikegami						
Model	HC-200/230/240 ⁷	HK-323 (323P) ⁸	HK-327 (327P) ⁹	HK-353 ¹⁰	HK-355 (355P) ¹¹	HL-53 Unicom	HL-55A Unicom ¹²
Composite output	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RGB output	Yes	Yes	Yes	Yes	Yes	Yes	Yes
YCrCb output	Yes	No	Yes	No	(355P)	Yes	Yes
S-VHS/Y-C output	Yes	No	No	No	...	No	No
μP in camera head	...	Yes	Yes	Yes	Yes	...	...
Direct VCR cable	Yes	No	No	No	No	Yes	Yes
Coax/Triax/Fiber Optic Cable	Coax	C/T/FO	C/T/FO	C/T/FO	Triax	Coax/triax	Coax/triax
Multicore cable	...	Yes	Yes	Yes	Yes	Yes	Yes
Docking VCR	Yes	No	No	No	No	Yes	Yes
Color balance memories	...	One	Yes	...	Yes	...	...
ND/color filters	3C 1N	4C-4N (3C-3N)	4C 4N	4N 5C	4C-4N (3C-3N)	2N-4C	2N-4C
Application ENG EFP Studio OB	ENG EFP	Studio/EFP	Studio/EFP	Studio/EFP	Stu EFP	E F S	E F S
Pickup size/type	3 IL /FIT 1/2	1 PbO DG	30mm M-S PbO	IT 2 ₃	FIT CCD 2 ₃	IT CCD 2 ₃	FIT CCD 2 ₃
CCD array size/type	510Hx492V	(2 ₃ PbO DG)	...	400k pix	450k pixel	400k pix	400k pix
Standard sensitivity	2000; 5.0	2000; 5.6(4.5)	1500; 5.6	f/5.6	2000; 5.6	2000; 5.6	2000; 5.6
Limiting sensitivity	20-25; 1.4	...	94; 1.4	...	...	10	10
Maximum video gain	18	12	12	...	12	24	24
S/N ratio	58/60	59(60)	59dB	62dB	62dB	62dB	62dB
Limiting resolution	530/600/700	700 (650)	800 65% 400TVL	700H 400V	800 (700)	700H 400V	700H 400V
Electronic shutter	6; 3; 6 speeds	No	No	Variable	Variable	6-speed	6-speed
Registration error %	0.05%	0.05/ .1/.2	0.05%	0.05%	0.02%	0.05%	0.05%
Color corection matrix	No	Yes	Yes	Yes	Yes	No	No
Remote control panel	...	Yes	Yes	Yes	Yes	Yes	Yes
Camera control unit	No	Yes	Yes	Yes	Yes	Yes	Yes
Multi-camera panel	No	Yes	Yes	Yes	Yes	...	No
Operating power	12V 11.5W	230VA	360VA	110 220Vac	130VA (26W)	11-16V	11-16V
Camera head weight lbs	6.6-9.2	57 (15.4)	79.2	55	55 (13.2)	6.8	6.8
Reader Service No	579	580	581	582	583	584	585

⁷Variations in models include different CCD types. ⁸-323P portable companion to studio unit. ⁹327P portable companion unit. ¹⁰Optical axis of prism adjusts to center lens on CCDs. ¹¹355P portable companion unit. ¹²Also HL-55 with Beta option.

Manufacturer	Ikegami			JVC Company			Panasonic
Model	HL-791	HL-87M Dwl ¹³	MKC-300 3D ¹⁴	BY-10U	KY-15CIBU ¹⁵	KY-25U	AK 400
Composite output	Yes	Yes	...	Yes	Yes	Yes	Yes
RGB output	Yes	Yes	Yes	Yes	Yes	Yes	Yes
YCrCb output	...	Yes	...	No	Yes	Yes	Yes
S-VHS/Y-C output	No	...	Yes	Yes	Yes	Yes	No
μP in camera head	Yes	...	...	...	...	Yes	...
Direct VCR cable	Yes	Option	No	Yes	Yes	Yes	Option
Coax/Triax/Fiber Optic Cable	Coax/triax	No	...	Coax	...	Coax	Coax/triax
Multicore cable	Yes	No	Special	Yes	Yes	Yes	Yes
Docking VCR	Yes	Betacam	No	Yes	...	Yes	AU 400
Color balance memories	...	...	[and monitor	...	...	...	...
ND/color filters	4C-3N	2N 4C	2C-1N	1N-3C	1N-3C	1N-3C	3N 4C
Application ENG EFP Studio OB	EFP	C	EFP	ENG/EFP	Graphics	ENG/EFP	E F S C
Pickup size/type	PbO 2 ₃	FIT 2 ₃	FT CCD 2 ₃	1 2 ₃ IT CCD	1/2 IT CCD	3 2 ₃ IT CCD	FIT 2 ₃
CCD array size/type	...	420k pix	400k	380k pixel	668x485 pixel	360k pixel	574x494
Standard sensitivity	2000; 4.5	150; 5.6	2000; 5.6	2000; 8	2000; 4	2000; 5.6	2000; 5.6
Limiting sensitivity	...	0.02	15; 1.2	10; 1.6	...	23; 1.7	20; 1.6
Maximum video gain	...	18	...	18	18	18	18
S/N ratio	61dB	58dB	60dB	58dB	58dB	60dB	60dB
Limiting resolution	650 lines	380H	600	450	...	700	650
Electronic shutter	No	2-speed	Variable	3-speed	to 1/500s	3-sp to 1/1000	4-speed
Registration error %	0.05/ .1/.3	±0.5%	0.05%	...	0.05%	0.05%	0.05%
Color corection matrix	...	No	Yes	No	No	No	Yes
Remote control panel	Yes	Yes	Yes	Yes	No	Yes	No
Camera control unit	Yes	Yes	...	No	No	No	Yes
Multi-camera panel	Yes	...	...	No	No	No	...
Operating power	21W 12V	12V 15W	10.8VA	12Vdc 12W	12Vdc 15W	12Vdc 18W	10.5 17V
Camera head weight lbs	12	9	2	5.1	8	6.6	7.5
Reader Service No	586	587	588	589	590	591	592

¹³Pil Proximity Image Intensifier/MCP Micro-Channel Plate. ¹⁴With appropriate accessories, and 120Hz V scan, produces 3D images. ¹⁵Designed for image capture for graphics.

Manufacturer	Panasonic Broadcast			Sony			
Model	AK 450	AQ-20 (-10)	BVP-360A/360AP ¹⁶	BVP-370 (270)	BVP-77P ¹⁷	BVW-500 series ¹⁸	DXC-3000A ¹⁹
Composite output	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RGB output	Yes	Yes	Yes	CCU	Yes	...	CCU
YCrCb output	Yes	Yes	Yes	CCU	Yes	Yes	No
S-VHS/Y-C output	No	No	No	No	No	Yes	Yes
μP in camera head	...	...	Yes	Yes	...	...	Yes
Direct VCR cable	Option	Yes	No	Option	Yes	Yes	Yes
Coax/Triax/Fiber Optic Cable	Coax/triax	C/T/FO	Triax	Triax	Triax	...	...
Multicore cable	Yes	Yes	Yes	...	Yes	Yes	Yes
Docking VCR	AU 400	AU 400	No	No	Yes	Yes ¹	No

Manufacturer	Panasonic Broadcast			Sony				
	Model	AK 450	AQ-20 (-10)	BVP-36WA/360AP ¹⁶	BVP-370 (270)	BVP-77P ¹⁷	BVW-500 series ¹⁸	DXC-3000A ¹⁹
Color balance memories	...	...	...	...	...	...	...	...
NO/color filters	3N 4C	4N-4C (2N-2C)	3N 4C	4N 3C	2N 4C	2N 4C	1N 3C	...
Application ENG EFP Studio OB	E F S C	E F S C	S F	S F	E F	E F	S E F	...
Pickup size/type	FIT 2 ₃	FIT 2 ₃	3 PbO 2 ₃	FIT (IT) 2 ₃	IT 2 ₃	FIT & IT 2 ₃	CCD IT 2 ₃	...
CCD array size/type	838x485	768x499 (574x)	...	380K	768x493	510(768)x492	250k	...
Standard sensitivity	2000; 5.6	2000; 5.6	2000; 4.5	2000; 5.6	2000; 5.6	2000; 5.6	2000; 5.6	...
Limiting sensitivity	20; 1.6	20; 1.6	9; 1.2	15; 1.4	15; 1.4	15; 1.4	16; 1.4	...
Maximum video gain	18	18	4	18	18	18	18	...
S/N ratio	60dB	60dB	60dB	62dB	62dB	62dB (60)	58dB	...
Limiting resolution	800	750 (630)	700	700	700	550 (700)	560	...
Electronic shutter	5-speed	6-speed	No	6-speed	6-speed	No	No	...
Registration error %	0.05%	0.05%	0.05/0.1/0.15	0.05%	0.05%	0.05%	0.05%	...
Color corection matrix	Yes	Yes	Yes	Option	Yes	No	No	...
Remote control panel	No	Yes	Option	Option	Option	Option	...	...
Camera control unit	Yes	Yes	Yes	Yes	Option	No	Option	...
Multi-camera panel	...	...	Option	Option	Option	No	No	...
Operating power	10.5 17V	12V	110/220W 350W	120V 350W	12Vdc 13W	*2V	12Vdc 9.2W	...
Camera head weight lbs	7.5	6.5	66	44	7.5	15.3	7.3	...
Reader Service No	593	594	595	596	597	598	599	...

¹⁶360AP for PAL 360/360P uses SAT or PbO (350 portable). ¹⁷T7 has removeable optical and sensor block; BVP-7000HS uses image intensifier Hi-Sense for extreme low-light use. ¹⁸BVP-5, -7, -50 units use BVW-505/-507/-550 docking VCRs. ¹⁹-3000IR/IRP infrared or normal lightmodes.

Manufacturer	Sony			Thomson Video Equipment				
	Model	DXC-325/325P	DXC-M7	HDC-300	TTV 1250 Proscan ²⁰	TTV1542	TTV1645 Sportcam	TTV1647
Composite output	Yes	Yes	No	No	Yes	Yes ...	Yes	...
RGB output	Yes	Yes	Yes	Yes	Yes	Yes	Yes	...
Y/C ₂ output	No	Yes	Yes	Yes	Yes	Yes	Yes	...
S-VHS/Y-C output	Yes	Yes	No	No	No	No	...	...
µP in camera head	...	...	Yes	Yes	Yes	Yes	Yes	...
Direct VCR cable	Yes	Yes	No	No	No	..	Yes	...
Coax/Triax/Fiber Optic Cable	C	C	No	No	Triax	T	T	...
Multicore cable	Yes	Yes	Yes	200m	Yes	No	...	...
Docking VCR	U/S	No	No	No	No	No	Betacam	...
Color balance memories	...	...	...	...	...	...	10	...
ND/color filters	1N 3C	2N 4C	4N 4C	6 pos.	2x6-pos	4 pos	4 pos	...
Application ENG EFP Studio OB	Utility	S E F	HDTV	HDTV(1)	S F	S F	E F S	...
Pickup size/type	CCD IT 1/2	CCD IT 2 ₃	SFSD SAT 1	PbO or SAT 2 ₃	IT 2 ₃	IT 2 ₃	IT 2 ₃	...
CCD array size/type	510x492	380k	...	...	440k	440k	440k	...
Standard sensitivity	2000; 5	2000; 5.6	2000; 4.7	2200; 4.3 S	1000; 4	1250; 4	1250; 4	...
Limiting sensitivity	20; 1.4	26; 1.8	...	50; 1.4	15; 1.4	10; 1.4	14; 1.4	...
Maximum video gain	18	18	6	12	18	21	21	...
S/N ratio	58dB	60dB	...	43dB/47dB	61dB	62dB	62dB	...
Limiting resolution	530	700	1200	... 20% 20MHz	... 60%	700 TVL	700	...
Electronic shutter	6-speed	6-speed	No	No	1/60-1/1000	5-speed	5-speed	...
Registration error %	0.05%	0.05%	0.025; 0.05	0.05%; 0.1%	0.05%; 0.1%	<0.05%	0.05%	...
Color corection matrix	No	No	Yes	Option	Yes	Opt	Option	...
Remote control panel	Option	Option	No	Option	Yes	Opt	Option	...
Camera control unit	Option	Option	Yes	Option	Yes	Yes	Option	...
Multi-camera panel	No	...	Option	Option	Yes	Opt	Option	...
Operating power	12Vdc 8W	10.5-17Vdc	120/240V 400W	110/220V	110-220Vac	110-220V	16.5W	...
Camera head weight lbs	6.5	9.3	18	28kg	28kg	26.5kg	3.5kg	...
Reader Service No	600	601	602	603	604	605	606	...

²⁰1250:50 and 1050:60 interlaced or 625:50 and 525:60 progressive scanning possible.

Television Zoom Lenses

These camera lenses are grouped by image format size. All systems use focus, zoom and iris servos. The use of lenses not noted as *CCD optimized* should be discussed with the manufacturer for applicability with CCD cameras. Abbreviations for lens applications include E ENG, F EFP, O Outside Broadcast, S Studio.

Television Zoom Lenses, 1/2"

Manufacturer	Angenieux		Canon USA			Fujinon		Schneider	
	Model	14x7 ¹	20x7 ²	PH14ax6.6BIRS	PH20xSuper	PH55xSuper	S14x6.4ERM ³	S8.5x4.2ERM	TV59 Apo-Varon
Application	E/F/O	S/F/O	E/F	Studio	EFP	E/F	E/F	E/F	E/F
CCD optimized	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Zoom range (mm)	7-98	7-140	6.6-92.4	6-120	7-385	6.4-90	4.2-36	6.5-91 (HM14x)	...
Aperture (Wide-Tele)	1.4-1.6	1.2	1.4-1.55	1.4-1.5	1.4-2.2	1.4-1.5	1.4-1.5	1.4-3	...
MOD distance	31"	0"	31.5"	23.6"	7.2"	29.1"	11"	31.5"	...
MOD area (HxV) in mm	52x39	110x83	712x534	813x610	178.8x134.1	75.1x56.3	46.9x35.1	53x40	...
Horizontal angle (Wide-Tele)	52°-4"	51.5°-2.75°	51.7°-4"	56.1°-3.06°	49.1°-0.95°	53°-4"	74°-10°	53°-4"	...
Back focus (mm)	Adjustable	Adjustable	Adjustable	Adjustable	Adjustable	...	...	35.5	...
Aperture (Front-Back)	...	...	...	...	...	...	...	70.5-30.5	...
Extender(s)	2x; 0.8	2x	2x	2x; 1.5x	2x; 2.6x	2x	1.7x	2x; W.W.	...
Macro focus	to 0" MOD	to 0" MOD	Yes	(at 3.74" MOD)	at 15.7" MOD	Yes	Yes	Yes	...
Diascope	No	3-lamp	No	No	No	Yes	Yes	...	...
Operating wt	3.1 lbs	39 lbs	2.87 lbs	35.2 lbs	39 lbs	2.81 lbs	4 lbs	3.95 lbs	...
Reader Service No	501	502	503	504	505	506	507	508	...

¹Wide angle, tele and retrozoom models available. ²Optional integral shutter; other extenders: 1.2x, 1.4x, 1.6x, 1.8x. ³Similar ERD lens for 2₃" is A14x8.5ERM/ERD.

Television Zoom Lenses, 2/3"

Manufacturer	Angenieux				Canon USA			
	14x8	14x9	20x8.5 ²	40x9.5	J13x9BIRS-IIA	J14x8.5BIRS	J15x9.5B IRS	J18x8.5B IRS
Model	14x8	14x9	20x8.5 ²	40x9.5	J13x9BIRS-IIA	J14x8.5BIRS	J15x9.5B IRS	J18x8.5B IRS
Application	E/F/O	E/F/O	S/F/O	S/F/O	E/F	ENG/EFP	E/F	E/F
CCD optimized	...	...	Yes	Yes	Yes	Yes	Yes	Yes
Zoom range (mm)	8-112	9-126	8.5-170	9.5-380	9-117	8.5-119	9.5-143	8.5-153
Aperture (Wide-Tele)	1.6-2	1.6-2	1.3	1.3-2.1	1.6-1.9	1.7-2.0	1.8-2.1	1.7-2.3
MOD distance	31"	31"	0"	0"	29.1"	31.5"	34.6"	35"
MOD area (HxV) in mm	61x46	52x39	121.9x91.7	55x41.5 ³	...	755x566	86.2x64.7	86.2x64.6
Horizontal angle (Wide-Tele)	58°-4.5°	52°-4°	55°-3°	49.75°-1.33°	52.1°-4.3°	54.7°-4.24°	49.7°-3.5°	54.7°-3.3°
Back focus (mm)	Adjustable	Adjustable	Adjustable	Adjustable	Var	man adj	Adjustable	Adjustable
Aperture (Front-Back)	...	...	...	...	72.6; 31.7	...	...	82.8
Extender(s)	2x; 0.6x	2x; 0.8x ¹	2x	2.15x; 2.7x	2x	2x	2x	2x
Macro focus	to 0" MOD	to 0" MOD	to 0" MOD	to 0" MOD	Yes	Yes	Yes	Yes
Diascope	No	No	3-lamp	3-lamp	Option	No	No	Option
Operating wt	3.9 lbs	3.1 lbs	39 lbs	43 lbs	2.84 lbs	2.82 lbs	3.5 lbs	3.5 lbs
Reader Service No	509	510	511	512	513	514	515	516

¹Wide angle attachment; 1.55x tele adapter available. ²Optional integral shutter; other extenders include: 1.2x, 1.4x, 1.6x, 1.8x. ³Based on MOD of 8.2'

Manufacturer	Canon USA				Fujinon			
	J20xSuper	J50xSuper	J55xSuper	A12x9ERM ⁴	A14x8.5ERM ⁵	A15x8ESM ⁶	A16x9.5ERM ⁷	A18x8.5ERM ⁸
Model	J20xSuper	J50xSuper	J55xSuper	A12x9ERM ⁴	A14x8.5ERM ⁵	A15x8ESM ⁶	A16x9.5ERM ⁷	A18x8.5ERM ⁸
Application	Studio	EFP	EFP	E/F	E/F	EFP	E/F	E/F
CCD optimized	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Zoom range (mm)	7.5-150	9.5-475	9-500	9-108	8.5-119	8-120	9.5-152	8.5-153
Aperture (Wide-Tele)	1.5-1.9	1.4-2.7	1.4-2.8	1.7-1.9	1.7-2.0	1.5-1.7	1.8-2.2	1.7-2.3
MOD distance	21.8"	24"	8.2"	5.4"	31.5"	27.5"	37.4"	35.4"
MOD area (HxV) in mm	89x67	180x135cm	190x143	877x658	777x583	915x686	817x613	879x659
Horizontal angle (Wide-Tele)	61.9°-3.3°	49.7°-1.1°	52.1°-1°	52°-4°	54°-4°	57°-4°	49°-3°	54°-3°
Back focus (mm)	Adjustable	Var; man adj	...	...	...	...	...	...
Extender(s)	2x; 1.5x	2x	2x; 1.5x	2x	2x	2x	2x	2x
Macro focus	Yes	...	No	Yes	Yes	No	Yes	Yes
Diascope	Option	Option	Option	Yes	Yes	Yes	Yes	Yes
Operating wt	35.2 lbs	37.5 lbs	37.5 lbs	3.2 lbs	2.8 lbs	28.6 lbs	3.2 lbs	3.34 lbs
Reader Service No	517	518	519	520	521	522	523	524

⁴Similar unit for 1/2" is S12x6.6ERM. ⁵Similar unit for 1/2" is S14x6.4ERM/ERD. ⁶Similar unit for 1/2" is S15x6ESM. ⁷Similar unit for 1/2" is S16x7ERM/RM. ⁸Similar unit for 1/2" is S18x6.2ERM/ERD.

Manufacturer	Fujinon							
	A20x7ESM ⁹	A24x11.5ERD ¹⁰	A34x10ESM ¹¹	A34x20.5ESM	A44x9.5ESM ¹²	A55x9.5ESM ¹³	A8.5x5.5ERM	HA14x8RD
Model	A20x7ESM ⁹	A24x11.5ERD ¹⁰	A34x10ESM ¹¹	A34x20.5ESM	A44x9.5ESM ¹²	A55x9.5ESM ¹³	A8.5x5.5ERM	HA14x8RD
Application	EFP	E/F	EFP	EFP	EFP	EFP	E/F	HDTV
CCD optimized	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Zoom range (mm)	7-140	11.5-276	10-340	20.5-700	9.5-420	9.5-525	5.5-47	8-112
Aperture (Wide-Tele)	1.4-1.6	2.0-2.7	1.6-2.4	2.4-3.5	1.4-2.5	1.4-2.9	1.7-1.9	1.7-2.1
MOD distance	29.5"	5.9"	5.9"	16.4'	7.2'	7.8'	11.8"	43.3"
MOD area (HxV) in mm	1166x874	1296x972	1446x1085	20001500	1863x1397	2028x1521	492x369	1086x611
Horizontal angle (Wide-Tele)	64°-3°	41°-1°	47°-1°	24°-0.7°	49°-1°	49°-0.97°	77°-10°	57°-4°
Extender(s)	2x	2x	2x	2x	2x	2x	1.7x	...
Macro focus	No	Yes	No	No	No	No	Yes	...
Diascope	Yes	Yes	Yes	Yes	Yes	Yes	Yes	...
Operating wt	33 lbs	6.38 lbs	28.6 lbs	42.9 lbs	31.9 lbs	36.9 lbs	4 lbs	6.2 lbs
Reader Service No	525	526	527	528	529	530	531	532

⁹Similar unit for 1/2" is S20x5.4ESM. ¹⁰Similar unit for 1/2" is S24x8.8ERD. ¹¹Similar unit for 1/2" is S34x8ESM. ¹²Similar unit for 1/2" is S44x7.3ESM. ¹³Similar unit for 1/2" is S55x7.3ESM

Manufacturer	Nikon			Schneider		Schwem	Tamron	
	S13x9B	S15x8.5B	S19x8B	TV56 Apo-Varon	TV80	Gyrozoom FP-1	466H (14x9BI)	Model 47HD
Model	S13x9B	S15x8.5B	S19x8B	TV56 Apo-Varon	TV80	Gyrozoom FP-1	466H (14x9BI)	Model 47HD
Application	E/F	E/F	E/F	E/F	O/S	E/F/O/S	ENG	CCTV
CCD optimized	Yes	Yes	...	Yes	No	...	...	...
Zoom range (mm)	9-117	8.5-127.5	8-152	9-126 (HM14x)	8.5-150	60-300	9-126	8-16
Aperture (Wide-Tele)	1.7-2.0	1.7-2.2	1.7-2.2	1.7-2.1	1.4-2	6.2	1.6-1.9	1.6
MOD distance	31.5"	31.5"	35.4"	31.5"	27.5"	10'	39.37"	39.37"
MOD area (HxV) in mm	72.2x54.2	76.4x57.5	89.3x67.4	54x41	53x40	...	...	...
Horizontal angle (Wide-Tele)	52.1°-4.3°	54.7°-4.0°	57.6°-3.3°	52°-4°	55.5°-3.4°	8.38°-1.68°	52°6'-4"	57.62°...-30.75
Back focus (mm)	Adjustable	Adjustable	Adjustable	42.5-47.6	42.4	...	38.98	10.85
Aperture (Front-Back)	...	...	...	72-29.5	133-33	...	76.5-24.8	26-9.4
Extender(s)	2x	2x	2x	2x; W.A.	2x	...	None	No
Macro focus	Yes	Yes	Yes	...	No	No	Yes	No
Operating wt	2.42 lbs	2.75 lbs	2.75 lbs	3.96 lbs	33 lbs	7.4 lbs	3.33 lbs	0.21 lbs
Reader Service No	533	534	535	536	537	538	539	540

Editor's Note:

The information contained in this issue of the **Broadcast Engineering Equipment Reference Manual** was derived from most-recent specifications sheets provided by the manufacturers this year. Not every company in the industry is represented, nor is every product included from those companies who are represented. The issue does give you a wide range of products to consider when you begin your search for new equipment, however.

Television Zoom Lenses, 1" (Non-CCD)

Manufacturer	Angenieux			Canon USA			Fujinon		
	Model	15x12 ¹	40x14	PV14x12.5BIE	PV40x13.5BIE	PV50x13.5BIE*	HR11x11SD	HR12x11SD	HR14x12.5ES
Application	HDTV	S/F/O	Studio	EPF	EPF	HDTV	HDTV	HDTV	
Zoom range (mm)	12-180	14-560	12.5-175	13.5-540	13.5-675	11-121	15-180	12.5-175	
Aperture (Wide-Tele)	1.5-1.8	1.9-3	1.6	1.7-2.8	2.0-3.7	1.8-2.0	1.8-2.0	1.6-1.7	
MOD distance	0"	0"	27.5"	8.2'	8.2'	3.9'	5.2'	4.6'	
MOD area (HxV) in mm	60x34.5	55x41.5	960x125	211x158	213x160	1179x#63	982x589	1058.6x595.5	
Horizontal angle (Wide-Tele)	60.25°-4.5°	49.75°-1.33°	54.2°-4.3°	50.7°-1.4°	50.7°-1.1°	64°-6°	49°-4°	58°-4°	
Back focus (mm)	Adjustable	Adjustable	Adjustable	Adjustable	Adjustable	...	...	...
Extender(s)	1.4x; 2x	2.15x; 2.7x	2x; 1.5x	2x; 1.5x	2x	...	...	2x
Macro focus	...	to 0" MOD	...	...	at 19.7" MOD	No	No	No
Diascope	3-lamp	3-lamp	Option	Option	Option	Option	Option	Option	
Operating wt	54 lbs	43 lbs	51 lbs	68 lbs	46 lbs	18.7 lbs	16.5 lbs	45.1 lbs	
Reader Service No	541	542	543	544	545	546	547	548	

¹ Similar unit is 6x10 10-60mm zoom f/1.5 with 16" MOD.

Manufacturer	Fujinon					Nikon		
	Model	HR22x18ES	HR6x12.5SD	R17x12.5ESM	R20x10.5ESM	R34x29.5ESM	R44x13.5ESM	R10x12AED-HD2	R6x8AED-HD2
Application	HDTV	HDTV	F/S/O/S	F/S/O	F/S/O/Special	F/S/O/Special	HDTV	HDTV
Zoom range (mm)	18-400	12.5-75	12.5-215	10.5-210	29.5-1000	13.5-600	12-120	8-48
Aperture (Wide-Tele)	1.8-2.7	1.5	1.6-2.0	1.6-2.1	3.5-5.0	1.8-3.0	1.8-2.2	1.7
MOD distance	18'	3.9'	29.5"	29.5"	18.7"	8.2"	51.6"	31.6"
MOD area (HxV) in mm	3644x2050	1013x570	987x174	1168x876	2021x1516	2181x1636	...	...
Horizontal angle (W-T)	42°-2°	58°-10°	54°-3°	62°-3°	24°-0.6°	50°-1°	60°19'-6°39'	82°9'-16°32'
Extender(s)	2x	...	2x; 1.5x	2x; 1.5x	2x	2x	2x	2x
Macro focus	No	No	No	No	No	No	Yes	Yes
Diascope	Yes	Option	Yes	Yes	Yes	Yes	...	...
Operating wt	57.2 lbs	15 lbs	42.9 lbs	45.1 lbs	45.1 lbs	55 lbs	16.5 lbs	16.5 lbs
Reader Service No	549	550	551	552	553	554	555	556

Television Zoom Lenses, 1¼" (Non-CCD)

Manufacturer	Angenieux		Canon USA			Fujinon			
	Model	15x16	P14x16.5BIE	P18x15BIE	P40x18BIE	HP5x16SD	P17x16.5ESM	P20x14ESM	P44x18ESM
Application	HDTV	Studio	F/S	Field	HDTV	F/S/G/Special	F/S/O/Special	F/S/O/Special	
Zoom range (mm)	16-240	16.5 235	15-270	18-720	16-80	16.5-280	14-280	18-800	
Aperture (Wide-Tele)	2-2.4	2.1	2.1-2.7	2.3-3.7	1.4	2.1-2.7	2.1-2.8	2.4-4.0	
MOD distance	0"	27.6"	23.6"	8.2'	3.9'	29.5"	29.5"	8.2'	
MOD area (HxV) in	60x34.5	965x724	922x692	211x158	1055x594	1000x750	1171x878	2181x1636	
Horizontal angle (Wide-Tele)	60.25°-4.5°	54.8°-4.2°	60.4°-3.7°	50.7°	60°-13°	54°-3°	62°-3°	50°-1°	
Back focus (mm)	Adjustable	Adjustable	Adjustable	Adjustable	...	...	...	...
Extender(s)	1.4x; 2x	2x; 1.5x	2x; 1.5x	2x; 1.5x	2x; 1.5x	2x; 1.5x	2x; 1.5x	2x; 1.5x	
Macro focus	...	...	...	...	No	No	No	No
Diascope	3-lamp	Option	Option	Option	Yes	Yes	Yes	Yes	
Operating wt	54 lbs	51 lbs	59 lbs	68 lbs	31.9 lbs	42.9 lbs	45.1 lbs	55 lbs	
Reader Service No	557	558	559	560	561	562	563	564	

Video Monitors

These monitors are designed primarily for monitoring of composite and component video, while some are also useful for digital signals. N NTSC, P PAL and S SECAM abbreviations are used. A dagger (†) indicates an X-Y output for vector type displays on X-Y signal monitors

Manufacturer	ASACA/ShibaSoku					Barco		
	Model	CM 23/43 ¹	CM93A1/95A1	CM99A	CMM 11 series†	CMM 7 series†	AVN series ²	CVS series ³	HDM XX53 series
Beam feedback CRT	...	Yes	...	...	Yes	Yes	Yes	...
Aperture correction	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
NTSC test matrix	No	Yes	No	Yes	No	No	No	No
Blue gun only test	No	Yes	No	No	No	Yes	Yes	No
Underscan/overscan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Crosspulse display	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
# composite inputs	3	3	2	3	2	3	2	None
RGB inputs	Yes	Yes	Yes	Opt	Opt	Yes	Yes	Yes
S-VHS inputs	Yes	Yes	No	Opt	No	No	No	No
Y/Cr/Cb inputs	No	Yes	No	Opt	No	Yes	Opt	No
Audio amp/speaker	No	No	Yes	No	No	Amp	-ASP opt	No
Application	Grade 2	Grade 1	Grade 2	Grade 1	Grade 2	Grade 1	Grade 1	HDTV
CRT diagonal (in.)	21 (15)	20 (14)	9	20 (14 26)	20 (14)	10-28	14 (20)	20-40
CRT type	In-line dot	In-line dot	In-line dot	Delta gun/dot	In-line dot	In-line slot	In-line dot	In-line dot
Dot/Stripe pitch (mm)	0.39	0.44 (.31)	0.3	0.44	0.44	0.31	0.31	0.26
Resolution at center	550TVL	600TVL	400TVL	600TVL	600TVL	>500 15"	900TVL	1000TVL
Luminance bandwidth	7MHz	7MHz	7MHz	7MHz	6MHz	6MHz	6MHz	30MHz
Chrominance bandwidth	0.5MHz	1.3MHz I	0.5MHz	to 4.4MHz	1.3MHz	0.6MHz	0.6MHz	...

Video Monitors

Manufacturer	ASACA/ShibaSoku					Barco		
	Model	CM 23/43 ¹	CM93A1/95A1	CM99A	CMM 11 series†	CMM 7 series†	AVM series ²	CVS series ³	HDM XX53 series
Demodulation axes	R-Y/B-Y	I/Q	No	I/Q	R-Y/B-Y	R-Y/B-Y	R-Y/B-Y	...
Decoder filter	Comb; notch	Notch; comb	Comb; notch	Comb; notch	Comb; notch	Comb filter	Comb; notch	...
Standards	NTSC/PAL	NTSC/PAL opt	NTSC/PAL	N/P/S/multi	NTSC/PAL	NTSC	N/P/S	Any HDTV
Multiscan capability	No	No	No	No	No	No	No	to 33.75kHz
µP/auto-setup	...	Yes	No	No	No	Option	Yes; setup opt	...
Reader Service No	607	608	609	610	611	612	613	614

¹ Flat square CRT also available in 14" rack-mount CM44. ² Available with MMRC, SRC multiple, single monitor remote controller. ³ Multiple input cards allow added input capability including quad input, NTSC-4.43, PAL-M/N; D-1/D-2, CCIR 601 digital.

Manufacturer	Conrac	Electronic Visuals	Hitachi Denshi		Ikegami			
			Model	CM-150 (-210)	15 series†	16 series	17 series	19 series	9 series
Beam feedback CRT	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Aperture correction	Yes	...	...	Yes	Yes	Yes	Yes	Yes
NTSC test matrix	No	...	No	...	No	...	...	...
Blue gun only test	No	...	No	Yes	No	...	...	...
Underscan/overscan	Yes	Yes	Yes	Yes	Under	Under	Under	Under
Crosspulse display	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
# composite inputs	3	Yes	3	3	Yes	Yes	Yes	Yes
RGB inputs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
S-VHS inputs	Opt	Yes	Yes	No	Yes	Yes	No	No
Y/C _r C _b inputs	Opt	Yes	...	Option	No	Yes	Yes	Yes
VCR 8-pin input	No	No	No	No	No	No	No	No
Audio amp/speaker	No	No	No	No	No	No	No	No
Application	Grade 1	Video	Video	Video	Video	Video	Video	Video
CRT diagonal (in.)	19 (13)	20	15 (21)	13 (19)	13 (19)	14 (20)	13 (19)	8.5 (13/19)
CRT type	In-line dot	In-line dot	Dark-Tint	In-line dot	In-line slot	In-line slot	In-line dot	In-line dot
Dot/stripe pitch (mm)	0.43 (0.31)	0.43 (0.47)	0.57	0.31 (0.43)	0.41 (0.55)	0.41 (0.55)	0.31 (0.43)	0.31 (0.43)
Resolution at center	800TVL RGB	...	450 (500)	700	500	500	700	700
Luminance bandwidth	13MHz	8MHz	...	to 10MHz	to 7MHz	50-8MHz	60-10MHz	to 8MHz
Chrominance bandwidth	...	...	...	0.6MHz	to 3.58MHz	3.58MHz	0.6MHz	0.6-I; 0.3-Q
Pixels HxV	...	...	...	...	...	...	...	...
Demodulation axes	R-Y/B-Y	UV	R-Y/B-Y	R-Y/B-Y	R-Y/B-Y	R-Y/B-Y	R-Y/B-Y	I/Q
Decoder filter	Comb; notch	Notch	Notch (NTSC)	Adaptive comb	Comb; notch	Notch	Comb; notch	Notch; Comb
Standards	NTSC/PAL	PAL	NTSC/PAL	NTSC	NTSC	NTSC	NTSC	NTSC
Multiscan capability	No	No	No	No	No	No	No	No
µP/auto-setup	...	No	No	Yes	No	Digital control	No	No
Reader Service No	615	616	617	618	619	620	621	622

⁴ EV6351 Grade II; -B model Grade I; switchable aspect ratio shows 4:3 or 16:9 pictures.

Manufacturer	JVC Company			Melford Electronics			Mitsubishi	Panasonic
	Model	TM-2084U/CA ⁶	VM-R190SU ⁷	DU5-20C	DU6 16C	DU6 series ⁸	AM-3501R	AT series
Beam feedback CRT	Yes	...	Yes	Yes	Yes	...	...	Yes
Aperture correction	...	Yes	Yes	EBU	...	...	...	10dB
NTSC test matrix	No	No	No	[phosphors	No	No	...	Yes
Blue gun only test	Yes	No	Gun switch	No	No	Yes	...	Yes
Underscan/overscan	Under	No	Yes	Overscan	Overscan	Yes	Yes	Yes
Crosspulse display	Yes	No	Yes	...	No	Yes	...	Yes
# composite inputs	2	2	2	2	2	Yes	3	3
RGB inputs	No	No	Yes	Yes	Yes	Yes	Yes	Yes
S-VHS inputs	Yes	No	Yes	No	No	No	Yes	Yes
Y/C _r C _b inputs	No	No	Yes	No	No	No	...	Yes
VCR 8-pin input	Yes	Yes	Yes	No	No	No	Yes	...
Audio amp/speaker	Yes	Yes	No	No	No	No	Yes	No
Application	Video/data	Video	Video/data	Video; Data	Video; data	Video	data	Data; Mon/Rcvr
CRT diagonal (in.)	14 Full Square	19	19	20	16	9-26	35	13; 19
CRT type	In-line dot	...	In-line dot	In-line dot	In-line dot	In-line	In-line dot	In-line dot
Dot/stripe pitch (mm)	0.499 stripe	...	0.4	0.4; 0.31	0.31mm	0.31; 0.43	1.0 center	0.31; 0.44
Resolution at center	450	350TVL	600	5.5MHz pattern	6MHz pattern	5.5MHz pattern	600 TVL	...
Luminance bandwidth	...	...	...	to 10MHz	10MHz	to 8MHz	...	>7
Chrominance bandwidth	...	...	...	...	...	...	...	0.6
Pixels HxV	...	...	CGA	...	...	...	640x480	...
Demodulation axes	R-Y/B-Y	R-Y/B-Y	R-Y/B-Y	UV	UV	UV	...	I/Q
Decoder filter	Comb	Comb	Comb	Notch	Notch	Notch filter	...	Both
Standards	NTSC/Y/C358	NTSC	NTSC/component	PAL; NTSC	525/625	PAL	NTSC	N/P/S
Multiscan capability	No	No	No	525/625	No	No	...	...
µP/auto-setup	No	No	No	No	No	No	...	Option
Reader Service No	623	624	625	626	627	628	629	630

⁵ VM-R200SU 20", TM-91SU 9" have similar characteristics. ⁶ TM-9UCV 9", TM-13U/CA 13" have similar characteristics; TM-9U does not include 8-pin VCT input. ⁷ VM-R140SU 14" unit with similar characteristics; TM-R14U/CA 14", TM-R9U/CA 9" do not support color difference inputs. ⁸ 22", 26" models have slot-mask CRT as standard with 0.85mm strip spacing; EBU or near EBU phosphors standard.



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Tektronix

Video Monitors

Manufacturer					Sony			
	Panasonic	PESA	Philips/BTC	Sharp	BVM-1910(-15) ^{10†}	GVM-2000 (1300)	HDM series ¹¹	PVM-1342Q (44Q) ¹²
Model	BT series ⁹	BM-4300	PM 5625	XM-2001/2701				
Beam feedback CRT	Yes	...	No	...	Yes	Yes	Yes	Yes
Aperture correction	Yes	...	Yes	Yes	6dB	Yes	in RGB	Yes
NTSC test matrix	Yes	No	No	No	No	No	No	No
Blue gun only test	Yes	No	Yes	No	Yes	No	No	Yes
Underscan/overscan	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Crosspulse display	Yes	Yes	Yes	No	Yes	...	Yes	Yes
# composite inputs	2	2	2	1	Yes	Yes	No	Yes
RGB inputs	Yes	No	Yes	(tuner)	Yes	Yes	Yes	Yes
S-VHS inputs	No	No	No	Yes	No	No (Y/C)	No	Yes
Y/C _R C _B inputs	No	No	No	No	Yes	No	Y _P P _B	No (Yes)
VCR 8-pin input	Yes	No	No	No	No	No	No	Yes
Audio amp/speaker	Yes	No	No	MTS system	No	Yes	No	Yes
Application	Video	Grade 2	Grade 2	Mon/Rcvr	Video/data	Video/data	HDTV	Video/data
CRT diagonal (in.)	13; 19	9; 14; 20	14	20 (27)	19	21 (13)	12/18/28/38	13
CRT type	In-line dot	In-line dot	In-line dot	Linytron	Trinitron	Trinitron	Trinitron	Trinitron
Dot/stripe pitch (mm)	0.31; 0.44	0.31	0.44	0.65	...	0.3 (0.4)	0.55 (.25)	0.26-0.46
Resolution at center	230-350	>450	600	Equiv 0.65mm	400TVL	900 (600)	560 (600)	600-1000 H
Luminance bandwidth	>7	5MHz	5MHz	...	8MHz (6) NTSC	7MHz (8)	30MHz 16:9	7MHz NTSC
Chrominance bandwidth	0.6	...	to F _{sc}	...	10MHz (6) RGB	20 (30)	...	9MHz RGB
Pixels HxV	...	...	...	...	...	720x480(900x560)	...	900x200
Demodulation axes	I/Q	...	R-Y/B-Y	R-Y/B-Y	R-Y/B-Y	...	...	R-Y/B-Y
Decoder filter	Both	...	Notch	Comb filter	CF	NF	...	...
Standards	N/P/S	NTSC/PAL	N/P/S opt	NTSC	NTSC	...	...	N P S
Multiscan capability	...	...	...	No	No	Yes	No	...
μP/auto-setup	No	...	...	No	Option	No	No	No
Reader Service No	631	632	633	634	635	636	637	638

⁹CompuFocus CRT with overlapping field lens gun; 9", 13" and 19" diagonals. ¹⁰BVM-2010/2015 PAL-M; BVM-1315/1415 13" NTSC, PAL-M; BVM-8021/9021ME 9" NTSC/PAL, SECAM. ¹¹28" and 38" use flat screen CRTs; all accept tri-level or bi-level with sync, HD/VD drives. ¹²PVM-1340/1341 do not include PAL, SECAM; resolution of 450 lines; 1910Q with 19" CRT.

Manufacturer	Sony		Videotek				Vistek
	PVM-2030/2530 ¹³	PVM-5310 (3x)	AVM-13sv (-19s)	RM-8 (-8PR) ¹⁴	Studio 13	VM-13 PRO	GM7100(7200) ¹⁵
Beam feedback CRT	Yes	Yes	No	No	No	No	...
Aperture correction	...	No	Yes	No	No	No	No
NTSC test matrix	No	No	No	No	No	No	No
Blue gun only test	No	Yes	Yes	Yes	Yes	Yes	No (Opt)
Underscan/overscan	No	No	Under	Opt	Yes	Yes	Yes (Opt)
Crosspulse display	Yes	No	Yes	Opt	Yes	Yes	Yes
# composite inputs	Yes	Yes	2	2	3	3	A/B
RGB inputs	PC	No	No	No	No	No	Yes
S-VHS inputs	Yes	No	-13vs	No	No	No	...
Y/C _R C _B inputs	No	No	No	No	No	No	No
VCR 8-pin input	Yes	No	Yes	RM-8 only	Yes	No	No
Audio amp/speaker	Yes	No	Yes	Yes	Yes	No	No
Application	Video/data	V	Grade 2	Mon/Rcvr	Grade 2	Grade II	Gr 1 (2)
CRT diagonal (in.)	21 (27)	5	13 (19)	8	10	13	14/20 (6.5/10)
CRT type	Trinitron	Trinitron	In-line slot	Trinitron	In-line Slot	Trinitron Plus	Dot mask
Dot/stripe pitch (mm)	0.55 (0.73)	...	...	...	...	0.25mm	0.39/0.44
Resolution at center	560	220	450 (380)	260TVL	380 TVL	260TVL	...
Luminance bandwidth	6MHz NTSC	...	4.2MHz	3MHz	3MHz	3.2MHz	6MHz
Chrominance bandwidth	10MHz RGB	...	1MHz	1MHz	1MHz	1.5MHz	...
Pixels HxV	640x200	...	...	1MHz	...	...	...
Demodulation 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	U-V
Decoder filter	Comb	...	Comb filter	Notch	Comb, notch	Notch	Comb filter
Standards	NTSC	NTSC	NTSC	NTSC	NTSC	NTSC	PAL
Multiscan capability	...	No	No	No	No	No	No
μP/auto-setup	No	No	No	No	No	No	No
Reader Service No	639	640	641	642	643	644	645

¹³PVM-3230 32"; PVM-4300 43"; PVM-1910 19". ¹⁴RM-8 is a portable unit; both operate from ac or 12Vdc; 68-channel tuner. ¹⁵GM7200 available for NTSC-358/4.43, PAL or SECAM.

Video Standards Converters

Systems for conversions among NTSC, PAL, SECAM and their variants; may also provide format conversion.

Manufacturer	AVS				CEL Electronics		Grunder/Video Int'l		I-DEN	OKI Electric
	AVS 6500	EOS	ISIS	ADAC	P156-2	P165 TETRA	DTC 2504	DTC 2604	IP-500	LT1210
Supports NTSC 3.58	I/O	I/O	I/O	I/O	I/O	I/O	I/O	I/O	Yes	I/O
Supports NTSC 4.43	I/O	I/O	I/O	I/O	Opt	I/O	Yes	I/O	No	I
Supports PAL (CCIR)	I/O	I/O	I/O	I/O	I/O	I/O	Yes	I/O	Yes	I/O
Supports PAL-M	Opt	and N	& N opt	& N Opt	Opt	I/O	...	& N	No	Opt
Supports SECAM	I/O	I/O	Option	Option	Input	I/O	Output opt	I/O	Yes	Opt
Supports Y-C/S-VHS	...	I/O	Option	No	...	I/O	Y/C-358/443	Dub U Opt	Yes	No
Supports Y/C _R C _B	...	Yes	Option	Yes	Input	I/O	No	I/O	Yes	No
Supports RGB	Opt	...	Option	Yes	...	No	No	Option	Yes	No

Manufacturer	AVS				CEL Electronics		Grunder/Video Int'l		I-DEN	OKI Electric	
	Model	AVS 6500	EOS	ISIS	ADAC	P156-2	P165 TETRA	DTC 2504	DTC 2504	IP-500	LT1210
Supports D-1 CCIR 601	...	No	Option	Option	No	Opt	No	No	No	No	No
Luminance sampling	10MHz		13.5MHz		12.9MHz	13.5MHz	...	13.5MHz	5.5MHz	...	...
Chrominance sampling	...		6.75		4.3MHz	6.75MHz	...	6.75MHz	3.58MHz	...	...
Quantizing (L/C)	8-bit		8-bit		7-bit	8-bit	8-bit	8-bit	8-bit	...	...
Input S/N ratio	...	>50dB	...	>55dB	53dB	>56dB	...	60dB wtd	...	...	(25dB)
Resolution luma b. w.	3.58MHz	4.5MHz NTSC	3.58MHz	5.5MHz	3.5MHz	4.2MHz	3.58+	>5.5	...	...	...
Resolution chroma b. w.	...	...	...	...	...	...	...	...	...	...	...
Functions:											
TBC/synchronizer	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	TBC	Yes
Frame (field) freeze	Yes (1 or 2)	Yes	Yes	Yes	Yes (4-field)	Yes (1 or 2)	Yes	Yes	Yes (4-field)	... (Yes)	Yes
Image enhancement	Yes	Yes	Yes	Yes	...	C	Yes	H/V	Yes	Yes	Yes
Noise reduction Y/C	Yes	Yes	17dB/21dB	9dB	...	Yes	15dB	15dB	Yes	...	...
Composite encoding	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Enhanced NTSC/PAL	...	Yes	Yes	Yes	...	...	...	...	...	...	...
Format conversion	...	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No
Auto input selection	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	...
Color timing correction	Yes	Yes	Yes	Yes	Gain; phase	Yes	Level	Yes	...	...	Yes
Programmable operation	No	4-preset	No	No	No	RS-423	No	No	No	No	No
R/B balance correction	Yes	Yes	Yes	Yes	No	...	No	Yes	No	No	...
Proc amp adjustment	Full	Full	Full	Full	Yes	Yes	Yes	Full	Full	Full	Full
Reader Service No	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1160

Manufacturer	OKI Electric	Quantel	Snell & Wilcox				Video International			Vistek Electronics		
			Model	LT2000TSC	Satin 601	ME2001	ME8800(8500)	DIP9800	ME990C series	DTC 3604	OTC 4500	DTC 3504	V4401 VECTOR
Supports NTSC-3.58	I/O	Yes	Out	I/O	I/O	I/O	I/O	I/O	I/O	I/O	Yes	Yes
Supports NTSC-4.43	In	Yes	Out	I/O	I/O	I/O	I/O	I/O	I/O	Yes	Yes	Yes
Supports PAL (CCIR)	I/O	Yes	Out	I/O	I/O	I/O	I/O	I/O	I/O	Yes	Yes	Yes
Supports PAL-M	I/O	Yes	Out	8800 (..)	I/O	(9930)	I/O	I/O	I/O	& -N	Yes	Yes
Supports SECAM	I/O	Yes	Out	I/O	I/O	(I/O 9900)	I/O	I/O	I/O	Yes	Yes	No
Supports Y-C/S-VHS	I/O	...	Y,C	Yes (DLB)	No	(9910 CUB)	I/O	Dub O	Yes	Yes	Yes	Yes
Supports Y-C/S	Opt	Yes	...	Yes	Out std (In opt)	(9930)	I/O	Y/O	Yes	Yes	Yes	Yes
Supports RGB	Opt	Yes	Yes	No	I/O opt	(9930)	I/O	Y/O	Yes	Yes	Yes	Yes
Supports D-1 CCIR 601	Yes	Yes	...	No	No	No	D1	Y/O	D1	Yes	Yes	No
Supports D-2	...	...	...	...	...	...	No	...	No	No	Yes	Yes
HDTV downconverter	No	...	Yes	No	No	No	No	...	No	No	13.5	13.5
Luminance sampling	13.5	...	...	3.3MHz	3.3MHz	3.3MHz	13.5	13.5	13.5	13.5	6.75	6.75
Chrominance sampling	6.75	...	...	...	...	...	6.75	6.75	6.75	6.75	8-bit	8-bit
Quantizing L/C	8-bit	...	...	8-bit	8-bit	8-bit	8-bit	8-bit	8-bit	8-bit	8-bit	8-bit
Input S/N ratio	(>25dB)	...	...	>56dB	56dB	56dB	60dB wtd	54dB	60dB	...	...	...
Resolution luma b. w.	420L H	...	...	...	...	4-field motion	>5.5MHz	>5.5MHz	>5.5MHz	5.5MHz	...	...
Resolution chroma b. w.	330L V	...	...	...	...	processing	...	...	...	...	...	...
Functions:												
TBC/synchronizer	Yes	TBC	...	Yes	Yes	Yes	Yes	Yes (4-field)	Yes	Yes (field 1 or 2)	Yes	Yes
Frame (field) freeze	Yes	...	Yes	Yes	Yes	Yes	Yes	H/V	Yes	Yes	Yes	Yes
Image enhancement	H	V	Yes	Yes	Yes	Yes	Yes	15dB	Yes	Yes	Yes	Yes
Noise reduction Y/C	Y	C	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Composite encoding	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Enhanced NTSC/PAL	...	...	...	...	...	...	...	...	Opt Como	...	...	...
Format conversion	...	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Auto input selection	Yes	...	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Color timing correction	Yes	...	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Programmable operation	Remote	Yes	Pan; squeeze	Yes	2-memories	Yes	No	No	No	No	No	No
R/B balance correction	No	...	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Proc amp adjustment	Full	Yes	Partial	Full	Full	Full	Full	Full	Full	Full	Full	Full
Reader Service No	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1170	1170

Time Base Correctors, Synchronizers

Abbreviations include N NTSC, P PAL, S SECAM. When no model in a group supports a particular function, that item is dropped from that group.

Manufacturer	ALTA Group	Ampex Corporation	Broadcast Systems Design	BTS	CEL Electronics	Digital Processing Systems (Midwest)			
	Model	Cygnus (-5.5)	ZEUS	Model 501	DSY7	P164-38 (-18)	DPS-170	DPS-175A	DPS-265
Function TBC/Synchronizer	Both	TBC	TBC	Synchronizer	Both	T3C			Both
Standard NTSC/PAL/SECAM	NTSC	N; P-M; S	NTSC	CCIR 601	N/P/S			NTSC	
Format conversions	(5.5 only)	No	Yes	No	Yes		No		Yes
Sampling frequency/bits	14.318MHz; 8-bit	14.318 MHz; 9-bit	16.11MHz; 8-bit	13.5MHz; 8-10 bit	13.5MHz; 8-bit			4xFsc; 8-bit	
Correction window	1 field	60 lines	±8 lines	to frame	5-field PAL	16 lines	>525 lines	Infinite	
Video bandwidth (dB/MHz)	290 line (5.5MHz)	±0.2/5MHz	±0.5/6.4MHz	...	5.5MHz		±0.25dB 4.2MHz	-3.0.5dB 6MHz	
S/N ratio	>55dB (>56dB)	>58dB	58dB	...	56dB		58dB		
Differential phase/gain	<3/3% (<2/2%)	<2/2%	1.5/1.5%	...	...		<2/2%		
Residual error	...	±10ns	±10ns Y	...	...		±10ns	±15ns	
Advanced sync output	No	Yes	Yes	...	Yes		Yes	No	
Coherent subcarrier out	No	Yes	Yes	AF delay control	...		Yes	No	
Composite I/O	Yes	Yes	Yes	With options	Yes		Yes		
Component I/O	(Y-C3.58)	D-2 out	Y-C/Y-C688/-C629	4:2:2 digital	YUV/Y-C(S-VHS) CCIR-601/656	No	No	Color-under	
Heterodyne operation	...	Yes	Yes	No	...		Yes		
Dropout compensation	...	Yes	Yes	[Auto selects	Yes		Yes		

Time Base Correctors

Manufacturer	ALTA Group	Ampex Corporation	Broadcast Systems Design	BTS	CEL Electronics	Digital Processing Systems (Midwest)		
Model	Cygnus (-5.5)	ZEUS	Model 501	DSY7	P164-38 (-18)	DPS-170	DPS-175A	DPS-265
For servo capstan	...	Yes	...	[525/625 line	...	...	...	...
Supports dynamic tracking	Yes	Yes	No	[standard ref.	Yes	Yes	...	No
Noise reduction	No	Yes	Chroma	[to input sync.	...	...	...	...
Image enhancement mode	Yes (No)	...	Horizontal	[Variable	...	...	...	...
Video effects	Yes	No	No	[delay.	-38 only	...	...	...
Freeze frame-field	Yes	Yes	No	Yes	...	No	...	(VITS insert)
Video mixer feature	4-input V/A	No	No	No	4-input BIM opt	...	No	Yes
Reader Service No	668	669	670	671	672	673	674	675

Manufacturer	Digital Processing Systems (Midwest)			For-A Corporation					
Model	DPS-270	DPS-275	DPS-375	FA-210	FA-300 ¹	FA-425	FA-740	FA-800	
Function TBC/Synchronizer	TBC	Both		TBC	Both	TBC	Dual TBC	Both w/ALC	
Standard NTSC/PAL/SECAM	NTSC		PAL	NTSC					
Format conversions	Yes			No	Yes	No	Yes	No	
Sampling frequency/bits	4xFsc; 8-bit		13.5; 8-bit	13.5/4:1:1; 8-bit		13.5MHz; 8-bit	14.318MHz; 8-bit	8.93MHz; 8-bit	4xFsc; 8-bit
Correction window	16 lines	Infinite		2-field		1-frame	2-field	1-frame	
Video bandwidth (dB/MHz)	-3/0.25 5.5MHz	-3/+0.25 6MHz Y-C		±0.5/5MHz Y-C		5MHz	4.2MHz	3.5MHz Y	±0.3 5MHz
S/N ratio	58dB			56dB		58dB	55dB	58dB	
Differential phase/gain	<2°/2%	<1°/1%		2°/2%		2°/2%			
Residual error	±15ns			15ns		±15ns	±15ns	±2.5ns	
Advanced sync output	Yes			Yes		Yes	Dual out	Yes	
Coherent subcarrier out	Yes	No		No		Yes	Blackburst	Yes	
Composite I/O	Yes			Yes		Yes			
Component I/O	S-VHS	Y-C358/Y-C688 YCrCb out only	Y-C(S-VHS)/YCrCb Y-C685/924 U-DUB	No	Y-C358/YCrCb in	No	Y-C358	No	
Heterodyne operation	Yes	...		Yes		Yes	Yes	...	
Dropout compensation	No	Yes	No	No	Yes	Yes			
Supports dynamic tracking	...	No	...	No	FA-300DT opt	No			
Noise reduction	Chroma			Luminance		...			
Image enhancement mode	...	Chroma		No		No			
Video effects	...	No	Yes	No		Yes			
Freeze frame-field	...	Yes		Yes		Yes			
Video mixer feature	No			No		No			
Reader Service No	676	677	678	679	680	681	682	683	

¹FA-700 Dualist 2-channel version.

Manufacturer	Fougerolle	Grunder/Feral		Hotronic			I•DEN	
Model	MPV1000 ser ²	GC-200	GS-100	AE61 (-B; -S)	AF71	AF75	IVT-7	IVT-9 Plus
Function TBC/Synchronizer	Both	Both		TBC	Both			Both
Standard NTSC/PAL/SECAM	PAL; SECAM	NTSC		NTSC				
Format conversions	Yes	No		Yes	No	Yes	Yes	
Sampling frequency/bits	13.5MHz; 8-bit	4xFsc; 8-bit		4xFsc; 8-bit			13.5MHz	
Correction window	1-frame	1 frame		16-line	2 frame	1 frame	1 frame	
Video bandwidth (dB)	5MHz	4.2MHz		4.2 (-B 2.5)	4.2	4.2 (400 lines)	450 TVL	5.5MHz
S/N ratio	55dB	58dB		58dB			58dB	
Differential phase/gain	2°/2%	2°/2%		<2°/2%	<1.5°/1.5%	<2°/2%	2°/2%	
Residual error	±15ns	...		±10ns	±20ns	±10ns	±15ns/2°	
Advanced sync output	...	...		Yes			...	Yes
Coherent subcarrier out	...	...		Yes			No	Yes
Composite I/O	w/decoder	Yes		Yes			No	Yes
Component I/O	RGB/YUV/27MHz 4:2:2 interface	No		Y-C358/S-VHS VHS/U-matic/SP	No	Y-C358/S-VHS VHS/U-matic/SP	Y-C358/Y-C688 Y-C629	Y-C688/Y-C358 YCrCb (S-VHS in)
Heterodyne operation	Yes	...		Yes			...	
Dropout compensation	Yes	...		Option			Yes	Yes
Supports dynamic tracking	No	No		...			No	Yes
Noise reduction	...	...		3dB chroma			...	
Image enhancement mode	...	...		...			No	
Video effects	No	A-B fade		No			No	Limited
Freeze frame-field	Yes	Yes		No	Yes			Yes
Video mixer feature	No	2-input	4-input	No			No	
Reader Service No	684	685	686	687	688	689	690	691

²27MHz 4:2:2 parallel interface on MPV1100.

Manufacturer	JVC	Marconi	Microtime		Nova Systems			
Model	SA-T411U	B2022	FS10 (FS8)	Tx6	502 EFP TBC	920SP (900)	Nova 710S (700)	NOVASync (F)
Function TBC/Synchronizer	TBC	Synchronizer	Both		TBC			
Standard NTSC/PAL/SECAM	NTSC	PAL	N; P-625/-525	NTSC; PAL-B	NTSC	NTSC (& PAL)		Synchronizer
Format conversions	Yes	No	No	Yes	No	Yes		NTSC
Sampling frequency/bits	13.5/4:1:1; 8-bit	3xFsc; 9-bit	4xFsc; 10(8)-bit	13.5MHz; 8-bit	14.3MHz; 8-bit	13.5MHz; 8-bit	14.3MHz; 8-bit	
Correction window	1 frame	2-/4-field	Inf. (4-fld opt)	Infinite	6-line	1 field	32-line	1 frame
Video bandwidth (dB/MHz)	5MHz	±0.25 5MHz	5.5MHz	(5.2 S-VHS)	5.5MHz	to 5.5MHz	5.5MHz	±0.5 4.2MHz
S/N ratio	56dB	...	>60dB	58dB NTSC	>58dB	>58dB		
Differential phase/gain	2°/2%	2°/3%	1°/1% (2°/2%)	2°/2%	<2°/2%	<2°/2%		

Manufacturer	JVC	Marconi	Microtime		Nova Systems			
Model	SA-T411U	B2022	FS10 (FS8)	Tx6	502 EFP TBC	920SP(900)	710S(700)	NOVASync (F)
Residual error	15ns monochrome	±2°	...	<15ns		±10ns		±10ns Y
Advanced sync output	Yes	No		Yes	Yes		Yes	
Coherent subcarrier out	...	No		No	Yes			Yes
Composite I/O	Yes	Yes		Yes	Output	Yes		NTSC
Component I/O	S-VHS I/O; YCrCb O	No	D2	Y-C(S-VHS); Y-C358; YCrCb	VTR video	Y-C in/Y-C358; YCrCb	S-VHS in -710S	S-VHS in
Heterodyne operation	...	...	Opt	...	...	...		Yes
Dropout compensation	Yes	...	...	Yes	No	Yes (No)		Yes
Supports dynamic tracking	No	...	No	Yes			No	
Noise reduction	Yes	...	No	to 6dB		3dB chroma		No
Image enhancement mode	No	...		No	[Portable		No	
Video effects	No	No	No	ABEEffects opt	[unit for	Yes		No
Freeze frame-field	Both	[Freeze on		Yes	[field use	Yes	No	NOVASync F
Video mixer feature	No	[signal interrupt	No	via effects	No	4x1		No
Multiple channel	No	No	No	Dual opt		No		No
Reader Service No	692	693	694	695	696	697	698	699

Manufacturer	Nova Systems	Panasonic			Prime Image			
Model	NOVASync 2 (2F)	AU-TB50B	TBC-100	TBC-200 Plus	7.5MHz 700(701)	7.5MHz 710(711)	HR600+ 800(801)	HR600+ 810(811)
Function TBC/Synchronizer	Both		TBC		TBC	Both	TBC	Both
Standard NTSC/PAL/SECAM	NTSC		NTSC			NTSC		NTSC
Format conversions	...		Yes			Yes		Yes
Sampling frequency/bits	14.3MHz; 8-bit	13.5MHz; 8-bit	14.318MHz; 8-bit			... 8-bit		... 8-bit
Correction window	1 frame	32-line	16 line		16 lines	1 frame	16-line	1 frame
Video bandwidth (dB/MHz)	±0.5 4.2MHz	4.5MHz	5.5MHz DUB	6MHz DUB		7.5MHz		7.5MHz
S/N ratio	>58dB	54dB	58dB	>57dB		58dB		58dB
Differential phase/gain	2/2%		2/2%			1.5/1.5%		1.5/1.5%
Residual error	±10ns Y	...	...	±15ns		±15nsec		±15nsec
Advanced sync output	Yes	Yes	Yes	Yes	Yes	Not required	Yes	Not required
Coherent subcarrier out	Yes	No	No	No		Yes		Yes
Composite I/O	NTSC	Yes	Yes	Yes		Yes		Yes
Component I/O	S-VHS in	CTCM in YCrCb out	Y-C358 S-VHS in	Y-C358 S-VHS YCrCb out	Y-C688/Y-C[S-VHS] YCrCb/RGB		Y-C688/Y-C[S-VHS]; YCrCb/RGB	
Heterodyne operation	Yes	...	...	...		Yes		Yes
Dropout compensation	Yes	...	...	...		Yes		Yes
Supports dynamic tracking	No	...	...	...		Yes		Yes
Noise reduction	No		No	Chroma		to 20dB		No
Image enhancement mode	No		No	Chroma	...	...		No
Video effects	No		No		701 only	711 ⁴	#801 only	#811 ⁵
Freeze frame-field	NOVASync F	...	...	...	701 only	711	No	Yes
Reader Service No	700	701	702	703	704	705	706	707

⁴Limited effects with #710. ⁵Limited effects with #810.

Manufacturer	Prime Image					QuesTech	Tektronix	Videotek
Model	Model 50	TBC+ 100 (150)	S-TBC+ 100S (150S)	STBC SYNC+ 200S (250S)	TBC SYNC+200 (250)	2101P	110-S ⁸	VDP-8400 (-8000) ⁹
Function TBC/Synchronizer	Both		TBC		Both	Both	Synchronizer	Synchronizer
Standard NTSC/PAL/SECAM	NTSC		NTSC		NTSC	PAL (625)	NTSC	NTSC
Format conversions	No	No	Yes	Yes	No	Yes	No	No
Sampling frequency/bits	...; 8-bit		... 8-bit		...; 8-bit	13.5MHz; 8-bit	14.314MHz; 10-bit	14.318MHz; 8-bit
Correction window	1 frame		16 lines		1 frame	1-frame+32-lines	Infinite	1-frame
Video bandwidth (dB)	4.2MHz		4.2MHz		4.2MHz	5.5MHz	to 4.2MHz	-3dB 5MHz
S/N ratio	58dB		58dB		58dB	54dB luma	60dB	>58dB
Differential phase/gain	1.5/1.5%		1.5/1.5%		1.5/1.5%	1.5/2.5%	1/1%	2/2%
Residual error	±15ns		±15ns		±15ns	±10ns/1"	20ns max	...
Advanced sync output	No		Yes		Not required	No	No	No
Coherent subcarrier out	No		Yes		Yes	No	No	No
Composite I/O	Yes		Yes		Yes	Yes	NTSC	Yes
Component I/O	No	No	[Y-C [S-VHS]	[Y-C [S-VHS]	No	RGB; YUV	None	No
Heterodyne operation	No		Yes		Yes	Yes	w/TBC opt	...
Dropout compensation	Yes		Yes		Yes	Yes	...	...
Supports dynamic tracking	No		Yes		No	Yes	No	...
Noise reduction	No	...	No	No	...	No	No	No
Image enhancement mode	No	...	No	No	...	No	No	No
Video effects	No	100 only	100S only	200S only ⁶	200 only ⁷	No	No	No
Freeze frame-field	Yes		No		Yes	Yes	Yes	Yes
Reader Service No	708	709	710	711	712	713	714	715

⁶Limited effects on #250S. ⁷Limited effects on #250. ⁸Includes link to AS-18 audio delay for resynchronizing of audio delayed through transmission or processing. ⁹8400 has 2-frame freeze memory or one frame with continued synchronized output; 8400 has 2-field memory or 1-field freeze with continued output; audio steering for audio synchronizer use.

Editor's Note: Small format 1/2" recording systems appear on the following page.

3/4" U-matic equipment remains available from Sony and Thomson Video (Thomson Broadcast), with AVEC providing "Alphatized" modifications.

D-1 format systems are available from BTS, Sony and Thomson Video.

C format 1" equipment is available from Ampex and Sony.

B format 1" equipment is available from BTS.

Video Recording Equipment

The designs of these products follow specific format criteria for placement of the signal onto the recording medium to permit interchange from one transport to another within the same format. Major variations between machines of the same format are features provided by individual manufacturers. Reader service numbers in parenthesis, braces and brackets refers to manufacturer and product in column above in matching enclosure symbols.

Manufacturer	Betacam SP					M-II			S-VHS			D-2		
	Amplex	BTS	Ikegami	Sony	Thomson Video	JVC	Panasonic	JVC	Panasonic	Sharp	AMPEX	BTS	Sony	
VCR use														
Camcorder	CVR-200 CVR-300	KCB590 LDK 391	HL-V55	BWV-200 BWV-300 BWV-400	TTV3505				AG450/460					
Docking	CVR-5	LDK-391				KR-M260U	AU-400	BR-S411U BR-S511U	AG-7450	(Hitachi)				
Portable	CVR-35	BCB-35	(AVEC)		TTV3535	KR-M470U	AU-500/-505	BR-S600U	AG-7400	(VL-S100)			DVR-2	
Field/office player	CVR-22	BCB-22	(CVR22EXS)		TTV3522		AU-620 AU-630	BR-S601U			(Hitachi) (VL-D500)			
Studio player	CVR-60 CVR-65	BCB-60 BCB-65		BWV-65	TTV3560 TTV3565	KR-M800U	AU-640/X80	BR-S810U	AG-7100 series			[Panasonic] [AJ-D350]		
Studio recorder	CVR-70 CVR-75	BCB-70 BCB-75		BWV-70 BWV-75	TTV3570 TTV3575	KR-M820U KR-M860U	AU-650/-660	BR-S611U	AG-7300 AG-7500	XA-2500S	VPR300, 200 VPR305 VPR350, 250	DCR-10 DCR-18	DVR-10 DVR-18	
Duplicator								BR-S711U						
Circle No.	1171	1172	1173 (1174)	1175	1176	1177	1178	1179	1180	1181 (1182)	1183 (1184)	1185 (1186)	1000	

Videocassette Automation Systems

Manufacturer	Amplex Corporation	ASACA ShibaSoku	AVS France	Odetics Broadcast	Panasonic Broad-cast	Sony Broadcast Products
Model	ACR-225 ¹	ACL-6000C	DIVA ²	TCS 2000 ³	MARC system ⁴	BVC-1000S LMS ⁵
Video record format	D-2	Betacam/SP; M-II	Various	Various	M-II; 1/2" digital	Beta SP; D-2
# playback decks	3-4 & external	4; 5	3/system	6 & external	5 max	4; 6 max
Specific playback model	No	No	No	Per format	Per format	Per format
Output channels	4 simultaneous	...	to 6 systems	Multiple	Multiple	2 simultaneous
# record decks	3-4	1	per transport	6 & external	1 or 2	4; 6 max
Editing features	Full feature	...	per transport	Per transport	Per transport	...
Control computer	IBM PC/comp	Charles River	IBM PC/comp	IBM/PC	IBM/PC AT	UNIX OS
Control protocol	RS-323/422	RS-422	RS-323	422; Ethernet; Ebus	RS-422	RS-422
Master automation port	Yes	Yes	Yes	Yes	Option	Yes
Record/delay play feature	Future opt	No	Yes	Yes	Yes	Option
Cassette ID type	Barcode	Barcode	Barcode	Barcode; TC/UB	Barcode; TC/UB	Barcode; TC/UB
Integral TC reader	LTC	Per transport	LTC	LTC	Yes	LTC/VITC
Integral TC generator	LTC	Per transport	LTC	LTC	...	LTC/VITC
Storage magazine	256 32 min D2	600 max	...	280	107 expandable	1036 for D-2
Shortest segment	7s w/4 decks	15s cycle	4s	12s recycle	10-15s	10s
System TBC	Integral	Per transport	Per transport	Per transport	AU-TB50	Integral
Reader Service No	1145	1146	1147	1148	1149	1150

¹Multi-event per cassette system; features AutoResolve software utility to preview playlist, recognize and automatically resolve playback conflicts. ²Betacam, U-matic, M-II, S-VHS, Hi8; to 99 events per cassette. ³D-2, Betacam/SP, M-II systems available including PAL capability; capacity of system extended with expansion units, maximum of 1495 cassettes in D-2 format. ⁴Expansion units permit systems from 472 to 1176 cassettes; external VTRs may also be used. ⁵Also BVC-10 with 40-cassette storage and 4 BWV-95 VTRs; three external transports may be controlled; several sizes available based on small, medium and large cassettes.

Time Code Generators, Readers

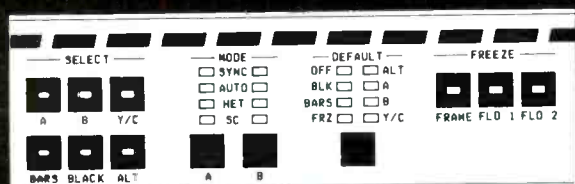
Manufacturer	Adams-Smith	Adams-Smith	ADx Systems	Cipher Digital					
	System 2600	Zeta-Three	ADx-02 (ADx-03)	CDI-4800 Shadow II	CDI-4810 Phantom 2	CDI-710A	CDI-716A	CDI-735L	CDI-735V
Internal reference	Yes	Yes	...	Yes	No	No	Yes	No	No
Reader function	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Generator function	Yes	Yes	Yes	No	No	No	Yes	No	No
Character generator function	Yes	...	Yes	No	No	Yes	No	No	Yes
Supports drop frame	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supports non dropframe	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supports color framing	Yes	Yes	Yes	...	...	Yes	Yes	Yes	Yes
Supports jam sync	Yes	Yes	Yes	No	No	No	Yes	No	No
Supports 3:2 film pull-down	Yes	Yes	...	...	...	No	No	No	No
Supports LTC	I/O	Yes	I/O	Input	Input	I/O	I/O	I/O	I/O
Supports VITC	I/O	MIDI	(-03)	No	No	No	No	No	No
Editor interlace	Yes	...	(-03)	Yes	Yes	No	Yes	Yes	Yes
Character keyer	Yes	No	Yes	No	No	Yes	No	No	Yes
Keyed window display	Adj	No	Adj	No	No	Adj	No	No	Adj
Time code entry	Yes	Yes	Yes	No	No	No	Yes	No	No
Time code comparisons	Yes	...	(-03)	Yes	Yes	No	No	No	No
User bit entry	Yes	Yes	Yes	No	No	No	Yes	No	No
User bit comparisons	Yes	...	...	No	No	No	No	No	No
Synchronizer function	Yes	Yes	...	Yes ¹	Yes	No	No	No	No

Manufacturer	Adams-Smith	Adams-Smith	ADx Systems	Cipher Digital					
Model	System 2600	Zeta-Three	ADx-02 (ADx-03)	CDI-4800 Shadow II	CDI-4810 Phantom ²	CDI-710A	CDI-716A	CDI-735L	CDI-735V
TC UB display	LED	Yes	LED	...	...	LED	LED	LED	None
TC UB display size	Various	Yes	...	...	...	0.7"	0.7"	0.7"	...
Reading speed range	1-100x	1/10-100x	1/32-80x	1/30-50x	1/30-50x	1/50-80x	1/30-15x	1/30-80x	1/30-80x
LTC output signal	1Vp-p	Yes	10dBm	...	...	+4dBm 600Ω	+4dBm 600Ω	+4dBm 600Ω	+4dBm 600Ω
Power requirement	110/220Vac	AC power	110Vac	110/220Vac	110/220Vac	110/220Vac	110/220Vac	110/220Vac	110/220Vac
Reader Service No	801	802	803	804	805	806	807	808	809

¹To synchronize and control one master and one slave. ²Interface for single transport, makes it appear as a VPR-3 or BVH-2000 RS-422 serial device.

Manufacturer	Cipher Digital	Denecke	ESE						
Model	CDI-750	TC-1 (Syncbox)	ES257	ES253	ES452	ES453	ES456	ES461	ES488
Internal reference	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes
Reader function	Yes	TC-1	Yes	No	Yes	Yes	Yes	No	Yes
Generator function	Yes	Syncbox	No	Yes	...	No	No	Yes	Yes
Character generator function	Yes	...	No	No	Yes	No	No	No	Yes
Supports drop frame	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supports non dropframe	Yes	...	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supports color framing	Yes	...	No	Yes	No	No	No	Yes	Yes
Supports jam sync	Yes	Yes	No	No	No	No	No	Yes	Yes
Supports 3.2 film pull-down	No	...	No	No	No	No	No	No	No
Supports LTC	I/O	Yes	In	Out	In	In	In	I/O	I/O
Supports VITC	No	No	No	No	No	No	No	No	No
Editor interface	Yes	Opt	No	No	No	Yes	No	No	No
Character keyer	Yes	No	No	No	Yes	No	No	No	Yes
Keyed window display	Adj	No	No	No	Multiline	No	No	No	Adj
Time code entry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time code comparisons	Yes	...	Yes	No	No	No	No	No	No
User bit entry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
User bit comparisons	...	...	Yes	No	No	No	No	No	No
Synchronizer function	No	No	No	No	No	No	No	No	No
TC UB display	LED	TC-1 LED	LED	...	Video	LED	LED	LED	LED
TC UB display size	0.7"	...	0.4"	...	5% of screen	0.56"	0.56"	0.56"	0.56"
Reading speed range	1/30-80x	1/50-50x	1x	...	1x	1x	1/30-30x	...	1/30-30x

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Time Code Generators, Readers

Manufacturer	Cipher Digital	Denecke	ESE						
Model	CDI-750	TC-1 (Synbox)	ES257	ES263	ES452	ES453	ES456	ES461	ES488
LTC output signal	+4dBm 600Ω	1V 10kΩ	...	1V 0dBm 75Ω	...	...	...	1V 0dBm 75Ω	1V 0dBm 75Ω
Power requirement	110/220Vac	ac/dc	110Vac	Rechargeable bat	110Vac	110Vac	110Vac	110Vac	110Vac
Reader Service No	810	811	812	813	814	815	816	817	818

Manufacturer	ESE	Evertz Microsystems							Fast Forward Video
Model	ES727	3700D	4015 ³	7200e ² 4	Chaser 7000	ECM 4010	Emulator 7100	EV-Bloc ⁵	P1† (F21)
Internal reference	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Reader function	Yes	Yes	No	Yes	Yes	Yes	Yes	611	Yes
Generator function	No	Yes	Yes	No	Yes	Yes	Yes	612	Yes
Character generator function	No	Yes	Yes	No	No	Yes	No	613	F21
Supports drop frame	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supports non dropframe	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supports color framing	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Supports jam sync	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes
Supports 3:2 film pull-down	No	No	Yes	No	No	Yes	Yes	Yes	Yes
Supports LTC	In	I/O	Opt	In	I/O	I/O	I/O	...	No
Supports VITC	No	No	Opt	In	In	I/O	No	I/O	I/O
Editor interface	No	No	No	Yes	No	No	Yes	Yes	No
Character keyer	No	Yes	Yes	No	No	Yes	No	613	F21
Keyed window display	No	...	...	No	No	...	No	Yes	No (Adj)
Time code entry	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Time code comparisons	Yes	No	No	No	Yes	No	No	...	No
User bit entry	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No
User bit comparisons	Yes	No	No	No	No	No	No	...	No
Synchronizer function	No	No	No	Yes	Yes	No	Yes	No	No
TC UB display	LED	LED	LED	...	LED	LED	LED	LED	LCD (LED)
TC UB display size	0.4"	0.75"	0.75"	...	0.75"	0.75"	0.75"	0.75"	0.55"
Reading speed range	1/30-30x	1/30-70x	...	0-70x	0-70x	0-70x	1/30-70x	0-70x	1x (1/30-15x)
LTC output signal	...	-20/12dBm	-20/12dBm	...	-20/12dBm	-20/12dBm	-20/12dBm	+6dBm	0dBm (0.5-8V)
Power requirement	110Vac	110/220Vac	110/220Vac	12Vdc	110/220Vac	110/220Vac	110/220Vac	110/220Vac	12Vdc (110Vac/9Vdc)
Reader Service No	819	820	821	822	823	824	825	826	827

³Film footage encoder. ⁴Intelligent interface. ⁵Modular system of building blocks to perform required functions.

Manufacturer	For-A	Fostex	Gray Eng. Labs	Horita	OpTex	Skotel			
Model	TGR-2000	4010/4011	DT-213/VID-225	TRG-50 ⁶	AVTC-20	TCG-132	TCG-132c	TCG-311	TCG-313
Portable unit	No	No	No	Yes	Yes	No	No	No	No
Internal reference	Yes	Yes	Yes	No	Yes	No	No	Yes	Yes
Reader function	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Generator function	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Character generator function	Yes	(4011)	Yes	Yes	-20Vl	Yes	Yes	No	Yes
Supports drop frame	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supports non dropframe	Yes	Yes	Yes	Yes	...	Yes	Yes	Yes	Yes
Supports color framing	Yes	Yes	Yes	No	...	Yes	Yes	Yes	Yes
Supports jam sync	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Supports 3:2 film pull-down	No	...	Yes	No	...	Yes	Yes	No	No
Supports LTC	I/O	Yes	I/O	I/O	Yes	I/O	I/O	I/O	I/O
Supports VITC	No	Yes	I/O	In	...	Input	Input	No	No
Editor interface	Yes	Yes	Yes	No	No	No	Yes	No	No
Character keyer	Yes	4011	Yes	Yes	...	Yes	Yes	No	Yes
Keyed window display	Adj	Yes	Adj	Adj	...	Adj	Adj	No	Adj
Time code entry	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Time code comparisons	No	Yes	Yes	No	No	No	No	No	No
User bit entry	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
User bit comparisons	No	Yes	Yes	No	No	No	No	No	No
Synchronizer function	...	4030	No	No	No	No	No	No	No
TC UB display	LED	LED	LED	...	LED	...	...	LED	LED
TC UB display size	Adj.	...	0.6"	...	...	...	...	0.6"	0.6"
Reading speed range	1/30-80x	1/10-100x	1/10-100x	1/30-10x	...	1/40-80x ⁷	1/40-80x ⁷	1/40-80x	1/40-80x
LTC output signal	2.2Vp-p	0.1-10V adj	+8dBm 600Ω adj	1V/-6dBm 2kΩ	3dB 1kΩ	0.5-5V 100Ω	0.5-5V 100Ω	0.5-5V 100Ω	0.5-5V 100Ω
Power requirement	110Vac	110/220ac	100/220Vac	110Vac/9-12Vdc	12Vdc	ac/dc	ac/dc	ac/dc	ac/dc
Reader Service No	828	829	830	831	832	833	834	835	836

⁶TCG-50 generator includes window dub insertion feature. ⁷0-50x VITC.

Manufacturer	Skotel						Sony	Telcom Research	
Model	TCG-80N-F7/008	TCG-80N/104	TCR-111 (111c)	TCR-112	TCR-80/114	TCR-80V/114	BVG series	Model 800	T 7000A
Portable unit	No	No	No	No	No	No	(BVG-100)	Yes	Yes
Internal reference	No	No	No	No	No	No	Yes	Yes	Yes
Reader function	Yes	Yes	Yes	Yes	Yes	Yes	BVG-1600	Yes	Yes
Generator function	Yes	Yes	No	No	No	No	BVG-1500	Yes	Yes

Manufacturer	Skotal						Sony	Telcom Research	
	TCG-80N-FT/008	TCG-80N/104	TCR-111 (111c)	TCR-112	TCR-80/114	TCR-80V/114	BVG series	Model 800	T 7000A
Model									
Character generator function	Yes	Yes	No	No	Yes	Yes	Yes	No	No
Supports drop frame	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supports non dropframe	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supports color framing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supports jam sync	Yes	Yes	No	No	No	No	Yes	Yes	Yes
Supports 3:2 film pull-down	No	No	No	Yes	No	No	...	No	No
Supports LTC	I/O	I/O	I/O	I/C	I/O	I/O	Yes	I/O	I/O
Supports VITC	Output	No	No	No	No	Input	Yes	I/O	No
Editor interface	No	No	-111c	No	No	No	Yes	No	No
Character keyer	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No
Keyed window display	Adj	Adj	No	Adj	Adj	Adj	Yes	No	No
Time code entry	Yes	Yes	No	No	No	No	Yes	Yes	Yes
Time code comparisons	No	No	-111c	No	No	No	...	No	No
User bit entry	Yes	Yes	No	No	No	No	Yes	Yes	Yes
User bit comparisons	No	No	-111c	No	No	No	...	No	No
Synchronizer function	No	No	No	No	No	No	No	No	No
TC UB display	LED	LED	LED	...	LED	LED	LED	LED	LED
TC UB display size	0.3"	0.3"	0.6"	...	0.3"	0.3"	...	...	0.3"
Reading speed range	0.9-1.1x	0.9-1.1x	1/40-80x	1/40-80x	1/20-40x	1/20-40x	...	1x only	1/50-8x
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	to 8dBm	+3dBm	11dBm 600Ω
Power requirement	ac/dc	ac/dc	ac/dc	ac/dc	ac/dc	ac/dc	110Vac (9dc)	110Vac/9Vdc	6-16Vdc
Reader Service No	837	838	839	840	841	842	843	844	845

Manufacturer	Telcom Research						Time Line	United Media	
	T5010	T6010	TCG-550	TCR 660	TCR 680	TCR-500	Lynx TC module	Model 505	Model 515 TCR/CG
Model									
Internal reference	Yes	...	Yes	...	...	No	Yes	Yes	Yes
Reader function	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Generator function	Yes	No	Yes	No	No	No	Yes	Yes	No
Character generator function	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes
Supports drop frame	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supports non dropframe	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supports color framing	Yes	Yes	Yes	Yes	...	Yes	No	Yes	Yes
Supports jam sync	Yes	...	No	...	...	No	Yes	Yes	Yes
Supports 3:2 film pull-down	No	No	No	No	No	No	Film module	Yes	Yes
Supports LTC	I/O	I/O	Out	Input	Input	Input	I/O	I/O	I/O
Supports VITC	No	No	No	No	No	No	No	I/O	I/O
Editor interface	No	No	No	No	No	No	Yes	Yes	Yes
Character keyer	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes
Keyed window display	Adj	Adj	No	No	Adj	Adj	No	Multiline Adj	Multiline Adj
Time code entry	Yes	...	Yes	...	...	No	Yes	Yes	Yes
Time code comparisons	No	...	No	...	...	No	No	Yes	Yes
User bit entry	Yes	...	No	...	...	No	No	No	No
User bit comparisons	No	...	No	...	...	No	No	No	No
Synchronizer function	No	No	No	No	...	No	Yes	No	No
TC UB display	LED	LED	LED	LED	Video	...	LED	LED	LED
TC UB display size	0.8"	0.8"	0.6"	0.6"	...	1"	0.3"	4"	4"
Reading speed range	1/30-8x	1/30-83x	...	1/50-10x	1/50-8x	1/5-5x	1/2-60x	1/20-50x	1/20-50x
LTC output signal	11dBm 600Ω	...	11dBm 600Ω	...	...	1Vp-p	-1dBm 200Ω adj	0.5-4Vp-p	0.5-4Vp-p
Power requirement	110/220Vac	110/220Vac	110/220Vac	110/220Vac	8-16Vdc	110Vac	110/220Vac	110/220Vac	110/220Vac
Reader Service No	846	847	848	849	850	851	852	853	854

Editor's Note:

The category of Time Code equipment does not include such devices as code translators or character generator/inserters. You may consult any of the manufacturers noted in this section for such products.

Videotape Editing Controllers

Dedicated control equipment, not a software package with plug-in card for use with personal computers (PCs, may, however, perform as a terminal with the editing system).

Manufacturer	Abekas Video Systems	Ampex Corporation	Amtel Systems	BTS	Cipher Digital	CMX		
	A34 Solo ¹	ACE 25 ⁴	E-Pix	BBE-900 ⁶	CDI-5000 Sof-touch II	300	3100B ⁷	3600
Suggested for	On-line	On, Off-line	Off-line	On/off-line	On-line	On/Off-line	On-line	On-line
Editing type	Linear	Linear	Non-linear	...	Linear	Linear	Linear	Linear
Transports controlled R/P	2-R, 4-P	1R, 3P	8 R, 8 P	1R, 3P	4-R, 4-P	1 R/3 P	6 R/6 P	6 R/6 P
Videodisc interface	No	No	Yes	No	No	Option	Option	Option
Control μP type	Centralized	80286 PC	Distributed	Centralized 8-bit	Multiple	Centralized	Distributed	Distributed
# events (internal storage)	512	1000	2000	128	16	999	999	999
External event storage	FD	FD dual 3.5"	Floppy disk	None	3.5" FD	FD	FD	FD, HD
Edit decision list	Yes	Yes	Yes	Yes	Multi per 3.5" FD	Yes	Yes	Yes
Edit data display	CRT	CRT	CRT	CRT	CRT	CRT	CRT	CRT
Printer interface	3.5" disk on PC	RS-232 ser/par	Centronics parallel	None	RS-232, parallel	Parallel	RS-232	RS-232
Command entry via	Keyboard	Keyboard	Keyboard	Keyboard	Keyboard	Keyboard/console	Keyboard, Gismo	Keyboard, Gismo
Deck motion control via	KB, Joystick ²	Keyboard, Knob	Joystick	Keyboard, knob	Keyboard	Keyboard/Gismo	Keyboard, Gismo	Keyboard, Gismo

While U-Matic is often the industry workhorse, be described somewhat

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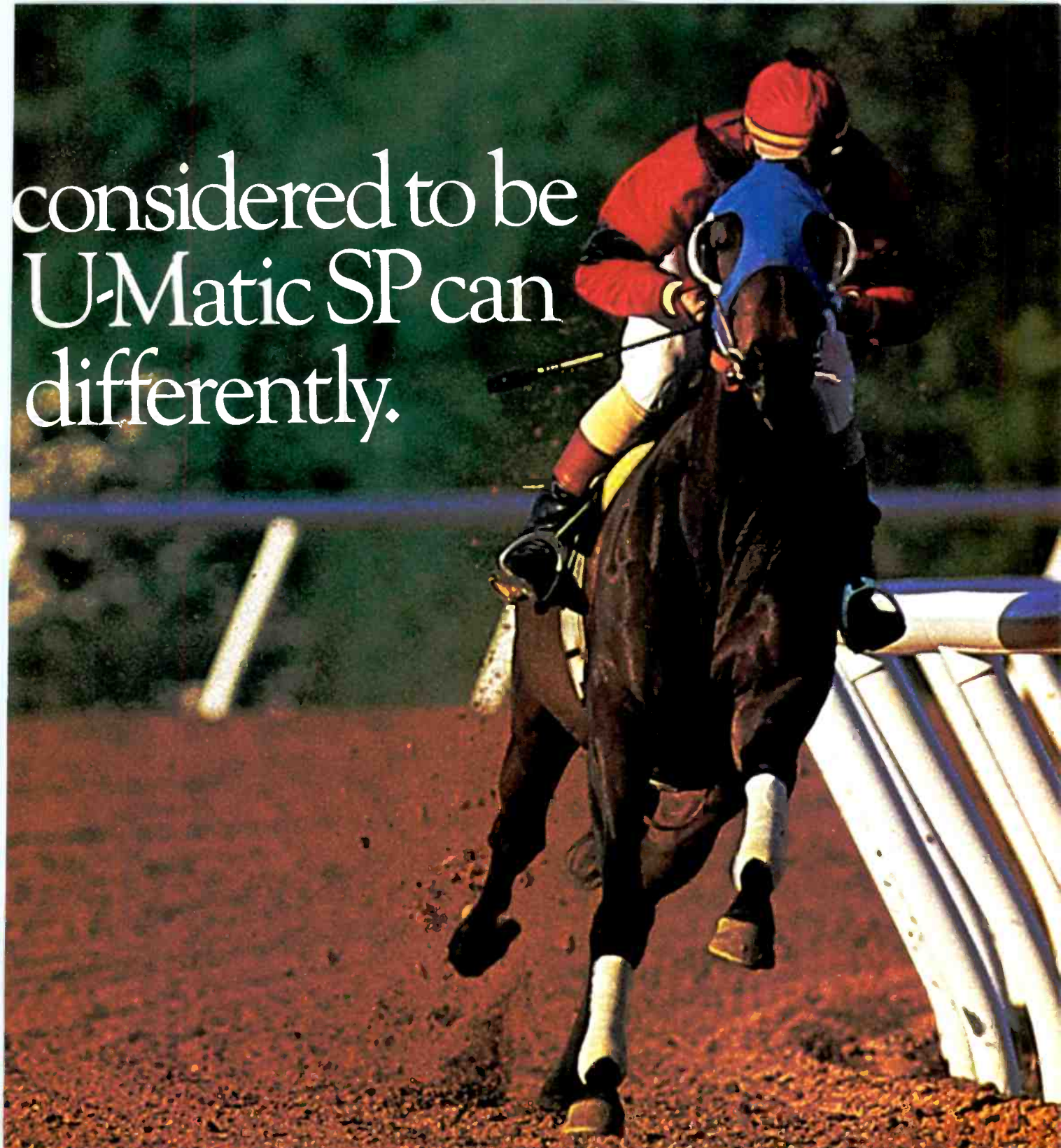
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Videotape Editing Controllers

Manufacturer	Abekas Video Systems	Ampex Corporation	Amtel Systems	BTS	Cipher Digital	CMX		
Model	A34 Solo ¹	ACE 25 ⁴	E-Pix	BBE-900 ⁶	CDI-5000 Soft-touch II	300	3100B ⁷	3600
Assemble edit	Yes	Yes	Yes	Yes	...	Yes	Yes	Yes
Insert edit	Yes	Yes	Yes	Yes	[Audio editing]	Yes	Yes	Yes
Split A-V edits	Yes	Yes	Yes	Yes	[stores user setup]	Yes	Yes	Yes
A-B sync roll	Yes	Yes	Yes	Yes	[w/edit list]	No	Yes	Yes
Animation mode	No	No	Yes	...	[Interface to four]	No	Yes	Yes
Integral TC reader	No	No	No	Yes	[Shadow II and	No	Option	Option
Integral TC generator	No	No	No	No	[CDI-750 G/R.	No	Option	Option
Time reference support for	LTC VITC Ctl-Trk	LTC VITC CtlTrk	LTC VITC	LTC VITC CtlTrk Sync	LTC	LTC/VITC/CtlTrk	LTC/VITC CtlTrk/Film	LTC/VITC CtlTrk/Film
Color framing	Yes	Yes	Yes	NTSC, PAL	...	NTSC/PAL	NTSC/PAL	NTSC/PAL
Editing accuracy	1 TC ±2 CtlTrk ³	0 TC ±1 CtlTrk	±0 TC	±0 TC, ±2 CTL	0:01 Frame w/TC	0 TC	0, 0	0, 0
Interfaces available	Af mixer, Video effects system	Auf mixer, video switcher, multi-track ATR, Serial-parallel interfacing ⁵	Af mixer, video switcher, multi-track ATR, titler	Switcher, mixer, GPI-controlled equipment	Audio mixer, video switcher	Audio mixer, video switcher, telecines, multitrack ATRs, video effects		
Control protocol	RS-422, GPI	RS-232	RS-422	GPI	RS-232/-422/GPI	RS-422, ESBUS, GPI	RS-232, GPI	RS-422, GPI
Reader Service No	911	912	913	914	915	916	500	917

¹Combines editing control with 8-input A/V switcher, 2-D digital effects, 3 TBCs, flying bus, luma and DSK keying. ²Or thumbwheel control. ³Accuracy dependent upon VTRs used in the system. ⁴ACE-200 (20 GPIs, 16 devices), ACE 10 (4 GPI, 2P/1R VTRs), ACE Micro (4 GPIs, 4VTRs) have characteristics similar to the ACE 25 system. ⁵ACE-MIF, digital effects system on GPI. ⁶BBE-600, scaled down version with fewer VTRs and reduced effects type control. ⁷Upgradable to CMX-3600 system.

Manufacturer	CMX	Convergence			Editing Machines Corp.	FOR-A	Grass Valley Group	
Model	OMNI-1000	ECS-185	ECS-195	ECS-985	EMC	EC-740	IPS-100 system	VPE-141
Suggested for	On-, off-line	...	Off- (& on-line)	Off-line	Off-line	On-line	On, Off	On, Off
Editing type	...	Linear	Linear	Linear	Non-linear	Linear	Linear	Linear
Transports controlled R/P	Multiple R/P	2-/3-VTR	1 R/2 P	4 or 6 total	Opt configs	1R, 2P	1-R, 6-P	1-R, 6-P
Videodisc interface	...	No	No	No	Option	...	No	No
Control μP type	68020	...	Multiple	...	PC	...	...	...
# events (internal storage)	999,999	500-line EDL	450	1000-line EDL	...	1-event	2,000	2,000
External event storage	3.5 FD, 40M HD	Floppy disk	FD/paper tip	Floppy disk	FD	None	FD	FD, papertape
Edit decision list	Yes	Yes	Yes	Non volatile	Yes	No	Yes	Yes
Edit data display	CRT, X-window	External CRT	CRT	External CRT	RGB CRT	LED displays	CRT	CRT
Printer interface	RS-232	RS-232	RS-232	RS-232	RS-232	None	RS-232	RS-232
Command entry via	Knob, keyboard	Keyboard	Keyboard	Keyboard	Keyboard	Keyboard	Keyboard	KB
Deck motion control via	Knob, keyboard	Joystick	Joystick	Joystick	Keyboard	Knob	Keyboard	KB
Assemble edit	Yes	Yes	Yes	Yes	Option	Yes	Yes	Yes
Insert edit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Split A V edits	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
A B sync roll	Yes	Yes	Yes	Yes	...	Yes	Yes	Yes
Animation mode	Yes	Yes	No	...	No	...	Option	Option
Integral TC reader	² interfaces	Yes	Yes	Integral	No	...	No	No
Integral TC generator	² interfaces	No	Yes	Integral	No	...	No	No
Time reference support for	LTC/VITC/Film	LTC CtlTrk	LTC CtlTrk	LTC CtlTrk	LTC	...	L/V/Ct	L/V/Ct
Color framing	Yes	Yes	Yes	No	Yes	...	Yes	Yes
Editing accuracy	0	±0 TC, ±1 CtlTrk	±0 TC, ±1 CtlTrk	±0 TC ±1 CtlTrk	...	±2	±0 TC, 1 CT	±0 TC, ±1 CT
Interfaces available	9 ports, 16 GPI	2 GPI, 2 serial, PSI interface	Auf mixer, Video switcher, Multi-track ATR, titler	PSI, GPI, parallel equipment	...	Various	Audio mixer, video switcher, still-store, multitrack ATRs, titlers, digital effects	
Control protocol	CMX, ESBUS	RS-232/-422, parallel VTRs	RS-232/-422/GPI, parallel VTRs	RS-422	...	GPI, RS-422	RS-422	RS-422
Reader Service No	918	919	920	921	922	923	924	925

Manufacturer	Grass Valley Group	JVC Professional Products			Paltex			QUANTEL
Model	VPE-151	RM G850U	RM G86U	RM-G810U (-410U)	Abner	ELAN	Elite	Harry Suite
Suggested for	On-line	Off-line	Off-line	Off-line	On-, Off-line	On-, Off-line	On-, Off-line	Either
Editing type	Linear	Linear	Linear	Linear	Linear	Linear	Linear	Random access
Transports controlled R/P	1-R, 6-P	1-R, 2-P	1-R, 1-P	1R, 1P	1 R, 2 P	4/4, any 4 of 8	3/3 or any 3 of 6	[RGB/YUV
Videodisc interface	...	No	No	No	No	Option	Option	[composite
Control μP type	...	...	...	...	Centralized	Multiple	Multiple	[CCIR 601
# events (internal storage)	16,000	1 event	1 event	1	20	326	250	[I/O support.
External event storage	FD, papertape	None	None	...	FD PT	FD PT	FD PT	...
Edit decision list	Yes	No	No	No	Yes	Yes	Yes	...
Edit data display	CRT	LED display	LED display	LED display	CRT	CRT	CRT	CRT menus
Printer interface	RS-232	...	...	...	RS-232	RS-232	RS-232	...
Command entry via	Keyboard	Keyboard	Keyboard	Keyboard	Keyboard	Keyboard	Keyboard	Keyboard
Deck motion control via	Keyboard	Knobs	Knobs	Knobs	Keyboard, knob	Keyboard, knob	Keyboard, knob	Yes
Assemble edit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	[For editing of

Manufacturer	Grass Valley Group	JVC Professional Products			Paltex			QUANTEL
Model	VPE-151	RM G850U	RM G86U	RM-G810U (-41DU)	Abner	ELAN	Elite	Harry Suite
Insert edit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	[short segments
Split A V edits	Yes	No	No	Yes	Yes	Yes	Yes	[in memory;
A B sync roll	Yes	No	No	No	Yes	Yes	Yes	[CRT display
Animation mode	Yes	No	No	No	Yes	Yes	Yes	[of video and
Integral TC reader	No	No	No	No	Yes	Yes	Yes	[commands;
Integral TC generator	No	No	No	No	No	No	No	[may link to
Time reference support for	L/V/CT	LTC CtiTrk	CtiTrk	Cti Trk	LTC CtiTrk ⁸	LTC CtiTrk VITC	LTC CtiTrk VITC	[Paintbox
Color framing	Yes	N	N	No	No	No	No	[Mirage, Encore
Editing accuracy	±0 TC, ±1 CT	±0 TC ±2 CtiTrk	±2 CtiTrk	±2 (±6) frms CtiTrk	±0 TC, ±1 CtiTrk ⁸	±0 TC, ±1 CtiTrk	±0 TC, ±1 CtiTrk	[effects.
Interfaces available	AF mixer, video switcher, still-store, multitrack ATR, titler, effects	...	...	None	GPI	Audio mixer, video switcher, teletext, still-store, multitrack ATR, titler, digital effects		
Control protocol	RS-422	RS-422	...	...	RS-422/GPI Parallel	RS-422/GPI, Parallel RS-232		...
Reader Service No	926	927	928	930	931	932	933	934

⁸ Abner-VITC supports VITC time code.

Manufacturer	Sony			United Media			Videomedia	
Model	BVE-600 (BVE-910)	BVE-9000	RM-450	MultiTasking	UMI 400 series	UMI 500 (600)	Mickey	VLC-32 (Micron)
Suggested for	On (& Off) line	On & Off line	On-line	On, Off-line	On	Off-line	On, Off-line	On/Off line
Editing type	Non-linear	Non-linear	Non-linear	Linear	Linear	Linear	Linear	Linear
Transports controlled R P	1-R/2-P, 1-R/3-P	2-R/12-P	1-R, 1-P	3; 2-6; 2-9	2, 3, 4 total	4 (6) total	R/P	R/P
Videodisc interface	No	Option	Yes	Yes	Yes	...	Option	Option
Control μ P type	Centralized	Central, Distribute	Centralized	Multi distributed	Multi distrib	MC68000	Distributed	Distributed
# events (internal storage)	... (998)	1000	...	2000, 3000	250	1000 (2000)	400	500 (250)
External event storage	Floppy disk	Floppy disk	None	Floppy disk	Floppy disk	3.5 Floppy disk	FD	FD
Edit decision list	No (Yes)	Yes	No	Yes	Yes	Yes	Yes	Yes
Edit data display	LED (CRT)	CRT	LED	CRT	CRT	CRT	CRT	CRT
Printer interface	RS-232	RS-232	...	RS-232	RS-232	RS-232	RS-232	RS-232
Command entry via	Keyboard	Keyboard	Keyboard	Keyboard	Keyboard joystick	Keyboard	Keyboard, Mouse	Keyboard
Deck motion control via	Keyboard	Keyboard	Keyboard	Keyboard	Keyboard	Joystick	Mouse	Keyboard
Assemble edit	No (Yes)	Yes	No	Yes	Yes	Yes	Yes	Yes
Insert edit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Split A V edits	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
A B sync roll	No (Yes)	Yes	No	Yes	Yes	Yes	Yes	Yes
Animation mode	No (Yes)	Yes	No	Yes	Yes	Yes	No	Yes
Integral TC reader	No (Opt)	Option	No	Yes	Yes	...	Option	Option
Integral TC generator	No (Opt)	Option	No	Yes	Yes	Yes	No	No
Time reference support for	LTC VITC CtiTrk	LTC VITC CtiTrk	LTC VITC CtiTrk	LTC VITC CtiTrk Tmr	LTC VITC CtiTrk Tmr	LTC VITC CtiTrk	LTC/VITC/CtiTrk	LTC/VITC/CtiTrk
Color framing	Yes (Opt)	Yes (Opt)	No	Yes	Yes	Yes	Yes	Yes
Editing accuracy	0 TC, ±2 CtiTrk	0 TC, ±2 CtiTrk	0 TC, ±2 CtiTrk	±0 TC ±2 CtiTrk	±0 TC, ±2 CtiTrk	±0 TC	...	...
Interfaces available	AF mixer, Video switcher, multitrack ATR, digital effects		None	AF mixer, video switcher, multitrack ATR	Audio mixer, video switcher	Various	V-LAN units	V-LAN control-lable networks
Control protocol	RS-422, GPI	RS-422, GPI	RS-422, GPI, parallel for VO, SLO series VTRs.	RS-232/-422/GPI	RS-232/-422/GPI	RS-232/-422, 6 GPI	RS-232/-422/GPI	RS-232/-422/GPI
Reader Service No	935	936	937	938	939	940	941	942

Video Switchers, Production/Master Control

Video control switching equipment for production, master control; effects are described by **Rot** rotary, **S-E** soft-edged, **H-E** hard-edged, **Adj edge** adjustable edge effects

Manufacturer	A. C. E./Midwest Communications	Abekas Video Systems		Ampex Corporation		BTS	Central Dynamics
Model	ARENA	A82 Digital	A84 Digital Post	AVC Vista series	Century series	MCS-2000	Strata-10
Control application	Production	Post production	Post production	Production	Production	Master control	Production
Standard	NTSC	Composite 0-2	CCIR 601 D-1	NTSC/PAL	NTSC/PAL	NTSC, PAL	NTSC/PAL ⁶
# inputs	13	32 video or key	12 ²	10 or 18	16 or 32	to 250	24/16/30
Integral matte source	6 generators	Yes	Yes	5 generators	per key	4 generators	16 generators
Key sources	4 ext/13 int	Any input ¹	12 ext 12 int	2 ext 10/18 int	2 ext 10/18 int	Ext/Int	Int/Ext
Chroma keyers	1 RGB	8 RGB	8 RGB	3 RGB/2 comp ³	3 per ME ⁵	Luminance only	RGB/composite
Downstream keyer	Yes	No	No	w/U&IKEY	w/JNIKEY	Yes	w/1 of 2 titler
Switching buses	4 prime/1 aux	...	...	4 prime, 5 aux	4 prime, 5 aux	3	7 prime/3 aux
# switcher M E amps	3	4 Multilayer	8 layer capability	1.5	2 or 3 multilevel	...	2
# pattern generators	2 gen w/89	2	3	1 w/32 patterns	164 patterns/ME	None	4/100 patterns
Wipe effects	Rot, S-E, Adj-Edge	Rot/S-E/Adj edge	Rot/S-E/Adj edge	Hard, soft edge	H-E, S-E, Rot.	No	Rot S-E Adj Edge
Spotlight effects	Yes	...	...	Yes	Yes	No	Yes
Border effects	Yes	Yes	Yes	Opt	Opt	Yes	Yes
Shadow effects	Yes	Yes	Yes	Opt	Opt	Yes	Yes
Programmable routines	Yes	Yes	Yes	24 routines	SuperSTAR Memory	Yes	>100 routines
Memory backup battery	Yes	Yes	Yes	No	No	Yes	Yes
Diagnostic software	No	Yes	Yes	Yes	Yes	Yes	Yes

Video Switchers, Production/ Master Control

Manufacturer	A.C.E./Midwest Communications	Abekas Video Systems		Ampex Corporation		BTS	Central Dynamics
Model	ARENA	A82 Digital	A84 Digital Post	AVC Vista series	Century series	MCS-2000	Strata-10
Digital effects port	Yes	Yes	Yes	Digi-Loop ¹	Yes	No	Yes
Automation port	RS-422	From edit control	From edit control	GPSI, PIPS	GPSI, PIPS	Yes	ESbus
Input timing adjustment	...	...	...	...	...	...	...
Path length	...	440ns	...	...	1.5'	1'	±1'
Crosstalk at subcarrier	-50dB	...	Not applicable	-55dB	<-55dB	<-60dB	<-56dB
Link to rack electronics	1-line digital	1 digital line	1 digital line	Multicore cable	Multicore cable	...	1-line digital
Audio preview function	No	No	No	Option	Option	Yes	No
Audio metering	No	No	No	Option	Option	Yes	No
Audio level control	No	No	No	Option	Option	Yes	No
Audio mixer interface	No	No	No	Option	Option	...	Yes
Edit control interface	Yes	Yes	Yes	Option	Option	No	Yes
Reader Service No	951	952	953	954	955	956	957

¹ Adaptive Sub-Pixel Intelligent Keying; framestores associated with each keyer. ² Frame store associated with each input and all 12 key inputs. Adaptive Sub-Pixel Intelligent Keying. ³ SpectraKey. ⁴ Fully integrated ADO-100 option. ⁵ All keyers capable of linear, RGB luminance, external and encoded modes; SpectraKey processing. ⁶ Models available with 20, 12 and 26 inputs; inputs may include analog composite and components.

Manufacturer	ECHOLab Inc			For-A		Grass Valley Group	
Model	DV-5	DV-7	SE-6	CVM-600 Component	PVM-600 ⁸	110/CV ⁹	200 Composite
Control application	Production	Production	Production	Production	Production	Production/Post	Production, post
Standard	NTSC/PAL	NTSC/PAL	NTSC/PAL	NTSC RGB R-Y/B-Y	NTSC/PAL	RGB or YUV	NTSC/PAL
# inputs	10	6	10	12 component ⁷	12	10	20
Integral matte source	3 generators	3 generators	3 generators	2 generators	2 generators	3 generators	9 generators
Key sources	4 ext/10 int	3 ext/1 int	5 ext 20 int	4 ext/2 int	4 ext/2 int	2 ext/8 int	6 ext/20 int
Chroma keyers	RGB/Composite opts	RGB opt	RGB/Comp opts	CCK-500C Exkey	CCK-500 Exkey	1 RGB optional	to 8 optional
Downstream keyer	Y	Yes	Yes	Yes	Yes w/NAM	DSK-101	Standard
Switching buses	3 primary	3 primary	4 primary 1 aux	2 prime	4	3 prime	8 prime/4 aux
# switcher M/E amps	1 1/2	1	2 1/2	1	1	1	1 or 2
# pattern generators	1 1/2/39 patterns	1; 10 patterns	2/40 patterns	1 w/24 patterns	1 w/24 patterns	1 gen/10 patterns	2 gen 56 patterns\10
Wipe effects	Rotary/adj edge	Soft-edge	Adjustable edge	Soft-edge Adj edge	Adj edge	Soft edge/adj edge	Rot/S-E/Adj Edge
Spotlight effects	Yes	No	Yes	No	No	Yes	Standard
Border effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Shadow effects	Opt	No	Option	Yes	Yes	Yes	Yes
Programmable routines	1 std/5 opt	No	10/297 keyframes	FXM-500 Extrol	FXM-500 Extrol	E-MEM memory	E-MEM system
Memory backup battery	Yes	No	Opt	No	No	Yes	Yes
Diagnostic software	Yes	Yes	No	No	No	Yes	Yes
Digital effects port	Yes	No	No	No	...	to DPM-100	...
Automation port	No	No	No	RS-422	...	Serial editor	Serial editor opt
Input timing adjustment	±0.001ms	±0.001ms	±0.001ms	...	...	Unspecified	...
Path length	...	1'	1...'	... 1'	...	1...'	Unspecified
Crosstalk at subcarrier	-52dB	-51dB	-51dB	...	-60dB	≤-54dB DC-5MHz	≤-54dB
Link to rack electronics	2 coaxial	Single digital line	Multicore cable	...	Multicore	1-line digital	1-cable 2-port serial
Audio preview function	No	No	No	Option	Option	Option	No
Audio metering	No	No	No	Option	Option	Option	No
Audio level control	No	No	No	Option	Option	Option	No
Audio mixer interface	No	No	No	Option	Option	to AMX-170S mixer	No
Edit control interface	GPI Opt	Opt	No	Option	to AFV-500 mixer	Option	Option
Reader Service No	958	959	960	961	962	963	964

⁷ CVM-400 component mixer is 8-source, 6-input system. ⁸ PVM-650 8-input with 5-layer effects, keying capability; 4-bus architecture. ⁹ 110 composite; 110CV component. ¹⁰ Programmable (20+4)x16)+32.

Manufacturer	Grass Valley Group			JVC Professional Products			
Model	200-2CV	KADENZA	MASTER 21	Model 300 2A/2B	KM-1600U	KM-2500U	KM-3000U
Control application	Production, post	Production	Master control	Production	Production	Production	Production
Standard	Y/R-Y/B-Y, YUV	NTSC/PAL ¹¹	NTSC/PAL	NTSC	PAL	S-VHS Y-C	NTSC
# inputs	20	32 maximum	16 V/stereo audio	24/16 ¹²	4	8	8
Integral matte source	9 generators	...	1 Int generator	5 generators	1 generator	2 gen w/DSK	2 generators
Key sources	16 ext	20 int	32 maximum	4 ext std/5 opt	6/31 Ext 18/26 Int	Ext/ Int	Ext/Int
Chroma keyers	...	Options	1 RGB opt	6 RGB, 14/22 Comps	RGB	RGB	RGB soft key
Downstream keyer	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Switching buses	8 prime/4 aux	10-channel	2 prime	9 prime/5 aux	2, flip/flop	3 prime 1 aux	3 prime
# switcher M/E amps	2 M/Es	...	1 opt	2	...	...	...
# pattern generators	2 gen/56 patterns	2 w/44 patterns	1 w/10 patterns	2 w/44 patterns	6 patterns	13 patterns	23 patterns
Wipe effects	Rot S-E Adj Edge	Rot/S-E/Adj-Edge	SE/Adj E	Rot/S-E/Adj-Edge	Soft wipes	S-E	Adj.
Spotlight effects	Yes	Yes	Option	Yes	No	No	No
Border effects	Yes	Yes	Option	Yes	No	Yes	Yes
Shadow effects	Yes	Yes	Option	Yes	No	No	No
Programmable routines	E-MEM 30 event	Yes	Event Stacker	20 per M/E	No	No	16-event
Memory backup battery	Yes	Yes	Yes	Yes	...	No	Yes
Diagnostic software	Yes	Yes	Yes	Yes	No	No	No
Digital effects port	No	Kaleidoscope	Opt w/GVG DPM-100	Yes	No	...	No
Automation port	Serial editor opt	Editor option	RS-422	Editor option	...	GPI	GPI
Input timing adjustment	...	...	...	...	...	...	...
Path length	...	Not applicable	...	100ns length	≤1.5'	...	...

Manufacturer	Grass Valley Group				JVC Professional Products		
	200-2CV	KADENZA	MASTER 21	Model 300 2A/2B	KM-1600U	KM-2500U	KM-3000U
Model	200-2CV	KADENZA	MASTER 21	Model 300 2A/2B	KM-1600U	KM-2500U	KM-3000U
Crosstalk at subcarrier	<-56dB DC-4MHz	...	56dB	-54dB	...	...	...
Link to rack electronics	1-line digital	...	Multicore cable	Multicore cables	...	1-line digital	1-line digital
Audio preview function	No	No	Yes	No	No	No	No
Audio metering	No	No	Yes	No	No	No	No
Audio level control	No	No	Yes	No	No	No	No
Audio mixer interface	No	Option	No	Option	No	No	Yes
Edit control interface	Option	Option	No	Option	No	GPI opt.	Serial, GPI
Reader Service No	965	966	967	968	969	970	971

¹¹Supports RGB, YUV SMPTE, YUV Betacam, CCIR 601/656 digital. ¹²Model 300 3A 24-input system, 300-3B 16-input; Model 300 units includes 3 M/Es.

Manufacturer	Polar Video	Prime Image	Ross Video Ltd		Sony		
	PVM-1 (PVM-2)	# 600 S-Switch	Model 210A/216A	Model 416 (424)	BVS 3100	BVS 3200 (3200C)	BVS 8000 (8000C)
Model	PVM-1 (PVM-2)	# 600 S-Switch	Model 210A/216A	Model 416 (424)	BVS 3100	BVS 3200 (3200C)	BVS 8000 (8000C)
Control application	Production	Production	Production	Production	Production	Production	Production
Standard	PAL/NTSC	NTSC	NTSC	PAL	NTSC/PAL	NTSC	NTSC/PAL (RGB/YCaCa)
# inputs	4 (U-matic/S-VHS)	6	8/14	16 (24)	8	8 composite ¹⁶	24
Integral matte source	Yes	3 generators	3 generators	6	3 generators	4 generators	4 generators
Key sources	Int/Ext	1 Ext 8 Int	3 Ext, 8/14-Int	6-E	14-I	3 ext/8 int ¹³	3 ext/8 int ¹³
Chroma keys	Yes	Composite, Y/C	RGB & composite	4-RGB/1-composite	1 RGB	1 RGB	1 RGB
Downstream keyer	...	Option	Yes	Option	Yes	Yes	Yes
Switching buses	3	2 prime/1 aux	3 prime	6 prime, aux avail	3 prime 0 aux	4 prime 0 aux	4 prime 4 aux
# switcher M E amps	1	1 M/E	1	2 multilevel keys	1	1	2 w/2 keys each
# pattern generators	1 w/8	16 w/16 patterns	1 w/53 patterns	2 w/64 patterns	1 w/18 patterns	1 w/18 patterns	1 w/18 patterns
Wipe effects	Yes	Soft-edge, Adj edge	S-E, Adj E	Rot/S-E/Adj E	Soft-edge, adj edge	Soft-edge/adj edge	Various
Spotlight effects	No	No	No	No	No	No	...
Border effects	No	Yes	Yes	Option	Yes	Yes	Yes
Shadow effects	No	No	No	No	Yes	Yes	Yes
Programmable routines	No	No	No	(40 event 424)	E-File registers ¹⁴	E-File registers ¹⁴	Yes
Memory backup battery	No	No	Yes	Yes	No	No	No
Diagnostic software	No	No	Yes	Yes	Yes	Yes	...
Digital effects port	No	No	Yes	Yes	Yes ¹⁵	Yes ¹⁵	Link to DME-5000
Automation port	GPI	No	RS-422 option	RS-422 opt	No	No	Yes
Input timing adjustment	...	±3ms	...	...	...	...	...
Crosstalk at subcarrier	...	-50dB	-53dB	-53dB	-54dB	-54dB	...
Link to rack electronics	...	...	Dig 1-line	Dig 1-line	Digital/RS-422	Digital/RS-422	Digital/RS-422
Audio preview function	No	Yes	No	No	No	No	No
Audio metering	No	No	No	No	No	No	No
Audio level control	No	No	No	No	No	No	No
Audio mixer interface	No	Yes	No	No	No	No	No
Edit control interface	PSI-I serial	Yes	Option	Option	Yes	Yes	Yes
Reader Service No	972	973	974	975	976	977	978

¹³Any input on key bus may be assigned as an internal key source. ¹⁴10 E-File registers std, may be sequenced from editor. ¹⁵Dedicated RS-422 control of DME 450. ¹⁶3200C is RGB/Betacam component.

Manufacturer	Thomson Video Equipment		Utah Scientific		VGV		Videotek
	IMPULS	TTV5645	MC-500B series	PVS2	D2500	D2500 (D3200)	Prodigy
Model	IMPULS	TTV5645	MC-500B series	PVS2	D2500	D2500 (D3200)	Prodigy
Control application	Production	Production	Master	Production	Production	Production	Production
Standard	4:2:2 digital	Analog component ¹⁷	NTSC/PAL	NTSC	D-2 Digital	D-2 Digital	NTSC
# inputs	16	16	30	24	20	10 to 20 ²⁰	8
Integral matte source	Yes	9 backgrounds	1 generator	1 generator	8 ¹⁸	8+2 ²¹	1 generator
Key sources	Int/Ext	Int/Ext	3 ext, 1 int	6x12 input	10 ext 20 int	10 ext 20 int	3 ext 8 int
Chroma keys	Yes	3	None	Analog	RGB, R-Y/B-Y	RGB, R-Y/B-Y	RGB Opt
Downstream keyer	...	...	None	Analog	...	...	Yes
Switching buses	5 prime	8 + 6 aux	2 prime/1 aux	3 prime/2 aux	5 prime/4 aux	5 prime/4 aux	3 prime
# switcher M E amps	Multiple	2	1	Dual	3	3, multilevel keys	1 ME
# pattern generators	Multiple digital	4 generators	1 w/4 patterns	1 w/42 patterns	6 w/100 patterns	6 w/100 patterns	24 pat/program-mable
Wipe effects	Yes	Yes	Soft-edge	Full feature	Rot/S-E/Adj E	Rot/S-E/Adj E	Soft-edge/adj edge
Spotlight effects	Yes	Yes	No	Yes	Yes	Yes	Yes
Border effects	Yes	Yes	Yes	Yes	Option	Option	Yes
Shadow effects	Yes	Yes	Yes	Yes	Option ¹⁹	Option ²²	No
Programmable routines	Yes	Yes	Opt 99 routines	250 event	More than 100	EZMEMthan 100	100 routines
Memory backup battery	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Diagnostic software	Yes	Yes	Yes	...	Yes	Yes	Yes
Digital effects port	Yes	Yes	No	...	Yes	Yes	Option
Automation port	Yes	Yes	Yes	Yes	RS-422	RS-422	Option
Input timing adjustment	...	...	...	...	...	...	...
Crosstalk at subcarrier	...	...	-60dB	-55dB	...	...	<-60dB
Link to rack electronics	...	...	Multicore	Multicore	1-line digital	1-line digital	...
Audio preview function	No	No	Yes	Yes	No	No	Yes
Audio metering	No	No	Yes	Yes	No	No	No
Audio level control	No	No	Yes	Yes	No	No	No
Audio mixer interface	No	No	No	No	No	No	No
Edit control interface	Yes	Yes	No	No	Option	Option	Yes
Reader Service No	979	980	981	982	983	984	985

¹⁷RGB or YCaCa component inputs, outputs; processing in 4:2:2 domain. ¹⁸Including complex functions. ¹⁹Flying total screen. ²⁰D3200 includes 20-input phantom analog package; digital inputs are 8-10 bit parallel or serial. ²¹Eight complex function generators with two paint-type generators. ²²Includes flying the entire screen.

Routing Switchers, Video and Audio

This category contains all matrix type distribution routing switchers of audio only, video only, combined V/A forms and various digital types. These products exclude the utility type unit of N-in¹-out, which could be developed into a matrix by stacking and looping inputs from one group to the next.

Manufacturer	AKAI/IMC		AVS France	Auditronics	AutoPatch /XN Technologies		Barco	BTS
Model	DP2000	DP3200	Onyx	1900 IFB	4XDM	4Y-140DM (8Y-)	BVRS/BARS	BSB-3000
Audio/Video/Data	V/A	Audio only	V/A	Audio	V/A/Data	V/A/Data	V/A	Audio
Basic crosspoint matrix	16x16	32x32	16x8	16x8	4x4; 12x12	4x4 (8x8)	16x16	4x4
Typical system size	...	...	128x128	48x24	16x48	32x128 (64x256)	32x32	...
Audio response \pm dB Hz-kHz	\pm 0.5 5-40k	...	-0.25 20-20k	\pm 0.5 20-20k	5-50k	\pm 0.1 20-30k	\pm 0.1 20-20k	\pm 0.1 20-20k
Harmonic distortion	<0.1%	<0.01%	<0.05%	<0.01%	<0.03%	<0.002%	<0.02%	<0.002%
S/N ratio	...	...	82dB	91dBu	>100dB	120dB	...	95dB
Audio crosstalk (worst)	<0.85dB	<-85dB	<0.75dB	-88dBu 1kHz	<-88dB	<-95dB	-100dB	<-95dB 20kHz
Video response	...	[Designed	-3 to 60MHz	...	to 12MHz	to 50MHz	to 40MHz	...
Diff phase/gain	1/1%	[for digital	<0.5%/<0.5%	...	<0.1%/0.1%	<0.05%/0.1%	<0.1%/<0.1%	...
Chroma Luma delay	...	[audio use.	2ns	...	...	...	1* 4.43MHz	...
Video S/N ratio	...	...	...	...	1.5mV floor	80dB	...	...
Video crosstalk (worst)	-40dB 3.48	...	<-56dB 4.43	...	-65dBdB	<-78dB 10MHz	50dB 5MHz	...
Multilevel audio control	Yes	...	Possible	...	Yes	Yes	Possible	...
Useable for component video	...	...	Possible	...	No	Yes	Possible	...
Reader Service No	744	745	746	747	748	749	750	751

Manufacturer	BTS				CEL Electronics		Central Dynamics	Datatek
Model	BSX-350A-V	BVS-350C	DRS 7	TAS/TVS-2000	TAS/TVS-3000	P169V/P169A	SDS-2+	D-2000
Audio/Video/Data	V/A	Component video	Digital video	V/A	V/A	V/A	V/A	V/A
Basic crosspoint matrix	10x10	3x10x1	8x4	10x10	10x10	8x4	16x8	50x25
Typical system size	10x10-V 20x-A	3x20x1	8x8/8x12/8x16	250x150	200x200	8x4	32x32	50x50; 250x500
Audio response \pm dB Hz-kHz	\pm 0.1 20-20k	...	[This system	\pm 0.1 20-20k	\pm 0.1 20-20k	\pm 0.5 100-15k	\pm 0.2 50-15k	\pm 0.1 20-20k
Harmonic distortion	<0.007%	...	[for CCIR	<0.007%	<0.007%	...	<0.1%	0.05%
S/N ratio	85dB	...	[601 4:2:2	85dB	85dB	<-90dBm	>100dB	105dB
Audio crosstalk (worst)	<-90dB	...	[digital video	<-90dB	<-90dB	-70dB	<-80dB 15k	-85dB 20kHz
Video response	to 20MHz	\pm 0.7 30MHz	[signals in	to 20MHz	to 20MHz	0.1 to 6MHz	\pm 0.1 to 8MHz	0.25 to 10MHz
Diff phase/gain	<0.1%	<0.1%/<0.1%	[8/9/10-bit	<0.1%/<0.1%	<0.15%/<0.15%	\pm 0.2/0.2%	<0.1%/<0.1%	0.15/0.15%
Chroma Luma delay	< \pm 1*	\pm 1.5*	[sampling;	< \pm 1*	< \pm 1*	...	\pm 1* 4.43MHz	5ns
Video S/N ratio	>75dB	>75dB	[system auto-	>75dB	>70dB	>80dB	>66dB	...
Video crosstalk (worst)	-60dB	-40dB 30MHz	[selection of	-60dB 3.58	-30dB 30MHz	<-55dBm	<-60dB	...
Multilevel audio control	Possible	Yes	[525 and 625.	Yes	Yes	...	Yes	Yes
Useable for component video	Possible	Yes	Digital	Possible	Possible	...	Yes	...
Reader Service No	...	753	754	755	756	757	758	759

Manufacturer	Datatek	Di-Tech						
Model	D-2400	5216	5217 Wideband	5616/5618	5815/5820	5856 HDTV/RGB	5862/5861	5865A/5864V
Audio/Video/Data	V/A	Video D1/D2	Video	V/A	V/A AFV	Video	V/A	V/2A
Basic crosspoint matrix	160x20	16x16	16x16	16x8/16x16	15x7/20x6	20x20 RGB	64x32	32x64
Typical system size	40x20x4	64x16	...	16x32 audio	x7n/x6n	60x20 HDTV	256x256	...
Audio response \pm dB Hz-kHz	\pm 0.05 20-20k	[Digital; 75	...	\pm 0.5 20-100k	\pm 0.25 20-20k	...	\pm 0.5 20-100k	\pm 0.1 20-20k
Harmonic distortion	<0.005%	[input/output	...	<0.25%	<0.5% +18dBm	...	<0.1%	<0.05%
S/N ratio	116dB	[at 0.8Vp-p;	...	>70dB	>70dB	...	>70dB	>70dB
Audio crosstalk (worst)	-82dB 20kHz	[data rates	...	<-80dB20-1k	<-70dB	...	<-80dB	<-75dB
Video response	-3/0.5 60MHz	[to 270Mbit/s	\pm 0.25 50MHz	-1/0 20MHz	-3/0 20MHz	-3 to 45MHz	-1.5/0 20MHz	-1/0 20MHz
Diff phase/gain	0.05/0.05%	[in D1 & D2	<0.2%/<0.2%	<0.25/0.25%	<0.25/0.25%	<0.2%/<0.2%	<0.25%/<0.25%	<0.25%/<0.25%
Chroma Luma delay	\pm 0.75*	[formats.	...	<1*dB	<1*	\pm 2*	<1*	<1*
Video S/N ratio	75dB	...	>60dB	>70dB	<-65dBV	>60dB	>70dB	>70dB
Video crosstalk (worst)	<-63dB 5MHz	...	<-40dB	<-60dB 4.5MHz	<-60dB 4.5MHz	<-35dB 40MHz	<-60dB 4.5MHz	<-60dB 4.5MHz
Multilevel audio control	Yes	...	No	Yes	Yes	No	...	...
Useable for component video	Yes	...	...	Possible	Yes	...	...	No
Reader Service No	760	761	762	763	764	765	766	767

Manufacturer	DYNAIR Corporation				Grass Valley Group			HEDCO
Model	DYNA MITE	DYNASTY WB	DYNASTY	DYNASTY 100	20-TEN/TEN-20	Horizon DHX-532	Horizon systems ¹	HD-16X A/V
Audio/Video/Data	V/A	V/A (70MHz)	V/A 30(40)MHz	Video/digital	V/A	Video/digital	V/A	V/A
Basic crosspoint matrix	10x10	10x10	10x10	10x10	20x10/10x20	8x8	8x16	16x4/16x8
Typical system size	30x10 A/V	100x30	100x100 (x50) V	50x100	20x20-10x40	32x32	128x128	16x16-64x64
Audio response \pm dB Hz-kHz	\pm 0.2 30-20k	\pm 0.1 20-20k	\pm 0.1 20-20k	...	\pm 0.1 20-20k	[Conforms to	\pm 0.1 20-20k	-0.05 20-100k
Harmonic distortion	0.1%	0.1%	0.1%	...	0.05%	[SMPTE RP125	<0.05%	<0.02%
S/N ratio	75dB	75dB	75dB	...	120dB	[CCIR 601/F	>100dB	-80dB
Audio crosstalk (worst)	80dB	<-80dB	56dB	...	80dB	[EBU 3246-E	<-80dB	>86dB
Video response	-3dB 40MHz	-3/1.5 70MHz	\pm 0.3 20MHz	\pm 2 to 100MHz	\pm 0.5 10MHz	[standards	\pm 0.015 8MHz	-3dB >32MHz
Diff phase/gain	0.05/0.05%	0.2/0.15%	0.05/0.05%	0.25/0.25%	0.2/0.1%	...	<0.1/0.1%	<0.3/0.2%
Chroma Luma delay	1* 5MHz	1*	1* 5MHz	...	\pm 1*	[DHX-88 8x8;	\pm 1*	< \pm 2ns
Video S/N ratio	30dB RMS	55dB 70MHz	80dB < 1Vp-p	55dB 100MHz	>75dB	[DHX-1616 16x16	>75dB	>70dB 10MHz
Video crosstalk (worst)	<-50dB 5MHz	<-25dB 70MHz	<-60dB 5MHz	-25dB 100MHz	-50dB 10MHz	[DHX-3216 32x16	-60dB 5MHz	<-60dB 4.43MHz
Multilevel audio control	Yes	Yes	Yes	...	Yes	...	Yes	Yes
Useable for component video	Yes	Yes	Yes	Yes	Yes	Digital	Yes	Yes
Reader Service No	768	769	770	771	772	773	774	775

¹Series includes HX-16 16x16; HX-32 8x16/16x16/24x16/32x16; HX-48 to 48x48; HX-64 to 64x64.

Manufacturer	International Tapetronics	JNS Electronic Industries	McCurdy Radio	PESA			Pro-Bel	
	Audio Switcher	9000 series	Century (Mini)	15x series	Model 40x	Series H ²	ADAM	HD series ³
Model	Audio only	Audio	Audio	A/V	A/V	A/V	Analog/digital	V/A
Audio/Video/Data	16x16	15x8 stereo	...	15x12	40x20	123x32	128x128	32x32
Basic crosspoint matrix	64x48 mono	(15x16 mono)	200x24 (24x24)	15x12	40x20	128x128	500 in/a out	256x256
Typical system size	±0.1 20-20k	±0.2dB 10-20k	-0.2 20-20k	±0.5dB 20-20k	±0.25 20-20k	±0.15dB to 20k	±0.35 20-20k	±0.2 20-20k
Audio response ±dB Hz-kHz	0.01%	30k	<0.1%	<0.5%	<0.3%	<0.1%	<0.1%	<0.1%
Harmonic distortion	S/N ratio	+24dBm	>95dB	85dB	80dB	92dB	>86dB	>88dB
S/N ratio	Audio crosstalk (worst)	<-95dB	>80dB	<-80dB	<-80dB	<-88dB	<-96dB	>100dB 16kHz
Audio crosstalk (worst)	Video response	...	Bal 40	...	±0.5dB 12MHz	±0.5 12MHz	-1.5 to 20MHz	148dB 18-bit
Video response	Diff phase/gain	...	+24dBm max	...	<0.5/0.5%	<0.4/0.4%	0 1/0.1%	[3.072MHz
Diff phase/gain	Chroma Luma delay	...	<±0.2dB 10-20k	...	...	...	±10ns	words/s data
Chroma Luma delay	Video S/N ratio	...	<0.01%	...	60dB	60dB	73dB	[rate 29-bit
Video S/N ratio	Video crosstalk (worst)	...	>90dB	...	-52dB 3.58MHz	-60dB 3.58MHz	-62dB 4.43MHz	parallel.
Video crosstalk (worst)	Multilevel audio control	Yes	<-90dB	Yes	Yes	Yes	Yes	Yes
Multilevel audio control	Useable for component video	No	...	No	Yes	Yes	Yes	Yes
Useable for component video	Reader Service No	776	777	778	779	780	781	782
Reader Service No								

²Series H also available in 256x32 and 32x32. ³Prodigy 24x12 model similar to HD series with smaller matrices.

Manufacturer	Sierra Auto-mated Systems	Sierra Video Systems		Thomson Video Equipement	360 Systems	Utah Scientific		
	SAS32000	MAXIN series	Series 16 ⁴	TTV5790	AM-16	AVS-1B (-1BW) ⁵	AVS-2 ⁶	DVS-1
Model	Audio/Video/Data	Video only	V/A	Video/digital	Audio	V/A	V/A	Video/digital
Audio/Video/Data	Basic crosspoint matrix	32x16 stereo	16x4	16x4	30x15	8x8/16x16	10x10	10x10
Basic crosspoint matrix	Typical system size	64x32	32x4 to 80x4	16x8/16x16	30x30	16x16x4	320x (150x10)	1280x1280
Typical system size	Audio response ±dB Hz-kHz	±0.05% 20-20k	...	±3 150kHz	[Conforms to	-3 to 50k	±0.05 30-20k	±0.05 30-20k
Audio response ±dB Hz-kHz	Harmonic distortion	<0.05%	...	0.1%	[EBU 3247 &	<0.008%	0.05%	0.05%
Harmonic distortion	S/N ratio	>86dB 20kHz	...	>100dB	[CCIR 656 rec.	105dB	85dB	85dB
S/N ratio	Audio crosstalk (worst)	<-70dB	...	<-80dB 1kHz	[for digital	88dB 1kHz	-90dB to 20k	-90dB to 20k
Audio crosstalk (worst)	Video response	...	3dB 30MHz	-3dB 30MHz	[video; for	...	-3/0.5 60MHz	±0.5dB 30MHz
Video response	Diff phase/gain	...	0.25/0.25%	0.25/0.25%	[signals to	...	0.05/0.05%	±0.05/0.05%
Diff phase/gain	Chroma Luma delay	...	5ns	...	[243 Mbits/s	...	±0.75"	±0.75"
Chroma Luma delay	Video S/N ratio	...	60dB	60dB	[data rate.	...	80dB	80dB
Video S/N ratio	Video crosstalk (worst)	...	-50dB 3.58MHz	-50dB 3.58MHz	...	...	-60dB 4.43MHz	-60dB 4.43MHz
Video crosstalk (worst)	Multilevel audio control	...	No	Yes	Yes	Yes	Yes	Yes
Multilevel audio control	Useable for component video	...	Yes	Yes	Digital	Possible	Possible	...
Useable for component video	Reader Service No	784	785	786	787	788	789	790
Reader Service No								

⁴Series 8 offers 8x8 matrix with similar characteristics; System 16x4/16x8 video or 16x8 with four audio channels; model 61 8x8 may include one to three levels of video with stereo. ⁵-1BW model rated to 100MHz; matrix size determined by bandwidth. ⁶VX-2 video crosspoints offer -3dB to 100MHz.

Production Titlers, Character Generators

Dedicated character generation systems, not software packages for PCs. Abbreviations for storage media include HD hard disk, FD floppy disk, ST streaming tape, RHD removable hard disk.

Manufacturer	Abekas Video Systems	Ampex Corp.	Aston/Paltex		AVS	AVS France	BTS
Model	A72	ALEX	Aston 4	Caption	Manuscript	S161-M/-T/-GC ¹	Vidifont II
Model	Subtitling	Variable	Variable	Variable	Variable	Variable position	Variable
Subtitling	Tab	Yes	Yes	Yes	Yes	No	Yes
Tab	Underlining by	C/W/L	C/W/L	Yes	Yes	Various	No
Underlining by	Page format	Free-form	Free-form	54 C/14 L	Free-form	Free-form	16Cx4L-16TVL ²
Page format	Resolution	5.5MHz luminance	4.6ns	10ns	<10ns	10ns effective	100ns
Resolution	Anti-aliasing	Hardware 256 level	Hardware, software	Software, hardware	Software	Yes	None
Anti-aliasing	On-line type faces	Unlimited	30	8	Multiple	50 faces	1
On-line type faces	Character planes	Unlimited	16	4	...	Multiple	...
Character planes	Background planes	1	1	Yes	Yes	Multiple	...
Background planes	Animation by	C/W/L	C/W/L	Yes	Yes	Yes	No
Animation by	Type styles	Serif, non-serif	Serif, non-serif	Multiple	Multiple	Serif, non-serif	...
Type styles	Italicize	Variable angle	Variable	Yes	Yes	Variable	No
Italicize	Rotation	No	360°	...	...	360°	No
Rotation	Sizing, scaling	Yes	Yes	Yes	Yes	4-400 scan lines	No
Sizing, scaling	Non Arabic faces	...	...	Yes	Yes	44 languages	No
Non Arabic faces	Type face storage	FD/HD/ST	RAM/FD/HD	Disk	Disk	...	PROM (RAM)
Type face storage	Face font compose	No	Option	Logo opt	Option	Yes	No
Face font compose	Display flash by	No	C/W/L	Yes	Yes	Various	Character
Display flash by	Edging effects	Surround, shadow	Surround, shadow	Yes	Yes	Drop, solid shadow	Surround, shadow
Edging effects	Auto centering	H/V	H/V	Yes	Yes	H/V	No
Auto centering	Roll crawl control	Variable	∞ speed variation.	8 each	Yes	Multiple	...
Roll crawl control	Keyer colorizer	2 encoders std	Integral or external	External	External	Yes	No
Keyer colorizer	Color palette	16.7M/screen	16.7M, 1024/screen	4096, 40/screen	16.7million	16.7M on screen	...
Color palette	S-VHS output format	No	No	No	...	also RGB	YCRB
S-VHS output format	Integral still store	No	No	No	No	40MByte	No
Integral still store	Internal memory	4:4:4/13.5MHz	Pipeline architectur	2 pages	24-bit	RISC architecture	...
Internal memory	Off-line storage	FD/ST	FD/HD	FD/HD	Disk	3.5" FD	...
Off-line storage	Access time per page	...	Per complexity	<1s	<1s	...	...
Access time per page	Remote control	RS-232	...	RS-232/422	RS-232/422	Yes	No
Remote control							

Production Titlers, Character Generators

Manufacturer	Abekas Video Systems	Ampex Corp.	Aston/Paltex		AVS	AVS France	BTS
Model	A72	ALEX	Aston 4	Caption	Manuscript	S161-M/-T/-GC¹	Vidifont II
Image sources	RGB components	C/ CV, Tablet, Comp video, CCIR-601	...	Camera LogoMaster Draw	Any video source	Composite video	RGB, Composite
Multi-user system	No	2 user	2-station	...	...	No	2 Keyboards
Automation interface	RS-232	Ethernet	RS-232/422	RS-232/422	...	RS-232	RS-422
Paint system interface	No	No	...	...	Networked	No	...
Reader Service No	442	443	444	445	446	447	448

¹ -HC clock, counter inserter; -S logo; -V, VU meter; -GC character generator. ²32Cx16L for 32TVL letters.

Manufacturer	Chyron Corporation				Dubner Computer Systems		ESE
Model	ACG	Chyron IV/4200	INFINITI	Scribe JNR	30K³	Graphics Factory⁴	ES-CG89
Subtitling	Variable	Lower 3rd	Variable	Variable	Any location	Any location	Lower 1/3
Tabs	Yes	Yes	Yes	Yes	Yes	Yes	...
Underlining by	All	All	All	All	by Character	by Character	...
Page format	Free form	64Lx24L 18TVL	Free form	64Cx24L 10TVL/free	Free form	Free form	20x5
Resolution	35ns	27ns	5ns	10ns	760x486	760x486	70ns
Anti-aliasing	Hardware	...	Software	Software	Software	Software	Software
On-line type faces	8	12	8	8	Infinite	Infinite	8
Character planes	Unlimited	2	Unlimited	unlimited	2	2	...
Background planes	1	2	3	1	Infinite	Infinite	...
Animation by	All	All	All	Line	C/W/L	C/W/L	...
Type styles	Serif, non-serif	Serif, non-serif	Serif, non-serif	Serif, non-serif	Serif, non-serif	Serif, non-serif	Non-serif
Italicize	Yes	Yes	Yes	Yes	Variable	Variable	No
Rotation	Row, page	Yes	Yes	Yes	360°	360°	...
Sizing, scaling	No	Yes	Yes	Yes	Yes	Yes	No
Non Arabic faces	...	Cyrillic	Cyrillic	Cyrillic	Cyrillic, Chinese	Cyrillic	No
Type face storage	RAM	RAM	RAM	RAM	Ram/FD/Bernoulli	Ram/FD/Bernoulli	RAM
Face font compose	Option	Yes	No	No	Yes	Yes	No
Display flash by	All	All	All	All	Character	Character	Character
Edging effects	Surr shad to 16lines	Surround, shadow	Surround, Shadow	All	Surround, shadow	Surround, shadow	Surround
Auto centering	H/V	Horizontal	H/V	H/V	H/V	H/V	Horizontal
Roll crawl control	9 speeds	4 speeds	9 speeds	9 speeds	9 speeds	9 speeds	1 speed
Keyer colorizer	Integral	External	Integral	Integral	Integral	Integral	Integral
Color palette	16.7M 527/screen	512 200/screen	16.7M; 16.7M/screen	16.7M 667/screen	16.7M, 256/screen	16.7M, 256/screen	16/16
S-VHS output format	Option	No	No	No	No	No	No
Integral still store	No	No	Yes	No	Option	Option	No
Internal memory	Proprietary	Proprietary	Proprietary	Proprietary	8MBytes, 32-bit	16MBytes, 32-bit	...
Off-line storage	FD HD RHD	FD HD	FD HD RHD	FD/HD/RHD	HD/Bernoulli SCSI/FD	HD, Bernoulli	...
Access time per page	...	...	...	...	...	...	100ms
Remote control	RS-232 MODEM GPI	RS-232	RS-232, Modem	RS-232 Modem	RS-232	RS-232	No
Image sources	Tablet	Composite, Data svc Weather svc	Component, Tablet Data service	Component, tablet	Tablet, weather data	Encoder, composite video, weather data	Composite
Multi-user system	No	Yes	Yes	Yes	2 users	2 users	No
Automation interface	RS-232 GPI	RS-232/-422	RS-232/-422 ARCNET	RS-232, ARCNET	RS-232, -422, GPI	RS-232, -422, GPIB	...
Paint system interface	No	Yes	Yes	Yes	Option	Option	No
Reader Service No	449	450	451	452	453	454	455

³5K, 10K, 20K have similar characteristics with varying amounts of internal storage and FD external storage. ⁴20KWN Weather Station also available with weather background graphics capability.

Manufacturer	For*A	Laird					
Model	VTW-240 (222S)	1450	1500 PROM	CG 7000 (7000 YC)	Legend (Turbo)	Legend GX (Turbo)	Legend-LX
Subtitling	...	Variable	Variable	Variable	Variable	Variable	Variable
Tabs	Yes	Yes	Yes	No	Yes	Yes	Yes
Underlining by	by character	Character	Character	...	Character	Character	Character
Page format	32C x 8L	Free form	Free form	39x16 24TVL	Free form	Free form	Free form
Resolution	24x20 dot matrix	35ns 1506x483	35ns 1506x483	80ns	35ns 1506x483	35ns 1506x483	35ns 1506x483
Anti-aliasing	(12x20 on 222S)	...	...	Hardware	Hardware/software ⁵	Hardware/software ⁶	Hardware/software
On-line type faces	4	6 + 6 opt	6 + 6 opt	1	16	16	16
Character planes	1	1/unlimited overlap	1/unlimited overlap	1	w/unlimited overlap	1/unlimited overlap	2/unlimited overlap
Background planes	1	1	1	1	1	1	2
Animation by	...	Character	Character	Line	Character	Character	Character
Type styles	Serif, non-serif	Serif, non-serif	Serif, non-serif	Non-serif standard ²	S/NS 35 type faces	S/NS 35 type faces	S/NS 35 type faces
Italicize	...	Variable	Variable	No	Variable	Variable	Variable
Rotation	...	H/V/flip	H/V/flip	No	H/V flip options	360° by <1 step	360° by <1 step
Sizing, scaling	...	No	No	4 sizes/face	Option	Yes	Yes
Non Arabic faces	No	No	No	No	No	No	No
Type face storage	FD	ROM	ROM	ROM cartridge	RAM/FD	RAM/FD	RAM/FD/HD
Face font compose	No	No	No	No	Option	Yes	Yes
Display flash by	to character	Character	Character	Character	Character	Character	Character
Edging effects	Shadow edge	Surround, shadow	Surround, shadow	Surround/shadow	Surround, shadow	Surround, shadow	Surround, shadow
Auto centering	H/V	Horizontal	Horizontal	H/V	Horizontal	Horizontal	Horizontal

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Production Titlers, Character Generators

Manufacturer	For-A	Laird					
Model	VTW-240 (222S)	1450	1500 PROM	CG 7000 (7000 YC)	Legend (Turbo)	Legend GX (Turbo)	Legend-LX
Roll crawl control	Multiple speeds	9R, 6C	9R, 6C	4 R/4 C	9 R, 6 C	9R, 6C	9R, 6C
Keyer colorizer	Yes	Integral	External	Integral	Integral	Integral	Integral
Color palette	512, 14/screen	65,536/966	65,536/966	Analog 2/screen	65,536/966	65,536/966	65,536/65,536
S-VHS output format	(-222S)	Option	Option	7000YC only	Option	Option	Option
Integral still store	No	No	No	No	No	No	No
Internal memory	1600 page	...	...	...	...	...	...
Off-line storage	3.5" FD	via PC connection	via PC connection	Non-vol RAM module	FD, HD	FD, HD	FD/HD
Access time per page	...	1s average	1s average	1.4s	1s average	1s average	1s average
Remote control	RS-232	RS-422	RS-422	GPI & (Proprietary)	RS-422	RS-422	RS-422
Image sources	Composite video	Composite	Composite	Composite (Y-C)	Composite, tablet	Composite, tablet	Composite, tablet
Multi-user system	No	No	No	No	No	No	No
Automation interface	Remote control	RS-422, GPIB	RS-422, GPIB	GPIB	RS-422, GPIB	RS-422, GPIB	RS-422, GPIB
Paint system interface	No	No	Upgrade option	No	Option	Option	Yes
Reader Service No	456	457	458	459	460	461	462

⁵Serif opt; 18 type styles available for 7000. ⁶anti-aliasing requires additional hardware.

Manufacturer	PESA	Quanta Corporation			Quantel	Ryley Communications Ltd
Model	CG-4722	Delta 1	Microgen Plus	Orion	Cypher ⁸	CAPGEN ser 2
Subtitling	Option	Lower 1/3	Lower 1/3s	Lower 1/3s	Any location	Variable
Tabs	8 tabs	Yes	No	Yes	Yes	Yes
Underlining by	Yes	Character	None	Character	Yes	Word
Page format	32 char x 16 line	Free form	32C x 12 L	64 C 36 L/10-126TVL	Free form	Free form
Resolution	35ns	0.289ns	50ns	5ns	...	11ns
Anti-aliasing	...	Hardware	None	Software	256-level 4:4:4:4	Hardware
On-line type faces	8 in RAM	Unlimited	4	250	Infinite	8
Character planes	...	Unlimited	1	1	Multiple	1
Background planes	...	Unlimited	1	1	Multiple	1
Animation by	No	Character	None	Character	Yes	...
Type styles	Various	Serif, non-serif	Serif, on-serif	Serif, non-serif	Serif, non-serif	Serif, non-serif
Italics	by line	Variable	No	Variable	Variable	Yes
Rotation	No	360° by font	None	360° by font	360°	...
Sizing, scaling	...	Yes	No	Yes by font	Yes	Yes
Non Arabic faces	Script, designer	None	None	None	Various	Roman
Type face storage	3.5" disk	RAM, HD	ROM	Floppy disk	FD cartridge	RAM
Face font compose	Option -4722	Yes	No	Option	Yes	No
Display flash by	Yes	Character	Character	Character	Various	Word
Edging effects	Full control	Surround, shadow	Surround, shadow	Surround shadow ⁷	Surround, shadow	Surround
Auto centering	H/V	H/V	Horizontal	Horizontal	H/V	H/V
Roll crawl control	8 speeds	2560 roll, 10 crawl	9 speeds	99 speeds	...	9 speeds
Keyer colorizer	Integral	Integral	Integral	Integral	Integral	External
Color palette	121, 121/s	16.7million	256, 24/screen	16.7million 1000/s	16.7M, 256/screen	64, 64/screen
S-VHS output format	No	No	No	No	No	No
Integral still store	No	Yes	No	No	Yes, 50-image	No
Internal memory	15 pg/4096 lines	4MB, 32-bit	8-bit 600 row RAM	2.5MB, 16/64-bit	...	...
Off-line storage	3.5" floppy	HD/FD/ST/RHD	None	HD/FD	Yes	FD
Access time per page	...	0.65s	4ms	0.5ms	...	500ms
Remote control	RS-232, timecode	RS-232	RS-232	RS-232/-422	Yes	...
Image sources	Video source	Composite, component	Composite	Compcsite	Any video	...
Multi-user system	-4722 dual channel	No	Option	No	...	No
Automation interface	RS-232	None	RS-232	RS-232/-422	Various	...
Paint system interface	...	Option	No	No	Yes	No
Reader Service No	463	464	465	466	467	468

⁷Also outline, highlight effects. ⁸Cypher Sprint; also Cypher Sports with 3-D effects; both allow mixing of pictures, graphics, titles.

Digital Video Effects Systems

These include systems designed for broadcast facility and production for broadcast; PCs may be used as control terminals for this equipment, but none are software packages for PC-based systems.

Manufacturer	Abekas Video Systems		ALTA Group	Ampex Corporation		CEL Electronics	Digital F/X
Model	A52	A53-D ¹	Pictoris	ADO 100 ²	ADO 2000 ²	P164 series ³	DF/X 200
# inputs channels	1 basic 2 exp	1 basic 2 exp	1 basic	2 basic 4 exp	2 basic 8 exp	4 basic 8 exp	2 basic
# output channels	1 basic 2 exp	1 basic 2 exp	1 basic	1 basic 2 exp	1 basic 4 exp	1 basic 2 ext	1 basic
# image planes	...	...	2 fore & background	...	...	2	1
Control system	Prop CPU/Ctl Pnl	Prop CPU/Ctl Pnl	CtlPnl	Prop. CPU/Ctl Pnl	Prop. CPU/Ctl Pnl	Proprietary/CtlPnl	Prop CPU/Ctl Pnl
Instruction memory form	RAM EPROM Data-Key	Floppy disk	...	FD for effects	FD	FD	HD FD RHD
Parameter display	On Ctl Pnl	On Ctl Pnl	...	Real Numbers	Real Numbers	LCD/TouchScreen	HR 14029x800

Manufacturer	Abekas Video Systems		ALTA Group	Ampex Corporation		CEL Electronics	Digital F/X
Model	A52	A53-D¹	Pictoris	ADO 100²	ADO 2000²	P164 series³	DFX 200
Y/C, S-VHS input, output	No	No	I/O	...	...	I/O Std	No
Component input, output	No	I/O	...	Analog I/O	Analog I/O	I/O Std	I/O
Digital input, output	I/O Composite	I/O Composite	...	Component/composite	Component/composite	I/O Opt	I/O component
Dub input, output	No	No	...	...	...	Input Std	No
Still store functions	No	No	No	No	No	Option	Yes
TBC functions	No	No	No	No	No	Yes	Yes
Remote protocol	RS-232/-422/GPI	RS-232/-422/GPI	GPI	GPI LAN	RS-422/GPI/ESBus	GPI	RS-422/GPI/LAN
System S/N ratio	52dB	52dB	55dB	...	...	56dB	...
Differential phase, gain	2', 2%	2', 2%	2', 2%	...	...	2', 2%	...
Sample rates, bits	14.3MHz, 8-bit	14.3MHz 8-bit	13.5MHz 8-bit	...	13.5MHz 8-bit	13.5MHz 8-bit	13.5MHz 32-bit
Image size variation	0x min, 99x max	0x min, 99x max	Any size ratio	...	...	0x-8x	Unlimited
Image compression ratio	...	...	Infinite	Zero	Zero	Yes	Unlimited
Image expansion ratio	...	...	None	Zero	Zero	Yes	Unlimited
Rotation around axes	X/Y	X/Y/Z	None	X/Y/Z	X/Y/Z	X/Y	X/Y/Z
Image freeze	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Strobe	Yes	Yes	No	...	Option	Yes	Yes
Iterative (trails, streamers)	Yes	No	No	...	Option	Opt	No
Perspective effects	No	Yes	No	Option	Yes	Yes	Yes
Curvilinear effects	No	Yes	Option	...	Yes	Yes	Yes
Picture splits	H/V	H/V Opt	No	...	...	H	No
Mirror effects	No	No	Option	H/V	H/V	H/V	No
Push-on, -off	H/V/Diagonal	H/V Opt	H/V/Diagonal	H/V	H/V Option	H/V/Diagonal	No
Solarize	Yes	Yes	No	Yes	Yes	Yes	No
Posterize	Yes	Yes	Yes	Yes	Yes	Yes	No
Mosaic tiling	Yes	No	Yes	Yes	Yes	Yes	No
Programmed sequences	Yes	Yes	Yes	Yes	Yes	Yes	No
Reader Service No	1288	1289	1290	1291	1292	1293	1294

¹System processes composite or component signals; various connections can be used with editing systems; sampling at 13.5MHz available. ²One key channel is standard. ³MS830/831, MS850/851 single channel systems are based on P164 effects/TBC unit; with Maurice controller forms MS832, MS852 dual channel systems.

Manufacturer	DSC Digital Services Corporation			ECHOlab	For-A	Fougerolle Video	GML/GML Grove
Model	Eclipse 5500CC	Illusion	Paragon	Tempest	MF-2000 Multiflex⁴	MPV 4000	System DVP
# input channels	1 basic	1 basic	1 basic 4 exp	Video	Dual option	1 basic 4 exp	1 exp to 2
# output channels	1 basic	1 basic	1 basic 4 exp	Video, key	Dual option	1 basic 4 exp	1 exp to 2
# image planes	1	1	1	2-D, 3-D	2-D only	Multiplane	1
Control system	Prop CPU/Ctl/Pnl	Prop CPU Ctl/Pan	Prop CPU Ctl/Pnl	34010, mouse	Dedicated panels	Proprietary	Dedicated
Instruction memory form	Floppy disk	PROM	Floppy disk	3.5" floppy	Memory card	FD option	Non-volatile
Parameter display	CRT	7-seg LED	CRT	CRT menu	Keyboard indicators	Fluorescent panel	Lighted keys
Y/C, S-VHS input, output	...	...	...	Yes	)	PAL or SECAM	No
Component input, output	I/O	...	I/O	and composite	and Composite	RGB R-Y/B-Y	No
Digital input, output	...	...	I/O Component	No	No	D-1 interface	No
Dub input, output	...	...	...	No	No	No	No
Still store functions	No	No	No	Yes	...	No	No
TBC functions	No	No	No	...	(MF-1000)	& synchronizer	Dual frame store
Remote protocol	GPI	GPI	RS-422/PI	SCSI	Yes	RS-422/GPI	GPI/RS-232/422
System S/N ratio	52dB	52dB	52dB	52dB	55dB	...	58dB
Differential phase, gain	2', 2%	2', 2%	2', 2%	2', 2%	2', 2%	...	2', 2%
Sample rates, bits	14.3MHz 8-bit	14.3MHz 8-bit	14.3MHz 8-bit	4:2:2 CCIR 601	13.5MHz 8-bit 4:2:2	13.5MHz 8-bit	8-bit
Image size variation	...	...	...	...	Yes	...	...
Image compression ratio	...	...	...	Yes	Yes	1 to infinite	...
Image expansion ratio	...	...	...	Yes	Yes	...	...
Rotation around axes	X/Y/Z	X/Y/Z	X/Y/Z	Yes	X/Y	X/Y Options	...
Image freeze	Yes	Yes	Yes	& multifreeze	Yes	Yes	Yes
Strobe	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Iterative (trails, streamers)	No	No	Opt	Yes	Yes	Yes	Yes
Perspective effects	Yes	Yes	Yes	Yes	No	Yes	...
Curvilinear effects	Yes	No	Yes	Yes	Yes	Yes	Yes
Picture splits	H/V	H/V	H/V	Yes	Yes	H/V	H/V
Mirror effects	H/V	H/V	H/V	Yes	Yes	H/V	H/V
Push-on, -off	...	...	...	Yes	Yes	Yes	H/V
Solarize	No	No	...	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	Yes
Reader Service No	1295	1296	1297	1298	1299	1300	1301

⁴MF-1000 for S-VHS, 1/2" & 3/4 VCRs; upgrades to 2-channel with perspective capability.

Editor's Note:

The information appearing in this **Broadcast Engineering Equipment Reference Manual** was derived from brochures sent by the manufacturers in response to invitations to participate. It does not contain information from every manufacturer, nor does it contain every model of a product type produced by any specific manufacturer. It does, however, offer you a wide range of products to consider, when you begin the process of searching for new equipment for your facility.

Digital Video Effects Systems

Manufacturer	GML/GML Grove	Grass Valley Group			Microtime		Pinnacle Systems
Model	X-Calibre (II)	DPM-100	Kaleidoscope DP	Genesis Act 3	Impact ser 4	RP-1 3D	2100 Series
# inputs channels	1 exp to 2	1 base 2 exp	1 base 5 exp	1 basic 2 exp	3	1 basic 2 exp	1 basic
# output channels	1 exp to 2	1 base 1 exp	1 base 4 exp	1 basic 2 exp	2	1 basic 2 exp	1 basic
# image planes	1	...	5	2	2	2	2
Control system	Dedicated/soft keys	Prop CPU/Ctl pnl	Prop CPU/ctl pnl	Prop CPU Ctl Pnl	Proprietary	Prop CPU Ctl Pnl	IBM/AT-based
Instruction memory form	ROM/FD opt	FD	FD	EAROM	RAM, 3.5' FD	FD	FD (HD in 2010)
Parameter display	Ctl pnl	2x40-character	Fluorescent/CRT opt	Vacuum fluorescent	CRT	CRT	Menu driven
Y/C, S-VHS input, output	...	No	...	...	No	...	NA
Component input, output	YUV/YIQ/RGB	I/O	I/O	I/O	Composite	I/O	In/Out
Digital input, output	...	I/O C/C	I/O C/C	...	D-2	I/O component	No
Dub input, output	...	No	...	...	No	...	No
Still store functions	No	Option	No	No	No	No	Yes (in 2010)
TBC functions	Dual frame sync	No	No	No	No	No	No
Remote protocol	GPI/RS-232/422	RS-232/422/GPI ⁵	RS-422/GPI	GPI	RS-422/GPI	RS-232/422/GPI	RS-232/422 GPI/ESbus
System S/N ratio	58dB	55dB	...	58dB	58dB	58dB	58dB
Differential phase, gain	2', 2%	2', 2%	<0.25', <0.25%	3', 3%	2', 2%	2', 2%	2', 2%
Sample rates, bits	8-bit	13.5/14.3 8-bit	13.5MHz 8-bit	8MHz 8-bit	14.3 4:2:2	13.5MHz 8-bit	10MHz 8-bit
Image size variation	1/2 & infinite	0x min, 100x max	0x min, 999x max	...	Infinite	...	0x-8x
Image compression ratio	1/2 & infinite	Infinite	0:1	Infinity:1	...	Infinity:1	Aspect ratio adj
Image expansion ratio	1/2 & infinite	1:100	1:Infinity	2:1	...	Infinity:1	8:1
Rotation around axes	X/Y/Z	X/Y/Z	X/Y/Z	X/Y/Z	X/Y/Z	X/Y/Z	X/Y
Image freeze	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Strobe	Yes	Opt	Yes	Yes	Yes	Yes	Yes
Iterative (trails, streamers)	Yes	Opt	Yes	No	Yes	Option	Yes
Perspective effects	Yes	No	Yes	Yes	True 3-D	Yes	Option
Curvilinear effects	Yes	No	Yes	Yes	Yes	Yes	Option
Picture splits	H/V	H/V	H/V	H/V	Yes	H V	H/V
Mirror effects	H/V	H/V	H/V	H/V	Yes	H V	H/V
Push-on, -off	H/V	H/V	H/V/diagonal	H/V/diagonal	Yes	H V diagonal	No
Solarize	Yes	Yes	Yes	Yes	Yes	Yes	No
Posterize	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mosaic tiling	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Programmed sequences	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Reader Service No	1302	1303	1304	1305	1306	1307	1308

⁵ESBus, Model 100, 200 interface.

Manufacturer	Pinnacle Systems	QuesTech	Sony		
Model	PRIZM	Charisma	DME 450 ⁶	DME-5000	DME-9000/System-G
# inputs channels	1 basic	3V 2key 2Z 1Bkgrnd	1 basic	4-channel option	1 (4-ch w/combiner)
# output channels	1 basic	Video/Z-axis/Key	1 basic	4-channel option	4:2:2, YCRCB
# image planes	3	Multiple	1	Multiple	Multiple
Control system	PC compatible	Ctl pnl/proprietary	PropCPU Ctl pnl	KB, Proprietary	Ctl pnl, mouse, KB
Instruction memory form	FD/HD	1000 keyframe/3.5' FD	ROM >280 effects	...	...
Parameter display	Menu driven	CRT, panel LEDs	LED of effect #	CRT	CRT, Ctl Pnl LEDs
Y/C, S-VHS input, output	No	No	No	...	...
Component input, output	I/O	CCIR PAL	I/O	YCRCB & composite	Yes
Digital input, output	No	Yes	No	Component/composite	10-bit
Dub input, output	No	No	No	...	...
Still store functions	Option	No	No	...	...
TBC functions	No	Int. synchronizer	Integral	Int. synchronizer	Integral
Remote protocol	RS-232/422/GPI/Esbus	Yes	...	RS-422, -232C, GPI	RS-422
System S/N ratio	58dB	per CCIR spec	52dB	>50dB	55dB
Differential phase, gain	2', 2%	...	<3'	<2', <2%	...
Sample rates, bits	10MHz 8-bit	13.5MHz 8-bit 4:2:2	8-bit 455H sampling	4:2:2	10-bit 4:2:2
Image size variation	0-∞	0-Infinity	...	Infinite	Infinite
Image compression ratio	Infinite	0-Infinity	...	Infinite	Infinite
Image expansion ratio	Infinite	0-Infinity	...	Infinite	Infinite
Rotation around axes	X/Y/Z	X/Y/Z	X/Y/Z	X/Y/Z	X/Y/Z
Image freeze	Yes	Yes	Yes	Inc multifreeze	w/multifreeze
Strobe	Yes	Yes	No	Yes	Yes
Iterative (trails, streamers)	Yes	Yes	No	Yes	Yes
Perspective effects	Yes	Yes	Yes	Yes	Yes
Curvilinear effects	Yes	CLEO	No	Yes	Yes
Picture splits	H/V	Yes	HV	Yes	Yes
Mirror effects	H/V	Yes	HV	Yes	Yes
Push-on, -off	No	Yes	LED of effect #	Yes	Yes
Solarize	Yes	Yes	...	Yes	...
Posterize	Yes	Yes	Yes	Yes	Yes
Mosaic tiling	Yes	Yes	Yes	Yes	Yes
Programmed sequences	Yes	Yes	No	T-file from DVS-8000	to 60sec
Reader Service No	1309	1310	1311	1312	1313

⁶With 3-input switcher, title key, dual matte generators, BVS-3000 and editor interface.

Still Store Systems

Magnetic and optical disk image storage systems, primarily used as image libraries, but may also be used in graphics production; **HD** hard disk, **RHD** removable hard disk, **M-O** magneto-optical, **ST** streaming tape, **R-O** read-only, **WORM** write-once, read-many.

Manufacturer	Abekas Video Systems		ALTA Group	Ampex Corporation		ASACA/Shiba-Soku	Aston /Paltex	Dubner Computer Systems
Model	A42	A62 (A64)	Centaurus	ESS-3	ESS-5	ADS-300	Wallet	DSS-4
Storage medium	HD on-line, s-tape	HD	HD, RHD	HD/RHD, ST/Optical	HD, RHD, ST, WORM	Rewritable MO, RHD	44Mbyte RHD	HD, RHD, M-O, R-O
# simultaneous output channels	2	1	1	2	2	2	3	2
Multiple control worstations	No	No	Yes	1-10 users	No	No	1	Yes
Standards	NTSC	NTSC ²	NTSC, PAL	NTSC, PAL	NTSC, PAL	NTSC	NTSC/PAL	NTSC
Stills catalog	Optional library	No	...	Multi-image screen	Proof-sheet	...	Disk directory	...
Integral digital effects	No	Keying	Yes	Yes	No	Options	...	Yes
Edit control port	GPI/RS-422	RS-232/-422/GPI	Yes	...	GPI	VS-422	No	GPI, GVG
Switcher control port	GPI/RS-422	...	Option RS-232/422	...	...	RS-232C	{13.5MHz/8-bit	GPI, GVG
Video response	±0.25 4.2MHz	±0.25 4.2MHz	-3dB 5.5MHz	≤5dB to 5MHz	0.5dB 5.9MHz	±0.5 60Hz-5.5MHz	[System uses	0.5dB 5MHz
YCbCr sample rate	...	D-2 system	14.3MHz	13.5MHz, 4:2:2	13.5MHz	4xfsc, 8-bit	[CCIR 601 4:2:2:4	...
Differential phase, gain	2°, 2%	2°, 2%	2°, 2%	<1°, 1%	2°, 2%	<2°, ≤2%	[sampling with	1°, 1%
Chroma Luma delay	±10ns	...	...	<±10ns	<25ns	...	[processors for	Ons
External TBC required	No	No	Dual TBC/FS	...	No	No	[NTSC/PAL output	No
Composite digital	Yes w/D-2 opt	D-2 interface	Y/C 3.58 (S-VHS)	No	...	No	...	D-2
Component digital	...	(CCIR 601)	...	No	D-1	No	RGB/YUV	...
Integral input A/D conversion	Yes	Yes	Yes	Yes	Yes	...	Yes	Yes
Integral output D/A conversion	Yes	Yes	Yes	Yes	Yes	...	Yes	Yes
Storage per disk	700 fields, 350 frame	50s or 100s	170 fields, 85 frames	80-800 frames	80-100 frames	3200 fields/1600 frames	39-42	1,000 images
# of drives maximum	3	1 or 2	4	25 in network	4 HD, 7 SCSI	14	2	14
Worst case access time	750ms	Instantaneous	2.1s/frame	<0.8s	1.5s	<1.7s	≤2s	1ms
Sequence, loop programming	...	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Reader Service No	1240	1241	1242	1243	1244	1245	1246	1247

¹Optional smaller disk drive for 200 fields/100 frame. ²I/O of A62 is composite RS170A with optional RGB out; A64 I/O is YCbCr, RGBS, CCIR 601. A60 has 25s-50s 525/60 capacity with CCIR 601 I/O, 4:2:2 processing.

Manufacturer	Harris Video Systems		Leitch Video	Rank Cintel		Sony		TEAC
Model	HarrisVws 5000 (1000)	IRIS II Plus	Still File	Pocket	Slide File	DNS-1000 ser	LVR/LVS-5000⁴	LV-250HC⁵
Storage medium	Floppy& (Winchester)	W/R-W	HO, ST, MO, RO	HO, RHD	HD, streaming tape	WORM (or M-O)	12" CAV videodisc	Recordable optical
# simultaneous output channels	2 (1)	to 72	4 I/O	2	to 4	Dual channel	1	One only
Multiple control worstations	Yes	Yes	Yes	No	Yes	6 in network	No	No
Standards	NTSC	NTSC	NTSC	NTSC/PAL	NTSC, PAL	NTSC, PAL	NTSC, PAL	NTSC
Stills catalog	20 field database	Data list	Data list/3x3 ³	Title list/index	Polyphoto/index	Directory	No	...
Integral digital effects	Option (No)	Option	Yes	Yes	Yes	Key channel	No	No
Edit control port	Option	Yes	Various protocol	Proprietary	Auto Preview, A/B	Yes	RS-232C/-422	RS-232
Switcher control port	Option	Yes	Various Protocol	No	A/B tally	...	...	...
Video response	0.4(0.5) to 4.2MHz	0.4 to 4.2MHz	±0.15dB 4.5MHz	8-bit sampling	CCIR 601	6MHz RGB	4.5MHz	>400 lines
YCbCr sample rate	...	...	N.A.	13.5MHz/6.75MHz	13.5MHz/6.75MHz	{5.5MHz Y/R-Y/B-Y	...	...
Differential phase, gain	≤2°, ≤2% (n.a.)	≤2°, ≤2%	<1°, 2%	CCIR-601 arch	8-bit sampling	<2°/≤2%	...	8-bit sampling
Chroma Luma delay	5ns (ns)	5ns	±10ns	...	...	...	...	...
External TBC required	No (Yes)	No	Integral synch	No	No	...	...	VY-250
Composite digital	...	...	D-2	No	No	No	[Analog RGB or	No
Component digital	D-1 (...)	D-1	N.A.	D-1	D-1	Serial	[Composite	No
Integral input A/D conversion	Yes	Yes	Yes	Yes	Yes	Yes	...	...
Integral output D/A conversion	Yes	Yes	Yes	Yes	Yes	Yes	...	...
Storage per disk	748 (422) frames	200 fields	1500/3000/5000 fields	40 frames	400 frames	1,800 (or 500)	43,500 frames	5400 frames
# of drives maximum	25	32	4 for 10,000 frames	2	1	7 per mainframe	1	1
Worst case access time	1.9s	1s	0.6s	1.7ms	1	3s (or 2s)	0.5s	<1.5sec
Sequence, loop programming	...	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Reader Service No	1248	1249	1250	1251	1252	1253	1254	1255

³Integrated management system; 2 users/station; Ethernet networking; color frame storage. ⁴LVA-7000 as play-only companion unit. ⁵LV-210 series includes A model with record and playback, P mode with 8kbyte RAM and 150-step programming.

Video Processing Systems

This product group contains signal encoders, format translators, color correction, signal correction products.

Manufacturer	A.C.E./MidwestCommunications			Accom	ALTA Group	Ampex Corp.
Model	205N¹ (204N)	660JN²	ACC200	D-Bridge 122³	DIE-125⁴	DST-300
Standards conversion	Encoder	Color corrector	Color correction	Encoder	Enhancer	Format converter
Supports NTSC	Yes	Yes	No	Yes	Yes	Yes
Supports PAL	No	No	No	Yes	...	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

Video Processing Systems

Manufacturer	A. C. E./Midwest Communications			Accom		ALTA Group	Ampex Corp.
	Model	205N ¹ (204N)	660JN ²	ACC200	D-Bridge 122 ³	DIE-125 ⁴	Celeris	DST-300
Supports RGB	Yes	Yes	Yes	Yes	Yes	No	No
Supports YCrCb	Yes	Yes	Yes	Yes	Yes	No	No
Supports D-1 CCIR 601	No	No	No	Yes	Yes	No	Yes
Supports D-2	No	No	No	Yes	No	No	Yes
Dubbing applications	No	Yes	Yes	Yes	Yes	Yes	Yes
Production applications	Yes	Yes	Yes	Yes	Yes	Yes	Yes
On-air applications	Yes	Yes	Yes	Yes	Yes	No	Yes
Enhancement	Yes	No	...	No	Yes	No	No
Noise reduction	No	No	...	No	Yes	No	No
Color correction	No	Yes	...	Yes	No	L/C delay	No
Contrast correction	No	Yes	...	Yes	No	No	No
Sync regeneration	Yes (No)	No	...	Yes	Yes	Yes	Yes
Full proc amp control	Yes (No)	No	...	Yes	No	No	No
Programmable system	No	NO	...	Yes	Yes	No	No
Time code control	No	Yes	...	No	No	No	No
RS-232/-422 control	No	No	...	Yes	Yes	No	No
Composite encoder	Yes	No	...	Yes	No	Yes	Yes
Improved NTSC encoding	No	No	...	Yes	No	No	Yes
Video bandwidth	6MHz	5 MHz	6MHz	to 5.75MHz	to 5.75MHz	-3dB 6MHz	10-bit data
Video S/N ratio	60dB	65dB	60dB	65dB	54dB	56dB	...
Envelope delay	1100ns	450ns	30ns	5ns	5ns	Adjustable	...
Differential phase, gain	0.5	0.5%	...	...	0.2°, 0.2%	0°, 0%	...
Reader Service No	1256	1257	1258	1259	1260	1261	1262

¹Model 205N provides genlock feature. ²600JN is similar unit providing color correction for component video. ³D-Bridge 221 is companion decoder unit. ⁴Designed for reduction of noise and grain in film-to-tape transfer operations.

Manufacturer	Broadcast Systems Design			Broadcast Video Systems			BTS	
	Model	Model 300 (305 ⁵)	Model 310	#100, 300 ⁶	#734/#735	#740, 750	EN300/350/450	CNR7
Standards conversion		Color processor	Transcoder	Format converter	Translator	Component translator	Encoders	Noise reduction
Supports NTSC	Yes	Yes	...	...	[#743 for	[#740 RGB to	Yes	Yes
Supports PAL	No	No	...	...	[RGBS to	[YCrCb	EN300	Yes
Supports SECAM	No	No	...	...	[YCrCb	No	No	...
Format conversion	...	...	Yes	Yes	[#735 for	Yes	350, 450	Yes
Supports Y/C-3.58	No	Yes	Yes	Yes	[YCrCb	[#750 RGB from	350, 450	Yes
Supports Y/C-688	No	Yes	Yes	Yes	to RGBS	[YCrCb	No	Yes
Supports RGB	No	...	...	...	Yes	Yes	Yes	Yes
Supports YCrCb	No	...	Yes	Yes	Yes	Yes	350, 450	Yes
Supports D-1 CCIR 601	No	No	No	No	No	No	No	...
Supports D-2	No	No	No	No	No	No	No	...
Dubbing applications	No	No	Yes	Yes	Yes	Yes	350, 450	Yes
Production applications	...	...	Yes	Yes	Yes	Yes	Yes	Yes
On-air applications	...	...	No	No	No	No	Yes	Yes
Enhancement	Yes	Yes	No	No	No	No	No	Yes
Noise reduction	...	...	No	No	No	No	No	Yes
Color correction	I/Q axes adj	I/Q axes adj	No	Yes	No	No	No	Yes
Contrast correction	...	...	No	Yes	No	No	No	Yes
Sync regeneration	Yes	Yes	No	Yes	Yes	Yes	350, 450	TBC
Full proc amp control	Yes	Yes	No	Partial	Yes	No	No	Yes
Programmable system	No	No	No	No	No	No	No	...
Time code control	No	No	No	No	No	No	No	No
RS-232/-422 control	No	No	No	No	No	No	No	...
Composite encoder	Yes	Yes	No	No	No	No	Yes	Yes
Improved NTSC encoding	...	...	No	No	No	No	No	...
Video bandwidth	6.4MHz	10MHz	6MHz	...	10MHz	5/5.5/6MHz	-3, +0.5dB 4MHz	...
Video S/N ratio	58dB	58dB	46dB	...	46dB	45/45/60dB	...	...
Envelope delay	...	...	...	...	4ns Δ	±15/15/10ns	Adjustable	...
Differential phase, gain	1.5°, 1.5%	1.5°, 1.5%	...	...	...	...	...	...
Reader Service No	1263	1264	1265	1266	1267	1268	1269	...

⁵#305 includes chroma level and phase and luminance setup adjustment; both have luminance EQ control. ⁶#100 Y-C to YCrCb; #300 YCrCb.

Manufacturer	BTS	CEL Electronics	Central Dynamics	Faroudja Laboratories			For-A	
	Model	DNR7 ⁷	P164	STAGE ☆1 E-NTSC	CTE-2	LD-1	VHP-N/P	CT-600
Standards conversion		Noise reduction	Enhancement	Encoder	Encoder	Line doubler	Enhancer	Format conversion
Supports NTSC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supports PAL	Yes	Yes	No	No	No	No	Yes	Yes
Supports SECAM	Yes	Yes	No	No	No	No	Yes	...
Format conversion	Yes	No	Yes	Yes	Yes	Yes	No	No
Supports Y/C-3.58	No	Yes	Yes	Yes	No	No	No	Yes
Supports Y/C-688	No	Yes	...	No	No	No	No	Yes
Supports RGB	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Supports YCrCb	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Supports D-1 CCIR 601	Yes	Yes	Yes	No	No	No	No	No

Manufacturer	BTS	CEL Electronics	Central Dynamics	Faroudja Laboratories			For-A
Model	DNR7 ⁷	P164	STAGE 11 E-NTSC	CTE-2	LD-1	VHP-N/P	CT-600
Supports D-2	No	No	Yes	No	No	No	Yes
Dubbing applications	Yes	Yes	Yes	Yes	No	Yes	Yes
Production applications	Yes	Yes	Yes	Yes	Yes	Yes	Yes
On-air applications	...	Yes	Yes	Yes	No	Yes	No
Enhancement horizontal	...	Yes	Yes	Yes	Yes	Yes	No
Enhancement vertical	...	Yes	Yes	Yes	Yes	Yes	No
Noise reduction	C/L	No	No	No	Yes	No	No
Color correction	Yes	Yes	No	No	No	No	No
Contrast correction	...L	Yes	No	No	Yes	Yes	No
Sync regeneration	per CCIR	Yes	Yes	Yes	Yes	No	Yes
Full proc amp control	Yes	Yes	No	Yes	No	No	Yes
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	Yes	Yes	No	No	No
Improved NTSC encoding	...	No	Yes	Yes	No	No	...
Video bandwidth	per CCIR	5.5MHz	5.5MHz	6MHz	9MHz	4.2MHz	5MHz
Video S/N ratio	...	56dB	>60dB	>60dB	...	>60dB	>60dB
Envelope delay	...	Adj.	<10ns	<25ns	...	<20ns	...
Differential phase, gain	...	2°, 2%	...	1°, 1%	...	2.5°, 2.5%	1°, 1%
Reader Service No	1270	1271	1272	1273	1274	1275	1276

⁷Integration into various production configurations with CD7 encoder, DC7 decoder, D-1.

Manufacturer	Fougerolle Video			•DEN	Leitch Video	Sierra Video Systems	Sony
Model	MPV 2000 series	MPV 2000 series	MPV 3200 series	IVS-3 (-4/-5)	VPA-330/331 (310P)	Delta Series	BVX-D10
Standards conversion	Translators	Encoders	Translators	Translator	Signal processor	Format conversion	Format translation
Supports NTSC	No	No	No	No	Yes	No	Yes
Supports PAL	Yes	...	Yes	[-3 RGB to	310P	No	Yes
Supports SECAM	Yes	#2040/#2045	Yes	[YCrCb	No	No	No
Format conversion	...	No	...	[-4 YCrCb	No	Yes	Yes
Supports Y/C-3.58	No	No	No	[to RGB	No	No	...
Supports Y/C-688	No	No	No	No	No	No	...

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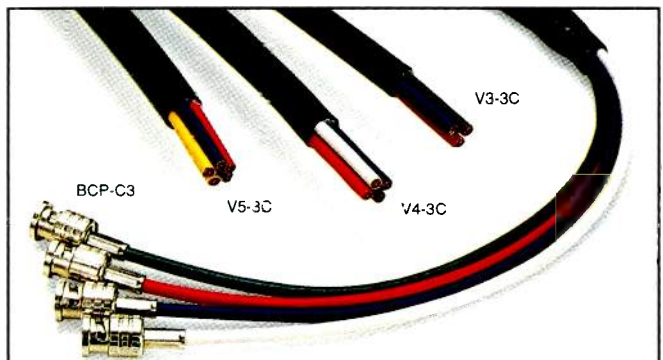
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Manufacturer	Fougerolle Video			I-DEN	Leitch Video	Sierra Video Systems	Sony
Model	MPV 2000 series	MPV 2000 series	MPV 3200 series	IVS-3 (-4/-5)	VPA-330/331 (310P)	Delta Series	BVX-D10
Supports RGB	Output	Yes	Output	Yes	No	Yes	Digital
Supports Y _C C _B	Output	Yes	Output	Yes	No	Yes	Digital
Supports D-1 CCIR 601	No	No	No	No	No	No	Yes
Supports D-2	No	No	No	No	No	No	Yes
Dubbing applications	Yes	Yes	Yes	Yes	Yes	No	Yes
Production applications	Yes	Yes	Yes	Yes	Yes	No	Yes
On-air applications	Yes	Yes	Yes	No	Yes	No	No
Enhancement	[#2050 PAL/SECAM	No	[#2050 PAL/SECAM	No	No	No	No
Noise reduction	[to SECAM	[MPV 2020 PAL	[to SECAM	[-5 converts	No	No	No
Color correction	[#2060 PAL/SECAM	[& SECAM auto	[#2060 PAL/SECAM	[CTDM & CTCM	Yes	No	[Gamma
Contrast correction	[to PAL	[select decoder	[to PAL	[component to	Yes	No	[Setup of RGB
Sync regeneration	[#2080 PAL/SECAM	[companion unit	[#2080 PAL/SECAM	[Y _C C _B	Yes	No	No
Full proc amp control	[to SECAM	No	[to SECAM	No	Yes	No	Yes
Programmable system	[#2070 PAL/SECAM	No	[#2070 PAL/SECAM	No	No	No	No
Time code control	[to PAL & SECAM	No	[to PAL & SECAM	No	No	No	No
RS 232 422 control	No	No	No	No	No	No	RS-422 comm.
Composite encoder	Yes	Yes	Yes	No	No	No	...
Improved NTSC encoding	No	No	No	No	No	No	No
Video bandwidth	3MHz	...	3MHz	-3dB 5.5MHz	±0.1dB 5MHz	20MHz	13.5MHz Y
Video S/N ratio	...	...	[#3300 translates	58dB	>60dB	60dB	...
Envelope delay	...	...	[RGB-YUV	...	...	5ns	...
Differential phase gain	...	...	[bidirectionally.	...	<0.2°, 0.5%	...	...
Reader Service No	1277	1278	1279	1280	1281	1282	1283

Manufacturer	Thomson Video Equipment	Vistek Electronics		
Model	COLORADO*	V1010 series	V4000 series	V4130 series
Standards conversion	Color correction	Format conversion	Transcoder	Encoders
Supports NTSC	No	...	Yes to PAL-M	3.58/4.43
Supports PAL	No	YUV	I, G, B, N	I/B/G/M/N
Supports SECAM	No	No	Yes	No
Format conversion	No	Yes	No	No
Supports Y/C-3.58	No	No	No	No
Supports Y/C-688	No	No	No	No
Supports RGB	Digital	Yes	Yes	Yes/YUV
Supports Y _C C _B	No	Yes	No	Yes
Supports D-1 CCIR 601	Yes	No	No	No
Supports D-2	No	No	No	No
Dubbing applications	Yes	Yes	Yes	Yes
Production applications	Yes	Yes	Yes	Yes
On-air applications	No	No	Yes	Yes
Enhancement	No	No	...	...
Noise reduction	...	No	[4021 PAL	[encoding and
Color correction	Yes	No	[4022 NTSC	[re-encoding of
Contrast correction	...	No	[decoder units	[original or
Sync regeneration	No	[Models for	[Units for	[decoded RGB
Full proc amp control	Yes	[conversion	[conversion	[or Y _C C _B
Programmable system	Yes	[among RGB	[between NTSC	[signals to a
Time code control	Yes	[RGS, and	[& PAL-M or	[composite output
RS-232/-422 control	Yes	[Y _C C _B	[PAL-I/B/G/N	...
Composite encoder	No	No	[to SECAM	Yes
Improved NTSC encoding	No	No	No	...
Video bandwidth	per CCIR 601	<0.1 5.5MHz	±1 5.5MHz	±0.2 5.5MHz
Video S/N ratio	per CCIR	>66dB	...	>64dB
Envelope delay	...	...	<20ns	<10ns
Differential phase gain	...	...	...	<0.1dB, <0.5°
Reader Service No	1284	1285	1286	1287

Cable Lengths vs. time delays and NTSC/PAL subcarrier degrees of phase

Cable length (feet)	Delay time (ns)	Degrees of phase NTSC	Degrees of phase PAL	Cable length (meters)	Delay time (ns)	Degrees of phase NTSC	Degrees of phase PAL
1	1.54	1.99	2.46	1	5	6.45	7.99
2	3.08	3.97	4.92	2	10	12.89	15.97
3	4.62	5.96	7.38	3	15	19.34	23.96
4	6.15	7.93	9.82	4	20	25.79	31.94
5	7.69	9.91	12.28	5	25	32.23	39.93
6	9.23	11.90	14.74	6	30	38.68	47.91
7	10.77	12.89	17.20	7	35	45.13	55.90
8	12.31	15.87	19.66	8	40	51.57	63.89
9	13.85	17.86	22.12	9	45	58.02	71.87
10	15.38	19.83	24.56	10	50	64.46	79.86
20	30.77	39.67	49.14	20	100	128.93	159.72
30	46.15	59.50	73.71	30	150	193.39	239.57
40	61.54	79.34	98.29	40	200	257.86	319.43
50	76.92	99.17	122.85	50	250	322.32	399.29
60	92.31	119.01	147.43	60	300	386.79	479.15
70	107.69	138.84	172.00	70	350	451.25	559.01
80	123.08	158.69	196.58	80	400	515.72	638.86
90	138.46	178.52	221.14	90	450	580.18	718.72
100	153.85	198.36	245.72	100	500	644.64	798.58

Extreme Measures

110.0
115.0
120.0
125.0
130.0
135.0
140.0
145.0
150.0

High-performance Audio Testing With System One + DSP
DESIGNING, MANUFACTURING and MAINTAINING high-performance analog & digital audio equipment places **extreme** demands on your test equipment. Your test set must have **extremely** low residual noise and distortion as well as **extremely** high accuracy... and the variety of systems under test calls for **extremely** flexible test set-up and control.

System One + DSP from **Audio Precision** is the solution. The trace below is a **System One + DSP** FFT spectrum display showing the residual distortion performance of our generator and analyzer. 2nd harmonic distortion of the sine wave is 125dB below the 1kHz fundamental level before nulling. The 3rd, 5th & 7th are all even lower!

This self test is typical of the high-performance, high-accuracy measurement capability of **System One + DSP**.

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- **Low residual THD + N** – Total analog system THD + N (22kHz bw) .001%. DSP analysis permits resolution of distortion as low as 145 dB below fundamental.

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0.0 5.00k 10.0k 15.0k 20.0k

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AUDIO SPECS

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AUDIO SPECS

Audio Products

Audio Mixers, On-Air

These audio consoles are desired primarily for radio with some TV applications; in general, the major need for control is that of level and L-R channel balance with little use of equalization and HP or LP filtering.

Manufacturer	AMEK Systems & Controls	Arrakis Systems	ATI/Audio Technologies	Broadcast Audio Corp.	Broadcast Electronics		Dorrough Electronics	EELA Audio
Model	BC II	15,000 (12000)	Vanguard BC8 (BC12)	Series VI	250A (350) ¹	MixTrak 90	Model 700	S-120 (SRM)
Modular system	Yes	Yes	Yes	Yes	No	Yes	No	Yes
Cue amp	Yes	Yes	Yes	Yes		Yes	Yes	Option
Automation port	Option	No	Opt	Yes	No	Limited	No	Opt (No)
Digital control	No	No (...)	Yes	No		No	No	No
Mono mix output	Yes	Yes	Yes	Yes	Opt	Yes	No	Opt
Telephone hybrid	No	No (...)	No	Opt	Option	No	No	Yes
Solid-state bus switching	...	Yes	Yes	Yes	No (Yes)	Yes	No	Yes
VCA gain control	Option	Yes	Yes	No	No	Yes	No	Yes
Compressor/limiter	Option	...	No	No		No	No	Yes
Pan pots	Yes	...	Yes	Option		No	No	Yes
Machine starts/stops	Yes	Yes	Option	Yes	No	Yes	No	Yes
Talkback circuitry	Yes	Yes	No	Yes		Yes	No	Yes
Speaker muting	Yes	...	Yes	Yes		Yes	Yes	Yes
Tone oscillator	Yes	...	No	Opt	No	...	No	Opt
Patch points	Yes	Yes	No	Yes		No	No	Opt
# of inputs (total)	12 (20/28)	8/18/28(56)	16-32	24 (72)	20 (22)	2x position	18	8-24
# of mixing positions	16 (24/32)	8/18/28(28)	8-12	8 (24)	10	12/18/21	7	8-24
# of mixing buses	6	3 (6)	4	2 (4)	2	2	3 Mono	8
Fader type	Slider	P&G slider	Rotary/slider	Slider	Rotary (Slider)	Slider	Rotary	P&G slider
Meter type	VU/PPM	VU/PPM	VU/PPM	VU/LED peak	VU		VU	VU/PPM
Filters	Option	...	...	...	...	...	...	HP
Input connection	A/TB 1.2k/20kΩ	AB	AB 20kΩ	A/TB 150/20kΩ	AB	1.5k/10kΩ	AB 150/UB 10kΩ	AB 2k/13k (1.7k)
Input range	+26dBu	20dB	-60/4dBu	-60/10dBv	-65/20dBv	-60/8dB	Mic/line	-55/20 (-72/22)
Output connection	A/TB >50kΩ	AB	AB 400Ω	TB 150Ω	TB 600Ω	Bal <100kΩ	600Ω	TB <40Ω
Output level max	26dBu	27dB	24dBm	28dBm	18dBm	+29dB	26dBm	21dB (6dB)
AF response dB/Hz-kHz	-1 20-20k	±0.5 20-20k	±0.25 20-20k	±0.5 20-20k	-1 30-20k	-0.25 20-20k	...	-1 20-20k
THD % +dB Hz	0.02	0.006 (0.01)	0.15	0.007	0.5 (0.075)	<0.05%	...	<0.03
S/N Mic EIn/Line dB	-128/81	-126/85(75)	-124/95	80dB	-120/68	>90dB	...	85dB (80dB)
Crosstalk (worst case)	<-90	<-75dB 20kHz	-74dB 10k	-80dB 15k	...	>80db	...	<-60dB 20-20k
Reader Service No	1022	1023	1024	1025	1026	1027	1028	1029

¹Other models available including 150 series with 5 and 8 mixing positions.

Manufacturer	EELA Audio	Hallikainen & Friends	Harris Broadcast	ITAME	Logitek	LPB Inc	MBI Broadcast Systems	McCurdy Radio
Model	S-240 (-90/-50)	TVA series	Medalist (AV)	Sierra 13S	T&2	SIGNATURE III	Series 24	Series S
Modular system	Yes (Yes/No)	No	Yes	Yes	Yes	Yes	Yes	Yes
Cue amp	Option	...	Yes	Yes	Yes	Yes	Yes	Yes
Automation port	Yes (Opt/No)	No	No	Yes	No	No	Rmt Ctl	...
Digital control	No	No	No	No	No	No	No	Yes
Mono mix output	Opt	Yes	Opt (Yes)	Yes	Yes	Opt	Yes	Yes
Telephone hybrid	Yes	No	No	Yes	No	No	No	Opt
Solid-state bus switching	Yes	...	Yes	Yes	No	No	No	Yes
VCA gain control	Yes	No	Yes	Yes	...	No	Opt	Yes
Compressor/limiter	Yes	No	No	Yes	No	No	Opt	...
Pan pots	Yes	No	No	No	No	No	Yes	...
Machine starts/stops	Yes	No	Opt (Yes)	No	Yes	Yes	Yes	Yes
Talkback circuitry	Yes	No	No	Yes	...	No	Yes	Yes
Speaker muting	Yes	No	Yes	Yes	Yes	Yes	Yes	No
Tone oscillator	Opt	No	No	No	No	No	Yes	...
Patch points	Opt	No	No	No	...	No	Yes	...
# of inputs (total)	28 (17/4)	36 +x6	24-36(36-72)	16	36	18-36	22-46	12-26
# of mixing positions	28 (17/4)	6	8-12 (12)	8	12	6-12	22-46	12-26
# of mixing buses	20 (8/2)	2 mono	2	8	2	2	6	3
Fader type	P&G slider	Rotary	Rot & (Slider)	Slider	Slider	Rotary	Slider	P&G faders
Meter type	VU/PPM/LED Peak	VU	VU	VU/PPM	VJ	...	VU/PPM	VU/PPM
Filters	HP	None	None	HP/LP	No	VU	HP	No
Input connection	AB 1.5k/12kΩ	Bal 150/15kΩ	AB 5kΩ	TB	AB 10kΩ	...	Bal	AB 150/20k
Input range	-70/22dB	-58dB mic	-60dBv/8dBm	-30/20dB	-60/23dBu	...	...	-70/8dBu
Output connection	TB <60Ω (50k)	Bal 600Ω	AB 20k	TB	AB 60k	TB 600Ω	Bal 600Ω	Bal 60k source
Output level max	20 (6/12)dB	+22dBm	24dBm	15dB	+23dBu	22dBm	+26dBu	28dBm
AF response dB/Hz-kHz	-1 20-20k	±1 20-20k	-0.5 20-20k	0.1 30-20k	±0.25 20-20k	1 20-20k	±0.25 40-20k	±0.5 20-20k
THD % +dB Hz	<0.03	<0.25%	0.05	0.1	0.006%	0.05	<0.1%	<0.1
S/N Mic EIn/Line dB	85dB	74dB	-127dBm	75dB	90dB	75dB	>80dB	<-125/>90
Crosstalk (worst case)	<-70dB 20-20k	-82dB	-85dB 15k	80dB 400Hz	...	-61dB 1kHz	<-75dB	>65B 20-20k
Reader Service No	1030	1031	1032	1033	1034	1035	1036	1037

Audio Mixers, On-air

Manufacturer	Pacific Recorders & Engineering			POWER/COMEL	Radio Systems	Solid State Logic	Sonosax Switzerland	Sony
Model	AMX	BMX II (III)	Stereomixer	PR1705	RS-6 (12/18)	SL 4000G	SX-V	MXP-2900
Modular system	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Cue amp	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Automation port	No	No	No	No	No	Yes	Opt	Opt
Digital control	No	No	No	No	Yes	Yes	Opt	No
Mono mix output	Option	Option	No	Yes	Yes	Yes	Yes	...
Telephone hybrid	No	No	No	w/dial	No	No	No	No
Solid-state bus switching	Yes	No (Yes)	Yes	Yes	Yes	No	No	Yes
VCA gain control	No	No	No	Yes	Yes	Yes	Option	...
Compressor/limiter	Opt	No	No	No	No	Yes	Yes	...
Pan pots	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Machine starts/stops	Yes	Yes	Yes	Option	Yes	Option	Option	Yes
Talkback circuitry	Yes	Yes	Yes	Yes	Yes	Yes	Option	Yes
Speaker muting	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Tone oscillator	Yes	No (Opt)	Yes	No	No	Yes	Yes	Yes
Patch points	Yes	Yes	Yes	...	Yes	Yes	Yes	Yes
# of inputs (total)	20-68	10-26(-34)	16	2x positions	12-36	24 to 96	10	2x positions
# of mixing positions	10-34	10-28	8	18	6-18	...	...	8-36
# of mixing buses	3	2 (3)	1	5	3	4	3	3
Fader type		Slider	Rotary	Slider	Slider	Slider	Slider	Slider
Meter type	VU/PPM	VU (& PPM)	VU	VU	VU; LED Peak	VU/PPM/bargraph	VU; LED peak	LED
Filters	HP/LP	...	HP/LP	HP; LP	...	HP/LP	HP	HP
Input connection		AB 40k Ω		200/600 TB	A 10k Ω	T/AB 1k/10k Ω	AB 10k Ω	TB 1.2k/10k
Input range	-10/8dBv	-40/8dBv(-10/8)	-10/8dBv	-60/+20dB	-60/10dBm	-80/24dBu	-85/6dBu	-62/24DBs
Output connection		AB 30k Ω	AB 80k Ω	TB	AB 100k Ω	A 75k Ω	AB 50k Ω	TB <100k Ω
Output level max	+28dBm	+26dBm	24dBm	+26dBm	22dBm	29dBu	24dBu	+24dB
AF response dB/Hz-kHz		-0.8/0 20-20k	-0.7 20-20k	\pm 0.5 20-20k	\pm 0.25 20-20k	\pm 0.5 20-20k	\pm 0.5 30-20k	-1.5 20-20k
THD % +dB Hz	<0.008%	<0.01 (<0.008)	<0.01	0.1%	0.02	0.2	0.01	0.1%
S/N Mic EIN/Line dB		-127/88	-126/88	-126dB EIN	-124/88	-127.5dBm	-129.2dBm	-122/85
Crosstalk (worst case)	-85dB	-80dB 1kHz	-70dB 1kHz	...	<-75dB 20kHz	-70dB 1kHz	80dB 20k	69dB 16kHz
Reader Service No	1038	1039	1040	1041	1042	1043	1044	1045

Manufacturer	Soundcraft	Studer	Ward-Beck	Wheatstone Corporation		
Model	SAC 200 (2000)	Studer 970	Series R	A-20/32	A-50	TV-500
Modular system	Yes	Yes	Yes	Yes	Yes	Yes
Cue amp	No	Yes	Yes	No	Yes	Yes
Automation port	Yes	...	Opt	No	No	No
Mono mix output	Yes	Yes	Yes	Yes	Yes	Yes
Telephone hybrid	Opt	...	Opt	No	No	No
Solid-state bus switching	No	Yes	Yes	No	No	No
VCA gain control	Yes	...	Yes	No	No	Option
Compressor/limiter	Yes	Yes	Option	No	No	No
Pan pots	Yes	Yes	Yes	No	No	Yes
Machine starts/stops	Yes	Yes	Yes	Yes	Yes	Yes
Talkback circuitry	Yes	Yes	Yes	Yes	Yes	Yes
Speaker muting	Yes	Yes	Yes	Yes	Yes	Yes
Tone oscillator	Yes	Yes	Opt	No	Opt	Yes
Patch points	Yes	Yes	Opt	Yes	Yes	Yes
# of inputs (total)	32-48	18/exp x9's	...	2/position	2/position	3/position
# of mixing positions	16-24	Various	14-22	10/16	8-12	24-56
# of mixing buses	3	Pgm; Aux	...	2	4	3
Fader type	Slider	Slider	Slider		Slider	
Meter type	VU/PPM	VU/Peak LED	VU/PPM	VU		VU/custom
Filters	HP/LP	HP/LP	HP	No	None	LP/HP
Input connection	AB 1k/10k Ω	A/TB >1.6k/10k Ω	Act 20k Ω	...	AB	A/BR; Xfmr
Input range	-80/30dBu	-60/21dBu	-60/15dBm	28dBu max	27dBu max	Mic/line
Output connection	AB	TB <40k Ω	Act	AB	AB	AB
Output level max	26dBu	6.15dBu	...	27dBu		30dBu
AF response dB/Hz-kHz	\pm 0.5 20-20k	-1/5 4.5-45k	\pm 0.5 20-20k	-0.25 20-20k		\pm 0.25 10-40k
THD % +dB Hz	0.02	<0.03	0.005	<0.003%		<0.007
S/N Mic EIN/Line dB	-128dBm	<-125/>95	-127/90	-128/88		...
Crosstalk (worst case)	-58dB 10kHz	>80dB	>90dB 30-15k	-65dB	-85dB 1Hz	-86dB 20k
Reader Service No	1047	1048	1049	1050	1051	1052

Editor's Note:

Information in this section of the **Broadcast Engineering Equipment Reference Manual** does not include every manufacturer, nor does it include every product by a manufacturer. The material included in this issue is derived from spec sheets provided by the manufacturers who responded to requests for most current information. Unfortunately, space considerations ruled out more detailed information on each product.

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Audio Mixers, Portable

Small mixing systems from ENG mic mixing to smaller production applications. Many can be carried by one person. Most allow use of mic and line level inputs either through switched or separate input circuits. **AB** active balanced; **TB** transformer balanced; **UB** unbalanced; **HP** high pass/low cut; **LP** low pass. When no model in a group includes a particular feature, that feature is not given for the group. Some include peripheral transport start/stop controls.

Manufacturer	Audio Services-Corp./ASC	Audio-Technica	Barco EMT	Broadcast Audio	Comrex	Fostex		Furman Sound
Model	MX-4-S	AT4462	EMT MM standard	System 6RM¹	STLX/SLX²	1240/1840/2440	280 Multitracker³	MM-4AB (MM-8AB)
Modular system	No	No	Yes	Yes	No	Yes	No	Yes
Cue amp	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Mono mix output	Yes	Yes	Opt	No	Yes	No	Yes	Yes
Telephone hybrid	No	No	No	No	Yes	No	No	No
Solid-state bus switching	No	No	Yes	No	No	No	...	No
VCA gain control	Yes	No	Opt	No	No	No	No	No
Compressor/limiter	Yes	Yes	Limit	No	AGC	No	Option	No
Pan pots	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Talkback circuitry	Yes	No	Yes	No	No	No	No	...
Speaker muting	No	No	Opt	Yes	No	No	No	...
Tone oscillator	Yes	Yes	Yes	No	...	No	No	No
Patch points	No	No	Yes	Yes	No	No	No	No
# of inputs (total)	4	4	60	12	4M/2L	12/18/24	8	4M/1S (11)
# of mixing positions	...	4	...	6	4	12/18/24	8	(4)
# of mixing buses	2	L/R	18	2	1 mono	4	4	3
# of groups/subgroups	...	No	16/6	...	...	4	4	...
Fader type	Rotary	Rotary	Slider	Rotary	Slider	Slider	Slider	Rotary
Meter type	...	VU	Bar graph	VU	VU	LED	LED	(LED)
EQ types	Swept	No	...	...	None	Parametric	3-band	...
Filters	HP	HP/Low cut	...	...	None	Shelving	HP/LP	HP
Input connection	AB 173Ω	Bal 1.5k/47kΩ	2kΩ/10kΩ	AB/TB	Bal 150/500Ω	3kΩ/16kΩ	10k/20kΩ	A (600Ω)
Input range	...	-15/+22dB	-66/24dBm	-67/+10dBv	-70/+8dBm	-10/+25dBV	-60/-10dBV	-75/18dBV(-60/18)
Output connection	AB	Bal >10Ω	<35Ω	TB	Bal 600	UB 10kΩ	UB >10kΩ	A (200Ω)
Output level max	...	+22dB	+20dBm	+28dBm	+24dB clip	+15dBV	10dBV	23dBV (21)
AF response (±dB Hz)	...	-3, 1 20-20k	-1, 0.5 30-15k	±0.5 20-20k	±0.5 50-15k	-1.5, 1 20-20k	20-20k	-3 20-20k
THD	0.03% 1kHz	<0.1%	0.08%	0.1%	0.5%	0.05%	<0.05%	0.02%
S/N (Mic EIN/Line) dB	...	<-127dBm	-126dBm/85dB	80dB	-127dBm/80dB	-125/48	-70-80dB	-126/-118dBV
Crosstalk (worst case)	...	65dB L-R	-70dB	-80dB	...	65dB	60dB	-40dB 20kHz
Weight (portable) lb	12 lbs	>5 lb	61.6 lbs	25 lbs	18 lbs	53/70/88	11	6 lbs
Power source (portable)	48Vdc	12-18Vdc/2-9V bat	90Vac	115Vac	Vac cr Nicad	33W/37W/45W	22W	115/230Vac
Reader Service No	1053	1054	1055	1056	1057	1058	1059	1060

¹ May configure for on-air use. ² STLX includes 2-line frequency extender; SLX 1-line frequency extender. ³ Includes 4-track cassette ATR.

Manufacturer	MBI Systems	Neve Electronics	Pacific Recorders & Eng.	Panasonic/RAWSA		Shure Brothers		Sonosax
Model	Series 12	542 range	NewsMaker	WR-133	WR-S208 (212/216)	FP32 (FP31)	FP51 (FP42)	SX-PR series
Modular system	No	Yes	Yes	No	No	No	No	Yes
Cue amp	Yes	Yes	Yes	No	Yes	No	Yes	No
Automation port	Rmt Ctl	No	No	No	No	...	No	No
Mono mix output	Yes	Yes	Yes	Yes	Yes	No (Yes)	Yes (No)	No
Solid-state bus switching	...	No	Yes	No	No	No	No	No
VCA gain control	Yes	No	No	No	No	Yes	Yes	No
Compressor/limiter	Yes	...	Opt	No	No	Yes	Yes	Yes
Pan pots	No	Yes	No	Yes	Yes	Yes (No)	No (Yes)	Yes
Talkback circuitry	Yes	...	Yes	No	Yes	No	...	Yes
Speaker muting	Yes	Yes	Yes	No	No	...	...	No
Tone oscillator	No	Yes	Yes	No	Yes	No (Yes)	Yes	Yes
Patch points	Yes	Yes	Yes	No	Yes	No	Yes	No
# of inputs (total)	12	Various config.	16	8+3	8 (12/16)	3	4	2 to 6
# of mixing positions	8	...	8	8	8	3	4	...
# of mixing buses	3	4	2	4	5	2 (1)	1 (2)	2
# of groups/subgroups	...	...	...	2/2	2 G/3 S	...	...	...
Fader type	Opt pack	Slider	Rotary	Slider	Slider	Rotary	Rotary	Rotary
Meter type	VU/PPM	...	VU	VU	LED	VU	VU	VU/LED peak
EQ types	None	Presence	Param/Swept	Fixed bass/treble	Sweep	...	...	...
Filters	None	LP/HP	HP/LP	...	...	HP	HP	HP
Input connection	T/AB 1k/10kΩ	1.2k/10k Bal	AB 40kΩ	AB	A 5k	TB 1kΩ	TB 1kΩ	AB >10k
Input range	Mic/line	40dB headroom	-10/8dBv	-50/0dBu	-60/10dBu	Mic/line	Mic/line	-98/6dBu
Output connection	TB 75Ω	50Ω Bal	AB 80Ω	TB	50Ω	330Ω (TB 150)	TB 185Ω	AB <50Ω
Output level max	22dBu	>20dBu	+24dBm	+20dBu	20dBu	+18dBm	+18dBm	21dBu
AF response (±dB Hz)	0, -1 20-20k	±0.5 30-20k	-0.7 20-20k	-2, +0.5 20-20k	-1, -5dB 20-20k	-3, +1(±2) 30-15k	±2(-3, 1) 30-20k	±0.5 30-20k
THD	0.5%	<0.8%	<0.01%	0.1%	0.03%	0.25%	0.4%	0.01%
S/N (Mic EIN/Line) dB	>78dB	-125dBu	-126dBm/88dB	-129dBm	-128dBm	-129dBm EIN	-129dBm EIN	-129.6
Crosstalk (worst case)	<-62dB	<-70dB	-80dB 1kHz	-45dB/10kHz	-60dB 1kHz	45dB 1kHz	(-50dB/1kHz)	80dB
Weight (portable) lb	...	...	...	22 lbs	33 lbs	2.5 lbs (2.2)	6 lbs	4.88 lbs
Power source (portable)	110-240Vac	...	...	120Vac 14W	120Vac	18Vdc	Vac/27Vdc	3Vdc
Reader Service No	1061	1062	1063	1064	1065	1066	1067	1068

Manufacturer	Sonosax	Sony			Stellavox	Studer		
Model	SX-S6 (8/10)	MX-P42	MX-P61VU/PK	MXP-210 (290)	AMI 48	961/962	C279 Compact	Studer A779
Modular system	Yes	No	Yes	No	Yes	Yes	No	No
Cue amp	No	...	Yes	Yes	Yes	Yes	Yes	Yes
Mono mix output	Yes	...	...	L or R	...	Yes	No	...
Solid-state bus switching	No	No	...	(-290)	No	...	Yes	Yes
VCA gain control	No	No	No	(-290)	...	...	Yes	Yes
Compressor/limiter	Yes	Yes	Yes	No	Yes	Yes	No	No
Pan pots	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Talkback circuitry	Opt	No	Yes	Yes	No	Yes	Yes	Yes
Speaker muting	No	No	...	Yes	No	Yes	Yes	...
Tone oscillator	Yes	Yes	Yes	Yes	Yes	Yes	Option	No
Patch points	Yes	No	No	...	Expansion	Yes	Yes	Yes
# of inputs (total)	6/8/10	6	17	9	5	18	12	6
# of mixing positions	...	4	12	4	5	18	6	1
# of mixing buses	3	L/R	3	L/R	1	6	4	2
# of groups/subgroups	...	...	...	...	None	4-main 2-aux	No	No
Fader type	Slider	Rotary	Slider	Slider	Slider	Slider	Slider	Slider
Meter type	VU/LED peak	VU	VU/PPM	LED	Analog meter	VU or PPM	LED w/peak	LED peak
EQ types	Swept	No	3-band	3-band	No	Yes	Swept	Swept
Filters	HP	HP	LP/HP	HP	Baxandall	HP	LP/HP	HP
Input connection	A 10k	Bal	Bal/Unbal	Bal 6k/47k Ω	200 Ω bal	1.6k/10k	1.2k/47k	A/T >47k
Input range	-85/6dBu	Mic/line	Mic/line	-60/24dBs	0.15m-12V	-69/21dBu	-66/10dBv	-66/10dBv
Output connection	A/T <50 Ω	Bal	Bal/Unbal	Bal 600 Ω /10k Ω	200/600 Ω	<40 Ω	<50 Ω <1k Ω	A/T <50 Ω
Output level max	24dBu	Mic/line	...	15dBs	1V	24dBm	24dBv	24dBv
AF response (\pm dB Hz)	\pm 0.5 30-20k	\pm 1 30-20k	\pm 0.5 30-20k	-1.5, .5 20-20k	30-20k	-1, 0.5 4.5-45k	\pm 1 20-20k	\pm 1 20-20k
THD	0.01%	...	...	<0.3%	<0.2%	<0.03%	<0.03%	0.03%
S/N (Mic EIN/Line) dB	-129.2	...	...	-126/80dB	...	<-125/>95	-125/>86	-65/86
Crosstalk (worst case)	-80dB 20kHz	...	...	<-70dB	0.1%	<-90dB	...	...
Weight (portable) lb	14.8lbs	...	...	16.5 lb	9.9 lb	55-75 lbs	24.2 lbs	24.2 lbs
Power source (portable)	9-15Vdc	9Vdc; 12Vdc	110/220Vac	24W ac	12V	110/220Vac	100-240Vac	110/220Vac
Reader Service No	1069	1070	1071	1072	1073	1074	1075	1076

Manufacturer	TASCAM				Unitronic	Vortex Comm.	Yamaha Music Corporation	
Model	M-106	M06 ST	M208 (M216/M224)	M308 (M312/M320)	Remote mixer	PFM-312	M406	MR1642 (1242/842)
Cue amp	No	No	No	No	Yes	Yes	No	Yes
Mono mix output	No	No	No	No	Yes	Mono only	No	Yes
Telephone hybrid	No	No	No	No	Yes	No	No	No
Telephone dial	No	No	No	No	Yes	No	No	No
Compressor/limiter	No	No	No	No	Yes	1/channel	No	No
Pan pots	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Talkback circuitry	...	No	No	...	...	No	No	Yes
Tone oscillator	No	No	No	No	Yes	1kHz	No	No
# of inputs (total)	6	6	8 (16/24)	8 (12/20)	3; expandable	3	6	16 (12/8)
# of mixing positions	6	No	8 (16/24)	8 (12/20)	3	3	...	16 (12/8)
# of mixing buses	4	No	4	...	1; expandable	1 morro	2	4 [2]
# of groups/subgroups	...	No	4/2	...	...	...	2	4/2 [2/5]
Fader type	Slider	Slider	Slider	Slider	Slider	Rotary	Rotary	Slider
Meter type	VU	VU	VU/Peak LED	VU/Peak LED	VU	LED bargraph	VU/LED peak	VU/LED peak
EQ types	Swept	Swept	Swept	Swept	...	None	...	Swept
Filters	...	...	...	...	...	None	...	...
Input connection	UB 100k	UB 100k	A 2.8k/22k	A 2.8k/22k	Bal floating	1k/6k	3k Ω	10k [4k]
Input range	-70/4dBV	-70/4dBV	-70/24dBV	-70/24dBV	...	-14/+22dBm	-60/24dB	-60/20dBV
Output connection	UB 100 Ω	UBb 220 Ω	100 Ω	100 Ω	Bal floating	50	150 Ω	150 Ω
Output level max	18dBV	0dBu	20dBV	20dBV	[Mixer and	+16 to 600 Ω	24dB	24dBV
AF response (\pm dB Hz)	-2, 1dB 20-20k	-2, 1 20-20k	-2, 1 20-25k	-2, 1 20-25k	[expansion	\pm 1 20-20k	-3, 0 20-20k	-3, 1 20-20k
THD	0.01%	0.025%	0.025%	0.025%	[slave units	<0.02%	0.1%	0.1%
S/N (Mic EIN/Line) dB	70dB	51dB (78dB)	83dB	83dB	[packaged in	...	95dB	90dB [92dB]
Crosstalk (worst case)	<-60dB	<-60dB	<-60dB	<-60dB	[brief case	...	-60dB/1kHz	-60dB
Weight (portable) lb	15.4 lbs	5.73 lbs	18.75 lbs	18.75 lbs	[or suitcase.	2 lbs	21 lbs	...
Power source (portable)	110/220Vac	110/220Vac	110/220Vac	110/220Vac	ac/dc	2x9Vdc	120Vac	...
Reader Service No	1077	1078	1079	1080	1081	1082	1083	1084

Audio Mixers, Studio Production/Recording

Manufacturer	Allen & Heath			AMEK Systems & Controls	AMS/Calrec	Arrakis Systems	Auditronics	
Model	SABER series	SIGMA series	System 8 series	Classic	EDIT 1	Virtual console	10,000 series ¹	310 series ²
Modular system	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Cue amp	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Automation port	Yes	Yes	No	Yes	for editor	Yes	Yes	Yes
Digital control	Yes	Yes	No	Opt	Yes	Yes	Yes	No
Digital processing	No	No	No	No	[Digitally	[Digitally	No	...
Mono mix output	Yes	Yes	No	Yes	[assignable	[assignable	Yes	...

Audio Mixers, Studio Production/Recording

Manufacturer	Allen & Heath			AMEK Systems & Controls	AMS/Calrec		Arrakis Systems	Audiotronics
	SABER series	SIGMA series	System 8 series		Classic	EDIT 1			Virtual console	10,000 series^{1}	310 series^{2}
Model								
Solid-state bus switching	No	No	No	No	[99 setup	[memories	Yes	Yes
VCA gain control	No	Opt	No	Opt	[memories	Yes	Yes	Yes
Compressor/limiter	No	No	No	Opt	Yes	Yes	Yes	Yes
Pan pots	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Machine starts/stops	Opt	No	No	Yes	Opt	Opt	Yes	Yes
Talkback circuitry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Speaker muting	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tone oscillator	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Patch points	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# of inputs (total)	40 (16, 24, 32)	32 (24, 40, 44)	24 (16)	32 (48, 64)	256 possible	128 (48/72)	48	16-40
# of mixing positions	40 (16, 24, 32)	32 (24, 40, 44)	24 (16)	44 (60, 76)	8	32	24	...
# of direct outputs	40 (16, 24, 32)	32 (24, 40, 44)	24 (16)	40 (56, 82)	...	24 or 32	24	16-40
# of mixing buses	16	24	8	28	1 stereo pair	4 stereo	8	4, 8
# of groups/subgroups	16 G/16 S (8)	In line	8 G/8 S	2ST/8ST	2 aux out	8 (8/16)	8	4 groups
# of sends/returns	6 S/4 R	32 S/32 R	3 S/2 R	8mono/8stereo	...	24 Sends	4	4S, 4R
Fader type	Slider	Slider	Slider	Slider	Rot Lin motorized	Slider	Slider	P&G slider
Solo type	PF, IP	PF, AF, IP	PF	PF, AF, IP	AF, PF, IP	AF, PF, IP	PF, AF	In-place
Meter type	VU	VU	VU	LED VU/PPM	Bargraph	VU, PPM	VU, PPM	VU
EQ types	Swept	Parametric	Swept	Parametric	2-/4-band	Parametric	Parametric	Swept
Filters	HP	HP	...	HP	LP	LP, HP	LP, HP	HP
Input connection	A 3k Ω	A 3k Ω	A 3k Ω	A 20k Ω	Anal/digital	AB 10k Ω /20k	AB	A 1k/50k Ω
Input range	-66, 6dB	-66, 6dB	-66, 6dB	-75, 26dB	1500dB range	28dBu max	Mic/line level	...
Output connection	A 50 Ω	A 50 Ω	A 50 Ω	A/T <50 Ω	Anal/digital	TB 600 Ω	AB	A 60 Ω
Output level max	27dBu	27dBv	21dBv	26dBu	...	22dBu	+27dBV	+24dBv
AF response \pm dB Hz-kHz	-1 20-20k	+1 20-20k	\pm 1 20-20k	\pm 1 20-20k	...	0.5 20-20k	0.5dB 20-20k	-0.5 20-20k
THD	<0.02%	<0.02%	0.05%	0.03%	...	0.02%	0.01% +18 20kHz	0.05%
S/N mic EIN/line dB	-127dBm	-127dBm	-125dBm	-127dBm/85dB	...	-126dBm/80dB	-127dBm/75dB	-129/84
Crosstalk (worst case)	-65dB 1kHz	-70dB	60dB	System dependent	...	...	-75dB 20Hz 20dB	-65 20kHz
Reader Service No	861	862	863	864	865	866	867	868

¹ Available in on-air formats. ² Expands in groups of 8.

Manufacturer	Audiotronics		Barco EMT	Broadcast Audio	Broadcast Electronics		For-A	Fostex
	400 series	900 series			EMT MM40	Series IV ³			350A	Mix Trak-90	AFV-500	1240 (2440)
Model								
Modular system	Yes	Yes	Yes	Yes	No	Yes	Yes	No
Cue amp	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Automation port	Yes	Yes	No	Yes	No	Yes	Yes	No
Digital control	No	Yes	No	No	No	Yes	Yes	No
Digital processing	No	...	No	No	No	No	No	No
Mono mix output	Yes	...	Opt	Yes	Opt	Opt	Yes	No
Solid-state bus switching	Yes	Yes	Yes	Yes	Yes	No	...	No
VCA gain control	Yes	Yes	Opt	No	No	Yes	...	No
Compressor/limiter	Yes	Yes	Yes	No	No	No	No	No
Pan pots	Yes	Yes	Yes	Opt	No	Yes	Yes	Yes
Machine starts/stops	Yes	Yes	Yes	Yes	No	Opt	...	No
Talkback circuitry	Yes	Yes	Yes	Yes	Yes	Opt	...	No
Speaker muting	Yes	Yes	Opt	Yes	Yes	Yes	Yes	No
Tone oscillator	Yes	Yes	Yes	Opt	No	No	Yes	No
Patch points	Yes	Yes	Yes	Yes	No	Yes	Opt	No
# of inputs (total)	18-24	32	60	18-48	22	24-48	8	24-48
# of mixing positions	...	...	...	6-16	10	12-24	8	...
# of direct outputs	18-24	...	1/channel	3-7	0	3	2	12-24
# of mixing buses	4 or 8	4, 8	32	2-4	2	6	2	4
# of groups/subgroups	...	4 groups	24 G/6 S	User defined	...	...	...	4
# of sends/returns	2 S/2 R	...	12 S/8 R	2R/Defined sends	...	...	...	4
Fader type	Slider	Slider	Slider	Slider	Slider	Slider	...	Slider
Solo type	In-place	In-place	...	PF	...	...	...	IP
Meter type	VU, LED peak	VU	Bargraph	VU, peak LEDs	VU	VU, PPM, LED	VU	LED peak
EQ types	Swept	Swept	...	Swept	...	Parametric	...	Parametric
Filters	LP, HP	LP, HP	...	...	...	HP, LP	...	...
Input connection	A 1k/50k Ω	A 1k/50k	2k/10k Ω	AB/TB 150/20k Ω	A	AB >10k Ω	A 600 Ω	A 7k Ω
Input range	-65, 8dBu	...	...	-60, 10dBm	...	-65, 13dBu	-12, 24dB	-70, 15dBV
Output connection	A 60 Ω	A 60 Ω	<35 Ω	TB 150 Ω	T	A <100 Ω	...	...
Output level max	24dBm	+24dBv	20dBm	28dBm	18dBm	26dBu	0, 24dB	15dBV
AF response \pm dB Hz-kHz	0.5 20-20k	-0.5 20-20k	-1, +.5 30-15k	\pm 0.5 20-20k	-1 30-20k	-0.25 20-20k	...	\pm 1 20-20k
THD	0.05%	0.05%	0.08%, +6dBm, 1kHz	0.007% +28dBm	0.5% +18 20-20k	0.05% 0 20-20k	0.15% +20 15kHz	0.05% 1Hz
S/N mic EIN/line dB	-127.5/84	-129/84	-126dBm/85dB	80dB	-120dBm/68dB	-128dBm/90dB	>90dB	52dB (48dB)
Crosstalk (worst case)	-65dB 20kHz	-65dB 20kHz	-70dB/15Hz+6dB	-80dB 1.5kHz +8dBm	...	<-80dB 20-20k 0dB	\hat{a} -20dB 30Hz	-65dB 1kHz
Reader Service No	869	870	871	872	873	874	875	876

³ Usable in on-air applications.

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Audio Mixers, Studio Production/Recording

Manufacturer	Graham-Patten Systems	Grass Valley Group	ITAME	LPB Inc	McCurdy Radio Industries	Neve	Pacific Recorders & Eng.
Model	ESAM series ⁴	AMX-170S ¹	Sierra 19S	CITATION II	SS 8800E ⁵	51 ser/V-Post	ABX ⁶
Modular system	Yes	No	Yes	Yes	Yes	Yes	Yes
Cue amp	No	No	Yes	Yes	Yes	Opt	Yes
Automation port	To editor	Yes	Yes	No	No	Opt	No
Digital control	Yes	Yes	No	No	No	Opt	No
Digital processing	...	No	No	No	No	No	No
Mono mix output	Yes	No	Yes	Yes	Yes	Yes	Opt
Solid-state bus switching	Yes	Yes	Yes	No	Yes	No	No
VCA gain control	...	Yes	Yes	No	No	No	No
Compressor/limiter	No	No	Yes	No	Opt	Opt	Opt
Pan pots	No	No	No	No	Yes	Yes	Yes
Machine starts/stops	...	No	No	Yes	Yes	Opt	Yes
Talkback circuitry	No	No	Yes	No	Yes	Yes	Yes
Speaker muting	No	Yes	Yes	Yes	Yes	Yes	Yes
Tone oscillator	No	Yes	No	No	Opt	Yes	Yes
Patch points	Yes	No	No	No	Opt	Opt	Yes
# of inputs (total)	12-16	8, 16	26	30	20-48	24-60	36-68 ⁶
# of mixing positions	12-16	1	14	10	10-24	1-4	18-34
# of direct outputs	12-46	...	26	6	...	24-60	18-34
# of mixing buses	2	4	14	2	6	2-8	12 (3)
# of groups/subgroups	...	2	1	...	...	48G (4/8)	9 (...)
# of sends/returns	...	4	2	1	...	8S/8R (4, 4)	4/2 (2/1)
Fader type	Slider	Slider	Slider	Slider	Slider	Slider	Slider
Solo type	...	...	IP	...	...	PF, AF, IP	PF, AF
Meter type	VU analog	VU, PPM, LED	VU, PPM	VU	VU, PPM, LED	VU, PPM, LED	VU, PPM
EQ types	Programmable	Fixed freq	Parametric	...	Param, Swept	Parametric, swept	Param/Swept
Filters	No	LP, HP	HP, LP	...	LP, HP	HP, LP	HP, LP
Input connection	Opt TB >20kW	A Hi-Z	TB	TB	AB 150/20kΩ	AB/TB 10kΩ	AB 40kΩ
Input range	...	-40, 8dBu	-30, +20dB	-65, -10dBm	-70, +10dBu	-10, 10dB	-10, 8dBv
Output connection	3/2 20kΩ	A 60kΩ	TB	TB	AB 600Ω	AB/TB 30Ω	AB 30Ω
Output level max	+8dBu max nom.	20dBm	+15dB	+22dBm	+24dBm	+26dBm	+28dBm
AF response ±dB Hz-kHz	±0.5 20-20k	-0.3 20-20k	0.1dB 30-20k	1.0dB 20-20k	±0.5 30-15k	...	-0.8, 0dB 20-20k
THD	<0.1% 16dBu	0.03% +4 20-20k	0.1%	0.03% 8dBm	<0.1% +18 20-20k	...	<0.008% 28 20-20k
S/N mic EIN/line dB	...	89dB	75dB	75dB	-125dBm/90dB	...	-127dBm/88dB
Crosstalk (worst case)	<-82dB 15kHz	-75dB/20kHz/+4dB	-80dB/400Hz/12dB	-65dB/1kHz/8dB	-65dB 15k +18dB	...	-85dB 1kHz 28dB
Reader Service No	877	878	879	880	882	883	884

⁴Editing suite mixer system. ⁵Available in on-air format. ⁶Inputs vary from 20 to 68 in groups of 8 with 2 inputs per fader

Manufacturer	Pacific Recorders & Eng.	Panasonic/RAMSA		Scantex	Solid State Logic		Sonosax Switzerland	Sony
Model	STX	WR-M10A	WR-T820B	AFDM-208 AEM	SL 5000M ser ⁷	SL 6000G ser ⁷	SX-T ⁷	MXP-2000
Modular system	Yes	No	No	Yes	Yes	Yes	Yes	Yes
Cue amp	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Automation port	No	No	No	Yes	Yes	Yes	Opt	Yes
Digital control	No	No	No	Yes	Yes	Yes	Opt	via editor
Digital processing	No	No	No	No	No	No	No	No
Mono mix output	Opt	Yes	Yes	Yes	Yes	Yes	Opt	Yes
Solid-state bus switching	Yes	No	No	Yes	Yes	No	Yes	No
VCA gain control	No	No	No	Yes	Yes	Yes	Opt	Yes
Compressor/limiter	Option	Yes	No	No	Yes	Yes	Opt	Yes
Pan pots	Yes	No	Yes	No	Yes	Yes	Yes	Yes
Machine starts/stops	Yes	Yes	No	No	Opt	Opt	Yes	Yes
Talkback circuitry	Yes	No	Yes	No	Yes	Yes	Yes	Yes
Speaker muting	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Tone oscillator	Yes	No	Yes	No	Yes	Yes	Yes	Yes
Patch points	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
# of inputs (total)	156-252	4+8	20+20	16	to 96	24 to 96	10-32	16-36
# of mixing positions	26-42	6	20	16	1 to 3	One	...	16-36
# of direct outputs	...	3	20+10	16	1 per channel	Option	8-16	16-36
# of mixing buses	15	2	14	4	32	6	8-16	4+2
# of groups/subgroups	...	2 G/1 S	8 G/4 S	2	Variable	1-32/1-32	8	4+2-G, 4R
# of sends/returns	12/1	1 S/1 R	4+20 S/8+20 R	...	8 S/# of channels	6 S/8 R	2	4S, 4R
Fader type	Slider	Slider, rotary	Slider	Slider	Slider	Slider	...	Slider
Solo type	...	...	AF	None	PF, AF, IP	PF, AF, IP	PF, AF, IP	PF, AF
Meter type	VU, PPM	LED Peak	VU, LED peak	VU	VU/PPM, LCD	VU PPM, Plasma	VU	LED peak
EQ types	...	Fixed Base, Treble	Swept	None	Parametric	Parametric	Swept	Swept
Filters	HP/LP	...	HP	None	HP, LP	HP, LP options	HP	HP
Input connection	AB 40kΩ	AB 5kΩ	AB 5kΩ	600/10kΩ	T/AB 10kW	TB/AB 1k/10kW	...	A/TB10kΩ
Input range	-15/10dBv	-60, -6dBu	-60, +10dBu	+24dBu	-80, +16dBu	-80, +24dBu	-85, +6dBu	+27dBm max
Output connection	AB 30Ω	TB 50kΩ	AB 50kΩ	40Ω	AB 30Ω	AB 75Ω	AB/TB	A/TB 50Ω
Output level max	28dBm	+4dBu	+20dBu	+25dBm	+28dBu	+29dBu	+24dBu	+25dBm
AF response ±dB Hz-kHz	-0.9 20-20k	-1, +0.5 20-20k	-0.8, +0.5 20-20k	±0.1 20-20k	±0.5dB 20-20k	±0.5dB 20-20k	±0.5 20-20k	±0.5dB 30-20k
THD	<0.1	0.1% +18 20-20k	0.08% +18 20-20k	0.03%	0.08% +24 1kHz	0.02% +8 1kHz	0.01% 6 20-20k	0.05% 20dB 1kHz
S/N mic EIN/line dB	-127/88	-125dBm EIN	-128dBm EIN	75dB	-125 dBm	-127.5dBm	-129.2dBm	-126dBm EIN
Crosstalk (worst case)	-80dB 1kHz	-65dB	-60B 1kHz	-70dB 15kHz	-80dB/15kHz/+4dB	-70dB/1kHz/+4dB	-80dB/20k/0dB	60dB 15kHz
Reader Service No	885	886	887	888	889	890	891	892

⁷Configures for on-air operations.

Manufacturer	Sony	Soundtracs Plc			Studer	TASCAM		
Model	VSP-8000	ERIC series	IL4832 (3632)	900 series ⁹	Model 963	M-3500	M-600	M512 (M520)
Modular system	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cue amp	Yes	No	No	Yes	Yes	Yes	Yes	No
Automation port	from editor	No ⁸	No	Yes	No	...	...	Yes
Digital control	Yes	Yes	No	Yes	No	No	No	No
Digital processing	Yes	No	No	No	No	No	No	No
Mono mix output	[48, 44.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Solid-state bus switching	[or 44.056kHz	Yes	No	Yes	...	No	Yes	No
VCA gain control	[32-bit sampling	No	No	Yes	...	...	Yes	No
Compressor/limiter	Yes	No	No	Yes	Yes	No	No	No
Pan pots	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Machine starts/stops	...	Yes	No	Yes	Yes	No	No	No
Talkback circuitry	...	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Speaker muting	...	Yes	Yes	Yes	Yes	Yes	Yes	No
Tone oscillator	...	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Patch points	Yes	Yes	Yes	Yes	Yes	...	Yes	Yes
# of inputs (total)	16 or 32 dig	32-48	48 (36)	28	24-60	24, 32	24, 32	12 (20)
# of mixing positions	16 or 32	...	...	41	24-60	24, 32	24, 32	12 (20)
# of direct outputs	...	32-48	48 (36)	24	56	...	16	12 (20)
# of mixing buses	4 out dig	8-24	32	24	2 master	4 aux	Program	3 stereo pairs
# of groups/subgroups	...	8-24	32 In line	8	4 or 8	8 groups	...	8
# of sends/returns	...	8	8 S	Various config.	Various config.	6 send/4 ret	8 aux	4
Fader type	Slider	Slider	Slider	Slider	Slider	Slider	Slider	Slider
Solo type	...	PF, AF, IP	PF, AF, IP	PF, AF	AF	IP/PFL	In-place	PF, AF, IP
Meter type	201-seg plasma	LED peak	LED Peak	VU	VU	bar graph	Bargraph	Analog
EQ types	4-band	Parametric	Parametric	Parametric	3-band	4-band	4-band	Swapt
Filters	HP/LP	Swept HP	HP	HF roll-off	HP	HP	HP	...
Input connection	XLR-3-31	AB 710k Ω	AB	T/A $\geq 1.6k/\geq 10k\Omega$	TB >5k Ω	Bal 2.2k/16k Ω	Bal 2.2k Ω	AB 2k/100k Ω
Input range	Per AES/EBU	-60, +10dB	-60, +10dB	-70, +20dBu	-70, +21dBu	-67, +4dBm	-68dBm nom.	-60, +18dBv
Output connection	XLR-3-32	AB <75 Ω	AB	TB $\leq 50\Omega$	TB <50 Ω	Bal 75 Ω	Bal 100 Ω	AB 100 Ω
Output level max	...	+24dBV	+26.3dBV	+24dBm	+24dBm	+25dBm	+4dBm nom.	+28dBm
AF response \pm dB Hz-kHz	-1, +0.5 20-20k	-2, 0dB 20-20k	-2, 0dB 20-20k	-1, +0.5 30-20k	-1, -0.5 4.5-40k	-1.5, +0.5 20-20k	-1.5, +0.5 20-20k	\pm 1dB 20-20k
THD	...	0.008% 0dB 1kHz	0.008% 0dB 1kHz	<0.1%	0.03%	<0.018%	<0.015%	0.025% 1kHz
S/N mic EIN/line dB	...	-127.5dBm	-127dBm	-125dBm/>100dB	<-125dBu/ \leq 95dB	-130dBm/85dB	-130dB/88dB	87dB unwt'd
Crosstalk (worst case)	...	-82dB/1kHz/0dB	-82dB/1kHz/0dB	<-85dB	>90dB	<59dB	<60dB	<-70dB 1kHz
Reader Service No	893	894	895	896	897	898	899	900

⁸ERIC III offers moving faders. ⁹Custom configurations available.

Manufacturer	TASCAM	Trident Audio	Ward-Beck	Wheatstone	Yamaha Music Corporation			
Model	M600 (M700)	Vector 432	ST ser. (ST2442)	SP-5	MC2404 series	PM1800 series	PM2800M-40 (32)	PM3000 ser/40C
Modular system	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cue amp	No	Opt	Yes	No	Yes	No	No	No
Automation port	Yes	Yes	Opt	No	No	No	No	No
Digital control	No	No	Yes	No	No	No	No	No
Digital processing	No	No	No	No	No	No	No	No
Mono mix output	No	Opt	Yes	Opt	Yes	Yes	Yes	Yes
Solid-state bus switching	No	Yes	No	No	No	No	No	No
VCA gain control	No	Opt	Opt	No	No	Yes	Yes	Yes
Compressor/limiter	No	Yes	Opt	No	No	No	No	No
Pan pots	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Machine starts/stops	No	Yes	Yes	No	No	No	No	No
Talkback circuitry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Speaker muting	No	Yes	Yes	Opt	Yes	Yes	Yes	Yes
Tone oscillator	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Patch points	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# of inputs (total)	162 (40)	40-4	24-48	...	12-24	16-4C	40 (32)	24-400
# of mixing positions	32	1-4	24-48	12-56	12-24	1-2	...	...
# of direct outputs	32	40-64	20	Per # mono inputs	12-24	16-40	40 (32)	24-40
# of mixing buses	16	4-8	23	1 stereo/1 mono	10	8	12	16
# of groups/subgroups	16 (32)	32 G/32 S	4 stereo sub-master	8 M/4 S groups	2/2	8/4	8/8	8
# of sends/returns	4/6 (8/8)	8 S/8 R	2-mono, 2 stereo	4/4	4/4	4/4	4/4	...
Fader type	Slider	Slider	Slider	Slider	Slider	Slider	Slider	Slider
Solo type	PF, AF, IP	PF AF IP	IP	PF	AF, PF, IP	PF	PF	PF, AF, IP
Meter type	VU, LED peak	VU, PPM, Peak LEDs	VU/PPM per req.	VU, Custom	VU, LED peak	VU, LED peak	VU, LED peak	VU, LED peak
EQ types	Swept	Parametric, swept	Parametric, swept	Swept	Swept	Parametric	Parametric	Parametric
Filters	... (HP, LP)	HP, LP	...	HP	...	HP, LP	HP, LP	HP, LP
Input connection	AB 2k/100k Ω	AB/TB >10k Ω	AB 20k Ω /TB 1.5k Ω	AB 20k Ω	AB	AB 3k Ω	AB 3k Ω	AB 3k/1k Ω
Input range	-68, +8dBm	-20, +70dB dBu	-6 Ω , +15dBm	Mic, line	-60, +26dBV	-80, +24dBu	-90, +24dBu	-90, +24dBu
Output connection	AB 100 Ω	AB/TB 600 Ω	AB <100 Ω	AB	AB	AB 150 Ω	AB 150 Ω	...
Output level max	+28dBm	+28dBu	+30dBm	+28dBu	+22dBV	+24dBu	+24dBu	+24dBu
AF response \pm dB Hz-kHz	\pm 1dB 20-20k	\pm 0.5dB 10-50k	\pm 0.5dB 20-20k	\pm 5dB 20-20k	-3, +1dB 20-20k	-3, -1dB 20-20k	-3, +1 20-20k	-3, +1 20-20k
THD	0.015% 1kHz	0.03%	0.05% +24 20-20k	\leq 0.01% 20-20k +18	0.1% 4 20-20k	0.1% 14 20-20k	0.1% 14 20-20k	0.1% 14 20-20k
S/N mic EIN/line dB	88dB unwt'd	-128dBm/+70dB	-117dBm EIN/90dB	-129dBm/90	86dB	93dB	95dB	95dB
Crosstalk (worst case)	<-60dB 1kHz	<-80dB/0dB	>90dB 30-15k	-90dB 1kHz	-60dB/1kHz/4dB	-63dB 1kHz 14dB	60dB 1kHz 14dB	70dB 1kHz 14dB
Reader Service No	901	902	903	904	905	906	907	908

Audio Processors, Dynamics Control

Signal processing in this category include compression, limiting and expansion to maintain audio signal levels between controlled limits to avoid overdriving of subsequent equipment along the signal chain. **AB** indicates actively balanced; **TB** transformer balanced; **GR** indicates gain reduction; **B/Unb** denotes balanced or unbalanced.

Manufacturer	Aphex Systems		ATI Audio Technologies Inc	Audio Animation	Barco EMT		CRL Circuit Research Labs
Model	Compellor ¹	Dominator 700	EM1000 Emphasizer	paragon	Compact line ³	EMT 266X (277)	Audio Signature
Compression	Yes	Yes	Yes	Yes	Yes	No (Yes)	Yes
Expansion	No	No	Yes	Yes	Yes	No (Yes)	..
Peak limiting	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Asymmetric limiting	No	No	No	Yes	No	No (Yes)	No
AGC	Yes	No	Yes	Yes	Yes	Yes	Yes
Loudness control	Yes	Yes	Yes	Yes	No	No	[Width
Stereo system	(#300 only)	Yes	No	Yes	Yes	Yes (No)	Yes [ctf
Digital processing	No	No	No	Yes	No	No	..
Programmable	No	No	Yes	Yes	No	(Yes)	w/memory
Multiband processing	No	3-band	No	4-band	No	No	4-band
Metering	VU GR In/Out	Pk GR	Peak GR Output	GR: In/Out	GR	GR	LED I/O, band
Input connector	AB 80kΩ	AB 160kΩ	AB/TB 38k/30kΩ	Act bal 600Ω	TB 10kΩ	TB 5kΩ	AB 600/10kΩ
Output connector	AB 65kΩ	AB 20kΩ	AB/TB 150kΩ	Act bal 600Ω	TB <40kΩ	TB 40kΩ	AB <50kΩ
Input level range	-30/+27dBm	-30/+24dB	-60/+24dB	-40/+20dB	-10/+6dB	-20/+15dB	-10/+20dB
Output level maximum	+27dBm	+20dBu	+24dBm	+20dBm	+21dB	+22dB	+20dB
AF response (±dB; Hz-kHz)	-0.2 5-100k	±0.2 20-50k	±0.25dB 30-20k	±0.25 5-20k	±0.5 40-15k	±0.3 30-15k	±1 50-15k
Distortion	0.002% in op	<0.01% in op	0.5% ²	0% bypass	<0.5% in op	0.2% (25%) ops	0.05%
S/N ratio	-87dB	80dB below peak	80dB	144dB	73dB RMS	92dB (72dB)	>70dB
Reader Service No	1085	1086	1087	1088	1089	1090	1091

¹ Models 300, 301. ² 10dB compression, 30-20kHz; bypass 0.2% +22dB out. ³ EMT-257 limiter; EMT-260 filter/limiter; EMT-261 compressor/limiter

Manufacturer	CRL Circuit Research Labs					dbx/AKG Acoustics	
Model	BAP-2000	MBL-100	PMC-450 ⁴	SEC-800 (SGC-800)	SMP-850	165A (166)	903
Compression	Yes	Dual band	Yes	Yes (No)	Yes	Yes	Yes
Expansion	No	...	No	No	...	No	No
Peak limiting	Yes	Tri band	Yes	No	Yes	Yes	Yes
Asymmetric limiting	No	Yes	Yes	No	No	...	...
AGC	Yes	Yes	Yes	Yes	Yes	...	...
Loudness control	No	Yes	No	No	No	...	...
Stereo system	No	[For short	No	Yes	Yes	Yes	No
Digital processing	No	[wave brdcast	No	No	No	No	No
Multiband processing	2-band	Yes	3-band	4-band (2-)	2-band	No	No
Metering	Peak GR Out	GR/Out/Overload	Peak/In	Peak/In	Peak/In	LED	LED
Input connector	AB/TB 600/10kΩ	AB 600/10kΩ	AB600/10kΩ	AB 600/10kΩ	AB 600/10kΩ	B/Unb 11k/22kΩ	B/Unb 18.5k/25kΩ
Output connector	AB/TB 100kΩ	AB 100kΩ	AB 200kΩ	AB 200kΩ (100kΩ)	AB 100kΩ	Unb 47kΩ (22kΩ)	Unbal 22kΩ
Input level range	-20/+20dB	-20/+20dB	-10/+20dB	-30/+20dB	-10/+20dB	+24dBu max	+24dBu max
Output level maximum	+20dB	+20dB	+20dB	+20dB	+20dB	+24dBu (+21)	+21dBu max
AF response (±dB; Hz-kHz)	±1 50-15k	±0.5 60-5.82k	-3/0.5 50-9.5k	±0.1(.5)50-20k	+1 50-15k	±0.5 20-20k	±0.5 20-20k
Distortion	0.15% in op	<0.25%	0.25%	0.25% (.15%)	0.25%	<0.2%	<0.2%
S/N ratio	75dB	70dB in op	65dB	70dB (80dB)	80dB	...	...
Reader Service No	1092	1093	1094	1095	1096	1097	1098

⁴ Meets NRSC specifications.

Manufacturer	Dorrugh Electronics	Eventide	Furman Sound	Gentner Electronics	Inovonics		
Model	610-A ⁵	Omnipressor	LC-6B	Audio Prism	222 NTSC	255	260 (250)
Compression	Yes	Yes	Yes	Yes	No	Yes	Yes
Expansion	Yes	Yes	Yes	Yes	No	No	No
Peak limiting	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Asymmetric limiting	No	...	No	No	Yes	No	No (Yes) ⁶
AGC	Yes	...	Yes	Yes	No	Yes	Yes
Loudness control	Yes	...	No	Yes	No	No	No
Stereo system	Yes	...	Yes	Option	No	Yes	Yes
Digital processing	Yes	...	No	No	No	No	No
Programmable	No	Yes	No	Yes	No	No	No (Yes)
Multiband processing	3-band	...	No	4-band	No	3-band	No (5-band)
Metering	VU GR I/O	I/O Gain	GR (& I/O)	Peak GR	GR	GR	GR
Input connector	AB 10kΩ	AB/TB opt	AB 20kΩ	AB 600/10kΩ	AB 10kΩ	AB 10kΩ	AB 10kΩ
Output connector	AB 30kΩ	UB/TB opt	AB 100kΩ (400)	AB 600kΩ	AB 600kΩ	AB 600kΩ	AB 600kΩ
Input level range	-25/+24dB	+20dBm max	-40(-60)/18dB	0/+12dB	-20/+10dB	-15/+15dB	-20/+10dB
Output level maximum	+22dB	+18dBm max	+23dBV	+10dB	+20dB	+24dB	+24dB
AF response (±dB; Hz-kHz)	±0 15-15k	-0.5 20-15k	±0.5 20-20k	-3, +2 20-18k	-1, 0.5 10-10k	±0.5 20-20k	±0.5 10-15k
Distortion	0.005% in ops	0.5%	0.1% (0.15%)	<0.1% in op	1% in op	1% in op	0.5% in op
S/N ratio	75dB	90dB	115dB (110)	-80dB	70dB	70dB	70dB (75dB)
Reader Service No	1099	1100	1101	1102	1103	1104	1105

⁵ Models available for AM, FM, TV and HF/SW broadcast. ⁶ Asymmetric for AM version only.

Manufacturer	ITAME	JBL/UREI			Kahn Communications	Clark-Teknik	Lectrosonics
Model	90A	1176LN/1178	7110	LA-4	GLN-86/-ST	DN500 (DN504)	Model CL1
Compression	Yes	No	Yes	Yes	Yes	Yes	Yes
Expansion	Yes	No	No	No	Yes	Yes (No)	...
Peak limiting	Yes	Yes	Yes	No	Yes	Yes (No)	Yes
Asymmetric limiting	Yes	No	No	No	Yes	No	...
AGC	Yes	No	No	No	...	No	Yes
Loudness control	No	No	...	No	...	Yes	...
Stereo system	Yes	1178	No	w/2 units	GLN-86-ST	Yes (Yes ⁷)	No
Digital processing	No	No	No	No	No	No	No
Programmable	No	No	Adj	No	No	No	No
Multiband processing	3-band	No	No	No	No	No	No
Metering	VU I/O Pk	VU	LED	VU	No	LED (GR I/O)	LEDs
Input connector	TB 600Ω	AB 10k/20kΩ	Bal 20kΩ	Bal 40kΩ	Bal 600Ω	AB 20kΩ	Bal 20kΩ
Output connector	TB 600Ω	TB 600/150Ω	TB 600Ω	TB 150Ω	Bal 600Ω	Unb/Xlfr <60Ω	Bal 100Ω
Input level range	-20/+18dB	+20dBu max	+22dBu	+20dB max	+10dB	...	+20dB max
Output level maximum	+20dB	+24dBm	+22dBm	+24dBm 600Ω	+10dB	+21dBm	+20dB max
AF response (±dB; Hz-kHz)	±1 50-15k	±1 20-20k	±0.5 20-20k		1 50-15k	±0.5 20-20k	20-20k
Distortion	0.7%	<0.5%	...	<0.25% 30-15k	<1% bypass	... (<0.03%)	<0.1%
S/N ratio	70dB	>81dB threshold	...	-90dB EIN	>50dB	<-94dBm	82dB
Reader Service No	1106	1107	1108	1109	1110	1111	1112

⁷ Quad or two stereo pairs.

Manufacturer	Orban				Orban Pro		
Model	4000A	8100A/XT2	8185A ^B	Optimod-AM	412A (414)	422A (424A)	464A (787A)
Compression	Yes	No	Yes	Yes	Yes	Yes	Yes
Expansion	...	No	No	No	No	No	No
Peak limiting	Yes	Yes	Yes	Yes	Yes	Yes	Yes (opt)
Asymmetric limiting	...	No	No	Yes	No	No	No (...)
AGC	Yes	No	Yes	Yes	No	No	Yes (...)
Loudness control	No	Yes	Yes	Yes	No	No	No (...)
Stereo system	Option	Yes	Yes	Yes	No (Yes)	No (Yes)	Yes (Opt)
Programmable	No	No	No	No	No	No	No (Yes)
Multiband processing	2-band	6-band	3-band	6-band	No	No	No
Metering	LED	VU GR	VU GR I/O	VU GR I/O	GR	GR/Out/peak	GR Out Peak
Input connector	AB 10kΩ	[Accessory	AB 10kΩ	AB 10kΩ	AB >10kΩ (<19kΩ)	AB >10kΩ	AB >10kΩ
Output connector	AB/TB 10Ω	]for 8100A	AB 370Ω	AB 290Ω	AB 100Ω	AB 100Ω	AB 93Ω (30Ω)
Input level range	-30/+10dBu	[Optimod-FM	-30/+10dB	-30/+10dB	-15/+21dB	-15dB	-10/+23dB
Output level maximum	>+20dBm	]processor &	+21dB	+20dB	+20dBm	+26dBm	+20dBm
AF response (±dB; Hz-kHz)	±0.25 30-15k	±1 30-15k	±0.75 50-15k	±1 50-9.5k ⁹	±0.25 20-20k	±0.25 20-20k	±0.25 20-20k
Distortion	<0.035%	0.15% in op	0.25% bypass	0.2% bypass	<0.05% in op	<0.03% in op	<0.03% (<0.1%)
S/N ratio	>87dB	70dB	75dB	75dB	85dB	85dB	85dB
Reader Service No	1113	1114	1115	1116	1117	1118	1119

⁹ Audio processing portion of BTSC TV stereo generator. ^B per NRSC-1 specification; values in "proof mode."

Manufacturer	ProTech Audio	Solid State Logic	Symetrix				Valley Int'l
Model	663CL/CL ¹	Logic FX G384	#525 gated	#544 Quad Gated	501 Peak-RMS	528	#400 mic processor
Compression	Yes	Yes	Yes	No	Yes	Yes	Yes
Expansion	No	No	Yes	Yes	No	Yes	Yes
Peak limiting	Yes	No	No	No	Yes	No	No
Asymmetric limiting	...	No	No	No	No	No	No
AGC	...	No	No	No	No	No	Yes
Loudness control	No	No	No	No	No	No	Yes
Stereo system	No	Yes	Yes	No	Option	No	No
Multiband processing	No	No	No	No	...	No	No
Metering	VU	GR	GR	Gain Reduction	GR	VU GR In/Cut	GR VU I/O
Input connector	TB/Unb 600Ω	AB 20kΩ	AB >40kΩ	>40kΩ	AB >10kΩ	AB 3k/10kΩ	AB >40kΩ
Output connector	TB 600Ω	AB 75Ω	Unb <100Ω	100Ω	AB/TB 200Ω	AB 100Ω	AB 50Ω
Input level range	+27dBm max	-11/+19dBu	-50/+20dB	-40/+20dB	40/+10dB	-80/+18dB	-40/+26dB
Output level maximum	+27dBm	+29dBu	+18dBm 600Ω	+19dBm 600Ω	+24dBm 600Ω	+24dBm 600Ω	+26dB
AF response (±dB; Hz-kHz)	0.25 20-20k	±0.2 20-20k	-1 20-20k	-1dB 20-20k	-1 20-20k	-1 20-20k	±0.5dB 20-20k
Distortion	0.5% 6dB comp	0.005%	0.025% in op	0.025% in op	0.025% in op	0.35% in op	<0.01% in op
S/N ratio	78dB	94dB	85dB	86dB	85dB	>86dB	82dB ref 0dB
Reader Service No	1120	1121	1122	1123	1124	1125	1126

Manufacturer	Valley International					Wheatstone	
Model	#430 (#440)	#610	#810 (#817)	#811 GainBrain II	Leveller (816)	Model DDP (DCE) ¹⁰	1202A
Compression	Yes	Yes	No (Yes)	No	No	Yes	Yes
Expansion	Yes	Yes	Yes	No	No	Yes	No
Peak limiting	Yes	Yes	No	Yes	Yes	Yes	Yes
Asymmetric limiting	No	No	No	No	No	No	No
AGC	Yes	Yes	No (Yes)	No	No	Yes	No
Loudness control	Yes	Yes	No (Yes)	Yes	Yes	Yes	...
Stereo system	Yes	Yes	No	No	No	Yes	Yes
Digital processing	No	No	No	No	No	Yes	No
Programmable	No	No	No	No	No	Yes	No
Multiband processing	No	No	No	No	No	8 (No)	No

Audio Processors, Dynamics Control

Manufacturer	Valley International						Wheatstone
	#430 (#440)	#610	#810 (#817)	#811 GainBrain II	Leveller (816)	Model DDP (DCE) ¹⁰	
Model	GR (VU I/O)	GR	GR	GR	GR VU I/O	VU GR I/O	VU/GR/Out
Metering	AB 94kΩ (100kΩ)	AB >90kΩ	AB 100kΩ	AB 150kΩ	AB 75k (100k)	Digital	AB 20kΩ
Input connector	AB 40kΩ	AB 2kΩ	AB 20kΩ (50kΩ)	AB 40kΩ	AB 50kΩ	Digital	AB 10kΩ
Output connector	AB 40kΩ	AB 2kΩ	AB 20kΩ (50kΩ)	AB 40kΩ	AB 50kΩ	Digital	AB 10kΩ
Input level range	-40/+21dB	-40/+24.5dB	-40/+24.5dB	-44/+24dB	-10(-16)/24dB	[16-bit	-20/+26dB
Output level maximum	+21dB (24dB)	+24dB	+21dB (24)	+21dB	+24dB	[PCM	+22dB
AF response (±dB; Hz-kHz)	±0.5 20-20k	±0.5 20-20k	±0.5 20-20k	±0.5 20-20k	±0.5 20-20k	±0.5 20-20k	±0.5 20-50k
Distortion	<0.05% in op	<0.05% in op	<0.05% (<0.4%)	<0.025% in op	0.04% in op	...	0.04%
S/N ratio	82dB ref 0dB	82dB ref 0dB	83dB ref 0dB	83dB ref 0dB	83dB ref 0dB	94dB ref 0dB	90dB
Reader Service No	1127	1128	1129	1130	1131	1132	1133

¹⁰DDP Digital Dynamics Processor; DCE Digital Compressor Expander.

Audio Cartridge Recorders, Reproducers

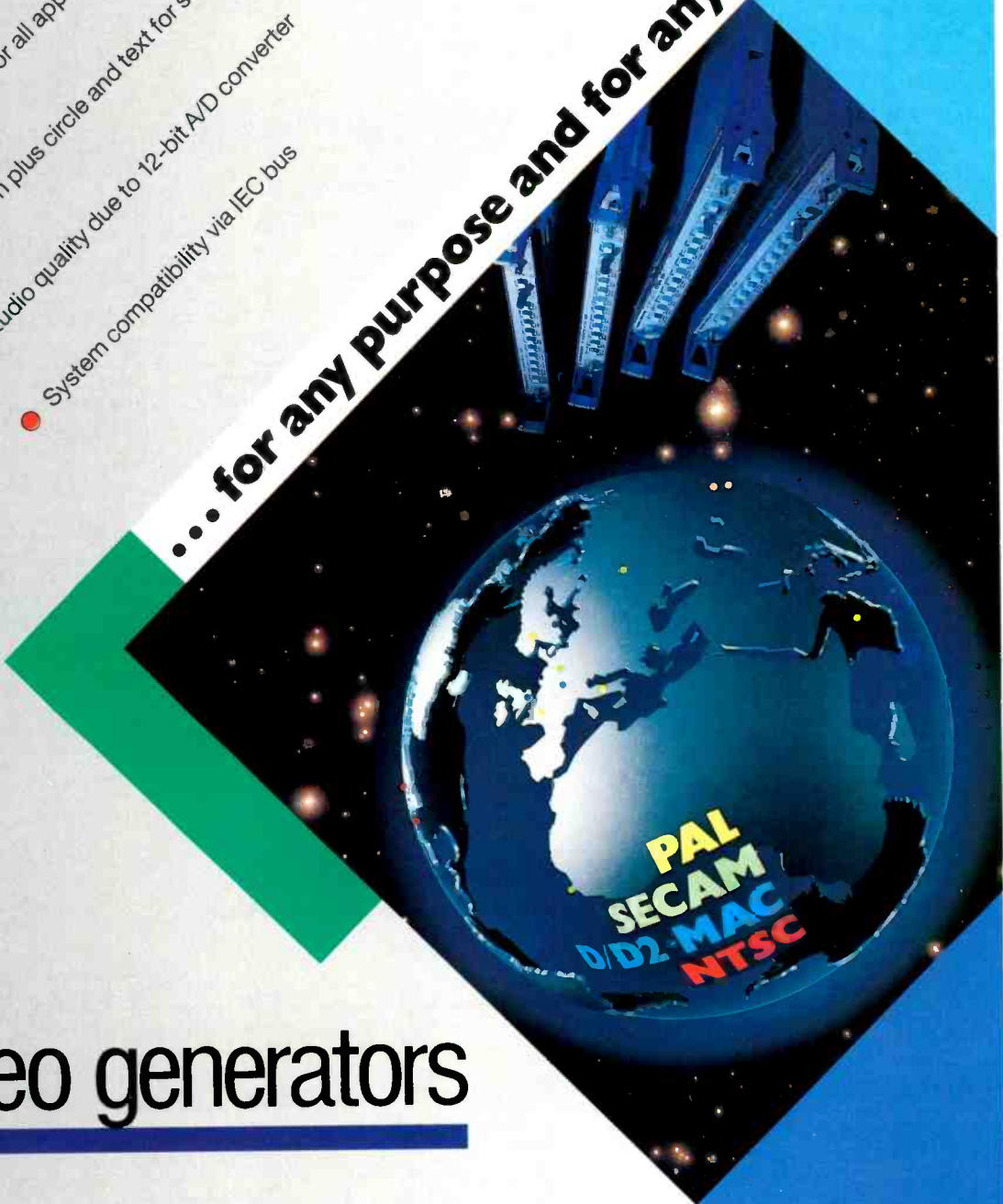
Manufacturer	Audi-Cord Corporation			Broadcast Electronics			
	"S" Series	DL series	2100C	5300C series	5404C/5410C ¹	DT-90 series	PT-90 series
Deck control logic	CMOS	CMOS	CMOS	CMOS	CMOS	CMOS	CMOS
Remote control type	Simple remote	Simple remote	Simple remote	96-pin D	96-pin D	48-pin D	48-pin D
Replay inhibit	Yes	Yes	No	Yes	Yes	Yes	Yes
Record timer	Yes	Yes	No	No	No	No	Yes
Secondary tone	Yes	Yes	Yes	Option	Yes	Yes	Yes
Tertiary tone	Yes	Opt	No	Option	Yes	Yes	Yes
Phase correction	No	No	PhaseLok V	PhaseLok V	PhaseLok V	PhaseLok V	PhaseLok V
Capstan motor	AC hysteresis	AC hysteresis	AC synch	AC synchr	AC synchronous	AC synch	DC servo
Capstan drive	Direct	Direct	Direct	Direct	Direct	Direct	Direct
Play speed	7.5ips	7.5ips	7.5	7.5	7.5	7.5 (3.75 opt)	7.5/3.75/15/var.
Sec/Tert cue outputs	Solid-state	Solid-state	Relay closure	Relay closure	Relay closure	Relay closure	SS
Meter types	VU	VU	VU taut-band	VU taut-band	VU taut-band	LED bar graph	LED bar graph
Monaural model	S-21	DL-RM	2100CRP/-CP	5301C/2C-09C	5403C/5409C	-90RP/-90P	PT-90P
Play only model	S-11	DL-PM	2100CPS	5303/04C-10C	5400C	-90PS	PT-90PS/-RPS
Multideck model	None	DL-DM	None	3-spot	3-cart	None	None
Input connection	TB 5kΩ	TB 5kΩ	Act bal	Xfmr bal	Act bal	Act bal	Act bal
Input impedance	5kΩ	5kΩ	75kΩ	50kΩ	50kΩ	600Ω	10kΩ
Input level range	-12/+10dBm	-12/+10dBm	-20/+20dBm	-20/+20dBm	-70/+20dBm	-18/+20dBm	-18/+20dBm
Output connection	TB 150Ω/600Ω	TB 150Ω/600Ω	Act bal	Xfmr bal	Xfmr bal	Non-Xfmr	Act bal
Output impedance	150Ω/600Ω	150Ω/600Ω	600Ω	600Ω	600Ω	75Ω source	600Ω
Output level max	+18dBm	+18dBm	+10dBm	17dBm clip	17dBm	+20dBm	+24dBm clip
AF response ±dB, Hz-kHz	±2dB 50-15k	±2dB 50-15k	±2dB 50-15k	±2dB 40-16k	±2dB 40-15k	±2dB 40-16k	±2dB 40-16k
referred to nWb/m	160nWb/m	160nWb/m	250nWb/m	250nWb/m	250nWb/m	250nWb/m	250nWb/m
S/N ratio	+52dB	+52dB	42dB stereo	56dB stereo	56dB	52dB stereo	58dB ²
Crosstalk L-R	-50dB	-50dB	<-50dB	<-50dB	-50dB	<-50dB	<-50dB
Crosstalk Pgm-Cue	-50dB	-50dB	<-50dB	<-50dB	-50dB	<-50dB	<-50dB
Distortion	0.5%	0.5%	<2%	<2%	2%	1.5% system	<1%
Wow	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%	0.15%
Reader Service No	1001	1002	1003	1004	1005	1006	1007

¹5500 series similar to 3-cart model with five slots. ²Dynafex noise reduction permits 80dB S/N ratio in stereo operation.

Manufacturer	Cartridge Technology	Fidelipac			ITC/International Tapetronics		
		CTR-10 series	CTR-100 series	CTR-90 series ⁴	99B series	DELTA series	Series 1
Model	CT-1001 ³	CTR-10 series	CTR-100 series	CTR-90 series ⁴	99B series	DELTA series	Series 1
Deck control logic	CMOS	CMOS	CMOS	CMOS	μP	μP	CMOS
Remote control type	Yes	D-connector	D-connector	D-connector	50-pin D	50-pin D	50-pin D
Replay inhibit	...	Yes	Yes	Yes	Yes	Yes	Yes
Record timer	Yes	No	No	No	No	No	No
Secondary tone	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tertiary tone	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Phase correction	...	No	No	No	ELSA	No	...
Capstan motor	dc servo	AC servo	dc servo	dc servo	DC servo	DC servo	dc servo
Capstan drive	Direct	Direct	Direct	Direct	Direct	Direct	Direct
Play speed	7.5ips	7.5ips	3.75/7.5	7.5ips	3.75/7.5/15	3.75/7.5/15	3.75/7.5/15
Sec/Tert cue outputs	Solid-state	Relay closure	Relay closure	Relay closure	S-S/relay close	S-S/relay close	S-S/relay close
Meter types	PPM; VU opt	LED bar graph	LED bar graph	LED bar graph	VU taut-band	VU Taut-band	LED ladder
Monaural model	...	CTR-11 P/CTR-13 R	CTR-111/-123	CTR-91P/-93R	Yes	DELTA I/III/IV	Available
Play only model	Available	CTR-12 P/CTR-14 R	CTR-111/-112	CTR-91P/-92P	Yes	DELTA I/III	Available
Multideck model	No	None	[MAXTRAX option]	CTR-30 series	No	DELTA III	None
Input connection	Act; Xfmr opt	AB 10kΩ	Act bal	Act bal	Act/Xfmr bal	Act/Xfmr bal	Xfmr bal
Input impedance	30kΩ	10 kΩ	10 kΩ	10 kΩ	20kΩ	20kΩ	20kΩ
Input level range	-10/0dBm	-17/+20dB	-17/+20dBm	-17/+20dB	-20/+10dBm	-18/+18dBm	-18/+18dBm
Output connection	Xfmr bal	AB 440Ω	Act bal	Act bal	Xfmr bal	Act Xfmr bal	Xfmr bal
Output impedance	<150Ω source	440Ω	≤60Ω	≤60Ω	600Ω	600Ω	80Ω source
Output level max	0dBm typical	20dB	20dBm	20dB	+25dBm	+18dBm	+18dBm

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- System compatibility via IEC bus

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Circle (111) on Reply Card

Audio Cartridge Recorders/Reproducers

Manufacturer	Cartridge Technology	Fidelipac			ITC/International Tapetronics		
		CTR-10 series	CTR-100 series	CTR-90 series ⁴	99B series	DELTA series	Series 1
Model	CT-1001 ³	CTR-10 series	CTR-100 series	CTR-90 series ⁴	99B series	DELTA series	Series 1
AF response \pm dB, Hz-kHz	\pm 2dB 20-16k	\pm 2dB 50-16k	\pm 2dB 50-16k	\pm 2dB 50-16k	\pm 2dB 50-16k	\pm 1dB 31.5-16k	\pm 2dB 50-16k
referred to nWb.m	200nWb/m	250nWb/m	250nWb/m	250nWb/m	250nWb/m	250nWb/m	250nWb/m
S/N ratio	50dB	+55dB	>60dB	>60dB	58dB	62dB	>55dB
Crosstalk L-R	...	-50dB	-50dB	-50dB	-50dB	-50dB	<-50dB
Crosstalk Pgm-Cue	...	...	<50dB	<-50dB	-50dB	-50dB	<-50dB
Distortion	<1.5%	0.1%	0.1%	0.1%	0.8%	1.5%	<0.2% 0dBm
Wow/flutter	<0.12% DIN	<0.12% DIN	0.12%	0.12%	0.12%	0.15% R/P max	0.15% R/P
Reader Service No	1008	1009	1010	1011	1012	1013	1014

³MAXTRAX headoption available. ⁴MAXTRAX format head option available.

Manufacturer	Otari Corporation	Pacific Recorders & Engineering	Radio Systems	Sonifex Ltd			
	CTM-10S series	Micromax ⁵	TOMCAT ⁶	RS-CART 2000	CQ 20 R	HS 200 R.X2	Micro HS 200R
Deck control logic	μ P	CMOS	μ P	...	CMOS	CMOS	CMOS
Remote control type	Yes	Simple remote	Simple remote	Yes	Yes	Yes	Yes
Replay inhibit	Yes	Yes	Yes	...	No	Yes	No
Record timer	Yes	No	No	Yes	No	Yes	No
Secondary tone	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tertiary tone	Yes	Yes	Yes	Yes	No	Yes	Yes
Phase correction	None	No	No	Yes	No	No	No
Capstan motor	DC servo	DC servo	DC servo	dc servo	DC servo	DC servo	DC servo
Capstan drive	Direct	Belt	Direct	Direct	Belt	Belt	Belt
Play speed	3.75/7.5/15	7.5ips	7.5/15	3-speed	7.5	7.5	7.5
Sec/Tert cue outputs	Solid-state	Solid-state	Solid-state	Solid-state	Solid-state	Solid-state	Solid-state
Meter types	VU/peak LED	VU	VU	LED ladder	LED bar graph	VU	VU
Monaural model	CTM-10M	Yes	No	Available	CQ 10 R	HS 200 X-2	Micro HS 100R
Play only model	CTM-10	Yes	Yes	Available	CQ 10; CQ 20	HS 200 X-2	HS100; HS200
Multideck model	None	No	No	None	None	None	None
Input connection	AB 10k Ω	Act bal	Act bal	Act bal	Unbal	Xfmr bal	Act bal
Input impedance	10k Ω	40k Ω	20k Ω	...	10k Ω	10k Ω	10k Ω
Input level range	+26dBv max	0-8dBv	-13/+9dBv	...	-22/+22dBv	-22/+22dBv	-22/+22dBv
Output connection	AB 5 Ω	Act bal	Act bal	Act bal	Unbal	Xfmr bal	Act Bal
Output impedance	5 Ω	150 Ω	>95 Ω	...	50 Ω	50 Ω source	50 Ω source
Output level max	+26dBv into 200 Ω	+24dBm max	+25dBm	...	+20dBv	+22dBv	+22dBm
AF response \pm dB Hz-kHz	2dB 20-20k	\pm 2dB 20-16k	\pm 1dB 40-16k	\pm 1dB 40-16k	...	\pm 2.5dB 40-16k	\pm 1.5dB 40-16k
referred to nWb.m	...	250nWb/m	250nWb/m	...	160nWb/m	160nWb/m	160nWb/m
S/N ratio	53dB	56dB MAXTRAX	62dB A wtd	...	>51dB unwt'd	55dB ⁷	61dB
Crosstalk L-R	<48dB 1kHz	45dB separation	<-50dB	...	<-50dB	<-50dB	<-50dB
Crosstalk Pgm-Cue	<48dB 1kHz	<-55dB	<-50dB	...	<-50dB	<-50dB	<-50dB
Distortion	<0.8% 1kHz	0.9% system	0.9%	...	<0.2%	<1.5% 1kHz	0.8%
Wow/flutter	...	<0.15% 7.5ips	0.08%	0.1%	...	<0.12%	0.06%
Reader Service No	1015	1016	1017	1018	1019	1020	1021

⁵Models with standard NAB or MAXTRAX heads. ⁶Uses MAXTRAXheads. ⁷63dB with noise reduction.

Audio Recorders, Reel-to-Reel

Open-reel audio recording systems, 2-track to multi-track equipment, rack-mounted and portable units.

Manufacturer	Fostex				Lyrec Manufacturing a/s		Nagra Kudelski
	E16 (E22)	E2	R8 (E8)	FRIDA	P-4400 Loopmaster	TR 533	NAB T-Audio TC
# of tracks	16 (2)	2	8	2	4	24	2+1 TC
Tape width	1/2	1/4	1/4	1/4	1/2	2"	1/4"
Time code track	No (Yes)	Yes	No	No	No	No	Yes
Deck control logic	μ P	μ P	μ P	μ P	μ P	TTL	μ P/TTL
Edit control interface	Synchronizer & Autolocator			Rmt Ctl	None	Rmt Ctl; Autolocator	RS-422/Rmt Ctl
Recording timer	Min/sec	Min/sec	Min/sec	Min/sec	Tape counter	Min/sec	Min/sec; counter
Cue track	No (Yes)	Yes	No	No	No	No	No
Phase correction	No	No	No	Yes	No	Yes	Yes
Capstan motor; drive	Direct (dc servo)	DC servo/Direct	DC servo (Direct)	DC servo; belt	DC servo; direct	DC servo; direct	DC servo
Reel motors	DC servo	DC servo	DC servo	DC servo	DC servo	AC servo	DC servo
Tape speeds	15ips (& 7.5)	7.5/15ips	15ips	3.75/7.5/15	480ips	15/30	3.75/7.5/15/30
# of heads; type	2 (3) Permalloy	3 Permalloy ferrite	2 Permalloy ferrite	3 metal	2 ferrite	3 metal	5 ¹
Metering types	LED bar (VU)	VU	Bargraph/Peak LED	LED bar graph	VU	VU	VU/Peak LED
Equalization	NAB	NAB1	IEC1 (NAB)	NAB/AES/CCIR	NAB	NAB/AES/CCIR	NAB/AES/CCIR
Input connection	Unb 30k Ω (40k)	Bal/Unbal 40k Ω	Unbal 30k Ω	AB 10k Ω	Playback only	TB 8k Ω	TB 10k Ω
Input level range	...	...	...	...	...	-6/+24	-390mV/+4.4V
Output connection	Unbal 10k Ω	Bal/unbal 10k Ω	Unbal 10k Ω	AB 40 Ω	Unb 5 Ω	TB 40 Ω	TB 30 Ω
Output level maximum	...	...	...	+26dB	...	+24	+24VdBm
AF response \pm dB; Hz-kHz	\pm 3dB 40-18k(30-30k)	\pm 3dB 30-20k	\pm 3dB 40-18k	-2/+2 30-28k	-2/+2 2k-1280k	-2/+2 50-20k	\pm 1 30-20k
S/N ratio	80dB (74dB)	74dB	78dB (80dB)	+69dB	+60dB	+63dB	+70dB tape dep.

Manufacturer	Fostex				Lyrec Manufacturing s/s			Nagra Kudelski
	E16 (E22)	E2	R8 (E8)	FRIDA	P-4400 Loopmaster	TR 533	NAB T-Audio TC	
Model	E16 (E22)	E2	R8 (E8)	FRIDA	P-4400 Loopmaster	TR 533	NAB T-Audio TC	
Distortion	<1%	<1	1%	0.1%	0.1%B	<0.1%	1-5% ²	
Crosstalk Pgm-Pgm	-55dB (-80)	-80dB	-70dB (-55dB)	-40dB	-80dB	-46dB	-88	
Crosstalk Pgm-Cue	(-77dB)	-77dB	...	...	...	...	...
Wow-flutter	0.05% 15ips (30)	0.05% 15ips	0.06 (05)% 15ips	0.06% 15ips	0.06% 480ips	0.04% 15ips	0.025% 15ips	
Reader Service No	716	717	718	719	720	721	722	

¹ 2-audio, 1-TC, 2-erase, opt. Neopilot. ² 3rd harm. max peak level 510nWb/m.

Manufacturer	Nagra Kudelski			Otari Corporation			Sony
	Nagra 4.2	Nagra IV-SJ	ARS-1000 DC-DS	MX-50	MX-55 series ³	APR-24	APR-5002W (5003W)
Model	Nagra 4.2	Nagra IV-SJ	ARS-1000 DC-DS	MX-50	MX-55 series ³	APR-24	APR-5002W (5003W)
# of tracks	1	2+1 TC	4	2	1/2/2TC/4	24	2 (3)
Tape width	1/4	1/4	1/4	1/4	1/4	2"	1/4
Time code track	w/Neopilot	Yes	No	No	MX-55TM	Yes	No (Yes)
Deck control logic	...	No	...	TTL	μP	μP	μP
Edit control interface	...	No	...	None	...	RmtCtl; SMPTE	RmtCtl
	...	Min/meter counter	...	...	...	Synch; Autolocator	Autolocator
Recording timer	Min/meters	counter	FM modulation	...	Yes	Yes	Min/sec; counter
Cue track	No	No	No	Search 0 + 1 cue	Search 0/cue/3-cue	SMPTE	No (Yes)
Phase correction	No	No	No	No	No	Yes	No (Yes)
Capstan motor; drive	DC servo	DC servo	Synchronous	DC servo	belt	DC servo/belt	DC servo
Reel motors	Belt drive reel	Belt drive reels	Induction	AC synchronous	Induction torque	DC servo	DC servo
Tape speeds	3.75/7.5/15	1.5/3.75/7.5/15	3.75/7.5	3.75/7.5/15/var	3.75-30ips	15/30	7.5/15/30
# of heads; type	4	4	...	4 ERP	ERP/P	3 amorphous	3 amorphous (4)
Metering types	VU	Modulometer	[Playback	VU/peak LED	VU w/peak LED	VU/LED/bargraph	VU
Equalization	NAB	CCIR	NAB	CCIR	only system	NAB/IEC	NAB/IEC
Input connection	UB 100kΩ; Bal opt	UB 100kΩ	...	AB >10kΩ	AB >10kΩ	AB 10kΩ	Bal 10kΩ
Input level range	-0.37/+127V	-10mV min	...	-20/+10dBm	-10dBV/+4dBm nom	Variable	Variable
Output connection	Bal 600Ω	UB 600Ω	UB 600Ω	AB <5Ω	AB 200Ω load	AB 120Ω	AB 120Ω
Output level maximum	0dB=4.4V	1V	+4dBm nominal	+22dBm 600Ω load	+26dBm max bal.	+24dBs	+24dBm
AF response ±dB; Hz-kHz	±2 30-15k	±2 25-35k	±2 50-18k	±2dB 20-20k	±2dB 30-20k	-3/0.75 25-24k	-3/+0.75 50-28k
S/N ratio	71dB	62dB	63dB 7.5ips	>54dB	71dB 7.5ips	+66dB	70dB 30ips
Distortion	1.5%	2%	<0.15% 250nWb/m	<0.3%	<0.3% 1kHz	0.15%	0.35% 30ips
Crosstalk Pgm-Pgm	...	...	<-50dB 1kHz	-55dB 1kHz 0VU	<-55dB 1kHz	...	...
Crosstalk Pgm-Cue	...	...	N.A.	<-55dB 1kHz	<-55dB 1kHz	...	...
Wow-flutter	0.07% 7.5ips	0.05% 15ips	0.06% 7.5ips	0.06%	<0.08% 7.5ips	0.03% 30ips	0.025% 30ips
Reader Service No	723	724	725	726	727	728	729

³ 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.

Manufacturer	Sony	Stellavox Digital Audio			Studer Revox		
	PCM-3202 (3402)	SP 9 Pro ⁵	TD 9N ⁶	A820 series	Revox C270 ⁹	Revox PR99 Mk III	Studer A807
Model	PCM-3202 (3402)	SP 9 Pro ⁵	TD 9N ⁶	A820 series	Revox C270 ⁹	Revox PR99 Mk III	Studer A807
# of tracks	2	2	4 (2) [2]	2-24	2 (4)	8)	2
Tape width	1/4	1/4"	1/2"-1/4"	1/4"	1/4" (1/2")	1/4"	1/4"
Time code track	Yes	Yes	Yes (No)	Yes	C270 TC	No	[A807 TC ver.]
Deck control logic	μP	Mechanical	μ	μP/TTL/CMOS	μP	μ	μP
Edit control interface	SMPTE autolocator	synch	None Stellalock III	RS-232/422 Autolocator Synchro	RS-232/422; SMPTE autoloc (& synchro)	RS-232/timecode	via rmt ctl Autolocator
Recording timer	Min/sec	Tape counter	Min/sec	Min/sec	Min/sec	Min/sec	Min/sec
Cue track	Y	Yes	Yes (No)	SMPTE ⁷	No	No	No
Phase correction	...	Yes	Yes	Yes	Yes	No	Yes
Capstan motor; drive	DC servo	DC servo	direct	DC servo belt	DC servo brushless	1 dc servo	ac servo
Reel motors	DC servo	...	DC servo	DC servo	2 ac servo	ac servo	DC servo
Tape speeds	15 (& 7.5)	3.75/7.5/15	3.75-30	3.75-30±7 semitones	3.75/7.5/15	7.5/15	3.75/7.5/15 30
# of heads; type	4 ⁴	4/ERP	3/ERP	3 or 4 (3)	3 Revox metal	3 Revox metal	3 amorphous
Metering types	Peak LED	VU	Per request	VJ	VU (LED bargraphs)	VU	Peak LED
Equalization	DASH	Any	All	NAB/CCIR	NAB	NAB	NAB/CCIR
Input connection	AB 10kΩ	TB 10kΩ	TB 10kΩ	A3 TB >10kΩ	TB >5kΩ (AB)	TB >5kΩ	TB >10kΩ
Input level range	-6. +10dBs	-74/-6dBm	22dBm	+24dBu max	+10dB	+10dBv	-30/+12dBu
Output impedance	120Ω	10Ω	9Ω	50Ω	<Ω (150Ω)	50Ω	2Ω
Output level maximum	+24dBs	+13dBm	+25dBm	+24dBm	+22dBm	+22dBm	+24dBm
AF response ±dB; Hz-kHz	-1 +0.5dB 20-20k	±2 30-18k	±2 30-20k	±2 30-16k ⁸	±2 30-22k	-3/+2 30-22k	±2d 30-20k
S/N ratio	90dB	67dB	69dB (71dB)	>65dB	64dB (61dB)	66dB	68dB
Distortion	0.05%	<2%	<1%	<0.5% 1kHz	<1% 0.8%	0.3%	<1.0%
Crosstalk Pgm-Pgm	-80dB	-55dB	-55dB	<-55dB 1kHz	>50dB (>55dB)	...	...
Crosstalk Pgm-Cue	...	-80dB	-80dB	...	...	...	...
Wow-flutter	...	0.07% 19ips	0.04% 15ips	0.06%	0.05% 15ips	<0.06% 15ips	0.05% 15ips
Reader Service No	730	731	732	733	734	735	736

⁴ Digital Rec, P/E Analog R/P. ⁵ Portable unit. ⁶ Includes models with 4-tr+cue, 2-tr+cue, 3-tr+cue. ⁷ Also five Locstart memories available. ⁸ Values for 7.5ips tape speed. ⁹ Models C274 4-track, C278 8-track; also time code control.

Manufacturer	TASCAM division/Teac of America						
	Studer A827-24	3030	ATR 60-16	ATR 80-24	MSR 16 (-24)	Series 30	TSR 8
Model	Studer A827-24	3030	ATR 60-16	ATR 80-24	MSR 16 (-24)	Series 30	TSR 8
# of tracks	24-track	2	16	24	16 (24)	2 (4)	8
Tape width	2"	1/4	1/4-1"	2AE	1/2AE-1AE	1/4AE	1/2
Time code track	No	No	Yes	...	No	No	No
Deck control logic	μP	TTL	μP	μP	μP	μP	μP

Audio Recorders, Reel-to-Reel

Manufacturer	Studer Revox			TASCAM division/Teac of America			
Model	Studer A827-24	3030	ATR 60-16	ATR 80-24	MSR 16 (-24)	Series 30	TSR 8
Edit control interface	RS-232/422/SMPTE Autoloc/Synchro	None	SMPTE synchronizer autolocator	SMPTE synchronizer autolocator	SMPTE synchronizer autolocator	SMPTE synchronizer autolocator	SMPTE synchronizer autolocator
Recording timer	Min/sec	Min/sec	Min/sec	...	...	...	Min/sec; tape ctr
Cue track	No	Yes	Yes	No	No	No	Yes
Phase correction	Yes	No	No	RTZ/STC	RTZ/STC	RTZ/STC	No
Capstan motor; drive	DC servo brushless	DC servo	DC servo	DC servo direct	DC servo direct	DC servo direct	DC servo belt
Reel motors	DC servo	DC servo	DC servo	DC servo	DC servo	2 DC servo	DC servo
Tape speeds	7.5/15/30	7.5/15 ips	7.5-30ips	30 ips	15 ips	7.5-15ips	15 ips
# of heads; type	3 amorphous metal	3	3	3	2	2	2
Metering types	VU	VU/LED peak	VU/LED peak	VU/Peak LED	Bargraph	Bargraph	LED bar graph
Equalization	NAB/CCIR/IEC1/AES	NAB/IEC1	NAB/IEC1/CCIR	NAB/IEC1/CCIR	IEC1/CCIR	IEC1/CCIR	IEC1/CCIR
Input connection	TB >10k Ω	AB or AU	AB	AB	Unbal	Unbal 10k	Unbal
Input level range	+24dBu	-72/+4dB	to 28dBm	-10/+4dB	...	-60/+18dBV	...
Output impedance	...	100k Ω	20k Ω	...	...	...	100 Ω
Output level maximum	+26dBm	...	+28dBm	+28dB	-10dBV	+18dBV	-10dBV
AF response \pm dB; Hz-kHz	\pm 2 50-20k	\pm 2 40-22k	\pm 2 30-15k	\pm 2dB	\pm 3 40-20k	\pm 3 40-22k	\pm 3 40-20k
S/N ratio	64dB 30ips	68dB	69dB	69dB	>65dB	>66dB	68dB
Distortion	<1.0% 510Wb/m	0.6%	0.8%	0.8%	0.8%	0.8%	0.8%
Crosstalk Pgm-Pgm	-60dB	<-55dB	<-55dB	-55dB	-80dB	-50dB	-62dB
Crosstalk Pgm-Cue	...	...	...	...	...	...	...
Wow-flutter	0.04% 30ips	<0.07%	0.05% 15ips	0.05%	<0.06%	<0.07%	0.08%
Reader Service No	737	738	739	740	741	742	743

Wireless Microphone Systems

Matched transmitter receiver systems, primarily for in-studio or limited area use.

Manufacturer	AKG Acoustics	Audio-Tech-nica US	beyerdynamic		Comtek		HM Electronics	
Model	WMS wireless	ATW1031/ATW1032	SEM 186	TS 190	Model 180	Model 182	515 (525)	System 55 (50)
RF spectrum	174-216MHz	169-216 MHz	170-240MHz	130-240MHz	169-216MHz	169-216MHz	169-216MHz	169-216MHz
Modulation control	...	Compression	Limiting	...	Compression	Compression	Compression	Compression
Companding function	...	2:1	Low noise	Low noise	2:1	2:1 companding	Dynamic expansion	
System AF response	...	\pm 1 40-16k	\pm 3 50-15k	\pm 3 50-15k	\pm 2 50-15k	\pm 2 80-15k	\pm 3 100-15k	\pm 3 100-15k
System S/N ratio	...	95dB	85dB	85dB	95dB	95dB	NRX II	NRX II
System distortion	...	0.5%	<1%	<1%	0.05%	0.5%	1%	1%
Transmitter Model:	T 185	ATW-T31 UniPak	SEM186	TS-190	M-72	M-182	TX550 (555)	TX555
Transmitter packaging	Handheld	Pocket unit	Handheld	Pocket unit	Pocket	Handheld	Body-Pac (HH)	Body-pac
RF output	25-35mW	30mW	<50mW	>30mW	35mW	50mW	>50mW	>50mW
FM deviation	...	\pm 15kHz	\pm 12kHz	\pm 12kHz	\pm 30kHz	\pm 30kHz	15kHz max	15kHz max
Microphone support	Electret; dynamic	AT831A/ATM73A ²	Electret	ribbon ⁴	Electret ⁵	Elect Dynam Rib	Electret	Electret (dynamic)
Auxiliary line input	Yes	Yes	No	No	Possible	No	...	No
Power requirement	9Vdc	9Vdc	9Vdc	9Vdc	9Vdc	3-AA	9Vdc	9Vdc
Operating weight	13.6	3.2	160g	160g	4	11	4.7	10
Receiver Model:	SR 185-10 (185-11)	ATW-R10	NE 185/US	NE 185-11	MR-180	MR-182	RX522	RX520
RF sensitivity/quieting	...	1 μ V/60dB	1 μ V/55dB	12V/55dB	1 μ V/45dB	1 μ V/45dB	1 μ V/30dB	1 μ V/30dB
Spurious rejection	...	60dB	85dB	>85dB	80dB	>90dB	>50dB	>60dB
Antenna types	Whip	Whip furnished	Whip/Dipole	Whip Dipole	Whip dpl multiel acc	Whip dpl multiel acc	Whip BNC	Whip BNC
Diversity reception	Option	Yes	Yes	Yes	No	No	No	Yes
Multichannel	No	No	No	Option	No	No	No	No
AF output level	-20/+6dBm	-8dBV Unbal ⁶	-20/+6dBm	-20/+6dBm	+9dBm	+10dBm	-4dBV	-4dBV
Power requirement	15-27dc/117V	120ac/12-18dc	15-26dc/110ac	15-27dc/110Vac	6-12dc 50hr	ac/dcV 8W	120ac/12-16dc	120ac/12-16dc
Metered parameters	AF/RF/V	AF/RF	AF/RF/V	AF/RF/V	AF/V	AF/RF/V	Vdc/RF	Vdc/RF/AF
Metering types	LEDs	LEDs	LEDs	LEDs	LEDs	LEDs	LEDs	LEDs
Reader Service No	1329	1330	1331	1332	1333	1334	1335	1336

¹ ATW-T32 Handheld. ² Also AT857AMa or any low-Z mic; -T32 uses dynamic only. ³ -20dB balanced. ⁴ MCE81 or M500, element applicable. ⁵ MCE 5, 6, 10; ECM 50, 55, 66, 77; MKE 2; SM 83, 84.

Manufacturer	Lectrosonics				Micron Audio Products			Nady Systems
Model	Pro-STD-T (-L)	PRO-4-Mini	PRO-DIV-L(-T)	PRO-Mini-L (-H)	CTR 501 /H	MDS30-SH	MDS-2	Model 101/201
RF spectrum	150-216MHz	150-216MHz	150-216MHz	150-216MHz	169-216MHz	150-216MHz	150-216MHz	170-216MHz
Modulation control	Compression	Compression	Compression	Compression	Limiting	Limiting	Limiting	Compression
Companding function	2:1	2:1	2:1	2:1	CNS type	CNS type	CNS type	Yes
System AF response	\pm 1 50-15k	\pm 1 50-15k	50-15k	\pm 1 50-15k	\pm 2 50-15k	\pm 2 50-15k	\pm 2 50-15k	\pm 0.3 25-20k
System S/N ratio	96dB A wtd	96dB A wtd	96dB A wtd	96dB A wtd	>115dB	>115dB	115dB	...
System distortion	0.7%	0.7%	0.7%	0.7%	<0.3% THD	<0.3% THD	<0.3% THD	0.3%
Transmitter Model:	T185 (M185)	M185/H185	M185 (T185)	M185 (H185)	TX-501 (503)⁶	TX-503	TX-501 (503)	HT/LT/GT
Transmitter packaging	Handheld (Pocket)	Handheld/plugon	Pocket (HH)	Pocket (Plug-on)	Pocket (HH)	Handheld	Pocket (HH)	HH; Lav; Instr
RF output	50mW	50mW	50mW	50mW	50mW	50mW	50mW	50mW
FM deviation	\pm 15kHz	\pm 15kHz	\pm 15kHz	\pm 15kHz	\pm 15kHz	\pm 15kHz	\pm 15kHz	...
Microphone support	SM58 (Electret ⁶)	Electret or dynamic	Electret (& dynamic)	Electret	dynamic	Electret	dyn.	AKG element
Auxiliary line input	No (Yes)	...	Yes (No)	Yes (No)	Yes	No	Yes (No)	Yes
Power requirement	9Vdc	9Vdc	9Vdc	9Vdc	9Vdc	9Vdc	9Vdc	9Vdc

Manufacturer	Lectrosonics				Micron Audio Products			Nady Systems
	Pro-STD-T (-L)	PRO-4-Mini	PRO-DIV-L(-T)	PRO-Mini-L (-H)	CTR 501/H	MDR530-SH	MDS-2	Model 101/201
Operating weight	13.2 (5.3)	...	5.3 (13.2)	5.3 (0.7)	8.5 (11)	11	8.5 (11)	8.5
Receiver Model:	R185	CR185/CDM4	DR185	CR185	MR-510 (110)⁹	MDR-530¹⁰	MDR-540 (-4)¹¹	101/201
RF sensitivity/quieting	0.5µV/20dB	0.6µV/20dB	0.5µV/20dB	0.6µV/20dB	>5µV >100dB S/N	2µV/60dB	2µV/60dB	...
Spurious rejection	>100dB	>100dB	>100dB	>100dB	>80dB	>80dB	>80dB	60dB
Antenna types	Whip furnished ⁷	Whip furnished	Whip furnished	Whip furnished	Whip furnished	Whips furnished	Dipole	Furnished
Diversity reception	No	No	Yes	No	No	No	Yes	201 only
Multichannel	No	4-channel	No	No	No	No	Yes	Yes
AF output level	-65.0dBm	-65.0dBm	-65.0dBm	-65.0dBm	-53dBV/0dBV	-53dBV; 0dBV line	0dB line	...
Power requirement	12dc/120ac	9-16dc/120ac	12dc/120ac	9-16dc/120ac	12-30dc	12-18dc/Vac	10-22dc/120ac	12dc
Metered parameters	AF/RF/Vdc	AF/RF/Vdc	AF/RF/Vdc	AF/RF/Vdc	AF/RF/Vdc	AF/RF/Vdc	AF/RF/Vdc	RF
Metering types	LEDs	LEDs	LEDs	LEDs	LEDs	LEDs	LEDs	LEDs
Reader Service No	1337	1338	1339	1340	1341	1342	1343	1344

⁶ M185 also supports dynamic mic units. ⁷ Dipole antenna available as an added accessory. ⁸ 501H includes TX-503 handheld transmitter. ⁹ Model 110 does not include Complementary Noise Suppression. ¹⁰ MDR-550 mobile diversity receiver offers similar characteristics in portable compact dc-powered package. ¹¹ -4 model does not include Complementary Noise Suppression; multiple element accessory available.

Manufacturer	Samson Technologies			Sennheiser Electronics				
	Broadcast STD	Concert TD	MR-1 system	UHF 1B (1H)	UHF 2B (2H)	UHF 2EB (2EH)	VHF 1B-90 (1H) ¹	VHF 2B-90(2H-90)
RF spectrum	174-199MHz	174-199MHz	174.46-199.6MHz	450-960MHz	450-960MHz	450-960MHz	174-216MHz	174-216MHz
Modulation control	...	...	...	Compress (limit)	Compress (limit)	Compress (limit)	Compress (limit)	Compress (limit)
Companding function	NRS dbx I/II	NRS dbx I/II	NRS dbx II	Hi-Dyn	Hi-Dyn	Hi-Dyn	Hi-Dyn	Hi-Dyn
System AF response	±3 30-18k	±3dB 30-18k	±3dB 60-12k	±3 40(70)-20k	±3 40(70)-20k	±3 40(70)-20k	±3 40(70)-20k	±0.3 40-20kHz
System S/N ratio	>115dB	>100dB	95dB IHF	94dB	94dB	94dB	+92dB A wtd (94)	+92dB A wtd
System distortion	<0.5% 400Hz	<0.5% 1kHz	...	<2%	<2%	<2%	<2%	<2%
Transmitter Model:	BH-3 (BT-3)	CH-2 (CT-2)	SH-2 (ST-2(L))	SK-2012-TV(SKM 4031)	SK-2012-TV(SKM 4031)	SK-2012-TV(SKM 4031)	SK-2012-90(4031-90)	SK 2012-90(SKM-4031)
Transmitter packaging	Handheld (Belt)	Handheld (Belt)	Handheld (Belt)	Pocket (handheld)	Pocket (handheld)	Pocket (handheld)	Pocket (handheld)	Pocket (handheld)
RF output	50mW	50mW	50mW	20mW	20mW	20mW	30mW	30mW
FM deviation	±15kHz	±15kHz	±15kHz	±40kHz	±40kHz	±40kHz	±40kHz nom.	±40kHz nom.
Microphone support	Various ¹²	Various ¹³	Various ¹⁴	Electret MKE-2/-40	MKE-2/-40	MKE-2/-40	MKE-2/-40	MKE-2/-40
Power requirement	9Vdc	9Vdc	9Vdc(6-8 hr)	4.5V 3-AAA cells	4.5V 3-AAA cells	4.5V 3-AAA cells	4.5Vdc 3-AAA	4.5Vdc 3-AAA
Operating weight	...	13 (4.2)	7.8 oz (5.1)	7 oz (9 oz)	7 oz (9 oz)	7 oz (9 oz)	7 oz (9 oz)	7 oz (9 oz)
Receiver Model:	BR-3	CR-2	MR-1 Micro	EK-2012-TV¹⁵	EM 2003-TV	EM-2003-TV¹⁶	EK-2012-90¹⁷	EM-2003-90¹⁸
RF sensitivity/quieting	15µV/60dB S/N	15dBµV/60dB S/N	15-45dBu	<20µV/40dB	<10µV/40dB	<10µV/40dB	<20µV/40dB	<10µV/40dB
Spurious rejection	60dB ±60Hz	60dB ±60Hz	60dB ±60kHz	>70dB	>80dB	>80dB	>70dB	>100dB
Antenna types	Dual whips	Dual whips	7" Flex whip	Whip furnished	Whip furnished	Whip furnished	Whip furnished	Whip
Diversity reception	Yes	Yes	No	No	Yes	Yes	No	Yes
Multichannel	10	1 of 10	1 of 10	Option	Yes	Option	No	No
AF output level	Bal/unbal 8dBm	Bal/unbal 8dBm	Bal/unbal 0dBm	-26/+6dBm	-28/+12dBm	-28,+12dBm	-26,+26dBm	-28/+12dBm
Power requirement	110/220ac	110/220Vac	9V	4.5Vdc 3-AAA cells	12-24Vdc 117Vac	12Vdc	4.5Vdc	117Vac
Metered parameters	Vdc/RF A-B Ch/AF	Vdc RF A/B	Vdc	RF	None	AF/RF	RF/AF/Vdc	None
Metering types	LEDs	LEDs	LEDs	...	LEDs	LEDs	...	LEDs
Reader Service No	1345	1346	1347	1348	1349	1350	1351	1352

¹² Various mic possibilities include: AKG, Audio-Technica, E-V, Sennheiser, Shure, Sony. ¹³ Various mic include AKG, Audio-Technica, E-V, Sennheiser, Shure, Sony. ¹⁴ Supports various mics from all major manufacturers in dynamic and condenser types. ¹⁵ Camera mounted receiver. ¹⁶ Includes ENG 2003 carrying case, antenna system, NiCad battery. ¹⁷ VHF camera mount receiver. ¹⁸ EM-2003-90 offers diversity reception; EK-2012-90 is a camera mount receiver.

Manufacturer	Shure Brothers		Sony		Swintek	Telex Comm.	VEGA/Mark IV	
	L-series	W-series	UHF systems	VHF systems	MK50A Hi-Fi-S ²³	ENG Wireless	Pro Plus	Pro Series
RF spectrum	169-216MHz	150-216MHz	400 (900)MHz	176-215MHz	49-470MHz	165-216MHz	150-216MHz	150-216MHz
Modulation control	...	...	Limit/compress	Compression	Limit/compression	...	...	...
Companding function	Yes	Yes	Switchable ²⁰	Yes	Yes	Selectable	Dynex III	Dynex II
System AF response	±2 50-15k	±10B 50-15k	±1.5dB 75-15k	±2.5dB 100-15k	±3dB	60Hz-20kHz	±1dB 100-15k	40-15kHz
System S/N ratio	...	...	57dB linear A-wtd	>60dB	80dB	104dB companded	110dB	104dB
System distortion	0.3%	0.5%	0.3% linear	<0.7%	1%	≤1%	<0.2%	<0.2%
Transmitter Model:	L1	W15HT (W10BT)	WRT-28L (H)	WRT410/420	MK50A HiFi	WT-400	77/DIII (T-81)	T-37 (T-36/38)
Transmitter packaging	Pocket	Handheld (pocket)	Pocket	Handheld	pocket	Pocket	Belt-pack	Body (handheld)
RF output	50mW	50mW	6mW (30mW) ²¹	50mW	50mW	50mW	50mW	50mW
FM deviation	±15kHz	±12kHz	±2.4kHz ²²	±1.9kHz 94dB SPL	±20kHz	±12kHz	...	...
Microphone support	Electret 839W	Dynam & (elec) ¹⁹	Elec Dyn ECM-77BC	Elec Dyn ECM-77BC	Electret; dynamic	Electret	Various ²⁴	Various ²⁵
Auxiliary line input	No	No	No	No	Yes	...	No	No
Power requirement	9Vdc	9Vdc	3Vdc	3Vdc	9Vdc	9Vdc	9V alk	9V alk
Operating weight	5.5oz	16 (6)	4.6 oz	14 oz	5 oz	5.5 oz	7 (9-13.5)	6 (10)
Receiver Model:	L3 (L4)	W20R (W25DR)	WRR-28/37	WRR410/WRR420	ODC Hi-Fi	ENG-4	R-42A	R-32 (R-31B)²⁶
RF sensitivity/quieting	0.35(45)µV/12dB	0.5µV/12dB	10dBµ	>65µV/20dB	1µV/12dB	0.5µV/12dB	1.3µV 50dB SNR	2µV 50dB SNR
Spurious rejection	75dB	>80dB	>70dB	<70dB	80dB	70dB	...	...
Antenna types	Whip furnished (2)	Whip furnished	Whip	Whip	Whip	L/4 rubber ducky	Dual whips	Dual whips
Diversity reception	L4 only	W25DR only	WRR-37	Option	0	No	Yes	R-32 only
Multichannel	No	No	Yes	Yes	0	Yes	No	No
AF output level	0dBm	0dBV (M/L switch)	-58dBs 600Ω	-58dB mic level	56dBm,+10dBm	-7,-21dBm	Line level	Line level
Power requirement	12-18Vdc	13.5Vdc	3/10-17Vdc	9Vdc 6-AA cells	9Vdc	...	ac/dc	ac/dc
Metered parameters	AF/RF/V(Div)	AF/RF/V	AF/RF	AF/RF	AF/RF/V	AF/RF/V	A/B; RF/AF	A/B; RF/AF
Metering types	LEDs	Meter (2 meters)	LEDs	LEDs	LEDs	Meter	LEDs	meter
Reader Service No	1353	1354	1355	1356	1357	1358	1359	1360

¹⁹ W15HT uses SM58 dynamic or SM87 electret; W10BT uses WL83 electret. ²⁰ Linear or companded; >60dB SNR w/companding; 0.7% distortion w/companding. ²¹ 1WP-27 amplifier gives 500mW. ²² per 1kHz linear mode; ±9.4kHz/1kHz companded. ²³ Video camera system. ²⁴ T-series includes elements such as E-V N/D757, Shure SM-58, SM-85, SM-87. ²⁵ T-36, E-V BK-1 element; T-38, E-V N/D457 element. ²⁶ 31B non diversity.

Shotgun Microphones

Hypercardioid is abbreviated to HC.

Manufacturer	AKG Acoustics			Audio-Technica			
Model	C568	CK8X capsule	ST205	AT4071	AT7403	AT877	AT4073
AF response Hz-kHz	20-20k	30-18k	...	30-20k	30-20k	60-14k	30-20k
Polar pattern(s)	HC/directional	HC/directional	Variable ¹	Lobar	Narrow dir	Unidir	Nar. dir.
Output impedance Ω	600	...	...	250 B	250 B	350 B	250
Output level (mV/Pa)	...	...	...	62mV	52mV	10mV	52mV/Pa -25.7dBm
Maximum SPL dB; % dist.	128dB 0.5%	137dB 0.5%	140dB 0.5%	127dB	129dB	120dB	129dB 1%
Output noise	18dB DIN 45412-A	15dB	20dB per pattern spc	12dB A-wtd	14dB	...	16dB
S/N ratio	76dB	79dB	...	...	...	>70dB	>75dB
Mic capsule type	Electret	Electret	...	Capacitor	Capacitor	Condenser	Ext polarized cap.
Stereo design	No	No	M/S or L/R	No	No	No	No
Power source	9-45Vdc	...	48Vdc or ac	12-48V	12-48V	1.5V	12-48Vdc
Filters	...	...	Bass rolloff	...	HP	...	High-pass
Weight	6.2gm	4.2gm	...	5.8 oz	4.2 oz	>6 oz	4.2oz
Reader Service No	647	648	649	650	651	652	653

¹ Patterns from omni through cardioids to Figure-eight.

Manufacturer	Audio-Technica US		beyerdynamic			Electro-Voice	
Model	AT815a	AT835	MC 736-PV	MC 737-PV	MCE 86 S	DL42 ²	RE45N/D ³
AF response Hz-kHz	40-20k	40-20k	40-20k	40-20k	50-18k	50-12k	150-15k
Polar pattern(s)	Narrow directional	Narrow directional	Cardioid lobe	HC/lobe	HC/lobe	HC	Card.-line
Output impedance	600	600	150	150	190	150	600
Output level (mV/Pa)	9.0mV/Pa -44.5dBm	9.0mV/Pa -45.5dBm	25mV/Pa	25mV/Pa -30dBV	4.2mV/Pa -47dBm	-50dB	5mV/Pa 1kHz
Maximum SPL dB; % dist.	120dB 3%	115dB 3%	128dB	122dB	138dB 0.7%	...	...
Output noise	18dB	17dB	4.5 μ Vs	4.5 μ Vs	3.8 μ Vs	-125dBm hum	130dBm hum pickup
S/N ratio	>70dB	>70dB	74dB	74dB	61dB	...	...
Mic capsule type	Fixed-charge cond.	Fixed-charge cap.	RF condenser	RF condenser	Electret	Dynamic	Dynamic
Stereo design	No	No	No	No	No	...	No
Power source	1.5Vdc AA-cell	1.5Vdc	AA cell	12Vdc	12-48Vdc	8-48Vdc	Not required
Filters	High-pass	High-pass	Bass rolloff	Bass rolloff	...	...	...
Weight	9.2oz	7.5 oz	4 oz	7 oz	2.5 oz	13 oz	7.5 oz
Reader Service No	654	655	656	657	658	659	660

²Windscreen, case, coiled cord, handle. ³Shock mount, case, handle, clamp, attenuator.

Manufacturer	Georg Neumann†		Sennheiser Electronics				Shure Brothers
Model	KMR8 1i(KMR821) ⁴	RSM190i MS-stereo ⁵	MKH 416 P48 ⁶	MKH 60 P48	MKH 70 P48	MKH 816 P48 ⁷	SM89
AF response Hz-kHz	40-18k (40-20k)	40-18k	40-20k	50-20k	\pm 2 70-20k	40-20k	60-20k
Polar pattern(s)	HC	HC/fig-8	Sup card./lobe	Sup card./lobe	Sup card. lobe	Ultra dir/lobe	HC: LOBAR
Output impedance	150	50	10	130	150 bal	10	100 source
Output level (mV/Pa)	18mV/Pa (21mV/Pa)	23mV/Pa	1.25	1.3V	40mV/Pa	1.2V	2.2mV/Pa -53dBV
Maximum SPL dB; % dist.	>128dB	134mV/Pa	128dB	125dB	124dB	124dB	127dB 0.5% dist
Output noise	...	...	17dB	9dBa	10dB/DIN 45500	15Ba	16dB A wtd
S/N ratio	82dB	78dB M/72dB S	>77dBa	>85dBa	...	>78dBa	79dB
Mic capsule type	...	...	RF condenser	RF condenser	RF condenser	RF condenser	Electret
Stereo design	No	Yes	No	No	No	No	No
Power source	48Vdc \pm 4V	48Vdc \pm 4V	48V	48V	48Vdc	48Vdc/8	11-52Vdc
Filters	...	...	...	Low cut	hi boost	Low cut	Highpass
Weight	145 g	300 g	6.25 oz	5.25 oz	6.5 ozams	13.4 oz	6.9oz
Reader Service No	661	662	663	664	665	666	667

⁴Windscreen, case, mounting accessories. ⁵MTX 190i matrix amp ⁶MKH 416 TU3 12Vdc. ⁷MKH 816 6 TU3 12Vdc. †Available in US from Gotham Audio.

Telephone Bandwidth Extender

Manufacturer	Comrex Corporation				Gentner Electronics		
Model	2XP/2XR	3XP/3XR	LX/T; LX/R	PLXmicro/TH-X	EFT-1000A ¹	EFT-100 ¹	EFT-3000
System type	2-line	3-line	1-line	1-line duplex	1-line	1-line	3-line duplex
Offset line 1 Hz	250/2k	250/2k/2k	250	250	250	250	320/2.82k/5.32
Translation error	\pm 0.02Hz	\pm 0.02Hz	\pm 0.02Hz	\pm 0.02Hz	\pm 0Hz	\pm 0Hz	\pm 0Hz
Processing analog/digital	Analog	Analog	Analog	Analog	Digital	Digital	Digital
AF response dB/Hz	0.5 50-5k	0.5 50-10k	0.5 50-5k	0.5 50-5k	0.5 50-3.5k	0.5 50-3k	0.5 50-7k
Compression/expansion	...	Auto lvl ctl	Yes	...	Yes	Yes	No
System transmitter	2XP	3XP	LX-T	PLX micro	EFT-1000A	EFT-100	EFT-3000
Packaging	Portable	Portable	Rack/Table	Portable	Portable	Rack/Table	Rack/Table
AF input impedance	600 Ω	600 Ω	600 Ω	150 Ω /10k Ω	600 Ω	>10k Ω	150/600 Ω
AF input level dBm	+4	+4	-20; +8	-60; +0	-55; 0	-10; 0	10
Mic input	...	...	...	Bal	Bal	...	Bal
Line input	Bal	Bal	Yes	Bal	Bal	Bal	Bal
Output connection	Xfmr bal	Xfmr bal	Xfmr bal	Xfmr bal	Xfmr bal	Ext hybrid	Xfmr bal
Output impedance	600 Ω	600 Ω	600 Ω	600 Ω	600 Ω	600 Ω	600 Ω
Output level	-9dBm	-9	-9	-9dBm	-15	-2	-10

Manufacturer	Comrex Corporation				Gentner Electronics			
	Model	2XP/2XR	3XP/3XR	LX/T; LX/R	PLXmicro/TH-X	EFT-1000A ¹	EFT-100 ¹	EFT-3000
Power requirement	120/240Vac	120/240Vac	120Vac	120Vac; ±15Vdc	117/234Vac; dc	117/234Vac	117/234Vac	117/234Vac
System receiver	2XR	3XR	LX-R	TH-X	EFT-1000A	EFT-100	EFT-3000	EFT-3000
Packaging	Rack mount	Rack mount	Rack/Table	Rack-mount	Portable	Rack/Table	Rack/Table	Rack/Table
Power requirement	...	120/240Vac	...	...	117/234Vac	117/234Vac	117/234Vac	117/234Vac
Telco connection	Xfmr bal	Xfmr bal	Xfmr bal	Xfmr bal	Xfmr bal	Ext hybrid	Xfmr bal	Xfmr bal
Telco input level	-40; +8	-40; +8	-40; +8	-40; +8	-30; +17	-20; 0	0	0
Telco impedance	600Ω	600Ω	600Ω	600Ω	600Ω	600Ω	600Ω	600Ω
AF output connection	Act bal	Act bal	Act bal	Act bal	Act bal	Act bal	Act bal	Act bal
AF output impedance	600Ω	600Ω	600Ω	600Ω	600Ω	600Ω	600Ω	600Ω
AF output level dBm	0	0	0	0dBm	0	-10; 0	10	10
Reader Service No	855	856	857	858	859	860	943	943

¹ Transceiver.

Manufacturer	Gentner Electronics	Kahn Communications	Rood Megatronics BV				
	Model	EFT-900A ¹	LPGP-1	BAX 110	BAX 111 ²	BAX 112	BAX 2010 ³
System type	1-line	2-line	2-line	1-2-line duplex	1-line	2-line	2-line
Offset line 1 Hz	250	...	350/2.1k	350/2.1k	350	350/2.1k	350/2.1k
Translation error	±0Hz	0%	±0.5Hz	±0.5Hz	±0.5Hz	±0.5Hz	±0.5Hz
Processing analog/digital	Digital	Analog	Anal & Dig	Anal & Dig	Anal & Dig	Anal & Dig	Anal & Dig
AF response dB/Hz	0.5-50-3.5k	50-5k	1.50-4.95k	1.50-4.95k	1.50-3.05k	1.50-4.95k	1.50-4.95k
Compression/expansion	Yes	Yes	Yes	Yes	w/auto EQ	Yes	Yes
System transmitter	EFT-900A	LPGP-1-T	BAX 110/m	BAX 111/m	BAX 112/m	BAX2010	BAX2010
Packaging	Portable	Portable	Rack/Table	Rack/Table	Portable	Attache case	Attache case
AF input impedance	150/600Ω	600Ω bal/unbal	600/10kΩ	600/10kΩ	600/10kΩ	600/12kΩ	600/12kΩ
AF input level dBm	-55; 0	0dBm	±6	±6	±6	±12	±12
Mic input	Bal	...	Bal/unbal	Bal/Unbal	10kΩ unbal	Bal/unbal	Bal/unbal
Line input	Bal	...	Bal	Bal	Bal 600Ω	Bal	Bal
Output connection	Xfmr bal	Bal/unbal	Xfmr bal	Xfmr bal	Xfmr bal	Xfmr bal	Xfmr bal
Output impedance	600Ω	600Ω	600Ω	600Ω	600Ω	600Ω	600Ω
Output level	-15	0dBm	±12	±12dB	-6	12	12
Power requirement	117/234Vac; dc	115/230Vac	110/220Vac	110/220Vac	6Vdc (4-D)	110/220Vac	110/220Vac

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Circle (101) on Reply Card

Telephone Bandwidth Extender

Manufacturer	Gentner Electronics	Kahn Communications	Rood Megatronics BV			
Model	EFT-900A ¹	LPGP-1	BAX 110	BAX 111 ²	BAX 112	BAX 2010 ³
System receiver	EFT-900A	LPGP-1-R	BAX 110/d	BAX 111/d	BAX 112/d	BAX 110/d
Packaging	Portable	Rack-mount	Rack/Table	Rack/Table	Rack/Table	Rack/Table
Power requirement	117/234Vac	115-230Vac	110/240Vac	110/240Vac	110/240Vac	110/240Vac
Telco connection	Xfmr bal	Bal/unbal	Xfmr bal	Xfmr bal	Xfmr bal	Xfmr bal
Telco input level	-35; +4	-20dBm	-30; +17	-30; +17	-30; +12	-30; +17
Telco impedance	600Ω	600Ω	600Ω	600Ω	600Ω	600Ω
AF output connection	Act bal	Bal/unbal	Act bal	Act bal	Act bal	Act bal
AF output impedance	600Ω	600Ω	600Ω	600Ω	600Ω	600Ω
AF output level dBm	-60; 0	0dB	0; +12	+12	0; +12	0; +12
Mixer feature	...	No	...	...	...	2M/1L
Mixing channels	...	No	...	...	...	3
Reader Service No	944	945	946	947	948	949

²BAX 114/m transmitter offers similar characteristics in a portable configuration operating on 90-270V, 40-400Hz. ³Includes 2-mic, 1-line mixing capability.

Audio Distortion Measurement Equipment

Manufacturer	Amber Electro Design		ASACA ShibaSoku			Audio Precision
Model	Model 3501	Model 5500 ²	AD60A	AD725C	AM50B	System One
Auto level set	Yes	Yes	...	Yes	...	Yes
Auto null set	Yes	Yes	Yes	Yes	Yes	Yes
μP-control	No	Yes	Yes	No	Yes	Yes
Auto ranging	No	Yes	Yes	Yes	Yes	Yes
X-Y display output	No	Option	...	No	...	No
Printer-plotter output	No	Option	Option	No	Option	Yes
Automation bus port	No	Yes	GP-IB	Yes	GP-IB	Yes
Audio recorder tests	Yes	Yes	CD spec	No	...	Yes
Transmit-receiver units	Yes	Yes	No	Opt	No	Yes
Portable unit	Yes	Yes	No	No	No	No
AF range (fundamentals)	10-100k	10-100k	10-120kHz	5-110kHz	10-109kHz	10-200kHz
Range (on harmonics)	10-300k	10-500k	...	5Hz-110kHz	to 330kHz	10Hz->500kHz
Input level range	-30/+40dBm	-30/+40dBm	1mV-100Vrms	0.1V-100V	-26.8/+42.2dBm	-90dBu/-140Vrms
Input impedance	100kΩ	100kΩ	200kΩ/100kΩ	100kΩ	2-ch 600Ω	100Ω
Input connection	AB/AU	AB/AU	2-ch Bal/unb	UB	Bal/unb	Bal/Unbal
Fundamental rejection	>100dB	>100dB	>115dB	120dB	>85dB	...
THD minimum	0.0008%	0.001%	<-110dB	0.001% f.s.	0.2%-100%	0.0004% 20-20k
THD accuracy	±1%	±1%	...	...	...	0.5dB
IMD measurements per	SMPTE ¹	SMPTE ¹	...	...	...	SMPTE ³
IMD accuracy	±2%	±1%	...	...	...	±1dB
IMD minimum	0.003%	0.001%	...	...	...	10mV
AC voltage range	<3μ-100V	10μ-100V	30μV-100V	110V-230V±10%	200μV-100V	300μV-160Vrms
Audio noise range	<1μ-100V	<1μ-100V	...	...	-80dB	75μ-160Vrms
Signal generator range	<-60/+28dBm	<-80/+30dBm	No	...	Yes	10Hz-204.775kHz
Generator output	TB/TU	TB/TU	...	...	Bal/unb	Bal/Unbal Xfmr
Frequency counter range	10Hz->500kHz	to 500kHz	Yes	5Hz-500kHz	Yes	10Hz->500kHz
Meters-displays	Mechanical	LED	Dual analog	LED	7-seg LEDs	CRT
Reader Service No	987	988	989	990	991	992

¹Also per DIN 45045 & CCIF specifications. ²AudioCheck package allows control from PC for automated measurement system. ³IMD also perDIN 45045/45043; measurements also per CCIR IEC 2683 IHF A202.

Manufacturer	Neutrik			Panasonic	Rohde & Schwarz	
Model	A1 System	Audiograph 3337/5	TT402A	VP-7722P	SUN-2 system	UPA analyzer
Auto level set	Yes	Yes	Yes	Yes	Yes	Yes
Auto null set	Yes	Yes	Yes	Yes	Yes	Yes
μP-control	Yes	Yes	Yes	Yes	Yes	Yes
Auto ranging	Yes	Yes	Yes	Yes	Yes	Yes
X-Y display output	Yes	Yes	Yes	No	Yes	Yes
Printer-plotter output	Yes	3302 mainframe	Yes	Yes	Yes	Yes
Automation bus port	RS-232	Yes	-488/-232	Yes	Yes	Yes
Audio recorder tests	Possible	Possible	Possible	NA	Yes	Yes
Transmit-receiver units	No	No	No	No	No	No
Portable unit	Yes	Yes	Yes	...	Yes	Yes
AF range (fundamentals)	20Hz-40kHz	20Hz-40kHz	19Hz-21kHz	10-110k	10-100k	10-100k
Range (on harmonics)	to 130kHz	to 200kHz	to 200kHz	to 10th harmonic	...	300k
Input level range	10mV-200V	20mV-200V	30μV-100V	0.05-110Vrms	-84/+32dB	12mV-400V
Input impedance	100kΩ	100kΩ	2 100kΩ	100kΩ	1MΩ	600Ω/10kΩ
Input connection	Act bal	Bal	Bal A/B	BNC floating	TB/unbal	Bal/unbal
Fundamental rejection	...	...	...	>140dB	>65dB	...
THD minimum	0.0025%	<0.005%	<0.01%	0.001%	0.06%	-90/0dB range
THD accuracy	...	±0.5dB	±1.5%	<±2%	±0.1dB	±1dB to 100kHz
IMD measurements per	...	SMPTE; DIN	Options	per SMPTE	DIN method	No
IMD accuracy	...	...	...	±1dB	...	...
IMD minimum	...	<-74dB	...	0.01%	...	...

Manufacturer	NeutrÅk			Panasonic	Rohde & Schwarz	
Model	A1 System	Audiograph 33375	TT402A	VP-7722P	SUN-2 system	UPA analyzer
AC voltage range	10µV-200V	10µV-200V	30µV-100V	0.316mB-100V±2%	Yes	10µV-300V unbal
Audio noise range	-111dBu residual	Yes	<-106dB min	0-130dB SNR	Yes	0-120dB SNR
Signal generator range	Yes	Yes	Yes	10-110k	SUN-2/S 10-100k	UPA-B6 opt 10-100k
Generator output	<0.2Ω bal	Bal	Bal	BNC floating	Telco jack	Bal
Frequency counter range	...	Yes	Yes	Yes	...	8-250k
Meters-displays	LCD	LCD	Multi-LED	VU	7-seg LEDs	LED displays
Reader Service No	993	1134	1135	1136	1137	1138

⁵3302 mainframe is required for operation.

Manufacturer	Schmid Telecom-munications	Sound Technology			Tektronix	
Model	SIAT SZ 346/3166	1510A ⁷	1530A analyzer	3200B/3100B ⁹	AA5001	AA501
Auto level set	Yes	Yes	Yes	Yes	Yes	Yes
Auto null set	Yes	Yes	Yes	Yes	Yes	Yes
µP-control	Yes	Yes	Yes	Yes	Yes	Yes
Auto ranging	Yes	Yes	Yes	Yes	Yes	No
X-Y display output	...	Yes	Yes	Opt	Yes	No
Printer-plotter output	Thermal printer	Yes	Yes	Yes	Yes	No
Automation bus port	RS-232	Opt	Opt	Yes	Yes	No
Audio recorder tests	Possible	Yes	No	Yes	No	No
Transmit-receiver units	Xmt 316/Rcv 346	Yes	Opt	Yes	No	No
Portable unit	Yes	Yes	Yes	Yes	No	No
AF range (fundamentals)	30Hz-20kHz	20-40kHz	20-40kHz	1-102.39kHz	10-100kHz	10-100kHz
Range (on harmonics)	...	315Hz-1kHz	100Hz-5kHz	10Hz-300kHz	to 300kHz	to 300kHz
Input level range	-44dBm/+21dBm	100µV-30V	100µV-40V RMS	10mV-100V	60mV-200V 100kΩ	60mV-200V 100kΩ
Input impedance	600/10kΩ	100kΩ	100kΩ	100kΩ	100kΩ	100kΩ
Input connection	2 bal	AB	AB	...	AB	AB
Fundamental rejection	...	...	...	...	10dB ¹⁰	10dB ¹⁰
THD minimum	>0.1%	0.05%	0.05% ⁸	0.001%	0.0025%	0.0025%
THD accuracy	...	5%	5%	10%	±10%	±10%
IMD measurements per	Opt SMPTE	...	SMPTE	SMPTE	CCIF/DIN/SMPTE	CCIF/DIN/SMPTE

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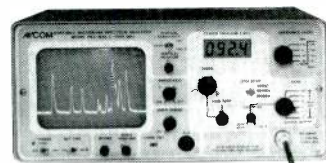
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Circle (102) on Reply Card

Audio Distortion Analyzers

Manufacturer	Schmid Telecom-munications	Sound Technology	Tektronix
Model	SIAT SZ 346/316 ⁶	1510A ⁷	1530A analyzer 3200B/3100B ⁹
IMD accuracy	...	...	5% 1.0%
IMD minimum	...	...	0.1% 0.002%
AC voltage range	-70dBm/+21dBm	300μV-40V	30μV-100V
Audio noise range	-70dBm/+1dBm	-92/-10dBV	-92/-10dBV
Signal generator range	Yes	-80,+30dBm	-80/+30dBm
Generator output	Bal<5/600Ω	AB	AB
Frequency counter range	...	20Hz-40kHz	20Hz-40kHz
Meters-displays	LEDs	CRT	CRT
Reader Service No	1139	1140	1141

⁶SIAT "Short Interval Audio Testing" is a signal generator and receiver for operation of wired or radio links; complete set of measurements made within 5-sec interval. ⁷Audio signal and recording test system; measures 2nd, 3rd harmonics separately. ⁸Measures 2nd, 3rd harmonics separately. Includes precision 10.396Hz for Bessel Null adjustment. ⁹Two-unit package for programmable transmission path tests; transmission package is 3100B programmable generator with LED metering displays. ¹⁰Value is below specified residual THD & noise or actual THD, whichever is greater.

CD Players

Manufacturer	Barco EMT	Denon America	Panasonic Pro Audio	Pioneer
Model	EMT 980	EMT 981	DN-950FA	SL-4300
Configuration	Single player	Single	Single player	Single
Player trays	...	...	1	1
Programmable events	None	4-event	None	20-event
Output connection	Balanced	Balanced	Balanced	Unb
Output level	+6dB	+6dB	+4dB	-10dBu
Digital output	No	Yes 44.1kHz	No	No
Digital resolution	16-bit	16-bit	16-bit	16-bit
Oversampling factor	x2	x4	x4	x4
AF response ±dB Hz-kHz	±0.5 20-19.8k	±0.2dB 40-20k	20Hz-20kHz	±0.5 2Hz-20kHz
Distortion	0.03%	0.04%	<0.01%	0.003%
Dynamic range	90dB	98dB	92dB A wtd	94dB
Crosstalk (worst case)	-60dB	<-75dB	...	...
S/N ratio	+94dB RMS	+105dB RMS	92dB	96dB
Access time (worst)	4s	3.5s	3s	...
Reader Service No	401	402	403	404

Manufacturer	Pioneer	Studer Revox	TASCAM
Model	PD-7300 (6300)	A727	A730
Configuration	Single player	Single	Single
Player trays	1	1	1
Programmable events	Yes	No ¹	3-event ¹
Output connection	Unbal	Bal/UB <50Ω	Bal/UB <50Ω
Output level	2.0V	+15dBm	15dBm
Digital output	Optical & (coaxial)	Yes	Yes
Digital resolution	18-bit	16-bit	16-bit
Oversampling factor	x8	x4	x4
AF response ±dB Hz-kHz	±0.5 4-20k	±0.1 20-20k	±0.1 20-20k
Distortion	0.0025% (0.0035%)	0.006%	<0.006%
Dynamic range	98dB	>100dB	>100dB
Crosstalk (worst case)	106dB separation	<-90dB	<-90dB
S/N ratio	110dB (104dB)	>100dB	>100dB
Access time (worst)	...	<3s	<3s
Reader Service No	408	409	410

¹A729 CDS series controller may be used with 4 A727 or A730 units for multiple event program.

Intercom Systems, Matrix

Manufacturer	Audio Visual Systemes	Clear-Com Inter-com Systems	Heikki Malkki Ltd	HM Electronics	McCurdy Radio Industries
Model	S70 (\$69)	Matrix Plus	00DS-Intercom	RP753 station	RP755 station
Matrix size range	12 (8-16) sets	50x50	11x11-100x100	6x12	6x12
# of stations standard	12 max (16 max)	2 expand to 50	30 expand to 300	64 w/call, 200 w/o	64 w/call, 200 w/o
Status display	None	LCD panel	LEDs	Switch position	Switch position
Party line function	No	Yes	Yes	Yes	Yes
Programmable grouping	No	Yes	Yes	Yes	Yes
Configuration storage	No	Yes	Yes	No	No
Simultaneous conversations	12 (16)	25	110-9000	6	6
System control	...	μP, PC/compatible	μP, PC, terminal	Manual	Manual
	Yes	Yes	Yes	No	No
Station priority	Keyboard	Keypad, keyboard	Keypad/station	Y-Y button	Y-Y button
Station selection	Keyboard	Keypad, Keyboard	Keypad/station	X-Y button	X-Y button

Manufacturer	Audio Visual Systemes	Clear-Com Intercom Systems	Heikki Malkki Ltd	HM Electronics		McCurdy Radio Industries	
Model	S70 (\$69)	Matrix Plus	ODDS-Intercom	RP753 station	RP755 station	CS9400+	CS9500
Channel selection	4-wire	Star, twisted pair	Star shielded pair	wire/channel, shield	wire/channel, shield	4-wire, star, 3 pair	4-wire, star, 3 pair
Wiring (matrix)	...	2-/4-wire	Star shielded pair	ed pair	ed pair	per station	per station
Wiring (party line)	...	Wire/channel Daisy chain Star Shld 2-w	Star shielded pair	Daisy chain, shielded pair	Daisy chain, shielded pair	...	...
Wiring (control)	...	Star	Star shielded pair	...	...	...	...
	...	twisted pair 2-wire	...	...	...	...	...
Voice processing	Analog	Analog & digital	Analog	Analog	Analog	Analog & digital	Analog & digital
Camera interface	Indirect	Direct/indirect	indirect	Indirect	Indirect	Direct 4-wire	Direct 4-wire ¹
Wireless interface	...	Direct/indirect	Direct	Indirect	Indirect	Direct	Direct
Telco interface	...	Direct/indirect	Direct	Direct	Direct	Option	Option
IFB interface	...	Direct/indirect	Direct	Indirect	Indirect	80 circuits	24 circuits
2-way radio interface	No	Option	Yes	Yes	Yes	48 w/TX ctl lines	8 w/TX ctl lines
Program audio	No	Yes	Not needed	No	No	Yes	Yes
Call waiting	No	Yes	Option	No	No	Yes	Yes
Caller tally	...	...	...	...	...	-wired user stations	-Wired user stations
Reader Service No	416	417	418	419	420	421	422

¹Controlled 16-camera ISO optional.

Manufacturer	PESA	Philip Drake Electronics		RTS Systems		Ward-Beck Systems	
Model	TB-8000 series	PD 6000 series	PD 8000 series	810-AA (810)	848A	MicroCom II	MiniCOM
Matrix size range	8x8-64x64	16x16-128x128	4x4-24x24	2x2-1Cx10	2x2-24x24	48x48-960x960	24x36
# of stations standard	Multiples of 8	16 expand to 128	4 expand to 12	2 expand to 10	2 expand to 24	960 max	24 max
Status display	LEDs on panel	LEDs, LCD panel	LEDs	Lighted button	VDT	CRT dot matrix	CRT dot matrix
Party line function	Yes	Yes	Yes	No	Yes	Option	Option
Programmable grouping	Yes	Yes	Yes	No	Yes	Yes	Yes
Configuration storage	Yes	Yes	No	No	Yes	Yes	Yes
Simultaneous conversations	Multiple	As # of stations	Per # of stations	5	14	1/2 matrix inputs	12
System control	Multi-μP, PC	μP PC/compatible	Pin-patch program	...	μP, PC, modem	Integral μP ²	μP, PC/compatible

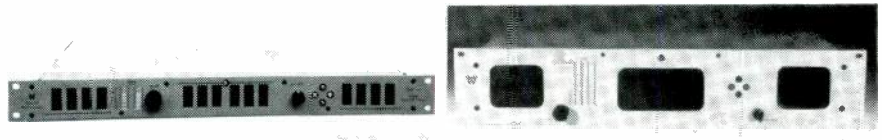
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Manufacturer	PESA	Philip Drake Electronics		RTS Systems		Ward-Beck Systems	
Model	TB-8000 series	PD 6000 series	PD 8000 series	810-AA (810)	848A	MicroCom II	MiniCOM
Station priority	Panel switch	Keypad, X-Y	X-Y buttons	X-Y button	...	Keyboard, keypad	Keyboard, keypad
Station selection	Panel switch	Keypad, X-Y button	X-Y buttons	X-Y button	...	Keypad	Keypad
Channel selection	Ribbon cable	Star,,twisted pair,, Wire/channel twisted	Wire/channel twisted	Wire/channel twisted	4-wire	4-wire	
Wiring (matrix)			4-wire	pair, 4-wire	pair	pair	
	...	Star,,twisted pair,, Wire/channel twisted	...	Wire/channel	Shielded pair	Shielded pair	
Wiring (party line)			pair	4-wire	...	shielded pair	...
	Ribbon cable	Star, twisted pair, Wire/channel twisted	...	Shielded pair	2-wire	Shielded pair	
Wiring (control)	...	4-wire	pair	...	...	...	...
Voice processing	Adapter	Direct	Direct	Indirect	Indirect	Direct	indirect
Camera interface	Adapter	Direct	Direct	Indirect	Indirect	Direct	Direct
Wireless interface	Adapter	Indirect	Indirect	Indirect	Indirect	Direct	Direct
Telco interface	Adapter	Direct	Direct	Indirect	Indirect	Direct/indirect	Direct/indirect
IFB interface	Adapter	Direct	Direct	Indirect	Indirect	Direct	Direct
2-way radio interface	Adapter	Yes	Yes	No	No	Option	Yes
Program audio	...	Yes	No	No	Yes	Yes	Yes
Call waiting	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Reader Service No	423	424	425	426	427	428	429

²System is PC/compatible.

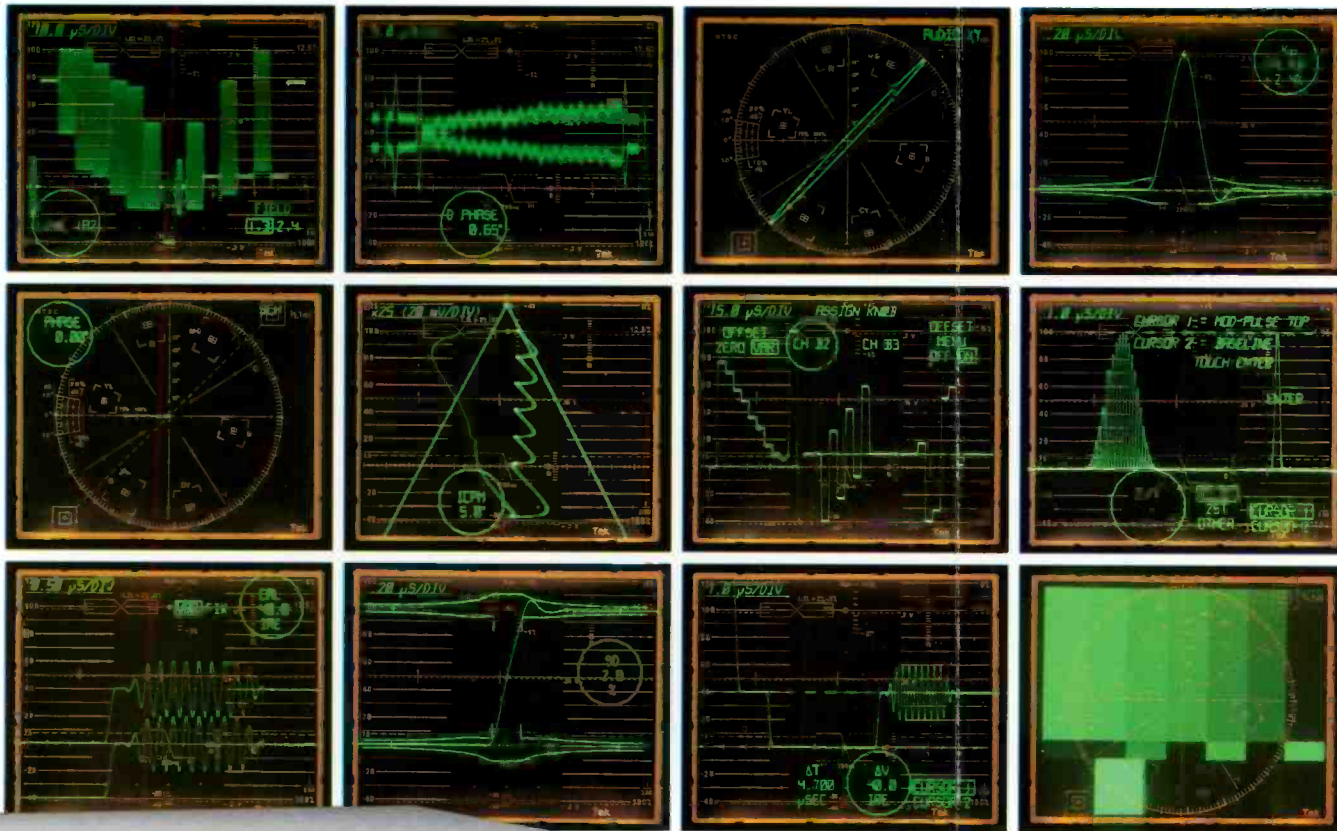
Intercom Systems, Party Line/Conference

Manufacturer	Clear-Com	HM Electronics		Philip Drake	RTS Systems	
Model	Party line series	RP733 (RP735 ²)	RP743 power station	PD 5001	802	810-CL/810-5CTL
Communications line	3-wire shielded Unba	3-wire unbalanced	3-wire unbalanced	4-wire balanced	2-/4-wire balanced	2-wire balanced
Maximum cable length	1 mile	...	...	500 ft	5000 ft	5000 ft
# of stations maximum	100	32 w/call (100 w/o)	64 w/call (200 w/o)	12	30	30
# of channels	Unlimited	2	4	12	12	10
Full duplex capability	Yes	Yes	Yes	Yes	Yes	Yes
AF response HzkHz	100Hz-12kHz	120-12k	120-12k	50Hz-8kHz	100Hz-10kHz	100Hz-10kHz
Variable sidetone	Yes	Yes	Yes	...	Yes	Yes
Visual signalling	dc powered	dc powered	dc powered	Yes	ac powered	No
State-stage announce	Yes	No	No	Option	Yes	Yes
Selectable program feed	Yes	Yes	Yes	No	Yes	No
Microphone type	Dynamic ¹	Dynamic/electret	Dynamic/electret	Dynamic	Carbon/dynamic	Carbon/cynamic
Remote mic mute	Yes	No	No	No	Yes	Yes
Mic control	PTT/footxch/latch	Latch	Latch	PTT, latch	PTT/latch/footxch	PTT/latch/footxch
Volume control	Conf line/Pgm	Program	Program	Conference line	Conf line/Pgm	Conference line
Camera interface	Option	No	No	Option	Option	No
IFB cue interface	Option	No	No	Yes	Option	No
Telco interface	Option	No	No	Option	Option	No
Wireless interface	Option	No	No	Yes	Option	No
2-way radio interface	Option	No	No	Option	Yes	No
Speaker stations	Yes	Yes	Yes	Yes	Yes	Option
Belt packs	1-/2-channel	1-/2-channel	1-/2-channel	2-channel	...	...
Belt pack weight	0.5 lb	0.69 lbs	0.69 lbs	1 lb	...	...
Reader Service No	431	432	433	434	435	436

¹Electret and carbon options. ²RP735 includes a speaker in the power station.

Manufacturer	RTS Systems			Telex Communications	Ward-Beck Systems
Model	824	Series 17	TW Intercom	IC-2 MAX (BP-1/BP-2)	M8220/PH-2
Communications line	2-wire balanced	2-/3-wire shielded unbalanced	2-wire unbalanced	2-wire, shielded balanced	2-wire, shielded unbalanced
Maximum cable length	5000 ft	500 ft	5000 ft	5280 ft	1000 ft
# of stations maximum	50	30	75	50	15
# of channels	24	1	...	...	2
Full duplex capability	Yes	Yes	Yes	Yes	Yes
AF response HzkHz	100Hz-10kHz	100Hz-10kHz	100Hz-10kHz	200Hz-20kHz	250Hz-5kHz
Variable sidetone	Yes	Yes	Yes	BP-1/BP-2 units	Yes
Visual signalling	No	No	ac powered	ac powered	No
State-stage announce	No	No	Yes	Yes	Yes
Selectable program feed	No	No	Yes	...	No
Microphone type	Carbon/dynamic	Dynamic	Carbon/dynamic	Dynamic/electret	Dynamic
Remote mic mute	No	No	Yes	Yes	No
Mic control	PTT/Latch/footxch	Latch	PTT/latch/footxch	Latch	...
Volume control	Conference line	Conference line	Conf line/Pgm	...	Conf line/Pgm
Camera interface	No	Option	Yes	No	Yes
IFB cue interface	No	No	Yes	No	Yes
Telco interface	Option	Option	Yes	No	Yes
Wireless interface	Option	Option	Yes	No	No
2-way radio interface	Option	Option	Yes	No	No
Speaker stations	Yes	No	Yes	Option	Option
Belt packs	...	1-channel	1-/2-channel	1-/2-channel	2-channel
Belt pack weight	...	0.25 lb	0.75 lb	1 lb	3 lbs
Reader Service No	437	438	439	440	441

The Tek 1780R: We don't mind if you judge by appearances.



Even at first glance, you can see that the Tek 1780R is in a class by itself. Only the 1780R offers full-bandwidth analog measurement capabilities with separate, complementary waveform and vector displays. Component and composite capabilities are provided through four video inputs and a front-panel probe

Nobody's watching closer.

input. You get polar SCH presentation, precision differential gain and phase displays required to test modern television systems, and more. All made easy enough for even first-time operators.

But enough said. Ask your nearest Tektronix representative for a demonstration of the 1780R: by all appearances, the most advanced analog video measurement set you can buy!

Tektronix
COMMITTED TO EXCELLENCE

TRANSMITTER/TEST &
MEASURING SPECS

If you thought they were just for HDTV,



think again:

Sure, our TSG 1000 Series Television Generators support the major proposed HDTV standards. But they're good for a lot more than high definition.

The fully programmable TSG 1001 and companion SDP 1000 Signal Development Program, for example, support signal generation in NTSC, Betacam®, MII and HDTV formats. With the PC-based SDP 1000, signals can be defined in arbitrary line and field rates.

FORMAT	TSG 1001	TSG 1050	TSG 1125	TSG 1250
525/59.94/2:1	•	•		
525/59.94/1:1	•	•		
787/59.94/1:1	•			
1050/59.94/2:1	•	•		
1050/59.94/1:1	•	•		
1125/60/2:1	•		•	
625/50/2:1	•			•
625/50/1:1	•			•
1250/50/2:1	•			•
1250/50/1:1	•			•
GBR	•	•	•	•
Y. PB, PR	•	•	•	•
Analog	•	•	•	•
Parallel Digital	•	•	•	•

The TSG 1050, TSG 1125 and TSG 1250 generate signals in HDTV as well as lower line rate interlaced formats.* With an optional RAM or PROM board and the SDP 1000, signals can be generated in a wide range of line and field rates. Plus, a programmable zone plate generator is included in the TSG 1001 and is available as an option with the rest of the family.

All in all, once you get the full story from your nearest Tek representative, we think you *will* think again about looking anywhere else!

*TSG 1125 excepted.

RF Transmission & Test/measurement equipment

AM/SW Radio Transmitters

These transmitters use amplitude modulation for standard broadcast (550-1650kHz) or international shortwave (3-30MHz) frequencies. Models with tube-type IPAs are noted with a dagger (†); Units with a separate power supply are indicated with a double dagger (‡). Auto recycling is standard on models rated greater than 1kW. A 50Ω monitor port is available on all systems.

Manufacturer	CCA Electronics			Continental Electronics				
	Model	AM-25000 FHF†	AM10000F ¹	315-R1‡	316F-1	317C-3‡	419F-2 ² ‡	420B ⁴ †‡
Band of service	1.5-10MHz	0.5-22MHz	Broadcast			Shortwave	Shortwave/SSB	
RF output	25kW	10kW	5kW	10kW	50kW	250kW ³	500kW	
RF output connection	...	...	1½"	1½"	3½"	75W/300Ω	9" 75Ω/300Ω	
Carrier stability	±10Hz	5Hz	±5Hz			±1x10 ⁻⁶ Hz		
Carrier shift	...	3%	2%	<2% 10W mod	<2%	...	<5%	
Modulation maximum	100% 125% pk	125%	125%			100%		
Audio input connection	Bal 600Ω	600Ω	Act bal			600Ω	Bal/Unbal	
Audio response (dB Hz)	1 50-10k	1.5 50-10k	±1 20-7.5k	1.5 10-15k	±0.5 20-7.5k	±1 50-7.5k		
Audio distortion	≤3%	95%	<3% 95% mod	<2% 100%	<3% 100% 50-10k	<2% 100%	<3% 95%	
AM noise figure	60dB	55dB	<-60dB unwt'd			<-55dB residual	<-55dB unwt'd	
Final amplifier	4CX20000A	4CX15000A	3CX3000F7	4CX15000A	4CX35000C	4CV250000C	4CV250000B	
Modulator final	4CX5000A		3CX3000F7	Solid-state	3CX3000A	3CW20000A7	2-4CV250000B	
Input AC power	220-440V 3φ	208-380V 3φ	208-250Vac 3φ		460 3φ	4160Vac 3φ		
Power consumption	53kW 95% mod	...	12.8kVA	28.4kW	118kVA	568kW	1075kVA	
Power factor	>0.9 min	...	0.95	0.93	0.95	>0.95	0.9	
System efficiency	...	...	>55%	53%	60%	65-70%	60%	
Stereo capable	...	...	Yes			No		
Fault logic	...	Relay	Relay			Relay	μP system	
Fault diagnosis	...	No	No			No		
Floor space used (in.)	...	76x34	35x34	67x26	144x54	400x72	42m ²	
Reader Service No	1400	1401	1402	1403	1404	1405	1406	

¹ Models available at 5kW and 15kW. ² 418D-2 rated 100kW has similar characteristics. ³ In SSB option, output power is 500kW PEP. ⁴ 3CW20000A7 with solid-state driver stage as IPA.

Manufacturer	Continental Electronics	Harris Broadcast		ITAME	LPB Inc	Marconi Comm.	
	Model	XL-301 (-310)	DX-50 ⁵	Gates Five ⁶	SX-5A ⁷	TAURO S 10 ⁸ †	AM-100P ⁹
Band of service	Broadcast	Broadcast			Broadcast	Broadcast	Broadcast
RF output	1kW (10kW)	50kW	500-5.6kW	5.6kW	10kW	100W	1kW
RF output connection	N (1½")	3½ 50Ω	7/8"	7/8" 50Ω	1½"	S0-239 UHF 50Ω	6½" 50Ω
Carrier stability	±5Hz	±2Hz typical	±4Hz	±10Hz PLL	±5Hz	±10Hz	±10Hz
Carrier shift	0.5% (2%)	<1%	...	<2% 100%	<3%	<2%	<5%
Modulation maximum	125%	145% 50kW	130% peak	125%	125% PDM	+125%	100%
Audio input connection	Act bal	600Ω bal			Bal 600Ω	600Ω	Bal 600Ω
Audio response (dB Hz)	±1 20-12k	-0.9, 1 30-10k	±0.5 20-10k	-1.5, 5 20-12.5k	±1 20-10k	±1.0 20-15k	±2 40-10k
Audio distortion	<2% 100%	≤1% 95% mod	<0.8% 95% mod	<1% 95%	<2% 99%	<2%	95% mod
AM noise figure	<-60dB unwt'd	65dB	>60dB		60dB	-55dB	-50dB
Final amplifier	MOSFET modules	MOSFET			3CX10000A7	Solid-state	Solid-state
Modulator final	Solid-state	AM digital	Polyphase PDM		4CX15000A	Solid-state	Solid-state
Input AC power	220Vac 1φ (3φ)	220Vac 3φ		240Vac 3φ	220/380Vac	117Vac 3φ	230Vac 3φ
Power consumption	2.6kW (17kW)	59kW	7.7kW	11.6kW	11kW	400W	3.5kVA
Power factor	...	0.98	...	...	...	0.9	0.9
System efficiency	>57% (75%)	85%	65%	>65%	40%	25%	48%
Stereo capable	Yes	Yes			Yes	Yes	No
Fault logic	Digital	Relay	Solid-state	Relay	μP	Solid-state	relay
Fault diagnosis	Option	Yes	"ColorStat"	μP	Yes	No	Yes
Floor space used (in.)	22x26	120x33	28x30	28x30	45x37	Wall-mount	32x22
Reader Service No	1407	1408	1409	1410	1411	1412	1413

⁵ Similar models using digital modulation include: DX-25U at 25kW, DX-10 at 10kW, DX-100 at 100kW. ⁶ Gates One 1kW; Gates Two 2.5kW. ⁷ Model SX-2.5A at 2.5kW; SW-1A at 1kW. ⁸ Systems available at 7kW, 5kW and 2kW available featuring similar characteristics. ⁹ Units rated at 5W through 60W available.

Manufacturer	Marconi Communications				Nautek			
	Model	B6034 ¹⁰	B6040†	B6126 (6127)	B6140 series ¹¹	AMPFET ND 10 (5)	AMPFET ND1	AMPFET ND50 (25)
Band of service	Broadcast			Shortwave		Broadcast		
RF output	50kW ¹⁰	5W/10kW	300kW (500kW)	3kW	10kW (5kW)	1kW	50kW (25kW)	
RF output connection	50Ω/300Ω	50Ω unbal	50Ω/300Ω	50Ω unbal	1½± 50Ω	50Ω UB 7/8	3½± 50Ω	
Carrier stability	<1 ppm/year	±10Hz	<1 ppm/year			±5Hz		
Carrier shift	<2.5%	<5%	<2.5%	...	<1%			
Modulation maximum	125%	100%	100%		125% at 10kW	125% PDM	125% at 50kW	
Audio input connection	Bal 600Ω		Bal 600Ω			Bal 600Ω		
Audio response (dB Hz)	±1 50-6k	±1 50-6k	±1 50-6k	-2, +* 60-6k	±0.5 30-10k			
Audio distortion	4% 90% mod	3% 90% mod	4%	90% mod	2.5% 90%	<1% 95% mod	<1% 95% mod	
AM noise figure	<-56dB	-55dB	<-56dB	-55dB	60dB			
Final amplifier	Tetrad	2 4CX5000A	TH 537 (TH 558)	Power tetrad	Modular Solid-state			

Manufacturer	Marconi Communications				Nautel		
Model	B6034 ¹⁰	B6040†	B6126 (6127)	B6140 series ¹¹	AMPFET ND 10 (5)	AMPFET ND1	AMPFET ND50 (25)
Modulator final	Tetrode	Solid-state	TH 555 (TH 581)	Solid-state	IRF 140	IRF 130	TRF 130
Input AC power	230Vac 2φ	380/415Vac 3φ	11kVac 3φ	110-440Vac 3φ	208Vac 3φ	240Vac 1φ	480Vac 3φ
Power consumption	...	30kVA	429kW (...)	...	20kVA	2.14kVA	100kVA
Power factor	...	...	0.9	...	0.98	0.82	0.98
System efficiency	...	...	64%	...	75%	>70%	75%
Stereo capable	Yes	...	No	...	...	Yes	...
Fault logic	Solid-state	Relay	...	Solid-state	Relay	MOS TTL/Relay	Solid-state
Fault diagnosis	...	...	Yes	...	...	...	...
Floor space used (in.)	3.65x1.54m ²	65x33	72(85)m ²	59x28 (118x40)	48x24	23x24	159x24
Reader Service No	1414	1415	1416	1417	1418	1419	1420

¹⁰B6035 rated 100kW, B6036 rated 150kW and B6037 rated 200kW are combinations of the B6034 system. ¹¹B6140 rated 3kW; B6141 rated 7.5kW; B6142 rated 12.5kW

Manufacturer	Nautel	Radio Systems	RF Dynamics	TELEFUNKEN Sendertechnik	
Model	AMPFET P400	TR-20	A-710	S4005 ^{12†}	S4006 ^{13†}
Band of service	Broadcast	Broadcast (LP)	0.1-10MHz	Shortwave	Broadcast/MW
RF output	0.4kW	20W	10kW	500kW	600kW
RF output connection	Type N 50Ω	50Ω	UHF SO-239; ...	50Ω 100230	50Ω 66152
Carrier stability	±5Hz	±0.002%	±10Hz	...	0.5x10 ⁶ Hz/yr
Carrier shift	<1%	2%	...	...	≤3%, 1kHz
Modulation maximum	125%	100%	100% 125% pk	...	100%
Audio input connection	600Ω bal	Bal 600Ω	Bal 600Ω	...	600Ω Bal
Audio response (dB Hz)	±0.5 30-10k	1 20-15k	1 50-10k	...	±1 40-4.5kHz
Audio distortion	1% 95% mod	2% 99% mod	2%	≤3% 80% mod	≤2% 80% mod
AM noise figure	60dB	-60dB	55dB	...	>55dB unwt'd
Final amplifier	TRF 140	Solid-state	4CX5000A	...	TH558
Modulator final	TRF 130	Solid-state	4CX5000A	...	TH558
Input AC power	115Vac	100Vac 1φ	220-440V 3φ	...	400V
Power consumption	0.92kVA	0.1kVA	22kW 95% mod	1103kVA	1253kVA
Power factor	0.8	...	>0.9 min	...	>0.9
System efficiency	65%	27%	...	68%	73%
Stereo capable	Yes	Yes	...	...	No
Fault logic	Solid-state	...	Relay; TTL	...	Solid-state
Fault diagnosis	Yes	No	...	...	Yes
Floor space used (in.)	10.75± in rack	Wall-mount	76x34	...	5.5x5.6m
Reader Service No	1421	1422	1423	1424	1425

^{12, 13}Models S4004, S4003 rated 300kW; S4002, S4001 rated 100kW; TH 573 and TH-555 devices are used; all models use PDM/PANTEL modulation and DAM volume-dependent carrier control for improved efficiency.

FM Exciters & LPFM Transmitters

These units are all designed for 87.5-108MHz operation, each using direct carrier frequency modulation. LPFM units included in this list are those transmitters rated at less than 1kW output.

Manufacturer	BEXT		Broadcast Electronics	C.T.E. Int'l	CCA Electronics	Continental Electronics	Harris Broadcast	ITAME
Model	PTX30 (TEX20)	PTX80	FX-50	S20	FM 20G	802A ²	THE-1	Europa series
Power output range	2-30W	5-80W	3-50W	30W	5-20W	5-50W	3-15W; 3-55W	100-600W
Output connector; Z	50Ω N	50Ω N	50Ω BNC	50Ω type N	50Ω Type N	BNC 50Ω	BNC 50Ω	50Ω Type N
Carrier stability Hz	±500Hz	±500Hz	±300Hz	<0.5ppm var	±500Hz	±250Hz	±300Hz	10ppm
Modulation capability	>75kHz	>75kHz	±350kHz	>±75kHz	±150kHz	±200kHz	±200kHz	>±75kHz
Asynchronous S/N	65dB	...	80dB	>66dB	>60dB	73dB	73dB	>65dB
Synchronous S/N	55dB	...	60dB	>66dB	>55dB	65dB	55dB	>65dB
Composite input Z	10kΩ	5kΩ	10kΩ/50Ω	10kΩ	...	5kΩ B/Ub	2kΩ	1kΩ unbal
Composite input level	2.2Vp-p	3.5Vp-p	3.5Vp-p	1Vp-p	...	1.25VRMS	1Vrms	3.5Vp-p
Composite THD	<0.05% (<0.1)	...	≤0.005%	<0.4%	<0.25%	0.08%	0.08%	<0.5% 30-15k
Composite IMD	<0.05%	...	≤0.005%	...	...	0.08%	0.02%	...
Composite response	30-100k ¹	...	±0.025%	...	±1dB 50-100k	±0.1 20-100k	±0.1 30-53k	±0.5 40-15k
Phase response	...	...	±0.1°	...	...	±0.5°	-1, +0.5°	...
Composite group delay	...	...	125ns	...	...	±25ns	...	...
Stereo separation	>45dB (>40)	>40dB	52dB to 15kHz	>45dB	...	50dB	to 50dB	55dB
SCA inputs	3	...	3 unbal BNC	...	...	Two	Bal	...
SCA input Z	10kΩ	...	100kΩ	...	...	15kΩ	600Ω	...
SCA inputs level	2.2Vp-p	...	3.5Vp-p	...	...	1.25V RMS	10dBm	...
Amplitude response	40k-100k ¹	...	±0.2dB	...	...	40k-100k	±0.5 30-15k	...
Stereo generator	Ext.	TDSS2 opt	FS-30	CS/300; COD250	Available	External	Option	Integral
SCA generator	Ext.	...	FC-30	...	Available	External	Option	...
Reader Service No	1477	1478	1479	1480	1481	1482	1483	1484

¹0.8dB for same frequency range for TEX20 unit. ²Model 813A rated 500W LPFM using 802 exciter.

Manufacturer	ITAME	Itelco	QEI Corporation		Rohde & Schwarz		Rood Megatronics	
Model	FM90D ³	T 241	#695	BBT500	Model 675 ⁴	SU115	SU155R2	FM-200
Power output range	5-25W	25W	5-20W	600W LPFM	5-20W	10W	50W	2V into 50Ω
Output connector; Z	50Ω Type N	Type N 50Ω	50Ω Type N	50Ω	BNC 50Ω	BNC 50Ω	BNC 50Ω	50Ω
Carrier stability Hz	±250Hz	±100Hz	±200Hz	±200Hz	±300Hz	...	±1kHz	±300Hz TCXO
Modulation capability	±200kHz	>±75kHz	100%	150kHz pk dev	150kHz pk	>±75kHz	>±75kHz	±200kHz
Asynchronous S/N	>65dB	>60dB	>55dB	>60dB	>55dB	≥56dB	≥56dB	...
Synchronous S/N	>65dB	>52dB	>55dB	>60dB	>55dB	...	...	...
Composite input Z	>1kΩ unbal BNC	Bal 600/5kΩ	10kΩ	10kΩ	10kΩ	>3kΩ	>3kΩ	Bal/Unbal 22kΩ



Out of Service.

In Service.

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Circle (112) on Reply Card

Manufacturer	ITAME	Iteco	QEI Corporation			Rohde & Schwarz		Rood Megatronics
Model	FM900 ³	T 241	#695	BBT500	Model 675 ⁴	SU115	SU155R2	FM-200
Composite input level	3.5Vp-p	-4.12dBm	3.5Vp-p	3.5Vp-p	3.5Vp-p	-6.9.5dBm	-6.9.5dBm	+6dBm
Composite THD	0.09%	<0.07%	0.025%	0.025%	0.25%	≤0.6%	≤0.6%	<0.05%
Composite IMD	...	...	0.025%	...	...	≤0.15%	≤0.15%	...
Composite response	±0.2 30-55k	0.2dB to 100kHz	±0.15 30-75k	±0.5 30-15k	±1 30 15k	≤0.3 to 75kHz	≤0.3 to 75kHz	...
Phase response	...	...	±0.1°	...	...	...	...	...
Stereo separation	>55dB	>50dB to 15kHz	60dB	>60dB	>40dB	≥43dB	≥43dB	>55dB
SCA inputs	2	Also RDS	3 inputs	3	2	Available	Available	Yes
SCA input Z	>1kΩ	600Ω unb	10kΩ	10kΩ	10kΩ	≥2k unb	≥2k unb	...
SCA inputs level	3.5Vp-p	-10.12dBm	1Vp-p	1Vp-p	1Vp-p	...	...	...
Stereo generator	GE90A	Integral	Any	#772F	Model 772	Integral	GC001	GC003
SCA generator	...	Integral	Any	...	...	Integral	Integral	Option 8
Reader Service No	1485	1486	1487	1488	1489	1490	1491	1492

³Model 20DTA includes stereo generator in stereo version. ⁴675T300 rate 300; 67T150 rated 150W.

Manufacturer	Telefunken Sendertechnik	TEM/Comad	Thomson-LGT		TTC/Television Technology		Varian TVT	Vector Technology
Model	S3233	7P10EZ18	FMT series	FMT100 Ramsès	FM-300J	Model X	1248	FMT-03
Power output range	2-20W	to 1kW LPMF	4W	30-100W LPMF	150-275	1-30W	15-100W	8-30W
Output connector: Z	Type N	7/8" 50Ω	50Ω N	50Ω N	50Ω Type N	50Ω type N	50Ω	50Ω N
Carrier stability Hz	<300Hz	±0.2PPM TXCO	±200Hz/yr	±200Hz/yr	±100Hz	±100Hz	±150Hz	±250Hz
Modulation capability	±120kHz	±75kHz	±150kHz	±150kHz	±500kHz	±500kHz	±150kHz	150kHz
Asynchronous S/N	>58dB unwt'd	>70dB	>80dB	>80dB	>60dB	80dB	58dB	55dB
Synchronous S/N	≥50dB unwt'd	>70dB	>74dB stereo	>74dB	>60dB	80dB	46dB	...
Composite input Z	600Ω/2kΩ	600Ω bal/unbal	15kΩ bal	15kΩ bal	BNC	10kΩ	...	5kΩ
Composite input level	-4,+9.4	-8	+15dBm	...	6dBm	...	3.5Vp-p	...
Composite THD	≤0.3%	≤0.4%	<0.15%	<0.3%	0.01%	≤0.01%	<0.3%	0.35% mono
Composite IMD	<0.1%	≤0.2%	...	...	0.01%	≤0.01%	<0.3%	...
Composite response	±0.3dB 75kHz	±0.1 30-30k	±0.3 to 75kHz	±0.3 to 75kHz	±0.5 25-100k	±0.05 20-100k	±0.5% 30-100k	0.1 30-15k
Phase response	...	0°; ±0.02°	...	...	...	...	±0.3°	...
Stereo separation	>40dB	>50dB	>50dB	>50dB	...	...	40dB	50dB 30-15k
SCA inputs	Option	...	Yes	and RDS	...	5 BNC	Yes	3
SCA input Z	...	...	...	15kΩ	...	10kΩ	...	5kΩ
SCA inputs level	...	...	...	6dBm	...	1Vp-p	...	1Vp-p
Stereo generator	Option	Model 7182	Integral	Integral	...	...	Yes	External
SCA generator	Option	...	Option	Option	...	...	Yes	External
Reader Service No	1493	1494	1495	1496	1497	1498	1499	1500

FM broadcast transmitters

These systems are rated power outputs of 1kW or greater. Additional parameters of operation may be found by looking in the chart for the suggested exciter model. All provide a 50Ω output. Models not indicating integral automatic power control are designated with a dagger (†). Those without an integral harmonic filter are designed with a double dagger (‡).

Manufacturer	BEXT	Broadcast Electronics			C. T. E. Int'l	CCA Electronics	
Model	T5000 (15000)	FM-100 (-250) ²	FM-35A (-35B) ³	FM-5A (-5B) ⁴	S 2000 ⁵	FM-10000G ⁶ ‡	FM-27500G ⁷ ‡
Exciter suggested	TEX20	FX-30	FX-30	FX-30	S20	FM-20G	FM-20G
Output power range	5kW (15kW)	100W (250W)	10-38.5kW	5kW	2kW	5-10.5kW	12.5-30kW
Output connector	15/8" (31/8")	Type N	31/8"	15/8"	LC type	15/8"	31/8"
Typical VSWR	...	1.1:1 max	1.8:1 max	1.8:1 max	Protected	...	...
Auto modulation control	...	...	...	...	Yes	No	No
Integrated remote control	Yes	Yes	Yes	Yes	Yes	No	No
μP diagnostics	No	...	Yes	Yes	Yes	No	No
PA device or	3CX3000A7 ¹	Solid-state	4CX20000C or	4CX3500A	Solid-state	3CX10000A7	3CX20000A7
Tube complement	...	...	8990 tetrode	-tetrode	2-160W and	triode	triode
PA circuit type	Grounded-Grid	...	Folded 1/2-λ cavity	Folded 1/2-λ cavity	8-250W modules	Grounded-grid	Grounded-grid
IPA device	Solid-state	Solid-state	Solid-state	Solid-state	Solid-state	3CX800A7	3CX1500A7
Floor space (in.)	23x28	24x31	91x32	35x38	27x20	38x34	38x34
Input ac power needed	240-380Vac 3φ	194/266V	208Y/240D	208Y/240D	220Vac	240V 3φ	240V 3φ
Power consumption (PF) efficiency	<9kVA (24.5)	524W (830W)	51kW (.94PF) 68%	8.3kW (.92PF) 60%	3.9kW 51%	...	...
Reader Service No	1439	1440	1441	1442	1443	1444	1445

¹3CX15000A7. ²2FM-300A, 300W. ³FM-20A, 22kW; FM-30A, 20kW; -B models include extended metering; integral envelope detector for measurement of synchronous AM noise. ⁴FM-1.5A, 1.5kW; FM-3.5A, 3.5kW; -B models include extended metering; integral envelope detector for measurement of synchronous AM noise. ⁵VL 5000, 5kW. ⁶FM-1000G, 1.5kW; FM-2500G, 3kW; FM-4000G, 4.8kW; FM-5000G, 5.6kW. ⁷FM-12000G, 13kW; FM-20000G, 22kW; FM-25000G, 30kW; FM-27500G, 30kW.

Manufacturer	Continental Electronics					Harris Broadcast	
Model	814C	814R-1 ⁸	816A	816R-4B ⁹	817A	817R-5B ¹⁰	FM 1FM ¹¹
Exciter suggested	802A	802A	802A	802A	802A	802A	THE-1
Output power range	3.8kW	2.5kW	11kW	27.5kW	to 60kW	70kW	1kW
Output connector	15/8"	15/8"	31/8"	31/8"	61/8"	61/8"	7/8"
Typical VSWR	1.2:1 max	2:1 max	2:1 max	2:1 max	2:1 max	2:1 max	1.5:1
Auto modulation control	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Integrated remote control	Yes	Yes	Yes	Yes	Yes	Yes	Yes
μP diagnostics	...	Yes	Yes	...	8-bit	8-bit	...
PA device or	Multiple 700W	5CX1500A	Tetrode	4CX15000A	4CX40000G	9019/9C130	FET modules
Tube complement	Solid-state	...	...	Tetrode	Tetrode	2-tetrodes in	...
PA circuit type	modules.	1/4-λ-cavity	...	Grounded Screen	Class C GS	90° hybrid	...
IPA device	Solid-state	Solid-state	Solid-state	Solid-state	Solid-state	Solid-state	Solid-state
Floor space (in.)	38x34	35x24	45x34	72x28	128x40	160x28	23x25



25000J
FM Transmitter

300J
FM Transmitter

Model X
FM Exciter

UHF
TV Transmitter

UHF
TV Transmitter

1000W UHF
TV Transmitter

100W UHF
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Manufacturer	Continental Electronics						Harris Broadcast
Model	814C	814R-1 ⁸	816A	816R-4B ⁹	817A	817R-5B ¹⁰	FM 1FM ¹¹
Input ac power needed	220Vac	220Vac	220Vac 3 ϕ	220Vac 3 ϕ	220Vac 3 ϕ	220Vac 3 ϕ s.ps.	220Vac
Power consumption	10.5kW	4.9kW	18.45kW	42kW	94.4kW	108kW	2.9kW
Reader Service No	1446	1447	1448	1449	1450	1451	1452

⁸ 815A system offers similar characteristics with 4CX3500Atetrode final; 5kW output with 9.8kW consumption. ⁹ 816R-2B rated 21.5kW; 816R-3B rated 25kW; using the 816B units in tandem results in 817R-2B 40kW; 817R-3B 50kW; 817R-4B 55kW; all other characteristics are similar. ¹⁰ 816R-5B rated 35kW uses a single 9019/YC130 tetrode with similar characteristics. ¹¹ HT 500FM 500W and HT 250FM 250W available.

Manufacturer	Harris Broadcast		ITAME SA				ITELCO
Model	HT 10FM ¹² ‡	HT 35FM ¹³ ‡	ES-2000 (-1000)	Tauro Mod 10 ¹⁴	Tauro Mod 30 ¹⁵	TFM-3000 (1000)	S233
Exciter suggested	THE-1	THE-1	20W	10W	15W	W	T 241
Output power range	5-10kW	10-35kW	2kW (1kW)	5-10kW	10-30kW	3kW (1kW)	2kW
Output connector	3/8"	3/8"	1 1/8" (7/16)	1 1/8"	3/8"	1 1/8" (7/16)	...
Typical VSWR	1.7:1 max	1.7:1 max	...	Protected	Protected	Protected	...
Auto modulation control	No	...	...	...	...	...	Yes
Integrated remote control	Yes	Yes	Yes	Yes	Yes	Yes	Yes
μ P diagnostics	Yes	Yes	...	...	...	...	...
PA device or Tube complement	4CX7500A Tetrode	4CX20000D Tetrode	Solid-state V-MOS; 600W	4CX-7500A ¹⁵ Tetrode	4CX-20000C Tetrode	4CX-3500A Tetrode	Solid-state four 500W
PA circuit type	1/4- λ cavity	1/4- λ cavity	...	...	...	...	FET modules
IPA device	300W S-S	600W S-S	Solid-state	Solid-state	Solid-state	Solid-state	Solid-state
Floor space (In.)	33x34	34x34	24x36	45x38	68x38	31x33	22x30
Input ac power needed	220-380 3 ϕ	220-380 3 ϕ	220Vac	220-380 3 ϕ	220-380 3 ϕ	220Vac	380Vac 3 ϕ
Power consumption (PF)	15.7kW (0.95PF)	52kW (0.95PF)	<4.5kW (<2.3kW)	18kW	43kW	7kW (3kW)	4.5kVA
Reader Service No	1453	1454	1455	1456	1457	1458	1459

¹² Similar models include HT 3.5FM at 4kW; HT 5FM at 5kW; HT 7M at 7kW. ¹³ Similar models include HT 30FM at 30kW; HT 25FM at 25kW; HT 20FM at 20kW. ¹⁴ Tauro 5 at 5kW; Tauro 3 at 3kW; Tauro 1 at 1kW. ¹⁵ Thomson TH341, Philips YL 1631. ¹⁶ Philips YL 1530 also available.

Manufacturer	ITELCO	Marconi	QEI Corporation		RF Dynamics	Rohde & Schwarz	
Model	T224 (T254)	B6526 (-25)	FMQ-10000B ¹⁷ ‡	FMQ-30000B ¹⁸ ‡	F-712 ¹⁹ ‡	NR 350 T ²⁰	NU411 ²¹
Exciter suggested	T 241	Integral	#695 or #675	#695 or #675	FE180 int.	SU115/SU155	SU155 R2
Output power range	15kW (30kW)	20kW (10kW)	10kW	10-30kW	1.5-11.5kW	5kW	10kW
Output connector	3/8"	3/8"	1 1/8"	3/8"	1 1/8"	1 1/8"	Dezifix D
Typical VSWR	...	1.4:1	...	...	...	1.5:1 max	\leq 1.8:1
Auto modulation control	Yes	...	Automod	Automod	...	Yes	Yes
Integrated remote control	Yes	Option	ARC-27 opt	ARC-27 opt	Yes	Yes	Yes
μ P diagnostics	Yes	C-MOS logic	Option	Option	...	Yes	Yes
PA device or Tube complement	4CX12000 (4CX20000C)	9011 (8986) Coaxial tetrode	YU148 Triode	3CX15000A7 Triode	YU148 triode	Four VU315 1.5kW	RS2024CL tetrode
PA circuit type	FET modules	Class C	Grounded-grid	Grounded-grid	Grounded-grid	Solid-state	Grounded cathode
IPA device	Solid-state	200W S-S	Solid-state	3CX3000A7	Opt Tube-type	Solid-state	Solid-state
Floor space (In.)	32x43	42x40	24x30	72x30	38x34	23x40	23x29
Input ac power needed	208/380V 3 ϕ	380-415V 3 ϕ	208-240V 3 ϕ	208-240V 3 ϕ	208 3 ϕ	220/380V 3 ϕ	220/380V 3 ϕ
Power consumption	22 (43)kVA	33kW (17kW)	17kW	50kW	17.2kW	8.86kW	21kVA
Reader Service No	1460	1461	1462	1463	1464	1465	1466

¹⁷ MQ-3500 at 3.5kW; FMQ-5000 at 5kW; both include internal low-pass filter. ¹⁸ FMQ-20000B at 20kW. ¹⁹ 710 to 10kW; F-550 to 5kW; F-510 to 5kW. ²⁰ NR330 rated 3kW uses 2 modules; NR315 rated 1.5kW uses 1 module. ²¹ Other connectors available upon request. Model NU351 rated 5kW also uses Siemens RS 2024CL tetrode.

Manufacturer	Telefunken Sendertechnik			TEM Technologie Electronique	Thomson LGT	TTC/Television Technology Corp	
Model	S3185 ²²	S3206	S3217	7P10EZ18	FMT 2000 S	FM-2500J ²³	FMS-8000 ²⁴
Exciter suggested	S3161	S3161	S3161	07A960 1Q/14	Integral	Model X	Model X
Output power range	1.5kW	5kW	3kW-10kW	1kW	2kW	15-25kW	8kW
Output connector	...	...	1 1/8"	7/8"	7/8"	3/8"	1 1/8"
Typical VSWR	...	...	...	...	1.4:1 max	...	2:1 max
Auto modulation control	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Integrated remote control	Yes	Yes	Yes	Yes	Yes/RS-232C	Option	Option
μ P diagnostics	Yes	Yes	MCSG5364	...	Yes	...	...
PA device or Tube complement	Multiple SV3169 500W modules	Four SV3206 13kW modules	RS2032CL Single tetrode	Solid-state 500W modules	Solid-state modules	4CX15000A tetrode	Solid-state
PA circuit type	Solid-state	Solid-state	Grounded cathode	...	Solid-state	...	...
IPA device	Solid-state	Solid-state	Solid-state	Solid-state	Solid-state	4CX250B	Solid-state
Floor space (In.)	24x24	24x40	24x40	22x25	19x27	35x38	46x31
Input ac power needed	220Vac 47-70Hz	380Vac 3 ϕ	220/380Vac 3 ϕ	220V	220V	240V 3 ϕ	240V
Power consumption	2.5kW	9kW	19kVA	<2.5kVA	4kW	38kW	13kW
Reader Service No	1467	1468	1469	1470	1471	1472	1473

²² S3175 rated 1kW; uses S3169 500W modules. ²³ M-5000J to 6kW; FM-1000J to 11kW. ²⁴ FMS-4000 to 4kW.

Manufacturer	Varian TVT Ltd		Vector Technology
Model	1239 ²⁵	1242-1247 ²⁶ ‡	FMT-3/FMT-5‡
Exciter suggested	1248	1248	FMT-03
Output power range	1kW	1.5kW-10kW	3kW-5kW
Output connector	Type N	1 1/8"	1 1/8"
Typical VSWR	...	...	2:1
Auto modulation control	No	No	No
Integrated remote control	Yes	Yes	Yes
μ P diagnostics	No	No	No
PA device or Tube complement	Solid-state 330W modules	Solid-state MRF141G FET	3CX3000A7
PA circuit type	...	modules	Grounded-grid

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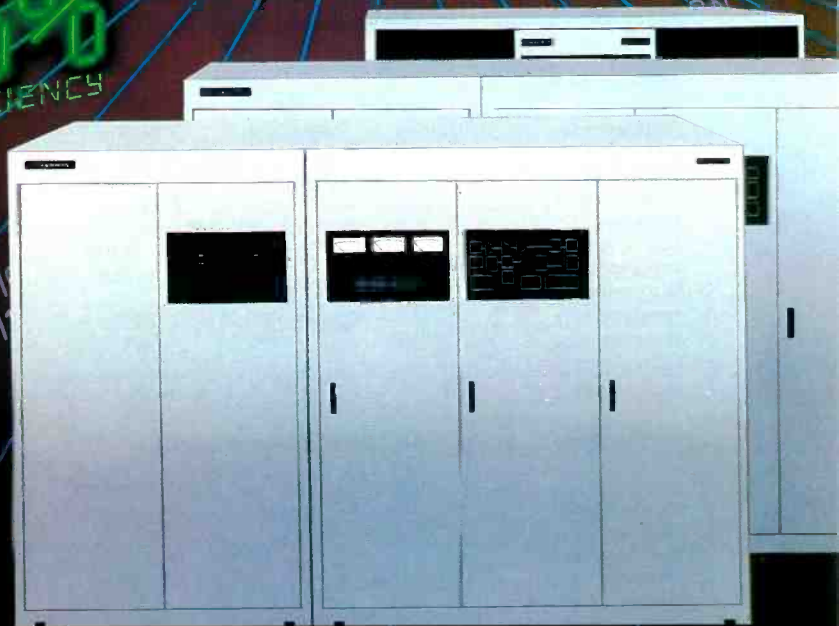
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Manufacturer	Varian TVT Ltd	Vector Technology
Model	1239 ^{25*}	1242-1247 ^{26†}
IPA device	Solid-state	Solid-state
Floor space (in.)	23x29	43x43
Input ac power needed	380/415Vac	190-415Vac 3φ
Power consumption	2.34kVA	3.2kW-21kW
Reader Service No	1474	1475

²⁵1238, 0.5kW; 1237, 300W. ²⁶Six models cover powers 1.5kW, 2.5kW, 3.5kW, 5kW, 7kW and 10kW.

UHF Television Transmitters

These systems are operable on any UHF CCIR IV/V band. All models not marked with a dagger (†) accommodate BTSC stereo aural transmissions; applicability to other systems should be discussed with the manufacturers.

Manufacturer	Acrodyne Industries			BEXT	Comark Communications			Harris Broadcast
	TL series	TR series	TRU/1000 ²	NS 1000S†	Klytrode equipped	S-series	Solid-state	TV-UM series
Visual peak power	1kW (100W)	25kW (10/5) ¹	1kW	1kW	(10kW-360kW)	10kW-360kW	1kW	60kW (120kW) ³
Carrier level regulation	...	3%	...	...	2%	3%	5%	3%
Modulation capability	...	3%	...	...	...	97%	...	0%
Response vs brightness	...	±0.75dB	...	...	...	±0.75dB	...	±0.75dB
Low frequency linearity	...	0.45dB	...	...	...	1.0dB	...	<1.0dB
ICPM uncorrected	...	±2°	...	...	...	2°	<2°	±2.0°
Diff phase/gain	...	±1.5°/5%	<2°/2%	...	...	±3°/5%	...	3°/0.5dB
S/N ratio	...	1%	70dB	...	...	55dB	...	55dB
K factor for 2T/12.5T	3%	2%/5%	...	...	...	2%/5%	...	2%/3%
Harmonics below visual	...	-60dB	-60dB	...	...	-60dB	≤-60dB	-60dB
Visual PA device	Solid-state	Tetrode	Solid-state	YL1057	Klytrode	Klystron ext	Solid-state	Klystron MSDC
Aural output power	10% of visual	100W	100W	100W	10% of visual	100W	100W	12kW (24)
Carrier deviation	...	100kHz	...	...	±25kHz	...	±75kHz	±120kHz
Audio response	...	±0.1 50-50k	...	±0.5 30-15k	...	±0.5 30-15k	...	±0.5 to 110k
Harmonic distortion	1%	0.5%	...	<0.4%	...	0.5%	...	0.5%
AM/FM noise	...	-50dB/-60dB	...	65dB	...	-50dB/-60dB	...	-55dB/-60dB
Aural PA device	Solid-state	Common to visual	Solid-state	Multiplexed	Klytrode	Klystron ext	Solid-state	Klystron MSDC
Cooling method	Forced air	Water (5kW air)	Forced air	Forced air	Forced air/water	Forced air	Vapor phase	Vapor phase
Input AC power	120Vac (120/230)	208Vac	230Vac	220V	...	480Vac 3φ	230Vac	480Vac ±5% 3φ
Power consumption	4.4kVA (1.2kVA)	46kVA (26/16)	4.4kVA	3.6kVA	...	>70% efficient	...	137kVA (253)
Reader Service No	1376	1377	1378	1379	1380	1381	1382	1383

¹TRU/25k 10kV available with 1kW solid-state driver; 10KVC model uses 400W solid-state driver. ²TLU/1000T available with TCU frequency converter for translator use. ³TV-240UM rated 240kW also available.

Manufacturer	Information Transmission Systems			Marconi Communications	PESA	Rohde & Schwarz	Technologix Midwest	Television Technology
Model	ITS-220 ⁴	ITS-230 ⁵	ITS-242(-235)	B7540 series ⁶	TT5000 series	NT UHF series ⁷	TX series	Silverline ⁸
Visual peak power	100W	1kW	10kW (5kW)	10kW-60kW	1W-20kW	100W-40kW	30kW-300kW	60-240kW
Carrier level regulation	5%	...	2%	±1%	≥1%	≤0.3dB	±2%	3%
Modulation capability	...	1%	...	3%	1% of sync	>75%	1%	2%
Response vs brightness	±0.7dB	...	±0.5dB	±0.5dB	<5%	<0.3dB	±1dB	1dB
Low frequency linearity	10%	...	5%	95%	<5%	...	10%	0.8dB
ICPM uncorrected	±3°	...	±2°	±4°	...	...	...	3°
Diff phase/gain	±3°/5%	±2°/5%	±1°/5%	3°/0.95	<±3°/5%	≤3°/5%	±3°/5%	4°/5%
S/N ratio	...	55dB	...	60%	>60dB	>63dB	55dB	50dB
K factor for 2T/12.5T	2%/5%	...	2%/4%	2% for 2T	2%	<2% 20T	2%/5%	2%/2%
Harmonics below visual	-70dB	...	-60dB	-60dB (20mW)	-60dB	≤-60dB	≤-60dB	-65dB
Visual PA device	Solid-state	9017 tetrode	TH582 (382)	Klystron Ext	SS or tube	Per power ⁷	Klystron ext	MSDC Klystron
Aural output power	5W	100W	1kW (500W)	1kW to 6kW	Adjustable	1/10-1/20 visual	Per request	10% of visual
Carrier deviation	...	±75kHz	...	±50kHz	±25kHz/-50kHz	≤50kHz	25kHz	±25kHz
Audio response	...	±0.5dB 30-50k	...	±1dB 30-15k	±1dB 30-15k	≤±0.3 to 60kHz	±0.5dB 30-15k	1 30-15k
Harmonic distortion	...	0.5%	...	0.5%	≤1% 30-15k	≤0.4% ±50kHz	≤0.5%	1%
AM/FM noise	...	-50dB/-60dB	...	-50dB/-60dB	-55dB/52dB unwt'd	≥46dB/≥56dB	≤-50B/-60dB	-55dB/-55dB
Aural PA device	S-S Int Diplex	Int Diplex	...	SS/Ext Klystron	SS or tube	Per power ⁷	Klystron ext	MSDC Klystron
Cooling method	Convection	Forced air	Vapor & (Air)	Vapor	Forced air	Per PA type	Water/glycol	Vapor
Input AC power	117Vac	208/240Vac 1φ	208/240Vac 1-3φ	380-415Vac 3φ	Per output	220-380Vac 3φ	460-500Vac 3φ	480Vac
Power consumption	0.75kW	5kW 50% APL	26kW (19)	38kW-129kW	...	1.8kVA-119kVA	Per model	100kVA
Reader Service No	1384	1385	1386	1387	1388	1389	1390	1391

⁴ITS-222 available as 100W translator; ITS-210/-212 are 10W transmitter and translator. ⁵Available as ITS-232 1kW translator; [TS-1230 1kW model all solid-state model. ⁶B7545 10/15kW; B7546 20/30kW; B7547 30/45kW; B7548 55/60kW. ⁷PAs use solid-state, tetrode or klystron devices, based on power level. ⁸UHF-60S rated 60kW; UHF-120S rated 120kW; UHF-240S rated 240kW.

Manufacturer	Television Technology Corp/TTC			Thomson-LGT	Varian TVT Division			
Model	UHF-10MA	UHF-30SK	XL 1000U ⁹	EUHF1000U ¹⁰	1740 series ¹¹	1790 series ¹²	Type 1781	VISTA series ¹³
Visual peak power	10kW	30kW	1kW	10kW	10-30kW	60-240kW	10kW	60-240kW
Carrier level regulation	...	3%	...	...	...	...	±2%	...
Modulation capability	...	2%	...	...	...	...	to 0.5%	...
Response vs brightness	...	1dB	...	...	...	...	±1.0dB	...
Low frequency linearity	...	0.8dB	...	5%	...	...	≤0.8dB	...
ICPM uncorrected	...	3°	...	<3°	...	...	≤±3°	...
Diff phase/gain	...	4°/5%	...	±3°/95%	...	...	≤±3°/0.4%	...
S/N ratio	...	>55dB	...	...	...	...	60dB	...
K factor for 2T/12.5T	...	2%/2%	...	±1.5%	...	...	<2%/<2%	...

Manufacturer	Television Technology Corp/TTC			Thomson-LGT	Varian TVT Division			
	UHF-10MA	UHF-30SK	XL 100U ⁹	EUHF10000 ¹⁰	1740 series ¹¹	1790 series ¹²	Type 1781	VISTA series ¹³
Harmonics below visual		-65dB		-60dB				-70dB
Visual PA device	Klystron	Klystron ext	TH-347 tetrode	Solid-state	Klystron external cavity		TH382 tetrode	VKP 7990
Aural output power	10% of visual			1kW	1-3kW	6-24kW	1.0kW	6.6-24kW
Carrier deviation	±120kHz		±25kHz	50kHz				>100kHz
Audio response	±0.5 30-15k		1dB 30-a5k	±0.5dB 40-20k			0.5dB 30-15k	
Harmonic distortion	0.5%		1%	0.5%			0.5%	
AM/FM noise	-55dB/-60dB		-55dB/-55dB	-50dB				-50dB/-60dB
Aural PA device	Multiplexed	Klystron ext	Multiplexed	Solid-state	Klystron external cavity		TH327 tetrode	VKP7990 ¹⁴
Cooling method	Forced air			Forced air	Air/vapor		Forced air	Air/water
Input AC power	480Vac	480Vac	230V _{ac}	380Vac	380/415Vac	480Vac	380Vac or 415Vac	480Vac
Power consumption	27kVA	81kVA	4.8kVA	34kVA	28-70kW	140-553kVA	25kVA	76-296kW
Reader Service No	1392	1393	1394	1395	1396	1397	1398	1399

⁹ Available with VHF or UHF inputs for translator; XL 100U rated 100W visual uses MOS devices. ¹⁰ EUHF 5000 rated at 5kW visual; RUHF 500S rated 500W; RUHF 100S rated 1kW with provisions for translator operation. ¹¹ 1740 rated to 30kW; 1741 rated to 15kW; 1472 rated 20-25kW. ¹² 1790 rated 60kW; 1791 rated 120kW; 1792 rated 240kW. ¹³ 1890 rated 60kW; 1891+1890 120kW; 1891+3x1890 240kW; all use MSDC type klystrons. ¹⁴ PT5080 standard klystron may be used in aural service.

VHF Television Transmitters

These systems are designed for use on VHF (CCIR I/III) bands as indicated. Models restricted to Band III are designated with a dagger (†).

Manufacturer	Acrodyne Industries		Harris Broadcast		ITELCO	LDL/LARCAN
	TR series		Platinum HT-LS series		T134 (383A) ^{4†}	TTS22M/TTP44M ⁵
Model	30kW (20)	10kW (5)	1kW-5kW ¹	10kW-30kW ²	20kW (5kW)	22kW (44kW)
Visual peak power						
Carrier level regulation	3%			3%	...	2%
Modulation capability	3%			0%	...	0%
Response vs brightness	±0.75dB			±0.75dB	0.5dB	±0.75dB
Low frequency linearity	0.45dB			<0.5dB	0.5dB	0.5dB
ICPM uncorrected	±2°			±1.5°	...	±1°
Diff phase/gain	±1.5°/3%			1°/3%	≤±3°/4%	±1°±3%
S/N ratio	1%			55dB	>50dB	55dB
K factor for 2T/12.5T	2%/5%			1.5%/3%	...	1%/3%
Harmonics below visual	-60dB			-70dB	<1mW	-80dB
Visual PA device	Tetrode			Solid-state modules	TH 371 tetrode	MOSFET SS
Aural output power	10% of visual			10% (20% opt)	1/10, 1/20	2.2kW (4.4kW)
Carrier deviation	100kHz			±200kHz	±50kHz	±200kHz
Audio response	±0.1 50-50k			±0.5 to 110k	0.5 40-15k	±0.5dB
Applicable to stereo	BTSC			Yes	...	Yes

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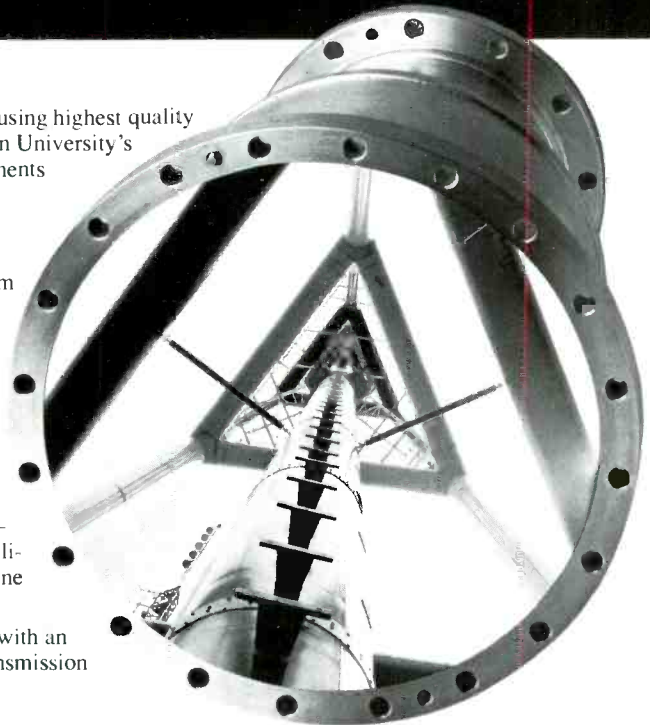
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Manufacturer	Acrodyne Industries		Harris Broadcast		ITELCD	LDL/LARCAN
Model	TR series		Platinum HT-LS series		T134 (383A) ^{4†}	TTS22M/TTP44M ⁵
Harmonic distortion	0.5%		0.25%		<0.3%	0.05%
AM/FM noise	-50dB/-60dB		-55dB/-70dB		>50dB/>60dB	-60dB/-62dB
Aural PA device	Common to visual		Solid-state modules		Solid-state	MOSFET SS
Cooling method	Forced air		Forced air		Air	Forced air
Input AC power	208Vac		280-415Vac 3φ		380Vac 3φ	208-242Vac 3φ
Power consumption	68kVA (39)	31kVA (21)	5.5-13.2kW	24.4-69kW	93-120kW	41.5kVA
Reader Service No	1361	1362	1363	1364	1365	1366

¹ Power levels include: 1LS/1HS 1kW; 2LS/2HS 2kW; 5LS/5HS 5kW. ² Power levels include: 10LS/10HS 10kW; 15LS/15HS 15kW; 20LS/20HS 20kW; 30LS/30HS 30kW. ³ Power levels include: 45LS/45HS 45kW; 60LS/60HS 60kW. ⁴ T383A high-band with common amplification of visual and aural carriers. ⁵ TTS30M rated 30kW, TTS3M rated 3kW.

Manufacturer	LDL/LARCAN	Marconi Communications		PESA	Rohde & Schwarz	Thomson-LGT	Toshiba Corp.
Model	TTS6M/TTS12M	B7530 series ^{6†}	B7530 series ^{7†}	TT5000 series	NT VHF series [†]	EVHF20000 ⁸	Series 2000
Visual peak power	6kW (12kW)	1kW (2kW/5kW)	10kW (25/30kW)	1W-20kW	100W-20kW	20kW	To 64kW
Carrier level regulation	2%	±1%		≥1%	≤0.3dB	...	≤±2%
Modulation capability	0%	3%		1% of sync	>75%	...	12.5%±2%
Response vs brightness	±0.75dB	±0.5dB		<5%	<0.3dB	...	...
Low frequency linearity	0.5dB	90%		<5%	...	5%	<10%
ICPM uncorrected	±1 [†]	±4 [†]		<3 [†]	±2%
Diff phase/gain	±1 [†] /±3%	±3 [†] /0.95dB		<±3 [†] /-5%	≤3 [†] /5%	±3 [†] /5%	±3%/±5%
S/N ratio	55dB	60dB		>60dB	>63dB	...	>50dB
K factor for 2T/12.5T	1%/3%	2% for 2T		2%	<2% 20T	±1.5%	<1.5%
Harmonics below visual	-80dB	60dB		-60dB	≤-60dB	-60dB	<-60dB
Visual PA device	MOS FET	Solid-state & tetrode		Solid-state or tube	Solid-state or tetrode	Solid-state	RF MOSFET array
Aural output power	600W (1.2kW)	0.1kW (2/5kW)	1kW (2.5/3kW)	Adjustable	1/10-1/20 visual	2kW	10%-20% visual
Carrier deviation	±200kHz	±50kHz		±25kHz/±50kHz	≤50kHz	50kHz	±100kHz
Audio response	±0.5dB	±1 30-15k		±1dB 30-15k	≤±0.3dB to 60kHz	±0.5dB 40-20k	±0.5dB 30-15k
Applicable to stereo	BTSC	Yes		Dual carrier	Dual carrier	Yes	BTSC
Harmonic distortion	0.05%	0.5%		≤1% 30-15k	≤0.4% ±50kHz	0.5%	<0.5% 30-15k
AM/FM noise	-60dB/-62dB	-50dB/-60dB		-55dB/52dB unbrtd	≥46dB/≥56dB unbrtd	-50dB	>50dB/>60dB
Aural PA device	MOSFET	Solid-state & tetrode		Solid-state or tube	Solid-state or tetrode	Solid-state	RF MOSFET array
Cooling method	Forced air	Forced air		Forced air	Per PA type	Forced air	Forced air
Input AC power	380-440Vac 3φ	380-415Vac 3φ		Per output	220-380Vac 3φ	380Vac	220Vac 3φ
Power consumption	9.5kW (17.5kW)	4.9 for 1kW	59.5kW for 30kW	...	1kVA-52kVA	36kVA	...
Reader Service No	1368	1369	1370	1371	1372	1373	1374

⁶ All units high-band, B7530 1kW; B7531 2kW; B7532 5kW. ⁷ All units high-band; B7533 10kW; B7536 25/30kW. ⁸ EVHF 5000S rated 5kW; EVHF 10000S rated 10kW.

Vectorscope

Transmission standards are abbreviated N NTSC, P PAL, S SECAM; variants of the standards are noted, for example, "PAL-N".

Manufacturer	Electronic Visuals ¹	Hamlet Video ²	Hitachi	Leader Instruments			Magni Systems
Model	EV4021	HVI 203 VIDEO ³	V-069 (-089)	5850C	5851V	5854	VS 530/531
Display size	8x10cm	128 linesx8.5μs	6" (3.5")	8x10cm	8x10cm	2.75" diagonal	4x3.25
Graticule	Internal	Electronic	Internal	Int/ext	Internal	Internal	Internal
Waveform mode	No	Yes	No	No	No	No	No
Standards	NTSC; PAL/-M	N; P; S	N; PAL avail.	NTSC	PAL	NTSC	NTSC; PAL
Function control	Manual	Manual	Manual	Manual	Manual	Manual	Man, WFM530/560
Integral calibrator	No	Yes	Yes	Yes	Yes	No	Test mode
# composite inputs	A	B	2	2	...	2	2
Subcarrier reference	Yes	A/B/Black	A/B/ext.	A/B/Black	A/B/Black	A/B	A/B/C/Black
Sync reference	A/B/Black/Composite	A/B/Black	A/B/ext.	A/B/Blackburst	A/B/Blackburst	A/B	A/B/C/Blackburst
Display reference	A/B/Ext	A/B/Ext	A/B/ext.	A/B/Ext	A/B/Ext	A/B	A/B/C/External
Diff phase/gain measurements	2 [†] /2%	1 [†] /1%	±1 [†] phase	1 [†] /1%	1 [†] /1%	1 [†] /1%	2 [†] /2%
VITS line select (range)	No	Full line range	No		Yes ⁴	No	Yes w/WFM 530/560
Luminance measurements	No	Yes	No	No	No	No	No
Reader Service No	1187	1188	1189	1190	1191	1192	1193

¹ Represented in US by Broadcast Video Systems. ² Represented in US by BPI Group/Brabury PortaPattern. ³ Unit displays vectorscope and waveform patterns on standard video monitor; freeze, store functions; dual standard opt.; outputs can be recorded or transmitted; expanded mode to 512 linesx34μs. ⁴ Determined by companion line select waveform monitor.

Manufacturer	Magni Systems	Philips Test & Measuring/BTC		Systems Video	Tektronix	Videotek
Model	VS 560/561	PM5667	PM5668	1255	1720 series	VSM-60
Display size	4x3.25"	8x10cm	8x10cm	10x10cm	8x10cm	8x10cm
Graticule	Internal	Internal	Internal	Internal	Internal	Internal etched
Waveform mode	No	Vector; δφ	Vector; δφ; SC/H φ	No	Stereo audio phase	Vector only
Standards	NTSC, PAL	N, P-G/-M/-N	N, P-G/-M/-N	N, PAL-M	N, P	N, P/-M
Function control	Man/WFM530/560	Manual; remote	Manual; remote	μP control panel	μP control	Manual
Integral calibrator	Test mode	Yes	Yes	Yes	Yes	Yes
# composite inputs	6 composite ⁵	A/B	2	A/B	A/B	2
Subcarrier reference	A/B/C/Black	A/B/Blk CompSync	A/B/Blk/CompSync	A/B/Ext Int	Ext ref	A/B/Sync
Sync reference	A/B/C/Blackburst	A/B/Blk CompSync	A/B/Blk/CompSync	A/B/Ext Int	Yes	...
Display reference	A/B/C/Ext	A/B/External	A/B/External	A/B/Ext Int	Int; Ext	A/B/Ext
Diff phase/gain measurements	<1 [†] / _{<} 1%	0.2 [†]	0.2 [†]	to 0.05 [†] /0.05% ⁶	2 [†] /2%	±10 [†] /±10%
VITS line select (range)	w/WFM530/560		from 5665 WFM	...	From 1730 WFM	No
Luminance measurements	No	No	No	No	No	No
Reader Service No	1194	1195	1196	1197	1198	1199

⁵ Or component inputs. ⁶ With 1407 δφ/δG measurement option.

Waveform Monitors

Units with a dagger (†) are capable of indicating audio stereo phase.

Manufacturer	Electronic Visuals ¹			Hamlet Video ²	Hitachi	Leader Instruments			Magni
Model	EV4042 (EV4031)	EV4050 Component	EV4061 combo	HVI 204 ³	V-079 (-099)	5860C (5860H)	5864 (5865)	5870 (5871) ⁵	WFM 530
Display size	8x10cm	8x10cm	8x10cm	128 linesx8.5µs	6" (3.5")	8x10cm	2.75" (8x10cm)	8x10cm	4x3.25"
Graticule	Int. Illum	Internal	Illuminated	Internal	Internal	Int illuminated	Int (illuminated)	Int illuminated	Int illuminated
Standards supported	N, P/-M, S	N, P, S	N, P/-M, S	N, PAL/-M, S	N, PAL avail.	NTSC	NTSC	N, (PAL)	N, P, S
Internal calibrator	Yes	Yes	Yes	Yes	Yes	Yes	No (Yes)	Yes	Y
Vertical response	Chroma, LP, 8G, Linearity, Flat	Chroma, LP, Flat Linearity,	Chroma, LP, Flat, 8G	Chroma, LP, Flat, 8G	Flat, IRE, Chroma, 8G	Chroma, LP, Flat, 8G, Linearity ⁴	LP, Flat, (Chroma, 8G)	Chroma, LP, Flat, 8G	Chroma, LP, Flat
Time bases	H 2H 2Hx V 2V 2Vx	H 2H 3H V 2V 3V	H 2H 2Hx V 2V 2Vx	H 2H 2Hm 3H V Vm	2H 2V	H 2H 2Hm V 2V 2Vm	2H 2V (H 2Hm V 2Vm)	H 2H 2Hm V 2V 2Vm	H 2H 2Hm 2V 2Vm
Time base magnification	1µs; 200µs/div	x5; x50	Yes	x3	2V Mag; 1µs/div	x10 H; x20V	(x10 H; x20V)	x10 H; x20V	x10 (H/2H) x25(2V)
RGB-YRGB displays	Yes (No)	Yes	Yes	Also YUV; YC	Yes/YRGB opt.	Yes	No (Yes)	Yes	Yes
DC restore	Back porch	Back porch	Back porch	Back porch	Yes	Back porch	Back porch	Back porch	Back porch
VITS line select	7-22 (No)	No	No	2-line	Yes	No (Yes)	No (Yes)	Yes	Yes
Programmable	No	No	No	No	No	No	No (Yes)	Yes	Yes
Remote control	No	No	No	Yes	...	No	No	Yes	Yes
Composite inputs	Yes	Yes	A/B	Yes	A/B	Yes	Yes	Yes	Yes
Component inputs	No	YCbCb	No	Yes	RGB	No	No	No	Yes
Line strobe pulse	No	No	No	...	...	No (Yes)	No (Yes)	No	No
Vectorscope function	No	Component	Yes	Yes	No	No	No	Yes	No
Waveform comparison	No	Superimposed	No	Yes	No	No	No	Yes	Yes
Reader Service No	1200	1201	1202	1203	1204	1205	1206	1207	1208

¹Represented in US by Broadcast Video Systems. ²Represented by BPI/Brabury PortaPattern. ³Generates waveform and vectorscope patterns for display on standard video monitor; expanded 512 linesx34µs. ⁴5860H does not include Linearity response or 1-line H or 1-line V timebase. ⁵Also performs SC/H measurement, simultaneous A/B signal displays and full line select; model 5872 uses same specifications as 5870, 5871 but without SC/H measurement, simultaneous A/B display and full line select.

Manufacturer	Magni Systems		Philips Test & Measuring/BTC ⁶			Systems Video ⁹	Tektronix		
Model	WFM 560/561	WV 560/561	PM5661 Combo (5662)	PM5664 Component	PM5665	1258	1480 series	1710B series†	1730 (1730-HD/-D2) ¹⁰
Display size	4x3.25"	4x3.25"	8x10cm	8x10cm	8x10cm	10x10cm	8x10cm	8x10cm	8x10cm
Graticule	Internal illuminated		Internal	Internal electronic	Internal	Internal	Int	Ext	Internal
Standards supported	N, P, S	NTSC, PAL	NTSC, PAL	RGB, YCbCb, YIQ ⁷	NTSC, PAL	N, P/-M	N, P/-M, S	N, P	N, P (multistd)
Internal calibrator	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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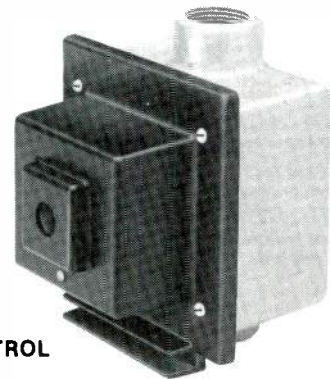
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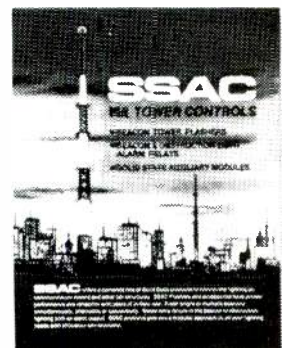
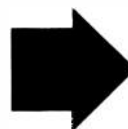
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Manufacturer	Magni Systems		Philips Test & Measuring/BTC ⁶			Systems Video ⁷	Tektronix		
Model	WFM 560/561	WV 560/561	PM5661 Combo (5662)	PM5664 Component	PM5665	1258	1480 series	1710B series†	1730 (1730-HD/D2) ¹⁰
Vertical response	Chroma, LP, Flat	Chroma, LP, Flat, ♂G	Chroma, LP, Flat, ♂G, ♂ Linearity	LP, Flat	Chroma, LP, Flat, ♂G, Linearity	Flat, LP, Chroma, Linearity	Flat, chroma, LP, IRE, ♂G	LP, Flat	Flat, LP, chroma, (30MHz, 2-trace filter)
Time bases	H 2H 2Hm 2V 2Vm	H 2H 2Hm 2V 2Vm	H 2H 2Hx V 2V 2Vx	H 2H 3H V 2V 2Vx	H 2H 2Hx V 2V 2Vx	H/V 2H/V 5H/V 10H/V	H 2H 2Hm V 2V 2Vm	2H 2Hm 2V 2Vm	H 2H 2Hm 2V 2Vm/2
Time base magnification	x10 (H/2H); x25 (2V)	x10 (H/2H); x25 (2V)	x10; x20	x10; x25	x10; x20	...	x5 10 20 25 50	x10	x10; 20; 25
RGB-YRGB displays	Yes	Yes	Yes	RGB only	Yes	Yes	Yes	No	Yes
DC restore	Back porch	Back porch	Back porch/ sync	Back porch/black	Back porch/sync	Yes	Back Porch, Sync	Back porch	Back porch
VITS line select	Yes	Yes	Any line	Any line	Any line	Yes	1L & 15L	None	Any (& 14-line)
Programmable	Yes	Yes	No	Yes	No	Yes	No	No	Yes
Remote control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Composite inputs	Yes	Yes	Yes	No	Yes	A/B	A/B/Aux	A/B	A
Component inputs	Yes	Yes	No	Yes	No	...	...	No	3 each/A/B
Line strobe pulse	No	No	Yes	No	Yes	...	Yes	No	Yes
Vectorscope function	Yes	Yes	Yes (w/SC-H ♂)	Yes ⁸	No	No	No	Burst phase	No
Waveform comparison	Yes	Yes	Yes	Overlay	Yes	Overlays	Overlay/parade	No	Parade/overlay
Reader Service No	1209	1210	1211	1212	1213	1214	1215	1216	1217

⁶Represented in US by BTC Test & Measurement Inc. ⁸Star mode, Gamut, RGB out. ⁹Represented in US by A.F. Associates. ⁷Also accepts Betacam and M-II inputs. ¹⁰D-2 model for digital D-2 signals; 10ns/div and 1/2-/3-line rates included for -HD.

Manufacturer	Tektronix				Videotek		
Model	1740 series	1750 series combo	1780R series combo†	WFM 300A	TSM-50	TSM-60	TVM-620
Display size	8x10cm	8x10cm	2 8x10cm	8x10cm	8x10cm	8x10cm	8x10cm
Graticule	Internal	Internal	Ext/ill/int/elect	Elect 1% accuracy	Internal	Internal	Internal
Standards supported	NTSC; PAL/-M	NTSC; PAL	N, P	525/60 625/50 RGB	N, PAL/-M	NTSC; PAL/-M	NTSC; PAL/-M
Internal calibrator	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vertical response	Flat, IRE, Luma, Chroma		Chr, LP, Flat, Luma, ♂-step ¹¹	Lightning, Bowtie, LP	Chroma, LP, Flat	Chroma, LP, Flat, ♂G	Chroma LP Flat
Time bases	H 2H 2Hm; V 2V 2Vm		H 2H 2Hm V 2V 2Vm	H 2H 2V 2Vm ♂-step	2H 2Hm 2V 2Vm	H 2H 2Hm 2V 2Vm	
Time base magnification	x10 20	x2 10 20 50	x5 10 20 25 50 100	x20	x20	x20	x5V; x10H
RGB-YRGB displays	Yes	Yes	Yes	Yes	No	Yes	Yes
DC restore	Back porch; sync tip	Back porch; sync tip	Back porch Sync tip	Back porch	Back porch	Back porch	Back porch
VITS line select	Internal jumper set	8-23; 6-21; 319-334	1H or 15H	Any line	No	Yes	No
Programmable	All functions	All functions	Yes	...	No	No	Yes
Remote control	Yes	Yes	RS-232/-422	Yes	No	No	No
Composite inputs	A/B	A/B	A/B1/B2/B3 ¹²	Yes	Yes	Yes	3
Component inputs	No	No	A/B1 B2 B3	RGB; YCrCb ¹³	No	No	No
Line strobe pulse	...	Yes	Yes	Any 2; any 15	No	No	Yes
Vectorscope function	♂ in R-Y mode	w/SC/H ♂	Yes	Yes	No	No	Yes
Waveform comparison	Parade display	Overlay Vctr/Wfm	Overlay & Parade	Overlay & parade	No	No	Yes
Reader Service No	1218	1219	1220	1221	1222	1223	1224

¹¹SCIH polar display, Diff Phase, Diff Gain. ¹²Auxiliary in/out. ¹³Transcoders for YIQ, YCrCb available.

Television Demodulators

Manufacturer	Barco Industries	Hans Plisch	Philips T&M/BTC	Rohde & Schwarz	Tektronix	Telemet	Videotek
Model	VSD 1000 ¹	FME 488/499 ²	PM 5560 ³	EMFT	1450-1	5401-B series	DM-141S
Serviceband	VHF, UHF	VHF	UHF	VHF, UHF, IF, CATV	VHF UHF IF	V/UHF IF CATV	IF
CCIR designations	CCIR I-IV	III	IV/V	CCIR I-V	Band I/III/IV/V	CCIR I-V	CCIR I/III/IV/V
Channel select	Xtal or PLL	PLL	PLL synthesized	Xtal, PLL, D/C	Fixed & tunable	Xtal, converter	Synthesized
RF input impedance	75, 50 opt.	50Ω	50Ω	50/75Ω	50Ω	50/75Ω	75Ω
Direct input range	-30/+30dBmV	...	3V max	0.5-100mV	80μV-5V	500mV	...
Offair input range	300μV-30mV	30-126μV	>100mV	0.5-100mV	80mV-5V	5-50mV	100μV-630mV
IF input range	0-40dBmV	...	70mV ±3dB	5-100mV	80μV-22mV	N.A.	...

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Manufacturer	Barco Industries	Hans Plisch	Philips T&M/BTC	Rohde & Schwarz	Tektronix	Telemet	Videotek
Model	VSD 1000 ¹	FME 488/499 ²	PM 5560 ³	EMFT	1450-1	5401-B series	DM-141S
Input level indicator	4-LED ladder	LED	Analog meter	Yes	LED display	Meter	No
Intercarrier input	...	...	Yes	Yes	50Ω	No	...
Split carrier mode	...	...	Yes	Yes	Yes	Yes	Yes
Zero-carrier reference	Yes	...	Int/Ext	Internal	Int	ext	Internal
Envelope detector	Yes	Yes	Yes	Yes	Yes	Nes	No
Synchronous detector	Yes	Yes	No	Yes	Yes	Yes	Yes
Quadrature detection	...	...	Yes	Yes	Yes	Yes	No
Aural signal reject	Yes	...	Yes	Yes	Yes	Yes	No
SAW filter design	Yes	Yes	No	Yes	Yes	μP	Yes
# video outputs	2	1	3	1	2 75Ω	Yes	2
Aural deviation out	Yes	Yes	75kHz	±25kHz	50mV/kHz 600Ω	75kHz	No
Audio line out	2-line	+6dBm±0.5dB	0-6dBm var.	Yes	...	+3dBm	+4dBm
Speaker out	2-speaker	Yes	...	Yes	Yes	No	Yes
Video clamp position	...	Sync	back porch	Backporch/sync	Backporch	Sync	blank
Carrier failure alarm	Yes	...	Yes	Yes	...	Yes	No
Modulation fail alarm	Yes	...	No	Yes	...	Yes	No
Stereo audio type	Dual channel	Dual carrier	BTSC/dual aural/Nica	BTSC & dual sound	BTSC system	BTSC	BTSC
Reader Service No	792	793	794	795	796	797	798

¹ Available for I and BG (dual carrier stereo). ² Base unit contains picture CRT; modules permit measurement of TELETEXT; for G/B/I standards. ³ Accepts BTSC dual aural and Nicam type signals from stereo audio.

AM Modulation Monitors

Manufacturer	Belar Electronics Laboratory		Broadcast Electronics	Harris/Broadcast Division	ITAME	Motorola	TFT Inc
Model	AMM-2B (-3)	AMM-3V	AS-10	AM-90	Mod AM 90A	1410 AM/Stereo	753/755A
Frequency range	200k-160MHz		530-1620kHz	450kHz-30MHz	530k-4MHz	530-1620kHz	500kHz-4MHz
Off-air RF range	100μV-300mV w/RFA2	...	500mV-15V RMS	Uses ext RF amp	1-10Vrms	...	100μV-10V
Direct input range	5-10Vrms		...	1-10Vrms	...	500mV-15V RMS	1-10V 50Ω
Input attenuator range	Continuous		0-30dB+AGC	0/+50dB 10dB steps	0-50dB	0-30dB 5 steps	0/-50dB 10dB steps



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Manufacturer	Belar Electronics Laboratory		Broadcast Electronics	Harris/Broadcast Division	ITAME	Motorola	TFT Inc
Model	AMM-2B (-3)		AS-10	AM-90	Mod AM 90A	1410 AM/Stereo	753/755A
Modulation range	0-133%		0-133%	0-140%	0-133%	-0	+133%
Peak modulation indicator	Adjust (Program)	Programmable	Autoranging	Adjustable	LEDs	Adjustable	Adj. & 100%/125%
Peak flasher accuracy	2% (1%)	1%	...	±1%	...	2%	±10%
Audio output level	+10dBm 600Ω		2.45VRMS	+10dB 500Ω	10dBm	10dBm 600Ω	0dBm
Audio output connection	Unbal active	Bal Xfmr	600Ω bal	Bal	600Ω bal	Active balanced	Bal/Unbal
AF response (mono) ±dB Hz-kHz	±0.5dB 20-25k		...	0,-0.5dB 20-20k	±0.5 20-25k	±2dB	30-20k
AF distortion (mono)	0.25% 99% mod		...	0.15%	...	0.25%	0.15%
Audio S/N ratio (mono)	75dB	75dB	...	75dB	75dB	+67dB	75dB
Meter, display type	Analog meters		Analog meters	Neon bar graph	Analog meter	Analog meter	Analog meter
Oscilloscope test output	Yes	Yes	Possible	Yes	...	Yes	No
Remote metering output	Yes	Yes	Possible	Yes	...	Yes	Yes
Failure alarms	Carrier off; modulation opt.	±30% carrier; modulation opt.	...	Carrier off; modulation low	Carrier fail.	...	Carrier off; Modulation low
Reader Service No	1225	1226	1227	1228	1229	1230	1231

FM Modulation Monitors

Manufacturer	Belar	QEI	TFT Inc	
Model	FMM-2	Model 691	844A	884
RF channel selection	Xtal (Opt presets)	PLL	Preselector	Preselector
Off-air RF range	50μV-300mV	3.16-80mV	250μV-100mV	50μV - 100mV
Direct input range	1V-10V	1mW-50W	100mV-10V	0.5mV-100mV
Input attenuator range	Continuous	...	0/-50dB 10dB sterep	
AGC circuitry	Yes	...	Yes	Yes
Modulation range	0-133% on meter	0-133%	0,+133%	
AF response (meter) ±dB Hz-kHz	±0.1 10-100k	0.2 30-75k	±0.25 50-15k	
Peak mod. adjustment range	199%	0-199%	50-199%	
Peak flasher accuracy	1% 75kHz dev	±1%	1% 5kHz	20% 75kHz
Residual AM monitor	Integral	Yes	Integral	Integral
Audio output	+10dBm	1Vp-p	0dBm	0dBm
AF response (out) ±dB Hz-kHz	±0.01dB 10-50k	...	±0.5dB 30-120k	±0.5dB 50-15k
AF distortion (mono)	0.003% THD/IMD	0.05%	0.1%	0.2%
S/N ratio (mono)	90dB	>75dB	75dB	70dB
Composite output V	1.5Vrms 75kHz dev	1V p-p	5Vrms 75kHz dev	50Vrms 75kHz
Meter display types	Analog	Dual analog	Analog meter	Analog meter
Modulation alarms	Yes	Yes	Yes	Yes
Stereo monitor	Options	...	Yes	No
SCA monitor	FMS-2, 4-channel	Integral	Dual TFT 845	
Reader Service No	1232	1233	1234	1235

TV Aural Monitors

Manufacturer	Belar	Tektronix	TFT Inc	
Model	TVM-101 (TVM-100)	751 BTSC	701 (Mono) ²	850
RF range-channel	Any per request	Any US TV channel	Ch 2-83 (UHF/VHF)	Ch2-38 UHF/VHF
Off-air RF range	200μV-1V 50Ω	from 1450-1 demod	250μV-5mV 75Ω	200μV-5mV 50Ω
AGC circuitry	Yes	per Demod	Yes	Yes
Modulation range	0-133% on meter ¹	100% 73kHz max	0/133%	0/133%
AF response (meter) ±dB Hz-kHz	±0.1dB 10-100k	±0.7kHz total	±0.2dB 50-15k	±2.0dB 50-120k
Audio output	+10dBm 600Ω bal	+8dBm 600Ω	2Vrms 600Ω	1.5Vrms 600Ω
AF response (out) ±dB Hz-kHz	±0.01 10-50k	±0.1 50-15k	0.2 15-15k	±0.5 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	1.5V 75Ω 75kHz dev	No	...	1.5V 75Ω
Meter display types	Analog (& digital)	EL bar graph	...	Analog meter
ATS compatible	Yes	...	No	Yes
Oscilloscope output	Yes	...	No	Yes
Carrier alarms	Low level	Loss/unlocked pilot	Off frequency	Low level/lost of lock
Modulation alarms	Mod loss option	Stereo phase reverse	Loss of modulation	Loss of modulation
Stereo monitor	TVM-210	Integral	No	Integral
SCA monitor	SCM-2 4-channel	SAP/PRO integral	Single	Option TFT855 for
PRO/SAP monitors	PRO SAP opt	...	...	SAP & PRO
Reader Service No	1236	1237	1238	1239

¹ RF frequency counter, intercarrier freq error measurements, remote meter. ² Switched for mono-BTSC stereo. Integral residual AM, FM noise meter; split sound, quasi-parallel detection.

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