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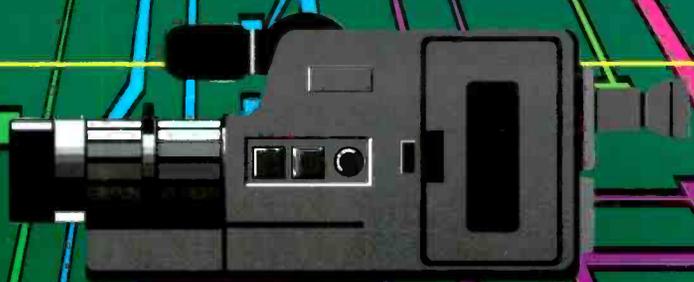
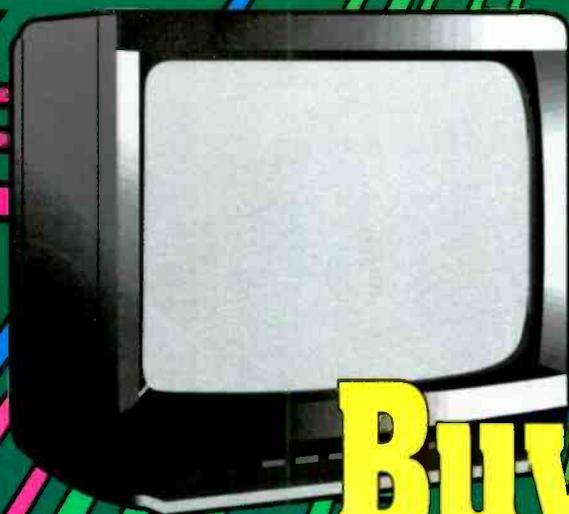
Servicing & Technology

March 1998

Motors in consumer electronics

A technician's glossary

**ES&T**



# 1998 Buyers' Guide

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# ELECTRONIC

Servicing & Technology

Volume 18, No. 3 March, 1998

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*By Victor Meeldjick*

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*By the ES&T Staff*

Every time a major advance takes place in consumer electronics, it's accompanied by a new vocabulary. This article contains some of the words that we'll hear bandied about as high definition television develops. All of these terms come from documentation provided by ACATS (The Advisory Committee on Advanced Television Service).

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### 1998 BUYERS' GUIDE

With so much new technology in consumer electronics these days it is vitally important that a service center have a source where it can find a good company for replacement parts and product information. One source of that type of information is the annual **ES&T** Buyers' Guide. The guide includes information about manufacturers and distributors, what they supply, where they are located and how to get in touch with them. We welcome you to this year's Buyers' Guide and we hope you find it useful in finding companies that provide just the product or service you need.

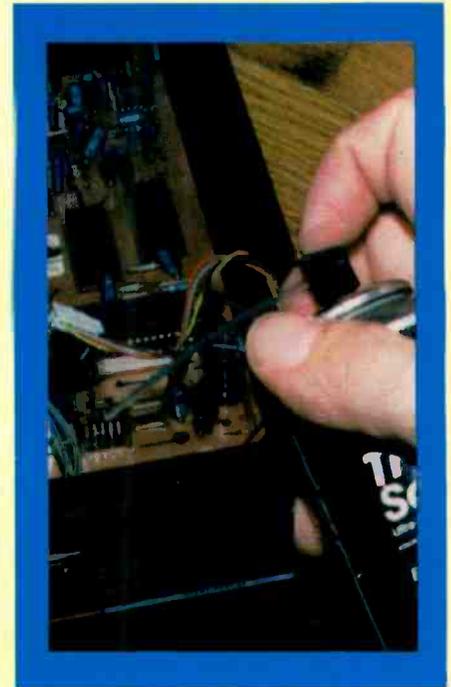
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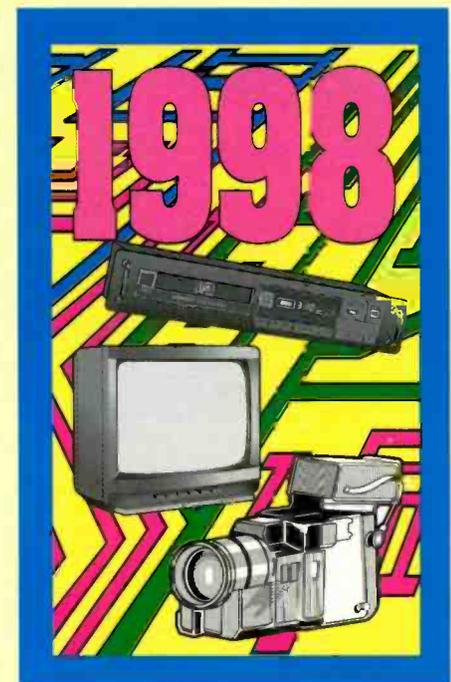
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### ON THE COVER

There are a lot of listings that a consumer electronics service center can consult to find sources of products they need to get the job done. But there's only one listing that is specifically designed for the exact mix of products needed by service centers. This one. If you're looking for a source of manufacturers of replacement parts, components, test equipment, books, services and more, for a service center, look no further. You've found it. Look through the 1998 **ES&T** Annual Buyers' Guide to find the companies that sell the products and services you need.

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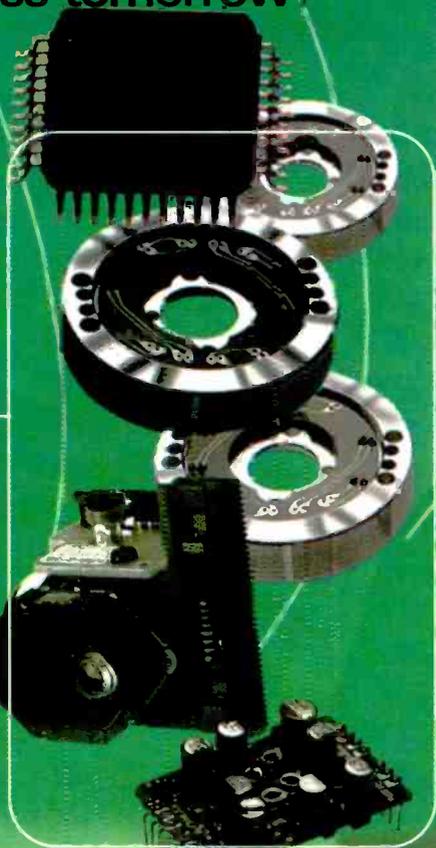
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## EDITORIAL

# Where's it all heading?

Do you remember back many years ago reading the comics page? There were Dick Tracy and Sam Ketchum communicating via their two-way wrist radios. Most of us thought that it would be wonderful to be able to communicate like that, but few of us thought that it would ever be possible. Now thanks to the wonders of cellular communications and hand-held two-way radios, it's not only possible, it's everywhere. Well, of course it's not wrist size yet, but just wait.

And how about computers. I remember someone once predicted that we would have computers the size of a shoe box. That was back when computers filled whole rooms and gobbled electricity at a prodigious rate. Most of us were skeptical, but today's laptops are even smaller than anyone could have predicted. And then there are palm top computers.

Since those days, we have gone from analog recording to digital, vinyl disks to compact disks, analog tuning to digital tuning, and we even have television transmitting antennas hanging above the earth beaming down digital signals that produce clear, sharp TV pictures and powerful high-fidelity stereophonic sound.

We're in the process of making even more changes in the tangent worlds of consumer electronics, computers, and communications. HDTV received great emphasis at the Consumer Electronics Show in January. Essentially every major manufacturer had a set to show. TV sets are being manufactured that contain a computer that will allow the viewer to gain access to all the information that the internet has to offer. Conversely, plug in cards are available that allow computer users to watch television on their computer screens.

### Convergence

The term for all of this is "convergence." That is, consumer electronics are converging toward a situation in which each type of product offers many of the features of the other products. For starters, the domain of consumer electronics continues to expand. For example, not long ago computers, mobile telephones, pagers, and that type of product were part of the world of business. Now, as they all become more affordable, they're falling increasingly under the umbrella of consumer electronics. Moreover, as circuitry continues to shrink, and prices of that circuitry continue to decrease, it's increasingly possible to combine the features of the various consumer electronics products into a single package.

Read the following paragraphs from a press release from the



Consumer Electronics Manufacturers' Association to see an example of what we mean.

Following the trend of merging TV and computer functions, the Consumer Electronics Manufacturers Association (CEMA) published EIA-746 which allows transport of Internet Uniform Resource Locators (URLs) in line 21 of the vertical blanking interval (VBI) of TV broadcasts. These URLs then can be used by TVs, set-top Internet terminals, and specially equipped PCs to associate Internet content with related broadcast content, providing a powerful way to extend TV advertising and programming through the richness and interactive nature of the Internet.

"This is a true convergence standard that allows new features in televisions to provide the seamless blending of interactive content from the Internet with traditional TV programs," said David Broberg, manager of New Technology Research & Industry Standards for Mitsubishi Consumer Electronics America, Inc. and chair of the technical working group that created EIA-746.

The standard provides broadcasters and receiver manufacturers with a common means of delivering URLs associated with the current program, the broadcast network, the local station, a commercial sponsor of the current program and/or the service (e.g. cable or satellite) operator. "The URLs and related information are transported using the same robust mechanism commonly used for closed captioning, making them available virtually everywhere television broadcasts are received," said Dan Zigmond, senior manager for Television Integration Development at WebTV Networks, Inc., and a participant in the technical working group and principal author of the EIA-746 standard. "The choice of line 21 for transporting URLs in EIA-746 also means that many existing closed captioning tools can be used to encode and broadcast the URLs. This will make the costs of adding these enhancements extremely low, especially for broadcasters and other television content providers who already include closed captioning information with their programming."

#### Service will have to cope

So what does all this mean to today's consumer electronics service center? Well, for starters, if a service manager doesn't know the meaning of the term "URL," it would be well advised if he learned it. Service technicians who have fought learning about digital circuitry and signals will have to learn these things in order to service the new web TVs and digital TVs. In essence, the definition of "consumer electronics" is broadening rapidly, and increasingly is encompassing every type of circuitry known to modern electronics. It will become the responsibility of service organizations to be familiar with all of it. That's a tall order, but given the skills and dedication of today's service technicians, we're confident that they will be able to get the job done.

*Nile Conrad Penon*

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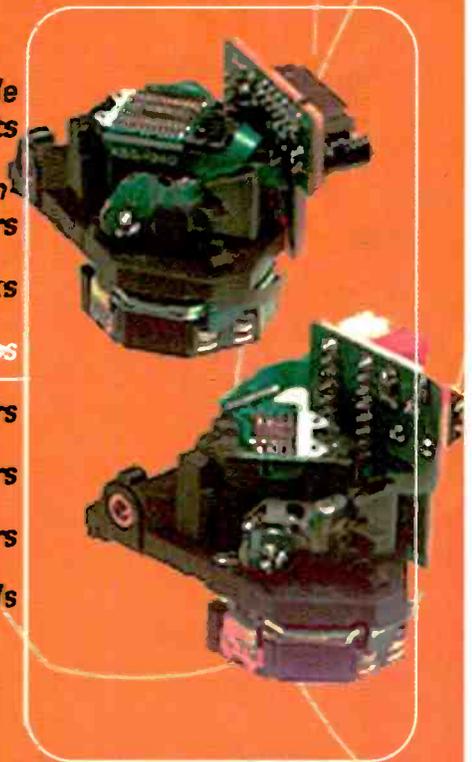
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**Electronic Servicing & Technology** is edited for servicing professionals who service consumer electronics equipment. This includes service technicians, field service personnel and avid servicing enthusiasts who repair and maintain audio, video, computer and other consumer electronics equipment.

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Electronic Servicing & Technology (ISSN 0278-9922) is published 12 times a year by CQ Communications, Inc. 76 N. Broadway, Hicksville, NY 11801. Telephone (516) 681-2922. Periodical class postage paid at Hicksville, NY and additional offices. Subscription prices (payable in US dollars only): Domestic—one year \$26.95, two years \$49.95. Canadian—one year \$36.95, two years \$69.95. Foreign Air Post—one year \$44.95, two years \$85.95. Entire contents copyright 1997 by CQ Communications, Inc. Electronic Servicing & Technology or CQ Communications, Inc. assumes no responsibility for unsolicited manuscripts. Allow six weeks for delivery of first issue and for change of address.  
Printed in the United States of America.

Postmaster: Please send change of address notice to Electronic Servicing & Technology, 76 N. Broadway, Hicksville, NY 11801.

CQ Communications, Inc. is publisher of CQ The Radio Amateur's Journal, Popular Communications, CQ Radio Amateur (Spanish CQ), CQ VHF, CQ Contest, and Electronic Servicing & Technology.

**NEWS**

### Second annual CEO summit and product returns conferences planned for 1998

Capitalizing on the success of the first CEO Summit, the Consumer Electronics Manufacturers Association (CEMA) announces that it will sponsor the second annual conference to be held June 24th - 27th, 1998 at The Broadmoor Hotel in Colorado Springs, CO. In addition, CEMA announces that it will also be sponsoring the second Product Returns Conference to be held in Chicago, IL on September 15th at the Marriot O'Hare.

The three day invitation only CEO conference will allow chief executive officers from the consumer electronics industry - manufacturers and retailers - an opportunity to meet in a business atmosphere to discuss issues of mutual interest to help create sustained success for the entire industry.

The one day Product Returns Conference will be open to all industry executives and will once again seek to bring together executives from a variety of industries facing similar problems in excessive product returns.

"Last year both events broke new ground in developing an environment where open dialog can occur," explained CEMA's President Gary Shapiro.

"With any new business opportunity senior executives need to feel confident their proposals and initiatives will be met with open minds, and clearly these events helped serve as catalysts for 1997. In 1998 we fully expect that attendees will have the opportunity to talk candidly about industry challenges, and come to the sessions with new and invigorating ideas. Because of the success from last year we believe that it's time to leverage our momentum and move ahead with both events this year."

"Both were impressive and successful first efforts," proclaimed Bob Borchardt CEMA's chairman and co-chairman and CEO of Recoton. "Approximately 70 top executives from the manufacturer and retail communities met in June to discuss important industry issues and forge new relationships. It was a chance to have no holds barred conversations with people in an informal environment."

"Nearly 300 people attended this

[Product Returns '97] one day session that focused on consumer attitudes, defining the problems and identifying strategies and solutions. Participants included CEMA members, as well as representatives from NARDA, PARA, the National Kitchen and Bath Association, the American Hardware Manufacturers Association and the National Housewares Association and the Association of Home Appliance Manufacturers. Already action groups are developing strategies that we hope can be implemented by retailers to curb this monumental industry problem. Together, the results of these conferences are encouraging and warrant continuation and expansion."

The second CEO Summit will be invitation only and will provide leading manufacturers and retailers the opportunity to talk openly about the direction of the industry and how both parties can work together to begin developing solutions to many of the challenges they face between now and the next millennium.

For more information about the program, and to register for the conference, prospective attendees can call Kelly Miller in the CEMA conference department at 703-907-7616.

### Market forecasts 57% growth projected for 1998 digital camera sales

The market for digital cameras is poised for significant growth in 1998 and beyond, according to two new reports from the Consumer Electronics Manufacturers Association (CEMA). The Arlington, VA-based trade group unveiled results from a new survey showing strong consumer interest in the capabilities of digital cameras. Also released was CEMA's forecast for future sales: 1.1 million digital cameras will be sold to retail dealers in 1998, CEMA estimates - up significantly from 700,000 units in 1997 and 300,000 in 1996.

"We saw digital cameras really mature as a consumer product in 1997, and optimism is high for the category as we head into the new millennium," said Gary Shapiro, president of CEMA. "An expanded retail presence for digital cameras and the involvement of a large number of top manufacturers have helped increase the awareness among consumers of the functionality of digital imaging.

Just as we saw the products proliferate at the 1998 International CES, our new survey shows similar excitement among the most likely adopters of digital cameras."

The survey, conducted through the CEMA Consumer Research Service, was administered via telephone in December 1997 to 750 households with a PC and a color printer - those currently best equipped to receive the maximum benefit from digital imaging products. Nearly eight in ten of those surveyed were at least somewhat familiar with digital cameras.

The CEMA survey shows that PC/color printer users have already been involved in activities that could benefit from the use of digital imaging products. When asked which tasks had been performed with their PC in the last six months, 67 percent said they had created invitations and/or greeting cards, 52 percent indicated they had produced designs, 41 percent said banners or posters, and 38 percent said newsletters. Additionally, forty-one percent of the respondents said they have printed digital photographic images from their PC. In many of these areas, digital cameras offer consumers a means to enhance their color printer output.

Personal computer owners indicated the top reason they bought a color printer was to print newsletters, cards, etc. (27 percent). This was followed by "to print reports" (17 percent); "it came as part of a system" (16 percent); and "to print photos or images" (13 percent).

Interest in features of digital imaging is significant among this early adopter sample. The survey shows that instant access - printing photos right after taking them - is the most important feature (56 percent are interested). This is followed by the ability to store photos on a PC (55 percent), use photos in newsletters or Web sites (53 percent), and reduce/enlarge photos (51 percent). Interestingly, although women are less familiar with digital cameras than men, their interest level in the cameras' main features are 10 to 15 percent higher than that of men, according to the CEMA survey.

"We are encouraged by the high level of product interest among the 20 million U.S. households with a PC and color printer," added Shapiro. "Indications of intent-to-buy show that digital cameras -

already more than a half billion dollar business [in 1998] - are ready for more of a mass market acceptance among PC users. And as the household penetration of PCs expands, sales of digital cameras are expected to come along for the ride."

Why wouldn't PC/color printer users want to purchase a digital camera? They indicated that "a regular camera meets my needs" (68 percent) and "digital cameras would be too expensive" (61 percent).

Shapiro remarked, "The greatest impediments to consumers purchasing a digital camera are actually those easiest to address. As consumers learn more about the capabilities of digital imaging, we believe many will see digital cameras as an integral part of their computing system, and a complement to their existing cameras. In addition, there are now digital camera models available in price ranges to fit any budget."

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# Motors in consumer electronics

by Victor Meeldijk

**M**otors are found in various consumer electronics products: video cassette recorders, cassette players, remote controls, compact disk players and computers, to name a few. This article continues the discussion of motors in electronics that was started in the March 1997 issue of **Electronic Servicing & Technology** and will briefly discuss some history, motor theory and look at some typical things that can go wrong.

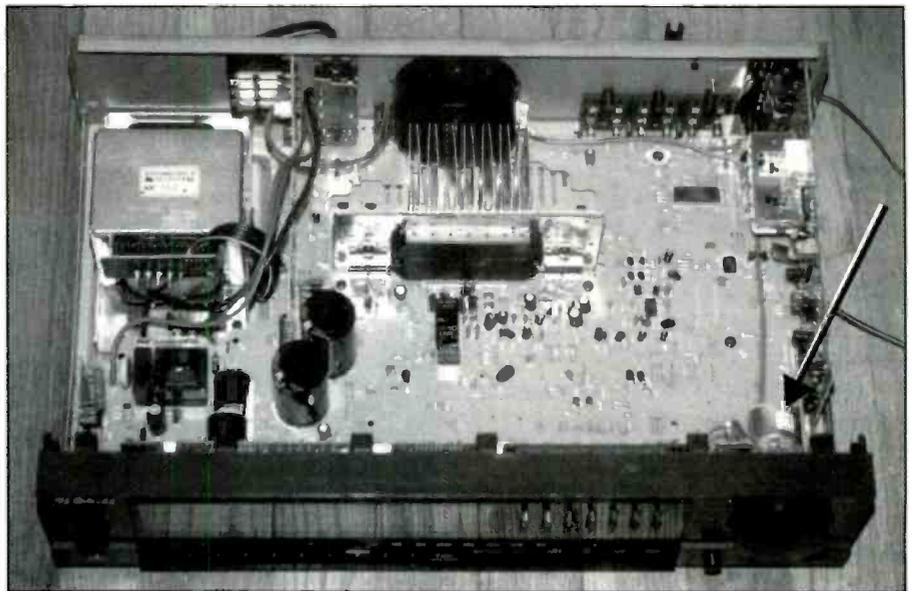
## History

In 1821 Michael Faraday constructed what was called a "rotator" consisting of a magnet (that acted as a stationary field) stuck upright in a cup of mercury and next to it a current carrying wire hanging down from above, one end in the mercury. When the circuit was completed with current flowing from a battery to the wire rotated around the magnet. Faraday later demonstrated that the magnet could also rotate about the wire.

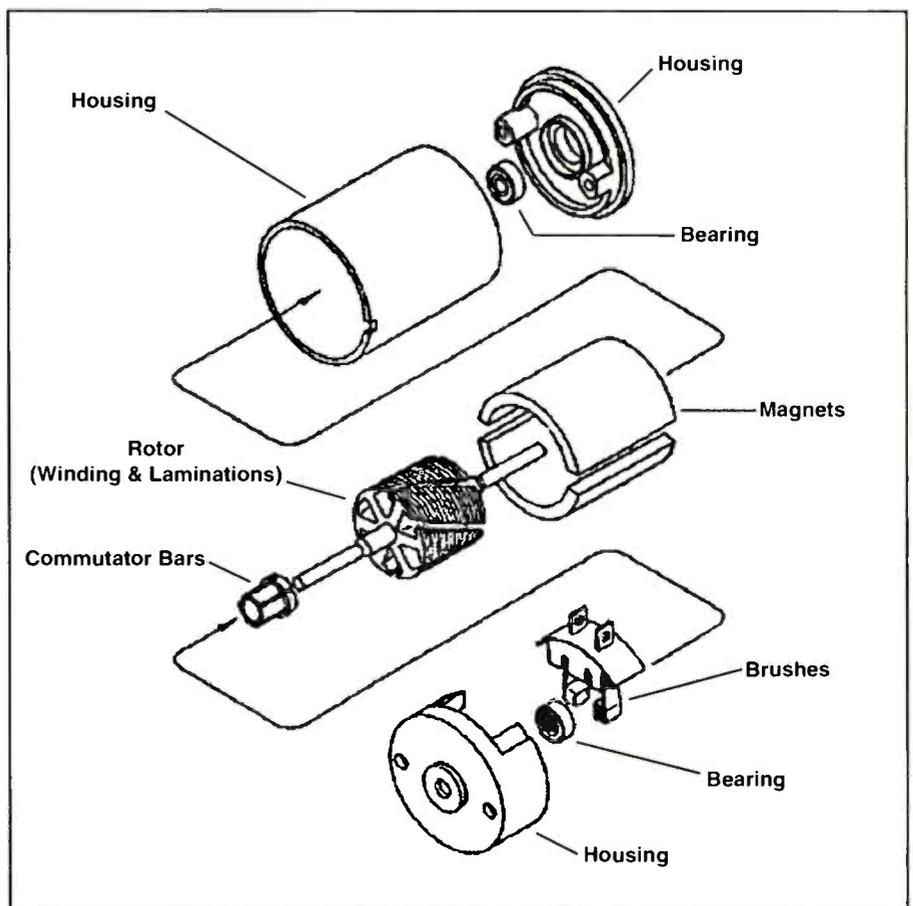
Later in 1828 Joseph Henry invented the electromagnet. It was demonstrated before the Albany Institute in Albany New York on June 1 of that year with an exhibit of a closely wound electric magnet that used a silk covered wire (from 1/40" to 1/20" in diameter).

In 1837 the first electric drill was made when Thomas Davenport, a blacksmith in Rutland VT, constructed a 50-pound motor that rotated at over 400 revolutions per minute to drill holes up to 1/4 inch in diameter in iron and steel. A patent number 132 was granted to him on February 25, 1837. All motors that use an electromagnetic field can trace their origins to the work done by Joseph Henry in 1828.

In 1873 Vienna Zenobe Theophile Gramme demonstrated a dc electric motor operating from a generator. A few years later, Dr. Schulyer Skaats Wheeler in 1882 created the first electric fan by placing a propeller on the shaft of an elec-



**Figure 1.** Motors are everywhere in consumer electronics products, even to remotely control the volume in this Technics SA-R277 stereo.



**Figure 2.** A typical permanent magnet brushed motor design.

Meeldijk is the Reliability/Maintanability Engineering Manager Diagnostic/Retrieval Systems, Oakland, NJ.

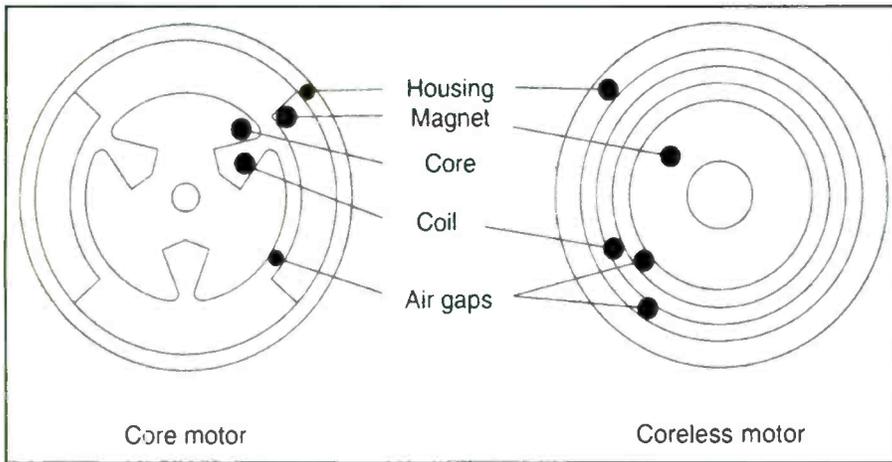


Figure 3. Comparison of a motor with a core and a coreless motor.

tric motor. Other achievements in the development of motors include the ac induction motor by Nikola Tesla and Galileo Ferraris in 1888.

Not immediately related to the invention of the motor was the discovery of the Hall effect (by Edwin Herbert Hall in 1879 at Johns Hopkins University) where a small electrical potential is created when a stationary magnetic field is placed perpendicular to a current-carrying semiconductor. The voltage caused by the electric field exactly balances the force

exerted by the magnetic field. Today Hall Effect sensors are used in VCRs to sense motion, direction and speed and are found inside capstan and cylinder head motors. They are also used to monitor the iris opening in camcorders, providing a feedback loop to the iris motor.

#### Types of motors generally found in consumer electronics

Motors in electronics generally fall into the following categories:

- Hall Effect (or brushless) Motors:



Figure 4. The JVC stereo cassette deck model TD-W11J has a motor with a built in speed control (as do many tape decks). If you look closely you can see the crack in the (Sanyo) IC case.

found in VCRs, CD players, computer floppy and hard disk drives, and printers.

- Stepping Motors, used in printers, copiers, disk drives, camcorder focusing lenses and even air conditioner louvers.
- Brushed Motors: VCRs (older or low cost models), CD players, radio con-

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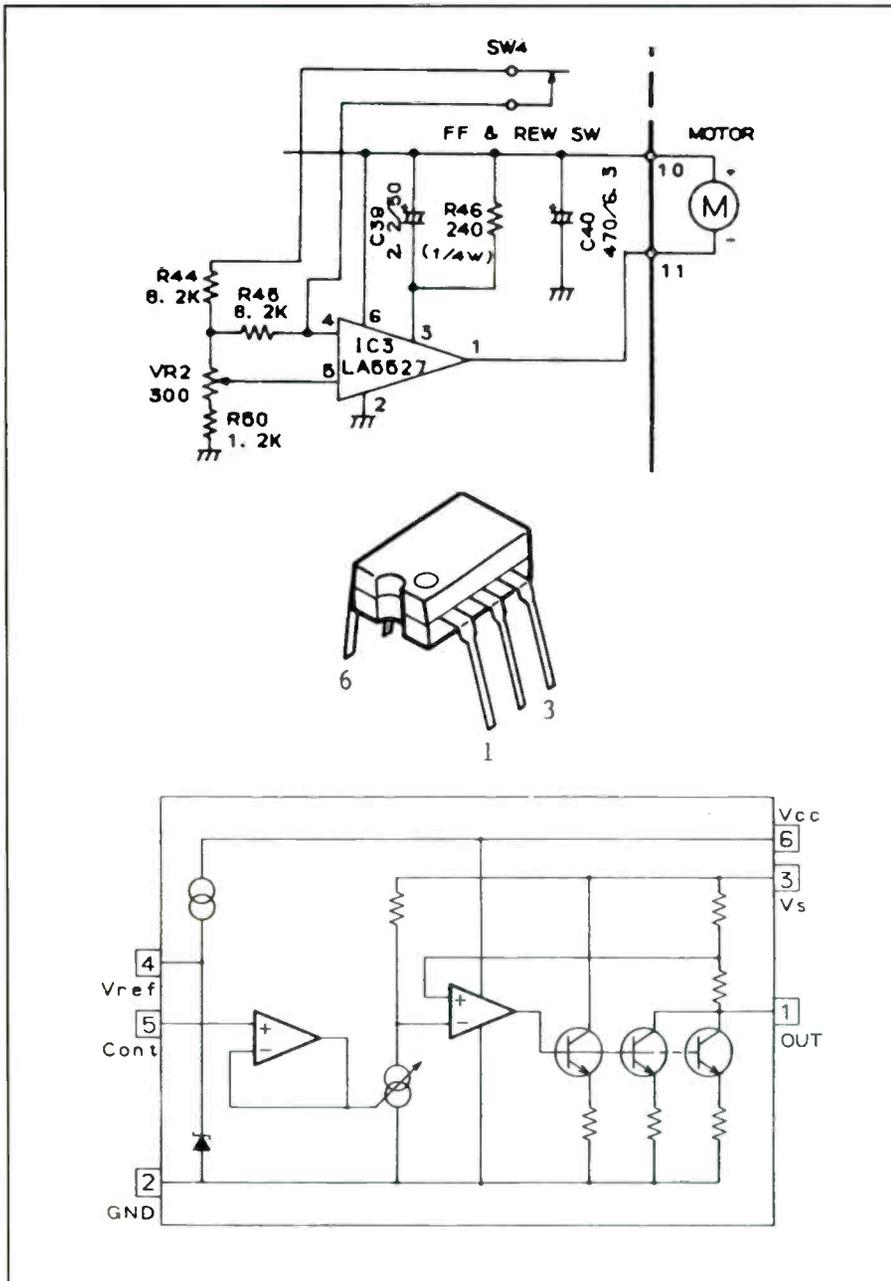


Figure 5. A typical motor speed control circuit used in a portable cassette recorder.

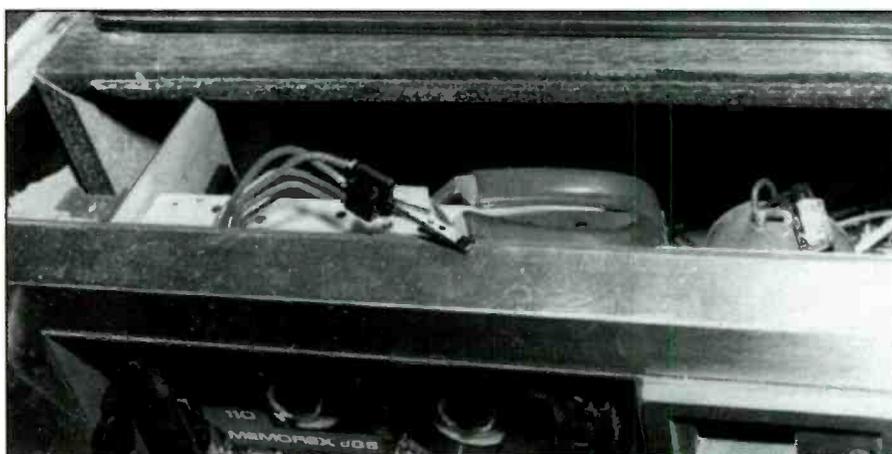


Figure 6. A broken leaf switch (shown held together with a heat sink clamp while glued together, in series with the motor, caused the problems in this Fisher Stereo (MC-4530).

trolled (RC) cars and even remote-controlled volume adjusters in stereos (Figure 1).

- Shaded-pole induction motors: turntables, especially older units.
- DC coreless motors used to generate vibration in pocket pagers.

### Theory of operation

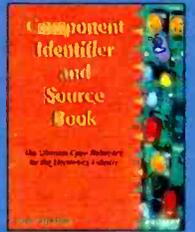
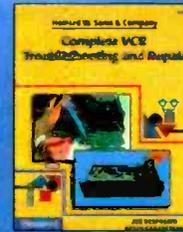
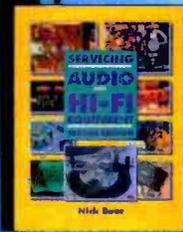
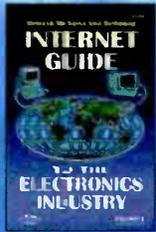
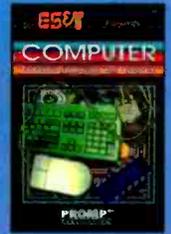
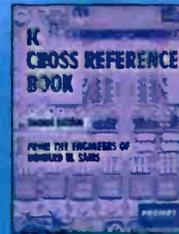
In brushed motors, permanent magnets supply the stator magnetic field, and the rotor field is generated by windings supplied by brushes that touch commutator bars. These brushes may be either metal contacts (copper or copper alloy), or carbon brushes mounted on copper (or copper alloy) (Figure 2). Motors for automotive applications (door locks and power windows) may have brushes (and commutators) made of precious metal alloys such as silver and platinum. This reduces resistance, thus requiring less contact force which will reduce motor noise and work with circuitry that makes the motor more precise and able to stabilize considerably more quickly.

Shaded-pole induction motors have their magnetic poles surrounded by a short circuited turn of copper called a shading coil. Induced currents in the shading coil cause the flux in the shaded magnetic pole of the motor to lag the flux in the other portion resulting in a rotating magnetic field, moving in the direction from the unshaded to the shaded portion of the motor. This results in a low starting torque. These motors are not very efficient and consequently, this type of motor is limited to low fractional horsepower and low cost units.

In stepping motors, the rotor (shaft) rotates through a certain angle each time current is switched. The final angle of rotation is proportional to the number of current switchings. Drive current switching permits simultaneous control of the angle of rotation and the rotational speed.

Stepping motors can operate as brushless dc motors, synchronous motors, variable speed motors and pulse counters. Types of stepping motors include permanent magnet (where there are permanent magnets on the rotor of the motor and an electromagnet in the stator side), variable reluctance motors (where the rotor uses a magnetic material such as mild steel instead of permanent magnets) and a hybrid motor uses a rotor of magnetic

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Figure 7. Loosening the shaft collar at the bottom of a VCR cylinder motor.

material induced by a permanent magnet.

The coreless motor has no iron core around its rotor and can uniformly rotate as there are no magnetic suction forces. The coreless motor has a rotor that consists of a shaft, hub shell, commutator and armature-coil. The stator includes a housing, bearing, permanent magnet and a brush assembly (figure 3). In vibrating pagers a counterweight is attached to the motor shaft. Coreless motors are also used in radio controllers, surveillance cameras, electron microscopes and medical equipment.

#### Typical problems

Motors fail for a number of reasons. Following is a breakdown of the incidence of failure of ac electric motors:

- Winding failure: 31%
- Bearing failure: 28%
- Fails to run after start: 23%
- Fails to start: 18%

Motor failure symptoms include the following:

- Motor not working at all
- Running at the wrong speed
- Running erratically
- Noisy, making whining sounds.

Motor problem causes are usually determined by observation of motor performance and detection of the presence of any burned smells. Open windings can be found with an ohmmeter, but shorted turns are nearly impossible to find as the resistance change is so small. Inductance measurements are also of little use for the same reason.

#### Typical motor problems in consumer electronics

Motor problem symptoms vary depending on the product in which the motor is operating. The following article segments describe some typical motor problem symptoms in selected products.

#### Cassette tape decks

Cassette tape player motor problems range from failure to work at all to running at the wrong speed. In one instance, a JVC Stereo Cassette Deck, model TD-W11J that uses one motor to control both cassette decks was playing the tapes too fast. When it was placed on the bench and powered up, the unit appeared dead: the input to voltage regulator (NEC 78M12) was 15V but the output was only 3.86V and it was hot. The motor emitted a burned smell. In this design the motor speed control is inside the motor (Figure 4). You will note the brushes look frayed, failure was caused by the brush tines wearing down, allowing a brush to be pulled around the commutator and shorting to the other brush. Measurement of the input voltage to the motor allowed selection of a generic replacement.

In portable cassettes the motor speed control is external to the motor. Figure 5 shows a typical motor speed schematic. In a Panasonic portable unit (RX-1925) incorrect speed movement was caused by the change in value of a control potentiometer. In a Fisher Stereo (MC-4530) the tape deck would not run because of a broken leaf switch (Figure 6).

#### VCR motor problems

VCR cylinder head and capstan motor problems include:

- Failure to operate at all
- Erratic operation
- Operation at the wrong speed

Tape Loading Motor problems will result in failure of the tape to be pulled

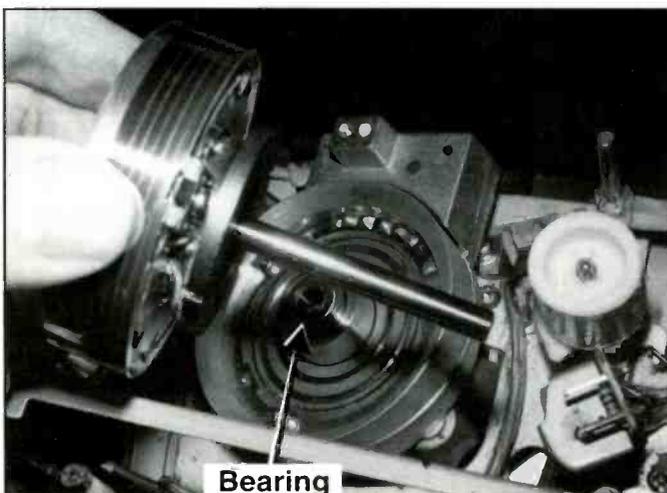


Figure 8. Removing the upper video head cylinder in this video cassette recorder reveals the top bearing of the cylinder motor.

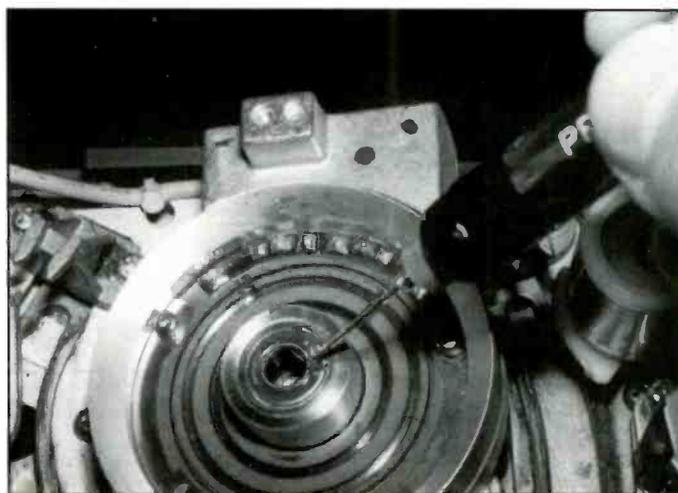
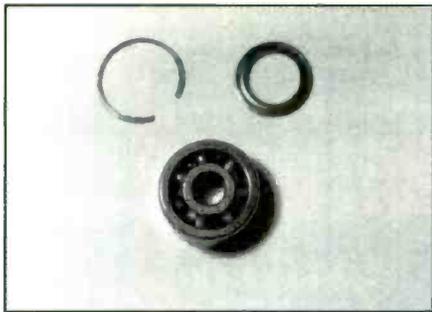


Figure 9. In a cylinder motor, bearings can be lubed with a little oil.

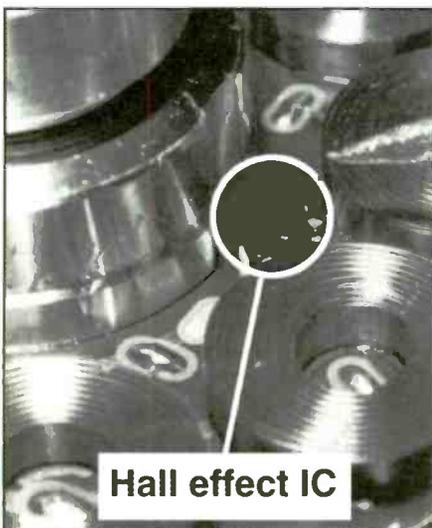


**Figure 10.** If oil does not improve motor operation, the bearing can be opened to add grease.

into the machine. Capstan motors and the servo system control the forward speed of the tape to insure proper tracking with the video heads and playback of the audio signals at the right speed. The capstan motor and pinch roller pull the tape through the VCR. Problems with these circuits can be related to the FG (frequency generator), PG (pulse generator), motor driver or the motor itself. The motor driver may be mounted on the pc board of the motor (and may be a custom IC that is not available).

What might at first appear to be motor related problems may actually be caused by worn belts, stuck gears, faulty mode switch contacts, damaged traces going to servo circuitry (especially around any IC pins that may have been probed (in Hitachi model M241 check the traces to the servo clock of servo IC)). Check protection ICs in the servo circuit (in Emerson model VCR966 if there is no reel motor movement check ICP2).

When the VCR is turned on, if the picture is snowy and then slowly clears, or



**Hall effect IC**

**Figure 11.** Hall effect ICs are used in VCR motors to control direction and speed.

if whining noises are heard from the cylinder motor, the bearings may need to be lubricated or replaced. Figure 7 shows the shaft collar at the bottom of a cylinder motor being loosened. Figures 8 and 9 show the video head and the top of the motor being removed exposing the top bearing which can be lubricated with a little oil. If this does not improve the situation, the bearing can be opened to add a little grease (Figure 10). Be careful not to put too much grease on the bearings as a high grease content can cause a high start-

ing load and can also cause the bearing to overheat which could solidify the grease. If it is necessary to remove the bearings, they can be pushed out using a wooden dowel. These are metric miniature precision bearings that are available from various companies including:

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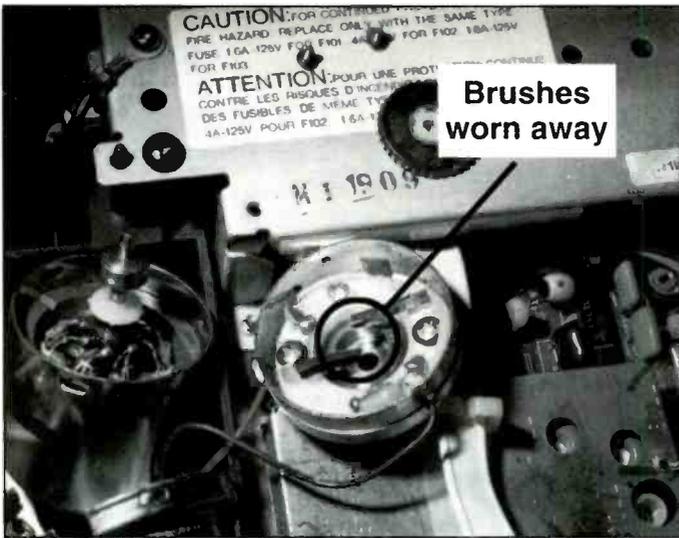
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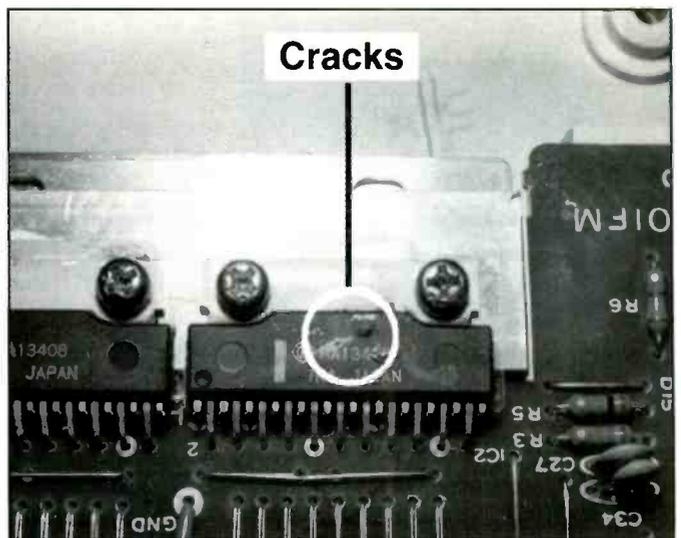
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**Figure 12.** This photograph shows the inside of a brushed VCR tape loading motor in which the carbon brushes have worn away after many hours of play.



**Figure 13.** Failed motor driver ICs in a dot matrix printer. The cost of labor and parts to replace them may exceed the value of the machine.

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Look for part numbers on the bearing, for example, in a JVC HR-D4050U, the bearing number is 696ZZ (6mm ID, 15mm OD and 5mm width), shielding adds a ZZ to the industry standard part number (i.e., 696ZZ). Be prepared to

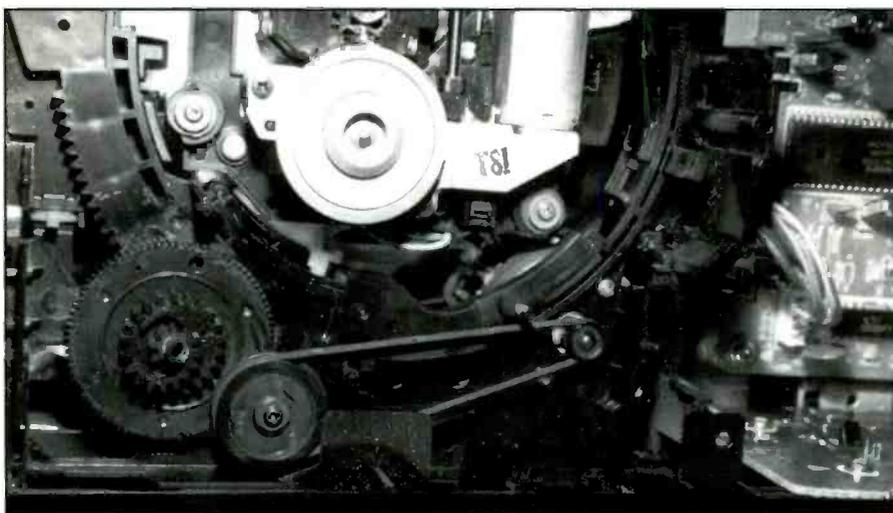
check with various companies and distributors as these miniature bearings can range in price from \$2 each to \$30 each depending upon the source/distributor.

Hall effect ICs (Figure 11, shown with a soldering iron tip ground to a fine point) are used in VCR motors (such as Panasonic models PV-1360, 1361, 1362, 1560, 5261 etc.) that when failed can result in erratic rotation or rotation in the wrong direction. If this IC fails, the motor will run erratically turning in one direction, then in the other direction because the cylinder motor drive IC is not getting any feedback pulses. The VCR will then automatically go into stop mode.

While the failure rate of Hall sensors is very small, they can be damaged during

troubleshooting (In the JVC VCR the cylinder motor Hall sensor can be damaged while probing IC2603 (AN3812K) or the pins of P2602, if the probe shorts the I/O lines of the sensor). The cost of the Hall effect device is less than \$1 compared to as much as \$100.00 for a new motor. Replacements for such devices include the SHS264 from Sanyo Semiconductor, the Sharp LT110, LT120, or LT130, or the MuRata Erie HE 101AA.

Older VCRs (such as the Panasonic PV-1270) used brushed motors. Figure 12 shows the tape loading motor and the brush holders in which the carbon brush has worn away. Replacement list cost of this motor is more than \$100, which is hard to justify in an older VCR.



**Figure 14.** In this Pioneer compact disk player, lubrication of the motor assembly and installation of a new belt solved tray opening problems.

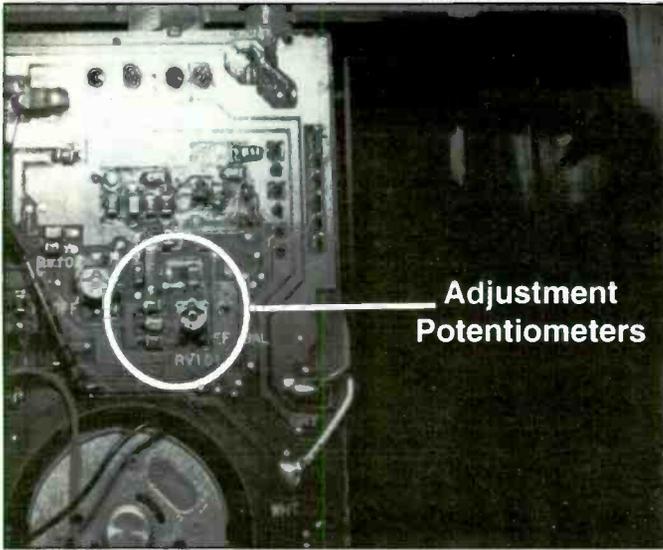
### Fax machines/computer printers

In fax machines, motor related problems may be related to worn or broken gears, belts or in driver ICs or poor solder connections. Figure 13 shows the failed driver ICs in a dot matrix printer (Shinwa of America, VP8100, NLQ180). As noted for VCRs, component replacement cost in older products may not warrant the repair.

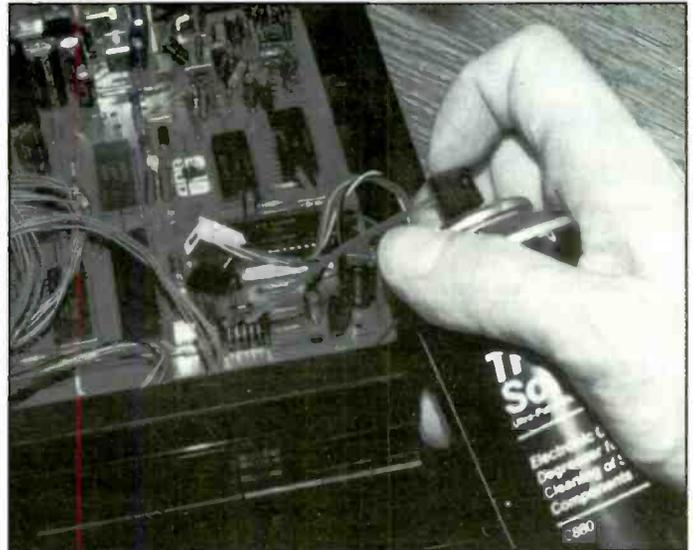
### CD players

CD players have 3 motors, the disk (turntable or spindle), tray and sled motor. In servicing any CD player or CD-ROM drive, the following checks are typically performed:

- Sled limit switch



**Figure 15.** In this Kenwood CD Portable Player, you can see the adjustment potentiometers are readily available to the technician.



**Figure 16.** Intermittent connections can also cause motor related problems in consumer products such as in this Kenwood unit which had TOC errors.

- Clean lens
- Adjustment of focus and RTOC.
- Servo drivers
- Check spindle motor resistance as shaft is rotated
- Motor resistance

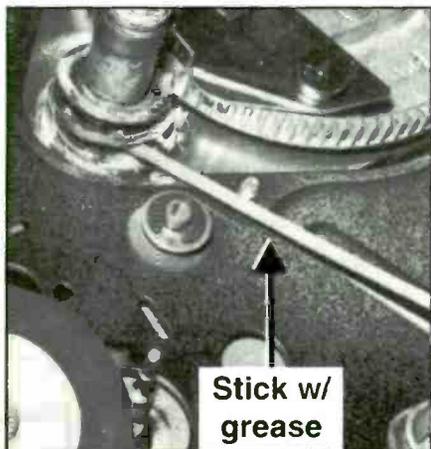
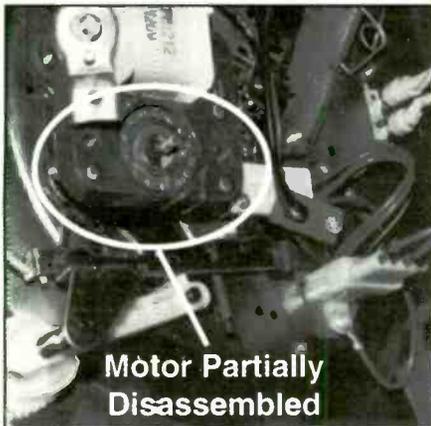
A common problem in CD players is

failure of the loading door to open, or sticking of the loading door. Figure 14 shows a Pioneer PD-201, in which lubrication of the tray mechanism and a new belt solved the tray opening problems.

Erratic operation may also be caused by component drift, which would be evi-

dent in the eye pattern. Adjustment controls are usually accessible (Figure 15 is a Kenwood CD Portable Player, Model DPC-80 on which the focus offset had to be adjusted).

Problems in compact disk players may also be caused by intermittent connec-



**Figure 17.** Disassembled record changers showing motor and gear lubrication.



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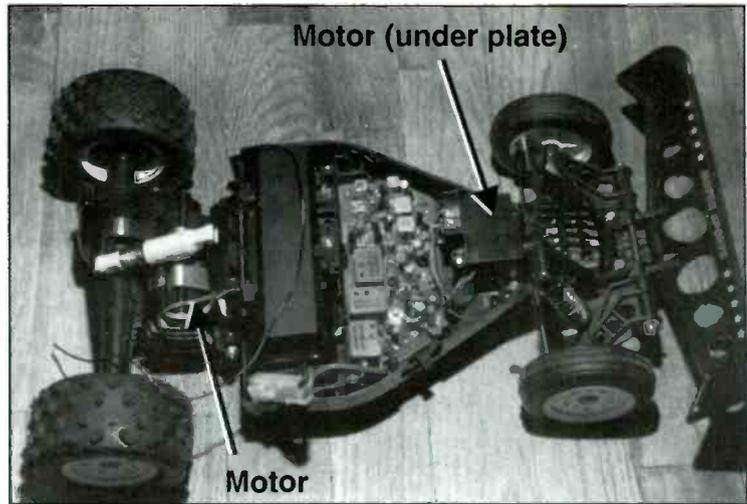


Figure 18. The circuits in radio controlled cars often have broken connections that can affect motor operation.

tions (Figure 16 shows the inside of a Magnavox model F1041BK01 unit on which intermittent contacts caused a TOC read error). On a Philips/NAP AK701-CBK01, the sled drive motor also had intermittent connections.

Low power supply voltages will also cause problems (Sharp model DX-620 required replacement of various part in the power supply (IC20, C103, C104, C096, R221 (fusible resistor), R222 (fusible resistor), Q30, Q31, R228. C152 in the motor spin circuit, was thermally sensitive and was also replaced).

Brushed motors are also found in CD players, NEC CDR-260 (a 2X CDROM) uses brushes which wear causing motor operation to become intermittent.

### Record changers

Problems with record changers involve a hardened rubber idler wheel, a worm/stretched belt and dried lubrication in the motor (and gearing). Figure 17 shows units disassembled and lubricated. Older units generally use an ac shaded

pole motor so there are no brushes to wear out. Newer units may use a brushless dc 4-pole type motor with a Hall effect sensor, or a magnetic pick-up reading magnetic stripes in the turntable platter (in these designs the motor control is external to the motor).

### Automobile door lock motors

These motors may complete their function before the motor shuts off so they are in a locked rotor condition for a short period of time. PTC thermistors may be used to monitor motor temperature. the locked rotor condition will draw high currents (3-4A) and heat the motor.

### RC controlled cars

Motors are used to control the motion and direction of the car. The high vibration and shocks the car is subject to often opens electrical connections. In the car shown in Figure 18, the heavier components lifted traces and broke printed wire traces resulting in the car only being able to move backwards.

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# A technician's glossary

by the ES&T Staff

**R**emember when manufacturers came out with VCRs? We all had to learn a new vocabulary: pulse generator (PG), field generator (FG), state switch, end-of-tape sensor, head drum, guide posts, VHS, Beta, head azimuth angle, etc. The same thing happened with the compact disc and CD-ROM, and now DVD. Every time a major advance takes place in consumer electronics, it's accompanied by a new vocabulary.

With a new, extremely sophisticated and complex technology, high-definition television (HDTV), looming on the horizon, there is now a whole new vocabulary we'll have to learn if we're going to understand. The definitions for many of the terms that will be used in conjunction with HDTV are presented here. A lot of this won't make a lot of sense at first, since we're not familiar with the technology. However, articles in future issues will deal in more detail with this new technology, and as they are published, much of this will become clearer. For now, here are some of the words that we'll all be hearing bandied about as HDTV develops. All of these terms come from documentation provided by ACATS (the Advisory Committee on Advanced Television Service).

**ACATS:** Advisory Committee on Advanced Television Service.

**access unit:** A coded representation of a presentation unit. In the case of audio, an access unit is the coded representation of an audio frame. In the case of video, an access unit includes all the coded data for a picture, and any stuffing that follows it, up to but not including the start of the next access unit. If a picture is not preceded by a *group\_start\_code* or a *sequence\_header\_code*, the access unit begins with a the picture start code. If a picture is preceded by a *group\_start\_code* and/or a *sequence\_header\_code*, the access unit begins with the first byte of the first of these start codes. If it is the last picture preceding a *sequence\_end\_code* in the *bit stream* all bytes between the last byte of the coded picture and the *sequence\_end\_code* (including the *sequence\_end\_code*) belong to the access unit.

**A/D:** Analog to digital converter.

**AES:** Audio Engineering Society.

**anchor frame:** A video frame that is used for prediction. I-frames and P-frames are generally used as anchor frames, but B-frames are never anchor frames.

**ANSI:** American National Standards Institute.

**Asynchronous Transfer Mode (ATM):** A digital signal protocol for efficient transport of both constant-rate and bursty information in broadband digital networks. The ATM digital stream consists of fixed-length packets called "cells," each containing 53 8-bit bytes—a 5-byte header and a 48-byte information payload.

**ATEL:** Advanced Television Evaluation Laboratory.

**ATM:** See asynchronous transfer mode.

**ATTC:** Advanced Television Test Center.

**ATV:** The U. S. advanced television system.

**bidirectional pictures or B-pictures or B-frames:** Pictures

that use both future and past pictures as a reference. This technique is termed *bidirectional prediction*. B-pictures provide the most compression. B-pictures do not propagate coding errors as they are never used as a reference.

**bit rate:** The rate at which the compressed bit stream is delivered from the channel to the input of a decoder.

**block:** A block is an 8-by-8 array of pel values or DCT coefficients representing luminance or chrominance information.

**bps:** Bits per second.

**byte-aligned:** A bit in a coded bit stream is byte-aligned if its position is a multiple of 8-bits from the first bit in the stream.

**CDTV:** See conventional definition television.

**channel:** A digital medium that stores or transports a digital television stream.

**coded representation:** A data element as represented in its encoded form.

**compression:** Reduction in the number of bits used to represent an item of data.

**constant bit rate:** Operation where the bit rate is constant from start to finish of the compressed bit stream.

**conventional definition television (CDTV):** This term is used to signify the *analog* NTSC television system as defined in ITU-R Recommendation 470. See also *standard definition television* and ITU-R Recommendation 1125.

**CRC:** The cyclic redundancy check to verify the correctness of the data.

**D-frame:** Frame coded according to an MPEG-1 mode which uses DC coefficients only.

**data element:** An item of data as represented before encoding and after decoding.

**DCT:** See discrete cosine transform.

**decoded stream:** The decoded reconstruction of a compressed bit stream.

**decoder:** An embodiment of a decoding process.

**decoding (process):** The process defined in the Digital Television Standard that reads an input coded bit stream and outputs decoded pictures or audio samples.

**decoding time-stamp (DTS):** A field that may be present in a *PES* packet header that indicates the time that an access unit is decoded in the system target decoder.

**digital storage media (DSM):** A digital storage or transmission device or system.

**discrete cosine transform:** A mathematical transform that can be perfectly undone and which is useful in image compression.

**DSM-CC:** Digital storage media command and control.

**DSM:** Digital storage media.

**DTS:** See decoding time-stamp.

**DVCR:** Digital video cassette recorder

**ECM:** See entitlement control message.

**editing:** A process by which one or more compressed bit streams are manipulated to produce a new compressed bit stream. Conforming edited bit streams are understood to meet the requirements defined in the Digital Television Standard.

**elementary stream (ES):** A generic term for one of the coded

video, coded audio or other coded bit streams. One elementary stream is carried in a sequence of PES packets with one and only one *stream\_id*.

**elementary stream clock reference (ESCR):** A time stamp in the PES Stream from which decoders of PES streams may derive timing.

**EMM:** See entitlement management message.

**encoder:** An embodiment of an encoding process.

**encoding (process):** A process that reads a stream of input pictures or audio samples and produces a valid coded bit stream as defined in the Digital Television Standard.

**entitlement control message (ECM):** Entitlement control messages are private conditional access information which specify control words and possibly other stream-specific, scrambling, and/or control parameters.

**entitlement management message (EMM):** Entitlement management messages are private conditional access information which specify the authorization level or the services of specific decoders. They may be addressed to single decoders or groups of decoders.

**entropy coding:** Variable length lossless coding of the digital representation of a signal to reduce redundancy.

**entry point:** Refers to a point in a coded bit stream after which a decoder can become properly initialized and commence syntactically correct decoding. The first transmitted picture after an entry point is either an I-picture or a P-picture. If the first transmitted picture is not an I-picture, the decoder may produce one or more pictures during acquisition.

**ES:** See elementary stream.

**ESCR:** See elementary stream clock reference.

**event:** An event is defined as a collection of elementary streams with a common time base, an associated start time, and an associated end time.

**field:** For an interlaced video signal, a "field" is the assembly of alternate lines of a frame. Therefore, an interlaced frame is composed of two fields, a top field and a bottom field.

**forbidden:** This term, when used in clauses defining the coded bit stream, indicates that the value shall never be used. This is usually to avoid emulation of start codes.

**FPLL:** Frequency and phase locked loop.

**frame:** A frame contains lines of spatial information of a video signal. For progressive video, these lines contain samples starting from one time instant and continuing through successive lines to the bottom of the frame. For interlaced video a frame consists of two fields, a top field and a bottom field. One of these fields will commence one field later than the other.

**GOP:** See group of pictures.

**Group of pictures (GOP):** A group of pictures consists of one or more pictures in sequence.

**HDTV:** See high definition television.

**high definition television (HDTV):** High definition television has a resolution of approximately twice that of conventional television in both the horizontal (H) and vertical (V) dimensions and a picture aspect ratio (HxV) of 16:9. ITU-R Recommendation 1125 further defines "HDTV quality" as the delivery of a television picture which is subjectively identical with the interlaced HDTV studio standard.

**high level:** A range of allowed picture parameters defined by the MPEG-2 video coding specification which corresponds to high definition television.

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**Huffman coding:** A type of source coding that uses codes of different lengths to represent symbols which have unequal likelihood of occurrence.

**IEC:** International Electrotechnical Commission.

**intra-coded pictures or I-pictures or I-frames:** Pictures that are coded using information present only in the picture itself and not depending on information from other pictures. I-pictures provide a mechanism for random access into the compressed video data. I-pictures employ transform coding of the pel blocks and provide only moderate compression.

**ISO:** International Organization for Standardization.

**ITU:** International Telecommunication Union.

**JEC:** Joint Engineering Committee of EIA and NCTA.

**layer:** One of the levels in the data hierarchy of the video and system specification.

**level:** A range of allowed picture parameters and combinations of picture parameters.

**macroblock:** In the advanced television system a macroblock consists of four blocks of luminance and one each Cr and Cb block.

**main level:** A range of allowed picture parameters defined by the MPEG-2 video coding specification with maximum resolution equivalent to ITU-R Recommendation 601.

**main profile:** A subset of the syntax of the MPEG-2 video coding specification that is expected to be supported over a large range of applications.

**Mbps:** 1,000,000 bits per second.

**motion vector:** A pair of numbers which represent the vertical and horizontal displacement of a region of a reference picture for prediction.

**MP@HL:** Main profile at high level.

**MP@ML:** Main profile at main level.

**MPEG:** Refers to standards developed by the ISO/IEC JTC1/SC29 WG11, *Moving Picture Experts Group*. MPEG may also refer to the Group.

**MPEG-1:** Refers to ISO/IEC standards 11172-1 (Systems), 11172-2 (Video), 11172-3 (Audio), 11172-4 (Compliance Testing), and 11172-5 (Technical Report).

**MPEG-2:** Refers to ISO/IEC standards 13818-1 (Systems), 13818-2 (Video), 13818-3 (Audio), 13818-4 (Compliance).

**pack:** A pack consists of a pack header followed by zero or more packets. It is a layer in the system coding syntax.

**packet data:** Contiguous bytes of data from an elementary data stream present in the packet.

**packet identifier (PID):** A unique integer value used to associate elementary streams of a program in a single or multi-program transport stream.

**packet:** A packet consists of a header followed by a number of contiguous bytes from an elementary data stream. It is a layer in the system coding syntax.

**padding:** A method to adjust the average length of an audio frame in time to the duration of the corresponding PCM samples, by continuously adding a slot to the audio frame.

**payload:** Payload refers to the bytes which follow the header byte in a packet. For example, the payload of a transport stream packet includes the *PES\_packet\_header* and its *PES\_packet\_data\_bytes* or *pointer\_field* and *PSI* sections, or private data. A *PES\_packet\_payload*, however, consists only of *PES\_packet\_data\_bytes*. The transport stream packet header and adaptation fields are not payload.

**PCR:** See program clock reference.

**pel:** See pixel.

**PES packet header:** The leading fields in a *PES* packet up to but not including the *PES\_packet\_data\_byte* fields where the stream is not a padding stream. In the case of a padding stream, the *PES* packet header is defined as the leading fields in a *PES* packet up to but not including the *padding\_byte* fields.

**PES packet:** The data structure used to carry elementary stream data. It consists of a packet header followed by *PES* packet payload.

**PES Stream:** A *PES* stream consists of *PES* packets, all of whose payloads consist of data from a single elementary stream, and all of which have the same *stream\_id*.

**PES:** An abbreviation for packetized elementary stream.

**picture:** Source, coded or reconstructed image data. A source or reconstructed picture consists of three rectangular matrices representing the luminance and two chrominance signals.

**PID:** See packet identifier.

**pixel:** "Picture element" or "pel." A pixel is a digital sample of the color intensity values of a picture at a single point.

**predicted pictures or P-pictures or P-frames:** Pictures that are coded with respect to the nearest *previous* I or P-picture. This technique is termed *forward prediction*. P-pictures provide more compression than I-pictures and serve as a reference for future P-pictures or B-pictures. P-pictures can propagate coding errors when P-pictures (or B-pictures) are predicted from prior P-pictures where the prediction is flawed.

**presentation time-stamp (PTS):** A field that may be present in a *PES* packet header that indicates the time that a presentation unit is presented in the system target decoder.

**presentation unit (PU):** A decoded audio access unit or a decoded picture.

**profile:** A defined subset of the syntax specified in the MPEG-2 video coding specification

**program clock reference (PCR):** A time stamp in the transport stream from which decoder timing is derived.

**program element:** A generic term for one of the elementary streams or other data streams that may be included in the program.

**program specific information (PSI):** *PSI* consists of normative data which is necessary for the demultiplexing of transport streams and the successful regeneration of programs.

**program:** A program is a collection of program elements. Program elements may be elementary streams. Program elements need not have any defined time base: those that do have a common time base and are intended for synchronized presentation.

**PSI:** See program specific information.

**PTS:** See presentation time-stamp.

**PU:** See presentation unit.

**quantizer:** A processing step which intentionally reduces the precision of DCT coefficients

**random access:** The process of beginning to read and decode the coded bit stream at an arbitrary point.

**reserved:** This term, when used in clauses defining the coded bit stream, indicates that the value may be used in the future for Digital Television Standard extensions. Unless otherwise specified within this Standard, all reserved bits shall be set to "1".

**SCR:** See system clock reference.

**scrambling:** The alteration of the characteristics of a video, audio or coded data stream in order to prevent unauthorized reception of the information in a clear form. This alteration is a specified process under the control of a conditional access system.

**SDTV:** See standard definition television.

**slice:** A series of consecutive macroblocks.

**SMPTTE:** Society of Motion Picture and Television Engineers.

**source stream:** A single, non-multiplexed stream of samples before compression coding.

**splicing:** The concatenation performed on the system level or two different elementary streams. It is understood that the resulting stream must conform totally to the Digital Television Standard.

**standard definition television (SDTV):** This term is used to signify a digital television system in which the quality is approximately equivalent to that of NTSC. This equivalent quality may be achieved from pictures sourced at the 4:2:2 level of ITU-R Recommendation 601 and subjected to processing as part of the bit rate compression. The results should be such that when judged across a representative sample of program material, subjective equivalence with NTSC is achieved. Also called standard digital television. See also *conventional definition television* and ITU-R Recommendation 1125.

**start codes:** 32-bit codes embedded in the coded bit stream that are unique. They are used for several purposes including identifying some of the layers in the coding syntax. Start codes consist of a 24 bit prefix (0x000001) and an 8 bit *stream\_id*.

**STD input buffer:** A first-in, first-out buffer at the input of a system target decoder for storage of compressed data from elementary streams before decoding.

**STD:** See system target decoder.

**still picture:** A coded still picture consists of a video sequence containing exactly one coded picture which is intra-coded. This picture has an associated *PTS* and the presentation time of succeeding pictures, if any, is later than that of the still picture by at least two picture periods.

**system clock reference (SCR):** A time stamp in the program stream from which decoder timing is derived.

**system header:** The system header is a data structure that carries information summarizing the system characteristics of the Digital Television Standard multiplexed bit stream.

**system target decoder (STD):** A hypothetical reference model of a decoding process used to describe the semantics of the Digital Television Standard multiplexed bit stream.

**time-stamp:** A term that indicates the time of a specific action such as the arrival of a byte or the presentation of a presentation unit.

**TOV:** Threshold of visibility.

**Transport Stream packet header:** The leading fields in a Transport Stream packet up to and including the *continuity\_counter* field.

**variable bit rate:** Operation where the bit rate varies with time during the decoding of a compressed bit stream.

**VBV:** See video buffering verifier.

**Video buffering verifier (VBV):** A hypothetical decoder that is conceptually connected to the output of an encoder. Its purpose is to provide a constraint on the variability of the data rate that an encoder can produce.

**video sequence:** A video sequence is represented by a sequence header, one or more groups of pictures, and an *end\_of\_sequence* code in the data stream.

**8 VSB:** Vestigial sideband modulation with 8 discrete amplitude levels

**16 VSB:** Vestigial sideband modulation with 16 discrete amplitude levels. ■



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# 1998 Buyers' Guide

**S**ervicing of consumer electronics products is never easy. For one thing, TVs, VCRs, and other consumer electronics products are complex products that operate on principles that are difficult to grasp. For another thing, consumer electronics products are constantly being changed, improved, upgraded. Technicians have to constantly upgrade their educations to keep up with those changes. As if that weren't enough, those products are more and more frequently being built using proprietary components and ICs, rather than on a stock of parts common to all manufacturers.

The problems encountered by service centers when they're trying to locate a replacement part to complete a repair therefore becomes more difficult. Not every distributor has access to all of the replacements needed by a typical service center. So when a technician strikes out in trying to obtain that elusive replacement, what does he do. Where does he find the information he needs to locate the source he needs.

One source of that type of information is this annual **Electronic Servicing & Technology** Buyers' Guide. Every year we send questionnaires to hundreds of manufacturers, distributors, publishers, software publishers; every type of company that might have a piece of test equipment, a replacement part, a schematic diagram, a book, or a piece of software that one of our readers might find useful. The questionnaire asks the recipient to update all of the vital information that makes it easy for a service center to contact them name, address, telephone, toll-free and fax numbers, e-mail and website information and whether the company is a manufacturer or a distributor.

The questionnaire also includes a list of over one hundred products, services, documents, information products, software products, and more, that service centers use. The recipients check off those products that apply to them, and when we receive that information, we enter it into our database.

So what you see in this Buyers' Guide is current and up to date as of the fourth

quarter of 1997, or possibly even January of 1998. Except those companies to whom we sent questionnaires that didn't send them back.

So please keep in mind, if you call one of the listees and find that the information in this guide was out of date, it may not have been our fault. The way companies move around, it's entirely possible that the information was up to date when we published it, but has since gone out of date.

Another word of caution. These days telephone area codes are changing constantly. It is possible that the area code for any of the companies listed here may have changed since the publication date. If you have a problem with any of the area codes listed here, please check with your local telephone company or with directory assistance. They can provide you with any updated area code information.

We welcome you to this new Buyers' Guide, and we hope you find it useful in finding companies that provide just the product or service you need. If you find it helpful, please let us know. Or if you think it could be improved to make it even more useful, please contact us with any suggestions you may have.

## Using the Buyers' Guide

We've broken down information in the Buyers' Guide into five categories:

- Product Directory ..... page 25.
- Replacement Parts/Components Directory .....page 51.
- Software/Services Directory .....page 56.
- Association/Educational Sources Directory .....page 57.
- Company Address Directory .....page 58.

We have subdivided the product directory according to types of products:

- Test equipment
- Test equipment accessories.
- Circuit damage protective equipment and supplies.
- Supplies/accessories equipment.
- Audio and video accessories.
- Tools.

For example, if you are looking for a VCR test jig kit, turn to the test equipment

accessories section of the Product Directory. The companies listed there all say they offer test jig kits. If the company name is followed by a \*D, that tells you this company is a distributor, not a manufacturer, of that product.

You will notice that certain company names are in color. Those companies have advertised in this issue. If you want to learn a little more about that company, turn to the page number listed to the far right. The ad alone might give you enough information to help you decide.

Once you know who you want to contact for more information, turn to the Company Address Directory. The address, telephone number and fax number for each company are listed there. (Of course, if the company you are interested in has advertised in this issue, you can just pull out your Reader Service card on page 35 and circle the reply number listed under the advertisement.)

The Replacement Parts/Components Directory works the same way. Just look up the type of component you need, then turn to the Company Address Directory to find out how to contact a company that supplies that product. The Company Address Directory lists information on over 700 companies and associations that offer products or services for the electronics servicer.

## Checking out services

Consult the Services Directory if you need to contact a consultant, get a disk drive or head refurbished, plug into an on-line service, find a company to repair or rework a PC board, rent or lease equipment, calibrate your older test equipment, or repair a tuner.

## Your source for continuing education

The Association/Educational Sources Directory helps you find books, schools and training seminars for continuing your servicing education. It also points you toward sources for service literature and schematics for the products you service. Finally, it lists those companies that produce management software systems that can help you run your business. ■

# Product Directory

Note: An entry followed by \*D means that this company is a distributor, not a manufacturer. An entry followed by a \*MD means that this company is both a manufacturer and a distributor.

A line listing that is in color indicates that the company has an ad in this issue. The number following the listing is the number of the page on which the ad is located. BC means Back Cover; IBC means Inside Back Cover; IFC means Inside Front Cover.

See Adv. Page

See Adv. Page

See Adv. Page

See Adv. Page

## Test equipment

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 Alfa Electronics\*D  
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 L-Com Inc.  
 Marshall Industries\*D  
**MCM Electronics\*D** .....13  
 Metric Supply\*D  
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 Print Products International\*D  
 QuadTech, Inc.  
 RAG Electronics Inc.\*D  
 RNJ Electronics Inc.\*D  
 RS Electronics\*D  
**Sencore Electronics** .....BC  
 Simpson Electronic Company  
 Snap-On Incorporated  
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 Techni-Tool Inc.\*D  
 Tenma Test Equipment  
 Test Equipment Depot\*D  
 TIF Instruments, Inc.  
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 Tucker Electronics Co.  
 Vector-VID Inc.  
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 Vance Baldwin Inc.\*D  
 Computer Svcs of America\*D  
 CSTS Inc.  
 East Coast Transistor\*D  
 E.I.L. Instruments, Inc.\*D  
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Racal Instruments Inc.  
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 Vance Baldwin Inc.\*D  
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 E.I.L. Instruments, Inc.\*D  
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 Electronics Warehouse Corp.\*D  
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### CELLULAR TELEPHONE TEST EQUIPMENT

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 Vance Baldwin Inc.\*D  
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 Racal Instruments Inc.  
 Schlumberger Technologies  
 Specialized Prods Company\*D  
 Sun Equipment Corporation  
 Techni-Tool Inc.\*D  
 Tektronix, Inc.  
 Tektronix  
 Telogy\*D  
 Telulex, Inc.  
 Test Equipment Depot\*D  
 Wavetek Corporation

### CONTINUITY TESTERS

Accutest Instruments, Inc.\*D  
 Ames Supply Co.\*D  
 AVO International  
 Vance Baldwin Inc.\*D  
 B-B&W Electronics\*D  
 Bel Merit Corporation  
 Brunelle Instruments, Inc.  
 Bursma Electronic Distrib.\*D  
 Consolidated Elctrnics, Inc.\*D  
 Contact East, Inc.\*D  
 CSTS Inc.  
 The Current Source\*D  
 Dalbani Corporation\*D  
 Desco  
 Digi-Key D\*  
 East Coast Transistor\*D  
 Eiger Electronics\*D  
 E.I.L. Instruments, Inc.\*D  
 Electro Tool, Inc.  
 Electronics Warehouse Corp.\*D  
 Exttech Instruments Corp.\*D  
 Fieldpiece Instruments  
 Foley-Belsaw\*D  
 Fotronic Corporation\*D  
 GC Electronics\*D  
 Harco Electronics\*D  
**Herman Electronics\*D** .....80  
 HMC - Hub Material Co.\*D  
 Hy Tec Dealer Service  
 JDR Microdevices\*D  
 W.S. Jenks & Son\*D  
 Joseph Electronics\*D  
 Kelvin Electronics\*D  
 Klein Tools, Inc.  
 L-Com Inc.  
 L'il Bitty Tester  
 Marshall Industries\*D  
 M.A.T. Electronics\*D  
**Mouser Electronics\*D** .....56  
 Omega Engineering, Inc.  
 Omnitron Electronics\*MD  
**Parts Express International\*D** .....79  
 Philips ECG Company  
 Print Products International\*D  
 Progressive Electronics  
 QuadTech, Inc.  
 RAG Electronics Inc.\*D  
 RNJ Electronics Inc.\*D  
 RS Electronics\*D  
 Simpson Electronic Company  
 Specialized Prods Company\*D  
 A.W. Sperry Instruments, Inc.

Sun Equipment Corporation  
 Tandy National Parts\*D  
 Techni-Tool Inc.\*D  
 Tenma Test Equipment  
 Test Equipment Depot\*D  
 TIF Instruments, Inc.  
 Time Motion Tools\*D  
 Union Electronics Distrib\*D  
 Weidmuller Inc.  
 Wholesale Electronics Inc.\*D

### CRT TESTERS/RESTORERS

Vance Baldwin Inc.\*D  
 Bursma Electronic Distrib.\*D  
**C&S Sales\*D** .....16  
 Computer Svcs of America\*D  
 Compuvideo  
 Connector Corporation  
 Consolidated Elctrnics, Inc.\*D  
 Conway Engineering, Inc.  
 The Current Source\*D  
 Dandy Mfg. Co.  
 East Coast Transistor\*D  
 Eiger Electronics\*D  
 Electronic Parts Supply\*D  
 Electronics Warehouse Corp.\*D  
 Fotronic Corporation\*D  
**Herman Electronics\*D** .....80  
 HMC - Hub Material Co.\*D  
 W.S. Jenks & Son\*D  
 Joseph Electronics\*D  
 M.A.T. Electronics\*D  
**MCM Electronics\*D** .....13  
 Metric Supply\*D  
 Omnitron Electronics\*MD  
 Philips ECG Company  
 Print Products International\*D  
 RNJ Electronics Inc.\*D  
**Sencore Electronics** .....BC  
 Specialized Prods Company\*D  
 Tandy National Parts\*D  
 A.G. Tannenbaum\*D  
 Techni-Tool Inc.\*D  
 Telematic  
 Test Equipment Depot\*D  
 Time Motion Tools\*D  
 Tritronics, Inc.\*D  
 Tucker Electronics Co.  
 Union Electronics Distrib\*D  
 Wholesale Electronics Inc.\*D

### CURVE TRACERS

Accutest Instruments, Inc.\*D  
 Vance Baldwin Inc.\*D  
 Brunelle Instruments, Inc.  
 Bursma Electronic Distrib.\*D  
 Computer Svcs of America\*D  
 The Current Source\*D  
 East Coast Transistor\*D  
 Fotronic Corporation\*D  
 Hameg Instruments, Inc.  
 Huntron Instruments, Inc.  
 Joseph Electronics\*D  
 Key Tek Instrument Corp.  
 LaserImpact  
 Leader Instruments Corp.  
 Marshall Industries\*D  
**MCM Electronics\*D** .....13  
 NCS\*D  
 Omnitron Electronics\*MD

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 Print Products International\*D  
 RAG Electronics Inc.\*D  
 RNJ Electronics Inc.\*D  
 Specialized Prods Company\*D  
 Herman H. Sticht Co., Inc.\*D  
 Sun Equipment Corporation  
 Tektronix  
 Tenma Test Equipment  
 Test Equipment Connection Corp  
 Test Equipment Depot\*D  
 Time Motion Tools\*D  
 Tucker Electronics Co.  
 Union Electronics Distrib\*D  
 Wholesale Electronics Inc.\*D

**DATA COMMUNICATION ANALYZERS/MONITORS/TESTERS**

Accutest Instruments, Inc.\*D  
 Advanced Electronic Applicatio  
 Allison Technology Corporation  
 Ames Supply Co.\*D  
 B&B Electronics Manufacturing  
 Vance Baldwin Inc.\*D  
 Benedict Computer  
 Contact East, Inc.\*D  
 Conway Engineering, Inc.  
 The Current Source\*D  
 East Coast Transistor\*D  
 E.I.L. Instruments, Inc.\*D  
 Electronics Warehouse Corp.\*D  
 Fluke Corporation.....1  
 Fotec Inc  
 Fotronic Corporation\*D  
 Frederick Engineering, Inc.  
 Global Specialties  
 Gould Instrument Systems Inc.  
 Harco Electronics\*D  
 International Disk Svcs, Inc.  
 JDR Microdevices\*D  
 W.S. Jenks & Son\*D  
 Joseph Electronics\*D  
 Kasco Distributing\*D  
 Marconi Instruments Inc.  
 Marshall Industries\*D  
 NCS\*D  
 Omnitron Electronics\*MD  
 Print Products International\*D  
 Racal Instruments Inc.  
 RS Electronics\*D  
 Schlumberger Technologies  
 Simpson Electronic Company  
 Specialized Prods Company\*D  
 Techni-Tool Inc.\*D  
 Tektronix, Inc.  
 Telematic  
 Telogy\*D  
 Telulux, Inc.  
 Test Equipment Depot\*D  
 Time Motion Tools\*D  
 Tucker Electronics Co.  
 Ultra-X, Inc.  
 Wavetek Corporation  
 Wholesale Electronics Inc.\*D

**DISC DRIVE ANALYZERS/TESTERS**

Accurate Technologies Inc.  
 Accutest Instruments, Inc.\*D  
 Analogic Corp.  
 Computer Svcs of America\*D  
 CSTS Inc.  
 Data Depot, Inc.  
 Fotronic Corporation\*D  
 HMC - Hub Material Co.\*D  
 W.S. Jenks & Son\*D  
 Joseph Electronics\*D  
 Kenwood U.S.A. Corp.  
 Leader Instruments Corp.  
 Marshall Industries\*D  
 Omnitron Electronics\*MD

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 Pioneer Research  
 RAG Electronics Inc.\*D  
 Test Equipment Depot\*D  
 Time Motion Tools\*D  
 Ultra-X, Inc.

**DISTORTION ANALYZERS**

Accutest Instruments, Inc.\*D  
 Alfa Electronics\*D  
 Vance Baldwin Inc.\*D  
 Bursma Electronic Distrib.\*D  
 The Current Source\*D  
 East Coast Transistor\*D  
 Electronics Warehouse Corp.\*D  
 Fotronic Corporation\*D  
 Instek Corp.\*D  
 Joseph Electronics\*D  
 Leader Instruments Corp.  
 MCM Electronics\*D .....13  
 Metric Supply\*D  
 NCS\*D  
 Omnitron Electronics\*MD  
 Print Products International\*D  
 RAG Electronics Inc.\*D  
 R.C. Distributing .....80  
 Schlumberger Technologies  
 Herman H. Sticht Co., Inc.\*D  
 Sun Equipment Corporation  
 A.G. Tannenbaum\*D  
 Techni-Tool Inc.\*D  
 Telogy\*D  
 Tenma Test Equipment  
 Test Equipment Connection Corp  
 Test Equipment Depot\*D  
 Time Motion Tools\*D  
 Tucker Electronics Co.  
 Union Electronics Distrib\*D

**FREQUENCY COUNTERS**

Accutest Instruments, Inc.\*D  
 Alfa Electronics\*D  
 Arrow Electronics  
 Vance Baldwin Inc.\*D  
 B-B&W Electronics\*D  
 Bel Merit Corporation  
 Brunelle Instruments, Inc.  
 Bursma Electronic Distrib.\*D  
 C&S Sales\*D .....16  
 Computer Svcs of America\*D  
 Consolidated Elctrncs, Inc.\*D  
 Contact East, Inc.\*D  
 The Current Source\*D  
 Dalbani Corporation\*D  
 Digi-Key D\*  
 East Coast Transistor\*D  
 E.I.L. Instruments, Inc.\*D  
 Electro Tool, Inc.  
 Electronic Parts Supply\*D  
 Electronics Warehouse Corp.\*D  
 Electronix Express\*D  
 Exttech Instruments Corp.\*D  
 Fluke Corporation.....1  
 Fotronic Corporation\*D  
 Global Specialties  
 Hameg Instruments, Inc.  
 Harco Electronics\*D  
 Heath Company .....15  
 Herman Electronics\*D .....80  
 HMC - Hub Material Co.\*D  
 Instek Corp.\*D  
 Jameco Electrnc Components\*D  
 JDR Microdevices\*D  
 W.S. Jenks & Son\*D  
 Joseph Electronics\*D  
 Keithley Instruments  
 Kelvin Electronics\*D  
 Kenwood U.S.A. Corp.  
 Lascar Electronics Inc.  
 Leader Instruments Corp.  
 LG Precision.....7  
 Marconi Instruments

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 Marconi Instruments Inc.  
 Marshall Industries\*D  
 M.A.T. Electronics\*D  
 MCM Electronics\*D .....13  
 Metric Supply\*D  
 Mouser Electronics\*D .....56  
 NCS\*D  
 Omnitron Electronics\*MD  
 Parts Express International\*D .....79  
 Philips ECG Company  
 Print Products International\*D  
 H.C. Protek  
 RAG Electronics Inc.\*D  
 RNJ Electronics Inc.\*D  
 RS Electronics\*D  
 Salen Enterprises\*D  
 Sencore Electronics .....BC  
 Sibex, Inc.  
 Simpson Electronic Company  
 Specialized Prods Company\*D  
 Herman H. Sticht Co., Inc.\*D  
 Sun Equipment Corporation  
 Tandy National Parts\*D  
 A.G. Tannenbaum\*D  
 TechAmerica\*D  
 Techni-Tool Inc.\*D  
 Tektronix  
 Telogy\*D  
 Tenma Test Equipment  
 Test Equipment Connection Corp  
 Test Equipment Depot\*D  
 Time Motion Tools\*D  
 Tucker Electronics Co.  
 Union Electronics Distrib\*D  
 Wavetek Corporation  
 Wholesale Electronics Inc.\*D

**FUNCTION GENERATORS**

Accutest Instruments, Inc.\*D  
 Alfa Electronics\*D  
 American Reliance  
 Analogic Corp.  
 Arrow Electronics  
 Vance Baldwin Inc.\*D  
 B-B&W Electronics\*D  
 Bel Merit Corporation  
 B&K Precision  
 Brunelle Instruments, Inc.  
 Bursma Electronic Distrib.\*D  
 C&S Sales\*D .....16  
 Consolidated Elctrncs, Inc.\*D  
 Contact East, Inc.\*D  
 The Current Source\*D  
 Dalbani Corporation\*D  
 Digi-Key D\*  
 East Coast Transistor\*D  
 Eiger Electronics\*D  
 E.I.L. Instruments, Inc.\*D  
 Electro Tool, Inc.  
 Electronic Parts Supply\*D  
 Electronics Warehouse Corp.\*D  
 Electronix Express\*D  
 Fluke Corporation.....1  
 Fotronic Corporation\*D  
 Global Specialties  
 Hameg Instruments, Inc.  
 Harco Electronics\*D  
 Heath Company .....15  
 Herman Electronics\*D .....80  
 HMC - Hub Material Co.\*D  
 Instek Corp.\*D  
 Jameco Electrnc Components\*D  
 JDR Microdevices\*D  
 W.S. Jenks & Son\*D  
 Joseph Electronics\*D  
 Keithley Instruments  
 Kelvin Electronics\*D  
 Kenwood U.S.A. Corp.  
 Leader Instruments Corp.  
 LG Precision.....7  
 Marshall Industries\*D  
 M.A.T. Electronics\*D

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 MCM Electronics\*D .....13  
 Metric Supply\*D  
 National Instruments Corp.  
 NCS\*D  
 Omnitron Electronics\*MD  
 Parts Express International\*D .....79  
 PC Instruments Incorporated  
 Philips ECG Company  
 Print Products International\*D  
 RAG Electronics Inc.\*D  
 RNJ Electronics Inc.\*D  
 RS Electronics\*D  
 Salen Enterprises\*D  
 Sibex, Inc.  
 Specialized Prods Company\*D  
 Herman H. Sticht Co., Inc.\*D  
 Sun Equipment Corporation  
 Tandy National Parts\*D  
 TechAmerica\*D  
 Techni-Tool Inc.\*D  
 Tektronix  
 Teledata Systems  
 Telogy\*D  
 Telulux, Inc.  
 Tenma Test Equipment  
 Test Equipment Connection Corp  
 Test Equipment Depot\*D  
 Tucker Electronics Co.  
 Union Electronics Distrib\*D  
 Wavetek Corporation  
 Wholesale Electronics Inc.\*D

**GAUGES: HEAD PROTRUSION/SPRINGTENSION/STYLUS FORCE/OTHER**

Vance Baldwin Inc.\*D  
 The Current Source\*D  
 Dalbani Corporation\*D  
 Electronic Parts Supply\*D  
 Electronics Warehouse Corp.\*D  
 Fotronic Corporation\*D  
 HMC - Hub Material Co.\*D  
 Hunter Products, Inc.  
 Jonard Industries Corp.  
 Joseph Electronics\*D  
 M.A.T. Electronics\*D  
 Sprague Magnetics, Inc.\*D  
 Techni-Tool Inc.\*D  
 Tentel  
 Test Equipment Depot\*D  
 UBM Corp  
 Wavetek Corporation

**GENERATORS, AUDIO**

Accutest Instruments, Inc.\*D  
 Alfa Electronics\*D  
 AudioVisual Inc.\*D  
 Vance Baldwin Inc.\*D  
 B-B&W Electronics\*D  
 Bel Merit Corporation  
 Brunelle Instruments, Inc.  
 Bursma Electronic Distrib.\*D  
 C&S Sales\*D .....16  
 Compuvideo  
 Consolidated Elctrncs, Inc.\*D  
 The Current Source\*D  
 East Coast Transistor\*D  
 Eiger Electronics\*D  
 Electronic Parts Supply\*D  
 Electronics Warehouse Corp.\*D  
 Electronix Express\*D  
 Fotronic Corporation\*D  
 Heath Company .....15  
 Instek Corp.\*D  
 JDR Microdevices\*D  
 W.S. Jenks & Son\*D  
 Joseph Electronics\*D  
 Kelvin Electronics\*D  
 Kenwood U.S.A. Corp.  
 Kikusui International Corp.  
 Leader Instruments Corp.

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Marshall Industries*D Multidyne Inc <b>Parts Express International*D</b> .....79	Tandy National Parts*D A.G. Tannenbaum*D TEAM Systems, Inc. TechAmerica*D Techni-Tool Inc.*D Tektronix, Inc. Tektronix Telogy*D Telulex, Inc. Tenma Test Equipment Test Equipment Connection Corp Test Equipment Depot*D Tucker Electronics Co. Union Electronics Distrib*D Vector-VID Inc. Wavetek Corporation Wholesale Electronics Inc.*D	Vance Baldwin Inc.*D B-B&W Electronics*D Brunelle Instruments, Inc. Bursma Electronic Distrib.*D <b>C&amp;S Sales*D</b> .....16 Consolidated ElctrnCs, Inc.*D The Current Source*D Digi-Key D* East Coast Transistor*D Electronic Parts Supply*D Electronics Warehouse Corp.*D Electronix Express*D Fieldpiece Instruments Fotronic Corporation*D Fox International*D Hameg Instruments, Inc. Harco Electronics*D <b>Herman Electronics*D</b> .....80 W.S. Jenks & Son*D Joseph Electronics*D Kelvin Electronics*D Marshall Industries*D M.A.T. Electronics*D Metric Supply*D Nationwide Electronics Omnitron Electronics*MD Philips ECG Company Print Products International*D RAG Electronics Inc.*D RNJ Electronics Inc.*D RS Electronics*D Salen Enterprises*D <b>Sencore Electronics</b> .....BC Simpson Electronic Company Specialized Prods Company*D A.G. Tannenbaum*D Techni-Tool Inc.*D Tektronix Telematic Tenma Test Equipment Test Equipment Depot*D Test Probes, Inc. Tucker Electronics Co. Union Electronics Distrib*D Wholesale Electronics Inc.*D	Techni-Tool Inc.*D Tektronix, Inc. Tektronix Telogy*D Test Equipment Connection Corp Test Equipment Depot*D Tucker Electronics Co. Union Electronics Distrib*D
<b>Generators, Signal</b>	<b>Generators, Video</b>	<b>Logic Analyzers: Signature/State</b>	<b>Logic Probes</b>
Accutest Instruments, Inc.*D Alfa Electronics*D Analogic Corp. AudioVisual Inc.*D Vance Baldwin Inc.*D B-B&W Electronics*D Behlman Electronics Brunelle Instruments, Inc. Bursma Electronic Distrib.*D <b>C&amp;S Sales*D</b> .....16 Compuvideo Consolidated ElctrnCs, Inc.*D The Current Source*D Dalbani Corporation*D East Coast Transistor*D Eiger Electronics*D Electro Tool, Inc. Electronic Parts Supply*D Electronics Warehouse Corp.*D Electronix Express*D <b>Fluke Corporation</b> .....1 Fotronic Corporation*D Global Specialties Harco Electronics*D <b>Heath Company</b> .....15 <b>ICM Components*D</b> .....21 Instek Corp.*D JDR Microdevices*D W.S. Jenks & Son*D Joseph Electronics*D Kelvin Electronics*D Kikusui International Corp. Leader Instruments Corp. Marconi Instruments Marconi Instruments Inc. Marshall Industries*D M.A.T. Electronics*D Metric Supply*D Multidyne Inc NCM Electronics NCS*D Omnitron Electronics*MD <b>Parts Express International*D</b> .....79 PC Instruments Incorporated Philips ECG Company Print Products International*D Progressive Electronics H.C. Protek RAG Electronics Inc.*D RNJ Electronics Inc.*D RS Electronics*D Salen Enterprises*D <b>Sencore Electronics</b> .....BC Sibex, Inc. Specialized Prods Company*D Herman H. Sticht Co., Inc.*D Sun Equipment Corporation	Accutest Instruments, Inc.*D ACM Company Alfa Electronics*D AudioVisual Inc.*D Vance Baldwin Inc.*D B-B&W Electronics*D Brunelle Instruments, Inc. Bursma Electronic Distrib.*D <b>Computer &amp; Monitor Maintenance</b> .57 Computer Svcs of America*D Compuvideo Consolidated ElctrnCs, Inc.*D The Current Source*D East Coast Transistor*D Eiger Electronics*D Electronics Warehouse Corp.*D <b>Fluke Corporation</b> .....1 Fotronic Corporation*D <b>Heath Company</b> .....15 <b>ICM Components*D</b> .....21 W.S. Jenks & Son*D Joseph Electronics*D Kelvin Electronics*D Leader Instruments Corp. Marshall Industries*D M.A.T. Electronics*D Metric Supply*D Multidyne Inc NCM Electronics Network Technologies Inc. Omnitron Electronics*MD <b>Parts Express International*D</b> .....79 PC Instruments Incorporated Philips ECG Company Print Products International*D H.C. Protek Quantum Data RAG Electronics Inc.*D <b>R.C. Distributing</b> .....80 RNJ Electronics Inc.*D RS Electronics*D Salen Enterprises*D <b>Sencore Electronics</b> .....BC Sirius Technologies Sonera Technologies Sun Equipment Corporation TEAM Systems, Inc. Techni-Tool Inc.*D Tektronix, Inc. Tektronix Ten-Lab Tenma Test Equipment Test Equipment Depot*D Tucker Electronics Co. Ultech Corp Union Electronics Distrib*D Wholesale Electronics Inc.*D	Accutest Instruments, Inc.*D Vance Baldwin Inc.*D Contact East, Inc.*D The Current Source*D Dalbani Corporation*D East Coast Transistor*D E.I.L. Instruments, Inc.*D Electronics Warehouse Corp.*D Electronix Express*D Fotronic Corporation*D Global Specialties Harco Electronics*D <b>Heath Company</b> .....15 Hy-Tronix Instruments, Inc. International Test Technologie JDR Microdevices*D W.S. Jenks & Son*D Joseph Electronics*D LaserImpact Leader Instruments Corp. Marshall Industries*D <b>MCM Electronics*D</b> .....13 Metric Supply*D NCS*D Omnitron Electronics*MD Orion Instruments, Inc. Print Products International*D RAG Electronics Inc.*D RNJ Electronics Inc.*D RS Electronics*D Salen Enterprises*D Schlumberger Technologies Specialized Prods Company*D Tandy National Parts*D	Accutest Instruments, Inc.*D Alfa Electronics*D American Design Components American Reliance Vance Baldwin Inc.*D B-B&W Electronics*D Bel Merit Corporation Brunelle Instruments, Inc. Bursma Electronic Distrib.*D <b>C&amp;S Sales*D</b> .....16 Consolidated ElctrnCs, Inc.*D Contact East, Inc.*D CSI/SPCCO The Current Source*D Dalbani Corporation*D Data Depot, Inc. East Coast Transistor*D E.I.L. Instruments, Inc.*D Electronic Parts Supply*D Electronics Warehouse Corp.*D Electronix Express*D Foley-Belsaw*D Fotronic Corporation*D Global Specialties Harco Electronics*D <b>Heath Company</b> .....15 HMC - Hub Material Co.*D Hy Tec Dealer Service Instek Corp.*D International Test Technologie Jameco ElectrnC Components*D JDR Microdevices*D W.S. Jenks & Son*D Jensen Tools, Inc.*D Joseph Electronics*D Kelvin Electronics*D Kenwood U.S.A. Corp. Kobetron, Inc. Leader Instruments Corp. Marshall Industries*D <b>MCM Electronics*D</b> .....13 Metric Supply*D Micro 2000, Inc. <b>Mouser Electronics*D</b> .....56 NCS*D Omnitron Electronics*MD Philips ECG Company Print Products International*D RAG Electronics Inc.*D RNJ Electronics Inc.*D RS Electronics*D Salen Enterprises*D Specialized Prods Company*D Techni-Tool Inc.*D TechAmerica*D Tektronix, Inc. Tektronix Tenma Test Equipment Test Equipment Connection Corp Test Equipment Depot*D Tucker Electronics Co. Union Electronics Distrib*D Wavetek Corporation Wholesale Electronics Inc.*D
<b>Generators, Signal</b>	<b>Generators, Video</b>	<b>Logic Analyzers: Signature/State</b>	<b>Logic Probes</b>
Accutest Instruments, Inc.*D Alfa Electronics*D Analogic Corp. AudioVisual Inc.*D Vance Baldwin Inc.*D B-B&W Electronics*D Behlman Electronics Brunelle Instruments, Inc. Bursma Electronic Distrib.*D <b>C&amp;S Sales*D</b> .....16 Compuvideo Consolidated ElctrnCs, Inc.*D The Current Source*D Dalbani Corporation*D East Coast Transistor*D Eiger Electronics*D Electro Tool, Inc. Electronic Parts Supply*D Electronics Warehouse Corp.*D Electronix Express*D <b>Fluke Corporation</b> .....1 Fotronic Corporation*D Global Specialties Harco Electronics*D <b>Heath Company</b> .....15 <b>ICM Components*D</b> .....21 Instek Corp.*D JDR Microdevices*D W.S. Jenks & Son*D Joseph Electronics*D Kelvin Electronics*D Kikusui International Corp. Leader Instruments Corp. Marconi Instruments Marconi Instruments Inc. Marshall Industries*D M.A.T. Electronics*D Metric Supply*D Multidyne Inc NCM Electronics NCS*D Omnitron Electronics*MD <b>Parts Express International*D</b> .....79 PC Instruments Incorporated Philips ECG Company Print Products International*D Progressive Electronics H.C. Protek RAG Electronics Inc.*D RNJ Electronics Inc.*D RS Electronics*D Salen Enterprises*D <b>Sencore Electronics</b> .....BC Sibex, Inc. Specialized Prods Company*D Herman H. Sticht Co., Inc.*D Sun Equipment Corporation	<b>Generators, Video</b>	<b>Logic Analyzers: Signature/State</b>	<b>Logic Probes</b>
Accutest Instruments, Inc.*D Alfa Electronics*D Analogic Corp. AudioVisual Inc.*D Vance Baldwin Inc.*D B-B&W Electronics*D Behlman Electronics Brunelle Instruments, Inc. Bursma Electronic Distrib.*D <b>C&amp;S Sales*D</b> .....16 Compuvideo Consolidated ElctrnCs, Inc.*D The Current Source*D Dalbani Corporation*D East Coast Transistor*D Eiger Electronics*D Electro Tool, Inc. Electronic Parts Supply*D Electronics Warehouse Corp.*D Electronix Express*D <b>Fluke Corporation</b> .....1 Fotronic Corporation*D Global Specialties Harco Electronics*D <b>Heath Company</b> .....15 <b>ICM Components*D</b> .....21 Instek Corp.*D JDR Microdevices*D W.S. Jenks & Son*D Joseph Electronics*D Kelvin Electronics*D Kikusui International Corp. Leader Instruments Corp. Marconi Instruments Marconi Instruments Inc. Marshall Industries*D M.A.T. Electronics*D Metric Supply*D Multidyne Inc NCM Electronics NCS*D Omnitron Electronics*MD <b>Parts Express International*D</b> .....79 PC Instruments Incorporated Philips ECG Company Print Products International*D Progressive Electronics H.C. Protek RAG Electronics Inc.*D RNJ Electronics Inc.*D RS Electronics*D Salen Enterprises*D <b>Sencore Electronics</b> .....BC Sibex, Inc. Specialized Prods Company*D Herman H. Sticht Co., Inc.*D Sun Equipment Corporation	<b>Generators, Video</b>	<b>Logic Analyzers: Signature/State</b>	<b>Logic Probes</b>







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E.I.L. Instruments, Inc.\*D  
 Electronics Warehouse Corp.\*D  
 Electronix Express\*D  
 Extech Instruments Corp.\*D  
 Fieldpiece Instruments  
 Fotronic Corporation\*D  
 Galco Industrial Electronics\*D  
 HMC - Hub Material Co.\*D  
 JDR Microdevices\*D  
 W.S. Jenks & Son\*D  
 Joseph Electronics\*D  
 Marshall Industries\*D  
**MCM Electronics\*D** .....13  
 Multicore Solders  
 Newport Electronics, Inc.  
 Omega Engineering, Inc.  
 Omega-Vanzetti, Inc.  
 Omnitron Electronics\*MD  
 Pacer Industries, Inc.  
 Philips ECG Company  
 Print Products International\*D  
 RAG Electronics Inc.\*D  
 RNJ Electronics Inc.\*D  
 RS Electronics\*D  
 Simpson Electronic Company  
 SAT/ A SPIRIG CO.  
 Specialized Prods Company\*D  
 Techni-Tool Inc.\*D  
 Technology Programs  
 Test Equipment Depot\*D  
 Time Motion Tools\*D  
 Tucker Electronics Co.  
 Union Electronics Distrib\*D  
 Universal Enterprises (UEI)  
**Viking Electronics** .....89  
 Wavetek Corporation  
 Wholesale Electronics Inc.\*D

**TRANSISTOR TESTERS**

Accutest Instruments, Inc.\*D  
 Arrow Electronics  
 Vance Baldwin Inc.\*D  
 B-B&W Electronics\*D  
 Bel Merit Corporation  
 Brunelle Instruments, Inc.  
 Bursma Electronic Distrib.\*D  
 Consolidated Elctrnics, Inc.\*D  
 The Current Source\*D  
 East Coast Transistor\*D  
 Eiger Electronics\*D  
 Electronic Design Specialists  
 Electronic Parts Supply\*D  
 Electronics Warehouse Corp.\*D  
**Electronix Corp.\*D** .....80  
 Fotronic Corporation\*D  
 Fox International\*D  
 Global Micro-Parts Depot\*MD  
 Jameco Electric Components\*D  
 JDR Microdevices\*D  
 W.S. Jenks & Son\*D  
 Jensen Tools, Inc.\*D  
 Joseph Electronics\*D  
 Kelvin Electronics\*D  
 L'il Bitty Tester  
 Marshall Industries\*D  
 M.A.T. Electronics\*D  
 Omnitron Electronics\*MD  
 Philips ECG Company  
 Print Products International\*D  
 RAG Electronics Inc.\*D  
 RNJ Electronics Inc.\*D  
 RS Electronics\*D  
 Salen Enterprises\*D  
**Sencore Electronics** .....BC  
 Specialized Prods Company\*D  
 A.G. Tannenbaum\*D  
 Telogy\*D  
 Tenma Test Equipment  
 Test Equipment Depot\*D  
 Time Motion Tools\*D  
 Tucker Electronics Co.  
 Union Electronics Distrib\*D  
 Wholesale Electronics Inc.\*D

**VECTORSCOPIES**

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Accutest Instruments, Inc.\*D  
 Arrow Electronics  
 AudioVisual Inc.\*D  
 Vance Baldwin Inc.\*D  
 Bursma Electronic Distrib.\*D  
 Compuvideo  
 The Current Source\*D  
 East Coast Transistor\*D  
 E.I.L. Instruments, Inc.\*D  
 Electronics Warehouse Corp.\*D  
 Fotronic Corporation\*D  
**Herman Electronics\*D** .....80  
 W.S. Jenks & Son\*D  
 Joseph Electronics\*D  
 Kenwood U.S.A. Corp.  
 Leader Instruments Corp.  
 Marshall Industries\*D  
**MCM Electronics\*D** .....13  
 Metric Supply\*D  
 Omnitron Electronics\*MD  
 Philips ECG Company  
 Print Products International\*D  
 RAG Electronics Inc.\*D  
 RNJ Electronics Inc.\*D  
 Salen Enterprises\*D  
**Sencore Electronics** .....BC  
 Techni-Tool Inc.\*D  
 Tektronix, Inc.  
 Tektronix  
 Tenma Test Equipment  
 Test Equipment Depot\*D  
 Tucker Electronics Co.  
 Union Electronics Distrib\*D

**WAVEFORM MONITORS**

Accutest Instruments, Inc.\*D  
 Allison Technology Corporation  
 Arrow Electronics  
 AudioVisual Inc.\*D  
 Vance Baldwin Inc.\*D  
 Bursma Electronic Distrib.\*D  
 Compuvideo  
 The Current Source\*D  
 Dranetz-BMI  
 East Coast Transistor\*D  
 E.I.L. Instruments, Inc.\*D  
 Electronics Warehouse Corp.\*D  
 Fotronic Corporation\*D  
 Gould Instrument Systems Inc.  
**Herman Electronics\*D** .....80  
 Hi-Techniques, Inc.  
 W.S. Jenks & Son\*D  
 Joseph Electronics\*D  
 Kenwood U.S.A. Corp.  
 LaserImpact  
 Leader Instruments Corp.  
 Marshall Industries\*D  
**MCM Electronics\*D** .....13  
 Metric Supply\*D  
 NCS\*D  
 Omnitron Electronics\*MD  
 Print Products International\*D  
 RAG Electronics Inc.\*D  
 RNJ Electronics Inc.\*D  
 RS Electronics\*D  
 Salen Enterprises\*D  
**Sencore Electronics** .....BC  
 Tandy National Parts\*D  
 Techni-Tool Inc.\*D  
 Tektronix, Inc.  
 Tektronix  
 Telogy\*D  
 Tenma Test Equipment  
 Test Equipment Connection Corp  
 Test Equipment Depot\*D  
 Tucker Electronics Co.  
 Ultech Corp  
 Union Electronics Distrib\*D  
 Wavetek Corporation

**OTHER TEST EQUIPMENT**

Accutest Instruments, Inc.\*D

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ACM Company  
 Allison Technology Corporation  
 American Reliance  
 Ames Supply Co.\*D  
 Amprobe Instrument  
 Analogic Corp.  
 A.P.E.  
 Aristo Computers, Inc.  
 B&B Electronics Manufacturing  
 Vance Baldwin Inc.\*D  
 Behlman Electronics  
 Bel Merit Corporation  
 Bird Electronics Corp.  
 Brunelle Instruments, Inc.  
 Bursma Electronic Distrib.\*D  
**C&S Sales\*D** .....16  
**Computer & Monitor Maintenance** ..57  
 Consolidated Elctrnics, Inc.\*D  
 Conway Engineering, Inc.  
 The Current Source\*D  
 Dalco Electronics\*D  
 Dranetz-BMI  
 East Coast Transistor\*D  
 E.I.L. Instruments, Inc.\*D  
 Electro Tool, Inc.  
 Electronics Warehouse Corp.\*D  
**Electronix Corp.\*D** .....80  
 Extech Instruments Corp.\*D  
**Fluke Ccrporation** .....1  
 Fotec Inc  
 Fotronic Corporation\*D  
 Fox International\*D  
 Global Sœcialties  
 Gould Instrument Systems Inc.  
 HMC - Hub Material Co.\*D  
 Huntron Instruments, Inc.  
 IET Labs, Inc.  
 Instek Corp.\*D  
 International Light, Inc.  
 International Power Tchnlgies  
 Iwatsu America  
 JDR Microdevices\*D  
 W.S. Jenks & Son\*D  
 Jonard Industries Corp.  
 Joseph Electronics\*D  
 Kasco Distributing\*D  
 Keithley Instruments  
 Kenwood U.S.A. Corp.  
 Key Tek Instrument Corp.  
 Kobetron, Inc.  
 Lascar Electronics Inc.  
 LaserImpact  
 Leader Instruments Corp.  
 LEM Instruments Inc  
**LG Precision** .....7  
 Marconi Instruments  
 Marshall Industries\*D  
**MCM Electronics\*D** .....13  
**Mouser Electronics\*D** .....56  
 Multicore Solders  
 National Instruments Corp.  
 NCS\*D  
 Newport Electronics, Inc.  
 Nutronix Inc.  
 Omega Engineering, Inc.  
 Omega-Vanzetti, Inc.  
 Omnitron Electronics\*MD  
 Pacer Industries, Inc.  
 Panasonic Industrial Co.  
 Philips ECG Company  
 Philtek Power Corp.  
 Print Products International\*D  
 Progressive Electronics  
 QuadTech, Inc.  
 Quantum Data  
 RAG Electronics Inc.\*D  
**R.C. Distributing** .....80  
 RNJ Electronics Inc.\*D  
 RS Electronics\*D  
 Salen Enterprises\*D  
**Sencore Electronics** .....BC  
 Simpson Electronic Company  
 Sirius Technologies  
 Snap-On Incorporated  
 Sonera Technologies

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Specialized Prods Company\*D  
 A.W. Sperry Instruments, Inc.  
 A.G. Tannenbaum\*D  
 Techni-Tool Inc.\*D  
 Technology Programs  
 Tektronix, Inc.  
 Tektronix  
 Telogy\*D  
 Temptronic Corp.  
 Tenma Test Equipment  
 Tentel  
 Test Equipment Depot\*D  
 TIF Instruments, Inc.  
 Time Motion Tools\*D  
 Triplett Corp.  
 Tucker Electronics Co.  
 UBM Corp  
 Union Electronics Distrib\*D  
 Universal Enterprises (UEI)  
**Viking Electronics** .....89  
 Wavetek Corporation

**Test equipment accessories**

**AUDIO DUMMY LOADS**

Vance Baldwin Inc.\*D  
 Computer Svcs of America\*D  
 The Current Source\*D  
 Electronic Parts Supply\*D  
 Electronics Warehouse Corp.\*D  
 Fotronic Corporation\*D  
 Joseph Electronics\*D  
 Marshall Industries\*D  
**MCM Electronics\*D** .....13  
 Metric Supply\*D  
 Omnitron Electronics\*MD  
**Parts Express International\*D** .....79  
 Print Products International\*D  
 Tenma Test Equipment  
 Test Equipment Depot\*D  
 Tucker Electronics Co.  
 Union Electronics Distrib\*D

**DECADE BOXES: CAPACITANCE/INDUCTANCE/RESISTANCE**

Accutest Instruments, Inc.\*D  
 Arrow Electronics  
 Vance Baldwin Inc.\*D  
 B-B&W Electronics\*D  
 Brunelle Instruments, Inc.  
 Bursma Electronic Distrib.\*D  
**C&S Sales\*D** .....16  
 Consolidated Elctrnics, Inc.\*D  
 The Current Source\*D  
 E.I.L. Instruments, Inc.\*D  
 Electronics Warehouse Corp.\*D  
 Electronix Express\*D  
 Fotronic Corporation\*D  
 GC Electronics\*D  
 HMC - Hub Material Co.\*D  
 Hostelt Electronics, Inc.\*D  
 IET Labs, Inc.  
 W.S. Jenks & Son\*D  
 Joseph Electronics\*D  
 Kenwood U.S.A. Corp.  
 Marshall Industries\*D  
 NCS\*D  
 Omnitron Electronics\*MD  
**Parts Express International\*D** .....79  
 Prime Technology, Inc.  
 Print Products International\*D  
 QuadTech, Inc.  
 RAG Electronics Inc.\*D  
 RNJ Electronics Inc.\*D  
 Salen Enterprises\*D  
 Specialized Prods Company\*D  
 A.G. Tannenbaum\*D

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Techni-Tool Inc.*D	E.I.L. Instruments, Inc.*D	Telematic	Time Motion Tools*D
Test Equipment Depot*D	Electro Tool, Inc.	Test Equipment Depot*D	Triplett Corp.
Tucker Electronics Co.	Electronic Parts Supply*D	Tritronics, Inc.*D	Tritronics, Inc.*D
Union Electronics Distrib*D	Electronics Warehouse Corp.*D	Union Electronics Distrib*D	Tucker Electronics Co.
Vector-VID Inc.	Electronix Express*D	Wholesale Electronics Inc.*D	Union Electronics Distrib*D
Wavetek Corporation	Elgar Corp.		Universal Enterprises (UEI)
	<b>Fluke Corporation.....1</b>		Wavetek Corporation
<b>IC TEST CLIPS</b>	Foley-Belsaw*D	<b>TEST LEADS AND PROBES</b>	<b>TRANSFORMERS: ISOLATION/ VARIABLE</b>
Arrow Electronics	Fotronic Corporation*D	Accutest Instruments, Inc.*D	Accutest Instruments, Inc.*D
Vance Baldwin Inc.*D	Global Specialties	Allison Technology Corporation	American Design Components
B-B&W Electronics*D	Hameg Instruments, Inc.	American Design Components	Arrow Electronics
B&K Precision	Harco Electronics*D	Avex Probes, Inc. (API)	Vance Baldwin Inc.*D
Bursma Electronic Distrib.*D	<b>Heath Company .....15</b>	Vance Baldwin Inc.*D	B-B&W Electronics*D
Computer Svcs of America*D	<b>Herman Electronics*D .....80</b>	B-B&W Electronics*D	Brunelle Instruments, Inc.
Consolidated Elctrcns, Inc.*D	HMC - Hub Material Co.*D	Bel Merit Corporation	Bursma Electronic Distrib.*D
Contact East, Inc.*D	Hosfelt Electronics, Inc.*D	B&K Precision	<b>C&amp;S Sales*D .....16</b>
The Current Source*D	Instek Corp.*D	Brunelle Instruments, Inc.	Compuvideo
Dalbani Corporation*D	JDR Microdevices*D	Bursma Electronic Distrib.*D	Consolidated Elctrcns, Inc.*D
Digi-Key D*	W.S. Jenks & Son*D	<b>C&amp;S Sales*D .....16</b>	The Current Source*D
East Coast Transistor*D	Joseph Electronics*D	Consolidated Elctrcns, Inc.*D	Electro Tool, Inc.
Electronic Parts Supply*D	Kelvin Electronics*D	Contact East, Inc.*D	Electronic Parts Supply*D
Electronics Warehouse Corp.*D	Kenwood U.S.A. Corp.	CSI/SPCCO	Electronics Warehouse Corp.*D
Electronix Express*D	Kikusui International Corp.	CSTS Inc.	Electronix Express*D
E-Z Hook	Marconi Instruments Inc.	CUI Stack	Fotronic Corporation*D
Fotronic Corporation*D	Marshall Industries*D	The Current Source*D	Harco Electronics*D
Harco Electronics*D	Metric Supply*D	Dalbani Corporation*D	HMC - Hub Material Co.*D
Richard Hirschmann of America	NCS*D	East Coast Transistor*D	Hosfelt Electronics, Inc.*D
HMC - Hub Material Co.*D	Omnitron Electronics*MD	Eiger Electronics*D	JDR Microdevices*D
Hosfelt Electronics, Inc.*D	<b>Parts Express International*D .....79</b>	E.I.L. Instruments, Inc.*D	W.S. Jenks & Son*D
Hy-Tronix Instruments, Inc.	Philips ECG Company	Electro Standards Lab, Inc.	Joseph Electronics*D
Innovative Solutions	Phitek Power Corp.	Electronic Parts Supply*D	Kelvin Electronics*D
ITT Pomona Electronics	Print Products International*D	Electronics Warehouse Corp.*D	Marshall Industries*D
Jameco Electrnc Components*D	RAG Electronics Inc.*D	<b>Electronix Corp.*D .....80</b>	<b>Mouser Electronics*D .....56</b>
JDR Microdevices*D	RNJ Electronics Inc.*D	E-Z Hook	Omnitron Electronics*MD
W.S. Jenks & Son*D	RS Electronics*D	<b>Fluke Corporation.....1</b>	Philips ECG Company
Jensen Tools, Inc.*D	Salen Enterprises*D	Fotronic Corporation*D	Print Products International*D
Jim-Pak*D	Specialized Prods Company*D	Galco Industrial Electronics*D	RAG Electronics Inc.*D
Joseph Electronics*D	Herman H. Sticht Co., Inc.*D	Harco Electronics*D	RNJ Electronics Inc.*D
Kelvin Electronics*D	Sun Equipment Corporation	<b>Heath Company .....15</b>	RS Electronics*D
Marshall Industries*D	Tandy National Parts*D	<b>Herman Electronics*D .....80</b>	Salen Enterprises*D
<b>MCM Electronics*D .....13</b>	A.G. Tannenbaum*D	Richard Hirschmann of America	<b>Sencore Electronics .....BC</b>
<b>Mouser Electronics*D .....56</b>	TechAmerica*D	HMC - Hub Material Co.*D	Specialized Prods Company*D
Oldaker Corp.	Techni-Tool Inc.*D	Hosfelt Electronics, Inc.*D	Staco Energy Products
Omnitron Electronics*MD	Telogy*D	Huntron Instruments, Inc.	A.G. Tannenbaum*D
Philips ECG Company	Tenma Test Equipment	Innovative Solutions	Techni-Tool Inc.*D
Premium Parts+ Elctrcns Co*D	Test Equipment Depot*D	Interconnect Devices, Inc.	Tenma Test Equipment
Print Products International*D	Tucker Electronics Co.	ITT Pomona Electronics	Test Equipment Depot*D
RNJ Electronics Inc.*D	Union Electronics Distrib*D	Jameco Electrnc Components*D	Union Electronics Distrib*D
RS Electronics*D	Vector-VID Inc.	JDR Microdevices*D	Vector-VID Inc.
Salen Enterprises*D	Wholesale Electronics Inc.*D	W.S. Jenks & Son*D	Wholesale Electronics Inc.*D
Specialized Prods Company*D		Jim-Pak*D	
Techni-Tool Inc.*D	<b>TEST JIGS AND FIXTURES</b>	Joseph Electronics*D	
Tenma Test Equipment	ACM Company	Kelvin Electronics*D	
Test Equipment Depot*D	Vance Baldwin Inc.*D	Kenwood U.S.A. Corp.	
Time Motion Tools*D	Bursma Electronic Distrib.*D	Keystone Electronics Corp.	
Union Electronics Distrib*D	Consolidated Elctrcns, Inc.*D	<b>LG Precision.....7</b>	
Wholesale Electronics Inc.*D	The Current Source*D	Marshall Industries*D	
	Dalbani Corporation*D	M.A.T. Electronics*D	
<b>POWER SUPPLIES, BENCH</b>	Dandy Mfg. Co.	NCS*D	
Accutest Instruments, Inc.*D	Diversified Parts*D	Oldaker Corp.	
Alfa Electronics*D	East Coast Transistor*D	Omnitron Electronics*MD	
American Reliance	Eiger Electronics*D	<b>Parts Express International*D .....79</b>	
Arrow Electronics	Electronic Parts Supply*D	PC Instruments Incorporated	
Vance Baldwin Inc.*D	Electronics Warehouse Corp.*D	Philips ECG Company	
B-B&W Electronics*D	<b>Electronix Corp.*D .....80</b>	J.S. Popper, Inc.	
Behlman Electronics	Excel Distributing*D	Premium Parts+ Elctrcns Co*D	
Bel Merit Corporation	E-Z Hook	Probe Master, Inc.	
B&K Precision	Foley-Belsaw*D	RAG Electronics Inc.*D	
Brunelle Instruments, Inc.	Fotronic Corporation*D	RNJ Electronics Inc.*D	
Bursma Electronic Distrib.*D	Hitachi Home Electronics	RS Electronics*D	
<b>C&amp;S Sales*D .....16</b>	Hy-Tronix Instruments, Inc.	Russell Industries*D	
Computer Products	W.S. Jenks & Son*D	Salen Enterprises*D	
Computer Svcs of America*D	Joseph Electronics*D	Schurter, Inc.	
Compuvideo	M.A.T. Electronics*D	<b>Sencore Electronics .....BC</b>	
Consolidated Elctrcns, Inc.*D	Nationwide Electronics	Simpson Electronic Company	
Contact East, Inc.*D	Omnitron Electronics*MD	Specialized Prods Company*D	
CSI/SPCCO	Philips ECG Company	Techni-Tool Inc.*D	
The Current Source*D	RNJ Electronics Inc.*D	Tegam Inc.	
Dalbani Corporation*D	RS Electronics*D	Tektronix, Inc.	
Digi-Key D*	Schurter, Inc.	Tektronix	
East Coast Transistor*D	Synergetix	Tenma Test Equipment	
Eiger Electronics*D	Techni-Tool Inc.*D	Test Equipment Depot*D	
		Test Probes, Inc.	
			Vance Baldwin Inc.*D
			Bursma Electronic Distrib.*D
			The Current Source*D
			Dalbani Corporation*D
			Diversified Parts*D
			East Coast Transistor*D
			Eiger Electronics*D
			Electronic Parts Supply*D
			Electronics Warehouse Corp.*D
			<b>Electronix Corp.*D .....80</b>
			Foley-Belsaw*D
			Fotronic Corporation*D
			<b>Herman Electronics*D .....80</b>
			Hitachi Home Electronics
			JDR Microdevices*D
			Joseph Electronics*D
			Marshall Industries*D
			M.A.T. Electronics*D
			<b>MCM Electronics*D .....13</b>
			Nationwide Electronics
			Omnitron Electronics*MD
			<b>Parts Express International*D .....79</b>
			Philips ECG Company
			RNJ Electronics Inc.*D
			Test Equipment Depot*D
			Tritronics, Inc.*D
			Union Electronics Distrib*D

**OTHER TEST EQUIPMENT ACCESSORIES**

Accutest Instruments, Inc.\*D  
ACM Company  
Allison Technology Corporation  
Amprobe Instrument  
A.P.E.  
Vance Baldwin Inc.\*D  
B-B&W Electronics\*D  
Bursma Electronic Distrib.\*D  
**C&S Sales\*D.....16**

Chicago Case Company  
Consolidated Elctrcns, Inc.\*D  
Contact East, Inc.\*D  
CRC Industries, Inc.  
The Current Source\*D  
Dalbani Corporation\*D  
Dalco Electronics\*D  
Digi-Key D\*  
East Coast Transistor\*D  
E.I.L. Instruments, Inc.\*D  
Electronic Parts Supply\*D  
Electronics Warehouse Corp.\*D  
**Electronix Corp.\*D.....80**

E-Z Hook  
Fieldpiece Instruments  
**Fluke Corporation.....1**

Fotec Inc  
Fotronic Corporation\*D  
Gemini Inc.  
Global Specialties  
**Herman Electronics\*D.....80**

HMC - Hub Material Co.\*D  
Hy-Tronix Instruments, Inc.  
**ICM Components\*D.....21**

IET Labs, Inc.  
Innovative Solutions  
Instek Corp.\*D  
Interconnect Devices, Inc.  
ITT Pomona Electronics  
JDR Microdevices\*D  
W.S. Jenks & Son\*D  
Joseph Electronics\*D  
Kenwood U.S.A. Corp.  
LaserImpact  
L-Com Inc.  
Marshall Industries\*D  
M.A.T. Electronics\*D  
**MCM Electronics\*D.....13**  
**Mouser Electronics\*D.....56**

Nationwide Electronics  
Omnitron Electronics\*MD  
**Parts Express International\*D.....79**

Philips ECG Company  
Premium Parts+ Electrcns Co\*D  
Print Products International\*D  
Probe Master, Inc.  
RAG Electronics Inc.\*D  
**R.C. Distributing.....80**

RNJ Electronics Inc.\*D  
RS Electronics\*D  
Salen Enterprises\*D  
**Sencore Electronics.....BC**

Simpson Electronic Company  
Specialized Prods Company\*D  
Support Systems International  
Synergetix  
A.G. Tannenbaum\*D  
TechAmerica\*D  
Techni-Tool Inc.\*D  
Tektronix, Inc.  
Tektronix  
Telematic  
Temptronic Corp.  
Tenma Test Equipment  
Tentel  
Test Equipment Depot\*D  
Test Probes, Inc.  
Time Motion Tools\*D  
Tritronics, Inc.\*D  
Tucker Electronics Co.  
UBM Corp

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Ultech Corp  
Union Electronics Distrib\*D  
Universal Enterprises (UEI)  
**Viking Electronics.....80**  
Wavetek Corporation

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**Circuit damage protective equipment/supplies**

**GROUNDING SYSTEMS**

Arrow Electronics  
Vance Baldwin Inc.\*D  
Bursma Electronic Distrib.\*D  
Consolidated Elctrcns, Inc.\*D  
The Current Source\*D  
Dalco Electronics\*D  
HMC - Hub Material Co.\*D  
W.S. Jenks & Son\*D  
Joseph Electronics\*D  
M.A.T. Electronics\*D  
Print Products International\*D  
Richmond Technology Inc.  
RNJ Electronics Inc.\*D  
Specialized Prods Company\*D  
Time Motion Tools\*D

**POWER LINE MONITORS**

Accutest Instruments, Inc.\*D  
Ames Supply Co.\*D  
Arrow Electronics  
Vance Baldwin Inc.\*D  
BMI-Basic Measuring Instrument  
Brunelle Instruments, Inc.  
Bursma Electronic Distrib.\*D  
Computer Power Inc.  
Consolidated Elctrcns, Inc.\*D  
Conway Engineering, Inc.  
The Current Source\*D  
Dranetz-BMI  
EFI Electronics Corporation  
E.I.L. Instruments, Inc.\*D  
Electronic Specialists, Inc.  
Electronics Warehouse Corp.\*D  
Galco Industrial Electronics\*D  
Global Specialties  
HMC - Hub Material Co.\*D  
Hosfelt Electronics, Inc.\*D  
JDR Microdevices\*D  
W.S. Jenks & Son\*D  
Joseph Electronics\*D  
**MCM Electronics\*D.....13**

NCS\*D  
Perma Power Electronics, Inc.  
PowerTronics  
Print Products International\*D  
RNJ Electronics Inc.\*D  
RS Electronics\*D  
SL Waber, Inc.  
Specialized Prods Company\*D  
Time Motion Tools\*D  
Tucker Electronics Co.  
Wholesale Electronics Inc.\*D

**STANDBY POWER SYSTEMS**

Accutest Instruments, Inc.\*D  
Alpha Technologies  
American Design Components  
Ames Supply Co.\*D  
Arrow Electronics  
Vance Baldwin Inc.\*D  
B-B&W Electronics\*D  
Bi-Tronics Inc.  
Bursma Electronic Distrib.\*D  
Computer Power Inc.  
Consolidated Elctrcns, Inc.\*D  
Controlled Power Co.

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The Current Source\*D  
Dalco Electronics\*D  
Digi-Key D\*  
Electronic Specialists, Inc.  
Electronics Warehouse Corp.\*D  
Harco Electronics\*D  
**Herman Electronics\*D.....80**

HMC - Hub Material Co.\*D  
Hosfelt Electronics, Inc.\*D  
JDR Microdevices\*D  
W.S. Jenks & Son\*D  
Joseph Electronics\*D  
Meirick, Inc.  
Minuteman UPS  
**Parts Express International\*D.....79**

Perma Power Electronics, Inc.  
Print Products International\*D  
RNJ Electronics Inc.\*D  
RS Electronics\*D  
SL Waber, Inc.  
Sutton Designs, Inc.  
Tripp Lite  
Wholesale Electronics Inc.\*D

**SURGE/SPIKE PROTECTORS**

Accutest Instruments, Inc.\*D  
Alpha Technologies  
American Design Components  
American Power Conversion Corp  
Ames Supply Co.\*D  
Arrow Electronics  
Vance Baldwin Inc.\*D  
B-B&W Electronics\*D  
Best Power  
Bi-Tronics Inc.  
Bursma Electronic Distrib.\*D  
Computer Svcs of America\*D  
Consolidated Elctrcns, Inc.\*D  
Contact East, Inc.\*D  
Controlled Power Co.  
The Current Source\*D  
Dalbani Corporation\*D  
Dalco Electronics\*D  
Delta Warranty  
Digi-Key D\*  
Diversified Parts\*D  
EFI Electronics Corporation  
E.I.L. Instruments, Inc.\*D  
Electro Standards Lab, Inc.  
Electronic Parts Supply\*D  
Electronic Specialists, Inc.  
Electronics Warehouse Corp.\*D  
Electronix Express\*D  
Excel Distributing\*D  
Galco Industrial Electronics\*D  
GC Electronics\*D  
Global Micro-Parts Depot\*MD  
Harco Electronics\*D  
**Herman Electronics\*D.....80**

Hitachi Home Electronics  
HMC - Hub Material Co.\*D  
Hosfelt Electronics, Inc.\*D  
International Power Tchnlgies  
JDR Microdevices\*D  
W.S. Jenks & Son\*D  
Joseph Electronics\*D  
Jim-Pak\*D  
Joseph Electronics\*D  
Kalglo Electronics Co., Inc.  
Kasco Distributing\*D  
Marshall Industries\*D  
MCG Electronics  
**MCM Electronics\*D.....13**

Meirick, Inc.  
Minuteman UPS  
**Mouser Electronics\*D.....56**

Omega Engineering, Inc.  
Panamax, Inc.  
**Parts Express International\*D.....79**

Perma Power Electronics, Inc.  
Philips ECG Company  
Print Products International\*D

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Recoton Corporation  
RNJ Electronics Inc.\*D  
RS Electronics\*D  
Schurter, Inc.  
Shape Electronics  
SL Waber, Inc.  
Specialized Prods Company\*D  
Sutton Designs, Inc.  
Techni-Tool Inc.\*D  
Time Motion Tools\*D  
Tripp Lite  
Tritronics, Inc.\*D  
Union Electronics Distrib\*D  
Wholesale Electronics Inc.\*D

**UNINTERRUPTIBLE POWER SUPPLIES**

Accutest Instruments, Inc.\*D  
Alpha Technologies  
American Design Components  
American Power Conversion Corp  
Ames Supply Co.\*D  
Arrow Electronics  
Vance Baldwin Inc.\*D  
B-B&W Electronics\*D  
Behlman Electronics  
Best Power  
Bi-Tronics Inc.  
Bursma Electronic Distrib.\*D  
Clary Corp.  
Computer Power Inc.  
Consolidated Elctrcns, Inc.\*D  
Contact East, Inc.\*D  
Controlled Power Co.  
The Current Source\*D  
Dalco Electronics\*D  
Delta Warranty  
Digi-Key D\*  
EFI Electronics Corporation  
Electronic Specialists, Inc.  
Electronics Warehouse Corp.\*D  
Electronix Express\*D  
Elgar Corp.  
Galco Industrial Electronics\*D  
Harco Electronics\*D  
**Herman Electronics\*D.....80**

HMC - Hub Material Co.\*D  
Hosfelt Electronics, Inc.\*D  
International Power Tchnlgies  
JDR Microdevices\*D  
W.S. Jenks & Son\*D  
Joseph Electronics\*D  
M.A.T. Electronics\*D  
**MCM Electronics\*D.....13**

Meirick, Inc.  
Minuteman UPS  
Nationwide Electronics  
Perma Power Electronics, Inc.  
Philek Power Corp.  
Print Products International\*D  
RNJ Electronics Inc.\*D  
RS Electronics\*D  
Salen Enterprises\*D  
SL Waber, Inc.  
Specialized Prods Company\*D  
Staco Energy Products  
Sutton Designs, Inc.  
Techni-Tool Inc.\*D  
Total Power International\*MD  
Tripp Lite  
Wholesale Electronics Inc.\*D

**VOLTAGE REGULATORS**

Accutest Instruments, Inc.\*D  
Arrow Electronics  
Vance Baldwin Inc.\*D  
B-B&W Electronics\*D  
Behlman Electronics  
Bi-Tronics Inc.  
Bursma Electronic Distrib.\*D  
Computer Power Inc.

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Compuvideo  
 Contact East, Inc.\*D  
 Controlled Power Co.  
 The Current Source\*D  
 Dalbani Corporation\*D  
 Dalco Electronics\*D  
 E.I.L. Instruments, Inc.\*D  
 Electronic Parts Supply\*D  
 Electronic Specialists, Inc.  
 Electronics Warehouse Corp.\*D  
 Electronix Express\*D  
 Harco Electronics\*D  
**Herman Electronics\*D.....80**  
 HMC - Hub Material Co.\*D  
 Hosfelt Electronics, Inc.\*D  
 Jameco Electrnc Components\*D  
 JDR Microdevices\*D  
 W.S. Jenks & Son\*D  
 Joseph Electronics\*D  
 Kelvin Electronics\*D  
 M.A.T. Electronics\*D  
**MCM Electronics\*D.....13**  
 Minuteman UPS  
**Mouser Electronics\*D.....56**  
 Perma Power Electronics, Inc.  
 Print Products International\*D  
 RNJ Electronics Inc.\*D  
 RS Electronics\*D  
 Salen Enterprises\*D  
 Shape Electronics  
 SL Waber, Inc.  
 Snap-On Incorporated  
 Specialized Prods Company\*D  
 Staco Energy Products  
 Sutton Designs, Inc.  
 Time Motion Tools\*D  
 Wholesale Electronics Inc.\*D

**ANTISTATIC CHEMICALS**

Alternative Technical Services  
 Ames Supply Co.\*D  
 Vance Baldwin Inc.\*D  
 B-B&W Electronics\*D  
 Bursma Electronic Distrib.\*D  
 CAIG Laboratories, Inc.  
 Charleswater  
 Chemtronics  
 Computer Component Source\*D  
 Computer Svcs of America\*D  
 Consolidated Elctrnics, Inc.\*D  
 Contact East, Inc.\*D  
 The Current Source\*D  
 Dalbani Corporation\*D  
 Dalco Electronics\*D  
 Desco  
 Digi-Key D\*  
 East Coast Transistor\*D  
**Electro Dynamics, Inc.\*D.....4.5**  
 Electronic Prod. Specialties\*D  
**Electronix Corp.\*D.....80**  
 Electronix Express\*D  
 Fox International\*D  
 GC Electronics\*D  
 Harco Electronics\*D  
 HMC - Hub Material Co.\*D  
 Hy Tec Dealer Service  
 Jameco Electrnc Components\*D  
 JDR Microdevices\*D  
 W.S. Jenks & Son\*D  
 JIT Resources, Inc.  
 Joseph Electronics\*D  
 Klein Tools, Inc.  
 Marshall Industries\*D  
 M.A.T. Electronics\*D  
 MG Chemicals  
 Micro Care Corp.  
 Miller-Stephenson Chemical Co.  
 Nationwide Electronics  
**Parts Express International\*D.....79**  
 Philips ECG Company  
 Print Products International\*D  
 RNJ Electronics Inc.\*D  
 Rogers Anti-Static Chemicals  
 RS Electronics\*D

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Syon Corporation  
 Tandy National Parts\*D  
 TechAmerica\*D  
 Tech Spray, Inc.  
 Techni-Tool Inc.\*D  
 3M Electrnc Hndlg & Prot Div  
 Time Motion Tools\*D  
 Tritronics, Inc.\*D  
 Union Electronics Distrib\*D  
 Wescorp  
 Wholesale Electronics Inc.\*D

**ANTISTATIC IONIZATION DEVICES**

Vance Baldwin Inc.\*D  
 Bursma Electronic Distrib.\*D  
 Charleswater  
 Computer Svcs of America\*D  
 Contact East, Inc.\*D  
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 Harco Electronics\*D  
 HMC - Hub Material Co.\*D  
 W.S. Jenks & Son\*D  
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 Joseph Electronics\*D  
 Marshall Industries\*D  
 Nationwide Electronics  
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 RS Electronics\*D  
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 Techni-Tool Inc.\*D  
 3M Electrnc Hndlg & Prot Div  
 Time Motion Tools\*D  
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 Bursma Electronic Distrib.\*D  
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 Computer Svcs of America\*D  
 Contact East, Inc.\*D  
 The Current Source\*D  
 Desco  
 Digi-Key D\*  
 E.I.L. Instruments, Inc.\*D  
 Electronic Prod. Specialties\*D  
 Electro-Tech Systems, Inc.  
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 JIT Resources, Inc.  
 Joseph Electronics\*D  
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Cititronix/Panson*D	M.A.T. Electronics*D	Antique Automobile Radio*D	The Current Source*D
Computer Component Source*D	<b>MCM Electronics*D..... 13</b>	Antique Electronic Supply*D	Curtis Mathes
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The Current Source*D	Nationwide Electronics	B-B&W Electronics*D	Diversified Parts*D
Curtis Mathes	Panasonic Industrial Co.	Bursma Electronic Distrib.*D	Electronic Parts Supply*D
Dalbani Corporation*D	<b>Parts Express International*D..... 79</b>	Cititronix/Panson*D	Excel Distributing*D
Dalco Electronics*D	Planstiehl Corp.*D	Consolidated Electrncs, Inc.*D	Fox International*D
Digi-Key D*	Philips ECG Company	The Current Source*D	<b>Herman Electronics*D..... 80</b>
Diversified Parts*D	Premium Parts+ Electrncs Co*D	Curtis Mathes	Hitachi Home Electronics
East Coast Transistor*D	Q B Products*D	Diversified Parts*D	Joseph Electronics*D
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Electronix Express*D	Schurter, Inc.	<b>Internat'l Components Corp.*D..... 80</b>	Panasonic Industrial Co.
Excel Distributing*D	SHOGYO International Corp.	Joseph Electronics*D	Philips ECG Company
Fox International*D	Tandy National Parts*D	Kelvin Electronics*D	Quasar
GC Electronics*D	TechAmerica*D	MCD Electronics*D	Sears Roebuck & Co
<b>Herman Electronics*D..... 80</b>	Tritronics, Inc.*D	<b>MCM Electronics*D..... 13</b>	Sony National Parts Center
Hitachi Home Electronics	Truminc of California Inc.*D	<b>Parts Express International*D..... 79</b>	Technics
Hosfelt Electronics, Inc.*D	Union Electronics Distrib*D	Richardson Electronics, Ltd.*D	Tritronics, Inc.*D

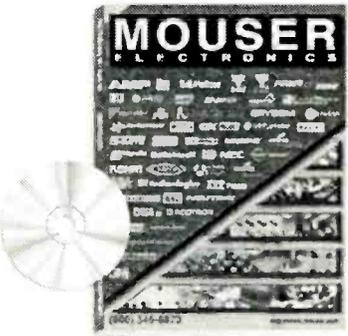
# Software/services directory

Note: An entry followed by \*D means that this company is a distributor, not a manufacturer. An entry followed by a \*MD means that this company is both a manufacturer and a distributor.

A line listing that is in color indicates that the company has an ad in this issue. The number following the listing is the number of the page on which the ad is located. BC means Back Cover; IBC means Inside Back Cover; IFC means Inside Front Cover.

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Accurite Technologies Inc. ACM Company AnaTek Corporation B&B Electronics Manufacturing Beige Bag Software Bursma Electronic Distrib.*D Cleveland Inst. of Electronics Computer Doctors Computer Svcs of America*D CSTS Inc. Data Depot, Inc. Dranetz-BMI Eagan Technical Services, Inc. Electronic Software Developers <b>Electronix Corp.*D</b> .....80 EURAS USA, Inc. Fessenden Technologies Gibson Research Corp. Higher Intelligence Software International Test Technologie JDR Microdevices*D <b>MCM Electronics*D</b> .....13 Micro 2000, Inc. Microcode Engineering National Advancement Corp. Ontrack Data Recovery, Inc. RG Software, Inc. RNJ Electronics Inc.*D Sonera Technologies Sony National Parts Center	<b>CONSULTANTS</b> Coordinated Service, Inc. CSTS Inc. Custom Data Associates Digi-Key D* Innovative Solutions JDR Microdevices*D Marshall Industries*D MaxServ, Inc. Micro 2000, Inc. National Advancement Corp. Ontrack Data Recovery, Inc. The Peak Technologies Group <b>Philips Service Solutions Grp*MD</b> ..IBC SMH Electronics Co., Inc. Sonera Technologies SyncPulse Systems	<b>ONLINE SERVICES</b> AnaTek Corporation Computer Doctors Digi-Key D* <b>Electronix Corp.*D</b> .....80 Electroservice Laboratories EURAS USA, Inc. JDR Microdevices*D MaxServ, Inc. <b>Philips Service Solutions Grp*MD</b> ..IBC Philips ECG Company Sony National Parts Center	A-Tech Electronics AnaTek Corporation Aslea International Automated Systems, Inc. BGI Company, Inc. *AutoTech* Cahill Electronics Computer Transaction Systems Core Software Creative Logics Corporation Custom Data Associates Data-Basics Inc. DataBasic DAYTA-CO Electronic Parts Supply*D <b>Electronix Corp.*D</b> .....80 EURAS USA, Inc. Foley-Belsaw*D Good-Lyddon Data Systems Higher Intelligence Software JDR Microdevices*D Magic Solutions, Inc. MaxServ, Inc. Merlin Software Metrix Inc. Nationwide Electronics NESDA PD Software Plaza Distributing*D RAM Software Enterprises RNJ Electronics Inc.*D Sage Data Systems SBS Direct <b>Sencore Electronics</b> .....BC Service Management Software ServiceWare Corporation Servicing Systems Sirius Software Inc. DW Smith & Associates SyncPulse Systems Tech Assist, Inc. TV Man Tech Tips Inc. Warrantech Corp.
	<b>DISC DRIVE/HEAD REFURBISHMENT</b> Computer Svcs of America*D Fessenden Technologies Gibson Research Corp.	<b>PC BOARD REPAIR/REWORK</b> Amcom Corporaton*D B-B&W Electronics*D Computer Doctors Contact East, Inc.*D CSTS Inc. Datatech Depot, Inc. Den-On Instruments (USA), Inc. Eagan Technical Services, Inc. Fessenden Technologies Hosfelt Electronics, Inc.*D Hy Tec Dealer Service JDR Microdevices*D W.S. Jenks & Son*D KDM Associates LaserImpact Module Exchange Nationwide Electronics PACE, Inc. <b>PTS Corporation</b> .....9 Service Electronics Inc. SMH Electronics Co., Inc. Softdesk Retail Products Specialized Prods Company*D 3E Corp. Valtron Technologies	<b>TEST EQUIPMENT REPAIR/CALIBRATION</b> Accutest Instruments, Inc.*D Advanced Electronic Applicatio Air 1 USA, Inc. Brunelle Instruments, Inc. Computer Svcs of America*D Compuvideo Conway Engineering, Inc. CSTS Inc. <b>Electronix Corp.*D</b> .....80 <b>Fluke Corporation</b> .....1 Fotronic Corporation*D Fox International*D JDR Microdevices*D W.S. Jenks & Son*D Lascar Electronics Inc. Marconi Instruments Inc. RS Electronics*D Sencore ElectronIcs Specialized Prods Company*D Tech Assist, Inc. TEKSERV Test Equipment Connection Corp Test Equipment Depot*D Wavetek Corporation
		<b>SERVICE BULLETIN SOFTWARE</b> A-Tech Electronics Cahill Electronics Electronic Software Developers Electronics Warehouse Corp.*D High Tech Electronic Services Higher Intelligence Software <b>ICM Components*D</b> .....21 JDR Microdevices*D M.I. Technologies PD Software <b>Philips Service Solutions Grp*MD</b> ..IBC <b>Philips Software Dev.*MD</b> .....IFC Philips ECG Company Sony National Parts Center SyncPulse Systems Tech-M Tech. Info. Procurement Serv. TV Man Tech Tips Inc.	<b>TUNER/MODULE REPAIR</b> B-B&W Electronics*D Electronics Warehouse Corp.*D Higher Intelligence Software Module Exchange <b>PTS Corporation</b> .....9 Wholesale Electronics Inc.*D

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958 North Main St., Mansfield, TX 76063



# Association/educational sources directory

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## BOOKS/MANUALS

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 Alternative Technical Services  
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 B-B&W Electronics\*D  
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 CEDIA  
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 The Current Source\*D  
 The Current Source\*D  
 Dalco Electronics\*D  
 D.A.T.A.  
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 Diversified Parts\*D  
 Dranetz-BMI  
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 Herman H. Sticht Co., Inc.\*D  
 Tab Books  
 A.G. Tannenbaum\*D

TechAmerica\*D  
 Tektronix, Inc.  
 Tritronics, Inc.\*D  
 TV Man Tech Tips Inc.  
 TVPRO  
 Ucando VCR Educational Prod Co  
 Underwriters Laboratories, Inc  
 Union Electronics Distrib\*D  
 Vintage TV and Radio Supply\*D  
 WEKA Publishing, Inc.  
 Wholesale Electronics Inc.\*D

## EDUCATIONAL/TRAINING SEMINARS/VIDEOS

CEDIA  
 Cleveland Inst. of Electronics  
 Computer Maintenance Training  
 Curtis Mathes  
 Dranetz-BMI  
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 NESDA  
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 Herman H. Sticht Co., Inc.\*D  
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 Tentel  
 United Servicers Association  
 Warrantech Corp.

## MANAGEMENT SOFTWARE SYSTEMS

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 SBS Direct  
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Sirius Software Inc.  
 SyncPulse Systems  
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 TV Man Tech Tips Inc.

## SCHOOLS: CORRESPONDENCE/RESIDENT

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 Curtis Mathes  
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 Dynamic Learning Systems  
 Eagan Technical Services, Inc.  
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 Electro Dynamics, Inc.\*D .....4,5  
 Electronic Parts Supply\*D  
 Electronics Warehouse Corp.\*D  
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 Philips Software Dev.\*MD .....IFC  
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 Satellite Dealers Association  
 Sencore Electronics.....BC  
 Specialized Prods Company\*D  
 Technics  
 Tritronics, Inc.\*D  
 TV Man Tech Tips Inc.  
 Union Electronics Distrib\*D

## CMM Monitor Test Equipment

### Checker 12e



Now you can repair and test Computer monitors with ease. With sweep rates up to 64KHz., eight step gray scale, white screen, single color mode, Mac II, EGA, CGA support, you can run almost ANY PC monitor. And it is EASY to use. Color front panel displays show just what you should see. Don't let its' small size fool you. It is the most powerful handheld available, and it supports ALL basic VGA modes (some don't). It is suitable for bench or field operations. Battery or AC operation.

**PRICE:\$295**

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Looking for a SMALL battery operated monitor test pattern generator that will fit in your pocket? The Checker Jr. is it. It displays a very useful 64 color pattern. You can evaluate size, focus, linearity, color tracking, and balance. It operates in the 640 x 480 mode (31.5KHz x 60Hz.), and is very easy to use. Use it anywhere.

**PRICE: \$99.95**

### Checker TV Pro & TV Jr. NEW!



The TV Pro is just the tool for your repair bench. It provides Video, S-Video, and RF outputs. It also has the most important pattern, GRAY SCALE! You can't set up a color TV without it. All with NTSC standards and COMPLEX sync. The RF output also includes an audio tone and STEREO signaling. With colorbars, gray scale, crosshatch, with dots, you can set and test quickly.

**Checker TV Pro..PRICE: \$499.95**

The TV Jr. is a small NTSC video generator, with colorbars, crosshatch with dots, white, red, blue, green, and black screens. Small enough to fit in your pocket, powerful enough to drive the largest projection TV!

**Checker TV Jr....PRICE: \$129.95**

**Computer & Monitor Maintenance, Inc.**  
 1-800-466-4411 • 770-662-5633  
<http://www.computermonitor.com>

# Company mailing addresses

## A

### **A-Tech Electronics**

198 Lincoln Highway  
Fairless Hills, PA 19030  
215-949-0400  
Fax: 215-949-0403  
E-mail: A\_tech@juno.com  
Website: [Http://www.a-techinc.com](http://www.a-techinc.com)

### **Abbot, Langer & Associates**

548 First Street  
Crete, IL 60417  
708-672-4200  
Fax: 708-672-4674  
E-mail: Slanger@abbot-langer.com

### **ACCSCOT**

2101 Wilson Blvd Suite 302  
Arlington, VA 22201  
703-247-4142  
Fax: 703-247-4533  
E-mail: [info@accscot.org](mailto:info@accscot.org)  
Website: [Http://www.accscot.org/](http://www.accscot.org/)

### **Accurite Technologies Inc.**

48460 Lakeview Blvd  
Fremont, CA 94538  
510-668-4900  
Fax: 510-668-4905  
E-mail: [Sales@accurite.com](mailto:Sales@accurite.com)  
Website: [Http://www.accurite.com](http://www.accurite.com)

### **Accutest Instruments, Inc.\*D**

PO Box 130  
Clarksburg, NJ 08510  
609-259-0460  
800-524-0747  
Fax: 609-259-0227

### **ACM Company**

7 Manor Drive  
Shirley, NY 11967  
516-395-4862  
Fax: 516-395-4862

### **Acme Electric Corporation**

Aerospace Division  
528 W 21st St.  
Tempe, AZ 85282  
602-894-6864  
Fax: 602-921-0470

### **Adaptive Research**

665 King St. East, #3  
Hamilton, Ontario  
Canada  
905-577-6936

### **Addison-Wesley Publishing Co.**

One Jacob Way  
Reading, MA 01867  
617-944-3700 X2714  
800-822-6339 Order

### **Advanced Electronic Applicatio**

PO Box C2160  
Lynnwood, WA 98036  
206-774-5554  
Fax: 206-775-2340

### **Advanced Software Karyonics**

805 West Avenue J  
Lancaster, CA 93534  
805-942-3088  
Fax: 805-940-8928

### **Advanced Technology Group, Inc**

205 Regency Executive Park Dr.  
Suite 306  
Charlotte, NC 28217  
704-521-8113

### **AeroAstro**

550 East Rogers Road  
Longmont, CO 80501  
303-651-7552

### **AEMC Instruments**

99 Chauncy St.  
Boston, MA 02111  
617-451-0227  
800-343-1391  
Fax: 617-423-2952

### **Aervo-Pacific Co.**

1198 Sawmill Rd.  
PO Box 485  
Gardnerville, NV 89410  
800-227-0196 Order  
Fax: 702-782-4027

### **AESI/Stedi Watt**

2005 Lincoln Way E.  
Chambersburg, PA 17201  
717-263-5681  
800-345-1280  
Fax: 717-263-1040

### **Air 1 USA Inc.**

Micro Services Division  
PO Box 3035  
Pueblo, CO 81005  
719-566-0018  
Fax: 719-566-0024

### **Aiwa America, Inc.**

800 Corporate Drive  
Mahwah, NJ 07430-2048  
201-512-3600

### **Alfa Electronics\***D****

P.O. Box 8089  
Princeton, NJ 08543-8089  
609-897-1135  
800-526-2532  
Fax: 609-897-0206  
E-mail: [Alfa0168@aol.com](mailto:Alfa0168@aol.com)

### **Allied Electronics, Inc.\***D****

An Avnet Co.  
7410 Pebble  
Fort Worth, TX 76118  
800-433-5700  
Fax: 817-595-6470

### **All Micro Inc.**

18820 US Hwy 19N Suite 215  
Clearwater, FL 34624  
813-539-0200  
Fax: 813-531-0200

### **Allison Technology Corporation**

8343 Carvel  
Houston, TX 77036  
713-777-0401  
800-980-9806  
Fax: 713-777-4746  
E-mail: [Atc@accesscomm.net](mailto:Atc@accesscomm.net)  
Website: [Http://www.atcweb.com](http://www.atcweb.com)

### **All-Spec Static Control Inc.**

PO Box 28  
Maspeth, NY 11378-0028  
800-537-0351  
Fax: 718-457-2811

### **Alpha Technologies**

3767 Alpha Way  
Bellingham, WA 98226  
360-647-2360  
800-421-8089  
Fax: 360-671-4936  
E-mail: [Alpha@alpha.com](mailto:Alpha@alpha.com)  
Website: [Http://www.alpha.com](http://www.alpha.com)

### **Alternative Technical Services**

17853-107 Santiago Blvd #505  
Villa Park, CA 92861  
714-633-8231  
800-343-3530  
Fax: 714-744-3870  
Website:  
[Http://www.ats-inc@pacbell.net](http://www.ats-inc@pacbell.net)

### **Ambico**

P.O. Box 427  
Norwood, NJ 07648-0427  
201-767-4100  
Fax: 201-767-4109

### **Amcom Corporaton\***D****

6205 Bury Drive  
Eden Prairie, MN 55346  
612-949-9400  
800-328-7723  
Fax: 612-949-9400

### **AMCOR**

373 Route 46 West  
Fairfield NJ 07004  
201-575-5900  
800-542-6267  
Fax: 201-575-8469

### **American Design Components**

PO Box 2601  
Secaucus, NJ 07096-2601  
201-601-8999  
800-776-3700  
Fax: 201-941-7480

### **American Megatrends, Inc.**

6145-F Northbelt Parkway  
Norcross, GA 30071  
770-246-8600  
800-U-BUY-AMI  
Fax: 770-246-8790

### **American Micronics, Inc.**

3002 Dow Ave Suite 416  
Tustin, CA 92680  
714-573-9005  
800-437-8668  
Fax: 714-573-9008

### **American Power Conversion Corp**

132 Fairgrounds Road  
West Kingston, RI 02892  
401-789-5735  
800-800-4080  
Fax: 401-789-3710

### **American Reliance**

11801 Goldring Road  
Arcadia, CA 91006-5880  
818-303-6688  
800-654-9838  
Fax: 818-358-3838  
E-mail: [Sandra@amrel.com](mailto:Sandra@amrel.com)  
Website: [Http://www.amrel.com](http://www.amrel.com)

### **Ames Supply Co.\***D****

2537 Curtiss St  
Downers Grove, IL 60515  
630-964-2440  
810-323-3856  
Fax: 810-848-8780

### **America West Communications**

And Electronics, Inc  
1900 Elk Street  
Rock Springs, WY 82901  
307-382-5663  
800-542-9378  
Fax: 307-382-7323

### **Amherst Media, Inc.**

155 Rano Street, Suite 300  
Buffalo, NY 14207  
716-874-4450  
800-622-3278  
Fax: 800-622-3298

### **AMP**

PO Box 3608  
Harrisburg, PA 17105-3608  
717-564-0100  
800-522-6752  
Fax: 717-986-7575

### **Amphenol Corporation**

Comm. and Network Prods. Div.  
One Kennedy Avenue  
Danbury, CT 06810  
203-743-9272  
800-825-5577  
Fax: 203-796-2091

### **Amprobe Instrument**

630 Merrick Rd.  
PO Box 329  
Lynbrook, NY 11563-2348  
516-593-5600  
800-477-8658  
Fax: 516-593-5682  
Website: [Http://www.amprobe.com](http://www.amprobe.com)

### **Analog Technology Center Inc**

62 Route 101A  
Amherst, NH 03031  
603-673-0404  
Fax: 603-673-4526

### **Analogic Corp.**

8 Centennial Drive  
Peabody, MA 01960  
508-977-3000  
Fax: 508-977-6814  
Website: [Http://www.analogic.com](http://www.analogic.com)

### **AnaTek Corporation**

PO Box 1200  
100 Merrimack Rd  
Amherst, NH 03031  
603-673-4342  
800-999-0304  
Fax: 603-673-5374  
E-mail: [Info@anatekcorp.com](mailto:Info@anatekcorp.com)  
Website: [Http://www.anatekcorp.com](http://www.anatekcorp.com)

### **Andrews Electronics\***D****

25158 Avenue Stanford  
Santa Clarita, CA 91355  
805-257-7700 231  
800-289-0300  
Fax: 800-289-0301

### **Anritsu Meter Co. of America**

P.O. Box 193  
Franklin Lakes, NJ 07417  
201-848-0033  
800-457-2999  
Fax: 201-848-1845

### **Antique Automobile Radio\***D****

700 Tampa Rd  
Palm Harbor, FL 34683-5454  
813-785-8733  
800-933-4926  
Fax: 813-789-0283

**Antique Electronic Supply\*<sup>D</sup>**  
6221 South Maple Ave.  
Tempe, AZ 85283-2856  
602-820-5411  
800-706-6789 (Fax)  
Fax: 602-820-5411  
E-mail: Info@tubesandmore.com  
Website:  
Http://www.tubesandmore.com

**Antique Radio Classified\*<sup>D</sup>**  
P.O. Box 802-C12  
Carlisle, MA 01741  
508-371-0512  
Fax: 508-371-7129

**A.P.E.**  
142 Peconic Ave.  
Medford, NY 11763-3244  
516-654-1197  
888-DSOLDER  
Fax: 516-289-4735  
E-mail: Apecorp@aol.com

**Apollo Electronics**  
PO Box 153107  
Irving, TX 75015-3107

**ARDIS**  
300 Knightsbridge Parkway  
Lincolnshire, IL 60069  
708-913-4229

**Aristo Computers, Inc.**  
6700 S.W. 105th Avenue  
Suite 300  
Beaverton, OR 97008-5484  
503-626-6333  
800-327-4786  
Fax: 503-626-6492  
E-mail: Sales@aristocom.com  
Website: Http://www.aristocom.com

**Armand Mfg. Inc.**  
2399 Silver Wolf Drive  
Henderson, NV 89015  
702-565-7500  
Fax: 800-669-9811  
E-mail: Armandmf@vegas.quik.com  
Website: Http://www.armandmfg.com

**ASC Capacitors**  
301 West "O" Street  
Ogallala, NE 69153  
308-284-3611  
Fax: 308-284-8324

**Arrow Electronics**  
25 Hub Drive  
Melville, NY 11747-3503  
516-391-1300  
Fax: 516-391-1640

**ASG Division of Jergens Inc.**  
19520 Nottingham Rd  
Cleveland, OH 44110-2730  
216-486-6163

**ASTEA International, Inc.**  
100 Highpoint Drive  
Chalfont, PA 18914  
215-822-8888

**Astea International**  
55 Middlesex Turnpike  
Bedford, MA 01730  
617-275-5440  
Fax: 617-275-1910

**ASTI Magnetics Corp.**  
45 W Broad St  
Bergenfield, NJ 07621-2866  
201-501-8900  
800-221-1828  
Fax: 201-385-1702

**AT&T Capital Corporation**  
Instrument Services  
P.O. Box 619-260  
D/FW Airport, TX 75261-9260  
214-456-4000  
800-874-7123  
Fax: 214-456-4002

**Audio Parts Co.\*<sup>D</sup>**  
1070 South Orange Drive  
Los Angeles, CA 90019  
213-933-2141

**AudioVisual Inc.\*<sup>D</sup>**  
dba AVI Systems  
6253 Bury Drive  
Eden Prairie, MN 55346  
612-949-3700  
Fax: 612-949-6000

**Automated Systems, Inc.**  
4827 Pioneer Blvd Suite 100  
Lincoln, NE 68506  
402-489-2717  
800-279-7312  
Fax: 402-489-2370

**AVA Instrumentation, Inc.**  
9672 Manzanita Ave  
Ben Lomond, CA 95005  
408-336-2281  
Fax: 408-336-5049

**Aven Tools, Inc.**  
4676 Freedom Drive  
Ann Arbor, MI 48108  
313-973-0099  
800-624-8170  
Fax: 313-973-0097  
E-mail: Aventools@msn.com  
Website: Http://www.aventools.com

**Avex Probes, Inc. (API)**  
1683 Winchester Road  
PO Box 1026  
Bensalem, PA 19020  
215-638-3300  
800-877-7623  
Fax: 215-638-9108

**AVO International**  
510 Township Line Road  
Blue Bell, PA 19422-2795  
215-646-9200  
800-723-AVO1  
Fax: 215-643-2670  
Website: Http://www.avointl.com

**B**

**B&B Electronics Manufacturing**  
707 Dayton Road  
PO Box 1040  
Ottawa, IL 61350-9545  
815-434-0846  
Fax: 815-434-7094  
E-mail: Rfoscender@bb-elec.com  
Website: Http://www.bb-elec.com

**B&D Enterprises**  
PO Box 460  
Main & Liberty Street  
Russell, PA 16345  
814-757-8300  
800-458-6053  
Fax: 814-757-5400

**Vance Baldwin Inc.\*<sup>D</sup>**  
2701 W McNab Rd  
Pompano Beach, FL 33069-4802  
954-969-1811  
800-432-8542  
Fax: 954-969-0226

**Banner Technical Books, Inc.**  
1203 Grant Ave.  
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815-962-4725

**BAPCO Bowden's Automated Prods**  
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PO Box 536  
Viborg, SD 57070  
605-326-5169  
800-419-4000  
Fax: 605-326-5138

**B-B&W Electronics\*<sup>D</sup>**  
2137 S. Euclid Ave.  
Berwin, IL 60402  
708-749-1710  
800-722-9684  
Fax: 708-749-0325

**Battery Specialties**  
3530 Cadillac Ave.  
Costa Mesa, CA 92626-1408

**Behlman Electronics**  
80 Cabot Court  
Happauge, NY 11788  
516-435-0410  
800-874-6727  
Fax: 516-951-4341  
E-mail: Sales@behlman.com  
Website: Http://www.behlman.com

**Beige Bag Software**  
279 East Liberty  
Ann Arbor, MI 48104-2120  
734-332-0487  
Fax: 734-332-0392  
E-mail: Info@beigebag.com  
Website: Http://www.beigebag.com

**Belden Wire & Cable Company**  
PO Box 1980  
Richmond, IN 47375  
765-983-5200  
800-235-3361  
Fax: 765-983-5294  
E-mail: Info@belden.email.com  
Website: Http://www.belden.com

**Bel Merit Corporation**  
26242 Dimension Dr., Suite 110  
Lake Forest, CA 92630-7802  
714-586-3700  
800532-3221  
Fax: 714-586-3399

**Benedict Computer**  
220 Felton Drive  
Menlo Park, CA 94025  
415-323-0148  
800-346-5186  
Fax: 415-323-0156  
E-mail: Sales@benedictcommunications.com  
Website: Http://www.benedictcommunication.com

**Bergwall Productions, Inc.**  
540 Baltimore Pike  
Chaddsford, PA 19317  
215-388-0400  
800-645-3565  
Fax: 215-388-0405

**Best Electronics\*<sup>D</sup>**  
2021 The Alameda, Suite 290  
San Jose, CA 95126  
408-243-6950

**Best Power**  
A Unit of General Signal  
PO Box 280  
Necedah, WI 54646  
608-565-7200  
800-356-5794  
Fax: 608-565-2221

**BGI Company, Inc. "AutoTech"**  
50509 Hollyhock Road  
South Bend, IN 46637  
219-277-8762  
Fax: 219-277-8762  
E-mail: S\_b@sprynet.com

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Needham Heights, MA 02194-0001  
617-444-1154  
Fax: 617-449-4584  
E-mail: lna@bibliodata.com  
Website: Http://www.bibliodata.com

**Bird Electronics Corp.**  
30303 Aurora Blvd.  
Cleveland (Solon), OH 44139  
216-248-1200  
Fax: 216-248-5426

**Bitwise Designs Inc.**  
50 Rotterdam Industrial Park  
Schenectady, NY 12306  
518-274-0755  
800-288-8728

**Bi-Tronics Inc.**  
#10 Skyline Drive  
Hawthorne, NY 10532  
914-592-1800  
800-666-0996  
Fax: 800-569-4244  
E-mail: Info@bi-tronics.com  
Website: Http://www.bi-tronics.com

**B&K Precision**  
1031 Segovia Circle  
Placentia, CA 92870  
714-237-9220  
Fax: 714-237-9214  
Website: Http://www.bkprecision.com/

**Blue Fin Technologies Inc.\*<sup>D</sup>**  
55 Green Street  
Portsmouth, NH 03801-3735  
603-433-2223  
Fax: 603-433-6437

**BMI-Basic Measuring Instrument**  
3250 Jay Street  
Santa Clara, CA 95054-3309  
408-970-3700  
800-876-5355  
Fax: 408-970-3720  
E-mail: Bmisales@bmi.electrotek.com  
Website:  
Http://www.electrotek.com/bmi

**Bondhus Corporation**  
1400 East Broadway  
P.O. Box 660  
Monticello, MN 55362-9347  
612-295-2162  
800-328-8310  
Fax: 612-295-4440  
E-mail: Bondhus@bondhus.com

**Bonkote America, Inc.**  
Bridg St., PO Box 278  
Three Rivers, MA 01080-0278  
413-289-1343  
Fax: 413-289-1754

**Brian Instruments, Inc.**  
626 S. State College Blvd.  
Fullerton, CA 92631  
714-992-5540  
Fax: 714-992-5553

**Brilliant King, Inc.**  
37 W. 39th St  
Room 401  
New York, NY 10018  
212-730-6797  
Fax: 212-730-6797

**Brunelle Instruments, Inc.**  
PO Box 1223  
Newport, VT 05855-1010  
819-563-9096  
800-567-3506  
Fax: 819-569-1408  
E-mail: Jbrunel@interlinx.qc.ca  
Website:  
Http://www.brunelle.interlinx.qc.ca

**Bullfrog**  
87 Quail Street  
Mahtomedi, MN 55115  
612-426-0971  
800-362-3192

**Burks, P.I.\*D**  
842 S. Seventh Ave.  
Louisville, KY 40203  
502-589-3960  
800-274-2875  
Fax: 800-723-8383

**Burma Electronic Distrib.\*D**  
2851 Buchanan S.W.  
Grand Rapids, MI 49548  
616-831-0080  
800-777-2604  
Fax: 616-831-9400  
E-mail: Vanran@iserv.net



**C&S Sales\*D**  
150 W. Carpenter Ave  
Wheeling, IL 60090  
847-541-0710  
800-292-7711  
Fax: 847-541-9904  
E-mail: Cs\_sales@elenco.com  
Website:  
Http://www.elenco.com/cs\_sales

**C. Hoelzle Associates, Inc.**  
17321 Eastman Street  
Irvine, CA 92614-5523  
714-251-9000  
800-959-9601  
Fax: 714-251-9291  
E-mail: Sales@chainc.com  
Website: Http://www.chainc.com

**Caill Electronics**  
160 Main Street  
PO Box 568  
Kingston, NH 03848  
603-642-4292  
Fax: 603-642-7941

**CAIG Laboratories, Inc.**  
16744 West Bernardo Drive  
San Diego, CA 92127-1904  
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800-CAIG-123  
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Website: Http://www.caig.com

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Los Angeles, CA 90038  
213-465-2131  
Fax: 213-465-3504

**Casio Technical Info Center**  
570 Mount Pleasant Avenue  
Dover, NJ 07801-1620  
201-361-5400  
800-458-0212

**CEDIA**  
9202 N Meridian #200  
Indianapolis, IN 46260-1810  
317-571-5602  
800-669-5329  
Fax: 317-571-5603  
E-mail: Member@cedia.org  
Website: Http://www.cedia.org.cedia

**Central Point Software**  
15220 NW Greenbrier Parkway  
Suite 200  
Beaverton, OR 97006  
503-690-8088  
800-441-7234 (Cust)

**Cerplex Group, Inc**  
1382 Bell Avenue  
Tustin, CA 92780  
714-258-5600  
Fax: 714-259-1944

**Champion Technologies Inc.**  
2553 North Edgington St  
Franklin Park, IL 60131  
708-451-1000

**Channel Master Div of Avnet**  
1315 Industrial Park Drive  
P.O. Box 1416  
Smithfield, NC 27577  
919-934-9711  
Fax: 919-989-2200  
Website:  
Http://www.channelmaster.avnet.com

**Chapman Corporation**  
125 Presumpscot Street  
PO Box 10700  
Portland, ME 04104-6100  
207-773-4726  
Fax: 207-775-1369

**Charleswater**  
Div. of All  
90 Hudson Rd.  
Canton, MA 02021-1407  
781-821-8370  
Fax: 781-575-0172  
E-mail: Service@charleswater.com  
Website:  
Http://www.charleswater.com

**Chemtronics**  
8125 Cobb Center Drive  
Kennesaw, GA 30152  
770-424-4888  
800-645-5244  
Fax: 770-424-4267  
Website: Http://www.chemtronics.com

**Chicago Case Company**  
4446 South Ashland Ave.  
Chicago, IL 60609-3141  
312-927-1600  
800-927-2602  
Fax: 800-333-8172

**Chicago Miniature Lamp, Inc.**  
147 Central Ave  
Hackensack, NJ 07601  
201-489-8989  
Fax: 201-489-6911  
Website: Http://www.chml.com

**Chip Quik**  
3 Second St  
Framingham, MA 01701-7115  
508-879-7727  
800-836-2447

**Circuit Repair Corp.**  
108 Turnpike  
Rowley, MA 01969  
508-948-7973  
Fax: 508-948-2365

**Circuit Specialists**  
Box 3047  
Scottsdale, AZ 85257

**Cititronix/Panson\*D**  
1260 Karl Court  
Wauconda, IL 60084-1094  
847-487-5170  
800-726-0146  
Fax: 800-726-0142

**Clary Corp.**  
1960 S. Walker Ave.  
Monrovia, CA 91016  
626-359-4486  
800-442-5279  
Fax: 626-305-0254  
E-mail: Shfernandez@clary.com  
Website: Http://www.clary.com

**Classic Cmpnts Supply, Inc.\*D**  
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Northbrook, IL 60062-1975  
708-272-9650  
Fax: 708-272-9264

**Clauss Electronics Div.**  
223 N. Prospect  
Fremont, OH 43420  
419-332-7344  
800-225-2877  
Fax: 419-332-8077  
Website: Http://www.claussco.com

**Cleveland Inst. of Electronics**  
1776 East 17th St.  
Cleveland, OH 44114  
216-781-9400  
800-CIE-OHIO  
Fax: 216-781-0331  
E-mail: Instruct@cie.wc.edu  
Website: Http://www.cie-wc.edu

**Clipper Products**  
P.O. Box 458200  
Cincinnati, OH 45245  
513-528-7011  
800-543-0324  
Fax: 513-528-7676

**CN Software**  
A Division of CNS Inc.  
100 Ford Road  
Denville, NJ 07834  
201-625-4056  
Fax: 201-625-9489

**Colorado Spectrum, Inc.**  
748 Whalers Way, Suite E-201  
Fort Collins, CO 80525  
303-225-6929

**The Component Exchange**  
5-7 Ray Avenue  
Burlington, MA 01803-4720  
800-786-9590  
Fax: 617-391-9150

**Computer Component Source\*D**  
135 Eileen Way  
Syosset, NY 11791  
516-496-8727  
800-356-1227  
Fax: 800-926-2062

**Computer Doctors**  
9204-B Baltimore Blvd.  
College Park, MD 20740  
301-474-3095  
E-mail: Support@idbdnet.com  
Website:  
Http://www.ldbdnet.com/ramstar

**The Computer Industry Almanac**  
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Glenbrook, NV 89413  
702-749-5053  
800-377-6810  
Fax: 702-749-5864  
E-mail: Info@c-i-a.com  
Website: Http://www.c-i-a.com

**Computer Maintenance Training**  
241 Boston Post Road W  
Marlboro, MA 01752  
508-624-7708  
800-952-5977  
Fax: 508-624-4179  
E-mail: Cmtc@ma.ultranet.com  
Website: Http://www.cmtctrains.com

**Computer & Monitor Maintenance**  
6649 Peachtree Ind. Blvd  
Suite N1  
Norcross, GA 30092-4302  
770-662-5633  
800-466-4411  
Fax: 770-840-8814  
Website:  
Http://www.computermonitor.com

**Computer Parts Unlimited\*D**  
5069 Maureen Lane  
Moorpark, CA 93021  
805-532-2500  
Fax: 805-532-2599

**Computer Coverup, Inc.**  
2762 Clybourn Avenue  
Chicago, IL 60614  
312-327-9200  
800-282-2541

**Computer Power Inc.**  
124 W. Main St.  
High Bridge, NJ 08829-1707  
908-638-8000  
800-526-5088  
Fax: 908-638-4931

**Computer Products**  
Power Conversion  
7 Elkins St  
South Boston, MA 02127  
617-464-6639  
Fax: 617-464-6612

**Computer Svcs of America\*D**  
1050 Perimeter Road  
Manchester, NH 03103  
603-644-5005  
800-255-7815  
Fax: 603-644-4645

**Computer Transaction Systems**  
15 Bayview St  
PO Box 56  
North Weymouth, MA 02191  
617-331-6968  
800-331-6968  
Fax: 617-331-6969  
E-mail: Ctsysinc@concentric.net

## Company mailing addresses

### Computer Connection

1101 W 80th  
Minneapolis, MN 55420  
612-884-0758  
Fax: 612-884-2206

### Computing Technology Ind. Asso

CTIA  
450 E 22nd St  
Lombard, IL 60148-6158  
800-333-9532  
Fax: 708-268-1384

### Compuvideo

3861 Oceanview Ave.  
Brooklyn, NY 11224  
718-372-8630

### Connector Corporation

4720 Yender Ave  
Lisle, IL 60532  
630-969-3400  
Fax: 630-969-3545

### Consolidated Elctrnics, Inc.\*D

705 Watervliet Ave.  
PO Box 20070  
Dayton, OH 45420-0070  
937-252-5662  
800-543-3568  
Fax: 937-252-4065/4066  
E-mail: Cei@ceitron.com  
Website: [Http://www.ceitron.com](http://www.ceitron.com)

### Contact East, Inc.\*D

335 Willow Street  
North Andover, MA 01845  
508-682-2000  
800-225-5334  
Fax: 508-688-7829  
E-mail: Sales@contact-east.com  
Website: [Http://www.contact-east.com](http://www.contact-east.com)

### Controlled Power Co.

1955 Stephenson Highway  
Troy, MI 48083  
248-528-3700  
800-521-4792  
Fax: 248-528-0411  
E-mail: Rich-d@controlledpwr.com  
Website:  
[Http://www.controlledpwr.com](http://www.controlledpwr.com)

### Conway Engineering, Inc.

8393 Capwell Drive  
Oakland, CA 94621-2113  
510-568-4028  
800-626-6929  
Fax: 510-568-1397  
E-mail: Conway@crl.com  
Website:  
[Http://www.crl.com/conway/](http://www.crl.com/conway/)

### Cook's Inst. of Elec. Engrg.

4251 Cypress Drive  
Jackson, MS 39212  
601-371-1351  
Fax: 601-371-2619

### Cooper Associates\*D

112 Oakwood Road  
McMurray, PA 15317  
412-941-6473  
Fax: 412-941-3410

### Coordinated Service, Inc.

20 A Court St  
Groton, MA 01450  
978-448-3800  
Fax: 978-448-0060  
E-mail: Wherbert@coord.com  
Website: [Http://www.coord.com](http://www.coord.com)

### Core Software

26303 Oak Ridge Drive  
Spring, TX 77380-1918  
281-292-2177  
Fax: 282-298-1492  
E-mail: Core@coresoftware.com  
Website:  
[Http://www.coresoftware.com](http://www.coresoftware.com)

### Corporate Systems Center\*D

1294 Hammerwood Avenue  
Sunnyvale, CA 94089  
408-734-3475  
Fax: 408-745-1816

### Cooper Tools

PO Box 30100  
Raleigh, NC 27622-0100  
919-362-7510  
Website: [Http://www.coopertools.com](http://www.coopertools.com)

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Lake Worth, FL 33461  
561-547-3383  
Fax: 561-547-1113  
E-mail: Rgc@aol.com

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186 University Parkway  
Pomona, CA 91766  
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800-858-4880 (DOM)  
Fax: 909-594-4761  
E-mail: Crccompnts@aol.com

### CRC Industries, Inc.

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Warminster, PA 18974-0586  
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800-556-5074  
Fax: 215-674-2207

### CRC Press, Inc.

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Boca Raton, FL 33431  
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630-574-9025  
888-564-4737  
Fax: 630-574-9026  
E-mail:  
75343,2575@compuserve.com  
Website: [Http://www.logiserv.com](http://www.logiserv.com)

### Creative Electronics

1417 N. Selfridge  
Clawson, MI 48017  
248-435-8916

### CSI/SPCCO

1172 Route 109  
Lindenhurst, NY 11757-0624  
516-957-8700  
800-645-5516  
Fax: 516-957-9142

### CSTS Inc.

4123 East La Palma  
Anaheim, CA 92807-1813  
714-961-2787  
Fax: 714-961-6010  
E-mail: Csts@csts.com  
Website: [Http://www.csts.com](http://www.csts.com)

### CTS Services

31 Hayward St.  
Franklin, MA 02038  
508-528-7220  
Fax: 508-528-3919

### CUI Stack

9640 S.W. Sunshine Ct Ste 700  
Beaverton, OR 97005  
503-643-4899  
Fax: 503-643-6129

### The Current Source\*D

5159 Glenwood  
Boise, ID 83714  
208-323-9692  
Fax: 208-323-9691  
E-mail: Crntsrc@currentsource.com

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Dallas, TX 75238  
214-503-8880  
Fax: 214-503-8515

### Custom Components Corp\*D

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Big Bend, WI 53103  
414-662-5266  
Fax: 414-662-3781

### Custom Data Associates

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Baltimore, MD 21234-4307  
410-668-9594  
800-451-0137  
Fax: 410-661-3942  
E-mail: Cda282@aol.com

### Cypress Information Resources

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Los Gatos, CA 95032  
408-354-4887  
Fax: 408-354-5058

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### Dactronix

15681 Highway 72  
Rolla, MO 65401-5827  
314-364-0193

### D&D Enterprises

27W937 Commercial Avenue  
Barrington, IL 60010  
708-381-0789  
800-445-7949

### Daetron

935 The Queensway  
Postal Station U, Box 641  
Toronto, ON M8Z 5Y9  
Canada  
416-676-1600

### Dak Tech\*D

4900 Ritter Road  
Mechanicsburg, PA 17055  
717-795-9544  
800-325-3238  
Fax: 717-795-9420

### Dak Tech\*D

4025 9th Avenue SW  
Fargo, ND 58103  
701-282-6686

### Dalbani Corporation\*D

4225 NW 72nd Avenue  
Miami, FL 33166-6341  
305-716-1016  
800-325-2264  
Fax: 305-594-6588

### Dalco Electronics\*D

475 South Pioneer Blvd  
Springboro, OH 45066-1180  
513-743-8042  
800-445-5342  
Fax: 513-743-9251  
E-mail:  
Website: [Http://www.dalco.com](http://www.dalco.com)

### Dana Corp Warner Electric

Motors and Controls Division  
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Bristol, CT 06010  
860-585-4556  
800-787-3532  
Fax: 860-582-3784  
E-mail: Ted.gladis@dana.com  
Website:  
[Http://www.warner.com/sev\\_main.html](http://www.warner.com/sev_main.html)

### Dandy Mfg. Co.

2323 Gibson St.  
Muskogee, OK 74403  
918-682-4286

### Data Business Publishing

15 Inverness Way East  
MSB 203  
Englewood, CO 80112-5776  
303-799-0381  
800-447-4666  
Fax: 303-799-4082  
E-mail: Data.sales@ihs.com  
Website: [Http://www.data.ihs.com](http://www.data.ihs.com)

### Dariana Software

5241 Lincoln Avenue, Suite B5  
Cypress, CA 90630  
714-236-1380

### Data Depot, Inc.

1710 Drew Street, Suite 1  
Clearwater, FL 34615-6213  
813-446-3402  
800-275-1913  
Fax: 813-443-4377

### D.A.T.A.

15 Inverness Way East  
PO Box 6510  
Englewood, CO 80155-6510  
303-799-0381  
800-447-4666  
Fax: 303-799-4082

### Data-Basics Inc.

9450 Midwest Ave  
Garfield Heights, OH 44125  
216-663-5600  
800-837-7574  
Fax: 216-663-5454

### DataBasic

120 Judd St  
Bristol, CT 06010  
800-967-5924

### Datacomm Distribution

2490 Black Rock Turnpike #403  
Fairfield, CT 06432  
203-367-7767  
Fax: 203-367-7040

### Dataproducts Corporation

528 Route 13 South  
Milford, NH 03055  
603-673-9100  
603-673-3091

### Datatech Depot, Inc.

1371 North Miller St.  
Anaheim, CA 92806  
714-996-7500  
Fax: 714-970-1670

## Company mailing addresses

**Datatron Corp.**  
355 Yuma Street  
Denver, CO 80223  
303-778-0870

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PO Box 30191  
Mesa, AZ 85275  
602-835-2243  
Fax: 602-835-2243  
Website: [Http://www.daytaco.com](http://www.daytaco.com)

**Dazor Manufacturing Corp.**  
4483 Duncan Avenue  
St. Louis, MO 63110-1111  
314-652-2400  
800-345-9103  
Fax: 314-652-2069  
E-mail: [Info@dazor.com](mailto:Info@dazor.com)  
Website: [Http://www.dazor.com](http://www.dazor.com)

**Decision Systems Plus**  
10400 W Higgins Rd.  
Rosemont, IL 60018-3711  
847-699-9960  
Fax: 847-699-0972

**DC Electronics**  
PO Box 3203  
Scottsdale, AZ 85257  
602-945-7736  
800-423-0070  
Fax: 602-994-1707

**Delphi**  
PO Box 5484  
Parsippany, NJ 07054-6484

**Delta Warranty**  
1775 12th Ave  
Issaquah, WA 98027  
206-391-2000  
800-733-3358  
Fax: 206-450-1311

**Deltron, Inc.**  
290 Wissahickon Ave.  
North Wales, PA 19454  
215-699-9261  
800-523-2332  
Fax: 215-699-2310

**Den-On Instruments (USA), Inc.**  
2079 S Atlantic Blvd, Ste C  
Monterey Park, CA 91754-6348  
213-266-5960  
800-397-5960  
Fax: 213-266-5963

**Depot America**  
1345 Campus Parkway  
Neptune, NJ 07753  
800-648-6833  
Fax: 908-919-1929

**Desco**  
761 Penarth Avenue  
Walnut, CA 91789  
909-598-2753  
Fax: 909-595-7028  
E-mail: [Dbermani@desco.com](mailto:Dbermani@desco.com)  
Website:  
[Http://www.desco.com/desco](http://www.desco.com/desco)

**DeVry**  
1 Tower Lane  
Oak Brook Terr, IL 60181  
708-571-7700

**Diagsoft, Inc.**  
5615 Scotts Valley Drive  
Suite 140  
Scotts Valley, CA 95066  
408-438-8247  
Fax: 408-438-7113

**Dialight Corporation**  
1913 Atlantic Ave  
Manasquan, NJ 08736-1005  
732-223-9400  
Fax: 732-223-8788  
Website: [Http://www.dialight.com](http://www.dialight.com)

**Digi-Key D\***  
701 Brooks Ave. S.  
PO Box 677  
Thief River Falls, MN 56701  
218-681-6674  
800-344-4539  
Fax: 218-681-3380  
E-mail: [Sales@digikey.com](mailto:Sales@digikey.com)  
Website: [Http://www.digikey.com](http://www.digikey.com)

**Digitech Industries Inc.**  
P.O. Box 2267  
55 Kenosia Ave  
Danbury, CT 06813-2267  
203-797-2676  
Fax: 203-797-2682

**Disk Technician Corp.**  
1940 Garnet Avenue  
San Diego, CA 92109  
619-274-5000

**Diversified Case Co., Inc.**  
50 Harbor Point  
Utica, NY 13502  
315-797-2725  
Fax: 315-797-5231

**Diversified Parts\*D**  
2114 S.E. 9th Ave.  
Portland, OR 97214-4615  
503-236-6140  
800-379-7737  
Fax: 800-373-2987  
E-mail:  
[Orderdesk@diversifiedparts.com](mailto:Orderdesk@diversifiedparts.com)

**Dolch Computer Systems**  
3178 Laurel View Court  
Fremont, CA 94538  
800-538-7506

**Dot Shop, The**  
12025 NE Summer St.  
Portland, OR 97220  
503-256-7585  
800-487-6025  
Fax: 503-256-7588

**Dow U.S.A.**  
2020 Willard H. Dow Center  
Midland, MI 48674  
800-447-4369

**R.L. Drake Company**  
P.O. Box 112  
Miamisburg, OH 45342  
513-866-2421

**Dranetz-BMI**  
1000 New Durham Road  
Edison, NJ 08818  
908-287-3680  
800-372-6832  
Fax: 908-248-1834  
E-mail: [Sales@dranetz-bmi.com](mailto:Sales@dranetz-bmi.com)  
Website: [Http://www.dranetz-bmi.com](http://www.dranetz-bmi.com)

**Dremel**  
4915 21st Street  
Racine, WI 53406  
414-554-1390  
800-437-3635  
Fax: 414-554-7654

**Dymax**  
51 Greenwood Rd  
Torrington, CT 06790  
860-496-0608

**Dynaloy, Inc.**  
1910 State Avenue  
Indianapolis, IN 46203  
800-669-5709  
Fax: 800-671-9583

**Dynamic Learning Systems**  
PO Box 282  
Jefferson, MA 01522-0282  
508-829-6744  
Fax: 508-829-6819  
Website: [Http://www.dlspubs.com/](http://www.dlspubs.com/)

# E

**Eagan Technical Services, Inc.**  
1408 Northland Drive  
St Paul, MN 55120  
612-688-0098  
800-285-1873  
Fax: 612-688-7829

**East Coast Transistor\*D**  
2 Marlborough Road  
West Hemstead, NY 11552-1712  
516-483-5742  
800-645-3516  
Fax: 800-733-5904  
E-mail: [Ectd@aol.com](mailto:Ectd@aol.com)

**Echelon Industries\*D**  
20681 E. Truss Court  
Walnut, CA 91789  
714-594-1891  
Fax: 714-598-3810

**Edroy Products**  
P.O. Box 998  
Nyack, NY 10960  
914-358-6600  
800-233-8803

**EFI Electronics Corporation**  
2415 South 2300 West  
Salt Lake City, UT 84119-2028  
800-729-3496  
Fax: 801-977-0200

**Eico Electronics**  
363 Merit Road  
Lynnbrook, NY 11563  
516-599-5744

**Eiger Electronics\*D**  
70A E. Jefryn Blvd.  
Deer Park, NY 11729  
516-242-2583/84  
Fax: 516-242-2586

**E.I.L. Instruments, Inc.\*D**  
10946A Golden West Drive  
Hunt Valley, MD 21031-1320  
410-584-7400  
800-345-4678  
Fax: 410-584-7561  
Website: [Http://www.eilinst.com](http://www.eilinst.com)

**Electro Insulation Corporation**  
3921 Ventura Drive  
Arlington Heights, IL 60004  
312-632-1020  
800-247-2114  
Fax: 312-632-1089

**Electro Tool, Inc.**  
9103 Gilman  
Livonia, MI 48150  
313-422-1221  
800-772-3455  
Fax: 313-422-3432

**Electrodyn, Inc.**  
501 E. Temperance St.  
Ellettsville, IN 47429  
812-876-2522  
800-937-1023  
Fax: 812-876-2533

**Electro Dynamics, Inc.\*D**  
EDI  
7 Oser Avenue  
Hauppauge, NY 11788  
516-496-4400  
800-426-6423  
Fax: 800-873-2948  
E-mail: [Sales@edi-sales.com](mailto:Sales@edi-sales.com)

**Electromatic Controls/**  
Soar Instruments  
2495 Pembroke Ave.  
Hoffman Estates, IL 60195  
708-882-5757  
800-222-2659  
Fax: 708-882-7234

**Electrohome**  
181 Cooper Ave, Suite 100  
Tonawanda, NY 14150  
716-874-3630  
Fax: 716-874-4309

**Electro Standards Lab, Inc.**  
Data Comm Prods Div  
36 Western Industrial Drive  
Cranston, RI 02921  
401-943-1164  
Fax: 401-946-5790  
E-mail: [Esrlab@ids.net](mailto:Esrlab@ids.net)  
Website:  
[Http://www.electrostandards.com](http://www.electrostandards.com)

**Electro-Metrics, Incorporated**  
A Penril Corporation  
231 Enterprise Road  
Johnstown, NY 12095  
518-762-2600

**Electron Processing**  
P.O. Box 68  
Cedar, MI 49621  
616-228-7020

**Electronic Inst. of Brooklyn**  
4823 Avenue N  
Brooklyn, NY 11234

**Electronic Design Specialists**  
4647 Appalachian St  
Boca Raton, FL 33428-4104  
561-487-6103

**EIA/CEMA Product Services**  
2500 Wilson Blvd  
Arlington, VA 22201-3834  
703-907-7670  
Fax: 703-907-7968  
Website: [Http://www.cemacity.org](http://www.cemacity.org)

**Electronic Prod. Specialties\*D**  
W140 N5084 Lilly Rd  
Menomonee Falls, WI 53051  
414-783-6300  
800-783-3337  
Fax: 414-783-6707

**Electronic Parts Supply\*D**  
4071 Emery Street  
Emeryville, CA 94608  
510-420-1040  
800-227-0104  
Fax: 510-420-0812  
E-mail: [MImlid@aol.com](mailto:MImlid@aol.com)  
Website: [Http://www.gen.com/wondarl](http://www.gen.com/wondarl)

## Company mailing addresses

### Electronic Software Developers

826 South Main Street  
South Farmingdale, NY 11735-4152  
516-221-6403  
800-621-8477 (TIPS)  
E-mail: [Esd@pa.net](mailto:Esd@pa.net)  
Website: [Http://www.pa.net/vcrtips](http://www.pa.net/vcrtips)

### Electronic Specialists, Inc.

171 South Main Street  
Natick, MA 01760  
508-655-1532  
800-225-4876  
Fax: 508-653-0268  
E-mail: [Clipprx@ix.netcom.com](mailto:Clipprx@ix.netcom.com)  
Website: [Http://www.elect-spec.com](http://www.elect-spec.com)

### Electronic Systems

624 Cedar St.  
Rockford, IL 61101  
815-968-1040  
Fax: 815-962-1495

### Electronics Representatives As

444 N Michigan Ave  
Suite 1960  
Chicago, IL 60611  
312-527-3050  
800-776-7377  
Fax: 312-527-3783  
E-mail: [Info@era.org](mailto:Info@era.org)  
Website: [Http://www.era.org](http://www.era.org)

### Electronics Warehouse Corp.\*D

1910 Coney Island Ave.  
Brooklyn, NY 11230-6590  
718-375-2700  
800-221-0424  
Fax: 718-375-2796

### Electronix Corp.\*D

1 Herald Square  
Fairborn, OH 45324-5155  
937-878-1828  
800-223-3205  
Fax: 937-878-1972  
E-mail: [Sales@electronix.com](mailto:Sales@electronix.com)  
Website: [Http://www.electronix.com](http://www.electronix.com)

### Electro-Tech Systems, Inc.

115 East Glenside Avenue  
Glenside, PA 19038  
215-887-2196  
Fax: 215-887-0131  
E-mail: [Brianh@etsz.com](mailto:Brianh@etsz.com)  
Website: [Http://www.electrotechsystems.com](http://www.electrotechsystems.com)

### Electronix Express\*D

365 Blair Road  
Avenel, NJ 07001-2201  
908-381-8020  
800-972-2225  
Fax: 908-381-1572

### Electroservice Laboratories

6085 Sikorsky St.  
Ventura, CA 93003  
805-644-2944  
Fax: 805-644-5006  
E-mail: [Info@esl.com](mailto:Info@esl.com)  
Website: [Http://www.esl.com/](http://www.esl.com/)

### Elgar Corp.

9250 Brown Deer Road  
San Diego, CA 92121  
619-450-0085  
800-733-5427  
Fax: 619-458-0267  
E-mail: [Sales@elgar.com](mailto:Sales@elgar.com)  
Website: [Http://www.elgar.com](http://www.elgar.com)

### C.H. Ellis Company, Inc.

2432 Southeastern Ave.  
Indianapolis, IN 46201  
317-636-3351  
800-466-3351  
Fax: 317-635-5140  
Website: <http://www.thomasregister.com/elliscase>

### Eltrex Industries Inc.

65 Sullivan St.  
Rochester, NY 14605  
716-454-6100 X222  
Fax: 716-263-7766

### Elvo Division of

Zumbach Electronics Corp.  
140 Kisco Ave.  
Mount Kisco, NY 10549-1407  
914-241-1008

### Emerson Radio Corp.

One Emerson Lane  
North Bergen, NJ 07047  
201-854-4800  
800-695-0095 Order

### E.M.T. Parts, Inc.\*D

2031 East Via Burton St.  
Suite J  
Anaheim, CA 92806  
714-758-8769  
800-448-7892  
Fax: 714-758-8768

### Emulation Technology, Inc.

2344 Walsh Ave., Building F  
Santa Clara, CA 95051  
408-982-0660  
Fax: 408-982-0664

### Entech Corp

2486 Dunwin Drive  
Mississauga, ON L52 1J9  
Canada  
905-820-3030

### Equus C/O Unistar

13562 Pawnee  
Tustin, CA 92680  
714-730-7936

### The Eraser Company, Inc.

Oliva Drive  
PO Box 4961  
Syracuse, NY 13221-4961  
315-454-3237  
800-724-0594  
Fax: 315-454-3090  
E-mail: [Info@eraser.com](mailto:Info@eraser.com)  
Website: [Http://www.eraser.com](http://www.eraser.com)

### ESP Inc.

14 Blackstone Valley Place  
Lincoln, RI 02865-1145  
401-333-3800  
800-338-4353  
Fax: 401-333-4954

### Essential Seminars

297-101 Kinderkamack Road  
Suite 122  
Oradell, NJ 07649  
201-986-1678  
Fax: 201-986-1679

### EURAS USA, Inc.

501 Sycamore Street, Ste 300  
Waterloo, IA 50703-4643  
319-236-2000  
800-453-8727  
Fax: 319-236-2020  
E-mail: [Info@euras.com](mailto:Info@euras.com)

### Electronic Technicians Assn.

602 N. Jackson  
Greencastle, IN 46135-1035  
765-653-8262  
800-288-3824  
Fax: 765-653-8262  
E-mail: [Eta@indy.tdsnet.com](mailto:Eta@indy.tdsnet.com)  
Website: [Http://www.eta-sda.com](http://www.eta-sda.com)

### Excel Distributing\*D

1819 Mentor Ave  
Cincinnati, OH 45212  
513-531-3989  
800-733-3329  
Fax: 800-735-8007

### Extech Instruments Corp.\*D

335 Bear Hill Road  
Waltham, MA 02154  
781-390-7440  
Fax: 781-890-7864  
E-mail: [Extech@extech.com](mailto:Extech@extech.com)  
Website: [Http://www.extech.com](http://www.extech.com)

### E-Z Hook

225 North Second Avenue  
PO Box 450  
Arcadia, CA 91066  
818-446-6175  
Fax: 818-466-0972

## F

### Fairway Electronics\*D

4210 Howard Ave.  
Kensington, MD 20895  
301-564-1440

### The Fax Doctor

85 West Wilmot St.  
Richmond Hill, ON L4B 1K7  
Canada  
905-882-0700  
800-265-0700

### Falcon Safety Products

25 Chubb Way  
Branchburg, NJ 08876  
908-707-4900  
Fax: 908-707-8855

### Fedco Electronics, Inc.\*D

PO Box 1403  
Fond Du Lac, WI 54936  
414-922-6490  
800-542-9761  
Fax: 414-922-6750  
E-mail: [Fedco@attmail](mailto:Fedco@attmail)

### Federal Warranty Service Corp.

PO Box 3490  
Cerritos, CA 90703  
800-223-1025

### Fessenden Technologies

116 3rd Street  
Ozark, MO 65721  
417-485-2501  
Fax: 417-485-3133

### Fiber Options, Inc.

80 Orville Drive, Suite 102  
Bohemia, NY 11716-2506  
516-567-8320  
800-342-3748  
Fax: 516-567-8322  
E-mail: [Info@fiberoptions.com](mailto:Info@fiberoptions.com)  
Website: [Http://www.fiberoptions.com](http://www.fiberoptions.com)

**Fieldpiece Instruments**  
231 East Imperial Highway  
Suite 250  
Fullerton, CA 92835  
714-992-1239  
Fax: 714-992-6541

**Fifth Generation Systems**  
10049 North Reiger Road  
Baton Rouge, LA 70809-4562  
504-291-7221

**Fluke Corporation**  
PO Box 9090 M/S 250E  
Everett, WA 98206-9090  
206-347-6100  
800-44-FLUKE  
Fax: 206-356-5116  
E-mail: [Fluke-info@tc.fluke.com](mailto:Fluke-info@tc.fluke.com)  
Website: [Http://www.fluke.com](http://www.fluke.com)

**Foley-Belsaw\*D**  
6301 Equitable Road  
Kansas City, MO 64120-1395  
816-483-2700  
800-821-3452  
Fax: 816-483-5010  
E-mail: [Electronics@foley-belsaw.com](mailto:Electronics@foley-belsaw.com)  
Website: [Http://www.foley-belsaw.com](http://www.foley-belsaw.com)

**Forefront Direct**  
18820 US Hwy 19N Suite 215  
Clearwater, FL 34624  
813-539-7283  
Fax: 813-531-0200

**Fotec Inc**  
151 Mystic Ave  
Medford, MA 02155-4615  
781-396-6155  
800-537-8254  
Fax: 617-396-6395  
E-mail: [Info@fotec.com](mailto:Info@fotec.com)  
Website: [Http://www.std.com/fotec](http://www.std.com/fotec)

**Fotronic Corporation\*D**  
PO Box 708  
Medford, MA 02155-0006  
617-665-1400  
800-996-3837  
Fax: 617-665-0780

**Four Star Chemical**  
5701 South Compton Avenue  
Los Angeles, CA 90011  
213-588-7166  
800-243-6264  
Fax: 213-582-6226

**Fox International\*D**  
23600 Aurora Road  
Bedford Heights, OH 44146-1712  
216-439-8500  
800-321-6993  
Fax: 800-445-7991  
E-mail: [Foxintl@aol.com](mailto:Foxintl@aol.com)  
Website: [Http://www.fox-international.com](http://www.fox-international.com)

**Fox International\*D**  
241A Central Ave  
Farmingdale, NY 11735  
516-694-0596  
800-874-1765  
Fax: 800-635-0595

**Franks Electronics\*D**  
PO Box 357  
Glen, MS 38846  
601-287-1594

**R. Frazier Inc.\*D**  
1300 Intervale Drive  
Salem, VA 24153  
703-387-3799  
Fax: 703-387-1180

**Frederick Engineering, Inc.**  
10200 Old Columbia Rd.  
Columbia, MD 21046  
410-290-9000  
Fax: 410-381-7180

**Future Active**  
41 Main St  
Bolton, MA 01740  
800-655-0006  
Fax: 800-645-2953



**Galco Industrial Electronics\*D**  
26010 Pinehurst Drive  
Madison Heights, MI 48071-4189  
248-542-9090  
800-827-8902  
Fax: 248-542-8031  
E-mail: [Sales@galco.com](mailto:Sales@galco.com)  
Website: [Http://www.galco.com](http://www.galco.com)

**GC Electronics\*D**  
A Division of GC Thorsen Co.  
1801 Morgan Street  
Rockford, IL 61105-1209  
815-968-9661  
800-443-0852  
Fax: 800-527-3436

**GE Remarketing Services\*D**  
2912 Pacific Dr  
Norcross, GA 30071  
404-263-5984  
800-431-7671  
Fax: 404-263-5780

**GE Consumer Service**  
4421 Bishop Lane  
Louisville, KY 40218  
800-572-2455

**Geist Inc.**  
P.O. Box 83088  
Lincoln, NE 68501  
402-474-3400  
800-432-3219  
Fax: 402-474-4369

**Gemini Inc.**  
103 Mensing Way  
Cannon Falls, MN 55009  
507-263-3957  
800-533-3631  
Fax: 507-263-3129  
E-mail: [Cases@signletters.com](mailto:Cases@signletters.com)

**General Diagnostics Inc.**  
400-B Devon Park Drive  
Wayne, PA 19087  
610-687-0900  
800-613-1010  
Fax: 610-687-0901  
E-mail: [Gdi@netreach.net](mailto:Gdi@netreach.net)

**General Disk Services**  
1530 Montague Expressway  
San Jose, CA 95131  
408-432-0537  
Fax: 408-434-1015

**General Power Systems, Inc.**  
17881 Cartwright Road  
Irvine, CA 92714  
714-851-0800  
Fax: 714-851-1181

**Genicom Corporation**  
1 Genicom Drive  
Waynesboro, VA 22980-1999  
800-535-4364  
Fax: 703-949-1500

**GEne Services**  
C/O Radio & Electronics  
21 Madison Plaza #149  
Madison, NJ 07940-2354  
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Van Nuys, CA 91411  
818-787-2100  
Fax: 818-786-4354

**Geotest, Inc**  
18242 McDermott St Suite A  
Irvine, CA 92714-6719  
714-263-2222  
800-886-1201  
Fax: 714-263-1203

**Gibson Research Corp.**  
27071 Cabot Rd  
Suite 105  
Laguna Hills, CA 92653-7009  
714-348-7100  
800-736-0637  
Fax: 714-348-7110

**Global Communications, Inc.**  
Global One Center  
472 Capital Circle NW  
Tallahassee, FL 32304  
904-574-6633  
800-659-8659  
Fax: 904-574-6663

**Global Kitting**  
P.O. Box 1757  
Roseburg, OR 97470  
503-672-5332  
Fax: 503-672-0614

**Global Micro-Parts Depot\*MD**  
11151 Denton Drive  
Dallas, TX 75229-4707  
972-241-9470  
800-325-8488  
Fax: 972-241-2800  
Website: [Http://www.allapplianceparts.com](http://www.allapplianceparts.com)

**Global Specialties**  
A Division of Interplex  
70 Fulton Terrace  
New Haven, CT 06512  
203-466-6103  
800-572-1028  
Fax: 203-468-0060  
Website: [Http://www.globalspecialties.com](http://www.globalspecialties.com)

**GlobeTech International, Inc.**  
1684 S. Research Loop  
Tucson, AZ 85710  
602-298-6900  
800-654-7314  
Fax: 602-298-1913

**GMB/dba Fox International\*D**  
140 N. Belle Mead Road  
Setauket, NY 11733  
800-874-1765  
Fax: 800-635-0596

**Go-Video, Inc.**  
7835 East McClain Drive  
Scottsdale, AZ 85260-1732  
602-998-3400  
Fax: 602-998-0381  
E-mail: [Parts@govideo.com](mailto:Parts@govideo.com)

**Good-Lyddon Data Systems**  
6879 Sard Street  
Rancho Cucamonga, CA 91701  
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**Gore Laboratories, Inc.**  
3 Northern Blvd  
Amherst, NH 03031  
606-672-4673  
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**Gould Instrument Systems Inc.**  
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Valley View, OH 44125-6100  
216-328-7000  
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Fax: 216-328-7417

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Brookfield, VT 05036  
802-276-3162  
802-276-3837

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24200 Burbank Blvd.  
Woodland Hills, CA 91367  
818-887-5533  
Fax: 818-883-5188

**Greenlee Textron, Inc.**  
4455 Boeing Drive  
Rockford, IL 61109  
815-397-7070  
Fax: 815-397-8289

**Guardian Computer Support, Inc**  
1177 Quarry Lane, Suite F  
Pleasanton, CA 94566  
510-846-3649  
800-752-8733 X102  
Fax: 510-846-4596



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PO Box 28  
Whitewater, WI 53190-0176  
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Website: [Http://www.wihatools.com](http://www.wihatools.com)

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800-241-6558  
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903-657-6320  
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2515 Frazier Ave  
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608-221-7500  
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<http://www.hi-techniques.com>

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PO Box 6795  
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800-524-0692  
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Fax: 610-837-7978  
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Website: [Http://www.lascarelectronics.com](http://www.lascarelectronics.com)

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**McAfee Associates, Inc.**

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E-mail: [Sales@platoproducts.com](mailto:Sales@platoproducts.com)  
Website:  
[Http://www.platoproducts.com](http://www.platoproducts.com)

### Platt Luggage, Inc.

4051 W. 51st St.  
Chicago, IL 60632-4211  
773-838-2000  
800-222-1555  
Fax: 773-838-2010  
Website: [Http://www.plattluggage.com](http://www.plattluggage.com)

### Plaza Distributing\*D

13268 66th Street N.  
Largo, FL 34643  
813-531-5484  
800-531-5484  
Fax: 813-530-1821

### Polaris Div. of UXL Corp.

108-02 Otis Ave.  
Corona, NY 11368  
718-271-5200  
Fax: 718-271-5738

### G.M. Popkey Company, Inc.

2035 Larsen Rd.  
PO Box 12237  
Green Bay, WI 54307-2237  
414-497-0400  
800-444-5920  
Fax: 414-497-4894

### J.S. Popper, Inc.

PO Box 206  
Little Ferry, NJ 07643  
201-641-3252  
Fax: 201-440-4283

### Portasol, Inc.

3129 Chaucer Drive  
Charlotte, NC 28210-4818  
704-553-7346  
Fax: 704-553-7974

### PowerSource

9477 Waples St  
San Diego, CA 92121  
619-558-1227  
800-215-0049  
Fax: 619-558-1022  
E-mail: [Invo@powersourceonline.com](mailto:Invo@powersourceonline.com)  
Website:  
[Http://www.powersourceonline.com](http://www.powersourceonline.com)

### PowerTronics

143 Raymond Road  
PO Box 735  
Candia, NH 03034  
603-483-5876  
Fax: 603-483-5938  
E-mail: [Mikesaint@juno.com](mailto:Mikesaint@juno.com)  
Website:  
[Http://www.powertronics.com](http://www.powertronics.com)

### Pre-Owned Electronics

125 Middlesex Turnpike  
Bedford, MA 01730  
617-778-4600  
Fax: 617-778-4848

### Projector Recorder Belt\*D

P.O. Box 176  
Whitewater, WI 53190-0176  
414-473-2151  
800-558-9572  
Fax: 800-887-2727  
E-mail: [Info@prbline.com](mailto:Info@prbline.com)  
Website: [Http://www.prbline.com](http://www.prbline.com)

### Preferred Computer Svcs Inc.

6120 West by NW Blvd Suite 100  
Houston, TX 77040  
713-895-0600  
800-2251923  
Fax: 713-895-6885

### Prelco Electronics

605 Chestnut St.  
Union, NJ 07083  
908-851-8600  
Fax: 908-686-4656

### Premium Parts+ Electrnics Co\*D

W9390 State Road 59  
PO Box 28  
Whitewater, WI 53190-0176  
414-473-2151  
800-558-9572  
Fax: 800-887-2727

### Prentice Hall PTR

Simon & Schuster Education Grp  
One Lake St  
Upper Saddle River, NJ 07458  
201-236-7139  
Fax: 201-236-7131

### Prime Technology, Inc.

International Insts. Div.  
Twin Lakes Rd PO Box 185  
North Branford, CT 06471  
203-481-5721  
Fax: 203-481-8937

### Princeton Computer Support

5 Crescent Avenue  
PO Box 787  
Rocky Hill, NJ 08553  
609-921-8889  
800-682-5168  
Fax: 609-921-7691

### Print Products International\*D

8931 Brookville Rd.  
Silver Spring, MD 20910  
301-587-7824  
800-638-2020  
Fax: 800-545-0058  
E-mail: [Smprodintl@aol.com](mailto:Smprodintl@aol.com)

### Priority Computer Parts

125 Springhill Blvd #1  
Grass Valley, CA 95945  
916-272-8084  
Fax: 916-272-8090

### Pro-Services

808 North First Street  
Grants, NM 87020  
505-285-5604

### ProAmerica\*D

959 E. Collins  
Richardson, TX 75081  
800-888-9600  
Fax: 214-690-8648

### Probe Master, Inc.

215 Denny Way  
El Cajon, CA 92020  
619-258-7412  
800-772-1519  
Fax: 619-258-7413

### Production Devices

215 Denny Way  
El Cajon, CA 92020  
619-258-7303  
800-824-4226  
Fax: 619-258-1753

### Professional Business Systems

490 W. Arrow Highway, Suite F  
San Oiams, CA 91733

### Progressive Electronics

325 South El Dorado  
Mesa, AZ 85202  
602-966-2931  
800-967-8602  
Fax: 602-967-8602

### Prostat Corporation

1072 Tower Lane  
Bensenville, IL 60106  
630-238-8883  
Fax: 630-238-9717  
Website: [Http://www.prostatcorp.com](http://www.prostatcorp.com)

### H.C. Protek

154 Veterans Drive  
Northvale, NJ 07647  
201-767-7242  
Fax: 201-784-0611  
E-mail: [Hcprotek@aol.com](mailto:Hcprotek@aol.com)

### PTS Corporation

5233 South Highway 37  
PO Box 272  
Bloomington, IN 47402  
812-824-9331  
800-844-7871  
Fax: 812-824-2848  
E-mail: [Pts@ptscorp.com](mailto:Pts@ptscorp.com)  
Website: [Http://www.ptscorp.com](http://www.ptscorp.com)



**Q B Products\*D**

Microwave Parts Div  
1260 Karl Court  
Wauconda, IL 60084-1094  
847-487-3333  
800-323-6856  
Fax: 847-487-2689

**QuadTech, Inc.**

100 Nickerson Rd.  
Marlborough, MA 01752  
508-485-3500  
800-253-1230  
Fax: 508-485-0295  
E-mail: Sales@quadtechinc.com  
Website: [Http://www.quadtechinc.com](http://www.quadtechinc.com)

**Quantum Data**

2111 Big Timber Road  
Elgin, IL 60123  
847-888-0450  
Fax: 847-888-2802  
E-mail: Sales@quantumdata.com  
Website:  
[Http://www.quantumdata.com](http://www.quantumdata.com)

**Quasar**

50 Meadowlands Parkway  
Secaucus, NJ 07094  
800-447-4700

**Quarterdeck**

PO Box 18049  
Clearwater, FL 34622-1049  
813-443-1331  
800-683-6696  
Fax: 813-443-6603



**R&K Supply Co.\*D**

650 W Smith Rd #17  
Medina, OH 44256  
800-362-6780  
Fax: 800-840-TOOL

**Racal Instruments Inc.**

4 Goodyear Street  
Irvine, CA 92718  
714-859-8999  
800-722-2528  
Fax: 714-859-2505

**RAG Electronics Inc.\*D**

Box 2450 Turquoise Circle  
Newbury Park, CA 91320  
805-498-9933  
800-732-3457  
Fax: 805-498-3733

**RAM Software Enterprises**

3434 Bren Lee Court  
Indianapolis, IN 46227-7905  
317-881-0690  
E-mail:  
Ramssoftwaresystems@juno.com

**Ramsey Electronics Inc.**

793 Caning Parkway  
Victor, NY 14564  
716-924-4560  
Fax: 716-924-4555

**Rawn Co. Inc.**

P.O. Box 9  
Spooner, WI 54801  
715-635-8711  
800-826-6791  
Fax: 715-635-2200

**R.C. Distributing**

PO Box 552  
South Bend, IN 46624  
219-236-5776  
Website:  
[Http://www.south-bend.net/rcd](http://www.south-bend.net/rcd)

**Read/Right Products Division**

The Texwipe Company  
650 East Crescent Avenue  
Upper Saddle River, NJ 07458  
201-327-9100 X315  
800-327-1237  
Fax: 800-569-3600

**Recoton Corporation**

2950 Lake Emma Rd  
Lake Mary, FL 32746  
407-333-8900  
800-223-6009  
Fax: 407-333-8903  
E-mail: lldau@recoton.com  
Website: [Http://www.recoton.com](http://www.recoton.com)

**Rehart Engineering**

646 Gibbons Street  
Los Angeles, CA 90031  
213-225-7349

**Republic Packaging Corp.**

9160 S. Green  
Chicago, IL 60620  
312-233-6530  
Fax: 312-233-6005

**Resanonce**

5173 Waring Road, Suite 115  
San Diego, CA 92120  
619-287-3348

**Research Specialists Inc.**

1816 Settlers Reserve Oval  
Westlake, OH 44145  
216-871-8909

**Reset, Inc.**

49 Strathearn Place  
Simi Valley, CA 93065  
805-584-4900  
Fax: 805-583-2900

**The Rex Company**

12311 Loreleen St.  
Garden Grove, CA 92641  
714-530-0330  
Fax: 714-530-8577

**RF Industries**

7610 Miramar Rd  
San Diego, CA 92126-4202  
619-549-6340  
800-233-1728  
Fax: 619-549-6345  
E-mail: Rfi@rfindustries.com

**RF Parts\*D**

435 S Pacific St  
San Marcos, CA 92069  
619-744-0700

**RG Software, Inc.**

9015 E Via Linda #107-223  
Scottsdale, AZ 85258-5410  
602-657-6900  
Fax: 602-657-6815  
E-mail: Rgsoftware@rg-av.com  
Website: [Http://www.rg-av.com](http://www.rg-av.com)

**RGD Electronics**

107 Trumbull St  
Elizabeth, NJ 07206  
908-354-2300

**Richardson Electronics, Ltd.\*D**

40W267 Keslinger Road  
LaFox, IL 60147  
708-208-2200  
800-348-5580  
Fax: 708-208-2550

**Richmond Technology Inc.**

1897 E Colton Ave  
Redlands, CA 92374  
909-794-2111  
800-829-2942  
Fax: 909-794-4003

**Ripley Company**

Miller Tool Products  
46 Nooks Hill Rd.  
Cromwell, CT 06416  
860-635-2220  
800-528-8665  
Fax: 860-635-3631  
E-mail: Info@ripley-tools.com  
Website: [Http://www.ripley-tools.com](http://www.ripley-tools.com)

**Rite Off**

105 Park Ave.  
Seaford Industrial Park  
Seaford, DE 19973  
302-628-2100  
800-645-5863  
Fax: 302-628-2110

**RNJ Electronics Inc.\*D**

202 New Highway  
PO Bcx 667  
Amityville, NY 11701  
516-226-2700  
800-645-5833  
Fax: 516-226-2770  
E-mail: Rnjelect@rnjelect.com  
Website:

**Rogers Anti-Static Chemicals**

120 W. Madison, Room 1118  
Chicago, IL 60602  
312-276-0665  
Fax: 312-276-4371

**Rose Research & Development**

1626 Becky Court  
Santa Rosa, CA 95403  
707-526-9044

**RS Electronics\*D**

34443 Schoolcraft  
Livonia, MI 48150  
313-525-1155  
800-555-5312  
Fax: 800-773-5320  
Website:  
[Http://www.rselectronics.com](http://www.rselectronics.com)

**Ruppman Parts Distribution\*D**

2130 Townline Road  
Peoria, IL 61615-1560  
800-662-0504  
Fax: 309-691-2271

**Russell Industries\*D**

3000 Lawson Ave.  
Oceanside, NY 11572  
516-536-5000  
800-645-2202  
Fax: 516-764-5747



**Sage Data Systems**

Division of America West C&E  
1900 Elk St.  
Rock Springs, WY 82901-4005  
307-382-5663  
800-542-9378  
Fax: 307-382-7323

**Salen Enterprises\*D**

P.O. Box 915  
Morton Grove, IL 60053  
773-736-0999  
Fax: 773-736-4238

**Howard W. Sams & Company**

2647 Waterfront Pkwy E. Drive  
Indianapolis, IN 46214  
317-298-5400  
800-428-SAMS  
Fax: 317-298-5604  
Website: [Http://www.hwsams.com](http://www.hwsams.com)

**Sanyo Energy Corp.**

1201 Sanyo Ave.  
San Diego, CA 92073  
619-661-6620  
Fax: 619-661-6743

**Sargent Tool Company**

30 East Industrial Road  
Branford, CT 06405

**SBS Direct**

123 NW 13th St, Suite 213  
Boca Raton, FL 33432  
561-394-8771  
800-603-9000  
Fax: 561-361-9774  
E-mail: Jon@sbsdirect.com  
Website: [Http://www.sbsdirect.com](http://www.sbsdirect.com)

**Schematic Solutions, Inc.**

13043 Hunters Ridge St  
San Antonio, TX 78230-2847  
512-696-0404  
Fax: 512-696-7135

**Schlumberger Technologies**

Instruments Div.  
P.O. Box 7004  
Billerica, MA 01821  
508-671-9700  
800-225-5765  
Fax: 508-671-9704

**Schurter, Inc.**

1016 Clegg Court  
Petaluma, CA 94954  
707-778-6311  
800-848-2600  
Fax: 707-778-6401  
E-mail: Info@schurterinc.com  
Website: [Http://www.schurterinc.com](http://www.schurterinc.com)

**SDI Technologies**

800 Federal Boulevard  
Carteret, NJ 07008-1002  
908-855-9750  
Fax: 908-855-0224

**Sears Roebuck & Co**

3333 Beverly Rd  
Hoffman Estates, IL 60179  
800-225-2864  
Fax: 800-755-1346

**Satellite Dealers Association**

602 N. Jackson St.  
Greencastle, IN 46135  
765-653-4301  
800-288-3824  
Fax: 765-653-8262  
E-mail: Eta@indy.tdsnet.com  
Website: [Http://www.eta-sda.com](http://www.eta-sda.com)

**Seco Industries**

6909 E. Washington Blvd.  
Montebello, CA 90640  
213-726-9721  
Fax: 213-726-9776  
E-mail: Seco2@aol.com

## Company mailing addresses

### SelecTronics, Inc.

Two Tobey Village Office Park  
Pittsford, NY 14534  
716-248-3875  
Fax: 716-248-3868

### Semtronics Corp.

PO Box 94  
Oldwick, NJ 08858  
908-439-2030  
800-946-4646  
Fax: 404-487-1128

### Sencore Electronics

3200 Sencore Drive  
Sioux Falls, SD 57107  
605-339-0100  
800-SENCORE  
Fax: 605-339-0317  
E-mail: [Sencore@sencore.com](mailto:Sencore@sencore.com)  
Website: [Http://www.sencore.com](http://www.sencore.com)

### Service Electronics Inc.

20 Hanes Drive  
Wayne, NJ 07470  
973-872-1200  
Fax: 973-872-2068

### Service Management Software

931 Sunset Boulevard  
West Columbia, SC 29169  
803-791-5860  
Fax: 803-791-8521

### Serviceplan, Inc.

1099 18th Street Suite 950  
Denver, CO 80202  
303-297-9032

### Service Systems International

8717 West 110th St Suite 600  
Overland Park, KS 66210  
913-661-0190  
Fax: 913-661-0220

### ServiceWare Inc.

300 Allegheny River Boulevard  
Oakmont, PA 15139  
412-826-1158  
Fax: 412-826-0577

### ServiceWare Corporation

200 Montcalm Suite R8  
Hull, PQ J8Y 3B5  
819-770-4000  
Fax: 819-770-1795  
E-mail: [Info@serviceware.ca](mailto:Info@serviceware.ca)  
Website: [Http://www.serviceware.ca](http://www.serviceware.ca)

### Servicing Systems

37 Davenport Drive  
Stamford, CT 06040  
203-316-0414  
Fax: 213-316-0414  
E-mail: [103021.3220@compuserve.com](mailto:103021.3220@compuserve.com)

### Shape Electronics

2105 Corporate Drive  
Addison, IL 60101-1484  
708-620-8394  
800-367-5811  
Fax: 708-620-0784

### Sharp Electronics Corp

1300 Naperville Drive  
Romeoville, IL 60446  
630-226-2502  
Fax: 630-759-2101

### SHOGYO International Corp.

45 Executive Drive  
Plainview, NY 11803  
516-349-5200  
Fax: 516-349-7744

### Sibex, Inc.

1040 Harbor Lake Drive  
Safety Harbor, FL 34698  
813-726-4343  
Fax: 813-726-4434

### Sigma Electronics

632 Elkton Dr  
Colorado Springs, CO 80907  
719-528-1115  
Fax: 1-719-522-9291

### Signal Measurement Company

PO Box 1607  
Tomball, TX 77377-1607  
713-356-2584

### Simco Static Cntrl & Clnrm Prd

2257 N. Penn Rd.  
Hatfield, PA 19440  
215-822-2171  
800-538-0750  
Fax: 215-997-3450  
E-mail: [Simco@itw.com](mailto:Simco@itw.com)  
Website: [Http://www.simco-static.com](http://www.simco-static.com)

### SiliconSoft

5131 Moorpark Ave, Suite 303  
San Jose, CA 95129  
408-446-4521  
Fax: 408-446-5196

### Simpson Electronic Company

853 Dundee Ave.  
Elgin, IL 60120  
708-697-2260  
Fax: 708-697-2272

### Sirius Technologies

Route 2, Box 196A  
Colfax, WI 54730  
715-962-3592  
800-359-3592

### Sirius Software Inc.

345 West Second St, Suite 201  
Dayton, OH 45402  
937-228-4849  
800-788-4849  
Fax: 937-228-1159  
E-mail: [Sales@slrusgt.com](mailto:Sales@slrusgt.com)  
Website: [Http://www.slrusgt.com](http://www.slrusgt.com)

### SL Waber, Inc.

520 Fellowship Rd.  
Mount Laurel, NJ 08054  
609-866-8888  
800-634-1485  
Fax: 609-866-1945  
Website: [Http://www.waber.com](http://www.waber.com)

### SMH Electronics Co., Inc.

21 Pattersons Brook Rd.  
West Wareham, MA 02576  
508-291-7447  
Fax: 508-291-7449  
E-mail: [Ekozak@smhelectronics.com](mailto:Ekozak@smhelectronics.com)

### DW Smith & Associates

2929 Campus Drive Suite 200  
San Mateo, CA 94403  
415-349-7725  
Fax: 415-349-5693

### Smith Design

207 E Prospect Ave  
North Wales, PA 19454  
215-661-9107  
Fax: 215-661-9107  
E-mail: [Probe@valley.net](mailto:Probe@valley.net)

### Smithy Co.

PO Box 1517  
Ann Arbor, MI 48106  
313-913-6700  
800-345-6342  
Fax: 313-913-6663

### Snap-On Incorporated

2301 30th Street  
Kenosha, WI 53141-1410  
414-656-5701  
Fax: 414-656-4980

### Soder-Wick Fine-Braid

8125 Cobb Center Drive  
Kennesaw, GA 30152  
770-424-4888  
800-645-5244  
Fax: 770-424-4267

### Softdesk Retail Products

10725 Ambassador Drive  
Kansas City, MO 64153-1216  
816-891-1040  
Fax: 816-891-8018

### Sola Electric

1717 Busse Road  
Elk Grove Village, IL 60007-5666  
708-439-2800  
800-TRY-SOLA  
Fax: 800-626-6269

### SAT/ A SPIRIG CO.

Solder Absorbing Tech. Inc.  
144 Oakland St  
Springfield, MA 01108-1787  
413-788-6191  
800-628-8862  
Fax: 413-788-0490  
E-mail: [Info@spirig.com](mailto:Info@spirig.com)

### Solomat Neotronics

26 Pearl St.  
Norwalk, CT 06850  
203-849-3111  
800-SOLO-MAT  
Fax: 203-847-9320

### Sonera Technologies

PO Box 565  
Rumson, NJ 07760  
732-747-6886  
800-932-6323  
Fax: 732-747-4523  
E-mail: [Info@displaymate.com](mailto:Info@displaymate.com)  
Website: [Http://www.displaymate.com](http://www.displaymate.com)

### Sony Service Company

680 Kinderkamack Rd  
Oradell, NJ 07649  
201-986-3000  
Website: [Http://www.sel.sony.com](http://www.sel.sony.com)

### Sony National Parts Center

National Parts Div.  
8281 N.W. 107th Terrace  
Kansas City, MO 64153  
816-891-7550  
Fax: 800-821-5662

### Sony Technician Devel. Ctr.

390 University Ave.  
Westwood, MA 02090  
617-329-8308

### Specialized Prods Company\*

1100 S Kimball Ave  
Southlake, TX 76092  
817-329-6647  
800-866-5353  
Fax: 800-234-8286  
E-mail: [SpC@specializedproducts.com](mailto:SpC@specializedproducts.com)  
Website: [Http://www.specializedproducts.com](http://www.specializedproducts.com)

### Spectrum Computer Technologies

2150 Liberty Drive  
Niagara Falls, NY 14304  
716-283-0825  
800-879-3225  
Fax: 716-283-0828

### Spencer Industries

PO Box 449  
Dale, IN 47523  
812-937-5611  
Fax: 812-937-4637

### A.W. Sperry Instruments, Inc.

P.O. Box 9300  
Smithtown, NY 11787  
516-231-7050  
800-645-5398  
Fax: 516-434-3128

### Sperry Tech, Inc.

PO Box 5234  
Lincoln, NE 68505  
402-489-4054  
800-228-4338

### Spi-Ro Manufacturing, Inc.

PO Box 5500  
Lakeland, FL 33807-5500  
813-646-7925

### Sprague Magnetics, Inc.\*D

12806 Bradley Ave  
Sylmar, CA 91342  
818-364-1800  
800-553-8712  
Fax: 818-364-1810  
Website: [earthlink.net/~sprague-magnetics/](http://earthlink.net/~sprague-magnetics/)

### SR Components, Inc.\*D

52 Railroad Ave.  
Valley Stream, NY 11580  
516-872-8100  
800-341-0003  
Fax: 516-872-8118

### Staco Energy Products

301 Gaddis Boulevard  
Dayton, OH 45403  
513-253-1191  
Fax: 513-253-1723

### Standard Electronics, Inc.\*D

215 John Glenn Drive  
Amherst, NY 14228  
800-333-1519

### Start International\*D

3361 Boyington Suite 120  
Carrollton, TX 75006  
214-960-1986  
800-259-1987  
Fax: 214-702-9551

### Star Tech

900 Road 170  
Carbondale, CO 81623  
970-963-1969  
Fax: 970-963-3969

### Static Prevention Inc.

211 Gemini Ave.  
Brea, CA 92622  
714-680-6478  
Fax: 714-680-6583

### Statics-End

761 Penarth Avenue  
Walnut, CA 91789  
800-895-0555

**Statx**  
RTW International Corporation  
1110 Lake Cook Rd Suite 150  
Buffalo Grove, IL 60089  
708-520-0007  
Fax: 708-520-1951

**Herman H. Sticht Co., Inc.\*D**  
57 Front St.  
Brooklyn, NY 11201  
718-852-7602  
800-221-3203  
Fax: 718-852-7915

**Stoner, Inc.**  
PO Box 65  
Quarryville, PA 17566  
800-227-5538  
Fax: 800-515-5150  
E-mail: Stoner@epix.net  
Website:  
Http://www.stonersolutions.com

**Sun Equipment Corporation**  
PO Box 97903  
Raleigh, NC 27624-7903  
919-870-1955  
800-870-1955  
Fax: 919-870-5720  
Website:  
Http://www.sunequipco@pass.net

**Support Systems International**  
Cables & Accessories Div.  
150 S. Second St.  
Richmond, CA 94804  
510-234-9090  
800-777-6269  
Fax: 510-233-8888

**Sutton Designs, Inc.**  
Computer Power Division  
215 N. Cayuga  
Ithaca, NY 14850  
607-277-4301  
800-326-8119  
Fax: 607-277-6983  
E-mail:  
74777.2533@compuserve.com  
Website:  
Http://www.suttondesigns.com

**Swiftlink**  
600 Emerson  
Suite 410  
Saint Louis, MO 63141  
800-794-3854

**Symantec**  
15220 NW Greenbrier Parkway  
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**Sencore SC3100** \$1600, **VG91** \$1100, **VC93** \$900, **VA62** \$700, **SC61** \$640, **VA48** \$250, **SG165** \$250. **TEK 475** 200meg \$400. 500 factory camcorder manuals, \$750. **Call 732-968-1145.**

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**Send your Readers' Exchange submissions to:**  
**Readers' Exchange, Electronic Servicing & Technology, 76 North  
 Broadway, Hicksville, New York 11801**

## FOR SALE

Sencore VA48 owners manuals and information available for \$35.00. VA63 instruction booklet, \$20.00. Plus shipping. *Contact: Maurer TV Sales and Service, 29 S. 4th Street, Lebanon, PA 17042, 717-272-2481.*

EP77X55 flyback, \$35, EP77X44 flyback, \$25, RCA/GE 148034 flyback, \$40, RCA/GE 158048 flyback, \$25. All items plus shipping. *Contact: Elmer, 440-232-8653.*

Picture tubes: 19VDZP22, 19VGQTC01, 19VKSP22, 25XP22, 25VCP22, 25VCZP22, 310EUB4, 15XP22, 230BWD22, and 14AHP22. Five Rider's service manuals. *Contact: Arnold Burns, 425 East 51st Street, Brooklyn, NY 11203.*

Sencore test equipment - all brand new in factory cartons - never used. SC3100 waveform analyzer, VG91 video pattern generator, CM2000 computer monitor analyzer, VC93 VCR analyzer, PR57 isolation transformer, \$10,000. *Contact: Bill Coomes, 27400 Royal Crescent Drive, Farmington Hills, MI 48336, 248-474-9110, 248-474-9111 (fax).*

Sencore CB49, \$100.00. Hewlett Packard function generator 3300A, \$60.00. Sylvania test jig with adapters, \$70.00. Signal Source video generator 12119, \$300.00. Fluke diff. voltmeter 895A, \$75.00. Biddle megger, \$15.00. GE Halogen leak detector H-10A, \$25.00. B&K color generator 1245, \$40.00. Biotek Electrosurgical analyzer, \$100.00, safety analyzer, \$120.00. Manuals with most items. *Contact: Ed, 603-669-1533 after 7pm EST, e-mail 102764.1435@compuserve.com.*

Webcor tape recorder 2 motors, tan, portable, \$75.00. Small microfiche Reader, \$50.00. One lot of RCA N.O.S. tubes two 866A, two 807, one 6293 all for \$50.00. British turntable/changer, \$59.00 works. Several German Normende table radios. Lists of radio sale. Books for sale send large stamped self-addressed envelope. Shipping extra on all. *Contact: Maurer Television, 29 South 4th Street, Lebanon, PA 17042, 717-272-2481.*

Electronics tech books. Sencore FC51 1GHz counter, \$350.00. Phone or send SASE for information. *Contact: 610-446-4519.*

Sencore CM2125 computer monitor tester. Original packaging, perfect condition. Used less than 50 hours. Includes all connectors, manuals and references. \$2575.00. *Contact: Rusty, 707-442-1388, 707-442-1027 (fax).*

Sencore SC3100 scope. LC102 cap inductor analyzer. LC53 cap inductor analyzer. Bruel & Kjaer response unit 4416 and wow/flutter meter 6203 with test records, HP300 distortion analyzer. Hickok tube tester TV-7B. *Contact: 612-869-4963.*

Sencore VC93, \$1800.00, OBO. *Contact: 506-789-0683, 506-789-0697 (fax).*

## WANTED

Sony model SLV-720HF VCR. *Contact: Bruce, 800-332-5582 ext. 7857 12-8PM.*

RCA VCR model VJT250 complete upper and lower video drum assembly. Include field coil board mounted on lower drum and motor speed control board (with chip HA14302) with all connectors. *Contact: William M. Suhry, 1633 Gordon Walters Drive, Charlotte, NC 28213.*

Mitsubishi projection VR404R, need flyback 334BO7605 or PCB main board with flyback. *Contact: A-Z audio/video 8707 Bethany Tinley Park, Ill 60477, 708-614-1837 (fax).*

Curtis Mathes TV model A2600RW chassis X17A-1 schematic. Will pay reasonable cost. *Contact: Bob Sherwood, 202 D Street SW, Miami, OK, 918-542-6058.*

Audiometric model AM441 power amplifier service manual. Also need source for STK3062 amplifier module. *Contact: Don Hicke, 619-569-4908, evenings and weekends.*

Mitsubishi flyback 334P168090. Magnavox horizontal osc panel for PTV 325 A10318-C003 or IC2 from the panel (TDA1770A) 6125970001. *Contact: Walt, 530-272-5458.*

Canon calculator schematic and/or operators manual. Model 161. Late 60's, possibly early 70's. Willing to pay really big bucks (or at least \$100.00). *Contact: Donald Dupre, 401-737-7118 or 401-886-3910, e-mail: dgb@cherry-semi.com.*

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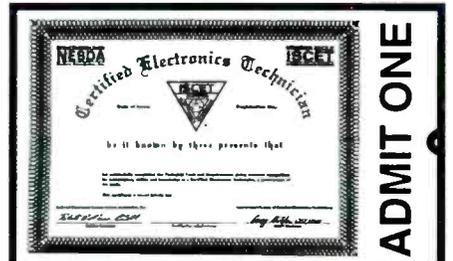
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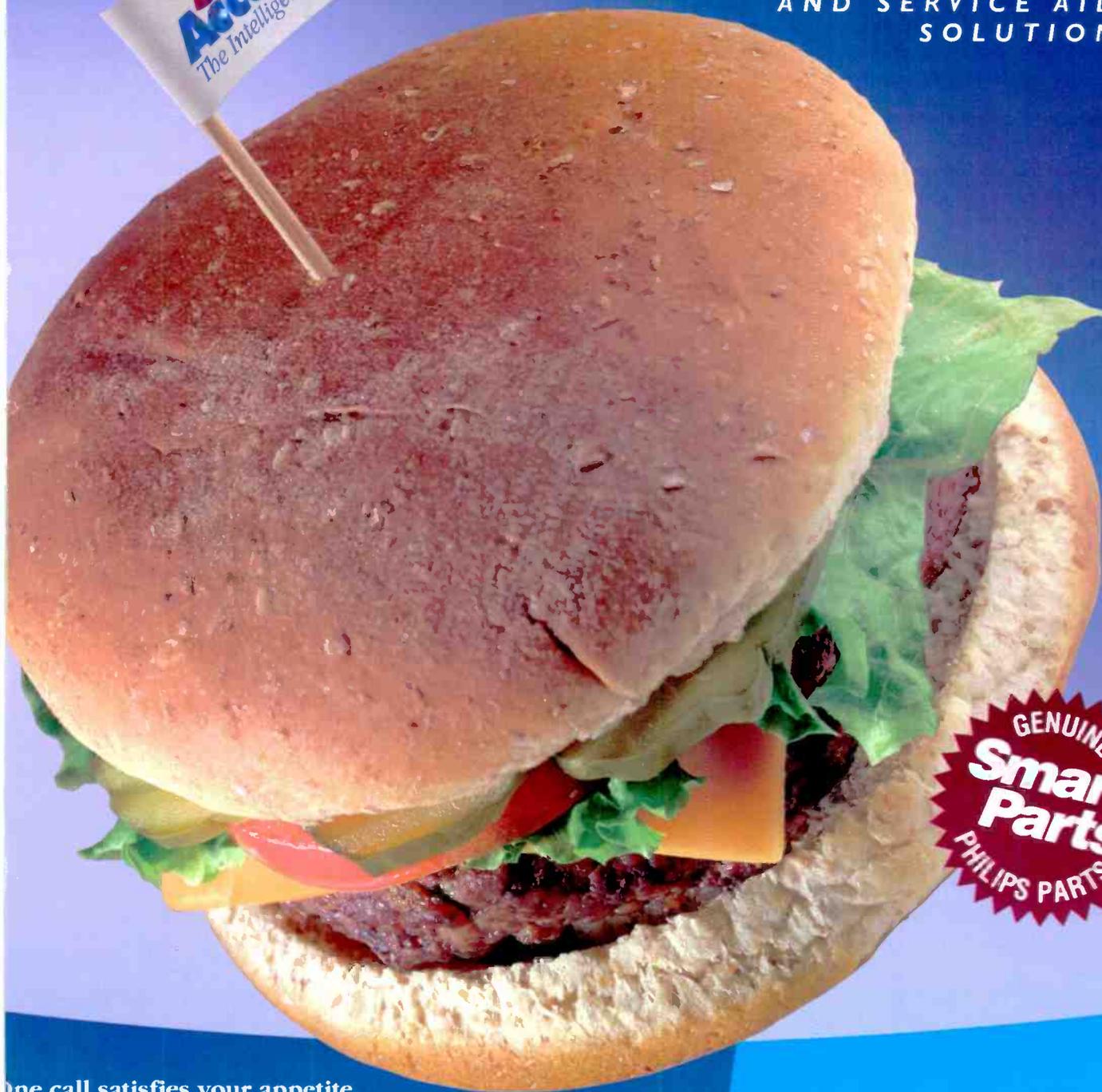
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