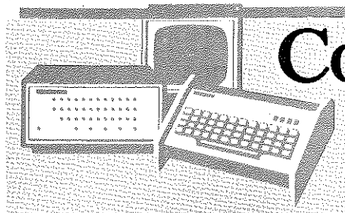


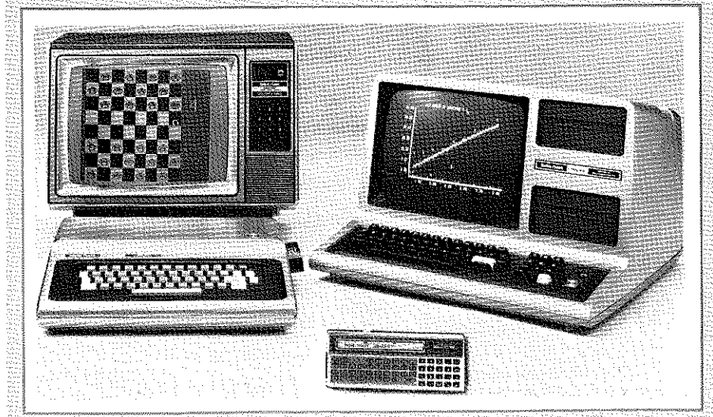
Computer Bits

By Carl Warren

Radio Shack Shows Surprises

FOR more than a year now, a number of industry pundits have conjectured about what the Fort Worth, TX-based Radio Shack would introduce as its next generation microcomputer system. Everything from the mythical TRS-90, which was to be a machine based on 16-bit technology, to a machine costing less than $500 was conjectured. The less-than-$500 machine was introduced (PE Oct 1980) in the form of a timesharing terminal. It has, however, been reintroduced as a color system called the TRS-80 Color computer.

This unit is the basic Videotex® machine I discussed last month, and has application cartridges that add value in the form of games or useful household programs. Yes, the unit is programmable, too, and has a version of Microsoft BASIC written specifically for the MC-6809 microprocessor. The TRS-80 Color computer, is aimed at the low-end user market.



Left to right are Radio Shack's TRS-80 Color Computer, the hand-held Pocket Computer, and the TRS-80 Model III.

The color unit isn't all that Radio Shack is offering for the early 80s though. Supporting the idea of computers for the consumer, the Fort Worth marketers have introduced the TRS-80 Pocket Computer. This $249 hand-held unit, uses a liquid-crystal 24-character display, incorporates a Level I-type BASIC, and is programmable. As an added feature, one can purchase a cassette interface for $49 and either load software tapes from Radio Shack or make your own. Initially, Radio Shack is offering eight application tapes ranging from real estate to personal finance. The software tapes are priced from $14.95 for a math drill to $24.95 for the engineering packages.

Those of you who are expecting the demise of the TRS-80 Model I can guess again. The original Model I is still available and being manufactured! However, owing to FCC requirements, it is being carefully evaluated for continued manufacture, though it will be supported for as long as necessary. The unit that is designed to supplant the Model I is the Model III. This model is basically the same computer as Model I, but with some twists in the packaging.

The Model III is a Z80 system with integrated keyboard, CRT, memory and expansion facilities. This design upgrades from the add-on bailing wire structure of the Model I. The Model III is base-priced at $699 for a 4K RAM, Level I BASIC system. A full-blown, 32K RAM, double-density (175K bytes per disk) dual integrated disks, and Model III BASIC goes for $2495. The Model III has the same display format (64 × 16) as the Model I, and is designed for any Model I software (using a conversion program). Radio Shack officials see Model III as the ideal machine for the small office that needs strong computing capability for less than $5000.

Even though Radio Shack has broadened its computer market with these introductions, it is also strongly supporting the Model II introduced last year. To enhance the Model II and the other units, they have developed, in conjunction with other unnamed companies, printers that support everything from general data processing to plotting.

The plotting printer is possibly the most exciting entrant. The printer/plotter is priced at $1460 and is designed to interface directly to either the Models I, II, or III computer systems. The plotter/printer uses a pen system, thus eliminating ribbons, and prints caps and lower case.

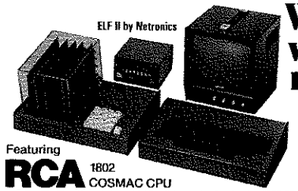
North Below the Border. Recently, I had the good fortune to visit the magic makers at Microsoft in Bellevue, Washington. Vern Raburn squired me around the growing, yet crowded headquarters of the dynamic software house. He let me view some new developments they are working on, specifically on the system side of the house. That's where they build BASIC, FORTRAN, and other high-level languages. One product, UNIX, a very high-level operating system from Bell Labs, is being revised for microcomputers by Microsoft and adapted to their product structure. This is an extremely powerful O/S and might change the whole picture of microcomputer data processing in the very near future.

Vern is president of the Consumer Products Division of Microsoft, and as such is responsible for the development and marketing of application software and products such as the Z80 card I talked about in the August issue. The application software products sold by the division include items like a typing tutor, an adventure game, and an editor. Vern explained that most of the products are being developed for the Apple and TRS-80, with some plans to support units like the Heath H8 and H89.

Color Next Important Step. While I was visiting Microsoft, I attended the SIGGRAPH conference held in Seattle. This is where manufacturers of graphics machines show their wares. This year color was the name of the game, with companies demonstrating terminals with as many as 4000 displayable hues.

Now these aren't the machines you buy for the home; but they are used by companies like Boeing for computer-aided design, and range in price from $20,000 on up.

Apple was there in full force, dem-



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Write and run programs—the very first night—even if you've never used a computer before!

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Own a powerful home computer system, starting for just $99.95—a price that gets you up and running the very first night...with your own TV for a video display. $99.95 ELF II includes RCA 1802 8-bit microprocessor addressable to 64k bytes with DMA, interrupt, 16 registers, ALU, 256 byte RAM, full hex keyboard, two digit hex output display, stable crystal clock for timing purposes, RCA 1861 video IC to display your programs on any video monitor or TV screen *and 5-slot plug-in expansion bus (less connectors) to expand ELF II into a giant!*

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Master ELF II's $99.95 capabilities, then expand with GIANT BOARD ... KLUGE BOARD...4k RAM BOARDS...TINY BASIC...ASCII KEYBOARD... LIGHT PEN...ELF-BUG MONITOR...COLOR GRAPHICS & MUSIC SYSTEM... TEXT EDITOR...ASSEMBLER...DISASSEMBLER...VIDEO DISPLAY BOARD ...*and*—

NEW!

16k Static Ram $199.95 plus $2 p&h
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Master This Computer In A Flash!

Regardless of how minimal your computer background is now, you can learn to program an ELF II in almost no time at all. Our *Short Course On Microprocessor & Computer Programming*—written in non-technical language—guides you through each of the RCA COSMAC 1802's capabilities, so you'll understand *everything* ELF II can do...*and how to get ELF II to do it!* Don't worry if you've been stumped by computer books before. The *Short Course* represents a major advance in literary clarity in the computer field. You don't have to be a computer engineer in order to understand it. Keyed to ELF II, it's loaded with "hands on" illustrations. When you're finished with the *Short Course*, neither ELF II nor the RCA 1802 will hold any mysteries for you.

In fact, not only will you now be able to use a personal computer creatively, you'll also be able to read magazines such as BYTE...INTERFACE AGE...POPULAR ELECTRONICS and PERSONAL COMPUTING and fully *understand* the articles. And, you'll understand how to expand ELF II to give you the exact capabilities you need!

If you work with large computers, ELF II and the *Short Course* will help you understand what they're doing.

Get Started For Just $99.95, Complete!

$99.95 ELF II includes all the hardware and software you need to start writing and running programs at home, displaying video graphics on your TV screen and designing circuits using a microprocessor—the very first night—even if you've never used a computer before.

ELF II connects directly to the video input of your TV set, without any additional hardware. Or, with an $8.95 RF modulator (see coupon below), you can connect ELF II to your TV's antenna terminals instead.

ELF II has been designed to play all the video games you want, including a fascinating new target/missile gun game that was developed specifically for ELF II. But games are only the icing on the cake. The real value of ELF II is that it gives you a chance to write machine language programs—and machine language is the fundamental language of all computers. Of course, machine language is only a starting point. You can also program ELF II with assembly language and tiny BASIC. But ELF II's machine language capability gives you a chance to develop a working knowledge of computers that you can't get from running only pre-recorded tape cassettes.

ELF II Gives You The Power To Make Things Happen!

Expanded, ELF II can give you more power to make things happen in the real world than heavily advertised home computers that sell for a lot more money. Thanks to an ongoing commitment to develop the RCA 1802 for home computer use, the ELF II products—being introduced by Netronics—keep you right on the outer fringe of today's small computer technology. It's a perfect computer for engineering, business, industrial, scientific and personal applications.

Plug in the **GIANT BOARD** to record and play back programs, edit and debug programs, communicate with remote devices and make things happen in the outside world. Add **Kluge** (prototyping) **Board** and you can use ELF II to solve special problems such as operating a complex alarm system or controlling a printing press. Add **4k RAM Boards** to write longer programs, store more information and solve more sophisticated problems.

ELF II add-ons already include the **ELF II Light Pen** and the amazing **ELF-BUG Monitor**—two extremely recent breakthroughs that have not yet been duplicated by any other manufacturer.

The ELF-BUG Monitor lets you debug programs with lightening speed because the key to debugging is to know what's inside the registers of the microprocessor. And, with the ELF-BUG Monitor, instead of single stepping through your programs, you can now display the entire contents of the registers on your TV screen. You find out immediately what's going on and can make any necessary changes.

The incredible ELF II Light Pen lets you write or draw anything you want on a TV screen with just a wave of the "magic wand." Netronics has also introduced the ELF II Color Graphics & Music System—more breakthroughs that ELF II owners were the first to enjoy!

ELF II Tiny BASIC

Ultimately, ELF II understands only machine language—the fundamental coding required by all computers. But, to simplify your relationship with ELF II, we've introduced an **ELF II Tiny BASIC** that makes communicating with ELF II a breeze.

Now Available! Text Editor, Assembler, Disassembler And A New Video Display Board!

The Text Editor gives you word processing ability and the ability to edit programs or text while it is displayed on your video monitor. Lines and characters may be quickly inserted, deleted or changed. Add a printer and ELF II can type letters for you—error free—plus print names and addresses from your mailing list!

ELF II's **Assembler** translates assembly language programs into hexidecimal machine code for ELF II use. The Assembler features mnemonic abbreviations rather than numerics so that the instructions on your programs are easier to read—this is a big help in catching errors.

ELF II's **Disassembler** takes machine code programs and produces assembly language source listings. This helps you understand the programs you are working with...and improve them when required.

The new **ELF II Video Display Board** lets you generate a sharp, professional 32 or 64 character by 16 line upper and lower case display on your TV screen or video monitor—dramatically improving your unexpanded $99.95 ELF II. When you get into longer programs, the Video Display Board is a real blessing!

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☐ **A-D/D-A Board Kit** includes 1 channel (expandable to 4) D-A, A-D converters, **$39.95** plus $2 postage & handling.

☐ **PILOT Language**—A *new* **text-oriented** language that allows you to write educational programs on ELF II with speed and ease! Write programs for games...unscrambling sentences...spelling drills..."fill in the missing word" tests, etc.! PILOT is a must for any ELF II owner with children. *PILOT Language on cassette tape, only $19.95 postpaid!*

☐ **Game Package** on cassette tape (requires 4k RAM), $9.95 plus $2 postage & handling.

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Yes! I want my own computer! Please rush me—

☐ RCA COSMAC ELF II kit at $99.95 plus $3 postage and handling (requires 6.3 to 9 volt AC power supply)

☐ Power Supply (required), $4.95 postpaid.

☐ RCA 1802 User's Manual, $5 postpaid.

☐ Tom Pittman's **Short Course On Microprocessor & Computer Programming** teaches you just about everything there is to know about ELF II or any RCA 1802 computer. Written in non-technical language, it's a learning breakthrough for engineers and laymen alike. $5 postpaid.

☐ Deluxe Metal Cabinet with plexiglas dust cover for ELF II, $29.95 plus $2.50 p&h.

☐ I am also enclosing payment (including postage & handling) for the items checked below!

☐ **I want my ELF II wired and tested with power supply, RCA 1802 User's Manual and Short Course—all for just $149.95 plus $3 p&h.**

Total Enclosed $ _____ (Conn. res. add tax)

CHARGE IT! Exp. Date _____
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☐ **Kluge** (Prototype) Board accepts up to 36 IC's **$17.00** plus $1 p&h

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☐ Gold plated **86-pin connectors** (one required for each plug-in board). **$5.70** ea., postpaid.

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☐ **Professional ASCII Keyboard** kit with 128 ASCII upper/lower case set, 96 printable characters, onboard regulator, handy, logic selection and choice of 4 handshaking signals to mate with almost any computer. **$64.95** plus $2 p&h

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☐ **ELF II Tiny BASIC** on cassette tape. Commands include SAVE, LOAD, ±, ×, ÷, (), 26 variables A-Z, LET, IF/THEN, INPUT, PRINT, GO TO, GO SUB, RETURN, END, REM, CLEAR, LIST, RUN, PLOT, PEEK, POKE. Comes fully documented and includes alphanumeric generator required to display alphanumeric characters directly on your tv screen without additional hardware. Also plays tick-tack-toe plus a programming game that uses ELF II's hex keyboard as a joystick. 4k memory required. **$14.95** postpaid.

☐ Tom Pittman's **Short Course on Tiny Basic** for ELF II. **$5** postpaid.

☐ **ELF-BUG™ Deluxe System Monitor** on cassette tape. Allows displaying the contents of all registers on your tv at any point in your program. Also displays 24 bytes of memory with full addresses, blinking cursor and auto scrolling. A must for the serious programmer! **$14.95** postpaid.

☐ **Text Editor** on cassette tape gives you the ability to insert, delete or edit lines and words from your programs while they are displayed on your video monitor. (Add printer and you can use ELF II to type error-free letters plus insert names and addresses from your mailing list.) **$19.95** postpaid.

☐ **Assembler** on cassette tape translates assembly language programs into hexidecimal machine code for ELF II use. Mnemonic abbreviations for instructions (rather than numerics) make programs easier to read and help prevent errors. **$19.95** postpaid.

☐ **Disassembler** on cassette tape takes machine code programs and produces assembly language source listings to help you understand and improve your programs. **$19.95** on cassette tape.

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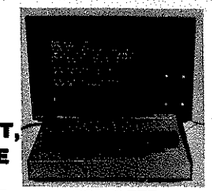

By Netronics

ASCII/BAUDOT, STAND ALONE

Computer Terminal

COMPLETE FOR ONLY... $149.95

The Netronics ASCII/BAUDOT Computer Terminal Kit is a microprocessor-controlled, stand alone keyboard/terminal requiring no computer memory or software. It allows the use of either a 64 or 32 character by 16 line professional display format with selectable baud rate, RS232-C or 20 ma. output, full cursor control and 75 ohm composite video output.

The keyboard follows the standard typewriter configuration and generates the entire 128 character ASCII upper/lower case set with 96 printable characters. Features include onboard regulators, selectable parity, shift lock key, alpha lock jumper, a drive capability of one TTY load, and the ability to mate directly with almost any computer, including the new Explorer/85 and ELF products by Netronics.

The Computer Terminal requires no I/O mapping and includes 1k of memory, character generator, 2 key rollover, processor controlled cursor control, parallel ASCII/BAUDOT to serial conversion and serial to video processing—fully crystal controlled for superb accuracy. PC boards are the highest quality glass epoxy for the ultimate in reliability and long life.

VIDEO DISPLAY SPECIFICATIONS

The heart of the Netronics Computer Terminal is the microprocessor-controlled Netronics Video Display Board (VID) which allows the terminal to utilize either a parallel ASCII or BAUDOT signal source. The VID converts the parallel data to serial data which is then formatted to either RS232-C or 20 ma. current loop output, which can be connected to the serial I/O on your computer or other interface, i.e., Modem.

When connected to a computer, the computer must echo the character received. This data is received by the VID which processes the information, converting to data to video suitable to be displayed on a TV set (using an RF modulator) or on a video monitor. The VID generates the cursor, horizontal and vertical sync pulses and performs the housekeeping relative to which character and where it is to be displayed on the screen.

Video Output: *1.5 P/P into 75 ohm (EIA RS-170)* • **Baud Rate:** *110 and 300 ASCII* • **Outputs:** *RS232-C or 20 ma. current loop* • **ASCII Character Set:** *128 printable characters—*

BAUDOT Character Set: *A B C D E F G H I J K L M N O P Q R S T U V W X Y Z - 2 : * 3 $ 8 ( ) , . 9 0 1 4 5 7 ; 2 / 6 8* • **Cursor Modes:** *Home, Backspace, Horizontal Tab, Line Feed, Vertical Tab, Carriage Return. Two special cursor sequences are provided for absolute and relative X-Y cursor addressing* • **Cursor Control:** *Erase, End of Line, Erase of Screen, Form Feed, Delete* • **Monitor Operation:** *50 or 60Hz (jumper selectable.*

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☐ **Video Display Board Kit** alone (less keyboard), **$89.95** plus **$3** postage & handling.

☐ **12" Video Monitor** (10 MHz bandwidth) fully assembled and tested, **$139.95** plus $5 postage and handling.

☐ **RF Modulator Kit** (to use your TV set for a monitor), **$8.95** postpaid.

☐ **5 amp Power Supply Kit** in Deluxe Steel Cabinet (±8VDC @ 5 amps, plus 6-8 VAC), **$39.95** plus $2 postage & handling.

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☐ **Send Me More Information**

onstrating that they have color and graphics capability in the same plane as many of the "high-end" manufacturers. Reinforcing the strength of Apple was ABW Corp. of Ann Arbor, MI. This company demonstrated a device called Teksim®, which is a read-only-memory (ROM) that plugs into the Apple computer. The $475 device makes use of the Apple's high-resolution plotting capabilities to emulate a Tektronix 4010-type graphics terminal, but with color.

To place this in perspective for you, the Tektronix line of graphics terminals are those that virtually every company tries to equal. The Tek terminals are of the monochrome type, but exhibit various degrees of gray scale and high resolutions. Consequently, a device that permits emulation of a Tex terminal, on a raster scan system such as an Apple, is definitely an achievement.

There is a caveat, though. The device is only valuable if you can use it. I don't recommend buying the Teksim just to buy it, but if you are doing computer graphics on the Apple, and need the enhanced functions that Teksim provides, then by all means add it to your system.

Following this philosophy of purposeful products is Godbout electronics. Bill's latest entry into the S-100 world is called Spectrum®. It is a board designed to give you color graphics capability for less than $400. It can fit into any memory location you have available and delivers composite NTSC video. Although Godbout doesn't tout it, the board is capable of 2D transforms and simulated motion. Bill sees the Spectrum as an ideal board for use in process-control systems—specifically those controlled by an S-100 bus computer system.

MORE INFORMATION

For additional information about products and services mentioned here, contact the companies directly.

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Box M1047
Ann Arbor, MI 48106
313-971-9364

Dave Nutting Assoc.
527 West Golf Rd.
Arlington Hts, IL 60005
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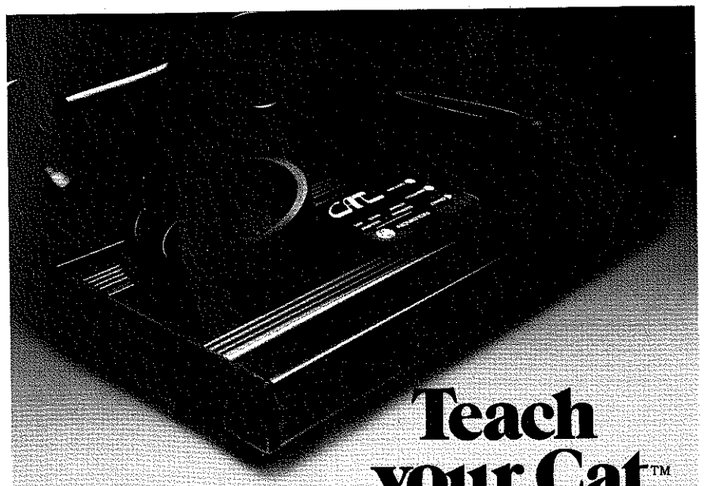
Godbout Electronics
Bldg. 725, Oakland Airport
Oakland, CA 94614
415-562-0636

Microsoft, Consumer Products Div.
10800 NE 8th St., Suite 507
Bellevue, WA 98004
204-454-1315

Radio Shack
1800 One Tandy Center
Box 17180
Forth Worth, TX 76102
817-390-3700

I was under the impression that the Bally microcomputer system was no longer in existence, but at SIGGRAPH, Dave Nutting Assoc. was demonstrating a Bally with their Grafix image editor. This software was powerful and worked well with digitizer tablets and light pens. Nutting did have a machine called the UV1 ZGrass University Machine that is Z80 based and can work in a time-sharing environment. They quote a price of $2395, but like many machines of this type it all depends on options. I don't know the price of the Bally or even if it was for sale. If you're interested, you might contact the company directly. ◇



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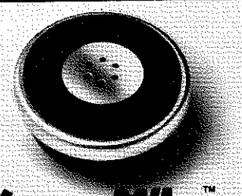

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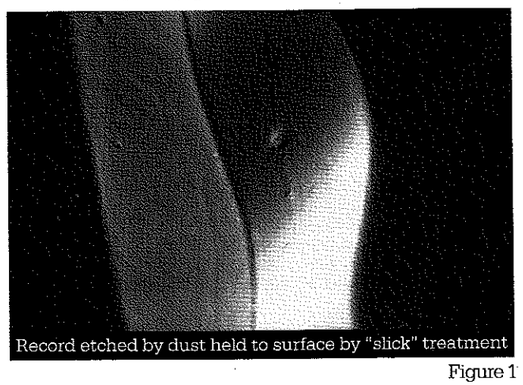
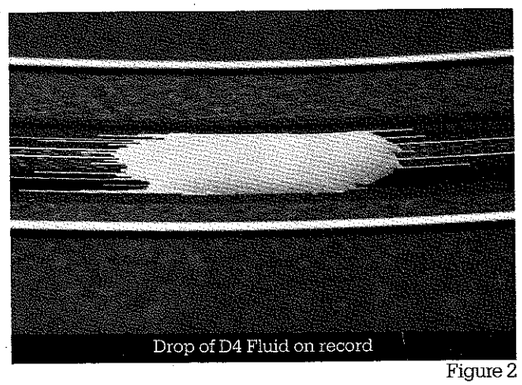
Record Care, Part 1:
Aqueous Cleaning vs. Organic Solvents

Electron microscopy (Figure 1) shows the principal cause of record wear: small particles of microdust, deposited from the air by gravity, are ground along the record groove by the stylus. Surface noise goes up. Sound quality goes down.



Record etched by dust held to surface by "slick" treatment

Figure 1

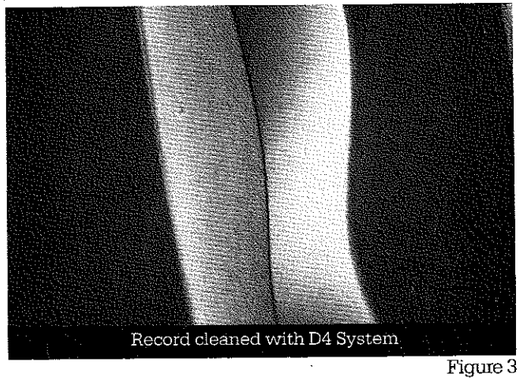


Drop of D4 Fluid on record

Figure 2

Figure 2 shows a drop of the aqueous Discwasher D4 Fluid, literally lifting dust and contamination out of record grooves. The extraordinarily complex D4 Fluid uses water pure enough for kidney dialysis, along with eleven chemically engineered additives that still results in lower dry-weight residue than most tap water. This formula is amazingly high in cleaning activity, uniquely safe for vinyl and vinyl additives, and preferentially "carries" contamination into the new Discwasher D4 pad.

In some record care products, organic solvents are used rather than water. Organic solvents such as ozone-gobbling chlorofluorocarbons, petroleum distillates (hexane, heptane) and alcohol concentrates are indeed speedy extractors and delivery solvents. They evaporate fast. Some organic solvents can dissolve vinyl stabilizers, Organic solvents may leave a "slick" looking record by treating the disc with other compounds carried in the solvent mix. In doing so, record contamination may also be dried back onto the disc in a nice even layer. Dust is often "held" to the record surface by "treatment."



Record cleaned with D4 System

Figure 3

Electron micrograph (Figure 3) shows a record cleaned with the Discwasher D4 System. High technology record care leaves only a clean surface.

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