# Top Discs of '81

BLOOPERS ON CASSETTE

# video

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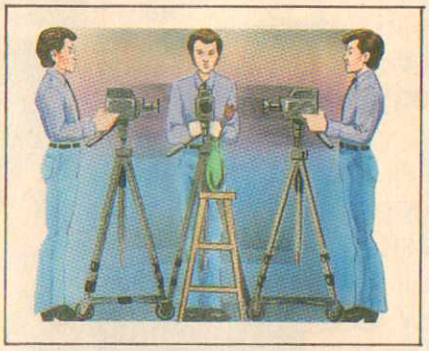
February 1982
Volume Five, Number 11










## Columns



## VideoTests



## Departments



**ABOUT THE COVER**
What was the best-performing new VCR you could buy last year? The sharpest TV picture? The most valuable accessories? VIDEO's Berger-Braithwaite Labs have prepared the definitive report on the best equipment of 1981. Cover photo by Les Morsillo.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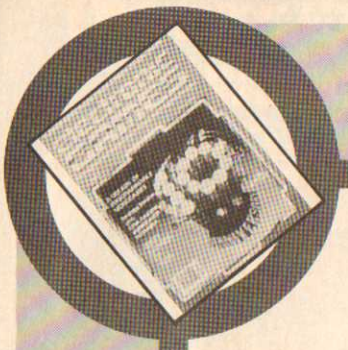

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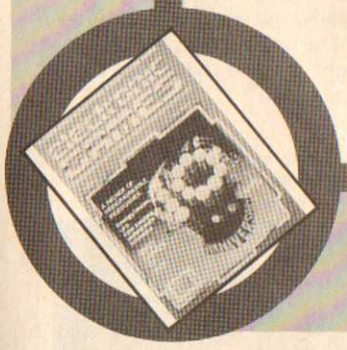

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# Arcade Alley

A Critical Look at Video Cartridge Games & Programs

by Bill Kunkel & Frank Laney, Jr.

## Zircon Resurrects Channel F

If the video-game industry ever awards medals for perseverance, our nominees would be those hardy souls who remained loyal to Channel F after its apparent demise a few years ago.

When Fairchild Electronics introduced Channel F in 1976, it was the world's first fully programmable video-game system. Not only did it enable pioneering arcaders to assemble a home game library on ROM cartridges; it also placed variables like playing time, number of participants, and speed under the arcader's direct control for the first time. Using a then-sophisticated screen-mapping technique, Channel F enhanced its titles with graphics significantly better than anything else on the market at that time.

Fairchild sold an estimated 300,000 systems, but decided to throw in the towel when Atari and Magnavox (now Odyssey) entered the field. This left Channel F owners holding the bag with a "dead" programmable for which no additional game cartridges would be made. Last year, however, Channel F partisans received something even better than a medal: they got a circular from Zircon International informing owners everywhere that Zircon had purchased Fairchild's entire hardware and software inventory.

This included the second-generation Channel F II, a souped-up version of the original that Fairchild had designed just before deciding to stop marketing the system altogether. Zircon not only priced this improved machine at under $100 but it also offered to let owners of the original Channel F trade their old systems for new ones for $69.95. Even more important, Zircon announced the reintroduction of the entire Channel F software catalog. The new supplier even had a few new titles to gladden the hearts of long-suffering Channel F-ites, games that Fairchild had developed but never brought to market. This mailing has proven so successful, according to Zircon's Bob Johnson, that Zircon will soon augment the existing two dozen Channel F games with new titles of its own.

The Channel F System II itself is remarkably durable and attractive. The sleek console features a power control, a reset button, and a bank of selection switches that govern time, mode, pause, and play start. The most unique feature of the system is its controllers. Each consists of a pistol-grip handle with a triangular top-piece. This knob can be twirled left or right, lifted up or pushed down. This permits it to perform up to eight control functions for any given game. Lacking some of the refinements introduced by later entries into the home programmable video-game market, Channel F games can't match the eye-popping high-resolution graphics of newer software. Yet the games are good solid designs with entertaining play-action. The line includes a pleasant mix of one- and two-player contests, so it is equally suitable for solitaire and head-to-head play. Two games come with the system, "Pong"-type affairs titled **Tennis** and **Hockey.**

Videocart 1, which comes packed with the Channel F, includes a quartet of electronic diversions: **Tic-Tac-Toe, Shooting Gallery, Doodle,** and **Quadradoodle.** "Tic-Tac-Toe" pits the arcader against the computer in the classic time-passer. The automated opponent hardly qualifies as "user friendly"; whenever it wins a round, it prints out an insolent "you lose, turkey!" to rub it in a little. "Shooting Gallery" is a deceptively simple game. The target moves at a steady speed down the right-hand side of the playfield, but the arcader's firing paddle pops up at random points on the screen. The fired pellet travels perpendicular to the paddle's orientation, so success depends on timing the shot and the angles just right.

"Doodle" and "Quadradoodle" are video-drawing programs. Electronic Leonardos can use the former to "paint" one line at a time on the screen. Three different brush sizes and an equal number of paint colors—red, green, and blue—are offered. As the name implies, "Quadradoodle" divides the field into four sections. A line drawn in one quadrant automatically appears in the other three. The program, which is otherwise the same as

*continued on page 80*

**Introduced in 1976, the Fairchild (now Zircon) Channel F system offers a versatile mix of entertaining action for one player or two.**

Massachusetts-based company, TV Disc Corporation, is the first outfit to announce a videodisc that records. According to Arnold Mende of TV Disc, it all came about when TV Disc, a high-tech group of scientists from the U.S. and other countries, found a way to increase storage capacity on a magnetic disc to allow recording, erasing, and re-recording. A test disc did the trick up to "2000 times."

The price of the disc will be about $400 and it can only be used on a TV Disc player and recorder. No one's seen it yet, but Mende says that it will be ready for marketing by the end of this year.

## Trouble in River City

Babylon, Long Island is a sleepy seaside town off the East Coast. But trouble lurks in every stationery store and donut shop in this once-serene community. And the trouble, my friends, is video machines.

"We don't want this to become a community of electronic games and arcades with loitering and gambling and drugs," says Mayor Gil Hanse. To fend off these dangers, Hanse cut Babylon's video-game mania to the quick, limiting each establishment to one game and banning use of the machines by Babylonians under 16.

Hanse has never seen any evidence of gambling near the machines, although he once spent a whole hour in an arcade scouting, but "parents have told me that some of these places offer prizes for the winners at the end of each week." He has also not seen any evidence of drugs, but he says the machines "create an atmosphere for drug pushers." At any rate, "The store owners were making more money from video machines than what they were licensed and registered for."

The law banning video games was passed by the town council; policing will be left up to the "public conscience."

Babylon's surveillance is but a portent of things to come. While Babylon town fathers were protecting their minors from videomania, the same thing was happening in Mesquite, Texas.

According to Mesquite's attorney, Ellande Archer, parents and police were concerned about drug traffic, gambling, runaways who would congregate in video-game arcades, and fights breaking out in the arcades. Parents also complained that kids spent their lunch money at the machines instead of on school lunches, says Archer. So Mesquite's city council passed an ordinance that prohibited kids 16 years and under from playing the games without supervision by a parent or a legal guardian.

The decision was immediately appealed in Federal District Court by Alladin's Castle, the scene of Mesquite's heavy video action. The Mesquite regulation was upheld there but Alladin's Castle then appealed to the Fifth Circuit Court, one step below the Supreme Court. The

circuit court reversed the decision, declaring the banning of video games for minors unconstitutional. So now Mesquite is having the ordinance reviewed once again. Meanwhile it has a temporary injunction and a stay order on the games.

## Vidbits

**The New York** (State) court of Appeals has unanimously approved use of hidden TV cameras in criminal situations, though such use is not sanctioned in any state law. The court did not limit its ruling to office or business premises, meaning that police can legally install a camera in the home of a criminal suspect.

**In Italy,** video cameras are being put to use just as creatively. Terrorists who captured Ciro Cirillo, a leader in the Christian Democratic Party, taped a one-hour trial of Cirillo during which they imposed a death sentence. The tape, entitled "The Cirillo Campaign Continues," was left at a pickup point for police. This videocassette marks the debut of terrorists into home video.

**More crime,** but strictly the white-collar kind: An ex-employee of ON-TV in Los Angeles has been charged with three counts of grand theft and three of burglary after police caught him going to ON-TV subscribers' houses and unhooking their boxes, promising to deliver a new model. The new models never arrived.

**What did Prince Charles** and Princess Diana do on their honeymoon besides go salmon fishing and idling in Gibralter? Charles recently disclosed that his videocassette recorder was his prized possession, so you can bet they spent a little time watching the telly. And Video Shack gave the prince and princess two presents that may have come in handy: cassettes of *The Man Who Would Be King* and *The King and I.* Schmaltz.

**What** has the Moral Majority been telling us not to do these days? Latest reports from Reverend Donald Wildmon, chairman of the Coalition for Better TV, say he's now monitoring advertisements. One we definitely shouldn't watch is the Hanes Pantyhose ad—too sexy. The major motivation for buying clothes, says Wildmon, should be "not to be sexy, but to look nice."

**Other people** who are depressed about what they see on their video screens, or rather that they see video screens at all, are U.S. workers who do their jobs at home in front of computer terminals. Thirty U.S. workers interviewed by Canadian researchers said they'd rather go to the office. The biggest complaint is isolation—fear of missing out on office politics and being passed over for promotions. So think twice about going to work in your bathrobe.

**Oh, some happy people** for a change: some of the most eager buyers of video equipment and cassettes and whatnot are casino employees in Las Vegas. Since most of their working hours are at night, the employees can't catch prime-time spectaculars without buying VCRs. So that's what they're doing, to the tune of 20,000 units. That means one out of 10 homes in the area.

**More unhappy people** are the rock group Queen, who think the new Warner Home Video Rental plan is such a dumb idea that they're not going to allow any of

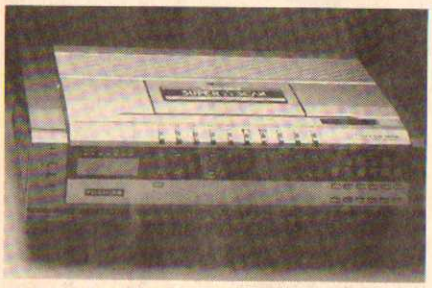
**They won't take rental for an answer.**

their cassettes to be rented through it. As a matter of fact, they've changed distribution companies. "We're adamant that it makes absolutely no sense to rent a music cassette the way Warner is now doing it," says Jim Beach, Queen's business manager. This is the first major defection from the Warner Vid plan, but more are expected.

**Also rushing** to shops (or in this case PXes) to buy videocassettes and recorders are American GIs, who've spent $250 million on audio and video this past year. The rush for blank videocassettes by our men overseas is so heavy that some PXes are limiting buys to two per customer.

# The Best of '81

## VIDEO's technical editors pick the top equipment from a stellar year



Toshiba V-8000 Beta VCR

by Ivan Berger and Lancelot Braithwaite

Picking the best of the year wasn't as easy in 1981 as in 1980. The products are getting better and their overall appeal is increasing. In most categories, some products were definitely in and some definitely out. But in all categories we had to do some careful choosing between products with different but almost equal virtues. It's like shopping: hard to do, because what one machine has the other lacks, and vice versa.

### Videodisc Players

We tested only two videodisc players per year in the last two years. Last year both were LaserVision players; this year both were CED players. The choice between them is closer this year: RCA's SFT-1000 ("VideoTests," VIDEO, April 1981) and Toshiba's VP100 (November) had identical picture quality at 240 lines horizontal resolution and about 42 dB signal-to-noise. The Toshiba cost a bit ($25) more but included a remote control and jacks for stereo-sound adapters (to come with CED stereo discs; '83 is our best current guess). This made it a slightly better value.

### Receivers

This was one of the categories in which the choice was hardest. For one thing, we tested nine of them, and most were pretty good.

Among non-portable sets, we had a hard time deciding between GE's 19-inch 19EC2676W (December) and Sony's 26-inch KV2654R (January) for our first choice. The Sony is the first 26-inch set, with a picture that looks surprisingly bigger than a 25-inch picture. (Grundig now plans to import a 26-incher and Sony now has a 30-incher—but that's a $10,000 custom job.) The 26-inch Sony has a very sharp picture, aided by a comb filter, and good sound. Our only reservations were about its color: the blues were lovely, but the reds were too orange.

GE sets, on the other hand, have excellent color balance. The one we tested was cable-ready, with 105-channel tuning. We liked the effect of its VIR and that we could adjust the picture under VIR control to suit our preferences. And for many, a 19-inch table model is easier to fit into their homes and budgets than a 26-inch console would be.

NEC 13-304A Color Monitor

Of the two portables we tested, we give the nod to the five-inch JVC CX-610US (February), mainly because it has monitor inputs (the five-inch Hitachi CK-200, tested in September, did not). We liked the Hitachi's automatic tuning, but found


Sony HVC-2200 Video Camera

the JVC's manual tuning virtually as quick and its channel-number scale easier to use. The JVC's monitor inputs let you use it in the field as a color monitor when recording.

We tested two full-sized (13-inch) monitors, the NEC 13-304A (March) and the Sharp 2013 (April). The NEC gets our vote; it was a bit less sensitive to interference and had two switch-selectable video inputs instead of only one. But this was again a close decision between two very good sets.

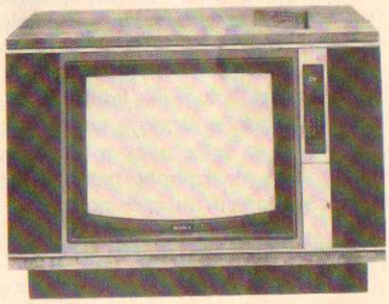
In projection TV, we tested only one self-contained projection system, RCA's 50-inch PFR100 (September). But that was a very good one, with very high resolution. We were satisfied with its performance overall but a bit less satisfied with its features: while it had remote control and direct video inputs (features we consider necessities in projection sets), and even stereo sound, we regretted its lack of simulcast sound-input switching and cable-ready tuning.

**GE 1CVP2020X VHS VCR**

We tested two projection adapters and liked one, the Schudel Video Telecaster (December). Like all such adapters it includes a lens to fit on the front of, and project the image from, a 13-inch color set; a 50-inch screen; and a holder for the TV. Its performance was slightly better than other single-tube systems we've tested (no huge praise—single-tube systems can't match any decent three-tube model for brightness or quality; they just cost a lot less). We found it the most convenient adapter we've tested, with easy focusing and an ingenious cradle system that requires no modification of your TV set. And it was quite low-priced at $495 (though it has plenty of competition there).


## Cameras

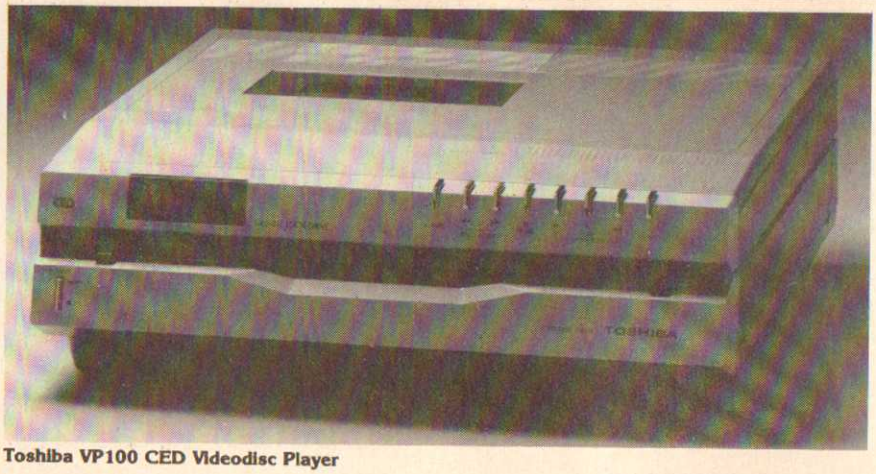
Hands down, our favorite camera of the year—our favorite, period—was Sony's HVC-2200 (August). A star performer, it had every feature we could ask for except two: it had red/blue balance but no way to balance green, and it lacked the convenient remote recorder controls that other cameras (to be tested soon) have come out with since. But it did have a camera remote, which is unusual. That lets you control the remote pause and zoom control from about 20 feet away,



**Sony KV-2645R Color TV**

though you can't focus. You can detach the viewfinder and use it with an accessory cable at the remote position. Best of all, the Sony had the best human engineering we've seen in a home-video camera, possibly even the best of any product we've tested. And human engineering is more important in a camera than in any other video product.

We also liked RCA's CC-010 (July) and Toshiba's IK-1850AF (May). The RCA was reasonably well-balanced and had such



**Toshiba VP100 CED Videodisc Player**

useful features as fade, auto white-balance, extra-fast (f1.4) 8X macro lens (with a 1.5X extender now available, which gives it the telephoto capability of a 12X), two-speed power zoom with switch in the grip, flip-over finder for the left-eyed, and shoulder notch for comfort (though not as comfortable as Sony's slanted notch). The same camera is now available as the CC-011 with a different Newvicon tube that resists lag and comet-tailing.

Toshiba's was the first auto-focus camera announced and the only one we've tested. We found it a bit awkward for hand-held use. But the auto-focus we found a great convenience—in its semi-automatic mode, in which the camera focuses on the nearest subject, then stops focusing until you press a button. In full-auto mode our sample was too sensitive to movement. Things like flopping collars could set it hunting annoyingly for proper focus, only to settle back to its original setting. The microphone picked up the focus mechanism's motor noise, too.

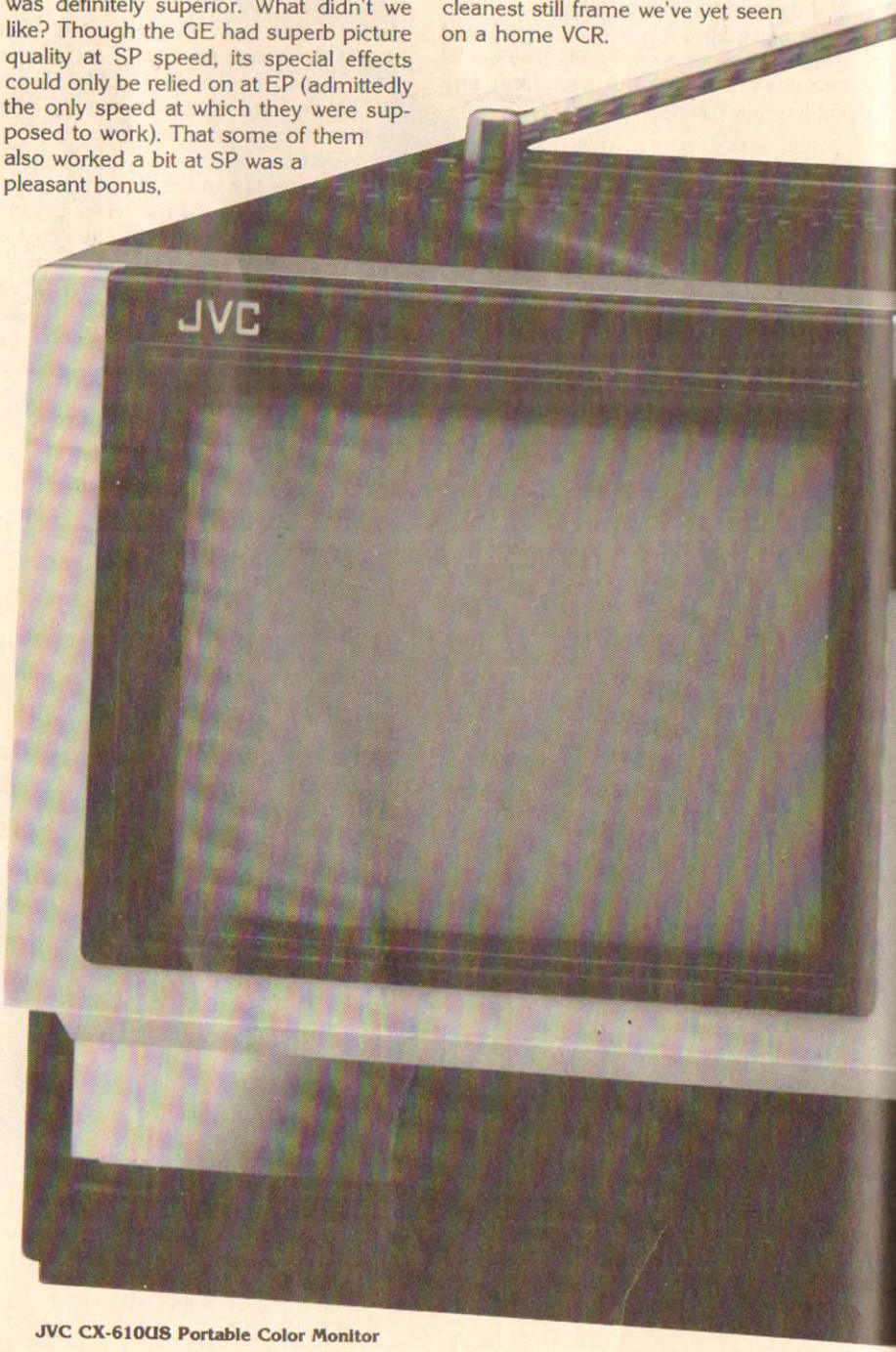
## Videocassette Recorders

We tested three Beta and 11 VHS decks last year. Of those, we found two Betas and one VHS deck in our best-of-year selection, though the VHS (GE's 1CVP2020X, November) was our favorite.

What we liked about the GE was its picture quality. In SP mode it was one of the most "transparent" VCRs we've tested—that is, it changed the signal going through it very little so that what it played back was unusually close in quality to what had been recorded on it. The picture did not measure that much better than its competition, but its appearance was definitely superior. What didn't we like? Though the GE had superb picture quality at SP speed, its special effects could only be relied on at EP (admittedly the only speed at which they were supposed to work). That some of them also worked a bit at SP was a pleasant bonus,

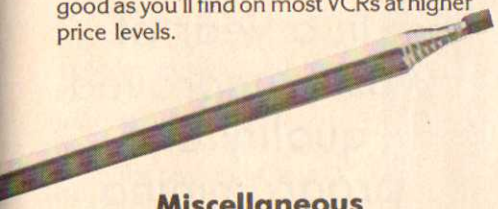
but we like to see all of a VCR's best features work at its best speed.

Our best-Beta nominee was Toshiba's V-8000 (June). It too had a very fine picture—the best Beta picture we've yet seen, and one of the finest we've ever seen in any half-inch format. It has two visual-scan speeds, a big help in finding exactly what you want on the tape. It also has a good remote control (though without a Record function) and a functional control layout. Our sample had overheating problems, but Toshiba has had quite a while to work those problems out since then. They've also since added a new model, the V-8500, which we haven't yet tested, with all the 8000's features plus the cleanest still frame we've yet seen on a home VCR.




**JVC CX-610US Portable Color Monitor**

Sanyo's 9100A (December) had one major virtue: it's a bargain in any book, one of the few VCRs that actually sells (by some discounters) for less than $500. It offers every basic feature you could want except audio dub. The only niceties we really missed were Betascan and programmability beyond the single-event 24-hour level. And picture quality was as good as you'll find on most VCRs at higher price levels.



Radio Shack TRS-80 Color Computer and accessories

## Miscellaneous

Our problem in selecting the year's best is different here than in other categories. Instead of similar devices, we have wildly different ones. The only two accessories on this final list that perform the same basic functions are two noise reducers, the KLH DNF 1201A (December) and Advanced Audio's DNR 450 (October). Both cut hiss and other high-frequency noise from videotape and broadcast sound. Both do a good job. The KLH does a better one and has more useful features—but the DNR comes close to the KLH's performance at a much lower price. That puts them neck and neck, in our book.

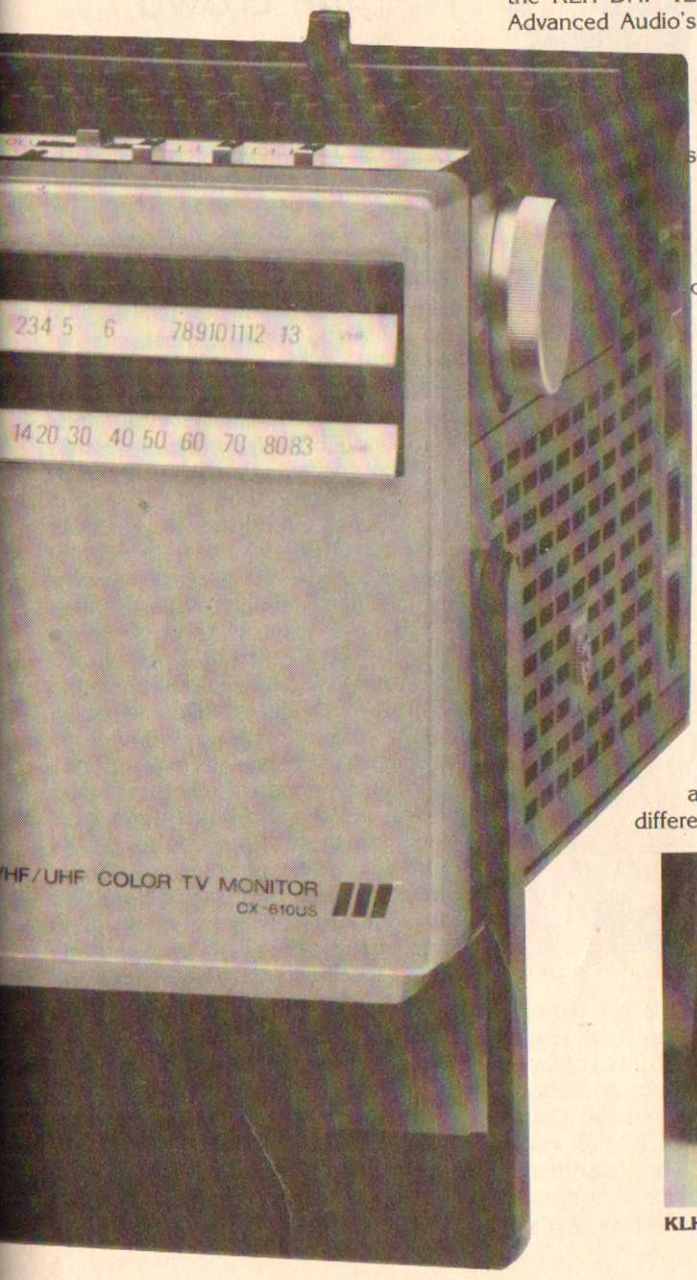
Another audio accessory made our short list: Radio Shack's Realistic TV-20 (March), a VHF TV-sound tuner for your hifi system. It did a worthwhile job in a worthwhile manner, took up little space, and didn't cost much—sterling virtues all.

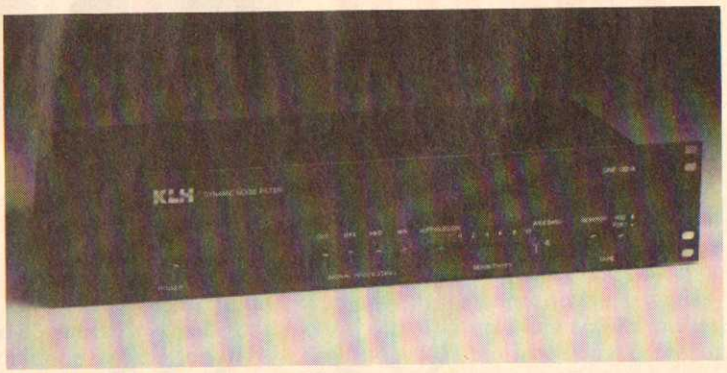
Vidicraft came up with an interesting value in a different way by combining a video stabilizer with an RF converter (September). Most of the stabilizers we've tested do about the same job, and about equally well. Adding an RF modulator means you can feed the stabilized picture right into your TV set—important if you don't have a set with monitor inputs.

That leaves only computers. We tested two, Radio Shack's TRS-80 Color Computer (August) and Atari's 400 (May). We found it so hard to choose between them that it's a tie. Both have good graphics facilities and wide distribution. There are more programs available for the Atari so far, but the Color Computer is still new and is easier to program if you want to write your own. The Radio Shack has a better keyboard than the Atari 400, but the 400 lets you move easily up to the 800, which has a still better keyboard.

## Parting Shot

Remember, these are by no means the only good video products on the market. They're just the best of those we've tested for VIDEO's 1981 issues. Admittedly, we tend to first test products that strike us as potentially meritorious. There may be other products as good or better that we've missed or haven't tested yet. And there are still plenty of excellent survivors in the crop from which we selected our Best of 1980.



KLH DNF 1201A Dynamic Noise Filter

# YOUR VIDEO I.Q.

1) "Space Phone" is:
   a) AT&T's executive intercom system
   b) a popular "call-in" program on Ted Turner's cable network
   c) a device for answering the telephone through your TV set
   d) a video communications device for astronauts
   e) an integral part of the Starship Enterprise
   f) NASA's code name for its BRTS program

2) Stereo television is commonplace in Russia.
   T☐ F☐

3) In *Blazing Saddles*, Madeline Kahn played:
   a) Mimi La France
   b) Kitty Bayou
   c) Marlena Dewdrop
   d) Heidi Hildegaard
   e) Lili Von Shtupp
   f) Missy Monroe

4) Videotapes must be played back at the same speed at which they were recorded.
   T☐ F☐

5) The movie *Hello Dolly* was directed by:
   a) Harold Prince
   b) Jerry Herman
   c) Gene Kelly
   d) Bob Fosse
   e) Gower Champion
   f) Joseph L. Mankiewicz

6) The exterior of a VCR should always be cleaned with a mild detergent.
   T☐ F☐

7) *Calliope* is a cable TV show for children produced by the USA network.
   T☐ F☐

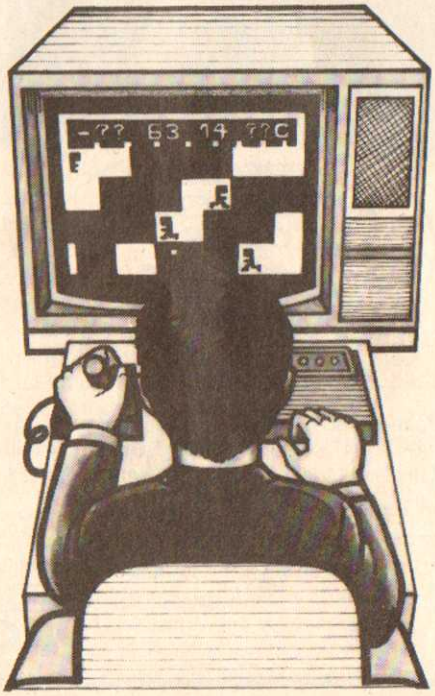
8) Videotapes cannot be spliced like audio tapes.
   T☐ F☐

9) Which company originated the VHS format?
   a) Quasar
   b) Magnavox
   c) Sanyo
   d) Hitachi
   e) RCA
   f) JVC

10) When taping with a VHS machine in the manual mode, about 10 seconds of lead time should always be allowed before and after each recording.
    T☐ F☐

11) Beta and VHS both use the azimuth recording process.
    T☐ F☐

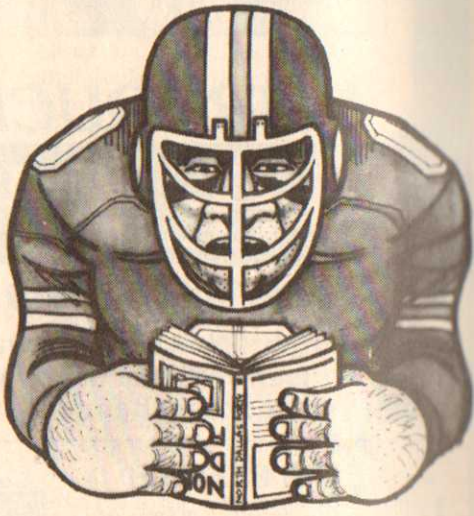
12) All video games are offered in a solitaire version for solo players.
    T☐ F☐



13) The movie *Julia* is based on an experience in the life of:
    a) Mary McCarthy
    b) Anita Loos
    c) Inge Morath
    d) Lillian Hellman
    e) Margaret Mitchell
    f) Katherine Anne Porter

14) Beta cassettes recorded on some units can't be played back on all other Beta units.
    T☐ F☐

15) The film *North Dallas Forty* is based on a book by:
    a) Bud Wilkinson



    b) Pete Gent
    c) Mac Davis
    d) Merlin Olsen
    e) Don Meredith
    f) Lance Rentzel

16) You can stay in the stop-action or still-frame mode of your VCR indefinitely.
    T☐ F☐

17) Most network programming is broadcast live.
    T☐ F☐

18) Which of these is a 1935 documentary produced by the federal government and shown in some 3000 movie theaters?
    a) *The Fight for Life*
    b) *The River*
    c) *Power and the Land*
    d) *The Plow that Broke the Plains*
    e) *Nanook of the North*
    f) *The True Glory*

# *Video I.Q. proved so popular in our June 1981 issue that we decided to offer a second set of questions. Try your luck (and knowledge).*

Answers are on page 86

19. Distribution costs for pay-TV distributors are falling while revenues climb.
T☐ F☐

20) Who directed the film *Superman*?
a) George Lucas
b) Richard Donner
c) Jean Renoir
d) Sidney Lumet
e) John Huston
f) Francis Ford Coppola

21) Which of the following TV rock shows is done by BBC?
a) *Midnight Special*
b) *Casey Casem's Top Ten*
c) *Video Concert Hall*
d) *Rockin' Around the Clock*
e) *Don Kirshner Presents*
f) *Top of the Pops*

22) If your videocassette recorder has a high signal-to-noise ratio, you have a good unit. T☐ F☐

23) The quality of movie prints shown on TV is generally better on network shows than on local ones.
T☐ F☐

24) Which of these is the Hollywood director who shot wartime films for the Navy, including the Academy-Award-winning *December 7th*?
a) John Sturges
b) John Ford
c) John Huston
d) Frank Capra
e) William Wyler
f) Garson Kanin

25) Anyone with a VCR and an antenna can record programs in color even with a black-and-white TV.
T☐ F☐

26) VHF consists of Channels 14 to 83, and UHF of Channels 2 to 13.
T☐ F☐

27) Channels 2 and 3 are used for VCR playback because one of them is vacant in every city in North America.
T☐ F☐

28) Films shown on local TV stations are more likely to be edited than those on network TV.
T☐ F☐

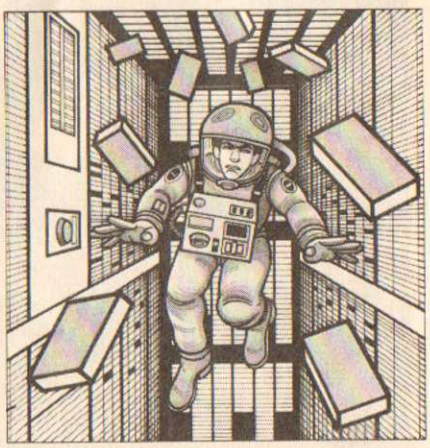
29) In laser and projection systems, colors are not in perfect register.
T☐ F☐

30) West Coast network news shows are actually rebroadcasts of the same material aired in New York three hours earlier.
T☐ F☐

31) Any video camera—color or black-and-white—can be used with any VCR, regardless of VCR format.
T☐ F☐

32) Which network was the first to have a video division?
a) ABC
b) CBS
c) NBC

33) What was the name of the computer in the movie *2001—A Space Odyssey*?
a) Robby the Robot
b) Conrad
c) Hal
d) Al
e) Arthur
f) Univac



34) FCC regulations prohibit networks from owning most of the programs they show.
T☐ F☐

35) It's impossible to improve color film and slide material when it is transferred to videotape.
T☐ F☐

36) A laser beam produces a light so intense that it can penetrate a diamond.
T☐ F☐

37) He directed *Alien*:
a) Stanley Kramer
b) Brian de Palma
c) Stanley Kubrick
d) George Lucas
e) Ridley Scott
f) Roman Polanski

38) Always use a monitor for best results when making dubs, whether or not you have an enhancer.
T☐ F☐

# The Electronic Paintbrush

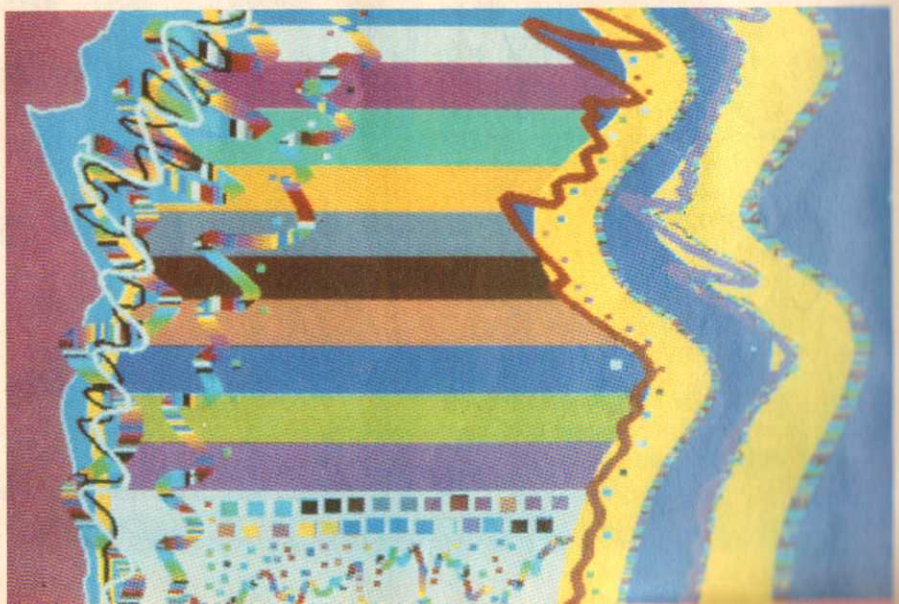
by Laurence Gartel

Electronic technology continues to push the borders of man's creativity ever outward, allowing us to express ourselves in ways that were not possible before. And the medium that currently offers the ultimate in creative freedom is the "electronic-paint" or computer-graphics system.

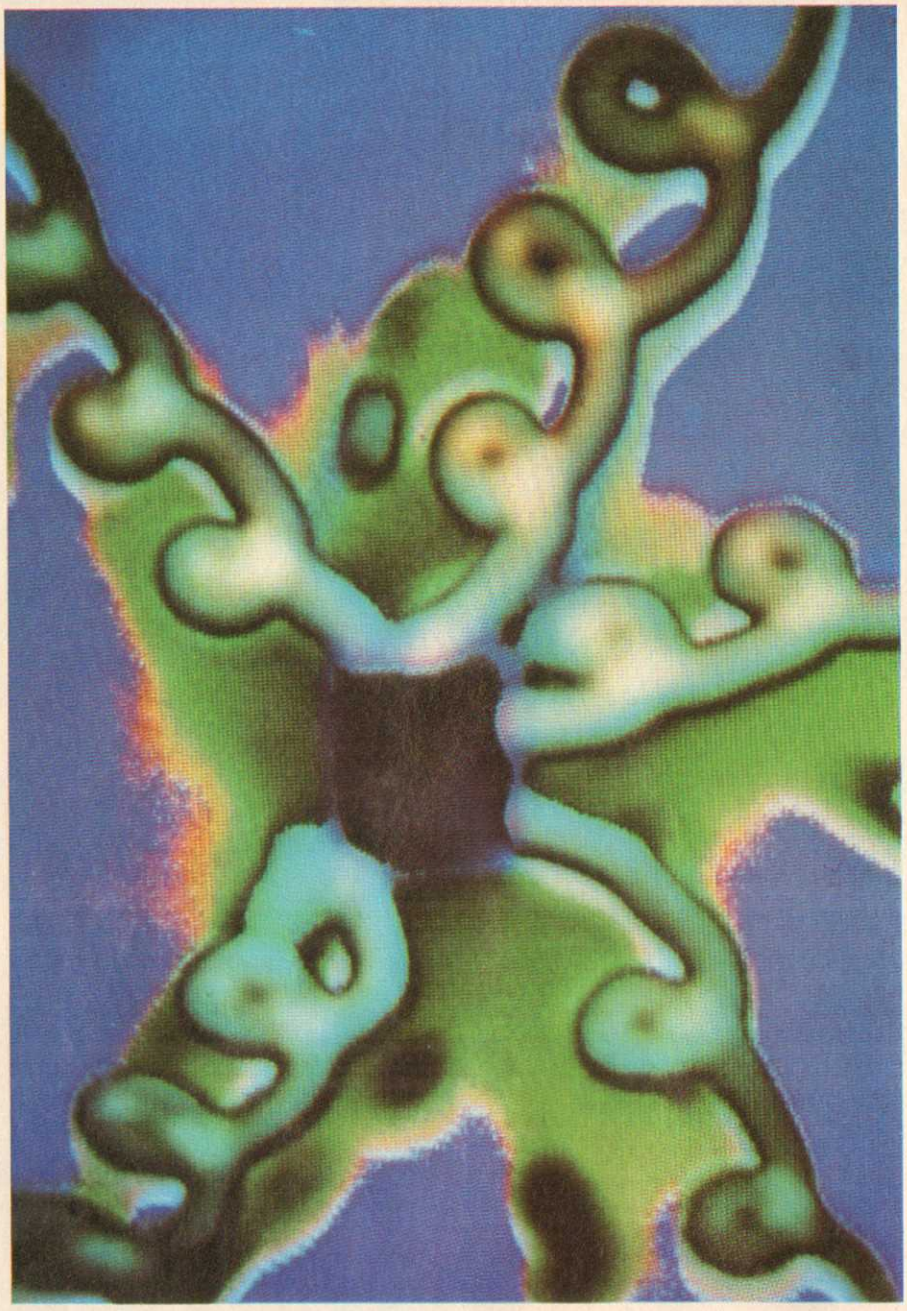
Electronic-paint systems allow their users to draw with an electronic stylus on an electronic tablet. As the user draws, what he creates appears on a video monitor. This kind of machine redefines the role of the artist, as it incorporates drawing, photography, video, and sometimes a bit of computer science. Electronic painting can be used in most kinds of visual communications: slide presentations, television and print graphics, and in my own field of fine arts. The person operating a computer-graphics system must be equally versatile if the system is to be worth its cost; he must be able to operate all the system's functions. A computer operator is also needed to provide a technical overview of the system's use.

The electronic-drawing device I use most often is the Digital Effects Video Palette. Computer-graphics technology moves so quickly that the Video Palette III was introduced only a year after the Video Palette. The new machine encompasses 256 colors as against the original's 32. The size of the drawing area has also changed considerably. The original machine had a large 30-by-40-inch drawing or "writing" tablet, all of which could be used for drawing. While this allowed for more intricate work, its perspective was deceiving. The new version uses a smaller Summagraphics "bit pad," an 11-by-11-inch square that allows the artist to more readily understand the size and shape relationships between the drawing itself and the image of it on the screen. In addition to the drawing tablet,

*Laurence Gartel is a leading video artist who has exhibited in New York's Museum of Modern Art.*



If you think computer graphics means charts and bar graphs, it's time to take a second look



As electronic painting becomes more widely known, it is certain to garner more respect in the world of fine art.

the Video Palette III consists of a computer and monitor. The computer stores information—color palettes, drawn images for stills, or parts for animation. The monitor displays information as the artist creates.

### Reading the Menu

How does it work? A menu of functions is at the bottom left of the monitor screen. Each function or command is in a self-contained box. The user activates a given function—he might want to draw a line, or fill an area with color—and then presses the electronic stylus on the drawing tablet. The artist must change functions each time he wants the stylus to do something different.

Here are some of the machine's functions: "Point" allows the artist to connect lines and make polygons. Lines do not connect until points are designated. "Stream" furnishes a continuously flowing line until the stylus is lifted from the drawing tablet. "Broken" breaks up a line into smaller lines, lengths of which depend on the length of the original line.

"Flood" does two things: it fills enclosed shapes to which color is to be added, and it erases. It can correct mistakes by filling unwanted lines or shapes with a background color. When working with a multi-tinted color, it is a good idea to keep track of the color's code numbers for reference. In some other systems it is possible to touch another area of the drawing to orient the stylus to the color without having to go back to the palette.

"Cycle" runs through a selected color palette as the artist draws to create a rainbow effect. If there is a full complement of 256 colors in a palette, all of them appear in a single line as long as the artist does not lift his hand from the drawing tablet. "No cycle" allows the artist to draw with one selected color.

"Magnification" is a useful tool that can enlarge or reduce a line, a section of a drawing, or an entire drawing. It works on

*continued on page 84*

feet. Frequency response was more than adequate for home-video use, about 90 to 7000 Hz. The signal was somewhat noisy indoors—no surprise in an office full of fluorescent lights. In a home environment, with fewer fluorescents but with our Model III computer running, it was noticeably quieter.

Outdoors, on a New York City street, it was quieter still and its range was about 225 feet. Note, however, that its exact range at any time depends directly on battery condition. Indoors or out, reception became erratic when we went around a corner, interposing shielded obstacles between receiver and transmitter. (We don't consider that much of a defect for video use; anything that blocks the signal will block your camera's view too. But in purely audio applications it might be a drawback.

By "erratic" we mean that the signal cut in and out unpredictably. You don't hear the signal fading out. Let it just begin to fade and the receiver cuts it off, a definite sign of a muting circuit. That's mixed blessing but it does give you a good indication of your signal limits. There's a visual indication too: the large, bright red LED near the top of the receiver which goes on when a signal overrides the muting and off when the signal becomes weak enough to be muted.

The microphone was quite sensitive, more than enough so to work when attached where it would be invisible in close-ups, or if hidden behind a collar, corsage, or pocket handkerchief. Output at the earphone jack was quite high (we wished for a volume control at times to turn it down.) The mic's windscreen did a good job on a fairly breezy day and served as an excellent "pop" filter on close-up speech though it did pick up a good deal of clothing rustle.

*Conclusion.* The WM001 has all the features it needs (except for an earphone-level control on its receiver) and performs well enough to do its job. Its transmitter range is limited, but so is the range of most home-video zoom lenses. If you're too far away to pick up the signal, the speaker's lip movements will probably look so small on your picture that you could dub in the dialogue later without anyone noticing lip-sync problems. And noise was low enough for practical purposes in all but fluorescent-filled environments. One of us once made wireless microphones for professional performers at $1000 or so per outfit, and they didn't perform much better than this one does.


We suspect everyone who does live taping could use a wireless microphone at least occasionally. If those occasions come often enough to justify paying $190 for one, we'd recommend this one.

**Test Report:**
**RCA WM001 Wireless Microphone**

**DATA**

**Function:** for pickup of sound up to 300 feet from camera without connecting wires

**Price:** $189.95, including transmitter with attached mic, receiver, batteries, and black leatherette case for transmitter; tie-clasp mounting on the mic is removable

**Weight with batteries:** 4 ounces, transmitter; 6 ounces, receiver

**Dimensions:** 0.8 x 2.3 x 3.3 inches (h/w/d), transmitter not including permanently attached mic on 30-inch cord; 3.5 x 0.8 x 2.5 inches (h/w/d), receiver including accessory shoe but not antenna which extends approximately 12 inches

**Operating frequencies:** 49.830MHz and 49.890MHz; FM

**RESULTS AND RATINGS**

**Range:** maximum 300 feet as specified but drops quickly to the 100 to 200 foot range as battery life diminishes—highly dependent on battery condition.

**Battery life:** 2 hours for the 9V receiver battery, as specified; 4 hours for the AA cell in the transmitter, as specified; diminishes quickly with battery condition; freshness of batteries also a factor in battery life

**Interference rejection:** immune to most kinds of RF interference including computers and auto-ignition noise but not to fluorescent lights

**Frequency response:** 300-3000Hz +/− 3dB; 100-7000Hz +/− 15dB; recommended for voice only

**Distortion:** less than 4%

**Ease of operation:** excellent

**Overall rating:** a mixture of strength and weakness—good except for the distance/battery condition limitation (remember to turn it off when it's not in use)

# Sinclair Computer


Sinclair's ZX81 is a very different computer. To begin with, it's the smallest and lightest computer you can buy other than the battery-operated pocket computers available from Radio Shack, Sharp, Casio, Quasar, and Panasonic. (We won't test them here because they use built-in single-line displays instead of video.) The Sinclair is also extraordinarily inexpensive: just $149.95, or $99.95 if you build it from a kit. It's been available for about a year in England, where thousands have been sold already (not to mention thousands of the previous ZX80 model). Production is currently running at 20,000 per month.

When we say small, we do mean small: you can almost cover the ZX81 with your hand. But it still has most of the basic necessities: a flat-membrane keyboard, BASIC that's ready as soon as it's powered up, some user memory (and connections for more), connections for a tape recorder, and an output for connection to a TV set. The tape, TV, and power connections are on the left side of the computer; the connection for additional memory and Sinclair's special printer (to be available soon for $100) is on the rear. The factory-wired version has a switch on the bottom to select VHF channel 2 or 3 for output and the kit version comes equipped for UHF Channel 33.

The miniature feeling hits you most strongly when you examine the keyboard, which has the layout of a standard typewriter compressed into 6½ x 2½ inches. Each key does multiple duty, as many as five functions per key in some cases.

The "A" key, for example, is just a letter "A" most of the time. But when the ZX81 expects you to enter a BASIC keyword, the key inputs a NEW command—to clear away the old program and get ready for a new one—indicated by the word NEW printed just above the key. Press SHIFT when you press "A" and you get a different function, STOP, which halts the program's execution. STOP can be entered as a line in a BASIC program (as on most computers) but can also be given when the computer asks for input—one of the many handy (and occasionally unhandy) differences between Sinclair BASIC and more common varieties. If you're in graphics mode (entered by hitting SHIFT-9), hitting SHIFT-A gives you a quasi-square of grey. If you hit SHIFT-ENTER before you press "A" you get the ARCSIN function.

Of the 40 "keys" printed on the keyboard, 12 have five functions indicated, 14 have four, nine have three, five have two, and only SHIFT has one. Those are just the indicated functions though. In graphics mode, pressing an unshifted key displays that key's normal character in white-on-black inverse video.

Of the four jacks on the left side, the TV-output connection is a phono jack while the Tape In, Tape Out, and Power jacks are 3.5mm mini-phono jacks. Thus it's possible to plug the 650-milliamp 9.75V power supply into one of the tape jacks; Sinclair says this will do no harm. We have stronger reservations about the use of a male plug on the power supply since it's possible to short the two contacts together when the supply is unplugged from the computer, and unplugging it is the only way to reset the ZX81 or turn it off.

The connecter in the back is a 44-pin edge connecter, actually an extension of the circuit board. You can connect extra memory to it. (The ZX81 comes with 1K or 1024 bytes of user memory; Sinclair's $100 add-on brings the total up to 16K, but expansions up to 48K are available from other sources.) Sinclair's printer will plug into this connecter too when it arrives in this country (it's now on sale in England). Various other attachments are available from other sources here and in Britain.

We don't normally describe the insides of equipment we test, but the ZX81's deserve special mention. The reason it's so cheap is that its main circuitry consists almost entirely of just four integrated circuits: the Z80 CPU chip, the 8K ROM chip which contains the BASIC, the 1K RAM memory chip, and a custom-made "Sinclair Computer Logic" chip which takes the place of most of the other chips you'd expect in a computer like this. The manual refers to these four ICs as (respectively) the "brains," the "note pad," the "manual," and the "dogsbody" (the British equivalent of our "gofer," the obedient do-it-all). The rest of the circuitry is nothing much: a voltage regulator, a few capacitors, a handful of resistors, and so on, plus a small shielded box containing the TV RF modulator.

As you'd gather from the use of "dogsbody," the manual is very British. This occasionally causes minor confusion, especially when it discusses items different in the U.S. version (such as the TV channel and the key called ENTER here but NEWLINE in England). Still, the manual's style adds to the Sinclair's charm. It's the first computer manual we've ever read that we'd describe as "charming." It's also one of the few to bear an author's byline, Steven Vickers—in this case an honor richly deserved.

*Sinclair BASIC.* The ZX81 uses an unconventional dialect of the BASIC language used in most home computers. The differences are fully spelled out in the manual. If you use the manual to learn BASIC from scratch, you'll learn the deviations as you go along. If you already know BASIC, the manual refers you right at the start to an 11-page appendix which doubles as a handy summary of Sinclair's BASIC dialect.

The most obvious difference between this and most other computers (the Atari 400—VIDEO, May 1981—is an exception) is that you don't type in such keywords and commands as PRINT in the usual letter-by-letter fashion, but instead press appropriate keyword keys. This can become quicker than the usual system, especially in view of the tiny keyboard, but takes a bit of learning. Sinclair has helped by associating these commands wherever possible with keys having main letters suggesting them. PRINT, for example, is on the "P" key; RUN is on the "R"; and so on. Not every command or keyword can be placed by its initial since several begin with the same letter (PLOT, POKE, PRINT, and PAUSE, for example, or REM, RUN, RAND, and RETURN), so preference is given to the most oft-used functions. Related functions (such as PLOT and UNPLOT or GOTO and GOSUB) are often grouped close together.

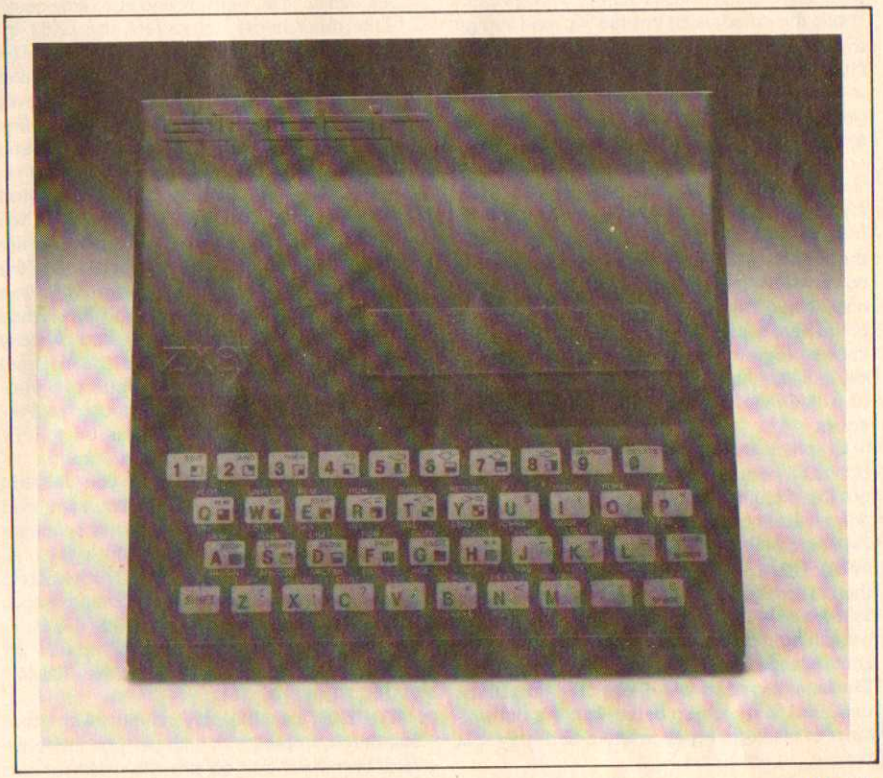
Most commands and functions are pretty standard. Among them are string-handling commands such as CHR$, STR$, VAL, and LEN, plus CODE (a non-standard equivalent of ASC$); trigonometric functions such as SIN, COS, TAN, ARCSIN, ARCCOS, and ARCTAN (plus pi—non-standard but handy); and such math functions as RND (random), SQR (square root), SGN (find the sign), and ABS (absolute value). Trig functions are in radians instead of degrees, which is fairly common, and logs are "natural" logs rather than the base-10 logs more commonly seen on home computers. The manual clearly explains how to convert to degrees or base-10 logs.

If you want to write machine-language routines, the BASIC includes PEEK, POKE, and USR functions, and the manual furnishes helpful information on the subject. Some common BASIC functions are missing, such as READ, DATA, and RESTORE, which are used to save data for reuse when a program is rerun. But you can do without them since all the variables and data used in a program will be automatically saved when you copy the program onto tape, and reloaded when you load the program back. Starting the reloaded program with RUN (the usual procedure) erases these values, but starting the program with GOTO and the first line number runs the program with all values preserved.

Whereas most home-computer BASICs restrict variable names to two characters (such as A1), Sinclair BASIC can use variable names of almost any length as long as the first character is a letter and uses only letters and numbers. That's handier than it sounds: a program is far easier to understand if a variable is called WRENCHES IN JANUARY 1981 INVENTORY instead of "WJ." The ZX81's small memory limits the number of such long names you can use, and string (non-numeric) variables must have names consisting of a single character plus a "$" sign (e.g., S$), while most other BASICs let you use two characters plus "$."

The LET function (as in "LET X=X+23"), which is optional on many computers (where just "X=X+23" will do), is mandatory on the ZX81. Functions that require parentheses on other computers, such as "LEN (A$)," don't use parentheses on the ZX81. Functions such as "◀=" (less than or equal to) have their own keys on the ZX81; on other computers you key in the "◀" and "=" separately. Another unusual compound character is " " (SHIFT-Q), which allows you to print out something in quotation marks. Most other BASICs can do that only after a lot of extra programming, if at all.

The GOTO statement also works differently. It makes the computer run a named line rather than the next line of the program, usually after some condition is met (for example: "IF X=0 THEN GOTO 100"). Most computers require that the line be named explicitly. The ZX81 also lets you name the line as the value of an expres-



sion (e.g.: "GOTO (X/Y-2)"). We have longed for this feature on other BASICs. GOTO even works if you name a nonexistent line number. In this case it goes to the first program line following the named one. That makes this BASIC more forgiving in one sense, but it also increases the chances of programming errors not being caught. Most BASICs come up with an error message if you try this.

The ZX81 has a handy error-checker that other machines lack. If you enter a line with an inherent error, the ZX81 will spot the error at once, reject the line, and plant a reverse "S" cursor where the error occurs on the line. Lines that contain no such errors within themselves but don't work in the context of the program (use of undefined variables, no more room in memory or on screen, and so on) prompt a one-digit "report code" (other computers call them "error codes"). You can then look up the code in the back of the manual. (Since there are only 15 such codes, they shouldn't be hard to learn.)

The ZX81's cursor, which indicates where the computer's attention is focused, is an inverse-video letter or symbol. It changes according to the computer's mode. Initially it's an inverse "K," showing that the computer expects a "keyword" command. Pressing the "A" key registers the keyword NEW, and pressing "P" registers PRINT. When the cursor becomes an inverse "L" the computer expects the next entry to be a letter, number, or other symbol ("A" prints as "A" in this mode). In either mode, pressing SHIFT along with the character gives you whatever character or command is printed in red in the key's top right corner—STOP for the "A" key, for example.

In function mode (the first keystroke after SHIFT-ENTER) the cursor becomes an inverse "F" and each key assumes the value printed beneath it (e.g. ARCSIN for "A"). In graphics mode the cursor is an inverse "G" and you get inverse video for each key you hit, or a graphics character if you use the SHIFT key. In BASIC an inverse "▶" cursor indicates the current program line. The inverse "S" cursor indicates a syntax error and occurs right at the point of the error in the program line.

The screen display has only 24 lines of 32 characters, of which 22 at most are available for program listings or output. At least two lines at the bottom of the screen are used for inputting commands, program lines, or data, and for displaying "reports." Reports consist of two characters separated by a slash. The first code shows program status: either "0" (which usually indicates "no problem") or any of 14 codes (2-9, A-D, and F) that show various kinds of errors.

Graphics consist chiefly of the PLOT and UNPLOT commands (which black in or white out the picture element at any specified location on the screen) and the graphics characters (which can be printed exactly like ordinary ones). There are 27 such characters. Sixteen of them represent all possible combinations of four black and/or white quadrants, while the remaining nine are combinations of two horizontally separated black, white, or grey halves. The latter include two varieties of all-grey block designed to match up better with the dot patterns of black-and-grey or white-and-grey split blocks.

We were gratified to see that the Sinclair lets you edit program lines rather than rewrite them from scratch; some more expensive computers have omitted this. Getting to the point where you want to edit isn't super-convenient—you move the cursor one line at a time to the line you want to fix, press Edit (SHIFT-1), move the cursor to what you want to change, and change it—but better than nothing. The changes themselves are easy to make: anything you enter is inserted into the line at the cursor position while a DELETE key can remove anything to the left of the cursor. Commands delete with a single keystroke. And if rerunning your program shows you that you want to re-edit that program line, the edit marker will still be at that line when you re-LIST it.

*Performance.* The ZX81 performs unusually. Once you get used to the keyboard (which confirms accepting input on the screen but makes no sound), you still must get used to the screen format. The screen holds fewer characters than any other computer we've used: 768, though only 704 can be program output. As you write programs it constantly "refreshes" itself, rewriting itself from scratch with each new line you enter. Everything stops when the screen fills up (which is time-consuming and distracting) unless you use the SCROLL command to make the top line roll off the screen when you need room for a new bottom one. (Most computers keep their contents steady on the screen until the screen is full, then automatically scroll up a line at a time as new lines are needed.)

You can avoid this by shifting into FAST mode, in which the computer blanks the screen, figures out what should be on it, and flashes it all on at once. This is faster because the computer's task is simplified: it doesn't have to keep track of the screen while it's computing. Cursor movement is quicker too. We greatly prefer FAST mode for editing. We also prefer an ordinary display, though we realize that this odd display technique is one of the factors that lets the Sinclair do the good job it does with so little memory and at so little cost.

Like most home computers, the ZX81 includes a cassette interface to save programs on tape and read them back into the computer when you want to run them again. This saves much time and grief in typing and retyping. Cables are provided to plug into the Mic and Earphone jacks of most popular cassette recorders. One cable is marked with a colored band at each end to help you identify it; the jacks are also labeled (though the labels are unfortunately printed under the jacks where the cables can hide them). Loading and saving was moderately quick and easy, though we had some trouble getting the plug seated properly in the recorder's Mic jack, as the manual warned. While you can't hear the buzz of signals being exchanged between computer and recorder, you can see the process on the TV screen. The ZX81 has no sound output.

You must name each program you save, but you needn't name the program when you load it unless you have several programs on a tape and want to be sure you load the right one. Program names can be up to 127 characters long and must be enclosed in quotation marks. The same tapes can be used with the older ZX80 model if it is equipped with the new 8K BASIC ROM chip, but not if it has the older 4K BASIC ROM chip.

The ZX81 cannot easily interface with more standard computers or with peripherals (printers, terminals, and so on) designed for use with them. That's mainly because it assigns non-standard codes to each of the characters it can display on screen. A space, for example, is code 0 in Sinclair's character set, but code 32 in standard ASCII code.

Interface to TV sets is hampered by a common microcomputer problem: even FCC-approved computers radiate some interference, and most of it's on the low VHF channels 2-6; yet the factory-wired ZX81 (and most other microcomputers with RF interfaces) is designed to play over channels 2 or 3 on your TV set. That's surprising—the kit and British versions of the ZX81 both come with UHF interfaces. If your set's well-shielded this won't cause problems, as we found when using the ZX81 with a Zenith GR-2000, but with some less well-shielded sets (two old five-inch portables) we had difficulty getting a clean picture. The ZX81 comes with the same sort of TV/Game switch box that most games and computers use for their TV-set connections.

We've seen Sinclair's printer but did not have one for test. The aluminized paper it uses makes the printer quiet, cheap, and moderately fast (though the paper costs a bit more than plain paper). It reproduces anything that can be shown on the ZX81's display, and Sinclair BASIC includes a "screen dump" command (COPY) which copies the screen's contents onto the printer. However, small printouts on aluminized paper (which is often hard to photocopy or reproduce) aren't as useful as the large plain-paper printouts made by standard (and more expensive) printers.

Sinclair's only additions to the ZX81 system so far are the 6K memory and (soon) the printer. But the computer is popular, and other peripherals (including more memory, a more standard keyboard, and a standard RS-232 serial interface adapter) are available from other companies. Several companies supply software for the ZX81 (including Softsync, Box 480, Murray Hill Station, New York, N.Y. 10156, two whose game programs we tried and liked), and there are already two magazines devoted to the Sinclair computers (*Sync*, 39 Hanover Avenue, Morris Plains, N.J. 07950 and *Syntax*, The Harvard Group, Bolton Road, Harvard, Mass. 01451).

*Conclusion.* The ZX81 is not a toy. It's a genuine computer with many unique and worthwhile features—as well as a few limitations, some common and some equally unique. We'd recommend it to someone who wants to take a trial step into computing without paying a fortune for it. It's especially well-suited for children both because of its low cost and because its small keyboard is best suited to small fingers—and is jellyproof to boot. We'd also recommend it to people with large, serious computer systems who want a computer they can use just for kicks.

The ZX81 is not itself a large, serious computer system, and turning it into one would take much effort and additional expense—if it's possible at all. If you know you want such a system, start out a notch or two further up the computer family tree, and be prepared to pay more than twice as much as the Sinclair would cost you.

But if you buy a Sinclair as a trial horse now and move up to something larger later, don't toss the ZX81 out. When that large system is running all your business applications, you may well find yourself drawn back to the Sinclair for the pure fun of it. And if you can't or won't move up, you'll find that the Sinclair (with added memory) can handle some pretty serious stuff on its own.

pick from his Warner catalog, and he gets them for you within 48 hours.

If this scheme works, Warner says, you and I will benefit in various ways. Copies will be of better quality because replacing worn-out and defective rental tapes will not cost the retailer anything. The retailer's temptation to duplicate in the back room and deal you a bootlegged copy will be removed. Many more outlets—newsstands, grocery stores, gas stations, cleaners, drugstores—can now rent programs. Warner will advertise, ship, promote, and do everything necessary to get us into outlets that Warner signs up as rental agents. The threat to retailers is that if they don't go along, Warner will surround them with rental-agent competition. Of course, there is no guarantee that this won't happen anyway.

Because Warner will be handling all this lock, stock, and barrel nationwide, Warner says it can put more special-interest material into its catalog. Warner says it's in a position to carry the kind of programs nationally that local retailers avoid. I'm not so sure about this. The overhead and return on investment required for the kind of operation Warner is talking about is enormous. I'm convinced that truly specialized programming is best handled by mail-order independents. What Warner is really referring to is getting off the hit-movie kick.

Warner is biting off a big mouthful. While it was known that Warner (like others) was moving toward rental, the surprise is that Warner says it will never, ever sell. That has got to change. I thought (and still do) that Warner would first rent-only but eventually add sale when a given title makes its inevitable way into some form of electronic transmission where it would be up for grabs for home recording.

Warner has overreacted. Given time, I'm certain Warner will change its tune. But until that time, keep your Warner titles under lock and key. *"10"* has become hot in more ways than one.



## Arcade Alley

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"Doodle," was a pleasant surprise: it's actually one of the most sophisticated sketching games available for programmable video-game systems.

**Slot Machine** (Videocart 22) is as good as any of the one-armed video-game bandits offered for rival home-game machines. Attractive graphics almost on a par with Intellivision's visuals are enhanced by clicking and whirring sounds as the arrays of symbols spin in the three windows of the faithfully rendered gambling device. A player starts the action by setting the size of his bankroll, making a bet, and setting the slot in motion. The cartridge offers two options for stopping the spin and determining the winner. The first simply lets the system itself halt the machine after a random time interval. The second and more interesting choice permits the players themselves to put the brakes on each window by pressing down the controller knob, adding a an additional dollop of involvement to a contest that is a bit more passive than most gamers really like.

**Video Whizball** (Videocart 20), which picked up an Honorable Mention for "Best Pong Variant" in this year's Arcade Awards, is a real one-of-a-kind cartridge. There's nothing else quite like this one on the market. "Whizball" can be played solitaire against the Channel F or head-to-head with two players. Each side controls a vertically movable firing paddle that shoots "whizballs" across the screen, either straight ahead or at an angle. The target for these pellets is a huge floater generated by the system. By hitting this balloon-like target, it is possible to drive it across the playfield into the opponent's goal. Of course, the competition is also slinging whizballs to send the floater in the opposite direction.

The real fun starts when up to four of

the weightless boulders are programmed into the Channel F for simultaneous play. A quartet of these big dumb things bouncing around the screen can wreak more havoc than a hockey team at an ice show. A key strategic element is that hitting an enemy's paddle with a whizball causes the victim to disappear from the screen for a brief penalty period. Needless to say, this represents a prime scoring opportunity for the arcader whose paddle is still functioning.

**Galactic Space Wars/Lunar Lander** (Videocart 23) is a good try, but the primitive technology of the Channel F system confounds the designer's best intentions. This was one of the titles awaiting release when Fairchild unplugged Channel F, and Zircon has presumably marketed it to remedy the lack of a space game in the cartridge lineup. "Galactic Space Wars" is the better of the two. It incorporates some fairly inventive elements including horizontal and vertical alignment settings for tracking the alien ships. Although the graphics are acceptable, they can't really compete with the visual wizardry of current state-of-the-art space shootouts. "Lunar Lander," on the other hand, is a near-total washout. The pale images seem to disintegrate on screen, and spaceship manipulation is unwieldy. Would-be Channel F star warriors might do better to wait for Zircon's upcoming "Galactic Intruders," a "Space Invaders"-type contest that should satisfy any Channel-F'ers who yearn to defend the civilized universe against extraterrestrial menace.



## Videology

*continued from page 26*

use include electroluminescent panels, gas-discharge or plasma panels, liquid-crystal displays (LCDs), groups of light-emitting diodes (the LEDs of early calculators), and other exotic materials. The manufacturing techniques necessary to create a flat TV panel are analogous to those for making transistors. Just as with transistors and chips, the so-called "learning curve" of semiconductor manufacturing will increase flat-screen resolution and lower the price.

Small black-and-white mini-TV receivers will most likely appear for sale this year. The need to upgrade picture-tube technology has spurred manufacturers on both sides of the Pacific to research new kinds of visual displays. At the same time, the needs of the burgeoning electronic-calculator/computer industry and the electronic-game sector have created demand for video-like displays on hand-held electronics. These black-and-white displays are virtually miniature video screens. Items like Mattel Electronics' new "Computer Chess" and "Grand Prix" from Entex offer detailed LCDs with video realism.

Taking that one step further, Sinclair Electronics and Toshiba have produced working prototypes of pocket TV sets that will be available in a couple of years. Toshiba has taken LCD technology and packaged it around a miniature set with a two-inch screen. The small size enhances the flat-screen image. The LCD approach is more acceptable in a small size, the picture having the greatest perceived resolution because the matrix is too small to be apparent. The Toshiba prototypes, shown as combinations of VHF/UHF TV sets with AM radios and digital clocks, need so little power that a shirt-pocket TV would play four to six hours on one set of lithium batteries. Hitachi is also working on an LCD pocket TV using AA batteries.

These LCD sets should reach the consumer during the next 18 to 24 months at a cost of $300 to $400; the price is expected to drop with mass production. Much sooner, the Sinclair 2700 Microvision will be available at half the initial price of the Japanese LCD units. Sinclair does not use flat-screen technology, having opted for a unique ultra-miniature picture tube. This special tube shoots the image

to the screen from the side, allowing for minimal depth. The Sinclair unit uses plastic lenses and other optic devices to enhance the video image produced by the smaller set.

Larger, wall-hanging color-TV displays could well solve the problem of providing an affordable viewing element for high-resolution television. The current resolving-power limit of picture tubes is very close to the 525-line NTSC scanning system used in the United States and Canada. Plasma and electroluminescent panels offer nearly three times the picture resolution of conventional CRT tubes; LCDs furnish almost 10 times the resolution. The most severe problems these flat-panel semiconductor displays currently pose are lack of brightness and limited color range. There is also a question about the lifespan of some of the luminous semiconductor materials. RCA may have an interim solution, a flat guided-beam panel tube that updates CRT technology and provides sufficient light output with the same 100,000-plus-hour life expectancy of conventional CRT tubes. RCA's four-inch-thick tube would furnish perfect color fidelity with none of the distortions found in conventional tubes.

Whatever the ultimate solution, bringing the video image up to par with state-of-the-art TV-set electronics would give televiewers high-fidelity television to complement the growing sophistication of visual entertainment. Coupled with the still-store capability some current video systems (such as LV) already offer, it's going to be a lot more rewarding to view your disc of all the paintings in the Louvre on a video receiver capable of displaying all of the nuances.

## Computer Art

*continued from page 66*

a sliding scale of one to 50. An artist can enlarge a section to add detail and then reduce the section back to normal size, or simply magnify an area to check his work. One important use of magnification is to clean up jagged areas, turning squared corners into smooth edges by either erasing or adding color to a line.

The "menu" stores the various color palettes, posting about 15 at a time in a "scrolling" mechanism that allows the artist to find a desired palette. The menu can be used to change the hue and tint of the colors by adjusting the red, green, and blue of each color. Like the magnification mode, the menu works on a sliding scale, from 1 to 256. The number of colors that can be obtained by mixing hues add up to 16 million. The "play and replay menu" allows the artist to replay a stored image line by line as it was created. Using the computer's keyboard, the artist types in a name for each element drawn and incorporates it into the computer memory, calling elements back later. The progression of movement creates the illusion of animation. This menu is a major part of the system and can show many variables in a short time. It can be used to design and reconstruct repeated images.

For hard copy, an external slide camera can be added to produce high-resolution 35mm transparencies; a Dunn camera can also be added for 8x10-inch Polaroids or transparencies. I photograph directly from the front of the monitor because I like the texture of the screen.

The possibilities of the Video Palettes are limited only by the imagination of the artists using them. The colors can be rich and saturated, or soft pastels. Electronic drawing can be a delicate medium that depends like other artists' media on the placement of shapes, structure of lines, and balance of design. The electronic pen is a special instrument that can create unique imagery. As electronic painting becomes more widely known, it is certain to garner more respect in the world of "high art."

## Video I.Q.

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## Answers

1) *C*—a device for answering the telephone without moving from your TV set. "Space Phone" is Zenith's brainchild. (See "Zoom Out—Phone In" in "News and Views," VIDEO, September 1980 for more information.)

2) *False*—not at all. Stereo TV has been developed by the electronic wizards in Japan. (TV audio was thoroughly dissected in a two-part series in "Audio into Video," VIDEO, July and September 1980.)

3) *E.* Our heroine goes by the name of Lili Von Shtupp.

4) *True.* Each speed requires a slightly different video-head placement.

5) *C*—Gene Kelly.

6) *False.* Use only a clean cloth or sponge, dry or very slightly dampened with plain water. Chemical cleaning fluid or a liquid cleaner can damage the finish and any liquids that get into the VCR can cause extensive damage.

7) *True.* See "Cable Choices this Fall," VIDEO, September 1980.)

8) *False.* You can buy special "splicing blocks" for this purpose although they're best used only for salvaging irreplaceable program material. Splicing is not recommended for tapes in regular use. You must trim and "glue" the splice very carefully or you'll clog and score your video heads, which are expensive to repair.

9) *F*—JVC.

10) *True.* Unlike Beta machines, in which the tape is always wrapped around the head, VHS systems need extra time to put the half-wrapped tape into position for recording. As a general rule of thumb, allow about 10 seconds before and after each recording. In the automatic mode, the recorder takes care of this.

11) *True.*

12) *False.* Sadly enough, you can't count on video games if you just "want to be alone." Atari is on your side with a full complement of solitaire options, but others such as Mattel offer few solo options. (See "Arcade Alley," VIDEO, September 1980.)

13) *D. Julia* is a selection from Lillian Hellman's best-selling book, *Pentimento.*

14) *True.*

15) *B.* Ex-Cowboy tight-end Pete Gent also co-authored the script.

16) *False.* It's best to move the tape after a minute or so to prevent the heads from clogging.

17) *False.* Most programming is taped or filmed. The few exceptions are sports coverage, major news stories, and occasional entertainment specials.

18) *D. The Plow that Broke the Plains*, produced during the Depression, was an award-winning film that focused on the Dust Bowl and which was important in helping to establish the documentary genre of film. *The River*, another award winner by director Pare Lorentz, followed a year later.

19) *True*—an enviable position to say the least. (For more on pay-TV's effect on first-run movies, see "Video Programmer," VIDEO, September 1980.)

20) *B*—Richard Donner.

21) *F. Top of the Pops* is a major means of breaking a new group or single in Britain. (See "Will Video Kill the Radio Star?," VIDEO, February 1981 for more on TV's role in rock.)

22) *True.* A high signal-to-noise ratio means a cleaner, crisper picture with less snow and fewer streaks.

23) *True.* Networks usually use 35mm prints from which higher-quality reproduction is possible. Local stations usually use smaller 16mm prints.

24) *B*—John Ford. All of these famous directors produced wartime films for the government.

25) *True.* A VCR is a complete color TV set, minus a picture tube, a loudspeaker, and certain related circuits.

26) *False.* It's the other way around: VHF is 2 to 13, and UHF is 14 to 83.

27) *False.* The VCR playback channels are usually 3 and 4.

28) *False.* Because of the high cost of editing, local stations are more likely to run films uncut, with their dialogue intact.

29) *False.* Because a laser system can generate an image with television's three primary colors within the beam there is no need to superimpose the different colors. They are therefore in perfect register. (See "Laser TV Tomorrow and Tomorrow," VIDEO, January 1981.)

30) *True.* News shows are the same, though with minor alterations. (For more on how networks fit prime-time shows into various time zones, see "Time Travelers," VIDEO, May 1981.)

31) *True.* In some cases, however, special adapter cables or even boxes must be used.

32) *A.* ABC launched its video division in July 1979 with an extensive and expensive 11-month research project to investigate the needs of the video market. (See "How Technology Will Change What We Watch," VIDEO, January 1981.)

33) *C*—Hal.

34) *True.* Networks own the news and some special programs. The rest are usually owned by independent producers and production companies.

35) *False.* Quite the contrary: not only can you correct for exposure and color rendition, you can also improve the sound.

36) *True.*

37) *E*—Ridley Scott.

38) *True.* (See "VideoTests," VIDEO, September 1980 for more on dubbing.)

## Commercials

*continued from page 57*

the-spot reactions to ads in a contrived laboratory situation. For instance, at ASI Market Research's Preview House in Hollywood, groups of Los Angelenos view commercials on large movie screens sprinkled among a succession of pilot TV shows. To express their "interest level" as they watch the ads, the men and women turn little dials at their seats, registering ratings from "very dull" to "very good." The dials are linked to a computer that calculates whether the commercial's a hit or a miss.

Quasar President Alex Stone is one advertiser who doesn't put much faith in the controlled theater-type test. "I believe 50 percent of what the [advertising] agency tells me about the results because they're creating an environment in which you've almost got to come out well," Stone stresses. "If you see the ad on a 12-foot screen, of course it looks terrific. But if you put the same commercial on a 19-inch screen and view it the way the consumer normally would, you begin to discover funny things—for example, maybe the product doesn't show up."

A Great Neck, New York research firm, McCollum/Spielman, also uses the forced-exposure approach. But in contrast to Preview House's dial style, commercials are screened on 19-inch sets and reactions are recorded entirely on paper. Afterward, everyone is taken on an imaginary shopping spree and asked to fill a market basket with products from a series of lists. Comparing information supplied before watching the commercials, testers can find out just how many people switched to brands promoted in the test ads. For participating in these tests, you might receive a small gift or maybe have a chance at winning a shopping bag full of goodies.

Consumer feedback is also sometimes applied to give a commercial a needed overhaul. When McCollum/Spielman tested RCA's initial SelectaVision videodisc-player ad, results showed that the commercial's emphasis should shift from price to ease of operation. "Consumers couldn't pick up the idea of how the system works," says RCA Vice President Jack K. Sauter. "Testing gave us the chance to go back and cut the re-edit to get that idea across."

### They Want Your Body

As if verbal probes weren't enough, market researchers have also dreamed up a battery of physical tests that scrutinize unconscious reactions to 30- and 60-second pitches. These include measuring brain waves (by putting electrodes on your head), perspiration output (galvanic skin response), and eye movement (tracked by a camera that pinpoints spots on the screen on which your eyes focus). This last test might be used to explain a low recall score by showing that you were busy studying the waterfall in the ad's background instead of say, zeroing in on the advertiser's package of laundry starch.

With costs for production and TV airtime skyrocketing (running $30,000 more for 60 seconds of a prime time than in 1978), consumer testing is definitely on the rise. Companies are even trying to foretell if proposed celebrity spokespersons will do justice to their products. Take Seagram. Before signing Orson Welles to promote its Paul Masson wines ("We will sell no wine before its time"), the firm tried a rough ad on a group of viewers using drawings of Welles and someone mimicking his voice. Welles fared splendidly, of course.

Not so George Burns in a test for a cat-food commercial. Skeptical consumers said they doubted he was a cat-lover and, moreover, couldn't imagine his being concerned with feeding cats. Burns later redeemed himself in a test for a denture product, an item with which people felt the venerable 85-year-old comedian was more familiar.