

HOW TO REJUVENATE
ANTIQUE RADIOS

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DGS

Radio- Electronics®

COMPUTERS - VIDEO - STEREO - TECHNOLOGY - SERVICE

Portable
SHORTWAVE RECEIVER

Buyers guide

Inside the new
767 COCKPIT

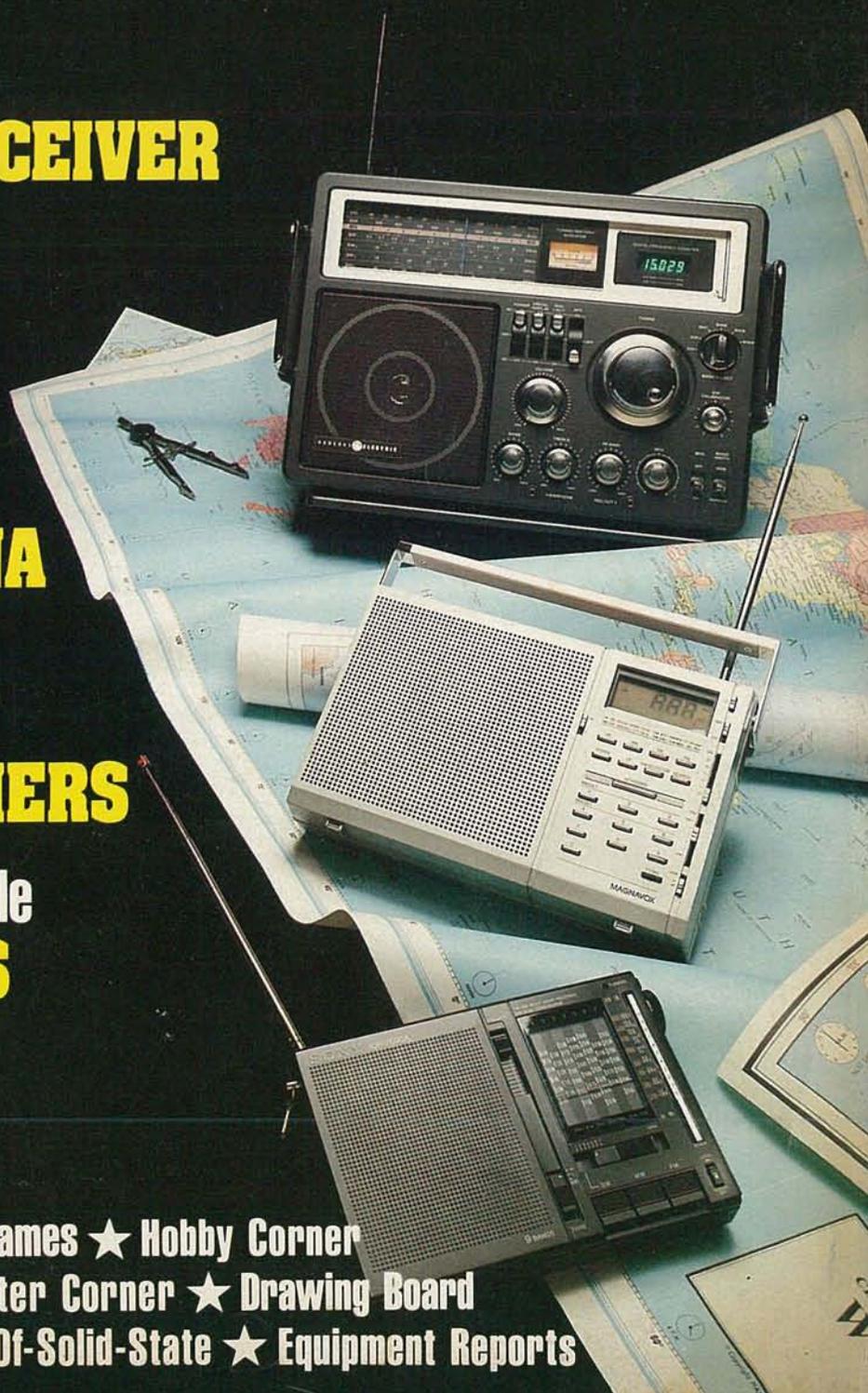
Build an
ACTIVE ANTENNA
for your VLF receiver

Back-to-school series
POWER AMPLIFIERS

Inexpensive and versatile
2 DVM CIRCUITS
you can build

PLUS:

- ★ Videogames ★ Hobby Corner
- ★ Computer Corner ★ Drawing Board
- ★ State-Of-Solid-State ★ Equipment Reports



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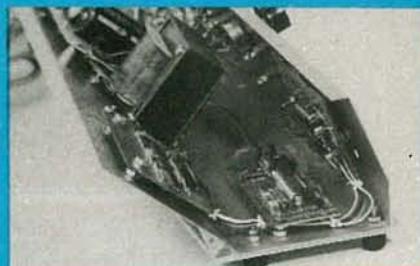
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ON THE COVER

Portable shortwave-receivers with features like microprocessor-controlled PLL tuning and digital readouts, and pocket-sized shortwave receivers with "big" radio performance, were once just dreams. Both types are now realities, as you'll see in our story on pocket-sized and portable shortwave receivers. The article begins on page 49.



IF YOU'RE LOOKING for a DVM for your workbench, one of those described here may be for you. Thanks to the use of LSI IC's, the circuits are small and inexpensive to build. The story begins on page 59.



EVEN THOUGH MODERN RADIOS are sleek, and are great performers, there's something about the old ones that makes most of us feel nostalgic. Find out how you can restore an old radio's original sound and appearance starting on page 56.

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WHAT'S NEWS

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school students in math and science courses.

The report—available from EIA—gives information on technical education in the United States and its importance to high technology; the balance of supply and demand in various technical fields, and job opportunities in electronics.

The EIA hopes to reach local school systems—who are most important in making decisions about early science and math education—with the report, and is organizing a campaign to do so. "The problem is to be addressed," says EIA president Peter McCloskey, "at the local level with volunteer employees—at all levels—from our member companies."

Copies of the report may be obtained by contacting the EIA Human Resources Council, 2001 Eye St., N.W., Washington, DC 20006 (phone 202-457-4925).

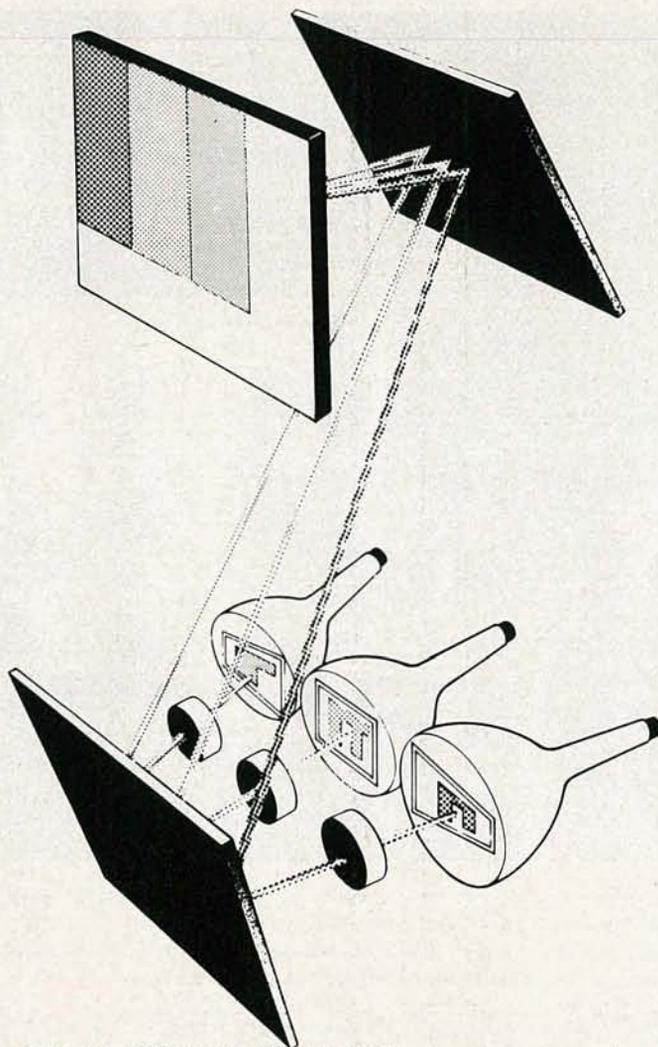
Self-converging tubes for projection TV

The problem of converging the three images of a color projection TV, formerly attempted with complex electronic circuitry and adjustable consumer controls is now solved, reports Zenith.

The patented solution is in the tubes themselves. In a conventional projection color-TV set, three tubes—red, green, and blue—are mounted side-by-side. Only the middle (green) tube can be aimed squarely at the screen. The others are tilted slightly inward. That distorts their images on the screen, and the picture has to be converged manually.

Zenith's solution was to tilt the faceplates on the red and blue tubes slightly. That distorts the image projected on the screen. The distortion produced by the tilted face plate is in the opposite direction to the distortion caused by the off-center mounting of the outside tubes. The two distortions thus cancel each other, resulting in a perfectly "self-converged" picture. Since the correction is built into the tubes themselves, controls and electronic parts are eliminated, and correct convergence becomes automatic.

Another improvement in the new



THE SELF-CONVERGING PICTURE-TUBE system. Image beams from each of the three tubes follow carefully engineered paths through precision acrylic lenses, which weigh about half as much as glass lenses. The images are then reflected by two glass mirrors that reflect more than 94 percent of the light that strikes them.

tubes is a special bipotential gun designed to maintain resolution at high brightness levels. In many conventional tubes, the dots of color on the screen tend to "bloom" whenever the tube is driven to provide a bright picture, producing a fuzzy image. Brightness must be reduced before the dots return to normal size.

The new electron gun operates on a fixed DC voltage, and is designed to hold the dots as sharp colored points at high brightness. The result is sharper detail at all levels of brightness.

Bible now published on videodisc

Noting the strong consumer response to such videodisc programs as "The Ten Commandments," RCA has licensed five volumes of *The New Media Bible*, a video translation of the Bible by the Genesis Project. RCA also has options on the additional 27 volumes for use in its videodisc system.

Seth Willenson of RCA Videodisc notes that "The Ten Commandments" has sold about 30,000 copies, which amounts to

more than \$1 million at retail prices. "We are bringing spiritual values into the home in an historical, realistic, and entertaining way that appeals to all the family," Mr. Willenson said. "To those parents who are concerned about what their children watch on television, the videodisc permits them to select from a wide variety of family-oriented programs."

Alaskan satellite in orbit

Satcom V, is a 2,385-pound advanced domestic communications satellite that was launched last October. It will provide long-distance communications within the State of Alaska, and between Alaska and the rest of the United States. The craft will also carry the state's rural area, television, and emergency medical networks.

RCA American Communications will operate the spacecraft as joint licensee with the owner, Alascom, Inc., the long-lines carrier for the state of Alaska.

RCA Satcom V is the first all-solid-state communications satellite, and is the first of a series of advanced spacecraft. They will provide up to a 50 percent increase in voice/data capacity over their predecessors, while remaining compatible with present in-orbit Satcom satellites, and with terrestrial facilities.

New CBS-Columbia group to market software

A new unit, CBS Software, has been formed to develop, license, and market game, education, and home-management software for personal home computers.

Edmund R. Auer, Senior Vice President of the Columbia Group, reports that concurrently with establishment of the CBS Software unit, a license agreement has been signed with K-Byte for the exclusive worldwide marketing and distribution rights to K-Byte computer games, including those that will be developed during the next four years.

CBS Software will initially offer the K-Byte games for the Atari 400 and 800 systems, and is evaluating several other formats for the games.

VIDEOGAMES

An exciting new home videogame-system.

DANNY GOODMAN, CONTRIBUTING EDITOR

WALK INTO ANY ONE OF LITERALLY MILLIONS of homes across the country and you're sure to see this familiar sight: the family color-TV hooked up to a videogame console, wires running all over the place, and the family engaged in a "spirited" conversation about whether Dallas or *Missile Command* will be on the screen tonight. That scene soon may be a little less common, however, thanks to the introduction of a self-contained cartridge-programmable videogame called *Vectrex* (see Fig. 1).

That is no ordinary videogame. Made by General Consumer Electronics Corporation (233 Wilshire Blvd., Santa Monica, CA 90401), it features a built-in 9-inch diagonal vector-scanning display monitor. Vector scanning produces razor-sharp outline graphics like those found on arcade games such as *Battle Zone*, *Asteroids*, and (in color) *Tempest*. Screen characters spin or glide smoothly, and the tiniest specks of light serve well as high-resolution laser blasts.

The other type of video-screen imaging, called raster scanning, allows areas to be colored in, but with less resolution. Home TV-receivers are of the raster-scan type.

Vectrex's self-contained design is unique. About the size of a small portable-TV (on its side), the unit simply plugs into any AC outlet. There's a carrying handle built into the top of the case, and one controller panel stows securely in a compartment beneath the screen. The controls on that panel include a small joystick (it's a little too small to allow for comfortable control, however) and a row of four pushbuttons. A speaker, ON/OFF/VOLUME and RESET switches, and jacks for two controller panels are located on the front of the unit, in the compartment under the screen.

Although the monitor is black and white, each game cartridge comes with a color overlay that helps jazz up the display and indicates which controller push-buttons do what. One game (*Mine Storm*) is "resident" in the unit when you buy it. Most of the 12 cartridges scheduled for introduction this year are space games, including a licensed version of *Scramble*. Other games include *Berzerk*, *Armor Attack*, a 3-D road race, and football.

Essentially a version of *Asteroids*, *Mine Storm* is challenging even for the



FIG. 1

experienced game player. In fact, most of the cartridges are tough, especially at higher levels—as they are intended to be. In fact, one early reviewer complained that the games were too tough—apparently he hasn't seen what it takes to challenge an arcade video whiz.

This is one system with a lot of potential—interesting game play, coupled with 3-D effects and a very versatile sound package. GCE is already at work on future cartridges. For the avid videogamer, *Vectrex* surely is the one to beat.

Odyssey's K.C.'s Crazy Chase for Odyssey 2

Ever since *Odyssey's* (I-40 and Straw Plains Pike, Knoxville, TN 37914) munchkin, named K.C., was held in chains by Atari's legal pursuers, he has been eager to reappear on the TV screens of *Odyssey-2* players. Now he has his chance, this time pursuing multi-segment monster, called a Dratapillar, that roams through a maze. (Is that Dratapillar perhaps a relative of Atari's dreaded

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VIDEOGAMES

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CIRCLE 101 ON FREE INFORMATION CARD

Odyssey	K.C.'s Crazy Chase									
GRAPHICS										
SOUND										
EASE OF LEARNING										
CHALLENGE										
VALUE										

Centipede? No one is saying.)

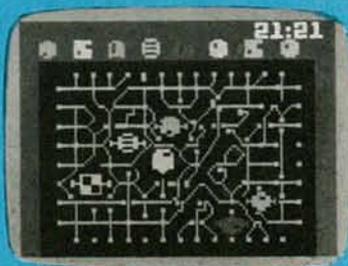
K.C.'s Crazy Chase is one of the first Odyssey cartridges to be compatible with Odyssey's speech-synthesis module, *The Voice*, although that accessory is not required. The game is deceptively simple at first. You control K.C.'s movements through the maze, while the six-segment Dratapillar and two smaller characters (Drats) join forces to pursue K.C. Your goal at each level is to make K.C. gobble up the Dratapillar's segments without being eaten by the Dratapillar's head or touched by a Drat. Once you eat a segment, however, the Drats turn white and flee for a few seconds. Catching up to one causes it to stop and spin while you collect bonus points. The basic strategy then, is to have K.C. chase after the Dratapillar from behind. Of course, if you can cut off a few segments from the moving Dratapillar, they stop, giving K.C. plenty of time to chew them up.

The Voice can be distracting during game play. It seems to issue warnings like, "Run" and "Hurry" at random—K.C. can be miles away from the nearest danger, and the voice will say "Look Out." That's disappointing, but it redeems itself at the end of each level (when all Dratapillar segments are

eaten) by letting out a contagious, high-pitched laugh (while K.C. hops up and down) and saying, "Incredible!" (while K.C.'s mouth moves). It will take quite a while for the novelty of the laugh to wear away.

I recently had out-of-town friends stay over a weekend. They didn't own a videogame, so their children, aged 7 and 9, were thrilled to have the luxury of having five different video-game systems and dozens of cartridges to keep them busy. The one cartridge they kept coming back to—and one that the non-gaming adults seemed to enjoy most—was *K.C.'s Crazy Chase*. That's a pretty good testimonial in my book.

Mattel's Bomb Squad for Intellivision



CIRCLE 102 ON FREE INFORMATION CARD

Mattel	Bomb Squad									
GRAPHICS										
SOUND										
EASE OF LEARNING										
CHALLENGE										
VALUE										

While the codebreaking games are not necessarily new, *Bomb Squad* from Mattel Electronics (5150 Rosecrans Ave., Hawthorne, CA 90250) is decidedly different and fresh. The game is designed for use with the *Intellivoice* speech-synthesis module. The speech

from the module is used to prompt you through the steps of the game. Thus, although some is merely ornamental, much of the voice output is an integral part of the game play.

The scenario of the game puts you on a bomb-disposal team whose job it is to determine the correct code numbers (only one number at the easiest level) that will defuse a bomb set to destroy a large portion of the city within thirty minutes (game time, not real time). Each code number is hidden behind a grid of 20 squares. Each square of the grid in turn represents an electronic circuit that needs fixing before you can see whether or not the square contains part of the number. You need to fix as many circuits as you can within the time period to figure out the code number from the exposed squares.

When you choose a circuit to fix, the work really begins. The screen becomes a colorful circuit board, with several components highlighted. The demolitions expert, named Frank, calls out to you (via the *Intellivoice* module) to either cut out certain components (and substitute jumper wires) or replace them with spare ones located above the circuit. In the latter instance, however, you may have to try several components to determine whether you're to follow the shape or the color of the original. In any case, you have to follow the correct sequence that Frank calls out, or you're in big trouble.

While you and Frank are busy performing circuit surgery, Boris (the terrorist who planted the bomb) razzes you with phrases like, "It won't be easy," and a European-style police-car siren rises and falls in the background.

Breaking the code is cause for celebration: an on-screen fireworks display over the city's skyline and Frank hearty proclaims that "You're a hero!" But if you guess wrong, he says "Oh, no!"—and the skyline loses one-third of its buildings in an explosion while the waterfront ripples from the blast.

Bomb Squad is not a game to pick up for an easy or quick play. You'll need to understand the manual thoroughly before you get the hang of it. And be prepared for a lengthy sit-down. If adventure and strategy are your games, you'll enjoy *Bomb Squad*, but it's not something you will play over and over in one session. **R-E**