40-CHANNEL CB—READY JAN. 1

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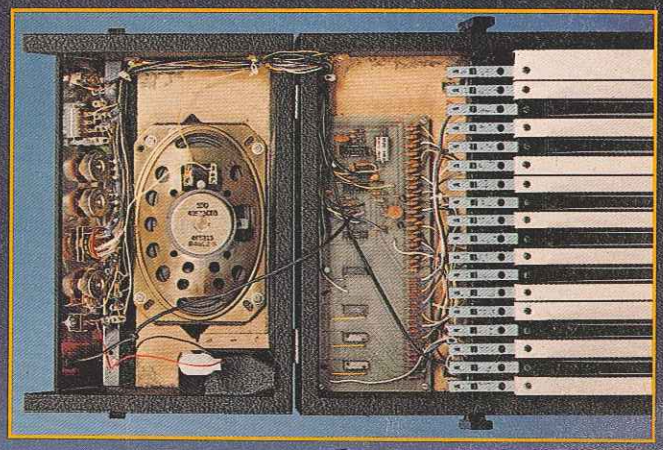
Radio-Electronics®

THE MAGAZINE FOR NEW IDEAS IN ELECTRONICS



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and R10 is adjusted for display intensity under maximum ambient lighting. The photoresistor controls display intensity under all other ambient light conditions. Six circuit elements, the photoresistor, the output transistor of the optical isolator/coupler, R8, R9, R10, and Q2 control the base drive to Q3. Transistor Q3 provides the current drive for all segments of the display. The photoresistor acts as a variable resistor that automatically varies the brightness of the display to provide a pleasing intensity for all conditions of ambient lighting.

Two types of displays may be used with the automotive digital clock: LED displays such as Litronix DL-704, National Semiconductor NSN74R or Monsanto MAN-74 will provide enough intensity for daytime viewing as long as direct bright sunlight does not strike the display. Figure 6-a shows the base diagram and internal connections for the Litronix DL-704 display. The readability of the LED's may be enhanced by placing a red circularly polarized viewing screen (see parts list) in front of the display.

Readability may be made perfect, even in direct sunlight, by using incandescent displays. These displays are attractive enough without a screen. However, a simple plastic screen of any color may be placed in front of the display if desired. The major disadvantage of the incandescent displays is that they may have to be replaced sometime during the life of the car—though many people would probably bet on the displays. Figure 6-b shows the base diagram and internal display for an incandescent display.

Operation

The time displayed in the normal mode of operation (that mode in which the clock keeps track of time) may be altered by pressing either the FAST SET switch or the SLOW SET switch. Additionally, the FAST SET and SLOW SET switches may be used individually or in combination to perform other functions.

If the SLEEP-SEC switch is placed in the SEC position, the clock will continue to keep track of time, but the 1 pulse-per-second LED does not flash, and the time is not displayed. Instead, the No. 4 display changes digits at a 1 pulse-per-second rate. After a count of 10 seconds, the No. 3 display changes digits, and after 60 seconds the No. 2 display changes digits. The No. 1 display is blank.

If the SLOW SET switch is pressed while the SLEEP-SEC switch is in the SEC position, the display stops counting and is held as long as the SLOW SET switch is closed; the clock does not continue to keep track of time. This action serves to hold the time being displayed in the normal mode.

If the FAST SET switch is pressed while the SLEEP-SEC switch is in the SEC position, displays No. 3 and 4 are reset to "0"; the No. 2 display is not affected.

When both the SLOW SET and the FAST SET switches are pressed simultaneously, and the SLEEP-SEC switch is in the SEC position, the No. 2, 3, and 4 displays are reset to "0"; in addition, the time being displayed in the normal mode is reset to 12:00 AM.

When the SLEEP-SEC switch is placed in the SLEEP position, the clock will continue to keep track of time as above, but displays No. 1 and 2 are blank, and displays No. 3 and 4 display the sleep time.

If the SLOW SET switch is pressed while the SLEEP-SEC switch is in the SLEEP position, the No. 3 and 4 displays count backwards at a 2-Hz rate from "00", which is equivalent to "60", to "00".

If the FAST SET switch, or if both the FAST SET and the SLOW SET switches are pressed, while the SLEEP-SEC switch is in the SLEEP position, the No. 3 and 4 displays count backwards at a 60-Hz rate from "00", which is equivalent to "60", to "00".

With the SLEEP-SEC switch in the SLEEP position, if the SLOW SET switch or the FAST SET switch is used to adjust the No. 3 and 4 displays to a set of digits, the sleep timer will be activated for the number of minutes indicated by them. The sleep counter will immediately begin to count down to "00". During the count-down, whether the SLEEP-SEC switch is in the SLEEP or the NORMAL position, the output at pin 14 of the MM5385 can be used to turn on a radio at the beginning of the indicated time interval (up to 59 minutes). When the sleep counter, which counts downwards, reaches "00" minutes, the sleep output drive is removed, thereby turning off the radio. The turn-off may also be manually controlled by a momentary V_{SS} connection to the snooze input (pin 17 of the MM5385). Of course, many other appliances may be controlled, including a photographic enlarger.

Pressing the SNOOZE-ALARM DISPLAY switch causes the alarm time to be displayed. The alarm time may be changed by pressing either the SLOW SET switch or the FAST SET switch. Pressing both the FAST SET and SLOW

continued on page 79

TABLE III—MM5385 SETTING CONTROL FUNCTIONS

Selected Display Mode	Control Input	Control Function
*Time	Slow	Minutes advance at 2-Hz rate
	Fast	Minutes advance at 60-Hz rate
	Both	Minutes advance at 60-Hz rate
Alarm	Slow	Alarm minutes advance at 2-Hz rate
	Fast	Alarm minutes advance at 60-Hz rate
	Both	Alarm resets to 12:00 AM
Seconds	Slow	Input to entire time counter is inhibited (Hold)
	Fast	Seconds and 10's of seconds reset to zero without a carry to minutes
	Both	Time reset to 12:00:00 AM
Sleep	Slow	Subtracts count at 2 Hz
	Fast	Subtracts count at 60 Hz
	Both	Subtracts count at 60 Hz

* When setting time sleep minutes will decrement at rate of time counter, until the sleep counter reaches 00 minutes (sleep counter will not recycle).

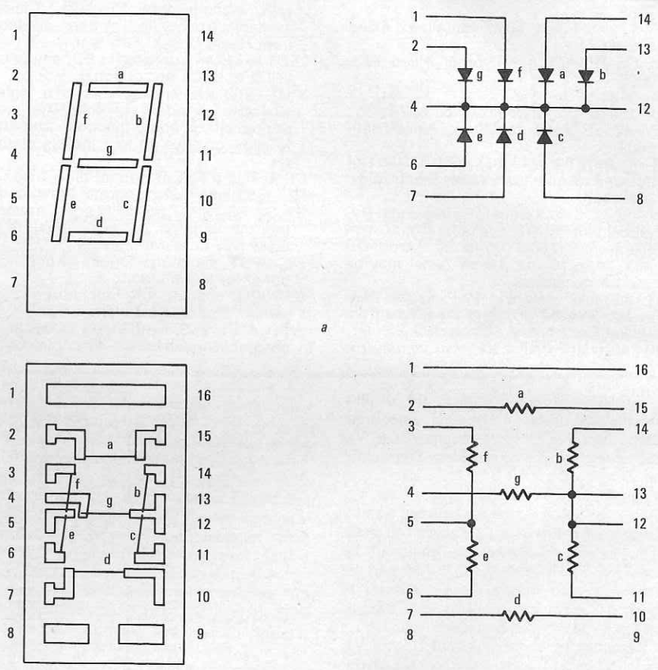
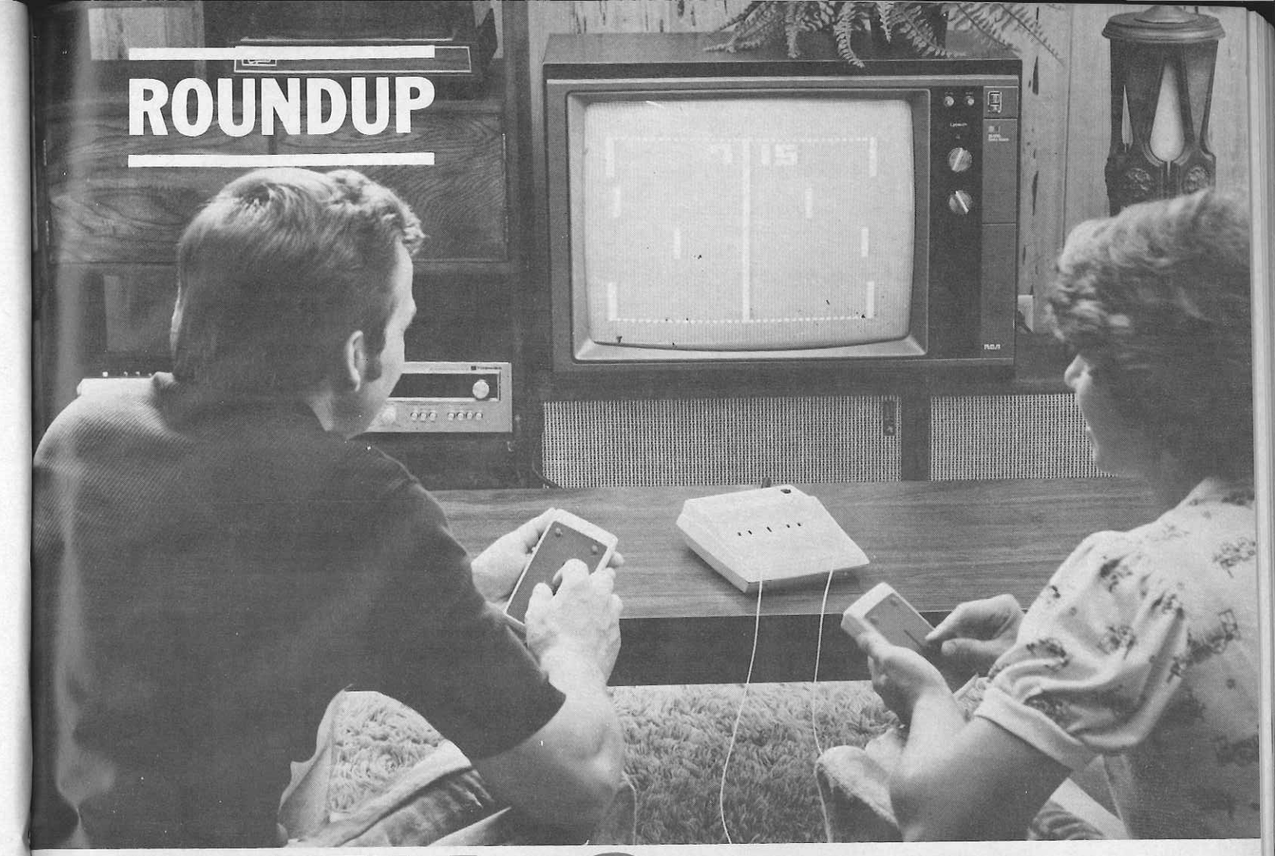


FIG. 6—CLOCK DISPLAY DETAIL. *a* shows incandescent display detail and the internal connections. (Connection between 1 and 16 is used to connect pin 15 to main board.) *b* shows Litronix DL-704 LED and internal connections of the unit.



TV Games

PART II. *New competition for prime time viewing adds a new dimension to an old medium*

FRED BLECHMAN

THE TV GAME INDUSTRY HAS RECENTLY EXPERIENCED TREMENDOUS Growth. To bring our readers up-to-date, last month we presented a listing of the TV games that are currently available.

This month, part 2 presents the details of these games.

Game and kit roundup

Because of design secrecy, FCC approval pending or incomplete designs, many sources contacted for information did not reply. Here are some details on those that replied, or where information was derived from another source.

Advanced Electronics: Offering only plans, PC boards and IC's, Advanced Electronics caters only to the advanced builder. The plans are clearly presented and printed, and appear to be quite complete. Also, the variety of plans offered is most extensive. For example, the 9-page Pong plans cover Pong, Tennis, 4-Player Tennis and Soccer. For an additional $7 you can order Pong Extras (8 pages) that cover circuitry for 7 more options, most of them easily added to the original games: Handball, Warball, Elimination, Fotsball, Digital-Controlled Paddles, Multiple Paddles and Multiple Balls.

Plans for Anti-Aircraft 1 & 2 (10 pages) are more complex, and involve the use of 107 IC's and a PROM (pre-programmed read-only memory). The game of Anti-Aircraft consists of missile firing units at the lower corners of the screen, with airplanes randomly moving across the sky. Missile firing and angle are controlled by the players with the intent of hitting an enemy plane which, in one version, can climb or dive to avoid the missiles. This is a game equivalent to the type found in amusement centers, even to the flashing of the screen when a plane is hit.

The 12-page plans for Jaws-2 and Space Race have some similarities with Anti-Aircraft—69 IC's are identical, but are wired differently for control and image presentation. Jaws-2 shows 2 divers, a fish and a shark displayed on the screen. Players (divers) compete to catch the most randomly moving fish before being "eaten" by the randomly swimming shark that is programmed to home in on any nearby diver!

Space Race has player-controlled rockets that attempt to move vertically up the screen without being hit by small horizontally-moving meteoroids.

Since the clock, sync, score and video output circuits are designed to be the same for all of Advanced Electronics'

games, they offer a PC board for $12.95 that holds 28 IC's plus various resistors and capacitors. For the Jaws-2, Space Race and Anti-Aircraft 1 & 2 games, the PC board to hold 40 IC's, a ROM (Read-Only Memory) and associated circuitry, is $15.95; this is for locating and moving the objects and forming their images on the screen.

Advanced Microcomputer Products: The General Instruments AY3 8500-1 MOS/LSI TV IC, used in the majority of ready-made TV games, is offered by itself for $39.95, with a PC board and instructions for $49.95 or as a kit with video output (no case) for $69.95. The instructions cover all six games (Tennis, Hockey, Squash, Pelota, and Rifle Shoot 1 & 2), but the parts in the kit do not include the photo-sensitive rifle parts to be offered at a later date.

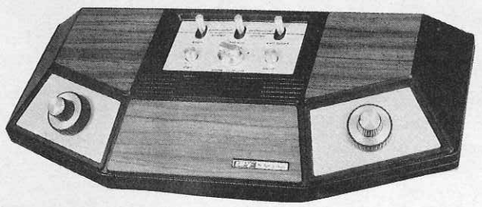
The plans are not designed for a beginner and are poorly reproduced. However, the assembly of a TV game from this IC is relatively simple and involves mostly the addition of switches. The external oscillator and video output circuits require two inexpensive IC's. The advantage of this kit is the number of builder-selected options available with this very versatile game chip.

Allied Leisure Industries: Manufacturers of 29 different coin-operated pinball and specialty amusement games, Allied Leisure has entered the home video-game market with two

ALLIED LEISURE, (above) the *Name of the Game No. 1,* (left) the *Name of the Game No. 2.*

units. One is a 2-player unit, another is a 4-player unit. Each player uses a hand control unit with a 12-foot cord.

APF Electronics: This handsome furniture-styled console in black, walnut and silver, allows two players to compete in three games (Tennis, Hockey, and Squash), or 1 player to



APF ELECTRONICS, *TV Fun Games.*

compete against the game. It uses most of the options available with the General Instrument IC, except for the rifle games.

ARS Systems: If you like to do it yourself, ARS offers plans for a Basic TV Ping-Pong Game (6 sheets) for $3.25 that includes a description of operation and construction information, a complete parts list, parts sources, parts layout diagram and a schematic. This is definitely for an advanced experimenter. The instructions include an on-board modulator for TV Channels 2, 3 or 4. Over 50 IC's are used in the basic design. Separate plans are available for Score Display (a pair of 2-digit LED displays that count from 00 to 99 with reset capability) for $2.25; Sound plans are $2, and plans for a regulated power supply (5V 1.5A) are $2.50.

Atari: The basic *Pong* unit, also sold under the Sears label, was one of the two initial video game entrants into the consumer field (the other was the Magnavox *Odyssey*). One of the unusual features of the Atari units is the variation of ball speed and deflection. In a volley (a series of paddle contacts with no misses in-between), the ball speed is constant for the first three hits, and the ball deflects off the paddle at any one of 7 angles (depending on which part of the paddle contacts

ATARI, *Super Pong.*

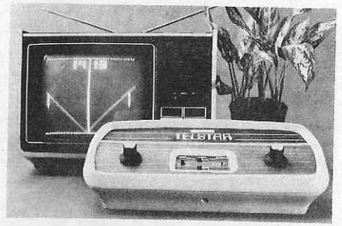
the ball). However, on the 4th through 7th paddle contact in a volley, the ball speeds up and the deflection angles are narrowed. The 8th paddle contact speeds up the ball to its top speed, and the paddle deflection angles are their narrowest. You can play against the machine by positioning the paddles to "lock-up" the ball in a repeating pattern.

Cal Kit: The basic *Ping-Pontronics* kit (TV-3) uses 12 IC's mounted on a single PC board and is furnished with an excellent assembly manual. It still is not recommended for beginners, however. An optional accessory kit (TV-4, $33) that can be mounted directly to the main game board adds scoring, two sound effects and automatic serve to the basic game. A special drilled and silk-screened case (TV-11, $12.50) contains the whole game, including options. If you want the basic PC board, it's available as TV-1 for $12. The PC board for the sound and score add-on option (TV-2) is $8.50. For $15.50 you can order all the IC's for the basic game (TV-6) and all the basic game sockets (TV-8) for $6.

The finished basic game has several unusual features: the ball speed can be controlled over a wide range, from rather slow to very fast, and SLAM buttons cause the ball to double in speed for catching your opponent off guard. A feature called *Aimshot* allows you to closely control the ball return angle—it depends on what part of the paddle hits the ball. While some games provide up to seven return angles based on paddle contact, this game provides 16! A CYBERNETICS MODE switch selects either man against machine, for either side, or machine versus machine.

Games played are Ping-Pong, Gravity (ball bounces in an arc simulating gravity), Handball (1 player) and Basketball (player tries to shoot ball through gap in upper court boundary).

Coleco: One of the first games using the General Instrument IC to be sold in stores—usually in the toy department—this unit offers many of the options contained within the IC. The on-screen digital scoring, 3-toned sound, and variations in



COLECO INDUSTRIES, *Telstar.*

ball-speed and paddle-size (beginner, intermediate and professional) keep the game interesting. Games played are Tennis, Hockey and 1-player Handball (so you can practice against the machine).

The Classic model appears to be the same unit in a more luxurious wooden case.

Continental Microsystems: Three versions of Bang are awaiting FCC approval as this is being written. It is possible that the V44CS unit, when it reaches the stores, will have *wireless* remote controls and a photoelectric rifle for the two rifle-games. In the rifle games, a bright spot moves across the screen. You aim the rifle at the spot and pull the trigger. The rifle has a lens and photocell to detect if you are precisely on target. If you pull the trigger and are right on target, the trigger pulse and photocell pulse coincide to register a hit, and the target disappears. The other games are the typical GI IC games. To add color, the GI IC is used with additional circuitry.

Exterprex: The four games played with this unit are Tennis, Hockey, Squash and Robot. Most of the options offered by the GI IC are switch-selected. The levers used to control paddle movement are linear potentiometers and are more natural in use than the knobs (rotary potentiometers) found on most units.

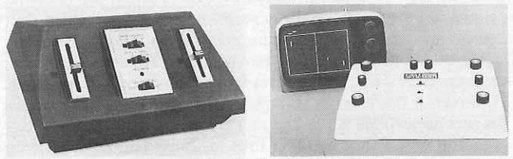
Entex: Basically a toy manufacturer, Entex has entered this field with a game that has several unique features. It operates on the UHF channels of your TV (adjustable from Channels 26 to 31). It has a vertical and a horizontal hold control on the console to lock-in an unsteady picture. Both vertical and horizontal paddle movement can be controlled to play Tennis, Table Tennis or Squash. Scoring is manual, using score-keeping dials.

Fairchild: The Video Entertainment System is the first home video electronic game to use replaceable *Videocart* cartridges to provide an unlimited number of format selections. Two games resident in the System are Tennis and Hockey. The first add-on cartridge ($20) adds Tic-Tac-Toe, Shooting Gallery and Doodle (a tracing game.) A total of 17 games are planned to be available by Christmas, with others to follow. Educational and other applications are also planned.

The heart of the system is the game console which incorporates a Fairchild F8 Microprocessor and four solid-state RAM's (Random Access Memories).

Although the comparison chart seems lacking in checkmarks for this unit, that's because specific information is lacking as this is written, not because this unit doesn't have the tabulated features. In all likelihood, this system will offer more options than any other unit covered, simply because of the inherent flexibility of the microprocessor/cartridge design approach.

First Dimension: Four different models are offered. The *Video Sports 76* uses many of the options of the GI chip, with the *Video Sports 76C* adding color when used with a color TV. The *Mark IV* uses a different chip and slide controls, but otherwise is very similar to the *76C*. The model FD 3000W is



FIRST DIMENSION *models Mark IV* (left) and *FD3000W* (right).

a more advanced design offering six games in one, two or four players, and even features boundary adjustment controls for a perfect display. (This compensates for non-linearity on many TV sets.) Surprisingly, however, for such a sophisticated design, horizontal advancing bars above the court boundary indicate individual scores instead of on-screen digital scoring.

Global Video: A large 50-inch diagonal big-screen color television receiver primarily designed for taverns, lounges, offices, schools and clubs, this unit can be used with closed circuit television, video cassettes, slide and movie projectors and also with their own 4-player *Challenge* video game.

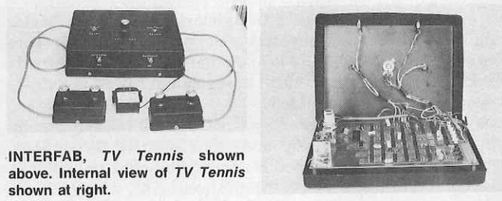
Heath: The lowest-priced complete kit using all the features of the GI IC, this game is intended to be connected to Heathkit solid-state color and black-and-white TV's, with five easy clip-on connections to the chassis (and a cable connector

HEATH *model GD-1350*

for easy removal). Two target games will not be usable until the optional rifle is available early next year.

IEA: Three models are offered by this Canadian manufacturer. The *Tele-tainment II* plays seven games: Ping-Pong, Squash Handball, Basketball, Catch, Trapshoot, Zany Rebound, and Krazy Catch. It appears to use discrete IC's rather than a dedicated game IC. *Tele-tainment III* and *IV* are almost identical; the *III* has a stylish molded plastic console with one wired remote control, while the *IV* is housed in a solid mahogany case of the same design, without remote.

Interfab: This very versatile game, formerly called Pong IV, is offered in three kit forms. The "B" kit is fully wired and tested with vertical and horizontal sweep oscillators tuned. The unit only requires mechanical assembly into the main cabinet and remote control enclosures, and costs $99.50. For $89.50 you can order the "C" kit that has the main board



INTERFAB, *TV Tennis* shown above. Internal view of *TV Tennis* shown at right.

completely soldered and short-circuit tested, but requires cabling to the switches and controls. The "D" kit, for $79.50, has all the main board components properly mounted and held to the top of the board in a plastic package. Simply solder on the underside, remove the plastic, then wire to the controls and switches.

All kits include a pre-drilled cabinet, pre-drilled remote control cases, all hardware, wire and cables. The unit uses 43 IC's, 93 resistors, 42 capacitors, 18 diodes and 4 transistors mounted on a two-sided PC board, so it's not for a beginner. The instructions are adequate for assembly and troubleshooting, but if you lack the equipment or know-how and your unit doesn't work properly, Interfab will repair and tune your unit for $15 including return postage!

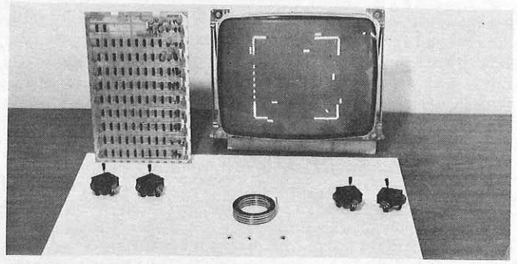
Since you build this unit yourself, you can make modifications. For example, you can add or change resistors to move the borders of the two basic games, Tennis and Handball. You can replace the knob controls for vertical and horizontal movement with joysticks. Also, you can modify the two automatic games (man vs. machine or machine vs. machine) to allow a miss now and then. You do this by inserting a 470K ½W resistor in series with the AUTOMATIC switch for either or both sides.

The output of this game, as supplied in kit form, is video. However, the PC board is etched for the addition of a UHF modulated oscillator using a 2N5770 transistor, 4 resistors, 2 capacitors and a piece of brass or copper. The typical circuit is

furnished by Interfab or could be found in radio circuit handbooks—or you could use the PXV-2A VHF Modulated Oscillator mentioned earlier in this article.

Interstate Industries: This unit plays the GI IC standard games Tennis, Hockey, 2-player Handball and 1-player Handball in black-and-white, but offers all the available paddle and ball options as well as using wired remote controls. The game is packaged in a relatively small smartly-styled main console.

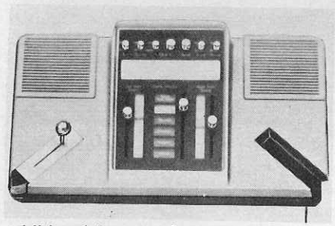
James: Kit A, for $179.95, consists of a *professional* game PC board that is assembled and tested, and 2 *professional* Kraft joysticks (these joysticks are used in radio-control for model airplanes and are very high quality). This is the same game seen in many commercial establishments. Accessory B, for $3.95, consists of six feet of ribbon cable (flat multi-conductor color-coded insulated wires) and three switches.



JAMES ELECTRONICS, Accessories A, B and C.

You can add two more Kraft joysticks with Accessory C for $39.95. There are actually four ways to play this game, selected by two switches: 1 player against the machine, 2 players against each other, 3 players against the machine or 4 players against each other. Scoring marks show at the beginning of a game and one mark disappears with each score down to zero. No enclosure is offered and the output is strictly black-and-white video. Also, a regulated 5-volt 2-ampere power supply must be added.

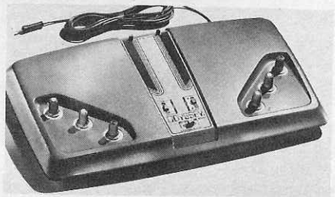
Lafayette: The *Tournament 2000* is made for Lafayette by Unisonic. It uses a GI chip and offers most of the options, including the two rifle games. It appears to be the only unit in this report that INCLUDES the electronic rifle, which has the



LAFAYETTE, *Tournament 2000.*

additional feature of a removable stock and barrel to convert it into an electronic pistol. With wired remote slide controls and manual scorekeeping in addition to the on-screen digital score display, this may be the most versatile unit in its price range. Furthermore, Lafayette lowers the price at times in limited special promotions.

Magnavox: Although the older *Odyssey* 100 and 200 models

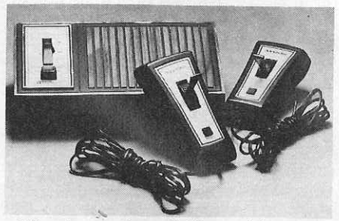


MAGNAVOX, *Odyssey 500.*

are still in some stores, the newer models (300, 400 and 500) have more features and are being heavily promoted. Also, Magnavox is the first to offer a video game built-into a color TV receiver. They are also offering the first ready-made home video game (*Odyssey* 500) with simulated playing *figures* on the screen instead of rectangles, and full-color playing fields. (Some color displays only have colored paddles, ball or score). The regular games are Tennis, Hockey and Smash (Handball) with Soccer added to the model 500 and Smash omitted from the model 100.

Microelectronic Systems: The games are *Ricochet* (player versus machine in 3-wall Handball), Racquetball (2-player 3-wall Handball), Tennis and Hockey. Various switches and buttons provide 72 possible game combinations!

National Semiconductor: This game uses the National MM57100 TV Game IC to provide all the logic necessary to generate backgrounds, paddles, ball and digital scoring for Hockey, Tennis and Handball. A 3.58 MHz crystal and a divide-by-3½ IC provide full color—including different colored backgrounds for each game—on color TV sets. There



NATIONAL SEMICONDUCTOR, *Adversary.*

are three selectable paddle sizes and the ball speed increases automatically after 4 hits. Hockey can be played with one player for practice against the machine. The paddles deflect the ball or puck at any one of seven angles depending upon the point of contact with the paddle, but no switch is provided to change these angles. Unlike many units, this design is limited to manual serve only and the sound comes through the TV speaker. The unit is strictly AC powered.

RCA: The Distributor and Special Products Division has filed an application for FCC type approval for a new TV game. Although, at presstime, we have little information on this new game, it is said to be based on the RCA COSMAC microprocessor. According to present plans, it is tentatively scheduled for introduction on a regional basis during January 1977, and will be offered for nationally later in the year.

Radio Shack: This unit appears to be identical with the Microelectronics *Ricochet,* except for the names given to the games.

Southwest Technical Products: This is a relatively simple kit using only 10 IC's, but only has video output. Single white squares on each side of the screen represent space ships that can be moved vertically by the players. Each can also fire a single-burst "laser beam" at the opponent. If hit by the beam, the opponent's ship disappears from the screen and he loses. However, if the laser beam misses, the aggressor's ship blinks for several seconds while his laser is "recharging". During this recharge time (since he can't fire) his only defense is to keep out of his adversary's line of fire. To add to the fun, the movement controls are intentionally sluggish!

Tokyo Phoenix: The four games in this unit are the standard GI IC games of Tennis, Hockey, Squash and 1-player Handball. The sound comes through the TV, so there is a possibility of leaving the game on unintentionally after turning off the TV.

Universal Research: The *Video Action* series includes a Game Table and an educational game called Fact. The Game Table appears to be the *Video Action IV* with a black-and-white video monitor built into an eight-sided table with a card-playing top and checkers/chess/backgammon inserts that are removed during video game play. The automatic

continued on page 84

CB Radio

23 or 40
When Should You Buy?

If you're hesitant about buying a 23-channel CB because the new 40-channel models are on the way—don't be. Here's why

FRED PETRAS

LIKE MANY READERS OF **RADIO-ELECTRONICS** WHO ARE THINKING of buying a Citizens band radio, you may be caught in the confusion surrounding CB's expansion from a 23-channel to 40-channel medium on Jan. 1, 1977. And, typically, you may have decided to forego your purchase. "Why buy a 23-channel CB now, when in a matter of weeks it will be obsolete?" was the question you posed to yourself, and answered with a decision to sit tight.

The Federal Communication Commission's announcement in late July that as of Jan. 1, 1977, 17 new Class-D channels would be added, also had an effect on current owners of CB equipment. "In effect," they told themselves, "come the New Year, our 23-channel rigs are dead as a dodo."

Both negative assumptions are false. The prospective CB buyer, holding off, may be doing himself a disservice. That decision may be costing him money. Why? Because at the moment the CB market is a big bargain field, with prices of 23-channel transceivers slashed as much as 50 percent by manufacturers and dealers to make way for new 40-channel models. If ever there was a time to buy a CB, now is it. Instead of buying a "starter" model as you may have been planning, you can now buy a deluxe unit and still have a few dollars left in your budget.

"But," you say, "Why buy something that will be obsolete?" Push the thought from your mind; you have some options, some "outs," to protect your investment.

Buyer protection

Those options are in the form of "buyers' insurance plans" being offered by manufacturers and/or their dealers to protect your investment. The 23-channel set you buy today—at a big-bargain price—can either be factory-modified at a low cost to accommodate the 17 new channels, or, you can exchange it for a 40-channel set, again at low cost, or, you can get a big discount or trade-in on a new 40 by way of a certificate you obtain with your 23-channel set purchase.

Typical of these plans are those from Hy-Gain and Pearce-Simpson. If you buy one of their current 23-channel transceivers and decide in 1977 that you'd like 40-channel capability, merely send the unit back to the factory (postpaid) along with $25. It will be returned to you (postpaid) "remanufactured" with 17 more channels. Under Pathcom's plan, consumers buying its Pace CB equipment before Jan. 1 can have it updated to 40 channels any time during 1977 for "no more than 20 percent additional cost," or $25 to $90, depending on the unit. SBE has a similar plan, with conversion costs ranging from $35 to $95. Under RCA's plan, conversions cost $40; J.I.L. charges $35.

Sharp Electronics offers purchasers of a 23-channel rig a chance to exchange it for a brand new 40-channel unit at a cost of only $30, up to Jan. 31, 1977.

And there are other protection plans. Dynascan, for example, has a two-way deal; if you buy one of its Cobra 23-channel models now, you get a certificate entitling you to a conversion to 40 channels at $40, or a $40 discount on a new 40-channel Cobra CB. Handic allows purchasers of its 23-channel CB's to turn in a certificate for a new 40-channel model at half price (without trading in the 23). Colt Communications, under their "Investment Protection Trade-In Program," allows purchasers of its 23-channel model 280, through March 15, 1977, the option of trading in that set

COBRA 139

COMMANDO 2310

EICO 7723

GEMTRONICS GTX-23

toward a new 1977 Colt model and apply 100 percent of the purchase price paid against the suggested retail price of the 40-channel unit. Kris, Inc., is offering purchasers of its 23's up

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mode (Robot) has a controllable skill level. The Indy 500 Road Race Game for 1 or 2 players has realistic sounds to duplicate engine acceleration and crashes, and appears to be one of the games in both the Game Table and *Video Action IV*. The models IIA and III play 2 or 4 player tennis, or hockey. The color display on the *Video Action* game screen is a rainbow pattern rather than discrete coloration of images.

The Fact game displays questions and answers in alphanumerics on your TV screen. It may have a microprocessor since it uses cartridges to program the mode of operation. The unit comes with 2 cartridges, and 5 more are available. One or two people can pit their knowledge against each other or against the machine. You can test your knowledge in hundreds of planned categories with two categories in each cartridge. Also, *learning* cartridges to improve reading, math, history or other skills, are planned. Multiple-choice answer buttons are used.

Videomaster: All of these games are manufactured in England. Some of the games in the Rally and Olympic models are different than the other games surveyed, and no upper or lower court boundaries are displayed. The 6000 seems to be a standard GI IC game, but in a fancy aluminum case with a lever control for each player.

Visulex: This kit was the subject of a detailed 3-part article in the June, July and August 1976 issues of **Radio-Electronics.** You can order anything from complete $6 construction plans and individual parts, to the everything package for $129.50 that includes the main circuit board, scoring circuit board, all parts, hardware, wire, cable, controls, power supply and main cabinet with remote player control boxes. **R-E**

next month

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- **Preview of 40-channel CB gear**
- **How manufacturers plan to handle trade-ins or conversions on 23-channel gear**
- **How to tune 40 channels. Rotary, Keyboard, Thumbwheel**
- **Directory of manufacturers**
- **Antennas for 40 channels. Can present antennas be used?**
- **New FCC regulations**