

The Twice Monthly Publication  
for the Coin Operated Entertainment Industry

# PLAY METER

Volume 7, Number 18

October 1, 1981

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NEW LOOK IN PHONOS

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PLAY METER AWARDS FOR '81

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OPERATORS NETTED IN VIDEO  
COPYRIGHT VIOLATIONS

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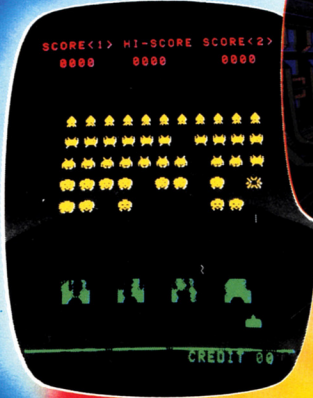
CONVERTIBLE  
CONVERTIBLE  
GAMES  
GAMES

## Part II: An Industry Reply

Operators, Distributors, and Manufacturers View the New Game Mode

# Screens of Fame and Fortune!

SPACE INVADERS



OMEGA RACE

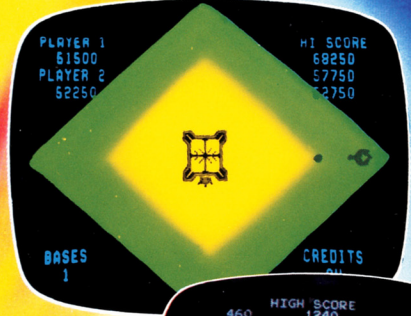


WIZARD OF WOR



GALAXIAN

SPACE ZAP



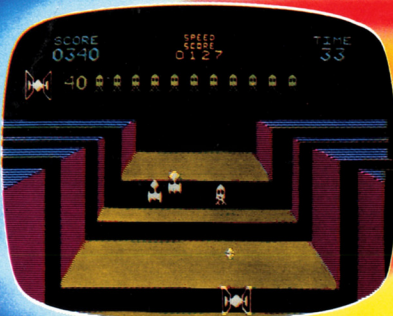
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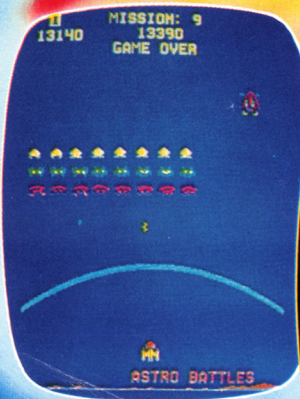
PAC-MAN



SPACE ENCOUNTERS



FLAG SHIP



ASTRO BATTLES



LASER ATTACK



GALAXIANS



SPACE WARP

The 5 Missions of GORF

# PLAY METER

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**Operators Are Hesitant About the New Mode**  
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*About the Cover: Hold it up to a mirror, and the unreadable becomes readable while the formerly readable is now—readable: a small optical trick, symbolizing the "reversible" nature of the new swap-games modes.*

## UP FRONT

Last year this magazine inaugurated the first ever "Play Meter" awards, designed to recognize excellence in the coin-op entertainment industry. Based on the evaluations you, our readers, made as far as which games were best for 1980, we presented "Play Meter" awards to Atari for *Asteroids*, the top video game of the year, and to Williams for *Firepower*, the top pinball game of the year, during last year's AMOA Show.

As we announced at the time of those awards presentations last year, we planned to expand the "Play Meter" awards categories to recognize industry excellence in other endeavors. As you will see from the official "Play Meter" Award Ballot you will soon be receiving—or have already received—we have indeed expanded the awards categories from two to eight. Those categories are as follows:

- Best video game for the year
- Best pinball game for the year
- Best artwork on a video game
- Best artwork on a pinball game
- Best new technical improvement on a video game
- Best new technical improvement on a pinball game
- Best new play feature on a video game
- Best new play feature on a pinball game

We feel recognition of excellence in these additional categories will help focus factory attention on producing better games, rather than merely producing slipshod games to keep the assembly line busy.

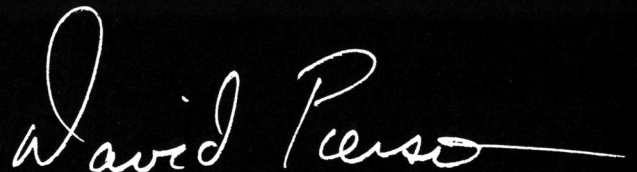
We all know, for instance, the inestimable value technical improvements play in this business and how new play features can open doors for even more money-making game ideas (Remember *Space Invaders*?) And industry recognition of excellence in artwork has long been overdue.

By focusing on excellence, this industry will have a standard, a gauge to produce better and better machines. And, in the end, that translates as more profitable for everyone concerned.

In every other industry in the entertainment field, the awards program has helped the industry focus its efforts on outdoing what had been done before. That, we hope, will be the end result or recognizing excellence in these various fields.

So, for the factories that are represented in the various categories, the best of luck to you.

And, to you, our operator/subscribers, please study the finalists in each category very carefully, because you are the final judge. It's all in your hands.



David Pierson  
Editorial Director





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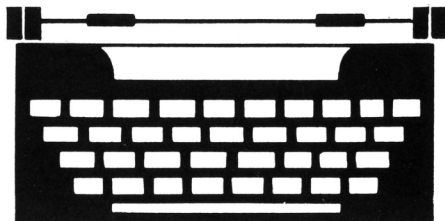
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## Letters to the editor . . .



### Reference source

I am new in the business and read each issue of your publication from cover to cover. I find it very interesting and informative.

I find particularly interesting "Frank's Cranks" by Frank Seninsky. I was wondering if you could publish a list of the various video machines that have been reviewed (i.e. service tips, or general reviews of the games) in the past few months. An individual could use the list as a reference source if he owned the machines, to check out any problems in back issues of your publication.

**Marvin S. Gehn**  
MSG Sales Company, Inc.  
Great Lakes, L.I., New York

[Ed. Note: An index of technical tips and games reviews is a good idea, suggested to us by numerous persons, and we plan to work up such a reference in the near future. Watch these pages.]

### Factory response

I enjoyed reading "Frank's Cranks" in the August 1 issue of *Play Meter*. Mention is made to the Midway joystick. My article in *Star Tech Journal* was only partially quoted. The new red wear plate on the assembly wasn't discussed.

Early *Pac-Man* games had a few problems in rough areas, but Midway came out with these new parts in a very short time. I have had

these new parts on my games for about six months with no failures. This is the kind of response I like to see in a factory. I feel this assembly is second to none.

How many operators would like to wait a few extra months to buy a *Pac-Man* for a minor problem to be cured?

**Todd A. Erickson**  
St. Paul, Minnesota

### Exidy warning

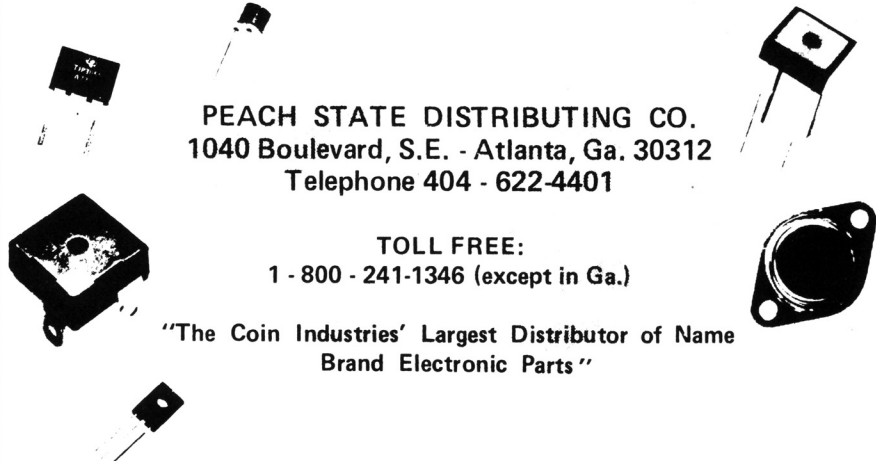
It has come to our attention that our games, specifically *Targ*, have been and continue to be converted to *Spectar*. As you are very well aware, there is a strong campaign afoot by many of us in the industry to protect our original products through enforcement of the United States Copyright Act. Both *Targ* and *Spectar* as original Exidy designed,

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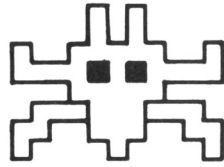
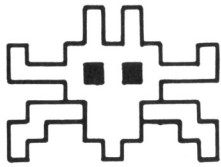
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# 'A Bum Rap'

By Robert J. Boyle

[Ed. note: The following editorial column appeared in a New Jersey newspaper. The subject of this defense, Bill O'Donnell, former chairman of Bally's board of directors, was forced by New Jersey officials to resign before Bally could be granted a license for its casino in Atlantic City.]

Former Attorney General John Degnan's loss in the primary pleases me. I never met the man, and really know little about him, except that I believe he used the Constitution for his own purposes and not for the purposes that it was written.

Degnan tilted a lot of casino windmills, and indicated that he saw himself as the protector of the public. That might not be a bad idea but the way he went about it and the logic he used, baffled me.

I always believed that in this country you were free to come and go as you please, free to associate with whomever you wished, free to conduct business and, that unless you were a convicted criminal, no government agency could throw up restrictions against you.

But, watching some of the hearing for casino officials from afar, I began to wonder about Mr. Degnan and his tactics. I especially wondered about his attacks on William O'Donnell, who headed the Bally Casino.

Mr. O'Donnell, a Chicago resident who took an ailing slot machine business and made it into a profitable one, was instrumental in building Atlantic City's most expensive casino. And, he wanted to head the business that he built.

Mr. O'Donnell has never been convicted of any crime. But he was denied ownership of the casino after the Casino Commission ruled against him. Mr. Degnan was the spear in the attacks on Mr. O'Donnell, and the attacks seem unfounded. One was that one of his employees at one time played golf with a suspected Mafia member. The duffer was no longer employed by Bally. Nevertheless it became an issue.

In this country we should be free to associate with anyone. Mr. O'Donnell also tried to get a loan, according to Degnan, from a person who may or may not have Mafia links. He wanted to save a business.

Loans do not necessarily have to come from banks. Organizations such as the Teamsters, and even the Catholic Church have given loans. When you need a buck you go where the money is. And, it appears that is what Mr. O'Donnell did, and there is nothing criminal in that.

Most everyone at one time or another deals with questionable characters. Because a policeman, or a newsman knows and perhaps even likes some of the world's shady people does not make him shady.

From where I sit, Mr. O'Donnell got a bum rap.

To force a man to sell his own property, a property he worked for and built with his own funds seemed lopsided.

Mr. O'Donnell is still on the outside looking in; still under orders to sell his stock; still unable to visit the casino he built. But with a new governor taking office in January, and with a Supreme Court hearing due, maybe Mr. O'Donnell will be able to enjoy the rights that he and every American should have.

He should be allowed his casino.

There are laws in the state to protect the citizens. If he, or any other casino operator breaks them, then he should be punished and restrictions should be placed against him. But neither he nor any citizens should face "before the fact" injustice.

That just isn't the way it should be done in this country or this state.



# Play Meter expands program to cite games 'excellence'

The "Play Meter" awards for 1981 will open up eight categories for operators' voting on excellence in coin-op pinballs and video games. This departure from the dual awards of 1980, the industry's first ever, has been made, *Play Meter* publisher Ralph C. Lally II said, because, "We want to recognize the multi-faceted appeal of games and their attraction to players. Assuming this to be the basis of growth in the industry, we want to give special recognition to the most innovative additions to the most popular game modes."

With this aim, *Play Meter* will in October award the manufacturers who, based on operator/readers response, have contributed machines that excelled in each of the following categories:

- Best video game for the year;
- Best pinball for the year;
- Best artwork on a video game;
- Best artwork on a pinball game;
- Best new technical improvement on a video game;
- Best new technical improvement on a pinball game;
- Best new play feature on a video game;
- Best new play feature on a pinball game.

David Pierson, *Play Meter's* editorial director, noted: "The operators' votes, based on their own direct experiences with the games of the year, will decide the awarding of 'The Play Meter' awards for 1981."

Ballots are currently being mailed to operator/readers of *Play Meter*. The balloting is not open to any manufacturer's representative, Pierson noted.

Manufacturers have, however, been notified of all nominations by their competitors, in the event that any dispute should arise as to which factory inaugurated any particular innovation in the games, Pierson added.

The input from readers has been impressive since the awarding of the 1980 *Play Meter* trophies, said publisher Lally. "It was this input which led to our expansion of the categories being awarded," he added. "As a mark of excellence in the industry, we hope for these  
PLAY METER, October 1, 1981

awards to have as much meaning for coin-op as Oscars have for the motion picture industry, the Grammy for records, The Tony, The Emmy and so forth in other entertainment modes.

"It is exceptional, however, that the operators of the games themselves, not the producers or the consumer as in other fields, do the voting which determines the winner," Lally added.

The awards program sponsored by *Play Meter* remains open to operators' input as to what categories should be extended for the games in the coming year, said Lally.

Balloting via the *Play Meter* annual polling of operators is part of the vehicle which has been widely recognized as the authoritative survey of the coin industry in the United States. The results of the

annual survey in other areas of operating will be published in the upcoming "State of the Industry" issue of *Play Meter*.

As stated in an editorial column ("Up Front") in this issue, the various categories of excellence being awarded via "The Play Meter" are posed as a standard for better machines and ultimately more profit for all those engaged in the industry.

The 1980 awards, Lally said, were "well-received by all industry people, not restricted to the winning companies (Atari and Williams). I think it shows the industry realized that the time has arrived to recognize excellence, as other entertainment fields likewise have such honors."

Winners will be presented with the "Play Meter" award during the 1981 AMOA Show in Chicago in late October.

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*Another approach to the jukebox royalty fight*

# Higher copyright fees opposed by Stern/Seeburg

By Michael A. Nemeroff  
*Counsel for Stern/Seeburg*

---

*Contributor Nemeroff of Sidley and Austin, Washington, D.C., has been active in lobbying against higher jukebox royalty fees.*

---

An increase in the copyright royalty payments could be in store for jukebox operators if Congress approves legislation creating a new copyright for performance rights in sound recordings. Legislation to require the new royalty payments has been introduced by Congressman George Danielson (D-California) and twenty-eight other members.

The proposed legislation (HR 1805) would create for the first time a copyright for sound recording performances to benefit record companies, performers, and musicians. Jukebox operators would be required to pay a new royalty for each jukebox operated. Currently jukebox operators pay royalties of \$8 a year for each machine. On January 1, 1982, royalties will increase to \$25 per machine and then to \$50 on January 1, 1984, as a result of a Copyright

Royalty Tribunal decision earlier this year.

The new bill would increase the current \$8 royalty by \$1 per jukebox, but this new royalty could be further increased by the Tribunal in line with the increases it ordered this year.

Hearings on HR 1805 were held by the House Subcommittee on Courts, Civil Liberties and the Administration of Justice in June. Wayne Hesch testified on behalf of the Amusement and Music Operators Association, telling the subcommittee that the new royalties would be unfair because operators have recently been subjected to heavy new royalties and that the jukebox industry already contributes substantial revenues to the record industry as the largest purchaser of 45 RPM records.

Lawrence Siegel, president of Seeburg, told the subcommittee in a statement submitted in July that the jukebox operating industry cannot afford the proposed new royalties, "HR 1805 would further weaken this industry and this would reduce the United States' market for new jukeboxes, seriously affecting

Seeburg and the other domestic manufacturers," said Siegel.

The legislation is strongly supported by the Recording Industry Association of America Inc., representing 49 record companies, and by a variety of musicians and performers groups.

Hearings on the legislation were completed in July and the subcommittee may take up consideration of HR 1805 when Congress returns on September 8, after the Labor Day recess. Operators who would like to register opposition to the legislation can write to the Congressmen listed below who are members of the subcommittee:

## **Subcommittee On Courts, Civil Liberties, and the Administration Of Justice**

Robert W. Kastenmeier, D-WI, chairman; Jack Brooks, D-TX; George E. Danielson, D-CA; Barney Frank, D-MA; Tom Railsback, R-IL; Harold S. Sawyer, R-MI; M. Caldwell Butler, R-VA.

Other Congressmen who may be contacted are those co-sponsoring HR 1805; as follows: Anthony C. Beilenson, D-CA; David E. Bonior, D-MI; John L. Buron, D-CA; Shirley A. Chisholm, D-NY; William L. Clay, D-MO; Cardiss R. Collins, D-IL; John Conyers, Jr., D-MI; Ronald V. Dellums, D-CA; Julian C. Dixon, D-CA; Walter E. Fauntroy, Del.-DC; James J. Florio, D-NJ; Harold E. Ford, D-TN; William H. Gray, D-PA.

Also, Albert Gore, Jr., D-TN; Augusta F. Hawkins, D-CA; Henry J. Hyde, R-IL; Joseph M. McDade, R-PA; Norman Mineta, D-CA; Parren J. Mitchell, D-MD; Donald J. Mitchell, D-NY; John T. Myers, R-IN; Fredrick W. Richmond, D-NY; Stephen J. Solarz, D-NY; Henry A. Waxman, D-CA; Ted S. Weiss, D-NY; Antonio B. Won Pat, Del.-Guam; Sidney R. Yates, D-IL, and Leo C. Zeferetti, D-NY.

### *The principal arguments against H.R. 1805:*

- (1) Jukebox operators cannot afford new royalties particularly because the royalties will be set by the Copyright Royalty Tribunal if the legislation is passed and will be much larger than \$1 per machine each year.
- (2) New royalties may cause jukebox operators to purchase and operate fewer machines and to concentrate more on video and pinball thereby defeating the purpose of the legislation.
- (3) Jukebox operators are major purchasers of 45 RPM records which are a substantial source of revenue for the record industry, performers and musicians.
- (4) Most of the new royalties will go to record companies and performers who produce the most popular records. These companies and performers are well compensated and successful and do not or deserve new copyright royalties.

# MIDWAY

# MEGA RACE



“Guidance Control, Thrust and Firing systems...GO!”

“Have sighted fleet of Droids...am on attack to score.”

“Photon and Vapor mines in view...can destroy or dodge.”

“On alert for extra point Death Ship target.”

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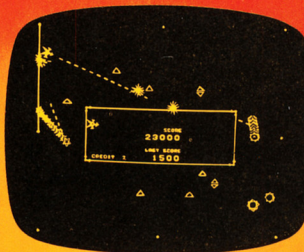
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Fast-paced, exciting video game featuring star-like opponents in an energy field.

The Omega 'pilot' skillfully maneuvers his fighter ship to out-shoot and destroy the steadily attacking aliens and deadly mines in his path.

Hyper-accelerated attacks by Death Ship targets are cued by special sound effects.

FOR 1 OR 2 PLAYERS



The Omega fighter is directed by a Rotation Control Knob. It is powered and propelled by a Thrust Button. The Firing Button releases the destructive missile blasts.

Omega Race features Midway's increase price of play option, enabling player to select added fighters for additional coins.

Color on screens mechanically reproduced.


# MIDWAY OMEGA RACE



In the year 2003, the Omega System developed a method of training its warriors to protect their star colonies against Android forces over the city of Komar. Omega fighters raced to engage and destroy these aliens and the mines they planted. The Omega method is so successful, it commands fear and respect from all throughout the galaxies.

This method is code named OMEGA RACE.

Points are awarded for the ability to neutralize the droid force as follows:

				
<b>350</b>	<b>500</b>	<b>1000</b>	<b>1500</b>	<b>2500</b>
Photon Mine	Vapor Mine	Droid Ship	Command Ship	Death Ship

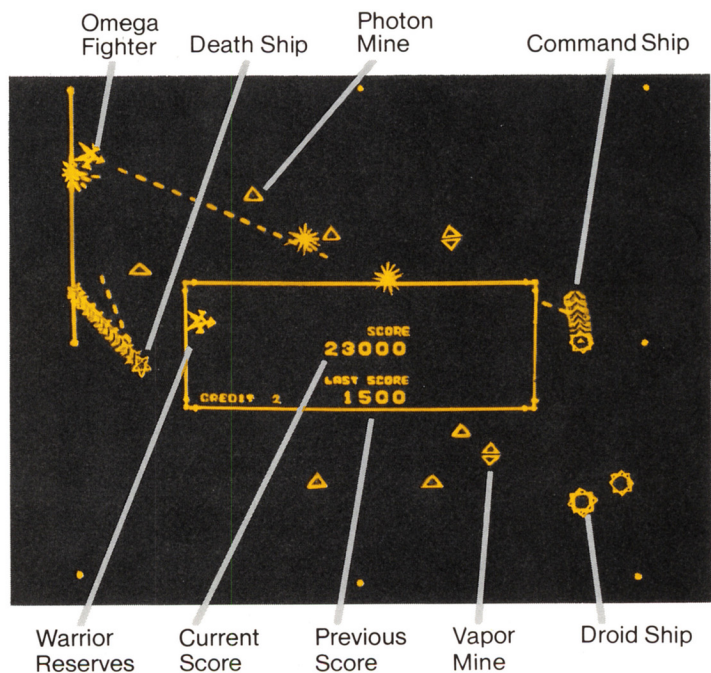
The player uses the Guidance Control knob for direction, and the Thrust Button for force to maneuver his Omega fighter in a chase attack throughout the energy field.

Upon confronting the alien droid units, a press of the Firing Button unleashes deadly laser rays that neutralize and destroy enemy targets.

Special attention must be paid when engaging the enemy Death Ship. This alien appears at random and has greater speed and maneuverability than ordinary droids. The hyper-accelerated attack by the Death Ship is accompanied by special sound effects. Its tactic is to bump and demolish the Omega fighter.

Clearing the screen earns continued play. A bonus Omega fighter is awarded at high score levels. A special feature enables a high score player to produce his initials and score which remain on the screen for all to challenge. High scores are maintained for 1 credit and 2 credit games.

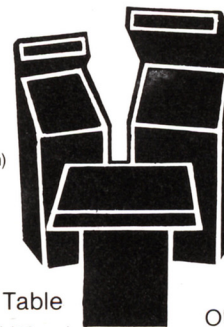
*For Operator:* Special screen display reveals research information regarding play activity in game. *Details contained in technical manual.*



Midway models:

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#### Cocktail Table

Height: 29" (73 cm)  
Width: 32" (80 cm)  
Depth: 22" (55 cm)

OMEGA RACE is also available in a 'Sit-In' Capsule model, ideal for game rooms and arcades.



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# Operating pinch is felt on the jukebox

Like the fabled repairman for the fabulous brand of washing machine, it may be the lonliest piece of coin-op equipment in town. It sits in the corner, only responding when you stimulate it with a quarter. But it can be your best companion over a solitary dinner or in a crowded bar...

The jukebox is dying, if you listen to a number of coin-op businessmen. It has a future, as it has a past, if you talk to others. It is only marginally profitable, or a loss leader, if you talk to still others.

The consensus seems to be that the large profits are not there, but that the jukebox retains an appeal, especially to location owners.

One manufacturer of the boxes recently noted *Play Meter's* annual survey of operators as supporting "our experience that many operators reluctantly keep these machines because of the need to offer a full line of services to patrons." The survey of last year revealed that, while three years earlier the jukebox held the distinction as the highest earning piece on location, it fell last year to fourth place, behind videos, pinballs, and pool tables. The weekly gross intake from a phonograph was, on average, \$50, down from \$54 weekly in 1979.

Manufacturers can cite a "steady decline for more than a decade," said the factory spokesman, "and currently U.S. manufacturers produce about 25,000 machines a year." Factors, such as the copyright royalty fees per jukebox, fly in the face of the business when growth is considered. Higher profitability of other coin-ops such as videos, of course has to be weighed also.

When called in an informal, random survey by *Play Meter*, one Virginia operator said his line of jukeboxes dropped this year, "ten down to eight. I'd like to sell them all. The only thing it serves as is a necessary service," he said, echoing the manufacturer's assessment. "Only in country bars do they do well—only where the customers can sit down and drink. It's a service to a location."

Some operators even loan jukeboxes to locations in order to gain entry to those location. "Cigarette machines are another way," said a southern operator, "but I don't want to do that, to have to fill a machine. That's essentially what you do with a jukebox, refill it with records."

A Midwest operator was more optimistic. Kirt Miller of Amuse-O-Matic Co., Fort Dodge, Iowa, said he sees in the jukebox revenues "a slump, but it seems to be coming back. I really don't see it ever ceasing. We donate a lot of time to them, there's good money in it, and it has to rise."

Miller pointed to the meshing of music styles—country and western with rock, rock with mainline records, and so forth—as stimulating the general play of jukeboxes and enriching the cashbox. In fact, he said, he believes they will survive, while he saw coin-op games as all having a fated lifespan, eventually losing most of their appeal to players.

Across the board, however, the average jukebox operator is probably gloomier. A Philadelphia operator saw revenue from music getting smaller and smaller, with locations' patrons not taking the

time to play jukeboxes. "The day of the fast-food diner is going too," said operator Barry Fireman. Fast-food restaurants, with their music piped-in or none at all, are obsoleting the casual, friendly diner where someone always plays the jukebox when the music dies.

An Atlanta operator said he has bought new boxes in the current year (which few of those contacted had done)—but he sees the music market "drying up," and said he uses phonographs only to accommodate locations whose favor he would like to curry for taking his games.

Of jukeboxes, operator Eugene Urso of Madison, Wisconsin (a college city) said: "We don't like buying them," and his company contracts with locations for a \$50 minimum on each box weekly for servicing them. Urso cited rising costs and canned music on location for his present negative feelings about the jukebox, but added: "It's been a heckuva a good piece for operators for a lot of years."

The box has the advantage of staying on location for two years or so, he noted. But, referring to royalty fees, increased purchase price, and other detractors from the music machine as a revenue producer, Urso commented, "Too many people are getting a piece of it."

If the phonograph, an archetype of American coin equipment, is to survive the eighties, then, it will take a number of factors operating favorably. The jukebox tax, creativity in packaging the phonograph, and ingenuity in operating are certainly among the key issues for coin-op music.

—by Ray E. Tilley

## Universal USA expands sales, service staff

Paul C. Jacobs, president of Universal USA, Inc. has announced the addition of Mark P. McCleskey to the Universal sales staff, effective August 10, 1981.

McCleskey, who will serve as Eastern regional sales manager, has spent the last five years with Sefco Distributing Co. of Hanover, Maryland. His most recent position was that of vice president/sales and marketing. A native of Memphis, he

holds a B.S. Degree from the University of Tennessee.

In a related announcement, Jacobs noted that Aldo J. Donnalioia has joined the firm as Customer Service Manager.

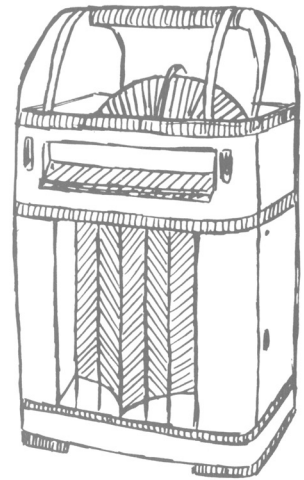
Donnalioia has over ten years' experience in various capacities including customer service management, general operations management, sales coordination, and related administrative functions. In

additions, he has experience in the video games business through his former position as customer service manager for Data East, Inc.

"We are very pleased to add Mark and Aldo to our staff at Universal. These two individuals will add greatly to the performance and growth of our company, through both their professional manner and their dedication to excellence," commented Jacobs.

# Phonos to start offering 'non-music' services

*"This year the big news in phonographs won't be a color change from red to blue..." —Seeburg president*



Apparently a revolution is in the offing for the phonograph industry. At least one of the "Big Three" domestic jukebox manufacturers has tipped its hand as far as new jukebox features for the upcoming year; and, from what has been revealed so far, it appears there may be some interesting departures in the immediate future for the coin-op music machines.

Jukeboxes offering video capability to disseminate such information as "stock market quotations, local advertising, and even restaurant menus" will apparently be offered as part of the phonograph package for this year's rejuvenated Seeburg phonograph line.

The revelation came July 29 from Lawrence Siegel, president of Seeburg, during his House Subcommittee testimony in opposition to the proposed Danielson Bill (The Danielson Bill, if enacted, would assess operators additional per-jukebox assessments under the new copyright law, with the additional monies going to "performing artists").

In his presentation to the subcommittee, the Seeburg president said such a per-jukebox assessment would be unfair, especially in light of the evolving nature of the phonograph. To substantiate his position, Siegel said, phonographs will begin to offer more and more "non-music services."

Said Siegel: "Given the technological decline of the jukebox industry, the only hope of manufacturers is technological innovation. Our machines must offer new services to attract customers and rebuild business. In the next few months, Seeburg will begin to offer jukeboxes equipped with a video capability. Customers will be able to obtain various forms of information,

such as stock market quotations, local advertising, and even restaurant menus. Increasingly, our machines will offer non-music services.

"We believe that these innovations will reverse the decline in our industry."

When contacted by *Play Meter*, Siegel commented on the development: "We feel it's a remarkable step forward in the jukebox industry, a dramatic departure from the jukebox in the past. It's something we hope will turn the jukebox industry around."

Siegel explained the nature of the Seeburg development: "We have put a CRT (cathode ray tube) in the jukebox," he said, "and that CRT is controlled by a microprocessor that was developed by our people at Universal Research Laboratories (a division of Stern Electronics).

"The function of it," he continued, "will be to eliminate the title strips since the titles will now appear on the screen. But we'll also be able to provide the location with numerous other services, such as those I mentioned in my testimony to the subcommittee.

"Also it will provide the operator with all kinds of bookkeeping and accounting operational data." He said the new Seeburg phonos would utilize "some very new technology, particularly in the way title strip data is incorporated onto the screen."

"It's been a dream for about a year," said Siegel, "and now it's becoming a functional reality."

He said samples will soon be ready for a special distributor showing in September. However, the phonograph will not be unveiled to the rest of the trade until the AMOA Show in Chicago.

Last year Gary Stern, chairman of Stern Electronics, hinted at the

drastic departure from existing jukebox technology when he was interviewed as "Coinman of the Month" (See November 15, 1980, *Play Meter*).

In answering a question about why Stern Electronics had purchased the bankrupt Seeburg company, Stern said, "We have some ideas for the future which we think will revolutionize the jukebox. I'm sure the other manufacturers have their ideas, too; but something must be done to revolutionize the jukebox business, to create demand for the jukebox and make it a great earner again."

He continued, "One thing, if you look at all the current jukeboxes, is that they're all microprocessor-based; however, they don't really do anything different from what non-microprocessor-based jukeboxes did."

He drew an analogy to Stern's evolutionary understanding of solid state technology in pinballs. "As the manufacturers learned more about the microprocessor," he said, "they were able to make and more interesting pinball machines."

He said that experience would pay dividends in development of the jukebox. "We have more knowledge of how to use the microprocessor and hope in the near future to take fuller advantage of that microprocessor and make the phonograph a solid earner again... We plan to short circuit that evolution process and do the same thing with the jukebox within a year or so" that evolved over the years with pinball.

Siegel, when confirming his company's innovations in the field, summed it up by saying, "This year the big news in phonographs won't be a color change from red to blue."

*David Pierson*



# Infringement Policy

To meet the demands of the marketplace for new and exciting electronic games, Williams creates innovative games with strong play appeal and exclusive features. Williams' research & development, design talent and engineering skill combine their expertise to continuously insure a high standard for the industry.

To protect the rights of original works, United States codes provide for registration of copyrights and trademarks. Williams fully intends to protect its proprietary rights under these regulations and will take all legal action necessary against anyone engaging in the manufacture, assembly, distribution, sale or operation of infringing games.

To date, Williams has received orders from United States District Courts in Portland, Newark, Alabama and Los Angeles prohibiting the further sale of infringing games. Williams' rights have also been upheld in the foreign marketplace in England, France, Spain, Germany and Italy.

This notice is to serve as fair warning that Williams intends to seek prosecution against any person or company violating its exclusive proprietary rights in DEFENDER™ and in other games that follow.

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# Elcon bows new games table that allows dining while playing



New coin-op table designed to fit restaurant booth space

Elcon Industries, Inc. has announced its new *Diversions* coin-op games table, hailed to be unique in the industry as the first booth-style video table.

Designed to fit existing restaurant booths or to be used separately with chairs, *Diversions* may prove to be a welcome addition to routes as well as offering a solution for many locations where space is a problem.

Andre Dubel, president of Elcon, said: "The idea, we developed basically for ShowBiz Pizza so there would be enough room for customers to put down their food and play the game also. It's already a proven item, doing nicely in 10 locations of ShowBiz, to date."

The tabletop provides 32-by-41-inch space for diners to eat and play, and unlike conventional cocktail

tables, *Diversions* has ample knee and leg room, said Dubel.

*Diversions* was being made available with a dozen different video games, including *Tank Battalion*, *Cosmic Attackers*, *Devil Zone*, and *Space Force*, that are easily and economically changed to keep games up to date, according to Elcon Industries.

Elcon is licensing from Universal USA, Data East, and Game Plan for logic boards for future games, said Dubel. Otherwise, location-selected games can be installed in the table, or games without logic boards will be sold for the location's own insertion of its game, under Elcon's flexible marketing plan, said Dubel.

Features include a 14-inch color monitor, hand-laminated finish, separate locking cash drawer, quality coin mechanism, and easy access to components—coin mech and cash box through the side of the cabinet and game parts through the back door. Thus, the units can be placed freestanding or back-to-back.

The *Diversions* table is available exclusively from Elcon Industries, 2715 Nakota Road, Royal Oak, Michigan 48073.

## Kits to boost Atari video tourney

Atari is sponsoring a coin-operated video game tournament, with a combined total of \$50,000 in cash and prizes being awarded. Players will compete in six categories including Open Singles, Women's Singles, Thursday Speciality, Friday Speciality, Open Singles Second Chance, and Women's Singles Second Chance.

This competition is open to players of Atari video games around the world and so far has generated wide-spread enthusiasm among operators and players alike, according to Atari.

The international tournament begins with contests at the level of local participating family game centers and street locations. Local winners are invited to compete in the open finals in Chicago and given a free entry pass, value set at \$60.

Operators are encouraged to participate by ordering a tournament kit from an Atari distributor and staging a local contest. Each kit has the necessary information for an operator to hold a contest and includes an entry pass to the finals for the winner(s).

The Atari World Championships are part of the Tournament Games, Inc., spectacular \$400,000 weekend. While the Atari tournament is taking place, Soccer, Mark Darts, Eight Ball, and Hockey tournaments will also be in session. These tournaments as well as the Atari World Championships are scheduled to be held in Chicago, to coincide with the AMOA show, October 29 through November 1.

Kits as well as attractive World Championship posters are available through Tournament Games, Inc.

For additional information about the tournament, call the toll free number 800/426-8897; from Alaska, Hawaii, Washington and Canada call 1-206/763-1362.

### **Frank's Cranks...**

The "Cranks" do not appear in this issue due to columnist Frank Seninsky being busy with late summer arcade start-ups in his own operation, Alpha-Omega Amusements on the New Jersey shore. The column will resume in the next issue of *Play Meter*. Meanwhile, Seninsky reports that he will be "taking notes and looking at features of new games that I feel need to be improved," and these game-consumer reports will appear in subsequent "Cranks."

—ed.



Copyright actions proceed

# Canada, Florida operators under Midway litigation

Midway Manufacturing Co. has brought action in the Supreme Court of Ontario, Canada, against Amusement Electronics, Ltd., and defendants Kurt Reichenberger and Stewart Lee for copyright infringement.

Meanwhile, a federal judge in Orlando, Florida has refused to lift the injunction or to return about 25 impounded coin-op video games to defendant involved in a Midway copyright suit.

On June 8, 1981, Ontario Justice Hughes granted an interlocutory injunction against the Amusement Electronics defendants, restraining them—and others having notice of the granting of the injunction—from manufacturing, selling, or distributing (or offering to do any of these) *Pac-Man* and *Rally-X* imitations sold under the name "Black Magic", and from manufacturing, selling or distributing (or offering to do any of these) "Super Galaxian Kit," and further ordered that the defendants deliver up to Midway's agent all such infringing games and kits.

On June 18, 1981, Justice Linden dismissed the defendants' application for leave to appeal the order of

Justice Hughes. Midway is taking action against other Canadian infringers and will continue to take action against infringers of its Canadian copyrights in its games, said the manufacturer.

Under Canadian copyright law all infringing copies of works in which copyright subsists are deemed to be the property of the owner of the copyright. Midway's counsel presented the view that persons who knowingly deal in or possess infringing copies of Midway's copyrights may be liable to prosecution under the Criminal Law of Canada for theft or possession of goods obtained by crime as the case may be and in appropriate cases, Midway will refer such infringers to the prosecuting authorities.

In Orlando, U.S. District Judge George Young continued indefinitely an injunction against use of any video games that Midway claims infringes on its copyrights, but he stated his decision did not imply guilt or innocence on the part of four defendants named in the suit by Midway in his court.

The *Sentinel Star* of Orlando

reported that, although Young refused to return the 25 impounded games to operators Joe Gucci, Hank Serino, and Larry Kruckenberg, all of Orlando, and Sol Tabb of Miami, he allowed them to file new motions for return of the machines.

Midway, based in Franklin Park, Illinois, was reportedly involved in 20 similar suits across the United States and was also seeking \$800,000 in damages and lost profits in the Orlando case.

The manufacturer claimed its copyright on designs of *Galaxian*, *Pac-Man*, and *Rally-X* was violated in Florida by counterfeiters who copy the games after they determine which ones are popular. Midway Vice President Stan Jarocki has testified that the three games cost Midway a total of at least \$20 million to design, develop, market, and produce, the *Sentinel Star* reported.

Judge Young agreed that Midway had a copyright on the machines, and the defendants did not contest that point, but he did not rule on the specific areas covered by the copyright. That issue was to be argued in a full hearing to determine liability and damages, at a date yet to be set.

## Distributors' assn. sets up

AVMDA (Amusement and Vending Machine Distributors Association), a newly formed trade association comprised of distributors of coin-operated amusement games, video games and juke boxes, as well as vending machine equipment, has established offices in Chicago.

The association's Chicago headquarters, with Edward G. Doris as its executive director, are located at the International Towers, 8550 West Bryn Mawr Avenue, Suite 303, Chicago, Illinois 60631; telephone 312/693-7410.

The law firm of Chatz, Berman, Maragos, Haber and Fagel of Chicago, has been appointed as legal counsel. Allen J. Fagel, a partner in the firm, will be responsible for representation of AVMDA.

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Domestic and Foreign For  
The Coin Operated Amusement  
Machine Industry**

## Peach State changes hands

Effective August 1, 1981, Peach State Distributing Company/Atlanta was acquired by John Head, Jim Libby, and Jack Head as equal owners. Peach State was previously owned by Albert Hawkins, Dyke Hawes, and Joe Hawes.

Jim Libby will be the chief operating officer of the company and John Head and Jack Head will be active in the overall direction of the company. All of the new owners are native Atlantans.

Libby is 39 years old and a graduate of the University of Georgia. Prior to acquiring Peach State, he was a partner in the Atlanta office of Arthur Young & Company, the international public accounting firm.

John Head is 34 years old, and a graduate of the University of Georgia. He is the owner of three building material companies in Georgia.

Jack Head is 28 years old and also a University of Georgia graduate. He is the owner of a tobacco wholesaler in Georgia.

### Hinson passes

Ralph Hinson, vice president & general manager of Peach State Distributing Company died suddenly on May 27, 1981. He was 48 at the time of this death.

Mr. Hinson was a graduate of Georgia Tech and served in management positions at Peach State Distributing since 1963. He was survived by his wife Ann, and three children.

## URL taps Sikorski

Universal Research Laboratories, Inc., Elk Grove Village, Ill., announced the appointment of Richard Sikorski to the newly created post of senior vice president of operations, in charge of all URL manufacturing operations, including production scheduling, purchasing, and quality control.

Sikorski comes to URL, a subsidiary of Chicago-based Stern Electronics, Inc., from Scheduling Corporation of America, Oak Brook, Ill., where he served as management consultant to electronics and plastics manufacturers.

# Videos in the U.K.:

The coin-operated amusement industry worldwide is fully aware of the state of the video games industry and the crossroads at which the trade's most popular vein has found itself. In Britain, however, that crossroads resembles something of a junction—so much is happening there!

No sooner had an enterprising young company based in the industrious northwest of England launched a new video games system described as the most powerful yet, than the Customs and Excise powers-that-be dropped the inevitable bombshell: a hint that the British Government budget could be looking at a new system of their own—levying gaming machine license duties geared to the takes of machines and with the suggestion that that duty could be applied to video games.

While these two factors alone provided the British industry with plenty to talk about in one week, the U.K.'s most prolific manufacturer of video games decided to shed 35% of their holdings on the stock exchange. However, the Subelectro issue was floated without a profit forecast and was not exactly received with open arms and was, in fact, withdrawn within a week.

On top of this a number of new and interesting games aimed at breaking the monotony of *Scramble*'s success and *Defender* copying were being launched with differing reactions across the U.K.

The new video games system launched is the Century Electronics device shown before completion during this year's ATE in London behind closed doors to a selected number of Japanese and American visitors—Exidy, we know, was among them.

After a year in development the Oldham firm released CVS—as it is to be known—with two new games, *Dark Warrior* and *Cosmos*.

CVS is a totally British-built interchangeable system “comparable with any system yet introduced,” Century's Joint Managing Director Peter Robinson states.

His partner, David Jones, points out: “The system has been designed to be easily written and there is no problem bringing out games every six weeks. The system is being

exported to the United States, throughout Europe and we are launching CVS ourselves in Japan in October when two further games will be added to *Dark Warrior* and *Cosmos* and a further new game will be released in Chicago at the AMOA show when our American customer will be disclosed.”

With three microprocessors, CVS is said to be more powerful than any other system for changing video games yet introduced.

### Duty proposal

The British video games operator may well be grateful for the introduction of such a promising yet economical system as Century Electronics' in view of the Customs and Excise proposals. The government office states, “When gaming machine license duty was discussed, suggestions were made that the duty might be restructured to reflect more closely the actual takings of different machines and that its scope might be extended to cover popular non-gaming machine.”

“The Chief Secretary said that the commissioners would review the whole question of machine taxation and in particular the possibility of introducing an ad valorem (in proportion) form of duty, with a view to possible changes in next year's budget.”

Alan Willis, general secretary of the British Amusement Catering Trades Association (BACTA) described the government idea as “utterly disastrous for the industry if implemented.” He added: “Anything along these lines would be wholesale tragedy for an already overtaxed trade.”

The realization of worsening situation was probably instrumental in Subelectro's move to go public. Subelectro Chairman Bill Tulloch, however, said: “There are two reasons for going public. First, I am an investor by nature and to have all my eggs in one basket is not prudent.

“The main reason, as far as the company is concerned, is that this is the key time to do it because we are negotiating with large and small companies overseas for manufacturing rights. These companies are much happier dealing with a company in the U.K. which has the

# Financial crisis worsens

conviction that comes with a public company. The status will, I am sure, give us far more license."

Subelectro's total share capital was valued at £8,250,000; the company having traded profitably for the past five years with the pre-tax figures rising from £30,000 in 1977 to £1,225,000 in 1980. During the same period turnover advanced from £294,000 to £5,891,000.

The fact that Subelectro was forced to withdraw from the market so rapidly was credited to "bad press." The reality, however, was somewhat different.

Subelectro's misfortunes are a timely reminder that, even in the accepted rough and tumble of the unlisted securities market of the stock exchange, a prospectus that avoids a profit forecast yet hints at recent slack demand is not what investors will accept...especially when the company's chief executive, and vendor of all the shares, is to

take £40,000 a year in salary, reviewed annually, for a maximum of four days' work a week.

Subelectro, needless to say, now has its problems. Other video game manufacturers, though, have been busy launching new product on the British market in the hope of easing their own situation as the industry had generally begun to mark time.

New interchangeable games systems were forthcoming from Gayton Games and Alca Electronics, the latter handling the Sega/Gremlin *Convert-a-Game* pack unveiled earlier at the company's California meeting of distributors.

The Gayton system is similar, a six-board system designed by Scottish company Datascan, a firm that specializes in the manufacture of oscilloscopes.

## Video revenue down

With the video games take on site 50% down versus this time last year, the British operator can be excused

for being cautious, neither of these systems meeting with an instant sales success.

The "fun games" from Atari and Nintendo, however, have brought some response. Atari's *Centipede* is already available and rivalling conversions in many quarters, despite an unusually high price. Nintendo's *Monkey Kong* was previewed in a modest manner through the opening of extended showrooms at Liverpool's Joyland Amusements and was highly acclaimed.

There is little doubt the video game industry in the U.K. is currently treading thin ice, a fact endorsed by the manufacturers majority decision to enter into the field of video fruit machines—an innovation that is bound to be in abundance by the time the ATE opens its doors for 1982 at the new National Exhibition Centre in Birmingham.

*Play Meter's London Desk*

## Oriental multi-tour readies for the trade

Sightseeing, trading, and briefing on the latest technological data and information in the electronic industries are available to the western coin-op trade executive via the 1981 Far East Consumer Electronics Tour, October 7-21 in Japan, South Korea, Taiwan, and Hong Kong.

Designed by Commerce Tours International, Inc. of San Francisco with development of international markets and previewing of 1982 products in mind, the tour will bring participants to the largest consumer electronics trade shows in those eastern nations.

The tour will include briefings by U.S. and local government and industry leaders in Osaka, Seoul, and Taipei; plus facility tours and individual business appointments. The tour price from U.S. west or east coasts is half of the cost of individual travel and accommodations. Included are round trip air fare, first class hotel room (shared), daily breakfasts, transportation to hotels and trade shows, six dinners, and special programs for spouses.

More than 600 executives from

the U.S.A. and other countries have participated in CTI's electronics tours during the last five years. This year the October tour is divided into sections by product areas in order to suit the individual's interests, said the agency.

CTI President Robert Chang said, "Participants tell us this is the most cost-effective—and enjoyable—way to make contacts, pick up new product lines a year or more in advance of the competition, or set up lucrative Far East export outlets. In addition, participants continue to receive inquiries long after the tour, since their names are distributed widely in each country," according to Chang.

Highlights of the trade shows portions of the tour are:

—A visit to the 1981 Japan Electronics Show, Osaka International Fairground, October 9 and 10. The main exhibits cover consumer electronics products, testing and measuring equipment, radio apparatus and associated electronic devices, electronic components, and computers. The show is considered

a significant international communication event for updated technological information, as well as trade business.

—Opening of the 12th annual Korea Electronics Show, Seoul, October 14. Exhibits will include consumer and industrial products, parts and components, production equipment, testing apparatus, computers, and allied equipment.

—The Taiwan Electronics Show, October 16 and 17, Taiwan. Four hundred foreign and local electronics firms are expected to exhibit.

—On October 18, the tour will split into groups attending either the Hong Kong Electronics Show—or Tokyo's International Electric Measurement and Control Instrumentation/Automation Exhibition and the Japan Data Show '81.

Departure for the United States is on October 21.

For more information, contact: Terry Butler, CTI, 870 Market Street, Suite 742, San Francisco 94102 (tel.: 415/433-3072), or Wes Thomas, 21st Century Media, 606 Fifth Avenue, East Northport, New York 11731 (tel.: 516/368-2609). •

# Operators hesitant about new game mode

By Ray E. Tilley

Operators' reactions to the introduction of interchangeable games via replaceable program boards vary widely. The immediately perceived benefits, operators cited as a price break over the ever-mounting purchase prices of games, and the installation ease and mobility of games in a series, as the ones to be marketed in the United States by Sega/Gremlin.

But their negative thoughts about the new Change-A-Game system might be summed up: the uncertainty of the unknown. At late summer, the new Sega system had not hit all markets, and some operators in an informal telephone canvass by *Play Meter* had only read or heard about the system, while others said they did not know

enough to comment.

A Virginia operator cited price benefits from the new system but said that is a double-edged sword, possibly making it easier for location ownership of games with an interchangeable system.

A West Coast operator said the technology involved may lock an operator into the state of the art represented by the cabinetry and the "works" in the games outside the game programs. Either the necessary junking of original shells of the game system or including extra capacities in future programs which cannot be absorbed in present machines—will equal waste and a driving up of expense both at the factory and the operating level, in the opinion of this operator of 500 game

units.

Welcome arms were opened by an operator in the deep South, however. He said, "We're going to love it; it's a big break for us because we have to pay so much for games plus high rates of financing. I'm 100 percent for it until it's proven otherwise" than profitable, he said.

Jules Millman of the Aladdin's Castle chain said from Chicago that the Change-A-Game "concept is good. I only question what it will do in this country." (The Sega system was developed in Japan, where the interchangeable system has been called "a way of life" for the past two years. An apparently similar system was recently announced for the British market by Century Electronics.)



*Changing of PC boards within 15 minutes with the Convert-A-Game system is demonstrated by a Sega engineer at a recent showing for handlers.*

Millman echoed the fears of many operators that all games in the new system will not have high appeal to the player. He noted that the first cassette-type reprogrammable games from Data East Corporation, tested in his arcade chain, "didn't test well. Gremlin's *Space Odyssey* did not do too well either." But when the second game in the game-swap series from Gremlin appeared, *Aladdin's Castle* ordered 250 sets. That buying decision was based, not on interchangeability, but on the

saying, as one recently did, 'Why shouldn't I buy it myself. Repair? I'll take my chance.' That location stayed with me, but it was hard to explain why he shouldn't do it himself."

Bado maintained that in the area of operators competing with locations as game entrepreneurs, "either the factories are going to stick by the operators or not," in the sales pipeline.

George Typaldos of Redondo Beach, California, told *Play Meter*,

ownership of new games. "All they need us for is service." But Madison Coin Machines, in dealing with locations "sells our service" and Urso is confident it is competitive for locations in Madison.

A Maryland operator who was ordering *Space Fury* said, "I love it because the new game price for freight shipment costs \$100 in the east. It's going to be easier to ship games across the continent" when only the program board is different in a new game, he observed.

This operator also said he is confident that the upcoming six games in the Sega interchangeable system will be well played and will extend his operation. He said he sees three different interchangeable games, for example, as "new money in each of three locations, with each of them having new pieces after they are rotated."

The Ft. Washington, Maryland operator was also optimistic about the possibility of greater numbers of operators entering the business with the advent of the new system. "I think the industry can absorb who comes in. Some will fall by the wayside, sure, if they don't have the business acumen," he commented.

Kirt Miller of Amuse-O-Matic Co./Fort Dodge, Iowa, responded to a question on new interchangeable games by saying, "Everybody is going to sit back and look at it a little bit. I think there is going to be a usefulness. The cost of equipment is staggering, to buy a picture tube and new cabinet every time you buy a game."

Miller commented on the

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*'It bothers me when a location owner says, "Why shouldn't I buy it myself?" The factories must stick with the operator...'*

*—Virginia operator*

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merits of the game on test, *Space Fury*, Millman said.

He said the arcades in the *Aladdin's* chain have certain buying criteria that are different from route operators'. Specifically, it needs good games "immediately," and the entire chain buys basically the same games. It will not usually make an expenditure based on "hopes that the next game will be good," said Millman.

Dwight Hahn at A & C Electronic Games/East Hartford, Connecticut, speculated on the interchangeable games' impact on his route: "It would obviously help our making employees move equipment around. But I don't know about resale value when they have a bumper game."

Asked the impact he sees on his locations, Hahn commented, "I don't think they give a hoot, they just want the best games. They don't care if you have to move equipment around. But no manufacturer is going to have five good games in a row," Hahn added.

Tony Bado of Anthony Amusements/Dale City, Virginia said he felt the changeable system was inevitable to come from a U.S. manufacturer, since the individual has the theoretical ability to put his own cabinets, monitor, and game boards together. "It's not even logic to keep buying the cabinet. Only big arcades can afford to do it; the price has to come down."

He added his misgiving about easily changed games. "One thing bothers me—a location owner

"Of course it's a good idea, but I don't think it'll go over at this time. There are too many innovations in technology and machines coming out too fast."

Comparing new video system introductions with the debut of electronic pinballs, Typaldos said, "A system good for two or three games may not last for a year." Further developments in videos with interchangeable boards may mean fitting an advanced game into a game shell with existing 1981 technology of coin slots and monitors, he indicated.

But Typaldos acknowledged the manufacturers' interest in new game

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*'If it's a good game, we'd be more likely to put more videos in locations.'*

*—Wisconsin operator*

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modes.

In Wisconsin, Eugene Urso of Madison Coin Machines saw positive and negative points in the introduction of swap-games. "If it's a good game, we'd be more likely to put more TV games out," with the reduced price per game, he said, but added: "You'd go for the game you'd make the most money with, whether it is in its own cabinet or interchangeable."

He said he felt the interchangeable system could encourage location

operating business in general with thoughts that may sum up the quandary over the new video system at this time:

"It's hectic, but it's exciting. With the income and the costs, it makes us all a bit better businessmen than we used to be. You may have to be more creative to keep up, and there can't be sluggish operators out there who will compete.

"It's going to be an exciting time, the next five to 10 years," observed Miller.

# Distributors ponder the mathematics

By Mike Shaw



Distributors get feel of the new mode at recent Sega showing.

Some distributors are echoing Sega/Gremlin executive Dave Rosen, who claims that Convert-a-Game is "a concept whose time has come," but others are not so anxious for a game now threatening the traditional approach to game sales.

The Convert-a-Game system, as conceived by Sega/Gremlin, offers conversion of an existing game into a "new" model by simple replacement of a front loaded card cage consisting of six PC boards: (1) CPU, (2) memory (holds the game program), (3) video board, (4) video background board, (5) sound, and (6) speech.

"Quite simply," says Dave Rosen in a speech delivered to Sega/Gremlin distributors during June 15, annual gathering in La Costa, California, "the boards to be replaced are slipped out, the new boards are inserted, and off you go with a brand new game."\*

The conversion approach is not

\* Rosen's speech is excerpted in Play Meter September 15 issue.

new, but the fact that a major company sees it as a basis for the future of video play is new and carries momentous significance to the distributor, just as it does to operators and manufacturers.

The system is designed to solve the resale or replacement problem for operators. The 700,000 computer video games that are currently on location will need replacement within three years, and considering the current price of a video outfit in contrast to its trade-in value, it is not surprising that buying *Convertapak*s at something like \$1,000 each is appealing to operators.

But those mathematics are disturbing some distributors.

"It's strictly a one sale situation," says one Philadelphia sales manager. "No big distributor can exist on selling boards, cartridges, or cassettes."

"This is our treadmill to oblivion," comments a large eastern distributor, "the beginning of the end."

"The concept is definitely not good for business," contends a Midwest distributor. "There's not enough profit in the turnover. I

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believe they're trying to eliminate the distributor by introducing these conversions over here."

Sega built the conversion system for its Japanese operations. In Japan the system has worked well. But in Japan, Sega preforms its own distributing and operation functions. And since the *Convert-a-Game* system seems so geared to that type of relationship between factory and location, it is natural distributors feel threatened by its U.S. introduction.

"Maybe Sega won't turn operator here, but I can envision truckloads of boards being carted around the country and sold for \$400 dollars each. This concept will eliminate the distributor first, then the operator. There will be small centers set up to handle repairs," said an eastern distributor.

He is serious when he forecasts the end of distributors. He is so serious that he is participating in what he contends is a national coalition. "We will stop this by not distributing the games, by not selling the machines. There is agreement throughout the country by many distributors not to take the game. Let (Sega/Gremlin) find out gradually who we are."

A Chicago major told *Play Meter* that *Convert-a-Game* is "adverse" because it will require him to restructure his way of doing business. In a sense, he must retool. He must adapt his operation to different storage and maintenance habits—units will be smaller and maintenance will be preoccupied with replacements. He will also have to justify his accounting system to unit prices one third the current entries.

Not all forecasts are for rain. Some distributor's agree with Rosen that *Convert-a-Game's* time is here. The lower price of a *Convertapak* will enable operators to change games faster and that will help distributors maintain good profits. While they agree that the current video marketing lines are working well, they feel it is impossible to stop the progress the concept represents.

They speak with hopes about the idea. "Operators are strapped financially because of the games' \$2800 price tags and—like everyone else—because of high interest rates. This might be a break for the operators. And that will help."

A Denver distributor believes *Convert-a-Game* will be a break for distributors, too, "...if it works the way Sega/Gremlin says it will. The

distributor is supposed to replace the boards and send the old boards back to the factory. The exchange is included in the \$1,000 price."

But there are going to be problems, he predicts. Some customers are hundreds of miles from Denver, they are spread out over the northwest, and it is impractical to assume operators will come to Denver whenever they need to change out boards. "Somehow operators will make their own conversions."

### Distributors can survive

Distributors voice more concern over their lack of control over replacement units than any other aspect of the *Convert-a-Game* concept, and they agree that Sega/Gremlin must find an appropriate solution to the problem, but most hold that view without fearing the system will lead to the destruction of the distributing function of the industry.

"I firmly believe Gremlin is looking out for operator and distributor interests. They are not going to destroy the marketing relationship," comments a North Carolinian, indicating that the service and maintenance role of the distributor is too vital to be so easily eliminated or replaced. "Besides, even a cabinet and a CRT have limited life.

"I think this is analagous to what has happened over the past decade in the pool table end of our business. We thought the tables would be one time sales, that the same table would stay in a location forever. But we found replacement rates surprising. Smart operators exchange tables every year or eighteen months. Newer tables give the location a better look and attract more players."

The bottom line for the success of the system, as always, is the quality of the games the system employs, and distributors polled generally agree that Sega/Gremlin's first two efforts for *Convert-a-Game* are quality games.

"*Space Fury* and *Space Odyssey* are good games," distributors from San Francisco, Denver, Chicago, and the East Coast agree. But with each purchase you spend a little faith that Sega/Gremlin will produce *Convertapaks* that will attract avid play. Otherwise, an operator will soon sour to an idea that offered up front savings but insufficient profits.

### Brink of industry change?

If *Convert-a-Game* is truly a

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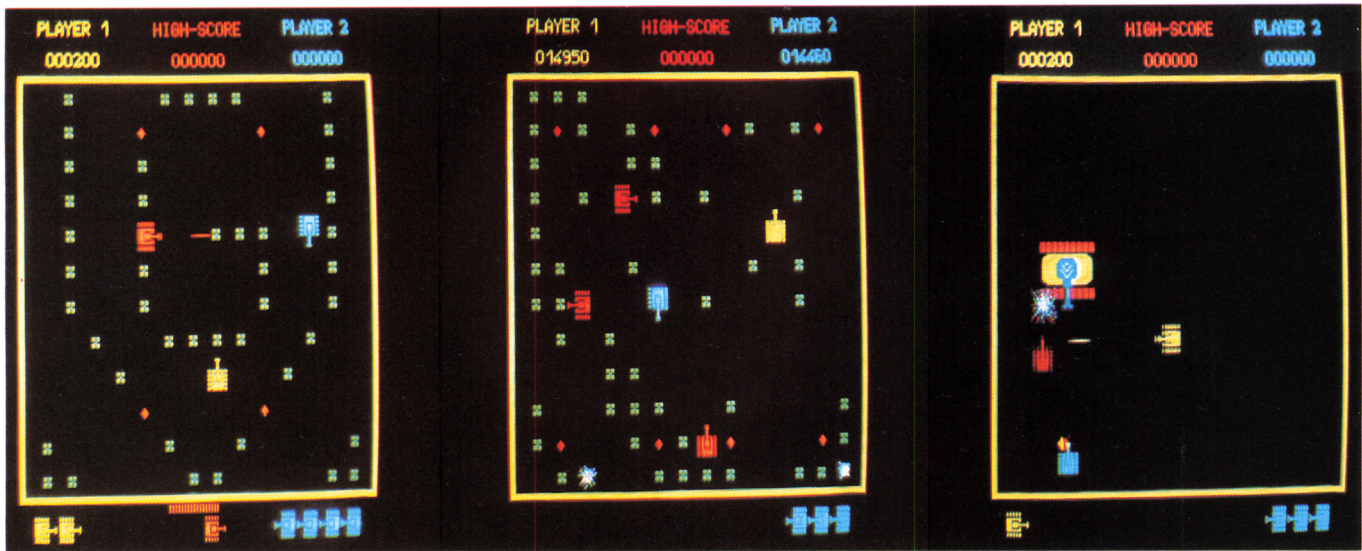


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"concept whose time has come," Sega/Gremlin could be on the brink of creating a major change in the way the industry does business. Games could rotate quicker as operators update faster for less, and industry profits could continue the dramatic upswing of recent years.

"It makes sense on paper," sums up one industry executive, "but we'll have to wait three or four years to see what the eventual outcome will show. This is a very revolutionary concept from a major company and is bound to have a serious impact on the market."

And: "Other manufacturers will go to if it pans out," offers a major western firm president. "I know of one who has it in the back room, ready to go."

But even *Convert-a-Game's* market impact is subject to debate. A Philadelphia distributor senses that most manufacturers will stick with traditional game concepts because "...they don't want to sell cartridges, or boards, they want to sell games."

Another view: "I see a limited growth factor for the next three or four years. Two or three other manufacturers may try to develop the concept, but the majority of sales

will be of traditional games."

From refusing to distribute the games, to appreciating the "concept whose time has come," to adopting a wait-and-see stance, distributors are scattered in their early evaluations of Sega/Gremlin's *Convert-a-Game*. Perhaps, as the manufacturer contends, profits will be as good as with less work and manpower required to earn them. Or, perhaps, the very advantage of the game concept is its disadvantage: conversion packages are so small and inexpensive they could be so hard to control that distributors will lose a serious percentage of their hold on the marketing structure of the video game industry.

Certainly, Dave Rosen and Sega/Gremlin find it much easier to explain the advantages of *Convert-a-Game* to an operator than account for advantages to the distributor:

"From the operator's view point, a new Sega/Gremlin *Convert-a-Game* will cost about the same as any competitor's game without conversion capability. But the Sega/Gremlin game has built-in resale value of about \$1,800 to \$2,000 which should make for satisfied operators," according to Rosen.

"And that resale value holds over

time because it is based on game conversion, whether the original game is first converted after three months, six months, even two years from now. The operator may also find a tax advantage as conversion may qualify for a one year tax write off...

"From a distributor's viewpoint, a new Sega/Gremlin *Convert-a-Game* earns him at least the same margins as before. Equally important, as you can well imagine, sales of *Convertapaks* a few months from now are quite attractive to the distributor as well as the operator."

All that is certain is that Sega/Gremlin's *Convert-a-Game* is here. The next few years will determine the answers to the questions posed by the distributors.

Maybe the San Francisco distributing executive summed up the national position for his sector of the industry most appropriately when he said: "Give it a chance; we really have no other choice."

[Ed. Note: Contributor Shaw, a former managing editor of *Play Meter*, has more recently pursued musical interests as well as freelance writing from his Mobile, Alabama home base.



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# Manufacturers skeptical, say: 'It won't fly'

By David Pierson

Sega/Gremlin will be going it alone. That's the response from the video game manufacturing heavyweights who were interviewed by *Play Meter* in the wake of Sega/Gremlin's announced plans to start offering convertible game packages to operators.

"I think it's an idea whose time has definitely not come," said one manufacturer.

Midway Manufacturing's Stan Jarocki put it another way. "Ours is to have a continued program of manufacturing for sale new and complete games with exciting cabinet styles and exotic controls."

The convertible game system, as offered by Sega/Gremlin, would apparently allow the operator to save money on his new game purchases by allowing him to re-use what appear to be reusable parts of previous games—such as the cabinet and video monitor. Under the manufacturer's convertible game system, operators will be able to change PC boards in the game, the graphics, and the player controls and come with an entirely new game.

It's a prospect which will probably appeal to many operators who are upset with escalating new game prices and zero trade-in value for the game after its short commercial life.

But the video game manufacturers *Play Meter* talked to about the possibility of incorporating a convertible game system, claim the idea is not quite that simple, or beneficial to the industry.

The reusable shell of the game—including the cabinet and the video monitor—make up a very small part of the cost of new equipment, manufacturers say, probably only about 25 percent of the cost of a new game. Most of the new game's cost, they say, is in an intangible, the research and development to create the new amusement machine.

And manufacturers are quick to point out that, for the operator to save that 25 percent in new game costs, he would have to sacrifice

earnings. He would have to settle for an inferior product, a game with a lower earning potential, the next time around. So the benefit is lost by a decline in revenues.

The reason why manufacturers of video game insist convertible games would be inferior to existing complete game packages is that they see any convertible game systems as presenting constraints on their creativity. By adapting to a particular system, other American manufacturers say, they would necessarily be hemming themselves in as far as what they would be able to put into their games.

"I think a system like this will limit what you can do with a game," said Williams Electronics's Ron Crouse. "You'll be locked into a fairly inflexible system. One of the things we have done, for instance, is that we have put no constraints on our design engineers and game engineers. If we have to design a new electronics system to handle some far-out idea, we feel it's much better to do that than to be constrained and tell our game designers they can do anything they want—as long as it fits within certain parameters."

Ed Miller, president of Centuri, agrees. "Since conversions must have universal cabinets, controls, harnesses, etc., research and development is stunted. It must be confined to these parameters, and that's not good for the coin-op industry, or any other industry, for that matter."

Another manufacturer put it this way: "It would stop creativity on the games. I can tell you that the games we're working on right now would not have worked on earlier systems. And the games we're going to have a year from now won't work on what we're working with right now. If we tie ourselves into a convertible game system, we'd be killed. We'd only be able to turn out dull, boring, same, same, games.

"When you make a convertible

game system," he continued, "you're locking yourself into a monitor and hardware system. With what we have in development and with what the monitor companies have in development, you could obsolete both of them over and over again in six months, a year, two years. So you'll be buying something that's obsolete when you buy it."

### Only when a better mousetrap

The competitive nature of the video game business, says Williams' Crouse, makes it infeasible for a major manufacturer to offer a convertible game system.

It's only going to work as long as nobody comes up with a better mousetrap," he said. "It can be Sega/Gremlin, Midway, anybody. They can be going alone with this nice setup selling convertible boards, and there are certain things they'll be able to do and certain things they won't be able to do. But as soon as another manufacturer comes up with an innovation that earns more money, the operator is going to have to go with it.

"The whole nature of the business is competition. The games that are exciting, new, and challenging are going to make the money, and the games that are pretty much the same won't. I don't see how you can insure success if you're committed to a system that's inflexible.

"Maybe the system can do everything you want it to do today, but what about six months from now when a new technological breakthrough occurs and somebody comes along with an innovation that can't work into your system? You've put yourself in a box, literally. You've made yourself non-competitive.

"The operators may look at this in the short run and say it's a good idea. But what I think they're going to see is that maybe a few months down the road it wasn't such a good idea, after all, because they're not going to be able to get the caliber of games they can get from other manufacturers



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who are not locked into a particular system," said Crouse.

"What are you really saving?" asked another manufacturer. "\$400? \$500? \$600? For what? After you're finished, you're still going to have an obsolete monitor and an obsolete hardware system. So the operator saves himself somewhere between \$400 and \$600. Big deal. He just got himself an obsolete game for that."

Centuri's Miller agreed. "Most of the cost of the games is in the research and development, and probably the electronics. It's not really in the cabinets—and what else would remain constant from game to game? Maybe 25 percent of the game's cost is reusable, salvageable through a convertible game system. All my money goes into the big expense of research and development because that's where it has to go. Or it goes into the licensing for the game, but licensing is just the flip side of R&D."

"Everybody wants a cheap game," said an executive at another factory, "and they think the manufacturers are gouging them. I'm sure some manufacturers probably think the operators out there are making a killing. But we really know that's not the case, either way.

"For our part, we commit for either engineering our own games or purchasing large quantities of Japanese product, and if we're wrong, we eat it. Not the operators, us. So there's a possibility of making a nice profit that we can pour back, that if we didn't have we couldn't pour back into engineering.

"We've got 75 people in engineering, and we've got to pay them every week.

"To give you an example of our costs, we're embarking on a million-dollar program to build adequate engineering space. That's a lot of money. It's got to be in cash. Last year we probably spent \$800,000 in engineering space, computers, and so forth. Not in salaries, just in space and equipment!

"We're constantly trying to make better games, more interesting games, and the only way we can do that is to pour a lot of money into engineering, to come up with better hardware systems and to buy better monitors so you can do more and so forth.

"What we try to explain to people is that we're not a game company," he continued. "We're an engineering company. We've got to think of ourselves as an engineering company. Even though we manu-

facture, we need the manufacturing to pay for our engineering. And we only manufacture if we engineer the right game with the right concept. If we don't have the right game, we close our doors. That's the risk of this business. We're putting a lot of money into the engineering of a game, and if it's a stiff, we've got nothing to build."

### Roots in Japan

The enticement to the operator of getting a hit video game cheap is not at the root of the convertible game system, American video manufacturers claim. Instead the convertible game concept has its roots in what happened in Japan.

Miller, who was with Taito during that company's phenomenal run with *Space Invaders* in Japan, offered a theory about the emergence of convertible games in today's market.

"Conversions started in Japan where the location had *Space Invaders*, and the climate was ripe due to hundreds of thousands of *Space Invaders* with the same controls, electronics, and cabinet configuration.

"When the saturated market of Japan suffered a marketing slump because operators couldn't afford any more machines because they had bought too many *Space Invaders*, and the *Space Invaders* were no longer earning enough money to replace themselves, then this depressed situation turned to conversions.

"Conversions are not necessarily bad in the short run," said Miller, "because they give new life to a location, possibly in a situation where an operator could not afford a complete new piece of equipment. But once that operator recovers, he must reinvest in new machines to increase earnings. And this happens only with really new equipment—new cabinet styles, new controls, new electronics, possibly even new monitor systems.

"Conversions are only a short term solution. They will not maintain the integrity of the profit margins down the line."

Miller continued, "As for the United States market and other markets that have not reached saturation, the conversions are not a long-term benefit to our industry." He said the U.S. market is still one, maybe even two years away from saturation; so the market here is not yet a replacement market, a condition which apparently would be ripe for convertible games.

"Completely new full machines are needed for the expansion of the market and the number of players—getting new players and keeping them. The U.S. market, and most markets outside of Japan, are still in this expansion mode, and complete new machines are needed. Conversions might be one option to maintain a market, but complete new machines are needed for expansion.

"For that reason we believe the U.S. market and most world markets are not ready for conversions, which are the result of operations saturation. We believe that complete machines are necessary for expansion.

"When the market is saturated, conversions may be one of the trends at that time." And if that trend is warranted, he said, "Centuri will also be ready."

Williams' Crouse had a similar feeling about the convertible game concept being an outgrowth of Japanese thinking. "I think Sega, from its Japanese origins, has tried to introduce the same sort of system in the United States," he said. "If you go to Japan today, just about every game you'll see on location has been around for awhile, and all they're doing is changing boards."

Adapting to a conversion market was easier in Japan, said Crouse, because that country did not have a strong distributor network. But here in the United States, he said, the convertible system could put the distributor out of business.

### Direct sales?

"The temptation is going to be very strong for a manufacturer to sell boards directly to the operator and bypass the distributor or to sell the boards directly to the location and bypass even the operator. I'm not saying Sega/Gremlin would ever do anything like this, but such a convertible game system, if the industry adopted it, could probably make the industry evolve along those lines."

Crouse also suggested that it was time for American operators to stop looking across the Atlantic. "History has shown that in the past two or three years, a lot of the major new concepts and games have come from the United States because the factories here are not as tied to existing systems as they are in Japan. In Japan, they take one idea, like *Space Invaders*, and kill it making fifty different versions of it. Then they wait until something new comes along."

None of the manufacturers sounded eager to have games designed and manufactured in their plants assembled by operators on location.

Miller said, "Centuri would not like to see a hard-earned, heavily-invested successful Centuri game in a two-year-old battered cabinet."

Jarocki of Midway said the game's exterior adds something to the whole game package, and if the factories give up the assembly of the games themselves, they are losing a lot of their own quality control.

"We know that people will walk up to a game if they see it's new. But if you put a board in an old cabinet, what have you got? The same cabinet, maybe even the same graphics on the side, or maybe you'll have the wood-grained effect. But whatever it is, after awhile the game will become part of the decor of that room, and that is not what you want. When you're offering a product to the public in a public location, you want it to have an impact on the player in the marketplace. And you're not going to get that by just changing a few things like the lighted header," said Jarocki.

"The problem, as I see it," said Crouse, "would be one of unknown

quality. What assurance is there that the operator is going to put the whole thing together right? In a situation like that, all we would be able to warranty would be that the printed circuit boards worked when they left here, and that's about it."

One manufacturer touched on an interesting aspect the convertible game system would create, something that's reminiscent of the poker player who goes rushing to bank with a straight flush in his hand, asking for a loan so he can stay in the game.

"There's a serious financing problem with the convertible game system. How is the operator going to finance that \$1000, or whatever the cost will be? No bank is going to lend him money for a printed circuit board that goes into a game and can move from place to place. It's wishful thinking.

"Let's say I have one of those games, and I want to convert it. I already have an installment sales contract on it. How then am I going to convert it? Nobody is going to lend me a thousand dollars to update a game that's already got a contract on it. The only 'brick' they would have would be the printed circuit board in that game. I really don't think it's realistic to the financing as it exists in

the United States today," said this manufacturer.

Obviously Sega/Gremlin's convertible game system will be one of the most closely watched and talked about programs in the industry in quite some time. Sega/Gremlin itself, however, appears the system has drawbacks as well as advantages.

In comments to Gremlin's in July, when the system was unveiled, Chairman David Rosen's said, "Sega/Gremlin will continue to design and manufacture unique games other than the Convert-a-Game. Arcades, for example, will always require special effect games, a unique cabinet may be required for a particular-type game play, and on and on."

So, even though Sega/Gremlin is committed, they don't appear to be irrevocably committed. If they're wrong, and convertible games are not in the cards for the immediate future, the company would probably be able to back out. But if the San Diego manufacturer is right, it could herald a whole new direction for this industry.

And a lot of competing factory people will be shaking their heads, saying they didn't think it could really be done. ●



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# Moving ahead: Coin-op in evolution

*By Roger Sharpe*

**As the industry grows and changes, the operator must adapt to changes...**

I spoke with a fellow the other day who is in the process of doing a book on video games which is projected to be out by next spring, and it struck me how much things change yet stay the same. I remember when I finished my pinball book there were some who asked when I was going to do a similar volume on video and I always replied that maybe I would when they had "enough history." Not so surprisingly, my sentiments haven't changed that much in the past few years, although I realize video's time has come and there will be many outside the industry who will try to capitalize on it.

The thing I find fascinating, in general, is how the entire industry has profited in the last decade by a wealth of material either in book form, magazine and newspaper articles, television exposure, or whatever, that has explored a variety of aspects of the business. From pinballs' rebirth in the early to mid-seventies, video has taken the baton and is running with it, helping all segments of the coin-machine industry. The public's awareness has been raised and it seems as if they have an insatiable appetite to know as much as they can about everything video.

The process has been remarkable when you stop to think how things were just ten years ago and where they are now. Not only has the equipment obviously changed but so too have the players, locations that now have games and never did before, and, of course, earnings. It has been a boom that is probably best appreciated by the old-timers who might never have envisioned how far things could go. And the success story continues at even a faster rate, with no stopping in sight.

Maybe the only change that's

regrettable, but was bound to happen, is that the family nature of the industry has been almost totally replaced. Big business has become involved in all areas and with it has come a lack of sensitivity or even interest into history, let alone the evolution, of the industry. Instead, there is an obsession with the bottomline and not much else.

One of the problems with this development is that there still needs to be a perspective of how the industry is viewed and the reasons behind these attitudes. Unfortunately, many of the newcomers don't have the background or experience to combat the negative image that for now and the near future seems to be part of the territory.

Recently I wrote about the problems beginning to face video now that it's become the dominant equipment and how cyclical the nature of the business is. Ideally, those with a large stake in the future of the coin-machine business will be willing to take the time and effort to see that positive pictures are portrayed when any coverage is presented to the outside world. And as the industry grows, this singular part of it will continue to become that much more important.

One thing that remains true with all of these developments, is that everything is happening so quickly. On all levels there is an incredible need for rethinking and re-evaluating how and why things are done the way they are. Maybe, with the entire sector of leisure time entertainment undergoing such a revolution, of which the coin-machine business is an integral part, the time has now come to achieve some lasting results regarding the industry.

What is important to understand



is just how sophisticated things are now, and how things have equally settled down in terms of the number of manufacturers, types of equipment being produced—although this latter point may be changing as the games evolve into possible new forms—and, lastly, the exploring of options in terms of where and how the games can be operated.

### Synergy effect

All of these factors have either a positive or negative impact on each of the others, which is maybe why there needs to be some stepping back and objective looking. After all, one book on video in progress may well lead to others. The media also hasn't been oblivious to the games and their popularity, with a wide assortment of stories both in print and TV and now the prospect of even more with the recently announced Atari video tournament that will not only be for Atari's coin-op games, but its home system as well.

The potential is limitless, which many are beginning to realize. And it doesn't matter if it's video leading the way or pinball or some new game creation, since everyone will wind up

benefitting.

When pinball was in the limelight not so long ago, it set the stage for what has followed in terms of growth. Now it's video turn and all should take advantage of it. Sometime in the future there may yet be another coin-machine form that will carry on. Time will tell, but history is destined to repeat itself over the passage of years.

In essence, what this whole little article is all about is that the coin-machine industry is news and always will be. Whether it's somebody out there who thinks *Space Invaders* is a new machine or who hasn't played pinball since it's become solid-state, the public attention will continually increase regarding the games.

As long as the history is successful this will be the case and why I find it so important to have manufacturers and especially operators take a more positive stance in doing things for the community that supports them.

If there will be a video book, throw it into some type of promotion and throw the proceeds into a charity. Sponsor events for local schools or hospitals in need of funds, give away games to worthwhile institutions who won't mind if it's a new piece or something that just works no matter

what the age.

The major problem is that all segments of the business can't just take the money and not give anything back in return if it's to survive. It is my hope that with many new individuals involved, there may be a sense of why this must be so. It's just that the old rules of running and hiding don't apply anymore—can't really, in this day and age—given the fact that there are so many new areas and people to tap.

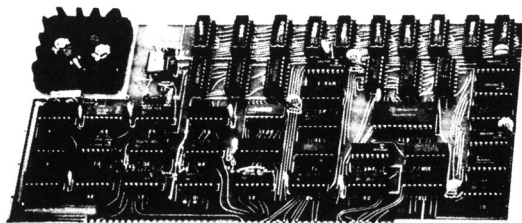
Even the home market will benefit as an offshoot of this, with my feeling being that in the future, a greater number of coin-op creations will increasingly find themselves available on home cartridges for the living room and family rec room.

Down the road there's only a positive feeling that swells from within. Those who have the belief and the daring to challenge their own ideas and see them through will be the leaders of the pack and the people that the industry will need in order to maintain its potential and exceed those dreams harbored since from the old days.

For my money, the next two years will reveal much, as we hit the crossroads of what can and might be possible.

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## INDEPENDENT TECHNICAL ANALYSIS:

# Color X-Y Monitor from Electrohome and Gremlin

By Randy Fromm

The scene was the 1980 AMOA show in Chicago. Quietly tucked away in a corner, somewhere among the hundreds of pinball machines, video games, and other technical marvels that have revolutionized our industry, sat the latest outstanding development in electronic amusement devices.

A casual observer strolling by the Electrohome booth may not have noticed that the Canadian monitor manufacturer was displaying a Gremlin Industries graphic demonstration program on a full color, X-Y monitor. You can kiss those colored overlays goodbye! The color X-Y monitor gives the video game manufacturer all of the high resolution capabilities and flexibili-

ties of the X-Y monitor, with the added bonus of brilliant color.

Color, up until now, was only available by using a comparatively low resolution raster scan monitor. The combination of color and X-Y capability will allow the game manufacturer to create new displays that will reach record levels for player appeal (and record levels of coins in the ol' cashbox as well).

The first manufacturer to release a color, X-Y game has been Gremlin Industries. Gremlin worked closely with Electrohome during the development of the monitor, with engineers in San Diego, California and Ontario, Canada working together to create the monitor and the system to drive it.

Gremlin's first color X-Y game (world's first, I guess, *Space Fury* is now in general release. The color graphics are incredible. In fact, the resolution of the system is so good, it is actually better than the resolution of the picture tube for certain vectors.

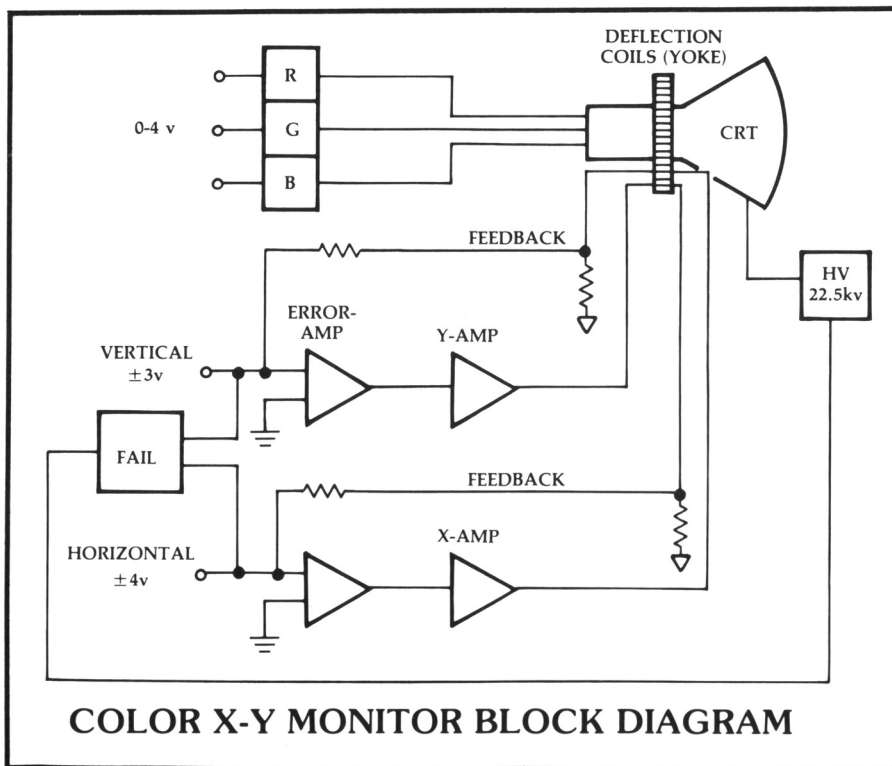
### Deflection Circuits

Some things about the color X-Y monitor are basically the same as the black and white X-Y monitor (the technical term for black and white is monochrome. Mono means one, chrome means color. In this case, the one color happens to be white.) Certainly, the deflection circuits must be similar.

The deflection circuits pass positive or negative current through the X and Y deflection coils. The current creates a magnetic field that surrounds the neck of the picture tube, and deflects the normally straight path of the electro beam. The electron beam creates the spot of light on the screen.

The magnetic field is used to move the spot around the front of the picture tube to draw a picture. It's kind of like a connect-the-dots picture with the electron beam doing the drawing, and the deflection circuits moving the beam from point to point. Another name for the deflection coils in a monitor is "yoke."

The output circuits of the X and Y deflection sections are basically the same between the monochrome and color monitors. A complimentary pair of power transistors (one NPN and one PNP) are used to drive each of the yoke coils. For the color monitor, the four transistors that drive the yoke are mounted on a two piece heat sink with a small fan





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attached. The fan keeps the heat sink and the transistors running cool.

It's interesting to note that since the color X-Y monitor is now powered by the 120 volts AC but rather with a 90-volt, center-tapped transformer, the fan actually runs off 90 volts AC instead of being plugged into a separate 120-volt circuit.

There are actually three fans in *Space Fury*: one in the monitor that cools the deflection transistors, one over the card cage that holds all of the boards, and one in the top of the backside of the cabinet to exhaust the heat from the inside of the cabinet itself. On a personal note, I am very pleased to see the use of fans in games. Heat is one of the big enemies of solid-state equipment (especially when the games get quite hot during the day, cool down during the night when they're turned off, and are cooked again the following day. The process, known as "temp cycling" can spell premature destruction for even the heartiest semiconductor.). The use of a fan or fans lowers the inside temperature of the video game considerably, and can lower the failure rate of your games.

There is quite a bit of difference

between the input circuitry of the deflection sections of the color monitor and the input circuits of the monochrome monitor. The monochrome monitor used discrete (individual) transistors throughout. The color monitor actually uses two integrated circuits. One of them is used for the input circuitry for the S and Y deflection.

The chip, a type 2755A, is a custom IC available only from Electrohome. However, I expect that it's an extremely reliable device and I seriously doubt that you'll ever have to replace one of them.

The purpose of the IC is to correct for something known as pincushion distortion, and to make sure that the current flowing through the yoke cells is exactly proportional to the voltage that appears at the input of the deflection circuits. Without the correction provided by the IC, the display would appear quite distorted.

#### Color drive circuits

The picture tube in the color X-Y monitor is the same as that for a conventional raster scan monitor. The front of the picture tube (also known as a CRT, meaning cathode ray tube) is coated with three types of phosphors. If you look closely at

the CRT, you can see the phosphor coating on the inside of the thick glass front of the tube. The three types of phosphors are laid in stripes across the face of the CRT.

In the neck of the picture tube are three electron guns, pointed toward the front of the CRT. As the name implies, the electron guns shoot electrons. Each of the three electron guns is precisely aligned, so that its beam of electrons strikes only one type of phosphor. One of the phosphor types glows red when struck with electrons from an electron gun. Another type glows green when struck with electrons from a gun, and the third type of phosphor glows blue.

Red, green, and blue are the three primary colors of light. By combining the colors in different ways, all the colors of the visible spectrum can be created. Red and blue for example, can be mixed together to create purple or violet. The color yellow is created by mixing red and green.

A pair of transistors is used to drive each of the electron guns. Each transistor pair forms something known as a differential amplifier. There is one differential amplifier for each color, so there are six color drive transistors in all.

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These transistors are located on the "neck board" of the monitors—a small printed circuit board that's mounted on the end of the neck of the CRT.

The color amplifiers get their driving signal from the computer itself. Anything that the computer wants to draw as red is fed into the red amplifier. The red amplifier turns on the red electron gun which sends out a beam of electrons. The electrons strike the red phosphor, causing it to glow. If the computer wants an object to appear green, it sends a signal to the green amplifier. If an object is to appear yellow, the same signal is sent to both the green and red circuits (remember, green and red mix together to form yellow).

There are controls (potentiometers) on the neck board for adjusting the black level of each of the three amplifiers, and setting the gain of the red and green amplifiers (The neck board is officially designated the "video PCB"). Under normal circumstances, you shouldn't have to adjust these controls.

The purpose of the differential amplifier set-up (as opposed to using just a single transistor to drive the electron gun) is that it automatically

compensates for temperature changes that would otherwise affect the gain or performance of the color amplifier circuits.

A neon lamp is connected to each electron gun to serve as a spark arrestor. If the voltage at the electron gun exceeds around 90 volts, the neon lamp will fire, discharging the excess voltage to ground and preventing destruction of the transistors in the color amplifier. Neon lamps have a very high resistance until the voltage across the two electrodes becomes high enough to "fire" the lamp.

Once the lamp begins to glow, its resistance becomes very low, almost a short circuit. This unique property makes the neon lamp ideal for this circuit.

### Power supply

The power supply in the color X-Y monitor is more complex than that of the black and white X-Y. But like most power supply circuits it is easy to understand how it works if we look at it one section at a time.

All of the power for the monitor comes from a 90-volt, center-tapped transformer. The AC power from the transformer is used to create six separate DC power supplies: +126

volts, +63 volts, +55 volts, +9.1 volts, -9.1 volts, and -63 volts.

Perhaps the most unique section of the power supply is the +126 volt supply. How can we make a 126-volt supply when the transformer is only 90 volts? Capacitors C401 and C402, and diodes D406 and D407 form a circuit known as a voltage doubler. A voltage doubler does just that. It takes an AC input, and gives you a DC output that is twice the voltage of the AC input.

Because the center-tap of the transformer is grounded, the voltage doubler is actually connected to only one-half of the transformer secondary. Each half of the secondary winding of the transformer produces 45 volts AC. But if the voltage doubler doubles the AC voltage, why do we get 126 volts out with only 45 volts coming in? Shouldn't we get 90 volts DC out?

The answer lies in the fact that the 90 volt AC transformer's voltage rating is measured in something known as Root Mean Square volts. RMS is a kind of average measurement for the constantly changing voltage of the alternating current. In fact, the 45 volt AC input to the voltage doubler actually peaks at 63 volts.



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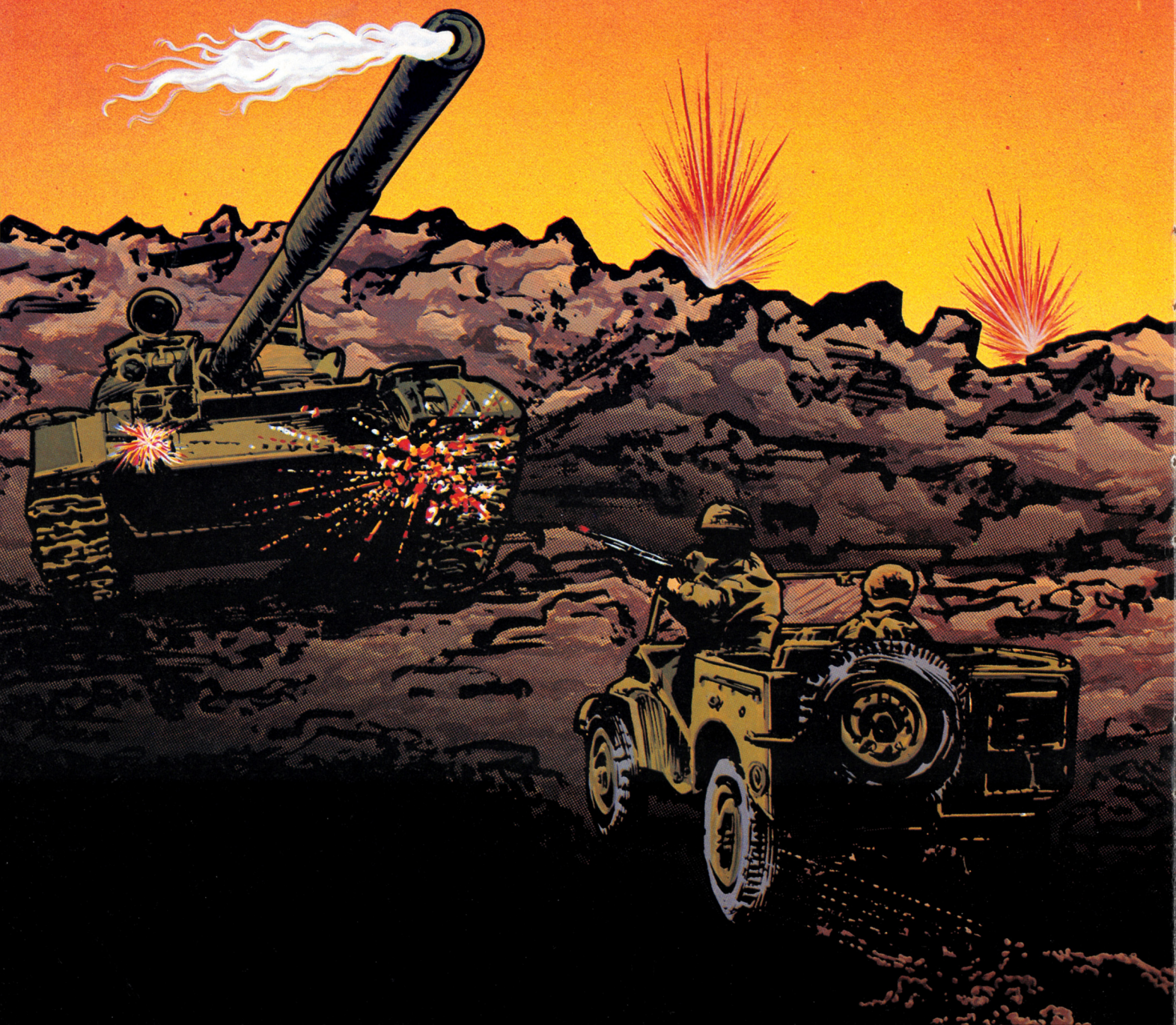


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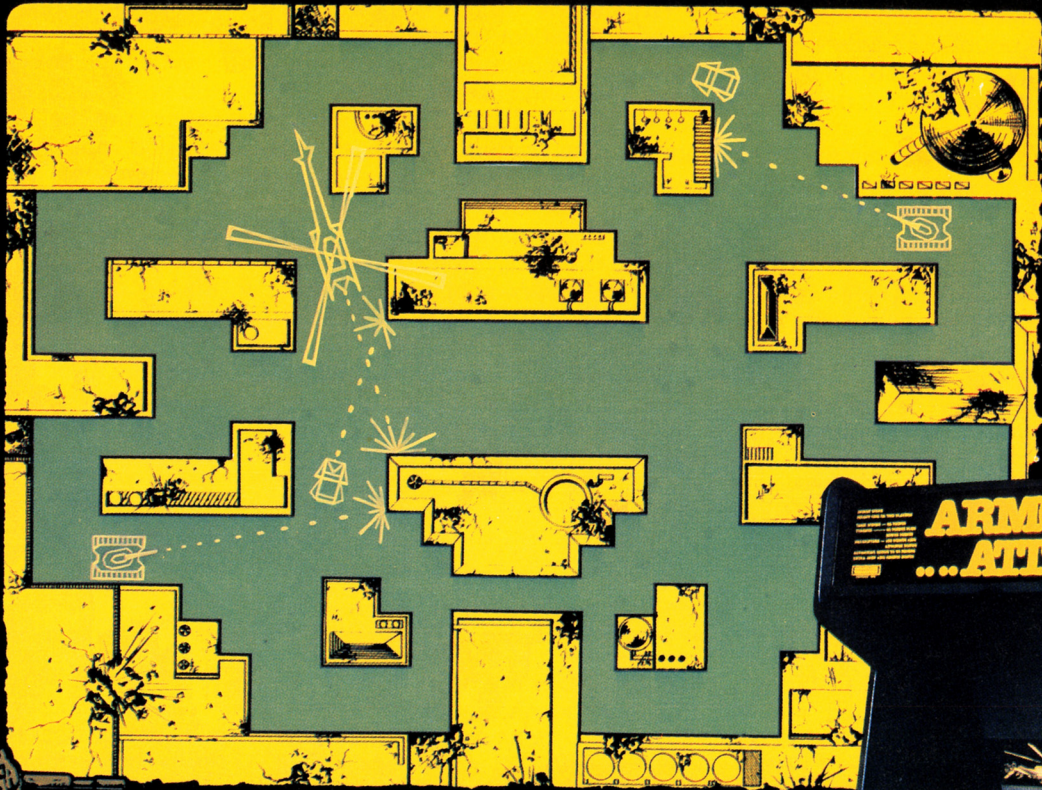


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Whenever the alternating current from a transformer is rectified (changed from AC to DC) and filtered with a capacitor, the DC output equals the peak voltage of the AC input, not the RMS voltage by which the transformer is rated. With a peak voltage input of 63 volts AC, the voltage doubler creates a +126 volt DC output. The +126 volt power supply is used to create a regulated +100 volt monitor.

Resistor R402 is a bleeder resistor. The bleeder resistor is a safety feature that discharges the filter capacitor when the power is removed. It keeps you from shocking the living daylight out of yourself when you're servicing the monitor!

Whenever we power a bridge rectifier with a center-tapped transformer and the center tap is grounded, we create something known as a split supply. The split supply creates both a positive and negative power supply. The two supplies are always equal in voltage. Their polarities are simply opposite.

This is exactly what we have here in the color X-Y monitor. The center-tap of the 90-volt transformer is grounded. Since ground is our zero volt reference point, the bridge rectifier (made from diodes D400—D403) gives us an output of +63 volts DC and -63 volts DC. Why 63 volts instead of 45? Remember, when we rectify AC and filter it, the DC output of the power supply will always be higher than the RMS voltage rating of the input.

If you're interested, the peak output of the DC supply should be equal to the RMS rating of the AC input voltage, multiplied by 1.414.

In this case, the RMS rating of the transformer is 45 volts. ( $45 \times 1.414 = 63.63$ ). The two 63-volt power supplies are used to power the output sections of the X and Y deflection circuits.

Some of the +63 volt power supply is regulated by a series-pass regulator transistor (Q400) to make a +55 volt supply. The regulator transistor keeps a constant base voltage by using a zener diode (ZD 400) and voltage dropping resistor (R403). The zener diode keeps a constant voltage across itself at all times. In this circuit a 51 volt zener is used, so the base voltage of the series-pass regulator transistor is pegged at exactly 51 volts.

In a series-pass regulator circuit, the output voltage at the emitter of the transistor is approximately .7 volt less than the voltage at the base.

Notice something strange when you look at the schematic? The base voltage is 51 volts, so you would expect to get around 50 volts out (50.3).

The output voltage is labeled +55 volts, but it's a simple human error.

Gremlin is using a new and improved version of the prototype color X-Y monitor. The prototype used a 56-volt zener diode as ZD400 which created a 55-volt power supply. The draftsman changed the voltage of the zener diode on the drawing, but forgot to change the output voltage of the supply from +55 volts to +50 volts. It is however, a +50 volt DC power supply. [Ed. note: *check with a Gremlin distributor for the schematic, or write Play Meter.*]

The +50 volt supply is used to power the three color amplifiers on the video PCB. It is also used in a circuit called the spot from burning a hole in the center of the phosphor coating. Without the spot killer, this could easily happen when the game is switched off. As soon as the game is turned off, the deflection circuits stop working. The electron guns do not shut off immediately! They continue to emit a beam of electrons for a few seconds after the power is removed, because of the high voltages involved in the operation of the picture tube.

With the deflection circuits dead, all three of the electron guns will shoot their electrons at a tiny dot in the center of CRT. Soon (real soon), the phosphor coating will burn out, leaving a dark hole in the center.

The spot killer circuit is used to prevent the electrons from the three electron guns from reaching the phosphor coating of the tube. Connected to pin 5 of the CRT is something called a grid. The grid is a wire mesh that is mounted inside the neck of the picture, between the electron guns and the front of the tube.

Under the normal circumstances, the electron beams travel right through the grid like water through a sieve. But if we put a negative charge on the grid, the charge will repel the electrons and prevent them from reaching the phosphor. Since like charges repel each other and an electron has a negative charge, all the spot killer has to do is to put a negative charge on the grid that's sufficiently large enough to block the electrons.

The spot killer circuit consists of diode D409, resistor R410—R412, and C411. the cathode of D409 is connected to the -63 volt power

supply. The -50 volt supply is connected to one side of resistor R410, a 4.7 K (4,700) ohm resistor. The three resistors form something called a voltage divider. The grid is connected between R411 (2.7 megaohm or 2 million, 7 hundred thousand ohms) and R412 (1.5 megaohm).

When the power is turned off, the +50 volt supply drops to zero volts faster than the -63 volt supply. The -63 volt supply is connected directly to a capacitor; the +50 supply is not. The capacitor holds a charge and allows the -63 volt supply to drop more slowly. The +50 volt supply is also connected to the color amplifiers. The additional load they provide caused the +50 volt supply to drop like a rock!

Because the positive supply to the voltage divider drops first, the voltage at the grid is quickly pulled down to a negative voltage. This negative voltage blocks the electron beam and "kills" the spot. By the time the -63 volt supply has discharged, the voltages that power the electron gun have discharged as well.

There are two other power supply voltages: +9.1 volts and -9.1 volts. These supplies are used to power the two integrated circuits in the monitor. The +9.1 volt supply is derived in much the same way as the +50 volt supply. A series-pass regulator transistor is used to drop the voltage from +63 to +9.1 volts. Resistor R404 is also used as a voltage dropping resistor. The base voltage for the series-pass regulator transistor (Q401) comes from zener diode ZD401, diode D408, and voltage dropping resistor R405.

Because we want 9.1 volts as an output, a conventional diode has been placed in series with the zener diode. A conventional silicon diode has a .7-volt drop across it. By placing the two diodes in series, the voltage at the base of Q401 will be 9.8 volts. Remember, the output of a series-pass regulator circuit will be .7 volt less than the voltage at the base of the transistor. With 9.8 volts on the base of the transistor, we will get 9.1 volts out.

The -9.1 volt supply is simply derived from the -63 volt power supply by a voltage dropping resistor (R406) and a 9.1 volt zener diode. A small filter capacitor (C406) is placed across the positive 9.1 volt supply.

### High voltage

The purpose of the high voltage section in any picture tube is to



attract the electrons after they've been fired from the electron gun and have struck the phosphor inside of the front of the tube. The electrons never leave the picture tube through the glass in the front. Glass is an insulator, so the electrons bounce off it.

It is interesting to note that the electron's kinetic energy (the energy stored in a moving object, e.g., a service vehicle that's just run out of gas on the way to the boss' most important location can coast on a level road due to the kinetic energy it possessed while doing 100 miles per hour on the way there—is changed to light energy as the electron strikes the glass.

Having lost their energy, the negatively charged electrons would soon fill the inside of the picture tube and repel the electron beams from the three guns if not for the high voltage. This positive 22.5 kilovolt (22,500 volts) power supply is connected to a metallic coating that covers the inside of the bell of the picture tube. After an electron strikes the glass and bounces off, it is immediately attracted to the positively charged coating (opposites attract, remember?) and is sucked into the high voltage power supply.

The high voltage supply connects to the CRT at a metal insert in the bell of the picture tube. It's called the second anode, and it look kind of like one of the freeze plugs in the block of an automobile engine. A well insulated wire carries the high voltage from the high voltage section to the second anode. If you have to remove the second anode counter for service, be sure to discharge the second anode to ground first! The picture tube can store a nasty charge, long after the monitor is turned off.

The high voltage is created by the flyback transformer. This high frequency transformer also produces a 10.3 kilovolt output that is used for the focus control, and the low voltage that's used to drive the filament (heater) in the neck of the picture tube. The filament is important because the electron guns must be heated to work.

All of the color monitors in popular use today (Electrohome and Wells-Gardner) have the heater voltage derived from a winding on the flyback transformer. If the high voltage section isn't operating, the filament will not glow. So don't depend on the heater glow to indicate whether or not you have

power to the monitor. A monitor that appears "dead" may have a condition where the high voltage section isn't operating.

The high voltage switching transistor (Q900) switches the regulated +100 volt power supply on and off across the primary winding of the flyback transformer. The base drive for Q900 comes from the second integrated circuit in the monitor, by way of amplifier transistors Q901—Q903 and driver transformer T900.

The type 2741 IC also serves another important function in the monitor. If either or both of the

deflection circuits fail, the IC will sense this and automatically shut down the high voltage section. Since loss of deflection will result in a straight line across the face of the CRT or a bright spot right in the center, the high voltage is shut down to prevent the phosphors from burning out.

The deflection circuits are monitored by sampling the voltage that appears across R735 and R635. This voltage is passed through R938 or R939, limited to -5.1 volts by ZD903 and ZD904, and coupled to the IC by capacitors C900 and C901. •

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I am a  supplier  technician  distributor  owner  
 operator

10/11 PM

# Business Myth of the Month

By Charles C. Ross

The Myth:

"My machines pay for themselves in less than 90 days!"

This is a spinoff myth of "Revenues are my only consideration." Customers, friends, and relatives are notorious for asking, "Just how long does it take a machine to pay for itself?" The question is harmless enough but the answer most operators give is not. The typical answer after some mental math is, "Oh, about 60 to 90 days" (\$2,500 cost divided by \$32 per day).

After the inquirer picks his chin up off the ground and restarts his pacemaker he concludes, whether he says it or not, that you are getting very rich very fast. Off he goes to see if he can sell the idea to Uncle Harry or to a bank so that he can get in on this business that can pay for itself in 60 days. How can you beat that?

And there you have it, part of the reason that everyone wants in on the act. Now there is no doubt that the amusement business can be profitable, but it is not as profitable as we may have led the outsiders to believe.

Again we have a continuation of the old "Let's look at revenues" syndrome. There are many costs in operating an amusement business which should be allocated on a per machine basis.

To calculate a true paycheck period (the time a machine takes to pay for itself) we should be considering the cash flows the machine generates. Monthly cash flow for a particular machine is calculated as follows:

Revenues for the Machine	
-Expenses to Operate the Machine	
Less Depreciation	
<hr/>	
<i>Machine Net Income</i>	
<hr/>	
Plus Depreciation	
<hr/>	
<i>Machines' Monthly Cash Flow</i>	

Cash flows are then to be used to compute a true paycheck period for the machine. This is done as follows:

$$\frac{\text{Machines Cost}}{\text{Mon. Cash Flow}} = \text{Payback Period}$$

Of course this quick little formula makes the assumption that the revenues for the machines will remain the same over the payback period, which may be several months. That of course will probably not hold true in most cases.

The problem can be easily cured by determining cash flows on a monthly basis. Let's take a look at the true payback on an amusement machine with \$32 per day average

revenues that do not drop over time:

Monthly Revenues	\$960
Less Operating Expenses	160
Less Depreciation	125
<hr/>	
<i>Machine Net Income</i>	\$675
Plus Depreciation	125
<hr/>	
<i>Monthly Cash Flows</i>	<b>\$800</b>

$$\frac{\text{Machines Cost} = \$2,500}{\text{Monthly Cash Flow } 800}$$

= 3 month payback

The true payback was 3 months, or 96 days, when the operator thought the payback was 78 days, or 2.6 months. Not a bad error considering he ignored the operating cost.

But this calculation was for a machine with very high earnings, a fairly conservative operating expense load and earnings that did not drop over 90 days. As the expense load goes up, the error in the payback calculations will magnify. The error will also magnify as the revenues drop.

For example, a \$2,500 machine with \$250 monthly revenues appears to pay for itself in 10 months, when in actuality it will not pay for itself until 28 months have elapsed if we take into account the operating expenses.

Another point should become quite apparent from this analysis. The purchasing of machines with high revenues and quick payback periods is a must. As should be obvious if you make a mistake and buy a machine with low revenues. It may never pay for itself when you consider the operating expenses associated with the machine.

For example, the above machine, grossing \$250 per month takes 28 months to pay for itself. How many machines have been good for 28 months? This also assumes the revenues will be the same \$250 per month for the 28-month period, which is also a false assumption. In reality the machine will probably never recapture its own cost, much less contribute to the profitability of the firm.

So next time someone asks, "How long does it take for a machine to pay for itself?" —you should respond, "A lot longer than you think," and leave them wondering.

*Charles C. Ross is a partner in the firm of Innovative Management Consultants which specializes in consulting to the amusement industry.*

Balloon goes up, marks 22 years—

## 'Lofty' move for J&J Distribs

J&J Distributors, Inc., of Indianapolis, held its midsummer open house with over 450 operators, factory suppliers, and guests counted in attendance. Joe Flynn, president of J&J, welcomed the crowd to the 9½-acre, 45,000 square foot facility which formerly housed a well-known Indianapolis swimming club.

Attractions included a hot air balloon, strolling musicians, buffet dinner, and a wet bar. Windy weather on July 12 prevented the balloonist from providing rides to the guests, but the party spirit remained high. Flynn pronounced the event a success and thanked the operators for their continued support of J&J since 1959.

Kelly Flynn and Pat Harper, sales managers, greeted old and new customers and showed off the attractive facility. The building itself was an attraction, with its 9,000

square foot showroom featuring solid oak ceiling beams and high "cathedral-style" architecture of the former country club's ballroom. A walk through the former cafeteria—now the electronics and vending shop area—led to a view of the 1¼ million gallon swimming pool, once the second largest in the U.S.

Phil Peterson of Peterson Vending/Muncie, Indiana, was the day's grand winner of a new Rowe jukebox, complete with 100 records courtesy of Lieberman's One Stop Records. Charles Anderson of Char-Dee Enterprises/Plainfield, was presented with a new Williams *Alien Poker* pinball in the open house drawing, and Don Hagar of Canteen Service/Fort Wayne won a stocked serviceman's tool case given by Stern Electronics.

Industry and distributor representatives on hand included Paul

Huebsch, executive director of the manufacturers association ADMA; Rowe's Matt Russ, vice president, and John Murname, midwestern sales manager; Hal Anthony of Valley Company; Ron Manne and Joe Steddum, Coinco; Marty Glazman, Williams Electronics; Steve Shaffer, Shaffer Distributing/Columbus; Tom Campbell, Stern Electronics; and a special guest Steve Wariner, RCA Records recording artist, who attended with his brother Kenny Wariner of Hall/Nobelsville.

Bill Brown, J&J's general manager, saw the high turnout of Indiana and Kentucky operators as "a continued challenge to J&J to provide top equipment and services to our operate family."

J&J's location is 9461 E. Washington Street, Indianapolis 46229; phone 317/899-2530.

## Advance Automatic Sales staff adds 30 years' experience

Chat McMurdie, Advance Automatic Sales Co. president, has announced the appointment of Don Edwards, Pat Russell, and Dave Goldner to the sales staff of this San Francisco-based, 45-year old, distributorship.

Edwards has been in the industry for 22 years, with an area of specialization in music and pool. "Music is still the backbone of the business offering a steady income over a long time," Edwards said. He also noted that the new enthusiasm in pool tournaments and leagues has brought more interest in the pool table market and opportunity for increased pricing with new games.

Pat Russell comes to Advance from Vendo in Kansas City where she spent three years in field sales. "I see a positive trend in the vending

business in this area," she said relating to her move to the West Coast. "The overall economy seems strong here. Also, the improved products that are available with electronic accounting and overall higher reliability are well accepted in this market."

Goldner is specialized in amusement game sales at Advance. He has been associated with the coin-op industry in a different way, as the official photographer for Atari's annual distributor meetings over the past five years. "I learned a lot about the business from the Atari meetings and decided it would be a good industry to stay with," Goldner commented.

After seven years owning a photography business and having a retail outlet at the Fisherman's

Wharf attraction in San Francisco, he said he is looking forward to working in games sales. "It is a dynamic and challenging market that I enjoy following and will look forward to working more closely with the operators."

Advance Automatic serves northern California, Hawaii, and Nevada from its San Francisco base. "It is a large area and it is important for our sales team to meet with their customers as often as possible," McMurdie said. "We want to better understand the business needs of the operators to offer the best possible service. I expect our sales staff to help reach this objective. Don, Pat, and Dave are all well qualified and can give the individual attention that our customers expect from Advance Automatic."

# PlayMeter

## Equipment Poll

The following are rankings of the top videos and top pinballs making above average weekly gross collections nationwide. The dollar amounts appearing are the average weekly grosses as reported to Play Meter magazine through its regular national operator survey, including both arcade and street locations. Games with less than adequate responses (less than fifty percent) but with above average collections are so noted. Games not appearing on the poll either (1) did not generate over a ten percent response rate to provide an adequate representative sampling or (2) did not register weekly gross collections above the national average. **Special note should be made that these earnings figures are gross revenues. When computing operator revenues, these amounts should be reduced by fifty percent to reflect the most widespread industry practice, that of granting fifty percent commissions to the location owners.**

### TOP PINBALLS

Nine of 21 pinballs (43%) with a response rate over ten percent have above average earnings.

	Aug. 6	Aug. 18
National average for pinballs	.....\$98	\$115
1. EIGHT-BALL DELUXE/Bally	\$153	\$157
★ 2. MARS/Gottlieb	\$159	\$156
3. BLACK KNIGHT/Williams	\$136	\$134
4. XENON/Bally	—	\$118
5. FLASH GORDON/Bally	—	\$115

### TOP VIDEOS

Fifteen of 34 videos (44%) with a response rate over ten percent have above average earnings.

	Aug. 6	Aug. 18
National average for videos	.....\$153	\$154
1. DEFENDER/Williams	\$213	\$219
2. CENTIPEDE/Atari	\$189	\$218
3. PAC-MAN/Midway	\$206	\$215
★ 4. SUPER COBRA/Stern	—	\$209
5. GORF/Midway	\$198	\$192
6. SCRAMBLE/Stern	\$192	\$182
7. ASTEROIDS/Atari	\$185	\$175
★ 8. PLEAIDES/Centuri	—	\$173
★ 9. WIZARD OF WOR/Midway	—	\$172
10. PHOENIX/Centuri	\$170	\$169
11. ARMOR ATTACK/Cinematronics	\$183	\$155

★ Conditionally Rated— Weekly average based on less than 50% response rate

### Provisionally Rated Pinballs and Videos (Above average earning games, with a response rate between 10—25%)

#### PINBALLS

Provisional Ratings	Aug. 6	Aug. 18
VOLCANO/Gottlieb	—	\$183
PHARAOH/Williams	\$155	\$175
EMBRYON/Bally	\$180	\$131
FREEFALL/Stern	—	\$119

#### VIDEOS

Provisional Ratings	Aug. 6	Aug. 18
VENTURE/Exidy	—	\$223
SPACE ODYSSEY/Gremlin	—	\$196
OMEGA RACE/Midway	—	\$195
RED BARON/Atari	—	\$158

Operator/readers who would like to join the ever-growing numbers of readers participating currently in the survey, write: Play Meter, Equipment Poll, P.O. Box 24170, New Orleans 70184.

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# Leon's firm stocks Euro kiddie rides

Three well-known European manufacturers of kiddie rides have appointed Thomas Leon's Kiddie-Rides America as their exclusive importer for the United States.

The lines are:

—R.J. Newbrough, which produces about 20 different kiddie rides in England which are noted for detail and finish.

—Bafco, also of England, with a line of six kiddie rides in production.

—Elektro-Mobiltechnik, with a line of 50 different items. The range of items produced by Jean Carzani's firm is said to be the world's largest.

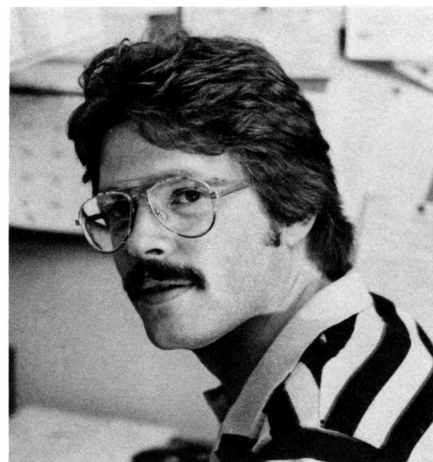
These 75 products add to half a dozen in Leon's stable, which he terms "the largest selection of kiddie items and kiddie rides in the world." Along with these exclusive lines for the U.S. market, Leon and the factories provide an extensive replacement parts inventory after the sale.

Leon, formerly associated with

Kiddie Rides USA, opened his own firm on April 20, 1981. The executive office is located at 3416 Blackhawk Road, Suite 205, Rock Island, Illinois 61201, and the Kiddie-Rides America warehouse and service facility is at 524 Second Street, Rock Island. On the staff are Randy Steffen, head of service, and Mike Mier, first assistant serviceman. Telephone: 309/788-1637.

Leon, in the kiddie coin-op business for 10 years, said: "Up until recently, the old line kiddie ride manufacturers were in a non-competitive situation and did not expand or improve their line of goods. They produced 'the same old thing' and little by little, there was less and less interest in kiddie rides.

"Recently, there have been a few new aggressive manufacturers who have expanded, improved and developed more and new kiddie rides. I believe I represent all of these firms. This puts me in a very unique and envious position," said Leon.



Jim Calore

## Arcade school goes to Philly

Randy Fromm's Arcade School recently announced the addition of another service school, this one in Philadelphia and called the Atlantic Arcade School, to offer the same comprehensive six-day course offered at the original San Diego Arcade School and at the Dallas Arcade School, which is already under way in Texas.

The Atlantic Arcade School is led by Jim Calore, known to the coin industry as publisher of *Star Tech Journal*, technical magazine that deals with electronic games and juke-boxes. Calore lives nearby the Philadelphia arcade school location, in suburban New Jersey.

The course, entitled "Practical Solid State Amusement Repair," stresses the easiest methods to repair electronic games without having to utilize expensive test equipment.

Dallas Arcade School's instructor is Nathan Bush, a well-known service technician from the Dallas area.

The three arcade school's instructors, including founder Fromm, have been featured at various times as *Play Meter's* "Coinmen of the Month."

For further information on enrollment, contact: Randy Fromm's Arcade Schools, 6123 El Cajon Blvd., San Diego, California 92115; telephone 714/286-0172.

### Arizona slots...

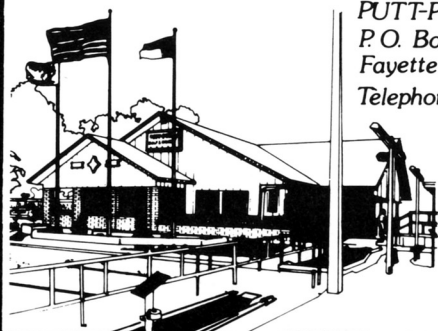
Owning antique slot machines—at least 26 years old—was recently made legal by the Arizona Legislature, as long as the machines are not used for gambling purposes. However, the collector's items are increasingly hard to find, *Arizona Business Gazette* reported.....

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# Arizona coin-ops see 'desert flowering'

The Phoenix, Arizona area has become a rapid growth center for electronic amusement games, coin-op businessmen in Phoenix observe.

The growing electronic manufacturing industry in the area has brought in persons with a technical bent, and many of these flow heavily into game rooms at lunchtime and after work for a joust with coin-op games, observed Mountain Coin Distributors' Brian Olsen in Phoenix.

West Coast and Midwest operators reportedly have transplanted to Arizona for its residential attractions and to open games and vending routes. It is evidently a growth area for family operations of arcades and game rooms, in Olsen's analysis.

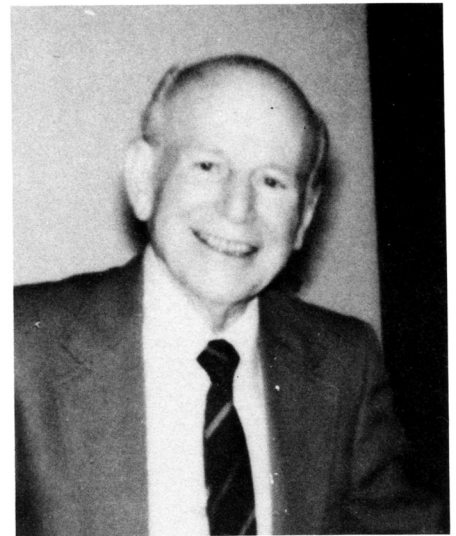
The assistant manager at Mountain Coin/Phoenix talked with *Play Meter* after a Loewen America service seminar, held at the distributorship in late July. Training programs for servicing of micro-

processor equipment are held weekly in morning sessions at Mountain Coin, he related.

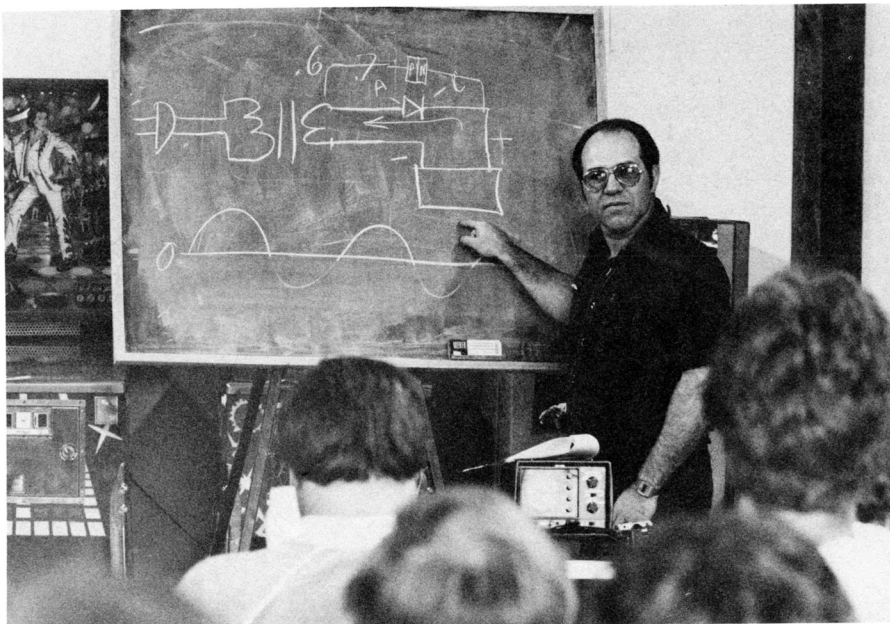
"We don't want to see what happened a few years ago, with everybody getting in on the games boom, but not able to keep up the machines," said Olson. Service seminars for operators are staged, as well as the microprocessor sessions at Mountain Coin.

In another area of coin-op, Olson noted the state's regulatory situation is "very strict about gray area games." Local governments have recently loosened up in relation to one phase of the game business: interchangeable cassettes. Will restrictions on this mode have been loosened, he related, the interchangeable systems were first seen by governing bodies as a means to change an amusement machine into a gambling machine by the substitution of electronic programs.

—by Ray E. Tilley



Pinball pioneer Harry Williams celebrated his birthday earlier this summer while visiting the offices of Stern Electronics, Inc. in Chicago. Williams—who pioneered the use of electricity in pinball games and was the first designer to incorporate the use of sound into the game—today serves as exclusive design consultant to Stern Electronics. When asked his age, the "master of pin geometry" would only divulge that he's still "in double figures."



World Wide Distributors' Michigan branch office recently concluded its first basic electronic course. The eight week course consisted of two hour sessions held each Wednesday night. The basic course was designed to provide operators with an understanding of frequently used electronic components, troubleshooting of solid state devices, and the use of multimeters. Branch Manager Jeff Neumann reports that operator response was very enthusiastic, "Simply by word of mouth the 25 students class was filled and people had to be turned away." Operators from as far away as 200 miles were in attendance. The course was taught by World Wide's Chief Technician Jerry Aiello, and was offered in response to operator inquiries regarding the availability of basic electronic courses. Aiello said, "Our purpose was to enhance the operator's ability to communicate with distributor and manufacturer technicians. Operator response and demand has prompted us to offer an advanced course, to be held in October and run through November.

## New idea for mall locations

The Bio-Kiosk by the Bio-Rhythm Company was designed to provide assistance in controlling the "change for the telephone" problem in malls and shopping centers.

Attractively designed in various color themes, the Bio-Kiosk contains a bill changer and either two or three coin-operated Bio-Rhythm machines in one self-contained modular unit.

Bio-Rhythm machine operators have found the Bio-Kiosk advantageous in placing machines in malls, according to the manufacturer. Malls which normally don't allow free standing machines are expected to allow placement of the Bio-Kiosk. The bill changer also propels the Bio-Rhythm machines to larger potential grosses.

The Bio-Rhythm Company displayed this new idea at the International Council of Shopping Centers show in Las Vegas.

Series E Logic Board. As of June 1st, 1981, the logic board put into the Bio-Rhythm machines is the new Series E board. This new board has 7 coin capability as well as other features.



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# Five Years Ago in Play Meter: Technical focus

**August, 1976**

The developing video games market was in focus in *Play Meter* five years ago this month. Technical articles by Bill Arkush explored how the games really work, and Coinman of the Month was distributor Vic Leslie of Cherry Group (and now with Sega/Europe) who told of his interest over several years then with the games with a monitor screen.

[Copies of *Play Meter*, August 15, 1976 issue, are available in limited quantity for readers who send \$4 for each issue, postage paid, to be sent. Write: *Play Meter*, Back Issues, P.O. Box 24170, New Orleans 70184.]

Laura Kreter (then of Taito America and now with Centuri, Inc.) contributed to that issue a report on the Consumer Electronics Show held in June in Chicago, writing: "Home video game units provided the biggest new attraction at the show..." Atari and Magnavox spokesmen had stated that the winter sales figures would be close to three or four million of these entertainment units.

Results of *Play Meter's* first ever operator survey were published in the August, 1976 issue. At that time, among other findings, the largest percentage of operators responding to *Play Meter's* survey were finding pool tables to be their most popular tavern location game and pinballs to

be the most popular in non-tavern locations.

In the news pages: Music Operators of Minnesota had held its first trade show in connection with its annual convention in Minneapolis, with attendance at a high mark of 150 operators. The Colorado Coin Industries association had held its first annual convention in Glenwood Springs. And Music Operators of Michigan had held its first State 8-Ball Tournament in Lansing, drawing 100 competitors from over Michigan for the first such statewide pool event.

New products on view in these pages five years ago: *Buccaneer* flipper from Gottlieb; *Cops 'N' Robbers* driving and shooting action game from Atari; *Tornado Baseball*, Midway's two player video; *Flyball* baseball theme video coming up to the mound for Atari; Exidy's *Old Time Basketball* electro-mechanical arcade game; blackjack play on Ramtek's *Hit Me* featuring four-player cocktail table with raised game screen; and "the world's first automatic backgammon game" in *Gammonmaster* by Xedar Corp. of Boulder, Colorado, in cocktail form.

In Critic's Corner, Roger Sharpe reviewed the pins: *Sound Stage* by Chicago Coin; *Surf Champ/Surfer* from Gottlieb; Playmatic's *Fiesta*; and Allied Leisure's *Boogie/Dyn O' Myte*.



Universal U.S.A., has introduced a new test fixture for all past and future Universal video games. The Universal Model T-4000 test fixture is a complete unit which includes all controls, an isolation transformer for a video monitor, and a fully protected and adjustable power supply. Other features include a left coin switch, coin counter, and internal audio amplifier. The Model T-4000 is shipped with a harness for Universal's current game Cosmic Avenger. Other harness for all previous games, are available on request.

## PLAY METER CALENDAR

**September 25-26**

West Virginia Music & Vending Association, annual meeting, Ramada Inn, South Charleston

**October 6-8**

JAA Convention, International Trade Center-Harumi Bldg., Tokyo

**October 7**

Ohio Music and Amusement Association dinner and drawing, The Tangier, Akron

**October 7-12**

Japan Electronics Show, Osaka International Trade Fairgrounds, Osaka

**October 12-18**

Taiwan Electronics Show, World Trade Center, Taipei

**October 14-20**

Korea Electronics Show, Exhibition Center, Seoul

**October 15-18**

Enada Show, Rome, Italy

**October 16-17**

Amusement & Music Operators of Virginia, annual convention, Holiday Inn, Richmond

**October 29-November 1**

NAMA annual convention-exhibit, McCormick Place, Chicago

**October 29-31**

AMOA Exposition, trade show and convention, Conrad Hilton, Chicago

**November 25-27**

Incomat Exhibition, Salzburg, Austria

**December 9-12**

Forainexpo, Paris, France

**January 18-21, 1982**

ATE, Birmingham, England, National Exhibition Centre

**January 19**

Music Operators of Minnesota, annual convention, Holiday Inn, Minneapolis

**January 21-24**

IMA, Frankfurt, Germany

**March 3-5**

Australia's AMOA Convention, Hilton Hotel, Melbourne

**March 26-28**

Amusement Operators Expo, Hyatt Regency, Chicago

# We women and the electronic invitation

By Marion Cutler and Jane Peterson

We had never been in an amusement arcade. That isn't unusual; most women probably have not been. Walking through the shopping mall past the arcade, we registered faintly the impression of an electric gauntlet. When we finally went inside, it seemed more like an assault of noise and light.

No place to sit, no place to put down the load a woman accumulates as she goes about her rounds. The arcade, though perfectly respectable, offers an atmosphere that is antithetical to the woman, and perhaps to the adult, looking for a moment's relaxation.

The adolescent may be in search of a high level of stimulation. Frankly, we have forgotten. Maybe adolescents can only plug into an artificial and temporary attempt to be involved, so they easily plug into a machine. Women and adults are already plugged into daily stresses—plugged into noises and interruptions and distractions—and are not likely to seek them out.

We seek a place to wind down, usually a bar or coffee shop where crowds and noise levels are tolerable because we can't face the vacuum cleaner after our nerve endings are driven to their limits. But we can't absorb too much more stimulation either. We want to sit down. We want to put down the debris we carry around with us. We want to hear ourselves think, even if our thoughts aren't making much sense.

So entering the arcade is, to us, like visiting a rifle range between battles...unlikely. But once, inside, rows of machines hustle us, blinking and burping. This middle class-oriented arcade contains fifty video games, eighteen pinball machines, and only enough aisle space to accommodate a player and a passer-

by. On screens, images flash and change colors while machines bleep or talk, oblivious to anything but the dropped quarter. (It is a little mad, this vision of a machine talking to itself.)

We drop our purses, try to kick them out of the way, and start to read instructions. We don't readily

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*A young woman in her teens tells us she 'really' comes to the arcade to play Pac-Man. Another young girl is transfixed on Missile Command... for 20 or 30 minutes.*

---

understand but, since the machine is hustling us, we drop our quarters and hit the two-player button. The machine cares nothing about our input beyond the quarters. It starts without us, so to speak, and three men are killed before we work out the logistics of who will go first. (We later discovered it would react to our action, but if we didn't act fast enough, the game played itself all the same. We can participate with the damned thing or not, it doesn't matter. All very Kafka-esque.)

There is a back-up line at the *Crazy Climber*. We watch young men try to match the electronic pace, jerking at the controls as if receiving an electric shock. The little green man climbs, angling crazily, and occasionally yelling "Ouch" when hit by a falling flower pot.

Lyrical music introduces a white bird flying left to right, then right to left, bombarding the climber. (If the energy were flowing in reverse—from the teenager to the machine—it appears there would still be enough to keep the machine running.) The action draws a crowd. Apparently the concept of climbing and being dumped on is very attractive.

Next we are at *Berzerk*, being called "Humanoid Intruder." Our task: to move through various colored mazes while avoiding walls and killing creatures. We don't do well. A twelve-year old boy stops to tell us to aim the stick before firing. That helps somewhat though the stick seems a little out of line for firing. Since we're not used to shooting, perhaps it is we who are out of line.

We play three more games—with a high score of 680—then grow weary of trying to escape a hostile world.

At *Pac-Man*, we corral a young woman in her late teens. She tells us she "really" comes to the arcade to play *Pac-Man*. Another young girl is transfixed on *Missile Command*, madly rolling the global control, shifting her body, her eyes locked on the screen. She defends her territory for 20 or 30 minutes and doesn't seem to flag at all.

"Do you play the games where you zap space ships and robots?" we ask our new acquaintance.

"Oh yes," she assures us, "I just like *Pac-Man* best."

She plays a sample game for us, explaining the finer points of energy consumption and reversals.

We play six or seven games. So far, this game intrigues us more than the others. We never completely clear a screen, but we get close.

Perhaps the attraction is the

consumption motif of *Pac-Man* or the fact that the player initiates the change in rules. (After all, to create change but not be able to dictate its end is life-like.) Perhaps it's because the machine doesn't verbally insult us; it only issues a slow, sinking sound and visual fade when the "yellow fellow" dies.

Perhaps the young woman's enthusiasm and demonstration made this electronic invitation more acceptable. Yet the pace of the game, the "hubba-hubba" sounds of the white dots being eaten, and the chase/be chased motif eventually bore us.

We are replaced at the game by a man in his mid twenties who has memorized the boards, clears each regularly, and scores so high the machine can't register his credits. As we leave, he is giving pointers to our young female acquaintance.

We return to *Crazy Climber* at the end of a game and take over. Before we have control, the music starts and the Climber ascends. We grab the sticks and begin the upward/downward motion, but the brown-haired man does not move steadily upward. He goes down nearly as often as up. When we stop to figure it out, the machine chides, "GO FOR

IT!" Ignoring the crack, we listen to directions from another twelve-year old. Windows slam shut and the Climber falls, crying, "Oh, no!"

After several attempts, one of us manipulated the Climber past the demon but nowhere near the top of the first building. "GO FOR IT! GO FOR IT!"

So we go on to the *Defender*, a

---

*As women, we know that  
the ante of the game of life  
is not hand-eye  
coordination and speed  
—it is the ability to relate.  
You can't kill all the  
hostile little creatures...*

---

classic "It's you or me" game. What is the pay-off? Suppose we avoid the mountain peaks, fire furiously, and kill all the hostile crafts or creatures. Is the reward supposed to be survival? Not to us, baby. We don't want to participate in the machine's fantasy, we have fantasies of our own. Besides, we're tired of standing.

Mastering a machine has some appeal and some relevance, but of a limited kind. As adults, and particularly as women, we know that the ante for the game of life is not hand-eye coordination and speed, it is the ability to relate. You can't kill all the hostile little creatures in the world; you have to get along with some of them, get to know them, and figure out what's on their minds.

We gather up our junk and our purses, and walk out, leaving the buzz of battle, the mania of light effect, and several dollars. We go in search of a machine that permits our input, that isn't obsessed with how fast we react, but will respond to *how* we react. Like the human machine next to us on a bar stool or across the table from us in a coffee shop.

To the adolescent, speed may be everything. As we said, we don't remember. But to most women, speed is simply a penalty we pay for having too much to do and too little time in which to do it. Faster isn't better, it is only faster.

Better is better. We have worked eight hours in a climate that isn't exactly wild about our input. We're not about to drop a quarter to be insulted or ignored again. ●



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# A maverick company breaks the manufacturers' self-reliance trend

It's sort of anathema to game manufacturers who point proudly to the fact they make their electronic wonders from the rawest materials. Yet when it comes to the payoff—where the coin goes in—manufacturers appear to be relying more and more on specialists.

Jim Douglass, vice president of marketing for Coin Acceptors, Inc. in St. Louis, offers a reason for the trend: "The overseas business for a manufacturer's games represents about twenty percent of his market, but it can create about ninety percent of the coin problems. And all of it is because of variabilities concerning the coin door, not the game itself."

For instance, there are close to forty variations relating to coinage

differences between the various countries, and appropriate decals are needed obviously to designate each country's coinage on the slots. So rather than remain largely self-reliant, there's a trend among manufacturers to give the whole coin door business to specialists.

It saves the manufacturer the bother of having to stock various parts to accommodate each coinage change. Thus, the manufacturer can concentrate his efforts on exactly what it is that he does best—the manufacturer of the game itself, which remained the same despite the various adaptations.

"To let something like the coin door be manufactured out of their own plants," said Douglass, "sort of goes against the grain of the

factories self-manufacturing concepts. But the door is a specialized thing, and manufacturers realize that. The game can be identical in all cases, except for the coin door because, for instance, of all the possible variations needed for exporting."

It's for this reason, Douglass states, that Coin Acceptors has begun actively marketing a coin door for this industry. For them, the opportunity became a reality with the introduction of Atari's *Asteroids*.

In discussions with Atari a few years ago, Douglass reveals, the subject came up that the Sunnyvale, California games manufacturer was investigating alternatives concerning its coin door. For Coin Acceptors, it was a solid lead which led the way to



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testing of Coinco doors on some of Atari's *Football* games in December '78 and January '79.

But it wasn't until *Asteroids* was produced that Coinco doors started to become commonplace.

For the manufacturer, probably the most critical requirement of all was the immediate availability in large quantities of the coin doors already pre-set for the market they were manufactured for.

"But that didn't present a problem for us," said Douglass, "since this is what we specialize in. Availability is immediate because this is what we do. So, for us, adapting the coin doors for specific overseas markets, for instance, is a whole lot easier than it would be for a games manufacturer who, by nature, is not as well-versed in all the coin adaptations."

The arguments for going outside the factory for the supply of already-completed coin doors have hit for Coin Acceptors on the receptive ears of Centuri, Cinematronics, Gremlin, Sircoma, Taito, and Rock-Ola, among others. And, Douglass hints, there are other games manufacturers who may soon join their fold. The major hesitation from a manufacturer, Douglass relates, is that the manufacturer must make the commitment to change over to someone else supplying the coin doors.

For the operator, of course, he's looking for a secure, safe coin door which is not going to let players get away with fishing for free games. And Douglass claims the Coinco doors have established a solid anti-cheat record. But operators who operate their games on token play require other things as well. After all, each token operation, Douglass relates, is something like a miniature foreign country with its own kind of coinage.

Distributors have, of course, become very adept in changing over coin doors for the token operators' individual requirements. But token suppliers have also become something of experts on all types of coin doors.

"Token suppliers," Douglass states, "are perhaps the most knowledgeable people around concerning coin doors because their whole businesses depend upon their understanding them."

As far as the replacement of the coin doors, Douglass points out, one of the major selling points for Coinco products is that not only do the



*Immediate availability in large quantities is key to Coinco's expansion hopes.*

distributors carry and understand the products, but Coin Acceptors has its own network of distribution outlets— sixty in all around the United States. And they have also a toll-free telephone number (1-800/325-2646, the last four digits of which spell out COIN) to handle service complaints and questions. This has also had a definite selling advantage for their Coinco products because manufacturers don't have to be counted on for every little thing that could go wrong with the game.

As far as Coin Acceptors' abilities to expand, Douglass adds smugly, "We're in good shape." He points to the company's numerous produc-

tion plants and suggests the company sees still more possibilities and avenues for its products. "We're not blind to the possibilities we have here," says Douglass. If electronic data recording becomes seriously considered by this industry, we are not blind to the fact that we'll already be in there with the coin door itself. We could easily expand our product to include an electronic data retrieval system."

Interestingly, Coin Acceptors is already marketing a data retrieval system to the vending industry.

It's an interesting thought and may herald the wave of future games and the operation of them as well. ●



*Trieman checks out the assembly line with Richard Moger, plant manager of Coinco's Mountain View, Missouri factory.*

# Rock-Ola in domestic market with new video from Namco Ltd.

By Ray E. Tilley

A distinctive new video game with the curious name *Warp-Warp* has been released in market samples by Rock-Ola Manufacturing and will be the first of an unspecified number of game products to be manufactured by Rock-Ola under license from Namco Ltd. of Tokyo.

Introduction in the United States of *Warp-Warp*, which features the ability for a player to "warp" himself between two "worlds" which represent two different play patterns in the game, was planned for coinciding with its introduction in Japan by Namco.

Rock-Ola officials said they were confident that *Warp-Warp* "has what it takes to prove itself worthy of the best of Namco's past successes, such video greats as *Galaxians* and *Pac-Man*," said a Rock-Ola announcement.

The game, characterized as "the challenge of two worlds," in reference to its two different playfields "Space World" and "Maze

World," was also timed to hit the domestic market after a period when American manufacturers marketing in Europe were facing a steep increase of parts costs on the Continent, said Dr. David R. Rockola, senior vice president/marketing.

So, in line with the company's high hopes for its entry into the domestic video market, its new game was expected to be a "star" of Rock-Ola's national distributors meeting, slated for September 21 at Kiowa, near Charleston, South Carolina. The slogan of the meeting will be "The Challenge of Two Worlds"—referring not only to the "dual worlds" play of the game, but also to Rock-Ola's intention to bolster its place in the jukebox market, said Dr. Rockola. New phonograph debuts from the 50-year-old firm are regularly made in the fall meeting for distributors.

In the video works, meanwhile, the Chicago producer was evidently gearing to originate its own game

products in the near future. "We have established the nucleus of a special engineering group for that purpose," said Dr. Rockola.

For its first game for U.S. sales, the licensing agreement was finalized in mid-June by Rock-Ola's President Donald C. Rockola, Dr. David Rockola, and Namco's Hideyuki Nakajima, Namco's director of international marketing. Negotiations had been proceeding, however, for about two months and Rock-Ola reportedly had rejected 12 other "good video games" offered by the leading Japanese coin machine manufacturer since June of 1980. Dr. Rockola said this fact underscores his company's confidence in *Warp-Warp* as a new product introduction.

Hugh J. Gorman, Rock-Ola's vice president and director of sales, predicted that this product "is destined to become one of the most successful video games in 1981-82, and Rock-Ola anticipates a heavy back-order position for many months to come."

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## PROGRAMMED TEST No. 3

# Complex Logic Elements

[Note: Lesson 3 appeared in Play Meter, September 15 issue]

*Editor's Note: The material below is a serialization of the Kurz Kasch correspondence course for electronics, designed specifically for the coin-operated amusement industry. This course is copyrighted and owned by Kurz Kasch of Dayton, Ohio and its reprinting is being sponsored jointly by Kurz Kasch and Play Meter magazine. This material is authorized for publication exclusively in Play Meter magazine.*

*Instructions: The purpose of this test is to guide you step-by-step through actual circuit design problems. Also, many of the tests in this series will provide you with additional design technique. Most important, these tests will provide you with a gauge to establish your degree of understanding of the material covered in the text. The test is programmed. Start at block one and then follow the numbered instruction associated with your answer.*

**1**

Draw the symbol for a two-input NAND gate and complete the truth table.

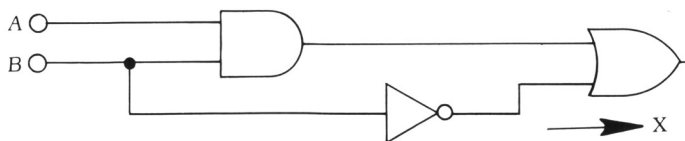
GO TO BLOCK 14

Truth Table

A	B	X

**2**

YOU ARE CORRECT!



Draw the truth table for this logic circuit.

GO TO BLOCK 17

Truth Table

A	B	X

**3**

YOU ARE INCORRECT!

Refer to the text and return to BLOCK 10.

**4**

YOU ARE INCORRECT!

Refer to the text and return to BLOCK 15.

**5**



Truth Table

A	B	X
0	0	1
0	1	0
1	0	0
1	1	0

Did you get the same results? If not, do not go on but check!

Draw the symbol for an exclusive OR gate and complete the truth table.

GO TO BLOCK 16

Truth Table

A	B	X

**6**

YOU ARE CORRECT!

Design a three-input logic circuit to give an output  $X = (A \cdot B) + \bar{C}$ .

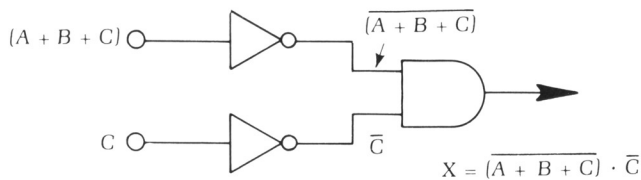
GO TO BLOCK 12

**7**

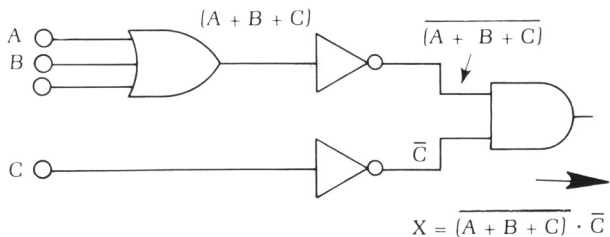
Breaking the output statement into its major components, we have  $(A + B + C)$  AND'ed with  $\bar{C}$  thus:



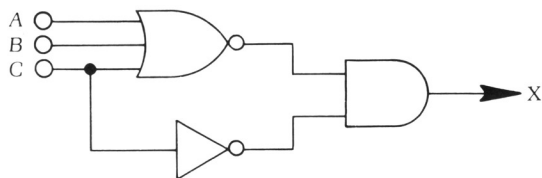
Next, we must account for the negation of  $(A + B + C)$  and the negation of  $C$ :



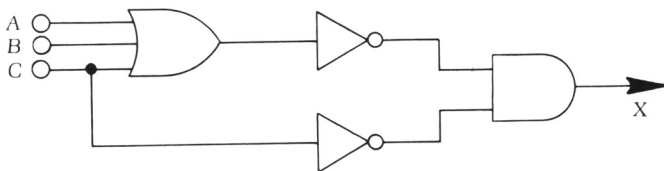
Next, we account for the OR'ing of  $A$ ,  $B$  and  $C$ .



Finally, since we have two  $C$  inputs, we can tie them together.



The circled part of the circuit is simply a NOR gate, so our completed logic circuit is:



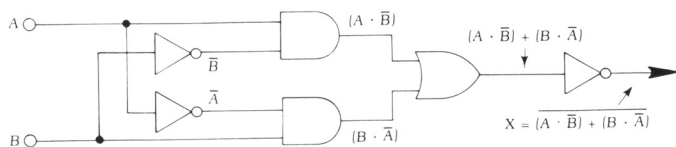
If you did not get the same result, check your work before proceeding.

Design a three-input logic circuit to give an output  $X = (A \cdot B) + (A + C)$ .

GO TO BLOCK 19

## 8

Again we start by labeling the logic circuit.



The preliminary truth table should include:

- 1) The inputs  $A$  and  $B$
- 2) The intermediates  $\bar{B}$ ,  $\bar{A}$ ,  $A \cdot \bar{B}$ ,  $B \cdot \bar{A}$ ,  $(A \cdot \bar{B}) + (B \cdot \bar{A})$
- 3) The output  $X = (A \cdot \bar{B}) + (B \cdot \bar{A})$

Proceed by filling in column by column from left to right.

Truth Table

A	B	$\bar{A}$	$\bar{B}$	$(A \cdot \bar{B})$	$(B \cdot \bar{A})$	$(A \cdot \bar{B}) + (B \cdot \bar{A})$	X
0	0						
0	1						
1	0						
1	1						

The truth table should look like this when completed. Remember,  $X$  is the complement of Column 7.

Truth Table

A	B	$\bar{A}$	$\bar{B}$	$(A \cdot \bar{B})$	$(B \cdot \bar{A})$	$(A \cdot \bar{B}) + (B \cdot \bar{A})$	X
0	0	1	1	0	0	0	1
0	1	1	0	0	1	1	0
1	0	0	1	1	0	1	0
1	1	0	0	0	0	0	1

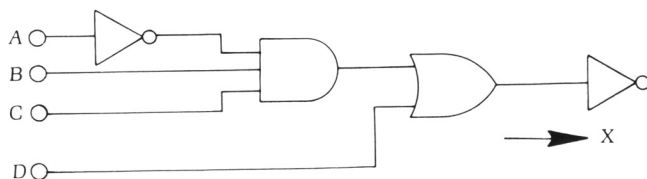
Leaving out the intermediates, the completed truth table should be:

Truth Table

A	B	X
0	0	1
0	1	0
1	0	0
1	1	1

It is interesting to note that this circuit gives a logic 1 output **ONLY** when  $A = B$ . It can be used to compare two inputs to see if they are equal. The circuit is called an **EXCLUSIVE AND** gate.

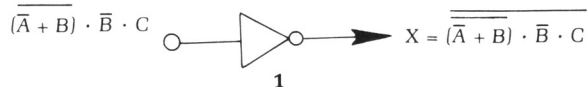
Draw the truth table for this logic circuit:



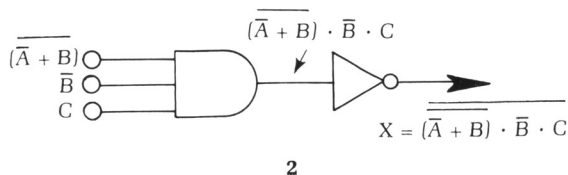
GO TO BLOCK 15

## 9

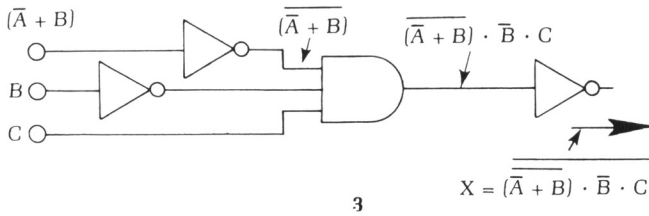
Since the entire output statement has been negated, we must account for that first.



Next we can break up the remaining statement into three AND'ed terms.

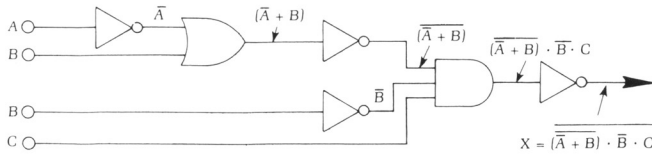


Next, we account for the negation of  $(\bar{A} + B)$  and the negation of  $B$ .



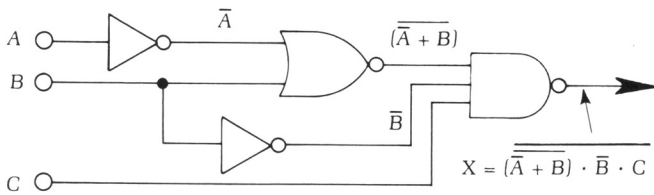
3

Now we can account for the OR'ing of  $A$  and  $B$ . We shall also account for  $\bar{A}$  in the same step.



4

Finally, we can tie the two  $B$  inputs together, replace the OR - NOT combination with a NOR gate, and replace the AND - NOT combination with a NAND gate.



5

In order to draw the truth table, we make reference to fig. 4. The truth table must include:

- 1) The inputs  $A$ ,  $B$ , and  $C$
- 2) All the intermediates  $\bar{A}$ ,  $\bar{A} + B$ ,  $\overline{\bar{A} + B}$ ,  $\bar{B}$ , and  $\overline{\bar{A} + B} \cdot \bar{B} \cdot C$
- 3) The output  $X = \overline{\bar{A} + B} \cdot \bar{B} \cdot C$

Since there are three inputs we must have  $2^3$  rows.

Proceed by filling in column by column from left to right.

Truth Table

A	B	C	$\bar{A}$	$(\bar{A}+B)$	$\overline{(\bar{A}+B)}$	$\bar{B}$	$\overline{(\bar{A}+B)} \cdot \bar{B} \cdot C$	X
0	0	0						
0	0	1						
0	1	0						
0	1	1						
1	0	0						
1	0	1						
1	1	0						
1	1	1						

The truth table should look like this when completed. Remember,  $X$  is the complement of Column 8.

Truth Table

A	B	C	$\bar{A}$	$(\bar{A}+B)$	$\overline{(\bar{A}+B)}$	$\bar{B}$	$\overline{(\bar{A}+B)} \cdot \bar{B} \cdot C$	X
0	0	0	1	1	0	1	0	1
0	0	1	1	1	0	1	0	1
0	1	0	1	1	0	0	0	1
0	1	1	1	1	0	0	0	1
1	0	0	0	0	1	1	0	1
1	0	1	0	0	1	1	1	0
1	1	0	0	1	0	0	0	1
1	1	1	0	1	0	0	0	1

Leaving out the intermediates we have the completed truth table.

Truth Table

A	B	C	X
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1

If you did not get the same result, check your work before proceeding.

Design a three-input logic circuit with two outputs:

$$X_1 = [C + \bar{C}A]$$

$$X_2 = [A \cdot (A + B) + \bar{A} \cdot B] \cdot [C + \bar{C}A]$$

GO TO BLOCK 18

## 10

YOU ARE CORRECT!

What function will an AND gate perform in negative logic?

- a. NAND
- b. OR

GO TO BLOCK 3  
GO TO BLOCK 6

## 11

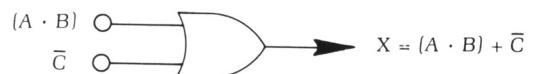
YOU ARE INCORRECT!

Refer to the text and draw a truth table for both NOR and the negated input AND. They should be identical.

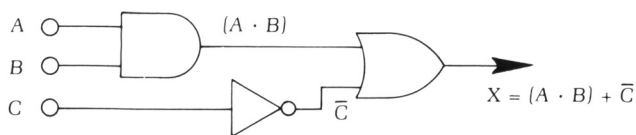
RETURN TO BLOCK 16

## 12

We start by breaking the output statement into its major components; that is  $(A \cdot B)$  is OR'ed with  $\bar{C}$ , thus:



Next, break up the remaining statements.



This is how the complete circuit should look. If you did not get the same result, check your work before proceeding.

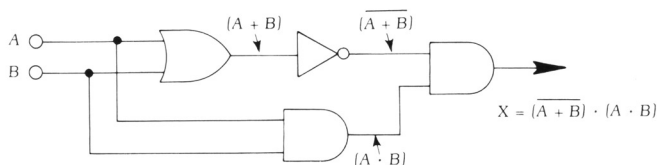
Design a three-input logic circuit to give an output:

$$X = (\overline{A + B + C}) \cdot \overline{C}$$

GO TO BLOCK 7

### 13

Start by labeling the logic circuit.



The preliminary truth table should include:

- 1) The inputs A and B
- 2) The intermediates  $A + B$ ,  $A \cdot B$ ,  $\overline{A + B}$
- 3) The output  $X = (\overline{A + B}) \cdot (A \cdot B)$

Proceed by filling in column by column from left to right.

Truth Table

A	B	(A + B)	(A · B)	( $\overline{A + B}$ )	X
0	0				
0	1				
1	0				
1	1				

The truth table should look like this when completed. Remember, X is the AND "product" of Columns 4 and 5.

Truth Table

A	B	(A + B)	(A · B)	( $\overline{A + B}$ )	X
0	0	0	0	1	0
0	1	1	0	0	0
1	0	1	0	0	0
1	1	1	1	0	0

Leaving out the intermediates, the completed truth table should be:

Truth Table

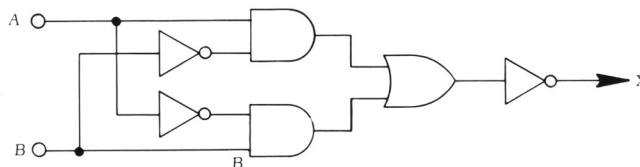
A	B	X
0	0	0
0	1	0
1	0	0
1	1	0

Notice that we have found that the output does **NOT** depend on the condition of the inputs. It is always logic zero. In other words, we have shown that the given logic circuit could be eliminated.

Truth Table

A	B	$\overline{X}$	X

Draw the truth table for this logic circuit:



GO TO BLOCK 8

### 14

Truth Table

A	B	X
0	0	1
0	1	1
1	0	1
1	1	0

Did you get the same results? If not, do not go on but check!

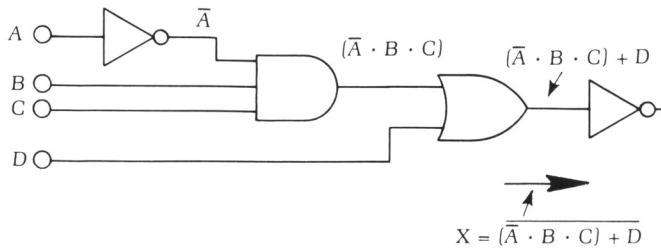
Draw the symbol for a NOR gate and complete the truth table.

GO TO BLOCK 5

Truth Table

A	B	X

Start by labeling the given logic circuit.



The preliminary truth table should include:

- 1) The inputs A, B, C and D
- 2) The intermediates  $\bar{A}$ ,  $\bar{A} \cdot B \cdot C$ ,  $(\bar{A} \cdot B \cdot C) + D$
- 3) The output  $X = (\bar{A} \cdot B \cdot C) + \bar{D}$

Since there are four inputs, we must have  $2^4$  rows.

Proceed by filling in column by column from left to right.

Truth Table

A	B	C	D	$\bar{A}$	$(\bar{A} \cdot B \cdot C)$	$(\bar{A} \cdot B \cdot C) + D$	X
0	0	0	0				
0	0	0	1				
0	0	1	0				
0	0	1	1				
0	1	0	0				
0	1	0	1				
0	1	1	0				
0	1	1	1				
1	0	0	0				
1	0	0	1				
1	0	1	0				
1	0	1	1				
1	1	0	0				
1	1	0	1				
1	1	1	0				
1	1	1	1				

The truth table should look like this when completed. Remember, X is the complement of Column 7.

Truth Table

A	B	C	D	$\bar{A}$	$(\bar{A} \cdot B \cdot C)$	$(\bar{A} \cdot B \cdot C) + D$	X
0	0	0	0	1	0	0	1
0	0	0	1	1	0	1	0
0	0	1	0	1	0	0	1
0	0	1	1	1	0	1	0
0	1	0	0	1	0	0	1
0	1	0	1	1	0	1	0
0	1	1	0	1	1	1	0
0	1	1	1	1	1	1	0
1	0	0	0	0	0	0	1
1	0	0	1	0	0	1	0
1	0	1	0	0	0	0	1
1	0	1	1	0	0	1	0
1	1	0	0	0	0	0	1
1	1	0	1	0	0	1	0
1	1	1	0	0	0	0	1
1	1	1	1	0	0	1	0

Leaving out the intermediates, we have the completed truth table.

Truth Table

A	B	C	D	X
0	0	0	0	1
0	0	0	1	0
0	0	1	0	1
0	0	1	1	0
0	1	0	0	1
0	1	0	1	0
0	1	1	0	0
0	1	1	1	0
1	0	0	0	1
1	0	0	1	0
1	0	1	0	1
1	0	1	1	0
1	1	0	0	1
1	1	0	1	0
1	1	1	0	1
1	1	1	1	0

If you did not get the same result, check your work before proceeding.

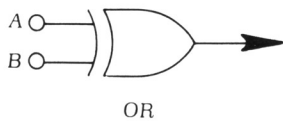
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What type of gate permits us to easily change from positive logic to negative logic?

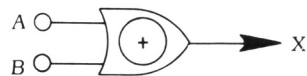
- a. EXCLUSIVE OR GO TO BLOCK 4
- b. NOT GO TO BLOCK 10

### 16



Truth Table

A	B	X
0	0	0
0	1	1
1	0	1
1	1	0



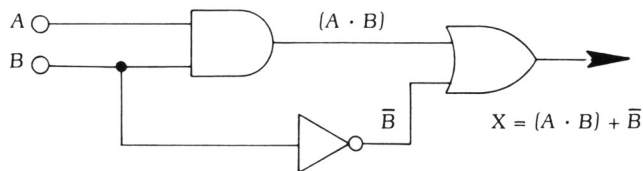
Did you get the same result? If not, do not go on but check!

The negated input AND gate functions in the same way as a . . .

- a. NAND gate GO TO BLOCK 11
- b. NOR gate GO TO BLOCK 2

### 17

Perhaps the best way to approach this problem is to label the logic circuit thus:



We proceed by drawing the truth table including all the intermediate points:

Now we can fill in the columns, starting from the left side.

Truth Table

A	B	(A · B)	B̄	X
0	0			
0	1			
1	0			
1	1			

The truth table should look like this when it is completed. Remember that X is just the OR "sum" of Columns 3 and 4.

Truth Table

A	B	(A · B)	B̄	X
0	0	0	1	1
0	1	0	0	0
1	0	0	1	1
1	1	1	0	1

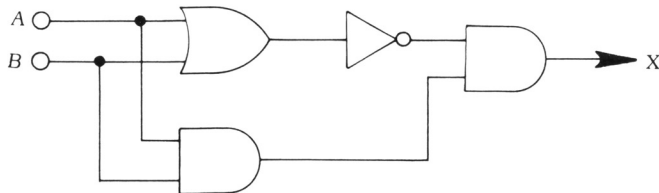
Finally, we can leave out the intermediate conditions. The

completed truth table shows only the input statement and their associated outputs.

Truth Table

A	B	X
0	0	1
0	1	0
1	0	1
1	1	1

Draw the truth table for this logic circuit.



GO TO BLOCK 13

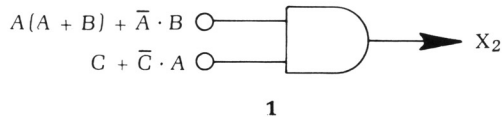
### 18

If the student pays careful attention to the problem, he will notice that  $X_1$  is part of the solution for  $X_2$ , that is:

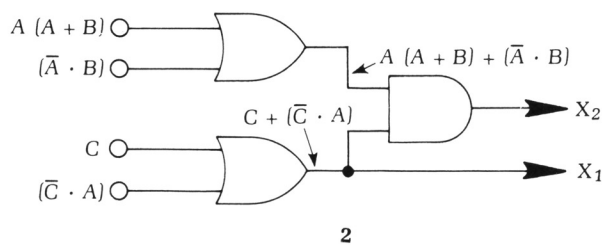
$$X_2 = [A \cdot (A + B) + \bar{A} \cdot B] \cdot X_1$$

In other words, we can momentarily disregard  $X_1$  since it will be available as part of  $X_2$ .

Breaking  $X_2$  into its two AND'ed components, we have:

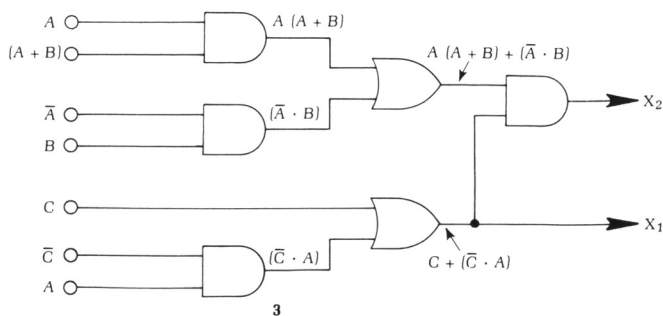


Since each input in fig. 1 is OR'ed, we add two OR gates:

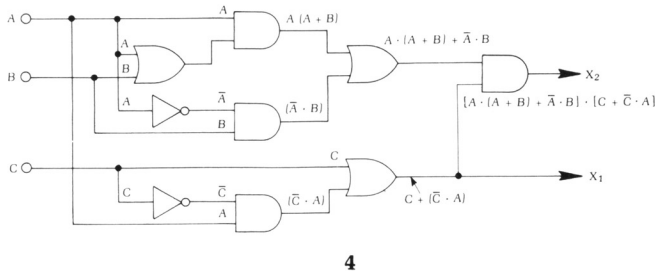


Notice as we previously mentioned,  $X_1$  is now available at one of the OR gates in fig. 2.

We continue by adding three more AND operations.



Last, we need an OR gate and two inverters. At the same time we can tie together all the A inputs, all the B inputs, and all the C inputs.

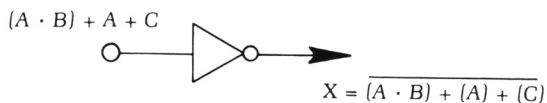


The logic circuit in fig. 4 will then perform all the operations required.

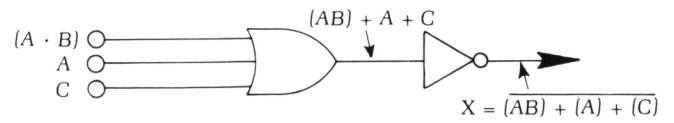
You have completed the test for lesson three. However, before going on you should review any area in this lesson you do not fully understand.

## 19

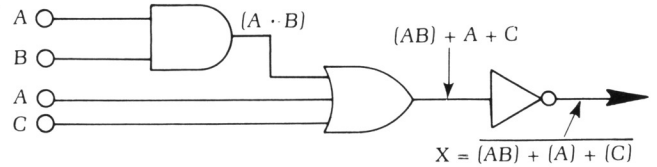
Since the entire output statement has been negated, we must account for that first.



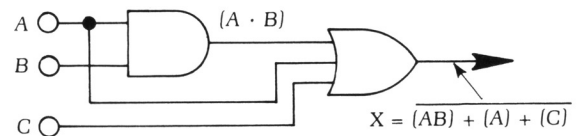
Now we can break up the remaining statement into three OR'ed terms.



Next we account for the AND'ing of A and B.



Finally, the two A inputs can be tied together and the OR-NOT combination may be replaced by a NOR gate:



If you did not get the same result, check your work before proceeding.

Design a three-input logic circuit to give an output  $X = \overline{(A + B) \cdot \bar{B} \cdot C}$ .

GO TO BLOCK 9

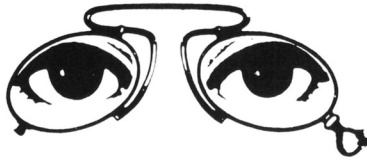
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# Critic's Corner

By Roger C. Sharpe

## Pinball bustin' loose



Gottlieb's VOLCANO

As I have been documenting in these past months, pinball in indeed going through changes that have helped elevate playfield design as well as the integration and importance of programming. What has been evident is that almost every effort has offered its own subtle touch of differentiation separating it from the past and leading to future modifications and improvements.

Gottlieb, in particular, is a good example of this, especially in the light of its last two models. Here is a company that has taken a step by step and game by game process in trying to achieve that mix of technology and features in attracting the players. But it is only with *Mars* and now *Volcano* that it seems to have gotten everything together.

Maybe part of the reason has been the return to standard playfield size and the utilization of the available space with some design features that are multifunctional, as well as a better use of space on a big game format with *Volcano*.

On *Mars* I was extremely impressed with the "Stargate" that either allowed the ball to travel up through the tube or under and back up to the top lanes. A simple touch, yet highly effective and something that hopefully will be used again on future games and maybe even in an updated or modified version.

But then Gottlieb's hasn't been alone in trying new things; all the manufacturers have taken caution to the wind and are branching out with different creations. However, Gottlieb has always had a special place in many people's hearts. I can still remember that devoted following and how they waited for the company's entrance into solidstate and their reaction to *Cleopatra*. In

many ways, the company is once again experiencing that same kind of impact as it seemingly has shifted into high gear to get its products competitive.

In fact, I tend to view *Mars* and now *Volcano* as Gottlieb's entry into the present and compare them to "*Cleo*" and *Sinbad* in terms of how they'll eventually be viewed as a turning point in the company's pinball fortunes.

Admittedly, there is still a long way to go and the other manufacturers aren't sitting idly by waiting for Gottlieb to take the lead, but the competition is heating up. There's Stern's double-level *Split Second*, which will be on view here next issue; Bally has readied its next two games, *Fathom* which also should be on view next time, and *Medusa*; while Gottlieb is getting ready its next and Williams is soon to follow up *Pharaoh*."

The feeling is that, although everyone is forging ahead, the real turning point could well be the AMOA show which is just around the corner and usually the setting for some unique attractions. In the meantime, the class of fall '81 seems to be ably represented as the year continues to support the idea that pinball in general continues to gain, although not at the rate video is enjoying.

For the present, maybe the most important thing for any operator is to be very selective of all equipment purchases. Obviously, there is a greater overlap regarding video and the imitation of themes, although this may tend to lessen the risk of choosing one game over another. However, with pinball, it's still a matter of trial and error that's more dependent upon player desires at



each individual location.

Anyway, the beat goes on and with it the time to take a closer look at Gottlieb's newest.

### Gottlieb's *Volcano*

This follow-up to *Mars* continues the graphic treatment, but adds some novel playfield touches that must be played to be fully appreciated. It's a good, solid package on all counts, although, the scoring is still of the six-digit variety, about which enough has been said by this writer in the past.

**PLAYFIELD:** It's a center entry for the ball off the shooter, but even this has been modified by a little revolving piece that moves the metal form, changing the angle of the ball as it enters onto the playfield. This can be done when the device is in motion, or it can be stopped at a desired point by a green flipper button on the right side of the cabinet just next to the standard flipper button.

From this point, the game features a bank of five drop targets at the top left, with a flipper over to the right and a kick-out hole just above. Move over and there's an interesting twist on a theme which brings "skee-ball," only this time on a pinball machine. A sloping set up of four holes (Craters 1 through 4) along with complimentary lights, which can be stopped in their sequence from that right side green cabinet button, is a self-contained area that is really the primary part of the game.

A ball entering any of the holes when lit is captured under the board for the potential of three-ball, multiple-ball play. If a ball enters at the "wrong" time, it's suddenly shot out from the left side of the field similar to those old baseball arcade games of the past.

Meanwhile; back to the layout: a yellow target is at the left of the entry to the "skee ball" area with a five bank of drop targets just below at the right. Two thumper bumpers are in mid-field, and the metal "trap" for the balls coming out of the playfield is just in front of a spinner that leads up and around behind the top targets (hidden by plastic overlays) and over to that top kick-out hole. Also at the

left side of mid-field is a shorter little kick-back that offers extra ball when lit.

The bottom is an interesting variation in that it offers two thumper bumpers just above the kickers leading down to the flippers. The right side has a gate thrown in to save "lost ball" although a little rubber-ringed post does provide some rebounding possibilities to keep a ball in play.

The left side, with a square target just above the bumper, offers a conventional lane leading down to the flipper, as well as an outside lane that features a "ball save" when lit that's activated by a green flipper button on the left side of the cabinet and must be timed if the player is going to be able to propel the ball back from death and out to the field.

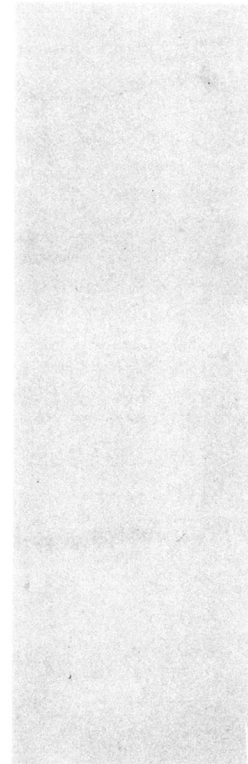
**ANALYSIS:** *Volcano* is an intriguing game that offers some non-stop action as well as plenty of skill shots and precise timing. All the drop targets on the board have lights in front, and getting appropriate targets at the right time or finishing off the banks can mean activating the bottom gate and ball save as well as increased point totals.

But the focal point is to get multi-ball play by shooting to the skee-ball top right area. There are some nice long shots from right to left and left to right as well as a fairly full complement of reverses, with two multipliers tied into the action for outhouse bonus as well as the multi-ball play value. And the added two bumpers at the bottom insure fast paced action on a board that's fairly well balanced and fully utilizes its available space.

**GRAPHICS:** The backglass approach begun on *Mars* by Gottlieb continues this time, appropriately enough, with a volcano erupting upward to an array of red lights that adds to the overall effect. It's prehistoric times and the theme is carried through on the playfield as well as with the sound effects, including flashing lights on the playfield when there's multi-ball play. And the addition of speech with "lave rising" and "eruption, eruption" are all a part of a total package that's as complete as it can be. The primary

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**'How the game's back legs are set up is important: too great a slant takes away much of the action, and too little can cause sluggish play.'**

reds and oranges only enhance the eye-catching quality of the game.

**PLAY:** Once again we're faced with the limitations of a six-digit display and a game that can score in the low millions—admittedly, not on a frequent basis, but often enough to warrant some type of indication. There is the switch to reset high score to date when it hits some point in the high 900,000's which bounces it back to something far less, but still and all, the scoring is there for the player who gets hot. For this reason alone, you'll probably be better off with two limits. On extra ball play a 400,000 start followed by 700,000 about 100,000 to 200,000 points for each.

**PROS & CONS:** *Volcano* is a strong game that's really only hindered by its six-digit displays, although getting over a million isn't the easiest of feats even in extra ball areas. I like the center metal trap for shooting the balls out, although this should be

checked from time to time to make sure that the balls are heading for the flippers, rather than through them, which is something I've encountered at a variety of locations and can be a real turn off.

Also, how the game is set up in terms of back legs versus front legs is important: too great a slant takes away much of the action and too little can cause the game to be sluggish. But the balance of targets and that top right area are perfect for shooters who like to make precise shots. In fact, there's really something for everyone on the board and it's gratifying to see that Gottlieb is continuing to improve. However, *Mars* as a game is probably more satisfying to play over the long haul just because of layout and the array of shots and features.

**RATING:** ###¼

All things being equal, what should

be interesting is what the show equipment is going to look like as the month winds down. There is that air of expectation not only for pinball but also video and whose show it will be. At the time of this writing, I have to be content in just anticipating the changes as well as the start of the second baseball season and the knowledge that football season is fast approaching with the hope that Vince Evans and Walter Payton can carry the Bears to the top of the Central Division and that, somehow, the Bulls can make progress in the NBA.

Otherwise, there's the concern of the economic conditions of the country and whether the industry will begin to feel the impact and the increasing encroachment of home entertainment and how that might ultimately have its effect. But that's off in the future. For now, as always, be well and prosper.

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*Omega Race/Midway*



*Fathom/Bally*



*Moon Shuttle/Nichibutsu*



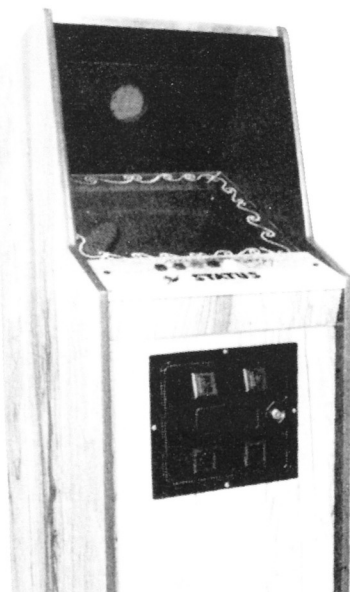
*Cosmic Avenger/Universal*



*Warp-Warp/Rock-Ola*



*Moon Shuttle/Taito*



*Status Games cabinet*



*Red Baron/Atari*

## Fighting your way to Luna

Taito America and Nichibutsu USA have each introduced a new video, *Moon Shuttle*, which poses the mission of defeating the "Prince of Darkness" who mysteriously multiplies his forces.

The game introduces a new "continuous play" feature: at any time during the game and at any number of times, a player can add another coin to receive an additional number of ships and play, stated Taito product literature.

Beginning the one- or two-player game, the player shoots through the Meteor Belt using the space ship's cannon and avoiding the oncoming rocks with the control lever. Sometimes hidden in the meteors is a miniature rocket; shooting it down awards an extra space ship.

Various enemies pose their challenge before the next level is reached. Guarding each level is a meteor belt which increases in speed, the farther the player proceeds.

The "ultimate challenge" is met at the farthest level, where the Blob Man is met fact-to-face. His power is to split up and attack the space ship with his remaining parts. Reinforcement rockets also try to attack the player's ship.

New sound and colorful displays are features of *Moon Shuttle*, which is available in 14 inch and 20 inch monitor tables and two sizes of uprights from Nichibutsu.

*Moon Shuttle* from Taito America is offered in upright and "Trimline models."

## Omega Race In high gear

*Omega Race* video game from Midway Manufacturing features star-like enemy units in an energy field. The Omega player "pilot" must maneuver his fighter ship to outshoot and destroy the steadily attacking aliens and the deadly mines they drop in his path. An aggressive pilot will go after the alien "droids" and Command Ships to score extra points.

Special attention must be paid

when engaging the enemy Death Ship target. This alien appears at random and has greater speed and maneuverability than ordinary droids. Its hyper-accelerated attack is cued and accompanied by special sound effects. Its tactic is to bump or shoot to demolish the Omega fighter.

The Omega fighter is aimed and directed by a Rotation Control Knob. It is powered and propelled by a Thrust Button that can be handled for slow or fast speed throughout the energy field. The Firing Button, when hit, unleashed destructive missile blasts. Clearing the screen earns continued play and a bonus Omega fighter is awarded at high score levels.

Midway's *Omega Race* is made in four models: One- or two-player standard upright, Midway's space saving Mini-Myte, cocktail table style with flip flop screen, plus single player "sit-in capsule" model for arcades and game rooms.

*Omega Race* offers an increase price of play at the player's option—operator adjustable. A single coin gives him the standard number of fighters. Two coins give him double the standard number of fighters plus a bonus fighter. A high score player can also produce his initials and score which remain on the screen for all to challenge.

Special screen display reveals research information to guide the operator regarding play activity in the game such as: high score-1 or 2 credits, number of 1 or 2 credits, and other data. Details are contained in the technical manual.

## The adjustable Cosmic Avenger

*Cosmic Avenger* from Universal USA features a new 8-directional joystick, colorful graphics, and sound effects that constantly reinforce the players' interest.

Ten different targets are featured, including the highly elusive, flashing "X" stations, which when destroyed allow the player to guide his spaceship through miles of "safe passage." The accumulation of miles traveled is recorded on the bottom of the screen as an additional player evaluation besides the conventional ranking based upon points scored.

*Cosmic Avenger* also features an all-new hardware system which

contains "dip switch" flexibility, allowing the operator to not only adjust the number of ships per game and the point level needed to obtain bonus ships, but to adjust the actual "level of difficulty" of the game itself. This means that the operator, after the game has been on location for an extended period of time, can increase the difficulty level in order to cut down on playing time once the players begin to "master" the game. There are four "levels of difficulty" to choose from.

## Battery back-up on Status games

Status Game Corporation, Newington, Connecticut, has introduced four new games, all available in cocktail tables or formica wood-grained upright cabinets.

The videos are Status Games' *Draw Poker*, *Black Jack*, *Video Roul-ette*, and *Chuck O' Luck*, all with color monitors and featuring battery backup in case of power failures.

Status Games, a newly founded company, announced that service manuals are provided for these new videos, and a warranty is set for them. The games are intended for amusement purposes, according to Status Games, but cash payout can be provided, through special order, for areas where payout is legal.

For further information, contact Status Games, 45 Spring Street, Newington, Connecticut 06111; phone: 203/233-5581.

## Now pins talk underwater

Bally Pinball Division announced the release of *Fathom*, a multi-ball pinball game with its challenge of a series of color-coded playfield features, either blue or green, and a multi-ball system, involving up to 3 balls at a time. Depending upon how many balls are in play, all playfield values can double or triple.

Play begins with the top A- B- C rollover lanes, with lane lights that can be rotated by the right flipper button. Each completion of the lane sequence qualifies other lanes for

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The playfield offers an unusual challenge with its two sets of in-line drop targets. These color-coded targets drop only *after* a ball is captured in either saucer trap. These balls are released by hitting the blue or green in-line drop targets. These targets can also be activated by remote control from the left side drop targets, which also multiply the bonus from 3X through 5X, when a ball is not captive.

Players continue through *Fathom* by a series of three drop targets. Knocked down in sequence, these targets light the extra-ball stationary target and advance the lit bonus 5 times. There is only a limited amount of time to hit it.

*Fathom* includes a voice mode that reinforces players' shots, and a beautiful blue underwater theme that helps to create the complete pinball environment.

## Rock-Ola's door in space

Rock-Ola's new video game, marketed in the United States under license from Namco Ltd., *Warp-Warp* is nicknamed "The Challenge of Two Worlds."

The game incorporates two different playfields, "Space World" and the "Maze World," and the player must defend himself against a myriad of colorful imaginary monsters on the raster-type monitor. Depending on his skill, strategy, and preference, the player can alternate back and forth between one world and another by entering the Warp Zone located in the center of each of the worlds when it is flashing. But he soon finds there is no true sanctuary in either of the worlds.

The object of *Warp-Warp* is to score points by defending oneself and destroying the attacking monsters. In the Space World, both monsters and the player are armed. Points are awarded according to the color the monster has changed to as it moves across the screen and toward the Warp Zone. By consecutively defeating monsters of the same color, the player gets special bonus targets in three mystery monsters: a green frog (worth 500 points); a blue octopus (1,000 points); and a purple lobster (2,000 points super bonus).

In the Maze World, the player does not shoot but instead drops "time delay bombs" in an effort to destroy his pursuers. He is awarded points by the number of monsters he destroys with one bomb.

*Warp-Warp* can be played by one or two players and it increases in speed as each "regiment" of monsters is destroyed.

The player is represented by a "fighter" and the number is operator-adjustable from two to five fighters per game. The game is available in an upright cabinet or a new 19-inch cocktail cabinet.

## Red Baron upright appears

A new upright cabinet version of *Red Baron* was recently introduced by Atari, Inc. *Red Baron* is a first-person, aerial-combat game that creates a three-dimensional illusion of attacking enemy planes and blimps on Atari's exclusive QuadraScan "3-D" video display.

A special feature of this new upright arcade version is Skill-Sense, which automatically adjusts the game according to the skill level of the player. The feature thus maintains a consistent average game time. Using Atari's QuadraScan video display heightens the aerial-combat experience by creating a 3-D illusion of attacking planes and blimps against a "realistic" backdrop.

Other features include a high-score table with non-volatile memory. The ten best scores are displayed with player's initials. The non-volatile memory remembers and again displays the top three scores, even after power interruption. To maximize earning power, the operator has the option of four adjustable bonus levels and game "lives."

Operators can order *Red Baron* in both sit-down and standard upright arcade versions.

## For ease of price changing

Equipment Systems and Devices, Inc., Philadelphia has introduced its new GX5 Adjustaprice 5 Coin Slide

available for immediate delivery. Vend prices change up or down in one step. "The total up and down price flexibility of the GX5 solves price increases, price decreases and price features simply in seconds without *disassembly*" according to product literature.

The ESD GX5 fits all existing and currently manufactured extensions with nothing extra to buy. It's complete with price decals and is available factory pre-set according to the operator's current vend price choice.

The GX5 features a delayed coin drop to reduce funnel jams, plus 5 independent locking edges to check coins, helping to eliminate forms of cheating.

The model GX5-110 provides vend prices of 10¢, 25¢, 35¢, 50¢, 60¢, 75¢, 85¢, \$1.00, and \$1.10 and it's convertible up to \$5.00 for less than \$5.00 cost.

## Digital tester signs in

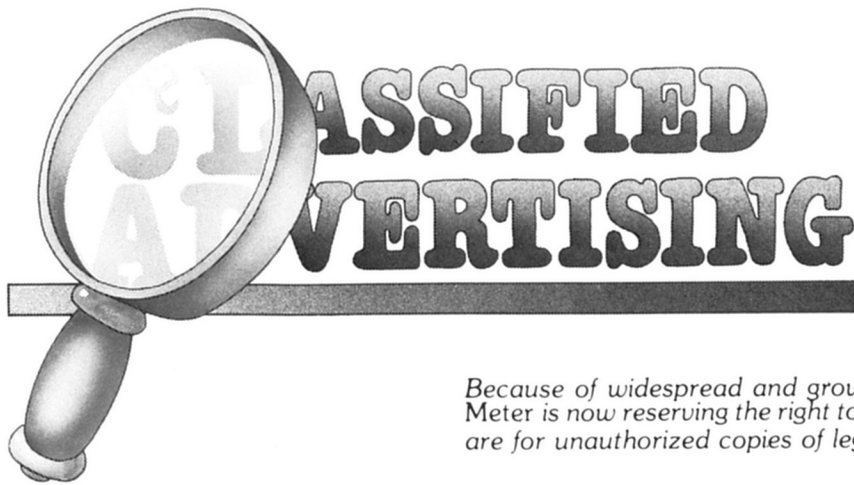
Kurz Kasch's new ROM Test II digital circuit tester allows reading only one signature to determine a "good" or "no good" test. The manufacturer claims the ROM Test II reduces testing time approximately 2 seconds, with its one-step verification.

Testing of 64K devices would normally require probing 80 data lines and reading 80 signatures, said Kurz-Kasch product literature. Now any read-only memory up to 128K can be tested with no probing, and 10 signatures verify operation.

Further details are available, and a demonstration can be arranged, by contacting Kurz-Kasch, Inc., 2271 Arbor Boulevard, Dayton, Ohio 45439; telephone 513/299-0900.



ROM Test II/Kurz Kasch



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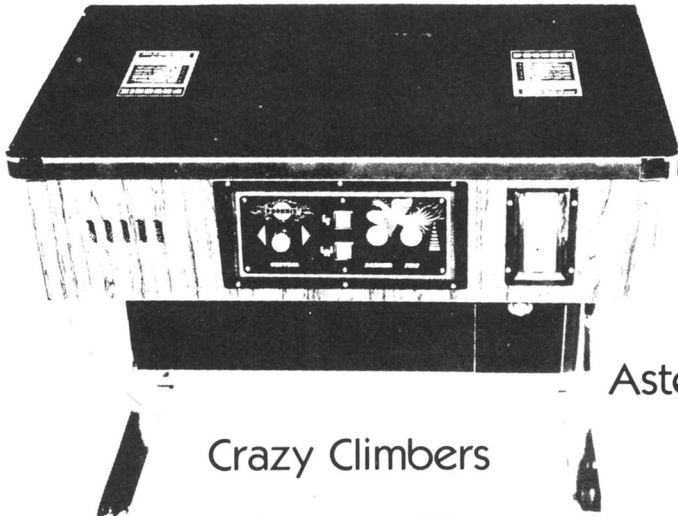
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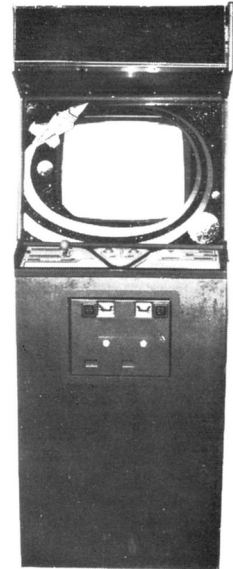
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.....Dynamo, the Grand Prairie, Texas pool table manufacturer, is going through changes and is evaluating a move into the video industry. Mark L. Struhs, director of sales and marketing for Dynamo, commented, however, that it will not abandon its table-making interests. A new pool table from Dynamo, called The Big D, was ready for its market in August following what Struhs termed a period of development for a table that would not require expensive service calls. Big D's frame will be constructed of steel and plywood, with no particle board utilized. "Every table will be consistent and yet the high costs of the development will not severely affect the price to the operator," said Struhs. His company, he added, will be gearing its production to accomodate both quality tables and the new videos it has planned to introduce following its extensive study of producing other coin-op modes than pool tables.....

.....The Amusement Operators of Tennessee held its second annual meeting in Nashville at the Hyatt Regency, July 24 and 25. Highlights included a golf match at Shelby Park and a video and pool tournament at the Hyatt. Prize drawings and industry speakers completed the program, and officers elected included President Bill Stone of Stone Amusement, and Vice President Paul Morrison of Coin Machine Distributing. Milton Hobbs, convention coordinator, reported that attendance at the Saturday night banquet was 56 percent greater than last year's. ....

.....Nichibutsu USA, currently shipping its new Moon Shuttle game from its Torrance, California facility, has announced new positions for two of its officers. Masao Kijima, formerly sales manager, was named general manager of Nichibutsu USA. Brian Ogihara, formerly sales representative, was elevated to sales manager. Details of Moon Shuttle, distributed jointly by Taito America and Nichibutsu USA, are found in the "New Products" section, this issue.....

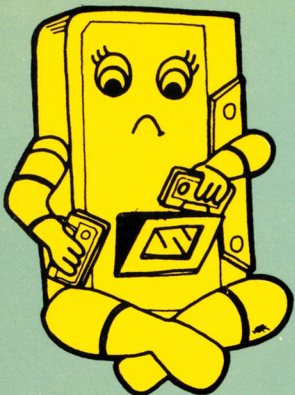
.....Williams Electronics, Inc. announced July 28 that it proposes to make a public offering of \$20 million principal amount of convertible subordinated debentures. The debentures will mature approximately 15 years from the date of issuance. The net proceeds of the offering to Williams will be used to retire its outstanding term indebtedness to its principal lender and as additional working capital. The sale is intended to be accomplished through an underwritten public offering to be made solely by means of a prospectus.....

.....Sellers of computerized poker game machines in South Dakota are violating the state's gambling and consumer protection laws, according to State Attorney General Mark Meierhenry. In an Associated Press news story, the attorney general was quoted as saying that in mid-July, 40 to 50 of the machines had been sold in South Dakota at a cost of about \$3,000 each. The games are "similar to legal video games found in entertainment establishments around the state," Meierhenry said. He noted that persons with the machines in question in their possession can be charged with a gambling violation and that location owners can have their liquor sales licenses suspended when the gray area games are in operation on site.....

.....Following the successful outcome of Coin-Op '81, the Irish Amusement Trades Association (IATA) has reviewed the dates scheduled for next year's exhibition at the favorably located Leopardstown Racecourse Centre. The new dates set for the Irish show are Wednesday, March 31, to Friday, April 2, 1982. ....

# REVOLUTION IN VIDEO GAMES

## "DECO Cassette System™"



### 1. HIGH CASH RETURNS ASSURED

You can be sure of top returns. Now keeping up with the winning games is simple—and cheap.

### 2. NO EXPENSIVE REPLACEMENTS

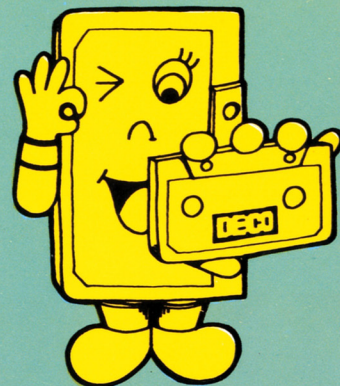
Once a game loses its popularity, there is no need to replace expensive cabinet units. DECO CASSETTE tapes will bring a new game within minutes.

### 3. AMPLE SUPPLY OF NEW GAMES

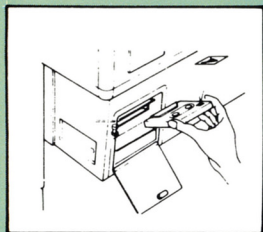
We can supply over 10 DECO original games a year and under license, supply the popular games of other major Japanese makers in tape cassettes too.

### 4. EASY TO CHANGE

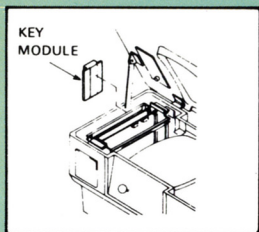
Simply change the cassettes and key modules.



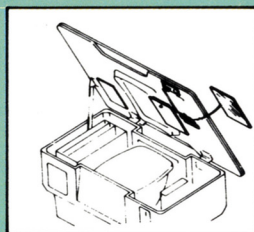
## CHANGE GAME CASSETTE SIMPLY LIKE THIS



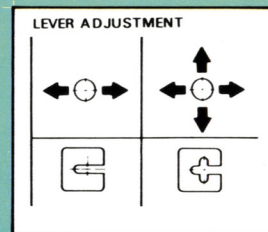
change cassettes.



set key module.



replace explanation panel.



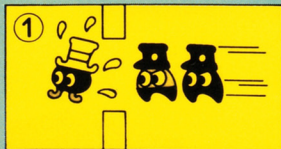
fit the joy stick movement stopper, suitable for the game.

## WATCH FOR OUR NEW GAME PACKAGE

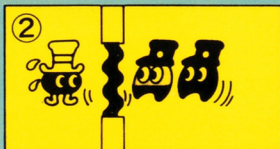


PUSH RED BUTTON  
TO CLOSE SHUTTER BEHIND LUPIN

#### 1 DODGE SUPER Ds



● WATCH OUT / PUSH SHUTTER  
BUTTON NOW LOCK UP SUPER Ds

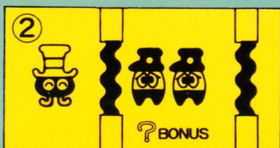


● WHEW /  
THAT WAS CLOSE

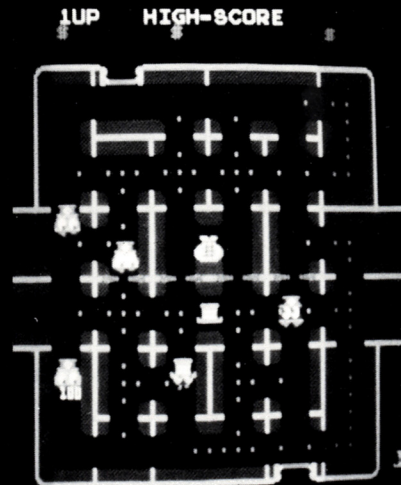
#### 2. LOCK UP SUPER Ds



● QUICK, CLOSE SHUTTER  
BEHIND LUPIN



● HAHA /  
GOT YOU TWO /



- ★ You can use two shutters at one time
- ★ Bonus points awarded when super Ds are locked-up. 1 Super D...100, 2...300, 3...1,000, 4...2,000.
- ★ Get out of maze through flashing "out" doors as soon as gold coins are all picked up.

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game action made possible by ColorBeam's speed, high fidelity voice synthesis with dramatic intonation, and ColorBeam's spectrum of color, guarantee Space Fury a winner.

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