

FOR THE COIN-OP ENTERTAINMENT INDUSTRY PUBLISHED TWICE MONTHLY

PLAY METER

August 1, 1982



COIN
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Annual Service Issue

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PLAY METER

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Educating Technicians

Mike Shaw gives you an update on schools that teach amusement games service people how to deal with their equipment.

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New Direction

Cinematronics recently did something unusual—the manufacturing firm released not one, but two games at the same time. Why the philosophy change?

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On the Battlefield

The copyright wars continue in England and Japan. Roger Pearson takes an in-depth look at the fight in England, and Mike Shaw gives an update on the skirmish in Japan.

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Successful Soldering

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UP FRONT

A veteran operator lamented the fact that at one time in this industry all you needed to fix a broken machine was a screwdriver and a pair of pliers. That may be a bit of an understatement, but, to a large degree, he was right. In the "old days," things were almost that simple. Today, a service technician's repertoire of remedies runs the gambit from logic probe to oscilloscope. The computer age has revolutionized this industry creating a whole new world of service problems and a need for skilled technicians to solve them.

When digital technology first made its impact on this industry, there was a great deal of concern over the serviceman's ability to make the leap from electromechanical to digital dexterity. This was an important concern and proved to be a determining factor in the growth rate of the industry. Looking back, I think it can safely be said that the transition from an old technology to a new technology at the operator level was not only very successful but also took less time to accomplish than most had anticipated. And the ones to thank for all this are the servicemen themselves. In fact, the service technicians of today are the unsung heroes of the computer revolution that took this industry by storm not so many years ago. Had it not been for them, the industry would never have come so far so fast.

While others may tend to overlook the vital role service plays in this industry, we have always maintained that service is a cornerstone of every smooth and efficient operation. That's why *Play Meter* makes

every effort to provide our readers with as much technical information as possible. A game may be the season's best, but if it doesn't work, it's no better than the worst. In this business, downtime is lost revenue. I hate to think of the millions of dollars this industry loses every year because of downtime. If we can help operators beef up their service programs and decrease their downtime, perhaps we can get some, if not all, of those lost millions into their pockets.

This, our annual "Service Issue," is dedicated to all the technicians throughout the entire industry. Technology itself is as volatile as the industry it revolutionized. And you can be sure that the technology of the future will be quite different from today's. When that day comes, you can rest assured that our technicians will be ready and willing to meet the challenge of another revolution. Thanks to their dedication and determination, the industry has been able to handle its growing pains and has come a long way over a short period of time.

To a great extent, the future of this industry rests in the hands of today's technicians; and because of them, the future may not be as far off as we think.



Ralph C. Lally II
Editor and Publisher

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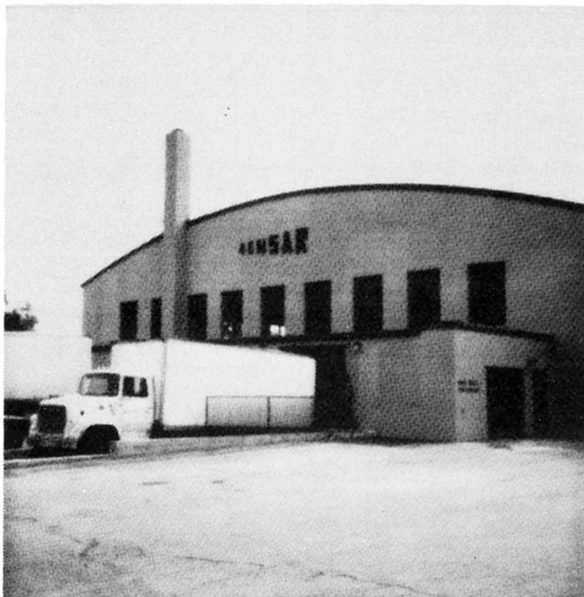
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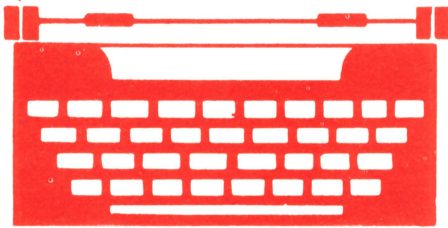
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Letters to the editor . . .



Always the individual

How original! I counted 172 members in the law firm of Jenner & Block—the PR firm retained by AMOA. How prestigious!

To solve our ASCAP problem, the fact sheet asks of us, “Who do you know in Congress?”—exactly what we’ve been saying and doing all along. We didn’t need a 172-member law firm to tell us that. As they say, the more things change, the more they remain the same.

It was always the individual. The last time the ACAP measure was tabled, it was largely due to the efforts of Fred Collins and Garland B. Garrett. The time before, it was Bill Cannon, and if you read the cover of *Billboard* in 1963, it was principally myself. So it remains, that you yourself are still your own best goodwill ambassador—no matter who you hire.

Millie McCarthy
President
New York State Coin Machine
Association Inc.
Hurleyville, New York

Home versions

After paying \$3,400 for my new *Turbo* and \$2,650 for my *Donkey Kong*, I’m standing in one of my locations reading a game magazine on the shelf offering not only *Turbo* and *Donkey Kong* on home video game versions, but *Zaxxon*, *Venture*, *Spectar*, *Phoenix*, and a game that’s just been released, *Tron*, not to mention scores more.

What’s going on? Can’t these manufacturers wait till I finish paying for these games at least, before they release them for home versions?

I’d like to know how the operators of 1982 are coping with increased game prices, as well as higher equipment output from the major manufacturers as well as the smaller manufacturers, and don’t

forget the bootleggers, along with high interest rates, location bonuses, more competition from other operators, and generally lower collections.

Many operators blame the industry problem on the manufacturers, and home games are just part of it. The trade-in market on good used equipment no longer exists as we knew it. Games are almost worthless after a year. That’s if you were lucky.

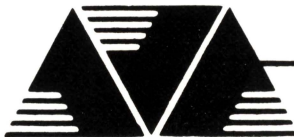
Operators today can’t afford to buy anything but what they think will be a hit, and understandably so. Manufacturers, through their higher output of equipment, have taken an open market and have come close to saturation in just two years. Where

if equipment were released with better timing, the market would be there longer and used equipment would have value.

The major manufacturers have an obligation, to the future of this industry, and not the home market. It was our money that made these manufacturers flourish, and operators should not be “sold out” for the home market.

For just as companies are made, they can be put under. Operators cannot continue to buy equipment for \$3,000 each, and turn it over in six months and stay in business.

The manufacturers have done many good things for the advancement of the industry as well. Innovations made make



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today's game better money-makers than ever before, but rising costs are higher than rising collections.

Everyone must work together as one to make this industry better for operators, manufacturers, and distributors, and the time to do it is now. Because if we don't, a few issues from now, some of you may no longer be in the business at all.

Jack Guarnieri
Brooklyn, New York

Blue sky artists

Our company would like to compliment you on the article you wrote in the January issue of *Play Meter* magazine. Regarding marketing technics of Leisure Time, Quorum, Potomic Games, and other similar type operations. We found it very informative.

Our employees have spent days passing out articles, like yours, at these expos. We too feel obligated to the public by informing them of the irreputability and misrepresentation of profits.

Another successful method which retards the production of these "Blue Sky Artists" is placing ads in local newspapers. I have enclosed a copy of Business Opportunities from the January 24th issue of the *Rocky Mountain News*. Our response has been gratifying.

I hope that other operators and distributors will take the time to invest in ads which discourage business practices such as these.

We again compliment you on your well written article.

Tim Prize
President
Vending Alternatives, Inc.
Wheat Ridge, Colorado

Ed. Note: Here is the ad from the *Rocky Mountain News*:

SCAM II

The cost of a phone call may Save you thousands. Before you get caught in the VIDEO SCAM with a fast talking non-professional working out of his home, car, hotel, or arcade. Call with questions you have, the answers are free.

Something on your mind you want to vent? Got a gripe? Full of praise? Have a question? If you have comments on the coin operated entertainment industry, write to Play Meter. Our "Letters to the Editor" columns are dedicated to you, the operator/reader.

All letters must be signed; if requested, only initials will be used or the name withheld from print. Please include return address (although, for the sake of your privacy, addresses will not be printed.) All letters subject to standard editing. Be concise.

PLAY METER, August 1, 1982



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Electronics Division

PUZZLE ANSWERS

The pin heard 'round the world

(Play Meter, July 15, p. 44)

Recently, a speech was made by someone who was to become a major pinball spokesperson. That speech was literally heard 'round the world. To learn exactly what was said in that speech, complete the names of the following coin-op games, then use the numbers below your answers to insert the appropriate letters into the spaces below to find out the contents of the speech and the people who translated the speech into English for us.

Answers

1. Gottlieb's $\frac{T}{32} \frac{i}{43} \frac{m}{36} \frac{e}{2}$ Line pingame
2. Stern's Sting $\frac{r}{24} \frac{a}{7} \frac{y}{33}$ pingame
3. Midway's Wizard of $\frac{W}{42} \frac{o}{4} \frac{r}{40}$ video
4. Bally's Nip- $\frac{l}{46} \frac{t}{21}$ pingame
5. Williams's Black $\frac{o}{34} \frac{u}{17} \frac{t}{41}$ pingame
6. Game-A-Tron's Space $\frac{B}{18} \frac{u}{35} \frac{g}{3} \frac{g}{22} \frac{e}{37} \frac{r}{27}$ video
7. Gottlieb's $\frac{M}{1} \frac{a}{26} \frac{r}{8} \frac{s}{49}$ God of War pingame

8. Midway's $\frac{O}{16} \frac{m}{48} \frac{e}{10} \frac{g}{25} \frac{a}{11}$ Race video
9. Stern's Big $\frac{G}{30} \frac{a}{20} \frac{m}{13} \frac{e}{29}$ pingame
10. An object important on the backglass of Gottlieb's Pink Panther: $\frac{G}{6} \frac{e}{19} \frac{m}{28}$
11. Bally's $\frac{H}{38} \frac{o}{31} \frac{t}{12}$ Doggin' pingame
12. Midway's $\frac{B}{9} \frac{l}{44} \frac{u}{39} \frac{e}{14}$ Shark video
13. Gottlieb's $\frac{R}{5} \frac{o}{23} \frac{y}{15} \frac{a}{47} \frac{l}{45}$ Flush pingame

The Speech

$\frac{M}{1} \frac{e}{2} \frac{G}{3} \frac{o}{4} \frac{r}{5} \frac{g}{6} \frac{a}{7} \frac{r}{8} \frac{B}{9} \frac{e}{10} \frac{a}{11} \frac{t}{12} \frac{m}{13} \frac{e}{14}$

$\frac{Y}{15} \frac{o}{16} \frac{u}{16} \frac{b}{18} \frac{e}{19} \frac{a}{20} \frac{t}{21} \frac{G}{22} \frac{o}{23} \frac{r}{24} \frac{g}{25} \frac{a}{26} \frac{r}{27}$

$\frac{M}{28} \frac{e}{29} \frac{g}{30} \frac{o}{31} \frac{t}{32} \frac{y}{33} \frac{o}{34} \frac{u}{35} \frac{M}{36} \frac{e}{37} \frac{h}{38} \frac{u}{39} \frac{r}{40} \frac{t}{41}$

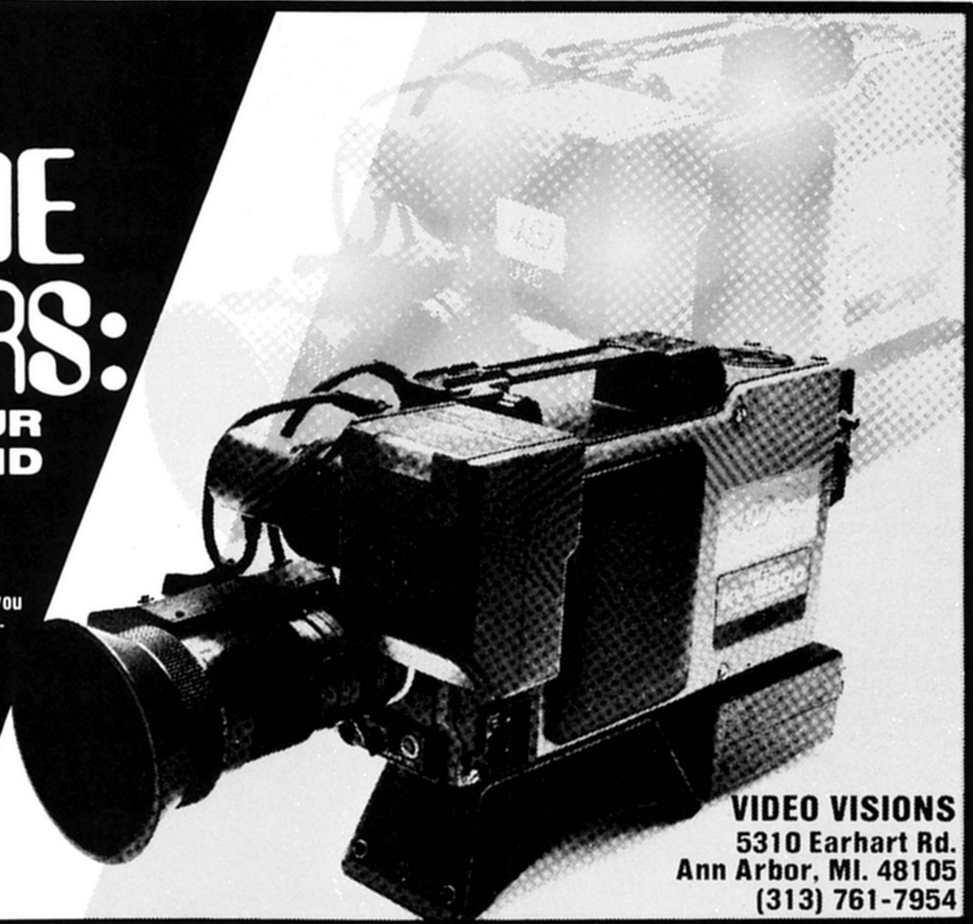
$\frac{W}{42} \frac{i}{43} \frac{l}{44} \frac{l}{45} \frac{i}{46} \frac>a}{47} \frac>a}{48} \frac>s}{49}$

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DYNAMO

Play Meter

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. Amounts are heavily weighted by averages reported from arcade locations; street locations are generally lower. 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.

TOP VIDEOS

Fourteen of 23 videos (61%) with a response rate over ten percent have above average earnings.

	Aug. 1	July 15	July 1
National video average.....	\$176	\$184	\$179
1. <i>Zaxxon/Gremlin</i>	\$236	\$253	\$265
2. <i>Robotron/Williams</i>	\$230	\$237	\$231
3. <i>Ms. Pac-Man/Midway</i>	\$223	\$243	\$235
4. <i>Dig Dug/Atari</i>	\$209	\$243	\$250
5. <i>Turbo/Gremlin</i>	\$202	\$231	\$230
6. <i>Donkey Kong/Nintendo</i> ..	\$196	\$215	\$226
7. <i>Stargate/Williams</i>	\$188	\$204	\$197
8. <i>Galaga/Midway</i>	\$184	\$210	\$186
9. <i>Pac-Man/Midway</i>	\$180	\$193	\$194

TOP PINBALLS

Six of 11 pinballs (55%) with a response rate over ten percent have above average earnings.

	Aug. 1	July 15	July 1
National pinball average	\$114	\$128	\$113
★ 1. <i>Caveman/Gottlieb</i>	\$175	\$194	\$190
★ 2. <i>Devil's Dare/Gottlieb</i>	\$150	\$132	\$150
3. <i>Mr. & Mrs. Pac-Man/Bally</i> ..	\$129	\$161	\$161
4. <i>Centaur/Bally</i>	\$120	—	—
5. <i>Haunted House/Gottlieb</i> ..	\$120	\$128	\$125

★ 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%)

VIDEOS

Provisional Ratings	Aug. 1	July 15	July 1
<i>Looping/Venture Line</i>	\$222	\$217	\$217
<i>Frenzy/Stern</i>	\$202	—	—
<i>Wild Western/Taito</i>	\$195	\$250	—
<i>The Pit/Centuri</i>	\$192	\$196	\$206
<i>Alpine Ski/Taito</i>	\$179	\$211	\$220

PINBALLS

Provisional Ratings	Aug. 1	July 15	July 1
<i>Orbitor 1/Stern</i>	\$134	\$139	\$180

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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NEWS

By
Mike
Shaw

ZAXXON SOARS ON TV • GRAY IS OK IN PA • DRAW POKER LOSES IN NEW YORK • MIDWAY SUES ELCON • STATEWIDE TAX SOUGHT • KANSAS CITY OPERATORS UNITE • OPS TRY TO EVOKE STATUTES • NEW YORK, NEW YORK • S&H DENIES SALE TALKS • ARCADE ARTHRITIS • VALLEY CUES UP • NINTENDO TO BUILD IN SEATTLE • BUSCH POOL LEAGUE WINNERS • ADMA MEETING PRODUCES CHANGES • TUNI IMPROVES WARRANTY • VIDEOS ON THE RISE • DOCTOR RATES RAGE • YOUTH RESEARCHER BACKS VIDEOS

ZAXXON SOARS ON TV

Sega's *Zaxxon* was featured in 30-second television commercials beginning June 22 for two weeks in the Los Angeles area.

Calling the commercials a "revolutionary marketing experiment," Sega Chairman Dave Rosen said the TV spots were probably the first coin-operated video game commercials based on a specific model.

The commercials featured *Zaxxon*'s game play and its number one ranking based on recent *Play Meter* and *RePlay* surveys. "...this will not be an ordinary commercial, but rather one that is somewhat spectacular in that it includes computer graphics," Rosen said in a letter to industry personnel in the Los Angeles/San Diego area announcing the *Zaxxon* TV commercial.

"We at Sega are very excited regarding this commercial, and we hope Sega's *Zaxxon* TV commercial marks the beginning of an on-going program which will, among other factors, enhance the image of the industry of which we are members," he continued.

GRAY IS OK IN PA

"Gray area" games are not so gray in Pennsylvania. There, courts have ruled that an Electro-Sport video *Draw Poker* game is not *per se* a gambling device under Pennsylvania law.

Initially, law officials seized the game from a bar in suburban Pittsburg. Officers did so assuming that the game was a violation of state law against gambling devices. But when the game's owner

begged the Court of Common Pleas of Allegheny County to return his *Draw Poker* game, Judge Robert E. Dower did so based on his determination that the game is not a gambling device under Pennsylvania law.

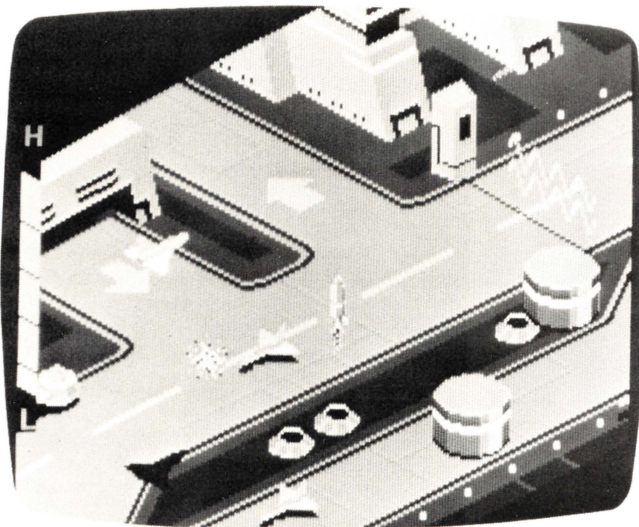
Kemal Mericli, an assistant district attorney, said the court judged that the machine required an amount of skill that would classify it as a non-gambling device.

"It requires the amount of skill required for poker," Mericli reported on the court's ruling.

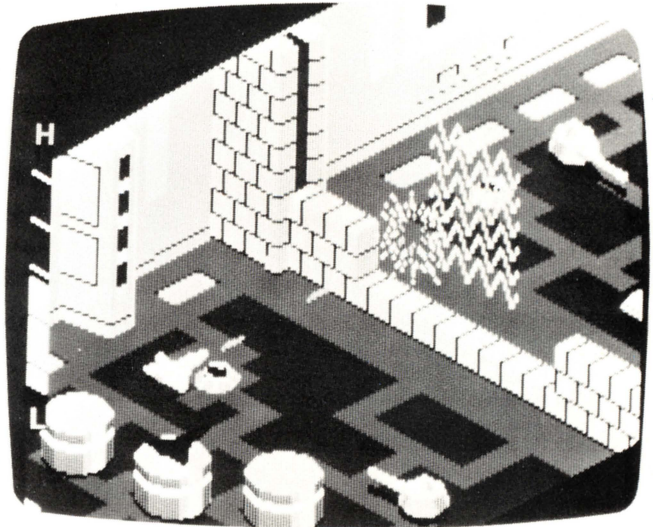
Mericli and the district attorney's office made an effort to get the lower court decision reversed in the state's Superior Court, but to no avail.

"The position of the district attorney is that the game is a gambling device because there is no significant amount of skill required to play the game and because of the mechanical adjustments to the machine."

A "dip switch," a "knock off" meter, and certain coin adjustments are indications to the district attorney's office that the game



Sega/Gremlin's TV announcements highlighted *Zaxxon*'s new screen display with detail, color, and 3-dimensional realism. Here a player craft approaches an energized laser barrier.



Players score points by maneuvering the fighter plane and firing on enemy missiles, gun emplacements, and other player obstacles.

is used for gambling and that payouts are issued to successful players.

"The amount of skill required to play the game," said Mericli, "is comparable to the kinds of things kindergarten children do when they circle pictures on the back of their readers."

The Superior Court's decision to uphold the lower court's ruling has been appealed to the state's Supreme Court, but there has been no information released as yet as to whether or not that court will consider the appeal. •

DRAW POKER LOSES IN NEW YORK

Electronic *Draw Poker* games have been banned from Niagara County, New York. In a lower level court decision for the western district of the state of New York, the Sircoma (now International Games Technology) *Draw Poker* game was declared an illegal gambling device, and its destruction was ordered.

Five of the Sircoma games were declared contraband and destroyed.

In referring to the decision, First Assistant District Attorney Stephen Shierling said that his office acted to keep the games out of Niagara County for fear that they were backed by organized crime.

The decision against the *Draw Poker*

machines was the result of consideration of New York state law, other states' analogous laws, and federal laws, Shierling said.

"The publicity was as effective as the ruling," Shierling reported. He said that when attorneys for Sircoma, who owned and were leasing the offending pieces, became aware of the publicity surrounding the destruction of the games, they decided not to attempt an appeal to the decision of Niagara County Judge Charles J. Hannigan.

Shierling opined that Sircoma had placed the machines to test legal authorities' reaction to them in hopes that the games could be installed throughout the state in connection with the state lottery system.

Although owners of the taverns where the five machines were seized were not prosecuted, the district attorney's office issued directives to law enforcement agencies throughout the county to "seize any such machines and arrest persons who maintain them." •

MIDWAY SUES ELCON

Midway Manufacturing has succeeded in enjoining Elcon Industries from using *Pac-Man* and other Midway printed circuit boards in its cabinets.

In a decision rendered by the U.S. District Court in Detroit, Elcon and its parent, Micropin, were ordered to stop marketing games that utilize *Pac-Man* or *Galaxian* boards.

They were also ordered to stop selling *Piranha* videos. *Piranha* is a Universal USA game that the company produces under a separate agreement with Midway. It, too, is considered a derivative of *Pac-Man* by Midway.

A distraught Andre Dubel of Elcon told *Play Meter* that he stopped selling *Pac-Man* and *Galaxian* games several months ago when Midway announced its intention to prosecute people marketing unlicensed versions of its games. He said he was warned against selling games that contained Midway boards at the Operator's Amusement Expo in March 1981 in New Orleans and again at a later related industry show in Chicago.

"We built 'knock-offs' like *Galaxian* and *Pac Man*," admitted Dubel, "like hundreds of others were doing, but we stopped about a year ago."

The injunction is in force while Midway and Elcon try to hammer out a deal that would compensate Midway for games sold by Elcon. That deal, according to Dubel, currently is set at \$500 per *Pac-Man* and *Galaxian* sold and \$200 per *Piranha*. Dubel said these figures would apply to about 80 *Pac-Man* and *Galaxian* games and about 50 *Piranha* games.

Dubel said that Williams Electronics has asked Elcon to pay \$700 for each *May-Day* it has sold. *May-Day* reportedly infringes on *Defender*. Additionally, Elcon has sold several *Crazy Kong* games and some have been seized from their owners by Nintendo of America as infringements of *Donkey Kong*. •

STATEWIDE TAX SOUGHT

Rep. Carl Boyes of Erie has introduced legislation into the Pennsylvania House of Representatives that would eliminate the power of localities to tax amusement operators. House Bill 2206 would empower the state to set a fee, and then channel the monies back to local communities.

The newly formed Pennsylvania Amusement and Music Machine Association supports the measure which would replace the frenzied and unequal ways amusement operators are currently taxed throughout the state.

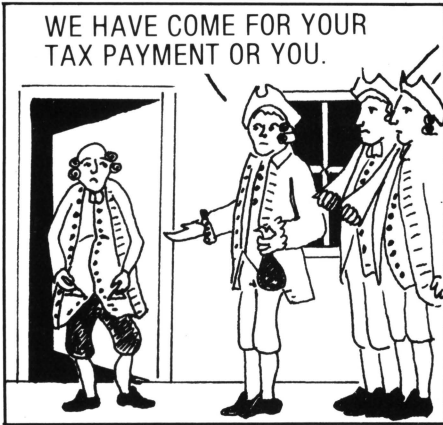


Niagara County District Attorney Peter Broderick wields a sledge hammer to destroy one of five video poker games declared illegal and ordered destroyed in Niagara Falls. The city's police superintendent, Anthony Fera, admires Broderick's handiwork and waits his turn with the sledge.

The city of Etna, Pennsylvania, recently passed an ordinance to license arcade (five games or more) operators at \$5,000 per year. This fee will be in addition to existing fees of \$250 per video.

"Amusement taxes and licensing permits, laws, and proposals vary from \$25 per machine to a 10 percent tax on gross receipts," said Herb Lottier of the association. "Under the current bill, the state wants \$100 per machine, but our goal is to reduce that figure."

The legislature's \$100 figure was devised from Rep. Boyes's estimate of 75,000 machines in use in the state, but Lottier thinks there is probably about 200,000 coin-operated amusement pieces in Pennsylvania. The association's initial effort is to make an accurate count of



machines, and lessen the tax burden per piece.

The bill is popular in its essence, reported Lottier. Indeed, the main argument seems to be over content.

"Some kind of bill is necessary," asserted Lottier.

But not everyone agrees. Under the proposed bill, communities who have taxes or fees in place would be reimbursed by the state for those amounts. But communities that did not have fees imposed before Jan. 1, 1982 might be left high and dry. At least, they would have no claim to a specific amount of the state collection.

In Castle Shannon, a suburban Pittsburgh borough, Mayor James Milcarek has voiced his opposition against the bill.

"I think it's a futile effort by the vending companies to get people like me off their backs," he said as he labeled an ordinance to raise a video/pinball fee from \$100 per year to \$200 per year "fastastic."

Under HB 2206, 25 percent of taxes collected from the amusement industry would go to support programs for Pennsylvania's handicapped citizens.

"As a result of that provision," said Lottier, "we have additional support from other lobbying groups."

The bill will be discussed throughout the state in a set of local hearings chaired by the bill's author. Passage of some form of HB 2206 is expected early in 1983.

KANSAS CITY OPERATORS UNITE

The threat of a \$100 tax on videos has created a major headache for operators in Kansas City, Missouri, and has forced them to band together to fight the debilitating legislation.

The proposed fee would be an increase of \$85 over the current \$15 fee locations pay. Though locations pay the fees, operators split the costs as they do the revenues from the games. Additionally, the county assesses a \$5 charge per game.

Tom Bengimina of B&G Amusement and Vending has taken charge of the new Kansas City Area Operators Association. The organization's first meeting was attended by 25 of the 30 operators in the city. These operators then showed up in force at a city council meeting to explain their plight and offer alternative measures.

"They're making a pile of money," John M. Urie, city finance director, said of the operators' businesses. "We ought to be able to get some of it."

Councilman Emanuel Cleaver, proposed that the increased tax revenue could help assuage a hard-pressed city budget and estimated the number of machines on location in the city to be about 20,000.

Bengimina said the Cleaver estimate is absurd.

"He did not poll any operators or any distributors to get his figures," Bengimina said. He contends there are about 6,000 games on location throughout the city.

"I wish we had never bought the first video game," Bengimina said. He said that all the publicity surrounding *Pac-Man* and other videos has led city officials to believe that profits are excessive for operators. Politicians don't take into account "the machines you buy every month that don't make enough to pay their freight, or the fact that distributors don't take trade-ins anymore," Bengimina said.

The Kansas City Area Operators Asso-

Roger Sharpe's column, Critic's Corner, will be back in the next issue of *Play Meter*. He's covering the Consumer Electronic Show in Chicago for *Play Meter*.

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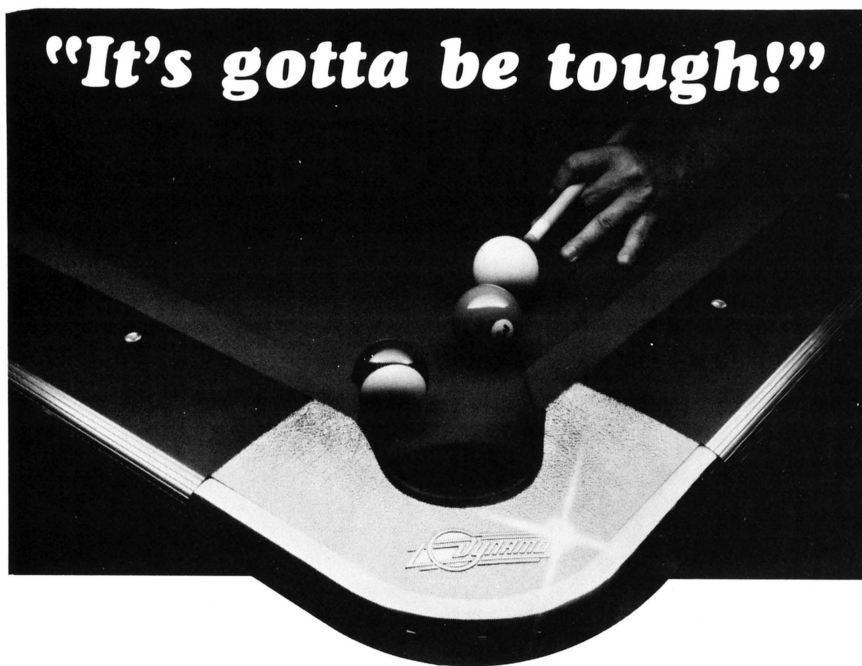
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ciation's efforts are meeting with success, Bengimina said. The council is leaning toward a lower fee, he said, admitting that some increase would be acceptable to operators, since \$15 has been the annual rate since the city first licensed coin-ops.

"We must give the devil his due," Bengimina said.

The operators believe a fee of \$25 to \$30 would be appropriate and feel the city will agree and the county will then raise its charge from \$5 to \$10. •

OPS TRY TO EVOKE STATUTES

Community officials throughout the U.S. have mulled over the problem of how to provide something to do for local youths. While American society provides a multitude of entertainment availabilities for adults, very little has been done for school-age youths.

Until the evolution of the neighborhood arcade, that is.

And now that community officials' questions have been answered by the amusement operators of America, many authorities are not so sure they wanted an answer at all.

Such is the position of Mayor Nicholas Corbiscello of Fort Lee, New Jersey. He and his council mates have imposed a moratorium on games in his borough. He fears the effect an arcade might have on "children and traffic."

But a former country health official and his company, Cosmic Vending, are challenging the mayor's moratorium. Richard Censullo and his partners, who wish to open a "coin-op electronic game family fun center" in Fort Lee, are also challenging the town's ordinance that allows but two games per establishment.

Cosmic will argue that the moratorium is a violation of federal anti-trust legislation, and that the city has no right to impose such a moratorium. A Cosmic victory could have national implications if federal law is evoked.

However, Cosmic Vending will have to fight an uphill battle. Its suit is filed in Bergen County Superior Court, and on June 7 there, Judge Harvey Smith ruled that Steven Steinberg was not entitled to licenses for 40 video games in a proposed arcade in Cliffside Park because a borough ordinance limits licenses to three per establishment. •

NEW YORK, NEW YORK



A New York City Supreme Court justice ruled that the city can use zoning laws to close 27 video game parlors. Consecutively, Justice Thomas Galligan ruled that the city could not use the laws to shut down peep shows because they are protected by the U.S. Constitution.

The judge issued an opinion that films, whether in theaters or in coin-op booths, are clearly covered by the First Amendment but video games are not.

The decision came June 15 as the culmination of a yearlong suit brought by the city against operators of 50 sex shows and video game parlors. The city sought a halt to operations in certain neighborhoods, contending the businesses violated zoning laws and caused traffic, parking, and crowd problems.

"This is a great town," said Sheldon Camhy, attorney for two video game arcades. "The children will be free to look at dirty pictures but not to play *Pac-Man*."

S&H DENIES SALE TALKS

S&H Distributing President Mrs. J. W. Hughes denies any attempt at a purchase arrangement for her company by Morgan's Restaurants.

"I never talked with anyone from

Morgan's Restaurants," Mrs. Hughes said in response to a *Play Meter* July 1 news story.

Although an executive of the company originally confirmed Morgan's buy-out attempts, Hughes flatly denied any such meetings or conversations ever took place. She said that at the time the Morgan's buy-out story was reported, another company was making overtures to S&H. But the offers never came to fruition, and she re-emphasized, were not from Morgan's. •

ARCADE ARTHRITIS

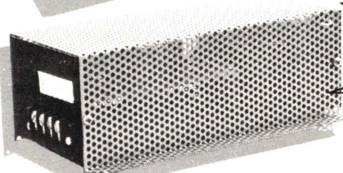
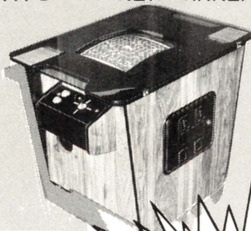
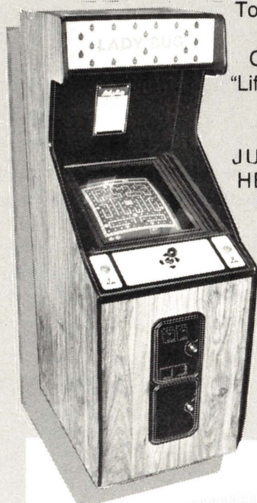
Emory University School of Medicine rheumatologists have released a study contending that millions of habitual video game players may come down with "arcade arthritis."

The study, conducted by the Atlanta school's rheumatologists and released at a recent meeting of the Pan-American Congress of Rheumatology, said that 65

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percent of players polled in the survey had temporary arthritic conditions or other noticeable physical complaints.

"The rapid repetition of motion in handling the controls is causing the injuries, said Dr. Gary Myerson, chief investigator of the study and a senior fellow in rheumatology and immunology at Emory.

Two temporary arthritic conditions were noted in the study, arthralgia and tendonitis. Arthralgia results in neuralgic pain in the fingers, wrists, palms, and arms. Tendonitis brings about an acute inflammation and redness in affected areas. The study of 142 arcade patrons also discovered blisters and callouses on the hands of players.

Myerson stressed that the symptoms were only temporary, usually disappearing within 24 hours after playing. it was

reported by the *Los Angeles Times*. However, he noted, his findings are only preliminary, and he plans to continue extensive study to determine if any permanent arthritic problems might be caused by playing the games.

Myerson is reportedly a video game enthusiast himself and offered that manufacturers could help reduce arthritic problems and related minor injuries by using softer plastic and by designing hand controls with a more natural wrist position. •

VALLEY CUES UP

A new service to provide cue buyers with fast response to orders has been inaugurated by The Valley Company, Bay City, Michigan, with cue manufacturing facilities in Shakopee, Minnesota. By dialing 1-800-248-CUES toll free, the buyer can order any of the Valley one- and two-piece cues. That order will usually be shipped within 48 hours.

"When a cue buyer needs his order, he needs it *fast*," said Valley's president, Charles P. Milhem. "We've always prided ourselves on both the quality of our products and the service we provide," he continued, "and this new hot line is one more way that says Valley cares about our customers."

An inside sales person has been assigned to expedite orders coming in on the 1-800-248-CUES line. Customers are instructed to ask for Melody who will process the

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VALLEY

order, and make certain it is shipped within the specified time. •

NINTENDO TO BUILD IN SEATTLE

Nintendo of America has purchased a parcel of land in Redmond, Washington, where it hopes to get the assistance of the City Council to build its new manufacturing facility.

Nintendo will pay \$4.3 million for 13.4

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The members of the 1982 Busch Pool League National Championship's winning team happily display their first place prize, a check for \$10,000. The six-member Jimmy's Bar team of Sandusky, Ohio, was one of 16 teams that competed at the 1982 Busch Pool League National Championships held recently in St. Louis, Missouri. Team members are Dave Mougey, Tony Mougey, Doug Bourque, captain, Dave Ives, Bill Wilder, and Del Williams.



Michael Palmer, marketing manager for the Busch Brand, Anheuser-Busch Inc., presents Doug Bourque, the captain of the 1982 Busch Pool League National Championship's winning team with the first place prize check for \$10,000. Bourque is the captain of the Jimmy's Bar team.

acres of land on the southwest corner of the intersection of Northeast 51st Street and Highway 520, east of 148th Avenue Northeast in the Seattle suburb.

A \$2.5 million building—four are planned—will include 65,000 square feet for assembly and distribution of videos. Later expansion will allow the American arm of Japan's major manufacturer to produce home video games and computers for nationwide distribution.

A key element in financing the new plant is a city bond package valued at \$7 million. According to Nintendo's Ron Judy, all indications are that the bond issue will be approved by the Redmond City Council.

"The intent of the council is to spur new development," Judy said.

The bonds will be issued as municipal offerings and therefore will pay tax exempt interest to investors.

Nintendo likes the Seattle area because of quality labor available, easy access to materials in the Northwest, closeness to Japan, and the good facilities of the Port of Seattle.

The new plant will manufacture some game components, but all assembly and cabinetry work for games sold in America will be performed there. •

BUSCH POOL LEAGUE WINNERS

Dynamo Corp. announced that the Jimmy's Bar team of Sandusky, Ohio, was the winning team of the 1982 Busch Pool League National Championships held recently in St. Louis Missouri.

The national amateur 8-ball league, offering \$33,000 in guaranteed cash and prizes, is co-sponsored by Dynamo and Anheuser-Busch Inc.

The Jimmy's bar team won the finals over the Northside Tavern Club team from Tampa, Florida, 3-1. For its efforts, the Jimmy's Bar Team was awarded the first place prize of \$10,000.

For achieving second place, the Northside Tavern Club team received \$5,000.

The Ballbusters team, St. Petersburg, Florida, and the Long Branch team, St. Louis, Missouri, placed in the semi-finals; each team received \$2,500. Fifth- through eighth-place teams each received \$1,250 and ninth- through 16th-place teams each received \$1,000.

"We are very pleased with the enthusiastic response to and the turn-out for the Busch Pool League tournaments," said

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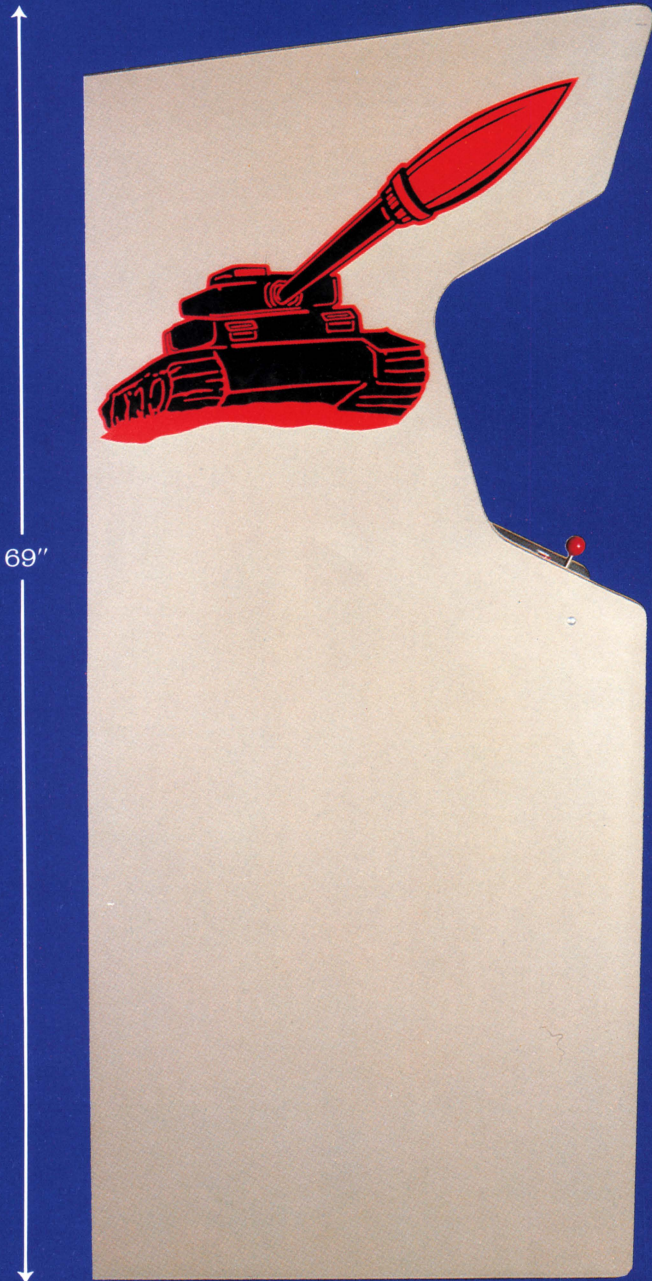
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Mark Struhs, vice president of sales and marketing for Dynamo Corp. "We are particularly pleased that the Busch Pool League is dedicated to amateur pool players since this allows these players to polish their skills and compete for monetary prizes and prestige in a national championship."

Sanctioned by the American Pool-players Association (APA), the Busch Pool League is a grass roots amateur team league that features weekly divisional play on coin-operated tables in taverns. Local winners advance to regional tournament competition, with the top teams there advancing to the national championships.

Dynamo's *Big D* coin-operated pool table was selected by Anheuser-Busch and the APA as the official league and tournament table for the Busch Pool League.

The game played in the league is a unique handicap version of 8-ball. The handicapping system allows players of different skill levels to compete equally in match play. As a result, Superstar players like Dave and Tony Mougey of the Jimmy's Bar team had to win several more games than their opponents to win a match.

Sixteen teams competed in the national championship. The Southeast Region and the Northeast Region were represented by four teams each with the Midwest Region being represented by eight teams due to a larger number of players from the region participating in the league.

ADMA MEETING PRODUCES CHANGES

The Amusement Device Manufacturers Association (ADMA) held its annual meeting in Chicago June 7 and introduced its new executive director.

Glenn E. Braswell comes to the association after 12 years with the United States Brewers Association. His credentials

The telephone number and address for Video Games Ireland Ltd. and its sister company, Amusement Machine Distributors Ltd., was not in the Directory. The companies' telephone number is Dublin 694888, unit 404. The address for Video Games Ireland is 77 Benburb St., Dublin 7, Ireland. Amusement Machine Distributors is located at 6 Callender St., Belfast BT1 5HX.

include a law degree from Emory Law School, Atlanta, Georgia. He is admitted to practice in all local and federal courts in Washington, D.C., as well as the U.S. Supreme Court.

ADMA also announced a name change to the Amusement Game Manufacturers Association (AGMA). The name change is effective immediately. But it was noticed specifically on July 1 when the association's headquarters were moved to the Washington, D.C., metropolitan area.

The relocation of its national office was noted by AGMA as an indication of the new emphasis to be asserted on legislative and regulatory problems facing manufacturers and the industry at large.

AGMA announced an increased level of activity in public affairs starting with participation in the National Conference of State Legislatures, the National Association of Counties Convention, and, later in the fall, the Congress of Cities. These three events are viewed by AGMA as providing the industry an opportunity to present its views to governmental decision makers from all levels of administration and from all parts of the U.S.

Following the general program, the members filled two vacancies to the Board of Directors by electing Glenn K. Seidenfeld

Jr. of Bally Manufacturing Corp. and Richrd Simon of U.S. Billiards each to a term of three years. Following the annual meeting, the new Board of Directors met and elected officers for 1982-83: Joe Robbins, president; Duane Blough, vice president; and Richrd Simon, secretary/treasurer.

TUNI IMPROVES WARRANTY

Tuni Electro Service, in a move designed to build operator trust in its Convertible Video System (CVS), is offering what it contends is the industry's first full one-year warranty on its games.

Tuni's CVS library of convertible games will carry 12 months of protection for parts, printed circuit boards, and television monitors. If "defects in workmanship" or "material" are present in any of its CVS games, Tuni will "repair, replace, or credit

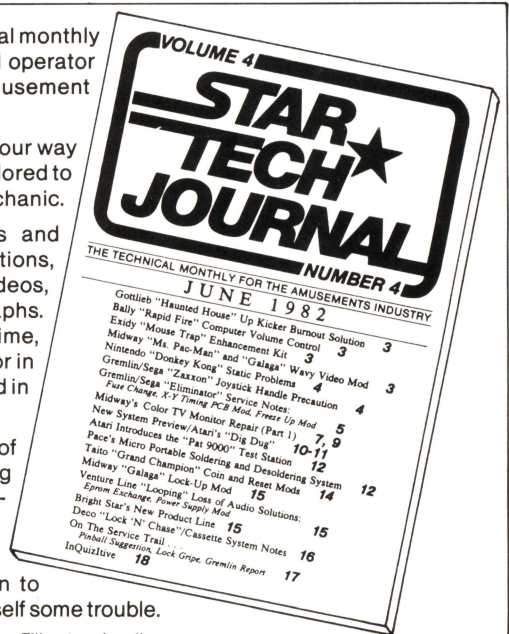
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THE CALENDAR

September 10—11

Wisconsin Amusement and Music Operators, Paper Valley Hotel and Convention Center, Appleton

September 10—12

Joint North and South Carolina Associations meeting, Radisson Plaza Hotel, Charlotte

September 24—25

West Virginia Music & Vending Association convention, Ramada Inn, South Charleston, West Virginia

October 7—10

NAMA convention and exhibit, The Rivergate, New Orleans

October 14—17

ENADA (exhibition of coin-op amusement machines), Congress Building (EUR), Rome, Italy

October 15—16

Amusement and Music Operators of Virginia, annual convention and

trade show, John Marshall Hotel, Richmond

November 18—20

AMOA Exposition, Hyatt Regency Downtown, Chicago

November 18—20

IAAPA annual convention (Parks Show), Bartle Hall, Kansas City

1983

January 10—13

ATE 39th Amusement Trades Exhibition, Olympia, London, England

March 16—17

Nihon Amusement-Machine Operator's Association, second amusement expo, Shinjuku N.S. Building, near Keio Plaza Hotel, Shinjuku, Tokyo.

March 25—27

Amusement Operators Expo '83, Hyatt Regency O'Hare, Chicago

NEWS

purchaser's account for such products which are returned to Tuni during the warranty period."

The full-year warranty will be retroactive to cover every applicable CVS game the company has sold.

"We are not aware of any other legitimate video game manufacturer offering a full-year warranty," indicated Tuni's marketing director, Alan Rosbrook. "We want this industry to know we are building a quality product that will compete with any game manufacturer, large or small."•

VIDEOS ON THE RISE

Warner Communications Chairman Steven J. Ross told the company's annual meeting that the popularity of video games is on the rise.

Far from following recent published reports that the video market has reached saturation, the chairman of Atari's parent firm reportedly indicated that he believed more than 44 million homes worldwide will eventually have a player within.

Ross said that 15 million homes were expected to house players by the end of this year. •

DOCTOR RATES RAGE

University of Nebraska Medical Center studies show video games can help determine stress factors in patients.

Dr. Robert S. Eliot, chairman of the center's department of preventive and stress medicine—and a much quoted figure relevant to the relationship of stress and video games—said the games are useful in deciding whether patients need medical assistance or counseling for stress.

He said his department has used video games for several years as part of its system for determining susceptibility to stress problems. Tests provide up to 136,000 pieces of data that relate to body chemistry and physical responses.

"Video games can be a form of relaxation for many people," he said. "But we use video games as a diagnostic tool because they offer one way of testing how an individual deals with pressure.

"They duplicate part of the mental tasks

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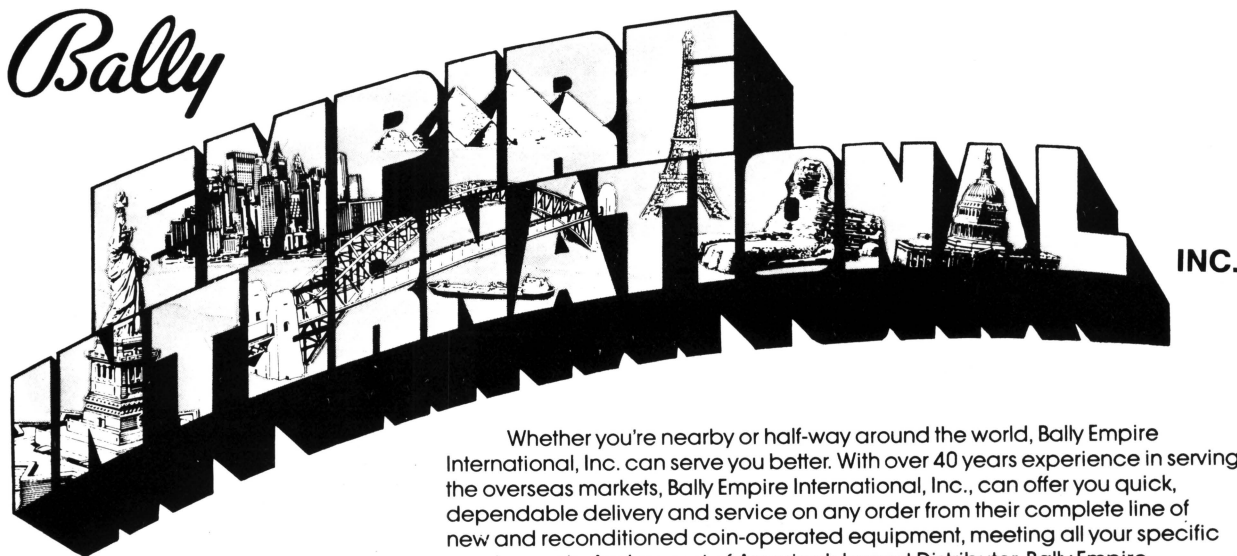
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that people face in daily life. We can determine that if they overreact in terms of bodily response to video games, they will do so in the real world."

Eliot has labeled those who respond vehemently to videos as "hot reactors." He said blood pressures can soar from 130/80 to 220/130 in a few minutes.

"They have no idea they are paying that kind of physiological price," he warned. •

YOUTH RESEARCHER BACKS VIDEOS

A former high school principal has addressed the Boston video game moratorium (*Play Meter*, July 15, p. 19) in a letter to the city's mayor, Kevin H. White.

Dr. B. David Brooks sent the mayor findings of a research project that answers many questions asked by parents and other concerned citizens about video games and their effects on youth.

Brooks finds that "the evidence seems clear. A well lit, well-supervised video arcade poses no more a threat to American youth than their congregating at athletic

events, pizza parlors, school dances, amusement parks, or soda fountains...My experience is that they (youth) are better off spending their quarters on a video game in a public arcade than on a "joint" in a not so public place. If it comes down to drugs, guns, gangs, or games, I'll take the games!"

Brooks is a specialist in the prevention of juvenile crime and has found common points shared by troubled youths.

"I find several threads that run through the many stories of violence and crime so common among children today," wrote Brooks.

Young people share a prevailing feeling of boredom, offered Brooks. Troubled youths often complain of having nothing to do.

"They can't go to parks because parks are 'controlled' by other youth. School facilities and recreation facilities are often closed when most needed—evenings and weekends—and a two-hour movie runs anywhere from \$3 to \$6.

"They see the video arcade as an exciting, enjoyable, and safe place to spend their leisure hours. In addition, they report—and my research verifies—that teenagers can play a video game for a fairly long time on 25 or 50 cents."

Brooks indicted that teens told him they have merely switched targets for the money they spend. They have receded from purchasing records and tapes and have decreased attendance at movies. Brooks said teenagers' changing tastes are evident

when noting the downturn in revenues in these industries.

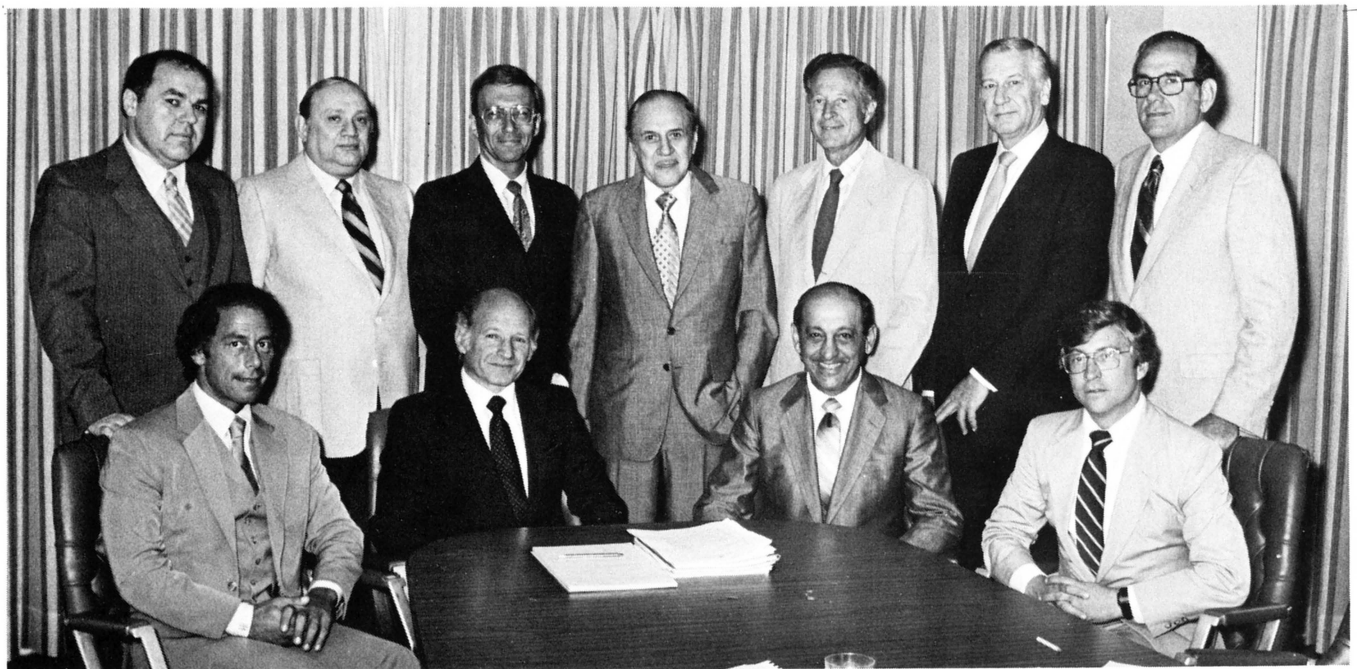
Brooks said that children who commit crimes share a need for excitement that drives them to criminal activity. Following years of seeing bizarre acts of violence on TV, "they find life's real experience dull.

"They tell me," Brooks continued, "the video games offer them a thrill, in addition to the chance to compete with themselves. As I observe the children of the 80s, I find this to be a very positive sign. I am beginning to see some examples that the challenge of competing against oneself and finding success may have carry-over to other aspects of these children's lives.

"I am greatly concerned about the plight of youth today," Brooks wrote. "They are surrounded by *actual*, not vicarious violence on TV and in films.

"They are not being taught basic values so necessary for survival of our American way of life, and they are entering the age of electronics and change at a pace never before known to man.

"I do not work for the electronic video game industry, nor do I own their stock. But I do have stock in the future of America, and that future is dependent on our youth. I encourage you and your staff to look very carefully at the positive aspects of video game amusement centers and their use by our nation's children. The small minority, albeit vocal, who oppose video games do not have *factual*, researched information." •



The AVMDA (Amusement and Vending Machine Distributors Association) recently held a board meeting to discuss an industry public relations program to supplement its Community Relations Manual. The AVMDA Board of Directors includes: (seated left to right) Ira Bettelman, Jerome Gordon, Rubin Franco, and Jon Brady. Standing (left to right) are Alexander Kress, Norman Goldstein, Allen Fagel, E. G. Doris, Albert Rodstein, Dean McMurdie, and Stephen Lieberman.

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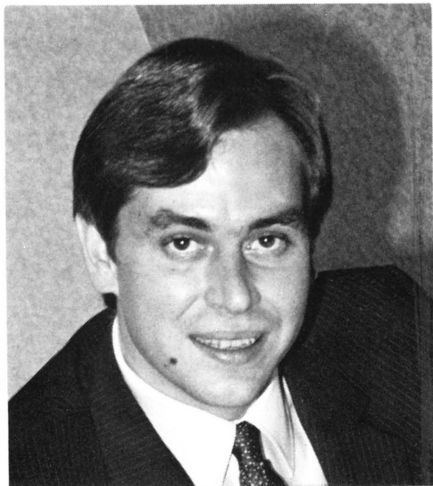
SNAPSHOTS

Stern engineers **Paul Ziehm**, **John White**, and **Lou Rudolph** demonstrate some of the visual features of the Video Music Center to an interested visitor at the National Restaurant Association Show in Chicago, May 22—26.



David Stroud (pictured) has resigned as vice president, marketing, for Cinematronics Inc., expressing his wishes to pursue other interests within the coin machine industry.

Steven Blattspieker, Cinematronics' national sales manager, will assume Stroud's corporate responsibilities.



J. Vernon Lloyd has been appointed general counsel and corporate attorney for Taito America Corp.

Lloyd will coordinate all legal work for the company, handling all phases of commercial and corporate law, contracts, trademarks, and coordination of all outside counsel.

Lloyd, a graduate of Yale Law School, was previously a general attorney in the legal division of Montgomery Ward. He is chairman of the Chicago Bar Association's Committee on the Unauthorized Practice of Law.

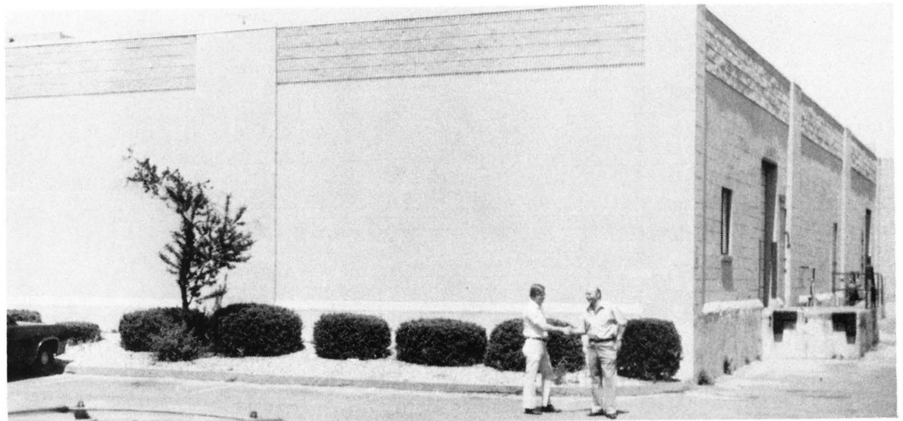


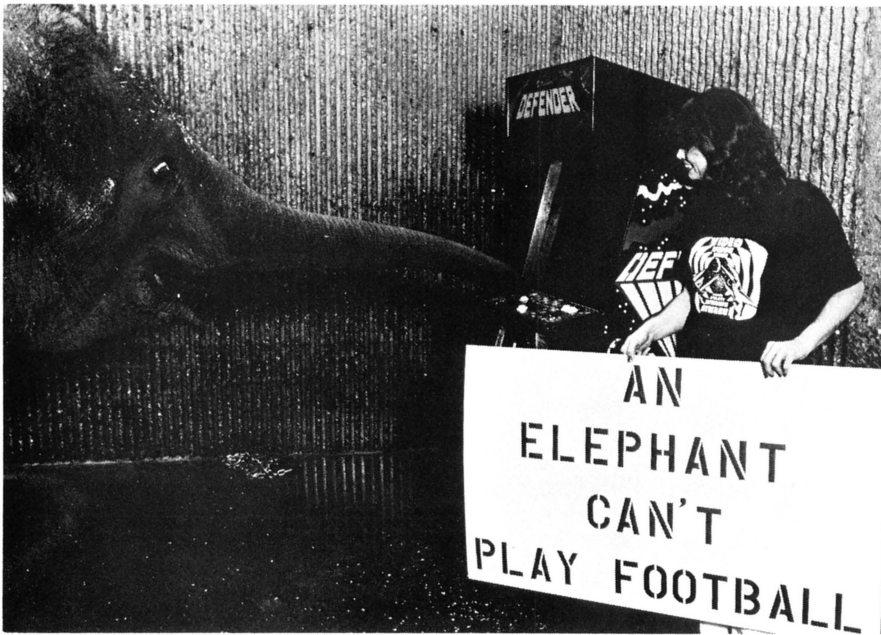
Status Games has moved into a new facility in West Hartford, Connecticut, that has enabled the company to triple its daily output.

Status Games, manufacturer of video games and video gambling machines, has increased production capability from 40 pieces a day to 140.

"The 20,000 square foot facility is expandable," offered Status President **Irv Jeffries**. "We also can now offer an attractive showroom and provide spacious research and development areas."

Status produces *Planet Patrol*, *Force One*, and *Blockade Runner*, and is gearing up for its newest video, *Highway Patrol*.





Whether or not an elephant can play *Defender* is another question, but the new American Video Athletic Association believes that players should join together to help develop their competitive skills.

"Video Athletes are good kids who deserve a little recognition," the association proclaimed. "We think it's time to acknowledge them."



Betson Pacific Distributing Company has a new headquarters at 2444 West Pico Blvd. in Los Angeles that opened June 1.

The new 20,000-square foot building is just one mile west of the company's previous location.

"With ramp and dock high indoor loading capacity, a 10,000-square foot parking area, expanded parts and service areas as well as a significantly larger showroom, the new Betson Pacific headquarters is designed to make it more convenient for our customers to buy and service their equipment," **Pete Betti**, president of Betson, noted.



Jack's Amusement Company of El Dorado, Arkansas, has opened a distributing branch office in Lubbock, Texas.

Brad King, sales manager for the 25-year-old distributorship said: "Our studies showed a real need for equipment and service in the west Texas region. The operators are anxious to deal face to face as opposed to over the telephone."

Pictured are **Mel Harp** (left), a 25-year veteran of the coin-op business who will manage the branch, and **John Hawley**, formerly of Sega/Gremlin who will head the service department.



Sunday, June 6, game operators enjoyed refreshments and industry conversation while touring Automated Consultant Systems's new showroom, offices, and warehouse now located at 2523 Data Drive in Louisville, Kentucky.

General Manager **E. W. Brewer** (right) is shown here with **Joe Furjanic**, regional sales manager for Universal.

PUZZLES

By
Bill
Brohaugh

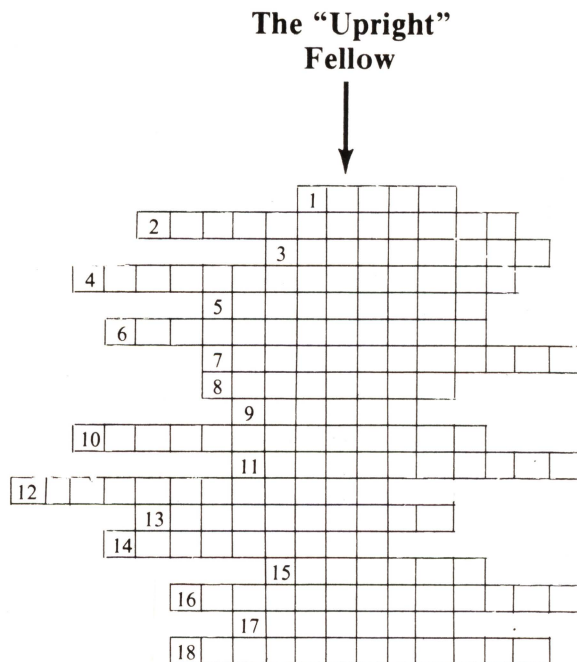
An "Upright" Fellow

Fill in the names of the appropriate games in the space below, then check the center row of vertical boxes to see who our nomination for the most upright fellow in the industry is.

CLUES

1. Centuri's driving game is in the maze city of _____.
2. The U.S. has its Space Shuttle, and Taito has its _____ (2 words).
3. E.G. Marshall in the old TV show, or the popular Williams video.
4. The only name to appear on both video and pingame. (2 words)
5. Centuri's space video named after star cluster.
6. Atari's recent video that revived some of the elements of *Pong*, but with a medieval theme.
7. Universal's video that stars, not Mickey, but _____ (2 words)
8. Taito's video makes you wonder what happened to colonies 1 through 6. (2 words)
9. Centuri's _____ has landed.
10. Gremlin/Sega first came out with *Astro Fighter*, and then with the similar-sounding _____ (2 words)
11. Gottlieb's first video. (3 words)
12. This Cinematronics game brought new meaning to the phrase, "Castles in the air." (2 words)
13. This new Atari video is 100 feet long.
14. You can do it to eggs, and to Stern's video.
15. Midway's successful entry into the "cute" game market.
16. The human fly would love this game by Nichibutsu.
17. Name this Stern video, and we will be close to _____ (2 words)
18. Cinematronics takes us back to World War II in _____ (2 words)

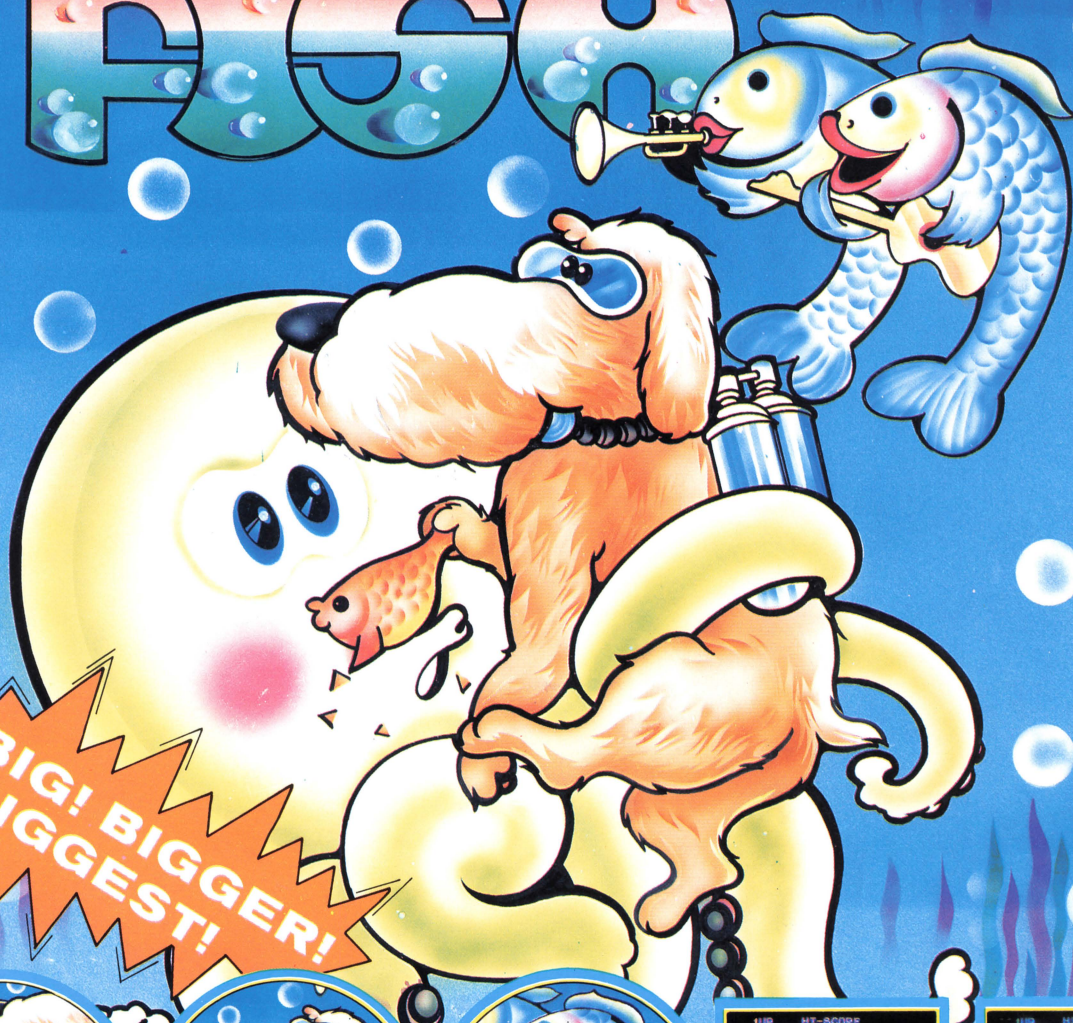
SOLUTION



(Answers will appear in August 15 issue.)

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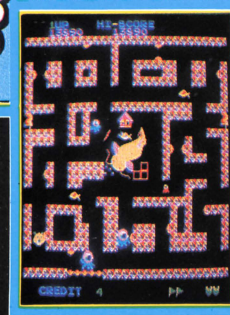
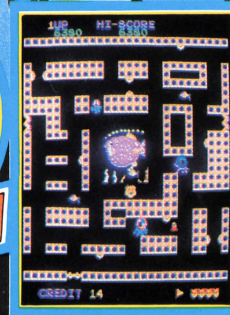
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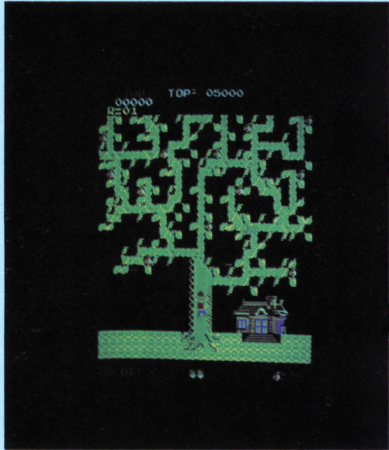
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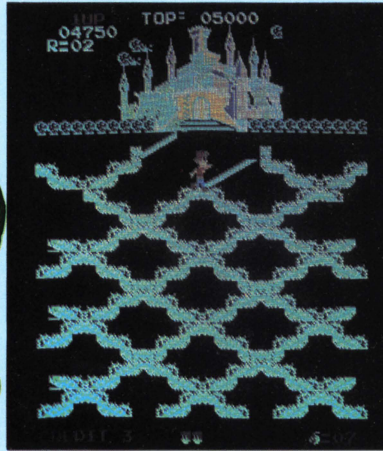
Gather the riches
with Jack's adventure
up the beanstalk...



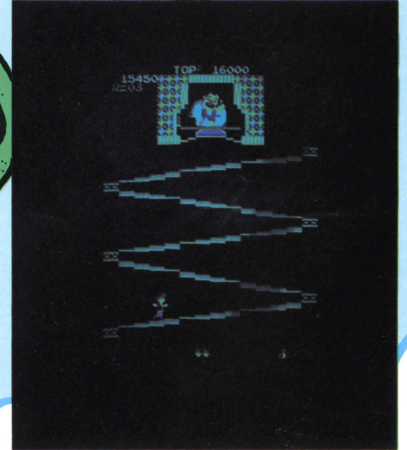
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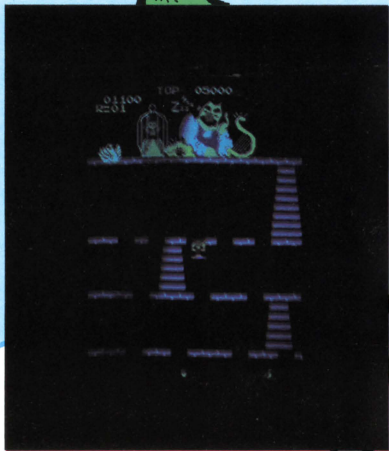
Jack climbs the beanstalk



Jack enters the clouds



Jack climbs the castle stairway



Jack makes his way to the
Giant's table



Jack Rescues the Princess



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Educating technicians: a 1982 update

By Mike Shaw

In the June 1979 issue of *Play Meter*, there was an article titled, "What's Available as far as Educating Your Technicians." It was a summary of the schools that teach amusement games service people how to deal with solid-state electronics and accompanying equipment.

Now, three years later, here's an update on these schools and what they are doing for their students.

Although there are a number of fine technical or vocational schools nationwide that offer thorough approaches to understanding digital circuitry, some schools are geared specifically to the industry, and these are the ones examined here.

AMOA schools

"Just change the boards."

That kind of service approach is what led Don Miller and the Amusement and Music Operators Association (AMOA) to sponsor a traveling classroom designed to help service technicians understand the intricacies of digital equipment.

Miller starts with the basics of digital electronics and progresses to proper shopping procedures, troubleshooting techniques, and preventive maintenance. Reading and understanding schematics is stressed. Using the schematics—to which Miller adamantly refers to as the keys to fixing any machine—the sequence of operation is covered to determine how the machines operate. All circuits are followed and explained. The final three days of each 10-day session are spent troubleshooting problems in popular machines.

AMOA Mechanics School tuition is currently \$250 per session. Classes are generally arranged by request of state associations, said AMOA's Executive Director Leo Droste.

Nevada Gaming School

The Nevada Gaming School, now in its 10th year, educates video game technicians as well as slot machine mechanics. The school was Bally's officially certified training center until June 6 when it was purchased by a Bally competitor. Although you will not find Bally's official stamp of approval on Nevada Gaming

School any longer, the courses and the quality of instruction are unchanged.

The institution features an extensive 24-week course on video game repair. Electronic video game instruction features training in the use of various pieces of test equipment—probes, oscilloscopes, signature analyzers, etc.—and educates students on high value soldering techniques.

Circuit board repair is taught to the component level, and the course also includes instruction on troubleshooting and TV monitor repair.

This amusement technicians' course features 600 hours of instruction at a rate of \$5.50 per hour. However, students with competent knowledge in some areas of electronics can alleviate hours and save tuition money.

Additionally, since the school is accredited by the Accrediting Commission of the National Association of Trade and Technical Schools, students can qualify for government loans and grants. Despite

government cutbacks in those areas, there are still plenty of government financing alternatives available, according to Stan Brateen, director of the school.

"About 40 percent of our students use government financing to attend," said Brateen. Enrollment currently at the Nevada game school reads at about 260 students in Las Vegas and about 80 at Brateen's Reno, Nevada, branch.

The set-up enables a student to design his schedule around the information he needs and the amount of time he desires to spend at the school each day. Classes start anew each Monday.

Electronic Institute of Brooklyn

One of the newest entries in the amusement machine education field is Joe Sturtz Electronic Institute of Brooklyn.

Sturtz, who left Sylvania as its chief service instructor, presents a study program designed for workers who cannot take time away from their jobs to attend classes.



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The Electronic Institute addresses its program to prospective technicians who have little or no electronics background. It includes instruction on meters, basic electronics, power supplies, monitors, basic logic, and pinball and video board repair.

Locally, Sturtz offers a five-week course of evening classes that meet three times weekly. There are a total of 60 hours of instruction, and new classes begin each seven or eight weeks.

Sturtz has also made the course available to students who cannot arrange a five-week stay in Brooklyn to learn the tricks of the trade. The same 60 hours of instruction offered at the Institute is available on video tape for home study.

The home course provides the same hands-on training a student would receive at the Institute. Sturtz even ships a malfunctioning TV monitor for the home student to repair, and, at another time during the course, he sends a faulty logic board for the aspiring technician to solve.

There is a toll-free number for students to call to get special assistance when needed, and Sturtz even offers a money-back guarantee to home students up to the end of the first lesson. The guarantee enables a prospective technician to find out for himself, at no risk, whether or not he can handle the program.

Sturtz charges \$800 for the course—whether the student attends in person or takes the home study course—and he insists that graduating students can handle 90 percent of the problems they encounter in the field. The \$800 ticket includes tools and materials valued at \$110.

Randy Fromm's Arcade School

Randy Fromm's Arcade School in San Diego has been helping entry level service people learn the ropes of solid-state electronics for slightly less than three years now.

Although the school's home is in San Diego, it has also been operating on the road. Dennis Sable instructs in San Diego, Fromm sets up shop several times a month in major cities, and, until recently, Nathan Bush was offering regular monthly sessions in Dallas.

The course lasts six days and teaches entry level "mechanics" (as Bush refers to his entering students) to deal with the majority of problems they will encounter in their service calls.

"We bring them up to the point where they can fix 90 percent plus of the problems they'll see. You can't educate a computer technician in six days, but they'll be able to handle most of everything else they'll encounter and even be able to handle some simple computer related problems."

Bush stressed that students need not invest heavily in tools or equipment prior to the course.

"The most sophisticated piece of equipment they need is a voltmeter," he said.

In addition to regular offerings in the San Diego area, Fromm's school will find its way to Minneapolis, Salt Lake City,

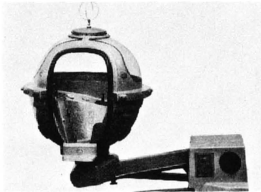
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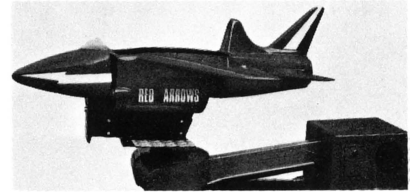
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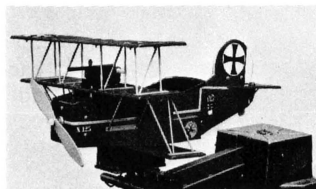
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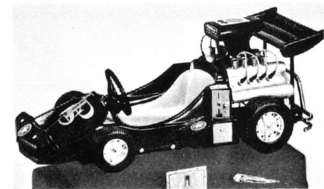


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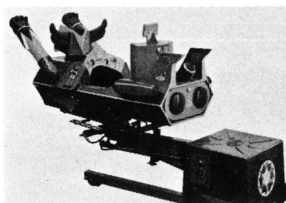
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Chicago, and Atlanta before the end of the year.

"And he might come to Dallas, since I'm retiring," joked Bush who is leaving the classroom to return to his route and servicing businesses.

Randy Fromm's six-day program currently costs \$400. A schedule for Fromm's traveling school is available by calling 714/286-0172.

Kurz-Kasch

The Kurz-Kasch Center for Technical Development calls its education a lesson in "advanced topics in electronic circuit design," but the company's general manager, Jim Sneed, said the course approaches digital electronics from a "basics" point of view.

The course is designed for the technician who already has some background in electronics. It is intended to teach electronics theory.

The I.C. Logic Design program is for technicians who are beginning to design, test, or repair equipment using ICs. The course is based on working with standard IC logic devices as they are offered by manufacturers.

One of the best things about the Kurz-Kasch course is that it's free to subscribers of *Play Meter*. Although a Kurz-Kasch education was previously only available as a \$400 correspondence course, it is now only featured in issues of *Play Meter* magazine.

Cal's Coin College

After 12 years of educating amusement technicians, Cal's Coin College has refined its program to a single approach—a two-week package of intensive practical application for aspiring video technicians.

The oldest of amusement tech schools, Cal's Coin College conducts its lesson totally on the basis of working with machines.

"We teach no theory, and mathematics is a no-no," said the school's founder and teacher, Cal Clifford.

The course is built for entry level students and teaches schematics and systems that emanate from manufacturers' documents on the games. Lessons include training on all types of TV monitors.

Clifford limits his enrollment to six people per class so he can assist each student in a thorough look at the machines and see them through their efforts to troubleshoot problems that commonly occur.

The Cal's Coin College course costs \$700.

The courses mentioned here all provide a basic electronics education for amusement technicians. Remember, "just change the boards" is a bad service approach. A solid education in digital circuitry basics and an in-house system that provides for circulation of pertinent, recent service information will produce good service people and a great service reputation for any operator.

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Comparing prices

Use a personal computer to save time, money

By David H. Ahl

Double-digit inflation. Shrinking profit margins. Higher prices on just about everything except avocados.

Because of these factors, people and organizations are doing more and more comparison shopping. Whether it's comparing supermarket ads in the newspaper or bids on a job, we all need to compare prices quickly and easily.

To compare prices on a few items is no particular problem; one need only jot them down on a slip of paper. On larger lists, it becomes more difficult. And when discounts and shipping charges enter the picture, the task becomes nearly impossible.

Example: You are an arcade operator trying to maximize your profit. This means

having a good choice of the latest games balanced by a cross-section of older games that still attract the quarters. You get *Play Meter* and look at the pages of classified listings of new and reconditioned games in the back. You attend the Amusement Operators Expo and pick up the circulars from the distributors. And, of course, your own distributor is always telling you he has a great deal on a like-new game that was just returned from a bum location.

You like to pick up a reconditioned game from time to time, but the ads and circulars just aren't designed for comparison shopping. One ad lists games in order of decreasing price, another by ascending price, another by manufacturer, another puts the biggest movers at the top and many seem to be in a totally random order.

This example will be used to show how the VisiCalc computer program on a small personal computer can be used quickly and easily to come to your rescue.

Alphabetical order

The first step is to put the list of items into some sensible order. While ascending or descending price has some attraction, it really isn't useful because a game might fall into several spots on the list because of different pricing from different vendors. In this case, I chose alphabetical order because it made the most sense to me.

Rather than trying to assemble the names of all the arcade games and then alphabetizing, I decided to start entering information into the computer, putting each new piece where it belonged. I took

(File: VIDEO)

	Vendor A	Vendor B	Vendor C	Vendor D	Vendor E	Vendor F	Min Price
Alpine Skier	2495	1E9	1E9	1E9	1E9	1E9	2495
Amidar	2395	1E9	1E9	1E9	1E9	1E9	2395
Armor Attack	1E9	1400	1E9	1249	1E9	1E9	1249
Asteroids	1695	1550	1395	1E9	1E9	1E9	1395
Asteroids Deluxe	1695	1450	1495	1495	1E9	1E9	1450
Astro Blaster	1895	1700	1E9	1E9	1E9	1E9	1700
Astro Fighter	1E9	1200	1E9	1E9	1E9	1E9	1200
Astro Invader	1E9	995	1E9	1095	1E9	1E9	995
Avalanche	1E9	1E9	1E9	1E9	295	1E9	295
Barrier	695	500	1E9	1E9	1E9	1E9	500

Figure 1

Portion of a price list with 1E9 filled in where no price is available. This allows selecting the minimum value in the 1st column.

(File: VIDEO)

	Vendor A	Vendor B	Vendor C	Vendor D	Vendor E	Vendor F	Min Price
Alpine Skier	2495.00	1E9	1E9	1E9	1E9	1E9	2495.00
Amidar	2395.00	1E9	1E9	1E9	1E9	1E9	2395.00
Armor Attack	1E9	1400.00	1E9	1249.00	1E9	1E9	1249.00
Asteroids	1695.00	1550.00	1395.00	1E9	1E9	1E9	1395.00
Asteroids Deluxe	1695.00	1450.00	1495.00	1495.00	1E9	1E9	1450.00
Astro Blaster	1895.00	1700.00	1E9	1E9	1E9	1E9	1700.00
Astro Fighter	1E9	1200.00	1E9	1E9	1E9	1E9	1200.00
Astro Invader	1E9	995.00	1E9	1095.00	1E9	1E9	995.00
Avalanche	1E9	1E9	1E9	1E9	295.00	1E9	295.00
Barrier	695.00	500.00	1E9	1E9	1E9	1E9	500.00

Figure 2

Formatting real prices into dollars and cents makes the list more readable.

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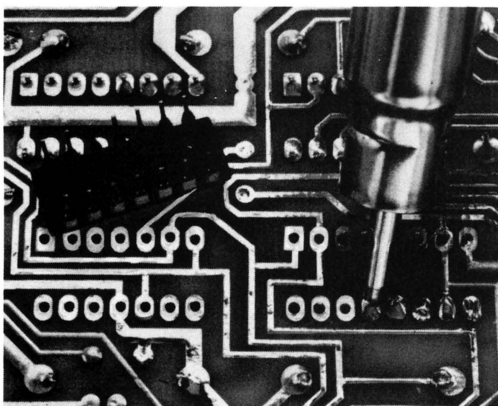
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the longest list of games from a single vendor, started five lines down from the top, and entered the name of the game in the first two VisiCalc columns (eighteen characters total) and the price in the third column (C).

If a game fell above or between those already entered, I simply opened up a row by typing /IR (insert row) and entered the new listing.

I then took the second largest vendor list and put these prices in the fourth column (D), opening up rows for new information as necessary. Ditto for the third and fourth vendor. But then trouble arose.

My computer (TRS-80 Model III) permits only six columns of VisiCalc data on the screen and adding additional vendors meant I could no longer see the game names in Columns A and B. So I simply typed /TV with the cursor on Column B which sets the first two columns permanently on the screen.

With the title columns protected in this way, to insert a new game, it was necessary to use the "go to location" function (> A28 for example) to enter the title area.

The best price?

Just doing these few steps alone was enormously valuable. I had previously been impressed with Vendor B because of his \$1,395 price on *Asteroids*, \$300 less than my local distributor was asking, and also his \$1,195 price on *Galaxian*, way less than anyone else. I had begun to think he had the best prices on everything and why

look farther. But then my simple list revealed that his \$1,595 price on *Battle-X* wasn't so good after all, and \$1,995 on *Gorf* was more than anyone else was asking.

Since I now had all the data, it seemed sensible to let the computer look for the best price on each game. I attempted to do this by typing @MIN(C4...H4) as the entry in I4. This function selects the minimum value from the list C4, D4, E4, etc. and enters it in I4. Surprise! The minimum was 0 because several entries in the list were blank.

This, of course, was not what I intended so I tried entering the special VisiCalc @NA function in the blanks (meaning, value not available). Now for the minimum I got NA. So I tried entering alphabetic characters. Still, no go.

Longer values

When averaging a list, VisiCalc looks at only the non-blank values. Not so for selecting the minimum or maximum values. Hence, the only solution was to fill in the chart with values larger than would ever be found (say, 10000) which, unfortunately, makes it less readable. Alternatively, one could use a value of 1E9 (meaning 1 times 10 to the ninth power). Since the expanded form of the number will not fit in a standard width VisiCalc column, the exponential notation is retained.

If you wish to use this method, you should fill in the VisiCalc worksheet with 10000 or 1E9 before entering any other

data by simply using the replicate command. This saves having to enter each value individually. A portion of the worksheet with 1E9 filled in is shown in Figure 1.

To make this modified worksheet more readable, I elected to format the real price entries as dollars and cents while leaving the 1E9 alone. This is done by typing /F\$ before each dollars-and-cents entry. Typing it in as, say, \$1,995.00 will not do since VisiCalc will drop the zeroes after the decimal point. This output is shown in Figure 2.

To use these data to make a shopping list which shows only the lowest price on each item, one can move the last column, in this case column I, to the position immediately next to the title columns using the /M command.

Since two of the vendors were on the West Coast and I was on the East Coast, I wanted to modify their prices to reflect an extra \$100 per game for shipping. This was done by using a spare column (J) and giving the command +C5+100 in position J5 followed by a /R (replicate) in J6...J109 using relative values. I then replaced the original column with this modified column using the move (/M) and delete column (/DC) commands.

All told, this entire initial comparison shopping procedure took about two hours. To update the list each month (or whenever the occasion arises) takes no more than fifteen minutes. The potential savings are hundreds or possibly thousands of dollars, a more-than-satisfactory return on my investment of time and computer resources.



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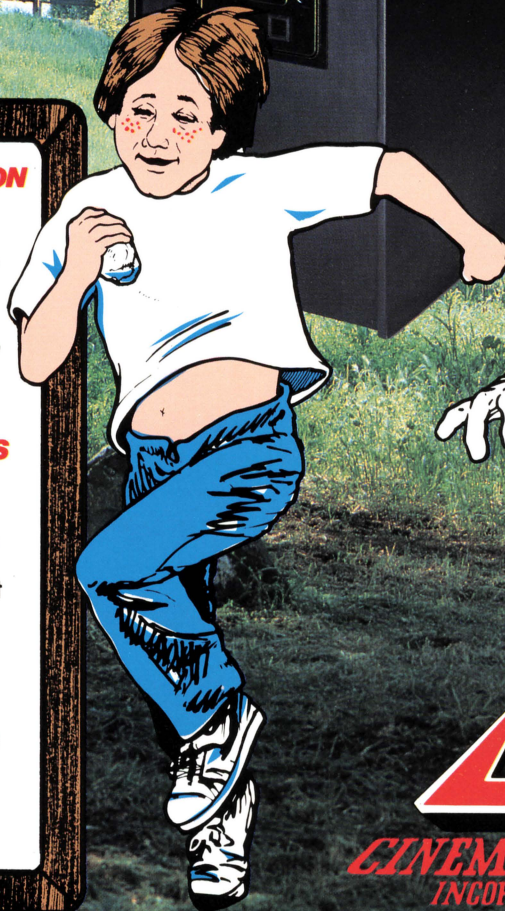
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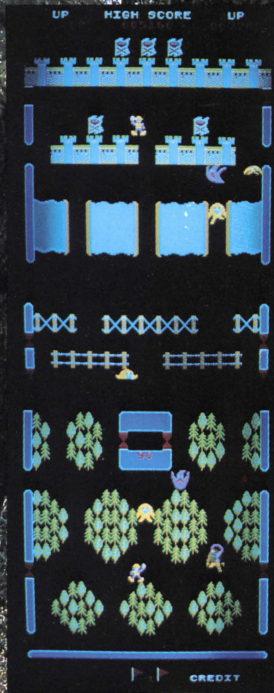
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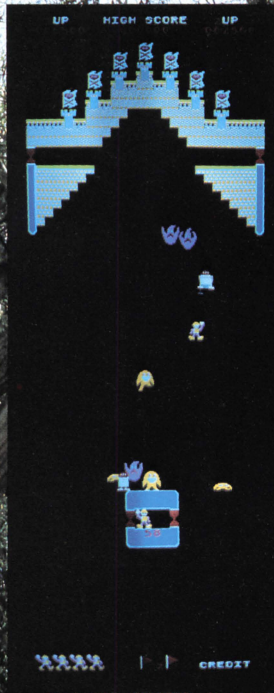


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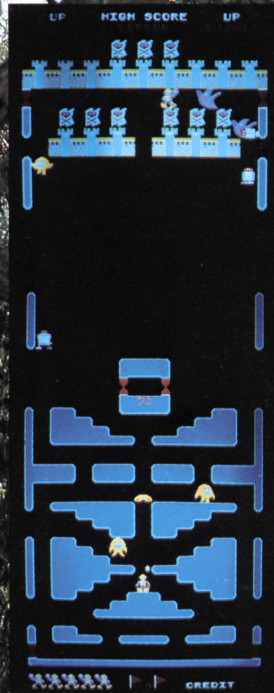
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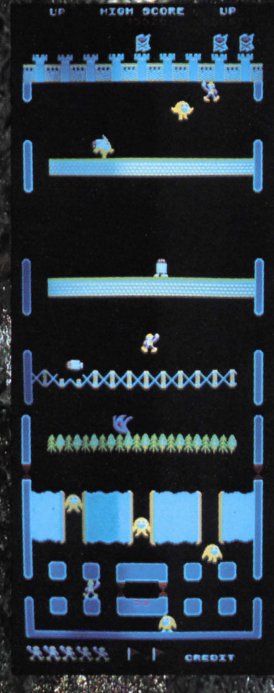
Screen 2



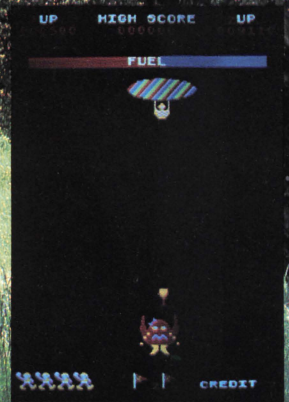
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Cinematronics's President Fred Fukumoto

Philosophy change:

Doubling up, deleting slack time

When someone does something out of the ordinary once, people tend to talk. But when someone does something different twice, people tend to ask questions.

Consider Cinematronics. The manufacturing firm released *Solar Quest* 1st October. Then something unusual happened: Cinematronics four months later released not one, but two licensed games—*Naughty Boy* and *Jack the Giantkiller*. The company produced more than one game at the same time.

People are asking questions. Has Cinematronics stopped developing product? Is it going to start manufacturing licensed-only games? Why was there a four-month lapse between *Solar Quest* and the *Naughty Boy*/*Jack the Giantkiller* dual release?

"We always designed and programmed our own product," explained Tom Stroud, Cinematronics's executive vice president. "But one of the problems was the slack time when we didn't have product."

To make effective use of its time,

Cinematronics decided to manufacture some licensed equipment. And Stroud gave many reasons for the new strategy.

For starters, he said it takes four months from concept to putting out an in-house product on the market compared to 30 to 60 days to ready a licensed product for testing.

Licensed product also gives Cinematronics some degree of flexibility. "We look for changes, and we dictate changes," Stroud pointed out. "We don't want a product just to have something to build. We have the capability to go any way based on each product."

Quick reaction

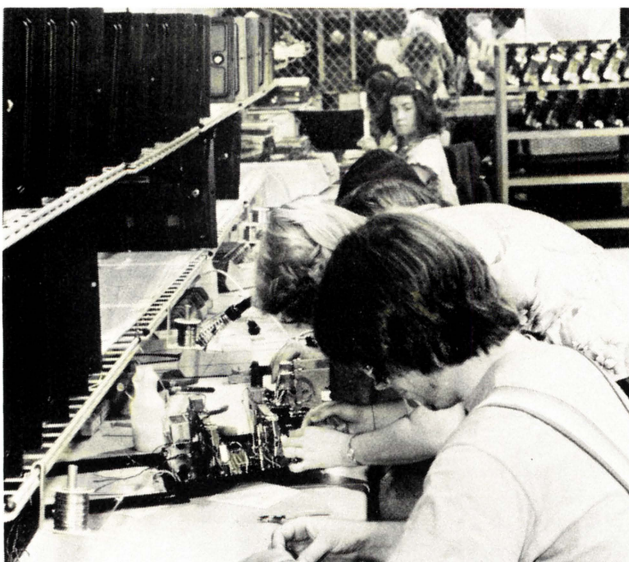
Another reason the manufacturing company decided to go with some licensed product is that Stroud said Cinematronics now has the ability to react to the market—it has evened out the risk of a game failing. If one game does not succeed, another one will soon be marketed to take its place since more than one game is always being produced.

Licensed product does have its advantages, but Stroud lamented that all of Cinematronics's product is not in-house. "Like any company, we want to develop in-house, but the reality of the situation is to get a relationship with other companies. It's nice to smooth out the valleys."

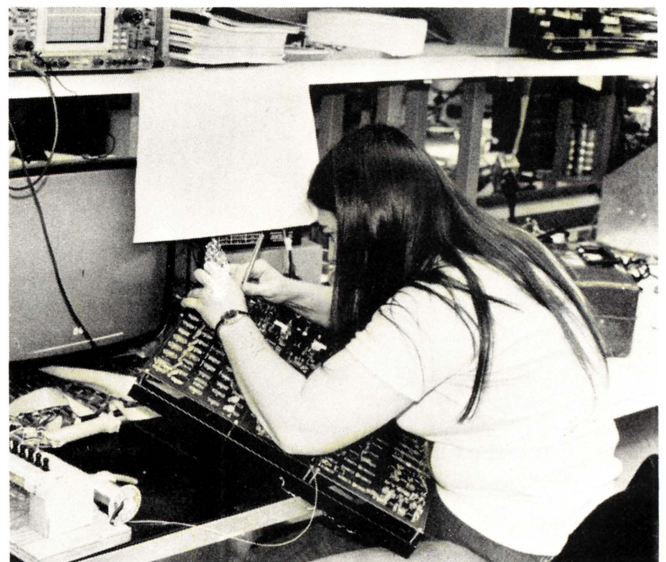
Accepting licensed product also means some of the company's philosophy has changed. Stroud said that in the past, Cinematronics wanted to be totally self-sufficient. But the slack time between in-house equipment developments was a loud vote in favor of licensed product.

Licensed equipment, however, is not a panacea to all development problems. There are more risks with licensed games, Stroud said. "But usually when we license a game, the electronics are proven and tested—we look for the performance in the field."

Cinematronics tests licensed equipment in convenience stores, bars, and arcades, and based on that information, it either makes a commitment or does not accept the product. In fact, the majority of the



The majority of the company's 85,000 square feet is devoted to producing games.



Ten to 12 percent of Cinematronics's profit goes back into game design.



Tom Stroud (right) and Bob Posten in the prototype shop.

licensed goods are not chosen in the conceptual stage or after the testing period.

But with all the talk about licensed product, Stroud pointed out that Cinematronics has not given up developing in-house equipment. "When we do hit a slack time, we can concentrate on developing games," he said. In fact, Stroud estimated that 10 to 12 percent of Cinematronics' profit goes back into game design.

Democratizing design

In addition to pumping profit into game design, the company has also "democratized" the design of its games. "We're broadening the base of people that we can draw from," Stroud said. "Within the next five years, anyone who likes games and has creative bent could create games."

Stroud goes back to 1977-78 to defend

Cinematronics' interest in design. That year, the company had one game designer; then in late 1978, the second and third designers were added. Today, Cinematronics has nine game designers that work in teams of two and also with other companies.

"It's the responsibility of the manufacturers to provide new games," he said. "We're open to ideas."

And the majority of Cinematronics' 85,000 square feet is devoted to producing games. One reason is that cabinet and art work come from outside sources. "This formula is a little bit unique and has been successful for Cinematronics," Stroud said. "We're in the coin-machine business, not in the graphic design or wood business."

Not only is more space used for designing games, but there is more room for

everyone since Cinematronics' employee roster has grown from 12 employees in 1975 to 270 people today. Twenty-seven people have recently been hired, and Stroud said the company is making a large commitment to quality control. "This is one of the best commitments we feel we can make to our customers."

Some results have already come out of the company's desire to create—a new hardware and software system has been developed. Game software is basically player-oriented, and system software is operator-oriented and geared to accounting and testing functions.

Next frontier

The home market is another frontier. "We're looking into it (the home market) for possible expansion," Stroud said. Cinematronics is working on a system for 3-D graphics that may have an application in the computer graphics field and home television.

But Stroud added that "video in some form is here to stay." He believes the industry is going to hit a saturation point, but, on the other hand, technology is moving in quantum leaps. With technology growth, Stroud said he sees players getting more serious about the games—serious enough to possibly start player organizations one day.

Stroud wants everyone asking questions about Cinematronics to know the answers. No, Cinematronics has not stopped developing product. No, it is not going to manufacture licensed-only games. And the four-month lapse between *Solar Quest* and *Naughty Boy* and *Jack the Giantkiller* was a slack time when no new product was being introduced.

Licensed product is not a complete answer for Cinematronics; development and licensed product are a two-pronged attack against slack time. •

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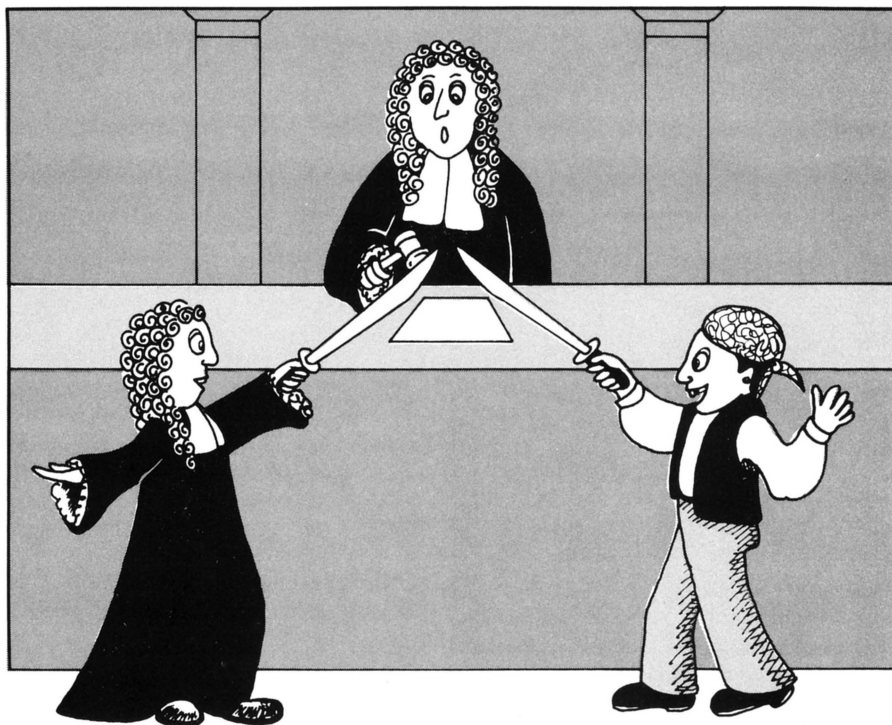
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Copyright battles are fought in England

By Roger Pearson



The video game copyright war is heating up in the United Kingdom. There still remains to be a definitive ruling by a High Court judge in Britain on whether under UK law any aspect of video games is protected by copyright.

Nevertheless, even in the absence of such a decision, legal action already taken in the courts on the other side of the Atlantic and involving market leaders such as Atari, Sega, Williams Electronics, Alca, and Taito, has now established a useful first line of legal defense for those claiming their games are being ripped off.

A pattern has been emerging as a variety of companies have beaten a trail to the steps of London's law courts. And it's a pattern that indicates that effective protection is now obtainable in the UK pending a definitive decision on the actual copyright issue.

The British High Court judges have been careful not to hint one way or the other where, if at all, they think copyright may lie in video games. Several are now on record, however, saying they would welcome a test case to decide the issue.

However, some other judicial comments and actions taken in the British courts must be of immense interest to those in the video industry who could come up against piracy in Britain.

One of the most telling comments to fall from a judge's lips came at a hearing of an action brought by Atari against a British amusement arcade operator.

Protection, although
on a temporary basis
at present, is now
available through the
UK courts.

Atari claimed that a *Millepedi* machine the operator was using, which was made by Scando of Italy, was a copy of its *Centipede*.

They took action in the English High Court, without warning the operator, to obtain a court order banning him from

using the machine. The order was made, but the operator later gave the court an undertaking along the same lines as the order. And he claimed that as he had been prepared to give an undertaking, the earlier court action against him had been unnecessary.

He said that for this reason Atari should be debarred from claiming legal costs.

The judge, Justice Dillon, would have none of this, however. He said there was an "arguable point" on whether there was copyright in the attract mode or program of a video game.

And: "It seems to me there is so much piracy in the video and electronic fields current at the moment that the plaintiffs (Atari) were fully entitled to do what very many other manufacturers and distributors are doing at the moment," he said.

"That is to apply to the courts for immediate injunctive relief against anyone who is apparently using infringing material to be removed so as to come up more conveniently elsewhere without the plaintiffs knowing."

In other words, the judge made it plain he believes that swift action, and, perhaps more to the point, action without any prior warning against those believed to be engaged in piracy, is justifiable.

For those fighting to protect the copy-

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right they believe the English law gives them in their machines, this comment is one on the plus side.

However, in the latest round of a legal battle between Sega and Alca, it was made clear that the courts are not prepared to make it too easy for companies to track down those using machines alleged to be copies.

Three of Britain's top judges in the Appeal Court unanimously refused to uphold an earlier ruling by a High Court judge that Alca should reveal the identity of customers and locations where machines have been sited. Sega wanted this information to launch further proceedings against those customers, primarily breweries, the court had been told.

Lord Justice Lawton said in this case that it was easy to see why Alca was reluctant to reveal this information. If proceedings were taken against its customers, they believed their business would be done "a great deal of damage." They would suffer "a great deal of ill will."

And, he said Sega had a safeguard. This particular aspect of the action involved interim court orders. If at the end of the day Sega proved its claim of copyright piracy, it would then be in a position to demand from Alca the names and addresses of customers.

Another of the judges sitting at this hearing, Lord Justice Templeman, said that if Alca had been ordered to reveal the names and addresses sought at this state of the proceedings, it could result in "pure harassment" of its customers.

However, in another action also

involving Sega, this time against a smaller English firm, it has been made plain that the copyright war is going to be fought fiercely in the UK courts against all who can be traced using allegedly pirate machines.

Gordon Day, Sega's solicitor, left no doubt about this in a written statement that was put before the court. In this, he said Sega was taking "all available steps" including legal proceedings both in the UK and elsewhere in "a systematic effort worldwide" to contain and eliminate the widespread infringement of copyright in its video games.

He said that Sega had instituted proceedings in Britain over the past three months against five companies, and court orders had already been granted on a temporary basis in some of these actions.

In that particular hearing, the judge, Justice Whitford, made it plain he is well aware of the copyright problems over video games. He said he thought the legal questions raised were "fascinating" and that it would be "very interesting" to hear full argument of them.

"I have been hoping for it for some time," he added. In this, of course, he was echoing the sentiments of many in the amusement industry on both sides of the Atlantic. The air needs clearing here.

In the absence of this "interesting and fascinating" legal argument and a definitive ruling, however, it does look as if positive steps are being taken in the UK to combat piracy. Protection, although on a temporary basis at present, is now available through the UK courts.

...and in Japan

By Mike Shaw

Sega Enterprises has been notified by the Japanese Agency for Cultural Affairs that it intends to treat videos as copyright items, reported the Japanese amusement press.

In light of that announcement, the Japanese Amusement Machine Manufacturers Association (JAMMA) conferred to discuss ways to eliminate copying and appoint a copyright protection committee.

The committee, composed of 40 persons from 17 major Japanese manufacturers, was chaired by Hayao Nakayama who called the Japanese video game copying efforts "shameful not merely domestically but also internationally."

"Although it is becoming commonly accepted that, at least in Japan, copying is harmful to the trade, the fact is that 80 percent of the domestic video game market remains invaded by copied products," he said.

"Thinking that copyright of video games can be protected under the current law as something like filmed items," Nakayama reported on the committee's findings, "we

have discussed the possible way for securing more powerful legal protection... Though there is no court decision that openly authorizes copyrights for video games, such an affirmative decision, I believe, will be made in the near future."

Sega succeeded last year in obtaining a "registration of transfer" from the Agency for Cultural Affairs. That registration recognizes that a copyright has been obtained outside Japan, but a "registration of the first publication of works" that is produced in Japan is seen by JAMMA as a much stronger type of copyright protection.

In anticipation that such copyrightability is near, Sega proposed the organization of a committee within the association that would help the government agency handle applications for registration smoothly.

Additionally, the Japanese press reported that Data East, Konami, Namco, Sega, and Taito have taken action against copiers in Japan. •

Pinpointing, dealing with the problem employee

By Joseph Arkin, M.B.A.

Each employee is part and parcel of a team and as such is expected to contribute to the overall objectives of the business organization. The employee who, for one reason or another, fails to satisfy his supervisors can become quite a problem and challenge.

The employment interview is perhaps the opportune time to be selective, weeding out those who show (1) an employment record with frequent changes of jobs without valid reasons for the shifts, (2) a tendency to lie about their previous positions—if you are interviewing a man for a supervisory position, you want to be sure that he had indeed held prior positions of leadership, and (3) poor work records as disclosed by checking references.

Despite all of these criteria, mistakes are bound to be made, and persons will be hired who are apt to be troublesome.

The initial period of employment can be considered as a trial period, one wherein management decisions are made as to whether or not an employee is satisfactory.

This critical period is one wherein the employee is trained, assigned to specific duties, and allowed to become part of the work force. At this point, it is necessary for supervisors to evaluate the employee in terms of adherence to the training program, aptitude, attitude, and performance.

Now is the time to find out if the employee displays indifference, apathy, inability to follow orders, an attitude of belligerence, or is seemingly unfit for the assigned tasks. If correctable, now is when supervisors should take a hand in trying to correct the situation, or if deemed so deep-rooted that correction seems impossible, it is best to terminate the employment.

Some people are slower learners than others, some take longer to acquire manual skills and need understanding and patience

of their superiors during the time that they are trying to prove themselves.

The employee should be kept informed of his progress so that he will be let down gently if the decision is made not to continue his services.

What are some of the factors that can lead to the situation where a trained worker does not make the grade? Knowing about what can cause a worker to do less than an adequate job is of paramount importance.

Robert N. McMurry, president of the McMurry Company, writing for the Small Business Administration, lists seven primary reasons for a problem employee.

Lack of skill

Sometimes a person is a problem because he lacks skill in his job and competence on it. His skill may have been sufficient when you hired him, but it didn't increase as the job grew. Not being able to perform the job as well as he'd like—or as well as he thinks you can expect him to—can do several things to an employee. It might, for example, make him indifferent to fellow workers.

Misplacement

Often an employee becomes a problem because he's in the wrong job. Perhaps he's selling and failing miserably because he lacks self-reliance (the capacity to accept rejection without anxiety). He begins to feel that people don't like him, and this causes him to act in a hostile way toward them.

Lack of job structure

Without job structure (detailed and clear instructions in what they are to do), most employees become confused. When an employee wonders in his own mind why

he doesn't know his job, he might decide that, "It's my fault. I didn't pay enough attention when he was explaining it." Or more likely, he will blame his employer—"That so and so never says what he wants and then jumps on me when I do it wrong." Either conclusion damages his morale and tends to lower morale throughout the business.

Incompatibility

Some people are problems because of incompatibility between them and their employers. "I just can't get along with him," a worker says about his supervisors. And the supervisor says, "No matter how hard I try to understand him, he rubs me the wrong way." What causes friction between two persons—both of whom are conscientiously trying to cooperate? Some people call it "personality clash." Actually, it is more complicated than this label implies. The important point is: Beware of such incompatibility, and realize that there isn't much you can do to change it.

Inadequate supervision

Many employees become problems because of inadequate supervision. In some cases, they don't know what to do, and the supervisor doesn't seem to care when or how they do it. People begin to deteriorate when they aren't kept busy at constructive tasks. They lose interest, become indifferent, and sometimes resentful. Closely related to this situation is inconsistent or capricious supervision. One day management is strict...the next day lax.

Emotionally immature employees

Other employees are problems because they are not emotionally mature. They never completely grow up, and sometimes

The employee who, for one reason or another, fails to satisfy his supervisors can become quite a problem and challenge.

they think and act like children. To a certain extent, everyone suffers with this situation. The difference between an emotionally immature person and one who is normal is: The normal person has fewer emotional disturbances, and he is often able to control them.

Physiological deterioration or poor health

The human body changes constantly. Deterioration sets in early with some persons, later with others, but eventually with everyone. Sometimes it's sudden as when an apparently healthy person suffers a heart attack. Or it may be gradual as when an employee loses his hearing over several years. Often, the most difficult problems created by such poor health conditions are the anxiety and psychological damages that often go with changing physical conditions. For example, nature may repair an employee's damaged heart so that he's almost as good as new, but he may never overcome his anxiety. His constant fear of another attack may turn him into a problem employee.

Proper supervision is the key to elimination of much of the troubles. When supervision is of high order, there will be little to contend with in the way of problem employees or problem cases. Therefore, it would seem that a good first step to a good working staff is the selection, training, and development of good supervisory personnel.

Supervisors have to do more than

merely instruct, train, oversee, or chastise. They have to develop teamwork so that each employee respects their authority, is free to ask questions without fear of belittlement, contributes ideas to save time and money, develops a sense of responsibility and loyalty, and receives acclaim for work well done.

The word communication is bandied about so much that it has almost lost any

...management must accept the fact that people are not perfect, and that mistakes are going to be made.

real meaning. Yet, a rampart must exist in which management establishes a system of handling employee relationships.

In this area you can appraise an employee and compare his performance to that which is required of his job, and you should keep him informed of his work performance. Where the employee is deficient, a plan should be established to correct the shortcomings or increased training to fully utilize his skills.

Oft times an employee will pass all of his initial tests and some personal problem may turn him into an unsatisfactory employee. This is when your supervisors have to know their stuff. They must be able to recognize signs, be able to offer sympathetic assistance, be able to tactfully suggest seeing a physician, and have the sincere desire to help the employee correct the weakness.

Proper discipline is what is required and oft times neglected in the mistaken notion that more can be gotten out of any group by "being friends." Yet, most people want order within the framework of freedom of a sort. They want to know what is expected of them, what results have been obtained, and that the company is successful—partially because of their efforts.

In conclusion, management must accept the fact that people are not perfect, and that mistakes are going to be made. To help overcome this fact, management must make every effort to motivate employees to be creative and imaginative, to be capable of self discipline, to volunteer extra effort, to make personal sacrifices for the good of the team, to be instilled with some sense of loyalty, and to want to do an honest day's work for an honest day's wages.

Perfection will never be achieved no matter how desirable a goal. But, wanting to reach the goal of perfection can lead to more orderly procedures which will make for a better and happier place in which to work. •

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TAX TIPS By Irving Blackman

Paying and collecting employee benefits

Everyone, except the IRS, loves this tax idea: you, the employer, can deduct more dollars than you pay to your employee. Impossible? The law will not allow such a result? You are right. Nothing in the law does allow it, but by combining several sections of the law, the result is obtained. Even the IRS has been forced to agree (Letter Ruling 8049017). Here's the scenario.

Success Corp. employs Joe Exec. Joe will receive an agreed salary plus 200 shares of Public Co. Success buys the shares of Public and transfers ownership to Joe. However, if Joe terminates his employment with Success before 1990, the shares are forfeited (ownership is returned to Success). In 1981 Joe receives \$10,000 in dividends on the Public stock.

Now the tax results of this scenario. The \$10,000 in dividends is considered income to Success. Why? The tax rule is that stock subject to a substantial risk of forfeiture, even though transferred to an employee as compensation, is treated as the property of the employer for tax purposes. This status continues until the employee's rights become fully vested. (Code Section 83) Success is entitled to deduct 85 percent of the dividends received. (Code Section 243)

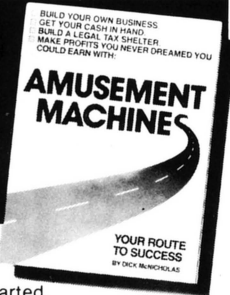
OK, let's put the law and the numbers together. Success, in effect, received the \$10,000 and paid it out to Joe. That's good for a \$10,000 compensation deduction. The 85 percent dividend credit produces another \$8,500 deduction. Total deduction for Success is \$18,500. Joe pays tax on only \$10,000.

Like I said, you will love this idea.

But how should Joe collect his benefits? Sooner or later, every participant (or his beneficiary) of a qualified plan (stock ownership, profit sharing, pension, or ESOP) will be entitled to receive his benefits. Is there a tax cost? Is this cost significant? Can anything be done to reduce the cost? The answers to the questions are Yes, Yes, Yes.

Unfortunately, the rules that govern the taxability of distributions from a qualified plan are a complex maze. You must seek professional help to maximize your after-tax benefits. Why? Because there are a number of choices on how benefits can be paid out of a plan. That's good. But what may be the best choice for one participant/taxpayer may be the worst for another

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participant/taxpayer. The right choice is related to your age, your income needs, and the size of your estate.

Basically you have three choices: (1) take a lump sum distribution and pay an immediate tax; (2) roll over the lump sum into a tax-free IRA (Individual Retirement Account); or (3) have the trustee of the plan pay your benefits in installments. You must always keep in mind that your benefits are subject to two taxes—the income tax and the estate tax.

The estate tax can be avoided entirely or in part. The income tax can, at best, be deferred or subjected to lower tax brackets down the road. All the options and possibilities could fill a small book.

Generally, the estate tax can be avoided by taking all or any balance in the plan or in an IRA (that received a lump sum from the plan) in installments. This is choice (3) above.

The income tax consequences are listed below:

Choice (1) - Pay an immediate tax, but it is based on a special favorable ten-year averaging computation.

Choice (2) - The transfer to the IRA is tax free. Between the ages of 59½ and 70½ you can withdraw whatever amount you want, taxable at no more than the fifty percent maximum tax. Undrawn funds

continue to accumulate tax free. At age 70½, you must begin to draw the balance.

Choice (3) - Installments received from the trustee are taxed up to the fifty percent maximum.

I suggest you cut this item out. Keep it with your qualified plan papers. When the time comes, take it to a qualified professional. He can make precise computations with your facts. You will also learn there

**You will be astounded
at how large the tax
savings will be with the
right choices.**

are more rules and exceptions than mentioned in this item. You will be astounded at how large the tax savings will be with the right choices.

An entertainment deduction test

I never met a taxpayer who does not like to deduct entertainment expenses. A recent case (*Donald Sap et al v. Comm.*,

TC Memo 1981-167) serves as a graphic reminder that even legitimate entertainment expense might not be deductible. How is such a result possible? In a word, substantiation; more precisely, a lack of proper substantiation.

Here's the story. Mr. Sap deducted lunches, dinners, and other entertainment expenses on his tax return. He offered only cancelled checks as evidence of these expenses. Thumbs down ruled the court. In order to properly substantiate an entertainment deduction you must have a record of (1) amount, (2) time (date), (3) place, (4) business purpose, and (5) business relationship (who entertained). Checks alone, the court held, do not indicate *who* was entertained.

Now the story really gets interesting. Mr. Sap also deducted travel expenses to attend trade shows in California and Florida. Only cancelled checks payable to the travel agency and the hotel were used to support the deductions. Thumbs up held the court: the checks "are direct evidence of the amount, time, place, and date of the expenditure." The court knows the law. Only the first four items listed above are required to support a travel deduction. Item (4)—business purpose—was the trade shows Mr. Sap attended and was satisfied by the checks. •

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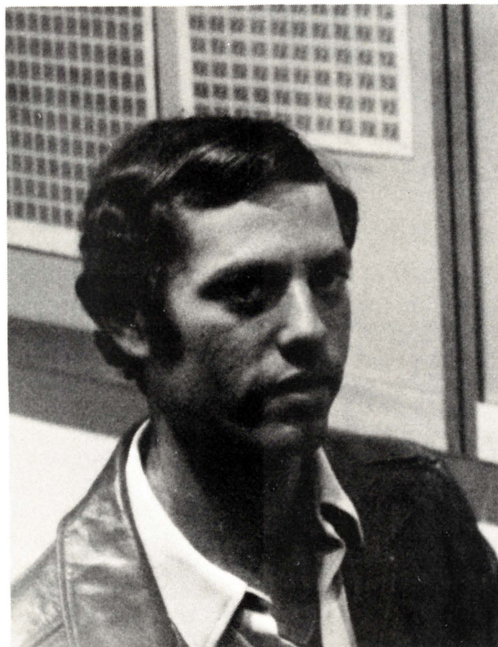


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COINMAN INTERVIEW



Frank Seninsky

Media hype, overbuying, and the future of the arcade business are some topics Frank Seninsky covers as this issue's Coinman. He is known for speaking his mind. Consider his Play Meter column, Frank's Cranks. He has told manufacturers about problems facing operators—and he has been successful. Manufacturers have adopted some of Frank's tips.

In his interview, Frank talks about service, (“...the more people that come in, the harder it is to service their machines.”), gray area games, (“Gray area games have nothing to do with

this industry.”), and speed-up kits (“...they do help dead wood come alive again.”).

He's president of Alpha-Omega Amusements Inc., a company that supplies and services coin-operated games to more than 71 college game rooms, (He's considered a college game room expert.) 35 New Jersey Shore arcades, and 100 street arcades and locations.

He attended Stevens Institute of Technology and got a bachelor's degree in engineering and went to Stevens and New Jersey Institute of Technology for graduate school.

PLAY METER: Why did you want to write a column?

SENINSKY: I wanted to get to the position where I could go to the manufacturers and converse with them. I felt that I could be one of the first in the industry to go to the manufacturers and educate them on the operators' problems and pass on any hints that I picked up in the field.

I figured since I would love to read something like this, others would too. And, besides, it would save operators hours of wasted time. I wanted to combine ideas with tips into one column.

PLAY METER: What was the initial response to Frank's Cranks?

SENINSKY: The reaction from the manufacturers (I thought they would be negative.) was very receptive! Most of these people were on a first-name basis, and they wanted to know what the problems are. They try like hell to get it pushed through upper management to get these things done right. Most

of the time you have to bring these things out into the open—make more of a big deal out of it than it really is to get it into the spotlight. I feel that I accomplished that.

PLAY METER: What direct changes have you seen implemented since the creation of this article?

SENINSKY: One of the biggest changes that has come about is the standardization of a very good coin door with an overrun to the cashbox. That was one of the major accomplishments—separating the cash from the other components of the games. The manufacturers now have moved in that direction.

PLAY METER: What was the response from the operators?

SENINSKY: I got very complimentary letters saying “keep it up.”

PLAY METER: Do you think that the operators that you heard from were just blowing off steam?

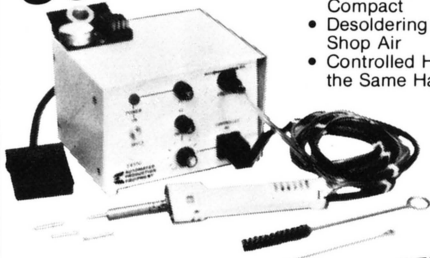
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SENINSKY: Maybe in the beginning. Now they're just using me as a sounding board, where in the past the sounding board that they had was the distributor. You can say what you want to the distributor and get him to pass it on to the manufacturer, but no one really believed it was getting back to them.

PLAY METER: Did you have any problems with the manufacturers?

SENINSKY: I can't think of any. Some would call and say that they thought I was being a little hard on them in this one category. But I did point out the good points also. It's a very realistic approach. I felt that the manufacturers understood that I was dealing with the good and the bad and trying to overcome the bad and make it a better industry. Basically it's the design engineers that I spent a lot of time with. These people are very concerned; they want to make the very best product. It's just that they have their hands tied a lot, or they have to use up all the old parts before they can design a new part.

PLAY METER: Does the responsiveness carry over to all phases of manufacturing today—even to the physical product itself?

SENINSKY: Not all of it. It is a major factor. They (manufacturers) are more aware of it now. They are putting out good machines and adding little things that are making it better.

One argument now is do they need an electrical coin counter (meter) on every single video game? My answer is yes. If they would get it, they could get the internal bookkeeping perfect. The design engineers believe this.

The manufacturers say they don't want to do this, which means that they are working very hard on the other approach to make sure that they don't have to.

PLAY METER: What about manufacturers' warranties? Play Meter gets letters sometimes about them not being realistic.

SENINSKY: I believe that no one in the industry would say there is a manufacturers' warranty. As I understand it, if the game is sold to a distributor, for all the time it takes to get from the distributor, to get crated, and to be shipped out, the warranty would be expired.

Realistically they have a distributor's warranty. The manufacturer may give the distributor some money for doing some amount of warranty work, but the way we see it on the street, if you're getting any amount of warranty work done, it's being done by the distributor.

PLAY METER: What is the solution? Service seems to be one of the major stumbling blocks left today. Most people would say that the quality of the work is better today than a few years ago. What can be done about the warranties?

SENINSKY: I'm not sure I have an answer because I don't like what I see. I see too many people coming into this industry with no background whatsoever, with no chance in hell in fixing anything that they buy, and they are just rebuying the games from whoever that they bought them from.

This could put a burden on the distributors that they could never handle at all or handle at a good efficiency rate. This means the more people that come in, the harder it is to service their machines.

PLAY METER: Is the operator doing all the work that he should be doing? Is he doing less?

SENINSKY: For the amount of people in the business, they're not doing anything. Then you have your people in the business that are almost self-sufficient—they handle 100 percent of all their board and monitor work themselves.

A company like ours very rarely has to go to a distributor except to get parts for the machines.

PLAY METER: The thing that you're most interested in is the new people that are coming into the industry. Are you optimistic about the continued well-being of the people coming into the business today?



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SENINSKY: No. Someone once told me that only the strong will survive. Business is in a boom period. The manufacturers are really geared up to produce at a very high level. The distributors are buying at very high levels. There's more credit now than there's ever been.

Before, people would not overbuy, but now I've noticed that they are overbuying without realizing it and that may continue for a while longer. But then saturation hits, and you have to sit back, and, in other words, digest what you just ate. I see that coming within the next year. A lot of people are going to go under.

PLAY METER: What are some indicators that people should be looking for, especially new operators?

SENINSKY: All the media hype. There are two different hypes going here—the regular media hype that comes up with the numbers that could be made everywhere, then you have your manufacturers now that are hyping all these products.

It seems that each manufacturer is really hyping every product that comes out. If the game can't make it on its own, there is no sense in hyping it. But that seems to be what the manufacturers do. They put out a lot of publicity on these games.

PLAY METER: Do you think the attention that Pac-Man is getting worldwide is good or bad?

SENINSKY: It did put our industry on the front page, but I think it cannot continue. *Pac-Man* was a good game to start off with. I knew right away that this was a game that people would enjoy playing, but once it got the hype, it got blown out of proportion and out of reality.

If there is any problem with the municipality, it is all blamed on the video games. It is so blown out of proportion that anyone wanting to make money is going to look at this industry. They think it's the "get rich quick" industry, but they're all going to find out that it's not true.

Most of the good locations have been taken up already. The new guy comes in and doesn't think nothing of spending \$10,000 of his hard-earned money on games then putting them out and hoping that a \$300 a week in a few weeks I'll have my money back. But it doesn't work that way. And people learn this real fast.

PLAY METER: From your own experience and for the record, how long can an operator expect to make top money with a game and how does it level off?

SENINSKY: I went to a Gottlieb luncheon in Chicago at the AOE. The manufacturers brought together a cross-section of operators across the country. There was about 30 of us there. We debated that for about a half hour. Depending on the part of country you were in, which again is related to the standard of living out there, the big cities were trying to get their money back out of the machines in six months and that went as high as 12 months. I almost discount the first three weeks when a new game comes out for testing. It will do good money because people will spend a few dollars on it to learn how to play it. Then at the end of the three weeks, you'll know if the game is good enough.

Most games start to drop rapidly; an exceptionally good game would naturally make more money in the beginning while everyone learns. Then it will level out in about four months and pretty much stay that way. Maybe a game like *Pac-Man* would finish out the year. *Pac-Man* is very popular, but it doesn't make as much money now because people are very good at it.

One thing that people do not take into account when they talk about making their money back on a game, they're looking at it as an income figure instead of deducting all their expenses from that. All the money that they make in the first year, they can apply, if they're lucky, 20 percent of that to the purchase price of the game.

You're a very healthy company if you have 20 percent gross profit. I'm in the 10 percent category. One industry survey (AMOA) reported that the big companies are receiving 7.5

percent profit, where if they took all their profits and put them into a bank, they could make twice as much. Maybe that's how we're all waking up. We're working like hell, and we don't know what the bottom line is.

PLAY METER: *We hear a lot of things about operators in dire straits. Unwise operators will look up one day and see that these machines are not going to be making \$300-\$400 a week. What does the operator need to do? Is it just luck guessing right on the games or is it principles of operation that the operator should be going by? You talk about overbuying. How does the operator know that he's overbought? What should he be looking for?*

SENINSKY: Well, I don't know how anyone else does his projections, but you only have so much money to buy with. Of course there are a million reasons why you shouldn't stick with those formulas, like location, demand, and competition. You have those fighting on one side, and on the other side, you're fighting for financial stability. You have to stay as close to financial stability as you can; you have to stick to your formula. Sometimes it may mean losing some accounts in the course of it, but in the long run, you're better off.

That's why I used that figure before, that 10 percent. For example, one year (I always shoot for 10 percent gross profit.) I ended up with 8.6 percent, and that means that I was foolish. I overbought. Just imagine, if I can make mistakes like that getting all the prototypes six months before anyone else does and really testing them all and knowing what to buy and gauging it all out in a formula, and I can make mistakes. Just imagine the guy who does it off the hip, who just guesses. New people always guess. They just go in and give away whatever they have to, and they make some money in the beginning, and maybe if they're lucky, they'll get to pay for part of their first machines. But as soon as the next round comes in, they're not in.

PLAY METER: *We got a comment from somebody who*

didn't want to put anything in writing. He was upset about our editorial stand in regard to gray area machines, talking in terms that video games today need gray area to make a profit. He said you cannot make a profit with video games. Is it really all that bleak?

SENINSKY: It's definitely not all that bleak, and I would never even consider putting the two together. Gray area games have nothing to do with this industry.

PLAY METER: *The reason I was asking the question was that this is the second occasion now that we've gotten someone who operates both types of equipment that says that he needs this type of equipment because video amusement games will not generate the necessary revenue on their own.*

SENINSKY: That's an overstatement. There's no way that can be true. I think basically he's in an illegal area. Maybe he's trying to rationalize that what he's doing is justified.

PLAY METER: *What about the speed-up kits? Are they necessary? Does an operator need them to turn a profit?*

SENINSKY: We haven't had to update any games or use speed-up kits yet. I know enough that people who do (use speed-up kits) don't have to work as hard maybe as a company as ours to move out the used equipment and have a very fast turnover to survive. We work very hard at it. We don't know if we're making any more money by not using it.

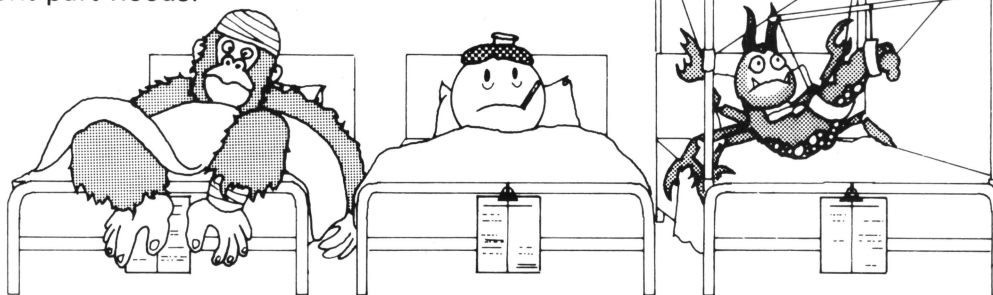
But I have to look at it from everyone's point of view. The manufacturers, I don't think, have a right to get a copyright on a game now if they don't want to sell speed-up kits or do anything for these operators that are stuck with these old games. Someone else is going to do it. Just like everything else in this country, it just has to be done. Someone's going to have to use these kits because they have been proven that they do help dead wood come alive again.

And if it remains a gray area, the operators are going to use them and they're going to be using them in a great quantity.

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PLAY METER: *Is it essential?*

SENINSKY: It should be part of the business.

PLAY METER: *Is it going to be harder for the operator to operate profitably without, would you say?*

SENINSKY: Oh, sure. There's no way you can pay for equipment now if it's going to have only a three- to four-month life. You are going to have to use every bit of your imagination and brain power that you were given to survive out there.

Speed-up kits are going to be a reality. I think copy games are wrong. I would take that stand for the manufacturer's copyrights. He should be able to copyright it, and he should fight for that. If they win it, granted, they should make the money on the games that they invented. But to fight the speed-up kit also and to keep the operators from using them, to me, is absurd.

There are some examples of how we used to make money 10 years ago. When I first came into the business, I spent a good part of my days becoming very proficient on pinball machines so I could just about play them in my sleep. We took many of the early pinball machines and rewired them to completely change the whole games to make them more thrilling.

This is probably one of the areas that you would call speed-up kits. I mean that's really what we did. We did everything we could to get more use out of the games, and no one ever said anything about it because it was our equipment and we did what we wanted to.

And we're in pretty much the same position now. Once you buy a piece of equipment, you're stuck with it. If you want to change it to make it better, I think you should have the right to do so.

But if you want to change them and sell them, that's where I listen to the laws and learn from them. For example, if I owned a Chevy and I wanted to put a Cadillac engine in it or use Cadillac parts on it, who would say that I can't do that? The problem would come when you wanted to sell your Chevy, and you wanted more for it from an unsuspecting public. But as long as you're up front about it, this is my Chevy with a Cadillac engine, I don't think there are any laws in the country that prohibit that. Speed-up kits is not a good name for them—I would call them modification kits.

PLAY METER: *What do you see for the future of the arcade business? Are we going to see a lot of people going out of business because the business is leveling off? As far as arcades, do you see them worse, better, or the same?*

SENINSKY: I don't see too many of them surviving. It just all came at once in just the past year or two.

Just take any industry where everything is cyclic. It's good, it's bad, then it levels off, then it gets good again. We're probably on the increase of the cycle right now, almost at the top or we may have come to the top now. We're there. There's not going to be too much more equipment put up. There may be more people coming into the business. There will be more games sold. So you'll have your manufacturers' curve and you'll have operators' curve too.

We're going to go through a period of eight to 12 months of nothing happening. People are just going to be meeting their financial obligations. Street collections are going down. Most of these street arcades, I've seen, they're carrying \$60-\$70 averages per machine for new equipment. It's just a matter of time until people realize that you just can't go into these things and make money.

They also create major problems for the municipalities. These people are running these places with absentee management or they're not doing it very professionally. They just want in, and they figure they can make \$500 a week, and here I am and I don't know what I'm doing.

And that just creates problems for the industry and has brought it more into the limelight. This is what I believe the public is protesting. I don't see much hope for these street arcades. The ones that are going to make it are the ones that are going into it very professionally or are backed by the big conglomerates. I couldn't even say now if all these are profitable

PLAY METER, August 1, 1982

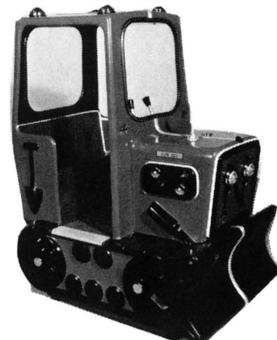
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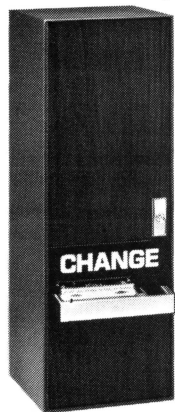
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or not. But when a company comes and puts a million dollars into a restaurant and entertainment center, these are the thing that people are going to go for. The street arcades are going to die if they're not dead already or legislated out of business.

PLAY METER: Are we going to see an end to the small entrepreneurial operation in place of these giant conglomerates?

SENINSKY: Within 10 years, I would think it would come to that just through laws of economic feasibility. We almost have 30 people a week calling up and asking me how to get into the arcade business. And I tell these people that first of all, before you even open your mouth, you got to do \$2,000 a week regardless of rent. And there's not many places you can do that—that's big bucks just to open up store. So they're going to disappear would be my guess.

PLAY METER: One of the factors affecting this you said would be governmental regulations. What are we doing wrong as far as working with municipalities at this point? Or is it something within our control?

SENINSKY: Well, the state organizations are getting more into it. The people in the industry have to educate the people that write the laws. All these towns are really doing what they want.

I wrote a column that had a lot of the background on what's wrong with the coin operators (See *Play Meter*, April 1, p. 41). The problem that I wrote about was misinformed and uneducated people who are trying to regulate this business.

But to add to that, we really have no standards of who should be in the industry. In the future I can see that you'll have your Aladdin's Castle and each one of your manufacturers will have their sort of side chain—big arcades and game rooms that are run professionally.

PLAY METER: Is the AMOA specifically getting into the speed-up kit controversy?

SENINSKY: I haven't heard if they will or not, but I think that will show you which direction it is going in.

The only way the operator can fight is to keep his established community to the best operators. Naturally operators are going to have to form together, and form strong associations in the regions that they operate and maybe write standards such as who is going to be in this industry—people that have money to buy equipment or professionals.

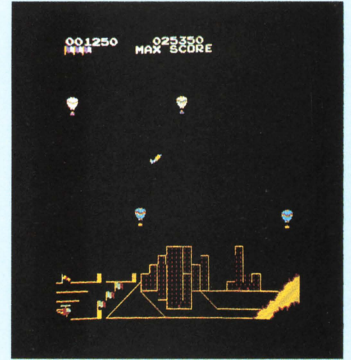
But the good operators will survive. They will beat out these chain stores for the small locations. I don't think they can do it for the big ones. But for the small ones, they'll be able to supply service in about five minutes if they really want to get on it. It's not bleak for everyone. It's just when you think about it, it's these big giants coming in too, and it's kind of hard to combat.

Now everyone wants the new equipment, and they won't stay with you if you don't give them the new equipment. The problem is that there is always someone around to give it to them. There never was before, but now there is. So you're overbuying to stay in business. But attrition is going to bleed this out in about a year.

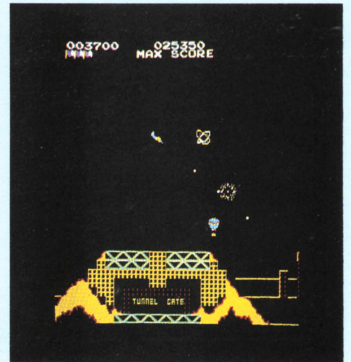
PLAY METER: So after this year we'll be back to a normal standard?

SENINSKY: We'll never be back at a normal standard again. When the market dries up, people won't realize that this is not the pot at the end of the rainbow. It used to be that people in the industry educated their locations. Now all the locations are educated.

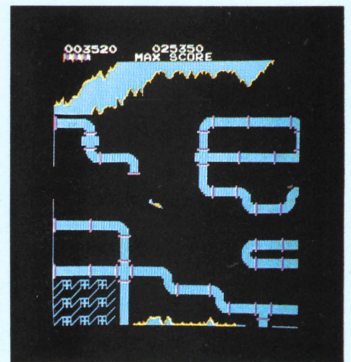
Phil Sternberg with Eastern Music just made this statement the other day that stuck in my head that the amusement game industry is run by a group of 10-year-olds. And what that means is that a 10-year-old kid goes into a pizzeria and says, "I want Super Donkey Kong," and the man at the pizzeria calls the operator, tells him what he wants, the operator call up the distributor, and orders the piece of equipment. So the decision was made by a 10-year-old. That's how it works and that's how it will always work.



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OUR 'CADES

By
Bill
Kurtz

Stocking your arcade

Arnies Arcade has 30 video games, taking in a total of \$4,500 each week. If Arnie had 60 machines in his arcade, how much would he make?

If you're a mathematician, you'd probably say \$9,000. But if you're an arcade operator, you would—or should—say a lot less than \$9,000.

Filling every nook and cranny of your arcade with games may seem like a good use of otherwise empty space, but it won't bring in many extra quarters.

Bruce Cherubin, director of games for the Malibu Grand Prix arcades, said he starts with a floor space measurement of the game room when deciding how many machines to operate.

"Usually about 30 to 35 square feet per game is adequate," he said. "If you put in more games, you get to a point where you'll delude a good game room."

Cherubin said he finds it better to start with slightly fewer machines than might be needed and later increase the number of pieces, if necessary, rather than overstock the arcade.

Yearly average

"A lot depends on the per-game volume," he said. "We try to make an average of \$125 per game per week (per year). If we're making more, then we would put in more games."

Steve Bodenstein, an arcade consultant with Professional Amusement Associates, said he doesn't use a formula but looks at how much business the arcade will do, which varies from location to location.

"Different criteria apply to different locations," he said. "The number of games you have should be determined by how much traffic you get."

Like Cherubin, Bodenstein said he looks at how much money the games make annually when deciding how many machines to put in an arcade, remembering that April and May are typically bad months for arcades while December and January are the most profitable.

"It's like the automobile industry in Detroit," he said. "They don't build to capacity but for year-average sales. In an arcade, you don't plan for peak demand, but for the average crowd."

Bodenstein said he considers 20 games "minimal" for a location to call itself an arcade and more than 40 games "superfluous" unless there's enough volume to justify it.

Is more better?

"You can only cram so many games into a room before they become unplayable," he said.

Of course, any formula can only give you a very rough estimate of how many games you'll need. Most upright videos, and even pinballs, don't require too much space.

But if you have coin-operated pool tables, sit-in videos, air hockey, foosball, skee ball, or even kiddie rides in your arcade, your games-per-square-foot formula will change.

How you arrange your machines is important, too. Cherubin said he banks his multiple games, placing them practically against each other, which allows room for a couple of extra games in the arcade. (See this column in *Play Meter*, July 15, p. 50) for some of the pros and cons of banking your games. When setting up your arcade, remember that more isn't necessarily better. •

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WILLFUL COPYRIGHT INFRINGEMENT IS A FEDERAL CRIME! (Now strengthened by Tougher Criminal Penalties)

On May 24, 1982 PRESIDENT REAGAN signed into law provisions amending the Criminal Copyright Infringement Provisions of Federal Law which toughen criminal penalties for those found guilty of pirating and counterfeiting copyrighted audio visual works. The amendments provided in part:

“PIRACY AND COUNTERFEITING AMENDMENTS ACT OF 1982

Section 506 (a) CRIMINAL INFRINGEMENT - ‘Any person who infringes a copyright willfully and for the purposes of commercial advantage or private financial gain shall be punished as provided in section 2319 of Title 18.’

Section 2319 - CRIMINAL INFRINGEMENT OF A COPYRIGHT...

- ‘(b) Any person who commits an offense under subsection (a) of this section –
- ‘(1) Shall be fined not more than \$250,000 or imprisoned for not more than FIVE YEARS, or both if the offense...
- ‘(c) is a second or subsequent offense...where a prior offense involved...a motion picture or other audiovisual work.’”

The new law additionally provides for a fine of \$25,000 and IMPRISONMENT UP TO A YEAR for the reproduction or distribution of pirated audiovisual works for less than sixty-five (65) copies but more than seven (7) copies during any 180-day period. Knowingly trafficking in counterfeit labels affixed or designed to be affixed to a copy of an audiovisual work may result in fines up to \$250,000 or IMPRISONMENT UP TO FIVE (5) YEARS OR BOTH.

The penalties for trafficking in counterfeit or infringing games by some manufacturers, distributors, and operators is clearly of greater concern than ever. These companies undermine the creativity which is essential to the life of this industry.

Because of the additional serious nature and attention given to the problem of criminal copyright infringement and trafficking of counterfeit labels, Bally Midway now gives notice that it intends to seek criminal prosecutions to the new limits of the law against any such companies in cases of willfull infringement of its copyrights in GALAXIAN™, PAC-MAN™, RALLY-X™, GORF™, WIZARD OF WOR™, OMEGA RACE™, GALAGA™, KICK-MAN™, BOSCONIAN™, MS PAC-MAN™, ROBBY ROTO™, SOLAR FOX™, and all other video games manufactured and released by Bally Midway as well as UNAUTHORIZED ENHANCEMENT or SPEED UP-KITS. Bally Midway will additionally seek to enforce its private rights by civil actions against infringers for injunctions, damages and profits. Bally Midway further places the business community on notice that it intends to enforce its copyrights and trademark rights against those infringing or trafficking in counterfeit labels on merchandising products other than video games. The new Piracy and Counterfeiting Amendments Act of 1982 will supplement and strengthen every available legal action that Bally Midway will take to protect its proprietary rights in its original and highly successful video games.

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Daily Vehicle Attention Pays Off

Today's high costs of maintaining and repairing trucks and vehicles justify cost-saving steps.

Add the increasingly costly replacement factor, as well as growing fuel bills, and the need for the steps listed below becomes urgent in the coin machine business.

- Place strong emphasis upon use and handling of company vehicles by employees. Improved driving habits can eliminate misuse and reduce high operating costs.

- Institute extremely strong penalties for private use of company vehicles by employees at any time. This should include carrying guests in the truck cab when on business rounds.

- When costs rise sharply, arrange for maintenance and service checks twice as frequently as in the past. Look for the minor service and repair needs on hoses, belts, and electrical wiring.

Make sure there is nothing slack about checkups. Pick a responsible employee, and give that individual ample time to do a good job. Make sure he has plenty of back-ground in every aspect of vehicle operation.

Saving maintenance checkups until several problems accumulate can turn a \$25 bill into a \$100 bill. And probably four or five more problems will develop just because the original ones were not handled immediately.

- Maintain constant attention to better truck routing. When done on a systematic basis, it is surprising how much of a daily reduction in mileage there is.

- Establish procedures to cut down on the number of half-loaded trucks that leave daily. Most of these trips can be saved by better scheduling and working closer with accounts covering deliveries.

- Never let up in efforts to sell employees on defensive driving as part of their working chores. This is something the average person can easily forget. Its value in holding down truck costs is high.

- Take a long, hard look at the quality of oil, gasoline and diesel fuel, lubricants, etc., that are used for preventive maintenance. Fuel is much the same from every source. With lubricants, there can be big differences, however.

- Institute careful checks upon overloading. This invariably produces strains and stresses not engineered into the truck's capabilities.

Sometimes company truck drivers can

be blamed for this, but more often, overloads originate elsewhere. A driver should be given the authority to refuse to move his truck when it is overloaded.

Too often, employees gauge loading limits with a visible check upon springs, tires, and other body details—it is a helpful procedure. But often overlooked are effects that overloading has on the motor, transmission, and rear-end parts when the vehicle is put into motion. The load that body springs can handle is often the one subjecting drive-train parts to costly strains.

- When possible, limit vehicle use during adverse weather conditions and over punishing terrain. Many times, trucks are used during circumstances where a little more careful planning could avoid unnecessary wear and tear.

- When not in use, even the most rugged truck should be given protection from adverse weather conditions. Extremely cold temperatures can do a lot of damage to every part of the vehicle though damage to painted surfaces is greatest.

Mechanical protection against weather also has high importance. Extremes of heat and cold can do many dollars worth of damage to even the newest truck.

- Another step is to assign each vehicle to a specific driver. When vehicles are available to all drivers, employees' feelings of responsibility are reduced.

An assigned driver invariably familiarizes himself with the characteristics of a specific vehicle and will probably spot developing problems earlier.

- Try to keep company vehicles neat and trim on the inside and outside. This not only contributes to a longer vehicle life, but psychologically demonstrates to employees that the firm is concerned about equipment appearance.

It has been proven that the employee who drives a neat and attractive truck is going to take better care of it than one who totally neglects his truck.

- Consider a recognition program for drivers' good records—not only for safe driving but also for maintaining low repair costs on the vehicles.

Everybody in the business has to develop concern for keeping truck use costs down...from the man who drives that truck to the operator behind the desk in the office. •

Institute extremely strong penalties for private use of company vehicles.

Establish procedures to cut down on the number of half-loaded trucks that leave daily.

When vehicles are available to all drivers, employees' feelings of responsibility are reduced.

By Ernest W. Fair

FRANK'S CRANKS

By
Frank
Seninsky

Fix your own circuit boards

A logic comparator is an inexpensive device that can save you a great deal of time in locating bad chips or IC's.

The method used to repair boards by many in this industry is to first call a service technician on the game manufacturer's toll-free number, wait a half hour on hold, and if you can accurately explain the symptoms correctly, you will, in most cases, be directed to a certain section of a logic board, monitor, or power supply if the problem is complex.

You then proceed to change each suspect IC (which takes a lot of time and patience)

until after many hours or days you finally find the bad chip or chips, and "presto," you tell your boss the board is fixed, but you spent \$139 in parts for the nine suspected bad IC's.

For those of you who can easily troubleshoot with schematics, oscilloscopes, signature analyzers, and logic probes, my hat is off to all 10 of you. Sure it is true that you must first understand "gate truth tables" to read schematics accurately, but how can a beginner get started and not waste time? One answer may be a logic comparator such as the Bugtrap Logic Comparator.

Piggy-backed together

A logic comparator compares a "known good" integrated circuit (IC) with a duplicate suspect IC that is on a powered-up board (usually in a game). The two IC's inputs are "piggy-backed" together, and the outputs are separated and compared. With identical inputs, the outputs should match perfectly. This is all done while the suspect IC is in operation.

Any output pin of the suspect IC that does not match with the corresponding output pin on the reference IC will cause a LED on the comparator (there are 16) to latch or lock on. The corresponding LED will also stay on if the comparator encounters small errors or intermittent miscompares that often cannot be picked up on an oscilloscope.

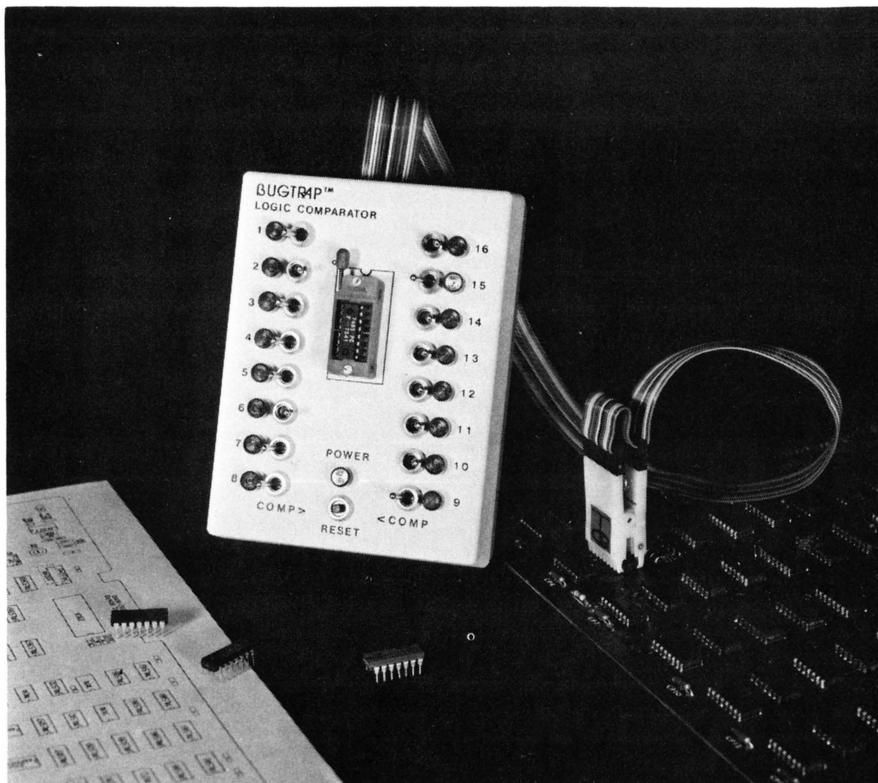
The *Bugtrap* comes in a hand-held unit made of a high-impact thermoplastic material. The 16 switches have contacts that are made of nickel and overlaid with a very thin gold covering. A 16 wire ribbon cable connects the test clip to the comparator. The test clip will easily fit onto any 16 pin IC, and each of the IC pins can be easily tested with a logic probe or multi-meter lead when the clip is connected.

A set of the 10 most commonly used IC's comes with the comparator along with a reference manual listing all the comparator switch settings for each IC output in the 7400 series.

Bugtrap limitations

As with any troubleshooting aid, the *Bugtrap* has its limitations. This unit can be used to test 8, 14, and 16 pin TTL (transistor-transistor logic) and DTL (diode-transistor logic) 7400 series circuits. The 7400 series includes simple IC's such as AND, NAND, OR, NOR gates and buffers and those more complicated: triggers, decoders, expanders, flip-flops, latches, adders, counters, shift registers, and multiplexers.

These cover just about all the possible 7400 IC's that are used on today's game logic boards. The IC's are numerically



A beginner can work on boards with a Bugtrap Logic Comparator.

listed in the manufacturer's logic comparator reference manual that also lists each IC's standard switch settings for the output pin comparisons.

Before starting to work with a comparator, you must at least know some basics about IC's.

Identifying IC's

There are four basic types of IC's. How many units an IC is to drive, and the speed that they must be driven determines what type will be used. In most cases, if you have to use a faster IC than the one you replaced, the game will work. The four types of IC's are:

- H High Speed
- L Low Power
- S Schottkey
- LS Low Power Schottkey

The IC part number is usually embossed on the IC surrounded by a mess of other numbers and letters. This mystique (confusion) is to make those who work with IC's feel important when they rattle off a string of numbers and letters and impress the rest of us dummies. Don't let this confuse you.

The two numbers before the type letter(s), usually LS, refer to the series, in our case 74. Any letters or numbers before the 74 can be disregarded. The last two or three numbers after the type letter(s) is the part number of the IC. Any numbers or letters after that can be disregarded. In Example 1, the IC's are easily identified.

To add to the confusion, sometimes a 54 is used in place of the 74 to denote an IC that is made to military specifications but is the same as its corresponding 74 series IC. The military does this so its special IC's can be kept secret, and no one will understand its codes.

Know where pin number one is

There are basically four different ways that manufacturers mark IC's to show where pin number one is. In Example II, all the IC's have some mark or notch to show which is the top end of the chip. Pin number now is then always in the top left corner.

+5 volts DC is needed

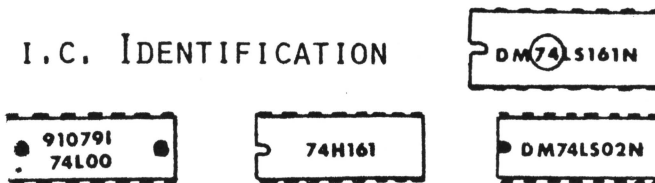
If the power light on the comparator does not go on when the test clip is correctly connected to a powered-up suspect IC, there is a strong possibility that the suspect IC isn't getting +5 VDC. Every 7400 series IC requires a 5 volts DC input and a grounded output to be driven. The comparator and the reference IC also run off this 5 volt input. You will have to check the +5 VDC input pin and output ground pin with a multimeter to be sure.

Clearing an IC

In order to get an accurate comparison

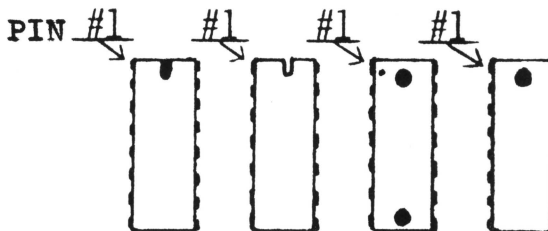
EXAMPLE I

I.C. IDENTIFICATION



The I.C.'s shown are 74LS161, 74L00, 74H161 and 74LS02

EXAMPLE II



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on the complicated flip-flops, latches, counters, registers, and multivibrators, you will have to clear or reset the IC under test, so it will start from the beginning and perform its total function.

If a miscompare is shown in an IC that isn't required to be cleared, (inverters, buffers, and gates) there is a good chance that the IC is bad. Every IC that must be cleared has a designated input pin or pins that must be pulsed to either a Logic 1 (high, +5 volts) or a Logic 0 (low, ground). The manufacturer recommends that you use a logic pulser to clear the IC's.

If you're careful, the easiest way to do the same thing is to take a jumper wire and clip one end to the +5 VDC test point on the board and use the other end as a Logic 1, and clip a wire to the ground test point on the board and use the other end of the wire as a Logic 0.

Just touch the end of whatever wire you require to the designated input clear pin or pins of the suspect IC. The table lists these pins precisely and also shows how to clear dual pack IC's. A dual pack IC has two separate clears: one for each half of the IC package.

It should be noted that if the clear instructions are enclosed by two vertical lines, then the input pins (which are next to each other) must be pulsed at the same time. If the clear instructions are separated by a horizontal line, then clear inputs can be pulsed separately, but both must be pulsed to compare the IC.

Additional notes

If the output of a suspect IC is connected to an input circuit of another IC, (a pull-up resistor/capacitor circuit or a clock circuit located close to the crystal) a miscompare can result. A miscompare may also result if the suspect IC has an output that connects to another component that has a shorted input. This drags down the suspect IC's output to ground.

It's a simple matter to lift the output pin or pins of the suspect IC that show miscompare or cut the trace from the output to the possible shorted input. This is still easier than replacing the whole IC. If you now show a compare, you should look at the next IC that might have a shorted input.

Beginner shortcuts

Some shortcuts for the beginner to be aware of:

1. *Ms. Pac-Man* piggy-back board—There is a bad run of 74LS74 flip-flops that causes the game to reset in the middle of play. This chip failure has been the cause most of the time.
2. *Centipede*—When the ball track won't move the man in either direction and both optic couplers are known good, then take a look at the 74LS157 on the logic board. It has been known to fail.
3. *Defender*—If your game just rests in the middle of play, look at the 74LS374 on the CPU board after checking that all connections are tight.
4. *Star Castle*—If you can't get your monitor to work and it tests good, look at the 74LS377 IC on the CPU board.
5. *Gottlieb*—If you are missing digits on a display and the display is good, look at the 7408 on the CPU board. If the whole display circuit is bad, check the 7448.

The Bugtrap Logic Comparator will help get you into checking IC's and collecting known good reference samples. Then, when you hear the guys rattling off the names of the stuff they work on, you can rattle off some of these names too. It's a nice tool to have.

By the way, I dropped it twice (as a test?), and it didn't break or scratch. It is made by Bugtrap Instrumentation, 1173 Tasman Dr., Sunnyvale, California 94086. Telephone: 408/734-1118. It costs \$265.

Over the summer, I'll be putting together a list of symptoms and bad IC's that would cause these symptoms. It should be a valuable list to have. •

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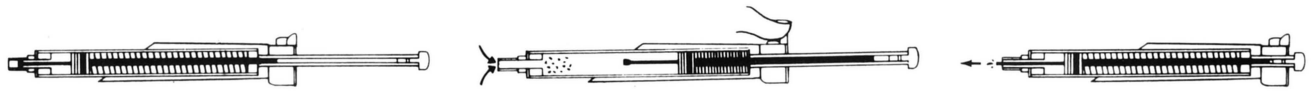


Figure 1-A

Soldering tips and techniques

By Randy Fromm

Electronic game repair is a lot like the work of a police detective. When a crime occurs, the detective looks for the person that committed the crime. When a game is out of order, the technician's job is to locate the component or components that have failed.

Of course, the similarity ends there. The detective has to simply turn the suspect over to the court that will determine the suspect's guilt or innocence and decide the sentence. But the technician must also be judge, jury, and executioner.

After locating the suspected component, he must test it to determine if it is actually defective. Once the part has been judged as actually having failed, there can be just one sentence—removal and replacement!

Because the vast majority of the electronic components in electronic game systems are soldered in place, a good soldering technique is essential to successful repair. It doesn't do you a heck of a lot of good to be able to locate the bad part if you can't replace it.

There are many different methods of removing and replacing electronic components. But because most games are repaired on location to save downtime and the costs involved in pulling a game to the shop for repair, it's important to have an effective and efficient means of repair that can be used while the technician is in the field. This means that the tools and equipment used for the repair must be highly portable.

One added consideration is the cost of the equipment. This is especially important since most mechanics are notoriously short of money!

So here is a soldering technique that covers all of the aforementioned aspects of repair. It's efficient, portable, and cheap.

The tools

There are three tools required to remove and replace an electronic component that is soldered onto a printed circuit board.

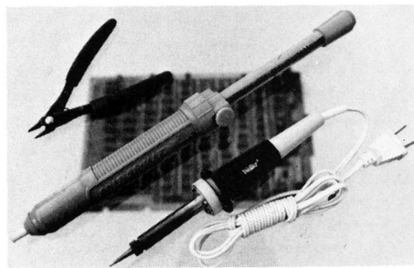


Figure 1

Among these, of course, is some type of soldering iron. There are many types and brands available.

The one I recommend is made by Weller, model number WP-25. (Figure 1) This is a 25-watt soldering iron with an iron-clad copper tip. The tip is replaceable when it wears out, as all soldering iron tips eventually wear out after some use. By using an iron-clad tip, however, tip life is greatly extended over those irons that have soldering tips made of copper alone. The WP-25 costs around \$15.

In any case, no matter what brand or type of soldering iron you choose, select one that has a 25-watt rating. A soldering iron that has a rating of more than 25 watts will be too hot for use on a printed circuit board and might damage the solder pads or traces that are bonded to the fiberglass board itself by melting the glue-like material that holds the two together. This causes the solder pad to come right off the board, leaving nothing left you can solder the component to.

More heat

A soldering iron with a rating of less than 25 watts (say, 15 watts) will work fine for many applications but will not have enough heat for larger components. These larger components, such as high current diodes and transistors, require more heat for soldering because of their thick component leads and large, heat dissipating

packages.

As the heat from the soldering iron is applied to the leads of the device, it is absorbed into the device itself. If the iron cannot provide sufficient heat, the component lead will not get hot enough to properly melt the solder.

Since a defective component must be removed from the printed circuit board before a replacement part can be installed, you have to be able to remove the solder that is holding the component in place.

Again, there are many different methods of accomplishing this. But there is one method in particular that I have found to be extraordinarily effective. I use a solder removal tool called a Soldapullt. (Figure 1)

Commonly referred to as a "solder sucker," the Soldapullt is a hand-held tool that is used to withdraw the molten solder from around the component lead by momentarily creating a powerful vacuum.

Inside the Soldapullt, a spring-loaded piston is quickly retracted inside the cylinder, or barrel, of the tool when the release button is depressed. (Figure 1A)

A replaceable Teflon tip is used to channel the resultant vacuum toward the component lead after the solder has been melted by the soldering iron. When the release button is depressed, the molten solder is withdrawn into the cylinder of the tool. As the molten solder sprays into the cylinder, it instantly cools and hardens into tiny fragments. The extracted solder is held in the cylinder until the tool is periodically emptied (after approximately 100 uses).

Dumping the trash

Removing the waste solder from the Soldapullt is a simple matter of twisting the top of the tool, pulling to separate the piston from the barrel and dumping the extracted solder waste into the trash.

As with the soldering iron, there are different types and brands of solder suckers on the market. The one I recommend is manufactured by Edsyn (an acronym for Engineering Dedicated to Suit Your

TYPICAL SOLDERING APPLICATIONS

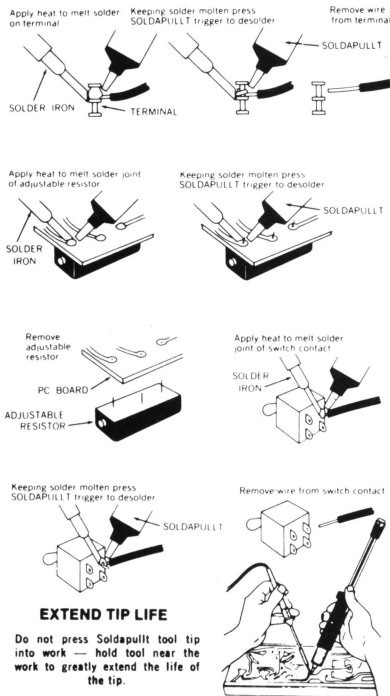


Figure 2

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Needs). Its model number is DS 017. This tool sells for around \$18, and like the soldering iron, is available from most electronic retail stores.

There are smaller versions of the Soldapull available, but I don't recommend them for a couple of reasons. The small solder suckers don't have enough suction to do as good a job at removing the molten solder.

Also, because the smaller versions don't have as much mass, they have a tendency to jump off the point at which you're trying to remove the solder due to the recoil that occurs as the spring-loaded piston retracts inside the tool. This can cause you to miss half the solder, forcing you to go back over the same point again to remove the solder you missed the first time around.

Cutting pliers

The third tool needed for successful printed circuit board repair is especially important when you're removing and replacing integrated circuits. It's a small pair of cutting pliers that has a bit that is small enough to get between the legs or pins of the integrated circuit package, so that the pins can be cut between the printed circuit board and the IC package itself. Commonly referred to as a "micro-shear" (although Micro-Shear is actually a brand name), this type of plier is available from many different manufacturers. As long as the plier will do the job of cutting off the legs of an integrated circuit, any brand will do. One type that works well is manufactured by Xcelite. Its model number is 96CG. (Figure 1)

Component removal

Removing a component, such as a diode, transistor, resistor, or capacitor, is easy when you use a soldering iron and the Soldapull to remove the solder first. (Figure 2) If you're right-handed, you'll hold the soldering iron in your right hand and the Soldapull in your left hand. Southpaws will probably want to hold the iron in the left hand and the Soldapull in the right hand.

Working from the bottom of the board, use the iron to melt the solder on one of the leads. When the solder has melted (Give it about three seconds to melt all of the solder in the hole in the printed circuit board.), place the tip of the Soldapull over the lead and the hole, and immediately press the release button. The piston will retract, drawing the molten solder into the Soldapull.

Repeat the process on the remaining lead(s) of the component, and the part should pull right out the top of the board.

If you are not successful at removing all of the solder from a hole on the first attempt, *do not try to clear the rest of the solder without first flowing additional solder into it!* This is important because it is the surface tension of the molten solder that helps to pull it all from the hole. If there is not enough solder in the hole, it's

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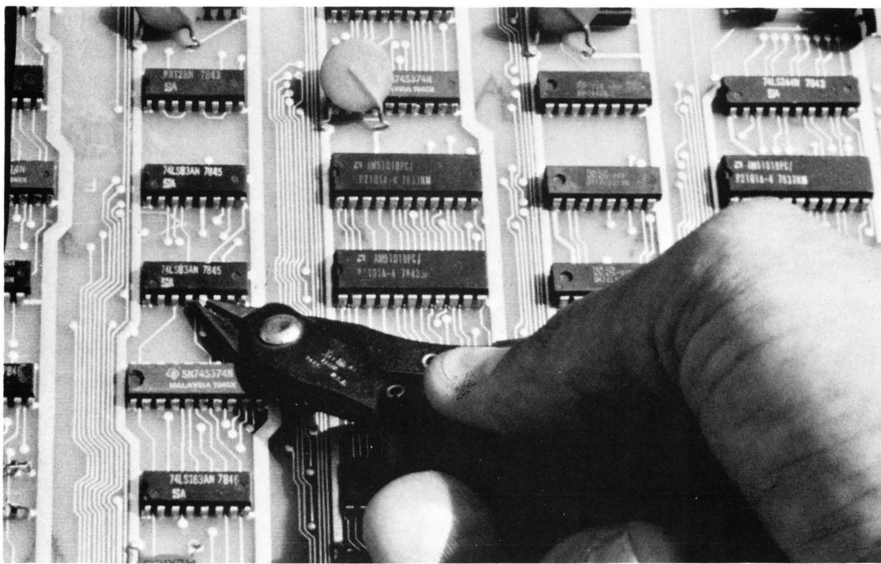


Figure 3

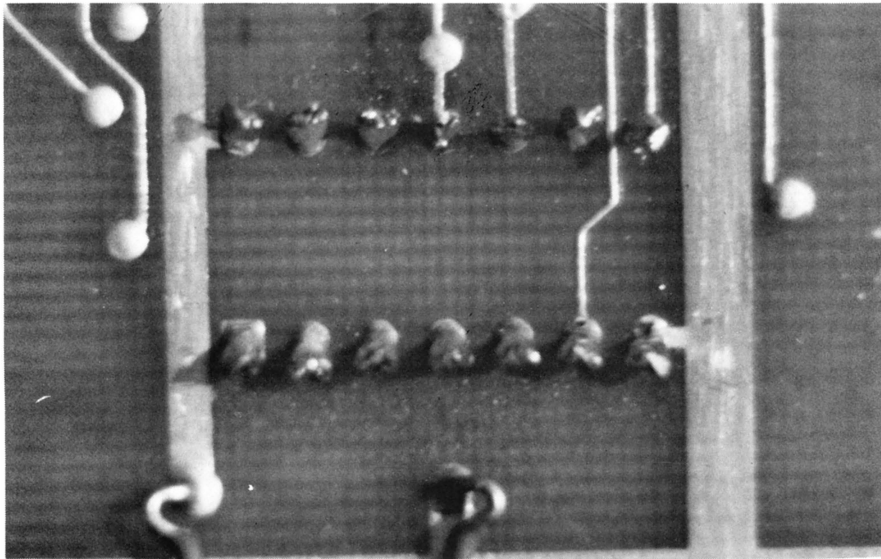


Figure 4

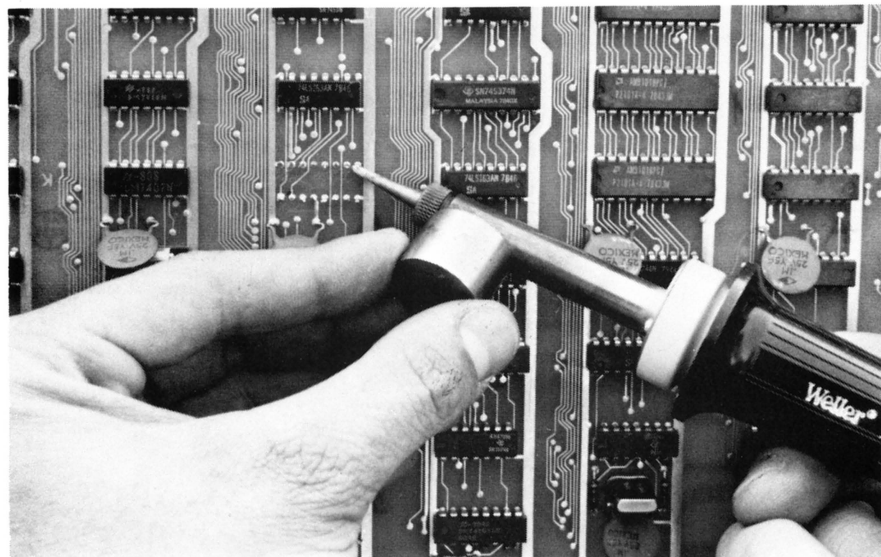


Figure 5

extremely difficult to pull the rest of it out, regardless of how much heat you use.

Also, although the tip of the Soldapullt is Teflon and will not melt, avoid pressing it directly against the tip of the soldering iron. This will shorten the tip life of the Soldapullt.

When the tip of the Soldapullt wears, it doesn't make as good a seal around the molten solder. This reduces the efficiency of the tool. Depending on how often you use it, the tip of the Soldapullt will have to be replaced every six months to a year with average use.

Removing integrated circuits is a bit more involved than removing other components because ICs have a larger number of leads. Integrated circuits can have up to 40 pins. And although a 40 pin IC will generally be installed in a socket that allows for easy removal, you will have to remove ICs that have 14, 16, or even 24 pins that are soldered into the printed circuit board.

The primary concern in removing an integrated circuit is to do so without damaging the printed circuit board itself. Improper technique can butcher the board by breaking the circuit traces that carry the signals between the ICs or by pulling the solder pads and traces right off the board.

One is easy

If you're removing an integrated circuit from a printed circuit board (PCB), chances are good that you've diagnosed the IC as having failed and you're removing it so it can be replaced. And because it's easier to remove a single component lead rather than 14 at once, the easiest way to remove the defective IC is to use the micro-shear cutting pliers to cut the legs off. (Figure 3)

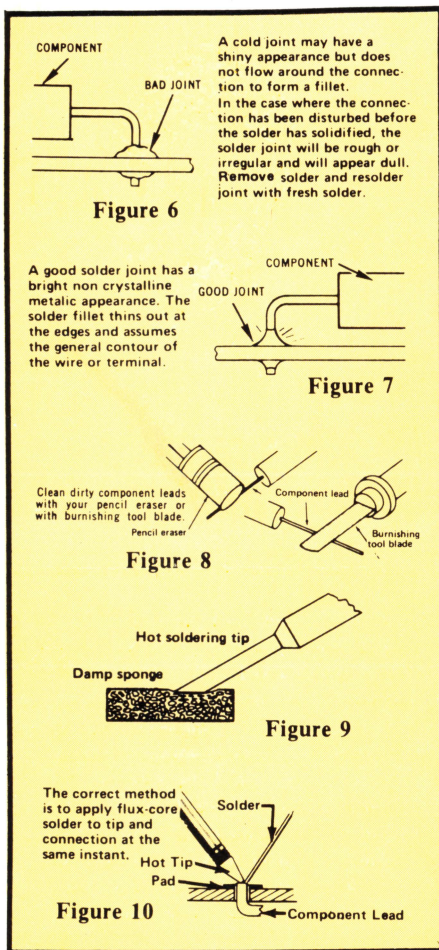
Cut all the legs, and remove the body of the integrated circuit. This leaves the leads themselves that can then be removed individually. (Figure 4)

The leads are then removed from the top of the board by heating each lead with the soldering iron to melt the solder that holds it in the hole. The lead can then be pulled right out. Generally, the surface tension of the molten solder will cause the lead to adhere to the tip of the soldering iron, and it can be pulled out by the iron itself.

Pliers can also be used to grab the leg for removal after the solder has been melted, but the cold bit of the tool can cause the solder to harden quickly, forcing you to reheat the lead to complete the removal process. This is what you want to avoid. The repeated reheating of the solder pad can cause the bond between the pad and the PCB to become weakened, allowing the pad to lift off the board.

There are a couple of tricks you can use to facilitate removal of the leads, if they do not easily pull out of the hole, using the soldering iron tip.

One is to flow additional solder onto the iron's tip and the lead itself. The extra surface tension from the additional solder will help the lead stick to the iron as you lift it out.



Another neat trick is to obtain a magnet that is fairly powerful (such as the magnet from a defunct speaker), and hold it against the shaft of the soldering iron, just behind the tip. (Figure 5) Because the tip is iron plated, it will also become magnetized. The magnetized tip will attract the leg of the IC, and put it right out of the board as soon as the solder is melted.

Effective method

I have found this method to be extraordinarily effective for removing all the IC leads, not just those that are being a bit stubborn. In fact, you can actually magnetize the iron itself by simply rubbing the magnet in one direction across the shaft and tip. This eliminates the need to hold the magnet against the shaft when removing the leads. You will have to remagnetize the iron periodically because the heat of the iron will eventually cause the magnetic strength to weaken after extended use.

After all of the leads have been removed, the holes in the PCB will still be filled with solder. Of course, the solder must be removed from the holes before the replacement IC can be installed. Use the Soldapull to remove the solder by melting the solder in each hole and extracting it one hole at a time. Do this from the bottom of the printed circuit board.

This is important because there are thin traces on the top of the PCB that carry data. These traces will often pass under an integrated circuit and between the leads. If a trace is accidentally broken when removing the bad IC and the replacement part is installed on top of the broken trace, you won't be able to visually find it. Then you'll have to troubleshoot the system all over again to find out where the problem is. Once the holes are all cleared of solder, you're ready to install the replacement integrated circuit.

There will be times when you'll want to remove an IC from a printed circuit board without cutting the leads off first. You might need to remove an integrated circuit from a junk board to use as a replacement part in another unit, or you may not be entirely certain that the IC you're replacing is actually bad.

If the part is fairly expensive, it would certainly be a waste of money to destroy a good IC by cutting it off the board. Although it's a bit more difficult to remove an IC intact, it can actually be a faster technique than cutting it out when it's done properly.

This time, start by removing the solder from each of the legs of the IC. Again, this is done from the bottom of the board.

Tricks to the trade

Two tricks that will help remove all of the solder from around each lead are to add solder to the lead as you heat it, forming a better seal around the tip of the Soldapull, and pushing the lead toward the middle of the IC with the tip of the iron as you use the Soldapull to extract the

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Because the ICs are generally inserted by machine, the leads are bowed out slightly as the new integrated circuits come from the manufacturer. This puts tension on the leads as the ICs are loaded into the stuffing machine, keeping them in place until the machine drops them into the holes in the board.

When you unsolder the leads from the bottom of the board, you will notice that all of the leads are pushed to the outside of the holes. By pushing the lead toward the center as you extract the solder, you will be assured of removing the solder from all sides of the lead.

After you have removed the solder from each leg, you will not be able to simply pull the IC off the board. The Soldapull cannot remove all the solder from the holes. The small amount of solder that is left in the hole causes the lead to sweat to the copper plating that is inside the hole in the printed circuit board.

(These holes are known as "plated through holes" because there is actually a thin deposit of copper inside the hole that connects the solder pad on the top of the board to the pad on the bottom. Improper removal of an integrated circuit can cause this plating to become damaged, breaking the connection between the top and bottom of the board.)

If you try to remove the IC by prying it off the board, you will rip the plating out of the hole and possibly the traces right off the board as well. So, before removing the IC, use the micro-shears to grasp each lead and give it a wiggle. You will generally be able to feel the lead break loose from the side of the hole. Use light pressure on the grips of the plier to avoid inadvertently cutting the leg of the integrated circuit.

After you have broken loose each of the leads, you should be able to lift the IC right off the board. If it's still a little stubborn, use a small, slot screwdriver (such as the pocket-type screwdriver that most mechanics carry in their breast pocket; it usually is inscribed with the name of a game manufacturer, distributor, or supplier of replacement parts) to gently pry the integrated circuit off the board.

Easy does it

Slide the blade of the screwdriver under one end of the IC and gently twist it to either side. Do not use the screwdriver as a lever or crowbar—this will greatly increase the chances of pulling the plating out of the hole or the leg right off the IC should one or more of the leads not be completely unsoldered.

Use the screwdriver to loosen first one end of the IC and then the other. The integrated circuit should then lift easily from the top of the printed circuit board.

This method takes a bit more practice (Ask your distributor if he has any junk boards that you can get, at little or no cost, to use for soldering practice.), but it's faster than the preceding removal technique. Once the integrated circuit has been

removed, the holes are already cleared of solder, and the board is ready to receive the replacement part.

Solder and soldering

Solder is an alloy metal comprised of two elemental metals: tin and lead. The resulting alloy has a melting point that is even lower than that of pure lead that melts at 327 degrees C (621 degrees F).

Solder is available in many alloy ratios. The melting point varies with the ratio of tin to lead. The greater the tin content, the lower the melting point becomes.

Offhand, you might think that larger percentages of tin would raise the melting point of the solder, but alloys often behave in a fashion that is quite different than what might be expected without a detailed knowledge of metallurgy. The most popular type of solder for electronic repair is known as SN63. SN63 is 63 percent tin and 37 percent lead (SN is the abbreviation for the element tin in the periodic table of the elements.). SN63 melts at 182 degrees C (362 degrees F).

SN60 is also popular in electronic repair. Its lower tin content of 60 percent means that it has a higher melting point. The melting point of SN60 is 188 degrees C (370 degrees F).

Other ratios such as SN50 and SN40 are also available. These types, however, are used primarily for plumbing, radiator repair, auto body work, or artists' metal sculptures and are not suitable for electronic repair or manufacturer. In electronics, you need to use a solder that will melt at a low temperature. By using a low temperature solder, you minimize the risk of damaging the printed circuit board through excessive heating.

Although many believe that extraordinary care must be taken to avoid overheating the electronic components while soldering, the parts you use in games are generally pretty rugged in heat tolerance.

Old school ideas

The idea of easy destruction of components due to overheating is "old school," a holdover from the time when most semiconductors (diodes and transistors) were made of an element known as germanium instead of the silicon now used in the vast majority of parts. The germanium components were sensitive to heat and careless soldering practices could (and did) blow the parts during installation.

Silicon, on the other hand, is a lot more rugged as far as temperature is concerned. Silicon components can generally tolerate fairly high temperatures without risk of damage.

As an experiment, I tried placing the tip of my soldering iron right on the top of some ICs to see if I could cause them to become permanently damaged. I even flowed some solder into the tip so there would be good heat transfer from the iron to the integrated circuit.



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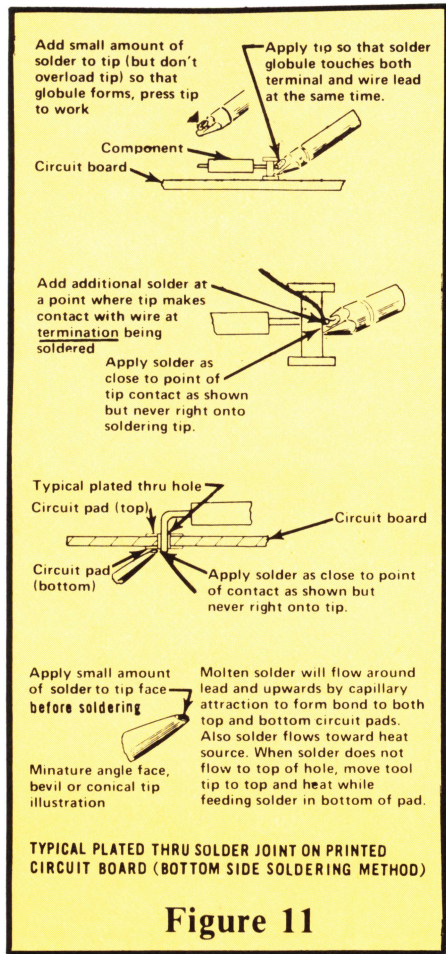


Figure 11

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For about the first five minutes, the game functioned normally. After five minutes, the IC package was much too hot to touch with my finger and the game began to malfunction.

I kept the iron on the IC for an additional 10 minutes. After letting the part cool for about 15 minutes, the game began to function normally again. The game is still on location, and the ICs that were heated have not failed. The IC may not work properly when overheated, but the heat will rarely damage it.

Another advantage of using SN63 or SN60 solder for electronic repair is that as the molten solder cools, it changes rapidly from a liquid state to a solid state. This is important as the component leads being soldered must remain motionless as the solder changes from liquid to solid.

Fractured solder joint

If the leads move during the cooling process, you can end up with something known as a "fractured solder joint." (Figure 6) A fractured solder joint will not make a good connection between the items being soldered and may cause intermittent problems. These intermittent problems always seem to occur at 7 on a Friday or Saturday evening or three minutes after the serviceman has left the location! And of course, the problem never shows up when the mechanic arrives in response to a service call.

A fractured solder joint can be easily recognized by a dull, rough, lumpy, and irregular appearance. A good solder joint will appear bright, smooth, and shiny and will adhere well to the parts being soldered. (Figure 7)

Another difference between solder types concerns something known as "flux." Flux is a chemical cleaner that is used in soldering to remove any oxidation that has occurred on the parts being soldered. The oxidation can cause the solder to surround the lead, but keep it from making a good electrical connection. The solder must bond to the items being soldered to form a well-adhered blob known as a "fillet."

If the molten solder surrounds the component lead, but the lead is unwilling to bond to the solder due to oxidation, a poor connection called a "cold" solder joint will occur. (Figure 6) The cold solder joint can be identified by a shiny appearance and a total lack of adhesion to the lead itself.

The flux used in electronic work is known as "rosin" flux. Although rosin flux is available in small cans, tubes, and bottles, the solder actually contains the flux in the core of the solder itself. (Figure 7)

A small amount of rosin flux is inside the solder that is actually a hollow tube. As the solder melts, the flux is automatically released onto the parts being soldered. The flux is activated by the heat of the iron, cleaning the component leads as they're being soldered.

This type of solder is known as "rosin core" solder. Rosin core solder is the only

type of solder used in electronic repair.

Acid core solder

The other type of solder is called "acid core" solder. The acid flux is highly corrosive and is used for plumbing and radiator repair. *Do not, under any circumstances, use acid core solder for electronic repair!* Besides being highly corrosive (to the point where the printed circuit traces can be dissolved right off the board), the acid flux is electrically conductive and will interfere with the normal operation of the circuits.

Good clean leads are important for a successful solder joint because soldering is more than simply joining two items together with a blob of molten solder and allowing the solder to cool. (Figure 8) Soldering is actually a chemical process where some of the metal from each of the items being soldered is actually dissolved into the solder itself. This makes it as if the lead being soldered, the copper plating inside the hole in the PCB, and the solder are as one piece, thus making a good electrical connection as well as a mechanical bond.

At the same time, some of the metal is also dissolved from the tip of the soldering iron as well. That is why soldering iron tips will eventually wear out.

For the same reason, it's important that you never file the iron-clad tip of the soldering iron. Copper dissolves easily in the molten solder, so the tip of the WP-25 soldering iron is plated with iron to greatly reduce tip erosion and prolong the usable life of the tip. If the iron plating is removed by filing the tip, the copper will be exposed and the tip will quickly dissolve.

A dirty tip can be cleaned by wiping it on a wet sponge when the iron is hot. (Figure 9) Excessive corrosion (such as that caused by leaving the iron on for extended periods of time) can usually be removed by melting solder on the hot tip of the iron and repeatedly wiping the tip on the wet sponge.

The flux in the solder will usually be sufficient to dissolve the corrosion. If not, a small can of rosin flux paste can be obtained from most electronic retailers. Dipping the hot soldering iron tip in the flux will surely remove any stubborn corrosion or oxidation on the tip. Be sure to use the flux in a room with adequate ventilation. It's not that the flux is poisonous, but it does smoke like crazy when it's heated by the iron.

Glasses for protection

Also, it's not a bad idea to wear safety glasses when soldering to protect your eyes from accidental splashes of solder. I can tell you, first hand, that it doesn't feel too good to have molten solder splashed into your eyes!

The actual soldering process itself is easy. After installing the replacement component by inserting the leads into the top of the printed circuit board, turn the board over and touch the soldering iron to the

lead at the point where it protrudes from the bottom of the board.

(You may want to bend over two of the corner pins of an integrated circuit to prevent it from falling out of the holes as you turn the board over.)

Make sure the iron is clean by wiping the tip on the wet sponge before applying it to the lead. Touching a small amount of solder to the tip before applying the iron to the component lead will help conduct the heat from the iron to the lead. This is known as "tinning" the iron.

Next, apply the solder as close to the point of contact between the iron and lead as possible. (Figure 10 & 11) Avoid applying the solder directly to the tip itself because this will vaporize the rosin flux before it has a chance to work on removing any oxidation that might be present on the lead.

Don't be afraid to add plenty of solder to the work. I see more bad solder joints caused by people who have not added enough heat and solder, than by those that have used too much. Any excess solder can always be removed with the Soldapull.

Take your time

It should require about three seconds for each joint. Just count slowly to yourself as you do it. Don't be in a rush when you're soldering. Take a good three seconds for each joint, and add plenty of solder.

If you don't heat the joint sufficiently, you can end up with a cold solder joint. If you don't use enough solder, it may not flow into the plated hole sufficiently to connect the top and bottom traces on either side of the hole. If the plating inside the hole has been damaged during the removal of the defective component (easy to do), the insufficient solder flow will not reconnect the top and bottom, and the signal may be lost at the bad connection.

Just go down the line soldering each lead in turn until all the leads have been soldered. Then, make a visual inspection of the solder joints. Look for blobs of solder bridges that are connecting two or more points that shouldn't be connected, and cold or fractured solder joints.

A deposit of rosin flux will usually be left on the board surface. The rosin does not conduct electricity and may be left on the board. However, it does make a neater job if the excess flux is removed after the installation.

There are many types of flux remover available. Some come in aerosol cans, and the excess flux deposits are removed by spraying the board with the solvent. Other types of flux remover come in a bottle or dispenser and are applied with an "acid brush." I prefer the latter because it is much less expensive to use, and the brush allows you to get all of the flux off the board.

With a little practice, you can change an integrated circuit quickly and easily with the end product being a repair job that is virtually impossible to detect as being any different than the original installation. •

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POWER SUPPLY DESIGN COURSE

Lesson One: System Analysis

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Lesson One – System Analysis: The purpose of this first lesson is to develop an understanding of the transfer of voltage or current from a source to a load. This study is simplified by the use of equivalent circuits and models. Complex and lengthy calculations have been eliminated by the introduction of the Universal Transfer Characteristic Curves.

POWER SUPPLIES :

The objective of this first lesson is to provide the power supply designer with a **systems point-of-view**. Also, the tools necessary to analyze and predict the performance of a power supply in a circuit will be developed in this first section.

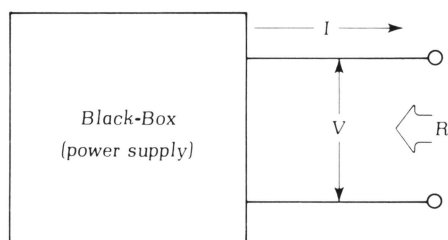


Fig. 1-1: The power supply can be viewed as a "black-box" with a set of output terminals. There are three parameters associated with the two output terminals. They are: Voltage measured across the terminals, the current which flows when a load is connected across the output terminals, and the internal resistance of the black-box measured across the terminals.

Consider, for example, the **black-box** in fig. 1-1, which in reality may be a power supply. Notice that, associated with the output terminals, are three basic parameters, V , I and R . V is the voltage across the terminals; I is the current which flows when the terminals are loaded; and R is the resistance seen across the terminals.

The **black-box** can be considered a voltage or current source depending upon which parameter, V or I , is to be controlled. If V is the controlled parameter, the **box** is considered a **voltage source**. If I is the controlled parameter, the **box** is

then a **current source**. In either case, however, it is the same **black-box**.

EQUIVALENT CIRCUITS AND MODELS :

Although the **black-box** mentioned above may be quite complex internally, the designer need only be concerned about the three basic parameters to perform a worthy analysis. He can do so by simply making a **model** of the **black-box** by developing an **equivalent circuit**. The equivalent circuit need only represent the parameter to be controlled.

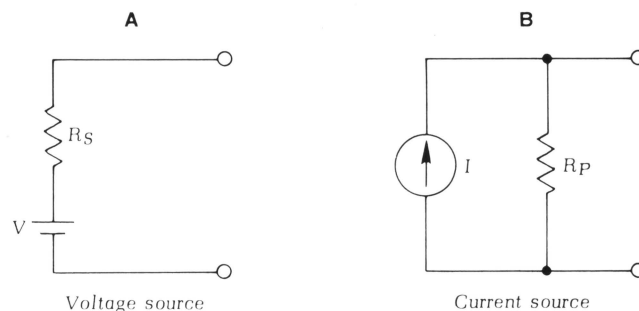


Fig. 1-2: Depending upon which parameter is to be controlled current, or voltage, an equivalent circuits can be derived. R_S and R_P represent the internal impedance.

Consider, for example, the circuit shown in fig. 1-2A. It contains a battery in series with a resistor, R_S . This circuit can be used to represent a power supply when voltage is the controlled parameter. The circuit shown in fig. 1-2B can be used to represent a power supply when current is the controlled parameter. In either case, notice that model represents only the controlled, or **independent**, parameters and the internal impedance. The uncontrolled, or **dependent**, parameter will be determined by the loading on the power supply.

THE IDEAL VOLTAGE SOURCE :

In order to gain a full appreciation of a power supply operating as a voltage source, it would be best to first con-

sider a source with ideal characteristics. The student should bear in mind, however, when reading this lesson that **ideals** are only points of reference and, most generally, are not attainable in practice.

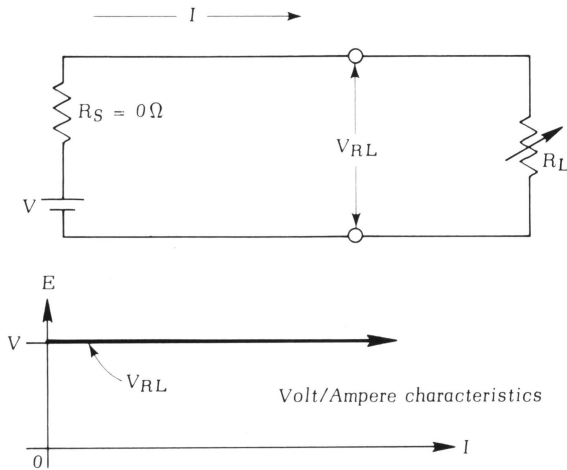


Fig. 1-3: In the case of the ideal voltage source, the voltage measured at the output terminals will be constant for all values of current drawn.

The circuit shown in fig. 1-3 is an example of an ideal voltage source. Notice the R_S is zero ohms. From observation it can be seen that when a load is connected to a voltage source it is in series with R_S . Also, it is known from elementary teaching that a current I will flow when the circuit is a closed loop. I will cause a voltage drop across R_L . However, since in this ideal case the value of R_S is zero the $I R_S$ drop is zero volts across R_S . Therefore, the full battery voltage will appear across the load R_L . Also shown in the diagram is the Volt/Ampere characteristic curve for the ideal voltage source. The locus V_{RL} indicates that V_{RL} is constant for all values of I and is the full battery voltage, V .

Summarizing, in the ideal case the independent parameter, V_{RL} , will be constant for all values of the dependent parameter, I . The value of I will be determined by the value of R_L .

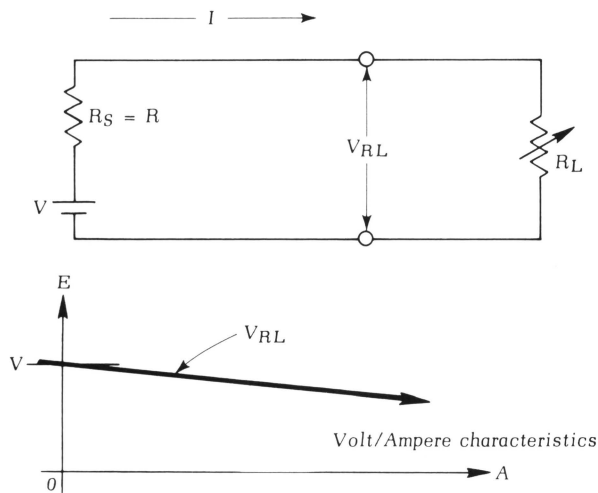


Fig. 1-4: In the case of a practical voltage source, R_S is a finite value. The voltage measured at the output terminals will be inversely proportionately at the load current.

THE PRACTICAL VOLTAGE SOURCE :

Turning our attention to fig. 1-4 and the practical voltage source, notice the V_{RL} is no longer constant for all values of

I . The change in V_{RL} , termed ΔV_{RL} (said delta V_{RL}), is the $I R_S$ drop across R_S , which is of a value greater than zero. Therefore, the slope of the V_{RL} locus is related to the values of R_S and R_L and so is the amount of V transferred to the load.

A useful relationship when considering a voltage source in a practical circuit is the ratio of R_S to R_L , termed sigma (σ). The value of V_{RL} and I can easily be found by use of sigma, the **Universal Transfer Characteristic Curves** and some

sigma - σ - is the ratio of R_S to R_L

elementary formula. The Universal Transfer Characteristic Curves (inserted at the end of this lesson) consist of two loci - one representing the dependent parameter, in this case, I , and the other representing that percent of the independent parameter transferred to the load, in this case V_{RL} . The voltage section of the chart represents the area of efficient voltage transfer. The rules for using the chart are few and uncomplicated. First, establish the maximum value the dependent parameter can attain. In this case, I will be maximum, $I_{(max)}$ when the output terminals are short circuited or when sigma is zero. $I_{(max)}$ is then the Ohms Law value of V and R_S . Establish sigma for the actual load. Then read up the sigma scale to the interceptions of the loci. The percent of V_{RL} of V and I of $I_{(max)}$, both known, can then be read off the percent scales.

EXAMPLE :

Determine the voltage transferred to the load (V_{RL}) and the actual current which flows when a 500Ω load is connected across a 10 volt source with an R_S of 10Ω . The circuit is shown in fig. 1-5.

STEP 1 : Find $I_{(max)}$ (the short circuit current).

$$I_{(max)} = \frac{V}{R_S}$$

$$= \frac{10V}{10\Omega} = 1AMP$$

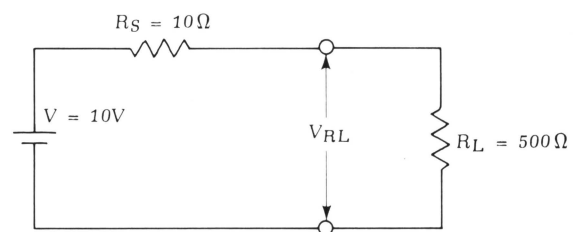


Fig. 1-5.

STEP 2 : Establish sigma (σ).

$$\sigma = \frac{R_L}{R_S}$$

$$= \frac{500\Omega}{10\Omega} = 50$$

STEP 3 : Using the chart, find I as a percent of $I_{(max)}$.

$$I = 0.02 \times I_{(max)}$$

$$= 20ma$$

STEP 4 : Using the chart, find V_{RL} as a percent of V .

$$V_{RL} = 0.98 \times V$$

$$= 9.8V$$

THE IDEAL CURRENT SOURCE :

The circuit shown in fig. 1-6 is that of an ideal current source where R_P is infinite. Also shown in the diagram is the Volt/Ampere characteristic curve associated with the circuit. Notice that the current transferred to the load, I_{RL} , is constant for all values of R_L and is the full generator current, I .

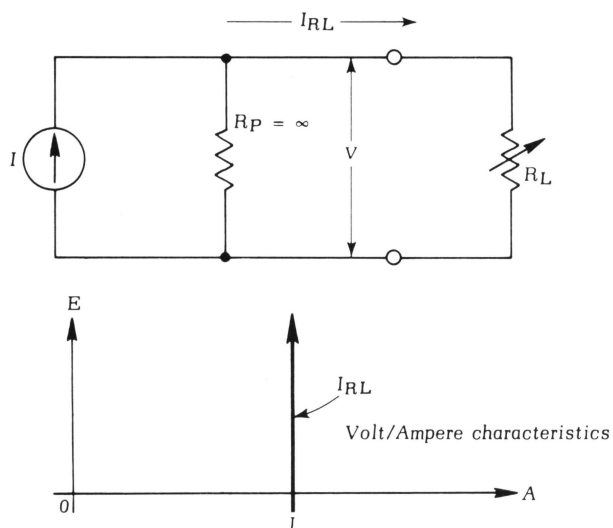


Fig. 1-6: In the case of the ideal current source, the current measured at the output terminals will be constant for all values of load resistance.

Stated more formally: In the ideal case, the independent parameter, I_{RL} , will be constant for all of the dependent parameter, V , and the value of V will be determined by the value of R_L .

THE PRACTICAL CURRENT SOURCE :

Turning our attention to the practical current source and fig. 1-7, notice that R_P is of a finite value, R , and that the locus, I_{RL} , is no longer constant for all values of R_L . The change in I_{RL} is termed ΔI_{RL} . ΔI_{RL} is the current flowing through R_P . Once again a performance value can be estab-

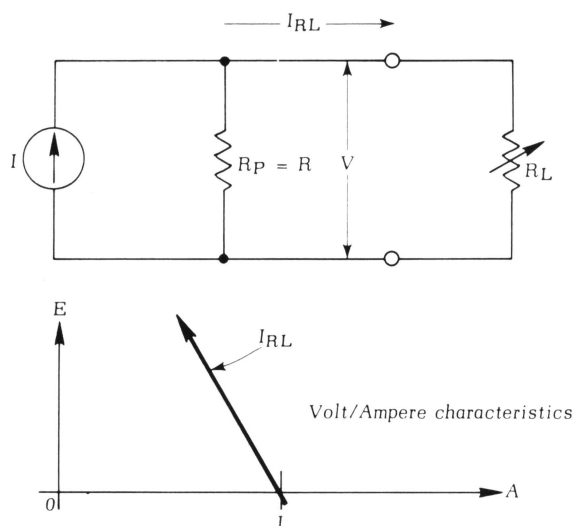


Fig. 1-7: In the case of the practical current source, where R_P is of finite value, the current measured at the output will be inversely proportionate to the load resistance.

lished and it is sigma. However, in this case, sigma is the ratio of R_P to R_L .

The current section on the Universal Transfer Characteristic Curves is the area of efficient current transfer.

When using the curves to analyze a current source, the loci represent the percent of the independent parameter transferred to the load I_{RL} , and the percent of the maximum value of the dependent parameter developed across the circuit.

EXAMPLE :

Determine for the circuit in fig. 1-8 the current transferred to the load (I_{RL}) and the voltage across the circuit when a 200Ω load is connected to a 100ma source with an R_P of $10\text{K}\Omega$. The circuit is shown in fig. 1-8.

STEP 1: Find $V_{(max)}$ (the open circuit voltage).

$$V_{(max)} = IR_P$$

$$= 100\text{ma} \times 10\text{K}\Omega = 1\text{KV}$$

STEP 2: Establish sigma (σ).

$$\sigma = \frac{R_L}{R_P}$$

$$= \frac{200\Omega}{10\text{K}\Omega} = 0.02$$

STEP 3: Using the chart, find V as a percent of $V_{(max)}$.

$$V = 0.015 \times V_{(max)}$$

$$= 15\text{V}$$

STEP 4: Using the chart, find I_{RL} as a percent of I .

$$I_{RL} = 0.985 \times I$$

$$= 98.5\text{ma}$$

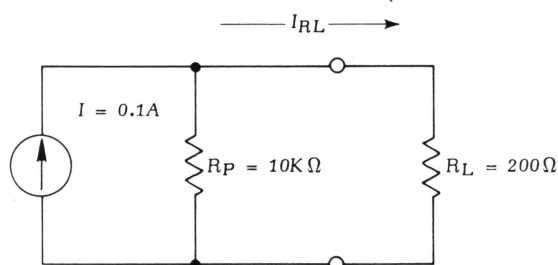


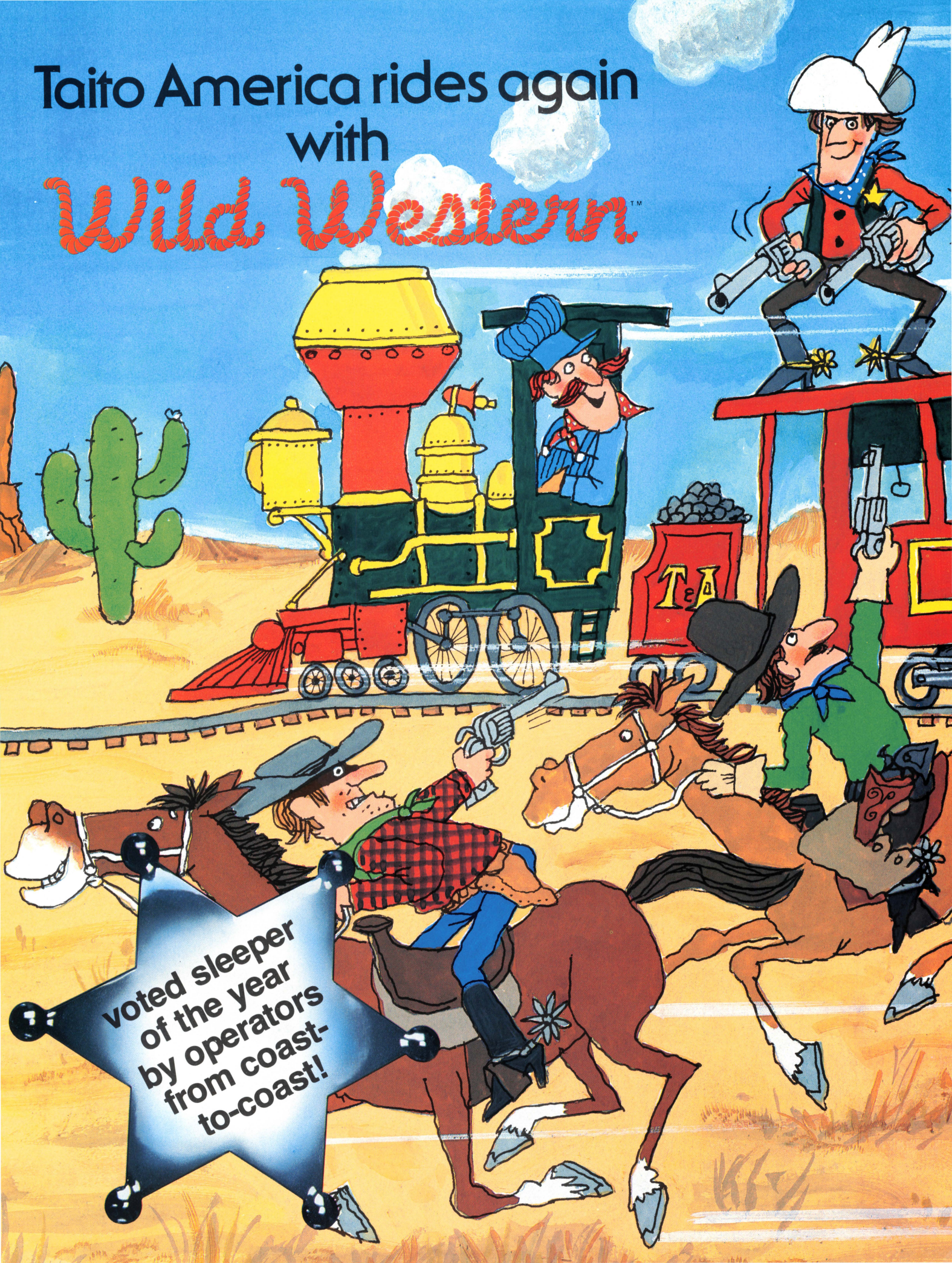
Fig. 1-8.

POWER TRANSFER :

Also shown on the curves is the area of efficient power transfer. This power section is associated with the sigma values ranging from 0.1 to 10. The loci represent the total power dissipated by the circuit, P_T , and that percent of P_T , dissipated by the load, P_{RL} . Since, when operating in this region, neither parameter can be considered **regulated**, it is, generally, of little concern to the power supply designer. It is, however, of concern to the designers of hi-fi equipment, transmitters and other power transferring devices.

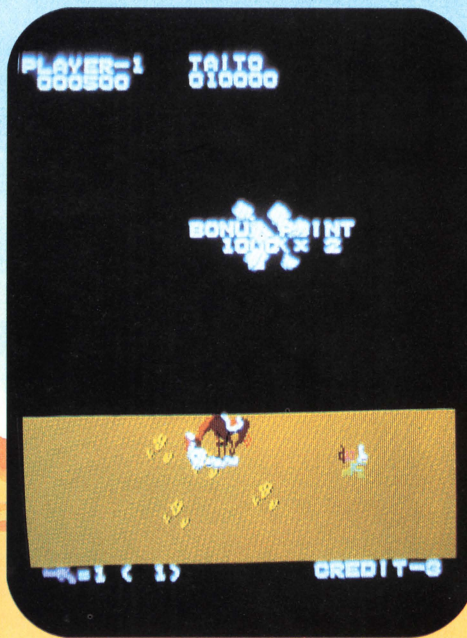
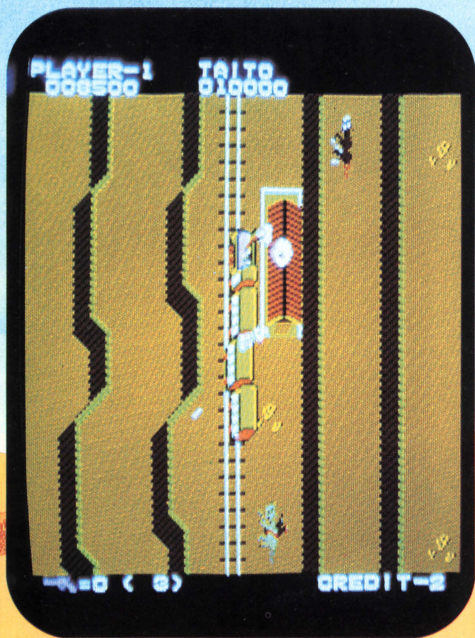
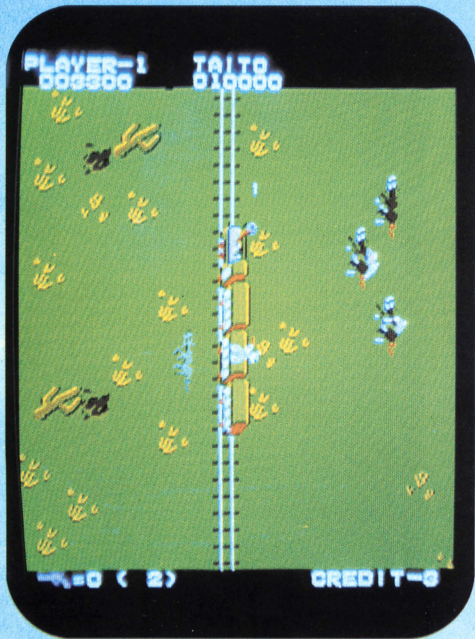
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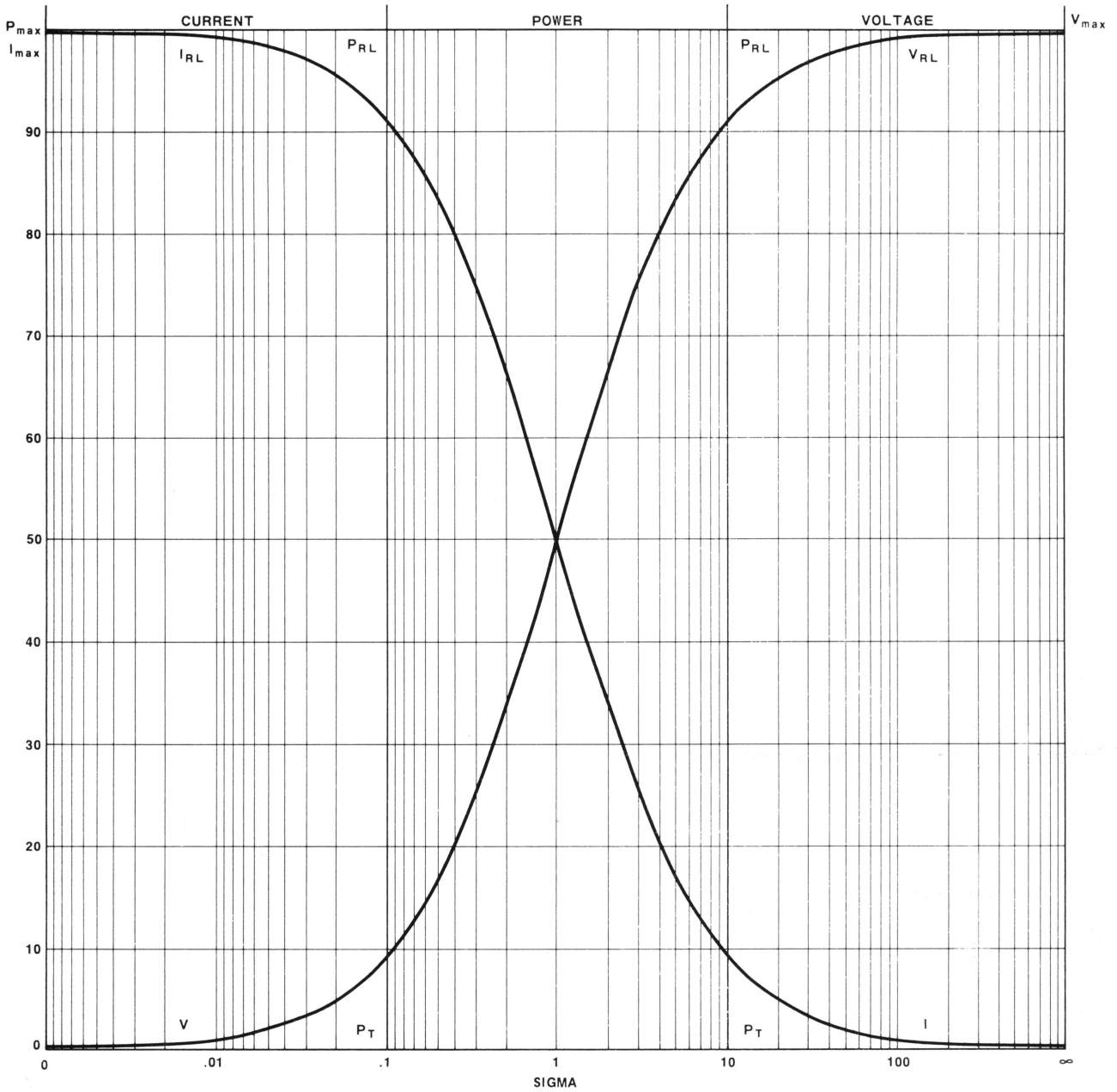


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STEPS	TYPE SOURCE		
	CURRENT SOURCE	POWER TRANSFER	VOLTAGE SOURCE
1. By use of Ohms Law, determine the maximum value of the dependent parameter.	$V_{(max)} = I \cdot R_P$ (open circuit voltage)	$P_{T(max)} = V^2 / R_S$ or $I^2 \cdot R_P$	$I_{(max)} = V / R_S$ (short circuit current)
2. By use of the stated formula, determine sigma (σ).	$\sigma = R_L / R_P$	$\sigma = R_L / R_S$ or R_L / R_P	$\sigma = R_L / R_S$
3. Then read up the sigma scale to the intercepts of the loci. The loci represent	V — the actual voltage across the circuit as a percent of $V_{(max)}$. I_{RL} — the percent of I flowing thru R_L .	P_T — the actual power dissipated by the circuit as percent of $P_{T(max)}$. P_{RL} — the percent of P_T dissipated by R_L .	I — the actual current flow as a percent of $I_{(max)}$. V_{RL} — the percent of V transferred to R_L .

Universal Transfer Characteristic Curves

Of interest to the power supply designer are the values of the power loci in the current and voltage sections, since that is where power supply circuits operate. To determine the power transfer characteristics, first find the maximum power the circuit can dissipate, ($P_{T(max)}$). For a current source, $P_{T(max)}$ will develop when sigma is infinite and is, therefore, I^2 times R_P ; and for a voltage source, $P_{T(max)}$ will develop when sigma is zero and is, therefore, V^2 over R_S . Establish the actual sigma. Then read up the sigma scale to the interceptions of the loci and the percent scales.

EXAMPLE :

Determine for the circuit in fig. 1-5 the total power dissipated (P_T) and the power dissipated by the load (P_{RL}).

STEP 1: Find $P_{T(max)}$ (the short circuit dissipation).

$$P_{T(max)} = \frac{V^2}{R_S}$$

$$= \frac{100}{10} = 10 \text{ watts}$$

STEP 2: Establish sigma (σ).

$$\sigma = \frac{R_L}{R_S}$$

$$= \frac{500 \Omega}{100 \Omega} = 50$$

STEP 3: Using the chart, find P_T as a percent of $P_{T(max)}$.

$$P_T = 0.02 \times P_{T(max)}$$

$$= 200\text{mw}$$

STEP 4: Using the chart, find P_{RL} as a percent of P_T .

$$P_{RL} = 0.98 \times P_T$$

$$= 196\text{mw}$$

Determine for the circuit in fig. 1-8 the total power dissipated (P_T) and the power dissipated by the load (P_{RL}).

STEP 1: Find $P_{T(max)}$ (the open circuit dissipation).

$$P_{T(max)} = I^2 \cdot R_P$$

$$= 0.01 \cdot 10K = 100 \text{ watts}$$

STEP 2: Establish sigma (σ).

$$\sigma = \frac{R_L}{R_P}$$

$$= \frac{200 \Omega}{10K \Omega} = 0.02$$

STEP 3: Using the chart, find P_T as a percent of $P_{T(max)}$.

$$P_T = 0.015 \times 100$$

$$= 15 \text{ watts}$$

STEP 4: Using the chart, find P_{RL} as a percent of P_T .

$$P_{RL} = 0.985 \times P_T$$

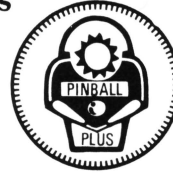
$$= 14.775 \text{ watts}$$



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Deadly reactor

D. Gottlieb & Co.'s entry into the video game field has come about with the recent release of its first game, *Reactor*.

Reactor players assume the role of a sub-atomic particle trapped inside a nuclear reactor that is slowly growing out of control. In addition, each screen is filled with growing numbers of Leptons, Nucleons, Neutrinos, and Positrons, which are also bent on destroying the player.

Using only his trak ball type control and continuous energy button, the player attempts to bounce all the enemy particles into the deadly outer wall of the reactor. All the while, the inner core of the reactor is expanding, which shrinks the available playing area.

Later screens replace the reactor core with a deadly swirling vortex. Decoys, reactor core control rods, bonus bounce chambers, two speaker-sound with speech, an "Enemies Left" readout, and "Hot Scores" with initials are additional features.

Reactor can be played on a relatively simple level, or by using the decoys, bounce chambers, and control rods, players can develop complex strategies to move into the game's most challenging screens.

Of technical note, Gottlieb has used an Intel 8088, 16 bit micro-processor as the basis for its new video system. Their system allows for quick information processing and extraordinary color capabilities.

For operator convenience, Gottlieb has located all solid-state boards on the swing-out back door and used separately keyed Coin Co. rejectors and cashboxes.



Cosmic cowboy

Cosmic Gunfight, a four-player, single level, priced-for-profit game, is Williams's Electronics Inc. latest pin game.

Cosmic Gunfight offers entertainment value for arcades, which require a wide variety of games, and for the pinball playing purists, a less complicated, back-to-basics game.

Cosmic Gunfight offers action, excitement, challenge, and variety. It not only has features proven to have player appeal like Multi-Lane Change, Multi-Ball, Bonus Multiplier, and Extra Ball, but it also introduces a new attraction, Cosmic Ball.

Excitement is at its peak when a player achieves Cosmic Ball play by making the nine A, B, C lights. This entitles each player who qualifies to 30-99 seconds (operator adjustable) of unlimited balls after the last regular ball is played.

During regular game play, challengers can increase their Cosmic Ball play time by three seconds every time a three bank of drop targets is completed. Also, each second of Multi-Ball play adds to Cosmic Ball final time (up to 99 seconds). When playing Cosmic Ball, making all of the three drop target banks in sequence will award the special.

In addition to its play features, *Cosmic Gunfight* comes in an attractive package. The colorful, action-packed backglass and playfield portray a gang of Galaxian cowboys mounted on futuristic horses fighting a cosmic cowboy range war.



Traveling videos

Elcon Industries, nine-year manufacturer of video games in Royal Oak, Michigan, announces a new *Video Game Trailer* that can be used for special events, fairs, grand openings, etc. or as a fund-raiser for charitable organizations.

The 14-foot tandem axle trailer can be pulled with a car or pickup and is equipped with 14 popular video games. After arrival on site, it can be readied for action in a matter of minutes.

All games come with an extension base so they may also be used in a game room and never stand idle.

Further information can be obtained by contacting Elcon Industries at 2715 Nakota, Royal Oak, Michigan 48073. Telephone: 313/549-1140 or 800-432-8308.



Take a cue

The Eight-Ball National Billiard Mfg. Co.'s newest addition to the national product line is the *Paramount Bumper Pool Table* in free play or coin.

The table features:

- a 3/4 inch slate bed
- poplar hardwood rails with formica quality laminate
- heavy-duty metal corner castings
- leg leveler pedestal legs
- built-in cue storage
- K-66 profile gum rubber cushions
- automatic ball return

Its dimensions are 59 inches by 43 inches. Accessories include a set of two 1/8 inch balls, two 48 inch cues, chalk, and rules.



Table action

The *Professional Soccer Table*, in free play or coin is offered by The Eight-Ball National Billiard Mfg. Co.

The equipment's highlights are:

- heavy construction with framework reinforced by solid poplar hardwood corners
- durable mar-resistant formica playing field
- double-braced poplar wooden legs
- leg levelers with non-mar rubber feet
- two ball entries
- two score counters
- 11 balls
- automatic ball return
- complete instructions

The *Professional Soccer Table* has tournament specifications which are:

Length55 1/4 inches
 Width29 1/8 inches
 Height35 1/2 inches
 Shipping weight, free play..... 190 lbs.
 Shipping weight, coin-operated . 235 lbs.



Thump, thump!

Heart Scan is just a heartbeat away! It's an attention-getting coin-operated heart rate monitor that costs 25 cents to use.

Heart Scan is manufactured by M.H.I. Manufacturers, a division of Movie Hut Inc.

Simply insert a coin, and grip the handles at the sides with both hands. This concept for reading the heart rate has proven under testing to be dependable and accurate.

During the reading, a tone is heard and a light pulses in time with the actual heart beat behind a life-like transparency of a heart. Digital readout of the measured heart rate in lighted numbers is accurate and easy to read.

A mother's duty

Kid Kangaroo has been kidnapped! Even now, the little one is being held, blindfolded, in a treehouse cage by a nasty gang of monkeys. It's up to Mom to come to the rescue in *Kangaroo*, a new coin video game by Atari Inc.

The object of the game is for Mother Kangaroo to rescue her baby while trying to avoid obstacles, dodging apples hurled at her by the monkeys, or simply removing the hoodlums by punching them out before they can punch her. Once she's reached the cage at the top of the screen, there's a joyous reunion with Kid Kangaroo, and "Mom" flashes on the screen to the happy strains of "Oh Susannah."

During Mother's first rescue attempt, she climbs rope ladders hung between branches of the tree. That feat accomplished, it's time for Mom to test her special super leaping ability by jumping to the top on log steps set at different heights. She must be careful, for one false leap will send her tumbling to the jungle floor with a video halo appearing above her head.

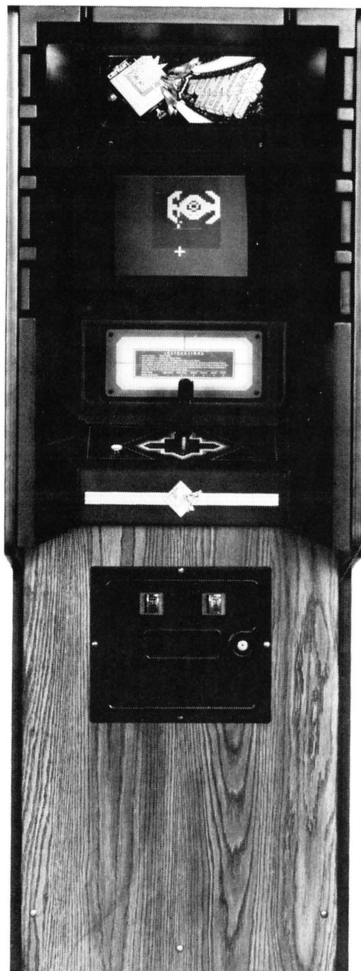
The third rescue attempt is against a column of monkey kidnapers standing on each other's shoulders, holding the cage at the top. Mom reached Kid Kangaroo by punching the monkeys out, one by one, and leaping onto higher platforms alongside the cage for the rescue. But the heroics aren't over yet, for Mom has one more challenge: climbing a series of long and short ladders to reach the captive kid.

A mother's job is never easy, but Mother's challenge becomes tougher as the game progresses. The monkeys multiply, each generation more clever than the last, hurling increasing numbers of apple cores at record-breaking speeds.

Then, as if the monkeys weren't enough, if Mother dares to stall along the way, a gorilla enters this perilous scene attempting to grab her boxing gloves. If he's successful, Mom is defenseless for a short time, and has to do some quick jumping and dodging to avoid her foes. Magically the gloves reappear and Mom can get back to Kid Kangaroo's rescue.

The *Kangaroo* player scores points when Mom finally rescues Kid Kangaroo and by punching out the monkeys and the apple cores they throw during the rescue attempt. Skillful players can rack up points by collecting a variety of fruits hanging from trees or scattered on the playfield. Those fruits are replenished and more points scored by ringing a bell, which sounds the chimes of "Big Ben."

Kangaroo ends when all Mother's lives have been used up. If the player's score is eligible for the high-score table, he enters his initials by using the joystick to guide a highlighted square to his initials.



Tunnel trip

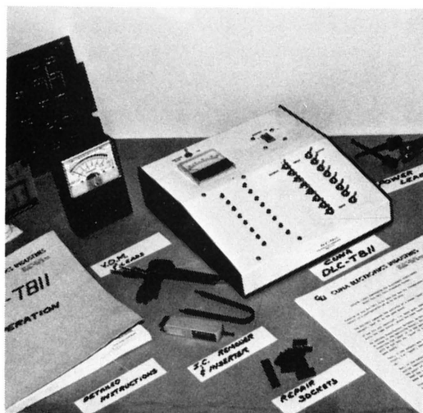
Centuri's latest entry in the video game market is *Tunnel Hunt* that features a four-way joystick allowing the player to guide an aircraft through a "space tunnel" while attempting to eliminate attacking enemy ships. The game is a product of a joint licensing agreement between Centuri and Atari.

The agreement marks the first time that Atari, a division of Warner Communications Inc., has licensed one of its game concepts to another manufacturer.

"We're extremely pleased to be working with an industry leader like Atari in this, their first such licensing agreement," said Centuri President Arnold Kaminkow. "We're also very excited about the introduction of the game *Tunnel Hunt*. Not only is the game concept exciting and challenging, but its unique 'wrap-around' cabinet styling adds yet another dimension to the coin-operated game industry."

In the game, the player, with the aid of a four-way joystick, guides his craft through a geometric space tunnel. One of the features that is expected to attract players is the increasing speeds of the game as play progresses.

Aids to the Trade



Do it yourself

Owners and operators of video games can now have the do-it-yourself capability to repair their own PC boards on site or in their work shops with the new *DLC-T811* from Cuna Electronics Industries.

Designed and developed to test 14, 16, and 18 pin 7400 Series TTL integrated circuits, this instrument can help increase profits, practically eliminate costly downtime, and reduce repair costs for operators when their PC boards malfunction due to defective ICs.

DLC-T811 is compact, lightweight, portable, and durable. It can be carried to games on site or used in workshops to check out PC boards. Clearly written, easy-to-follow instructions make it ready for immediate use by the operator or his technician. It has its own self-testing procedure, and built-in voltage meter and excess current fuse for safeguards.

With the *DLC-T811*, operators receive a fully detailed operating manual that has game maintenance recommendations and troubleshooting hints, a package of 50 ICs most commonly used in video games, and a separate voltmeter for checking diodes, resistors, and capacitors, as well as a three-year warranty to assure long-term operation. Available options include extender boards and extender cables for use in testing difficult-to-reach PC boards.

DLC-T811 is available through dealers or directly from Cuna Electronics Industries, 7319 Greenwood Avenue North, Seattle, Washington 98103. It costs \$895.

Fix-its

Bright Star Technology Corp. of Dallas, Texas, is offering two product lines to fight video game downtime and repair problems. Bright Star has developed a set of technical packages with detailed game information and repair aids called *Faxpak* and *Fixpak*.

Faxpak is a logic tutorial that describes how the hardware of a particular game works. Included are aids such as: Functional Description; Detail Block Diagram; Signal Mnemonic Listing, alphabetized with a description of each signal's function; a Memory Address Map that shows the exact function of each ROM or RAM chip; an I/O Address Map that describes bit assignments and functions; and more.

Fixpak is a diagnostic test program to run on a Fluke 9000 Series Microsystem Troubleshooter. (See *Play Meter* May 15, p. 129.) This software is recorded on Fluke compatible digital microcassettes packaged in a binder complete with operating instructions. *Fixpak* instructions prompt the technician operating the Fluke 9000 Series to probe certain points or make specific measurements on the unit under test, and guide him through a logical sequence to repair those hard-to-fix boards.

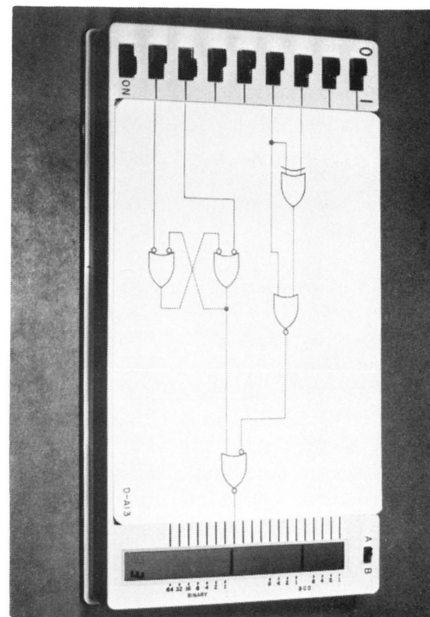
Fixpak and *Faxpak* from Bright Star are available for Midway's *Pac-Man* and *Ms. Pac-Man* video games. More packages will be available soon.

To learn more about these products, contact: Bright Star Technology Corp., Dept. PM, 8222 Douglas, Suite 390, Dallas, Texas 75225; telephone: 214/987-1147; or John Fluke Mfg. Co. Inc., P.O. Box C9090, Everett, Washington 98206; telephone: 800/426-0361.

Training package

The *Broder Logic Trainer* model 100 can reduce the training time required to learn how gates and flip-flops function in circuits. Now a new training package has been added to include relay logic, diodes, bipolar transistors, and FETs (non-linear).

The student solves the trainer problems



by correctly manipulating the eight switches that provide inputs to the circuits problems. A solved problem will result in the designated display bar being on. The problems are related to circuits used in communications, word processing, automatic machinery, etc.

The *Trainer* requires no component or wire manipulation and can be ideal for testing and upgrading employee skills, as well as setting competency levels for job grades.

The *Broder Logic Trainer* comes complete with a 9 V battery and a self-paced manual. The trainer can be returned within 20 days if the customer is not satisfied, and it has a one-year warranty and sells for \$169.

For information, contact L. J. Broder Enterprises Inc., 11105 Shady Trail, Suite 115, Dallas, Texas 75229; telephone: 214/241-3727.

Geared for work

The *Zipper Tool Case* is the newest product from Platt.

The case may be ideal for service requirements that demand a full complement of small tools.

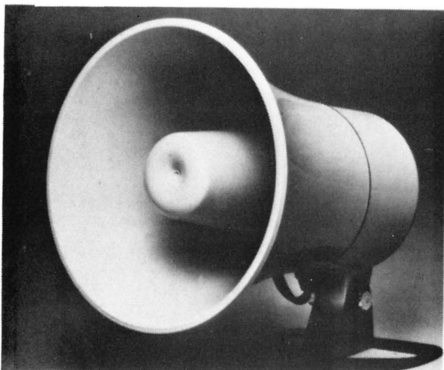


It measures 10 inches by 13 inches and weighs 2 pounds.

The *Zipper Tool Case* is covered with oxford/brown padded, expanded vinyl, and it also features a heavy-duty nylon zipper and 29 pockets.

For information, contact Platt Luggage Inc., 2301 South Prairie Ave., Chicago, Illinois 60616. Telephone: 312/225-6670.

Fire, Fire!



A computerized voice driver that calls "burglar, burglar" or "fire, fire" when connected to a 6 or 12 VDC speaker is offered by Mountain West of Phoenix, Arizona.

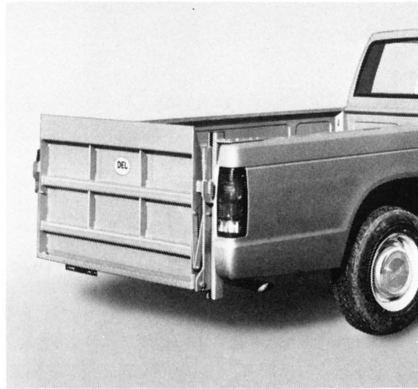
This module can replace siren drivers or bells in security and fire alarm systems.

Also available on special order, the voice

driver can be programmed to announce "burglar" and "fire" in German, Spanish, French, and Dutch.

For more information on the *B10-002 Driver* and the *S8-005 Speaker*, contact Mountain West, 4215 North 16th St., Dept. PM, P.O. Box 10780, Phoenix, Arizona 85064.

Light pickups



A new model liftgate, designed for the new light pickups, has been announced by DEL America Corp.

The DL-10-5324 *Del-Track liftgate* has been specially designed to fit the GMC S15, Chevrolet S10, and Ford Ranger. The DL10 is a 1,000 pound capacity, "rail-type" liftgate. The rail-type liftgate provides a 100 percent level-ride from ground to truck bed.

Chain drive is featured on the *Del-Track DL10-5324*, permitting design with minimum of moving parts and, consequently, reduced maintenance requirements. The platform is 48 inches wide by 24 inches deep with a 5 inch ramp, with a safety treadplate steel surface.

The liftgate bolts into the tailgate opening on the pickup box.

Del-Track liftgates are available in capacities from 1,000 to 6,000 pounds to fit all vehicles from pickups to highway trailers. They are sold through a nationwide distribution network by DEL America Corp. of Buffalo, New York.

For further information, contact DEL America Corp., 15 Holt St., P.O. Box 6126, Buffalo, New York 14240. Telephone 716/853-7994.

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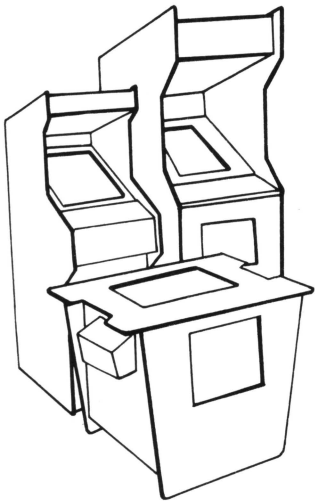
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King & Balloon	Game Plan	New
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Mousetrap	Exidy	New
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Omega Race	Midway	New
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Qix	Taito	New
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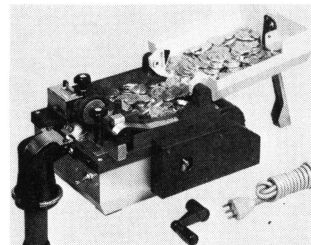
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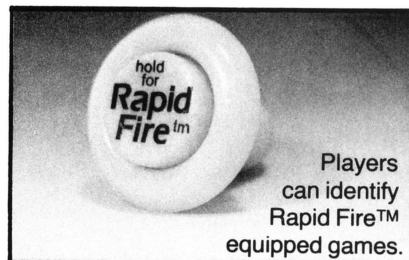
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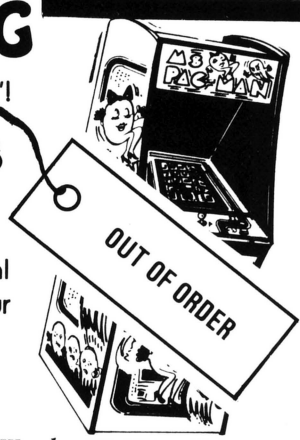
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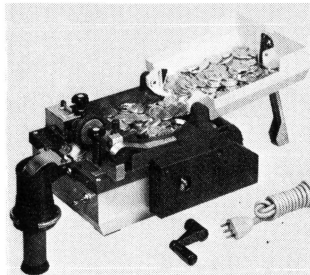
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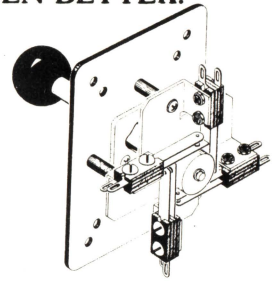
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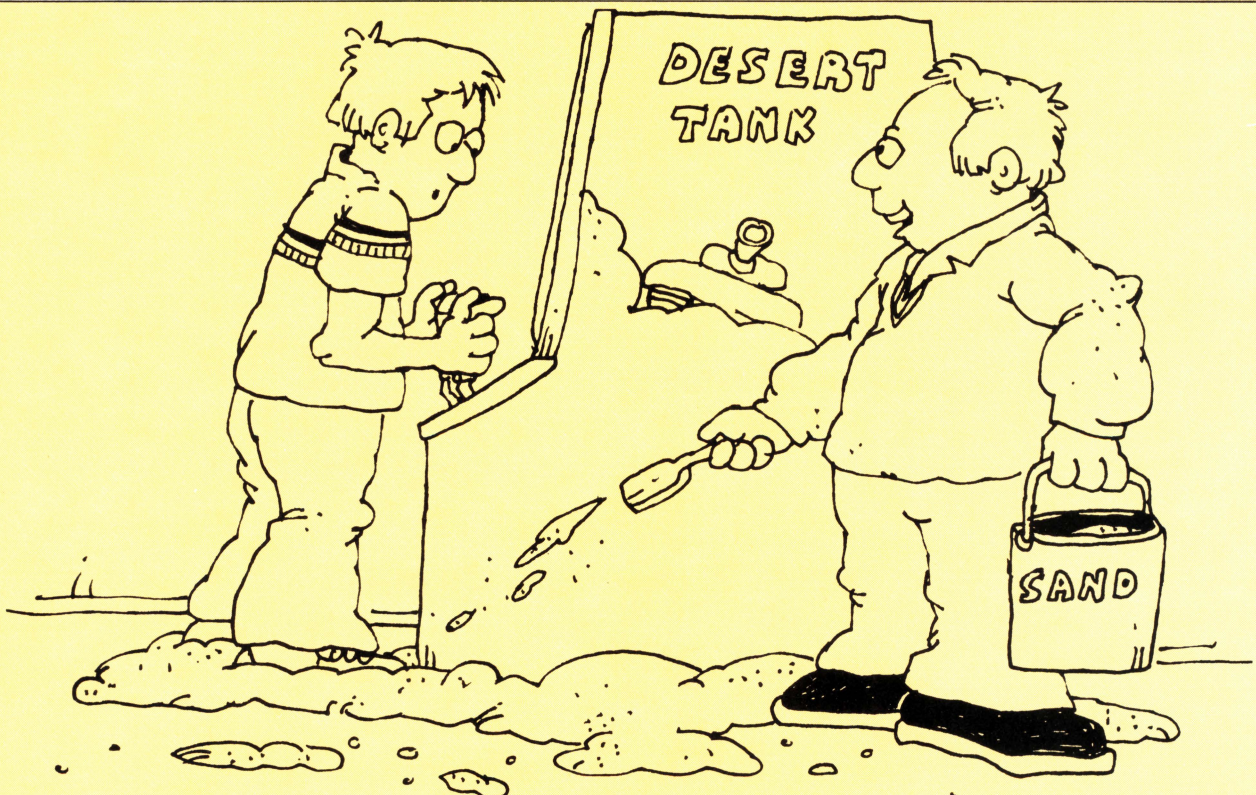
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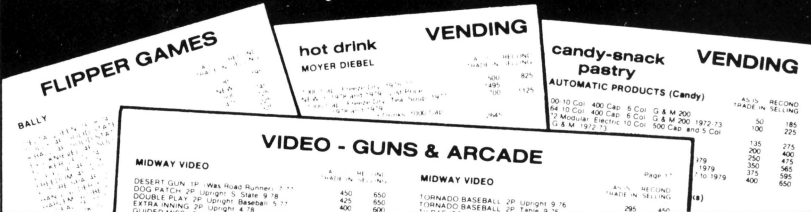
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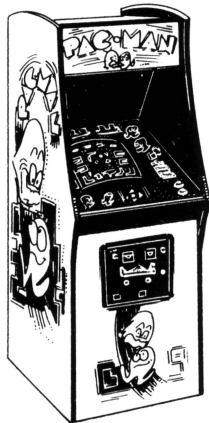
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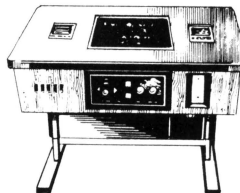
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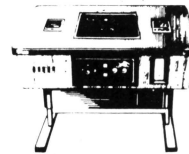
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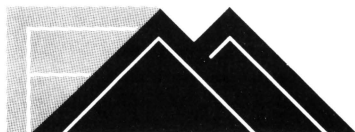
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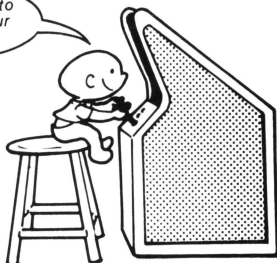
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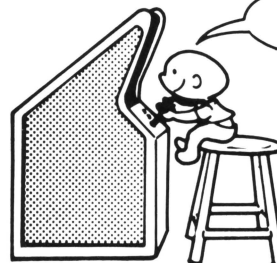


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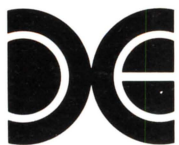
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