

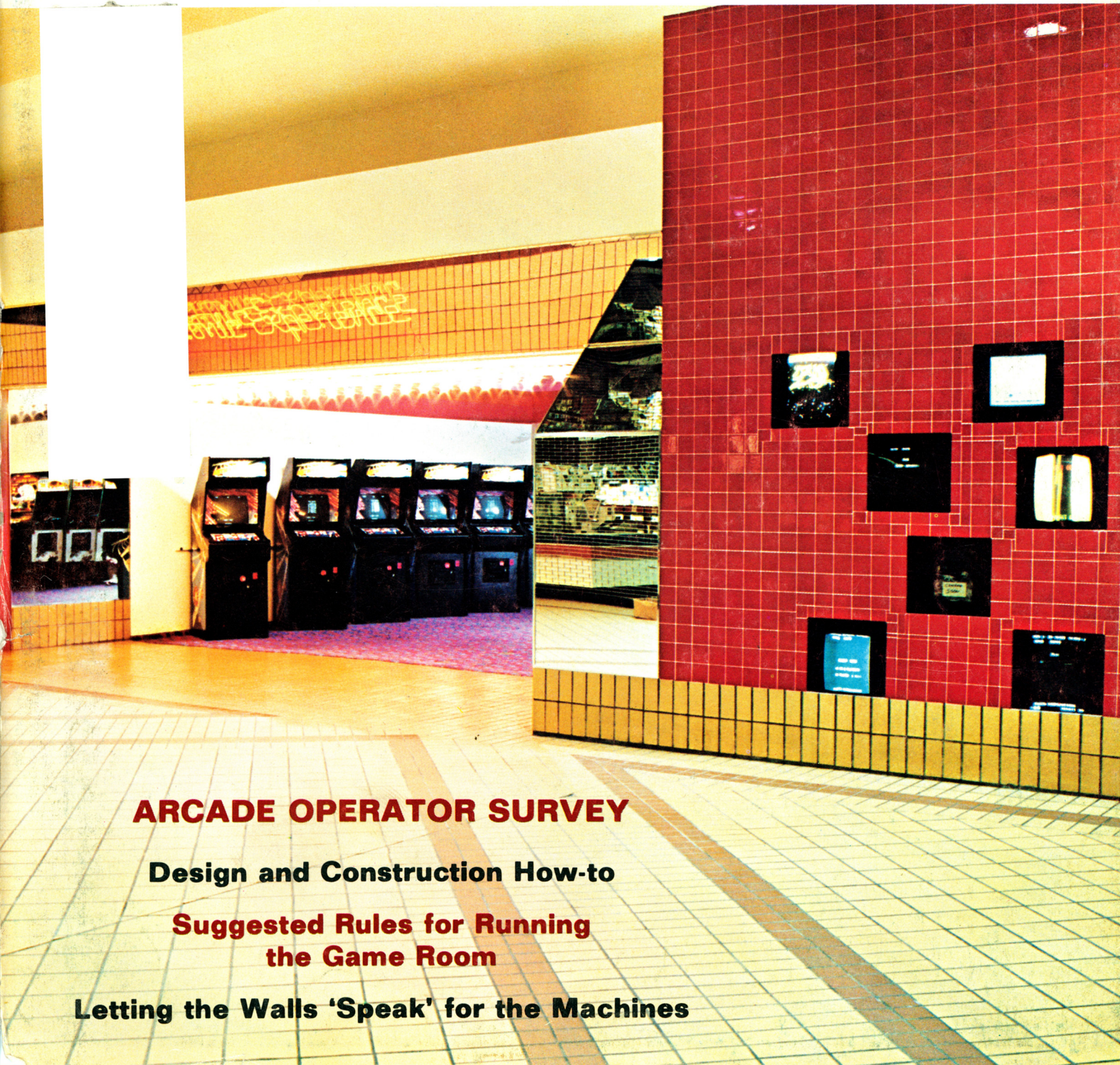
The World's Leading Amusement Machine Trade Publication

PLAY METER

Volume 7, Number 9

May 15, 1981

Arcades Today
Part 1



ARCADE OPERATOR SURVEY

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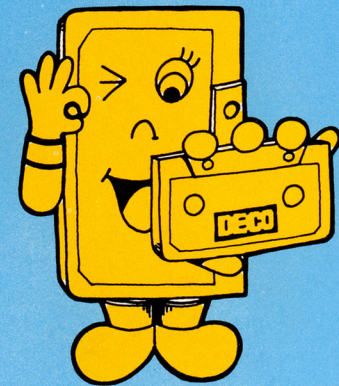
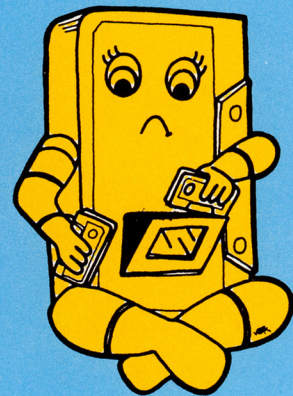
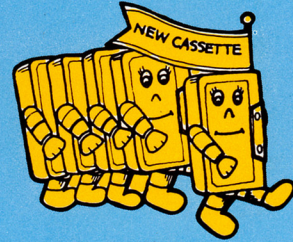
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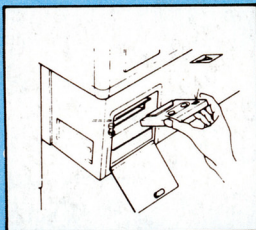
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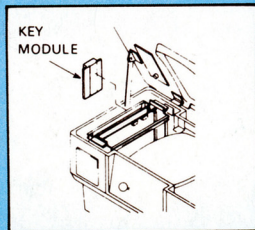
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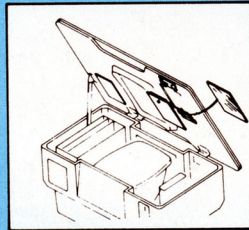
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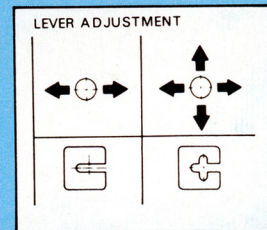
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Vol. 7 No. 9
May 15, 1981

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PLAY METER, May 15, 1981

PLAY METER



AOE Early Bird Seminar 11

Some problems of the industry were laid on the line in a heavily-attended discussion at the Amusement Operators Expo. Keynote speakers Rufus King and Gary Stern offered their pointed observations, as reported here.

Arcade Operators Survey 14

In Part 1 of the results from the first-ever polling of arcade operators and locations, **PLAY METER** takes a look at the indicated trends. This vital census of the coin-op arcade sector will continue in next issue.

**The Penny Arcade:
Suggestions for Operating Rules** 23

Veteran operator Louis Boasberg of New Orleans offers some well-reasoned regulations which an arcade can adopt to increase business and improve image.

Arcade Design and Construction 31

Some do's and don't's on getting started in a mall or free-standing arcade location, as presented by an AOE '81 seminar speaker with experience in the management of Funway Freeways.

Congressman Hears Jukebox Ops Gripes 40

Louisiana operators recently wanted to hear from their Member of Congress why he had cast a vote against their interests in the bill for jukebox royalties. His answer: "It Wasn't My Fault," as we find out why in this exclusive **PLAY METER** report.

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ABOUT THE COVER:

The Electronic Experience arcade in Denton, Texas uses the novel approach of a "video wall" to show potential customers outside what's offered on the games inside. Technical writer Randy Fromm explains on page 67 how it's done

From the Editor

Due to the close proximity between our press date for this issue and the conclusion of the 2nd Annual Amusement Operators Expo (AOE), we found it next to impossible to include a full report on the show in this issue. We will, of course, be bringing you complete AOE coverage in our next edition. Nevertheless, I just couldn't let this issue go to press without expressing some of my thoughts about the AOE show here in New Orleans.

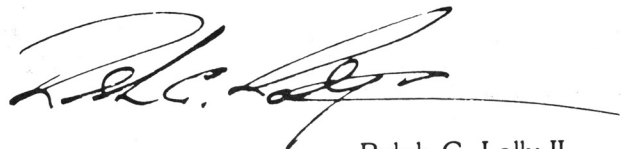
Looking back on the overwhelming success of the 2nd Annual AOE, one would have to conclude that the AOE has indeed established itself as a major industry event. The question about a need for a second show, with Spring timing, has clearly been answered. The message came through loud and clear. It was high time an exposition was concerned with the operator in mind first and foremost. While there were a lot of smiling faces among the manufacturers and distributors in attendance, the biggest smiles of all came from the operating ranks. And they had lots to smile about.

Without a doubt, the AOE's seminar/exhibit format would have to be counted as the major reason for the AOE's success. Operators today are eager to learn as they become more open-minded and enterprising than ever before. In the face of today's strained economic conditions, operators recognize the need to conduct their operations with sound, professional business techniques. The "seat of the pants" operator is falling by the wayside while the smart operators are facing up to the age-old fact that "only the strong will survive." As testimony to their eagerness to survive in the coin-op business atmosphere of today, participation in this year's AOE seminar program increased dramatically.

The average operator attending AOE this year signed up for a total of four 90-minute seminars. This compares to a total of two per registrant last year. Added to this is the fact that operator registration doubled this year over last. Nearly two-thirds of the operators in attendance participated in the seminar program. They had 32 different operator-oriented sessions to choose from, and a number of seminar classrooms were filled to capacity. It was obvious that the operators of America had discovered a fountain of information that satisfied their thirst for knowledge.

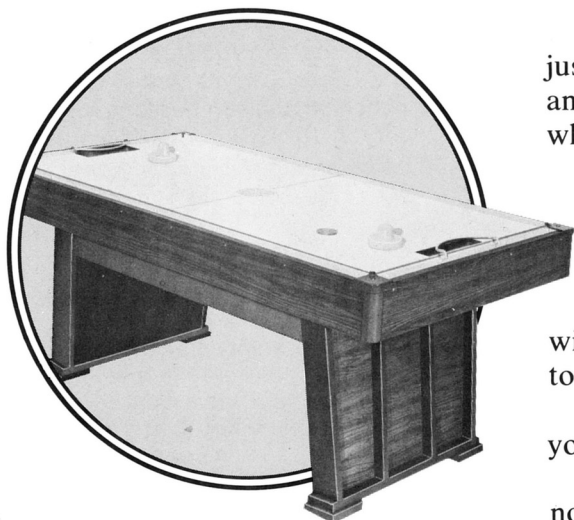
As for the exhibit portion of the AOE, there was considerably increased activity in the exhibit hall area. In addition to the doubled attendance figures, the show was arranged this year so that the seminar sessions did not conflict with the exhibit hours. The exhibit hall atmosphere was bright and refreshing. Nobody had to fight their way through mobs of people to play a game they were interested in. The pace of the show was relaxed but steady. The exhibitors at this year's AOE were delighted with the number of people in attendance as well as with a lot of solid new orders for new equipment.

Perhaps the only disappointment of the entire show was the obvious absence of a number of the major manufacturers. I really can't blame them for holding off. Last year's AOE didn't exactly set the world on fire, and nobody, not even us, had any guarantee that this year's show would be the success that it turned out to be. I guess they were watching to see if the AOE could make it on its own merits. Obviously, it did and we now have it from a number of reliable sources that the "no shows" this year will be showing next year. I hope that will make a lot of you out there even happier. We sure are!



Ralph C. Lally II
Editor and Publisher

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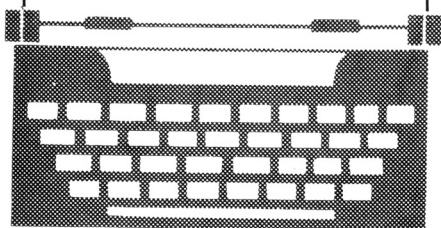
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Letters to the editor . . .



No wing-nuts

Frank Seninsky comments on *Spectar* in his column, "Frank's Cranks" ...were much appreciated, as this type of information helps us make a better product for you. His comments on the *Spectar* joystick support our redesign efforts.

However, please note that we do not use wing nuts to fasten down our control panels, as was mentioned in Frank's column [February, 1981 *PLAY METER*].

Joanne M. Anderson
Exidy, Inc.
Sunnyvale, California

[Seninsky responds to this point in Frank's Cranks, this issue. —ed.]

Had a switch

In reference to the article by Frank K. Seninsky on page 44 of your February 1981 magazine, the article states, and I quote:

(In reference to *Xenon*) "Next step would be to add a memory-clear switch similar to Stern's."

Bally has had a memory-clear switch, which is the third coin micro switch as listed in our game manuals since September of 1979 on the production game *Harlem Globetrotters*.

B.M. Powers
Bally Pinball Division
Bensenville, Illinois

[Ed. note: Contributor Seninsky's reply follows:

"Bernie Powers is absolutely correct that Bally has had a memory-clear switch, which is the

third coin micro switch, on all their games since *Harlem Globetrotters*. I stand corrected but I also found that very few servicemen knew about this feature. I'm glad that Bernie has brought this to our attention.

Now that the error has been apologized for, I would still keep the wording the same: 'Next step would be to add a memory-clear switch similar to Stern's.' An easy to use switch would increase awareness and usage of this important feature. It isn't a good idea to activate the third coin micro switch by hand because the trip wire is easily damaged. And why carry a Susan B. coin around.'"]

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cate to those readers who successfully complete the course? It certainly is a considerate service to your readers that you are offering.

J. Marck Parsons
J. Marck Parsons, Inc.
Melbourne, Florida

[Ed. note: The magazine is not prepared to grade course work in the *Digital Circuit Design Course*—which began with Lesson One in the March 15, 1981 issue and continues with each publication of *PLAY METER*—twice each month.]

Correction

An article in *PLAY METER*, March, 1981, concerning the organizing meeting last December of Tennessee operators, incorrectly identified the brand of pool table donated to the association by Rowe International of Nashville. The line of pool table was *Tournament Eight Ball*, and the editors apologize for the erroneous identification in the article ("Singing About Coin-op Togetherness," March 15, issue, page 46.) ‡

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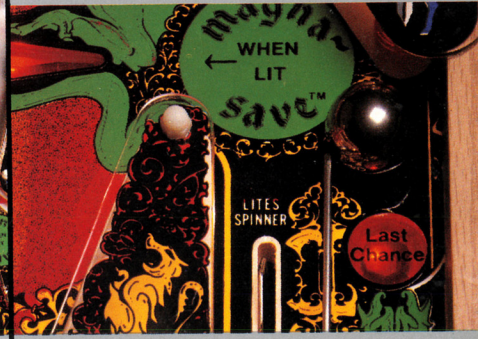
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AOE Keynote Address:

'We Can't Just Let Things Happen'

By David Pierson

"We have to take an active role in the marketplace," Gary Stern told a crowd of about 400 industry people at the keynote Early Bird session of the Amusement Operators Expo March 11 at the Hyatt Regency Hotel in New Orleans.

"We have to quit thinking of this as a small industry," he said, "because it isn't. We're too big to let things just continue to happen. We have to take an active hand."

As the session unfolded, it became clear exactly what "an active hand" meant: active lobbying at both the state and national levels; a concerted public relations campaign, maybe even a national coin-op advertising program; a united defense against adverse legislation; and a unified stand against questionable equipment.

Stern—who appeared on the keynote panel with industry attorney Rufus King and PLAY METER Magazine Publisher Ralph C. Lally II, the sponsor of the show—told the early convention arrivals that the coin-operated amusement industry is on the verge of even greater gains than ever before. But he warned that with this growing acceptance comes a responsibility on the part of the industry to police itself.

[Complete AOE show coverage will appear in the next issue.]

Stern also said the coin-op amusement trade should start to expect governmental regulations, and so all sectors of the industry should work closely to make sure the resulting regulations are not injurious to its goals.

"We are too big to hide," Stern said. "We must work with the people



Gary Stern



Rufus King

who are going to regulate us to make sure those regulations are most acceptable to our industry."

He touched on some of the areas where the industry must work closely with government to achieve workable standards. Some of those areas were zoning ordinances (which if unchecked could outlaw or restrict amusement machines); local and state taxes and licenses (which have generally gone unchecked and presently show a nationwide patchwork of overtaxation); and various federal regulation hearings (which if allowed to go unanswered would effectively stop the production of new amusement equipment).

These are all areas, Stern said, where the industry should work in partnership with governmental bodies to make sure that the regulations affecting the industry are workable.

"What we need," Stern continued, is an active lobbyist. We can't just let things happen as they have in the past. We're too big an industry for that."

During the course of his presentation, Stern levelled an attack against the operators' national association, the AMOA. He stated that it had become bogged down in fighting "a losing copyright law" when it should have devoted more of its energies to addressing itself to the host of other issues now facing the industry.

"There is so much the AMOA should do," Stern said. "There is potential there for so much political clout."

But then he pointed out that these issues affect not only the operators but the industry as a whole. And he

'What we need is an active lobbyist. We can't just let things happen as they have in the past.' —Gary Stern

'We're not against gambling, but we are against gray area games muddying up our industry...' —Rufus King, lawyer

called out for a united industry stand. He said this is the work of the operators, distributors, and manufacturers associations.

"The manufacturers as a whole are willing to help in this. And the operators' and distributors' associations could be effective lobbying groups in this regard also. We must fight these problems as they come up."

Then after this appeal for unity, he touched on a subject which may eventually divide the industry—the manufacture and operation of video card games which have been tagged with the moniker, "gray area" games.

This, he said, is an area where the industry must show some sort of self-regulation because governmental bodies would be confounded in their attempts to separate these video machines from the pure amusement videos, such as *Asteroids*, et al.

"If we allow the gray area games to operate," he said, "then we'll kill the golden goose that has been getting

very gold for us all lately."

"I personally have nothing against gambling games," Stern told the audience, "but if we allow gray area games to proliferate, then it will have the effect of outlawing all games."

He said that the predominant governmental attitude is to allow amusement games in unless problems develop (such as gambling) in which case government has shown a predisposition to outlaw everything rather than waste time trying to sort out what is amusement and what is gambling. Government, Stern told the industry gathering doesn't see coin-operated amusement as something that's essential to the society in the first place; so it will be predisposed to outlaw the equipment if it causes any problems.

Rufus King added his support on the stand against the gray area games. "We're not against gambling," he reiterated. "But we are against gray area games coming in and muddying up our industry by calling themselves amusement."

In the question-and-answer session, the suggestion was made that the industry, probably through the manufacturers' association, should sponsor a national coin-op advertising program on television to stimulate even more interest in coin-op entertainment.

King responded that this was the type of advancement the industry could now expect, as long as there was no question about the pure amusement value of the games. "We're at the point now where we can draw attention to ourselves through institutional advertising," King said.

The question-and-answer session fragmented into an airing of complaints about the various sectors of the industry. But the message and theme from the keynote address at the AOE in New Orleans was clear—the industry stands on the verge of an even greater boom if the various sectors in the industry can start working together for some common goal. ●



Operators were intent on an exchange of views concerned with the directions the industry is taking: a packed audience for the 'Early Bird' discussion at AOE/'81 in New Orleans.

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PLAY METER Polling:

Arcade Operators Survey Part I

Everyone it seems these days is interested in the arcade business. More talk than ever before within the industry is on the subject of arcade operations. At the recent Amusement Operators Expo, for example, a large number of operators showed just that same tendency, with arcade-related seminars bulging in attendance.

But there has never been a breakdown as far as how many arcade operators there are presently in the industry. According to the first ever arcade operator survey conducted by PLAY METER magazine, it appears that 47 percent of the nation's operators operate at least one arcade. That's quite a large portion. Assuming there are 8,000 operators in the country (see related article on industry surveys), that means there are approximately 3,760 arcade operators in the United

States. Of that total, PLAY METER projects that 56 percent (or slightly over 2,100) operate two or more arcades.

Still, there are a large number of operators who operate regular street routes in addition to arcade operations. So one of the questions on the survey helped break down the percentages of operators who operate arcades, routes, or a combination of the two.

The PLAY METER estimates show that 71 percent of the nation's arcade operators also operate street locations, and 29 percent of the operators operate only arcades. What this shows is that about one-third of the nation's operators operate both street routes and arcades.

Continued on page 17

Survey fact and survey fiction

When it comes to surveys, the most important statistic of all is the response rate. The reason is anybody can prepare and mail out a survey and compile the results. But if the survey is based on an insufficient sample, with a small number of responses, as are some surveys presently being circulated in the industry, the conclusions the operator will draw will be severely distorted and misleading.

Such is not the case with PLAY METER surveys. Thanks to a large industry mailing list—in excess of 14,000—a large PLAY METER subscriber base, and (most importantly) the full cooperation of operator/subscribers, PLAY METER's surveys have always generated acceptable to excellent response rates.

But there was no anticipating the phenomenal response to PLAY METER's first-ever arcade survey. Mailed out to PLAY METER's several thousand domestic subscribers, a whopping 17.4 percent of those operators responded to the survey, detailing facts and figures about the arcade business. Because of the very high response rate, PLAY METER believes the results of the industry's first arcade poll (appearing in this and the following issue of PLAY METER) give a realistic picture of the current status of arcade operators all across the country.

One of the most unusual aspects of this industry is that

nobody seems to know exactly how big this industry really is. Not until just recently did someone do some figuring to see how much money a specific hit game, namely Atari's *Asteroids*, took in all across the country. The figure came out to be somewhere over the \$500 million mark!

And in PLAY METER's annual operator survey for 1980, PLAY METER itself estimated the annual gross collections of coin-operated amusement equipment at \$7.15 billion.

Truly, both the \$500 million and the \$7.15 billion figures are staggering.

But, admittedly, all these figures are just ballpark estimates because no one seems to know exactly how many operators there are in the United States. For this reason, PLAY METER is presently preparing to conduct a census of our industry in order to find out exactly how many operators are really out there. Until then, we will have to assume there are approximately 8,000 operators in the United States; and, in the two-part survey analysis that follows, we will use that 8,000 figure in making any national projections as to the size and scope of the arcade field.

After the PLAY METER census is completed, then maybe finally we'll all know exactly how big and wide-ranging this great industry of ours is!

—by *Ralph C. Lally II*



Also shown: Ace, Ray, Teddy, and Kathryn Anne

“ The best thing ol' Al ever did for his place was Pulsar. It's more than a game. It's a sport. I like its guts. I mean, the better I get, the tougher it gets. See, you're slidin' through the maze blastin' away, the Pulsar heart-beat is keepin' time. Then, just when you think you've got it whipped, in comes a new maze and you gotta change your

'Fingers' Malloy for Pulsar

game plan. Hey, I may have the touch, but I don't have Pulsar aced. It's the only game in town that keeps comin' back for more. So I do too. I'll bet ol' Al figures he's got a gravy train with Pulsar, and he's right. Cause I'll tell you one thing; if you're not playing Pulsar, you're just playing games. And you can quote me on that. ”

Gremlin/SEGA

"Check it out."

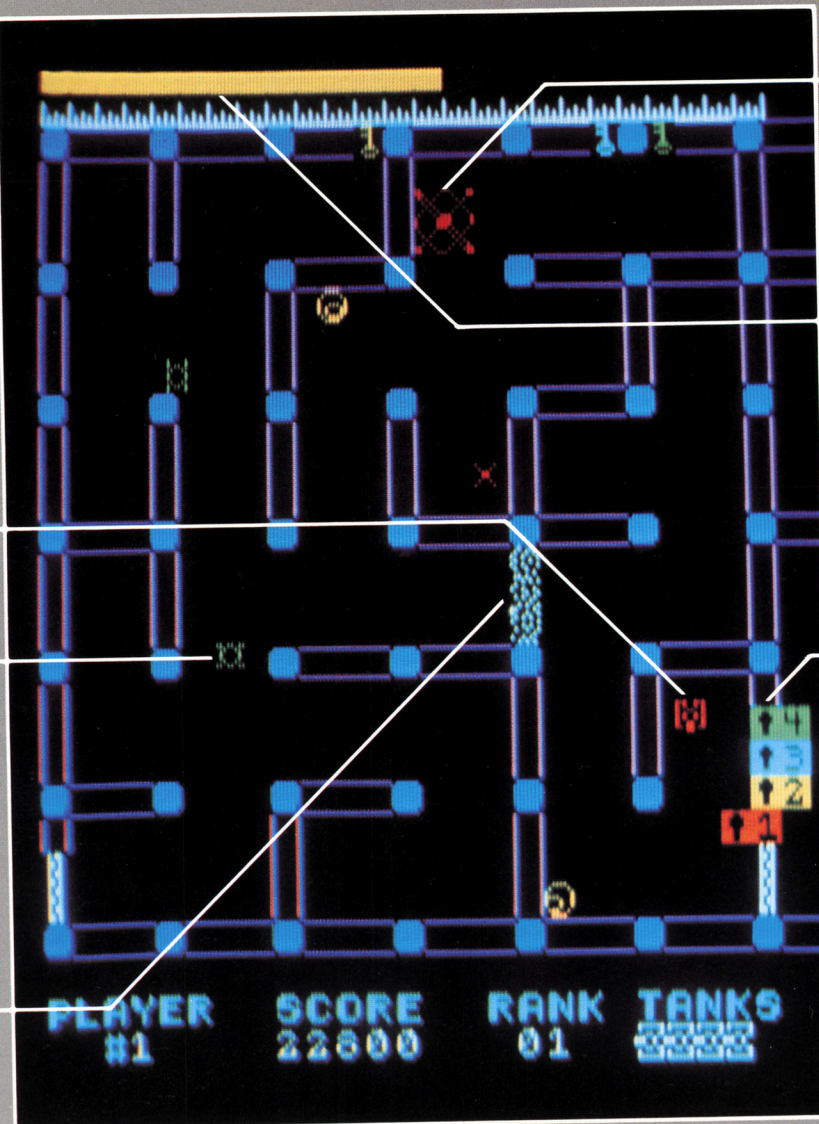


Guide the tank through the changing maze and transport the treasure keys to their color-matched locks. Every round presents the player with a new environment.

Score points to earn more fuel by blasting enemy aggressors and by unlocking the locks.

Yellow enemy aggressors move along the walls. Green aggressors travel at random. Red enemies bounce and ricochet off walls. All travel faster and shoot more frequently with each round, and they also become worth more points.

Avoid the constantly changing "force field" walls. The player is destroyed if caught in one.



Blast the Pulsar target and it breaks into six enemy aggressors.

Open the locks to earn bonus points:

- by unlocking all the locks in any sequence,
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- the continuous Pulsar heartbeat,
- the electric sizzle of force-field walls
- the clanging of shifting walls,
- the blasting sound of the player's fire.
- the piercing shots of the aggressors,
- the sound that signals the shift to a new maze,
- the exciting clamor of bonus points.

PULSAR

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[continued from page 14]

Actually, according to the PLAY METER survey, the average arcade operator operates 2.76 arcades. According to PLAY METER's most recent annual operator survey, the average operator is working with slightly under 300 pieces of equipment, meaning that the typical arcade/street operator has about one out of every four of his pieces of amusement equipment in an arcade.

PLAY METER also projects that there are more than 10,000 arcades in operation in the United States today. Adding the number of game rooms, it is conceivable that the number of arcade-type locations may be over 20,000.

The average number of pieces in an arcade, according to the poll, was 33. This would mean there are approximately 350,000 machines on location in arcades throughout the United States (for a further breakdown of the ratio of pinballs to videos, see the second half of the PLAY METER survey appearing in the June 1, 1981 issue).

After having determined the relative size of the U.S. arcade industry, PLAY METER then focused its attention on the operators themselves. Do they use metering systems? How do they service their games? Do they use tokens? Are promotions worthwhile? The list of questions was endless. And responding operators gave some solid factual information which helped establish industry tendencies for arcade operations.

One question which received a surprising response dealt with the most acute problem of the industry (no, not the prices of new equipment)—cash accountability. It matters not how good the piece is earning if the operator does not have a good cash accountability system to make sure he is getting his due.

But apparently a large number of operators are either doing their own cash collections or else have employed nuns to do their collections, for 47 percent of the arcade operators reported that they did not use a metering system for cash accountability purposes.

Concerning service work, 37 percent of the responding arcade operators reported that they do their own service work. Another 39 percent said they employ their own service personnel, while 14 percent said they rely on their local distributors for service assistance. The balance of those responding, ten percent, said they hire independent local technicians to handle their repair problems.

Token play has been catching on in arcades throughout the United States. Because of its versatility, its adaptability to pricing changes and to promotions as well, many operators have found tokens to be a worthwhile investment. And that was reflected in the survey results. One out of every three arcade operators responding to the survey now reports that he uses tokens in his arcades. Twenty-four percent of all arcade operators use tokens in *all* their arcade locations, and the remaining nine percent report using tokens in some but not all of their arcade locations.

Sixty-seven percent of the arcade operators, therefore, do not presently employ tokens in their arcade operations.

This leads into another area of inquiry which has been closely connected to token operations—on-site promotions and tournaments. Surprisingly, a solid 59 percent of the responding arcade operators indicated that they use various types of promotions to stimulate play at their arcade locations.

Another percentage, and one which shows some of the problems this industry still has to face, concerns negative public opinion. Although headway is being

PLAY METER, May 15, 1981

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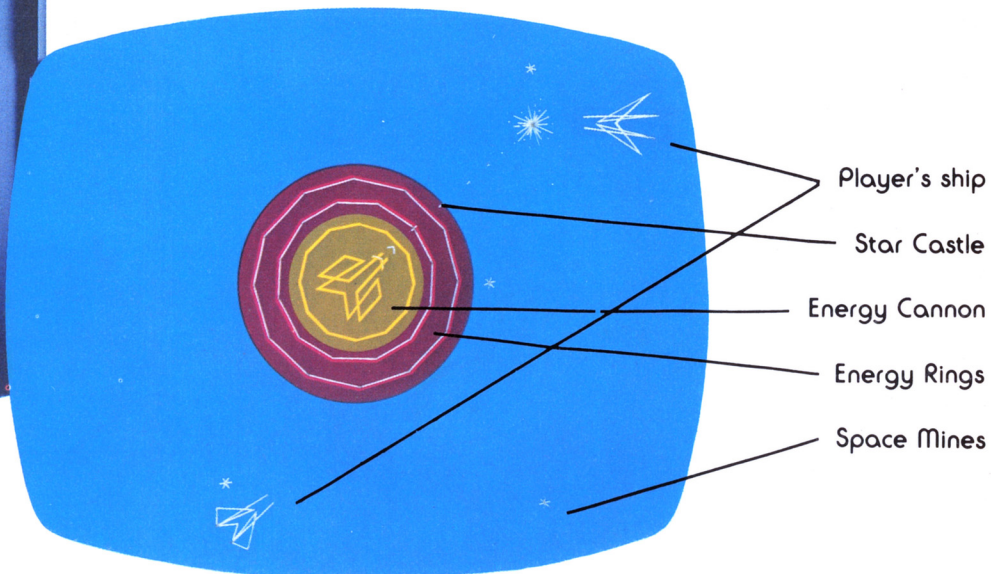
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made as far as the public's acceptance of the games and arcades—or "family amusement centers"—a startling 43 percent of those responding said they had encountered special problems when starting their arcades. The resistance appeared almost evenly split among governmental interference and interference from the business community and the local citizenry as far as stopping or slowing down the establishment of the arcades. So, despite the advances the industry has made in recent months as far as public relations it is quite apparent that there are still sizeable pockets of resistance against coin-operated amusement.

Besides pinballs and videos (which, as stated previously, will be detailed in next issue's installment of the survey) and specialty pieces, the survey also examined what other types of equipment was placed in the arcades. Eighteen percent of the arcade operators said they operated kiddie rides, and 20 percent said they operated photo machines. However, interestingly, half of those who said they were operating photo machines, said they found them to be unprofitable unto themselves. It appears that they use the photo machines instead as loss leaders to attract more traffic into their amusement centers.

Twenty-two percent of the arcade operators responding reported that they also operated some sort of attraction in connection with their arcade operations. Among those attractions most frequently cited by responding operators were the following: *Boom Ball*, *Skee Ball*, go-carts, bumper cars, slot cars, amusement rides, baseball batting cages, miniature golf, bumper boats, radio-controlled boats, and water slides.

Finally, with so much interest being shown nowadays in computers, PLAY METER sought to find out how many operators had operations sophisticated enough to warrant the use of a computer. The finding was that 16 percent of the nation's arcade operators now employ a computer in their operations.

Next issue will mark the conclusion of the industry's first-ever arcade operators' survey. Part II will focus in, of course, on the ratio of pinballs to videos in America's arcades, the game types' respective earnings (which are somewhat different from regular street earnings), location life of various game types, buying patterns and overall profitability. ●

Arcade Breakdown

	#	%
Free Standing	2698	26
Strip Centers	1660	16
Enclosed Malls	1868	18
Other	4152	40

The 'other' category of arcades represents those arcades that are operated in combination with other businesses. Examples of these businesses are: miniature golf courses, bowling centers, amusement parks, skating rinks, billiard parlors, museums, restaurants, drive-in theaters, stamp shops, candy shops, ice cream parlors, travelling carnivals, and gambling casinos.

Estimated Operator Population by Type of Operation

	#	%
Strictly street operators	4240	53
Arcade/Street operators	2670	33
Strictly arcade operators	1090	14

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Pinball-pool lovers score 2000 points for each of the 1-7 or 9-15 drop target balls hit, as well as advancing the bonuses. Dropping all 7 targets lights the 8-Ball. Making all 7 targets and the 8-Ball Target awards the bonus and lights the D-E-L-U-X-E lights.

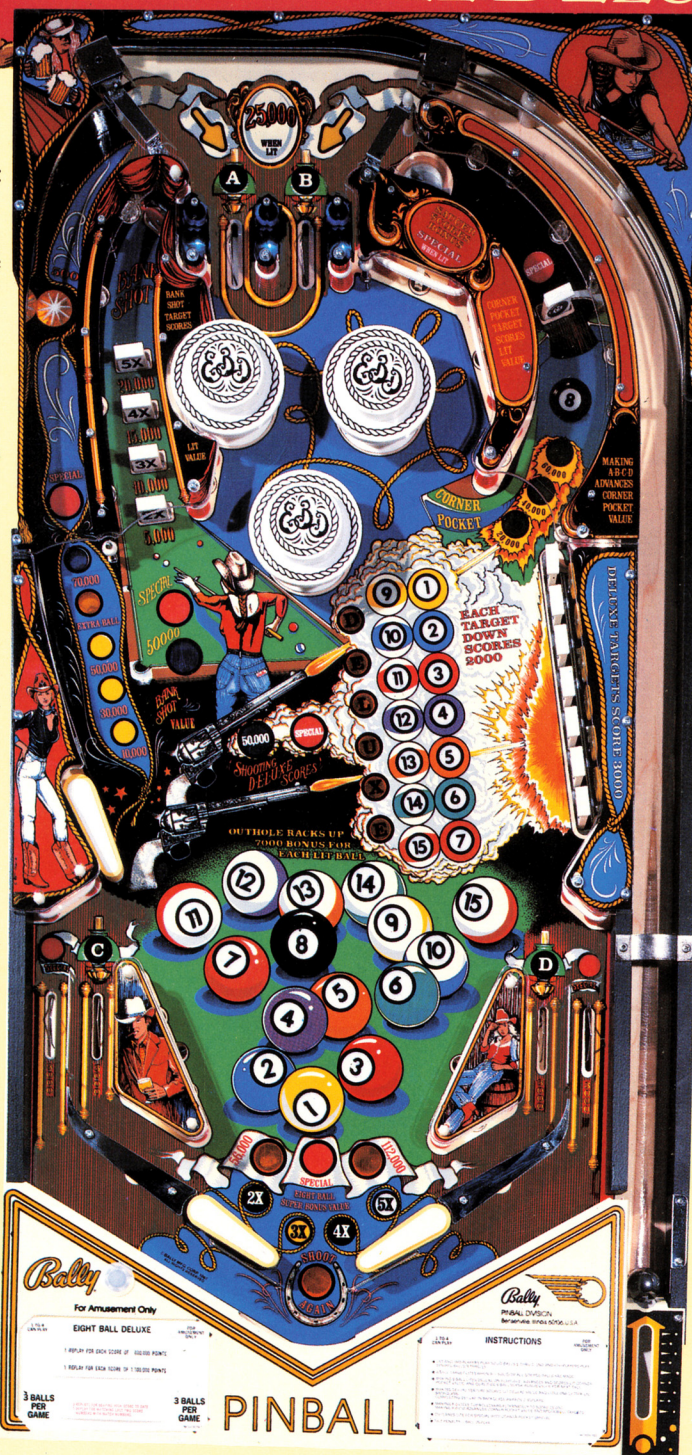
Deluxe targets score 3,000 points each; Completing D-E-L-U-X-E scores either 50,000 points or the Deluxe Special, and lights a letter in the backbox D-E-L-U-X-E Carry-over feature.

Go for the Bank Shot, Partner

50,000 points are awarded when you hit the Bankshot target the first time; 50,000 points and Special the second time, but first you'll have to drop the entire 4 drop targets, scoring 5, 10, 15 and 20 thousand points consecutively while multiplying bonus scores from 2 thru 5x.

Shoot for A·B·C·D

A & B top lanes, when completed, light alternately for 25,000 points. When all 4 letters are completed they drop drop targets and increase the corner pocket value for hitting the 8-Ball Target.



8-Ball, Corner Pocket

Build up special points by hitting the 8-Ball Drop Target in the corner pocket. This bonus advances from 20 to 40 to 60 thousand points, and lights the outlane specials by completing the A-B-C-D feature, or by hitting the 8-Ball Target. It is collected only by hitting the 8-Ball Target.

Dropping the ball into the saucer scores top right lane special when lit and awards 500 or 7000 points for each lit ball, plus Super Bonus time the multipliers.

Chalk Up for the Left Lane Shot

Consecutive shots up the left lane to the top of the playfield score 50,000, 10,000, 30,000, 50,000, Extra Ball, 70,000, then Special. 70,000 points are earned for each subsequent shot up this lane.

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It's a long way to here from

The Penny Arcade

By Louis Boasberg



Coin-op machines prior to the '20s were forerunners of motion picture palaces.

Insomuch as we are one of the early pioneers in the operation of so-called modern fun arcades or game rooms (our first arcade was the Penny Arcade, opened in 1938 at 620 Canal Street, New Orleans), many operators have come to us for advice on opening arcades and game rooms. So, we will state some very important rules and regulations that should govern any and all arcades and game rooms.

Naturally, many owners of arcades and game rooms operating today will not agree with us on some of the things we advocate. But unless all arcades are governed by their own stringent rules and regulations, there are going to be laws and ordinances passed in many cities and states, and even if some of these arcades are not declared nuisances and are not closed entirely, there will be at least some very strict rules and regulations passed against them. So, it is best for us to clean up our own industry voluntarily—while we still have the chance.

First and foremost, let me say that it is unwise to open any kind of arcade on Skid Row or in any rundown or sleazy section of a city, large or small. Such an arcade would only be a meeting place for dope pushers, addicts, prostitutes, pick-pockets, and similar people.

By way of pointing this out, I would like to give you a brief history of the penny arcades and amusement centers throughout the country, and their history is interesting indeed.

From 1900 until 1920 the penny arcades in America were at the height of their success. The booming downtown areas of all large cities had several well-stocked penny arcades, which were crowded at all times. During this period, many great arcade games and machines made their appearance. Mills Novelty Company, International Mutoscope, Exhibit Supply Company, Scientific Amusement Company, and many other factories here and abroad turned out exceptionally well-made,

indestructible, appealing arcade equipment that took in plenty of money and stood the test of time. Some of the pieces made during this era were so ingenious that they have never been equalled, even with today's scientific advancements in the electronic and engineering fields.

The main attraction and real money makers in all of these old arcades were the mutoscope machines that were the forerunners of the great motion picture industry that we know today. In fact, many of the old pioneer movie men started out in the penny arcade business and then began to establish the early nickelodeons, which were the very first movie theaters.

With the '20s came the motion picture palaces of splendor and when these made their appearance, the deterioration of the arcades began. During the '20s, '30s, and '40s, most of these old penny arcades had been located in what were once the prosperous downtown business sections of the big cities, but as these cities modernized, the business and amusement section moved to the outlying districts or suburbs. The arcades, remaining where they were, simply withered away. Most of the arcades of this era got a bad name as hangouts for the lowest class of people, and so arcades were not acceptable by the nice people of that day.

During the war years, members of the armed forces, looking for any and all amusements, furnished a shot in the arm to the arcade business and the arcades made a strong comeback. But they again reached a low ebb right after the war, due to the lack of new and interesting equipment.

In the middle '50s and the beginning of the '60s, game rooms and amusement centers sprang up throughout the country in the newly established shopping centers. After a few enterprising operators found out that these shopping centers,

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airports, bus stations, etc., could contain and support an amusement center, the idea caught on and manufacturers started making better and better equipment to support this new business.

There were many pioneers establishing these new arcades, but Jules Millman, the brilliant, aggressive head of Bally's vast Aladdin's Castle empire deserves a great deal of credit for initiating and carrying out to perfection the chain store idea of beautiful arcades, located in new shopping centers throughout the country.

Today all operators know that modern, well-located arcades—with beautiful decor, a maximum of brand new equipment and frequent changes of games, kept clean and playable—can compete with the movie theaters or any other attraction for the public's amusement dollar. Where there is a demand for anything, there is always going to be a supply.

Local prohibitions

However, like the proverbial rotten apple, one badly run arcade in a town, city, or community can

cause a great deal of harm and eliminate the arcades that are well run. A case in point is Kenner, Louisiana, a thriving community near New Orleans and where the airport is located. Some years ago there was a great deal of trouble in several Kenner arcades. The trouble was mostly narcotics, with racial overtones. Today no arcades are allowed to exist in the city of Kenner. In fact, no location can have over two games. So it shows that a badly run arcade can influence a city council to go to the other extreme. In other words, "burn the house down to get rid of the termites."

The Kenner situation could be true throughout the country. Badly run, unsupervised arcades could inspire many ordinances and state laws that would eliminate arcades entirely. Always remember, you have competitors in other businesses that not only have political influence, but power with the media. And these competitors would seize any opportunity, large or small, to destroy arcades—and all coin-operated amusement games for that matter.

By way of helping out the situation, here are a few reforms or rules and regulations that we have put in at all of our arcades. We strongly suggest that other arcade owners give some thought to these rules and regulations, no matter whose toes you step on and no matter what manufacturer you hurt:

1. *Positively no smoking.* This is a good public relations gesture in the eyes of parents and automatically eliminates the "pot" crowd. It also helps to maintain a cleaner and more healthful arcade, to say nothing of eliminating cigarette burns all over your games.

2. Large signs, prominently displayed, to read: "*Rowdy, Boisterous Conduct or Use of Vulgar, Offensive Language Will Not Be Tolerated in This Arcade.*" This rule must be enforced at all times.

3. *Minors under 12 years of age are not permitted in the arcade after 7 p.m., unless accompanied by a parent or adult.* Again, good public relations.

4. *Positively no pornographic movies or peep shows allowed to operate on the premises, and no pool tables.* Although pool tables are innocent enough and a very popular form of amusement in their proper habitat—in the eyes of parents they connote smoky rooms with all kinds of characters playing pool. We do not think pool tables mix with a well-

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Look! Up on that building!
It's a bird! It's a helicopter! It's...

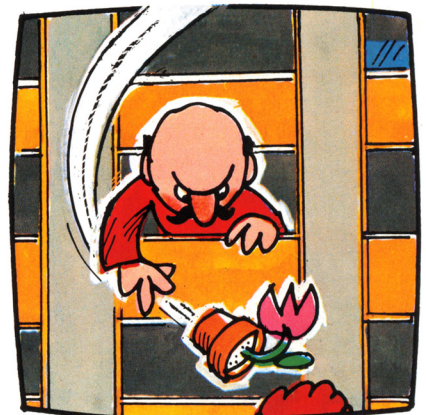
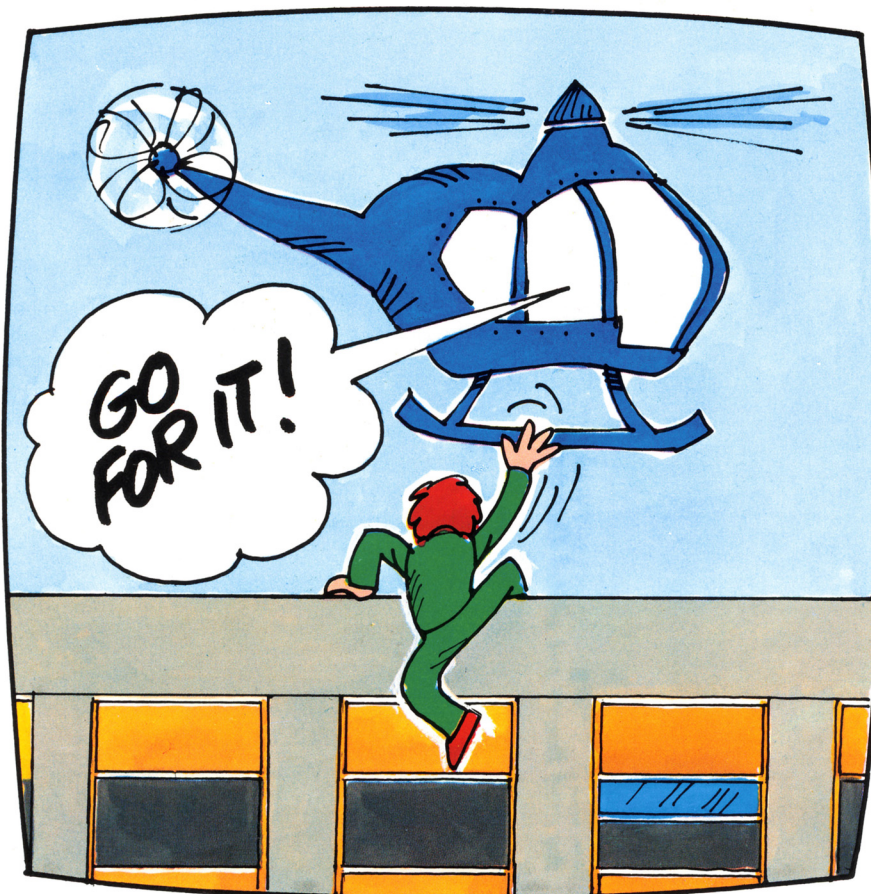
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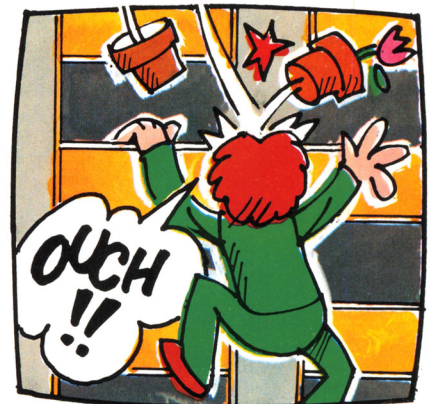
- *Faster than a speeding bullet, action gets more and more furious as Crazy climbs 4 skyscrapers, each one more challenging than the last!*
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Join us now for the amazing,
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When we last saw Crazy Climber, he was frantically trying to reach the roof and helicopter that would take him to safety!

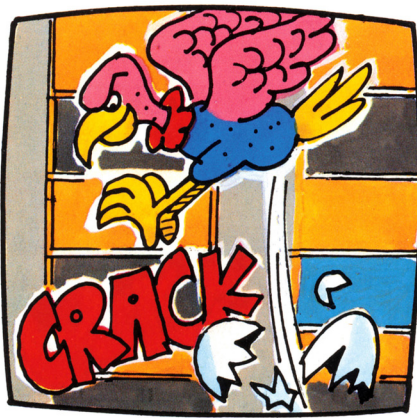


Look out! Arch enemy, that evil Dr. Dropper, is hurling cans, bottles, vases and pots from his window!

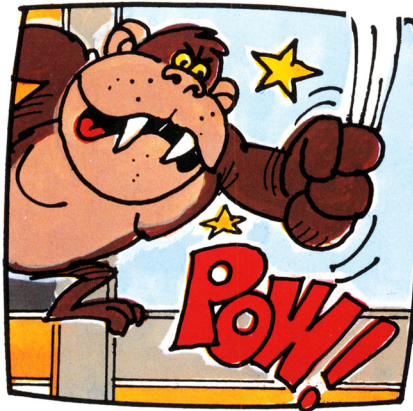


But never fear! The Climber has outsmarted the daffy Doctor once again by holding on to the window ledge with both hands!

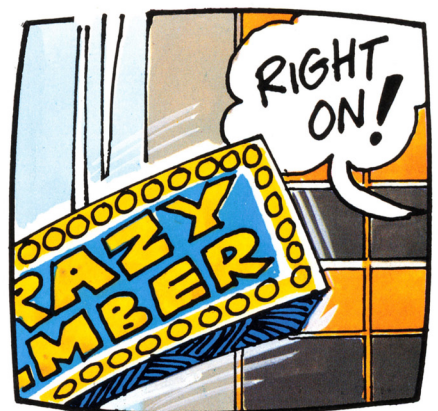
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The Condor is not to be messed with or eggs will be a real slap in the face!



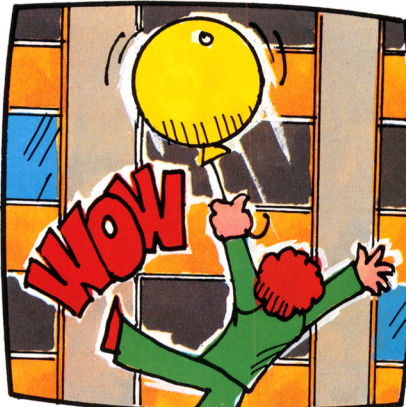
And whew! He ducked the powerful punch of King Kong!



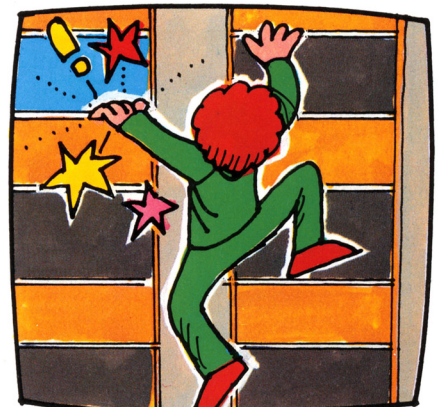
He climbs higher, dodging girders, dumbbells and falling signs!



The electric wire's been cut! Crazy would have been in for a shock if he hadn't moved fast!



He's nearing the top! Catching that balloon sure got a rise out of him!



But wait! The windows are closing! Hold on with both hands, Crazy, and move over to a free ledge!



He did it! Crazy Climber conquered foe and flower pot alike! Our hero!

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68"	24"	35"	300 lbs.	



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run arcade where youngsters represent a large percentage of the patrons. We do not allow foosballs in our arcades. We have found out that the competition is so intense among certain types of players who play these games, that there is a profusion of profanity and loud arguments. (Like pool tables, foosballs are terrific games and are suitable for many locations, but not acceptable in arcades.)

5. *Under no circumstances are any kind of alcoholic beverages permitted in the building or on the premises.* All persons must be dressed properly—shirts, shoes, etc.—at all times. Signs must be prominently displayed on the doors of the arcade indicating that all persons entering the arcade *must be properly dressed.*

6. *No amusement games allowed with gambling themes such as poker, blackjack, craps, roulette, etc.* Not that there is anything wrong in these games, if run as strictly amusement games, but again a compromise is made, for good public relations. These games suggest gambling, which most parents frown on and do not want their youngsters to be exposed to. We also know from experience that

games with gambling themes, without some kind of awards in money or merchandise, will not begin to compete with the space action video games that are on the market today. And the giving of any kind of award or prizes, be it money, merchandise, or anything else, should be a no-no in any and all arcades where youngsters congregate. (We have even eliminated iron claw/diggers, which are legal in Louisiana, from our own arcades.)

7. *The arcade must be supervised at all times by one or two adult managers—* one or both being on the floor at all times. Insomuch as a change both or one or several change machines are usually provided, these managers must be constantly on the lookout for illicit conduct by anyone in the arcade, especially those abusing or damaging any of the equipment. Remember, your managers have the legal right to bar any and all persons from an arcade who are abusing the equipment, using foul or obscene language, or behaving in any disorderly manner.

8. Although many arcade owners and other people will disagree with me, I do not think that any kind of food, sandwiches, or

beverages should be served or made a part of any well-run arcade. In fact, we frown on drink machines or vendors of any kind. Food and drink usually keep an arcade dirty and smelly, and when a soft drink is turned over on a flipper or video game, it presents problems. So, if food or drink have to be on the premises, keep them in a separate building and do not let anyone into the arcade carrying any kind of food or beverage. (Encourage birthday parties, but let the youngsters enjoy their cake, ice cream, and soft drinks nearby, but out of the arcade.)

In closing, may I state that an arcade must be run in the most proper and sedate manner possible. It must be a model of cleanliness and should never have anything or any type of equipment in the arcade that is *illegal, immoral, or offensive to anyone.* All advertising for the arcade, be it newspaper, radio, TV, or giveaways, should always suggest, imply, and insist that the arcade is a family amusement center for youngsters and adults of all ages.

I repeat and emphasize, do not have anything in your arcade that is illegal, immoral, or offensive to any person. ●



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Arcade design and construction

By Ray E. Tilley

Arcades are both like and unlike other forms of business designed for selling to the public. Like the newsstand or the grocery, the presentation of goods on the floor is a matter for careful thinking about display over the available space. And there are other analogies to shops selling merchandise.

Operators of arcades are aware (or should be aware), however, that their revenue comes mainly from the selling of time on the games. This and the peculiar constraints by local governments—regulations on game rooms as such and on places of assembly where many patrons may be found—create pressures on the arcade operator to look carefully at the unique aspects of his business. These facts translate to demands on the design and construction of the arcade.

Experience being the best teacher, here are vital points in arcade design from the experience of successful fun center operators of varying operating size and revenue gross.

Number one is the body of site requirements administered by the local building inspection office. Without approval there, in a nutshell: you won't fly. Will you be required to have a rear exit door? Two restrooms? Certain levels for walking into the entrance? Find out in the earliest stage of your planning. Talk to the building inspector in your city or a high assistant to him.

If you're thinking about squeaking by in non-compliance: don't. This mistake could end with your closing the store with costly equipment on "permanent down-time." Or otherwise, on your planned opening

in Fun City Mall, you may find the building officer serving you with a nice little notice that you cannot open without that second restroom, an approved sprinkler system, or a hundred other possible items.

"There is a lot of hostility against arcades in the infrastructure of any city," observed Steven J. Bodenstein, manager of construction and special projects for Six Flags Amusement Centers, Inc., Atlanta, Georgia. This negativity often "extends to the building inspection department," he added, speaking in a two-part seminar on the subject of arcade design and construction in the 1981 Amusement Operators Expo, New Orleans.

For example, your decorative and sound-absorbing carpet on walls may be required to meet a flame-

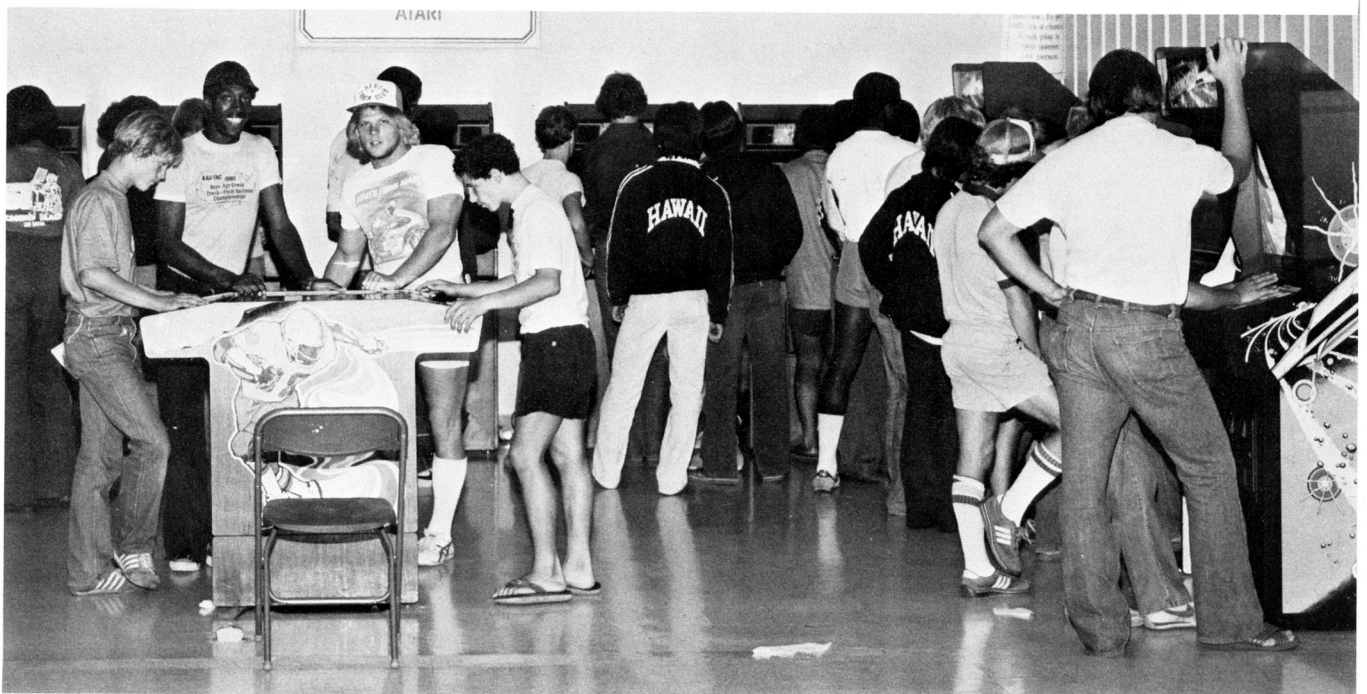


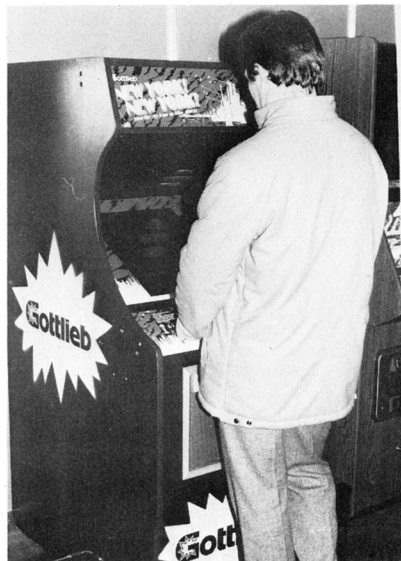
Photo courtesy of Atari, Inc.



Games-playing is done on "impulse"—so make it easy to follow that urge.



Overhead track lighting is one of the most flexible ways to illuminate



Plan floor space to give adequate elbow room for play on the popular equipment.

retardant test that has never been put in a standard form. Be prepared to deal with these legalities and requirements of the local zoning ordinance, he warned.

Zoning: this can be the cold water that douses your dream of an amusement center if you are ill-prepared. Talk to as many local authorities as possible on what will be required for variance or rezoning. A personal appearance before the zoning board is often mandatory. Don't appear before the board in a Marlon Brando disguise of T-shirts and jeans: Put on the appearance of a professional, a business person as you will want to be considered and acknowledged.

Location features

The law will dictate some physical items: required rear exits, or a wall separating the game room from other businesses, for example. Knowing the legal requirements will, of course, influence your choice of an arcade site.

Visual access: "The more you can see into the arcade, its flashing lights, etc., etc., the more money you'll make," said Bodenstein. "You want the opening of the store as wide as possible if you're in a shopping mall." He sees 16-foot width as about the minimum. A configuration of 15 feet by 40 feet is limiting, when the length of pintables is taken into consideration, plus the players and traffic between games.

Bodenstein recommends the "ideal" of 18 x 100 feet as giving area for 45 pieces of equipment, an office, restrooms, and bill changers. Also, if you operate pieces such as pool tables or air cushion games, a door should be large enough to admit them without removal of the door frame.

Ten feet of ceiling height is standard. (Consider that added area means increased air cooling and heating costs.)

Heating, ventilation, and air conditioning: Beware of an aged air conditioning unit in leased space. Breakdowns can be costly, and an overheated arcade in summer is hardly an attraction to players. A five-ton a/c unit capacity should be planned for the first 1,000 square feet, then 2½ tons additional capacity for each additional 500 square feet in the arcade, according to Bodenstein.

Store layout

Once the location features are planned and put in place, or a store site found that suits your requirements, the all-important mapping of the arcade floor must be made. As a basic rule, arcades serve an "impulse customer." You do not want to discourage anyone from entering or encourage anyone to leave. Dungeon-like store fronts won't appeal to the general public, and for an arcade, an entrance devoid of bright lighting suggests to parents the "cave" environment of a cocktail lounge—not a place to leave the kids. (Darkness breeds problems such as drugs that you don't want inside either. More on lighting later.)

On the cover of this issue of *PLAY METER* is a mall design approach taken by Electronic Experience. The video monitors are hooked-up to the games on the floor of the arcade. Either when being played or in their attract modes, the games are "broadcasting" an appeal to a customer that is as appropriate to your business as a movie theater's marquee. Whether by this or another technique, you can clearly display what you have to offer inside—as by a diagonal line arrangement of games, relative to the store front.

A bill changer near the front of the fun center is suggested by Bodenstein. The professional arcade manager stressed that the operator should make change as soon as possible for the player, in order to get that change out of his pocket and into the machines.

In the arrangement of games, consider a partition between rows. Having games back-to-back is not desirable—because the back of a machine is not attractive. The color and pattern of the partition (and likewise the floor and wall coverings) should not be highly patterned, which would conflict with the graphic designs of the game cabinets.

Arrange games so as not to block visibility through the arcade. The product must be seen to be bought, arcade designers advise.

Avoid blind spots: store area which the manager cannot see. Again, problems breed in the dark or in a shielded corner—from smoking to breaking into the games.

Dead areas, like the elephant's

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The operator is given a wide range of flexibility in controlling the difficulty levels of the game. Extra Spaceports are awarded at 7,000, 10,000, 15,000 or 20,000 points, as determined by the operator. The initial number of Spaceports may also be pre-programmed at 3, 4, 5, or 6. When the required number of spaceships is destroyed, the player receives an extra point bonus.

Radar Scope demands acute concentration and coordination. But remember... as your skill improves, the Gamma Raiders, re-energized with new and devastating power, launch an intensifyingly deadly attack of catastrophic proportions.

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TABLE HT 22¾ inches (580mm)
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DPH 22 inches (560mm)
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COCKPIT HT 67 inches (1700mm)
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graveyard, are where games die. Arrange to give long and vigorous life to the equipment. Place kiddie rides at the front, and parents will be more inclined to drop off Jack or Jill for a few rides than if the rides were way to the rear. If *Space Marshall* isn't getting good play in mid-store, consider moving it to an odd corner or over by the air-cushion games where waiting players might be attracted to the game. (If it's a dead duck no matter where you place it, one professional suggestion on where to place it is "at the bottom of the river.")

Single or multi-room arcades: which is better? It's your choice; you may see value in a separate table games room, a pinball room, and so forth.

Six Flags' manager Bodenstein, however, opposes specialized rooms as "a nightmare of maintenance, supervision, plus the cost of all those walls." Also, walls keep people out; think of the visibility of the games. Maybe Bob came in with Tom and Bill, and his pals are hep on playing table soccer, but he spies an air-cushion to try his hand on. The advantage of visibility is in not losing a customer because he could not see his favorite product.

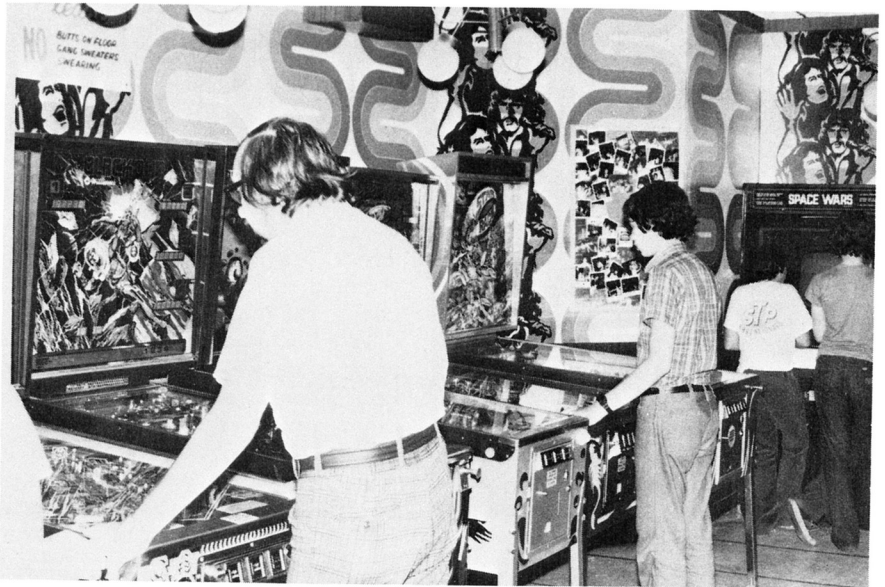
Lighting. Fluorescent light tends to wash out the bright colors of a pingame, and it makes play on a video monitor difficult because of the glare. Overhead track lights provide for versatility in lighting, being moveable on their track and able to shed light on an alternate set of games if you decide to change the layout. "Eyeball spots" are also effective in illuminating those dark spots of potential mischief and highlighting game pieces from one direction.

Other design points

"Build a maintenance-free store," says an operator familiar with overhead costs-cutting. Don't soak money in maintenance, put it in your equipment. Don't put up anything that the customer can tear down.

Locks and security: For a mall location, burglar alarm systems may be non-productive and an unnecessary expense. However, place deadbolt locks on every door.

The air conditioning thermostat must be on the show floor: that's where heat is going to be generated



Effective use of wall coverings and partitions to divide rows of equipment is important to display of your product and for sound-absorption.



Arrange the various game types to pull the most volume: Idle hands are not paying out quarters to play.



Eliminate 'blind spots' where problems—including cash box break-ins— can breed. You should be able to see all floor area clearly.

Finding the best pros to help start up

by human traffic, not in your office. Place a lock over the thermostat so customers can't disturb the setting. Air conditioning maintenance can be done under a service contract for economy at \$240 yearly for periodic service, by one estimate.

Floor coverings: they are an attractive feature in the arcade, "eating sound," aiding maintenance, and adding to the atmosphere. In carpeting, avoid nylon, since it is static prone, and static is going to give electronic games problems.

Wall coverings: paint takes scratches and reflects sound; carpeting and possibly fiberglass panels overcome these disadvantages.

Signs: there are many possibilities, but the landlord and/or zoning will dictate some limits. Arcade manager Bodenstein advised that signs "should communicate an idea about what you are, if you have a theme or idea for the arcade. If you have a place you really want to "class up," it's a great place to start." He notes further that electric sign maintenance under a service contract is likely to be a wasted expense.

Restrooms: requiring customers to ask an attendant for the key, and the attendant to check after the user, discourages vandalism. Keeping them clean is a good image booster. Separate the facility from your office and eliminate unwanted traffic through your business' nerve center.

Exit signs must be on battery power (usually under an ordinance requirement) and are never off. Emergency lights on a battery pack will cover you during times when the electricity goes off in a power-out and you could be the victim of a looting.

A sprinkler system must be able to cover all floor area under most ordinances, Bodenstein advises, as are fire extinguishers required (which are best kept in the office or a glass-fronted cabinet.)

A final point is not in the store at all: the parking lot. It may not be your problem, but if your arcade opens into it, it's your image lying out there among the beer cans, ice cream cups, and hamburger wrappers. Have your people clean it up—including snow in cold areas.

From the street to the back of the fun center—a game room can be an ugly environment if the operator lets it be ugly. With all the other investment he has made, the fact of an unattractive environment smudges the image of the business. ●

If you are going to set up an arcade operation as a business, you will need professional advise and counsel, particularly if you are constructing an arcade location.

What should you expect of the professionals you hire in construction? How to select them? These and other points on constructing an arcade were covered in depth by Amusement Operators Expo seminar speaker Steven J. Bodenstein, manager of construction and special projects for Six Flags Amusement Centers, Inc.

A digest of Bodenstein's advice about people you will contact and contract with, follows.

—Selecting a general contractor is a tough step, he noted. One method is, if you see a store you like—find out who built it and find him. This may be the right contractor for your own location.

—Calling in bids may produce the cheapest price for the job, but cheapest is not always the best in construction. Shop around.

—When you pick a contractor, specify exactly what you are thinking of building, with drawings to scale on drafting paper—of walls, floor area, restrooms, everything. "He knows and you know then exactly what you want," said Bodenstein. "Also, every change (in what you want) in the middle of a contract costs you money."

—Find out exactly who the subcontractors will be. If there is time, visit both with them and the general contractor. If you find sloppy offices, it may just signify sloppy construction work out on the job. Let the contractor refer you to jobs he has done, and go out and look at them. See if you are satisfied with the work.

—If you don't know the construction field, it may pay you to hire an architect to supervise the contractor. (If you are entering a new mall, you may need an architect. If you are entering a re-leased store, you likely do not need this professional help.)

—When you do go to an architect, find out the basis of payment for his work: by square foot, per-hour, or flat rate.

—The architect should serve you what you want in design and in cost. Again, specify. Artistic ideas well-

executed are very nice, but will you want to pay what a set of creative plans would cost?

—If a mall provides a set of requirements for your store—signs, fronts, air conditioning, etc.—this will save construction guesswork. Have the mall developer initial your design plans, Bodenstein advises.

—With an architect supervising construction, a book of specs will spell out materials to be used by the contractor. If the contractor does not abide by this, he defaults; you do not pay extra.

—Local permission is needed for planned signs. Never install a sign until it is approved by the municipality and by the mall developer.

—A contractor with any reputé will provide certificates of insurance he holds, covering such items as liability for pipes broken on the job which flood adjoining stores in the mall.

—The experience of going to the local building inspection department for permits can be frustrating or very easy, Bodenstein commented. A wait of 90 days may be necessary for approvals. Map this time into your projected opening schedule. (If a general contractor does the job, he takes the step of getting permits.) Talk with the local building inspector far ahead of your planned construction start-up time, to learn what you face. Sometimes an occupancy permit certifying safety, fire inspection, and bonding is required.

—Do you have any doubt about the value of contracts? Bodenstein advised: "Tie everyone down to a contract." It can be a standard form recommended by the American Institute of Architects (A.I.A. form #107), however, said Bodenstein, and you would not need an attorney to draw up the contract.

—List every document affecting the contracted person's responsibility, then file them for evidence if needed. List also what amount is paid by you for the job, and when.

The more thorough you are in selecting persons you hire for your construction, and the more attentive you are to details, the better you will be established in your dream location, the coin-operated amusement arcade.

—by Ray E. Tilley



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Congressman tells jukebox operators: *'It's not my fault'*

"The people you've got representing you ain't doing their job, and that's not my fault," Congressman John Breaux of Crowley, Louisiana told a roomful of Louisiana jukebox operators March 6.

Breaux and PLAY METER magazine's Editorial Director David Pierson were the key speakers at the March 6 meeting.

Louisiana operators, irate over the recent turn of events surrounding the unpopular law (i.e., the increased per-box fee and the location list requirement which has been upheld by the U.S. Supreme Court) had invited Breaux to the special meeting to explain why he voted for the omnibus copyright bill which enacted the compulsory jukebox copyright law.

Pierson of PLAY METER was invited to present the operators' side of the issue to Breaux at the Crowley, Louisiana meeting.

As one operator told Breaux at the meeting, "When you voted for the jukebox copyright law, you voted against me."

Breaux defended his vote by stating he was not even aware he was voting against the best interests of jukebox operators, "I had been informed this (omnibus) bill was agreeable to all parties concerned," the Louisiana Democrat told his constituents.

"Let me tell you what happened," he continued. "The main issue that was debated here was the cable television royalty issue. I didn't even know there was anything wrong with the jukebox portion of the bill. My records show that the bill was supposed to be agreeable to all parties concerned."

Then he asked the roomful of operators, "Aren't you people represented by any sort of national association or lobbying group?"

"Yes," responded someone from the audience, "the AMOA."

"Then I want to make this very clear to you," Breaux said. "Some-

body there wasn't doing his job. In fact, we were told just the opposite. Whoever you had representing you wasn't doing a very good job of it because I didn't even know this bill was unsatisfactory for jukebox operators."

Donald Barbin of Barbin Novelty Company in Crowley, Louisiana, who was the operator who arranged for the meeting, came to Breaux's defense. "You're the second congressman who's told me that. I have no doubt what you're telling me is the truth. (Former Congressman David) Treen told me the very same thing when I asked him why he voted against our interests. He said no one from our side told him this was a bad bill. He said he would've considered offering an amendment if he had known."

Breaux said that he had been approached several times by members of ASCAP who said "it was important to bring this copyright law into the twentieth century. But I was

never approached by anyone representing the operators. This bill was presented to me as being agreeable to all parties. How was I to know it wasn't in your best interests? Where was your lobby?"

He referred once again to the lopsided vote on the omnibus bill. "The vote was 324—7 in the House of Representatives and 97—0 in the Senate. Doesn't that indicate anything to you? Your organization must have fallen down on you."

Then Pierson directed a question to Breaux: "What these operators want to know most of all is, if it can be shown that this law is a bad law, would you be willing to support a new law which would more fairly represent their interests?"

"Of course I would," answered Breaux. "I'd be foolish not to. I've got a lot of operators in my district. I don't even know if there's a single songwriter in my constituency."

"And there are a lot of location owners who feel the same way about



Irate jukebox operators listen as Congressman John Breaux (in foreground with back to camera) explains why he voted for the compulsory jukebox royalty law. After hearing operators' grievances, Breaux promised to support legislation which would more fairly represent the interests of the operators.

THE PINBALL PATRON

**Sneak Peek
Into
Pinball Freak**

(See inside)





WE'RE WIRED INTO THE PINBALL PLAYER.

What makes pinball players tick? How do you get a pinball player totally involved in the action? Is there pinball in China? Or after death?

In December of 1976, Stern Electronics commissioned themselves to unravel these perplexing mysteries.

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The Plot Unfolds.

Recently, the success of their expedition has been revealed and documented. (This helps explain Stern's spectacular corporate rise.)

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For three long days they traipsed through brain circuitry via chemo-electrical impulses. Like no one before, they came to know the innermost thoughts and feelings of the subject. Including his perceptions of the perfect "10" machine.

Recent Stern games have all been formulated from the results of this research.

What lies ahead for this seemingly mad company?

It's been learned that Stern plans to send further mini exploratory expeditions into the heads of Bally, Gottlieb and Williams executives.

Someone should let these people know they better get earplugs soon.

STERN

“You ain’t seen nothing yet!”

STERN

'The jukebox operator is already paying up to 100 times the regular royalty; why should he pay a second time?'

this law too," blurted an operator in the audience.

"I'm sure there are a lot of location owners who feel just as strongly about this as you do," agreed Breaux, "but I really didn't know you felt this was a bad bill. I thought you felt it was a good bill."

Pierson then tried to point out why the bill was bad law for the jukebox industry. "Operators are ending up paying twice for the right to play the music," he said, "and no one else does that."

"Apparently there was a lot of talk in Congress about jukebox operators being exempt all these years from having to pay copyright royalties. But that's just not the case. Operators have been paying their fair share all along. What this law does is make them have to pay twice for the same thing."

Pierson stressed that operators pay a mechanical royalty that is already built into the cost of the records, and he pointed out that this rate has been increased also. "This mechanical royalty, which is about eight cents per record, is paid every time an operator buys a record. The main point here is that when a jukebox operator buys a songwriter's property, he doesn't just buy that song one time, he buys it twenty, thirty, fifty, even one hundred times. So he's already paying up to one hundred times the regular royalty payment for that musical property. Why then does this operator have to pay a second time with a per-box fee?"

He continued, "All the references to what radio stations and background music users pay in copyright fees is irrelevant. Radio stations don't buy their records. They get them free, and background music users don't buy records with built-in mechanical royalties either."

Pierson continued by drawing an analogy to mustard producers. "Using this same rationale," he said, "mustard producers could use the copyright law to attach a per-restaurant fee to restaurant owners who use their mustard for profit, even though those restaurant

owners buy in higher volumes."

Half in jest, Breaux interrupted: "You'd better not go too far with that analogy, or else we'll have the mustard producers asking us for a per-restaurant fee."

"That's just the point," Pierson snapped back, "where does it end? Why should the jukebox operator have to pay twice, then?"

Breaux was quick to respond. "What you say makes a lot of sense. It sounds as if there are some serious problems with the bill, but no one pointed this out to me. Sure, I'll grant you operators shouldn't have to pay twice for the rights to the music, but no one pointed this out to me before. It's the first time I have heard this mentioned. All I voted for was an omnibus bill which included this provision. Someone from your organization (AMOA) should have pointed out these problems to me beforehand. Where was your lobby?"

Pierson continued, "Another thing this law you voted for has created is that it has now placed these operators in the compromised position of having to disclose their lists of jukebox locations, if they want to remain in compliance with the law. And many operators fear this will jeopardize their businesses by leaving them open to blue-sky operations that will sell direct to their locations. The operators' national association has appealed this disclosure problem all the way to the U.S. Supreme Court without success. The courts have ruled in every instance that the location lists can be required because it is implied in the law."

Pierson also drew attention to the fact that the Copyright Royalty Tribunal was an anomaly of the law, created by Congress to collect money from one group of people and earmark it for another group of people. "And they don't even deduct their operating expenses from the total money collected," Pierson continued. "So what we have is the taxpayer funding a government agency that is acting as the private collection

agency for one group of people. Not only does that sound questionable constitutionally, but for me as a taxpayer, it throws a lot of light on the thinking which has helped run up such a huge federal deficit in this country. Why are our taxes funding this private collection agency?"

Pierson added that this peculiarity in the law—of the CRT being funded at the taxpayers' expense but serving the sole purpose of distributing monies to special interest groups—should indicate exactly who it was that authored the bill. "It's the special interest groups which sought to save as much of the money collected for themselves as possible by having the taxpayer pick up the tab for the distribution process. The special interest groups are the ones who benefit from this set-up. If you look at the law in this light, then you can see this was not a law written in the best interests of the jukebox operator or the taxpayer, but written by and for the special interests of organizations like ASCAP."

Breaux agreed that the law needed to be reworked, but he stressed that he had not been informed by the operators' national association at the time he was voting on the omnibus bill.

He stressed to the operators that they must get the word out to other operators nationwide to approach their congressmen to have the law changed.

Since that March 6 meeting, Louisiana operators have reportedly met with at least three other Louisiana congressmen to garner their support for a new bill which the operators want to see enacted.

Donald Barbin of Crowley, Louisiana, who was instrumental in organizing the grassroots movement in Louisiana, said he hopes this initiative will create a nationwide movement among operators to start speaking with their congressmen and showing the injustices of the law so they will have gained their representatives' ears when a new bill, more favorable to the jukebox industry, is introduced.

—by Ralph C. Lally II

'Your organization (AMOA) must have fallen down on the job for you...' —Congressman Breaux

The only games in town — are hot!

By **RAY E. TILLEY**

Following a court ruling that video games are legal in Buffalo, New York, two local operators established the city's first video arcade, in a prime downtown location where they now claim it is "the best drawing card in the shopping mall."

Partners in the "Space Shuttle" arcade, John Gallineau and Greg Bunn, believe that they currently draw five percent of potential coin-op business in the newly bustling downtown. With a 500-square-foot floor, they were negotiating a lease for twice again that much space, which they estimate would yield thirty percent of coin customers. "We can't fit any more people in," said Gallineau in a conversation with **PLAY METER** during the Amusement Operators Expo in New Orleans, where he and Bunn were scouting the new products on exhibit.

Half of the trade comes from business people frequenting the 60-store Courtyard Mall and being attracted to the advanced coin-op games prominently displayed at Space Shuttle, said Gallineau. The Main Street location enjoys Buffalo's current "state of renaissance," he explained, with a convention center, a new hotel, and rapid transit all part of renewed urban growth there. So, given the potential trade, the partners say they don't fear



Space-age art carries out the theme: games in the space age. The message on arcade's walls is scriptural.

competition that might surface.

It was the operators' second arcade; they have maintained a separate billiards-oriented game room for the past three years. At the Space Shuttle location, token operation has doubled the revenues, they report, on 25 games presently. From their mall opening in November of 1980, trade has gone

"to the saturation point," said Gallineau.

If there was a hunger for games playing in Buffalo, that was probably due to the dearth of games since 1952, when "coin-operated devices" were banned by a city ordinance.

The issue was raised during a 1980 fall festival, when an amusement machine operated in a tent was seized. Local vendors through their association brought the matter to court and enjoined law enforcement authorities from pulling the plugs on electronic games until the question of the games' legality could be settled. Final ruling in local court was on the now-familiar basis of games as amusement versus gambling devices: video was ruled a skill game, but pinball was judged a game of chance, and pins remain illegal in Buffalo.

Bunn and Gallineau's arcade carries the theme slogan: "The Space Age Is Here." Artistic effects on the walls and the sleek games (serviced by a full-time technician) carry out the idea. The videos are clearly popular in Buffalo. Whether the city accepts playing on electronic pingames remains to be seen. For the present, the two operators are evidently profiting nicely from the acceptance of the video games sector and ready for expansion further into the "space age" of amusement. ●



Buffalo's first arcade since 'legalization' of amusement video games: The floor is packed; expansion is planned.



Professional people mix with the youths to play the latest equipment in a downtown mall location.



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Common interests link distribs

CHICAGO—A trade association devoted to the interests and welfare of distributors of coin-operated amusement and vending machines nationwide was incorporated as a non-profit corporation in Illinois on March 4, 1981.

In forming the Amusement and Vending Machine Distributors Association (AVMDA), approximately twenty members of the industry from across the United States met informally in Chicago on February 27. The representative group of distributors voted unanimously that there was a need to immediately form an association.

"The purpose of the new trade association," said newly-elected AVMDA President Ira Bettelman, a Los Angeles-based distributor with C.A. Robinson & Co., "is to promote the common business interests of the coin-operated amusement and vending machine distributors in America."

Bettelman continued, "We also wish to be in a position to hire independent third parties to acquire and disseminate statistical information throughout all markets that will be useful to the trade in general."

As a "non-controversial example,"



Ira Bettelman

Bettelman told *PLAY METER*, information about types of group insurance for employees might be gathered and disseminated to AVMDA members, who would "have considerable clout" with a greater number of potential members in a group plan.

Generally, the group would broadcast "information which all of us distributors are concerned with, which, if we knew what everyone else was doing, we'd be better off," said Bettelman.

The members noted that, although the coin-op industry already has established national trade associations for manufacturers and others engaged in the industry, no association has ever existed to address the specific needs of distributors. Membership in the new organization, an announcement said, "will be open to all parties regularly engaged in the wholesale distribution of coin-operated equipment and supplies to other than affiliated parties and who normally perform sales, service, warehousing, delivery, and credit functions."

Officers elected at the formation meeting also included Jerry Gordon of H. Betti Industries/New Jersey, vice president; Rubin Franco of Franco Distributing Co./Alabama, secretary; and Jon Brady of Brady Distributing Co./North Carolina, treasurer.

A second meeting was to be announced before the end of April, and at that gathering the association would address the signing of new members, said Bettelman. A governing board for AVMDA would be formed at that meeting, he indicated. ●

NAMA positions change

CHICAGO—Ralph L. Sanese, president of Sanese Services, Columbus, Ohio, was elected treasurer of the National Automatic Merchandising Association at the February meeting of the Board of Directors, succeeding Howard A. Michaels.

Changes in several NAMA officer positions resulted from the resignation of Jerry L. Zaug as senior vice chairman which took effect at the February 24 meeting. Zaug resigned because he sold his interest in Zaug's Inc., Appleton, Wisconsin, and is no longer a NAMA member.

Howard C. Miller, president of Canteen Corp. and NAMA vice chairman, was advanced to senior vice chairman, and Michaels, president of Automatic Vendors Inc., Randolph, Massachusetts, became vice chairman.

"We accepted Jerry Zaug's departure with great regret because he has been a dedicated leader of

NAMA and of the Wisconsin state council," NAMA Chairman John B. Edgerton said in announcing the changes. He added that the officers are elected by the Board of Directors and their terms are for the current year.

Sanese is a former president of the Ohio Automatic Merchandising Association, a NAMA state council, and has been a NAMA director for the past three years. He serves on the NAMA executive and public-relations committees.

In other news, NAMA was readying at this issue's press time to top the number of 1980's exhibitors in the 1981 Western Convention/Exhibit of Vending and Foodservice Management, to be held April 3-5 in Phoenix.

Seminars for the three-day Convention program were built around an integrated management seminar format.

NAMA officials said they hoped to

attract more than the 144 exhibitors registered for the 1980 edition of the convention which was initiated in 1960 and has been held in California until this year.


Williams bows cocktail videos

Williams Electronics announced it will introduce cocktail table models of its first video game, *Defender*, in March, according to Ron Crouse, director of marketing.

Crouse told *PLAY METER* he is pleased with the new tables' design, as Williams did its own work, rather than go with a standard model.

He pointed out that the control panel is wider than on conventional tables to accommodate *Defender*'s numerous controls. There are seven on *Defender*, in contrast to two or three on most video games.

—by Tony Licata



**The most technically advanced
video game ever created.
And the most sensational!**

DEFENDER

Your mission, as Captain of the Defender, is to protect the humanoids stranded on the planet from their alien abductors. The scanner will help you determine strategy to shoot down the alien ships before they reach the humanoids. If you destroy the aliens only after they've captured their prey, you must return the humanoids to the safety of the planet or they will fall to their death. If an alien carries its victim out of your range, the humanoid will mutate, joining the alien force, and take to the assault with deadly vengeance!

The challenge becomes ever more intense as action progresses. Fighter ships and mines will test your skill. A direct hit will destroy a mother ship but smash it into a swarming mass of mini-ships which then must be wiped out! And if you don't act quickly, the cosmic baiter will attack!

Use your 2 escape options only if all else fails! Your "smart bomb" power is limited and "hyper-space" puts you into an unknown time warp. But

beware! If all the humanoids are abducted, the entire planet will explode in a blinding flash!

Dimensions:

1 or 2 player upright:

Height: 70" (177.8c/m) Width: 26" (66.1c/m)
Depth: 30" (76.2c/m) Weight: 255 lbs. (562.1k/g)
110/220 volt

1 or 2 player cocktail table:

Height: 27³/₄" (70.3c/m) Width: 30" (76.2c/m)
Depth: 27" (60.9c/m) Weight: 144 lbs. (316.8k/g)
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A composite image featuring an astronaut on the moon in the background, and two Defender arcade machines in the foreground. The machine on the right is a classic upright cabinet with a screen displaying the game's title and a character illustration. The machine on the left is a smaller, wood-grain cabinet. The scene is set on a dark, rocky lunar surface.

**Out of this world
entertainment!**

**Record-breaking
earnings!**

Kiddie arcade proves success

What has been happening successfully for coin-op in Europe is now working with success in the United States. That is to take spaces of 400 to 800 square feet in in-line stores of malls and feature kiddie items only.

Linsey Hurd, a New Orleans operator, set up his first 400-square foot Kiddie Land in August 1980 in the "Plaza in Lake Forest" mall at 5700 Read Blvd., New Orleans. He terms the response by customers' families and the mall management "fantastic" and relates that Sizler Realty, large-scale mall managers and owners of the Plaza, want him to expand his operation to all of their malls in Louisiana.

The advantages cited for the kiddie arcade are that it is good for mall business, stimulating trade for other merchants, improving public relations, and proving profitable.

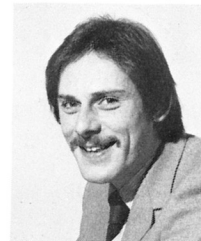
Kiddie Land was developed,

planned, and stocked by Thomas Leon of Kiddie-Rides—U.S.A./Universal Visual, 604 Main Street, Davenport, Iowa.

"Mr. Hurd operates 11 rides and the return on the investment is unbelievable—and with very little servicing of the equipment," said Thomas Leon. "His first store is 400 square feet and he plans future stores to be 600 square feet and to use 20 kiddie rides—the 800 square feet and 11 rides cannot handle the volume of business," Leon concluded.

Kiddie-Rides—U.S.A. is presently importing rides from Italy, Germany, and England, and have most recently signed an exclusive sales agreement with Waite Mfg. of Brush, Colorado.

The company was formed this year to market the rides. The principals of the firm are the same people who own and operate Universal Visual Audiotronics Co.



Dorsett



Williams

Ramtek appoints

CHELLENHAM, England—Ramtek Limited, manufacturer of video monitors, has appointed a U.K. sales manager and a sales administrator as part of a program of expansion and diversification.

Paul Dorsett was appointed as sales manager, and Katherine Williams was named sales administrator. Dorsett is in charge of the company's U.K. sales to the leisure industry as well as heading the company's diversification into the industrial market.

Miss Williams' duties include the control and administration of the sales effort.

Both officials are based at Ramtek's headquarters at Bath Road, Cheltenham. Dorsett joined Ramtek Limited from Gothic Electronic Components Limited of Birmingham, England, where he was franchise manager.

Katherine Williams of St. George's Road, Cheltenham, joined Ramtek after employment in office management.

Sales Mgr./Ireland

KILDARE, Ireland—Coin Operated Amusements Ltd. have recently appointed Miss Kathleen Whelan as its sales manager. She formerly worked with the company as a receptionist and then in the Accounts Department, and she has been involved in the Sales Department for the past year.

Miss Whelan succeeds Martin Dempsey who was recently appointed sales director.



Centuri, Inc. profits rise

HIALEAH, Fla.—Centuri, Inc. has reported financial results rising in the first fiscal quarter of 1981, compared to the previous fiscal year.

Revenues in fiscal 1980 were \$5,906,044 with an operating loss of \$4,525,473, or 60¢ per share. This compares with revenues of \$6,263,687 in fiscal 1979 and an operating loss of \$692,379, before extraordinary items, or 21¢ per share.

First quarter revenues for the fiscal period ending January 31, 1981 were \$6,484,379 with a net profit of \$379,142, or 5¢ per share. This compares to revenues of \$737,957 in the first quarter of fiscal 1980 and a loss of \$671,004, or 4¢ per share.

Ed Miller, president, said that Centuri currently employs approximately 250 persons in two plants in Hialeah. The company is traded on the over-the-counter exchange.

Photo credit

Photographs used with the article, "Advance Automatic Previews, in the February, 1981 issue of PLAY METER, page 21, should have carried a credit line for the photographer. The shots were taken by Steve Lomba, freelance cameraman of Oakland, California. The editors apologize for the omission of photo credit.

Can you speak 'computer'?

Do you think the technical workings of a coin-op game are too complex for the old "electro-mechanical" mind to grasp? Well, consider cramming a course in computer science fast; educators are predicting that Americans will find themselves branded as "functionally illiterate" sometime in the near future—even though they can read and write—if they cannot operate a computer.

According to a recent United Press International report, a number

of scientists and technicians warn that it will be necessary within a few years to program and operate a small electronic computer in order to get and hold a job.

By 1990, the nation will need 40 million persons able to use computers, and educators wonder who is going to teach that many persons. While the computer has been rapidly developed and made affordable for all institutions, businesses, and individuals, education on the computer has not kept pace, the

teachers say.

"The day will come when we will need to have a computer sciences department in every grade school," said Edward W. Warnshuis, publisher of *Technical Horizons in Education* magazine in Santa Ana, California. He said a Philadelphia schools program proved that computer literacy can be achieved in grade school.

Problems arise, however, in school administrators' not wanting to spend funds on computer training and in the lack of persons to teach on the computer, since the personnel with the skills are employed in the business world, observed Dr. Warnshuis. This means, he said, that "for the foreseeable future, business is going to have to solve its computer literacy problem itself."

One such program, developed by a Torrance, California firm, has been tested successfully on two groups of high school students, UPI reported.

Incidentally, the article you are reading—as well as much of the material in this issue—was written on a computer terminal keyboard to be typeset by the electronic brain. •

45



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"Happy Hour"

"Our arcade is near a high school. Every afternoon from 3 to 6 p.m., we set the bill changers for six tokens for \$1. We call it 'Happy Hour' and the kids love it.

"One afternoon, a lady came in to buy \$4 worth of tokens at 'Happy Hour' prices and told us that 'Johnny couldn't be here because he had basketball practice. He'll be back on Saturday to play on the tokens.' We think it's terrific."

—from 'Notes and Quotes,' arcade game token hints from Van Brook of Lexington, Inc., Lexington, Ky. 40555.

Going to Tokens

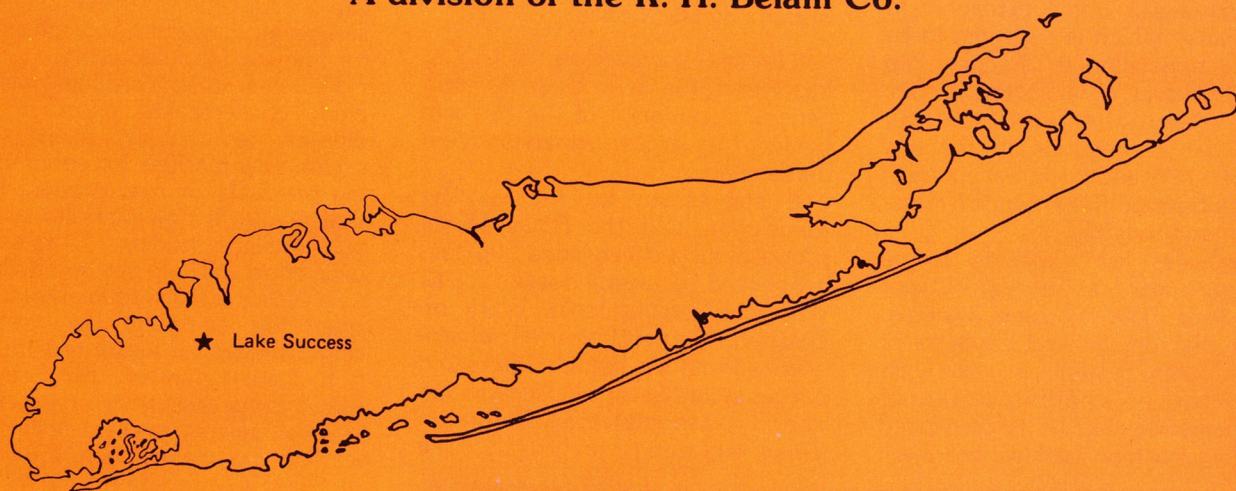
"When we first thought about going to tokens, we were in the 'cost squeeze' and were convinced that three tokens for \$1 would be our answer. After discussing the subject, we took your advice to start 5 for \$1 and see what would happen. That was the best advice ever. We are still at 5 for \$1, and we'll probably be there for years to come."

—from 'Notes and Quotes' on arcade game tokens, by Van Brook of Lexington, Inc.

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New coins stir U.K. trade's interest

LONDON—The amusement and vending industries expect new opportunities with the planned introduction of a £1 coin.

A joint committee of the British Amusement Catering Trades Association and the Automatic Vending Association of Britain has spent considerable effort on its own proposals for the new £1 coin, according to trade press reports here, but it was taken by surprise when the Royal Mint announced also that a 20 pence coin will also be issued.

Following the circulation of details of the mint's proposals, the trade committee will submit its reaction to the plans—which is expected to be strong opposition to the new 20p coin. However, other sectors of coin-op business were likely to benefit from the introduction of the 20p piece in 1982 and the metal pound in 1983, observed the *Financial Times* of London recently.

Engineers are expected to be getting to work on building a £1 slot into their coin machine systems. Peter Harrop, general manager of Mars Money Systems, a major U.K. exporter of vending machine mechanisms, said he is convinced vending machine manufacturers will

get a boost from the new metal pound. "Developments in other countries show that the introduction of new, higher denomination coins always has this effect," he said.

Particular hopes were placed on increased sales of dry soups, or noodles, vended with hot water—which have developed into a £30 million industry in Britain in the past few years. An estimated 25,000 Japanese-manufactured noodle dispensers were in operation in the U.K., with vending set at the £1 value.

Among other applications of the new coin would be at transit depots and in pay telephones.

(Notable, however, in the U.S.A. has been the less than feverish general acceptance of the \$1 "Sue buck," the largest American coin denomination.)

A spokesman for the vending association said the Royal Mint's proposal for a seven-sided 20p coin is opposed because it doesn't roll as well as a circular coin. Work on designs of the new coins will not proceed without the input of interested parties including the amusement and vending associations, *Financial Times* reported.



Scheer



Barber

Bally appoints

CHICAGO—Ross B. Scheer has been named president of Bally Manufacturing Corporation's Special Markets and Products Division. Robert E. Mullane, chairman and president of Bally, said the promotion was part of a restructuring of divisions of Bally.

Scheer has been with the Bally organization for 14 years, most recently as director of marketing for the corporation. Previously, he served as marketing vice president for Midway Manufacturing.

His new responsibilities will include a dedicated effort by his division to analyze, define, and create new markets for either existing products or new product lines that would fit new markets' needs, said Mullane, adding: "This worldwide effort will help position Bally for successful entry into markets that offer the company the greatest opportunities for future growth."

Mullane continued, "Mr. Scheer's long and successful record in helping Bally achieve its present position of leadership, makes him eminently qualified to undertake this difficult assignment."

The Bally Systems Division, which designs and markets Slot Data Systems, will become part of the Special Markets and Products Division.

The appointment of Mahlon Barber as president of the Gaming Equipment Division of Bally was announced March 4 by Robert Mullane, chairman and president of the corporation.

Barber joined Bally in 1973 as operations manager of Bally Distributing Co. and became president of the subsidiary in 1980.

His responsibilities will now include the development and marketing of Bally gaming equipment, principally slot machines worldwide.

Mullane stated that "Mr. Barber's experience in the development and marketing of slot machines makes him eminently qualified for this position. He is recognized as one of the foremost authorities on worldwide marketing of gaming equipment."



Laniel Automatic Machines of Montreal has celebrated 40 years of service by employee Gaston Barsalo, giving him and Mrs. Barsalo an expense-paid week's trip to Paris. Shown here before their departure are the Barsalos, flanked by Laniel's Vice President Jean Coutu (left) and President Pierre Laniel. *Bonjour!*



GAZAR

THE INCOMPARABLE MULTI-MISSION VIDEO CHALLENGE



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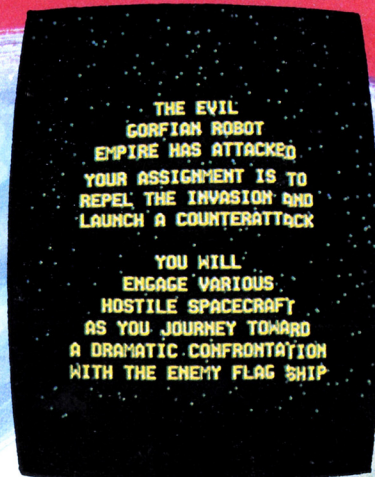
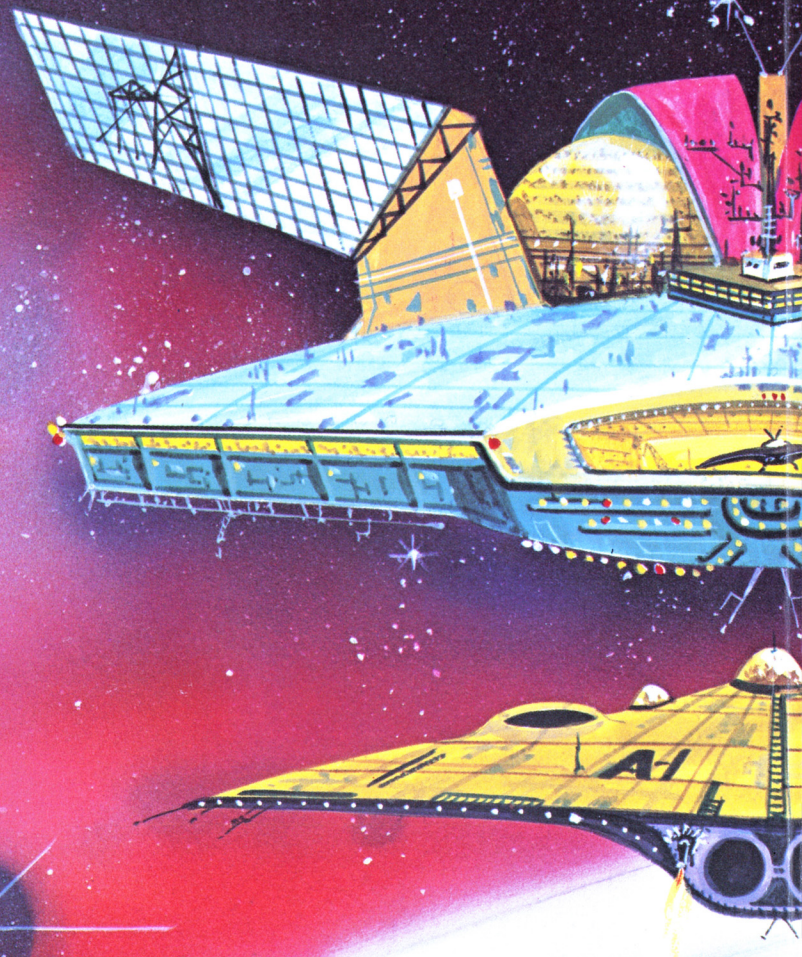
A unique sight and sound adventure that enlists players into the Interstellar Space Force for a challenging voyage against the Gorfian Empire.

In a series of missions, the player's assignment is to repel the Gorfian robot attacks and launch a counter-attack to ultimately destroy the enemy flagship.

Throughout the game, the GORF speaks to the player with taunting phrases like: "Prepare yourself for annihilation." "Survival is impossible." "Some galactic defender you are...ha! ha! ha!" "My Gorfian robots are unbeatable." And more!

"I devour coins," says the GORF—and he does to the great profit of the operator and location.

A major innovation by MIDWAY's creative engineers, GORF is a sure-fire, play-action success.



FLIGHT CONTROL:

A quark packet laser feature with multi-directional capability. Maneuver and press trigger to fire.



ASTRO BATTLES:

Shielded by a forcefield, player defends his planet against constantly descending Gorfian robots that drop anti-gravity bombs. Player earns points by hitting and destroying invading columns of Droids. With the destruction of this entire attack matrix, player proceeds to next mission.

LASER ATTACK:

This orbital zone is GORF's first line of defense against player's counter-attack. Player must destroy the 2 anti-particle Laser Ships before they blast him. The supporting Kamikaze Ships and Gorfis must also be destroyed before player continues on his mission.



SINGLE COIN:
2 Interstellar Space Fighters.



TWO COINS:
4 Interstellar Space Fighters.

FIELD PROMOTION SCHEDULE: SPACE CADET (recruit): 1 to 5 Missions
SPACE GENERAL: 16 to 20 Missions
(For higher achievements, inform Interstellar Space Force)

Highest scores for 2 Ship and 4 Ship



MIDWAY 

GORF

1 or 2 Player
Full Color Video Game
...that TALKS!



GALAXIANS:

Approaching the defense perimeter of the Gorfian Empire, the player defends his ship against the Galaxian formation as they swoop and diving launching anti-photon bombs. Extra points are earned by hitting Leaders, Escorts, Heavy Bombers and Phasor Fodder as these units attack.



SPACE WARP:

An eery web, generated by the approaching enemy Flagship releases Gorfis and Fighters firing subquark torpedoes at player's Interstellar Attack Ships. Successful hits by player as aliens emerge from the vortex of the web, scores points and reduces launching of deadly torps.



FLAG SHIP:

The player must avoid the furiously hurling fireballs while blasting a space in the Flagship's heavy forcefield arc, in order to get a clear shot at the internal power reactor vent. Following a succesful hit, a violent neutronium explosion appears in dazzling color and sounds. Player continues striving for next promotion.

ions. SPACE CAPTAIN: 6 to 10 Missions. SPACE COLONEL: 11 to 15 Missions.
ns. SPACE WARRIOR: 21 to 25 Missions. SPACE AVENGER: 26 to 30 Missions.
Interstellar Space Force Headquarters.)

Ship games retained on screen for all to challenge.



The excitingly different GORF™ is available in three MIDWAY models: **STANDARD ARCADE**—Eye-catching lighted header and front panel plus colorful graphics that frame monitor as well as sides of cabinet.

Height: 73" (183 cm)
Width: 25" (63 cm)
Depth: 28" (70 cm)

MINI-MYTE™—

Space-saving compact unit with new hooded monitor, tasteful walnut finish cabinet, lighted header and attractive graphics.

Height: 59" (148 cm)
Width: 20" (50 cm)
Depth: 24" (60 cm)

COCKTAIL TABLE—

Popular sit-down style with flip-flop screen. Accessory legs are available to raise to upright play height.

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

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GORF

PRINTED IN U.S.A.

COIN NOTES: EUROPE

Ramtek, Ltd. expanding

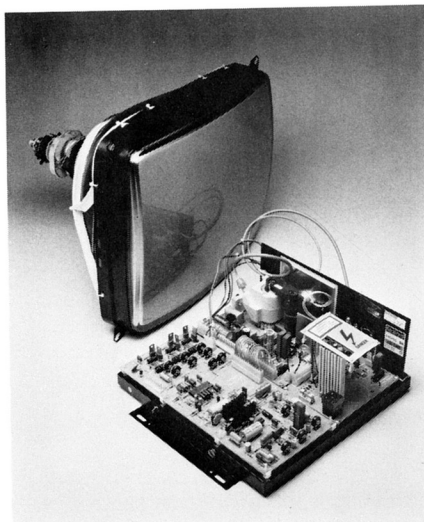
Ramtek Limited, the Cheltenham, England manufacturer of commercial video monitors, is projecting a 40 percent increase in sales in 1981, compared with its 1980 figure. This projection was based on the continuing buoyancy of the video games market—for which the multi-million-pound company claims to have established itself as the dominant force in Europe.

Arthur Combe, its director of marketing, said: "Despite the strength of [the pound] sterling, we are expanding rapidly overseas by marketing our monitors in a highly professional manner.

"We are planning to double our export turnover in 1981 by further strengthening our service to overseas customers in a variety of ways, including quoting our prices in local currencies (not a common practice by British exporters) and by maintaining a large stockholding," Combe added.

In 1980, Ramtek Ltd. increased its production facilities to keep pace with the ever-increasing demand and has recently acquired the lease on a new factory site. Ramtek offers a 24-hour replacement service to manufacturers and operators throughout the British Isles.

Training courses for operators' and manufacturers' staffs have been



Ramtek Ltd. announced its new PIL 90 Series color monitor is backed with a two-year guarantee. Code-named VMC 90, it is complete with precision in-line 20" CRT and is designed to meet the high performance and reliability standards of the electronic games and data and computer industries, says Ramtek, Ltd.

run by Ramtek throughout 1980. The courses on the maintenance of monitor sub-assemblies are made available to operators who write Ramtek Ltd., 105/107 Bath Road, Cheltenham, Glos., England.

During the past year, Ramtek maintained its technological advice

center, said to be still an innovation in the industry despite being now two years old. "Any manufacturer or operator can ring us up and we will offer technical advice on monitors, monitor sub-assemblies and game logic boards," said Combe.

As 1980 ended, Ramtek was finalizing arrangements for doubling its soak testing facilities, to ensure that quality is maintained at a high level despite the increasing production levels.

In 1980, Ramtek increased the range of sizes of monitor models it offers to the industry. Among the new product launches was the introduction of the 14" size.

Summing up, Arthur Combe said: "In the past year, we have been making a concerted effort to consolidate our position in every aspect of our activity: We have widened our product range; further improved our quality assurance; increased our production facilities; strengthened our sales and marketing team; enlarged on our research and development operation, now established in its own center at Cheltenham; and expanded our export and accounting teams. All in all, we have been driving hard in 1980, and we will continue to do so in 1981 in order to achieve the massive lift in turnover for which we have budgeted."

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Hubka moves up at Gottlieb

NORTHLAKE, Ill.—Appointment of Jack E. Hubka as Gottlieb marketing coordinator has been announced by the company's Marketing Vice President, C. Marshall Caras.

Hubka joined Gottlieb in January of 1976 and has been engaged in various positions in the company, including production planning, inventory planning, and purchasing.

According to Gottlieb sales management, his marketing activities will include advertising, publicity and public relations,

and selling contacts, both with the company's regional managers and its distributors.

Jack Hubka lives in nearby Roselle, Illinois, is a licensed pilot, and plays a little golf when he is not flying. "We are delighted to have Jack in marketing," said Caras, "and are confident his experience in other departments of the company will be extremely helpful in the sales/factory relationships. Jack will be an important part of Gottlieb's new attitudes and major strategy that will unfold in the next several months."

An announcement from D. Gottlieb & Co. in February noted that the company is considering expansion "in new directions" beyond its pinball and video lines.

Robert W. Bloom, president, said: "As the industry knows, we have recently changed from a single-product games manufacturer to a multi-product company with the addition of our line of video games—and we are considering expansion in other directions." Personnel appointments were being made with that aim, he indicated.

Silicon Valley school day, by Exidy

The fourth through sixth graders at DeVargas Elementary School in San Jose learned all about video games technology from Exidy at their recent Speakers Day. Exidy sponsored three 40-minute sessions where Gary Jensen, operations manager, and Larry Benedict, production test manager, showed these nine to twelve year olds how a computer makes the Rammers, Spectars, and Wummels move around on the screen of their *Spectar* game.

Sixth grade teacher Jeri Bryden was pleased with the class' attention to the technical aspects of the talk as well as the actual play of the game, and said: "The presentation was excellent. Gary and Larry did a good job of relating the technical information to the students' level," she noted. Jensen and Benedict explained the history of computers from vacuum tubes to transistors to

intergrated circuits. Explaining the extreme change in the size of the components, Benedict noted, "One of these small integrated circuits includes so many instructions to the game that you would have to fill all your tennis shoes and backpacks with transistors to do the same thing." Each student was given a sample IC to take home and was also given a chance to look at it under a magnifier.

"The area you live in is called Silicon Valley," noted Jensen, "this is because the electronic companies here all need silicon to make their products work. Silicon is one of the major materials that makes our game *Spectar* work too." As he described the technical aspects of the game the students waited eagerly for their opportunity to actually play the games that were brought by Exidy for the presentation.

Only a brief explanation of the

Spectar game strategy was needed. The students gathered around the games to try their skill. A fifth grader, Paynette Grant, said, "I did real good for a first try." Jeremy Sullivan, a fourth grader, bragged, "I got one star before he hit me."

All of these youngsters were pleased to play the games at school. They also took the time to examine all the parts on display and look at their chip under the magnifier. "It is still strange how such a small chip makes all that happen on the *Spectar* game," noted one perceptive fourth grade girl.

Jensen and Benedict said the Speakers Day was "a great opportunity, not only as a contribution to the community, but for these students, our players, to learn about Exidy." They both confirmed that the day at the elementary school proved to be informative and fun.

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PM

Directory Addendum

The 1981 Play Meter Directory Issue inadvertently omitted current information on Sefco Distributing Co., Inc., which distributes coin-op equipment lines in the areas of Maryland, Virginia, District of Columbia, Delaware, and West Virginia.

Following is current listing information for Sefco, 7255 Standard Drive, Parkway Industrial Center Hanover, Maryland 21076; phone: 301/796-8950

President: Richard H. Vaughan
Vice President/Music & Amusement Division: Mark McCleskey

Service Manager/Music & Amusement Division: Nick DiSebastiano
Sales & Market Manager/Vending and Foodservice Division: Gregg Kalifut

Service Manager/Vending & Foodservice Division: Jim Klein
Field Service Manager: Robert Uhl
Mg'r/Parts, Accessories & Supplies: Diana Balint

Representing: Seeburg, Williams, United, Gremlin/Sega, Dynamo, General Products, Choice Vend, Frymaster, Creative Concepts, Vanguard, Vendo, National Rejectors, Ardac, Centuri

Gafford rises

SANTA CLARA, Calif.—Paul C. Jacobs, president of Universal U.S.A., Inc., has announced the promotion of Harold D. Gafford to the position of manufacturing manager, effective March 1.

In his new position, Gafford, formerly production manager, will have responsibilities for all manufacturing operations within Universal U.S.A. These duties will include the planning, direction, and control of production, material and inventory control, plant maintenance quality control, and allied engineering and technical services related to Universal products.

Gafford had previous video game manufacturing experience with both Vectorbeam, Inc. and Exidy, Inc., prior to joining Universal in July of 1980.

Logic for operators

A new computer program developed by Innovative Management Consultants provides operators with a powerful tool for evaluating equipment and location performance.

The "Operators Investment Analysis" program is designed for use on Radio Shack's TRS-80 series of computers. It will help the coin operator perform location cost analysis, determine when to rotate and dispose of equipment, and more, said a spokesman for I.M.C.

Reports can be generated by location, machine name or number, return on investment, revenue

produced, and others. "Flex time" programming developed by I.M.C. allows the operator to perform analysis for any time period.

The computer program for operators with anywhere from 30 to 2,000 machines comes complete with a training manual. Installation and employee training is available.

For free information, write: H. Richard Priesmeyer, Innovative Management Consultants, 2040 Lisa Lane, Fayetteville, Arkansas 72701, or phone Charles C. Ross, 512/428-7370.

Busts 'Star Castle'

POCATELLO, Idaho—A player's record-setting run on a *Star Castle* video game stimulated local interest in the game and generated publicity here in March, reported the game's operator, Bruce McCaskill.

The player, 23-year-old Steve Kirby, planned his marathon "to play 'til I drop," said McCaskill. Kirby began play at 11 a.m. on March 5 and continued for 33 hours. When his hands were too tired to play further, he had logged a score of 5,690,000 with 422 (!) spaceships remaining on the Cinematronics game.

Gary Strand, partner with McCaskill in Bannock Music, an operation with about 100 locations, observed Kirby's ceaseless play in the cocktail lounge location. "I haven't beaten 10,000 points yet," said the operator. Kirby's playing received news coverage on local television, and a number of players attempted to best his record. No one did so, said McCaskill, but: "We've got an awful lot of people with sore hands."

Wiley distributes IEE

VAN NUYS, Calif.—Industrial Electronic Engineers, Inc., (IEE), a leading supplier of multiple display technologies, has announced an addition to its sales representative network.

Wiley Company, based in Los Angeles, California with a branch office in San Diego will be representing IEE's Component Products Division in Southern

California. The Wiley Company, a component oriented firm with nine outside salesmen, has been serving the Southern California electronics industry's OEMs and distributors for more than 30 years.

Other divisions of IEE, the Special Products Division and Industrial Products Division, will continue to be represented by Components Marketing Associates, Inc.

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Write or call for color card.



Suntans via coin machine

Safetan Solarium, of Sheffield, England, has introduced its coin-operated suntan machine for arcades. The *Sunburst* machine operates on a 50-pence coin, giving three to five minutes of "tanning."

Both the coin mech and the amount of time per coin are operator-adjustable, said John Marchington, a partner in Safetan Solariums. The machine is approximately the size of a photo machine. Models have seen use in coastal

resorts after their introduction this year, reports said.

The *Sunburst* machines are safe, said the manufacturer, and instructions inside the booth give the user details of how to operate the sun lamps. Two sessions a day are recommended for a person using the booth over about six days to get a proper tan. Marchington said the coin-op pricing "compares favorably with the £15 per hour which some solariums are charging for treatment."

Pins revisited

TORONTO—Conversion kits are now available for selected older pinball games. Wally Crowder of Electro-Sport Promotions, manufacturers of these kits, commented: "With today's video market, many operators are stuck with older pins. Our kits breathe new life and earning power into these games at a fraction of the cost of new."

The kits, called Pro Pinball Conversion Kits, consist of a new backglass screened with live-shot photography and a brightly colored plastic mylar playfield cover. Decals are also included to cover all plastic inserts together with custom posts which alter the play of the original games.

"Keeping locations happy with a 'new' piece and extending the earning power of older games are the primary benefits of this product," said Crowder.

Kits for *Euel Knievel*, *Star Trek*, *Power Play*, *Strikes and Spares*, and *Eight Ball* are currently available from Electro-Sport Promotions at 103 Walnut Avenue, Toronto, Canada M5V2S1.

Hoyle moves up

HUNTINGTON VALLEY, Pa.—The Magna/Fun Company has appointed Wade Hoyle as vice president/operations. Magna/Fun operates Space Port family amusement centers in shopping malls and other locations across the United States. Hoyle began with Space Port as a store manager in 1974.

Six Flags centers in Atlanta

Corporate headquarters of Six Flags Amusement Centers, Inc. which operates electronic amusement centers in 20 states, has been moved from Columbus, Ohio, to Atlanta, Georgia.

The new offices are at 120 Interstate North Parkway East, Suite 120, Atlanta 30339.

According to John von Lessen, chairman of the corporation, the Georgia location is more geographically centered for the operations of the company, which is a subsidiary of Six Flags Corp., owner of theme parks

and wax museums coast to coast.

Larry Allen, vice president and general manager, added: "We have extensive expansion plans for 1981 and the move places us in the rapidly growing Sun Belt area and gives us easy access to all parts of the country."

The centers which feature the latest in electronic video games and pinball machines, operate under the name Funway Freeway. These are located in regional shopping centers or malls from New York to Arizona and from Florida to Michigan.

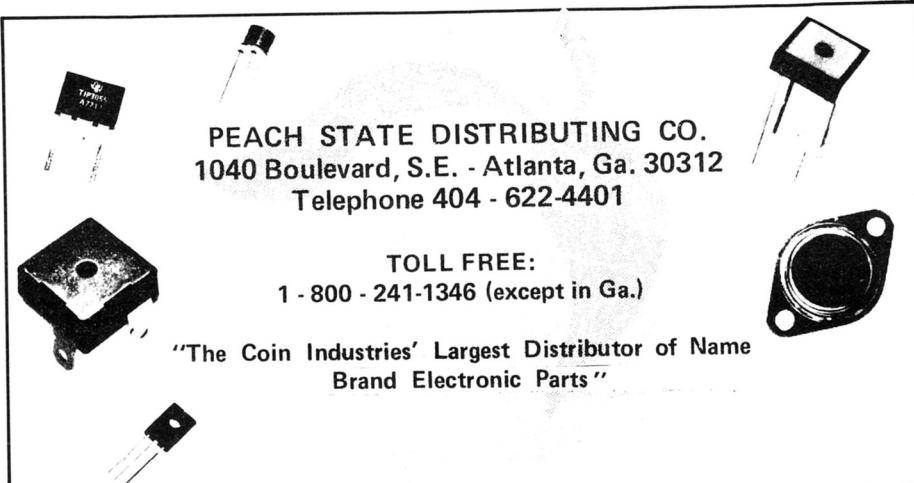
Padjen joins Abloy's force

NILES, Ill.—Abloy Security Locks has announced the addition of James S. Padjen to the field sales force. In his new capacity, Padjen will represent Abloy in the Ohio Valley region, working from a home base near Cincinnati.

Prior to joining Abloy, Padjen was a field sales representative for

American Lock Company, responsible for commercial, industrial, and educational market sales of locks in the Ohio Valley area.

For Abloy, Padjen will be handling lock sales to all Abloy markets in his area. His territory will cover Ohio, Kentucky, and portions of Indiana, Michigan, Pennsylvania, Virginia, and West Virginia.



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MUSIC PROGRAMMING

By Pat Matthews

Waiting for the summer winds

In a recent issue of the trade paper *Variety* appeared an article with an interesting theory. You may have been wondering why there have been so few records released by major recording artists in recent months. *Variety* believes that based on record sales figures for the first quarter of this year, many of the big-named acts are delaying the release dates of their next albums until after July 1st. After that date the royalty rates on released products will increase dramatically. The Copyright Royalty Tribunal, which sets royalty fees, just recently boosted the royalties an artist can earn from 2¾ cents to 4 cents *per song* for all song recordings released after the first of July.

So, it all comes down to money, as usual. But the bright side of it all is that new recording artists, as well as biggies from the past attempting comebacks are selling more records than usual because their lps aren't having to compete against new releases from big name groups. And that, in a way, is healthy for everyone. And a couple of those new artists are featured this time around.

Angel Of The Morning—Juice Newton—Captiol/P-4976

Here's a chick who's been

around for a long time, but will no doubt be referred to as a newcomer. Making her mark for the first time, Juice showcases her dynamic vocal style and range on a classic from the Sixties. The song is such a timeless piece, I'm surprised no one did it over sooner. She has Country roots, so this record will do well in Pop and Country circles: *10 out of 10* on both.

Yesterday Once More/Nothing Remains The Same—Spinners—Atlantic/3798

After striking out with a couple of originals after a string of re-make successes, the current kings of choreographed songs are back to a sure winner: a remake plus and original "addition"—thus creating a medley.

The vocals found on the remake of a year ago, like "Cupid," are back. This plus the disco-fied back-up instrumentation make this a *10 out of 10* record on R&B and Pop charts for the Spinners...again!

Me (Without You)—Andy Gibb—RSO/RS1056

What we have here is a dreamy love song written and sung by the heart-throb of millions, including *Dallas'* Pam Ewing (Victoria Principal). The arrangement and vocals makes one think of the Bee

Gees of the vintage era—in the mid to late Sixties. A pretty song done in a classy style by a guy who may never get the "due" he deserves because of the shadow he stands in: *9 out of 10* at least.

Turn Me Loose—Loverboy—Columbia/11-11421

Co-written by the two vocalists of this newcomer to the music scene, this rock'n'roll tune takes us to musical peaks and valleys we have yet to cross. The style of the group, which hails from Canada, is reminiscent of England's Foreigner, and since they (Foreigner) may be holding out 'til that magic first day of July to release something after what seems like forever, this may be a perfect example of a new face coming in and taking over. Very AOR, very good: *8 out of 10* or better.

That Didn't Hurt Too Bad—Dr. Hook—Casablanca/NB2325

The second single release on their current label features the sound which has made the group a success. About three years ago, after returning from total oblivion, Dr. Hook changed musical direction. The songs were suddenly pretty and not satirical. Vibes, strings, and electric pianos became the forefront

and Ray Sawyer's vocals became dreamy—almost like John Sebastian singing one of his ballads. The result has been phenomenal: hit after hit, a new audience and a new label, where the legacy, thus far, has continued. The only thing that hasn't changed is the patch over Ray's eye. Give it 9 out of 10 or higher.

One More Chance—Diana Ross—Motown/M1508F

It even starts the same as her recent hit "It's My Turn." The vocals are superior as usual on this mid-tempo love song which features an excellent lush orchestration: 10 out of 10 on highest chart.

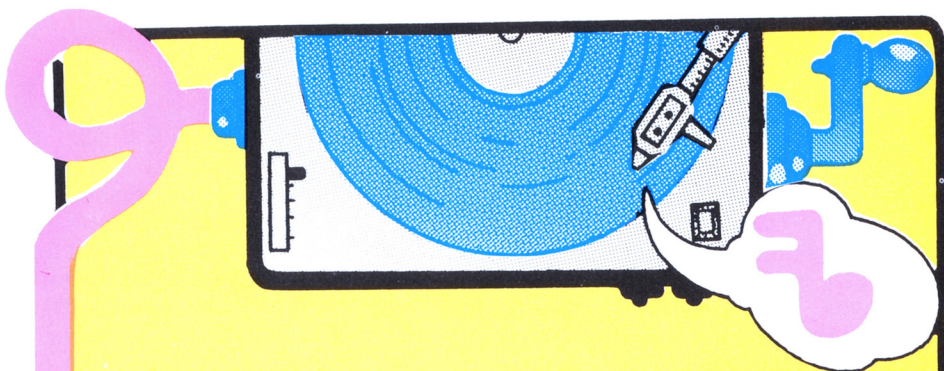
Her Town Too—James Taylor & J.D. Souther—Columbia/11-60514

It has everything going for it. The song was penned by its singers and is produced by Peter Asher. What more could you ask for in a record? Probably not very much more. This one features the best of both worlds: the Country-tinted Pop vocals of Taylor and the Pop side of Souther's country vocalizing. Not since the days of "Fire and Rain" have the lyrics of a James Taylor associated effort had such ambiguously poignant lyrics. It's all about the end results of a divorce and may be a personal statement from James regarding his recent parting of the ways with Carly Simon. Whatever the motive, the collaboration is exciting: 10 out of 10 on a possible three charts—Pop, Country, and Easy Listening.

Time Out Of Mind—Steely Dan—MCA/51082

From the "Gaucho" album and just as jazzy as ever, it's the duo that makes music like a house full of musicians. With an emphasis on piano and the back beat of an infectious drum kit, Steely Dan proves once again that all of that good time jazz rock music they made back in the early Seventies should be re-released so all their new fans can hear what they missed. This is probably their most commercially accessible song since "Peg" from a few years back: 10 out of 10; has an outside chance of crossing over to R&B.

The records are rated as follows:
 10 out of 10 — Top Ten peak; 9 out of 10 — Top 20 peak; 8 out of 10 — Top 30 peak; 7 out of 10 — Top 40 peak; 5 or 6 out of 10 — somewhere in Top 100; 4 or less — forget it, loser, break in half.



Top Pop

- WOMAN—John Lennon—Geffen***
- MORNING TRAIN (NINE TO FIVE)—Sheena Easton—EMI America
- THE BEST OF TIMES—Styx—A&M
- KEEP ON LOVING YOU—REO Spedwagon—Epic***
- KISS ON MY LIST—Daryl Hall & John Oates—RCA
- HELLO AGAIN—Neil Diamond—Capitol***
- SOMEBODY'S KNOCKIN'—Terri Gibbs—MCA
- WHAT KIND OF FOOL—Barbra Streisand & Barry Gibb—Columbia***
- CRYING—Don McLean—Millenium***
- WHILE YOU SEE A CHANCE—Steve Winwood—Island
- RAPTURE—Blondie—Chrysalis***
- LIVING IN A FANTASY—Leo Sayer—Warner Brothers***
- DON'T STAND SO CLOSE TO ME—The Police—A&M
- FADE AWAY—Bruce Springsteen—Columbia***
- JUST THE TWO OF US—Grover Washington, Jr.—Elektra
- TREAT ME RIGHT—Pat Benatar—Chrysalis***
- PRECIOUS TO ME—Phil Seymour—Boardwalk
- I CAN'T STAND IT—Eric Clapton—RSO***
- THE WINNER TAKES IT ALL—Abba—Atlantic
- BEING WITH YOU—Smokey Robinson—Tamla***
- DON'T STOP THE MUSIC—Yarbrough & Peoples—Mercury
- HEARTS ON FIRE—Randy Meisner—Epic
- GAMES—Phoebe Snow—Mirage***
- MISTER SANDMAN—Emmylou Harris—Warner Brothers***
- HOW 'BOUT US—Champaign—Columbia
- WHO DO YOU THINK YOU'RE FOOLIN'—Donna Summer—Geffen

Country & Western

- TEXAS WOMEN—Hank Williams, Jr.—Elektra/Curb
- YOU'RE THE REASON GOD MADE OKLAHOMA—David Frizzell & Shelly West—Warner Brothers***
- SYLVIA—Drifter—RCA
- CRYING—Don McLean—Millenium***
- TAKE IT EASY—Crystal Gayle—Columbia
- GUITAR MAN—Elvis Presley—RCA***
- OLD FLAME—Alabama—RCA
- PICKIN' UP STRANGERS—Johnny Lee—Full Moon/Asylum
- WHAT I HAD WITH YOU—John Conlee—MCA
- LEONARD—Merle Haggard—MCA***
- PERFECT FOOL—Debbie Boone—Warner/Curb***
- FALLING AGAIN—Don Williams—MCA

Rhythm & Blues

- IT'S A LOVE THING—Whispers—Solar/RCA
- THIGHS HIGH—Tom Browne—GRP/Arista
- BEING WITH YOU—Smokey Robinson—Tamla***
- PERFECT FIT—Jerry Knight—A&A
- SUKIYAKI—A Taste Of Honey—Capitol
- ALL AMERICAN GIRLS—Sister Sledge—Cotillion***
- JUST THE TWO OF US—Grover Washington, Jr.—Elektra
- HOW 'BOUT US—Champaign—Columbia
- DON'T STOP THE MUSIC—Yarbrough & Peoples—Mercury/Polygram
- TAKE IT TO THE TOP—Kool & The Gang—DeLite
- BURN RUBBER ON ME—Gap Band—Mercury/Polygram
- EVERYTHING IS COOL—T Connection—Capitol

***denotes records reviewed previously by PLAY METER



Five Years Ago In Play Meter...

April, 1976

The growing technology of amusement games and their servicing came under scrutiny in PLAY METER's pages. The April, 1976 issue's lead feature article, authored by Gremlin Industries' Lane Hauck, explored the microprocessor.

Coinman of the Month was Thomas Cundieff, chief technician at O'Connor Distributing in Dallas, a 22-year veteran of the industry.

That issue also carried Play Meter's Annual Operator Poll, which would soon become the standard survey of the amusement games industry. "The Annual Survey's statistical information gathered from participating operators over the past five years has aided the editorial direction of this magazine in serving the operators, and it has become the major barometer of industry trends," said Ralph C. Lally II, Play Meter publisher and editor.

Among the news items five years ago: The attendance or more than 300 operators and servicemen in C.A. Robinson's two-day Bally-

Midway service school made it the most successful of such schools ever held in the Los Angeles distributor's showroom....Shaffer Distributing in Columbus had just held a grand opening for its new, 65,000-square-foot location, with more than 650 coin machine operators from three states converging for the gala event....And in Chicago, several employees of Midway Manufacturing, including Sales Manager Larry Berke, had been injured when a tornado collapsed the factory March 12. Production facilities were set up in another building, and by April the line was back to 50 percent of normal capacity, PLAY METER reported.

New products in these pages for Spring 1976 unveiling, included: Chicago Coin's newest four-player flipper, *Cinema*; and its *Demolition Derby* video driving game in a lower-profile cabinet....Gottlieb brought out its *Sure Shot* single-player flipper featuring a "Gay '90s" pool-playing motif....Exidy, Inc. bowed its *Death Race 98* driving game....Williams-United showed its six-player *Seville*

shuffle alley....Meadows Games had *Bombs Away*, a war action video....Ebonite Billiards introduced a new line of coin-op tables....Electra Games unwrapped its *Eliminator IV* video games with realistic drag strip action.

The average token has been sold 50 times before it "walks out" of the arcade. The first-time cost of 8¢ has generated, at 25¢ pricing, gross income of \$12.50—a pretty fair return on cost.

No More Bums

"To keep out the bums we charge \$2 admission and give eight tokens at the door. No more bums."

Gross Up 30%

"We have been converted to tokens about three weeks. We started on five tokens for \$1. The gross is up at least 30 percent, and we plan to stay at five for a dollar indefinitely. The tokens are great!"

—from 'Notes and Quotes' by Van Brook of Lexington, Inc.

The Greenwald four-coin chute is here ...

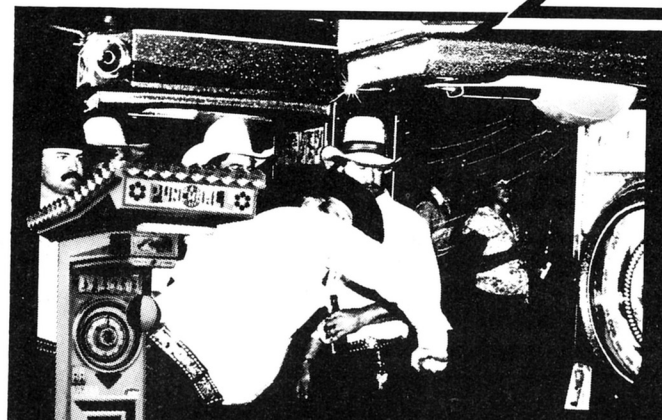


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Building a video wall

By Randy Fromm

The cover of this issue features the "video wall" at the Electronic Experience arcade in Denton, Texas. Visitors to the Golden Triangle Shopping Center in this college town north of Dallas are treated to this striking and colorful display as they pass the front of the amusement center. Each of the seven monitors in the "video wall" is connected to a game inside the arcade. As players in the arcade operate the games, a second monitor in the wall displays the progress of the game to passers-by. The results of this kind of "advertising" are quite positive. People who have never had the courage to enter an amusement arcade will stand for ten or fifteen minutes in front of the wall and watch the games being played. Most will eventually enter the arcade to try their hand at playing the games themselves. Although many large malls have restrictions regarding exposed or flashing signs or lights, the "video wall" has a beauty and esthetic appeal that convinced the mall developers to allow its construction.

Construction

The construction of the wall is quite simple. Behind the tiled wall is a shelf that supports the monitors. For the wall in Denton, four black and white and three color monitors were used. Naturally, if you have fewer games with black and white monitors, you could use more color monitors instead.

Each of the color monitors is powered through an isolation transformer. The isolation transformer is absolutely necessary for providing the power to the color monitors. Without the isolation transformer, you risk not only a potential shock hazard, but the destruction of the electronic systems in the game as well. If you can find an

isolation transformer that can handle the current, all of the monitors can be powered from the same transformer. Each of the color monitors draws about .8 amps of AC current or about 100 watts.

Once the AC power to the monitors is hooked up, the video must be connected from each of the games to the individual monitor in the wall. This is a fairly easy process (Midway has been doing it for years when it displays new games at the trade shows) that simply requires a parallel connection between the monitor in the game and the monitor in the wall. For black and white games it is especially easy, requiring only a single pair of wires to carry the video signal and the video return.

Color monitors are a bit more complex, requiring a separate connection for each of the three colors that make up a color display; red, green, and blue. In addition, the color display also requires separate connections for the vertical and horizontal synchronization signals (Although vertical and horizontal "sync" may be combined in some games, such as *Galaxian*) and ground

A Quadrascan monitor such as those used in *Asteroids* and *Battlezone* can also be used in a "video wall" although none were used in this location. Connecting the Quadrascan monitor requires separate connections for each of the three signals that create the picture: the X, Y, and Z outputs from the logic board.

In addition, since the Quadrascan monitor is not powered by the AC line voltage, separate power must be run for this monitor. Because the power supply in the game was not designed to power two monitors, a separate power supply should be created to assure the reliability of the game to which the second monitor is

connected. The easiest way to do it is to simply purchase a power supply transformer for the Quadrascan from your local Atari distributor. The transformer is used to provide the 6.3 volts AC for the filament of the picture tube, and a 60-volt AC center tapped for the DC supply in the monitor.

Because of the distance between the games and the video wall, shielded cable is a must for the video connections. RG 59 was used for the connections. The coaxial cable is readily available from most electronic retailers, including Radio Shack. For the color games, five separate runs of coaxial were utilized to carry each of the three colors, and the vertical and horizontal sync. The actual connections to the game were made with a short piece of coaxial for each of the five connections. These five short pieces of coaxial each have their own connector so the game can be easily disconnected from the video wall, or a new game hooked up when the game has to be sold to make room for a later model.

Special notes

There are a few important notes about hooking up the video wall that must be observed. Depending on the type of monitor used for the video wall, you may have to modify the sync signals coming from the game. Some monitors use a positive sync system, some use negative sync. The new Electrohome monitors have a separate connector to allow both positive and negative sync inputs to work. The polarity of the required sync will be indicated on the monitor schematic. If you need to modify the sync to reverse its polarity, simply "piggyback" a type 7404 inverter IC somewhere on the logic board, and run the sync signal to it. Take the inverted output from the 7404 and run it to the monitor's sync output.

FRANK'S CRANKS



By Frank Seninsky

Three for the money

Now that I've seen the first two "Frank's Cranks" in print, it's time to atone for a few misstatements. In the *Pac-Man* review it states: "The main cabinet improvement is that now the line cord can be fully placed inside the cabinet for horizontal shipment." [PLAY METER, February 15, page 41.] This sentence does not belong there. Midway has always designed its cabinets so the line cord could be placed inside. I apologize to Midway and if it makes them feel better, the statement was supposed to apply to just Atari games up to and including *Asteroids*. With Atari/Ireland's production of *Asteroids*, Atari started the practice of designing the cabinet so the line cord could be placed inside. The manufacturer has continued this feature on *Missile Command* and *Battlezone*, adding a plate which protects against pulling the cord from the inside connectors.

Exidy writes that in the *Spectar* review I said that the control panel is held down by bolts with wing nuts. The game that I worked on may have been a test model; it was at the show in New Orleans. That test *Spectar* also used the *Targ* joystick before the newly designed joystick went into production.

For *Battlezone* by Atari I wrote, "The controls may be a problem if the players are extremely rough on them." Since that time, most of the handles on our *Battlezone* have broken. The replacement parts are the same as the originals, so they can be expected to just break again.

I have had two major problems with Stern's *Berzerk*. (1) The bottom section of the joystick control has a metal collar banging into a metal stop plate. This causes the collar to wear down and the joystick bottom can actually cause damage to the steering circuit board. A new nylon block has been designed by Stern that can easily be mounted to the wood frame. Now the joystick collar will strike a flat plane surface of the

nylon block. This should reduce wear of the collar. As of March 11, Stern began producing these nylon blocks. Another method for reducing the force exerted between the collar and the metal plate would be to cut off about one inch of the joystick at the top. The players will not be able to generate such a huge lever force. (2) The LM339 chip on the steering board has had a high failure rate. A well prepared mechanic should carry this extra chip in his tool box. These are the only types of service calls we've had so far on the *Berzerk*.

Games selected for review this issue are *Star Castle*, *Intruder*, and *Nine Ball*. Next issue I'll do *The End* and *Phoenix*, followed by *Free Fall*, *Defender*, *Radar Scope*, *Gorf*, and *Astro Blaster* in PLAY METER, June 15 issue. So watch this space twice monthly!

NINE BALL/Stern In the February issue, Stern's *Flight 2000* was highlighted in this column. The *Nine Ball* game has many of the features that were used successfully on *Flight 2000*: (1) the extra plywood section under the cashbox, for added security; (2) the extended brackets on the back of the head glass to keep the glass in position if the head lock loosens or slips; (3) the transformers and power module are located on the bottom of the cabinet under the playfield for better heat dissipation; (4) durable plastic links have replaced the old fiberboard links on all plunger coil rods; (5) plastic cylinder on the flipper shoe negates the need for insulation paper on the flipper break blades (end of stroke blades); (6) a memory-clear switch is located on the front coin door.

On *Flight 2000* I complained about the frame supporting the spinning target: "This frame is too close to the playfield glass; and angry or devious players can pound on the game and sometimes bend this frame, causing

the target to jam. (He can also break the glass in the process.) Sometimes the spinner contact points can be positioned to give away free points by using the flippers or just banging on the cabinet." On *Nine Ball* the spinning target frame overhangs the playfield like a cantilever. Banging on the glass or bending the frame won't cause the target to jam. There is also less chance of the ball getting stuck under the spinning target because there are no posts to hold the ball up.

The coin chutes are held in latches which are held in place by high tension spring wire forms. These short spring wire forms replace the standard springs which exerted much less tension on the coin chute latches. Now the coin chutes will remain in place when an irate player kicks or pounds on the coin door. These were also on *Flight 2000*.

Capacitors were not soldered onto the pop bumper switches for a good reason. If the capacitor were to fail by short circuiting, then the pop bumper coil would remain energized and burn up in a few minutes. The purpose of capacitors on switches is to assure scoring and coil action for short duration switch closings. The time the ball takes to roll up and down the bumper skirt is adequate so the capacitors aren't really necessary.

The 190-volt voltage supply for the displays has been "crowbarred" to protect the circuit. If the 190-volt section shorts high, then transistor Q24 will shunt to ground and no voltage will flow through the 190-volt system. This "crowbarring" was also done on the *Flight 2000* 190-volt section.

Stern warns in its manual that this game must be level from side to side for balls to enter the outhole properly. I had nothing but trouble with the balls getting caught in the ball return section. I used a prototype game. Stern has replaced the switch actuating wires in the ball

return tank with taller and stiffer wires on all of the production *Nine Ball* games. This should eliminate, or at least reduce, this type of problem.

STAR CASTLE/Cinematronics At first glance, I was overly impressed with the internal design of this game. Cinematronics has used a Vector-beam monitor which is exceptionally easy to troubleshoot. All the monitor components are clearly marked and spread out. The monitor is divided into three sections: the display board, the Keltron Power supply (which is the high voltage supply for the CRT), and the CRT. The Keltron supply is now modular and can be easily interchanged. The *Star Castle* monitor can be replaced by any previous Cinematronics monitor except *Sundance*.

The only monitor control which does not require a screwdriver for rotation is the display brightness. Some operators may feel that this is an advantage which helps restrain unqualified people from making monitor adjustments. I feel it's better to have pots that you can adjust by hand to control horizontal, vertical, brightness, and contrast adjustments. The easier it is to adjust, the more likely it will get adjusted. As is the case with most video games, the monitor picture screen attracts dust particles. When cleaning the screen, use extreme care not to rub off parts of the color decal. This decal becomes brittle and flakes off easily.

The coin door used on *Star Castle* is what we call the "stripped Coin Acceptor Door." This door is fairly reliable but does not come with coin entrance lights, a slam switch, or a hook to put the back door key on. Atari uses the same door, but it comes with these options as standard equipment.

The CPU logic board is one large board so all the components are easy to troubleshoot. The power supply is mounted on the side of the cabinet, so this keeps the bottom of the cabinet empty. The cabinet floor is where any loose nuts, bolts, or coins usually end up. Now there are no circuits there which may become blown. The power supply is interchangeable with previous Cinematronics games, but voltages must be carefully adjusted when changed from one game to another.

From the front door, the option switches can be easily reached. All of the test patterns are operated from the option switches. The volume control is also on the front door. As I've stated before, having all the controls and test switches on the

front door makes life easy for the operator who, in most cases, now will not hesitate to use them.

The cash box is held in place by two small lengths of wood which act as guides. The cash box can move slightly in either direction—which can cause a coin "jam-up." The coin box can also be reached from the back of the machine. A special coin box tongue has been added which helps to keep the box secure when a lock is utilized.

Cinematronics has continued their use of circuit breakers, instead of the conventional fuses. While this may be cheaper for the operator in the short run (he does not have to purchase fuses) it may well cost him plenty in the long run. I have been told (and seen on occasion) that it's very tempting to "hold in" the breakers when they trip out. How many servicemen have done this and actually caused a major disaster. It only takes a few seconds! It would be better to use the type of circuit breakers that we have in our homes, which must be switched on to reset them, if Cinematronics insists on using circuit breakers.

The audio board has been designed so that if the two speaker wires are shorted together, no damage will result. This thinking should be carried to other sections such as the ribbon connectors on the boards. These connectors can be connected in two different ways—so be careful. They should be of the same type used by other manufacturers that have been made "fool proof" to only go on one way, the correct way.

The instructions for *Star Castle* have been placed on the marquee, making them easier to read. The *Star Castle* troubleshooting section of the manual is well written and easy to follow.

INTRUDER/Game Plan The logic board set up uses the Z-80 processor system designed by Taito. This is the same system that has proven so reliable in over 60,000 *Space Invaders*. Three logic boards separated by plastic spacers approximately 1/2" long make troubleshooting on location an almost impossible situation. The volume control is located on a logic board which makes it difficult for the operator to adjust. The original Taito program did not provide for changing the number of laser bases. Three ROMs can be easily changed to give the operator a selectable number of laser bases. LA01-2 replaces LA01-1, LA03-2A replaces

LA03-1, and LA04-2 replaces LA04-1. Game Plan is providing these replacement ROMs at no charge. Contact your local distributor to order these ROMs.

The coin door is satisfactory. The only improvement would be to add coin entrance lights which I do believe help increase game receipts. This can be proven by taking two identical games, placing them side by side, and taking the coin entrance lights out of one game.

The coin chute rejectors are offset from the coin return, which makes it difficult for players to flip pennies up the coin returns. The coin box is sturdy but can slide forward and backward 1/4". Care should be taken to keep the box in the most forward position to prevent quarters from hanging up between the coin slide and the lips of the cash box cover.

The Wells-Gardner monitor is difficult for one person to remove. It must be lifted out at an awkward angle. It would be easier if the monitor could slide out such as is the case with most games.

The power supply has been placed on the bottom of the cabinet and the connections are wide open to stray nuts, bolts, and coins. The cash box is clearly visible from the back of the game but is somewhat difficult to lift because the coin chutes overhang the cash box when the coin door is closed. Game Plan has used all Molex inline plug assemblies which provide for easy replacement of all sub assemblies. All the controls are standard buttons with gold leaf actuating blades. The control panel is held in place by latches. This has proven to be the best design because it's easier for repairmen to take off and put back.

It's good to see that there are people out there who will send in their comments and ideas. Please send me a note if you have any service tips that will be of interest. For this month I want to thank Frank Sola, field service manager for Centuri; Jack Czura of Cinematronics; Lou Rudolph, field service manager for Stern; Snapper Wilson and Stu Schubert of Game Plan; and my brother Richard Seninsky, who is in his own right, a "Crank."

[Editor's Note: Contributor Frank Seninsky is president of Alpha-Omega Amusements, Inc. which operates a route including over 50 college gamerooms and Wizard's World Arcades on the New Jersey Shore.]

TECHNICAL TOPICS

DIGITAL CIRCUIT DESIGN COURSE

Lesson Seven: Semiconductor Diodes

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

This lesson is about the design of a logic gate which includes both diodes and transistors. By this point in the Digital Circuit Design Course, these elements should be familiar to the student. Therefore, he should pay particular attention to the effect the diodes have on the inverter.

DTL Gates:

A two-input DTL (diode-transistor logic) gate is shown in figure 7-1. It consists of the diode AND gate of Lesson 6 [in PLAY METER NEWS UPDATE, May 1] and the inverter of Lesson 4 [PLAY METER, April 15 issue].

The advantage of the transistor is to provide a better fan-out and active pull-up of the output X. Also, diodes (D1 and D2) are reverse biased for logic 1 inputs and to provide isolation to previous gates. The features are particularly useful when logic gates are used in large digital systems.

Truth Table

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

Also, notice from the truth table that the output of a DTL gate is not in agreement with the AND gate of Lesson 6. The logic operation of a DTL gate is the complement of an AND gate and is termed *negated AND* or *NAND*.

To convert figure 7-1 to an NPN DTL gate, reverse diodes D1 and D2 and reverse the polarity associated with V, VCC and VBB.

Circuit Operation:

For purposes of simplicity, V_F ,

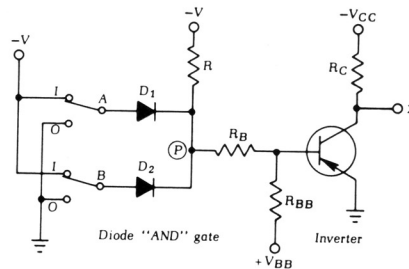


Fig. 7-1: A Diode-Transistor Logic (DTL) gate. The circuit consists of a diode AND gate and an inverter. The truth table should be compared to that of the AND gate in Fig. 6-1 of Lesson Six.

for diodes D1 and D2, shall be neglected in this paragraph. However, V_F will be accounted for in detail later on.

When inputs A and B are at a logic 0, diodes D1 and D2 are forward biased and junction point P in fig. 7-1 is grounded. With P grounded the base-emitter diode of the transistor is reverse biased, as was the case of the inverter in Lesson 4.

This operating condition is illustrated in fig. 7-2A. The current I' flows through R when the diodes are forward biased. Because the collector current equals zero when the base-emitter diode is reverse biased, the output, X, is at a logic 1. This result confirms the first row of the truth table.

When either input is at a logic 1, the operating condition described above does not change. Since one forward biased diode will clamp P to the ground, the output will, therefore, remain at logic 1. This result is consistent with rows two and three of the truth table.

If inputs A and B are at a logic 1, the diodes are reverse biased, P raises to a voltage proportionate to the ratio of R and R_B . The voltage at P is sufficient to forward bias the base-emitter

diode of the transistor and reverse bias the input diodes. The transistor will then be driven into saturation and the output will be at a logic 0. This result is in agreement with the last row of the truth table.

Design Procedure:

The design of a DTL gate involves the design of an inverter and a diode AND gate. The two circuits are joined at the junction point P (refer to fig. 7-1). The inverter can be designed without concern for the AND gate if

$$R_B \gg R$$

and

$$V_B > V_F$$

of the input diodes. The reasons for these conditions will be explained in the actual procedure. STEP 1: Design an inverter as outlined in Lesson 4. STEP 2: Find V_B' .

$$V_B' = V_B + V_P$$

where

$$V_B = V_{BB} \left[\frac{R_B}{R_B + R_{BB}} \right]$$

V_P is the voltage measured from junction P to ground. In the case of the inverter of Lesson 4, P was ground or V_{CC} , depending on the state of the input. Because of the diode, V_P will be V_F above ground and will add to V_B . The addition is algebraic since V_B is positive (negative for NPN) and V_P is negative (positive for NPN). Since the purpose of R_{BB} is to reverse bias the base-emitter diode, adherence to the following statement is imperative:

$$|V_B| > |V_P|$$

STEP 3: Find R.

$$R_B \geq 5 \times R$$

The above formula is a general rule and can be used almost universally: the only restriction on its use being when the device preceding the gate is sensitive to the amount of current through the diode. For example, in practice the input diodes may be connected to the collector of a previous gate. Although R_B and R add when the inputs are at a logic 1, the allowance of two to three times the required I_B will keep the transistor in saturation.

STEP 4: Find I'

$$I' = \frac{V - V_F}{R}$$

STEP 5: Find V_P when both inputs are at a logic 1.

$$V_P = (|-V| - |V_{BE(sat)}|) \left(\frac{R_B}{R_B + R} \right) + |V_{BE(sat)}|$$

The voltage at P, when the inputs are at a logic 1, should be sufficient to reverse bias the diodes. A voltage of 0.1V or greater across the diodes is a good general rule.

Design Example:

Design a two-input DTL gate which will drive a 150 (ohm), 6V lamp. (Use the circuit configuration shown in fig.7-1.) Use a germanium transistor type 2N404 and germanium diodes type 1N270. Make $V_{BB} = +3.0V$, $R_C = R_L$, and $-V = -V_{CC}$.

STEP 1: Design an inverter.

Following the procedure in Lesson 4, the following values will have been calculated:

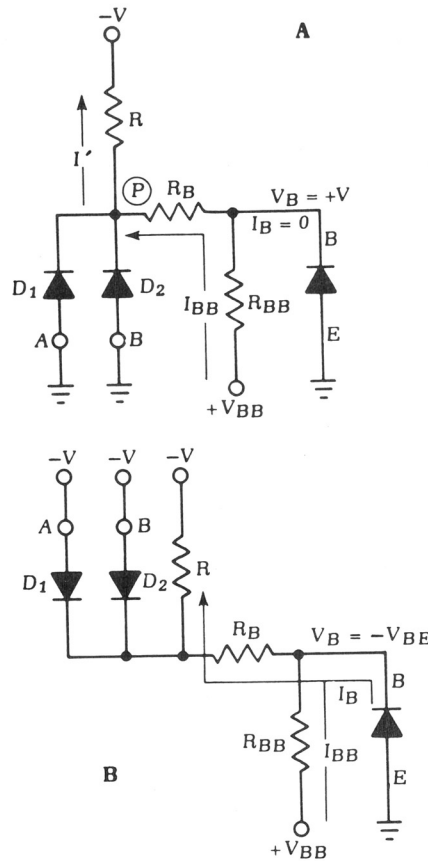


Fig. 7-2. Equivalent circuits of the input circuits of a DTL gate. A represents the top line of the truth table and B the bottom line in the table.

$$I_C = \frac{|-V_{CC}| - |V_{CE(sat)}|}{R_L} = \frac{5.9}{150\Omega} = 39ma$$

$$I_B = 2 \text{ to } 3 \text{ times } \frac{I_C}{\beta_{min}} = \frac{39ma}{50} = 0.8ma$$

$$I_{BB} = \frac{I_B}{10} = \frac{2.0ma}{10} = 0.2ma$$

$$R_{BB} = \frac{V_{BB} + |V_{BE(sat)}|}{I_{BB}} = \frac{3.3V}{0.2ma} = 16K$$

$$R_B = \frac{|(-V)| - |V_{BE(sat)}|}{I_B + I_{BB}} = \frac{5.7V}{2.2ma} = 2.7K$$

STEP 2: Find V_B'

$$V_B' = V_B + V_P$$

$$+ 0.23 = 0.43 + (-0.2V)$$

A voltage of +0.23 is sufficient to reverse bias the base-emitter diode. The general rule for germanium diodes ($V_F = 0.2V$) was used. Also, the condition that the absolute value V_B is greater than the absolute value V_P (see step 2 under Design Procedure, above) has been satisfied.

STEP 3: Find R.

$$R = \frac{R_B}{5} = \frac{2.7K}{5} = 540\Omega$$

(Use 510 Ω)

STEP 4: Find I'

$$I' = \frac{V_{CC} - V_F}{R} = \frac{(6) - 0.3}{510} = 11ma$$

STEP 5: Find V_P when both inputs are at a logic 1.

$$V_P = (|-V| - |V_{BE(sat)}|) \left(\frac{R_B}{R_B + R} \right) + |V_{BE(sat)}|$$

$$= (6 - 0.3) \frac{2.7K}{3.2K} + 0.3 = 5V$$

When junction point P raises to approximately 5V and the input (-V) is -6V, the diodes will be reverse biased by approximately 1V.

END OF LESSON 7

PROGRAMMED TEST / 7

Instructions: The purpose of this test is to guide you step-by-step through actual circuit design problems. Also, the tests in the Digital Circuit Design Course will provide you with additional design technique. Most important, these tests will provide you with a gauge to establish your degree of understanding of the material covered in the lesson text. The test is programmed: start at block 1 and follow the numbered instruction associated with your answer.

1 The logic operation performed by a DTL is

- a. NAND GO TO BLOCK 11
b. AND GO TO BLOCK 20

2 YOU ARE INCORRECT!

Refer to the text and return to BLOCK 11

3

$$I' = \frac{11.3V}{3.6K} = 3.1ma$$

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

What is V_P when both the inputs are at a logic 1?

$$V_P = \underline{\hspace{2cm}} \text{ GO TO BLOCK 13}$$

4

$X = V_{CC} - V_{CE(sat)}$, of the output stage.

The output voltage of a DTL gate is determined by the transistor and is, therefore, uniform. The transistor will isolate the diode gates from each other.

You have completed the test for lesson 7.

11 YOU ARE CORRECT!

The logic function NAND is the _____ the logic AND.

[Block continued on next page.]

- a. Complement of **GO TO BLOCK 21**
 b. Same as **GO TO BLOCK 2**

12

$$V_{B'} = (-1.0V + 0.7V = -0.3V)$$

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

What is the value of R?
 $R = \frac{18K}{5} = 3.6K$
GO TO BLOCK 22

13

$$V_P = (11.3 \times 0.835) + 0.7 = 10.15V$$

How much reverse voltage, V_R , is across the diodes?

$$V_R = 12 - 10.15 = 1.85V$$

GO TO BLOCK 23

20 YOU ARE INCORRECT!

Refer to the text and return to BLOCK 1.

21 YOU ARE CORRECT!

Design a two-input DTL gate with an R_C of 1K. Use a silicon NPN transistor with a beta of 50 and silicon diodes. Make $V_{CC} = 12V$, $V_{BB} = -12V$ and $V = V_{CC}$.

The above specifications are the same as for the inverter in the test for lesson 4.

What is $V_{B'}$?

$$V_{B'} = -0.3V$$

GO TO BLOCK 12

22

$$R = \frac{18K}{5} = 3.6K$$

What is I' ?

$$I' = \frac{12 - 10.15}{1K} = 1.85mA$$

GO TO BLOCK 23

23

$$V_R = 12 - 10.15 = 1.85V$$

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

If there were a chain of ten DTL gates in series, what would the output voltage X be for the final stage?

$$a.: X = 10.15 \text{ volts}$$

GO TO BLOCK 4

BREADBOARD PROJECT:

Lesson Seven

DTL Gate Design

Truth Table

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

- "Wire up" the circuit in figure 1 on the breadboard. Before applying power, set switches S1 and S2 to the low (L) position.
- Apply power, both -6V and +3V.
- The lamp should *not* light. When S1 and S2 are in the low position, the A and B inputs are at logic 0. The base voltage, V_B , is positive and, therefore, the base-emitter diode is reverse biased. A voltmeter, if one is available, would indicate that the base is positive. However, if a comparison were made to the basic voltage of the inverter of lesson 4, it would be found that the base in this case is *not* as positive. Remember, the voltage across the diodes adds

algebraically to V_B . The output is at a logic 1 since the transistor is cut off. The collector circuit behaves as did the inverter in lesson 4. This operating condition is shown in figure 7-2A.

The logic for this condition is shown in the top row of the Truth Table.

- Set S1 to the high (H) position. The lamp should remain off. Because diode D2 is clamping the base to ground, the emitter-base diode of Q1 remains reverse biased. This operating condition is shown in fig. 7-2B. The output has remained at a logic 1 since the transistor is still cut off.

The student should describe the logic for this operating condition in the second row of the Truth Table.

- Set S1 to the low (L) position and S2 to the high position. The lamp should remain off. The above operating condition still exists, with the exception that D1 is clamping the input to a low level.

The student should describe this

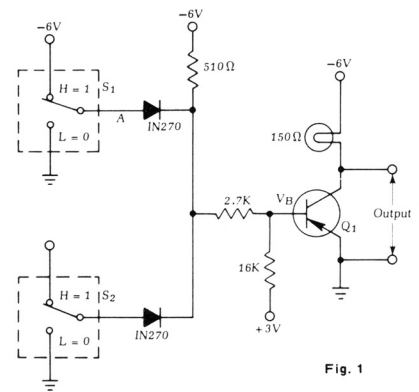


Fig. 1

logic condition in the third row of the Truth Table.

- Set S2 to the high (H) position. The lamp should *light*. When both inputs are at a logic 1, diodes D1 and D2 are zero biased. Junction point P has risen to a voltage which will permit the base-emitter diode to forward bias. Q1 is in saturation and the output has fallen to $V_{CE, sat}$.

The student should describe this logic condition in the last row of the Truth Table. When completed the Truth Table should be the same as the one shown in figure 7-1.

The logic operation is NAND.

TECHNICAL TOPICS and DIGITAL CIRCUIT DESIGN COURSE
 appear TWICE MONTHLY in PLAY METER Magazine.

DIGITAL CIRCUIT DESIGN COURSE

Lesson Eight: RTL Gates

Truth Table

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

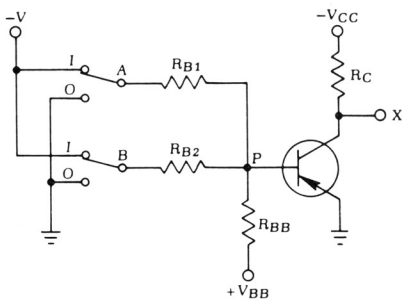


Fig. 8-1. A two-input Resistor-Transistor (RTL) gate. The logic function of this circuit is NOR. The truth table should be compared to that of the OR gate in Fig. 6-1 of Lesson Six.

This lesson will introduce the student to the procedure for designing a logic gate which involves resistors and transistors.

The circuit shown in *fig. 8-1* is an RTL (resistor-transistor logic) gate. Notice that the inputs, A and B, are through resistors [R_{B1} and R_{B2}]. The circuit can be thought of as a two-input inverter. The advantage of an RTL gate is lower cost and fewer parts. However, the RTL gate will not provide the input isolation of the DTL gate. The logic operation performed by an RTL gate is *negated OR* or *NOR*.

Circuit Operation:

When inputs A and B are at a logic 0, the base-emitter diode is reverse biased and the transistor is cutoff. I_C equals zero at cutoff and the output X is at a logic 1. This operating condition is illustrated by *fig. 8-2A*. The operation in this state is identical to that of the inverter, with the sole exception that I_{BB} flows

through the two base resistors. Checking against the truth table in *fig. 8-1*, we find agreement with the first row.

When *either* input A or B is at a logic 1, point P [*fig. 8-1*] goes negative and forward biases the base-emitter diode. As shown in *fig. 8-2B*, a current [I_P] will flow through the base resistor with the logic 0 input. This is the worst case condition for an RTL gate and becomes more acute as the number of inputs increases. For example, I_P for a four input gate will be three times greater than for a two input gate if both gates have the same value of base resistance. The forward biased base-emitter diode "generates" a current in the collector circuit sufficient to produce a logic 0 at the output. The logic 0 at the output is in agreement with the second and third rows of the truth table.

The operation condition when inputs A and B are at a logic 1 is illustrated in *fig. 8-2C*. Again the operation is identical to that of the inverter with the exception of the parallel effects of the two base resistors. The lower value of base resistance will attempt to drive the transistor further into saturation. With inputs A and B at a logic 1, the output is at a logic 0 and confirms the last row of the truth table.

Design Procedure:

STEP 1: Design an inverter as outlined in lesson 4.

STEP 2: Find I_P .

$$I_P = \frac{V_P}{R_B}$$

where

$$V_P = |V_{BE(sat)}|$$

I_P will flow when one input is at a logic 1. The transistor is saturated and V_P is clamped by $V_{BE(sat)}$.

STEP 3: Check if the transistor

[Continued on next page]

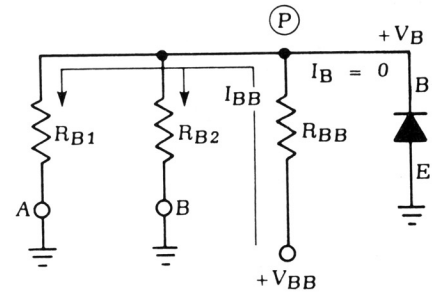


Fig. 8-2A. Equivalent circuit of the input circuit with both inputs at a low level. This condition describes the top line of the truth table.

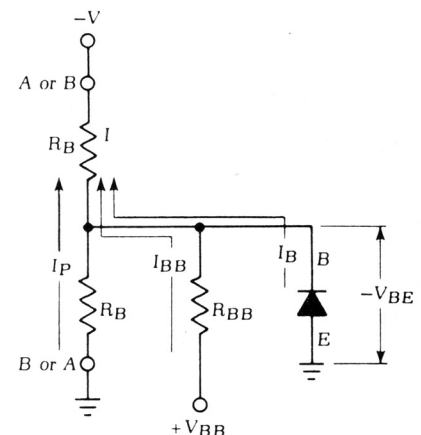


Fig. 8-2B. Equivalent circuit of the input circuit with one input at a low level and one at a high level. This condition describes lines two and three of the truth table.

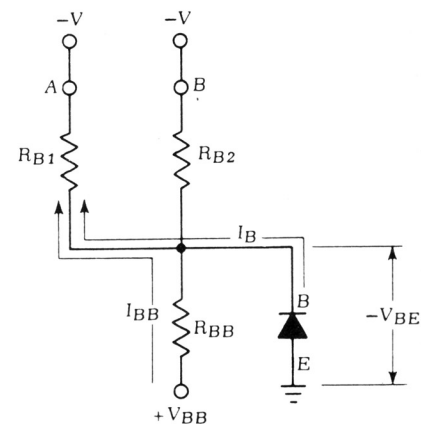


Fig. 8-2C. Equivalent circuit of the input circuit when both inputs are at a high level. This condition describes the bottom line of the truth table.

is in saturation when one input is at a logic 1.

$$(I_B - I_P) \beta > I_C$$

The assumption here is that all of I_P is at the expense of the base current. In reality, I_P will affect I_{BB} in proportion to the ratio of I_B and I_{BB} .

Since $I_B \gg I_{BB}$, the above, for all practical purposes, is true.

STEP 4: Find V_B when both inputs are at a logic 0.

$$(\pm) V_B =$$

$$(\pm) V_{BB} \left[\frac{R_B'}{R_B' + R_{BB}} \right]$$

Remember R_{B1} and R_{B2} are in parallel, so R_B in the above formula is the total effective resistance of R_{B1} and R_{B2} . Refer to fig. 8-2A.

STEP 5: Find I_B when both inputs are at a logic 1.

$$I_B = \frac{|(-V)| - |V_{BE(sat)}|}{R_B'}$$

Again R_{B1} and R_{B2} are in parallel, as shown in fig. 8-2C. R_B is, therefore, the total effective resistance of R_{B1} and R_{B2} .

Design Example:

Design an RTL gate which will drive a 150-ohm, 6V lamp (use the design configuration shown in fig. 8-1). Use a germanium transistor type 2N404.

Make $V_{BB} = +3V$, $-V = -V_{CC}$ and $R_C = R_L$.

STEP 1: Design an inverter as outlined in lesson 4.

$$I_C = \frac{|-V_{CC}| - |V_{CE(sat)}|}{R_L} = \frac{5.9}{150 \Omega} = 39ma$$

$$I_B = 2 \text{ to } 3 \text{ times } \frac{|I_C|}{\beta_{min}} = \frac{39ma}{50} = 0.8ma$$

$$I_{BB} = \frac{I_B}{10} = \frac{2.0ma}{10} = 0.2ma$$

$$R_{BB} = \frac{|V_{BB}| + |V_{BE(sat)}|}{I_{BB}} = \frac{3.3V}{0.2ma} = 16K$$

$$R_B = \frac{|(-V)| - |V_{BE(sat)}|}{I_B + I_{BB}} = \frac{5.7V}{2.2ma} = 2.7K$$

STEP 2: Find I_P .

$$I_P = \frac{V_P}{R_B'} = \frac{0.3V}{2.7K} = 0.11ma$$

R_B in this case is either R_{B1} or R_{B2} depending upon which input is at a logic 0. However, should this have been a gate with more than two inputs, R_B would be the total effective resistance of all the inputs at a logic 0.

V_P is able to rise to $V_{BE(sat)}$.

STEP 3: Check if the transistor is in saturation when one input is

at a logic 1.

$$(I_B - I_P) \beta_{min} > I_C$$

$$(2.2ma - 0.11ma) 50 > 39ma$$

$$(2.04ma) 50 > 39ma$$

$$104.5ma > 39ma$$

STEP 4: Find V_B when both outputs are at a logic 0.

$$(\pm) V_B =$$

$$(\pm) V_{BB} \left[\frac{R_B'}{R_B' + R_{BB}} \right]$$

$$0.23V = +3 \left[\frac{1.35K}{17.35K} \right]$$

A voltage of 0.23V is sufficient to reverse bias the base-emitter diode at elevated temperatures. However, as the number of inputs increases, R_B' will decrease. V_B will decrease with R_B' and eventually R_B' will require adjustment. For example, if this were a five input RTL gate, R_B' would be 540Ω and V_B would be +0.09V. A small adjustment in R_B' to 600Ω will yield a V_B of +1.08V. When R_B' is 600Ω each R_B will be $3K \Omega$ and the transistor will saturate because I_B is two to three times the required current.

STEP 5: Find I_B when both inputs are at a logic 1.

$$I_B = \frac{|(-V)| - |V_{BE(sat)}|}{R_B'}$$

$$4.2ma = \frac{(-6) - 0.3}{1.35K}$$

End of lesson 8.

PROGRAMMED TEST / 8

Instructions: Again, the test is programmed: start at block 1 and follow the numbered instruction associated with your answer. Complete your work in the appropriate block.

1

The logic operation performed by an RTL gate is

- a. NAND GO TO BLOCK 22
b. NOR GO TO BLOCK 11

2 YOU ARE INCORRECT!

Refer to the text and return to BLOCK 11

3

$$I' = \frac{0.7V}{4.5K} = 0.155ma$$

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

Since I' will subtract from the base current available to the transistor, what is I_B and is the transistor still able to saturate?

$$I_B = \underline{\hspace{2cm}} \quad \text{GO TO BLOCK 20}$$

4

$$R_B'' = \frac{R_B}{N} = \frac{18K}{5} = 3.6K$$

R_B'' is the combined resistance of R_B when all inputs are at a logic 0.

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

What is V_B ?

$$V_B = \underline{\hspace{2cm}} \quad \text{GO TO BLOCK 13}$$

11 YOU ARE CORRECT!

The NOR logic function is the _____ the OR logic function.

- a. Same as GO TO BLOCK 2
b. Complement of GO TO BLOCK 21

12

$$R_B' = \frac{R_B}{N-1} = \frac{18K}{4} = 4.5K$$

N in the above is the total number of inputs to the gate. Since we are concerned with the loading caused by the inputs at a logic 0 when only one input is at a logic 1, R_B' is the combined resistance of four input resistors.

What is I' ?

$$I' = \underline{\hspace{2cm}} \quad \text{GO TO BLOCK 3}$$

13

$$V_B = -12 \frac{3.6K}{203.6K} =$$

PLAY METER, May 15, 1981

$$0.175(12) = 0.212V$$

What is I_B when all of the inputs are at a logic 1?

$$I_B = \frac{\quad}{\quad} \quad \text{GO TO BLOCK 19}$$

19

$$I_B = V - \frac{V_{BE(sat)}}{R_{B'}} = \frac{11.3V}{3.6K} = 3.25ma$$

Did you get the same result. If you did not, do not go on but check.

You have completed the test for lesson 8.

20

$$I_B = (0.6 ma - 0.155ma) = 0.445 ma$$

and the transistor will saturate if

$$\beta \times I_B > \frac{V_{CC}}{R_C}$$

$$0.445 \times 50 > 12ma$$

$$22.25ma > 12ma$$

The addition of 2 or 3 times the required base current has sufficiently compensated for the current "lost" through $R_{B'}$.

What is R_B when all the inputs are at a logic 0?

$$R_{B''} = \frac{\quad}{\quad} \quad \text{GO TO BLOCK 4}$$

21 YOU ARE CORRECT!

Design a five input RTL gate with an R_C of 1K. Use a silicon NPN transistor with a beta of 50. Make $V_{CC} = 12V$, $V_{BB} = -12V$ and $V = V_{CC}$.

The above specifications are the same as for the inverter in the test for lesson 4.

What is $R_{B'}$?

$$R_{B'} = \frac{\quad}{\quad} \quad \text{GO TO BLOCK 12}$$

22 YOU ARE INCORRECT!

Refer to the text and return to BLOCK 1.

End of programmed test 8.

BREADBOARD PROJECT / Lesson Eight

RTL Gate Design

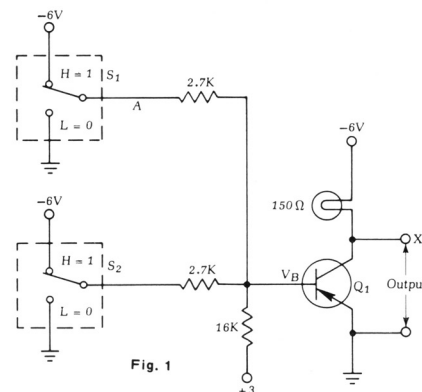
Truth Table

A	B	X
0	0	1

- "Wire up" the circuit in figure 1 on the breadboard. Before applying power, set S_1 and S_2 in the low (L) position.
- Apply power, both $-6V$ and $+3V$.
- The lamp should *not* light. When both inputs are at a logic 0, the transistor is cutoff. The base voltage, V_B , is positive. A voltmeter would verify this fact. Figure 8-2A is an illustration of this operating condition. The output is, of course, at a logic 1 when the transistor is cutoff. The top row of the Truth Table defines logic condition.
- Set S_1 to the high (H) position. The lamp should come on. When S_1 was set to the high

position, a logic 1 was applied to input A. The base-emitter diode of Q_1 was forward biased and the transistor saturated. Referring to fig. 8-2B you will find the equivalent circuit for this operating condition. The output has fallen to a logic 0 when Q_1 saturated. The student should state this logic condition in the second row of the Truth Table.

- Set S_1 to the low (L) position and S_2 to the high (H) position. The lamp should remain on. This operating state is the same as the above with the exception that input B is at a logic 1. Of course, input A is at a logic 0. The student should state the logic condition in the third row of the Truth Table.
- Set S_1 to the high (H) position. The lamp should remain on. Inputs A and B are now at a logic 1. The transistor is driven further into saturation. This operating condition is shown in fig. 8-2C. The student should complete the Truth Table by stating this logic condition in the last row. When completed the Truth Table should be the same as the one



shown in fig. 8-1. The logic operation is NOR.

Breadboard projects will appear from time to time with various lessons in this course. Kurz Kasch has suggested that operators and technicians interested in completing the breadboard projects could find the suitable hardware being offered by AP Products of Euclid, Ohio. AP Products, which markets through electronics hobby distributors and radio and television parts supply houses, offers an inexpensive breadboard. Components for the individual exercises can be gotten from Radio Shack outlets or from the operator's own inventory.

The course series continues in PLAY METER.

PlayMeter

Survey results
compiled through
March 20, 1981.

Equipment Poll

Top Videos

MARCH 20	MARCH 5	MARCH 20	MARCH 5
1 ASTEROIDS/Atari	1	6 MISSILE COMMAND/Atari	5
2 PAC-MAN/Midway	2	7 STAR CASTLE/Cinematronics	8
3 GALAXIAN/Midway	3	8 SPACE INVADERS/Midway	7
4 BERZERK/Stern	6	9 DEFENDER/Williams	9
5 BATTLEZONE/Atari	4	10 MOON CRESTA/Nichibutsu & Gremlin .	10

Others receiving votes: ASTRO FIGHTER (Gremlin), CARNIVAL (Gremlin), MONACO GP (Gremlin), PHOENIX (Centuri), STRATOVox (Taito).

Top Pins

MARCH 20	MARCH 5	MARCH 20	MARCH 5
1 BLACK KNIGHT/Williams	2	6 SPACE INVADERS/Bally	6
2 FIREPOWER/Williams	3	7 GORGAR/Williams	7
3 XENON/Bally	1	8 SCORPION/Williams	—
4 BLACKOUT/Williams	5	9 ALIEN POKER/Williams	9
5 FLIGHT 2000/Stern	4	10 FLASH/Williams	8

Others receiving votes: FORCE II (Gottlieb), FRONTIER (BALLY), METEOR (Stern), SILVERBALL MANIA (Bally), TIME LINE (Gottlieb).

The PLAY METER subscriber survey of pinball and video games will be a regular feature in subsequent PLAY METER publications. If you would like to join readers currently participating in the survey, simply fill out and return the coupon below.

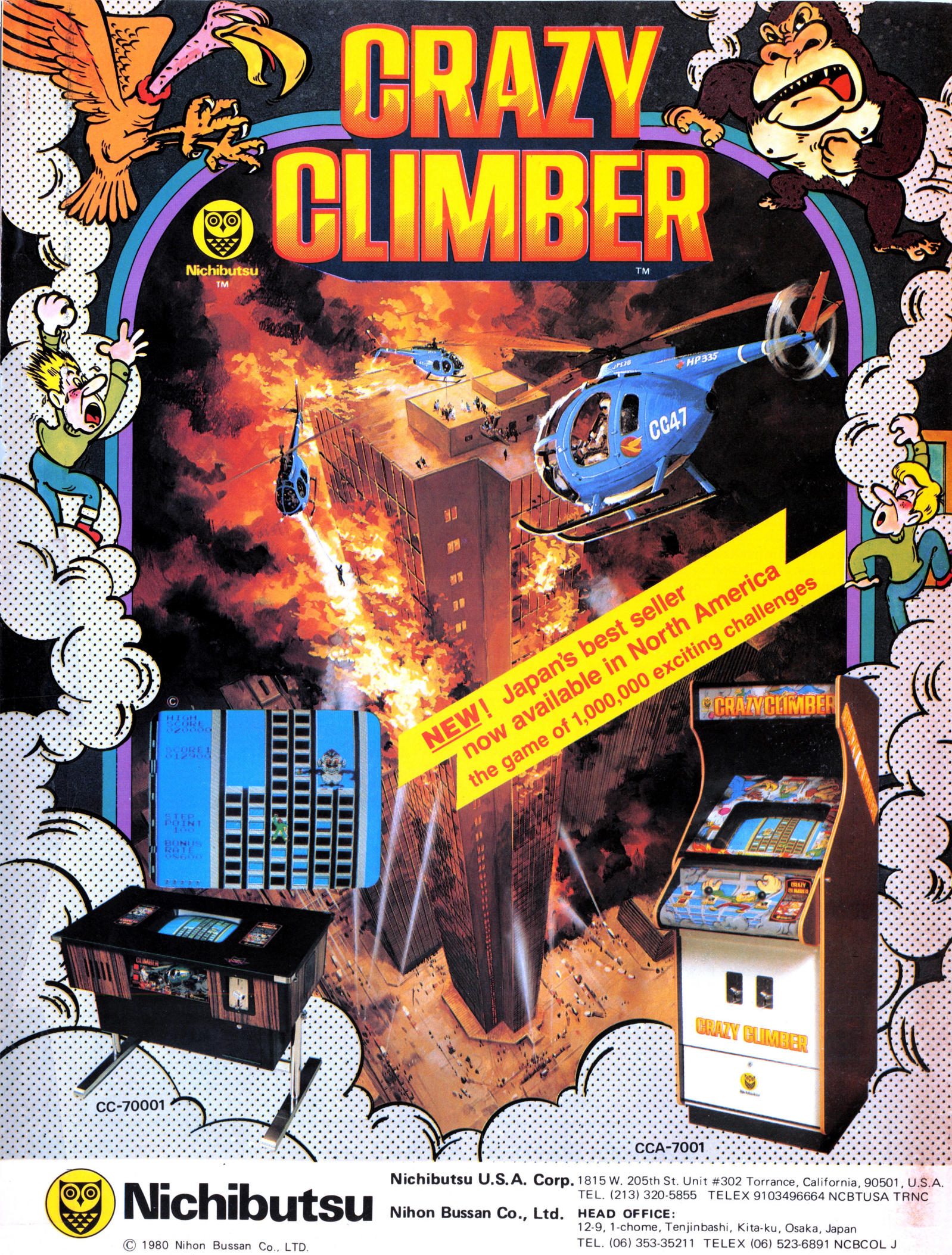
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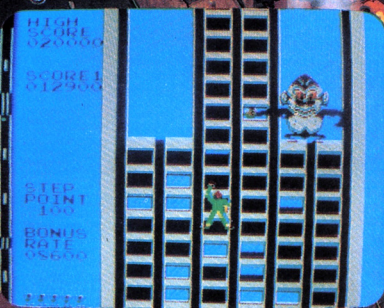
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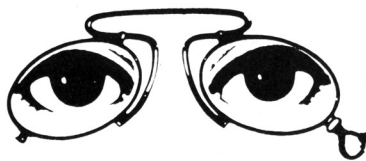


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Critic's Corner

By Roger C. Sharpe

Three ball play

It seems that we've reached the point where everybody is getting their multiple ball play into the act and this issue's two machines are no exception. What is interesting, no matter what the prevailing mood in the industry, is that players are on the streets waiting with anticipation for each and every new game. And if the pin is strong enough, it's going to survive and earn its share of money.

In general, so far, it's been a fairly quiet year with not that many machines being introduced up to this time. The runs are getting longer and more methodical which can only help that guy on the street who had suffered for so long with the never-ending stream of machines he was constantly facing. And maybe, in time, the result will be that the resale value and market will grow, which will only help the flipper games.

An interesting point was brought up last month in *PLAY METER* by Louis Boasberg with his short article entitled "Fast Quarters and Slow 50¢" which hasn't been talked about too much of late. The idea of pricing has to be crucial to the acceptance of any game on the street whether it be a pinball or video. And I am in total agreement with Louis regarding the fact that the super machine may well be worth the extra price but that most of the equipment now available should still be set at quarter play, with the operator making any adjustments, whether they be in setting the limits for free play or extra ball, changing some of the memory and the hold-over of certain features, or even making some game adjustments on the board itself going from liberal to conservative settings.

The big thing with today's market and the current economic condition

is that any operator who wants to be successful is going to have to become involved with his location(s) and how the games are playing and whether the players are content to spend their time and money there rather than at another place down the block or across town.

This is really important to understand because a smart operator can have an impact on his location and the earnings. I can go to one location in New York City and *Alien Poker* has one limit for an extra ball of 3,000,000 points (you're not seeing things, the zeros are correct), or I can walk two blocks and find the same machine with settings of 600,000 points followed by 1,200,000 and 2,400,000 points. Which game do you think I'll play and at which location do you think I'll go more often? The idea, bottom line, isn't too screw the player, or if you are, not to have the player know that you are.

In extra ball areas I've always felt that since there are no free games and the turnaround is on a per game basis, a good operator should at least offer the player a realistic level to shoot for, for that first extra ball, so that most players can feel that they've accomplished something. And the same thing holds true for free play, although your own preferences for percentaging have got to be taken into account just as long as you're not hurting yourself by making the machines impossible. Video is no different: if you're talking about extended time, an extra ship, or whatever, you have to find that delicate balance where earnings aren't being hurt and neither are players' feelings or egos.

One operator I talked with told me about *Flight 2000* and that when he

first got it in, it was constantly busy—and yet, when he checked the cashbox at the end of the first week, he was disappointed by what he saw. Instead of thinking that the game wasn't that good after all, which many operators tend to do, he watched people playing for a couple of days and realized that the machine was playing too long. A slight post adjustment at the bottom of the field, which he tried, offered a slightly greater drain that players really didn't notice but he did when he checked the earnings after the next week—they had increased.

Once again the lesson here is that there's more to any game than just going by factory settings and distributors' suggestions and plugging the game in. You have to get involved, read through the literature that's buried in the guts of the game to see what is supposed to do what, play the machine a few times to get a feeling of it, and think through your location for finding the best place to put each piece of equipment that comes through the door. It's that easy, along with being a knowledgeable consumer when it comes to purchasing different pieces—and knowing what to pass on because it's not right for your particular clientele and what to grab because you know you're going to do well with it.

But the time has come to take a look at the two machines on view this month, which further indicate the strides being taken by their respective companies.

PINK PANTHER/Gottlieb

The follow-up to its first multi-ball game shows how methodically

Roger's Ratings At-A-Glance

Gottlieb's **PINK PANTHER** ##½ Stern's **FREE FALL** ####

Gottlieb is approaching the steps it wants to take in the development of its pinball machines—and with each new game, they show just a little bit more.

PLAYFIELD: The playfield begins with four widely spaced lanes (P-I-N-K) at the top which are fronted by four Pink Panther targets. At the right are five more targets and a “hidden staircase” lane which holds the ball when lit for multi-ball play. Three thumper bumpers are in the middle of the field and a left side “secret passage,” with access from the top or bottom, edges a four-drop-target bank. Just to the center of this is a three-drop-target bank, with a kick-out hole over on the right and a thumper bumper with short rubber on the left. The bottom features two flippers, spaced on different levels, at the right and one flipper on the left with a small post just above the center drain.

ANALYSIS: With *Force II* the company offered two-ball multi-ball play; here they’ve raised the ante by one with a left and right side “hidden” lock-up that’s activated by getting down both drop target banks. But that’s not necessarily the main emphasis of the game, since out-hole bonus points and multiplier are tied into the nine targets which are set at the top and right of the field. And the nice touch with this is that when you hit the targets for the first times they spot a pink, Pink Panther on the field, a flashing blue light then appears and hit the target for a multiplier which can rise to 9X (one for each target). Then to maximize their features, the game also has a multiple value when a target is hit for the fourth time, so points can be built up. This is especially true since there’s good rebounding off the thumper bumpers into the targets and some straight away shots from the flippers, which have more power than has been found on a Gottlieb game in quite awhile—so everything is reachable. Access back to the top, from the right side lane when there’s not a ball locked up, or up the left side can get P-I-N-K spelled out, which lights the bottom right kick-out hole for extra ball value.

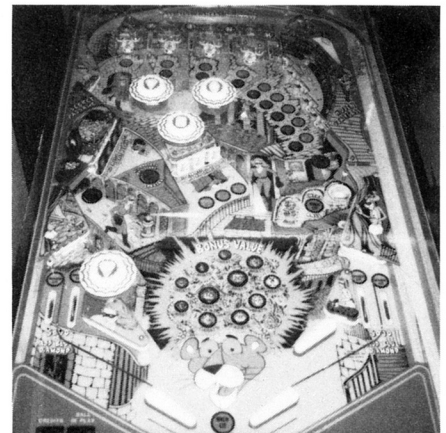
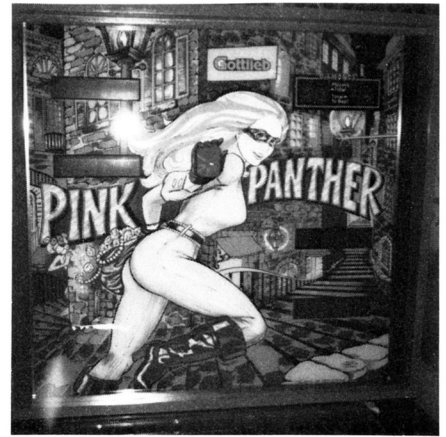
Add into this something also different in multi-ball play, which is that the targets are all indicated by blue diamond lights, with a high score on these displayed in the back glass—beat the existing total and it’s either an extra ball or free play, depending upon which way the game is set. All in all it’s a pretty decent layout, which isn’t too complicated

or cluttered and leaves shots for drops or stationary targets from all three flippers.

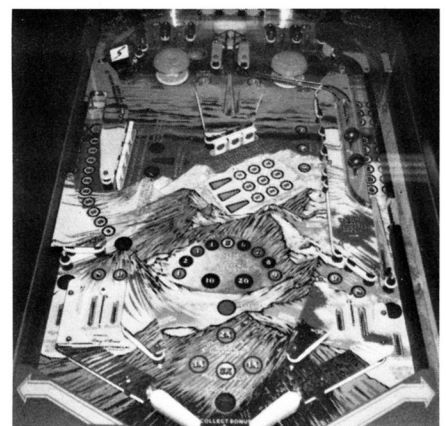
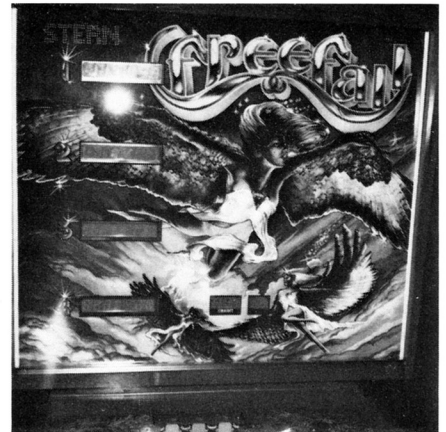
GRAPHICS: When I first heard that Gottlieb was coming out with *Pink Panther*, I immediately had my own visions and expectations of what it might look like. I figured that since Peter Sellers had died and no new replacement had yet been named, that the famed Inspector probably wouldn’t figure into the artwork, but that left the panther himself as undoubtedly the central figure for the machine. Well, when I finally saw the game, I realized just how wrong I had been. Admittedly, old P.P. is peeking out on the back glass and his image is on the playfield near the flippers as well as around the field on targets and the like, but the end result was less than I expected and really doesn’t fully utilize the tie-in with one of the more universally know cartoon characters. It’s too bad, because the artwork could have been so much stronger and funny rather than having a blond lady carting away a special effect, shimmering pink jewel on the back glass.

PLAY: Once again, with only six-digit scoring, you’ll probably be better off with only two limits on *Pink Panther*. For extra ball play you might want to start at about 350,000 points and follow this with 750,000 points. On free play the game should be able to sustain an increase of about 150,000 points to each of these limits.

PROS & CONS: As has been the case in the past, my main fault with Gottlieb isn’t so much in the game design or even the artwork, but rather with the company’s reluctance to recognize the need for seven-digit scoring and how it could be extremely effective in increasing and lengthening play on its games and thus have a positive reaction in the cashbox. I can’t stress enough the point that if you’re offering features on a machine that can get scoring up to even the low one or two millions, the players still have something to shoot for, instead of seeing that depressing 990,000-plus that’s always present on most six-digit games. The result is that there’s nothing to shoot for if you’re willing to admit that most pinball players are playing for that high score each time they step up to a machine and anything that can be done to enhance or build up this challenge should be done, and Gottlieb wouldn’t even have to change the scoring values on its games to



Gottlieb's PINK PANTHER



Stern's FREE FALL

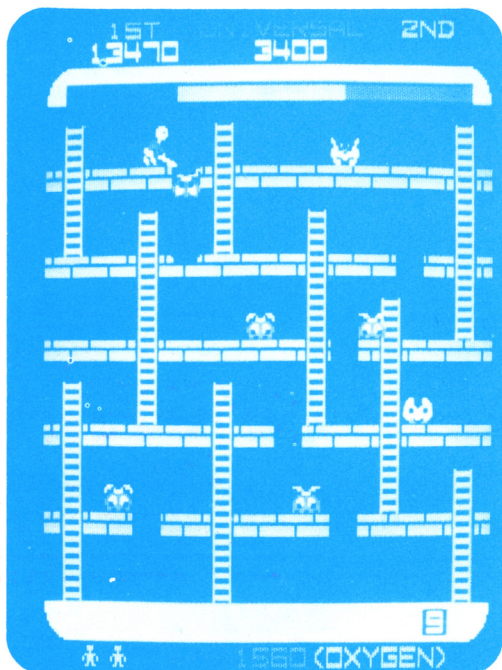
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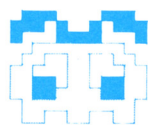
SPACE PANIC

HOW TO PLAY

- ★ Dig holes by operating the man. When a space monster has fallen into a hole, fill it up before the space monster creeps out of it, and you are awarded points.
- ★ The man can escape by jumping down through the hole he has dug to the next lower floor.
- ★ When oxygen is rarefied, a warning buzzer sounds and the man's movement slows down. When oxygen is reduced to zero, he dies.
- ★ If oxygen has not been reduced to zero even when all the space monsters on the screen have been destroyed, you are awarded corresponding bonus points.
- ★ The highest scorer can register his name on the screen.



SCORE



MONSTER 100~800 PTS



BOSS 300~1,200 PTS



DON 800~2,000 PTS

SPECIFICATIONS

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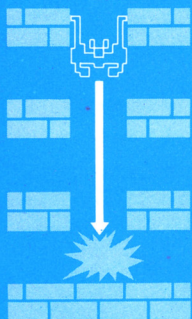
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842 m/m (W) 50/60Hz
650-850 m/m (H) 140W
▽ 95-1859

[Upright type]

800 m/m (D) AC 100V/115V/230V
640 m/m (W) 50/60Hz
1750 m/m (H) 180W
▽ 95-1653

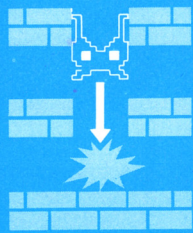
HOW TO SCORE POINTS

DON



dies when it falls down by more than 3 floors.

BOSS

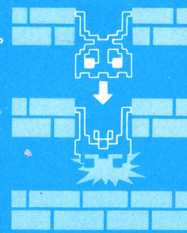


dies when it falls down by more than 2 floors.

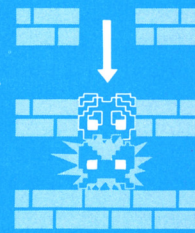
MONSTER



dies when it falls down by more than 1 floor.



[Die together]
When more than 2 monsters have fallen into the upright holes.



[Falls down onto the other's head]
when it falls down onto the head of a monster, etc. they are both destroyed.

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accomplish this.

It's just very dispiriting to have a reachable maximum point on any coin-machine game. Much of the allure is beating that phantom player's score and the fact that it's missing on Gottlieb machines tends to overwhelmingly diminish their draw on location, which is something I've heard time and time again when I've talked with players. It's really the primary reason Gottlieb machines have been less than record-breakers in the recent past and also weighs heavily from this writer as well.

RATING: ##½

FREE FALL/Stern

For a company that's been experiencing such incredible results from its video games, it's nice to know that it wasn't idle with pinball machines as witnessed by Stern's long awaited follow-up to *Nine Ball*, which shows that the legendary Harry Williams can still turn them out, with some novel touches thrown in.

PLAYFIELD: This "big game" size effort offers three yellow square targets at the middle top of the board along with two lanes on the left, two on the right and a thumper bumper in between. At the left is a top spinner along with another thumper bumper, while the right has a stationary target and also a thumper bumper. In the middle is a kicker set up that propels a ball up to a wire loop and an elevated track over to the right side that can keep up to three balls ready to be sent up and out for multi-ball play when activated. A long lane just next to the shooter offers letters to spell out as well as a kicker to send the balls back to the field, while a gate is opened if the player hasn't accomplished the multi-play, sending the ball back to the plunger. Meanwhile, back to the major part of the playfield, there are three stationary targets (S-K-Y) on the right and a five-drop-target bank on the left as well as a long shot up to a target next to this for values that can reach into six figures as well as specials when lit. The bottom takes the short double lanes down to the flippers approach, and that's the board.

ANALYSIS: For a multi-ball, multi-level game, *Free Fall* has some interesting touches, not the least of which is the utilization of a ramp to not take away any actual playfield space to get the heightened action. The game is basically a spell out of S-K-Y-D-I-V-E-R-S from the top lanes, side targets, and bottom lanes, in

order to activate the possible multi-ball play, but the game doesn't stop there nor is the multiple ball play integral to the game. It's an extra. The left side five bank offers a game within a game since getting all the targets down increases bonus multiplier (up to a max of 14X). But if a player can get the targets down in sequence a special is possible in that left side deep set target and, if that weren't enough, if the targets are all hit except for the 3, an extra ball can be gotten by hitting that last target. And then there's the center three-drop-target bank which features a small grid in front of it, for filling out the card and making lines for extra bonus points and an increase in the value of that deeply set left side target. For this Stern and Harry Williams have come up with a line selector change that's activated by the flipper buttons, making this a very active feature and a way to have the player really get more control over what he wants to hit and when he should hit it. And making the lines adds onto the multiplier and builds up to a reserve bonus of over 100,000 points.

It's a well thought-out and balanced machine that offers a pretty good array of shots, such as a top left spinner that, when lit, is worth 5,000 points per revolution and can really add up to points. There's good play on the sides and, as was the case with *Flight 2000*, the multiple balls are sent up rather than straight down to the flippers, so a player has a chance to get ready for the onslaught.

GRAPHICS: With lots of blues, yellows, and oranges, *Free Fall* offers a striking visual package complete with a winged woman on the back glass and some interestingly stylized lettering, which is a refreshing change of pace from most of Stern's very dark games of late.

PLAY: Once again the seventh digit is a godsend, allowing the operator to play around with the right limits and giving the player something to shoot for. On extra ball play you might want to start with 600,000 points and follow it with 1,100,000 and 1,700,000 points. For free play you should be in the ball park with an increase of 200,000 to 400,000 points for each of these levels.

PROS & CONS: It's nice when added elevation to a pingame doesn't take away from the total board as is the case here and even with *Xenon*. Splitting the game, such as *Black Knight* and *Flash Gordon* is a big adjustment not only for the

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designers but also for the players who must quicken themselves to the play angles, which isn't to say that this isn't good.

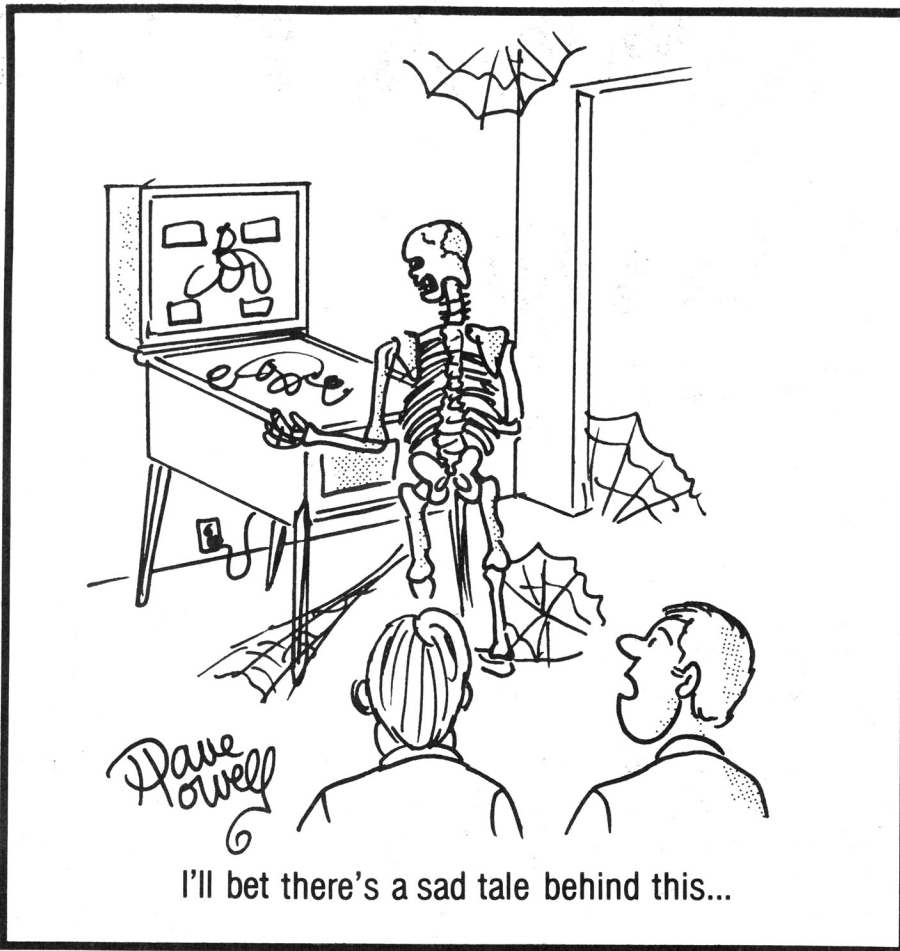
But with *Free Fall* we might see an indication that the bigger the game size could be more successful in the long run for the novelty of multi-level play, since there is more space to play around with and less of a danger of proximity to the flippers for exit and entry points. *Free Fall* does involve the player with that center grid and the flexibility of values on the left side targets and, if anything, some of its weakest points might be a right side that only offers four targets, although this is minimized by that center three bank, and the fact that there's really no direct shot to getting the ball up the loop-the-loop and over to its holding place. But these concerns aren't really major in looking at the effect of the overall board, which is challenging and fun to play. One other point may also be some sluggish action at the top around the posts separating the thumpers, which may cause some operators to adjust the bottom side posts in order to open up the game and compensate time wise.

RATING: #####

Two games for the present reflect the growth and development of their respective companies. Everyone seems to be moving in the same direction, which is to offer more for the player, but the fear remains that every game will have to be multi-ball or, God forbid, multi-level. That's not the answer. Every once in a while it's nice to see a change of pace where a game is loaded, but basics have to stay as the primary motivation for any pingame design.

If the machinery becomes too complex, those borderline players are going to be even more intimidated and the skill players are going to want their shots and general playfield action. The hope here is that everything can be taken into account and somehow blended together from game to game.

Next issue may give an indication of these feelings when we take a look at Bally's newest, which is neither multi-ball or multi-level and seems a pretty good game in its own right, with some nice touches thrown in, speech included, as well as some very appealing design features. Also on tap will hopefully be some comments on Gottlieb's and Williams' newest efforts, as well as much more. In the meantime, as always...be well and prosper. ●



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targets is hit, a
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show starts on the
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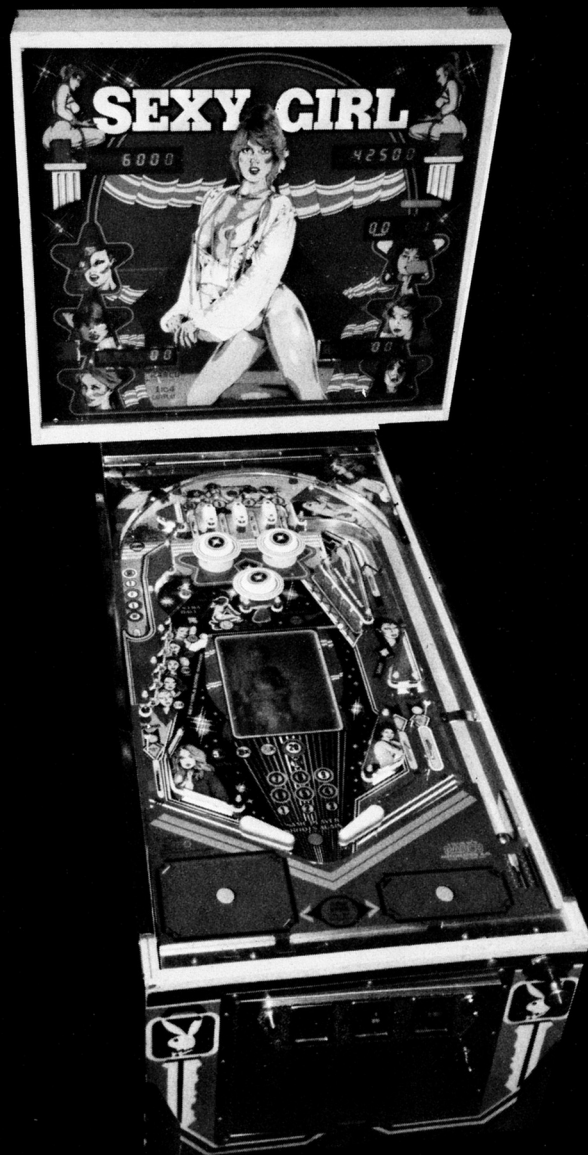
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Rumbles in the Jungle

Williams Electronics has introduced its "Double Trouble," fast-moving, high scoring challenge feature on *Jungle Lord*, its new multi-level, timed Multi-Ball pingame.

Players must earn the right to play the Double Trouble drop target feature. The five-bank drop targets located on the upper playfield start the action simply enough with one target showing. Hit that target and two more targets appear; knock those down and three emerge, and on to four and then five. Demolishing the last sequence of five targets qualifies the player for Double Trouble and high scoring opportunities. Double trouble targets pop up one at a time at random and must be hit within a certain time period before they drop, for scoring action. For added playfield interest, it is even possible to achieve Multi-Ball Double Trouble.

Jungle Lord's top level playfield holds an encased mini-playfield with a captive mini-ball and four lanes spelling out L-O-R-D. Getting a ball in either of the two eject holes on this field automatically kicks out the mini-ball to roll down one of the four lanes—lighting a letter in L-O-R-D and advancing the bonus one to four times depending on which letter is lit. With four letters lit, Multi-Ball play is enabled. A shot to either of the two top playfield eject holes will lock the ball in play. This in turn will release a second ball to be shot onto the playfield. As soon as the second ball is shot, the eject hole will release the locked ball for two ball, 35-second (operator adjustable) Multi-Ball play.

To build up draining ball control insurance, hitting any drop target on the lower level banks will light timer lights for Magna Save. Players direct the number of seconds used for Magna Save via the right and left red control buttons forward of the flipper control buttons for spectacular playfield saves.



Sky's the limit

Crazy Climber, Taito America's new video game manufactured through a license agreement with Nichibutsu (USA) Ltd., is currently available in upright and Taito's Trimline versions.

Jack Mittel, president of Taito America, said: "Our test locations' income supports the fact that *Crazy Climber* is one of the top games in the world market."

"*Crazy Climber* is a refreshing new theme in video games," said Mike Von Kennel, Taito sales manager. "In this lighthearted yet challenging, talking video, the player must scale a skyscraper by using the 8-way joy sticks that simulate the player's hands. Along the way, he must avoid unique obstacles such as gorillas, birds dropping eggs, debris thrown from windows, closing windows, and falling girders and signs. If the player stops, the game says, 'Go for it!' or bonus points will be lost.

"Once the player reaches the top, grabbing a helicopter will collect bonus points and present him with the challenge of climbing three more skyscrapers, each one more difficult than the rest."



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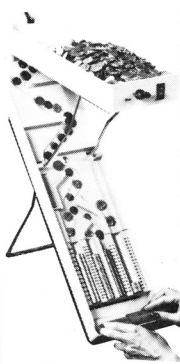
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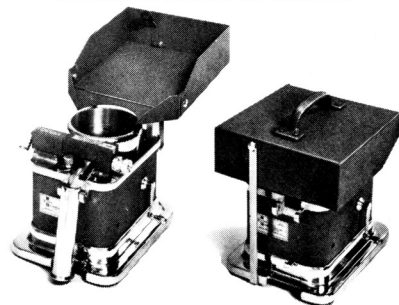
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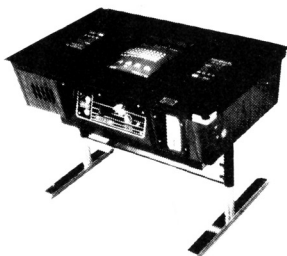
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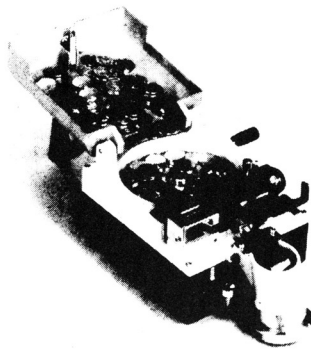
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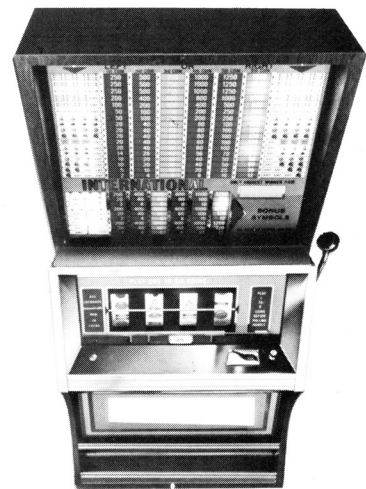
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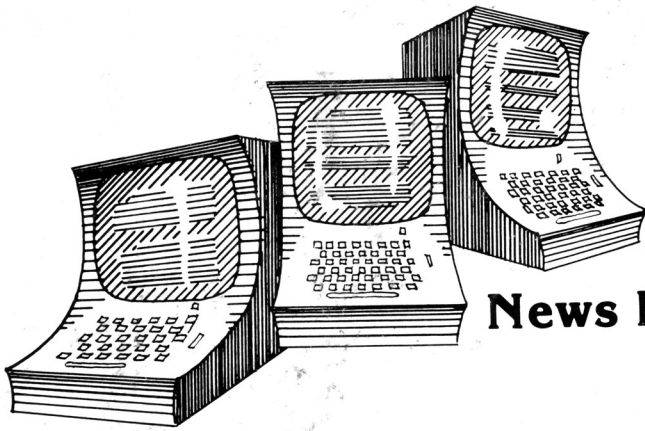
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News briefs....news briefs....news l

.....The Court of Appeals in Franklin County, Ohio on March 24 overruled the local Common Pleas Court decision which had favored video poker games in the case of Mills-Jennings of Ohio, owner of the machines. The appeals court ruled that "Draw Poker on the basis of the Ohio statutes, has been determined as a matter of law to be a gambling device." The matter was remanded to the Common Pleas Court, which had issued a restraining order preventing state authorities from confiscating the games from the Fraternal Order of Eagles lodge location in Cleveland. The issue would be finalized in four to six weeks, depending on whether or not Mills-Jennings appeals further, to the State Supreme Court. Of the appeals decision, spokesman Paul Corey for the Ohio Music & Amusement Association (which had filed with the Court a brief opposing the "gray area" equipment) said: "OMAA is very pleased with this decision as it shows that our stand was the correct one." OMAA had sought to underline the distinction between games of chance and coin-operated amusement equipment..... Atari, Inc. staged a press showing March 23 in New York City for its VCS system home version of Missile Command and its new Asteroids Deluxe arcade model. The list of media sending representatives included network television, Time magazine, Scientific American, and a number of others scheduled for the presentation at The Tower Suite of the Time/Life Building. Cocktails and a special film were set up for the press, and Atari's chief officers were present. Details will follow in PLAY METER.....The chairman of the Copyright Royalty Tribunal has told a Congressional panel that he believes the CRT should be abolished. Clarence L. James, Jr. in early March testified before the U.S. House Subcommittee on Courts, Civil Liberties, and the Administration of Justice during a review procedure for agencies over which Congress exercises controls. James emphasized that he believes the copyright owners and users of recorded music could better establish fair royalty rates by "market-place negotiations," and he said there should be no more compulsory licenses for jukebox operators.....The next IMA exhibition in Frankfurt will be held on January 21-24, 1982, which includes one conflicting date with the ATE Show in Britain. The ATE runs January 18-21 at the National Exhibition Centre in Birmingham.....A proposed New Orleans ordinance to set a \$50 per-machine license fee on amusement games was delayed one month on March 19 when operators came to city council for the second session to argue against the measure.....Southwest Vending has scheduled a special showing of new equipment in a two to three day show in May in the Dallas area, with time to be announced later.....

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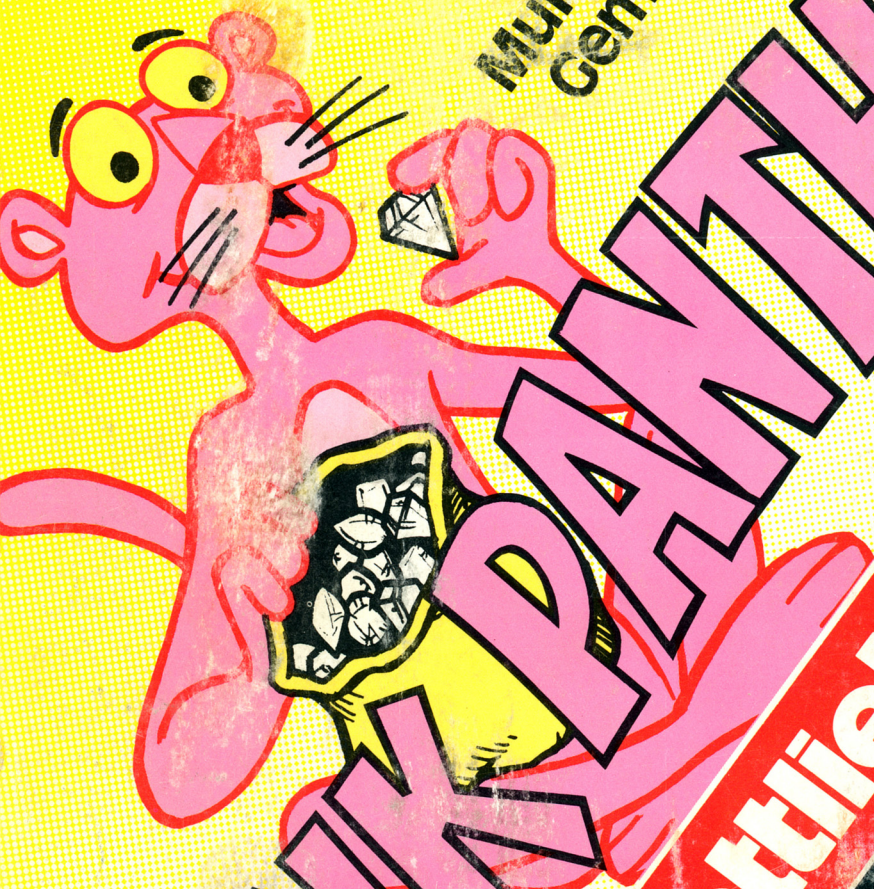
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