# NIGHT MISSION

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## T A B L E   O F   C O N T E N T S

## LOADING NIGHT MISSION INTO YOUR SYSTEM

The cassette that comes with the book contains 5 programs on it. Two on the Cassette side for cassette based systems and three on the Diskette side for disk based systems. The following pages will guide you through the steps necessary to load the proper version in your system.

### CASSETTE BASED - Joystick version

1. The first program on the Cassette side of your cassette is the Joystick version of Night Mission. Load the cassette so that the Cassette side is ready to be played, type in **RUN "CS1"** and press ENTER.

2. Follow the instructions on your screen for loading the program.

3. The documentation for the game is in the next section of this book.

4. It is recommended that you run this program a few times to get familiar with it before you read through the "PROGRAM FLOW" section.

### CASSETTE BASED - Keyboard version

1. The Keyboard version of Night Mission is the second program on the Cassette side of your cassette. You must advance the tape past the first program, which is the Joystick version, to the start (long continues tone) of the Keyboard version. You may have to unplug the PAUSE and EARPHONE jacks form your cassette before you press PLAY in order to allow you to advance the tape and hear the tones.

2. After you have found the beginning of the Keyboard version (second program) on the Cassette side plug your PAUSE and EARPHONE jacks back into your recorder. Now type in **RUN "CS1"** and press ENTER.

3. DO NOT REWIND THE CASSETTE as it says on the screen just press ENTER. Now you can follow the rest of the instructions on the screen for loading the program.

4. Now would be a good time to record a backup copy of this program on a blank cassette. By doing this you will not have to find the beginning of the keyboard version each time you load it.

5. The documentation for the game is in the next section of this book.

6. It is recommended that you run this program a few times to get familiar with it before you read through the "PROGRAM FLOW" section.

DISKETTE BASED - Loader, Joystick & Keyboard versions

1. Install a blank, freshly initialized diskette into disk drive 1 in your system and then select EXTENDED BASIC.

2. The Disk based versions of Night Mission are on the Diskette side of the cassette tape. This program was too large to load into a Disk based system without Memory Expansion, so we divided it into sections to allow it to fit into a 16K system. Even if you have Memory Expansion the program would be in a INT/VAR254 file type instead of a PROGRAM type and it would take longer to load. The first program on the Diskette side is the Loader program. This program initializes the characters and screen, displays the title screen and generates a menu. The menu allows you to select the Joystick or Keyboard version and then loads and runs that version. Load the cassette so that the Diskette side is ready to be played, type in **OLD CS1** and then press ENTER.

3. Follow the instructions on your screen for loading the program.

4. After the program has been loaded, type in **SAVE DSK1.LOAD** and press ENTER. You have now saved the first part of the disk based program. By saving this part of the program under the name of LOAD it will automatically be loaded and run whenever this diskette is placed into drive 1 and you select EXTENDED BASIC.

5. Now we are ready to load the Joystick version of Night Mission. The disk based version differs from the cassette based version in that the character definitions have been removed from the main body of the program and placed into the LOAD program. By doing this we were able to free up a lot of RAM and keep the file in a PROGRAM format, which allows it to be run without Expansion Memory. Type in **OLD CS1** and press ENTER.

6. DO NOT REWIND THE CASSETTE as it says on the screen just press ENTER. Now you can follow the rest of the instructions on the screen for loading the second part of the disk based program.

7. After this portion of the program has been loaded type in **SAVE DSK1.NMJOY** and press ENTER. It is important that you save this portion under the name of NMJOY because the LOAD program will search for a program named NMJOY to load and run from drive 1 when you select the Joystick version from the menu.

DISKETTE BASED - Continued

8. Now once again type in **OLD CS1** and press ENTER to load the Keyboard version. DO NOT REWIND THE CASSETTE as it says on your screen just press ENTER. Now you can follow the rest of the instructions for loading the third and final part of the disk based program.

9. After this portion of the program has been loaded type in **SAVE DSK1.NMKEY** and press ENTER. It is important that you save this portion under the name of NMKEY because the LOAD program will search for a program named NMKEY to load and run from drive 1 when you select the Keyboard version from the menu.

10. When everything is saved to disk you can type in RUN "DSK1.LOAD" to start up the Night Mission Game. You could also type in BYE and then select EXTENDED BASIC from the menu and Night Mission will automatically load and run.

11. The documentation for the game is in the next section of this book.

12. It is recommended that you run this program a few times to get familiar with it before you read through the "PROGRAM FLOW" section.

## THE GAME DOCUMENTATION

### YOUR MISSION:

To rescue as many men as possible from the hostile enemy territory and bring them safely to the ship waiting offshore.

### THE HAZARDS:

This is a covert action. You will be working entirely on your own. If you should get caught we will disallow any knowledge of your actions. The territory is fully protected by enemy tanks, rockets, jet planes and choppers. Your chopper can only hold 5 men at a time so you will have to make a number of trips to the ship. The first trip will be fairly easy but on the following trips they will be aware of your presence and they will try harder to stop you. Good Luck.

### TANK SCREEN:

This screen has an enemy tank rolling along the bottom of the screen just above the closed missile silos. Your helicopter will come into play from the left hand edge of the screen, above the hills, on a starry moonlit night.

When you land on the ground a man will come running out from the left hand edge of the screen toward the helicopter. When he reaches your chopper he will climb aboard and your chopper will lift off. After you have picked up your fifth man you will move on to the next screen.

Watch out for the enemy's tank since it can shoot down your chopper, but you can also shoot back to protect yourself and the man on the ground. When your chopper has landed on the ground don't let it get too close or it will destroy the chopper and the man.

On this screen, the keyboard version uses the arrows keys (ESDX) to move your chopper in the appropriate direction and the V key to fire your lasers while you are in the air. The E or up key will also lift your chopper off the ground after it has landed.

In the joystick version all four directions are active on the number one joystick and they will move your chopper in the appropriate direction. The diagonals are also active but they react as a left or right motion. The fire button will fire your lasers while you are in the air.

### LEVELS:

The order in which the other screens come up is determined by the number of successful trips you have made. Each time you successfully deliver five men to the ship the level of difficulty will increase. The difficulty is increased by adding more screens for you to go through before reaching the ship and by increasing the speed of the tank, planes, and rockets. The order of screens on each level is as follows:

**1st Level** - Tank screen - Ship screen
**2nd Level** - Tank screen - Enemy rockets or planes (randomly chosen) - Ship screen
**3rd and up** - Tank screen - Enemy rockets or planes - Enemy choppers - Ship screen

### SHIP SCREEN:

On this screen there is our offshore ship waiting for you to deliver the men in your chopper. The ship will be moving at a random speed from left to right. Your job is to GENTLY land your chopper on the landing platform on the rear of the ship. If you land to hard or land on any other part of the ship it will sink and all hands will be lost and so will all the points you have accumulated for the men you previously delivered. If you touch the water, your helicopter will sink and you will not receive any points for a safe delivery. Unlike the First screen in which you have one forward and one reverse speed for your helicopter, on this screen you have three forward and three reverse speeds.
(TIP: lower your chopper until it is about level with the landing platform and then ease into the ship from the rear.)

In the keyboard version the arrow keys (ESDX) are active. E will make you fly up and X will fly you down. S and D will change your forward or reverse velocity.

In the joystick version all four directions are active. The diagonals are also active but they react as a left or right joystick motion.

**ENEMY PLANES:**

On this screen a number of enemy planes will come on screen from the right hand edge and travel from right to left at various speeds. Your mission is to maneuver around the planes and fly your chopper from the left hand edge of the screen to the right hand edge. If you make it safely there you will move on to the next screen.

In the keyboard version the arrow keys (ESDX) are active. E will fly you upwards and X will fly you down. D will increase your forward motion slightly and S will bring you to a stop.

In the joystick version up and down will fly you in the appropriate direction. Right will increase your forward motion slightly and left will bring you to a stop.

**ENEMY ROCKETS:**

On this screen the rocket silos will open up and the enemy will launch a continuous barrage of missiles into the air. Your mission is to safely fly your chopper through this barrage from the right hand edge of the screen to the left hand edge. If your mission is a success you will move on to the next screen.

The keyboard and joysticks react the same as they do on the Enemy planes screen.

**ENEMY CHOPPERS:**

On this screen your chopper will appear from the top left corner of the screen and will move in a downward motion. The enemy chopper will appear from either the top or bottom right hand corner of the screen and will move to line up with you. Your mission is to destroy an unknown number (3-9) of the enemy choppers before they destroy you. In this screen your chopper can move up, down or stay stationary. You are not allowed to move forward or backwards.

In the keyboard version the arrow keys (ESDX) are active and the V key will allow you to shoot at the enemy. The E key will fly you up and the X key will fly you down. The S and D keys will stop your motion.

In the joystick version all four directions are active. Pushing the stick up or down will fly you in the appropriate direction. Pushing the stick right or left will stop your motion. The fire button will allow you to shoot at the enemy chopper.

**POINTS:**

| | |
|---|---|
| **MEN** | - Each man you safely deliver to the ship will add 500 points to your score. Total of 2500 points each time you land on the ship. |
| **TANKS** | - The points for destroying the enemy tanks is determined by your height above the ground. You will receive 500 points for each tank you destroy from the top of the screen and the points will diminish the closer your chopper is to the ground. |
| **ENEMY CHOPPERS** | - You will receive 250 points for each enemy chopper you destroy. |

**BONUS (Free Plays):**

For every 10,000 points you rack up you will receive one extra helicopter which will be awarded to you after you have lost your first five choppers.

**SCREEN SCORE DISPLAY:**

```
A  BBB      CCCCCCCCCC    DDD
```

A = Men in your helicopter.
B = Total men safely delivered to the ship.
C = Total points accumulated.
D = Remaining helicopters. (5 to start)

Good Luck. If you find the game to be too hard you could use the information contained in "The Program Flow" to help you make it easier.

## THE POWER OF AND

One of the most powerful and versatile functions in Extended Basic and many other languages is the logical expression of AND. Unfortunately it has also been one of the least explained functions. In the TI Extended Basic manual they devote all of two and a half confusing pages to the logical expressions of AND, OR, XOR and NOT. This is also true for most of the other computer's basic manuals.

So a few years back we decided to find out all we could on this mysterious unexplained function. After much research and a number of books on Boolean Algebra and Boolean Logic we ended up more confused than when we began since most of the material did not deal with the subject on a computer level.

Well it was now time to tackle this subject on a purely experimental basis with Extended Basic. After many weeks of testing, trying, discovering and failing the answers finally became understandable and explainable in plain english. So now we would like to share our understanding of the use of AND on direct numbers with you.

You are all probably familiar with the use of AND with two relational expressions such as: IF A=1 AND B=2 THEN...... so we will not discuss this use. We will instead discuss the many uses of AND on direct numbers such as: C=C+1 AND 7 or C=C AND 32767 or IF C AND 1 THEN...... Used in this form AND works fast and usually reduces the amount of code, or bytes, in your program.

To start with lets look at a few of the possible uses of AND in your programs:

1. Very good for auto-reset counters that never increment beyond a certain value.
2. It can be used to easily determine if a number is Odd or Even.
3. Excellent for small pseudo random numbers when sprites are in motion and your program uses CALL POSITION.
4. Very good for conserving on the total number of variables in your program when you are using the variables as flags or condition indicators.
5. It can be used to easily round off a floating point number into an integer.
6. Easily converts Lower case to Upper case or visa versa.

Lets look at this function on a Binary level and then we will discuss the rules and some examples for its use. When you use AND on direct numbers you are actually comparing bits at the binary level. If a certain bit is on in B and the same bit is on in C then, when you AND these two ( PRINT B AND C) that bit will be on in the result. If a certain bit is on in B but off in C it will be off in the result. So the number one basic rule is:

ON Bits that match in the two numbers will be ON in the result.
and
OFF Bits in either of the two numbers will be off in the result.

It might help to think of the use of AND as a filter that only allows ON bits that match up to pass through it for the result.

```
                                             binary

Examples:       4 AND 7              4   =   00000100
                                     7   =   00000111
                      4 AND 7 Result    =   00000100   or 4


                9 AND 7              9   =   00001001
                                     7   =   00000111
                      9 AND 7 Result    =   00000001   or 1
```

From the above example we can see that when a number is ANDed to 7 the result can never be greater than 7 since the higher value bits are off (xxxxx111). This is true for any possible ANDed value within the valid range. On the TI in Extended Basic the Valid range is -32768 through 32767. Lets take a look at the value of each bit in a 16 bit 2's compliment binary number.

| Bit No. | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Value | sgn | 16384 | 8192 | 4096 | 2048 | 1024 | 512 | 256 | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |

These values can also be thought of as Binary Powers. If you raise 2 to the bit number the result is the Value displayed above.

Examples: $2^0 = 1$    $2^1 = 2$    $2^2 = 4$    .....    $2^{12} = 4096$    etc.

so if bits 0,1 & 2 are on (00000111) then the decimal number is: 1+2+4 or 7

If bits 0,2,3 & 5 are on (00101101) then it equals: 1+4+8+32 or 45

When Binary numbers are used in 2's compliment form like in Extended Basic the highest order bit, or in this case bit 15, is used as the SIGN bit. This bit tells the computer that the number is a positive value when it is off or that it is a negative value when it is on. We will talk more about 2's compliment Binary numbers a little later. So with these items in mind lets look a little deeper into this subject.

As we saw earlier the decimal value of 7 is 00000111 in binary and this will mask out any values higher than 7. This is also true for any other value in the valid range but some value serve this purpose better than others. We have found the values that best serve this purpose are the ones that are 1 less than a Binary Power.

```
Examples:  8-1 = 7      16 - 1 = 15    ......      4096 - 1 = 4095    etc.

          7 = 0000000000000111                  15 = 0000000000001111
       4095 = 0000111111111111
```

As you can see when you subtract 1 from a Binary power ALL of the lower bits are turned ON. This allows any value up to this number to pass through the filter but never a larger number. With this in mind lets look at a few examples:

1. Very good for auto-reset counters that never increment beyond a certain value.

Many times in an Extended Basic program you may need a counter that counts up to a certain value and resets itself. In normal Extended Basic code this may look like this:

```
B=B+1 :: IF B=8 THEN B=0
```

By using AND with a number that is 1 less than a Binary Power we can reduce the code and speed up the program by using:

```
B=B+1 AND 7
```

Since 7 is one less than a Binary Power and since we are using AND in this statement it will only allow the counter to count to 7. When B+1 becomes 8 the AND function will automatically reset B back to 0 because higher values are filtered or masked out. This type of counter can be used with any Binary Power minus 1 (ie: 1,3,7,15,31 .... 16383 or 32767) and it will never count past your AND value.

2. It can be used to easily determine if a number is Odd or Even.

Using this same principal we can use AND to determine if a number is Odd or Even. An Odd number will ALWAYS have Binary bit 0 set and an Even number will never have bit 0 set since the bits represent powers of 2. With this in mind we could replace the following Extended Basic code of:

```
IF B/2-INT(B/2) THEN ..... the number is odd
```

with

```
IF B AND 1 THEN ..... the number is odd
```

Note: The statement IF B AND 1 returns the same true false condition as IF B AND 1<>0. This is also the same for IF C or IF C-1 etc. This type of statement is TRUE whenever the result of the test or variable IS NOT ZERO.

3. Excellent for small pseudo random numbers when sprites are in motion and your program uses CALL POSITION.

Whenever you have sprites in motion and your program uses CALL POSITION you can use AND to rapidly generate small pseudo random numbers especially if the player has control over the sprites movement. Since sprites are only allowed to have row and column positions from 1 through 256 you can easily AND their position with any value less than 255 to obtain a pseudo random number. Example: CALL POSITION(#1,X,Y):: IF Y AND 1 THEN ...... By trying different AND values you can get a variety of random numbers or decisions from a sprites position. Here is a little Extended Basic program that displays the different possible combinations and also shows you some of the value patterns generated by AND:

```
100 CALL CLEAR :: INPUT "Sta
rt at what AND value ":V ::
INPUT "Loop from zero throug
h  ":L

110 FOR V=V TO 255 :: PRINT
: :"  V=";V :: FOR I=0 TO L
:: PRINT USING "### AND ###
 = ###":I,V,I AND V

120 CALL KEY(0,K,S):: IF S T
HEN GOSUB 140

130 NEXT I :: NEXT V :: END

140 CALL KEY(0,K,S):: IF S=1
 THEN RETURN ELSE 140
```

After running this program for a little while you should notice that Even numbers and Odd numbers that are 1 less than a Binary Power generate nice regular patterns. Other Odd numbers also have set patterns within a group of numbers but they are not as regular and they do not automatically increase as the value increases.

So by using a value of 1 for AND you can get a random 1 or 0 for any sprite position. If you use a value of 3 you can get random values of 0,1,2 or 3. A value of 6 will return random numbers of 0,2,4 or 6 for any sprite position. The value of 8 returns 0 when the sprite is located in an Odd numbered Graphics column (1-32) and 8 when the sprite is in an Even numbered Graphics column. This method of generating small pseudo random numbers in Extended Basic is much faster than the RND function.

Note: After playing with AND in the above program change the two references to AND in line 110 to XOR and then change them to OR to see how these logical expressions work with direct numbers.

4. Very good for conserving on the total number of variables in your program when you are using the variables as flags or condition indicators.

When you use variables as Flags or Condition indicators in your program you can easily replace up to 15 variables with just one Flag variable. A Flag is a fancy term for a variable or bit that tells the program a certain condition exists or doesn't exist (on or off). For example, this condition could be anything from OUTPUT TO PRINTER to the fact that a certain For-Next Loop was just executed so the program needs to do something else before the loop is executed again. Lets also say that you are using a flag variable to tell your program that the user has a Color or B&W monitor. So, for this example lets say that normally you would set B=1 to send the Output to the printer, you would set C=1 when something else must be executed before the loop is executed again and you would set D=1 for a Color monitor. The parts of your program that may use these Flag variables may look something like this:

```
        160 IF D=1 THEN CALL COLOR(x,x,x) ELSE CALL COLOR(y,y,y)
         .
         .
        230 IF B=1 THEN PRINT #3:A$,B$
        240 PRINT A$,BS
         .
         .
        400 IF C=1 THEN RETURN
        410 FOR I=1 TO 20 :: ......... :: NEXT I :: RETURN
```

As you can see we are using 3 variables as flags in this program example. By using AND, OR, XOR and NOT you can reduce this to one variable and just test to see if ceratin bits are On or Off for your flags. This method also allows you to test multiple conditions or flag bits in one operation.

First lets map out the values of those bits again:

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bit No. | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Value | sgn | 16384 | 8192 | 4096 | 2048 | 1024 | 512 | 256 | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |

You can turn ON any of the 15 bits (0-14) with the OR function without worrying about the status of the other bits. Example: F=F OR 4. This turns on bit number 2 without affecting the other bits.

You can test any bit with the AND function. Example: IF F AND 4 THEN ... bit number 2 is on.

You can turn OFF a bit with the AND and NOT functions. Example F=F AND NOT 4 (which is the same as F=F AND -5) This turns off bit number 2 without affecting the other bits.

And, you can turn ON a bit that is OFF and turn OFF a bit that is ON (toggle the bit to its opposite state without knowing the state) with the XOR function. Example: F=F XOR 4. This will turn OFF bit 2 if it is ON and it will turn ON bit 2 if it is OFF.

With this in mind lets put it to work in the previous example program but first we will map out our Flag variable F.

```
                    OUTPUT = Set equals Output to printer
                    NOLOOP = Set equals Don't execute loop
                    COLOR  = Set equals Color Monitor
```

| | | | | |
|---|---|---|---|---|
| Bit no. | 15 --- 3 | 2 | 1 | 0 |
| Value | -------- | 4 | 2 | 1 |
| Condition | not used | COLOR | NOLOOP | OUTPUT |
| Old variable | | D | C | B |

And now lets apply them to the previous program example but now we only need one flag variable.

```
        160 IF F AND 4 THEN CALL COLOR(x,x,x) ELSE CALL COLOR(y,y,y)
         .
         .
        230 IF F AND 1 THEN PRINT #3:A$,B$
        240 PRINT A$,B$
         .
         .
        400 IF F AND 2 THEN RETURN
        410 FOR I=1 TO 20 :: ......... :: NEXT I :: RETURN
```

In your program the IF F AND 4 statement uses the same number of bytes as IF F=1. However, since we have eliminated 2 other variables (flags C & D) and replaced B with F we have reduced the running size of the program. Also, the fewer the variables in your program the faster it runs! If your program had a few more flag variables in it they too could be eliminated by assigning their flag condition to one of the unused bits in F.

When you want to test for more than one condition at the same time simply add up the values for the bits you want to test and perform your AND and compare the result to the total value. Example:

```
    IF F AND 6=6 THEN .... both the COLOR and NOLOP bits are set  ....
                 ELSE .... one or none of the bits are set.
```

This type of multiple testing replaces the normal code of:

```
              IF D=1 AND C=1 THEN .... both conditions are set.
```

To replace the normal code of IF D=1 OR C=1 add up the bits again but do not compare the result of AND to the total. Example:

```
        IF F AND 6 THEN .... both or either bit could be set ....
                   ELSE .... neither bit is set.
```

5. It can be used to easily round off a floating point number into an integer.

Since the logical expressions of AND, OR XOR and NOT work on binary integers you can use AND to round a floating point number into an integer. Normally your code to perform this may look like:

```
                        B=INT(B+.5)
```

By using AND you can save 3 bytes and slightly speed up your program by replacing the above code with:

```
                        B=B AND-1
```

This forces the computer do the rounding internally for you so it can operate on an integer. When you use this method your floating point value must be in the range of -32768.5000 through 32767.4999.

We used the AND value of -1 because -1 is the same as NOT 0 or ALL BITS ON. With all the bits turned on, your AND or filter allows all bits to pass through it and just return the result of the computer's internal rounding.

You can carry this one step further and use it to round for dollars and cents or any number of decimal places you want. For example, the normal code used to round to 2 decimal places of:

```
                        B=INT(B*100+.5)/100
```

Could be replaced with:

```
                        B=(B*100 AND-1)/100
```

But this makes the valid range limit -327.6850 through 327.6749 since we are multiplying by 100 before the AND is executed. Also, this method only saves 1 byte and with all the other floating point operations in this statement the time saved is very slight. So, we recommend that you only use this method of rounding for obtaining integers and not for rounding to decimal places.

6. Easily converts Lower case to Upper case or visa versa.

To convert lower case or uppercase to uppercase value just AND it with 95.

```
Example:  97 AND 95 returns 65 .... 65 AND 95 also returns 65.
          a                 A       A                      A
```

To convert uppercase or lower case to lower case value just OR it with 32.

```
Example:  65 OR 32 returns 97 ..... 97 OR 32 also returns 97.
          A                a        a                     a
```

To exchange case, upper to lower & lower to upper, just XOR it with 32.

```
Example:  65 XOR 32 returns 97 ..... 97 XOR 32 returns 65.
          A                 a        a                 A
```

One practical application for this is with CALL KEY statements. Example:

```
      CALL KEY(0,K,S):: IF K AND 95=89 THEN .... Y or y was pressed.
```

However, on the 99/4A, TI gave us a CALL KEY that only returns uppercase values so, CALL KEY(3,K,S):: IF K=89 THEN .... works the same as the above example and K will equal 89 whether Y or y was pressed.

We hope that the previous pages have helped shed some light on the potential uses for AND, OR, XOR and NOT. With a little experimentation in your programs you may find many more areas that these logical expressions can be used to help speed up your programs and save a few bytes of code.

## THE CHARACTERS

**Character Set 1** — Character Colors

| | | | Tank | R&P | Ship | EC |
|---|---|---|---|---|---|---|
| 32 | | Space character | Tank | R&P | Ship | EC |
| 33 | ■ | Solid block for foreground | 11,1 | 11,1 | 5,1 | 1,1 |
| 34 | | Top of the water | | | | |
| 35 | | Closed and Open Missile silo | | | | |
| 36 | | 36-39 Tank fire - sprite | Sprite Colors | | | |
| 37 | | ........... | | | | |
| 38 | | ........... | 9 | -- | -- | -- |
| 39 | | ........... | | | | |

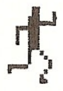
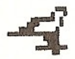
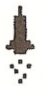
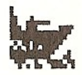
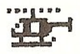
**Character Set 2** — Character Colors

| | | | Tank | R&P | Ship | EC |
|---|---|---|---|---|---|---|
| 40 | ■ | Solid block for hills | Tank | R&P | Ship | EC |
| 41 | | (not used) | | | | |
| 42 | | (not used) | 11,1 | 11,1 | 1,1 | 1,1 |
| 43 | | (not used) | | | | |
| 44 | | Hill | | | | |
| 45 | | Hill | | | | |
| 46 | | Hill | | | | |
| 47 | | Hill | | | | |

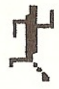
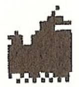
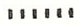
**Character Set 3** — Character Colors

| | | | Tank | R&P | Ship | EC |
|---|---|---|---|---|---|---|
| 48 | | Chars 48 thru 57 are | Tank | R&P | Ship | EC |
| 49 | | redefined as slanted | 15,1 | 15,1 | 15,1 | 15,1 |
| 50 | | numerals. | | | | |
| 51 | | | | | | |
| 52 | | | | | | |
| 53 | | | | | | |
| 54 | | | | | | |
| 55 | | | | | | |

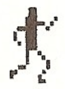
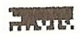
**Character Set 4** — Character Colors

| | | | Tank | R&P | Ship | EC |
|---|---|---|---|---|---|---|
| 56 | | 8 | | | | |
| 57 | | 9 | 15,1 | 15,1 | 15,1 | 15,1 |
| 58 | | (not used) | | | | |
| 59 | | (not used) | | | | |
| | | | Sprite Colors | | | |
| 60<br>61<br>62<br>63 |  | 60-63 Man running, Planes & Rockets, Ship and Enemy Chopper sprites | 2 | rnd 3-10 | 16 | 6 |
| 60<br>61<br>62<br>63 |  | | Planes screen | | | |
| 60<br>61<br>62<br>63 |  | | Rockets screen | | | |
| 60<br>61<br>62<br>63 |  | | Ship screen | | | |
| 60<br>61<br>62<br>63 |  | | Enemy Chopper screen | | | |

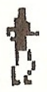
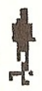
**Character Set 5** — Sprite Colors

| | | | Tank | R&P | Ship | EC |
|---|---|---|---|---|---|---|
| 64<br>65<br>66<br>67 |  | 64-67 Man running, Ship & Enemy Chopper fire sprites<br>............. | 2 | -- | 16 | 7 or 4 |
| 64<br>65<br>66<br>67 |  | | Ship screen | | | |
| 64<br>65<br>66<br>67 |  | | Enemy Chopper screen | | | |

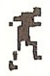
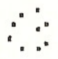
**Character Set 5 Continued** — Sprite Colors

| | | | Tank | R&P | Ship | EC |
|---|---|---|---|---|---|---|
| 68<br>69<br>70<br>71 |  | 68-71 Man running and Ship sprites<br>.............<br>............. | 2 | -- | 16 | -- |
| 68<br>69<br>70<br>71 |  | | Ship screen | | | |

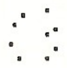
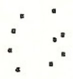
**Character Set 6** — Sprite Colors

| | | | Tank | R&P | Ship | EC |
|---|---|---|---|---|---|---|
| 72<br>73<br>74<br>75 |  | 72-75 Man running sprite<br>.............<br>............. | 2 | -- | -- | -- |
| | | | Sprite Colors | | | |
| 76<br>77<br>78<br>79 |  | 76-79 Man running sprite<br>.............<br>............. | 2 | -- | -- | -- |

**Character Set 7** — Sprite Colors

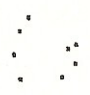
| | | | Tank | R&P | Ship | EC |
|---|---|---|---|---|---|---|
| 80<br>81<br>82<br>83 |  | 80-83 Man shot or climbing into chopper - sprite<br>.............<br>............. | 2 | -- | -- | -- |
| | | | Sprite Colors | | | |
| 84<br>85<br>86<br>87 |  | 84-87 First pattern tank or chopper explosion - sprite<br>............. | Tank = 2<br>Our Chopper = 16 or rnd 3-10 | -- | 11 | |

**Character Set 8** — Sprite Colors

| | | | Tank | R&P | Ship | EC |
|---|---|---|---|---|---|---|
| 88<br>89<br>90<br>91 |  | 88-91 Second pattern tank or chopper explosion - sprite<br>............ | see char 84 | -- | | 11<br>15 |
| | | | Sprite Colors | | | |
| 92<br>93<br>94<br>95 |  | 92-95 Third pattern tank or chopper explosion - sprite<br>............. | see char 84 | -- | | 11<br>15 |

**Character Set 9**

96
97
98
99

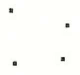


96-99 Fourth pattern
tank or chopper
explosion - sprite
............

Sprite Colors

| Tank | R&P | Ship | EC |
|---|---|---|---|
| see char 84 | | -- | 11 |
| | | | 15 |

100
101
102
103



100-103 Fifth pattern
tank or chopper
explosion - sprite
and the Star char

Sprite Colors

| | | | |
|---|---|---|---|
| see char 84 | | -- | 11 |

(Star char - 15,1 all scrns)

**Character Set 10**

Character Colors

| Tank | R&P | Ship | EC |
|---|---|---|---|

104
105
106
107

104-107 Backwards flight
chopper - sprite
and the letters
PLAY

End of Game - Letters
twinkle - 7,9,16,10 on 1

108
109
110
111

108-111 Level flight
chopper - sprite
and the letters
GIN

Sprite Colors

| | | | |
|---|---|---|---|
| 13 | 13 | 13 | 13 |

**Character Set 11**

112
113
114
115

112-115 Forward flight
chopper - sprite
...............
...............

Sprite Colors

| Tank | R&P | Ship | EC |
|---|---|---|---|
| 13 | 13 | 13 | 13 |

116
117
118
119

116-119 Chopper on the ground
or landed on the ship
sprite ........
...............

Sprite Colors

| | | | |
|---|---|---|---|
| 13 | 13 | 13 | 13 |

**Character Set 12**

120
121
122
123

120-123 Moon
...............
...............
...............

Character Colors

| Tank | R&P | Ship | EC |
|---|---|---|---|
| 15,1 | 15,1 | 15,1 | 15,1 |

124
125
126
127

124-127 First pattern
man waiving - sprite
...............
...............

Sprite Colors

| | | | |
|---|---|---|---|
| 2 | -- | -- | -- |

**Character Set 13**

128
129
130
131

128-131 Second pattern
man waiving - sprite
...............
...............

Sprite Colors

| Tank | R&P | Ship | EC |
|---|---|---|---|
| 2 | -- | -- | -- |

132 M (CTRL D) ----MG----

133 G (CTRL E)

Character Colors

| | | | |
|---|---|---|---|
| 12,1 | 12,1 | 12,1 | 1,1 |

134 — Line ——— (CTRL F)

135 _ Line ____ (CTRL G)

**Character Set 14**

136
137
138
139

136-139 Laser fire - sprite
...............
...............
...............

Sprite Colors

| Tank | R&P | Ship | EC |
|---|---|---|---|
| 7 | -- | -- | -- |

140
141
142
143

140-143 Tank - sprite
...............
...............
...............

Sprite Colors

| | | | |
|---|---|---|---|
| 2 | -- | -- | -- |

## THE VARIABLES

### Permanent String Variables

A$ = Lower line of the hills & foreground with missile silos
B$ = Image for the DISPLAY AT USING for Score
W$ = Water screen for the ship
E$ = Eight zeros for CALL CHAR statements
T$ = Twelve zeros for CALL CHAR statements
S$ = Sixteen zeros for CALL CHAR statements

### Permanent Numeric Variables

| | |
|---|---|
| B | = Value for bonus (incremented by 10,000's) |
| SC | = Total current Score |
| HP | = Number for men in your chopper (incremented by 1's) |
| SP | = Total men delivered to the ship (incremented by 5's) |
| Z | = Remaining number of your choppers (decremented by 1's) |
| K | = Current level you have reached (incremented by 1's) |
| V | = Current column velocity of your chopper |

### Temporary Numeric Variables

| | |
|---|---|
| X | = Carries your choppers dot row position. |
| Y | = Carries your choppers dot column position. It is also used in conjunction with the AND function to generate random numbers. ie: SGN(Y-YY)*((Y AND 6)+4+K). It is also used in FOR NEXT loops as the control variable. |
| Y1 | = Carries the dot column position of the man running to your chopper. It is also used to carry the random number of enemy choppers for that screen. |
| YY | = Carries the tanks dot column position. It is also used for the sound value on the rockets and planes screen and as the dot row of the enemy chopper. |
| T | = The all around catch all. FOR NEXT loops. CALL COINC flag. Chopper just coming into play flag. The Key variable from CALL KEY or CALL JOYST etc. |

## NIGHT MISSION - THE PROGRAM FLOW

There are many ways to program the computer to do essentially the same task. Some ways are faster and/or they use up less RAM than others. What we hope to accomplish is to show you some of the tricks and methods we have found that work quite well for reducing program space and improving the execution speed of your programs.

The Night Mission program took approximately seven months to write with its' many revisions and improvements. Our main objective with this program was to write a multiple screen game that would be fun for all ages to play. It would also have to incorporate extensive use of sprites, animation, graphics, sound effects and of course lots of color and action. Our challenge was to do it all in Extended BASIC, without the use of expansion memory, and to maintain a fast response time to joystick and keyboard inputs. Well we are proud to say that once again the TI 99/4(A) computer has shown us how powerful it can be with the right program structure and proper use of its' built in subprograms! So now lets see how 'THE HOME COMPUTER' reacts to the various program statements and how it all came together to form an Award Winning Program.

The following pages contain the documentation for the Night Mission keyboard version. On the Left hand page you will find the program listings for the lines that are documented on the right hand page. Some of the lines have a label in front of them to indicate that there is a GOTO or GOSUB instruction somewhere else in the program that references that line.

The documentation was set up to match each program line so that each new paragraph starts a new program line. Also all IFs and ELSE IFs have been indented to make it easier to follow the program flow and, remember IFs without an ELSE always have an automatic ELSE (or continuation) on the next program line.

After you have completed the documentation try changing different things in the program to see what affect it has. When you are able to make successful changes you know that you fully understand that portion of the program. This is how we first learned to program since books on programming TI Extended Basic were nonexistent at the time.

We hope that you find this documentation simple to follow and complete enough to allow you to use different routines and subroutines from Night Mission in your own programs. And now - On With The Program.

### NIGHT MISSION LINE NUMBER MAP

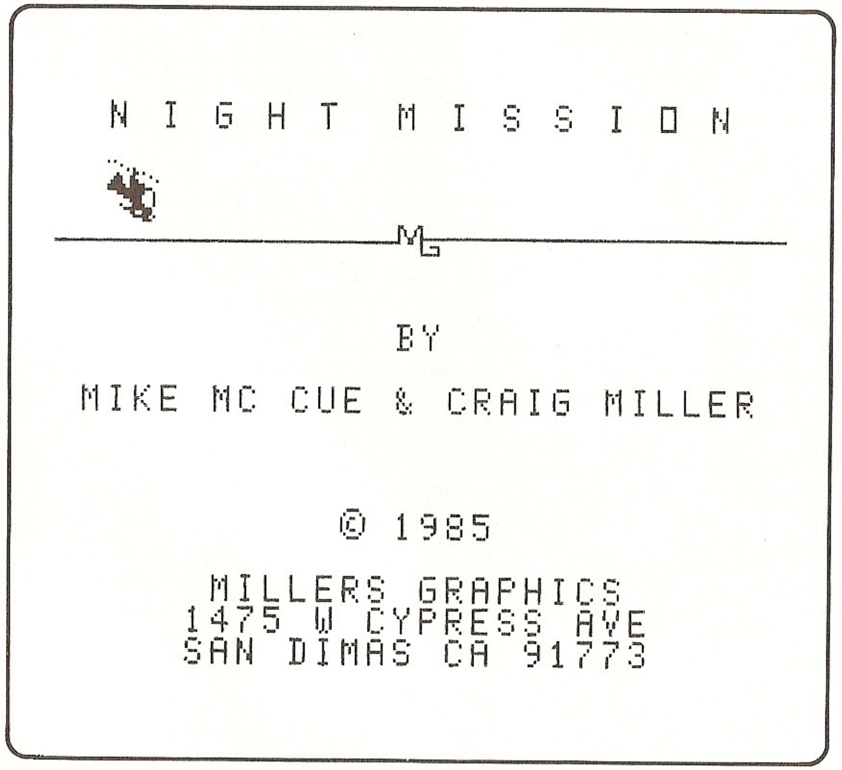
| | |
|---|---|
| 10- 210 | Initialization and title screen. |
| 220- 290 | Restart, Game Over & Bonus play. |
| 300- 400 | Rockets and Enemy Planes initialization and game loop. |
| 410- 560 | Enemy Choppers initialization and game loop. |
| 570- 730 | Ship screen initialization and game loop. |
| 740- 800 | Tank screen initialization. |
| 810-1020 | Tank screen routines. |
| 1030-1120 | Tank screen game loop. |
| 1130-1170 | Laser fire routine. |

**START**

```
10 CALL CLEAR :: CALL MAGNIF
Y(3):: CALL SCREEN(2):: GOTO
 30 :: A$,B$,W$,B :: CALL KE
Y :: CALL SOUND :: CALL PEEK
 :: CALL HCHAR :: CALL VCHAR

20 X,Y,Y1,YY,K,V,Z,HP,SP,SC
:: CALL POSITION :: CALL PAT
TERN :: CALL SPRITE :: CALL
DELSPRITE :: CALL COINC :: C
ALL MOTION :: CALL LOCATE
```

**START1**

```
30 E$="00000000" :: T$=E$&"0
000" :: S$=E$&E$ :: CALL CHA
R(132,"6152524CCC00000080808
0FF809C84FC"&E$&"FF"&T$&"FF"
):: FOR T=1 TO 8 :: CALL COL
OR(T,15,1):: NEXT T :: !@P-

40 CALL CHAR(47,"3C4299A1A19
9423C",33,RPT$("FF",8)&"0000
002011B3FFFFFFFFFFFF817E7E81
",112,"A00802103979FDFF1F070
1080701"&E$&"80D084C1F0FCF2E
2E2F2FC9CFA1C")
```



N I G H T   M I S S I O N

BY

MIKE MC CUE & CRAIG MILLER

© 1985

MILLERS GRAPHICS
1475 W CYPRESS AVE
SAN DIMAS CA 91773

| | |
|---|---|
| **START** 10 | Clear the screen, set the sprite magnification to 3 (four regular sized characters per sprite), change the screen color to black, and GOTO START1 (jump over the following items that were placed here for a rapid Pre-Scan). |
| 20 | These items are also here for a rapid Pre-Scan. |
| **START1** 30 | Setup E,T & S strings as eight, twelve and sixteen zeros for the CALL CHARs to follow, define chars 132 (ctrl d), 133 (ctrl e), 134 (ctrl f) and 135 (ctrl g) as the MG logo and accompanying lines, set the upper case character colors to grey on transparent and turn off the Pre-Scan (!@P-). |
| 40 | Define char 47 as the Copyright symbol for the Title screen, char 33 as a solid foreground character for all screens but the Enemy Chopper screen, char 34 as the top of the water for the Ship screen, char 35 as the closed missile silos for the Tank screen, and chars 112, 113, 114 and 115 for our forward flying chopper sprite. |

**TITLE_SCRN**

```
50 DISPLAY AT(5,3):"N I G H
T  M I S S I O N": : : :RPT$
("?",13)&"??"&RPT$("?",13)::
 CALL COLOR(13,12,1):: GOSUB
 240 :: CALL SPRITE(#1,112,1
3,46,25,0,11)

60 DISPLAY AT(12,14):"BY": :
" MIKE MC CUE & CRAIG MILLER
": : : :TAB(12);"/ 1983": :"
      MILLERS GRAPHICS":"
  1475 W CYPRESS AVE":"
SAN DIMAS CA 91773"

70 CALL CHAR(136,"9048241209
0402010"&E$&S$&"080402090482
41209",96,"10000040"&E$&"80"
&E$&"2"&S$&"104000001000008"
,100,"0000008"&S$&"000004"&S
$&"2"&T$&"04")

80 CALL CHAR(120,"030E3F3C7F
F7FFFFFF6F7F7F33360F03E0583C
F8F8E8F0B0F0F0F07078E81CFC",
124,"0008080907"&RPT$("01",1
1)&"00C0C0C0E0E0E0E0E0C04040
404040E0")

90 A$=RPT$(" ",22):: CALL CH
AR(128,"0202040503"&RPT$("01
",11)&"00C0C0C0E0E0E0E0E0C04
0404040E0",140,T$&"0103073
F6AAAAA7F"&S$&"80C0E0FCAAA9A
AFC")

100 A$=A$&"/  e      e   /,
      e    .(-    e      .((-
 e     /..(((,  e   e  .((((
-      .(((((((-   ./  .(((((
(,  e.(((((((((- .((-,((((((
((-/.(((((((((((,"
```

**TITLE_SCRN**

50 Display the top part of the Title screen with the MG logo, turn on the colors for the MG logo, GOSUB CHOP_SOUND (generate the chopper sound), and bring out our forward flying chopper.

60 Display the bottom portion of the title screen.

70 Now that there is something on the screen we will let the computer go on with the rest of the initialization of the characters and strings. Define chars 136 thru 139 as the laser fire, chars 96 thru 99 and 100 thru 103 as the fourth and fifth patterns for the blow_up routines. Note: Char 101 (e) is also used as the stars.

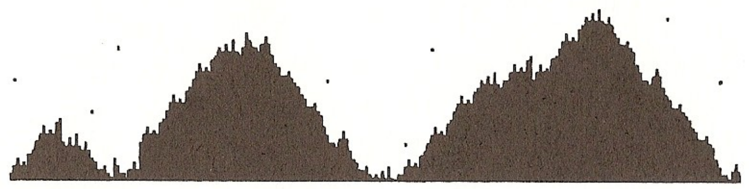
80 Define chars 120 thru 123 as the moon and chars 124 thru 127 as the first of two patterns that make up the man waving his arm at our chopper when we take off and leave him on the ground.

90 Start setting up A$ as the hills for the Tank screen (it wouldn't all fit on one program line), define chars 128 thru 131 as the second pattern of the man waving his arm, and define chars 140 thru 143 as the tank for the Tank screen

100 Finish setting up A$ as the hills for the Tank screen. (Note: If you use strings, whenever possible, to display your screens they will display MUCH faster than HCHARs).

```
                      /  E
    E   /,      E    .(-
E      .((- E     /..(((,  E
   E  .((((-     .(((((((-
 ./  .((((((,  E.(((((((((-
.((-,((((((((-/.(((((((((((,
```

Print out of A$ in ASCII form  (28 columns)



Screen dump of A$ in graphics form

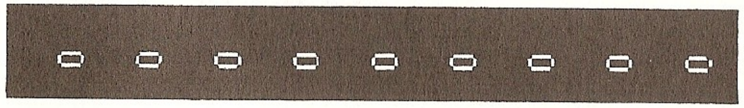
```
110 GOSUB 240 :: B$=RPT$("!"
,28)&RPT$("!!#",9)&RPT$("!",
29):: W$=RPT$("""",28)&RPT$(
"!",84)
```

```
120 CALL CHAR(92,"0008000020
000000400000001"&E$&"80"&E$&
"208000002001",116,"00005501
0F1E183020301E1F0F1320300000
5580F078180C040C78F8F0C8040C
")
```

110 GOSUB CHOP_SOUND (keep the chopper sound going), set up B$ as the foreground and missile silos for the tank screen and set up W$ as the top of the water and the foreground for the Ship screen.

```
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! !
! ! # ! ! # ! ! # ! ! # ! ! # ! ! # ! ! # ! ! # ! ! # !
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! !
```

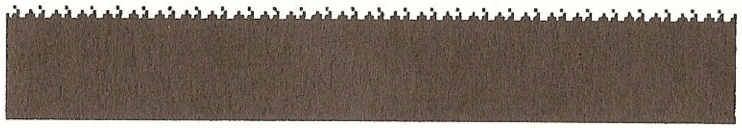
Print out of B$ in ASCII form (28 columns)



Screen dump of B$ in graphics form

```
" " " " " " " " " " " " " " " " " " " " " " " " " " " "
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! !
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! !
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! !
```

Print out of W$ in ASCII form (28 columns)



Screen dump of W$ in graphics form

120 Define chars 92 thru 95 as the third pattern for the blow up routines, and chars 116 thru 119 as our chopper when it has landed on the ground or on the ship. This is the end of the characters that can be defined with the Title screen displayed. The rest of the character definitions and initialization will effect the characters that are currently displayed on the Title screen.

**CLEAR_TITLE**

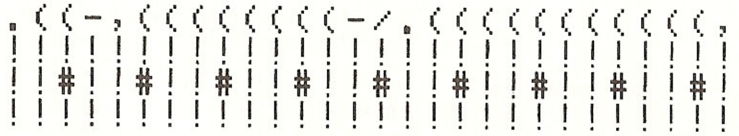
```
130 CALL CLEAR :: FOR T=1 TO
 13 :: CALL COLOR(T,1,1):: N
EXT T :: FOR X=1 TO 30 :: RA
NDOMIZE :: CALL PEEK(-31808,
T,Y):: CALL HCHAR(T/18+1,Y*.
12+1,101):: NEXT X

140 GOSUB 240 :: CALL CHAR(8
8,"00000400100000000200000008"
&E$&"001"&E$&"410000004001",
56,"1F1122223E4444F81F21213E
02040408")

150 CALL CHAR(48,"1F21214242
8484F801010202040408081F0101
023C20407E3F0103021C0408F8",
52,"1111223E020404081F202040
7C0408F8102020407E82827C3F01
020408102040")

160 CALL CHAR(80,E$&"0003040
101010101020204060000018F8E
0F8C0C0C070101018",84,"00000
0020000800000100002"&T$&"00200
00008200000082")

170 CALL CHAR(72,"0000010107
05030101010101020202203C0C0C0
E0E0F8C0C0C02020101020406"):
: CALL HCHAR(20,1,34,32)

180 CALL CHAR(36,"140A200D1A
21641A241A0814080800080"&S$,
76,"00000103030303010101010100
00070400C0C0C0E0E0E0F0C0C040
40C0C0A080C"):: CALL HCHAR(2
1,1,33,128)

190 DISPLAY AT(10,1):"e h i
j k ej l j m n ek n e" :: CA
LL CHAR(40,RPT$("FF",8),44,"
00008082C2C7F7FF8080C0E0E4FC
FEFF0103232B7F7FFFFF"&E$&"08
28A9FD")
```

| | |
|---|---|
| **CLEAR_TITLE** 130 | Clear off the Title screen, turn off the colors for all the character sets that make up the screen display, and generate 30 randomly placed stars on the screen using the double random number generator from the Smart Programming Guide for Sprites. These stars will end up between rows 1 thru 15 and columns 1 thru 32. |
| 140 | GOSUB CHOP_SOUND (keep the chopper sound going), define chars 88 thru 91 as the second pattern for the blow up routines, and redefine chars 56 and 57, the 8 and 9 characters, as slanted numerals. |
| 150 | Redefine chars 48 thru 51 and chars 52 thru 55, the 0 thru 7 characters, as slanted numerals. |
| 160 | Define chars 80 thru 83 as the man when he is climbing into the chopper or when he is shot by the tank, and chars 84 thru 87 as the first pattern for the blow up routines. |
| 170 | Define chars 72 thru 75 as the forth pattern for the running man, and place the top of the water character across the screen at row 20 to fill the edges of the screen. |
| 180 | Define chars 36 thru 39 as the sprite character that the tank fires at our chopper, chars 76 thru 79 as the fifth pattern for the running man, and fill the foreground portion of the screen with the solid block character. This HCHAR and the one in the previous line are used to fill the edges of the screen that are not written to with a DISPLAY or PRINT statement. |
| 190 | Place the characters that make up the words "PLAY AGAIN Y N" on the 10 row of the screen. There are also a few stars (e) displayed with these characters. The characters are not seen because their color is turned off. These characters are defined as the backwards and level flying choppers until the end of the game. When the game ends they are redefined into the letters and their color is turned on. Define char 40 as a solid block for the hills and chars 44 thru 47 as the top of the hills for the tank screen. |

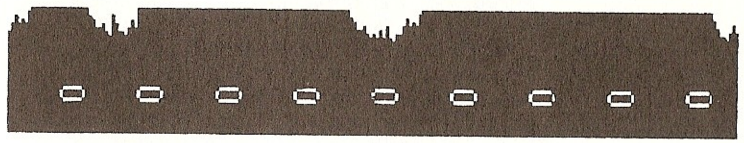
```
200 DISPLAY AT(2,1):RPT$("?"
,13)&"??"&RPT$("?",13):: DIS
PLAY AT(3,24):"xz" :: DISPLA
Y AT(4,24):"y{" :: DISPLAY A
T(15,1):A$:B$ :: A$=SEG$(A$,
141,28)&B$
```

```
210 GOSUB 240 :: B$="e # ###
# e########## e### e" :: CAL
L DELSPRITE(ALL):: CALL COLO
R(3,15,1,4,15,1,9,11,1,2,11,
1,1,11,1,12,15,1,13,12,1)
```

200 Now we display the lines with the MG logo to separate the scoring values from the play area of the screen, next we display the four characters that make up the moon, and then we display the hills (A$) and foreground (B$), and lastly we set A$ equal to the last screen line of A$ plus all of B$, for rapid screen changes in the game.
(Note: once the hills have been displayed we never clear them off the screen instead we just turn off their color, so we don't need to retain them in A$.)



Print out of new A$ in ASCII form (28 columns)



Screen dump of new A$ in graphics form

210 Since B$ has been added to the new A$ we can now reuse B$ so we will assign the USING IMAGE to B$ for our scoring display. This image also contains a few stars (e) along with the ### signs for the scoring. Next we delete our chopper that has been flying across the screen since the Title screen appeared. Lastly we turn on all the colors for the screen at the same time. This causes the play screen to appear all at once.

```
E # #### E########## E### E
```

**RESTART**

```
220 CALL COLOR(10,1,1):: CAL
L CHAR(108,E$&"55000061E1FFF
FFF00000003"&E$&"5540E0F8E4E
2E1F1FF7C45FE")

230 K=1 :: Z=5 :: HP,SP,SC,B
=0 :: CALL CHAR(104,E$&"0104
10400103CFFFFF78600102082OC0
707CE2E1E1F3FEFCC54658E")::
GOTO 740
```

**CHOP_SOUND**

```
240 CALL SOUND(-4250,-4,1,11
0,30,110,30,200,30):: RETURN
```

**GAME_OVER**

```
250 CALL KEY(3,T,Y):: Z=INT(
(SC-B)/10000):: FOR T=1 TO Z
 :: CALL SOUND(200,770,4,777
,6):: DISPLAY AT(1,24):USING
 "###":T :: NEXT T

260 IF Z THEN B=B+Z*10000 ::
 GOTO 740 ELSE CALL CHAR(108
,"FF81BFA0AFB981FFFF81E71818
E781FFE7B5B5BDBDADADE7")

270 CALL CHAR(104,"FF81BD81B
FA0A0E0E0A0A0A0A0BF81FFFF81B
DBD81BDA5E7E7A5BD81E7181818"
):: CALL SPRITE(#1,112,13,87
,1,0,12)
```

**GETKEY**

```
280 CALL COLOR(10,7,1,10,9,1
,10,16,1,10,6,1):: CALL KEY(
0,T,T)

290 IF T=89 THEN 220 ELSE IF
 T=78 THEN CALL DELSPRITE(AL
L):: CALL VCHAR(1,1,32,768):
: END ELSE 280
```

**RESTART**
220 Turn off the colors for the PLAY AGAIN letters, in case the program came here from a game over condition, and define chars 108 thru 111 as the level flying chopper (the game_over routine defines these characters as the letters GIN for the PLAY AGAIN Y N message at the end of the game).

230 Set the level (K) to 1, set the number of our choppers remaining (Z) to 5, clear out the number of men in the chopper (HP) - the number of men delivered to the ship (SP) - the score (SC) and the bonus points (B), and define the chars 104 thru 107 as the backwards flight chopper (the game_over routine defines these characters as the letters PLAY for the PLAY AGAIN Y N message at the end of the game). GOTO TANK_INIT (set up the tank screen).

**CHOP_SOUND**
240 This subroutine is used to keep the chopper sound going during initialization.

**GAME_OVER**
250 Initialize keyboard for caps only, calculate the number of bonus choppers that should be awarded, if the current score minus the previous bonus is less than 10000 this calculation will set Z equal to zero and the following FOR NEXT loop will not execute, if Z is greater than zero (1,2,3 etc.) the loop will execute that many times and display the adding of choppers in the scoring portion of the screen with a bell sound each time it increments the display.

260 IF there are bonus choppers ( Z<>0 ) THEN add to the variable (B) that keeps track of the bonuses awarded so far, and GOTO TANK_INIT (set up the tank screen since the game isn't over yet).
ELSE redefine the characters used for the GIN letters in the PLAY AGAIN Y N message.

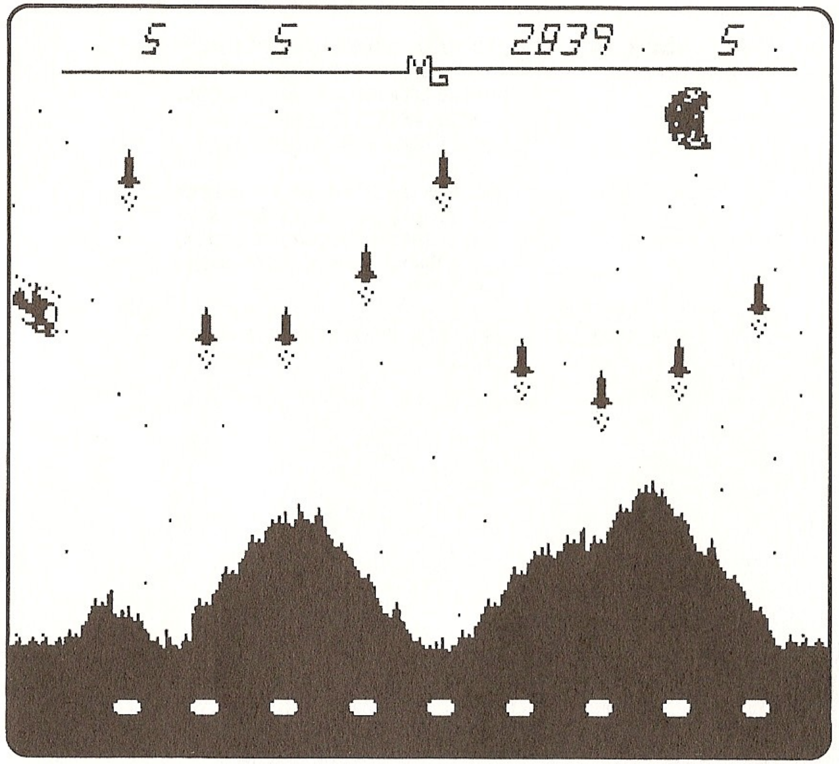
270 Redefine the characters used for the PLAY letters in the PLAY AGAIN Y N message, bring out our forward flight chopper and make it fly across the screen.

**GETKEY**
280 Turn on the colors for the letters and make them twinkle, and scan for a key press.

290 IF a YES key is pressed THEN GOTO RESTART (start the game over).
ELSE IF a NO key is pressed THEN delete all the sprites and wipe off the screen and END the program.
ELSE since no key was pressed GOTO GETKEY (twinkle the letters and scan for a key).

**R&P_INIT**

```
300 V=8 :: IF K<2 THEN 570 E
LSE IF Y AND 1 THEN 340 ELSE
 CALL CHAR(60,"08081C1C1C1C1
C3E7F1C0008221004080"&S$)

310 YY=600 :: CALL DELSPRITE
(ALL):: FOR T=2 TO 5 :: CALL
 LOCATE(#T,1,T*17,#T+4,177,T
*17):: NEXT T

320 CALL SOUND(-350,-7,6,110
,5):: CALL CHAR(35,"FFFFFFFF
81000081"):: CALL SOUND(4250
,-8,4,110,27,115,28,YY,30)

330 FOR T=10 TO 18 :: RANDOM
IZE :: CALL PEEK(-31880,X):·
 CALL SPRITE(#T,60,(X AND 7)
+3,177,T*24-208,-X/8-3-K,0):
: NEXT T :: GOTO 360
```



**R&P_INIT**
300 Set V equal to 8 for use with the blow_up_chop subroutine, in case we get hit, or in case the level is less than 2.
IF the level is less than 2 THEN GOTO SHIP_INIT (set up the ship screen).
ELSE IF when our chopper's last position was checked and it was on an odd dot column ( (Y AND 1)<>0 ) then GOTO PLANE_INIT (bring out enemy planes).
ELSE Define the rocket characters.

310 Set YY equal to 600 for the rocket sound, delete all the sprites, place four invisible sprites at the top and bottom of the screen (this makes the rockets disappear under the scoring and reappear at the silos).

320 Generate the silo opening sound, define the silo character as open and generate the rocket sound.

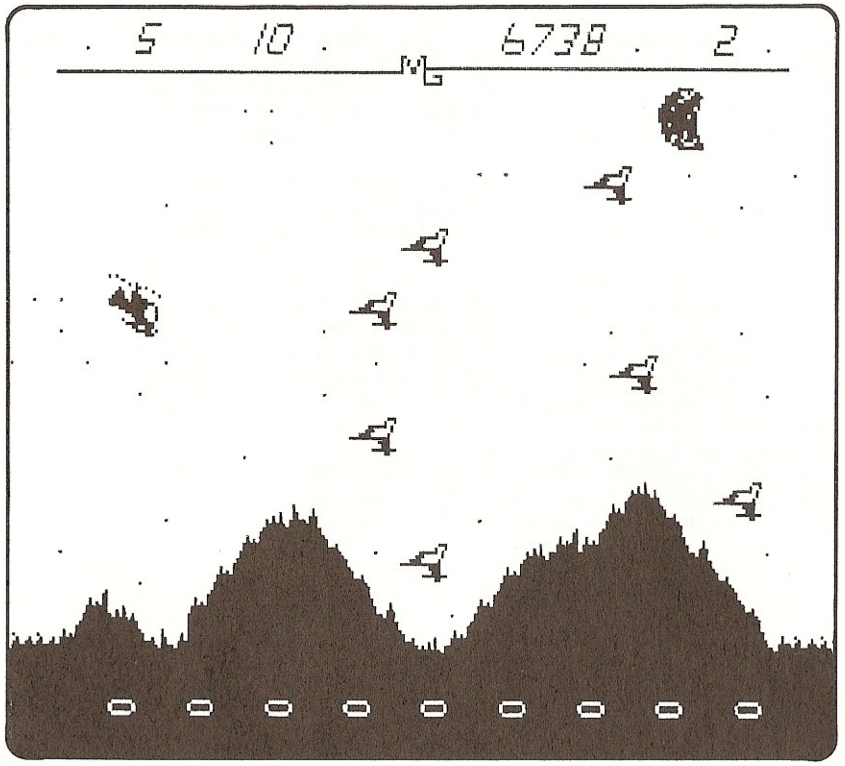
330 Bring out the 9 enemy rockets with random colors and at random speeds using the level (K) to increase the speeds at higher levels, and GOTO OUR_CHOP_OUT (bring out our chopper).

**PLANE_INIT**

```
340 CALL CHAR(60,T$&"01030F7
F0"&E$&T$&"709FA8204FC3C1CFF
0C"):: YY=1600 :: CALL SOUND
(-4250,-8,6,110,27,115,28,YY
,30):: CALL DELSPRITE(ALL)

350 FOR T=10 TO 18 :: RANDOM
IZE :: CALL PEEK(-31880,X)::
 CALL SPRITE(#T,60,(X AND 7)
+3,T*16-120,256,0,-X/8-3-K):
: NEXT T
```

**OUR_CHOP_OUT**

```
360 CALL SPRITE(#1,112,13,72
,1,0,3)
```



| | |
|---|---|
| **PLANE_INIT** 340 | Define the plane character, set YY equal to 1600 for the plane sound, generate the plane sound, and delete all the sprites. |
| 350 | Bring out the 9 enemy planes with random colors and at random speeds using the level (K) to increase the speeds at higher levels. |
| **OUR_CHOP_OUT** 360 | Bring out our forward flight chopper on the left hand edge of the screen flying slowly to the right. |

**R&P_LOOP**

```
370 CALL SOUND(-999,-8,6,110
,27,115,28,YY,30):: CALL COI
NC(ALL,T):: CALL POSITION(#1
,X,Y):: IF T OR X>161 THEN G
OSUB 870 :: GOTO 740

380 IF Y>224 THEN 410 ELSE C
ALL KEY(1,T,T):: IF T<0 THEN
 CALL MOTION(#1,0,2):: GOTO
370

390 IF T=0 THEN T=8 ELSE IF
T=5 THEN T=8*(X>35)ELSE IF T
=3 THEN CALL MOTION(#1,0,4):
: GOTO 370 ELSE CALL MOTION(
#1,0,0):: GOTO 370
```

**END_R&P_LOOP**

```
400 CALL MOTION(#1,T,2):: GO
TO 370
```

**R&P_LOOP** 370

```
Generate rocket or plane sound according to value of YY, check
coincidence between any sprites, and get the position of our
chopper.
IF   there was a coincidence or our chopper has flown into the
     ground THEN GOSUB CRASH_CHOP (blow it up), GOTO TANK_INIT
     (go back to the tank screen).
```

380

```
IF   the chopper has made it to the right hand edge of the
     screen THEN GOTO EC_INIT (move on to the next screen)
ELSE scan for a key press.
     IF   no key was pressed THEN slow down the chopper and
          GOTO R&P_LOOP (start the loop over again).
```

390

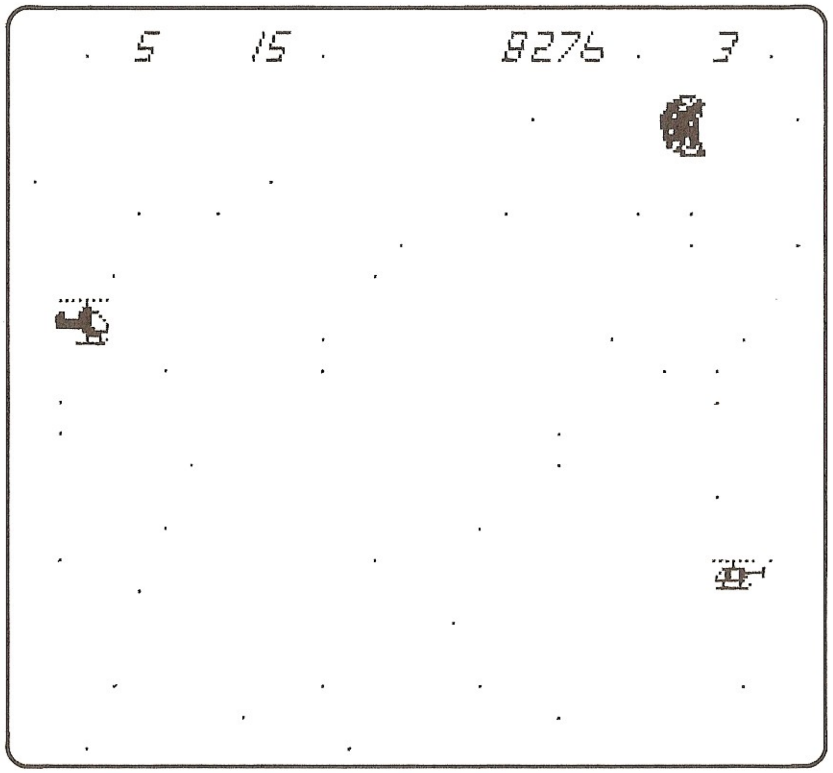
```
IF   the Down arrow key was pressed THEN set T equal to 8 for
     downward motion and continue with end_r&p_loop.
ELSE IF   the Up arrow key was pressed THEN set T equal to -8
          if our chopper is is on a dot row greater that 35
          else set T equal to 0 and continue with end_r&p_loop
     ELSE IF   the Right arrow key was pressed THEN put our
               chopper into a faster forward motion, and GOTO
               R&P_LOOP (start the loop over again).
          ELSE it must have been some other key that was
               pressed so bring our chopper to a stop, and GOTO
               R&P_LOOP (start the loop over again).
```

**END_R&P_LOOP** 400

Put our chopper into motion according to the value of T (8,-8 or 0), and GOTO R&P_LOOP (start the loop over again).

**EC_INIT**

```
410 CALL DELSPRITE(#1):: IF
K<3 THEN 570 ELSE Y1=(Y AND
6)-4 :: CALL DELSPRITE(ALL):
: CALL COLOR(2,1,1,1,1,1,13,
1,1)

420 DISPLAY AT(21,1):"  e
     e     e         e
 e            e           e
      e"

430 CALL CHAR(60,T$&"AA021F2
C4C7F107F"&S$&"A800C1FFE1C09
0E",64,S$&"00009292"&T$&S$&"
4949"):: CALL SPRITE(#1,108,
13,40,31,8,0)
```



| | |
|---|---|
| **EC_INIT** | Delete our chopper |
| 410 | IF the level is less than 3 THEN GOTO SHIP_INIT (set up the ship screen).<br>ELSE set Y1 equal to a random number of enemy choppers based on the last dot column of our chopper, delete all sprites, and turn off the colors for the hills and the lines with the MG logo.<br>(Note: since Y, which comes from the call position statement, can only have a value between 1 and 256, the Y AND 6 function can only return 0,2,4 or 6 for any value of Y. By subtracting 4 from 0,2,4 or 6, Y1 can only have a value of -4,-2,0 or 2. Each time our chopper shoots down an enemy chopper we add 1 to Y1 and then test it to see if it is less than 5. If it is less than 5 there are more enemy choppers. So the least number of enemy choppers that must be shot down before you can go on to the next screen is 3 and the maximum number is 9). |
| 420 | Display some more stars (e) at the bottom of the screen. |
| 430 | Define the enemy chopper character and the sprite that it fires at us and we fire at them, and bring out our level flight chopper at the top left hand edge of the screen moving downward. |

```
EC_OUT          440 CALL SPRITE(#2,60,6,242,
                216,(Y AND 1)*80-40,0)

EC_LOOP         450 CALL SOUND(-4250,-4,1,20
                0,30,200,30,200,30):: CALL P
                OSITION(#1,X,Y,#2,YY,Y)

                460 IF X>180 THEN CALL LOCAT
                E(#1,1-(V<0)*180,31)ELSE IF
                ABS(X-YY)<7 THEN 490 ELSE CA
                LL MOTION(#2,SGN(X-YY)*((YY
                AND 11)+9),0)

                470 CALL KEY(1,T,Y):: IF T=1
                3 THEN 510 ELSE IF T=5 THEN
                V=-8 ELSE IF T=0 THEN V=8 EL
                SE IF Y THEN V=0

END_EC_LOOP     480 CALL MOTION(#1,V,0):: GO
                TO 450
```

```
EC_OUT        Bring out the enemy chopper, randomly from the top or bottom of
  440         the screen based on our chopper's previous position, or the
              missile's position, that we fired at the last enemy chopper,
              dot column position (odd or even).

EC_LOOP       Generate chopper sound, get our chopper's and enemy chopper's
  450         positions (we only need their dot row position since they are
              not allowed to change column positions).

  460         IF  our chopper is moving off the screen THEN wrap it around
              back onto the screen (determined by the motion direction
              according to the value of V).
              ELSE IF  the enemy chopper is lined up with us THEN GOTO
                       EC_FIRES (enemy shoots us down).
                   ELSE make the enemy chopper move at a random speed to
                       align itself with us.

  470         Scan for a key press.
              IF   the fire key was pressed THEN GOTO WE_FIRE (shoot at the
                   enemy chopper).
              ELSE IF  the Up arrow key was pressed then set V equal to -8
                       (upward motion) and continue with end_ec_loop.
                   ELSE IF  the Down arrow key was pressed the set V equal
                            to 8 (downward motion) and continue with
                            end_ec_loop.
                        ELSE IF  any other key was pressed (Y<>0) then set V
                                 equal to 0 (no motion) and continue with
                                 end_ec_loop.
              (Note: if no key was pressed the above IFs would not be
              executed so the value of V would remain unchanged and the
              program flow would drop thru to end_ec_loop)

END_EC_LOOP   Put chopper into an upward or downward motion according to the
  480         value of V and GOTO EC_LOOP (start the loop over again).
```

```
EC_FIRES      490 CALL SPRITE(#3,64,7,YY,2
              09,V+X-YY,-127):: CALL SOUND
              (-900,-8,1,110,30,110,30,999
              9,30):: T=0

   WHERE      500 CALL POSITION(#3,Y,Y)::
              IF Y>50 THEN 500 ELSE CALL D
              ELSPRITE(#3):: CALL COLOR(#1
              ,11):: GOSUB 930 :: CALL DEL
              SPRITE(#2):: GOTO 740

WE_FIRE       510 CALL SOUND(-900,-8,0,110
              ,30,110,30,300,30):: CALL PO
              SITION(#1,X,Y):: CALL SPRITE
              (#3,64,4,X,36,0,127)

   WHERE1     520 CALL POSITION(#3,X,Y)::
              IF Y<192 THEN 520 ELSE CALL
              DELSPRITE(#3):: CALL COINC(#
              2,X,220,7,T):: IF T THEN CAL
              L SOUND(-1,-4,9)ELSE 450

BLOW_UP_EC    530 CALL COLOR(#2,15):: FOR
              T=0 TO 2 :: CALL PATTERN(#2,
              88+T*4):: FOR X=5 TO 7 :: CA
              LL SOUND(100,-X,T*10):: NEXT
               X :: NEXT T

              540 CALL DELSPRITE(#2):: Y1=
              Y1+1 :: SC=SC+250 :: DISPLAY
               AT(1,12)SIZE(10):USING "###
              #######":SC :: IF Y1<5 THEN
              440

              550 CALL POSITION(#1,X,Y)::
              IF X>185 THEN CALL LOCATE(#1
              ,35,Y)

              560 CALL PATTERN(#1,112):: C
              ALL MOTION(#1,0,20):: CALL S
              OUND(-4250,-4,1,200,30,200,3
              0,200,30)
```

**EC_FIRES**
490

Shoot enemy's missile at us, according to the values obtained from the last position check, generate missile fire sound, and set T equal to zero. T is used as a flag in the BLOW_UP_CHOP subroutine to indicate a coincidence between the crashing chopper and the tank on the Tank screen.

**WHERE**
500

```
Check the missile's position.
IF   it has not reached us yet GOTO WHERE (keep checking).
ELSE delete  the  missile, change  our  choppers color to light
          yellow for a better blow up effect, GOSUB BLOW_UP_CHOP
          (blow up our chopper), delete the enemy chopper and GOTO
          TANK_INIT (go back to the Tank screen).
```

**WE_FIRE**
510

Generate missile fire sound, get our chopper's position and shoot our missile at the enemy from our current position.

**WHERE1**
520

```
Check the missile's position.
IF   it has not reached them yet GOTO WHERE1 (keep checking).
ELSE Delete  the missile and check  for coincidence between our
          missile's last position and the enemy's chopper.
          IF   we hit  them, turn off  the missile sound,  since the
                    next sound statements have a positive duration, and
                    continue with BLOW_UP_EC (blow up the enemy chopper).
          ELSE GOTO EC_LOOP (start the loop over again).
```

**BLOW_UP_EC**
530

Since we hit them change their color to grey for a better blow up effect, and start the blow up routine. Change their pattern to 88,92 & 96 while the blow up sound is being generated.

540

```
Delete  the  blow  up  pattern,  add  1  to  the enemy choppers
destroyed counter (Y1), add 250 points to our score (SC), and
display the new score at the top of the screen.
IF   the  EC counter  is less  than five  (there are more enemy
          choppers to shoot down before we can move on so) THEN GOTO
          EC_OUT (bring out the next enemy chopper).
```

550

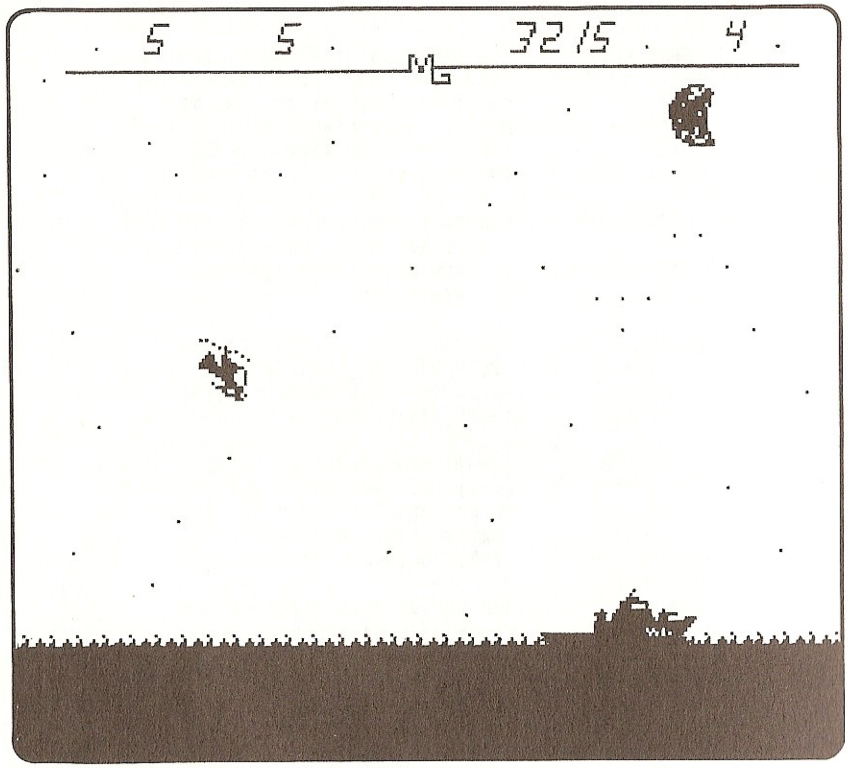
```
Check our chopper's position.
          IF   it is too low or off the screen THEN locate it at the
                    top of the screen at its current dot column.
```

560

Change its pattern to forward flight, set it in forward motion, generate the chopper sound and continue execution with SHIP_INIT (set up the Ship screen).

**SHIP_INIT**

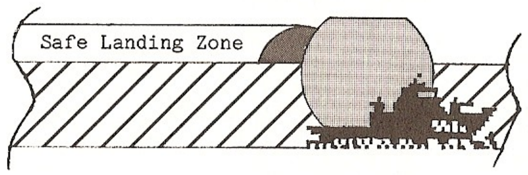
```
570 CALL CHAR(68,S$&"000000F
F7F1FFEAB"&S$&"000000FFFFFFA
A6D",64,E$&"0021F373FFFFFFFF
FFFF972A08103CFFF0FFFFFFFFFF
FFFFFFFF5EAA")

580 Y1=(Y AND 5)+6 :: GOSUB
800 :: CALL CHAR(60,"0000008
080C4CFEEFFFF5BAAFFFF722B"&T
$&"C00FFEFCF8F0E2C67B3D")::
CALL COLOR(1,1,1,2,1,1)

590 DISPLAY AT(20,1):W$ :: C
ALL COLOR(1,5,1,7,12,1):: FO
R T=1 TO 4 :: CALL LOCATE(#T
,161,1):: NEXT T :: CALL SPR
ITE(#9,112,13,15,1,20,35)

600 CALL SPRITE(#10,68,15,14
3,1,#11,64,15,143,17,#12,60,
15,143,33):: CALL MOTION(#10
,0,Y1,#11,0,Y1,#12,0,Y1)
```



| | |
|---|---|
| **SHIP_INIT** 570 | Define the back portion (char 68) and middle portion (char 64) of the ship. |
| 580 | Calculate a random value for the ship's speed based on the last value of Y (dot column tracker), GOSUB INVIS_SUB (delete all sprites and put invisible sprites at the bottom of the screen), define rest of the ship, and turn off the hill colors (in case we haven't just come from the Enemy Chopper screen.) |
| 590 | Display the top of the water at row 20, turn on the water and the MG logo colors, put 4 more invisible sprites just below the top of the water for the sinking effect, and bring out our chopper. |
| 600 | Bring out the 3 sprites that make up the ship and put them all into motion at the same time so the ship doesn't break up. |

```
SHIP_LOOP       610 CALL SOUND(-4250,-4,1,20
                0,30,200,30,200,30):: CALL P
                OSITION(#9,X,Y):: IF X<35 TH
                EN CALL MOTION(#9,0,V):: CAL
                L LOCATE(#9,35,Y)ELSE IF X>1
                40 THEN 690

                620 CALL COINC(#9,#11,16,T):
                : IF T AND X>130 THEN 680 EL
                SE CALL COINC(#9,#10,9,T)::
                IF T THEN 710

                630 CALL KEY(1,T,T):: IF T<0
                 THEN CALL PATTERN(#9,SGN(V)
                *4+108):: CALL MOTION(#9,3*(
                X>35),V):: GOTO 610

                640 IF T=3 THEN CALL PATTERN
                (#9,112):: V=V-4*(V<12):: GO
                TO 670 ELSE IF T=2 THEN CALL
                 PATTERN(#9,104):: V=V+4*(V>
                -12):: GOTO 670

                650 IF T=0 THEN CALL PATTERN
                (#9,108):: CALL MOTION(#9,8,
                V):: GOTO 610

                660 IF T=5 THEN CALL PATTERN
                (#9,108):: CALL POSITION(#9,
                X,Y):: IF X<36 THEN CALL LOC
                ATE(#9,35,Y)ELSE CALL MOTION
                (#9,-8,V):: GOTO 610

END_SHIP_LOOP   670 CALL MOTION(#9,0,V):: GO
                TO 610
```

```
SHIP_LOOP     Generate chopper sound, get chopper's position,
  610         IF   it is too high THEN adjust its motion to level  flight and
                   bring it down to dot row 35.
              ELSE IF   it is too low THEN GOTO SINK_CHOP (Sink the chopper).

  620         Check  coincidence between  our chopper  and the  sprite in the
              middle of the ship (see drawing).
              IF   there is a coincidence GOTO SINK_SHIP (crash  the chopper,
                   sink the ship and sink the chopper).
              ELSE check  for proper coincidence between  our chopper and the
                   back of the ship (see drawing).
                   IF   there is a  coincidence THEN GOTO LAND_CHOP (land the
                        chopper on the back of the ship).
```



▨ IF X>140
Sink Chopper

⬜ IF T AND X>130
Sink Ship & Chopper

⬛ IF T
Land Chopper

```
  630         Scan for a key press.
              IF   no  key  was  pressed  THEN  change  pattern to forward or
                   backward motion chopper according to the value of V,
                   adjust motion to make our chopper fly slowly up and GOTO
                   SHIP_LOOP (start the loop over again).

  640         IF   the Right  arrow key was pressed  THEN change the choppers
                   pattern to forward flight, add 4 to V if V is less than
                   12,  and GOTO END_SHIP_LOOP (change the chopper's motion).
              ELSE IF   the Left arrow key was pressed THEN change the
                        chopper's pattern to backward flight, subtract 4 from
                        V if V is greater than -12, and GOTO END_SHIP_LOOP
                        (set the chopper into the new motion).

  650         IF   the Down arrow  key was pressed THEN  change the chopper's
                   pattern to level flight, set the chopper into a diagonal
                   downward motion along with the forward or backward motion
                   according to the value of V, and GOTO SHIP_LOOP (start the
                   loop over again).

  660         IF   The  Up arrow  key was  pressed THEN  change the chopper's
                   pattern to level flight, and get its current position.
                   IF   it is too high  THEN bring it back down to dot row 35
                        at its current dot column, and continue with
                        end_ship_loop.
                   ELSE set the chopper into  an upward motion along with the
                        forward or backward motion according to the value of
                        V and GOTO SHIP_LOOP (start the loop over again).
              (Note: If a key was pressed that wasn't one of the 4 arrow keys
              the program would not execute any of the previous IF statements
              or change the value of V. It would just drop through and
              execute end_ship_loop.)

END_SHIP_LOOP Set the chopper into forward or backward motion according to
  670         the value of V, and GOTO SHIP_LOOP (start the loop over again).
```

**SINK_SHIP**

```
680 CALL MOTION(#9,0,0,#10,2
,4,#11,2,4,#12,2,4):: SC=SC-
SP*500 :: SP=0
```

**SINK_CHOP**

```
690 CALL MOTION(#9,3,0):: CA
LL SOUND(-2450,-8,6,110,30,1
10,30,9999,30):: CALL PATTER
N(#9,104):: CALL SOUND(1,-4,
9):: HP=0 :: Z=Z-1

700 CALL DELSPRITE(#9):: IF
SP THEN 740 ELSE CALL DELSPR
ITE(#10,#11,#12):: GOTO  740
```

**LAND_CHOP**

```
710 CALL POSITION(#10,X,Y)::
 CALL SPRITE(#9,116,13,136,Y
,0,Y1):: FOR T=306 TO 122 ST
EP -6 :: CALL SOUND(-200,-4,
1,T,27,T,30,T,30):: NEXT T

720 FOR T=130 TO 306 STEP 8
:: CALL SOUND(-4250,-4,1,T,3
0,T,30,T,27):: NEXT T :: CAL
L MOTION(#9,-10,0):: K=K+1 :
: SC=SC+500*HP

730 FOR T=1 TO 300 :: NEXT T
 :: SP=SP+HP :: HP=0
```

**SINK_SHIP** 680 — Stop our choppers motion and set the ship into a slow diagonal downward motion to sink it, subtract all the points for the total number of men that have been delivered to the ship, and reset the variable for the total men delivered to the ship (SP) to zero.

**SINK_CHOP** 690 — Set our chopper into a slow downward motion, generate the sizzling sound, change our choppers pattern to the backward flight chopper to give it the effect of sinking tail first, turn off the sizzling sound, reset the variable for the number of men in the chopper (HP) to zero, and subtract 1 from the number of our choppers remaining (Z).

700 — Delete our chopper off the screen.
IF there are men on the ship (SP<>0) (we didn't sink the ship, however, it is possible that we never delivered any men to the ship, we just sank our chopper) THEN GOTO TANK_INIT (set up the tank screen).
ELSE Delete the ship, because odds are that it is sinking and we don't want it to wrap around and come floating out of the top of the screen, and then GOTO TANK_INIT (set up the Tank screen).

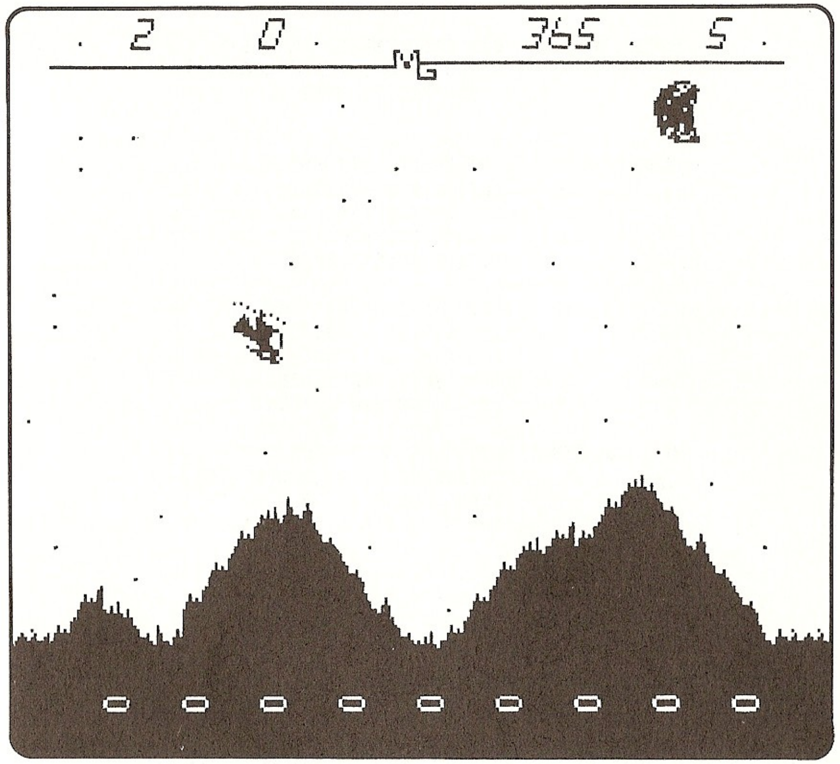
**LAND_CHOP** 710 — Get the back of the ship's position, set our chopper down there in the landed pattern using the same motion (velocity) as the ship, and generate the sound of the chopper engines slowing down (for a slight time delay to give your joystick or keyboard hand a rest).

720 — Rest time is over, so rev up the chopper engines, make our chopper lift off the ship, add 1 to the level (K), and add 500 points for each man in the chopper to the score.
(Note: by using the HP variable here you can easily change the total number of men required to be picked up on the tank screen without worrying about adjustments to the scoring).

730 — Generate a slight time delay to allow the chopper to get higher in the air before going back to the Tank screen, add the number of men in the chopper (HP) to the total men delivered to the ship (SP), and reset the number of men in the chopper (HP) to zero, and continue with tank_init.

**TANK_INIT**

```
740 DISPLAY AT(1,2):USING B$
:HP,SP,SC,Z :: IF Z THEN CAL
L DELSPRITE(ALL)ELSE 250

750 CALL CHAR(60,"000001010F
090909010101013E200000C0C4C4
FCC0C0C0C0C02010080810203")

760 CALL CHAR(64,"0101031F13
1313030303033F20000000808888
88F88080808080000080402O3")

770 CALL CHAR(68,"0000010107
0909050101010106181000C0C0C2
F4C8C0C0C0C02010080810203",3
5,"FFFFFFFF817E7E81")

780 DISPLAY AT(20,1):A$ :: C
ALL COLOR(2,11,1,1,11,1,13,1
2,1):: GOSUB 800

790 CALL SPRITE(#3,140,2,161
,256,0,-24):: FOR T=9 TO 20
:: CALL SPRITE(#T,136,7,200,
1):: NEXT T :: GOTO 1030
```



| | |
|---|---|
| **TANK_INIT** 740 | Display the scoring on row 1. IF there are any of our choppers left (Z<>0) THEN delete all sprites. ELSE GOTO GAME_OVER (end of game). |
| 750 | Define the first pattern of the running man sprite (char 60). |
| 760 | Define the second pattern of the running man sprite (char 64). |
| 770 | Define the third pattern of the running man sprite (char 68) and redefine the missile silo character as closed, in case it was opened. |
| 780 | Display the Tank screen foreground with the missile silos in case we just came from the Ship or Enemy Chopper screens, turn on the colors for the hills and the MG logo, and GOSUB INVIS_SUB (delete all sprites and place 4 invisible sprites at the bottom of the screen). |
| 790 | Bring out the tank from the right hand edge of the screen at a rapid motion so that it will be near the middle of the screen when our chopper comes out, set up the sprites used for the laser fire but place them off the visible portion of the screen, and GOTO CHOP_OUT (bring out our chopper). |

**INVIS_SUB**

```
800 CALL DELSPRITE(ALL):: FO
R T=5 TO 8 :: CALL LOCATE(#T
,177,T*17):: NEXT T :: RETUR
N
```

**TANK_SHOOTS**

```
810 IF T<>12 THEN CALL POSIT
ION(#1,X,Y,#3,YY,YY):: IF AB
S(Y-YY)<80 THEN CALL SPRITE(
#4,36,9,157,YY,X-147,2*V+Y-Y
Y)ELSE 1060 ELSE 1060   2×Y - YY

820 CALL SOUND(-150,-8,3,110
,30,110,30,5010,30):: CALL S
OUND(300,-8,1,128,30,128,30,
1100,30):: CALL DELSPRITE(#4
):: GOSUB 870 :: GOTO 1030
```

**MACHINE_GUN**

```
830 CALL MOTION(#3,0,V/4,#2,
0,0):: CALL PATTERN(#2,80)::
 CALL SOUND(-1,-4,9):: IF T=
12 THEN CALL MOTION(#1,0,V)

840 FOR T=1 TO 9 :: CALL SOU
ND(50,-6,1):: NEXT T :: CALL
 DELSPRITE(#2):: Y1=0 :: RET
URN
```

**INVIS_SUB**
800

This subroutine deletes all sprites, sets up 4 invisible sprites at the bottom of the screen, and returns.

**TANK_SHOOTS**
810

```
IF   our chopper is not just coming out (T<>12, the just coming
     out flag) THEN  get our choppers current  position and the
     tanks current position, we only need the tanks dot column
     since its dot row is not allowed to change.
     IF   they  are still in alignment  and our chopper has not
          flown, wrapped, around to the other side of the
          screen (ABS(Y-YY)<80) THEN make the tank shoot a
          sprite at the chopper from the tanks current position
          to the choppers current position and continue with
          the next line.
     ELSE the chopper must have flown around to  the other side
          of the screen so just GOTO TANK_LOOP1 (go back into
          the tank_loop).
ELSE our  chopper is  just coming  out so  give it a chance and
     GOTO TANK_LOOP1 (go back into the tank_loop).
```

820

Generate tank shoots sound which we will use in conjunction with the next positive duration sound statement as a time delay, generate the hit sound, delete the sprite that was shot at the chopper, GOSUB CRASH_CHOP (crash or blow up the chopper) and GOTO OUR_CHOP_OUT (to start the tank loop over).

**MACHINE_GUN**
830

This subroutine, which can be branched to from the tank_loop or the land_it sections of the program, will change the tanks motion and move it at 1/4 the speed of our choppers last velocity (this usually makes the tank move away from the chopper when it has landed on the ground so that the blow_up_chop routine doesn't cause the chopper to hit the tank and blow it up too). Also, in case the man is running, stop his motion, change the man's pattern in case he is on the screen, to the bent over figure, stop any previous sound statements that may be on since the next sound statements have a positive duration.

```
IF   the chopper is just coming out (T=12, the just  coming out
     flag) THEN change its motion to level flight so that it
     doesn't fly through the ground while the tank machine guns
     the man.
```

840

Generate the  machine gun sound, delete the man off the screen, set the mans dot column variable (Y1) to zero, this tells the tank_loop that the man is no longer on the screen and it tells the land_it loop to bring out another man, and then return to the next statement after the GOSUB MACHINE_GUN statement.

```
BLOW_UP_TANK   850 CALL COLOR(#3,2):: FOR T
               =0 TO 16 STEP 4 :: CALL SOUN
               D(-999,-8,T,120,27,127,28,10
               00,30):: CALL PATTERN(#3,84+
               T):: NEXT T

               860 SC=605-3*X+SC :: CALL DE
               LSPRITE(#3):: CALL SPRITE(#3
               ,140,2,161,256,0,-24):: RETU
               RN

CRASH_CHOP     870 T=0 :: CALL SOUND(-1,-4,
               9):: IF Y AND 1 THEN CALL PA
               TTERN(#1,112):: CALL MOTION(
               #1,9,V)ELSE CALL COLOR(#1,16
               ):: GOTO 930

NEW_COLOR      880 CALL COLOR(#1,RND*7+3)::
                FOR T=1 TO 26 STEP 5 :: CAL
               L SOUND(T*40+200,-8,T,110,30
               ,110,30,1100-T,30)

               890 CALL POSITION(#1,X,Y)::
               IF X>155 THEN CALL MOTION(#1
               ,0,0):: GOTO 910 ELSE IF X A
               ND 2 THEN 880

               900 NEXT T :: GOTO 880
```

**BLOW_UP_TANK**
850 This subroutine will change the tanks color back to black since the laser_fire routine changes it to white, start the blow up routine by generating the blow up sound while changing the tank pattern into expanding fragments.

860 Calculate and add a number of points to our score (the higher the chopper is in the air the greater the points, X is the choppers dot row position, so if the chopper is low, dot row 160, this will add 125 points and if the chopper is at the top of the screen, dot row 35 this will add 500 points to our score), delete the blown up tank sprite, bring out a new tank from the right hand edge of the screen, and return.

**CRASH_CHOP**
870 This Subroutine Has 2 entry points. The First one randomly decides to either crash the chopper into the ground or to just blow it up in the air. The second entry point at BLOW_UP_CHOP blows up the chopper wherever it is. So, by letting CRASH_CHOP fall through to BLOW_UP_CHOP we can crash the chopper into the ground and then blow it up. First we clear the COINC flag (T=0) in case we hop right into BLOW_UP_CHOP. Next we turn off any previous sounds that may be on since the next sound statements have a positive duration.

IF Our choppers last checked position was on an odd dot column (Y AND 1) THEN we will get ready to crash it into the ground by changing its pattern to the forward flight chopper, and setting it into a diagonally downward motion according to the value of V.

ELSE We will get ready to blow it up in the sky by changing its color to white and then we will GOTO BLOW_UP_CHOP.

**NEW_COLOR**
880 This is part of the loop that crashes the chopper into the ground. First change its color to a randomly selected color between 3 and 10. Next we start up a For-Next loop that may or may not be completed but it is used to generate a sound like the choppers engines are in trouble.

890 Now we check our choppers position.

IF we are close to the ground (X>155) THEN stop our choppers motion and GOTO CHK_COINC (this leaves the For-Next loop and the crash loop).

ELSE IF our choppers last dot row position has the binary bit for the value of 2 turned on, then goto NEW_COLOR. This will not allow the entire For-Next loop to execute so the sound will not have a regular pattern. (the X AND 2 is a simple random test since the chopper is constantly changing its position)

900 Since the X AND 2 test returned 0 or false then execute NEXT T. When the For-Next loop is finished GOTO NEW_COLOR and start the loop over again. The only way out of the loop is when the choppers dot row is greater than 155.

```
CHK_COINC        910 CALL COINC(#1,#2,16,T)::
                  IF T THEN CALL DELSPRITE(#2
                 )

                 920 CALL COINC(#1,#3,17,T)::
                  CALL COLOR(#1,2):: IF T THE
                 N CALL SOUND(-300,-8,1,110,3
                 0,110,30,3000,30):: CALL COL
                 OR(#3,7)

BLOW_UP_CHOP     930 FOR Y=0 TO 16 STEP 4 ::
                 CALL SOUND(-999,-8,Y,120,27,
                 127,28,1100,30):: CALL PATTE
                 RN(#1,84+Y):: NEXT Y

                 940 CALL DELSPRITE(#1):: Z=Z
                 -1 :: HP=0 :: IF T THEN GOSU
                 B 850 :: RETURN ELSE RETURN

LAND_IT          950 CALL MOTION(#1,0,V):: CA
                 LL COINC(#1,#2,12,YY):: IF Y
                 Y THEN CALL SOUND(-500,-8,1,
                 110,30,110,30,840,28):: CALL
                  DELSPRITE(#2)

                 960 CALL SOUND(-4250,-4,1,14
                 0,30,140,30,140,30):: CALL P
                 OSITION(#1,X,Y,#2,Y1,Y1):: C
                 ALL SPRITE(#1,116,13,160,Y,0
                 ,0)

MAN_OUT          970 CALL MOTION(#2,0,4*SGN(Y
                 -Y1)):: IF Y1=0 THEN CALL SP
                 RITE(#2,76,2,163,256)
```

**CHK_COINC**
910 When the program flow comes here our chopper is near the ground (X>155) so check to see if it has crashed on top of the man.
IF it has crashed on top of the man THEN delete him off the screen.

920 Next check to see if our chopper has crashed on top of the tank and change our choppers color to black since it was changed to random colors in the crash loop.
IF it has crashed on top of the tank THEN generate a noise that sounds like the choppers blades hitting the tank and change the tank's color to red.

**BLOW_UP_CHOP**
930 Now we will execute a For-Next loop to generate the blow up sound while it changes the blow up pattern for our chopper.

940 Next we delete our blown up chopper off the screen, subtract 1 from the number of our choppers remaining (Z=Z-1) and clear out the variable that contains the number of men currently in our chopper (HP=0).
IF our chopper crashed into the tank (T<>0) THEN GOSUB BLOW_UP_TANK and RETURN.
ELSE just RETURN to the statement after gosub crash_chop or blow_up_chop.

**LAND_IT**
950 This routine, which makes our chopper land on the ground, is branched to from the TANK_LOOP when our chopper's dot row is greater than 151. First we stop its downward motion but we keep its forward motion going so it can slide in for a landing. Then we check to see if we landed the chopper on top of the man.
IF we have landed on top of the man (YY<>0) THEN generate a sound and delete the man off the screen.

960 Next generate a slightly different sound for the chopper while its on the ground, check the position of our chopper and the man so we can set the man into motion toward our chopper and then set our chopper on the ground in the landed pattern with all velocities at 0 or bring it to a stop.

**MAN_OUT**
970 Now put the man into motion toward our chopper. Note: Since we used CALL DELSPRITE(#2) instead of CALL DELSPRITE(ALL) the sprite is not actually deleted it is just moved off the screen.
IF the man is not on the screen (Y1=0 when the sprite is deleted and its position is checked) THEN bring him out on the extreme right hand edge of the screen. The previous CALL MOTION will put him into motion towards the chopper so he will smoothly come out on the left hand edge of the screen.

```
KEY_LOOP    980 CALL KEY(1,T,T):: IF T=5
             THEN 1020 ELSE YY=YY-4 :: I
            F YY<60 THEN YY=76

            990 CALL PATTERN(#2,YY):: CA
            LL COINC(#1,#3,32,T):: IF T
            THEN GOSUB 830 :: GOSUB 870
            :: GOTO 1030

            1000 CALL COINC(#2,#3,24,T):
            : IF T THEN GOSUB 830 :: GOT
            O 970 ELSE CALL COINC(#1,#2,
            11,T):: IF T THEN CALL PATTE
            RN(#2,80)ELSE 980

            1010 CALL SOUND(-200,220,7,2
            23,8,226,9):: HP=HP+1 :: DIS
            PLAY AT(1,3)SIZE(2):HP :: CA
            LL DELSPRITE(#2)

TAKE_OFF    1020 CALL SOUND(-4000,-4,1,1
            10,30,110,30,320,30):: CALL
            MOTION(#1,-17,V/2,#2,0,0)::
            CALL PATTERN(#2,128):: IF HP
            =5 THEN 300 ELSE 1050
```

```
KEY_LOOP   Scan the left hand keyboard, we don't care  about the status so
 980       we can reuse the T variable here for faster operation.
           IF   the up arrow key was pressed THEN goto TAKE_OFF.
           ELSE subtract  4  from  the  pattern  variable for our animated
                running man.
                IF   the  pattern variable is  less than 60  we are at the
                     end of the running man patterns so THEN reset it back
                     to 76.

 990       Change the running man's pattern  and then check to see  if the
           tank is within 32 pixels of our chopper.
           IF   it is  (T<>0) THEN GOSUB MACHINE_GUN to shoot the tank and
                man, GOSUB CRASH_CHOP to blow up our chopper and GOTO
                OUR_CHOP_OUT to start the Tank Loop all over again.

 1000      Since the tank  was not close  to our chopper  check to see  if
           just the man is close to the tank.
           IF   he is  THEN GOSUB  MACHINE_GUN to  shoot the  man and GOTO
                MAN_OUT to bring out another man and continue with the
                key_loop.
           ELSE Since the man was not close to the tank check to see if he
                is close to our chopper so he can climb aboard.
                IF   he is then change  his pattern and make him bend down
                     to climb in and continue with the next line.
                ELSE since he is not close  enough to our chopper yet GOTO
                     KEY_LOOP and start this loop over again.

 1010      Since he  was close  enough to  climb aboard  generate the beep
           sound to indicate that he made it, add 1 to the variable that
           contains the total number of men in our chopper, display the
           total number of men in our chopper at the top of the screen and
           delete the man of the screen.

TAKE_OFF   Generate  the take off  sound for our  chopper, put our chopper
 1020      into a diagonally  upwards motion according  to the value  of V
           and stop the running man and change his pattern to the waving
           man in case we came to this part of the routine directly from
           key_loop and left him on the ground.
           IF   we have 5 men  in the chopper THEN goto  R&P_INIT to check
                the level and see which screen we should goto next.
           ELSE go back  to the TANK_LOOP to continue  playing on the Tank
                Screen since we don't have enough men in the chopper yet.
```

**OUR_CHOP_OUT**
```
1030 IF Z THEN CALL SPRITE(#
1,112,13,20,1,20,35):: T,V=1
2
```

**TANK_SCORE**
```
1040 DISPLAY AT(1,2):USING B
$:HP,SP,SC,Z :: IF Z=0 THEN
250
```

**TANK_LOOP**
```
1050 CALL SOUND(-999,-4,1,11
0,30,110,30,200,30):: CALL P
OSITION(#1,X,Y,#2,Y1,Y1,#3,Y
Y,YY):: IF ABS(YY-Y)<5 THEN
810 ELSE IF Y1 THEN CALL PAT
TERN(#2,124)
```

**TANK_LOOP1**
```
1060 CALL MOTION(#3,0,SGN(Y-
YY)*((Y AND 6)+4+K)):: IF X<
35 THEN CALL MOTION(#1,0,V):
: CALL LOCATE(#1,35,Y)ELSE I
F X>151 THEN 950

1070 IF Y1 THEN CALL PATTERN
(#2,128):: IF ABS(YY-Y1)<26
THEN GOSUB 830
```

**OUR_CHOP_OUT** 1030

IF there are any choppers left (Z<>0) THEN bring out our chopper from the upper left hand corner of the screen moving diagonally down and forward, initialize the chopper's velocity variable (V) and set the chopper just coming out flag (T) with the same value.

**TANKSCORE** 1040

Display the scoring on row 1.
IF there aren't any choppers left (Z=0) THEN GOTO GAME_OVER (end of game).

**TANK_LOOP** 1050

Generate chopper sound, get the chopper's (sprite #1), the running man's (sprite #2) and the tank's (sprite #3) positions (Note: we need the dot row and dot column for our chopper but we only need the dot column for the man and the tank since they are always on the same dot row).
IF the tank is lined up within 4 dot column pixels of the flying chopper (ABS(YY-Y)<5) THEN GOTO TANK_SHOOTS (tank shoots at the flying chopper).
ELSE IF the man is on the screen (Y1<>0) THEN change his pattern to make his arm wave.

**TANK_LOOP1** 1060

Make the tank move towards the chopper (SGN(Y-YY) at a random speed based on our choppers last dot column position ((Y AND 6)+4) adding some extra speed for the current level (+K).
IF our chopper is too high on the screen (X<35) THEN change its motion into level flight in the current direction it is heading (V), and relocate it back down to dot row 35 at it current dot column position.
ELSE IF our chopper is near the ground (X>151) THEN GOTO LAND_IT (land it on the ground).

1070

IF the man is on the screen (Y1<>0) THEN change his pattern to make his arm wave and,
IF the tank is within 25 dot column pixels of him (ABS(YY-Y1)<26 THEN GOSUB MACHINE_GUN (make the tank shoot the man).

```
               1080 CALL KEY(1,T,T):: IF T=
               13 THEN 1130 ELSE IF T<0 THE
               N CALL PATTERN(#1,V/3+108)::
                CALL MOTION(#1,3*(X>35),V):
               : GOTO 1050

               1090 IF T=3 THEN CALL PATTER
               N(#1,112):: V=12 :: GOTO 112
               0 ELSE IF T=2 THEN CALL PATT
               ERN(#1,104):: V=-12 :: GOTO
               1120

               1100 IF T=0 THEN CALL PATTER
               N(#1,108):: CALL MOTION(#1,8
               ,V):: GOTO 1050

               1110 IF T=5 THEN CALL PATTER
               N(#1,108):: CALL POSITION(#1
               ,X,Y):: IF X<36 THEN CALL LO
               CATE(#1,35,Y)ELSE CALL MOTIO
               N(#1,-12,V):: GOTO 1050

END_TANK_LOOP  1120 CALL MOTION(#1,0,V):: G
               OTO 1050
```

1080 Scan the left hand side of the keyboard for a key press (we don't need the status).
IF the fire key was pressed (T=13) THEN GOTO LASER_FIRE (shoot at the tank).
ELSE IF no key was pressed (T<0 or T=-1) THEN set the choppers pattern according to the velocity (V), the pattern equals 104 (backwards) when V=-12 and it equals 112 (forwards) when V=12, set the chopper into a slightly upward diagonal motion (forward or backward according to V) if it is not above or at dot row 35, and then GOTO TANK_LOOP (start the over loop again).

1090 IF the Right arrow key was pressed THEN change the choppers pattern to forward flight (char 112), set the velocity variable (V) equal to 12, and GOTO END_TANK_LOOP (adjust our choppers motion).
ELSE IF the Left arrow key was pressed THEN change the choppers pattern to backward flight (char 104), set the velocity variable (V) equal to -12, and GOTO END_TANK_LOOP (adjust choppers motion).

1100 IF the Down arrow key was pressed THEN change the choppers pattern to level flight, set it into a diagonally downward motion (forward or backward according to V), and GOTO TANK_LOOP.

1110 IF the Up arrow key was pressed THEN change the choppers pattern to level flight, check its current position and,
IF it is too high (X<36) THEN locate it back down to dot row 35, if it was on dot row 35 this locate statement won't have any visual effect on the screen, and continue with end_tank_loop.
ELSE set it into a diagonally upward motion (forward or backward according to the value of V), and GOTO TANK_LOOP (start the loop over again).

(Note: if an invalid key was pressed then none of the above IF statements would be executed and the value for V will remain unchanged and the program will drop through to end_tank_loop)

**END_TANK_LOOP** 1120 Adjust our chopper's motion according to the value of V and GOTO TANK_LOOP (start the loop over again).

**LASER_FIRE**

```
1130 CALL SOUND(-999,-8,3,12
8,30,128,30,999,30):: CALL M
OTION(#1,0,V):: CALL POSITIO
N(#1,X,Y):: Y=V/2+Y :: IF Y<
1 THEN Y=1

1140 FOR T=X+16 TO 175 STEP
13 :: Y=Y+13 :: IF Y>255 THE
N Y=1

1150 CALL LOCATE(#T/13+7,T,Y
):: NEXT T :: IF Y1 THEN CAL
L COINC(#2,160,Y,18,T):: IF
T THEN CALL DELSPRITE(#2)

1160 CALL SOUND(-999,-8,3,12
8,30,128,30,500,30):: CALL C
OINC(ALL,T):: CALL DELSPRITE
(#9,#10,#11,#12,#13,#14,#15,
#16,#17,#18,#19,#20)

1170 IF T THEN CALL COLOR(#3
,16):: GOSUB 850 :: GOTO 104
0 ELSE 1050
```

**LASER_FIRE**
1130 Generate the Laser Fire sound, change our chopper's motion to level flight V and check its position. Next adjust the dot column variable slightly to compensate for our chopper's level flight motion. This allows the laser to always start underneath the chopper no matter which direction it is moving in.
IF after the adjustment, we are left with a value less than 1, because our chopper is moving backwards and on the left hand edge of the screen, THEN change it to 1.

1140 Start the laser fire For-Next loop 16 pixels lower than our choppers position. This also determines how many laser sprites to bring out. The closer our chopper is to the ground the fewer the sprites we need to display. This loop increments in units of 13 to compensate for the double line laser pattern. If you look in the appendix for the definition of character number 136, laser fire, you will notice that only 13 pixel rows were used. If you use a single line laser you can use all 16 pixel rows without worrying about sprite pixel overlap. The end of the loop at 175 assures that the laser will be displayed all the way down to the 4 invisible sprites at the bottom of the screen, which have a lower number than the laser sprites. This automatically ends the laser at the same position on the ground no matter where our chopper is in the air since any part of the laser that resides in the same dot rows will not be seen. On each loop we also add 13 to Y (the dot column) to make the laser come out diagonally.
IF Y is greater than 255 we need to wrap the laser around to the other side of the screen.

1150 Bring out a laser fire sprite. At the end of the TANK_INIT routine we placed sprite numbers 9 through 20 off the bottom of the screen for the laser fire. This was done because a CALL LOCATE works MUCH faster than a CALL SPRITE, so now with them defined and off the screen we can just use a CALL LOCATE to display them. Keep looping until the For-Next loop is done.
IF our man is on the screen (Y1<>0), THEN check the coincidence between him and the last laser sprites position from the For-Next loop (Y).
IF we hit him THEN delete him off the screen. Note: You could make the game much harder here by clearing out the total score if you shoot one of our men or you could penalize the player by blowing up the chopper or......? its up to you.

1160 Generate the end of the laser fire sound and check for any coincidence (we already checked to see if we hit the man so if there is a coincidence it must be the tank) and delete the laser fire off the screen. By using CALL DELSPRITE(#x) instead of (ALL) we will not actually delete the laser sprites we will just move them off the visible portion of the screen. This method works faster than a For-Next loop to delete the sprites.

1170 IF we hit the tank THEN change its color to white, GOSUB BLOW_UP_TANK and GOTO TANK_SCORE to display the score and start the tank_loop over again.
ELSE since we didn't hit the tank there's no need to display the score so just goto TANK_LOOP to start it over again.

## MORE CALL PEEKs & CALL LOADs

Listed below are some new CALL PEEKs and CALL LOADs. Along with these you will also find the CALL PEEKs and CALL LOADs that were in the Smart Programming Guide for Sprites and the Smart Programmer newsletter.

### CALL PEEK (Extended Basic)

| | |
|---|---|
| CALL PEEK(-28672,A)::IF A=0 OR A=127 | The speech synthesizer is NOT attached |
| RANDOMIZE :: CALL PEEK(-31880,A) | Random Integers 0-99 |
| RANDOMIZE :: CALL PEEK(-31808,A,B) | Double Random Integers 0-255 |
| CALL PEEK(-31879) | VDP Interrupt Timer |
| CALL PEEK(-31878) | Highest # Sprite in Auto-Motion |
| CALL PEEK(-31877) | VDP Status Register |
| CALL PEEK(8198,A,B)::IF A/B=2 or IF A*256+B=43605 or IF A=170 AND B=85 | THEN CALL INIT has been executed |
| CALL PEEK(8194,A,B,C,D)::(C-A)*256+D-B | = Free Space in Low Memory after CALL INIT or CALL LOAD("DSKx.xxxxxx") |
| CALL PEEK(-31974,A,B) :: A*256+B-2487 | = Running free space in VDP Ram. Note: FOR - NEXT LOOPs, GOSUBs etc. use running space, garbage collection recovers it. This PEEK will not ALWAYs return EXACT amount of free VDP Space unless Garbage collection has JUST been accomplished. (SIZE performs garbage collection before reporting STACK Free Space) |
| CALL PEEK(-31936,A,B) :: A*256+B-2487 | = Exact amount of Free Stack space while the program is running. Does not count the garbage collection area as used. |
| CALL PEEK(-31866,A,B) :: A*256+B-41023 | = Free Program space in High Memory |
| CALL PEEK(-31952,A,B) :: A*256+B | = Start of Line number Table - Without Mem-Expansion this points into VDP Ram. With Mem-Expansion this points into High Mem-Expansion. |
| CALL PEEK(-31950,A,B) :: A*256+B | = End of Line Number Table - points to the last byte of the line number table. |
| CALL PEEK(-31954,A,B) :: A*256+B | = The memory address of the pointer to the current line being executed. |

### CALL PEEK (Extended Basic) Continued

| | |
|---|---|
| CALL PEEK(-31954,A,B) :: CALL PEEK(A*256+B-65536,C,D):: C*256+D | = Start address of current program line being executed. |
| CALL PEEK(-31954,A,B) :: CALL PEEK(A*256+B-65538,C,D):: C*256+D | = Current line number being executed. |
| CALL PEEK(-31952,A) :: IF A=55 THEN | No Memory Expansion |

### CALL LOAD (Extended Basic)

| | |
|---|---|
| CALL LOAD(-31962,0,32) | Execute Power Up Routine - Go To Title Screen does not close open files. |
| CALL LOAD(-31962,33,111) | Hop directly into TI Basic |
| CALL LOAD(-31962,99,114) | Restart Extended Basic - try to reload DSK1.LOAD |
| CALL LOAD(-31962,101,190) | Execute LIST command - from command mode only |
| CALL LOAD(-31962,100,155) | Execute RUN command |
| CALL LOAD(-31962,100,124) | Execute NEW command |
| CALL LOAD(-31962,100,126) | Execute CONTINUE command - from command mode only |
| CALL LOAD(-31962,100,128) | Another LIST command - from command mode only |
| CALL LOAD(-31962,100,130) | Execute BYE command (closes all open files) |
| CALL LOAD(-31962,100,132) | Execute default NUM command - when running program ends. Line 100 contains garbage so just place a REM there. |
| CALL LOAD(-31962,100,136) | Execute default RESEQUENCE command |
| CALL LOAD(-31962,160,000) | Generates colorful Title Screen |
| CALL LOAD(-31962,160,04) | Execute RUN without Pre-Scan (Faster than having a RUN command in your program to restart it.) |
| CALL LOAD(-31806,128) | Disables Auto Sprite motion, Auto Sound and the QUIT Key |
| CALL LOAD(-31806,64) | Disables Auto Sprite motion - brings ALL moving Sprites to an immediate stop. |
| CALL LOAD(-31878,0) | Brings ALL moving Sprites to an immediate stop - placing a value in here between 1 and 28 allows only the sprite numbers that are equal to or less than that number to be in auto motion. |

**CALL LOAD (Extended Basic) Continued**

| | |
|---|---|
| CALL LOAD(-31806,32) | Disables Auto Sound processing - leaves the sound on forever. |
| CALL LOAD(-31806,16) | Disables the QUIT key |
| CALL LOAD(-31806,0) | Enables Auto Sprite motion, Auto sound processing and the QUIT key. |
| CALL LOAD(-31744,x,x,x,x) | Sound chip location, different values turn on different sounds. |
| CALL LOAD(-27648,x,x,x) | Speech chip location |
| CALL LOAD(-31868,0,0):: RUN "DSKx.xxxx" | Turns OFF Memory Expansion |
| CALL LOAD(-31868,255,231):: RUN "DSKx.xxxx" | Turns ON Memory Expansion |

**APPENDIX - A**

## CASSETTE JOYSTICK VERSION

```
10 CALL CLEAR :: CALL MAGNIF
Y(3):: CALL SCREEN(2):: GOTO
 30 :: A$,B$,W$,B :: CALL KE
Y :: CALL JOYST :: CALL SOUN
D :: CALL PEEK :: CALL HCHAR
 :: CALL VCHAR

20 X,Y,Y1,YY,K,V,Z,HP,SP,SC
:: CALL POSITION :: CALL PAT
TERN :: CALL SPRITE :: CALL
DELSPRITE :: CALL COINC :: C
ALL MOTION :: CALL LOCATE

30 E$="00000000" :: T$=E$&"0
000" :: S$=E$&E$ :: CALL CHA
R(132,"6152524CCC00000080808
0FF809C84FC"&E$&"FF"&T$&"FF"
):: FOR T=1 TO 8 :: CALL COL
OR(T,15,1):: NEXT T :: !@P-

35 FOR T=0 TO 27 STEP 3 :: D
ISPLAY AT(12,2):"RELEASE THE
 ALPHA LOCK KEY" :: CALL SOU
ND(-140,550,T,557,T):: DISPL
AY AT(12,1):: NEXT T

40 CALL CHAR(47,"3C4299A1A19
9423C",33,RPT$("FF",8)&"0000
002011B3FFFFFFFFFFFF817E7E81
",112,"A00802103979FDFF1F070
1080701"&E$&"80D084C1F0FCF2E
2E2F2FC9CFA1C")

50 DISPLAY AT(5,3):"N I G H
T  M I S S I O N": : :RPT$
(" ",13)&"  "&RPT$(" ",13)::
 CALL COLOR(13,12,1):: GOSUB
 240 :: CALL SPRITE(#1,112,1
3,46,25,0,11)

60 DISPLAY AT(12,14):"BY": :
" MIKE MC CUE & CRAIG MILLER
": : : :TAB(12);"/ 1983": :"
     MILLERS GRAPHICS":"
  1475 W CYPRESS AVE":"
SAN DIMAS CA 91773"

70 CALL CHAR(136,"9048241209
0402010"&E$&S$&"080402090482
41209",96,"1000040"&E$&"80"
&E$&"2"&S$&"104000001000008"
,100,"0000008"&S$&"000004"&S
$&"2"&T$&"04")

80 CALL CHAR(120,"030E3F3C7F
F7FFFFFF6F7F7F33360F03E0583C
F8F8E8F0B0F0F0F07078E81CFC",
124,"0008080907"&RPT$("01",1
1)&"00C0C0C0E0E0E0E0E0C04040
404040E0")

90 A$=RPT$(" ",22):: CALL CH
AR(128,"0202040503"&RPT$("01
",11)&"00C0C0C0E0E0E0E0E0C04
0404040 40E0",140,T$&"0103073
F6AAAAA7F"&S$&"80C0E0FCAAA9A
AFC")

100 A$=A$&"/  e     e   /,
    e    .(-   e     .((-
 e     /..(((,  e   e  .((((
-     .(((((((-   ./  .(((((
(,  e.((((((((- .((-,((((((
((-/.(((((((((((,"

110 GOSUB 240 :: B$=RPT$("!"
,28)&RPT$("!!#",9)&RPT$("!",
29):: W$=RPT$("""",28)&RPT$(
"!",84)

120 CALL CHAR(92,"0008000020
000000400000001"&E$&"80"&E$&
"208000002001",116,"00005501
0F1E183020301E1F0F1320300000
5580F078180C040C78F8F0C8040C
")

130 CALL CLEAR :: FOR T=1 TO
 13 :: CALL COLOR(T,1,1):: N
EXT T :: FOR X=1 TO 30 :: RA
NDOMIZE :: CALL PEEK(-31808,
T,Y):: CALL HCHAR(T/18+1,Y*.
12+1,101):: NEXT X

140 GOSUB 240 :: CALL CHAR(8
8,"00000400100000002000000 8"
&E$&"001"&E$&"410000004001",
56,"1F1122223E4444F81F21213E
02040408")

150 CALL CHAR(48,"1F21214242
8484F801010202040408081F0101
023C20407E3F0103021C0408F8",
52,"1111223E020404081F202040
7C0408F8102020407E82827C3F01
020408102040")

160 CALL CHAR(80,E$&"0003040
10101010102020406000000 18F8E
0F8C0C0C070101018",84,"00000
002000080000100002"&T$&"00200
00008200000082")

170 CALL CHAR(72,"0000010107
0503010101010102020203C0C0C0
E0E0F8C0C0C02020101020406"):
: CALL HCHAR(20,1,34,32)

180 CALL CHAR(36,"140A200D1A
21641A241A0814080800080"&S$,
76,"0000010303030301010101 00
00070400C0C0C0E0E0E0F0C0C040
40C0C0A080C"):: CALL HCHAR(2
1,1,33,128)

190 DISPLAY AT(10,1):"e h i
j k ej l j m n ek n e" :: CA
LL CHAR(40,RPT$("FF",8),44,"
00008082C2C7F7FF8080C0E0E4FC
FEFF0103232B7F7FFFFF"&E$&"08
28A9FD")

200 DISPLAY AT(2,1):RPT$(" "
,13)&"  "&RPT$(" ",13):: DIS
PLAY AT(3,24):"xz" :: DISPLA
Y AT(4,24):"y{" :: DISPLAY A
T(15,1):A$:B$ :: A$=SEG$(A$,
141,28)&B$

210 GOSUB 240 :: B$="e # ###
# e########### e### e" :: CAL
L DELSPRITE(ALL):: CALL COLO
R(3,15,1,4,15,1,9,11,1,2,11,
1,1,11,1,12,15,1,13,12,1)

220 CALL COLOR(10,1,1):: CAL
L CHAR(108,E$&"55000061E1FFF
FFF00000003"&E$&"5540E0F8E4E
2E1F1FF7C45FE")

230 K=1 :: Z=5 :: HP,SP,SC,B
=0 :: CALL CHAR(104,E$&"0104
10400103CFFFFF7860010208 20C0
707CE2E1E1F3FEFCC54658E")::
GOTO 740

240 CALL SOUND(-4250,-4,1,11
0,30,110,30,200,30):: RETURN

250 CALL KEY(3,T,Y):: Z=INT(
(SC-B)/10000):: FOR T=1 TO Z
 :: CALL SOUND(200,770,4,777
,6):: DISPLAY AT(1,24):USING
 "###":T :: NEXT T

260 IF Z THEN B=B+Z*10000 ::
 GOTO 740 ELSE CALL CHAR(108
,"FF81BFA0AFB981FFFF81E71818
E781FFE7B5B5BDBDADADE7")

270 CALL CHAR(104,"FF81BD81B
FA0A0E0E0A0A0A0A0BF81FFFF81B
DBD81BDA5E7E7A5BD81E7181818"
):: CALL SPRITE(#1,112,13,87
,1,0,12)

280 CALL COLOR(10,7,1,10,9,1
,10,16,1,10,6,1):: CALL KEY(
1,T,Y1):: CALL KEY(0,T,T)

290 IF T=89 OR Y1 THEN 220 E
LSE IF T=78 THEN CALL DELSPR
ITE(ALL):: CALL VCHAR(1,1,32
,768):: END ELSE 280

300 V=8 :: IF K<2 THEN 570 E
LSE IF Y AND 1 THEN 340 ELSE
 CALL CHAR(60,"08081C1C1C1C1
C3E7F1C0008221004080"&S$)

310 YY=600 :: CALL DELSPRITE
(ALL):: FOR T=2 TO 5 :: CALL
 LOCATE(#T,1,T*17,#T+4,177,T
*17):: NEXT T

320 CALL SOUND(-350,-7,6,110
,5):: CALL CHAR(35,"FFFFFFFF
81000081"):: CALL SOUND(4250
,-8,4,110,27,115,28,YY,30)

330 FOR T=10 TO 18 :: RANDOM
IZE :: CALL PEEK(-31880,X)::
 CALL SPRITE(#T,60,(X AND 7)
+3,177,T*24-208,-X/8-3-K,0):
: NEXT T :: GOTO 360

340 CALL CHAR(60,T$&"01030F7
F0"&E$&T$&"709FA8204FC3C1CFF
0C"):: YY=1600 :: CALL SOUND
(-4250,-8,6,110,27,115,28,YY
,30):: CALL DELSPRITE(ALL)

350 FOR T=10 TO 18 :: RANDOM
IZE :: CALL PEEK(-31880,X)::
 CALL SPRITE(#T,60,(X AND 7)
+3,T*16-120,256,0,-X/8-3-K):
: NEXT T

360 CALL SPRITE(#1,112,13,72
,1,0,3)

370 CALL SOUND(-999,-8,6,110
,27,115,28,YY,30):: CALL COI
NC(ALL,T):: CALL POSITION(#1
,X,Y):: IF T OR X>161 THEN G
OSUB 870 :: GOTO 740

380 IF Y>224 THEN 410 ELSE C
ALL JOYST(1,T,Y1):: IF Y1 TH
EN CALL PATTERN(#1,108):: CA
LL MOTION(#1,(X-2*Y1>30)*2*Y
1,2):: GOTO 370

390 CALL PATTERN(#1,112):: C
ALL MOTION(#1,0,T/2+2):: GOT
O 370
```

```
410 CALL DELSPRITE(#1):: IF
K<3 THEN 570 ELSE Y1=(Y AND
6)-4 :: CALL DELSPRITE(ALL):
: CALL COLOR(2,1,1,1,1,1,13,
1,1)

420 DISPLAY AT(21,1):"  e
   e     e       e
 e         e       e
   e"

430 CALL CHAR(60,T$&"AA021F2
C4C7F107F"&S$&"A800C1FFE1C09
0E",64,S$&"00009292"&T$&S$&"
4949"):: CALL SPRITE(#1,108,
13,40,31,8,0)

440 CALL SPRITE(#2,60,6,242,
216,(Y AND 1)*80-40,0)

450 CALL SOUND(-4250,-4,1,20
0,30,200,30,200,30):: CALL P
OSITION(#1,X,Y,#2,YY,Y)

460 IF X>180 THEN CALL LOCAT
E(#1,1-(V<0)*180,31)ELSE IF
ABS(X-YY)<7 THEN 490 ELSE CA
LL MOTION(#2,SGN(X-YY)*((YY
AND 11)+9),0)

470 CALL KEY(1,T,Y):: IF Y T
HEN 510 ELSE CALL JOYST(1,Y,
T):: IF T THEN V=-2*T ELSE I
F Y THEN V=0 ELSE 450

480 CALL MOTION(#1,V,0):: GO
TO 450

490 CALL SPRITE(#3,64,7,YY,2
09,V+X-YY,-127):: CALL SOUND
(-900,-8,1,110,30,110,30,999
9,30):: T=0

500 CALL POSITION(#3,Y,Y)::
IF Y>50 THEN 500 ELSE CALL D
ELSPRITE(#3):: CALL COLOR(#1
,11):: GOSUB 930 :: CALL DEL
SPRITE(#2):: GOTO 740

510 CALL SOUND(-900,-8,0,110
,30,110,30,300,30):: CALL PO
SITION(#1,X,Y):: CALL SPRITE
(#3,64,4,X,36,0,127)

520 CALL POSITION(#3,X,Y)::
IF Y<192 THEN 520 ELSE CALL
DELSPRITE(#3):: CALL COINC(#
2,X,220,7,T):: IF T THEN CAL
L SOUND(-1,-4,9)ELSE 450

530 CALL COLOR(#2,15):: FOR
T=0 TO 2 :: CALL PATTERN(#2,
88+T*4):: FOR X=5 TO 7 :: CA
LL SOUND(100,-X,T*10):: NEXT
 X :: NEXT T

540 CALL DELSPRITE(#2):: Y1=
Y1+1 :: SC=SC+250 :: DISPLAY
 AT(1,12)SIZE(10):USING "###
#######":SC :: IF Y1<5 THEN
440

550 CALL POSITION(#1,X,Y)::
IF X>185 THEN CALL LOCATE(#1
,35,Y)

560 CALL PATTERN(#1,112):: C
ALL MOTION(#1,0,20):: CALL S
OUND(-4250,-4,1,200,30,200,3
0,200,30)

570 CALL CHAR(68,S$&"000000F
F7F1FFEAB"&S$&"000000FFFFFFA
A6D",64,E$&"0021F373FFFFFFFF
FFFF972A08103CFFF0FFFFFFFFFF
FFFFFFFF5EAA")

580 Y1=(Y AND 5)+6 :: GOSUB
800 :: CALL CHAR(60,"0000008
080C4CFEEFFFF5BAAFFFF722B"&T
$&"C00FFEFCF8F0E2C67B3D")::
CALL COLOR(1,1,1,2,1,1)

590 DISPLAY AT(20,1):W$ :: C
ALL COLOR(1,5,1,7,12,1):: FO
R T=1 TO 4 :: CALL LOCATE(#T
,161,1):: NEXT T :: CALL SPR
ITE(#9,112,13,15,1,20,35)

600 CALL SPRITE(#10,68,15,14
3,1,#11,64,15,143,17,#12,60,
15,143,33):: CALL MOTION(#10
,0,Y1,#11,0,Y1,#12,0,Y1)

610 CALL SOUND(-4250,-4,1,20
0,30,200,30,200,30):: CALL P
OSITION(#9,X,Y):: IF X<35 TH
EN CALL MOTION(#9,0,V):: CAL
L LOCATE(#9,35,Y)ELSE IF X>1
40 THEN 690

620 CALL COINC(#9,#11,16,T):
: IF T AND X>130 THEN 680 EL
SE CALL COINC(#9,#10,9,T)::
IF T THEN 710

630 CALL JOYST(1,Y,T):: IF Y
 THEN CALL PATTERN(#9,Y+108)
:: V=V-Y*(ABS(Y+V)<16):: CAL
L MOTION(#9,0,V):: GOTO 610

640 IF T THEN CALL PATTERN(#
9,108):: CALL MOTION(#9,2*T*
(X-T>35),V):: GOTO 610

650 CALL PATTERN(#9,SGN(V)*4
+108):: CALL MOTION(#9,(X>35
)*3,V):: GOTO 610

680 CALL MOTION(#9,0,0,#10,2
,4,#11,2,4,#12,2,4):: SC=SC-
SP*500 :: SP=0

690 CALL MOTION(#9,3,0):: CA
LL SOUND(-2450,-8,6,110,30,1
10,30,9999,30):: CALL PATTER
N(#9,104):: CALL SOUND(1,-4,
9):: HP=0 :: Z=Z-1

700 CALL DELSPRITE(#9):: IF
SP THEN 740 ELSE CALL DELSPR
ITE(#10,#11,#12):: GOTO 740

710 CALL POSITION(#10,X,Y)::
 CALL SPRITE(#9,116,13,136,Y
,0,Y1):: FOR T=306 TO 122 ST
EP -6 :: CALL SOUND(-200,-4,
1,T,27,T,30,T,30):: NEXT T

720 FOR T=130 TO 306 STEP 8
:: CALL SOUND(-4250,-4,1,T,3
0,T,30,T,27):: NEXT T :: CAL
L MOTION(#9,-10,0):: K=K+1 :
: SC=SC+500*HP

730 FOR T=1 TO 300 :: NEXT T
 :: SP=SP+HP :: HP=0

740 DISPLAY AT(1,2):USING B$
:HP,SP,SC,Z :: IF Z THEN CAL
L DELSPRITE(ALL)ELSE 250 !!!

750 CALL CHAR(60,"000001010F
0909090101010113E200000C0C4C4
FCC0C0C0C0C02010080810203")

760 CALL CHAR(64,"0101031F13
131303030303033F200000000808888
88F8808080808000008040203")

770 CALL CHAR(68,"0000010107
09090501010101061810000C0C0C2
F4C8C0C0C0C020100808102O3",3
5,"FFFFFFFF817E7E81")

780 DISPLAY AT(20,1):A$ :: C
ALL COLOR(2,11,1,1,11,1,13,1
2,1):: GOSUB 800

790 CALL SPRITE(#3,140,2,161
,256,0,-24):: FOR T=9 TO 20
:: CALL SPRITE(#T,136,7,200,
1):: NEXT T :: GOTO 1030

800 CALL DELSPRITE(ALL):: FO
R T=5 TO 8 :: CALL LOCATE(#T
,177,T*17):: NEXT T :: RETUR
N

810 IF T<>12 THEN CALL POSIT
ION(#1,X,Y,#3,YY,YY):: IF AB
S(Y-YY)<80 THEN CALL SPRITE(
#4,36,9,157,YY,X-147,2*V+Y-Y
Y)ELSE 1060 ELSE 1060

820 CALL SOUND(-150,-8,3,110
,30,110,30,5010,30):: CALL S
OUND(300,-8,1,128,30,128,30,
1100,30):: CALL DELSPRITE(#4
):: GOSUB 870 :: GOTO 1030

830 CALL MOTION(#3,0,V/4,#2,
0,0):: CALL PATTERN(#2,80)::
 CALL SOUND(-1,-4,9):: IF T=
12 THEN CALL MOTION(#1,0,V)

840 FOR T=1 TO 9 :: CALL SOU
ND(50,-6,1):: NEXT T :: CALL
 DELSPRITE(#2):: Y1=0 :: RET
URN

850 CALL COLOR(#3,2):: FOR T
=0 TO 16 STEP 4 :: CALL SOUN
D(-999,-8,T,120,27,127,28,10
00,30):: CALL PATTERN(#3,84+
T):: NEXT T

860 SC=605-3*X+SC :: CALL DE
LSPRITE(#3):: CALL SPRITE(#3
,140,2,161,256,0,-24):: RETU
RN

870 T=0 :: CALL SOUND(-1,-4,
9):: IF Y AND 1 THEN CALL PA
TTERN(#1,112):: CALL MOTION(
#1,9,V)ELSE CALL COLOR(#1,16
):: GOTO 930

880 CALL COLOR(#1,RND*7+3)::
 FOR T=1 TO 26 STEP 5 :: CAL
L SOUND(T*40+200,-8,T,110,30
,110,30,1100-T,30)

890 CALL POSITION(#1,X,Y)::
IF X>155 THEN CALL MOTION(#1
,0,0):: GOTO 910 ELSE IF X A
ND 2 THEN 880
```

```
900 NEXT T :: GOTO 880

910 CALL COINC(#1,#2,16,T)::
 IF T THEN CALL DELSPRITE(#2
)

920 CALL COINC(#1,#3,17,T)::
 CALL COLOR(#1,2):: IF T THE
N CALL SOUND(-300,-8,1,110,3
0,110,30,3000,30):: CALL COL
OR(#3,7)

930 FOR Y=0 TO 16 STEP 4 ::
CALL SOUND(-999,-8,Y,120,27,
127,28,1100,30):: CALL PATTE
RN(#1,84+Y):: NEXT Y

940 CALL DELSPRITE(#1):: Z=Z
-1 :: HP=0 :: IF T THEN GOSU
B 850 :: RETURN ELSE RETURN

950 CALL MOTION(#1,0,V):: CA
LL COINC(#1,#2,12,YY):: IF Y
Y THEN CALL SOUND(-500,-8,1,
110,30,110,30,840,28):: CALL
 DELSPRITE(#2)

960 CALL SOUND(-4250,-4,1,14
0,30,140,30,140,30):: CALL P
OSITION(#1,X,Y,#2,Y1,Y1):: C
ALL SPRITE(#1,116,13,160,Y,0
,0)

970 CALL MOTION(#2,0,4*SGN(Y
-Y1)):: IF Y1=0 THEN CALL SP
RITE(#2,76,2,163,256)

980 CALL JOYST(1,T,Y1):: IF
Y1>0 THEN 1020 ELSE YY=YY-4
:: IF YY<60 THEN YY=76

990 CALL PATTERN(#2,YY):: CA
LL COINC(#1,#3,32,T):: IF T
THEN GOSUB 830 :: GOSUB 870
:: GOTO 1030

1000 CALL COINC(#2,#3,24,T):
: IF T THEN GOSUB 830 :: GOT
O 970 ELSE CALL COINC(#1,#2,
11,T):: IF T THEN CALL PATTE
RN(#2,80)ELSE 980

1010 CALL SOUND(-200,220,7,2
23,8,226,9):: HP=HP+1 :: DIS
PLAY AT(1,3)SIZE(2):HP :: CA
LL DELSPRITE(#2)

1020 CALL SOUND(-4000,-4,1,1
10,30,110,30,320,30):: CALL
MOTION(#1,-17,V/2,#2,0,0)::
CALL PATTERN(#2,128):: IF HP
=5 THEN 300 ELSE 1050

1030 IF Z THEN CALL SPRITE(#
1,112,13,20,1,20,35):: T,V=1
2

1040 DISPLAY AT(1,2):USING B
$:HP,SP,SC,Z :: IF Z=0 THEN
250

1050 CALL SOUND(-999,-4,1,11
0,30,110,30,200,30):: CALL P
OSITION(#1,X,Y,#2,Y1,Y1,#3,Y
Y,YY):: IF ABS(YY-Y)<5 THEN
810 ELSE IF Y1 THEN CALL PAT
TERN(#2,124)

1060 CALL MOTION(#3,0,SGN(Y-
YY)*((Y AND 6)+4+K)):: IF X<
35 THEN CALL MOTION(#1,0,V):
: CALL LOCATE(#1,35,Y)ELSE I
F X>151 THEN 950

1070 IF Y1 THEN CALL PATTERN
(#2,128):: IF ABS(YY-Y1)<26
THEN GOSUB 830

1080 CALL KEY(1,YY,T):: IF T
 THEN 1130 ELSE CALL JOYST(1
,T,YY):: IF T OR YY THEN CAL
L PATTERN(#1,108+T)ELSE CALL
 PATTERN(#1,V/3+108):: CALL
MOTION(#1,3*(X>35),V):: GOTO
 1050

1090 IF T THEN V=T*3 :: CALL
 MOTION(#1,0,V):: GOTO 1050
ELSE CALL MOTION(#1,YY*2*(X-
YY>31),V):: GOTO 1050

1130 CALL SOUND(-999,-8,3,12
8,30,128,30,999,30):: CALL M
OTION(#1,0,V):: CALL POSITIO
N(#1,X,Y):: Y=V/2+Y :: IF Y<
1 THEN Y=1

1140 FOR T=X+16 TO 175 STEP
13 :: Y=Y+13 :: IF Y>255 THE
N Y=1

1150 CALL LOCATE(#T/13+7,T,Y
):: NEXT T :: IF Y1 THEN CAL
L COINC(#2,160,Y,18,T):: IF
T THEN CALL DELSPRITE(#2)

1160 CALL SOUND(-999,-8,3,12
8,30,128,30,500,30):: CALL C
OINC(ALL,T):: CALL DELSPRITE
(#9,#10,#11,#12,#13,#14,#15,
#16,#17,#18,#19,#20)

1170 IF T THEN CALL COLOR(#3
,16):: GOSUB 850 :: GOTO 104
0 ELSE 1050
```

## DISK LOADer

```
10 CALL CLEAR :: CALL MAGNIF
Y(3):: CALL SCREEN(2):: GOTO
 30 :: YY,X,Y

20 A$ :: CALL KEY :: CALL PE
EK :: CALL HCHAR :: CALL SPR
ITE :: CALL SOUND :: CALL DE
LSPRITE

30 E$="00000000" :: T$=E$&"0
000" :: S$=E$&E$ :: CALL CHA
R(132,"6152524CCC00000080808
0FF809C84FC"&E$&"FF"&T$&"FF"
):: FOR T=1 TO 8 :: CALL COL
OR(T,15,1):: NEXT T :: !@P-

40 CALL CHAR(47,"3C4299A1A19
9423C",33,RPT$("FF",8)&"0000
002011B3FFFFFFFFFFFF817E7E81
",112,"A00802103979FDFF1F070
1080701"&E$&"80D084C1F0FCF2E
2E2F2FC9CFA1C")

50 DISPLAY AT(5,3):"N I G H
T  M I S S I O N": : : :RPT$
(" ",13)&"  "&RPT$(" ",13)::
 CALL COLOR(13,12,1):: GOSUB
 290 :: CALL SPRITE(#1,112,1
3,46,25,0,11)

60 DISPLAY AT(14,1):" PRESS
    TO USE": : :"   1 THE NU
MBER 1 JOYSTICK": : :"   2 T
HE ARROW KEYS (ESDX)": :"
   AND V TO FIRE"

70 X=X+1 :: CALL KEY(0,YY,T)
:: IF T=0 THEN IF X<90 THEN
70 ELSE GOSUB 290 :: GOTO 70

80 IF YY<49 OR YY>50 THEN DI
SPLAY AT(14,1):: CALL SOUND(
-100,200,4,208,6):: X=90 ::
GOTO 60 ELSE IF YY-49 THEN 1
00

90 FOR X=0 TO 27 STEP 3 :: C
ALL SOUND(-140,550,X,557,X):
: DISPLAY AT(14,1): : : : :
: : : : : :: DISPLAY AT(16,2
):"RELEASE THE ALPHA LOCK KE
Y" :: NEXT X

100 GOSUB 290 :: DISPLAY AT(
12,14):"BY": :" MIKE MC CUE
& CRAIG MILLER": : : :TAB(12
);"/ 1985": :"      MILLERS
GRAPHICS":"     1475 W CYPRE
SS AVE":"     SAN DIMAS CA 9
1773"

110 CALL CHAR(136,"904824120
90402010"&E$&S$&"08040209048
241209",96,"10000040"&E$&"80
"&E$&"2"&S$&"104000001000008
",100,"0000008"&S$&"000004"&
S$&"2"&T$&"04")

120 CALL CHAR(120,"030E3F3C7
FF7FFFFFF6F7F7F33360F03E0583
CF8F8E8F0B0F0F0F07078E81CFC"
,124,"0008080907"&RPT$("01",
11)&"00C0C0C0E0E0E0E0E0C0404
04040E0")

130 CALL CHAR(128,"020204050
3"&RPT$("01",11)&"00C0C0C0E0
E0E0E0E0C0404040404040E0",140,
T$&"0103073F6AAAAA7F"&S$&"80
C0E0FCAAA9AAFC")

140 CALL CHAR(92,"0008000020
000000400000001"&E$&"80"&E$&
"208000002001",116,"00005501
0F1E183020301E1F0F1320300000
5580F078180C040C78F8F0C8040C
")

150 A$="e         e
    e                  e
             e
 e       "

160 CALL CLEAR :: FOR T=1 TO
 8 :: CALL COLOR(T,1,1):: NE
XT T :: GOSUB 290

170 DISPLAY AT(3,24):"xz" ::
 DISPLAY AT(4,24):"y{" :: CA
LL COLOR(12,9,1,13,1,1):: CA
LL HCHAR(20,1,34,32)

180 CALL HCHAR(21,1,33,128):
: FOR X=1 TO 30 :: RANDOMIZE
 :: CALL PEEK(-31808,T,Y)::
IF T>26 AND T<64 AND Y>204 A
ND Y<221 THEN T=T+40

190 CALL HCHAR(T/18+1,Y*.12+
1,101):: NEXT X

200 DISPLAY AT(10,1):"e h i
j k ej l j m n ek n e"

210 DISPLAY AT(2,1):RPT$(" "
,13)&"  "&RPT$(" ",13):: DIS
PLAY AT(15,1):A$&A$&A$ :: CA
LL COLOR(12,15,1,9,11,1)

220 GOSUB 290 :: CALL CHAR(8
8,"0000040010000000020000008"
&E$&"001"&E$&"410000004001",
56,"1F1122223E4444F81F21213E
02040408")

230 CALL CHAR(48,"1F21214242
8484F8010102020404080 81F0101
023C20407E3F0103021C0408F8",
52,"1111223E020404081F202040
7C0408F8102020407E82827C3F01
020408102040")

240 CALL CHAR(80,E$&"0003040
10101010102020406000000 18F8E
0F8C0C0C070101018",84,"00000
0020008000010000 2"&T$&"00200
00008200000082")

250 CALL CHAR(72,"0000010107
0503010101010102020203C0C0C0
E0E0F8C0C0C0202010102040 6")

260 CALL CHAR(36,"140A200D1A
21641A241A0814080800080"&S$,
76,"000001030303030101010100
00070400C0C0C0E0E0E0F0C0C040
40C0C0A080C")

270 CALL CHAR(40,RPT$("FF",8
),44,"00008082C2C7F7FF8080C0
E0E4FCFEFF0103232B7F7FFFFF"&
E$&"0828A9FD")

280 GOSUB 290 :: CALL DELSPR
ITE(ALL):: IF YY=49 THEN RUN
 "DSK1.NMJOY" ELSE RUN "DSK1
.NMKEY"

290 CALL SOUND(-4250,-4,1,20
0,30,200,30,200,30):: X=0 ::
 RETURN
```

## DISKETTE KEYBOARD VERSION

```
10 CALL MAGNIFY(3):: CALL SC
REEN(2):: GOTO 30 :: CALL KE
Y :: CALL SOUND :: CALL PEEK
 :: CALL HCHAR :: CALL VCHAR

20 X,Y,Y1,YY,V,T :: CALL POS
ITION :: CALL PATTERN :: CAL
L SPRITE :: CALL DELSPRITE :
: CALL COINC :: CALL MOTION
:: CALL LOCATE

30 E$="00000000" :: T$=E$&"0
000" :: S$=E$&E$

90 A$=RPT$(" ",22)

100 A$=A$&"/  e      e   /,
    e     .(-    e      .((-
 e     /..(((,  e   e  .((((
-     .(((((((-    ./  .(((((
(,  e.(((((((((- .((-,((((((
((-/.((((((((((((,"

110 GOSUB 240 :: B$=RPT$("!"
,28)&RPT$("!!#",9)&RPT$("!",
29):: W$=RPT$("""",28)&RPT$(
"!",84)

200 DISPLAY AT(15,1):A$:B$ :
: A$=SEG$(A$,141,28)&B$

210 GOSUB 240 :: B$="e # ###
# e########## e### e" :: CAL
L DELSPRITE(ALL):: CALL COLO
R(3,15,1,4,15,1,9,11,1,2,11,
1,1,11,1,12,15,1,13,12,1)

220 CALL COLOR(10,1,1):: CAL
L CHAR(108,E$&"55000061E1FFF
FFF00000003"&E$&"5540E0F8E4E
2E1F1FF7C45FE")

230 K=1 :: Z=5 :: HP,SP,SC,B
=0 :: CALL CHAR(104,E$&"0104
10400103CFFFFF786001020820C0
707CE2E1E1F3FEFCC54658E")::
GOTO 740 :: !@P-

240 CALL SOUND(-4250,-4,1,11
0,30,110,30,200,30):: RETURN

250 CALL KEY(3,T,Y):: Z=INT(
(SC-B)/10000):: FOR T=1 TO Z
 :: CALL SOUND(200,770,4,777
,6):: DISPLAY AT(1,24):USING
 "###":T :: NEXT T

260 IF Z THEN B=B+Z*10000 ::
 GOTO 740 ELSE CALL CHAR(108
,"FF81BFA0AFB981FFFF81E71818
E781FFE7B5B5BDBDADADE7")

270 CALL CHAR(104,"FF81BD81B
FA0A0E0E0A0A0A0A0BF81FFFF81B
DBD81BDA5E7E7A5BD81E7181818"
):: CALL SPRITE(#1,112,13,87
,1,0,12)

280 CALL COLOR(10,7,1,10,9,1
,10,16,1,10,6,1):: CALL KEY(
0,T,T)

290 IF T=89 THEN 220 ELSE IF
 T=78 THEN CALL DELSPRITE(AL
L):: CALL VCHAR(1,1,32,768):
: END ELSE 280

300 V=8 :: IF K<2 THEN 570 E
LSE IF Y AND 1 THEN 340 ELSE
 CALL CHAR(60,"08081C1C1C1C1
C3E7F1C0008221004080"&S$)

310 YY=600 :: CALL DELSPRITE
(ALL):: FOR T=2 TO 5 :: CALL
 LOCATE(#T,1,T*17,#T+4,177,T
*17):: NEXT T

320 CALL SOUND(-350,-7,6,110
,5):: CALL CHAR(35,"FFFFFFFF
81000081"):: CALL SOUND(4250
,-8,4,110,27,115,28,YY,30)

330 FOR T=10 TO 18 :: RANDOM
IZE :: CALL PEEK(-31880,X)::
 CALL SPRITE(#T,60,(X AND 7)
+3,177,T*24-208,-X/8-3-K,0):
: NEXT T :: GOTO 360

340 CALL CHAR(60,T$&"01030F7
F0"&E$&T$&"709FA8204FC3C1CFF
0C"):: YY=1600 :: CALL SOUND
(-4250,-8,6,110,27,115,28,YY
,30):: CALL DELSPRITE(ALL)

350 FOR T=10 TO 18 :: RANDOM
IZE :: CALL PEEK(-31880,X)::
 CALL SPRITE(#T,60,(X AND 7)
+3,T*16-120,256,0,-X/8-3-K):
: NEXT T

360 CALL SPRITE(#1,112,13,72
,1,0,3)

370 CALL SOUND(-999,-8,6,110
,27,115,28,YY,30):: CALL COI
NC(ALL,T):: CALL POSITION(#1
,X,Y):: IF T OR X>161 THEN G
OSUB 870 :: GOTO 740

380 IF Y>224 THEN 410 ELSE C
ALL KEY(1,T,T):: IF T<0 THEN
 CALL MOTION(#1,0,2):: GOTO
370

390 IF T=0 THEN T=8 ELSE IF
T=5 THEN T=8*(X>35)ELSE IF T
=3 THEN CALL MOTION(#1,0,4):
: GOTO 370 ELSE CALL MOTION(
#1,0,0):: GOTO 370

400 CALL MOTION(#1,T,2):: GO
TO 370

410 CALL DELSPRITE(#1):: IF
K<3 THEN 570 ELSE Y1=(Y AND
6)-4 :: CALL DELSPRITE(ALL):
: CALL COLOR(2,1,1,1,1,1,13,
1,1)

420 DISPLAY AT(21,1):"  e
    e     e          e
 e         e          e
      e"

430 CALL CHAR(60,T$&"AA021F2
C4C7F107F"&S$&"A800C1FFE1C09
0E",64,S$&"00009292"&T$&S$&"
4949"):: CALL SPRITE(#1,108,
13,40,31,8,0)

440 CALL SPRITE(#2,60,6,242,
216,(Y AND 1)*80-40,0)

450 CALL SOUND(-4250,-4,1,20
0,30,200,30,200,30):: CALL P
OSITION(#1,X,Y,#2,YY,Y)

460 IF X>180 THEN CALL LOCAT
E(#1,1-(V<0)*180,31)ELSE IF
ABS(X-YY)<7 THEN 490 ELSE CA
LL MOTION(#2,SGN(X-YY)*((YY
AND 11)+9),0)

470 CALL KEY(1,T,Y):: IF T=1
3 THEN 510 ELSE IF T=5 THEN
V=-8 ELSE IF T=0 THEN V=8 EL
SE IF Y THEN V=0

480 CALL MOTION(#1,V,0):: GO
TO 450

490 CALL SPRITE(#3,64,7,YY,2
09,V+X-YY,-127):: CALL SOUND
(-900,-8,1,110,30,110,30,999
9,30):: T=0

500 CALL POSITION(#3,Y,Y)::
IF Y>50 THEN 500 ELSE CALL D
ELSPRITE(#3):: CALL COLOR(#1
,11):: GOSUB 930 :: CALL DEL
SPRITE(#2):: GOTO 740

510 CALL SOUND(-900,-8,0,110
,30,110,30,300,30):: CALL PO
SITION(#1,X,Y):: CALL SPRITE
(#3,64,4,X,36,0,127)

520 CALL POSITION(#3,X,Y)::
IF Y<192 THEN 520 ELSE CALL
DELSPRITE(#3):: CALL COINC(#
2,X,220,7,T):: IF T THEN CAL
L SOUND(-1,-4,9)ELSE 450

530 CALL COLOR(#2,15):: FOR
T=0 TO 2 :: CALL PATTERN(#2,
88+T*4):: FOR X=5 TO 7 :: CA
LL SOUND(100,-X,T*10):: NEXT
 X :: NEXT T

540 CALL DELSPRITE(#2):: Y1=
Y1+1 :: SC=SC+250 :: DISPLAY
 AT(1,12)SIZE(10):USING "###
#######":SC :: IF Y1<5 THEN
440

550 CALL POSITION(#1,X,Y)::
IF X>185 THEN CALL LOCATE(#1
,35,Y)

560 CALL PATTERN(#1,112):: C
ALL MOTION(#1,0,20):: CALL S
OUND(-4250,-4,1,200,30,200,3
0,200,30)

570 CALL CHAR(68,S$&"000000F
F7F1FFEAB"&S$&"000000FFFFFFA
A6D",64,E$&"0021F373FFFFFFFF
FFFF972A08103CFFF0FFFFFFFFFF
FFFFFFFF5EAA")

580 Y1=(Y AND 5)+6 :: GOSUB
800 :: CALL CHAR(60,"0000008
080C4CFEEFFFF5BAAFFFF722B"&T
$&"C00FFEFCF8F0E2C67B3D")::
CALL COLOR(1,1,1,2,1,1)

590 DISPLAY AT(20,1):W$ :: C
ALL COLOR(1,5,1,7,12,1):: FO
R T=1 TO 4 :: CALL LOCATE(#T
,161,1):: NEXT T :: CALL SPR
ITE(#9,112,13,15,1,20,35)

600 CALL SPRITE(#10,68,15,14
3,1,#11,64,15,143,17,#12,60,
15,143,33):: CALL MOTION(#10
,0,Y1,#11,0,Y1,#12,0,Y1)
```

```
610 CALL SOUND(-4250,-4,1,20
0,30,200,30,200,30):: CALL P
OSITION(#9,X,Y):: IF X<35 TH
EN CALL MOTION(#9,0,V):: CAL
L LOCATE(#9,35,Y)ELSE IF X>1
40 THEN 690

620 CALL COINC(#9,#11,16,T):
: IF T AND X>130 THEN 680 EL
SE CALL COINC(#9,#10,9,T)::
IF T THEN 710

630 CALL KEY(1,T,T):: IF T<0
 THEN CALL PATTERN(#9,SGN(V)
*4+108):: CALL MOTION(#9,3*(
X>35),V):: GOTO 610

640 IF T=3 THEN CALL PATTERN
(#9,112):: V=V-4*(V<12):: GO
TO 670 ELSE IF T=2 THEN CALL
 PATTERN(#9,104):: V=V+4*(V>
-12):: GOTO 670

650 IF T=0 THEN CALL PATTERN
(#9,108):: CALL MOTION(#9,8,
V):: GOTO 610

660 IF T=5 THEN CALL PATTERN
(#9,108):: CALL POSITION(#9,
X,Y):: IF X<36 THEN CALL LOC
ATE(#9,35,Y)ELSE CALL MOTION
(#9,-8,V):: GOTO 610

670 CALL MOTION(#9,0,V):: GO
TO 610

680 CALL MOTION(#9,0,0,#10,2
,4,#11,2,4,#12,2,4):: SC=SC-
SP*500 :: SP=0

690 CALL MOTION(#9,3,0):: CA
LL SOUND(-2450,-8,6,110,30,1
10,30,9999,30):: CALL PATTER
N(#9,104):: CALL SOUND(1,-4,
9):: HP=0 :: Z=Z-1

700 CALL DELSPRITE(#9):: IF
SP THEN 740 ELSE CALL DELSPR
ITE(#10,#11,#12):: GOTO 740

710 CALL POSITION(#10,X,Y)::
 CALL SPRITE(#9,116,13,136,Y
,0,Y1):: FOR T=306 TO 122 ST
EP -6 :: CALL SOUND(-200,-4,
1,T,27,T,30,T,30):: NEXT T

720 FOR T=130 TO 306 STEP 8
:: CALL SOUND(-4250,-4,1,T,3
0,T,30,T,27):: NEXT T :: CAL
L MOTION(#9,-10,0):: K=K+1 :
: SC=SC+500*HP

730 FOR T=1 TO 300 :: NEXT T
 :: SP=SP+HP :: HP=0

740 DISPLAY AT(1,2):USING B$
:HP,SP,SC,Z :: IF Z THEN CAL
L DELSPRITE(ALL)ELSE 250 !!!

750 CALL CHAR(60,"000001010F
090909010101013E200000C0C4C4
FCC0C0C0C0C020100808010203")

760 CALL CHAR(64,"0101031F13
1313030303033F2000000080888
88F880808080800000080402 03")

770 CALL CHAR(68,"0000010107
0909050101010106181000C0C0C2
F4C8C0C0C0C020100808010203",3
5,"FFFFFFFF817E7E81")

780 DISPLAY AT(20,1):A$ :: C
ALL COLOR(2,11,1,1,11,1,13,1
2,1):: GOSUB 800

790 CALL SPRITE(#3,140,2,161
,256,0,-24):: FOR T=9 TO 20
:: CALL SPRITE(#T,136,7,200,
1):: NEXT T :: GOTO 1030

800 CALL DELSPRITE(ALL):: FO
R T=5 TO 8 :: CALL LOCATE(#T
,177,T*17):: NEXT T :: RETUR
N

810 IF T<>12 THEN CALL POSIT
ION(#1,X,Y,#3,YY,YY):: IF AB
S(Y-YY)<80 THEN CALL SPRITE(
#4,36,9,157,YY,X-147,2*V+Y-Y
Y)ELSE 1060 ELSE 1060

820 CALL SOUND(-150,-8,3,110
,30,110,30,5010,30):: CALL S
OUND(300,-8,1,128,30,128,30,
1100,30):: CALL DELSPRITE(#4
):: GOSUB 870 :: GOTO 1030

830 CALL MOTION(#3,0,V/4,#2,
0,0):: CALL PATTERN(#2,80)::
 CALL SOUND(-1,-4,9):: IF T=
12 THEN CALL MOTION(#1,0,V)

840 FOR T=1 TO 9 :: CALL SOU
ND(50,-6,1):: NEXT T :: CALL
 DELSPRITE(#2):: Y1=0 :: RET
URN

850 CALL COLOR(#3,2):: FOR T
=0 TO 16 STEP 4 :: CALL SOUN
D(-999,-8,T,120,27,127,28,10
00,30):: CALL PATTERN(#3,84+
T):: NEXT T

860 SC=605-3*X+SC :: CALL DE
LSPRITE(#3):: CALL SPRITE(#3
,140,2,161,256,0,-24):: RETU
RN

870 T=0 :: CALL SOUND(-1,-4,
9):: IF Y AND 1 THEN CALL PA
TTERN(#1,112):: CALL MOTION(
#1,9,V)ELSE CALL COLOR(#1,16
):: GOTO 930

880 CALL COLOR(#1,RND*7+3)::
 FOR T=1 TO 26 STEP 5 :: CAL
L SOUND(T*40+200,-8,T,110,30
,110,30,1100-T,30)

890 CALL POSITION(#1,X,Y)::
IF X>155 THEN CALL MOTION(#1
,0,0):: GOTO 910 ELSE IF X A
ND 2 THEN 880

900 NEXT T :: GOTO 880

910 CALL COINC(#1,#2,16,T)::
 IF T THEN CALL DELSPRITE(#2
)

920 CALL COINC(#1,#3,17,T)::
 CALL COLOR(#1,2):: IF T THE
N CALL SOUND(-300,-8,1,110,3
0,110,30,3000,30):: CALL COL
OR(#3,7)

930 FOR Y=0 TO 16 STEP 4 ::
CALL SOUND(-999,-8,Y,120,27,
127,28,1100,30):: CALL PATTE
RN(#1,84+Y):: NEXT Y

940 CALL DELSPRITE(#1):: Z=Z
-1 :: HP=0 :: IF T THEN GOSU
B 850 :: RETURN ELSE RETURN

950 CALL MOTION(#1,0,V):: CA
LL COINC(#1,#2,12,YY):: IF Y
Y THEN CALL SOUND(-500,-8,1,
110,30,110,30,840,28):: CALL
 DELSPRITE(#2)

960 CALL SOUND(-4250,-4,1,14
0,30,140,30,140,30):: CALL P
OSITION(#1,X,Y,#2,Y1,Y1):: C
ALL SPRITE(#1,116,13,160,Y,0
,0)

970 CALL MOTION(#2,0,4*SGN(Y
-Y1)):: IF Y1=0 THEN CALL SP
RITE(#2,76,2,163,256)

980 CALL KEY(1,T,T):: IF T=5
 THEN 1020 ELSE YY=YY-4 :: I
F YY<60 THEN YY=76

990 CALL PATTERN(#2,YY):: CA
LL COINC(#1,#3,32,T):: IF T
THEN GOSUB 830 :: GOSUB 870
:: GOTO 1030

1000 CALL COINC(#2,#3,24,T):
: IF T THEN GOSUB 830 :: GOT
O 970 ELSE CALL COINC(#1,#2,
11,T):: IF T THEN CALL PATTE
RN(#2,80)ELSE 980

1010 CALL SOUND(-200,220,7,2
23,8,226,9):: HP=HP+1 :: DIS
PLAY AT(1,3)SIZE(2):HP :: CA
LL DELSPRITE(#2)

1020 CALL SOUND(-4000,-4,1,1
10,30,110,30,320,30):: CALL
MOTION(#1,-17,V/2,#2,0,0)::
CALL PATTERN(#2,128):: IF HP
=5 THEN 300 ELSE 1050

1030 IF Z THEN CALL SPRITE(#
1,112,13,20,1,20,35):: T,V=1
2

1040 DISPLAY AT(1,2):USING B
$:HP,SP,SC,Z :: IF Z=0 THEN
250

1050 CALL SOUND(-999,-4,1,11
0,30,110,30,200,30):: CALL P
OSITION(#1,X,Y,#2,Y1,Y1,#3,Y
Y,YY):: IF ABS(YY-Y)<5 THEN
810 ELSE IF Y1 THEN CALL PAT
TERN(#2,124)

1060 CALL MOTION(#3,0,SGN(Y-
YY)*((Y AND 6)+4+K)):: IF X<
35 THEN CALL MOTION(#1,0,V):
: CALL LOCATE(#1,35,Y)ELSE I
F X>151 THEN 950
```

```
1070 IF Y1 THEN CALL PATTERN
(#2,128):: IF ABS(YY-Y1)<26
THEN GOSUB 830

1080 CALL KEY(1,T,T):: IF T=
13 THEN 1130 ELSE IF T<0 THE
N CALL PATTERN(#1,V/3+108)::
 CALL MOTION(#1,3*(X>35),V):
: GOTO 1050

1090 IF T=3 THEN CALL PATTER
N(#1,112):: V=12 :: GOTO 112
0 ELSE IF T=2 THEN CALL PATT
ERN(#1,104):: V=-12 :: GOTO
1120

1100 IF T=0 THEN CALL PATTER
N(#1,108):: CALL MOTION(#1,8
,V):: GOTO 1050

1110 IF T=5 THEN CALL PATTER
N(#1,108):: CALL POSITION(#1
,X,Y):: IF X<36 THEN CALL LO
CATE(#1,35,Y)ELSE CALL MOTIO
N(#1,-12,V):: GOTO 1050

1120 CALL MOTION(#1,0,V):: G
OTO 1050

1130 CALL SOUND(-999,-8,3,12
8,30,128,30,999,30):: CALL M
OTION(#1,0,V):: CALL POSITIO
N(#1,X,Y):: Y=V/2+Y :: IF Y<
1 THEN Y=1

1140 FOR T=X+16 TO 175 STEP
13 :: Y=Y+13 :: IF Y>255 THE
N Y=1

1150 CALL LOCATE(#T/13+7,T,Y
):: NEXT T :: IF Y1 THEN CAL
L COINC(#2,160,Y,18,T):: IF
T THEN CALL DELSPRITE(#2)

1160 CALL SOUND(-999,-8,3,12
8,30,128,30,500,30):: CALL C
OINC(ALL,T):: CALL DELSPRITE
(#9,#10,#11,#12,#13,#14,#15,
#16,#17,#18,#19,#20)

1170 IF T THEN CALL COLOR(#3
,16):: GOSUB 850 :: GOTO 104
0 ELSE 1050
```

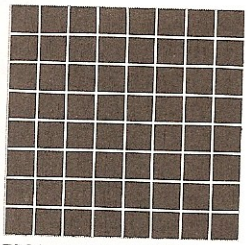
## DISKETTE JOYSTICK VERSION

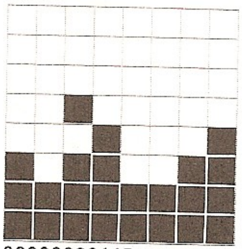
```
10 CALL MAGNIFY(3):: CALL SC
REEN(2):: GOTO 30 :: CALL KE
Y :: CALL JOYST :: CALL SOUN
D :: CALL PEEK :: CALL HCHAR
 :: CALL VCHAR

20 X,Y,Y1,YY,V,T :: CALL POS
ITION :: CALL PATTERN :: CAL
L SPRITE :: CALL DELSPRITE :
: CALL COINC :: CALL MOTION
:: CALL LOCATE

30 E$="00000000" :: T$=E$&"0
000" :: S$=E$&E$

90 A$=RPT$(" ",22)

100 A$=A$&"/  e      e   /,
    e    .(-    e      .((-
 e     /..(((,  e   e  .((((
-      .(((((((-    ./  .(((((
(,  e.(((((((((- .((-,((((((
((-/.(((((((((((,"

110 GOSUB 240 :: B$=RPT$("!"
,28)&RPT$("!!#",9)&RPT$("!",
29):: W$=RPT$("""",28)&RPT$(
"!",84)

200 DISPLAY AT(15,1):A$:B$ :
: A$=SEG$(A$,141,28)&B$

210 B$="e # #### e##########
 e### e" :: CALL COLOR(3,15,
1,4,15,1,9,11,1,2,11,1,1,11,
1,12,15,1,13,12,1)

220 CALL COLOR(10,1,1):: CAL
L CHAR(108,E$&"55000061E1FFF
FFF00000003"&E$&"5540E0F8E4E
2E1F1FF7C45FE")

230 K=1 :: Z=5 :: HP,SP,SC,B
=0 :: CALL CHAR(104,E$&"0104
10400103CFFFFF7860010208200C0
707CE2E1E1F3FEFCC54658E")::
GOTO 740 :: !@P-

240 CALL SOUND(-4250,-4,1,11
0,30,110,30,200,30):: RETURN

250 CALL KEY(3,T,Y):: Z=INT(
(SC-B)/10000):: FOR T=1 TO Z
 :: CALL SOUND(200,770,4,777
,6):: DISPLAY AT(1,24):USING
 "###":T :: NEXT T

260 IF Z THEN B=B+Z*10000 ::
 GOTO 740 ELSE CALL CHAR(108
,"FF81BFA0AFB981FFFF81E71818
E781FFE7B5B5BDBDADADE7")

270 CALL CHAR(104,"FF81BD81B
FA0A0E0E0A0A0A0BF81FFFF81B
DBD81BDA5E7E7A5BD81E7181818"
):: CALL SPRITE(#1,112,13,87
,1,0,12)

280 CALL COLOR(10,7,1,10,9,1
,10,16,1,10,6,1):: CALL KEY(
1,T,Y1):: CALL KEY(0,T,T)

290 IF T=89 OR Y1 THEN 220 E
LSE IF T=78 THEN CALL DELSPR
ITE(ALL):: CALL VCHAR(1,1,32
,768):: END ELSE 280

300 V=8 :: IF K<2 THEN 570 E
LSE IF Y AND 1 THEN 340 ELSE
 CALL CHAR(60,"08081C1C1C1C1
C3E7F1C000822100408O"&S$)

310 YY=600 :: CALL DELSPRITE
(ALL):: FOR T=2 TO 5 :: CALL
 LOCATE(#T,1,T*17,#T+4,177,T
*17):: NEXT T

320 CALL SOUND(-350,-7,6,110
,5):: CALL CHAR(35,"FFFFFFFF
81000081"):: CALL SOUND(4250
,-8,4,110,27,115,28,YY,30)

330 FOR T=10 TO 18 :: RANDOM
IZE :: CALL PEEK(-31880,X)::
 CALL SPRITE(#T,60,(X AND 7)
+3,177,T*24-208,-X/8-3-K,0):
: NEXT T :: GOTO 360

340 CALL CHAR(60,T$&"01030F7
F0"&E$&T$&"709FA8204FC3C1CFF
0C"):: YY=1600 :: CALL SOUND
(-4250,-8,6,110,27,115,28,YY
,30):: CALL DELSPRITE(ALL)

350 FOR T=10 TO 18 :: RANDOM
IZE :: CALL PEEK(-31880,X)::
 CALL SPRITE(#T,60,(X AND 7)
+3,T*16-120,256,0,-X/8-3-K):
: NEXT T

360 CALL SPRITE(#1,112,13,72
,1,0,3)

370 CALL SOUND(-999,-8,6,110
,27,115,28,YY,30):: CALL COI
NC(ALL,T):: CALL POSITION(#1
,X,Y):: IF T OR X>161 THEN G
OSUB 870 :: GOTO 740

380 IF Y>224 THEN 410 ELSE C
ALL JOYST(1,T,Y1):: IF Y1 TH
EN CALL PATTERN(#1,108):: CA
LL MOTION(#1,(X-2*Y1>30)*2*Y
1,2):: GOTO 370

390 CALL PATTERN(#1,112):: C
ALL MOTION(#1,0,T/2+2):: GOT
O 370

410 CALL DELSPRITE(#1):: IF
K<3 THEN 570 ELSE Y1=(Y AND
6)-4 :: CALL DELSPRITE(ALL):
: CALL COLOR(2,1,1,1,1,1,13,
1,1)

420 DISPLAY AT(21,1):"  e
    e     e          e
 e          e        e
      e"

430 CALL CHAR(60,T$&"AA021F2
C4C7F107F"&S$&"A800C1FFE1C09
0E",64,S$&"00009292"&T$&S$&"
4949"):: CALL SPRITE(#1,108,
13,40,31,8,0)

440 CALL SPRITE(#2,60,6,242,
216,(Y AND 1)*80-40,0)

450 CALL SOUND(-4250,-4,1,20
0,30,200,30,200,30):: CALL P
OSITION(#1,X,Y,#2,YY,Y)

460 IF X>180 THEN CALL LOCAT
E(#1,1-(V<0)*180,31)ELSE IF
ABS(X-YY)<7 THEN 490 ELSE CA
LL MOTION(#2,SGN(X-YY)*((YY
AND 11)+9),0)

470 CALL KEY(1,T,Y):: IF Y T
HEN 510 ELSE CALL JOYST(1,Y,
T):: IF T THEN V=-2*T ELSE I
F Y THEN V=0 ELSE 450

480 CALL MOTION(#1,V,0):: GO
TO 450

490 CALL SPRITE(#3,64,7,YY,2
09,V+X-YY,-127):: CALL SOUND
(-900,-8,1,110,30,110,30,999
9,30):: T=0

500 CALL POSITION(#3,Y,Y)::
IF Y>50 THEN 500 ELSE CALL D
ELSPRITE(#3):: CALL COLOR(#1
,11):: GOSUB 930 :: CALL DEL
SPRITE(#2):: GOTO 740

510 CALL SOUND(-900,-8,0,110
,30,110,30,300,30):: CALL PO
SITION(#1,X,Y):: CALL SPRITE
(#3,64,4,X,36,0,127)

520 CALL POSITION(#3,X,Y)::
IF Y<192 THEN 520 ELSE CALL
DELSPRITE(#3):: CALL COINC(#
2,X,220,7,T):: IF T THEN CAL
L SOUND(-1,-4,9)ELSE 450

530 CALL COLOR(#2,15):: FOR
T=0 TO 2 :: CALL PATTERN(#2,
88+T*4):: FOR X=5 TO 7 :: CA
LL SOUND(100,-X,T*10):: NEXT
 X :: NEXT T

540 CALL DELSPRITE(#2):: Y1=
Y1+1 :: SC=SC+250 :: DISPLAY
 AT(1,12)SIZE(10):USING "###
#######":SC :: IF Y1<5 THEN
440

550 CALL POSITION(#1,X,Y)::
IF X>185 THEN CALL LOCATE(#1
,35,Y)

560 CALL PATTERN(#1,112):: C
ALL MOTION(#1,0,20):: CALL S
OUND(-4250,-4,1,200,30,200,3
0,200,30)

570 CALL CHAR(68,S$&"000000F
F7F1FFEAB"&S$&"000000FFFFFFA
A6D",64,E$&"0021F373FFFFFFFF
FFFF972A08103CFFF0FFFFFFFFFF
FFFFFFFF5EAA")

580 Y1=(Y AND 5)+6 :: GOSUB
800 :: CALL CHAR(60,"0000008
080C4CFEEFFFF5BAAFFFF722B"&T
$&"C00FFEFCF8F0E2C67B3D")::
CALL COLOR(1,1,1,2,1,1)

590 DISPLAY AT(20,1):W$ :: C
ALL COLOR(1,5,1,7,12,1):: FO
R T=1 TO 4 :: CALL LOCATE(#T
,161,1):: NEXT T :: CALL SPR
ITE(#9,112,13,15,1,20,35)

600 CALL SPRITE(#10,68,15,14
3,1,#11,64,15,143,17,#12,60,
15,143,33):: CALL MOTION(#10
,0,Y1,#11,0,Y1,#12,0,Y1)
```

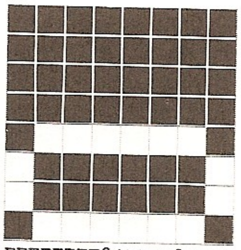
```
610 CALL SOUND(-4250,-4,1,20
0,30,200,30,200,30):: CALL P
OSITION(#9,X,Y):: IF X<35 TH
EN CALL MOTION(#9,0,V):: CAL
L LOCATE(#9,35,Y)ELSE IF X>1
40 THEN 690

620 CALL COINC(#9,#11,16,T):
: IF T AND X>130 THEN 680 EL
SE CALL COINC(#9,#10,9,T)::
IF T THEN 710

630 CALL JOYST(1,Y,T):: IF Y
 THEN CALL PATTERN(#9,Y+108)
:: V=V-Y*(ABS(Y+V)<16):: CAL
L MOTION(#9,0,V):: GOTO 610

640 IF T THEN CALL PATTERN(#
9,108):: CALL MOTION(#9,2*T*
(X-T>35),V):: GOTO 610

650 CALL PATTERN(#9,SGN(V)*4
+108):: CALL MOTION(#9,(X>35
)*3,V):: GOTO 610

680 CALL MOTION(#9,0,0,#10,2
,4,#11,2,4,#12,2,4):: SC=SC-
SP*500 :: SP=0

690 CALL MOTION(#9,3,0):: CA
LL SOUND(-2450,-8,6,110,30,1
10,30,9999,30):: CALL PATTER
N(#9,104):: CALL SOUND(1,-4,
9):: HP=0 :: Z=Z-1

700 CALL DELSPRITE(#9):: IF
SP THEN 740 ELSE CALL DELSPR
ITE(#10,#11,#12):: GOTO 740

710 CALL POSITION(#10,X,Y)::
 CALL SPRITE(#9,116,13,136,Y
,0,Y1):: FOR T=306 TO 122 ST
EP -6 :: CALL SOUND(-200,-4,
1,T,27,T,30,T,30):: NEXT T

720 FOR T=130 TO 306 STEP 8
:: CALL SOUND(-4250,-4,1,T,3
0,T,30,T,27):: NEXT T :: CAL
L MOTION(#9,-10,0):: K=K+1 :
: SC=SC+500*HP

730 FOR T=1 TO 300 :: NEXT T
 :: SP=SP+HP :: HP=0

740 DISPLAY AT(1,2):USING B$
:HP,SP,SC,Z :: IF Z THEN CAL
L DELSPRITE(ALL)ELSE 250 !!!

750 CALL CHAR(60,"000001010F
0909090101010 13E200000C0C4C4
FCC0C0C0C0C0201008081O203")

760 CALL CHAR(64,"0101031F13
1313030303033F20000000808888
88F8808080808000008040203")

770 CALL CHAR(68,"0000010107
0909050101010106181000C0C0C2
F4C8C0C0C0C0201008081O203",3
5,"FFFFFFFF817E7E81")

780 DISPLAY AT(20,1):A$ :: C
ALL COLOR(2,11,1,1,11,1,13,1
2,1):: GOSUB 800

790 CALL SPRITE(#3,140,2,161
,256,0,-24):: FOR T=9 TO 20
:: CALL SPRITE(#T,136,7,200,
1):: NEXT T :: GOTO 1030

800 CALL DELSPRITE(ALL):: FO
R T=5 TO 8 :: CALL LOCATE(#T
,177,T*17):: NEXT T :: RETUR
N

810 IF T<>12 THEN CALL POSIT
ION(#1,X,Y,#3,YY,YY):: IF AB
S(Y-YY)<80 THEN CALL SPRITE(
#4,36,9,157,YY,X-147,2*V+Y-Y
Y)ELSE 1060 ELSE 1060

820 CALL SOUND(-150,-8,3,110
,30,110,30,5010,30):: CALL S
OUND(300,-8,1,128,30,128,30,
1100,30):: CALL DELSPRITE(#4
):: GOSUB 870 :: GOTO 1030

830 CALL MOTION(#3,0,V/4,#2,
0,0):: CALL PATTERN(#2,80)::
 CALL SOUND(-1,-4,9):: IF T=
12 THEN CALL MOTION(#1,0,V)

840 FOR T=1 TO 9 :: CALL SOU
ND(50,-6,1):: NEXT T :: CALL
 DELSPRITE(#2):: Y1=0 :: RET
URN

850 CALL COLOR(#3,2):: FOR T
=0 TO 16 STEP 4 :: CALL SOUN
D(-999,-8,T,120,27,127,28,10
00,30):: CALL PATTERN(#3,84+
T):: NEXT T

860 SC=605-3*X+SC :: CALL DE
LSPRITE(#3):: CALL SPRITE(#3
,140,2,161,256,0,-24):: RETU
RN

870 T=0 :: CALL SOUND(-1,-4,
9):: IF Y AND 1 THEN CALL PA
TTERN(#1,112):: CALL MOTION(
#1,9,V)ELSE CALL COLOR(#1,16
):: GOTO 930

880 CALL COLOR(#1,RND*7+3)::
 FOR T=1 TO 26 STEP 5 :: CAL
L SOUND(T*40+200,-8,T,110,30
,110,30,1100-T,30)

890 CALL POSITION(#1,X,Y)::
IF X>155 THEN CALL MOTION(#1
,0,0):: GOTO 910 ELSE IF X A
ND 2 THEN 880

900 NEXT T :: GOTO 880

910 CALL COINC(#1,#2,16,T)::
 IF T THEN CALL DELSPRITE(#2
)

920 CALL COINC(#1,#3,17,T)::
 CALL COLOR(#1,2):: IF T THE
N CALL SOUND(-300,-8,1,110,3
0,110,30,3000,30):: CALL COL
OR(#3,7)

930 FOR Y=0 TO 16 STEP 4 ::
CALL SOUND(-999,-8,Y,120,27,
127,28,1100,30):: CALL PATTE
RN(#1,84+Y):: NEXT Y

940 CALL DELSPRITE(#1):: Z=Z
-1 :: HP=0 :: IF T THEN GOSU
B 850 :: RETURN ELSE RETURN

950 CALL MOTION(#1,0,V):: CA
LL COINC(#1,#2,12,YY):: IF Y
Y THEN CALL SOUND(-500,-8,1,
110,30,110,30,840,28):: CALL
 DELSPRITE(#2)

960 CALL SOUND(-4250,-4,1,14
0,30,140,30,140,30):: CALL P
OSITION(#1,X,Y,#2,Y1,Y1):: C
ALL SPRITE(#1,116,13,160,Y,0
,0)

970 CALL MOTION(#2,0,4*SGN(Y
-Y1)):: IF Y1=0 THEN CALL SP
RITE(#2,76,2,163,256)

980 CALL JOYST(1,T,Y1):: IF
Y1>0 THEN 1020 ELSE YY=YY-4
:: IF YY<60 THEN YY=76

990 CALL PATTERN(#2,YY):: CA
LL COINC(#1,#3,32,T):: IF T
THEN GOSUB 830 :: GOSUB 870
:: GOTO 1030

1000 CALL COINC(#2,#3,24,T):
: IF T THEN GOSUB 830 :: GOT
O 970 ELSE CALL COINC(#1,#2,
11,T):: IF T THEN CALL PATTE
RN(#2,80)ELSE 980

1010 CALL SOUND(-200,220,7,2
23,8,226,9):: HP=HP+1 :: DIS
PLAY AT(1,3)SIZE(2):HP :: CA
LL DELSPRITE(#2)

1020 CALL SOUND(-4000,-4,1,1
10,30,110,30,320,30):: CALL
MOTION(#1,-17,V/2,#2,0,0)::
CALL PATTERN(#2,128):: IF HP
=5 THEN 300 ELSE 1050

1030 IF Z THEN CALL SPRITE(#
1,112,13,20,1,20,35):: T,V=1
2

1040 DISPLAY AT(1,2):USING B
$:HP,SP,SC,Z :: IF Z=0 THEN
250

1050 CALL SOUND(-999,-4,1,11
0,30,110,30,200,30):: CALL P
OSITION(#1,X,Y,#2,Y1,Y1,#3,Y
Y,YY):: IF ABS(YY-Y)<5 THEN
810 ELSE IF Y1 THEN CALL PAT
TERN(#2,124)

1060 CALL MOTION(#3,0,SGN(Y-
YY)*((Y AND 6)+4+K)):: IF X<
35 THEN CALL MOTION(#1,0,V):
: CALL LOCATE(#1,35,Y)ELSE I
F X>151 THEN 950

1070 IF Y1 THEN CALL PATTERN
(#2,128):: IF ABS(YY-Y1)<26
THEN GOSUB 830

1080 CALL KEY(1,YY,T):: IF T
 THEN 1130 ELSE CALL JOYST(1
,T,YY):: IF T OR YY THEN CAL
L PATTERN(#1,108+T)ELSE CALL
 PATTERN(#1,V/3+108):: CALL
MOTION(#1,3*(X>35),V):: GOTO
 1050
```

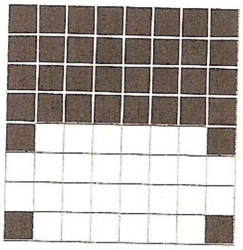
```
1090 IF T THEN V=T*3 :: CALL
 MOTION(#1,0,V):: GOTO 1050
ELSE CALL MOTION(#1,YY*2*(X-
YY>31),V):: GOTO 1050


1130 CALL SOUND(-999,-8,3,12
8,30,128,30,999,30):: CALL M
OTION(#1,0,V):: CALL POSITIO
N(#1,X,Y):: Y=V/2+Y :: IF Y<
1 THEN Y=1

1140 FOR T=X+16 TO 175 STEP
13 :: Y=Y+13 :: IF Y>255 THE
N Y=1

1150 CALL LOCATE(#T/13+7,T,Y
):: NEXT T :: IF Y1 THEN CAL
L COINC(#2,160,Y,18,T):: IF
T THEN CALL DELSPRITE(#2)

1160 CALL SOUND(-999,-8,3,12
8,30,128,30,500,30):: CALL C
OINC(ALL,T):: CALL DELSPRITE
(#9,#10,#11,#12,#13,#14,#15,
#16,#17,#18,#19,#20)

1170 IF T THEN CALL COLOR(#3
,16):: GOSUB 850 :: GOTO 104
0 ELSE 1050
```

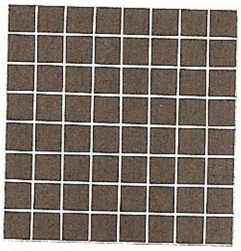
## APPENDIX - E    8 x 8 CHARACTER DIAGRAMS

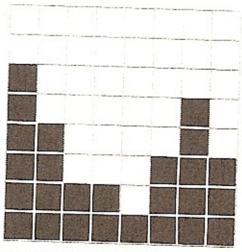

33 - FFFFFFFFFFFFFFFF


34 - 0000002011B3FFFF


35 - FFFFFFFF817E7E81


35 - FFFFFFFF81000081


40 - FFFFFFFFFFFFFFFF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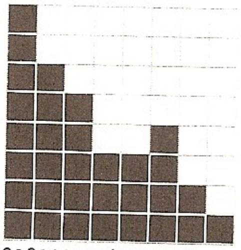
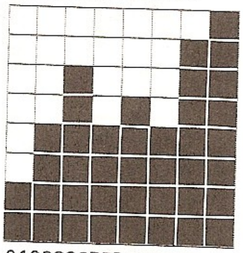
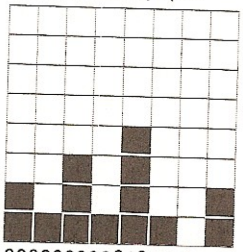

45 - 8080C0E0E4FCFEFF


46 - 0103232B7F7FFFFF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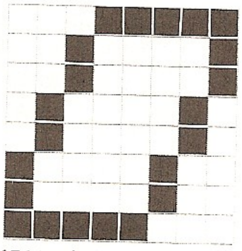
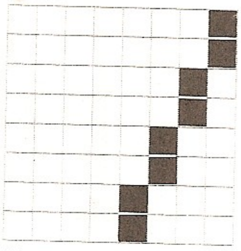

48 - 1F21214242848 4F8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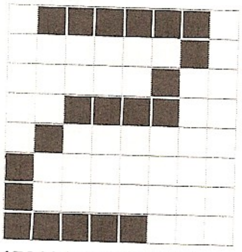
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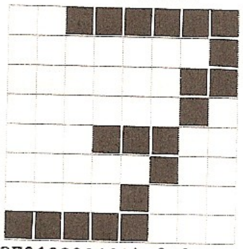
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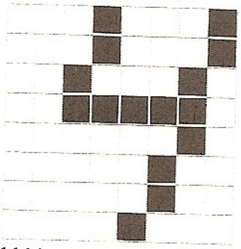
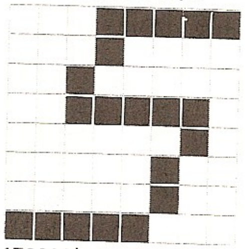
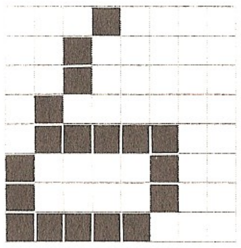
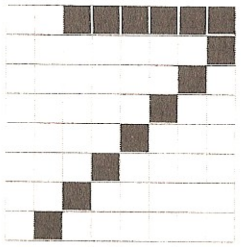

52 - 1111223E02040408


53 - 1F2020407C0408F8


54 - 102020407E82827C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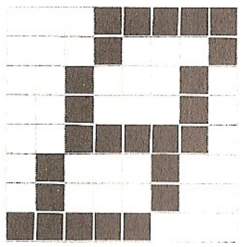
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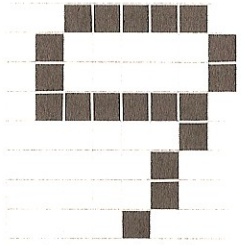
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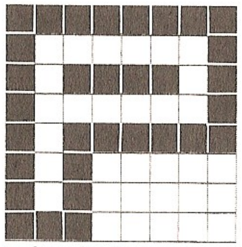
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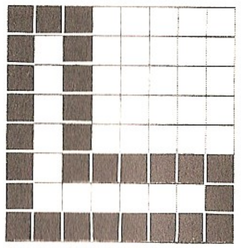
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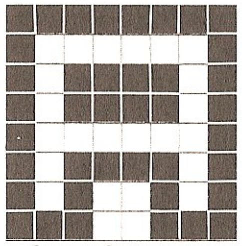
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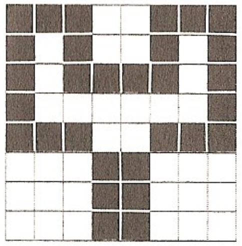
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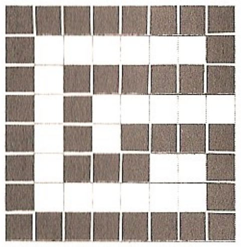
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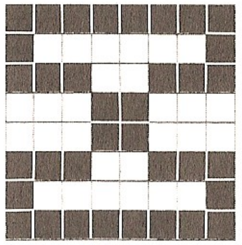
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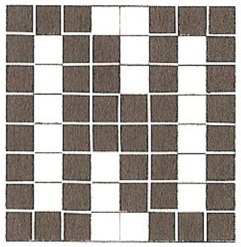
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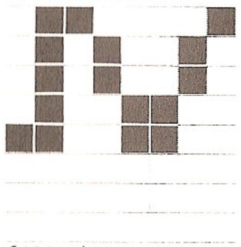
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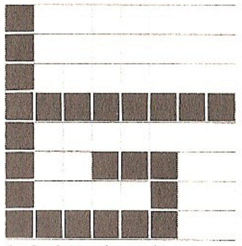
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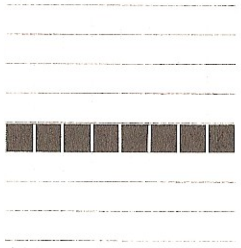
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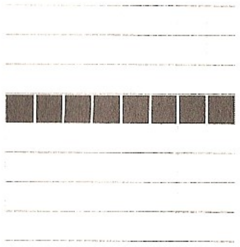
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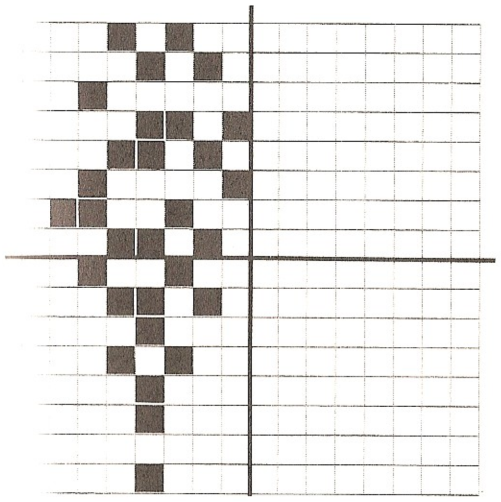
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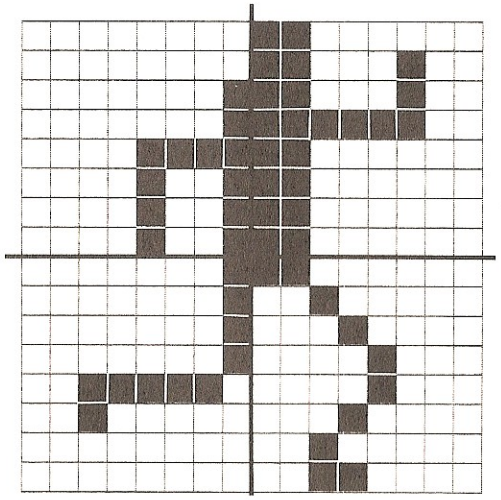
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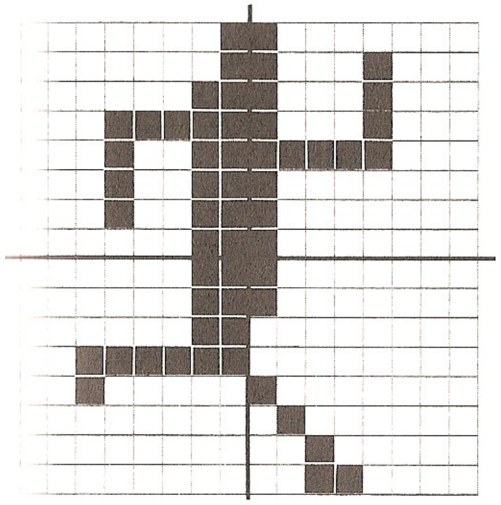
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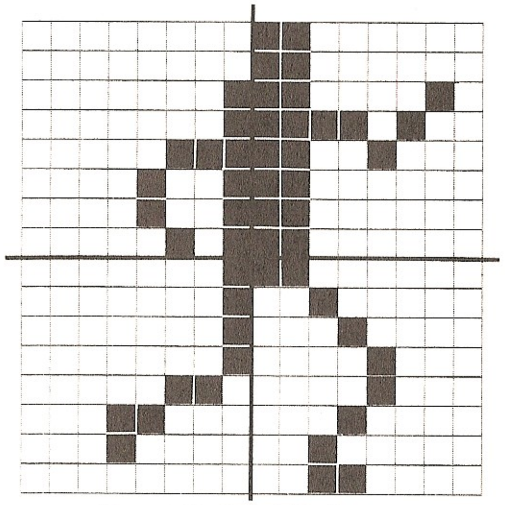
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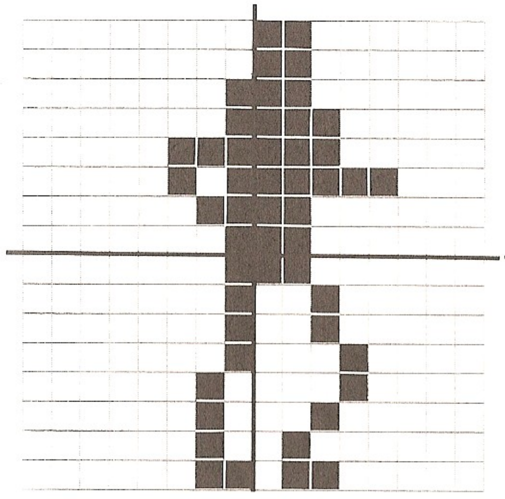

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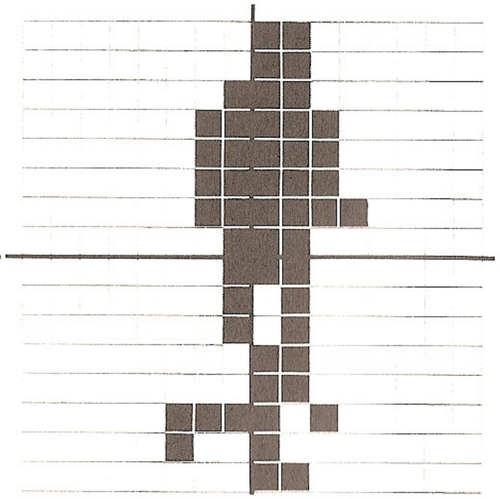

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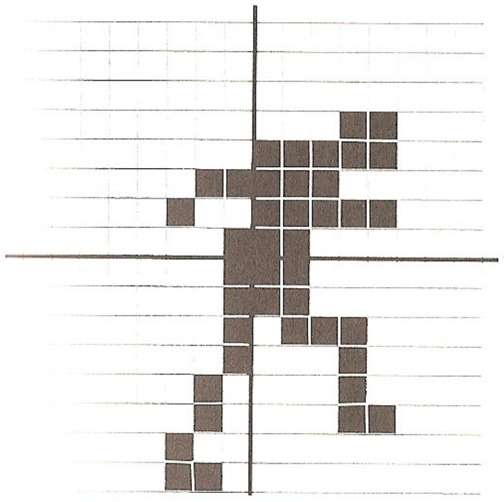

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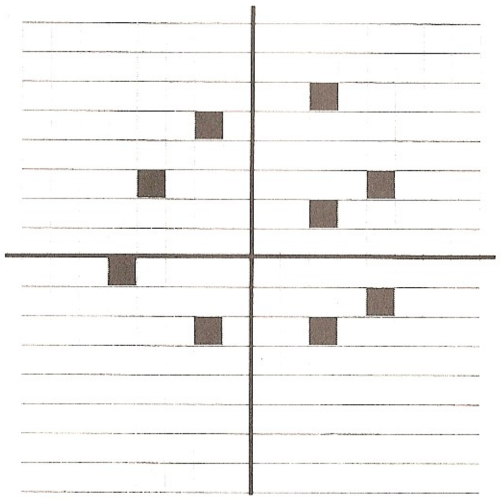

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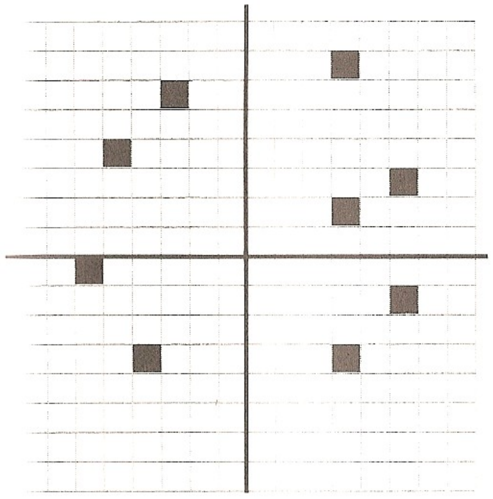

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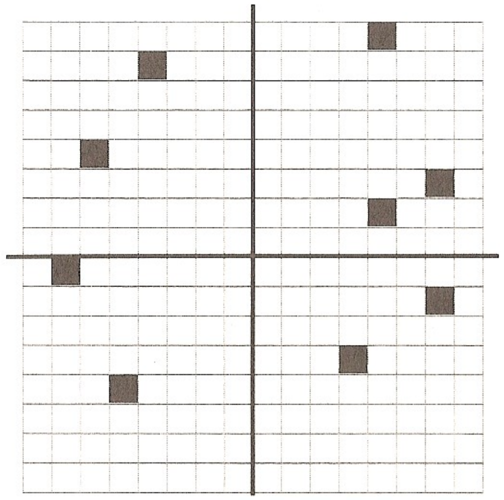

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92 - 0008000020000000
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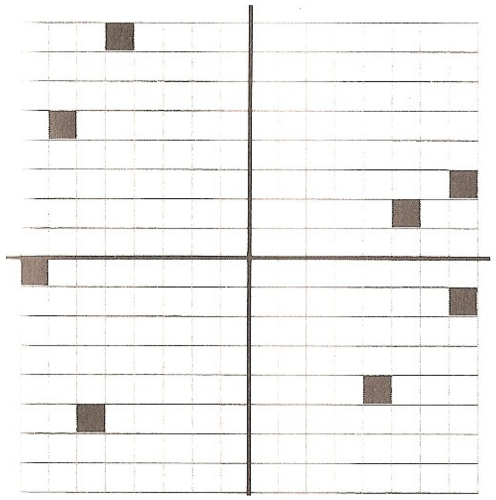

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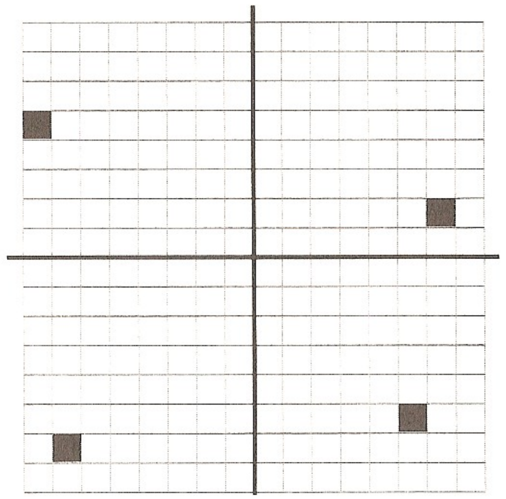

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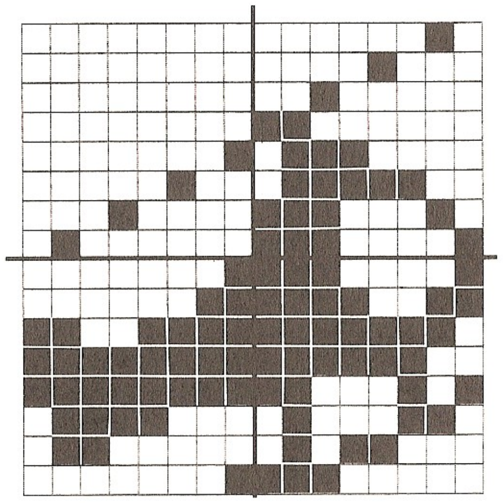

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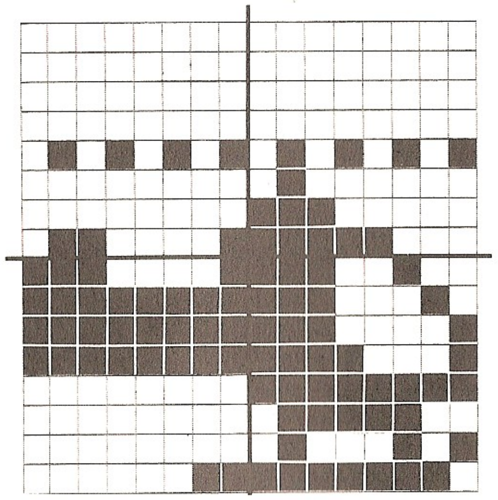

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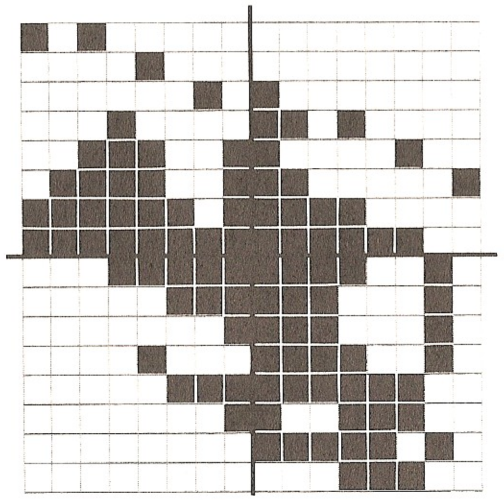

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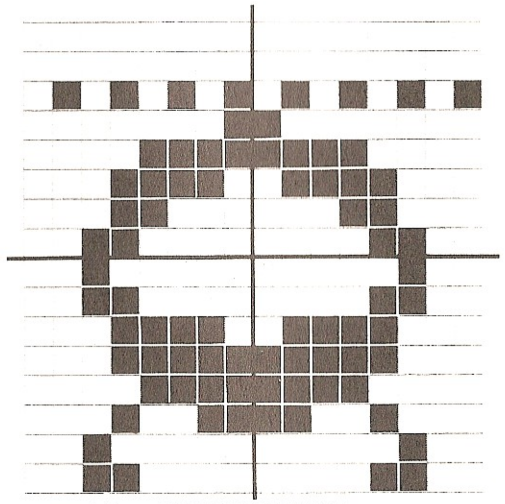

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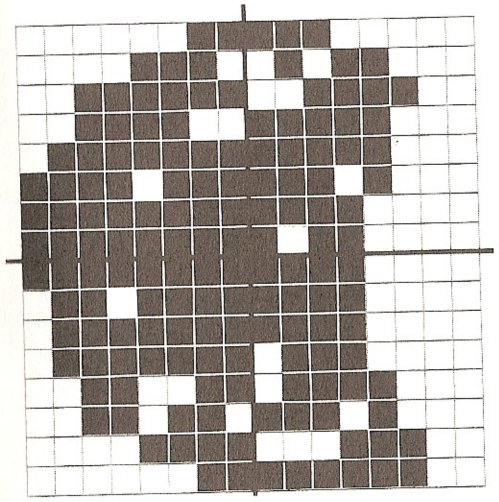

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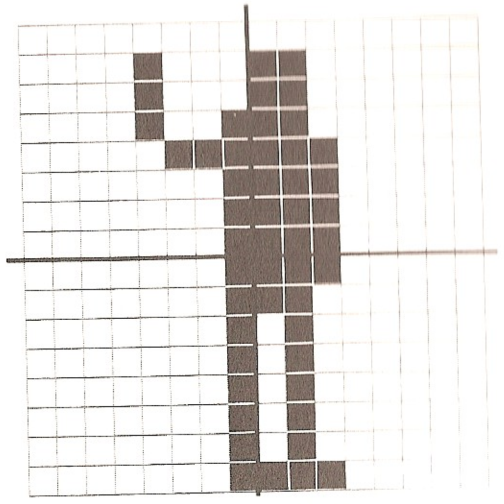

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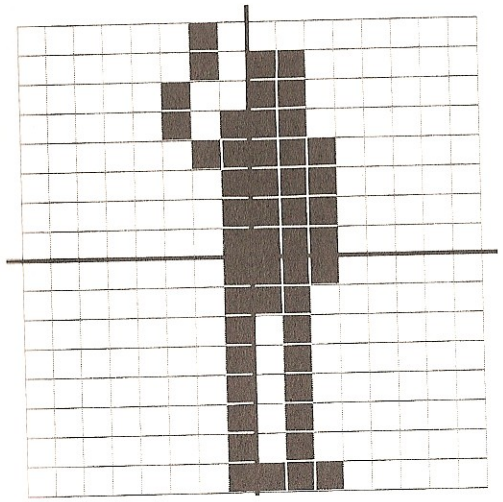

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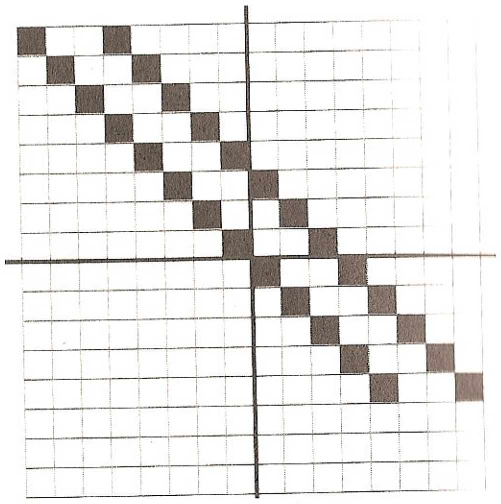

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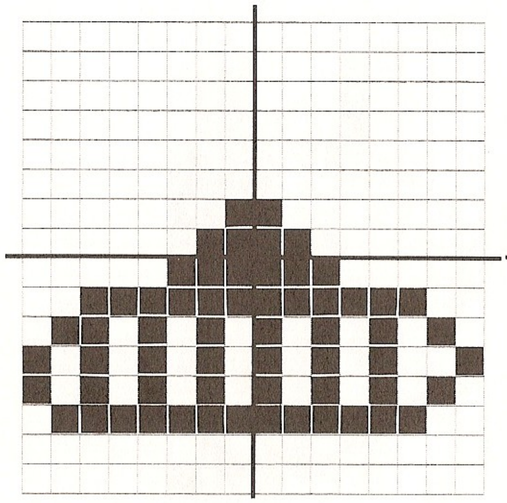

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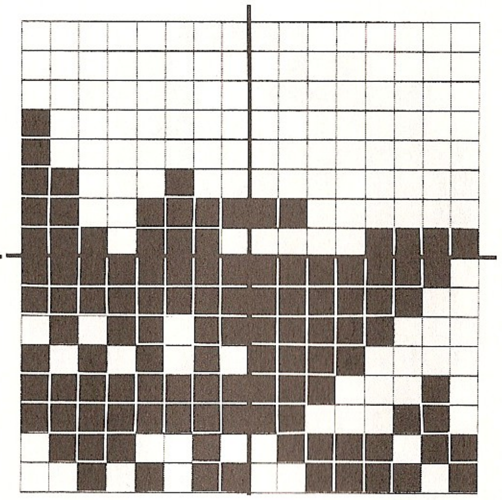

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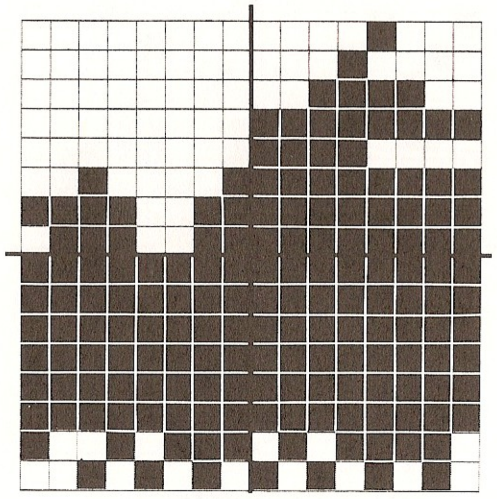

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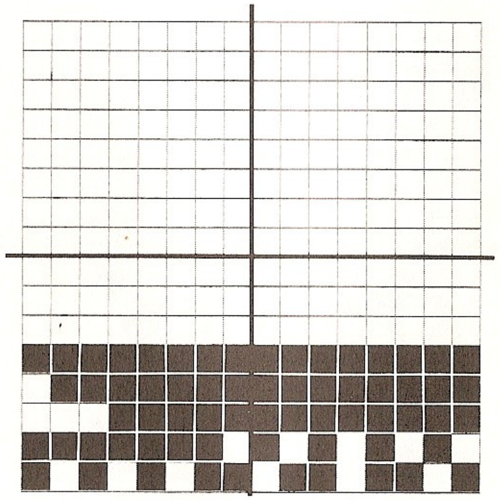

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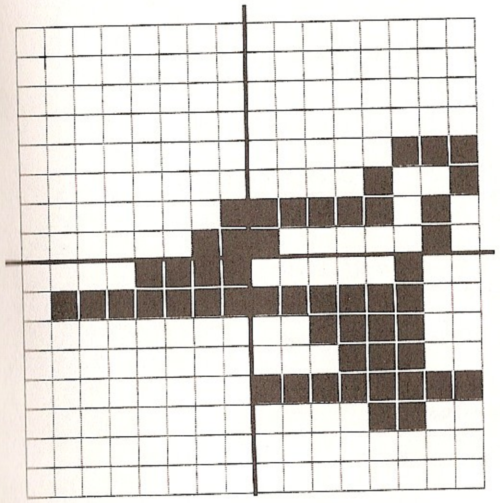

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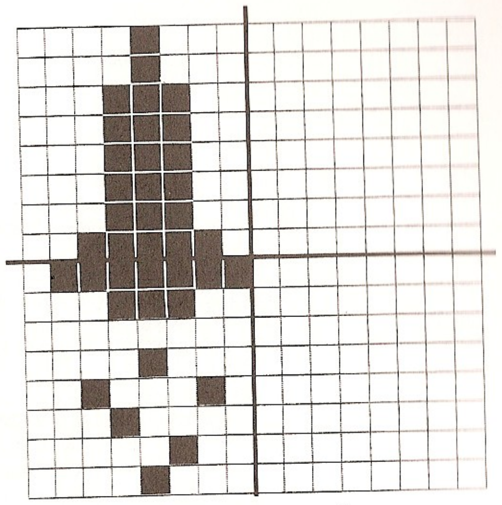

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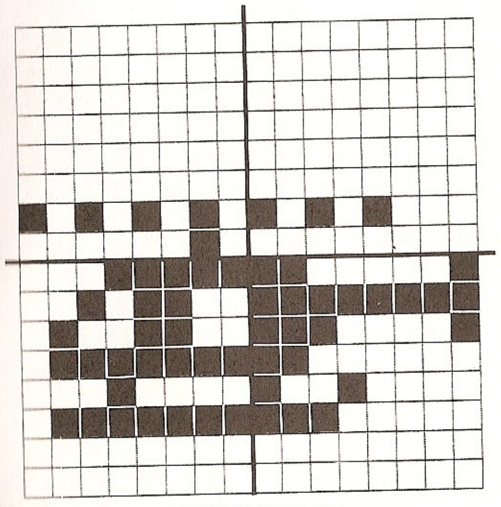

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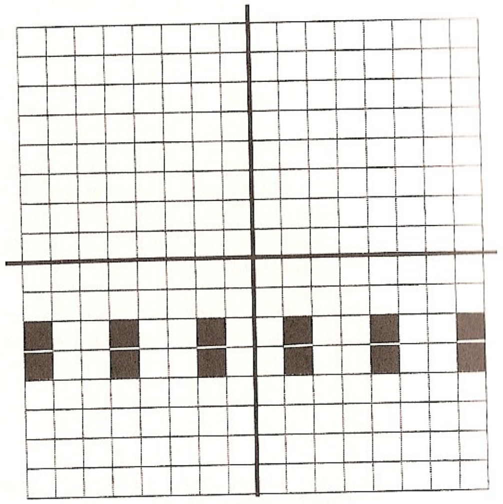

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64 - 0000000000000000
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