

THE ALPHA JOYSTICK

For the TRS-80 Model I Microcomputer

INSTRUCTIONS

INSTALLATION

If you have an Expansion Interface, plug the connector module of your Alpha Joystick into the "expansion bus port" (left side panel, to the right of the parallel printer port). For systems without an Expansion Interface, plug onto the 40 pin bus on the left rear of the keyboard.

Make certain that the top of the connector module is facing upwards. Always plug and unplug the Alpha Joystick with computer power turned off.

Insert the connector by holding the module sides. Then push firmly until you can feel that the connector is properly seated.

To unplug, hold the module by it's sides and gently wriggle side-to-side while pulling.

JOYSTICK GAMES

There is a two position mode switch on the joystick connector module.

Use the "5" position for all games produced by **BIG FIVE SOFTWARE**.

Use the "4" position for all other games, including those by **ADVENTURE INTERNATIONAL**, **CORNISOFT GROUP**, **ALPHA PRODUCTS**, etc.

Most joystick software includes an explanation of how the joystick interacts with that particular game. Plugging-in the joystick and running the software is the simplest way to learn how the joystick functions in a particular game.

You can begin playing games immediately. The following information is intended for those wishing to write or modify programs or who desire an understanding of how the joystick functions.

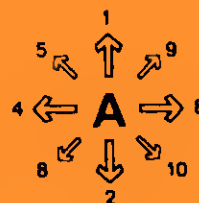
DEMONSTRATION PROGRAM

The last page of these instructions contains a listing of a graphics creation program for joystick entitled "Alpha Joystick Demo Program". This program can be typed-in and run in BASIC. Use your Alpha Joystick to create graphics the fun and easy way. Place mode switch in the "5" position.

TESTING THE ALPHA JOYSTICK

Type in this short BASIC program:

```
10 A=255-INP(0)      (we will explain the 255 later)
20 PRINT @0,A
30 GOTO10
```



When this program is run, the value 0 should be displayed on the top left of your screen. This indicates that the joystick is not activated and is the same as if there were no joystick connected to the computer.

Now try the eight different joystick directions. They should correspond with the values on the diagram above. Notice that each direction has a different value and that the diagonals are the sum of the right angle components. For example, UP is 1, LEFT is 4, therefore, UP & LEFT is 1+4 = 5.

The output of the FIRE button depends on which position the selector switch on the connector module is in. The switch selects either the old 4 bit mode or the new 5 bit mode.

With the switch in the "4" position, FIRE has a value of 3, which is made by combining the UP (value = 1) and DOWN (value = 2). UP and DOWN are mutually exclusive of each other (they can not be activated simultaneously). This allows the use of the UP-DOWN combination (value = 3) as the fire code.

With the selector switch in the "5" position, pressing the FIRE button results in a value of 16. In the "5" position, the joystick uses 5 bits instead of 4. The 5 bit mode has certain advantages as explained under "Mode Selection Switch".

The output of the joystick is always the combination of all activated functions. Thus if the stick were pushed left and the fire button pressed simultaneously, a value of 20 (16 for fire + 4 for left) would be displayed, assuming that the mode switch was set for "5".

UNDERSTANDING THE ALPHA JOYSTICK

The ALPHA JOYSTICK is a "ported" device, like the cassette recorder. It uses a port address (port 0), and therefore does not use any memory space. To communicate with the computer the BASIC INP(0) (Input Port zero) statement is used. Each time a program executes an INP(0), the computer "reads" the joystick and returns a number corresponding to the joystick's present state. This number should be stored in a variable so the program can subsequently look at it and take the proper action.

A=255-INP(0) is the general way to read the Alpha Joystick. Here is a simple program that will familiarize you with joystick operations:

```
10 DEFINT A           This is just to speed up the program execution.
20 A=255-INP(0)       This puts the joystick status in variable A.
30 IF A=1 THEN PRINT"UP"
40 IF A=2 THEN PRINT"DOWN"
50 IF A=4 THEN PRINT"LEFT"
60 IF A=8 THEN PRINT"RIGHT"
70 IF A=3 THEN PRINT"FIRE"      If selector switch is in the "4" position.
80 IF A=16 THEN PRINT"FIRE"     If selector switch is in the "5" position.
90 GOTO 20
```

You can expand this short program to read the diagonals as well. For example, add this line: IF A=5 THEN PRINT"UP AND LEFT". The program will now recognize the "UP & LEFT" direction.

You may have wondered why we have been using A=255-INP(0) rather than just A=INP(0). The reason is convenience. Type: PRINT INP(0) and press enter. The computer returns 255. Because the TRS-80 data lines are normally high, (pulled up) the computer returns the maximum value possible for an INP statement (255), even if nothing is connected to the computer. While there is nothing wrong with this, it is much simpler to work with small numbers like 1,2,4,8 rather than 254, 253, 251, 247 which are the actual values returned by the INP(0) statement. So we "invert" the readings. Now an idle joystick reads 0, and any activation of direction or FIRE results in an easily recognizable number such as 2 for DOWN. Summary table:

DIRECTION	A=255-INP(0)	A=INP(0)	BIT USED	BINARY WEIGHT
UP	1	254	0	1
DOWN	2	243	1	2
LEFT	4	251	2	4
RIGHT	8	247	3	8
FIRE (Mode 4)	3	252	0 & 1	3
FIRE (Mode 5)	16	239	4	16

Remember, the diagonal directions as well as the FIRE + direction combinations are obtained by adding the corresponding values of A when using A=255-INP(0).

MODE SELECTOR SWITCH

Beginning in October, 1981, a new version of the Alpha Joystick replaced the original "Stick-80". The new Joystick has an added feature. A two position mode selector switch on the joystick interface allows either 4 bit or 5 bit operation to be selected. The 5 bit operation is new and has some programming advantages while 4 bit operation preserves compatibility with the original joystick and the many existing games available in joystick version.

In the 4 bit mode, the joystick uses the lower 4 of the 8 bits available on the computer's data bus. The 4 directions; UP, DOWN, LEFT and RIGHT, correspond with bits 0,1,2 and 3 respectively. In this 4 bit mode, the fire function is derived by combining the UP and DOWN bits, 0 and 1.

The new 5 bit mode has the advantage of using a separate bit for the FIRE function. The 4 directions still use bits 0,1,2 and 3, however now the FIRE function has a bit of it's own, bit 5. In this mode there is no ambiguity between UP/DOWN control and FIRE. This means that programs can be written where directional changes can be made while the fire button is activated. Another advantage is that programming is simplified as no "masking" scheme is required to separate the UP/DOWN function from the FIRE function. Any programs that you write or modify, should take advantage of this new 5 bit mode.

CONVERTING BASIC PROGRAMS

Although many of the best action games are available in joystick version, you may wish to convert some non-joystick BASIC programs for joystick control. Provided that the game is written in BASIC, this is a fairly simple matter.

The type of program that is a good candidate for joystick conversion is one that uses character keys for directional control. Usually the arrow keys or the "<" and ">" keys govern direction and the space bar commands FIRE. In most cases, the program will contain a routine or subroutine using the BASIC "INKEY\$" function for keyboard input. An INKEY\$ loop repeatedly checks the keyboard for any valid keystroke, and if it detects one, branches to the appropriate subroutine. The subroutine then executes the proper response for that keystroke and when done, returns control once again to the INKEY\$ loop. Usually it is only necessary to modify this INKEY\$ loop in order to convert to joystick control. Here is an example of a typical keyboard input routine:

```
1000 A$=INKEY$ : IF A$="" THEN 1000
1010 IF A$="<" THEN GOSUB XXXX
1020 IF A$=">" THEN GOSUB YYYY
```

The joystick version would be:

```
1000 A=255-INP(0) : IF A=0 THEN 1000
1010 IF A=4 THEN GOSUB XXXX
1020 IF A=8 THEN GOSUB YYYY
```

For maximum execution speed, delete the old input scheme. In addition, use the BASIC "DEFINT" (DEFine as an INTeger) function on the variable used. In this case for example, place a "DEFINT A" statement in the initialization portion of the program.

MACHINE LANGUAGE GAMES

The fastest action games are written in machine language. Modification of these games requires some knowledge of machine language however, the principle is the same as in a BASIC program. The control input routine should be modified to read Port 0 (where the joystick resides) instead of scanning the keyboard memory locations.

EXPANSION

If you have other devices that also plug onto the 40 pin bus such as a modem or screen printer, you may wish to utilize one of our EXPANDABUS series of bus expansion cables. EXPANDABUS allows connection of multiple devices on the TRS-80 bus, and is available in x2, x3, x4, and x5 configurations.

Your ALPHA JOYSTICK can remain connected to the TRS-80 bus at all times as it draws no power and will not interfere with any other equipment connected to your system.

LIMITED WARRANTY

The manufacturer warrants that the item furnished hereunder, is free from defects in material and workmanship to perform to published specifications for a period of ninety (90) days from the date of original purchase. Under no circumstances will manufacturer be liable for special or consequential damages as a result of any alleged breach of this warranty provision. The liability of manufacturer hereunder shall be limited to replacing or repairing, at it's option, any defective units that are returned F.O.B. manufacturer's plant. Units or parts which have been subjected to abuse, misuse, accident, alteration, neglect, or unauthorized repair are not covered by warranty. Opening either the joystick or the interface module voids warranty.

ALPHA JOYSTICK DEMO PROGRAM

```

10 CLS:PRINT"ALPHA JOYSTICK DEMO PROGRAM":PRINT:PRINT
12 PRINT" > FIRE BUTTON TOGGLES BETWEEN DRAW AND ERASE MODE"
14 PRINT" > FOR A NEW SCREEN, PRESS FIRE WITH STICK LEFT"
16 PRINT" > FOR A HALF-REVERSE EFFECT, PRESS FIRE WITH STICK RIGHT"
20 CLEAR1000:DEFINTA-2:X=32:Y=24:P%=STRING$(64,CHR$(191)):S=1
30 A%=STRING$(255,191):B%=LEFT$(A%,3):ON ERROR GOTO190
40 PRINT:PRINT"SELECT SPEED : 1 (SLOW) TO 9 (FAST)":PRINT:PRINT"SPEED ?"
50 I%=INKEY$:IF I%="" THEN 50 ELSE E=VAL(I%)
60 PRINT:PRINT:D=(9-E)*10
70 PRINT" > FOR BLACK BACKGROUND, PUSH STICK UP"
75 PRINT" > FOR WHITE BACKGROUND, PUSH STICK DOWN"
80 A=255-INP(0):IF A=0 GOTO80
90 IFA<>2 AND A<>1 THEN GOTO80
100 CLS:IF A=2 THEN N=1:PRINTA%A%A%A%B%:POKE16383,191
110 A=255-INP(0):FORZ=0TOD:NEXT:SET(X,Y):SET(X+1,Y)
120 IFA=20THENGOTO70ELSEIFA=16THENS=-S:FORT=0TO100:NEXT
130 IFS=1 THEN RESET(X,Y):RESET(X+1,Y)
140 IF A=24 GOSUB220
150 IF A=1 THEN Y=Y-1 ELSEIF A=2 THEN Y=Y+1 ELSEIF A=4 THEN X=X-2
160 IF A=8 THEN X=X+2 ELSEIF A=9 THEN X=X+2: Y=Y-1 ELSEIF A=10 THEN X=X+2: Y=Y+1
170 IF A=6 THEN X=X-2: Y=Y+1 ELSEIF A=5 THEN X=X-2: Y=Y-1
180 RESET(X,Y):RESET(X+1,Y):GOTO110
190 IFX>127,X=126:V=127ELSEIFX<0,X=0
200 IFY>17,Y=17ELSEIFY<0,Y=0
210 RESUME180
220 FORX=0TO126STEP2:FORY=0TO17
230 P=POINT(X,Y):IFP=-1,RESET(X,Y)ELSEIFP=0,SET(X,Y)
240 NEXT:NEXT:RETURN

```


ALPHA Products

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WHY

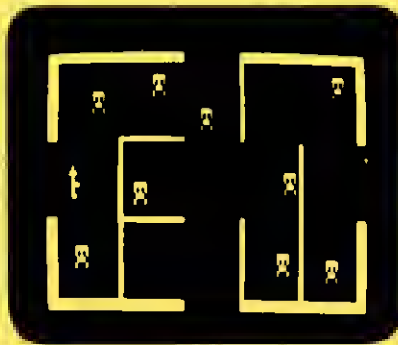
IS THE ALPHA JOYSTICK SUCH A SUCCESS ?

TALKING ROBOT ATTACK

NEW!

ALL GAMES:

16K Level 2, Mod 1 + Mod 3 Cassette: \$15.95
32k Level 2, Mod 1 + Mod 3 Diskette: \$19.95
10% discount for 2 games, 15% for 3 or more
Games may be played with or without joystick



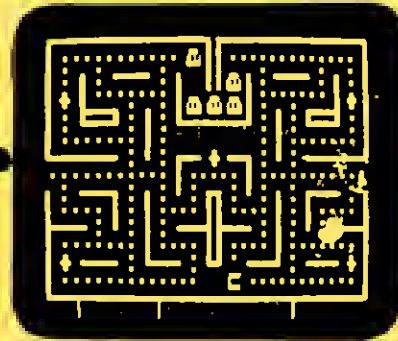
TALKING ROBOT ATTACK

INCREDIBLE! This amazing game actually **TALKS** without a speech synthesizer, through the cassette AUX plug.

You are armed with just a hand held laser. In a remote section of the space station you encounter armed robots. Some march towards you, some wait around corners. Watch out, the walls are electrified. Zap as many robots as you dare before escaping into a new section where more robots await you. The struggle continues. With Joystick action and **VOICE OUTPUT**, this game will amaze you.

NEW!

SCARFMAN



SCARFMAN

NEW!

THE LATEST ARCADE CRAZE now runs on your TRS-80

It's eat or be eaten. You control Scarfman around the maze gobbling up everything in your path. You attempt to eat it all before the monsters devour you. Difficulty increases as game progresses. Excellent high speed machine language action game. From The Cornsoft Group. With sound.

CAUTION: Played with the Alpha Joystick, Scarfman may become addictive.



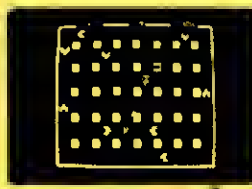
SUPER NOVA

Asteroids loom ominously around the screen. You must destroy the asteroids before they destroy you! (Big asteroids break into little ones.) Your ship will respond to thrust, rotate, hyperspace and fire. Watch out for that saucer with the laser. As reviewed in May 1981 Byte Magazine.



GALAXY INVASION

The sound of the klaxon is calling you! Invaders have been spotted warping toward Earth. You shift right and left as you fire your lasers. A few break formation and fly straight at you! You place your finger on the fire button knowing that this shot must connect! With sound effects!



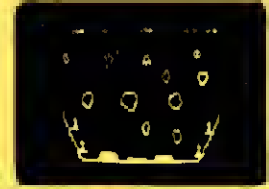
ATTACK FORCE

As your ship appears on the bottom of the maze, eight alien ships appear on the top, all traveling directly at you! You move toward them and fire missiles. But the more aliens you destroy, the faster the remaining ones become. If you get too good, you must endure the "Flag ship." With sound effects!



COSMIC FIGHTER

Your ship comes out of hyperspace under a convoy of aliens. You destroy every one. But another set appears. These aren't more intelligent. You eliminate them too. Your fuel supply is diminishing. You must destroy two more sets before you can dock. The space station is low on your scanner. With sound!



METEOR MISSION II

As you look down on your vna, asteroids fly out for escape. You must maneuver through the asteroids to meteors. Can you get back to the space station? Fire lasers to destroy the asteroids, but watch out, there could be an alien! (AUSP) - working. Includes sound effects!

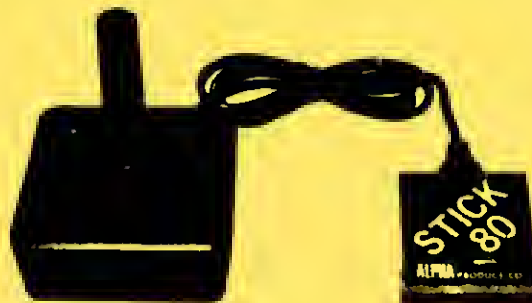
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- ☐ Plugs directly into KB or E/I (next to printer port)
- ☐ Compatible with any other TRS-80 accessories
- ☐ Saves your keyboard
- ☐ Fun to experiment in BASIC. Simply use A=INP(0) to read the joystick.
- ☐ Fully assembled, ready to plug in and use.

Price includes Atari Joystick + Alpha interface + instructions + demo program. The Alpha Joystick is backed by an unconditional money back guarantee. If you are not delighted with it, return it within 14 days for a prompt and courteous refund.



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