

B L U E R A M

K E Y B O A R D

O W N E R ' S M A N U A L

*opens RAM*

*call*

$28416 \rightarrow 28630$   
 $\frac{28416}{214} + 1 = 215$   
 $\% (28416) = KP$

$\Delta(192) = 0$ ;  $A = 28416$ ; FOR  $N = A$  TO  $28630$ ;  $\% (N) = KP$ ; INEXT  $N$ ; IF  
*'ERROR'*

$KP \# 85$  PRINT;  $TU = 69$ ;  $TU = 82$ ;  $TU = 82$ ;  $TU = 79$ ;  $TU = 82$ ;  $TU = 13$

$\& (64) = 0$  closes RAM to ROM

! RETURN; CLEAR; CALL 28416

$\& (14) = 8$ ; NT = 3

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## KEYBOARD OPERATIONS

INSTALLATION: Open the ZIF socket on the BLUE RAM. Insert the 12 pins of the logic block into the ZIF socket on the side nearest the handle (back side) such that the cable extends to the left. This leaves the front side of the ZIF socket unobstructed. Close the ZIF socket.

OPERATION: Load the keyboard control program. This is the tape marked BLUE RAM KEYBOARD. Latch down the CAPS LOCK key. When the tape finishes loading, stop the tape and your keyboard is in control! If control is lost as it will be from time to time (when the keyboard program is stopped, for example) enter: CALL28416 GO at the keypad to start it up again. RESET will stop the keyboard program but again you may start it again simply by entering: CALL28416 GO.

### THINGS TO REMEMBER:

1. All keys on the keyboard are functional although the Bally ARCADE does not respond to all of them. The CNTL key, for example, is used in conjunction with other keys to provide special control codes used by modem communications, etc., but the Bally just displays a "?" when it sees those codes.
2. Although the special key labels indicate which keys provide special "words" when shifted, other translations from the Bally keypad are more subtle:

RETURN = GO                      DELETE = ERASE

PAUSE and HALT are not available on this keyboard; they must be operated from the keypad as before. The GO+10 function is not available at all. Attempts to use it will cause the keyboard program to stop.

3. Occasionally it will appear that the keyboard has quit on its own. This is because there are a number of traps in Bally BASIC which can stop the keyboard program:

:RETURN    :PRINT    :INPUT    :LIST    Depressing almost any key on the keypad while input is being solicited.

If the keyboard should stop, restart it with a CALL28416 and continue. The keyboard program is safe in the BLUE RAM.

SPECIAL NOTE: The keyboard program can be added to the BLUE RAM UTILITY so that the keyboard comes up in control when the utility is loaded. Here is the procedure:

1. Load the BLUE RAM UTILITY and BLUE RAM KEYBOARD programs together. Do not RESET between loads.
2. Add line 105 to the UTILITY as follows:

```
105CALL28416;&(14)=8;NT=3
```

Change the ending GOTO on lines 170 and 350 to GOTO 105.

3. Write out the machine code portion of the UTILITY using its PRINT function (DUMP TO TAPE) specifying 2 sections:

```
6C00-6CA3 GO  
6F00-6FDB L
```

Next write out the BASIC portion using GOTO 360.

A NOTE ON WORDS: If you are an adequate typist, it may well be easier for you to type out the BASIC key words instead of using the special shifted "words" keys. DON'T DO IT! Bally BASIC is programmed to accept only the single stroke "words" keys and will say WHAT? if you try to spell it out.

PROGRAMMING: The keyboard may be used to input to BASIC programs in the normal way that the keypad does as long as the keyboard program has been started. A CALL28416 in your program will ensure that it has started. Additionally, as with the keypad, it is possible to test for a key being held down without waiting to see what character is input. For example, to test for the RETURN key being pressed without waiting for a read i.e. K=KP; IF K=13... use the following form:

```
10 &(162)=63 .ARMS THE KEYBOARD LOGIC  
20 &(160)=53 .ADDRESS OF RETURN KEY  
30 K=&(134) .PLACES KEY STATUS INTO K  
40 &(162)=0 .DISABLES KEYBOARD LOGIC  
50 IF K=0.... .K=0 IF KEY IS PRESSED
```

The following program will allow you to determine the address of each key:

```
10 :RETURN ;CLEAR  
20 FOR N=0 TO 60; &(162)=63; &(160)=N  
30 K=&(134); &(162)=0  
40 IF K=0 PRINT N  
50 NEXT N; GOTO 20
```

Note that if the CAPS LOCK key is latched down it will show up as key #58. Be sure to hold the key long enough for it to print the key address.



4. This step wires the X pins as follows:

- |                     |                         |
|---------------------|-------------------------|
| 106X(1)-109X(1) 5"  | 205X(1)-208X(1) 5"      |
| 109X(2)-110X(1) 3½" | 208X(2)-210X(1) 4"      |
| 110X(2)-111X(1) 3½" | 210X(2)-211X(1) 3½"     |
| 111X(2)-112X(1) 3½" | 211X(2)-410X(1) 4½"     |
| 112X(2)-113X(1) 3½" | 410X(2)-313X(1) 4½"     |
| 113X(2)-114X(1) 3½" | 313X(2)-213X(1) 3½"     |
| 114X(2)-115X(1) 3½" | 213X(2)-214X(1) 3½"     |
| 406X(1)-405X(1) 3½" | 303X(1)-102X(1) 4½"     |
| 405X(2)-404X(1) 3½" | 102X(2)-103X(1) 3½"     |
| 404X(2)-305X(1) 3½" | 103X(2)-104X(1) 3½"     |
| 305X(2)-304X(1) 3½" | 104X(2)-204X(1) 3½"     |
| 304X(2)-105X(1) 4½" | 204X(2)-209X(1) 6½"     |
| 105X(2)-107X(1) 4"  | 209X(2)-412X(1) 5½"     |
| 107X(2)-108X(1) 3½" | 412X(2)-413X(1) 3½"     |
| 203X(1)-409X(1) 7½" | 401X(1)-302X(1) 4"      |
| 409X(2)-310X(1) 3½" | 302X(2)-201X(1) 3½"     |
| 310X(2)-311X(1) 3½" | 201X(2)-202X(1) 3½"     |
| 311X(2)-411X(1) 3½" | 202X(2)-501X(1) 8½"     |
| 411X(2)-312X(1) 3½" | 501X(2)-415X(1) 8"      |
| 312X(2)-212X(1) 3½" | 415X(2)-215X(1) 4"      |
| 212X(2)-314X(1) 4"  | 215X(2)-116X(1) 3½"     |
| 207X(1)-206X(1) 3½" | 101X(1)-403X(1) 5½"     |
| 206X(2)-306X(1) 3½" | 403X(2)-414X(1) 11"     |
| 306X(2)-307X(1) 3½" | 414X(2)-315X(1) 3½"     |
| 307X(2)-407X(1) 3½" | 403X(3)-402X(1) NOTE 1. |
| 407X(2)-408X(1) 3½" | 315X(3)-316X(1) NOTE 2. |
| 408X(2)-308X(1) 3½" |                         |
| 308X(2)-309X(1) 3½" |                         |

NOTE 1. This connection is made with a diode, ensuring that the banded end connects to 402X. Trim extra wire.

NOTE 2. This connection is made with a diode, ensuring that the banded end connects to 316X. Trim extra wire.

~~XXXX~~  
~~XXXX~~  
XXXX

514

3½ gm  
4 = blk  
4½ = blk  
5 = org  
5½ = blu

5. This step wires the Y pins as follows:

- 203Y(1)-205Y(1) 4"
- 205Y(2)-106Y(1) 3½"
- 106Y(2)-108Y(1) 4"
- 108Y(2)-309Y(1) 4½"
- 309Y(2)-501Y(1) 4"
- 501Y(2)-412Y(1) 5½" ←
- 203Y(2)-101Y(1) NOTE 3.
- 401Y(1)-104Y(1) 5½"
- 104Y(2)-306Y(1) 5"
- 306Y(2)-406Y(1) 3½"
- 406Y(2)-210Y(1) 6"
- 210Y(2)-112Y(1) 4"
- 112Y(2)-312Y(1) 4"
- 312Y(2)-316Y(1) 5½" ←

- 403Y(1)-414Y(1) 11"
- 107Y(1)-207Y(1) 3½"
- 207Y(2)-209Y(1) 4"
- 209Y(2)-314Y(1) 6½"
- 314Y(2)-214Y(1) 3½"
- 214Y(2)-215Y(1) 3½"
- 215Y(2)-115Y(1) 3½" ←
- 314Y(3)-414Y(2) NOTE 4.
- 302Y(1)-303Y(1) 3½"
- 303Y(2)-105Y(1) 4½"
- 105Y(2)-407Y(1) 5½"
- 407Y(2)-208Y(1) 4"
- 208Y(2)-111Y(1) 4½"
- 111Y(2)-212Y(1) 4" ←

- 202Y(1)-304Y(1) 4"
- 304Y(2)-308Y(1) 5½"
- 308Y(2)-409Y(1) 4"
- 409Y(2)-211Y(1) 5"
- 211Y(2)-413Y(1) 5"
- 413Y(2)-114Y(1) 5" ←
- 114Y(2)-315Y(1) NOTE 5.
- 103Y(1)-405Y(1) 5½"
- 405Y(2)-408Y(1) 5"
- 408Y(2)-410Y(1) 4"
- 410Y(2)-311Y(1) 3½"
- 311Y(2)-110Y(1) 4½"
- 110Y(2)-116Y(1) 7" ←

313Y

*Sy. Dan. 10/4/66*

- 402Y(1)-204Y(1) 5"
- 204Y(2)-305Y(1) 3½"
- 305Y(2)-307Y(1) 4"
- 307Y(2)-411Y(1) 6"
- 411Y(2)-113Y(1) 5"
- 113Y(2)-313Y(1) 4"
- 313Y(2)-415Y(1) 5" ←
- 102Y(1)-201Y(1) 3½"
- 201Y(2)-404Y(1) 5½"
- 404Y(2)-206Y(1) 5"
- 206Y(2)-109Y(1) 4½"
- 109Y(2)-310Y(1) 4½"
- 310Y(2)-213Y(1) 5" ←

- ✓ NOTE 3. This connection is made with a diode, ensuring that the banded end connects to 203Y.
- ✓ NOTE 4. This connection is made with a diode, ensuring that the banded end connects to 314Y. Trim extra wire.
- ✓ NOTE 5. This connection is made with a diode, ensuring that the banded end connects to 114Y.

6. This step wires the end-block socket to the keyboard X and Y lines. The socket pins are numbered clockwise looking from the bottom with pin 1 adjacent to the angle-cut corner. Pins may be bent slightly away from the end-block as necessary to wrap the wires, however, DO NOT OVERSTRESS THE END-BLOCK/SOCKET JOINT. Lay the end-block on the keyboard at the right side such that the specified wire lengths will reach the socket.

✓115X(2)-S15(1) 4"	✓412Y(2)-S11(1) 6½"
✓108X(2)-S1(1) 9"	✓115Y(2)-S5(1) 3½"
✓314X(2)-S16(1) 5"	✓114Y(3)-S12(1) 5½"
✓309X(2)-S2(1) 8½"	✓415Y(2)-S6(1) 5½"
✓214X(2)-S14(1) 4½"	✓316Y(2)-S8(1) 4½"
✓413X(2)-S4(1) 6"	✓212Y(2)-S10(1) 5½"
✓116X(2)-S3(1) 3½"	✓116Y(2)-S9(1) 3½"
✓315X(3)-S13(1) 5"	✓213Y(2)-S7(1) 5"

This completes all wiring of the keyboard. Double check for connections not being soldered. Solder any overlooked connections at this time.

7. Place the end-block in its proper position on the end of the keyboard with the hole in the end-block aligned with the large hole in the keyboard. Check the positioning of the socket pins and bend them slightly if necessary to prevent them from touching the pins of block 116. When a clearance of 1/16th" is ensured, mount the end-block to the keyboard by passing a 6-32x3/4" flat-head screw through the end-block from the bottom and on through the large keyboard hole, securing it with a 6-32 nut. In a similar manner, mount the other end-block to the other end of the keyboard. Peel the backing from 4 feet and place them on the end-block bottoms such that the front feet cover the screw holes.
8. Perform a final inspection and when satisfied, turn the keyboard right side up. Attach the logic cable to the end-block socket such that the cable leaves the keyboard to the left. DO NOT OVERSTRESS THE END-BLOCK/SOCKET JOINT. Remove the backing from the key cap labels and carefully center them on the appropriate keys. The appropriate key is marked on the label below center. When the labels are squarely in the center of the keys, press them into the concave surface of the keys. The kit is now complete.

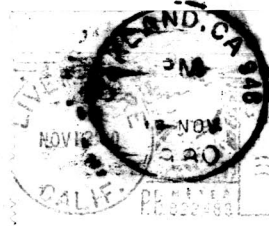
NOTE: If additional end-block support is desired for a more rugged environment, small (9/64) holes may be drilled in the keyboard toward the back and #6 wood screws applied.

P A R T S   L I S T

ITEM	QTY	DESCRIPTION
1.	1	Logic cable assembly. Keyboard end has a 16 pin connector and BLUE RAM end has a logic block with a 12 pin connector.
2.	1	Left end-block with 16 pin socket attached.
3.	1	Right end-block.
4.	4	End-block feet (adhesive backed).
5.	2	6-32 x 3/4" flat-head machine screw.
6.	2	6-32 machine nut.
7.	2	#6 x 3/4" pan-head wood screw (for optional end-block secondary support).
8.	5	1N914 diodes.
9.	47+	3½" wire-wrap wire. NOTE the specified length is overall including 1" of bare wire on each end.
10.	19+	4" wire-wrap wires.
11.	12+	4½" wire-wrap wires.
12.	15+	5" wire-wrap wires.
13.	12+	5½" wire-wrap wires.
14.	3+	6" wire-wrap wires.
15.	3+	6½" wire-wrap wires.
16.	1	7" " " "
17.	1	7½" wire-wrap wire.
18.	2	8" wire-wrap wire.
19.	1	8½" wire-wrap wires.
20.	2	9" wire-wrap wire.
21.	1	11" wire-wrap wires.
21.	1	Assorted key cap labels (adhesive backed).



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