PG Design Electronics Inc.
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Instruction Manual For Installation Of 32/64K CMOS EXPANSION RAM for TRS 80 Model 100 Portable Computer *

CAUTION:
Do not remove your Memory Module from protective foam packing until you are ready to insert Memory Module into your Model 100 Computer.
The 32/64K CMOS Ram Memory Module you have purchased is designed to use very low power CMOS components. Because CMOS Components are very low power devices they can be damaged by the energy present in Static Electricity. Please use the necessary precautions when handling your CMOS Component.

* TRS-80 is a Trademark of the Tandy Corp.

Patent Pending

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Statement Of Limited Warranty

PG Design Electronics, Inc. Warrants that its products will be free from defects in materials and workmanship for a period of 180 days from date of shipment. PG Design Electronics, Inc. will repair or replace, at its option any equipment or parts that PG Design Electronics, Inc. determines were defective when shipped by us.

If service is required under this warranty, the customer must: (1) Notify PG Design in writing or by telephone of the defect; (2) Obtain a return authorization (RA) number from PG Design which must be shown on the outside of all shipping containers and in all correspondence; and (3) send the product to PG Design delivery charges prepaid unless otherwise directed by PG Design. In making repairs, PG Design will replace parts as required on an exchange basis. PG Design Electronics,Inc. reserves the right to alter the appearance or physical parameters of the product or to change its manner of functioning without notice to the customer. After repair PG Design Electronics, Inc. will prepay return delivery charges.

This limited warranty does not cover losses or damage which occur due to, but not limited to; (1) shipment to or from customer; (2) neglect, misuse or any cause other than ordinary use;(3) Adjustment, repair, or modifications by other than PG Design Electronics, Inc. authorized personnel;

(4) improper enviromental factors such as excessive or inadequate heating or air conditioning, and electrical power failures, surges, or other irregularities; (5) other causes beyond the control of PG Design Electronics, Inc. including but not limited to natural causes or disasters, wars, insurrections, civil disturbances, labor disputes, or the requirements of domestic or foreign governments; (6) shortages or allocation of materials, utilities or other resources.

PG Design Electronics, Inc. does not warrant that its products are merchantable or fit for any particular purpose whatsoever. This limited warranty is in lieu of all other warranties, express, implied, or statutory.

PG Design Electronics, Inc's liability, whether based on contract, tort, warranty, strict liability, or any other theory, shall not exceed the price of the individual product whose defect or damage is the basis of the claim. In no event shall PG Design Electronics, Inc. be liable for any loss of profits, loss of use of facilities or equipment, or other indirect, incidental, or consequential damages. The foregoing limited warranty is the exclusive remedy provided to our customers.

Specifications:

Dimension: 32K/64K
Length: 2.25 in.
Width: 3.00 in.
Height: .50 in.

Weight: 1.5 oz.

Memory: 1 Bank of 32,768 x 8bit CMOS RAM
32K Module
2 Banks of 32,768 x 8bit CMOS RAM
64K Module

Electrical: Voltage: 5v +- 10%
Operating Current: 10 to 15 ma
Standby Current: 8 to 80 ua

Battery: Type:One CR 1220 3V Lithium
Life: Six Months while out of Computer. Six Years if left in Computer.

Battery Replacement Time: Must be done while Module is in the Computer.There is no limit on the time required to change the battery.

Disc Video Interface: Your Module comes with a sturdy 40 pin setup to facilitate the use of a Disc Video Interface. An adaptor cable for this purpose is available from PG Design Elec. Call for pricing

Installation of 32/64k CMOS RAM Memory Module

(1) Turn Computer "OFF" This is the switch on the right hand side of the machine as you are looking at the screen.
"Memory Power" switch which is located on the underside of the machine does not have to be turned "OFF".

(2) Remove Expansion Buss Cavity Compartment Cover. This is located on the underside of your Computer. Ref. Figure (1).

(3) Remove any adaptor sockets from Expansion Buss e.g. Disk Video Interface Adaptor etc.

(4) Remove 32/64K expansion RAM from carrying case. NOTE: 32/64Expansion Ram is a CMOS device and is very susceptible to static discharge. Be certain not to build up charge within yourself by walking on carpeting prior to removal of your 32/64k RAM Expansion Module from case. It is suggested that you discharge static build up from yourself by (grabbing metal door handle, metal desk knob, or metal lock, etc. etc. etc.).

(5) Check all pins on underside of 32/64K to ascertain their straightness. Then place 32/64K Ram into Expansion Buss Cavity with pins facing towards inside of Computer making sure the Nylon Strap on the underside of Module is accessible to remove Module when needed.After pins drop into Buss holes firmly press 32/64KRam into place.

(6) Re-install Expansion Compartment Cover.

(7) Turn Computer over and turn power switch "ON". Computer will power up in the first or original bank. If display does not turn on, turn power "OFF" at once. Refer to removal instructions to check Ram for bent pins or improper seating of 32/64K Expansion RAM.

(8) Refer to " Bank Select Program" pg.11 to select second bank and/or third bank.

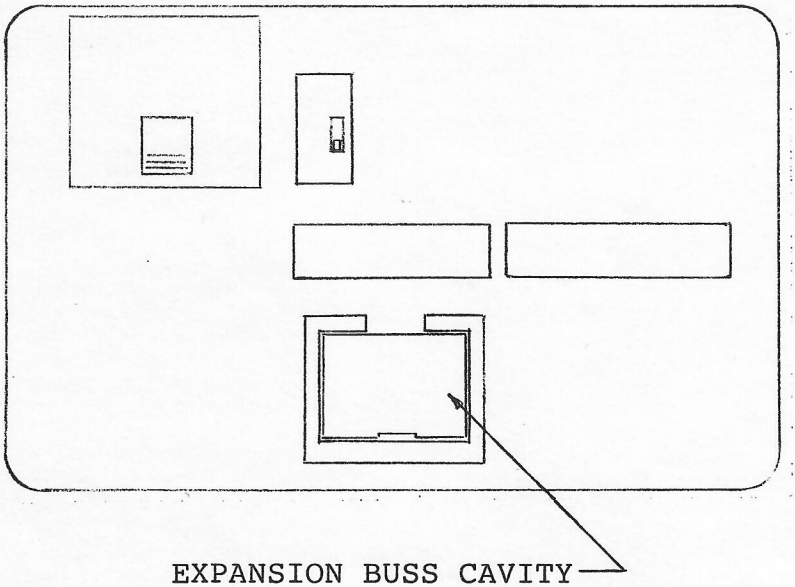


Figure (1)

Removal of 32/64K Expansion RAM from Computer.

(1) 32/64K Module retains memory when removed from Computer.

(2) Turn Power "OFF".

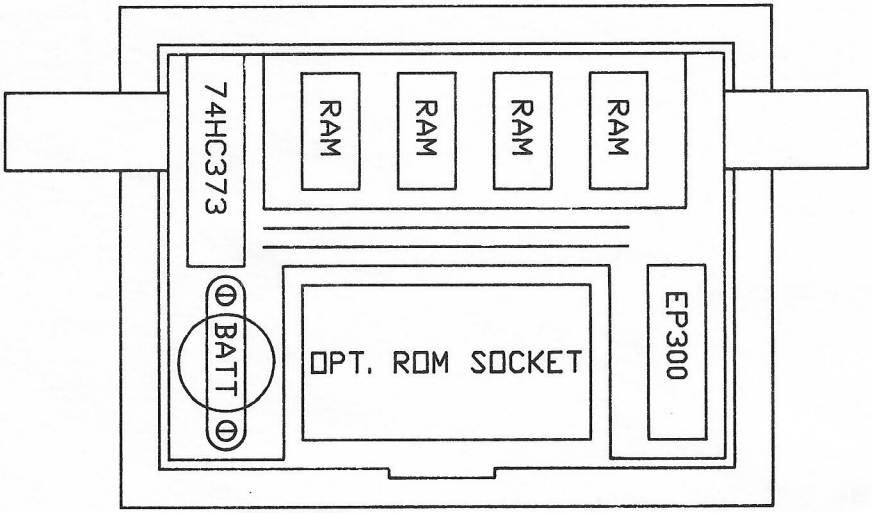
(3) Turn Computer over so that its face is in downward position.You will be looking at the underside of Computer after doing this.

(4) Remove Expansion Buss Compartment Cover .

(5) Refer Figure (2)

(6) Firmly take hold of (2) two Nylon straps coming from the side of your Expansion Module. Pull straight up and out. Do not pull one side more than the other.Uneven pulling could bend pins. Pull evenly on both sides of Nylon Strap. Upon re-installation of your Expansion Module be certain to make sure nylon strap is accessible prior to re-installing.

(7) Replace 32/64K Ram into carrying case to prevent bending of pins.



40 Pin Buss Cavity on the underside of the Computer shown with the cover plate removed.

Figure (2)

" Bank Select Program"

(1) Turn Computer "ON".

(2) Go to "BASIC".

(3) Type in program as shown in line 4.

(4) 10 INPUT"INPUT BANK";X:IF X<1 OR X>3 TH
EN 10 ELSE A#=0:B=VARPTR(A#):POKE B,243:
POKE B+1,211:POKE B+2,(X-1)*16:POKE B+3,
195:POKE B+4,0:POKE B+5,0:CALL B

(5) Save this program as "Bank.Ba".

(6) Return to Menu. Function key 8. Position cursor to "Bank.BA" hit the "Enter" key and the screen on your Computer will ask you which Bank you desire 1,2,or3. Pick one of the options and hit "enter" and immediately you are in the Bank that you have chosen.

(7) The Bank you have chosen will come up with (2) two files in addition to Basic, Text, Telcom, Addrss, and Schedl. These programs are named "Bank.Ba", and Test.Ba. Bytes free should be ( ).
If these files are not present, memory has been lost during shipping. The Bank switch program must be typed into the second and third Banks.Follow instructions 2 thru 6 to install the bank program in to the second and/or third bank. Save program as "Bank.Ba".

(8) If the Module you purchased is only a 32K, typing #3 to the Bank program question will always put you in the original Radio Shack Bank.

(9) Test.BA is a test program to test new bank. Refer (TEST PROGRAM). This program can be removed once you have installed your RAM Module. It is only used to test memory to make sure you have your Module installed properly.

(10) The Easy Cold Start Method

Steps:

A: Run Bank Program, type in the number of the Bank you want to "Cold Started". DO NOT PRESS ENTER.

B: Hold Down CTRL Key

C: Hold Down Pause/Break Key

D: While holding these two keys down Press ENTER.

E: You will be in the Bank you typed in Step A, but it will be cleared.

(11) Optional pokes to make Life Easy. Step E thru M are done at the factory but should be done over any time you "Cold Start" the Modules.

Steps:A: Turn Computer "OFF", then "ON". Computer will come up in Radio Shack Bank.

B: Enter "Basic" then type POKE 63850,49 . Make sure you type this correctly then hit "Enter".

C: Return to Menu(Function Key 8)

D: Looking at Basic on the Menu you will see Basic1 (Bank 1)

E: Move cursor to "Bank.Ba" hit "Enter" Question given is to be answered with #2 (Bank 2)

F: Enter "Basic" and type POKE 63850,50 . Hit enter after making sure you have typed the correct numbers.

G: Return to Menu(Function Key 8)

H: Basic will say Basic2(Bank 2)

I: If you have a 64K Module run steps J,K,L

J: Move Cursor to "Bank.Ba" hit Enter & answer Question with #3, (Bank3)

K: Enter "Basic" and type POKE 63850,51 . Hit Enter after making sure you have typed the correct numbers.

L: Return to Menu(Function Key 8)

M: Basic will read Basic3(Bank3)

These above pokes are used to easily identify which Bank you are in by simply going to the Menu.Always the first entry in the Menu.

"TEST PROGRAM"

```
10 CLS:PRINT"Starting Ram Test"
20 CLEAR 1000,MAXRAM
30 IF MAXRAM <> 62960 THEN PRINT "SOMETH
ING HAS CHANGED MAXRAM PROGRAM   ILL   N
OT RUN":END
40 FOR A= 62001 TO 62093
50 READ B
60 B1=B1+B
70 POKE A,B
80 NEXT A
90 IF B1=11093 THEN 110
100 PRINT"DATA Statements are wrong ":PR
INT"Program Will Not run Unless Correcte
d":END
110 FOR H=32*1024 TO 64*1024 STEP 256
120 IF H=65536 THEN H=H-1
130 IF H=61952 THEN H=H+256
140 PRINT"Testing Ram Byte "H;:PRINTCHR$
(13);
150 CALL 62001,0,H
160 IF PEEK(62094)><0 THEN 170 ELSE 180
170 PRINT"Ram Failed At Byte ";:PRINT(PE
EK(62095)*256)+PEEK(62096):PRINT"BAD RAM
":END
180 NEXT H:PRINT:PRINT"GOOD RAM"
190 END
200 DATA 243,245,197,213,229,0,0,0,17,12
9,242,70,26,254,254,202,77,242,119,78,18
5
210 DATA 194,110,242,19,195,61,242,112,3
5,124,181,202,102,242,62,0,189,194,57,24
2,0,0,0
220 DATA 0,0,0,0,0,0,0,0,0,62,0,50,142,2
42,195,123,242,62,255,50,142,242,124,50,
143,242,125,50,144,242,225,209,193,241,2
51,201
230 DATA 0,1,2,4,8,16,32,64,128,255,85,1
70,254
```

BATTERY REPLACEMENT:

(1) 32/64K RAM Module SHOULD NOT BE be removed to change 3V Lithium battery. Battery should be replaced within (6) six months if 32/64K Module is left out of Computer. If left in the Computer our Expansion Module draws all power from the Computer whether Computer is on or off. Shelf life on a 3V Lithium battery is approxiametly (5) five years. No warranty is given or implied on batteries.

(2) Battery is a Cr-1220 , 3 V Lithium.

(3) Replace batters as per figure (3).

(4) If Memory is lost due to unforseen circumstances please reinstall 32/64K RAM MODULE INTO COMPUTER AND REPLACE COVER PLATE.Turn Computer over so that it is face-up and turn Computer "ON".Follow instructions in Bank Select Program, page 11.

BATTERY REPLACEMENT:

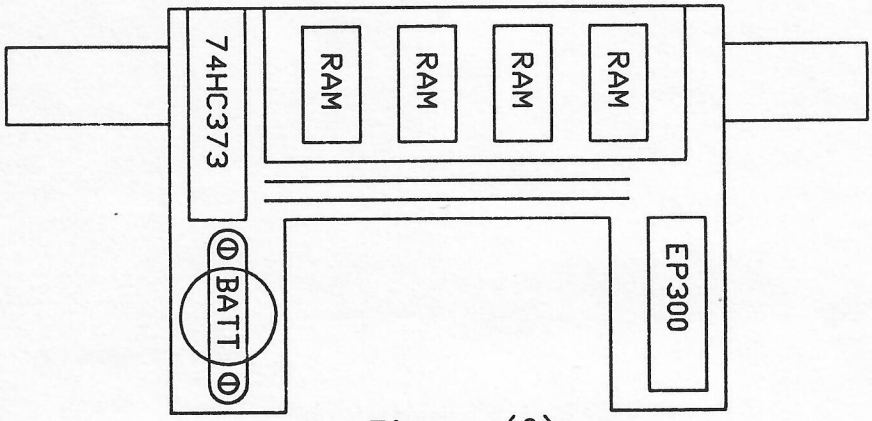


Figure (3)

To remove the battery,leave the Expansion Module in your Computer and loosen (2)Two small screws that hold battery clip in place. To loosen turn screws in a counterclockwise fashion. Just loosen screws and do not remove them. grab hold of brass clip and turn to the left and the clip will come free from the screws. Now turn Computer over and the baterry will fall out. Turn Computer over again and install new 3V battery. Install brass battery clip and turn to the right until clip is in place under the two screws. tighten small screws by turning to the right.

Disc Video Interface Cable Installation & Removal

(1) To install DVI, Optional Cable is required due to the change in connection to increase strength and reliability of the DVI Connection.

(2) Insert DVI Cable with Nylon pull strap into 32/64K Ram . Cable pointing towards top of machine. Insert other end into the Disc Video Interface as per original DVI cable.

(3) To Remove cable place thumb and forefinger on to two chips 373, and EP 300 to hold Module in place,pull on Nylon strap on connector to remove it.(pull straight up as to not bend pins).

DATA TRANSFER UTILITY

(1) WILL BE SUPPLIED IN TWO TO THREE WEEKS FREE OF CHARGE ON CASSETTE WITH MANUAL.

(2) FUNCTION:

A: ALLOW FILE TO BE TRANSFERRED FROM ONE BANK TO ANY OTHER BANK.

B: MENU UTILITY RENAMES FUNCTION KEYS WHILE IN MENU TO ALLOW BANKING WITH FUNCTION KEYS. KILLING FILE WITHOUT GOING TO BASIC. AUTOMATIC SIZE OF FILES WHEN CURSOR OVER FILE.