INTEC PERIPHERALS CORP

64K RAM

TOOLS REQUIRED FOR INSTALLATION

Phillips head screwdriver, small
soldering iron
(25W-40W will be adequate)

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1. Remove cartridge if present and close cartridge door. Place computer face down on a soft surface to avoid marring cabinet.
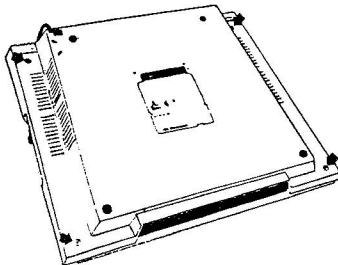
2. Remove (4) screws securing bottom case half. Swing bottom case half to the left and allow to rest on the work surface. Pay particular attention to the placement of the black RF cable and attached toroidal core for ease of reassembly.
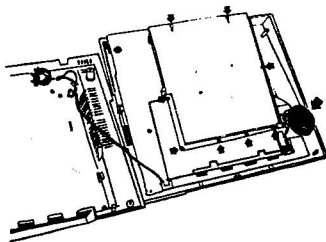
3. The underside of the computer is now exposed. Locate the large aluminum cover plate and remove (8) screws securing it to cast housing. Remove plate, fisch paper and speaker; set aside temporarily.
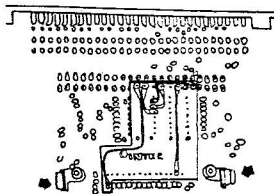
4. Locate cartridge socket by observing two plastic clips protruding through holes in the motherboard. Align enclosed overlay with the two rows of pins on the cartridge socket, which match the small holes in the overlay as pictured above. The overlay is now in position and must be soldered at this point. Be sure to solder all (10) connections.
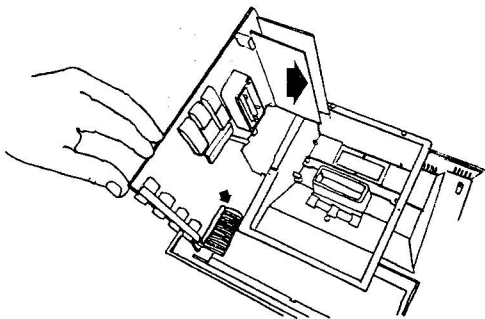
5. Lift motherboard up about one inch to unplug it from the power supply board located to the left. Be careful not to unplug the keyboard ribbon from its connector, as it is very difficult to reinsert. Remove the existing RAM module as indicated above, while holding motherboard as shown for next step.
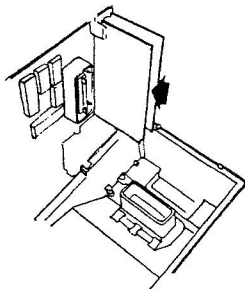
6. Insert INTEC 64K RAM module into the now empty RAM socket,
orienting with solder side FACING KEYBOARD. Verify   correct
orientation of the RAM module, as it will be damaged if power is
applied while it is installed backwards!
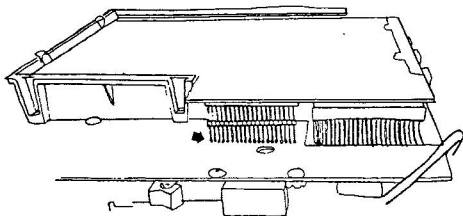
7. Align motherboard/power board connector with corresponding socket on power board, being sure that all (12) pins are in position before exerting any force on motherboard. Gently apply pressure over the connector area to seat pins into socket; verify that motherboard is nestled properly into cast housing.
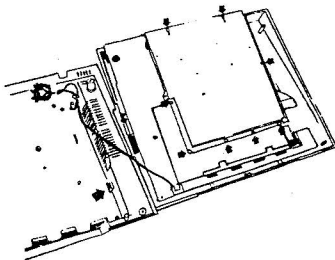
8. Replace fisch paper and aluminum cover plate; secure with (8) screws. Position black RF cable and toroidal core as previously noted in step (2). Rotate bottom case half to the right and place over the computer.
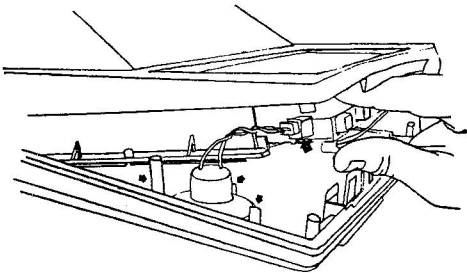
9. While holding the two case halves together, turn the computer right side up. Lift the left corner of the top case half and place speaker between (3) plastic posts in bottom case half and reconnect as shown.
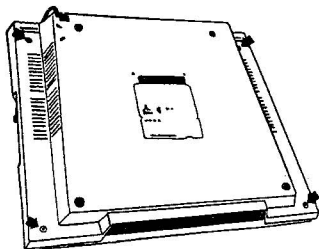
10. Place unit face down and secure the two case halves with (4) screws. Installation is now complete. Please refer to the following pages for checkout procedure and hints for general use.

PRELIMINARY CHECKOUT

At this point, the computer should be in a completely
assembled condition, with the Intec 64K RAM board installed.

Power up computer in BASIC.   If READY prompt is not displayed
turn off machine and refer to troubleshooting guide on page 23.

RAM CHECKOUT

Now that everything appears to operate properly, the RAM and bank
selection can be checked.   Turn on the computer and type:

PRINT FRE(0)   [RETURN]

The computer should respond with approximately 37,900 free bytes.
When the computer boots up, it checks all the locations in memory
in sequence to determine what is RAM (Random Access Memory) and
what is ROM (Read Only Memory).   When the computer encounters
ROM, it stops & sets the values of the low and high memory
limits and continues with the rest of its booting.   As a
result, any RAM above the cartridge will not be zeroed and
acknowledged as available memory.

To obtain more free RAM the computer must be forced to relocate the display list from its normal area just below the cartridge to the 4K banked RAM area above the cartridge. To do this, first POKE into memory location 106 (RAMTOP), the value 208 (most significant byte of 53248, one byte beyond the end of the bank). Then issue a GRAPHICS 0 command. At this point, a "PRINT FRE(0)" will return approximately 50,000 bytes. This value includes the 8K occupied by the BASIC cartridge and is, therefore, 8K too high. With no cartridge installed, however, the computer, when booting-up, will intialize all 52K of RAM, reserving the approximately 3K that it normally requires for its own use.

HOW BANKING WORKS

Four banks of 4K each share the same address area in the computer (48-52K). This yields an additional 16K of fully accessable RAM, although since each bank shares the same addresses, the computer can only access one 4K bank at a time. Bank selection on the Intec 64K RAM board is done by enabling several unused addresses in the hardware region above the 52K boundary. The write-protect feature is enabled in the same manner. A table depicting the bank-and-write-protection combinations as well as both the hexadecimal and decimal address for each mode desired has been included in this book. To enable the desired mode, simply use any instruction which requires an address (e.g. PEEK, POKE, STA, LDA, etc). The data used in each case is irrelevant, as the address is what actually enables the mode.

SAMPLE PROGRAMS

The following pages contain examples illustrating the use of the bank select method employed with the Intec 64K RAM board. When typing the programs, the remarks may, of course, be omitted. The addresses used in the routines provided give normal RAM in all areas; if write protection is desired, simply substitute the appropriate address from the mode table provided.

SAMPLE PROGRAMS

```
10 REM ********************
11 REM * INTEC 64K DEMO   *
12 REM * ROUTINE TO SHOW  *
13 REM * BANK SELECTION   *
15 REM ********************
30 BANK0=55056:BANK1=55057
40 BANK2=55058:BANK3=55059
50 POKE 106,208
60 FOR BANK=BANK0 TO BANK3
70 POKE BANK,ANYTHING:GRAPHICS 0
100 LIST
110 NEXT BANK
120 END
```

```
10 REM *INTEC 64K RAM DEMO     *
11 REM *                       *
12 REM *ROUTINE TO INITIALIZE  *
13 REM *ALL FOUR BANKS TO ZERO*
14 REM ***********************
15 REM
30 GRAPHICS O
40 FOR X=0 TO 77:READ CODE
50 POKE 1536+X,CODE
60 NEXT X
70 A=USR(1536)
80 END
500 DATA 169,192,133,255,169,0,133,254,141,16,215,32
510 DATA 37,6,141,17,215,32,37,6,141,18,215
520 DATA 32,37,6,141,19,215,32,37,6,141,16
530 DATA 215,104,96,160,0,169,0,145,254,165,254
540 DATA 201,255,240,5,230,254,76,39,6,165,255
550 DATA 201,207,240,9,230,255,169,0,133,254,76
560 DATA 39,6,169,192,133,255,169,0,133,254,96
```

MODE TABLE

DECIMAL	HEX	BNK0	BNK1	BNK2	BNK3	BLK5
55056	D710	R/W				R/W
55057	D711		R/W			R/W
55058	D712			R/W		R/W
55059	D713				R/W	R/W
55060	D714	R/W				R
55061	D715		R/W			R
55062	D716			R/W		R
55063	D717				R/W	R
55064	D718	R				R/W
55065	D719		R			R/W
55066	D71A			R		R/W
55067	D71B				R	R/W
55068	D71C	R				R
55069	D71D		R			R
55070	D71E			R		R
55071	D71F				R	R

MODE TABLE

The table on the opposite page will allow quick determination of
the correct selection address to use for the desired mode.
The symbols "R" and "R/W" refer to "read only" and "read or
write" respectively. The "BLK5" shown in the last column of
the table is the 40-48K area, the normal residence of the 8K
"left" cartridge. NOTE: The read only feature should
not be enabled for RAM containing the display list and display
data, as the computer will lock up if unable to alter the
display data. With no cartridge present, the computer will
automatically place the display list in BANK 0 at boot-time.

Address	Use	Size
FFFF D000	Operating system and math routines	10K
D000–D7FF	Hardware addresses	2K
CFFF C000	Intec banked RAM (4X4K banks=16K total)	4K
BFFF A000	ROM cartridge* RAM if no cartridge	8K
9FFF 8000	ROM cartridge* RAM if no 16K cartridge	8K
7FFF 0000	RAM	32K

*When cartridge is inserted, RAM in this area is deselected; with no cartridge, continuous RAM area is 52K.

PROBLEM	POSSIBLE CORRECTIVE ACTION

Computer is dead (no power lite)

1. Check power pack at both ends and verify that they are securely connected to computer and wall socket.
2. Open cartridge lid and verify that the lid switch is being actuated by the protrusion on the right side of the lid. (a faint click should be heard just before the lid engages the latch).
3. Verify that the 64K board is installed with "keyboard side" toward keyboard.

Power lite is on but display is not normal

1. Check "TV-COMPUTER" switch at rear of TV.
2. Check channel selector switches on monitor and at rear of computer.
3. Make certain that the RF output plugs are inserted completely into connectors (check monitor end first, then computer end at power board).
4. Verify that the 64K board is installed with "keyboard side" toward keyboard.

PROBLEM	POSSIBLE CORRECTIVE ACTION
Incorrect value returned for PRINT FRE(0)	1. Make sure all peripherals are "off". 2. Verify that the overlay is properly soldered at all (10) points.
Some or all keys are inactive	1. Check keyboard ribbon. If it has come partially or completely out of the connector on the motherboard, you may want to use a pair of long-nosed pliers to facilitate re-inserting ribbon into connector.
No click when keys are pressed	1. Check speaker connection.

NOTES

LIMITED WARRANTY

This product is warranted against defects in material and workmanship for as long as it is owned by the original purchaser. This warranty shall not apply to any product which has been improperly installed, handled, or misused. UNDER NO CIRCUMSTANCES shall a buyer be entitled to consequential or incidental damages. Warranty is limited to repair or replacement of product. Warranty does not apply to any incompatibility with any specific software. Warranty is void if repair is attempted by any unauthorized personnel.

The warranty card must be completed and mailed to INTEC PERIPHERALS CORP. within TEN DAYS of original purchase. Proof of purchase may be required for repair in the event service is required, ship in suitable shipping container, fully insured and prepaid, along with ten dollars (subject to change due to inflation) to cover return shipping, handling, and insurance (foreign returns send $30.00 U.S.) INTEC PERIPHERALS CORP. will not be responsible for any damages or losses incurred during transportation to the service center. Please describe any problems you are experiencing with the product.