

# THE ZX80 HOME COMPUTER PACKAGE

For the ZX 80 & MicroAce with 4K BASIC and 1 K memory or more



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THE ZX80 HOME COMPUTER PACKAGE contains: this manual, a cassette of programs, two reference cards, two keyboard overlays, a blank score sheet, and a blank SCREEN DISPLAY sheet.

Lamo-Lem guarantees satisfaction with this package, or return within ten days for refund or replacement.

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## Etch-A-Screen

ETCH-A-SCREEN can rapidly draw pictures and text on the screen, then save the display on tape for later viewing or modification.

### TO SEE A STORED PICTURE:

- 1) LOAD ETCH-A-SCREEN from the tape on which the picture is stored.
- 2) Type: GOTO 100 NEWLINE
- 3) To modify the picture, proceed as in 3 below.

### STARTING A NEW PICTURE:

- 1) LOAD the ETCH-A-SCREEN program.
- 2) Type: GOTO 1 NEWLINE
- 3) Press a direction arrow (don't use SHIFT), then NEWLINE.
- 4) Press the desired character, then NEWLINE.

### USING ETCH-A-SCREEN:

To change characters, press the character or graphic symbol then NEWLINE. The character will be repeated each time NEWLINE is pressed. Not all symbols are available from the keyboard. Only the graphic symbols, ?, \$, :, and £ are obtainable using the SHIFT key. For all others, use the reference card: type AND ("2" key with SHIFT down), then NEWLINE. Then enter a character code from the card and NEWLINE.

To change direction, type TO ("4" key with SHIFT down), NEWLINE. Then press an arrow key (without SHIFTing), and NEWLINE.

## STORING A PICTURE

Put a blank tape in the recorder, start recording, and press THEN ("3" key with SHIFT down), and NEWLINE.

To recover after storing, type GOTO 100 NEWLINE

### TO STOP THE PROGRAM OR RESET FOR A NEW PICTURE:

Type: TO ("4" key with SHIFT DOWN), STOP ("S" key, without shift), NEWLINE

Then type: GOTO 1 NEWLINE to draw a new picture.

### NOTE:

Change ETCH-A-SCREEN's background by changing the character between quotes in line 3 of the program. (  creates a dramatic background.)

Copies of the enclosed screen display sheet can be made and used to plot sketches of planned displays.

### FUNCTIONS

TO NEWLINE arrow NEWLINE	(change direction)
AND NEWLINE character code NEWLINE	(changes character)
THEN NEWLINE	(stores a picture, recover with GOTO 100 NEWLINE)
TO NEWLINE STOP NEWLINE	(stops program, GOTO 1 NEWLINE to reset)

## ELECTRONIC BILLBOARD

ELECTRONIC BILLBOARD displays your message in a banner of giant characters which scroll continuously across the screen. Easy setup for exhibits and displays.

### SETUP:

LOAD the program, ELECTRONIC BILLBOARD

### TO DISPLAY A STORED MESSAGE:

- 1) Type: GOTO 100
- 2) Press BREAK to stop.

### TO WRITE A NEW MESSAGE:

- 1) Type: GOTO 1
- 2) Type in the message, (see box below). Press NEWLINE to end.
- 3) The display begins automatically. Press BREAK to stop.

### TO SAVE A MESSAGE:

SAVE in the normal manner, on a blank tape.

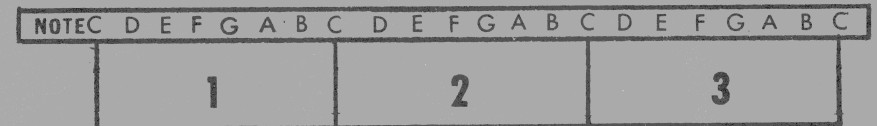
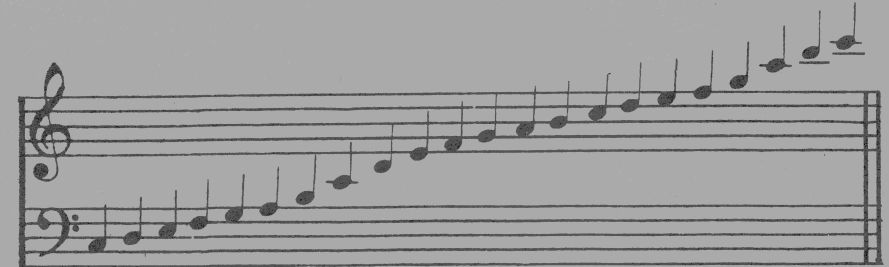
### NOTE:

The message may not exceed 210 characters, (6½ lines). Only certain symbols should be entered with the SHIFT key. These are: all graphic symbols, ?, \$, :, and £.

To inspect a message before displaying it, type: PRINT M\$.

The speed of the display may be changed by poking a value from 0 to 255 at location 16432, (i.e. POKE 16432,value).

## COMPOSER



OCTAVE

COMPOSER uses a color overlay to produce a multi-octave keyboard for the creation of electronic music. Compositions of hundreds of notes can be saved on tape for later editing, broadcast to nearby AM radio or TV, or recorded directly into a tape recorder. Changes can be easily made.

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## SETUP:

- 1) LOAD the program, COMPOSER
- 2) Cut out and slip on the COMPOSER keyboard overlay, (back edge under cover)
- 3) Press the RESET button two or three times until GOTO G appears. Press SEND.

## THE KEYBOARD

The keyboard is broken into functional sections:

**NOTE**—These nine keys form a 'C' scale spanning one octave. REST is used to produce silence.

**OCTAVE**—Five octaves (0-4) are available from the keyboard. Higher numbered octaves have higher pitch.

**TONE**—The current note can be made sharp (higher) or flat (lower) with these keys.

**LENGTH**—The duration of succeeding notes can be set from FULL, (one second), to 1/64 second.

**MODE**—Two keys to be used for experimental effects, (see below).

**COMPOSE**—Three keys which provide the editing functions.

**PLAY**—These keys start a composition (BEGIN), and halt it (FINI).

**RESET**—Used to start and stop the COMPOSER program.

## PLAYING A COMPOSITION:

### TO PLAY:

Press: BEGIN SEND

The piece will start playing, and repeat until halted by pressing and holding down the FINI key.

### LISTENING TO A COMPOSITION:

The music may be monitored in several ways:

- 1) Turn up the TV volume, and the music may be audible. A pattern is displayed on the screen as well.
- 2) Place an AM radio near the computer and tune it until the music is found.
- 3) Connect the MIC cable between the computer and tape recorder. Insert a blank tape and start recording. The composition will be recorded directly onto the tape, which may be played back later.

After a piece is halted with FINI, the program must be restarted as in 3 of SETUP.

## USING THE KEYBOARD:

After the program is started (with the RESET button), any of the functions may be used at any time. The notes stored in the computer are not affected by the use of any keys, except that: SET NOTE will set the current note to the most recently entered NOTE, OCTAVE, TONE, and LENGTH. Further, the MODE keys, when used, will affect all notes in the composition, and may be used to experiment with different effects.

## TO COMPOSE:

A total of 225 notes can be programmed into COMPOSER. Each note is numbered (from 1 to 225), and the current note is listed on the screen.

A piece of music can first be outlined on a score sheet, then transferred note-by-note to the computer. (Copies of the score sheet enclosed can be used to draft your compositions.)

Four characteristics need to be chosen for each note. These are: NOTE, TONE, OCTAVE, & LENGTH. They may be entered in any order, and do not need to be reentered (except TONE, which affects only the current note). Also, characteristics can be changed whenever desired by reentering them. The characteristics of a note are not stored in memory until the note is 'set' (see below).

### ENTERING NOTES —

**NOTE**—Press the desired note and SEND. (Use REST for silence)

**TONE**—If the note is to be flat or sharp, press that key and SEND.

**OCTAVE**—Press a number (0 to 4) and SEND. (Higher octaves have higher pitch.)

**LENGTH**—Press a length key and SEND.

When all selections have been made for the current note, press: SET NOTE SEND. COMPOSER automatically advances to the next note.

**NOTE:** On succeeding notes, it is only necessary to enter those characteristics which have changed, (i.e. if the next note is the same as the first, then NOTE, OCTAVE, & LENGTH can be skipped and only SET NOTE SEND is entered, (except that if a note is sharp or flat, TONE must be entered)).

When a composition is completed, press END SCORE SEND. This places a marker at the current note indicating the end of the piece. (A marker may later be eliminated by changing the note which holds the marker.)

### CHANGING NOTES —

To change a note, other than the current note listed on the screen, press: SELECT NOTE SEND, then enter the number of the new note and SEND. The new note is listed on the screen, and may be changed by following the steps in ENTERING NOTES above.

**NOTE:** Octave two is tuned to A440. this is the preferable octave to use for composition. Inaccuracies occur in the octaves beyond two. (Octaves 0 & 1 are more accurate than 3 & 4).



### THE MODE KEYS

Two keys are provided for experimentation:

TEMPO changes the duration of all notes, and slightly changes their pitch. The standard tempo is 1. Values greater than 1 result in longer duration. To use:

Press: TEMPO SEND, then enter a number from 1 to 256 (1, 2, or 3 is suggested), and SEND.

DECAY causes each note in a piece to drop or rise in pitch at a rate set by you. The value entered sets the rate of decay. To use:

Press: DECAY SEND, then enter a number from 0 to 255 (0 is no decay, 1 is downward decay, 255 is upward decay). Press SEND.

When the piece is played, the TEMPO and DECAY values will add new effects to the resulting music.

### ENDING A SESSION — SAVING A COMPOSITION

Press RESET twice, then SEND to stop the program.

SAVE in the normal manner. The current composition will be saved along with the program. (Label your blank tape with the title of the composition.)

### EDIT FUNCTIONS

SET NOTE SEND (to store a note)

END SCORE SEND (to mark the end of a piece)

SELECT NOTE SEND number of note SEND (selects a new current note)

Press RESET twice then SEND to start or stop the program.

### THE MODE KEYS

DECAY SEND number (0-255) SEND (sets decay)

TEMPO SEND number (1-256) SEND (sets tempo)

### TO PLAY:

BEGIN SEND (starts composition)

FINI (hold down to halt)

### CALCULATOR

CALCULATOR allows high precision multiplication or division to be performed on two numbers ranging from 9999999999. to .0000000001.

### USING THE CALCULATOR:

- 1) LOAD the program, CALCULATOR
- 2) RUN the program
- 3) Enter two positive numbers separated by \* or / . Each number must include a decimal point. (see box below.)
- 4) Press NEWLINE.
- 5) The answer will appear and the program will terminate.
- 6) To use again, repeat from STEP 2.

### EXAMPLES:

1234567890.\*245.63 (answer is 303246910820.7)

.0000000347/12632.774 (answer is .0000000000274682346)

### NOTE:

Any two positive numbers of up to ten decimal places may be entered. Each must include a decimal point.

When using division, (/), the first number is the dividend, and the second is the divisor.

Division by 0 returns an answer of 0. Actually, the answer should be undefined.

## CHECKBOOK BALANCER

CHECKBOOK BALANCER keeps an ongoing record of your bank account. Deposits and withdrawals are entered using the transaction keys. When a bank statement arrives, transactions shown on the statement are cleared using the CLEAR key. CHECKBOOK BALANCER stores a list of uncleared transactions, and displays both the balance which should be shown on the statement, and the actual current balance. CHECKBOOK BALANCER accepts a balance of up to \$32,767.99 and can store up to 30 uncleared transactions.

### SETUP:

- 1) LOAD the program, CHECKBOOK BALANCER.
- 2) Cut out and insert the overlay (back edge goes under cover).
- 3) Press START/STOP until GOTO G appears. Press SEND.
- 4) Label a blank tape for each bank account you will record.

### INITIALIZING AN ACCOUNT RECORD:

A starting balance must be entered (done one time only):

- 1) Press: + SEND 1 SEND
- 2) Enter the balance on your most recent statement, (use the "." key to separate dollars from cents). Press SEND.
- 3) Press: CLEAR SEND 1 SEND \$ SEND
- 4) You are ready now to enter those deposits and withdrawals which have not yet cleared the bank, (have not shown up on a statement). Enter them as described in the next section. When done, the CURRENT BALANCE will display what is actually in the bank. The BANK BALANCE will hold the amount on your last statement. When a new statement arrives, use CLEAR as described below to update BANK BALANCE.

## DEPOSITS AND WITHDRAWALS

Enter checks, deposits, bank charges, interest, etc., as they occur:

- 1) Press: + or - then SEND.
- 2) Enter the check number or deposit slip number, (up to three digits), then press SEND.
- 3) Enter the amount of the transaction, (separate dollars and cents with the "." key), then SEND.
- 4) The CURRENT BALANCE is automatically displayed. If the screen goes blank, the action was improperly entered, try again. If you are not sure whether an action has already been entered, press LIST SEND to check. Deposits and withdrawals will not appear in BANK BALANCE until the transactions clear the bank.

### CLEAR

To clear checks, deposits, bank charges, interest, etc., which appear on a bank statement:

- 1) Press: CLEAR SEND
- 2) Enter the check number or deposit slip number to be cleared, then SEND.
- 3) The BANK BALANCE is automatically displayed. (If the screen is blank, try again.) When all entries on a bank statement have been CLEARed, BANK BALANCE should agree with the statement.

The difference between BANK BALANCE and CURRENT BALANCE is the total of uncleared transactions. Those transactions which have not yet cleared the bank can be listed with LIST SEND. To find the amount of one of these transactions, press AMT SEND, enter the transaction number, then SEND.

### ERROR

ERROR appears if:

1. Thirty uncleared transactions have already been stored. You can't enter a new transaction until one of the old ones is CLEARed.
2. A nonexistent transaction number has been entered. Type: LIST SEND to identify the correct number and try again.

### RECOVERING FROM AN IMPROPER ENTRY:

If you have not pressed SEND yet, use the RUBOUT key with SHIFT, (the blue dots), to erase.

If you have not entered the final SEND after cents, then press START/STOP twice and SEND to end the session, then start again in the normal manner, and reenter the transaction.

If you have completed an improper transaction, it can be undone by CLEARing it, then entering the same amount with reversed sign, and CLEARing it also. Then enter the correct transaction.

## TRANSACTIONS

### PROMPT

### DEPOSITS AND WITHDRAWALS

Press + or - and SEND

? Enter the check # or deposit slip # (up to 3 digits) and SEND

?\$ Enter the dollar amount of the transaction, then press "."

?\$.\$\$ Enter the cents of the transaction, then SEND

### CLEAR

Press CLEAR SEND

? Enter the check # or deposit slip # to be cleared, then SEND

## DISPLAYS

### PROMPT

### KEYS

### ACTION

\$ SEND Displays CURRENT & BANK BALANCE

LIST SEND Displays list of uncleared transactions.

AMT SEND } Displays the amount of chosen transaction.

? transaction # SEND }

## ENDING A SESSION:

- 1) Stop the program by pressing the START/STOP button twice, then SEND.
- 2) Put the appropriate tape in your recorder and SAVE (green dot) in the normal manner, on a blank tape which has been labeled and dated. Be sure to load the program from this cassette next time it is used.