Extended Basic - The SYSTEM TESTS diskette has a LOAD program on it
which will allow automatic program execution if this diskette is
placed in drive 1 on system power-up. This loader will return with
a menu screen with options for console test or speech test. Choose
the option you want and computer will automatically load it and
begin running.

Editor/Assembler - Place the SYSTEM TESTS diskette in drive 1.
Select the RUN PROGRAM FILE option and press enter. The computer
will return with a menu screen with options for console test or
speech test. Choose the option you want and the computer will
begin running the program you have chosen.

TI-Writer - Place the SYSTEM TESTS diskette in drive 1. Select the
UTILITY option and press enter. The computer will return with a
menu screen with options for the console test or speech test.
Choose the option you want and the computer will begin running the
program you have chosen.

Mini Memory - Select the LOAD AND RUN option and type DSK_.MMLOAD .
then press the enter key. The computer will return with a menu screen
with options for console test, speech test, or memory expansion test.
Choose the option you want and the computer will automatically load
it and begin running.

CONSOLE TEST

    The test begins with the VDP RAM test. All ram bits are turned
on and off and checked for both conditions. A special address
error test is used to make sure there aren't any addressing errors.
When the test begins the screen will flash to blue then yellow then
transparent. If an error is found during this time the computer
screen will turn red and will print out the board layout number of
the RAM in question. The rams are numbered in sequence from U102
thru U109. The ram nearest the edge of the board is U102, and the
ram furthest from the edge of the board is U109. If all is well the
computer will print "VDP RAMS good". Next the computer checks
the console GROMS by combining the data in each GROM and getting a
signature unique to that GROM. If the signature is not correct the
computer will print out the chip number for the GROM. This will be
either 2155, 2156, or 2157 GROM gives bad data. If no error is found
the computer will print "Console GROMS good". Next is the scratch-
pad RAM test. Every bit in the pad is turned on and off and verified.
If an error is found the computer will print either LSB or MSB
scratchpad RAM gives bad recall. See the attached diagram to locate
each one. Next is the console ROM test. The computer combines all
the data in the console ROM to get a signature. If the signature
is not correct the computer prints either LSB or MSB ROM gives bad
data. If the signature is correct the computer prints "Console ROMS
good". After these tests the computer begins the graphics and sound
tests. First the computer fills the screen with ASCII characters
and then shows the same number of characters in text mode. The
computer will hold this screen for a few seconds. If you want to
examine this screen longer you can press the space bar and the

computer will hold this screen until you press the space bar again.
Next comes the multicolor test. The multicolor test consists of
8 rows of alternating colors. These 8 rows are repeated 8 times
until the screen is filled. The first row is medium red and trans-
parent. The second row is light red and black. The third row is
medium green and dark yellow. The fourth row is light green and
light yellow. The fifth row is dark green and dark blue. The sixth
row is light blue and magenta. The seventh row is dark red and gray.
the eighth row is cyan and white. The background color will change
to all the possible colors during this test. You can hold any screen
by pressing the space bar during the screen you want. Pressing the
space bar again will move the computer to the next test. Next is
the bit map test. A light green diamond bordered on the top two
sides by white and the bottom two sides by blue will fill every
screen position. A transparent dot will also be visible in the
center of the diamond. The screen background color will switch to
all the screen colors. Pressing the space bar during this time will
hold the screen. Pressing the space bar again will cause the computer
to move to the next test. The next test is the sound test. The
computer checks all three sound and both noise channels at descending
amplitudes. The graphics and sound tests require user verification
to determine correctness. The last test is a sprite test which
checks both coincidence and fifth sprite. A vertically descending
white sprite will coincide with a stationary magenta sprite and then
will move between four sprites colored blue, red, green and yellow
to become a fifth sprite. The word "coincidence" will be displayed
during the coincidence. The words "fifth sprite" will be displayed
when the white sprite is the fifth sprite. This sequence will be
completed two times. After this the computer will go back to the
beginning and start over with the test. The test will continue to
cycle unless an error is found in GROM, ROM, or RAM. If an error
is found the screen will turn red and the error will be reported.

SPEECH TEST

     The test begins by speaking 3 words from its resident memory.
The 3 words are "BLACK", "FROM", and "ZERO". The words "THAT IS
RIGHT" are then spoken by using the external speech function of the
speech synthesizer. The data in the two phrase ROMs is then checked.
The words are used to check the ability to generate recognizable
speech output. A problem with a word or part of a word generally
indicates a faulty synthesizer chop. The external speech function
is used to check the ability to input external speech data and
generate recognizable speech. A problem with external speech
generally indicates a problem with the synthesizer chip or the
computer-synthesizer interface. The entire speech synthesizer ROM
memory is then checked for correctness of data. If the data read
from the ROM memory is zero at all locations, then it is likely
that the synthesizer chip is faulty and unable to properly address
and read from the ROM memory chips and the words "UNABLE TO READ"
will be displayed. The previous test of the words should have
resulted in no speech output for the first 3 words. If the data
is incorrect, but not zero, then it is likely that the ROM memory
chips are defective and the word "BAD" will be displayed. If the
memory check is good then the word "GOOD" will be displayed.

MEMORY EXPANSION TEST

The memory expansion test is available only if you are using a
Mini Memory. It will be the third option available on the menu. The
memory expansion test turns every bit in the 32K memory expansion on and
off and checks for both conditions. It also checks for addressing
errors. In most memory expansions there are two block of 8 16K bit
rams. One block is for memory addresses >2000 thru >3FFF and >A000 thru
>BFFF. The other block is for addresses >C000 thru >FFFF. There are
two test options on the memory expansion test. One continuously loops
checking every bit in the memory expansion. While it loops a counter at
the center of the screen counts the cycles in hexadecimal. The other
option is the refresh test. When this option is chosen a prompt will
appear asking "HOW MANY MINUTES?". Enter a four digit decimal number
from 0001 to 9999. Every bit in the memory will be turned on and the
computer will then wait the chosen number of minutes until it checks to
see if any bits have decayed to 0. In most cases entering 0005 minutes
will be sufficiant to test the memory expansion. If you have a memory
expansion that you feel looses a bit only on occasion, then you can put
in enough time to last over night. At any time if an error occurs when
the memory is checked the screen will turn red, the address the error
was found at, and the expected and actual data are displayed on the
screen. Also the words "POSSIBLE BAD RAM BIT _" is displayed. The bad
bit can be from bit 0 to bit 7. Keeping with the TI tradition bit 0 is
the most significant bit and bit 7 is the least significant bit. Here
the address at which it failed is important because that determines
which bank of rams is at fault.

THE PURPOSE OF THESE TESTS

If the computer passes these tests then the user can be reasonably
sure that his or her system is functioning properly. If any test
fails and a diagnostic indication is given then the chances are good
that the diagnostic information is right. However if certain comp-
ponents fail an erroneous diagnosis may result. An example would be
a bad microprocessor or a bad ram in the memory expansion (where the
program resides) and some hardware problems. We believe these tests
are the best that can be done with software alone. Also the computer
must be able to load and run programs before the tests can even begin
to work.