TANDY®

Technician Series
Diagnostics Software

TDCPLUS

Tandy Drive
Controller Diagnostic

01-0220 Computer Technical Services

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TDCPLUS

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GENERAL DESCRIPTION

The TDCPLUS (Tandy Drive Controller Plus Aids) diagnostic program provides the means to manipulate a floppy drive in order to perform the steps required for alignment and maintenance.

FEATURES

Several drive types predefined plus the ability for the user to add new drives as well as update the current ones.

Up to three (3) drive types can be selected for those computers capable of supporting three installed drives.

Drive type selection simplified by menus and an on-line cross reference screen.

On-line drive information screens providing Test Points, Jumpers, Default Test Tracks, and Test Specifications.

Test options are ordered in the sequence best suited to properly align a drive. Test preparation time is decreased with commands available within each test to quickly go to the next test avoiding the main menu. All tests have default parameters which further decrease preparation time.

All Test parameters can be manually configured for special applications.

On-line amplitude percentage calculator for determining if specifications are met.

Quick function test provides a verification of proper drive operation after alignment.

EQUIPMENT REQUIRED

MS-DOS compatible computer system
Proper alignment diskette(s)
Proper blank diskette(s)
35 MHz or better dual trace oscilloscope
Three (3) scope probes
Frequency counter

LOADING TDCPLUS

The TDCPLUS program can be loaded either by selecting the appropriate menu selection on a Diagnostic Diskette or at the DOS prompt by typing:

tdcplus<ENTER>

OPERATING TDCPLUS

Once loaded, TDCPLUS displays the title screen. At this point you have the option of continuing into TDCPLUS or aborting and returning to DOS. Continuing with TDCPLUS the drive position menu will be displayed along with all of the currently defined drive types. Refer to the SELECT DRIVE TYPES section of MAIN OPTIONS for further detail on selecting the drive position and drive type.

The TDCPLUS menu options can be selected by one of two methods, direct or cursor. Using the direct selection method the highlighted character of the desired option (usually the first character of the option name) is pressed. To use the cursor selection method the arrow keys are used to move the highlight bar over the desired option followed by pressing the <ENTER> key.

TDCPLUS uses the external file DTYPES.TDC to hold the specific information for all of the currently defined drive types. This file must be located on the 'Program' diskette. When the SELECT DRIVE TYPES or ADD/UPDATE DRIVE TYPES options are selected TDCPLUS will prompt for the insertion of the 'Program' diskette to access the DTYPES.TDC file.

With the drive position(s) and type(s) selected the main screen is displayed.

IMPORTANT NOTE TO TANDY 1400LT USERS

Due to the methods of dealing directly with the computer's hardware, which TDCPLUS requires, some 1400LT computers may exhibit a few problems.

When starting a test the drive may take several seconds to activate.

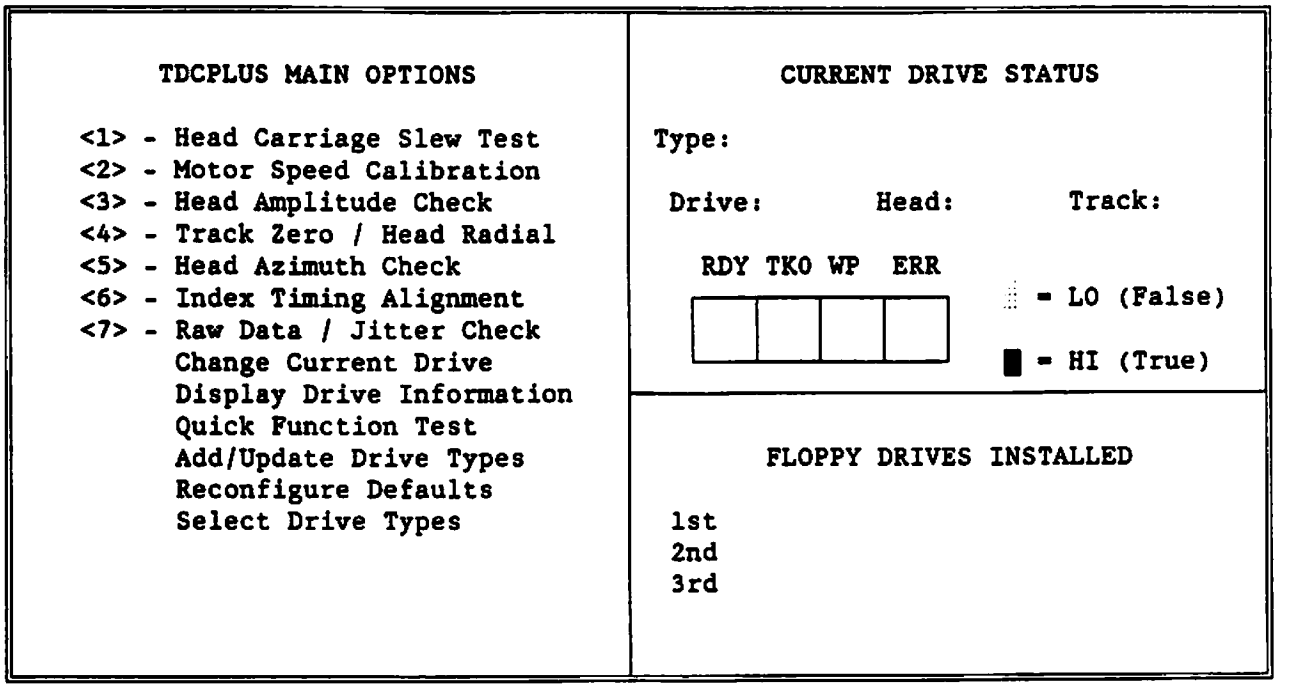
When the drive first seeks to the test track it may not stop on the correct track. To verify the correct position step out one track (F7) and then back in one (F8). This should correctly position the drive head.

Pressing a function key from within a test to perform a command may result in one of three things happening:

1. The command may be executed as desired.
2. Nothing may happen as if the key was not pressed.
3. A different command may be executed as if a different function key was pressed.

MAIN DISPLAY DESCRIPTION

TDCPLUS TANDY DRIVE CONTROLLER PLUS Ver. 2.00



The TDCPLUS main screen can be divided into four (4) sections:

TDCPLUS Main Options — **Current Drive Status**
Floppy Drives Installed — **Dialog Bar**

TDCPLUS Main Options: Displays the tests and options available.

Current Drive Status: Displays the currently selected drive type (manufacturer, model number, track count and storage size), as well as the drive number, current head number, current track number and the status of the floppy drive's Ready, Track 00, Write Protect and Error signals.

Floppy Drives Installed: Displays the selected drive types and the position they were assigned.

Dialog Bar: Displays any information relevant to the current operation.

MAIN OPTIONS

DRIVE ALIGNMENT TESTS:

Pressing <1-7> selects an individual step in the drive alignment process. Refer to the TEST DESCRIPTIONS section for a detailed description of the individual test.

Before any tests can be executed the current drive must have been selected by using the Change Current Drive option. If not done the following error message will appear within the Dialog Bar;

The Current Drive Has Not Been Selected

Pressing any key will remove the error message and return to the main option menu.

CHANGE CURRENT DRIVE:

Before testing can begin a drive position must be selected. The Change Current Drive option is used to set a drive as the current, or test, drive. The drive type for the selected position must already have been defined by using the Select Drive Types option.

Once selected, the labels under the Floppy Drives Installed area of the screen become the menu options for selecting the drive position to test. A highlight bar will appear over the 1st drive position. With a drive selected the program will position the drive's head to track 0, display the drive type, head, track and the status signals under the Current Drive Status screen area, and return to the TDCPLUS Main Options menu.

A drive position can not be selected if a drive type has not been defined. If the selection is attempted the following error message will appear within the dialog bar;

Selected Drive's Type Has Not Been Defined

Pressing any key will remove the error message and return to the drive selection menu.

NOTE: If the computer does not support three floppy drives the third drive position will have a message stating it's not supported and it will not be available as a menu selection.

DISPLAY DRIVE INFORMATION:

This option displays the current drive's Test Points, Jumper Positions, Test Track Values, Test Settings and Specifications. When selected, the first of two screens will be displayed. For information on drive logic board layouts, refer to the Tandy Drive Reference Manual, Technical Bulletin INFO:19, and Notes and Jumpers.

```
  DRIVE TYPE NAME
   Mfg/Model Name: Sony MP-F73W
      Tracks/Size: 80 Trk, 1.44M

  TEST POINT LOCATIONS
    Head Output 1: RF                    Write Protect: CN1 - 28
    Head Output 2: RF                             Step: CN1 - 20
      Index Pulse: CN1 - 8                        Side: CN1 - 32
         Raw Data: CN1 - 30                    Motor On: CN1 - 16
    Track 00 Flag: CN1 - 26                      Ground: GND
        Direction: CN1 - 18

  JUMPER POSITIONS
 Standard Jumpers: S1 (0-3) = Drive Select

  TEST TRACK VALUES
Number Of Sectors Per Track: 18        Head Azimuth Test Track: 40
          High Track Number: 79          Index Timing Test Track: 0
  Head Amplitude Test Track: 79       Track 00 Toggle Low Track: 0
     Head Radial Test Track: 40      Track 00 Toggle High Track: 1
```

Pressing <ESC> will abort displaying the second screen and return immediately to the main options menu. Pressing any other key will display the second screen of drive information.

```
  TESTS SETTINGS AND SPECIFICATIONS
      Track 00 Volts/Div: 2.0 V              Azimuth Slope: NEG
       Track 00 Time/Div: 5.0 mS           Azimuth Time/Div: 0.5 mS
    Track 00 Adjustment: SENSOR
                                        Raw Data Volts/Div: 2.0 V
   Head Radial Volts/Div: 50 mV       Raw Data Adjustment: None.
    Head Radial Time/Div: 20 mS
        Head Radial Spec: 70 %

     Motor Speed in mSec: 200 mSec
      Motor Speed in RPM: 300 RPM
  Motor Speed Adjustment: None.

Head Amplitude Volts/Div: 50 mV
     Head Amplitude Spec: HEAD AMPLITUDE greater than 130 millivolts.
    Head Compliance Spec: COMPLIANCE AMPLITUDE changes less than 10%.

   Index Timing Time/Div: 50 uS
      Index Timing Slope: NEG
       Index Timing Spec: 200 uS (+/- 50 uS) Trace before Data Burst (RV101)
```

Pressing any key will return to the main options menu.

Note: The actual data displayed in the above screens will vary depending on the currently selected drive type.

QUICK FUNCTION TEST:

The Quick Function Test is included with TDCPLUS primarily to confirm the basic operation of the floppy drive after an alignment has been performed. It is not intended to be a comprehensive drive reliability test.

When selected, the Quick Function Test window will replace the Current Drive Status window on the main screen.

TDCPLUS MAIN OPTIONS

<1> - Head Carriage Slew Test
<2> - Motor Speed Calibration
<3> - Head Amplitude Check
<4> - Track Zero / Head Radial
<5> - Head Azimuth Check
<6> - Index Timing Alignment
<7> - Raw Data / Jitter Check
Change Current Drive
Display Drive Information
Quick Function Test
Add/Update Drive Types
Reconfigure Defaults
Select Drive Types

QUICK FUNCTION TEST

Test: Format / Verify / Write / Read

Drive: 1 Head: 0 Track: 00
Pass: 1 Sector:

TEST ERROR COUNT	READ	WRITE	CRC	ADR MRK
	00000	00000	00000	00000

FLOPPY DRIVES INSTALLED

1st **Sony MP-F73W 80 Trk, 1.44M**
2nd **Mitsubishi MF504 80 Trk, 1.2M**
3rd **(Not Supported On This Computer)**

Note: The drive types displayed above will vary depending on the types selected.

With the Quick Function Test screen displayed you will be prompted to insert a blank diskette into the test drive. This diskette must be of the type to match the highest density of the drive, and for best results it should be bulk erased.

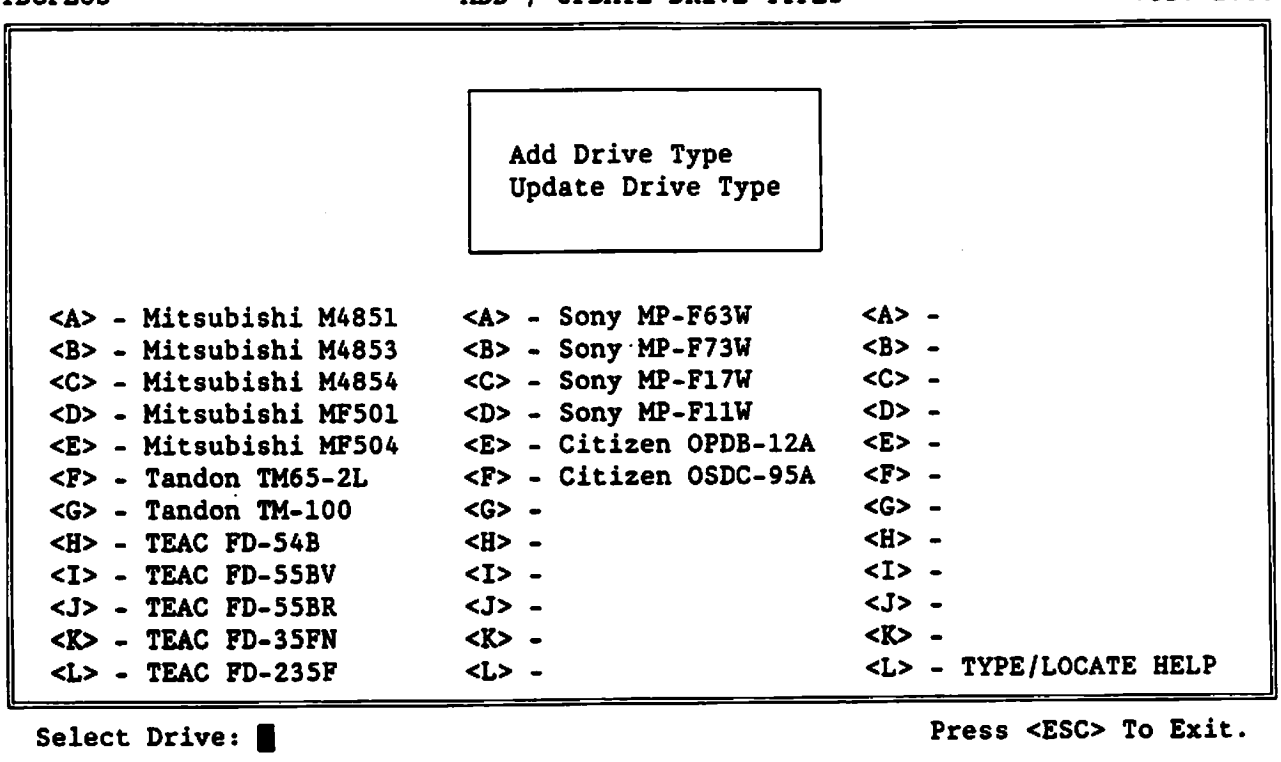
The test uses tracks 00, 19 and 39 on forty track drives while for eighty track drives it uses 00, 19, 39, 59 and 79. It starts by formatting and verifying both sides of each track. Following that it will write random data to both sides of each track. Finally it will read both sides of each track. This process constitutes the first pass, while the following passes will just contain the write and read portions. The test will continue until <ESC> is pressed which removes the Quick Function Test window and replaces the Current Drive Status window and returns to the main options menu.

Any errors encountered will be accumulated in the Test Error Count section. An error during the Format and Write processes will increment the Write error count. An error during Verify will increment the Read error count. An error during the Read process will increment the Address Mark or CRC error count if that was the reason for the error, otherwise it will increment the Read count.

ADD/UPDATE DRIVE TYPES:

The Add/Update Drive Types option is provided to maintain the DTYPES.TDC external file. This file contains the drive type information for each of the drive types supported. By using this option to manipulate the DTYPES.TDC file it's possible to add new drive types, up to 35 supported at one time, as they become available, or change the currently defined types. This provides greater flexibility and longer life of the TDCPLUS program as well as the ability to customize the program to the user's needs.

Once the Add/Update Drive Types option is selected the program will prompt for the insertion of the program diskette into the boot drive. The program diskette contains the DTYPES.TDC file. When a key is pressed, indicating the program diskette is installed, the Add/Update menu will become active and the currently defined drive types will be displayed.



If the Add Drive Type option is selected the drive information screen (refer to the Display Drive Information section described previously) will be displayed with all of the data fields blank. If the Update Drive Type option is selected then the first group of currently defined drive types will be highlighted. At this point you can select one of the types from this group or use the right arrow and move to one of the other groups. Once a drive type has been selected then the drive information screen is displayed with the selected drive type's data shown in each field.

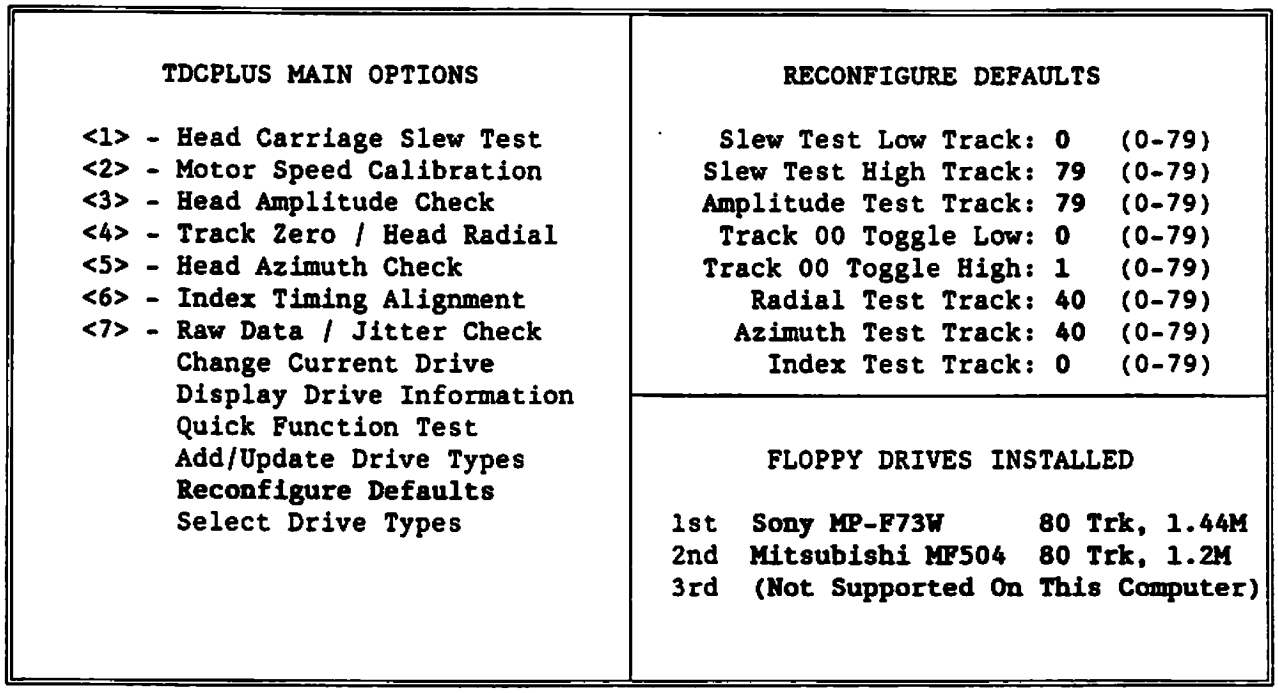
The current field to be entered, or updated, will be displayed with a cursor block showing the maximum length of the field. Entering data and pressing **<ENTER>** will record the field and move the cursor block to the next field. The arrow keys may be used to move up or down through the fields on the current screen. If a field is not blank the current entry will be displayed within the cursor block, however if a character key is pressed the old data will be cleared allowing the entry of the new or corrected data. Once the first screen is completed press **<ESC>** to display the second screen and enter the information into the appropriate fields. With the second screen completed pressing **<ESC>** again will bring the prompt asking whether you would like to save the new or updated drive type entry to the DTYPES.TDC file. If answered with a no, all changes will be lost. Answering yes will write the new or corrected drive type to the file. Either answer will return to the Add/Update menu option.

NOTE: Refer to the Select Drive Types option for a description of the TYPE/LOCATE HELP feature.

RECONFIGURE DEFAULTS:

Each alignment step, or test, has a predefined default track number to speed its execution. The Reconfigure Defaults option is used to change these track numbers for special testing purposes.

When selected, the Reconfigure Defaults window will replace the Current Drive Status window on the main screen and display the current default values. Displayed to the right of the current values is the track values allowable range. This range of course will vary depending on the size of the current drive type selected.



Note: The drive types and default track values displayed above will vary depending on the types selected.

The current default field to be updated will be displayed with a cursor block showing the maximum length of the field. Entering data and pressing <ENTER> will record the field and move the cursor block to the next field. The arrow keys may be used to move up or down through the fields. The current entry will be displayed within the cursor block, however if a character key is pressed the old data will be cleared allowing the entry of the new or corrected data. When all the track values are correct pressing <ESC> will display the second screen of default values. This screen allows changing the Amplitude and Raw Data write patterns as well as selecting continuous write mode for troubleshooting the drive's write circuitry. With the write defaults correct, pressing <ESC> will record the all of the new default values, replace the Current Drive Status window and return to the main options menu.

SELECT DRIVE TYPES:

This option provides a means of defining the drive positions and types installed in the computer which are to be tested. When TDCPLUS is first started this option is executed automatically and will not prompt for the insertion of the program diskette. However if the option is selected any other time the prompt for the program diskette will appear. The program diskette is required to load the DTYPES.TDC file which contains the drive type information.

With the drive type file loaded the drive position menu becomes active. At this point you select which drive position to assign a type. After selecting the drive position the first group of currently defined drive types will be highlighted. At this point you can select one of the types from this group or use the right arrow and move to one of the other groups. Once a drive type has been selected the manufacturer, model and size will be displayed next to the drive position and control will return to the drive position menu. At this point the remainder of the drive positions can be defined or you can return to the main options by pressing <ESC>.

TDCPLUS SELECT DRIVE TYPES Ver. 2.00

DRIVE	TYPE	SIZE
1st DRIVE		
2nd DRIVE		
3rd DRIVE		

<A> - Mitsubishi M4851	<A> - Sony MP-F63W	<A> -
<B> - Mitsubishi M4853	<B> - Sony MP-F73W	<B> -
<C> - Mitsubishi M4854	<C> - Sony MP-F17W	<C> -
<D> - Mitsubishi MF501	<D> - Sony MP-F11W	<D> -
<E> - Mitsubishi MF504	<E> - Citizen OPDB-12A	<E> -
<F> - Tandon TM65-2L	<F> - Citizen OSDC-95A	<F> -
<G> - Tandon TM-100	<G> -	<G> -
<H> - TEAC FD-54B	<H> -	<H> -
<I> - TEAC FD-55BV	<I> -	<I> -
<J> - TEAC FD-55BR	<J> -	<J> -
<K> - TEAC FD-35FN	<K> -	<K> -
<L> - TEAC FD-235F	<L> -	<L> - TYPE/LOCATE HELP

Select Drive: Press <ESC> To Exit.

NOTE: If the computer does not support three floppy drives the third drive position will have a message stating it's not supported and it will not be available as a menu selection.

At least one drive position must have a defined drive type before exiting. If not, the following error message will be displayed:

THERE MUST BE ONE DRIVE TYPE DEFINED

TYPE/LOCATE HELP:

To aid in determining the drive type and drive position to use for testing TDCPLUS provides a computer/drive cross reference screen and a drive position function. Selecting the last option of the third type group displays the Type/Locate option menu.

```
                DRIVE TYPE HELP FUNCTIONS

              Drive Type/Computer Cross Reference
              Identify Drive Location

<A> - Mitsubishi M4851    <A> - Sony MP-F63W       <A> -
<B> - Mitsubishi M4853    <B> - Sony MP-F73W       <B> -
<C> - Mitsubishi M4854    <C> - Sony MP-F17W       <C> -
<D> - Mitsubishi MF501    <D> - Sony MP-F11W       <D> -
<E> - Mitsubishi MF504    <E> - Citizen OPDB-12A   <E> -
<F> - Tandon TM65-2L      <F> - Citizen OSDC-95A   <F> -
<G> - Tandon TM-100       <G> -                    <G> -
<H> - TEAC FD-54B         <H> -                    <H> -
<I> - TEAC FD-55BV        <I> -                    <I> -
<J> - TEAC FD-55BR        <J> -                    <J> -
<K> - TEAC FD-35FN        <K> -                    <K> -
<L> - TEAC FD-235F        <L> -                    <L> - TYPE/LOCATE HELP
```

The first option, Drive Type/Computer Cross Reference, will display a cross reference screen listing the current Tandy MS-DOS computers and the standard drive types used in each. Pressing any key returns to the drive type help option menu.

The second option, Identify Drive Location, brings up a drive position window with the first drive position highlighted. Using the arrow keys will move the highlight bar through the different drive positions. Along with the drive position being highlighted the corresponding floppy drive select light will be on. By moving the highlight bar and observing which floppy drive is selected it is easily determined which TDCPLUS drive position corresponds to the computer's physical drive position.

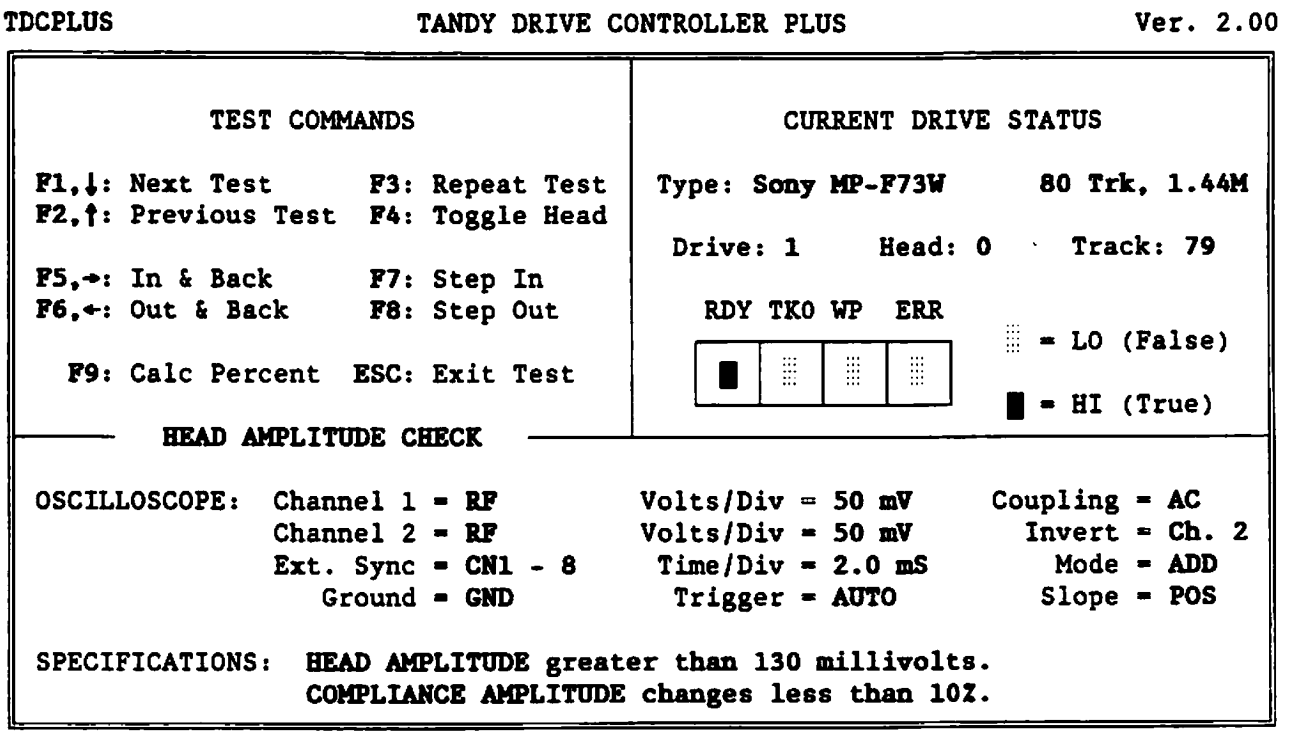
NOTE: Because of different hardware configurations TDCPLUS's 1st, 2nd and 3rd drive positions may not correspond to DOS's drive A, B and C. For this reason it is recommended you use the Identify Drive Location option to verify the drive position of the drive type you wish to test.

EXIT TDCPLUS:

Pressing the <ESC> key will normally exit, or abort, any of the TDCPLUS functions. However pressing <ESC> when located at the main option menu causes a prompt asking to verify your desire to exit the program. Pressing <ESC> again aborts the exit and returns to the main option menu. Pressing the <ENTER> key will exit the TDCPLUS program and return to the DOS prompt or the Diagnostic Diskette menu depending on how TDCPLUS was loaded.

TEST DISPLAY DESCRIPTION

When one of the alignment steps, or test options, is selected the main test screen is displayed.



The TDCPLUS test screen can be divided into four (4) sections:

Test Commands — **Current Drive Status**
Oscilloscope Settings and Test Specifications — **Dialog Bar**

Test Commands: This area displays the commands available while a test is active. Not all commands are available during all tests. Those commands which are valid for the current test are displayed using a high intensity attribute while those not currently available are displayed in low intensity. Also any command selected which is not available will cause a beep from the speaker and no other action will be taken.

Current Drive Status: This area displays the current status of the Floppy Drive and the FDC (Floppy Drive Controller). The Type lists the name of the drive under test as selected earlier. The Drive, Head and Track numbers are values the FDC is sending to the Floppy

Drive. The four flags in the boxes, Ready, Track 00, Write Protect, and Error, are status signals sent from the Floppy Drive to the FDC.

Oscilloscope Settings And Test Specifications: This area displays the test name, the oscilloscope or frequency counter settings, and the desired specifications of the current test.

Note: The oscilloscope settings are provided as a starting point. There may be minor adjustments required depending on the oscilloscope, computer and drive being used.

Dialog Bar: Displays any information relevant to the current operation.

TEST COMMANDS

NEXT TEST (F1,↓):

This command exits the current test and automatically starts the next test in the main option menu. This provides a quick method of stepping through the tests and avoiding the main option menu.

PREVIOUS TEST (F2,↑):

This command exits the current test and automatically starts the previous test in the main option menu.

REPEAT TEST (F3):

The Repeat Test command provides a means of restarting the current test. This command could be useful if you wanted to execute the same test after an adjustment to the drive has been made.

TOGGLE HEAD (F4):

This command toggles the drive head, or side, between 0 and 1.

IN & BACK (F5,→):

The In & Back command causes the drive to step to the innermost track and then return to the current track.

OUT & BACK (F6,←):

The Out & Back command causes the drive to step to the outermost track and then return to the current track.

STEP IN (F7):

This command causes the drive to step in (higher track number) one track making it the new current track number.

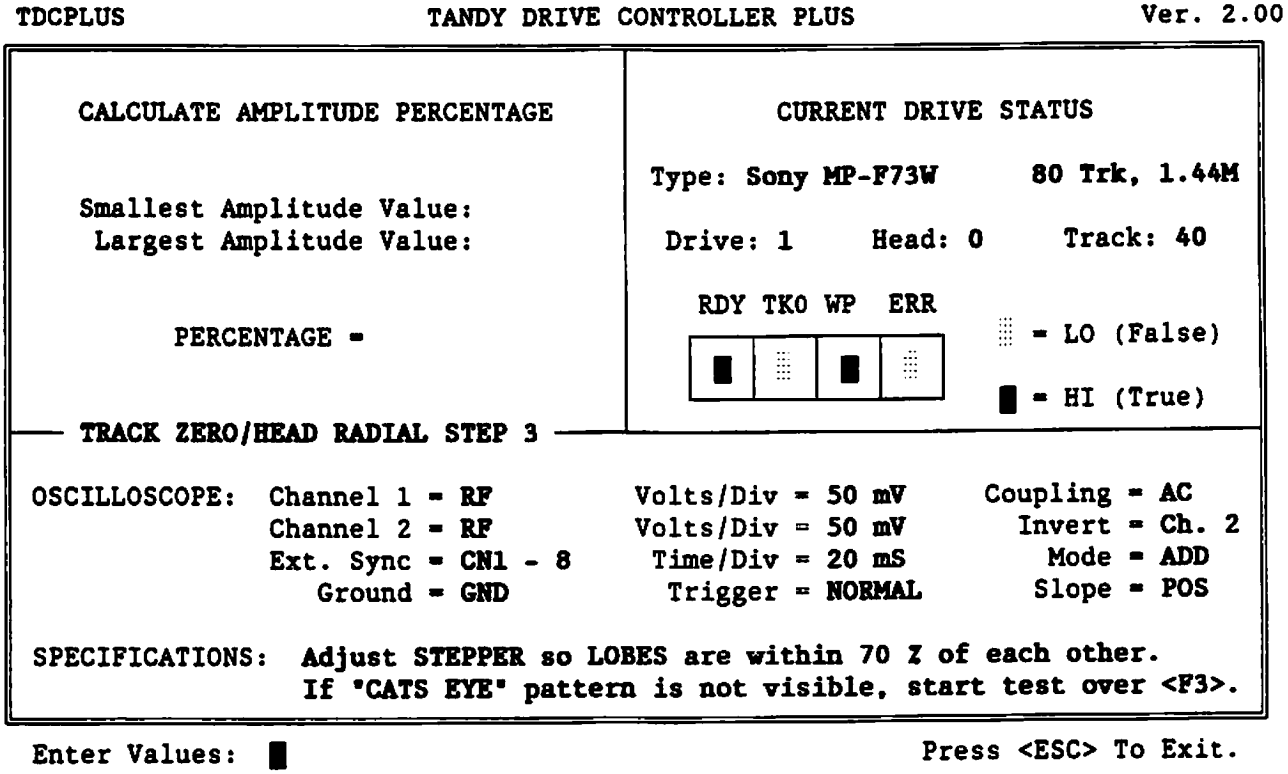
STEP OUT (F8):

This command causes the drive to step out (lower track number) one track making it the new current track number.

CALC PERCENT (F9):

The Calc Percent command is used to calculate the percentage between two amplitudes. For an example, the Head Radial test specification requires the two "Cat's Eye" lobes' amplitudes to be within a certain percentage of each other. This command allows the entry of the two amplitude values and then displays the corresponding percentage.

Once selected, the Calculate Amplitude Percentage window replaces the Test Commands window and prompts for the entry of the smallest of the two amplitude values. It then prompts for the larger value after which it returns the resulting percentage.



NOTE: The percentage calculator only accepts numbers. For this reason both values must be in the same voltage scale, such as millivolts or volts.

EXIT TEST (ESC):

This command exits the current test and returns to the main option menu.

TEST DESCRIPTIONS

HEAD CARRIAGE SLEW TEST:

The Head Carriage Slew Test is intended to insure proper movement of the head carriage assembly and the proper DC voltage levels at the floppy drive.

After selecting the test, TDCPLUS prompts for the insertion of a blank diskette. The type of diskette for this test is not important, in fact, only the Tandy 1400 and GRiD 140XT actually require a diskette for operation. However, by inserting a diskette you insure the most realistic power supply and spindle loads. With a diskette installed pressing any key, except <ESC>, continues. Pressing <ESC> aborts the test and returns to the main option menu.

Once started the drive will begin seeking between the low and high track as defined in the default configuration. At this point the DC voltages should be checked to insure they meet the listed specifications and the head carriage should be checked for free movement.

MOTOR SPEED CALIBRATION:

The Motor Speed test is used to insure the proper speed of the spindle motor.

After selecting the test, TDCPLUS prompts for the insertion of a blank diskette. A diskette MUST be installed to provide the index sensor with a signal and to apply a realistic load on the spindle motor. With a diskette installed pressing any key, except <ESC>, continues. Pressing <ESC> aborts the test and returns to the main option menu.

With a diskette installed the drive will restore to track 00 and the spindle motor will spin continuously. At this point the frequency counter should be connected as described in the Oscilloscope Settings and Test Specifications area of the screen and the speed of the spindle motor checked to insure it meets the listed specification.

HEAD AMPLITUDE CHECK:

The Head Amplitude Check test is used to check the read amplitude of the floppy drive's read/write heads.

> **NOTE:** This test writes to the diskette before starting the read test. It will therefore destroy any data located on the selected test track.

After selecting the test, TDCPLUS prompts for the insertion of a blank diskette. A diskette MUST be inserted for this test. For the most accurate results, a Bulk Erased diskette should be used. With a diskette installed pressing any key, except <ESC>, continues. Pressing <ESC> aborts the test and returns to the main option menu.

The innermost, or highest numbered, track of any drive is the most difficult to read. For this reason it should be used to determine if the Read/Write heads are providing sufficient amplitude. For troubleshooting purposes, however, any track may be selected. The Reconfigure Defaults option allows changing the track used for this test. It also allows changing the write mode and pattern. Normally a single write is performed, with the selected write pattern, before the continuous read is performed to allow the measurement of the head amplitude. However to aid in troubleshooting the write circuitry you may select a continuous write before the read. With continuous write selected you must press <ESC> before the test will proceed to the continuous read operation.

With the drive performing a continuous read operation BOTH heads should be checked to insure they meet the listed specifications.

NOTE: BOTH HEADS MUST MEET THE MINIMUM AMPLITUDE SPECIFICATION.

TRACK ZERO / HEAD RADIAL:

The Track Zero and Head Radial tests are used to align the head carriage assembly over the formatted tracks of the alignment diskette. This assures that when the FDC moves the floppy drive's head to say track 30, it is in fact over track 30. This test is performed in three steps:

Step 1 - Coarse Track Zero Adjust
Step 2 - Fine Track Zero Adjust
Step 3 - Radial Adjust

Each step should be completed before proceeding onto the next.

After selecting the test, TDCPLUS prompts for the insertion of an alignment diskette. The type of alignment diskette used must match the size of the drive being tested. With a diskette installed pressing any key, except <ESC>, continues. Pressing <ESC> aborts the test and returns to the main option menu.

NOTE: The alignment diskettes are specially prepared with the test patterns on specified tracks. For this reason there should be little need to change the default track values. These diskettes are not copyable and therefore should always be write protected.

Step 1, is the Coarse Track Zero Adjustment. The drive will restore to track 00 and then step to the track containing the radial, or "Cat's Eye", pattern. If the pattern is visible press <ESC> to proceed to the next step. If not, step in or out single tracks until the pattern becomes visible. Knowing how many tracks away the head is from the radial pattern gives you a rough idea of how much to move the track zero switch or sensor. After moving the track zero switch, or sensor, repeat the test by pressing <F3>. This will restore the head again causing it to locate the new track zero position and then step to the test track. Repeat this procedure, moving the track zero switch or sensor a little at a time, until the pattern becomes visible.

Step 2, is the Fine Track Zero Adjustment. With the track zero switch, or sensor, adjusted to position roughly over the proper track, it must now be adjusted to trigger at the proper time. The drive will be quickly stepping in and out of the track zero position. While it's doing this the track zero switch, or sensor, should be adjusted to obtain a 50% duty cycle. When obtained, press <ESC> to continue.

Step 3, is the Radial Adjustment. This is the fine adjustment to the stepper to position the head exactly over the desired track. Check **BOTH** heads to insure they meet the listed specification. If one head is further out of spec than the other, you should adjust the radial alignment so both heads are equal but they MUST still both meet the specification.

NOTE: BOTH HEADS MUST MEET THE MINIMUM SPECIFICATION.

HEAD AZIMUTH CHECK:

The Head Azimuth test is used to verify the proper angle of the read/write heads over the diskette.

After selecting the test, TDCPLUS prompts for the insertion of an alignment diskette. The type of alignment diskette used must match the size of the drive being tested. With a diskette installed pressing any key, except <ESC>, continues. Pressing <ESC> aborts the test and returns to the main option menu.

NOTE: The alignment diskettes are specially prepared with the test patterns on specified tracks. For this reason there should be little need to change the default track values. These diskettes are not copyable and therefore should always be write protected.

The drive will step to the test track and perform a continuous read. Using the oscilloscope settings displayed on the screen, verify both heads meet the listed specification.

NOTE: BOTH HEADS MUST MEET THE MINIMUM SPECIFICATION.

INDEX TIMING ALIGNMENT:

The Index Timing test is used to adjust the index sensor to assure the index pulse is generated at the correct time.

After selecting the test, TDCPLUS prompts for the insertion of an alignment diskette. The type of alignment diskette used must match the size of the drive being tested. With a diskette installed pressing any key, except <ESC>, continues. Pressing <ESC> aborts the test and returns to the main option menu.

NOTE: The alignment diskettes are specially prepared with the test patterns on specified tracks. For this reason there should be little need to change the default track values. These diskettes are not copyable and therefore should always be write protected.

Using the oscilloscope settings displayed on the screen, adjust the index sensor assembly to meet the listed specification.

RAW DATA / JITTER CHECK:

The Raw Data / Jitter test is used to check the data and mechanical noise from the drive's read/write heads.

> **NOTE:** This test writes to the diskette before starting the read test. It will therefore destroy any data located on the selected test track.

After selecting the test, TDCPLUS prompts for the insertion of a blank diskette. A diskette MUST be inserted for this test. For the most accurate results, a Bulk Erased diskette should be used. With a diskette installed pressing any key, except <ESC>, continues. Pressing <ESC> aborts the test and returns to the main option menu.

The innermost, or highest numbered, track of any drive is the most difficult to read. For this reason it should be used to determine data and mechanical noise. For troubleshooting purposes however, any track may be selected. The Reconfigure Defaults option allows changing the track used for this test. It also allows changing the write mode and pattern. Normally a single write is performed, with the selected write pattern, before the continuous read is performed to allow the measurement of the data jitter. However, to aid in troubleshooting the write circuitry you may select a continuous write before the read. With continuous write selected you must press <ESC> before the test will proceed to the continuous read operation.

With the drive performing a continuous read operation **BOTH** heads should be checked to insure they meet the listed specifications.

> **NOTE: BOTH HEADS MUST MEET THE MINIMUM NOISE SPECIFICATION.**

APPENDIX

DISTRIBUTED DRIVE TYPES

The following drive types are defined and included in version 2.00 of TDCPLUS:

MANUFACTURE AND MODEL	TRACK COUNT AND CAPACITY	DRIVE SIZE	SECTORS	DEFAULT TEST TRACKS					
				AMPLITUDE	RADIAL	AZIMUTH	INDEX	LOW TRK 0	HI TRK 0
Mitsubishi M4851	40 Trk, 360K	5¼	09	39	16	34	01	00	01
Mitsubishi M4853	80 Trk, 720K	5¼	09	79	32	68	02	00	02
Mitsubishi M4854	80 Trk, 1.2M	5¼	15	79	32	68	02	00	02
Mitsubishi MF501	40 Trk, 360K	5¼	09	39	16	34	01	00	01
Mitsubishi MF504	80 Trk, 1.2M	5¼	15	79	32	68	02	00	01
Tandon TM65-2L	40 Trk, 360K	5¼	09	39	16	34	01	00	02
Tandon TM100	40 Trk, 360K	5¼	09	39	16	34	01	00	02
TEAC FD-54B	40 Trk, 360K	5¼	09	39	16	34	01	00	02
TEAC FD-55BV	40 Trk, 360K	5¼	09	39	16	34	01	00	02
TEAC FD-55BR	40 Trk, 360K	5¼	09	39	16	34	01	00	02
TEAC FD-35FN	80 Trk, 720K	3½	09	79	40	40	00	00	02
TEAC FD-235F	80 Trk, 720K	3½	09	79	40	40	00	00	01
Sony MP-F63W	80 Trk, 720K	3½	09	79	40	40	00	00	01
Sony MP-F73W	80 Trk, 1.44M	3½	18	79	40	40	00	00	01
Sony MP-F17W	80 Trk, 1.44M	3½	18	79	40	40	00	00	01
Sony MP-F11W	80 Trk, 720K	3½	09	79	40	40	00	00	01
Citizen OPDB-12A	80 Trk, 720K	3½	09	79	40	40	00	00	01
Citizen OSDC-95A	80 Trk, 720K	3½	09	79	40	40	00	00	01

ERROR MESSAGES

TDCPLUS contains two basic types of error message screens, Standard and DOS.

Standard Error Message Screen:

The standard error message screen occupies the bottom two lines of the screen with the actual error message displayed in the lower left corner.

```
*** ERROR ***                *** ERROR ***                *** ERROR ***
  message displayed here                  Press Any Key To Continue ... ▉
```

The only option available is to press any key to continue which will abort the attempted command or function.

DOS Critical Error Message Screen:

TDCPLUS uses DOS functions to access the external DTYPES.TDC file. If DOS encounters a problem reading or writing to this file it produces it's own message. TDCPLUS intercepts these messages and displays them with a pop-up screen in the center of the display.

```
┌──────────────────────────────┐
│       *** DOS ERROR ***      │
│                              │
│ error message displayed here │
│                              │
│   Abort, Retry, Ignore: ▉    │
└──────────────────────────────┘
```

DOS errors provide three options; Abort, Retry and Ignore. Abort and Ignore will cause the current operation to be aborted and control returned to TDCPLUS. TDCPLUS will then display a standard error message before continuing. If the Retry option is selected DOS will attempt the operation again and if successful, continue as if no problem occurred.

STANDARD ERROR MESSAGES

ACCESS DENIED:

Internal program error when trying to open DTYPES.TDC file. Retry the function or reboot the computer.

ADDRESS MARK NOT FOUND:

Error reading diskette. Retry the function or reboot the computer.

A DEFAULT TRACK NUMBER IS OUT OF RANGE:

Attempting to exit the Reconfigure Defaults window when one of the default track values is larger than the size of the drive. Correct the default track values.

A WRITE MODE OPTION IS INVALID:

Attempting to exit the second Reconfigure Defaults window when one of the default mode values is invalid. Correct the default mode values.

BAD COMMAND:

Internal program error or FDC problem. Retry the function or reboot the computer.

BAD CRC:

Read of the diskette caused an FDC CRC error. Retry the function or reboot the computer.

CONFIG.SYS MUST HAVE BUFFERS=3 MINIMUM:

For proper operation on some computers TDCPLUS requires at least three DOS buffers. Modify the CONFIG.SYS file with the BUFFERS=3 statement and reboot the computer.

DISK CONTROLLER FAILED:

Internal FDC error indicating FDC could not perform the requested command. Retry the function or reboot the computer.

DISKETTE REMOVED:

FDC received the Disk Change signal from the floppy drive during a read or write operation. Retry the function or reboot the computer.

DISKETTE WRITE PROTECTED:

The floppy drive indicates the write protect function is active when attempting to write to the diskette. Remove the write protect flag and retry the function.

DMA ATTEMPT ACROSS 64K BOUNDARY:

Indicates a memory or internal program error occurred. Retry the function or reboot the computer.

DMA OVERRUN:

Indicates a memory or internal program error occurred. Retry the function or reboot the computer.

DRIVE RESTORE UNSUCCESSFUL:

Indicates the track 00 flag was not detected during a drive restore command before the FDC timed out. Check the track 00 switch, or sensor, and possibly the stepper motor assembly then retry the function.

DRIVE TYPE DEFINITION TABLE IS FULL:

A maximum of 35 drive types can be defined. This error indicates an attempt to add another was made. If another type is needed either update an unused type with the new type information or create a second program diskette with a different DTYPES.TDC file.

DRIVE TYPE FILE DTYPES.TDC NOT FOUND:

Could not locate the DTYPES.TDC file on the boot drive. Make sure the file is located in the root directory of the boot drive.

FUNCTION NUMBER INVALID:

Internal program error. Retry the function or reboot the computer.

INVALID ALIGNMENT DISK, NO WRITE PROTECTION!:

The write protect flag was not seen when the alignment diskette was expected to be installed which should be write protected. Check write protect switch, or sensor, and confirm alignment diskette is installed. Retry the function or reboot the computer.

INVALID ERROR:

An unknown error occurred. Retry the function or reboot the computer.

INVALID HANDLE:

Internal program error when trying to access the DTYPES.TDC file. Retry the function or reboot the computer.

INVALID KEYBOARD ENTRY:

Indicates a key pressed or the value entered was not valid. Check command window or dialog bar for acceptable keyboard responses.

NO HANDLE AVAILABLE:

Internal program error when trying to access the DTYPES.TDC file. Retry the function or reboot the computer.

OPEN MODE INVALID:

Internal program error when trying to access the DTYPES.TDC file. Retry the function or reboot the computer.

PATH FOR TYPE FILE DTYPES.TDC NOT FOUND:

Could not locate the DTYPES.TDC file on the boot drive. Make sure the file is located in the root directory of the boot drive.

SECTOR NOT FOUND:

Indicates the FDC did not receive from the floppy drive read the correct sector ID information. Check the floppy drive read section or check for possible FDC failure. Retry the function or reboot the computer.

SEEK FAILED:

Indicates the FDC sensed the floppy drive did not step to the correct track. Check floppy drive carriage assembly for movement or check for possible FDC failure. Retry the function or reboot the computer.

SELECTED DRIVE'S TYPE HAS NOT BEEN DEFINED:

Indicates the drive position selected has not had a drive type assigned. Either select a different drive position which has been assigned a drive type or select the Select Drive Type option and define the type for the desired position.

SELECTED OPTION HAS NO TYPE DEFINITION:

Indicates the selected drive type option has not been defined with drive type information. Select another drive type option.

THE CURRENT DRIVE HAS NOT BEEN SELECTED:

Indicates the test drive position has not been selected when trying to execute a test or other option. Select the Change Current Drive option and select which drive to test.

THERE MUST BE ONE DRIVE TYPE DEFINED:

Indicates no drive types were selected before trying to exit the type selection to the main options. Assign at least one drive type to a drive position.

TIME OUT-DEVICE NOT RESPONDING:

Indicates the Floppy Drive or the FDC did not respond to a command within a predetermined time. Make sure a diskette is installed with the door closed. Check for possible FDC, floppy drive or computer failure.

UNDEFINED ERROR:

An unknown error occurred. Retry the function or reboot the computer.

DOS ERROR MESSAGES

Write-protect Error:

The floppy drive indicates the write protect function is active when attempting to write to the diskette. Remove the write protect flag and retry the function.

Invalid Drive Number:

Internal program error when trying to access the DTYPES.TDC file. Retry the function or reboot the computer.

Drive Not Ready:

Indicates the Floppy Drive or the FDC did not respond to a command within a predetermined time. Make sure a diskette is installed with the door closed. Check for possible FDC, floppy drive or computer failure.

Invalid Command:

Internal program error when trying to access the DTYPES.TDC file. Retry the function or reboot the computer.

CRC Error:

Read of the diskette caused an FDC CRC error. Retry the function or reboot the computer.

Seek Error:

Indicates the FDC sensed the floppy drive did not step to the correct track. Check floppy drive carriage assembly for movement or check for possible FDC failure. Retry the function or reboot the computer.

Disk Format Not Recognized:

Error reading diskette. Retry the function or reboot the computer.

Sector Not Found:

Indicates the FDC did not receive from the floppy drive read the correct sector ID information. Check the floppy drive read section or check for possible FDC failure. Retry the function or reboot the computer.

Write Error:

Error writing to diskette. Retry the function or reboot the computer.

Read Error:

Error reading diskette. Retry the function or reboot the computer.

General, Nonspecific Error:

Error reading or writing diskette. Insure diskette is installed with door closed. Retry the function or reboot the computer

Invalid Disk Change:

FDC received the Disk Change signal from the floppy drive during a read or write operation. Retry the function or reboot the computer.

TDCPLUS ADDENDUM
VERSION 2.10 UPDATES

HEAD AMPLITUDE & RAW DATA TESTS:

TDCPLUS version 2.10 has added a feature to the Head Amplitude and Raw Data tests. Before reading the test track these tests begin by writing a special format and test pattern on the test track, which by default is the innermost track. As with most drives it has the lowest amplitude making it the most difficult to write and read. Version 2.10 will first write this special format and pattern on track 0 followed by the test track. This allows a simple method of comparing the "Best" (track 0) and "Worst" (innermost track) case of the write/read operations.

DISTRIBUTED DRIVE TYPES:

The following drive types are defined and included in version 2.10 of TDCPLUS:

MANUFACTURE AND MODEL	TRACK COUNT AND CAPACITY	DRIVE SIZE	SECTORS	DEFAULT TEST TRACKS					
				AMPLITUDE	RADIAL	AZIMUTH	INDEX	LOW TRK 0	HI TRK 0
Mitsubishi M4851	40 Trk, 360K	5¼	09	39	16	34	01	00	01
Mitsubishi M4853	80 Trk, 720K	5¼	09	79	32	68	02	00	02
Mitsubishi M4854	80 Trk, 1.2M	5¼	15	79	32	68	02	00	02
Mitsubishi MF501	40 Trk, 360K	5¼	09	39	16	34	01	00	01
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TEAC FD-55BV	40 Trk, 360K	5¼	09	39	16	34	01	00	02
TEAC FD-55BR-5??	40 Trk, 360K	5¼	09	39	16	34	01	00	02
TEAC FD-35FN	80 Trk, 720K	3½	09	79	40	40	00	00	02
TEAC FD-235F	80 Trk, 720K	3½	09	79	40	40	00	00	01
Sony MP-F63W	80 Trk, 720K	3½	09	79	40	40	00	00	01
Sony MP-F73W	80 Trk, 1.44M	3½	18	79	40	40	00	00	01
Sony MP-F17W	80 Trk, 1.44M	3½	18	79	40	40	00	00	01
Sony MP-F11W	80 Trk, 720K	3½	09	79	40	40	00	00	01
Citizen OPDB-12A	80 Trk, 720K	3½	09	79	40	40	00	00	01
Citizen OSDC-95A	80 Trk, 720K	3½	09	79	40	40	00	00	01
TEAC FD-55BR-121	40 Trk, 360K	5¼	09	39	16	34	01	00	02

SERVICE POLICY

Radio Shack's nationwide network of service facilities provides quick, convenient, and reliable repair services for all of its computer products, in most instances. Warranty service will be performed in accordance with Radio Shack's Limited Warranty. Non-warranty service will be provided at reasonable parts and labor costs.

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