The Model 100-PT. Continuity Test System

Designed And Manufactured by:

CableTrak LLC

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Limited Warranty

CableTrak LLL warrants the accompanying product to be free of defects in materials and workmanship for a period of one year. If your CableTrak product is defective and returned within (90) days of the date it was purchased, we will replace it with a new one at no charge to you. If returned after 90 days but within one year of the date of purchase, we will repair it, or at our option, replace it with a new or rebuilt reconditioned one at no charge to you. The repair or replacement will be warranted for either (A) 90 days or (B) the remainder of the original one year warranty, whichever is longer.

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The Model 100-PT. Continuity Test System

User Manual

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I
INTRODUCTION

SYSTEM OVERVIEW

The Model 100-PT. Continuity Test System is designed to link to a "PC" or laptop via a USB cable. The system is expandable to 300 test points (or three modules) per system by the use of card cage assemblies. It automatically learns a known good cable or, if you prefer, you can build your own cable by entering information to a "Net" list and testing cables against this list. This removes any possibility of "READING" in a faulty sample cable. The Model 100-PT. tests every pin to every pin.

Probing a pin is another unique feature that will enable the user to locate a specific wire. The system allows the saving of all cable information to the P.C. or laptop. Errors detected by the Model 100-PT. may be sent to a display or a printer.

SYSTEM REQUIREMENTS

MINIMUM REQUIREMENTS

PC or Laptop
Runs on Microsoft Windows 10 or Windows 7.

EQUIPMENT SUPPLIED

The basic test system is supplied with the following:

- **Model 100-PT. Main Board**
- **Adapter Board**
- **Card Cage Including MotherBoard up to Qty. 3 Model 100-PT. Main Boards**
- **Power Pack**
- **3 Foot USB Cable**
- **User Manuals**
- **CD ROM w/ Software**
- **Pin Connector (for Test Lead Use)**

SPECIFICATIONS:

TEST VOLTAGE: 5V
TEST CURRENT: .5 MA.
PIN & LABEL LENGTH: 7 CHARACTERS EACH
OPEN/SHORT THRESHOLD: APPROX. 3K OHMS
"LOCATE A WIRE" DISPLAY: 160 POINTS MAX.

II
ESD

<u>ESD...(ELECTRO STATIC DISCHARGE)</u> is a danger to any electronic equipment, especially those where direct electrical connections from the equipment come in continual contact with the user. ESD, (Static Electricity), of many thousands of volts can be generated by the user/operator simply walking across the floor, (especially carpet and vinyl), shifting around in a chair or similar actions. This condition is increasingly evident in cold and dry conditions. This ESD, may, in the best case, only cause the software that is running on the machine to crash or in the worst case, damage Printed Circuit Board components.

It is strongly recommended that the user/operator use wrist grounding straps, anti-static mats, or at least ensure that they have discharged themselves to ground before making any connections to the unit.

Wrist straps can be connected directly to the Adapter Board or to the Connector Box by using the "Locate-A-Wire" probe connection <u>*which is ground*</u>.

In the event that the unit appears to be operating incorrectly, the possibility that *ESD* was the cause always exists. In this case, reset the machine and try again ensuring that preventative measures have been taken.

III
JUMPER SETUP

JUMPER SETTINGS:

Before installing the Model 100-PT. main board into a PC, the correct jumpers on the board must be installed. Located on the top-left corner of the PC board (See Fig. 1) is the Board Select Jumper Block. Single boards supplied by the factory are shipped with the jumper set specified to Sales Order. To select Board #1 (JP1 1-2) for pins 1-100. In the event that a second or third board is later added, the jumper settings on those boards will have to be set as follows:

To add a second board to the PC jumper JP1 3-4 (for pins 101-200)
To add a third board to the PC jumper JP1 5-6 (for pins 201-300)

Physical positioning of the boards in the computer with respect to pin numbering is not critical as the Model 100-PT. relies strictly on the jumper settings to determine pin numbering for each installed board. The system diagnostics and software will recognize the boards no matter what their location. It is important however, when adding boards to the system not to skip any board jumpers. That is, the second board installed must be jumpered as board number 2, it cannot be jumpered as board number 3. Otherwise, the diagnostics will report an error saying that board number 2 is missing.

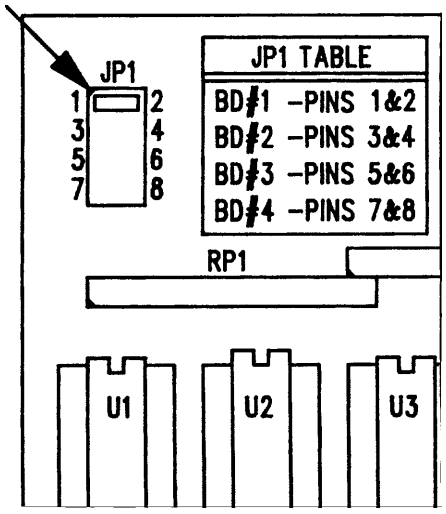


FIGURE 1
BOARD SELECT JUMPER BLOCK

ADAPTER BOARD:

The Model 100-PT. PC board is fitted with a 104 position high density connector that protrudes through the I/O bracket at the rear of the PC. The ADAPTER BOARD mates with the Model 100-PT. PC board to convert this high density connector to 2 standard .1 pitch IDC (INLINE DUAL CONNECTOR) male headers which can

mate to standard female ribbon cable connectors. One male header is a 50 position connector (P1) which corresponds to the first 50 I/O pins on the board. The other male header is a 60 position connector (P2) which corresponds to the second set of 50 I/O pins on the board. Pins 55-60 on this connector are ground and are optionally used for the "LOCATE A WIRE" function. (Refer to Main Menu Option #4, "LOCATE A WIRE"). Pins 51-54 of the 60 pin connector are left out to allow the use of a standard 50 pin female header when custom test fixtures are used. When a CableTrak connector box is purchased, 1 50 pin and 1 60 pin ribbon cable is provided. Otherwise the user may use 2 50 pin ribbon cables purchased from CableTrak, or the cables can be assembled in-house with the other end terminated as the user sees fit. In the event that a 50 pin connector is used with the 60 pin header, and the "LOCATE A WIRE" function is still required, there is also a connector that is mounted on the Adapter Board to allow the connection of a test lead for this purpose.(Refer to Main Menu Option #4, "LOCATE A WIRE").

BOARD ADDRESSES:

The Model 100-PT. PCB uses the following "HEX" addresses: (167,16B,16D,16E,101,102,121,122,140, and 1A0 through 1BF).
The PCB *does not use any interrupts.* If a problem arises, make sure that there are no address conflicts with any other board installed in the computer.

IV
SOFTWARE INSTALLATION and SETUP

The software supplied with the Model 100-PT. is provided on a CR ROM. This allows for the CDROM to be used to either copy the software to your system or run it directly from the disk if no hard drive is available.

A. ***INSTALLING THE SOFTWARE ON A HARD DISK DRIVE***

1. Insert the CD ROM into the PC's or laptop's CD drive.

2. Create a new folder named CABLE for the CableTrak programs and copy the software from the CD ROM into that directory.

3. Review all the files and manuals in the newly created CABLE directory which will direct you through the installation process.

V
GETTING STARTED

SOFTWARE OVERVIEW

The following section of this manual will explain the operation and capabilities of the Model 100-PT. Continuity Test System. Each step in the process of testing a cable will be discussed, in depth, beginning with "reading in" a sample cable, testing a cable, editing the cable's "Net" list, and printing the results of the cable read.

LEARNING BY EXAMPLE:

A helpful way of learning this software is to use a cable as an example and to visualize all the various phases of testing the cable and saving the results to disk for future testing against this saved file. We will also modify these results by changing the "Net" list and saving the results again, but as a different file name, thus creating a new cable.

STARTING THE PROGRAM:

Please follow the Installation Manual on the CDROM. This will initialize the Model 100-PT. board's that you have installed in your Personal Computer. Diagnostics' tests will begin. The tests that will be conducted will check the integrity of the hardware; check for correct jumper settings; and search for configuration files.

VI
SYSTEM OPERATION

DIAGNOSTICS

Immediately after typing the word "***CABLE***," the initialization screen will be viewed.

```
CABLETRAK CORP. CABLE TESTER

VERSION V x.xx


Type Any Key to Continue
```

Pressing any key will then bring up this *warning:*

```
WARNING!! DISCONNECT ANY SAMPLE OR TEST CABLES
 THAT ARE CONNECTED TO THE CABLE TESTER BEFORE
   PROCEEDING, OR THE DIAGNOSTICS WILL FAIL!

          Press any key to continue
```

The user *must* be certain that there are **no** cables connected upon start-up.

After pressing any key, On-board diagnostics will begin and the following message will appear:

```
PLEASE WAIT, CHECKING HARDWARE
```

Normal conditions will produce the following result:

```
                    *** DIAGNOSTIC RESULTS ***
TOTAL NUMBER OF BOARDS FOUND IN SYSTEM = 1  JUMPERED AS  #1
NO ERRORS WERE DETECTED ON INSTALLED BOARDS
DIAGNOSTIC TEST PASSED. PRESS ANY KEY TO CONTINUE.
```

After depressing any key, the system will attempt to read the configuration file. (For more information on this file, see "Selecting from the Main Menu" -- Option #5.)

The following message will appear:

If no configuration was created by the user, this screen will be displayed:

At this point, press any key to go to the MAIN MENU. (Refer to VI MAIN MENU)

Provided that a configuration file was found, the system will read this file and determine the integrity of it and the following message will appear:

Upon completion of the file validity test, the system will be ready for operation.

At this point, press any key to go to the MAIN MENU. (Refer to VI MAIN MENU)

Some errors may be encountered by the diagnostics' tests that will prohibit the operation of the board. One such discrepancy will produce the following screen:

```
FATAL ERROR WHILE TESTING PC TIMER!!!

PROGRAM CANNOT CONTINUE WITHOUT PROPERLY FUNCTIONING TIMER.

Press any key to exit to DOS
```

This problem is generated by the Personal Computer in use and *is not* associated with the Model 100-PT. Continuity Test System. (This case is extremely rare).

Another possible error message is:

```
*** DIAGNOSTIC RESULTS ***

ERROR: NO WORKING BOARDS DETECTED IN SYSTEM!!!
CANNOT CONTINUE

PRESS ANY KEY TO RETURN TO DOS.
```

Ensure that the Model 100-PT. printed circuit board is present in the Personal Computer and that it is seated properly into the ISA or EISA connector slot on the motherboard. Also, make certain that the board is screwed down into the I/O panel located at the rear of the computer.

Another possible error message is:

```
*** DIAGNOSTIC RESULTS ***

TOTAL NUMBER OF BOARDS FOUND IN SYSTEM = 1  JUMPERED AS  #2

AN ERROR WAS DETECTED ON 0 BOARD(S).

BOARDS INSTALLED ARE INCORRECTLY JUMPERED. INSTALLED BOARDS SHOULD BE JUMPERED
STARTING WITH JUMPER #1, THE SECOND BOARD WITH JUMPER #2, ETC.

RECOMMEND BOARD #2 BE JUMPERED AS BOARD #1

JUMPERS MUST BE CORRECT BEFORE PROCEEDING, PRESS ANY KEY TO EXIT TO DOS.
```

The jumper settings must be set correctly in order for testing to begin. These settings are factory preset provided the desired configuration is specified at time of order. If a user wishes to add additional boards at a later date, the jumper setting must be changed. (Refer to the Jumper Table "JP1" located on the Model 100-PT. PCB) The on-screen diagnostic test results will help determine any jumper setting problem that arises.

This error message will appear if it is determined that a board is defective. The program will prompt the user to return to the operating system rendering testing impossible. Please call CableTrak Technical Support if this problem occurs.

```
                    *** DIAGNOSTIC RESULTS ***

TOTAL NUMBER OF BOARDS FOUND IN SYSTEM = 1  JUMPERED AS  #1

AN ERROR WAS DETECTED ON 1 BOARD(S).  #1

CANNOT CONTINUE WITH DEFECTIVE BOARD!!  PRESS ANY KEY TO RETURN TO DOS.
```

MAIN MENU

```
CABLE NAME = NONE                                   I/O PIN NAMING = DEFAULT1
                                                    NUMBER OF BOARDS = 1

                          MAIN MENU

                    0. READ IN A SAMPLE CABLE
                    1. TEST A CABLE
                    2. FILE OPERATIONS
                    3. DISPLAY FILE DATA
                    4. LOCATE A WIRE
                    5. CONFIGURATION
                    6. VIEW/EDIT/CREATE CABLE NET
                    7. TEST FOR INTERMITTENTS
                    8. DATA LOGGER OPERATIONS
                    9. EXIT TO DOS

                PLEASE MAKE CHOICE (ENTER Key to Accept):
```

When initially entering the Main Menu, the screen will show the current CABLE NAME; (default is "NONE"), I/O PIN NAMING; (default is "DEFAULT1") and the NUMBER OF BOARDS presently installed in the Personal Computer.

CABLE NAME:

This heading represents the cable file that is currently read in from either a sample cable, the hard drive or diskette. Disk cable files are recognizable because of their (.CBL) extension. **(Refer to Item #2 -- File Operations from Main Menu.)**

I/O PIN NAMING:

This corresponds to the type of pin numbering used by the Model 100-PT. Continuity Test System. **(Refer to Item #5 -- Configuration from Main Menu & then Item #1 -- Rename I/O Pins from Configuration Sub-Menu.)**

NUMBER of BOARDS:

This is determined by the on-board self diagnostic test that runs during start-up. (A maximum of 4 boards can be installed.)

MAIN MENU SELECTIONS:

0. READ IN A SAMPLE CABLE

Connect a cable to the unit using either a user provided adapter or an optional CableTrak connector box and press 0 to read in the cable.

The following message will appear:

```
                              WARNING!!!!

   NEW CABLE NAME IS NOT SAVED TO DISK UNLESS A WRITE NET COMMAND IS ISSUED!!

         Please Enter Cable Name (ENTER key to Accept, ESC to Abort)

                              >SAMPLE
```

This "WARNING" means that unless the user goes to *Option #2 from the Main Menu (File Operations) and saves the cable information to disk, this data will be saved to memory only*. **If the user exits the program, this data will be lost.** (Saving data to disk will be discussed later in this section.)

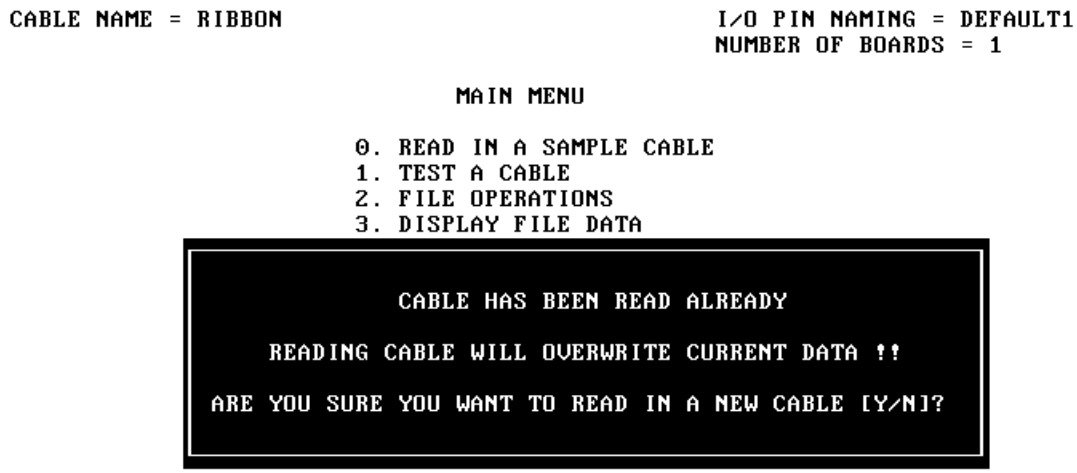
The default cable name **"SAMPLE" cannot be written to disk.** This name is reserved for memory residence only. If saving to disk, a new cable name must be applied to the cable data that is currently being read in. The name can be up to eight characters in length. The cable name can be left as SAMPLE if desired and then changed later if writing the cable data to disk.

```
                              WARNING!!!!!

   NEW CABLE NAME IS NOT SAVED TO DISK UNLESS A WRITE NET COMMAND IS ISSUED!!

         Please Enter Cable Name (ENTER key to Accept, ESC to Abort)

                              >RIBBON

                  ┌──────────────────────────────┐
                  │ READING IN SAMPLE CABLE NOW  │
                  └──────────────────────────────┘
```

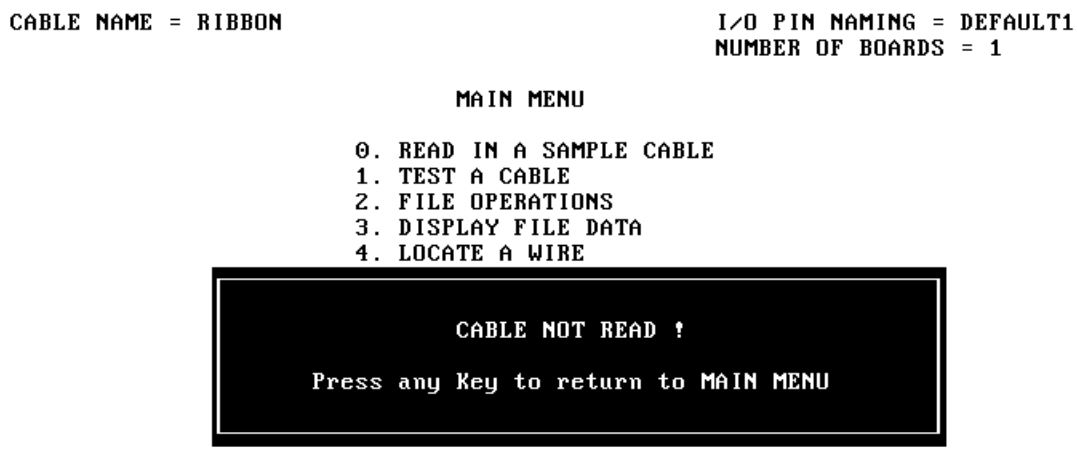
The above display shows we have named a sample cable "RIBBON" and pressed the enter key. That name will be used throughout this User Manual.

The following message shows that the cable has now been read into memory.

```
                              WARNING!!!!!

   NEW CABLE NAME IS NOT SAVED TO DISK UNLESS A WRITE NET COMMAND IS ISSUED!!

         Please Enter Cable Name (ENTER key to Accept, ESC to Abort)

                              >RIBBON

            ┌──────────────────────────────────────────────┐
            │ *** CABLE READ, Press any key to continue *** │
            └──────────────────────────────────────────────┘
```



Once the cable has been read in, the new cable name new appears in the top left-hand corner of the Main Menu screen. If the user attempts to read another cable into memory, the above prompt will appear. **Overwriting data will remove any current data from memory**. Provided that the user wants to save the data from the cable that is currently read into memory, a Write Net Command must be issued. (Item #2 from the Main Menu). This option saves information to disk.



If the user selected "NO" to overwriting the current data, the above screen will appear. *(The data from the new cable will not be read into memory.)*

The Model 100-PT. Continuity Test System will detect problems when reading in the sample cable. The sample cable must not have any diodes, resistors or any other in-line components installed within it. The integrity of the cable must be proven prior to reading the data. This message will also appear if a connection was intermittent when reading in a sample cable.

1. TEST A CABLE

The next step in this sequence is to disconnect the sample cable and to begin hooking up cables to be tested. After connecting a cable to test, select Item #1 from the MAIN MENU and then press the enter key.

The following message briefly appears during the testing process.

```
***TESTING CABLE NOW***
```

The next screen reveals that no errors were encountered during testing.

```
***CABLE PASSED, Type any key to continue.***
```

In the event that no cable was read in during Main Menu Item #0 (Read In A Sample Cable), this result is shown below:

```
NO CABLE HAS BEEN READ IN YET - Press any key to return to the MAIN MENU
```

When a defective cable is found, an audible tone alerts the user to the problem and the choice of either displaying or printing these errors is given as shown below:

```
*** CABLE FAILED ***

0. Return to Main Menu
1. Display Errors
2. Print Errors

PLEASE MAKE CHOICE (ENTER Key to Accept):
```

By selecting Item #1 above, we can view the cable's faults.

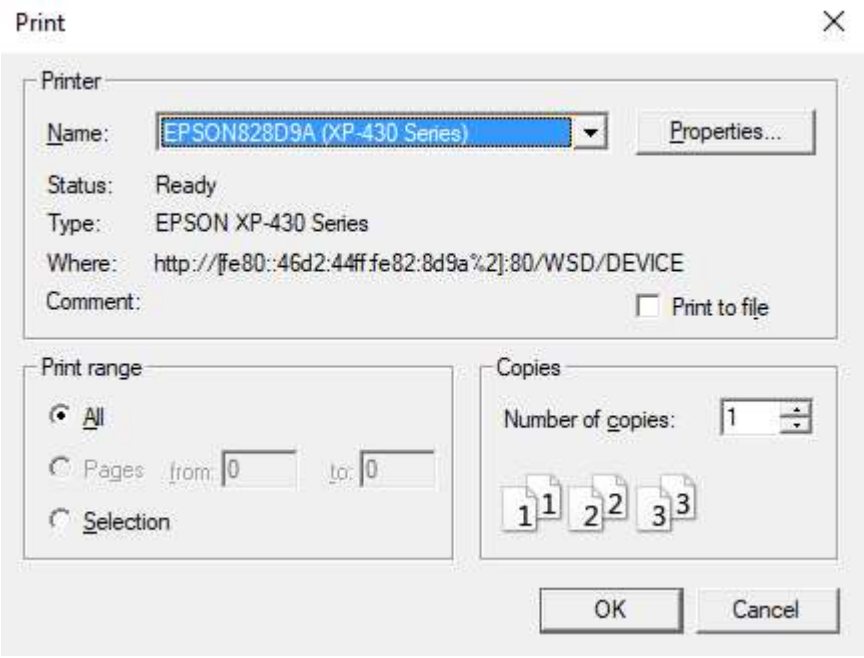
```
PIN NO.   LABEL          PIN NO.   LABEL      FAULT        PAGE = 0001
-------------------------------------------------------------------------
J1-01           - to -   J2-01              OPEN
J1-02           - to -   J2-02              OPEN
J1-03           - to -   J2-03              OPEN
J1-04           - to -   J2-04              OPEN
J1-05           - to -   J2-05              OPEN
J1-06           - to -   J2-06              OPEN
J1-07           - to -   J2-07              OPEN
J1-08           - to -   J2-08              OPEN
J1-09           - to -   J2-09              OPEN
J1-10           - to -   J2-10              OPEN

        Press PAGEUP for previous page, ESC to return to MAIN MENU
```

In the above case, the cable was read in using Item #0 from the Main Menu. This cable, which will be called "RIBBON," is a 10-conductor flat ribbon cable with 10 position ribbon cable connectors on both ends. The cable was then removed from the fixture and no other cable was hooked up. The test was conducted by

going back to the Main Menu and selecting Item #1. The resulting output is viewed in the above chart.

In the event that Item #2 (Print Errors) is selected, the preceding display would be printed along with the Cable Name, I/O Pin Naming, # of Boards, Time and Date.

The user would see the "Printer Options" Box will open as shown below:



Select the desired printer from the drop-down menu and the data will be sent to the printer. Saved files may also be sent to a PDF file if that driver was installed as one of the printers on the list.

2. FILE OPERATIONS

<u>Selecting Item #2</u> from the Main Menu will bring the user to the "DISK FILE OPERATIONS" Sub-Menu shown below:

```
DISK FILE OPERATIONS SUB-MENU

0. Return to Main Menu
1. Read Cable Data From Disk
2. Write Cable Data To Disk
3. Delete File

PLEASE MAKE CHOICE (ENTER Key to Accept):
```

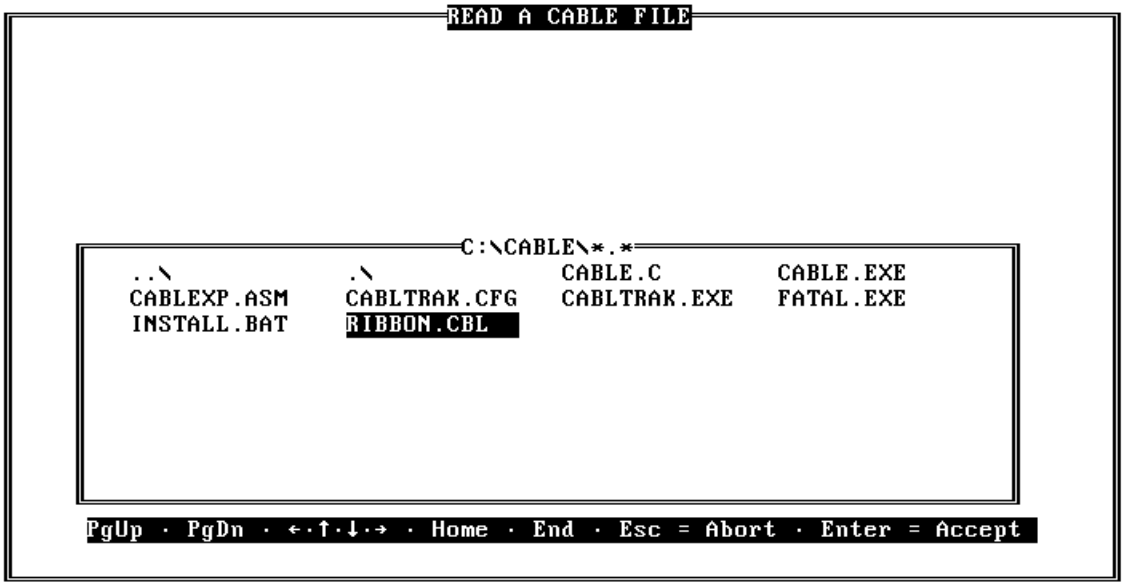
<u>Choosing Item #1</u> from this Sub-Menu will give the operator the function of f <u>READING</u> in information from "Hard Drives."

NOTE:

The highest drive letter available in the system will be displayed. In the example below, **"H"** is the highest drive letter available.

The above screen allows selecting from drives which are currently installed.

The example that follows shows the file "RIBBON" from the "C:" Drive and the Sub-Directory of "\CABLE" about to be read into memory. You can also move around directories by selecting **..** to move to the previous directory or selecting a directory name to move to a sub-directory.



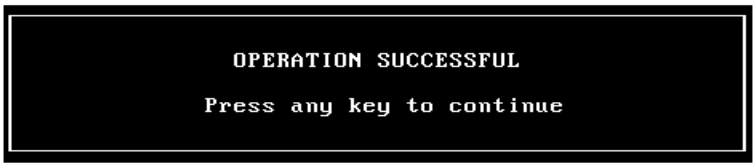
Use the editing keys shown above to move around the screen.

After selecting a file and pressing the ENTER key, the following message will appear:

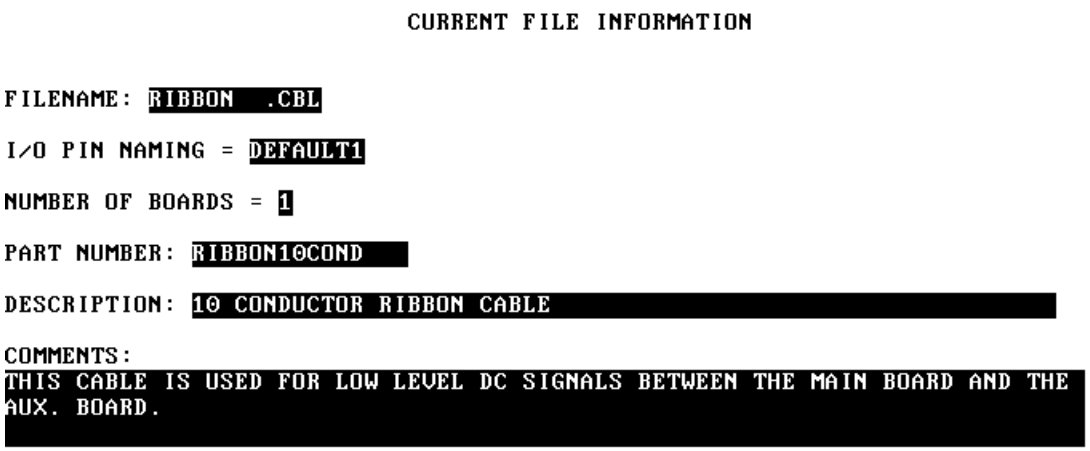
The file is now being read in by the software.

After reading in the file, it is checked to see if it is a valid cable file. The following message will appear:

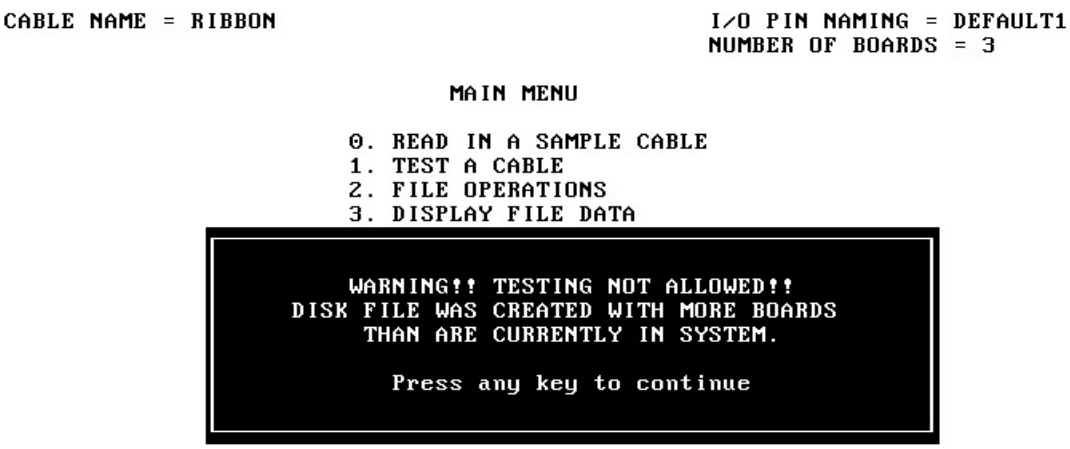
If the cable file read is valid, the following message will appear:



After pressing any key, information about the file will be displayed as shown below:



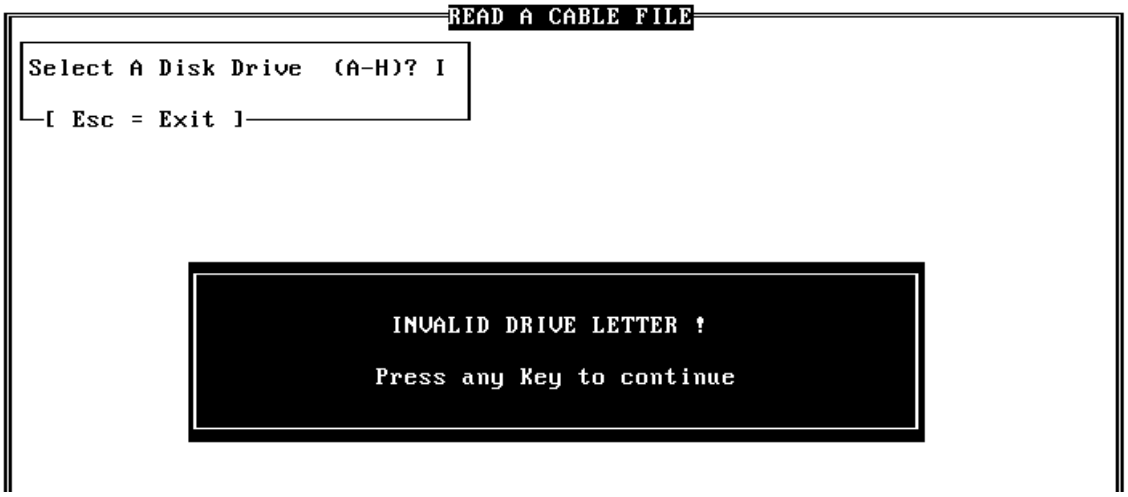
The number of boards used when saving a cable file should equal or exceed the number of boards in the system. If the file “RIBBON” was saved on a system with 3 boards, and then this file was read on a system with one board, the following message would appear before the file information above. This means that in order to test cables against a given cable file, the number of boards currently installed in the computer must be equal to or greater than the quantity of boards used when saving the cable file.



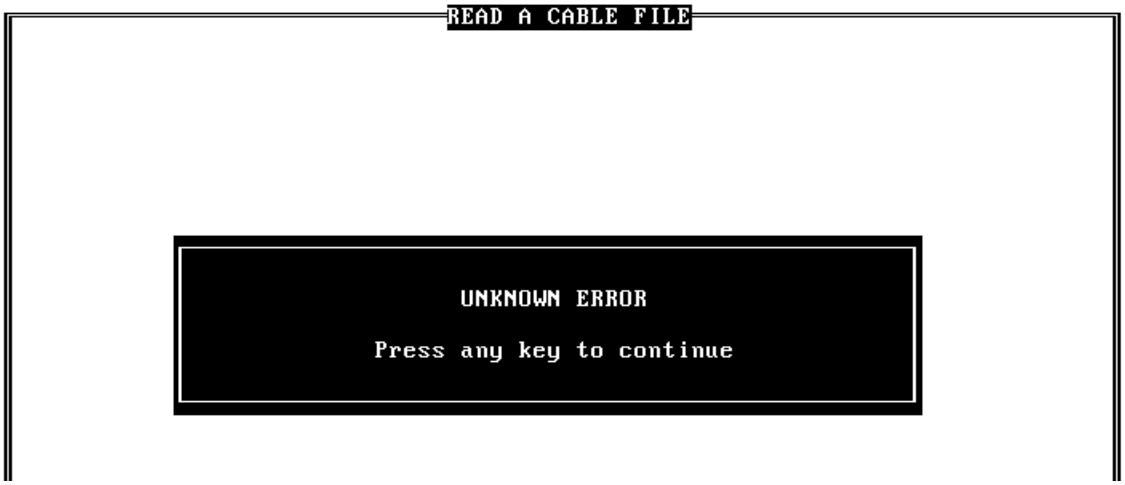
On the preceding screen, notice the total number of boards used when saving the cable file "RIBBON" was 3. At least 3 boards *must* be installed in the computer for testing to be possible.

ERROR MESSAGES WHILE READING

As shown below, trying to access an invalid drive will indicate that another selection is required. (In this case, Drive “I:” is not installed in the Personal Computer).



Other errors may occur when trying to read in a file. Some of these problems are as follows:



This error possibly indicates that an Operating System not compatible with the Model 100-PT. software may be in use by the Personal Computer.

Only files ending in a (.CBL) extension are valid cable files. In the event that a file is defective, reading the cable data into memory is impossible.

Choosing Item #2 from the DISK FILE OPERATIONS SUB-MENU permits the WRITING of cable files to "Hard Drives."

To Write A Cable File To Disk:

ENTER DRIVE:
Select a valid hard drive to store the cable file.

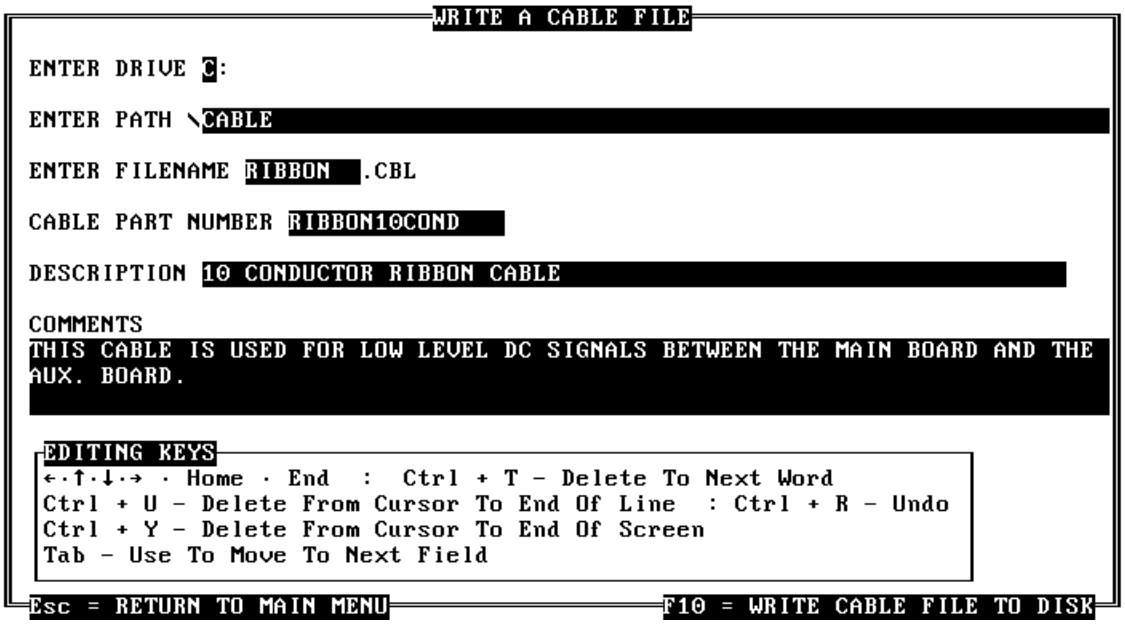
ENTER PATH:
The selected path must be an existing one. The software will not create a new directory.

ENTER FILENAME:
Choose a name up to 8 characters in length.
("SAMPLE" and "CREATED" cannot be used for file names.)

CABLE PART NUMBER: **(Optional entry)**
You can assign your own *meaningful part number* to the cable.

DESCRIPTION: **(Optional entry)**

COMMENTS: **(Optional entry)**



The previous screen is an example of a correctly filled in screen. We can now proceed to save a cable file and write it to disk. In the event that the user is rewriting a file that was previously read in from disk, the existing data that was previously read in will appear on the screen. This information can be edited to create a new cable file or overwrite the existing file. (Refer to "EDITING KEYS" legend at the bottom of the previous view). "Escape" will return you to the Main Menu. The Function key *"F10" must be pressed to write the new cable file to disk!*

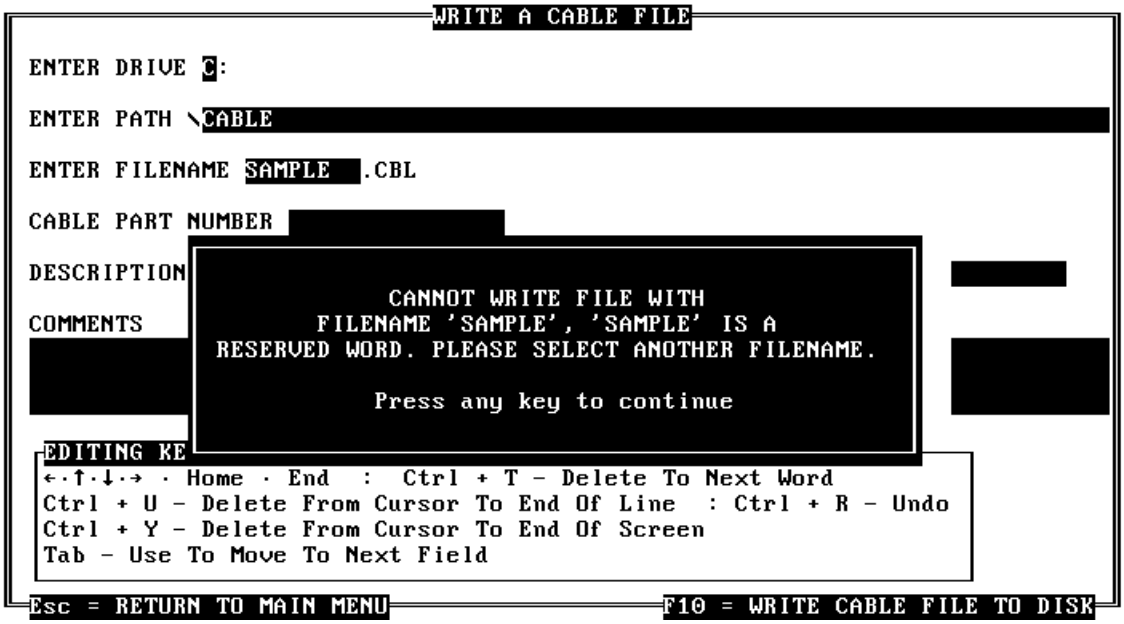
If the user attempts to overwrite an existing file, this screen is shown:

Provided "YES" is selected, the following message will appear:

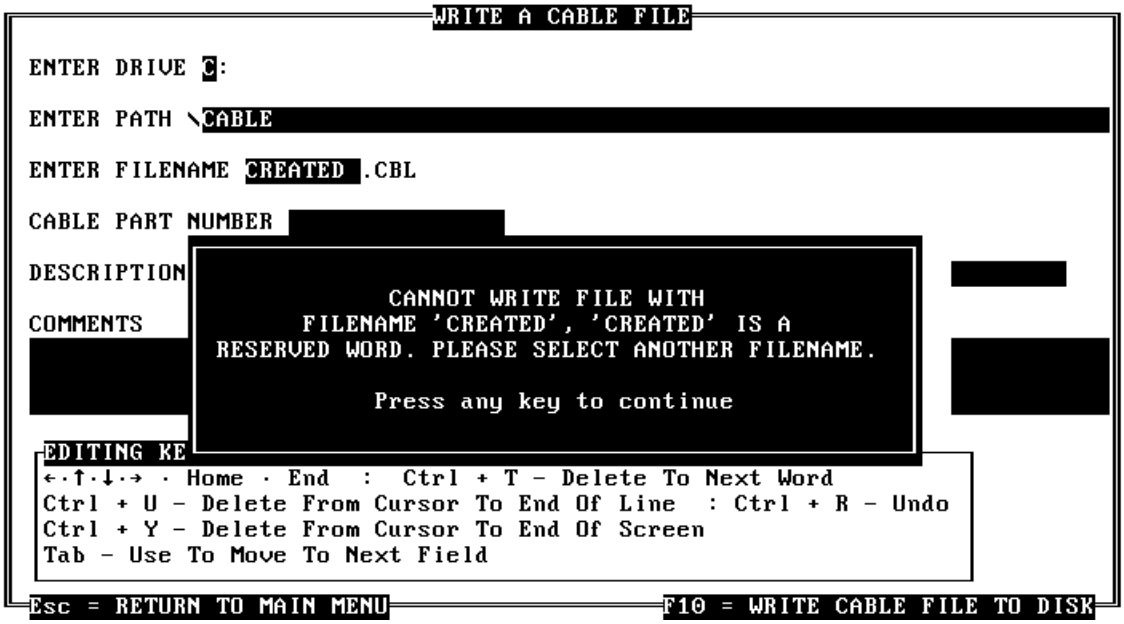
If "NO" is chosen, you will be returned to the "DISK FILE OPERATIONS SUB-MENU" screen.

ERROR MESSAGES WHEN WRITING TO DISK

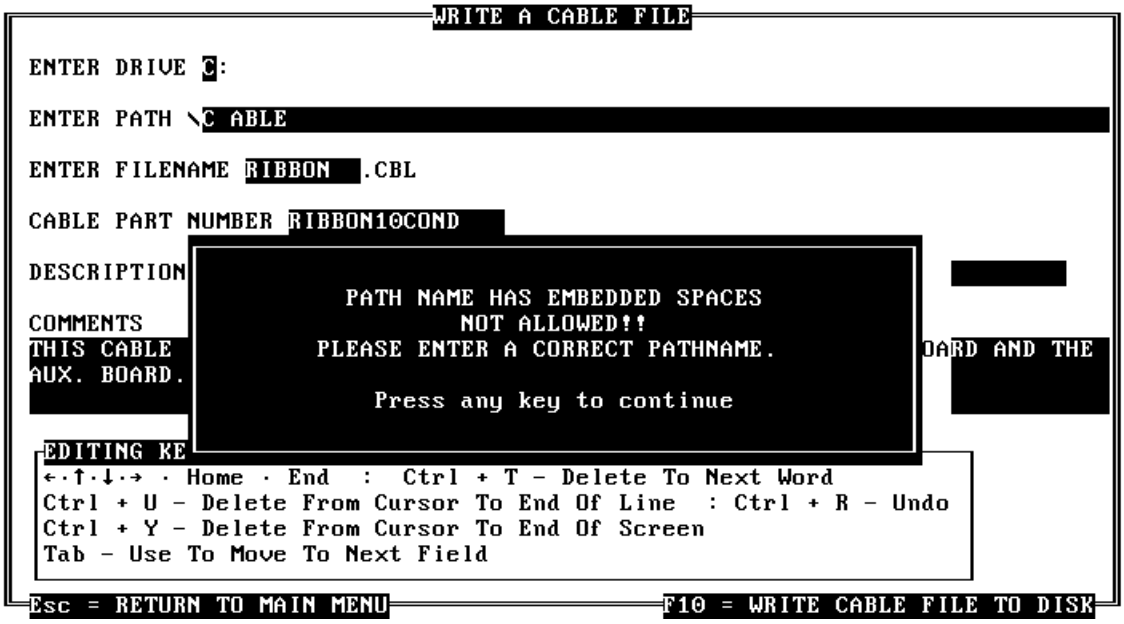
As shown below, in the event that no cable name was given when a sample cable was read in, the filename “SAMPLE” will automatically be displayed. This name is not allowed for cable files and must be changed. If you attempt to write this file, the following error will be displayed:



"CREATED" is another word reserved by the Model 100-PT. program that will show up if a net list was created but no name was given. A similar error screen will be displayed as when "SAMPLE" was used for a filename as shown below:

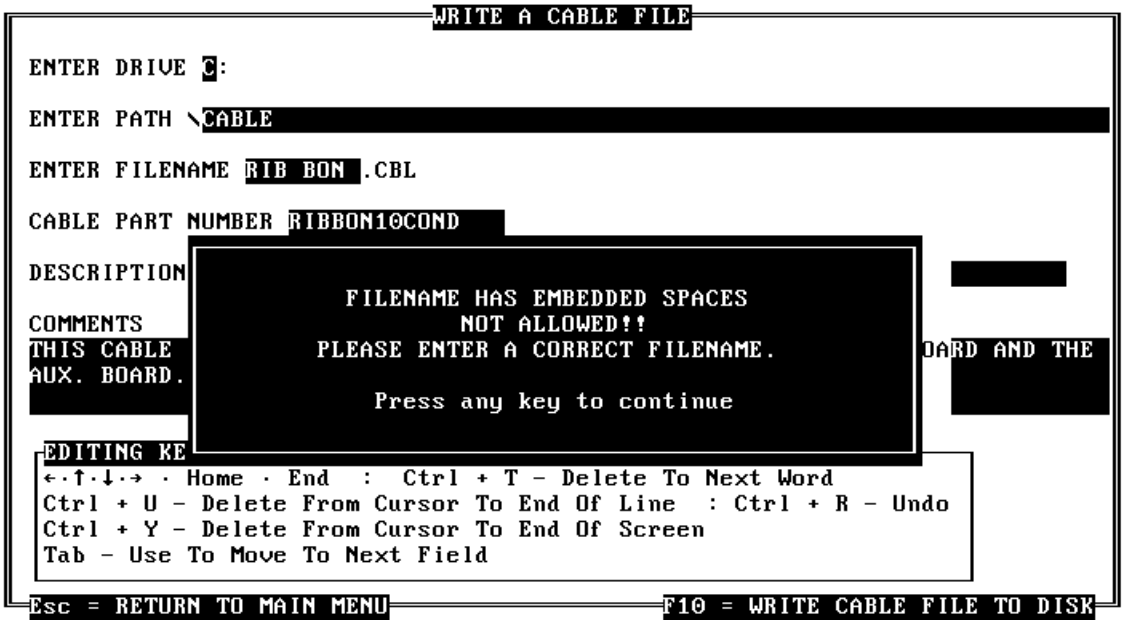


The term "CREATED" represents the default cable filename assigned when generating a net list using the “NET LIST CREATE” function.

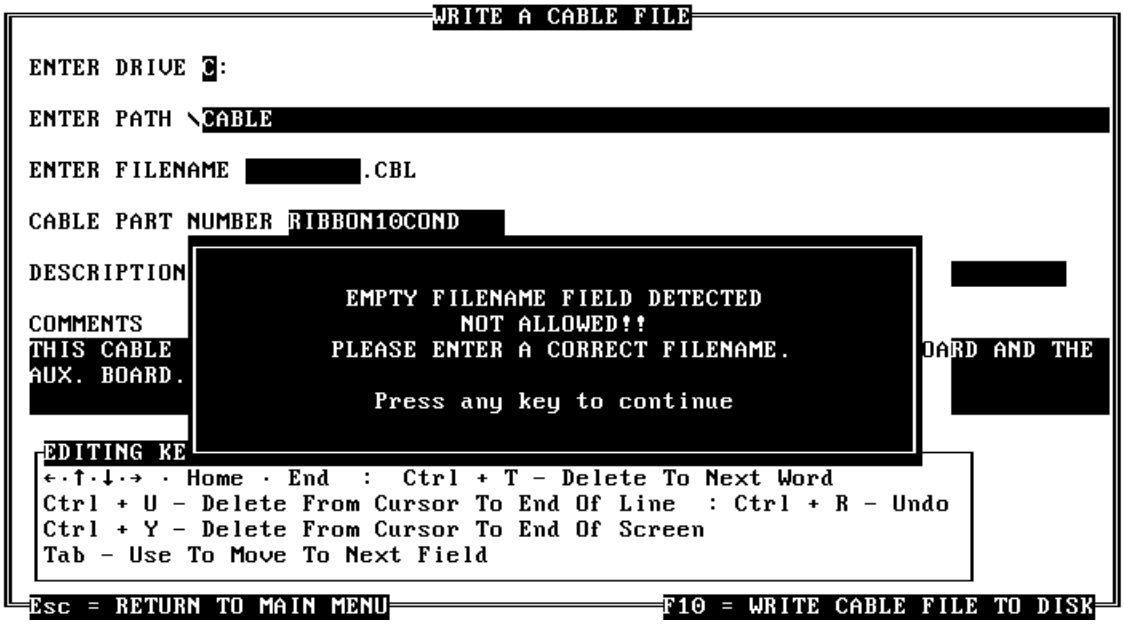


As shown above, blank spaces within the "Path Name" are not permitted when writing a cable file. If the Path Name is not specified, the file will be written to the root directory of the selected drive.

Similarly, embedded spaces within the "Filename" are not acceptable. This message is shown in the next pictorial.

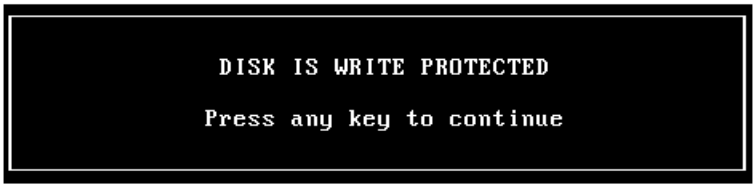


As shown below, the filename must be entered before writing to disk can take place!



The following error messages are the most commonly seen when saving a cable file to disk.

(The last 2 errors are usually associated with "Drives.")



(The above message is also usually associated with "Drives.")

The error shown above means that testing will be only be possible provided more Model 100-PT. Boards are installed in the Personal Computer. To determine the number of boards used to save this file, refer to the *"Current File Information"* screen. This screen can be accessed by selecting Option #1 (Read Cable Data from Disk), found under the "Disk File Operations Sub-Menu".

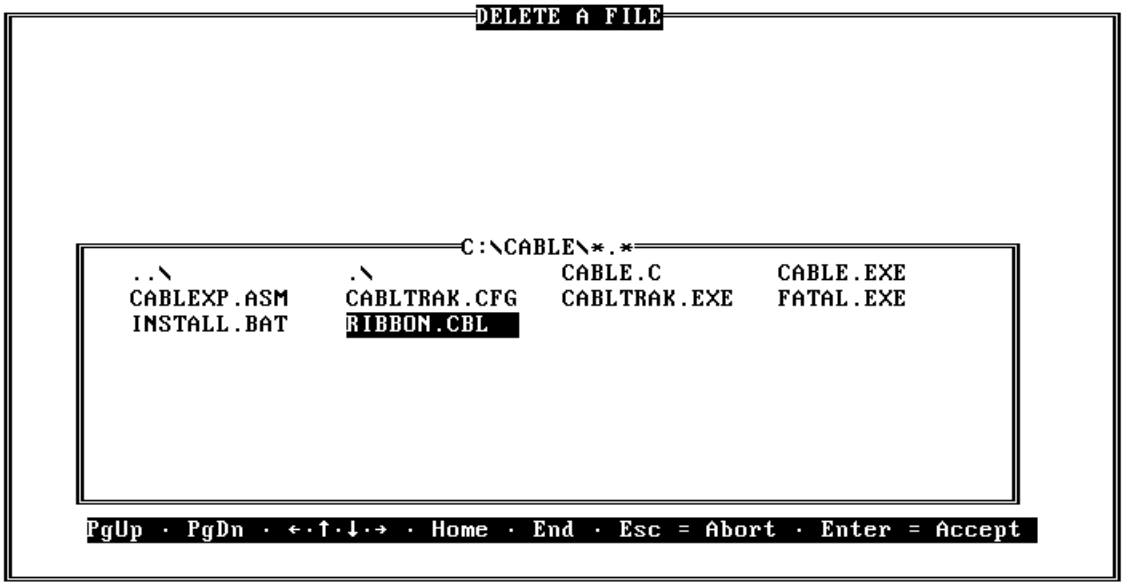
This will appear if the user attempts to *READ FROM* or *WRITE TO* **DOS** System, Hidden, or Read-Only Files. *Only files with the extension (.CBL) are valid cable files.*

Choosing Item #3 **from the DISK FILE OPERATIONS SUB-MENU permits the DELETING of cable files.**

Warning: Delete **ONLY** files ending in the extension (.CBL) which are cable data files.

To Delete A File:

Select A Valid Disk Drive as shown above:



Select File from Root Directory or from Sub-Directory as shown above:

You will then be Prompted to “Verify Delete" as shown above:

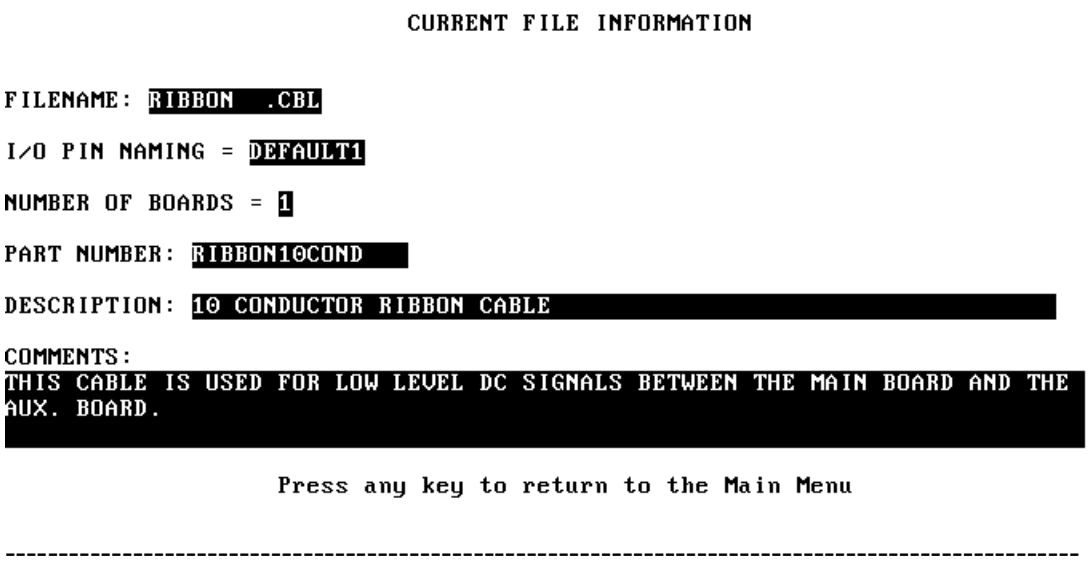
As Deletion Process Takes Place, the above message will appear:

...And Verification of Completion of Process will show this final message above:

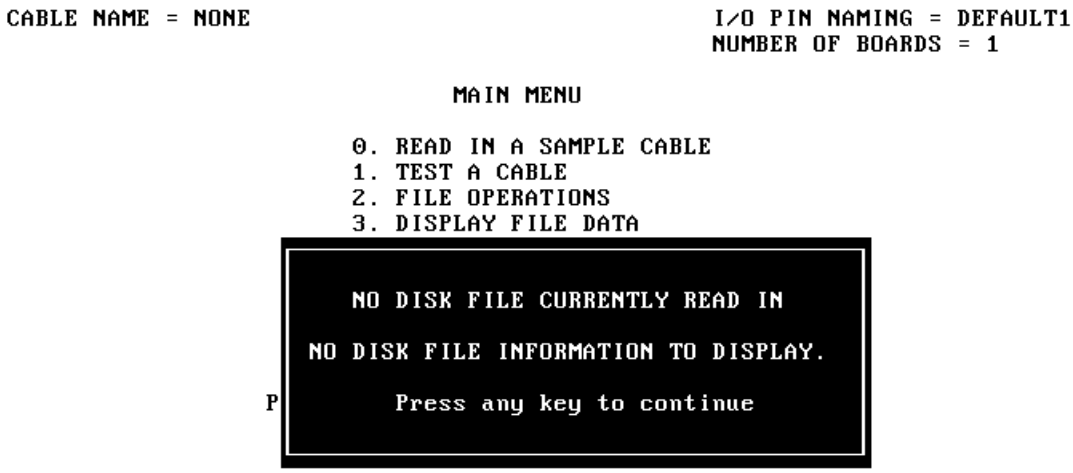
The above error message will be displayed if the user attempts to delete certain types of files *usually* related to the operating system.

3. DISPLAY FILE DATA

Provided that a cable file has already been read in from disk, the current cable file data information as shown below will be displayed by selecting Item #3 from the Main Menu.



In the event that the user did not first read in a cable file from disk, the next screen will be shown.



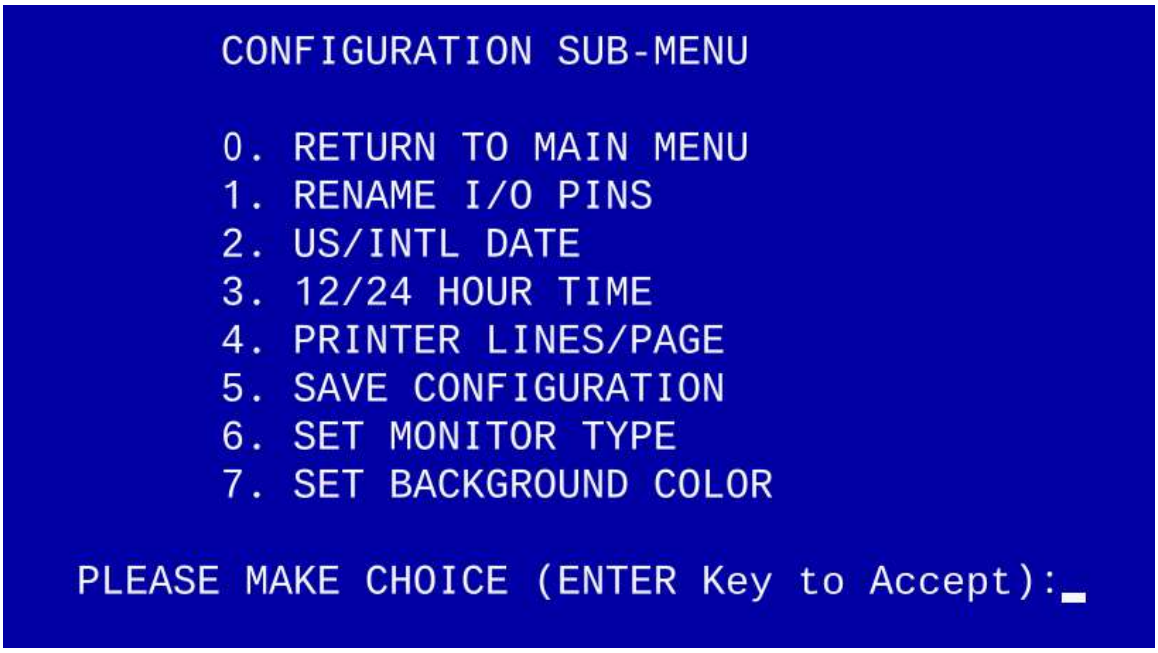
4. LOCATE A WIRE

Selecting Item #4 from the Main Menu causes the following message to appear on the bottom line of the screen.

The ground probe is a unique feature of the Model 100-PT. in that the probe enables the user to determine the pin # of a specific wire in a harness or cable by touching the probe to any connector pin. The ground probe can be hooked up to either the Connector Box, (optional), or directly to the Adapter Board that is connected to the rear of the Model 100-PT. Printed Circuit Board. The pin #'s of the wire or pin touched with the probe will be displayed. Up to 160 points can be simultaneously displayed.

5. CONFIGURATION

Selecting Item *#5* from the Main Menu opens up the *Configuration Sub-Menu as shown below:*



NOTE 1: *If a true Monochrome Monitor is connected to the system, selections #6 & #7 will not appear.*

NOTE 2: *If monitor type is set to Gray Scale by the user or configuration file, selection #7 will not appear.*

Choosing Item #1 **(RENAME I/O PINS), from the CONFIGURATION SUB-MENU will open up the following screen:**

```
        SELECT I/O PIN NAMING CONVENTION

0. I/O Pins named J1 to J100 (J400) [DEFAULT0]

1. I/O Pins named J1-1 to J1-50
                  J2-1 to J2-50 etc. [DEFAULT1]

2. User Selected Pin Naming
3. User Selected Label Naming
4. User Selected Pin & Label Naming
5. Return to Config Menu

PLEASE MAKE CHOICE (ENTER Key to Accept):
```

0. I/O Pins named J1 to J100 (J300) [DEFAULT0]

J300 represents all boards installed in the Personal Computer. (4 Boards * 100 Points per Board.)

1. I/O Pins named J1-1 to J1-50 J2-1 to J2-50, etc. [DEFAULT1]

NOTE:

THE DEFAULT0 OR DEFAULT1 MESSAGES WILL BE DISPLAYED IN THE TOP RIGHT HAND CORNER OF THE MAIN MENU SCREEN.

****** DEFAULT1 IS THE MODEL 100-PT.'S SYSTEM DEFAULT ******

2. User Selected Pin Naming

The next screen shows how we are able to change a pin number assignment. In the example shown we first changed the overall pin numbers by selecting *Item #0* from the SELECT I/O PIN NAMING CONVENTION menu at the top of this page.

The Pin #001 was changed to ABC. The legend at the bottom of the screen shows how to move around the screen to edit any "PIN NO." field. *With this selection, only PIN NO. columns can be edited.* This selection helps prevent possible destruction of previously created "LABEL" fields by not allowing entry to those fields.

PIN NO. LABEL	PIN NO. LABEL	PIN NO. LABEL	PIN NO. LABEL	PIN NO. LABEL
PIN ABC	PIN 002	PIN 003	PIN 004	PIN 005
PIN 006	PIN 007	PIN 008	PIN 009	PIN 010
PIN 011	PIN 012	PIN 013	PIN 014	PIN 015
PIN 016	PIN 017	PIN 018	PIN 019	PIN 020
PIN 021	PIN 022	PIN 023	PIN 024	PIN 025
PIN 026	PIN 027	PIN 028	PIN 029	PIN 030
PIN 031	PIN 032	PIN 033	PIN 034	PIN 035
PIN 036	PIN 037	PIN 038	PIN 039	PIN 040
PIN 041	PIN 042	PIN 043	PIN 044	PIN 045
PIN 046	PIN 047	PIN 048	PIN 049	PIN 050
PIN 051	PIN 052	PIN 053	PIN 054	PIN 055
PIN 056	PIN 057	PIN 058	PIN 059	PIN 060
PIN 061	PIN 062	PIN 063	PIN 064	PIN 065
PIN 066	PIN 067	PIN 068	PIN 069	PIN 070
PIN 071	PIN 072	PIN 073	PIN 074	PIN 075
PIN 076	PIN 077	PIN 078	PIN 079	PIN 080
PIN 081	PIN 082	PIN 083	PIN 084	PIN 085
PIN 086	PIN 087	PIN 088	PIN 089	PIN 090
PIN 091	PIN 092	PIN 093	PIN 094	PIN 095
PIN 096	PIN 097	PIN 098	PIN 099	PIN 100

↑↓→← = Cursor Control/SHIFT+TAB = Previous Field/TAB = Next Field
PAGE UP =Previous Page/PAGE DOWN = Next Page/HOME = Home Cursor/ESC = Exit

---

3. User Selected Label Naming

Allows editing of "LABEL" columns without worrying about inadvertent overwriting of "PIN NO.'s." These labels can be wire colors, signal names, etc.

4. User Selected Pin and Label Naming

Allows both "PIN NO." and "LABEL" columns to be edited at the same time.

Both of these options are exemplified in the following screen:

PIN NO. LABEL	PIN NO. LABEL	PIN NO. LABEL	PIN NO. LABEL	PIN NO. LABEL
PIN ABC +5 VOLT	PIN 002	PIN 003	PIN 004	PIN 005
PIN 006	PIN 007	PIN 008	PIN 009	PIN 010
PIN 011	PIN 012	PIN 013	PIN 014	PIN 015
PIN 016	PIN 017	PIN 018	PIN 019	PIN 020
PIN 021	PIN 022	PIN 023	PIN 024	PIN 025
PIN 026	PIN 027	PIN 028	PIN 029	PIN 030
PIN 031	PIN 032	PIN 033	PIN 034	PIN 035
PIN 036	PIN 037	PIN 038	PIN 039	PIN 040
PIN 041	PIN 042	PIN 043	PIN 044	PIN 045
PIN 046	PIN 047	PIN 048	PIN 049	PIN 050
PIN 051	PIN 052	PIN 053	PIN 054	PIN 055
PIN 056	PIN 057	PIN 058	PIN 059	PIN 060
PIN 061	PIN 062	PIN 063	PIN 064	PIN 065
PIN 066	PIN 067	PIN 068	PIN 069	PIN 070
PIN 071	PIN 072	PIN 073	PIN 074	PIN 075
PIN 076	PIN 077	PIN 078	PIN 079	PIN 080
PIN 081	PIN 082	PIN 083	PIN 084	PIN 085
PIN 086	PIN 087	PIN 088	PIN 089	PIN 090
PIN 091	PIN 092	PIN 093	PIN 094	PIN 095
PIN 096	PIN 097	PIN 098	PIN 099	PIN 100

↑↓→← = Cursor Control/SHIFT+TAB = Previous Field/TAB = Next Field
PAGE UP =Previous Page/PAGE DOWN = Next Page/HOME = Home Cursor/ESC = Exit

Above we added the **LABEL** (+5 VOLT) as a description for the pin "ABC."

When exiting the RENAME PIN NO. or RENAME PIN NO. and LABEL screens using the “ESC” key, the following error message may appear. The following screen shows that a Pin No. field has been left blank causing the error message to appear. Empty Pin No. fields are not allowed.

PIN NO. LABEL	PIN NO. LABEL	PIN NO. LABEL	PIN NO. LABEL	PIN NO. LABEL
	J1-02	J1-03	J1-04	J1-05
J1-06	J1-07	J1-08	J1-09	J1-10
J1-11	J1-12	J1-13	J1-14	J1-15
J1-16	J1-17	J1-18	J1-19	J1-20
J1-21	J1-22	J1-23	J1-24	J1-25
J1-26	J1-27	J1-28	J1-29	J1-30
J1-31	J1-32	J1-33	J1-34	J1-35
J1-36	J1-37	J1-38	J1-39	J1-40
J1-41	J1			J1-45
J1-46	J1			J1-50
J2-01	J2			J2-05
J2-06	J2			J2-10
J2-11	J2			J2-15
J2-16	J2			J2-20
J2-21	J2			J2-25
J2-26	J2-27	J2-28	J2-29	J2-30
J2-31	J2-32	J2-33	J2-34	J2-35
J2-36	J2-37	J2-38	J2-39	J2-40
J2-41	J2-42	J2-43	J2-44	J2-45
J2-46	J2-47	J2-48	J2-49	J2-50

BLANK PIN NAME DETECTED. NOT ALLOWED !!

Press any key to continue

↑↓→← = Cursor Control/BACKSPACE = Previous Field/TAB = Next Field
PAGE UP =Previous Page/PAGE DOWN = Next Page/HOME = Home Cursor/ESC = Exit

---

5. Return to Config. Menu

In the event that the user wants to keep the changes that were made regarding the Pin Naming and Label Naming, verification is required when “RETURN TO CONFIG. MENU” is selected.

This is shown below:

```
SELECT I/O PIN NAMING CONVENTION

0. I/O Pins named J1 to J100 (J400) [DEFAULT0]

1. I/O Pins named J1-1 to J1-50
                  J2-1 to J2-50 etc. [DEFAULT1]

   WARNING! YOU ARE ABOUT TO OVERWRITE

   PREVIOUSLY SELECTED I/O PIN NAMES AND LABELS.

ARE YOU SURE YOU WANT TO SELECT NEW NAMES [Y/N]?
```

*** *Choosing Item #2* (US / INTL. DATE), from** CONFIGURATION SUB-MENU:

```
DATE PRINTOUT TYPE SELECTION

 0. USA STANDARD   (mm/dd/yy)
 1. INT'L STANDARD (dd/mm/yy)

PLEASE MAKE CHOICE (ENTER Key to Accept):0
```

Example: July 1, 1995
0. USA STANDARD (i.e.: 07/01/95)
1. INT'L STANDARD (i.e.: 01/07/95)

*** *Choosing Item #3* (12/24 HOUR TIME), from** CONFIGURATION SUB-MENU:

```
TIME PRINTOUT SELECTION

   0. 12 HOUR CLOCK
   1. 24 HOUR CLOCK

PLEASE MAKE CHOICE (ENTER Key to Accept):0
```

0. 12 HOUR CLOCK (i.e.: 3:30 P.M.)
1. 24 HOUR CLOCK (i.e.: 15:30 HOURS)

*** NOTE: These selections only affect the header during printer operations.**

***Choosing Item #4* (PRINTER LINES / PAGE), from CONFIGURATION SUB-MENU**:

```
NUMBER OF PRINTER LINES PER PAGE

ENTER THE LINES/PAGE FROM 10-82

Enter Selection and ESCAPE to exit: 61
```

Select the desired number of lines per page. *(Default = 61 lines.)*

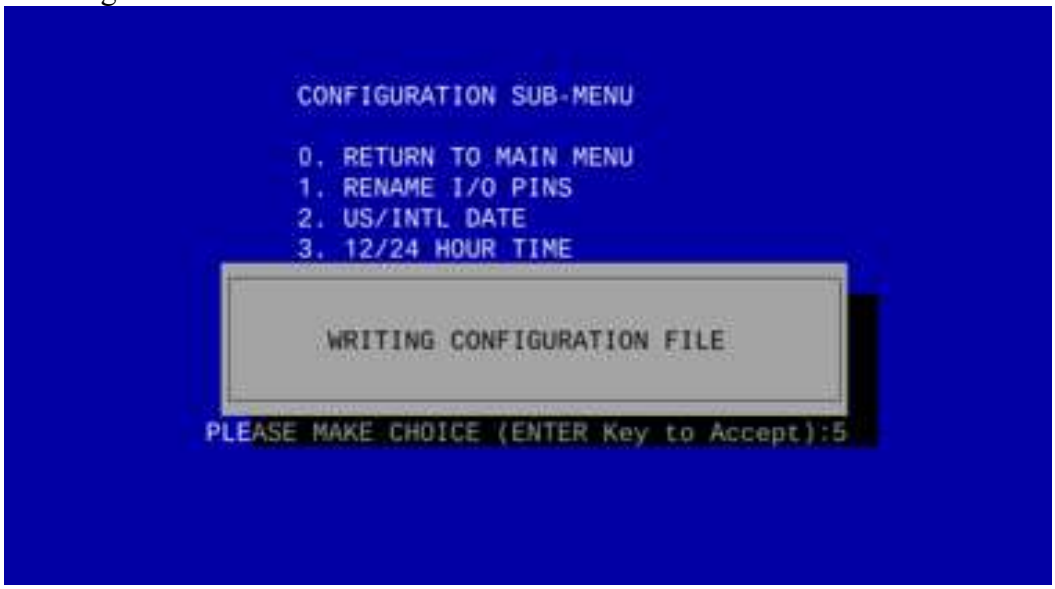
If the chosen number is outside the allowable range, the following screen will appear:

```
NUMBER OF PRINTER LINES PER PAGE

ENTER THE LINES/PAGE FROM 10-82

Enter Selection and ESCAPE to exit: 83
```

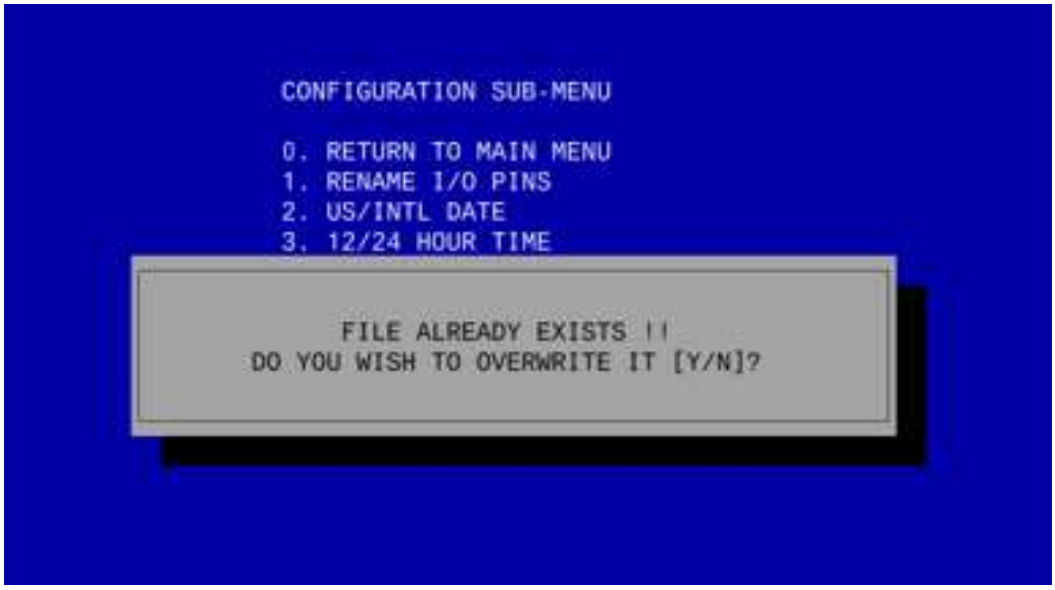
```
VALUE TOO LARGE - REENTER DATA
   Press any key to continue
```

Choosing Item #5 **(SAVE CONFIGURATION), from CONFIGURATION SUB-MENU**:

The *Configuration File* consists of *all data gather from the Configuration Sub-Menu.* This file can be written and will be read when starting the Model 100-PT. System software. *If this file is not written, all default settings will be activated* when starting the program. The file itself is given a (.CFG) extension and is automatically placed in the directory that you were in when the cable program was loaded. It is also only checked for in the directory you were in when the cable program was loaded. The following screen is shown when writing the Configuration File.



If the Configuration File already exists the user will get the following message.



The following message appears if you choose to overwrite the existing Configuration File.

When selecting not to overwrite the Configuration File, the program bounces back to the Configuration Menu.

NOTE:

Items #6 and #7 will not be available if a true Monochrome Monitor is connected to the system.

Choosing Item #6 (SET MONITOR TYPE), from CONFIGURATION SUB-MENU:

```
MONITOR TYPE SELECTION

0. GRAY SCALE MONITOR
1. COLOR MONITOR

PLEASE MAKE CHOICE (ENTER Key to Accept):1
```

Choosing Item #7 (SET BACKGROUND COLOR), from CONFIGURATION SUB-MENU:

```
BACKGROUND COLOR SELECTION

0. BLACK
1. BLUE
2. GREEN
3. CYAN
4. RED
5. MAGENTA
6. BROWN

PLEASE MAKE CHOICE (ENTER Key to Accept):1
```

NOTE:

If Item #6 above is selected as a Gray Scale monitor, this item will have no effect and will not be displayed.

6. VIEW/EDIT/CREATE CABLE NET

Selecting Item #6 from the **Main Menu** reveals the following screen:

```
NET LIST OPERATIONS

0. Return to Main Menu
1. Display / Print Net List
2. Edit Current Net List
3. Create New Net List

PLEASE MAKE CHOICE (ENTER Key to Accept):
```

Choosing Item #1 **(DISPLAY / PRINT NET LIST), from NET LIST OPERATIONS MENU**:

Selecting this item shows...

```
0. Return to Main Menu
1. Display Net List
2. Print Net List

PLEASE MAKE CHOICE (ENTER Key to Accept):
```

If Selection #1, “Display Net List” is selected, the following screen will be displayed:

```
FROM PIN#  LABEL            TO PIN#    LABEL                    PAGE = 0001
-------------------------------------------------------------------------------
 J1-01            ————————   J2-01
 J1-02            ————————   J2-02
 J1-03            ————————   J2-03
 J1-04            ————————   J2-04
 J1-05            ————————   J2-05
 J1-06            ————————   J2-06
 J1-07            ————————   J2-07
 J1-08            ————————   J2-08
 J1-09            ————————   J2-09
 J1-10            ————————   J2-10

          Press PAGEUP for previous page, ESC to return to MAIN MENU
```

If a “Read in Sample Cable” has been done, but no cable was connected to the unit, the following screen appears:

```
CABLE COMPLETELY OPEN, NO NET LIST TO DISPLAY!!

Press any key to return to the Main Menu
```

If no cable has been Read in, the following screen appears:

```
NO CABLE HAS BEEN READ IN YET - Press any key to return to the MAIN MENU
```

If selection #2, “Print Net List” is selected, the following will be displayed:

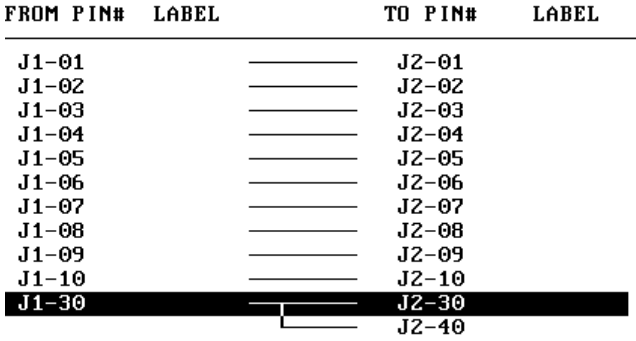
```
PRINTING IN PROGRESS - TYPE ANY KEY TO CANCEL PRINTING
```

IF AN ERROR IS ENCOUNTERED WHILE PRINTING, the following will be displayed:

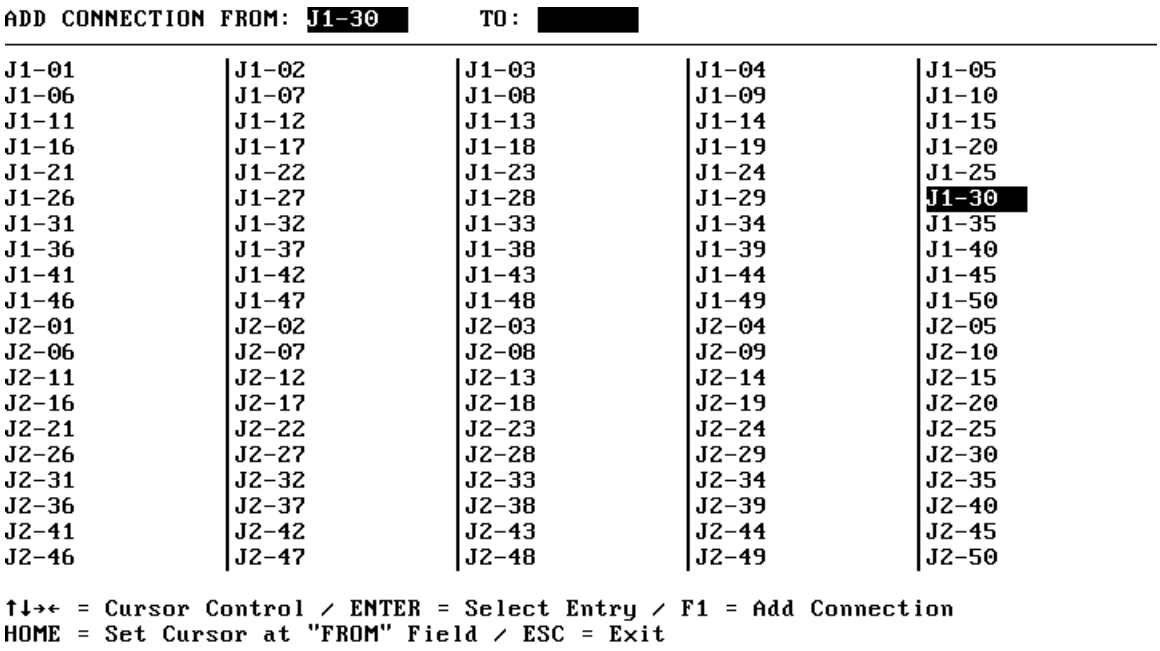
Ensure that your printer is on, it is connected to the PC, it has paper and it is on-line. Also, check that the correct port has been selected.

If a key is pressed to cancel printing, the following message will appear:

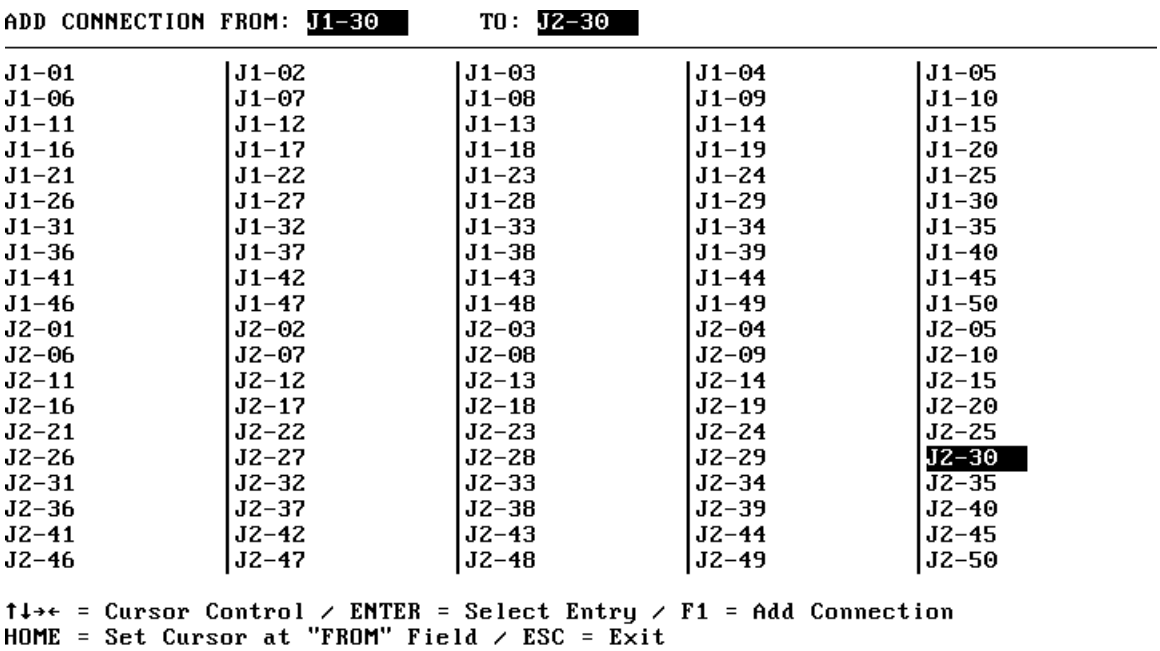
Choosing Item #2 **(EDIT CURRENT NET LIST), from NET LIST OPERATIONS MENU**:



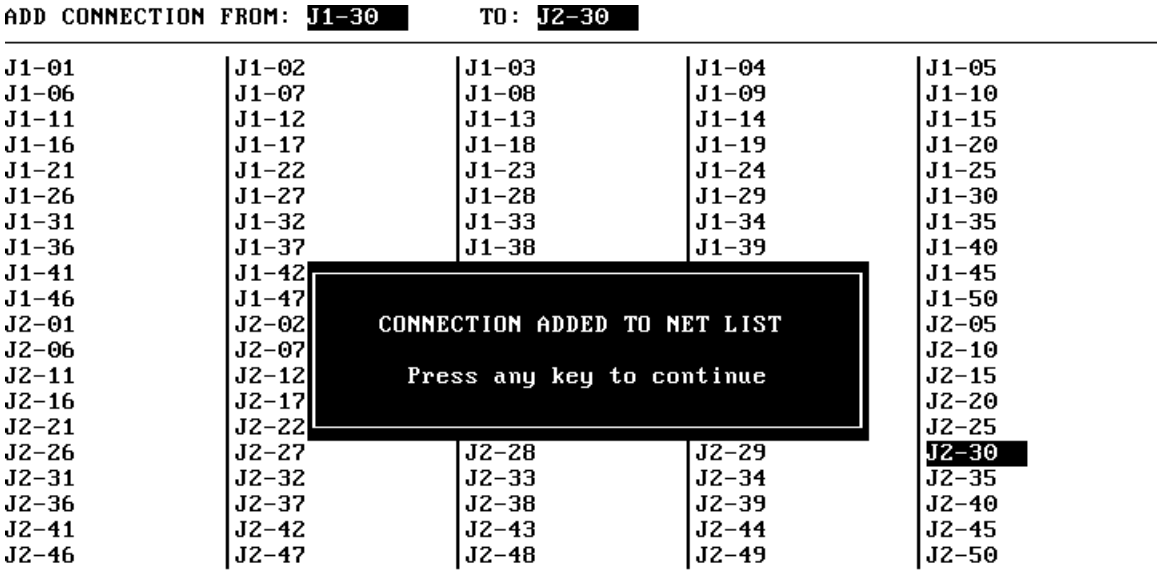
The previous screen displays our **"Sample"** 10 conductor ribbon cable that was read in either by using Item #0 "Read In A Sample Cable," or Item #2 "File Operations" from the Main Menu. However, after reading in our cable, we then modified the cable by adding connections to the existing cable or *"Editing the Current Net List.*" In the above example we added a connection between **J1-30 and J2-30 & J2-40**. To accomplish this, press *"F1"* which takes us to a screen that allows us to now add connections to the cable. Use the arrow key to highlight **J1-30** and press "*Enter*."



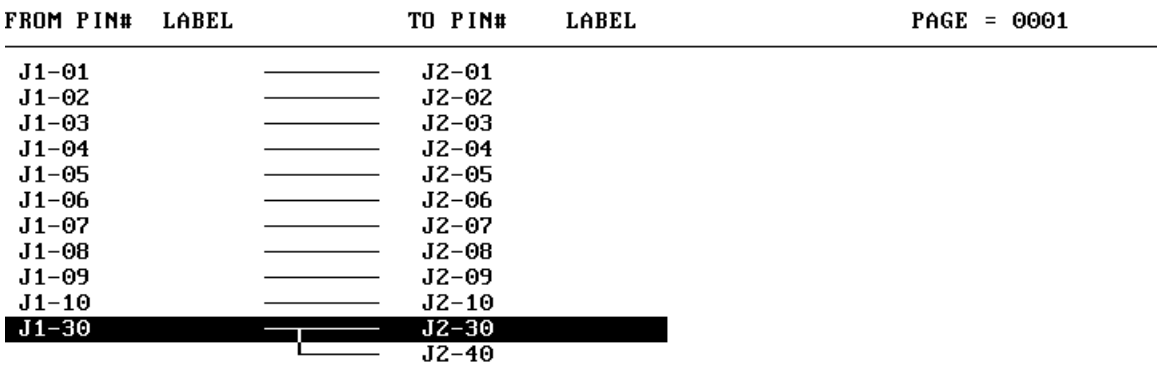
This selection now appears in the "*FROM:*" box at the top of the screen. Now, use the arrow key to move to the next pin to be added **(J2-30)** and press "*Enter*."



This selection now appears in the "*TO:"* box at the top-center of the screen as illustrated above. The next step is to press *"F1"* and add this connection to the "Net List" as well. The following screen now shows that both connections have been added to the list. **It is important to remember that selected connections *will not be added* unless "F1" is pressed!!!**



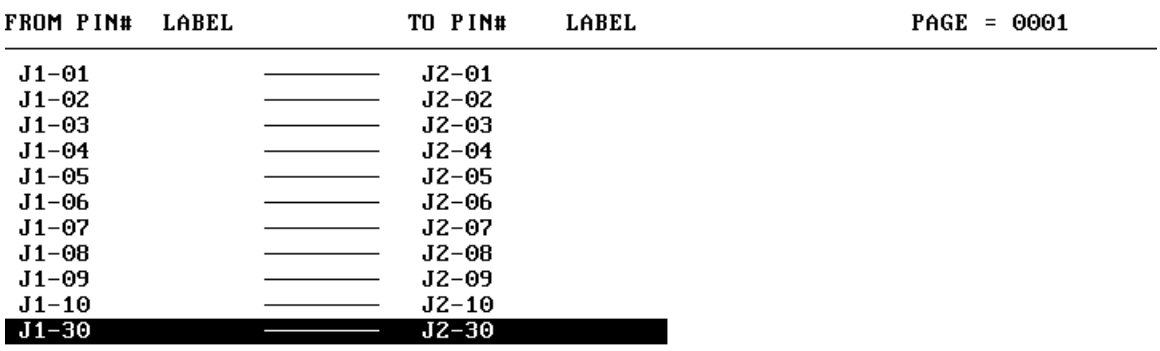
To add **J2-40** to the list, we arrow down to that pin and press *"Enter."* This connection is now displayed in the *"To:"* box at the top of the screen. Then press "F1" to add the connection. If we also need to change the *"From:"* field, the *"Home"* key will move the cursor back to the *"From:"* field if a different pin is required there also. After completing the additional connections, press *"ESC"* to exit.



NOTE:

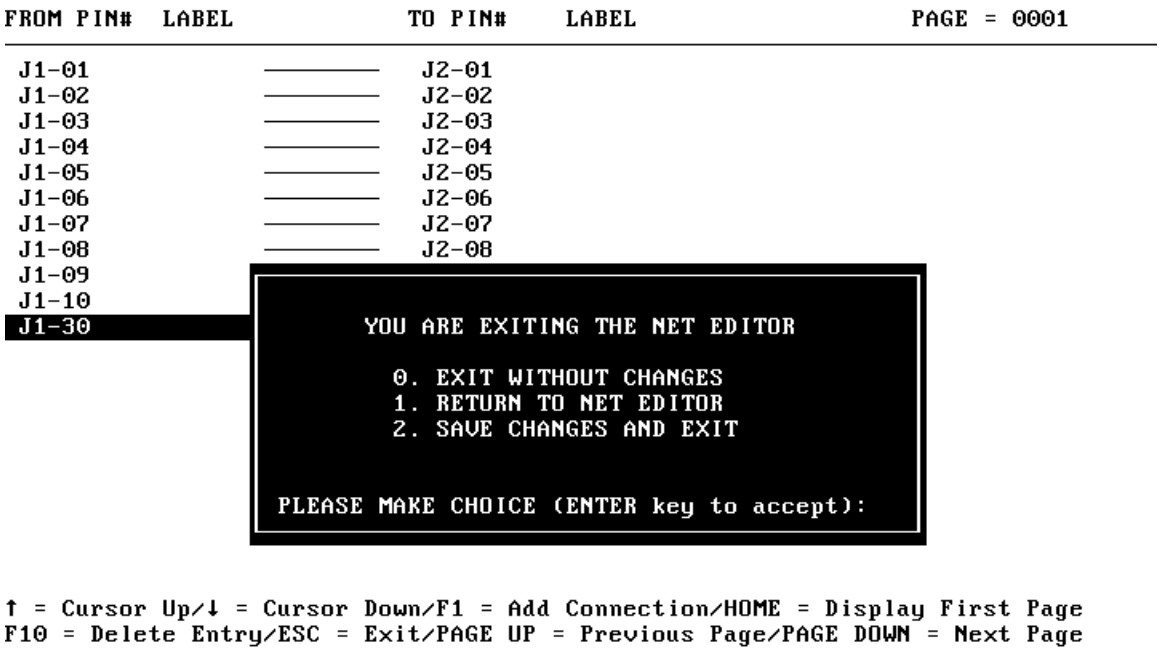
Always press *"F1"* to add connections to "Net List."

To Delete An Entry: Highlight the desired connection and press *"F10."* The connection will then be deleted as shown below:



*Above we have deleted the connection **J2-40**.*

To exit the "Editor," press "ESC." The following message will appear:



Select the appropriate item as required.

Item #0: Exits without changes. **(All changes will be lost!).**
Item #1: Returns to the editor for further changes.
Item #2: *Saves all existing changes to memory only!*

Note:

In order to save this file to disk, a "Write Net Command" must be executed.
To execute this command, select **Item #2 (FILE OPERATIONS)** from the **Main Menu** then select **Item #2 (WRITE CABLE DATA TO DISK)** from the **DISK FILE OPERATIONS SUB-MENU**. *If this command is not executed, cable data will reside in memory only and will be lost upon system shutdown.*

Provided that Item #2 (Save Changes and Exit) is selected, the word **"ALTERED"** flashes at the top of the **Main Menu** screen alerting the user that the cable has been modified. Note the following screen: (This will only occur if the data edited is from a file that was read in from Disk. It will not happen if data edited is from a Sample Cable!)

```
CABLE NAME = RIBBON.CBL        (ALTERED)          I/O PIN NAMING = DEFAULT1
                                                  NUMBER OF BOARDS = 1

                              MAIN MENU

                        0. READ IN A SAMPLE CABLE
                        1. TEST A CABLE
                        2. FILE OPERATIONS
                        3. DISPLAY FILE DATA
                        4. LOCATE A WIRE
                        5. CONFIGURATION
                        6. VIEW/EDIT/CREATE CABLE NET
                        7. TEST FOR INTERMITTENTS
                        8. DATA LOGGER OPERATIONS
                        9. EXIT TO DOS

                    PLEASE MAKE CHOICE (ENTER Key to Accept):
```

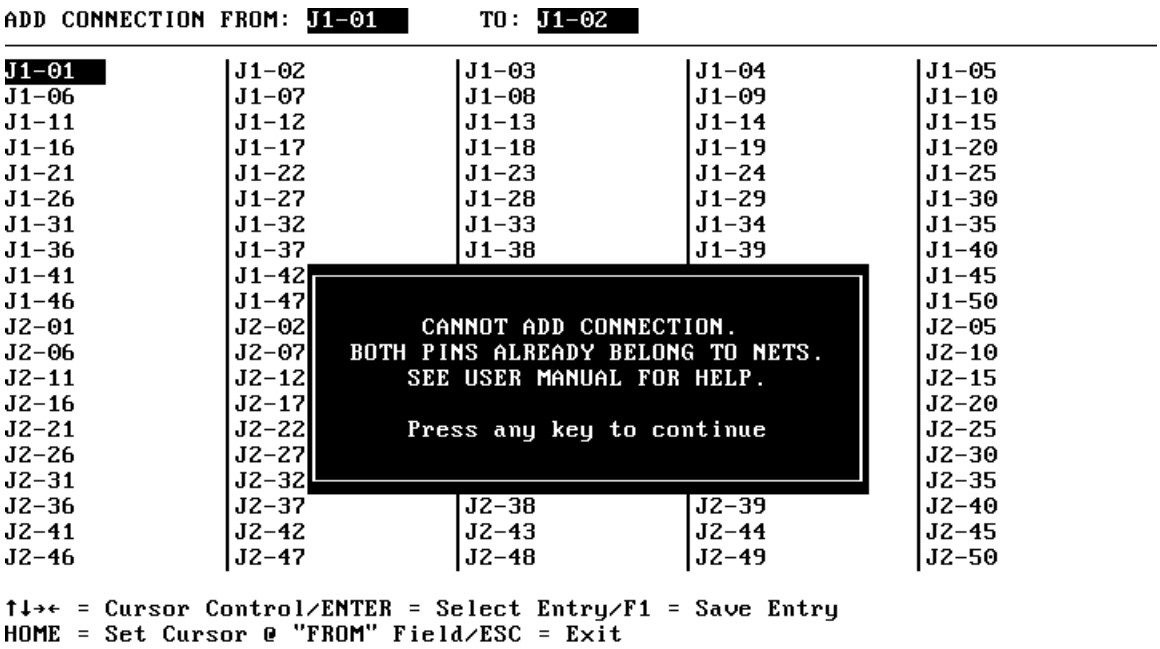
The next two screens show some common errors that may be encountered during the "Edit Current Net List and Create New Net List" operations.

```
ADD CONNECTION FROM:        TO:
```

J1-01	J1-02	J1-03	J1-04	J1-05
J1-06	J1-07	J1-08	J1-09	J1-10
J1-11	J1-12	J1-13	J1-14	J1-15
J1-16	J1-17	J1-18	J1-19	J1-20
J1-21	J1-22	J1-23	J1-24	J1-25
J1-26	J1-27	J1-28	J1-29	J1-30
J1-31	J1-32	J1-33	J1-34	J1-35
J1-36	J1-37	J1-38	J1-39	J1-40
J1-41	J1-42			J1-45
J1-46	J1-47			J1-50
J2-01	J2-02			J2-05
J2-06	J2-07			J2-10
J2-11	J2-12			J2-15
J2-16	J2-17			J2-20
J2-21	J2-22			J2-25
J2-26	J2-27	J2-28	J2-29	J2-30
J2-31	J2-32	J2-33	J2-34	J2-35
J2-36	J2-37	J2-38	J2-39	J2-40
J2-41	J2-42	J2-43	J2-44	J2-45
J2-46	J2-47	J2-48	J2-49	J2-50

```
'FROM' OR 'TO' FIELDS MISSING

Press any key to continue
```

```
↑↓→← = Cursor Control/ENTER = Select Entry/F1 = Save Entry
HOME = Set Cursor @ "FROM" Field/ESC = Exit
```



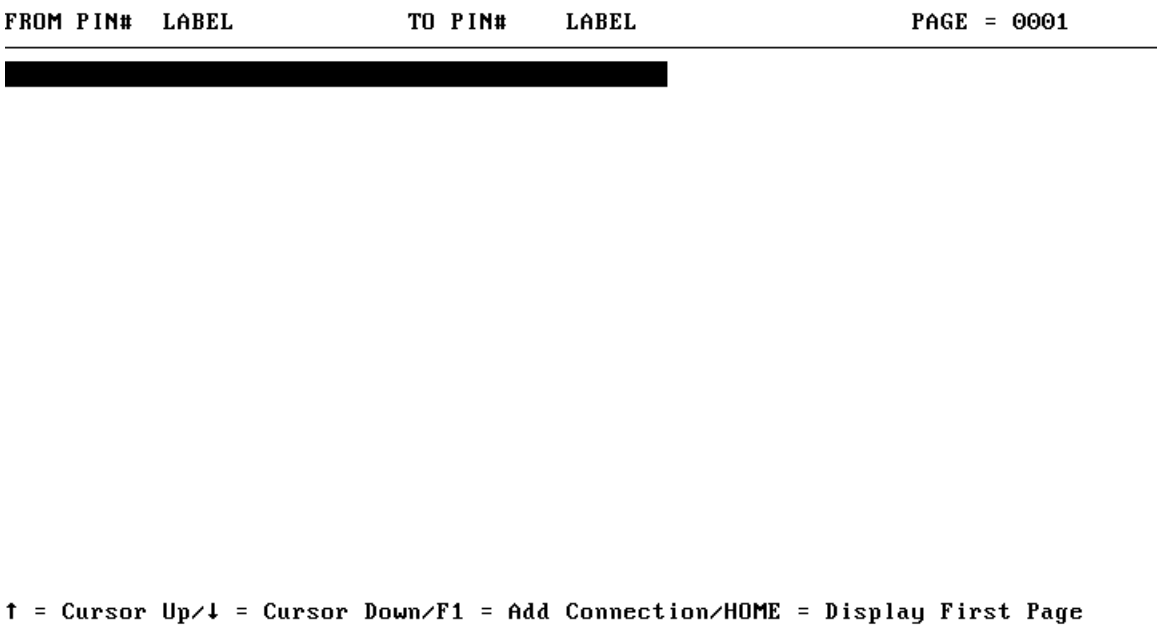
The above message means that both the pins that are currently selected to be added to the "Net List" are already connected in the existing cable.

You can only add unconnected pins to an already existing Net (previously connected pins.) If it is required to connect two Nets together, all the pins in the smallest Net would have to be deleted, then connected back to the other Net one by one.

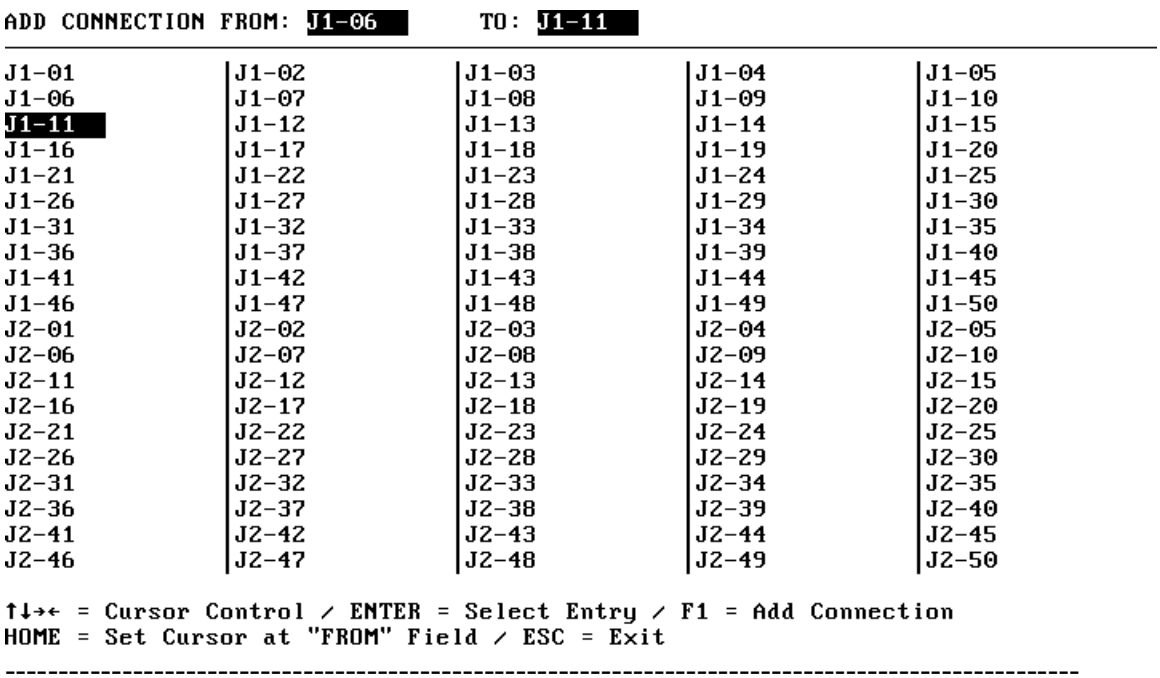
This page intentionally left blank.

Choosing Item #3 **(CREATE NEW NET LIST), from NET LIST OPERATIONS MENU**:

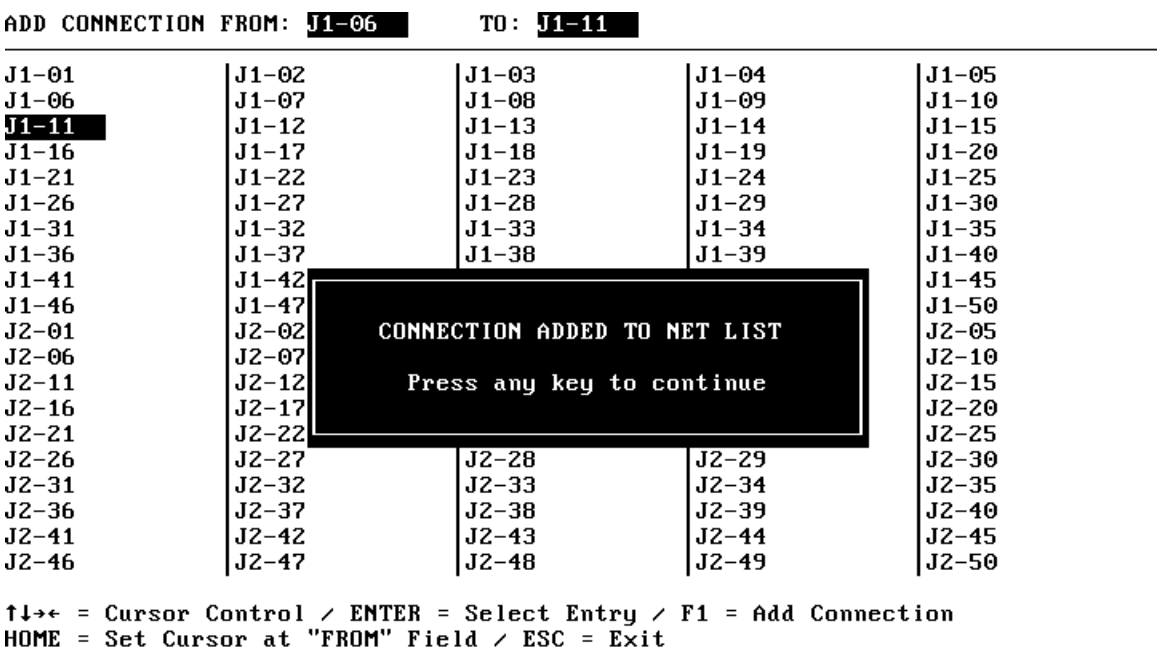
Item #3 works much in the same fashion as Option #2 (EDIT CURRENT NET LIST.) There are, however, a few differences that we will discuss. We will again use a "Sample" cable, only this time we will create the new cable by creating a "New Net List." The first screen shows that no cable data has been assigned yet.



Press *"F1"* to **add** a connection to the above list. We will add **J1-06** (highlight and press "Enter") & **J1-11** (highlight and press "Enter.") (Refer to the screen below.)

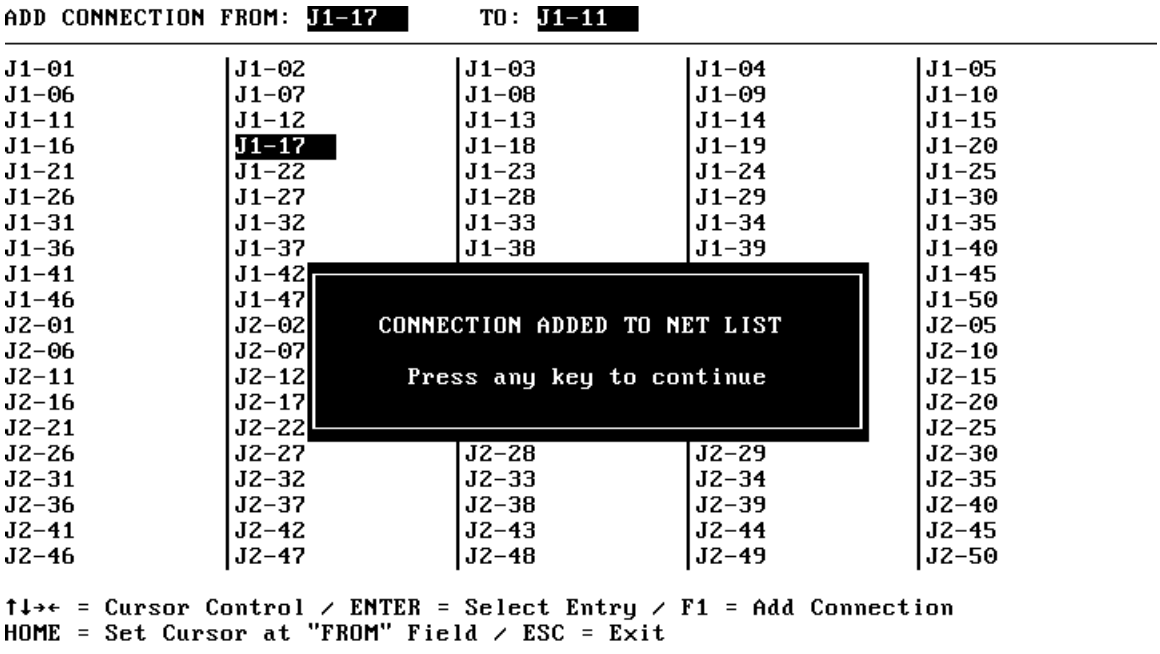


Then press *"F1"* to add the connection to the "Net List", the following message will appear:

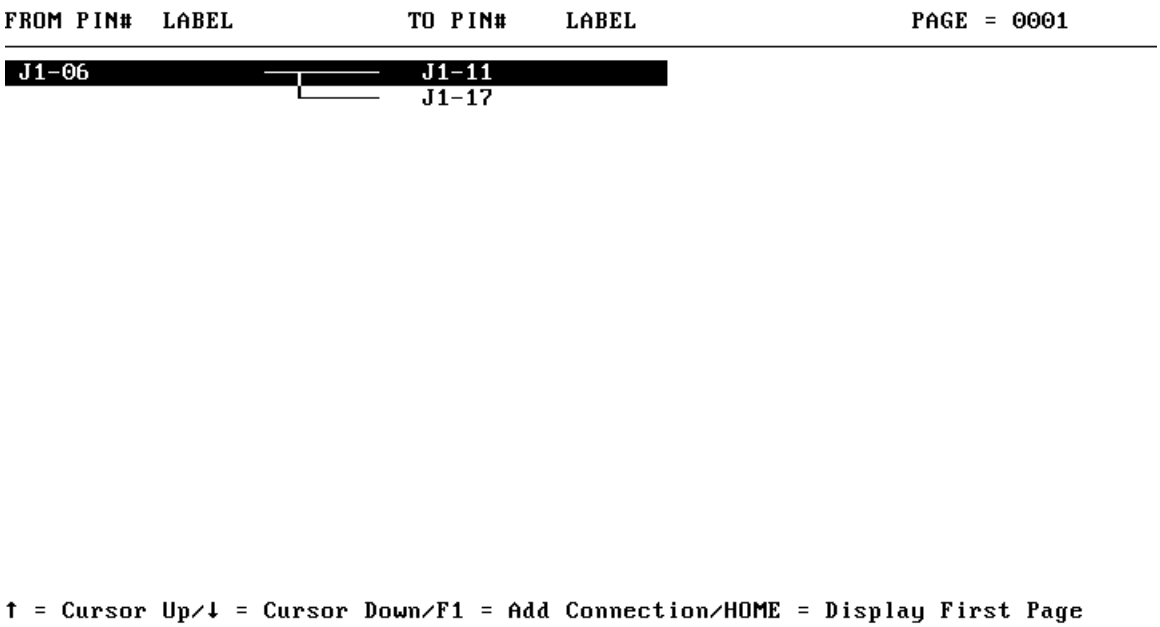


Now, press the "Home" key to return to the *"From:"* box and select pin **J1-17** and press *"F1"* to add this connection to the "Net List." (See next screen.)

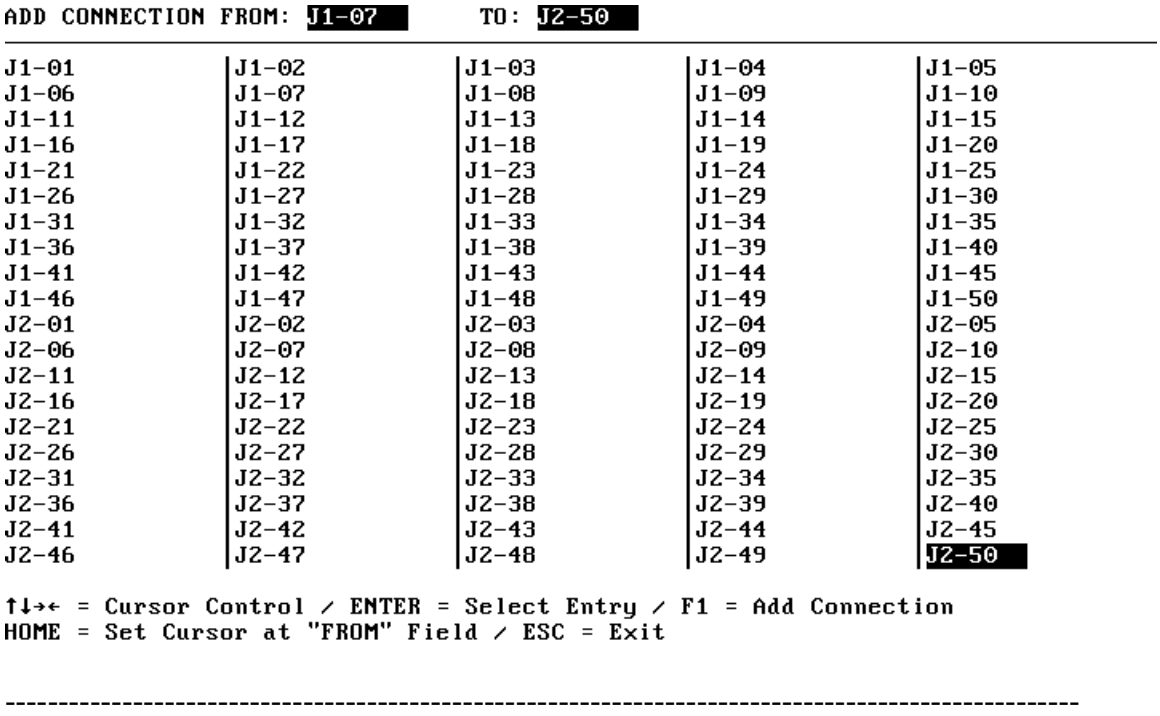
Remember, connections selected *will not be added* unless "F1" is pressed!!!



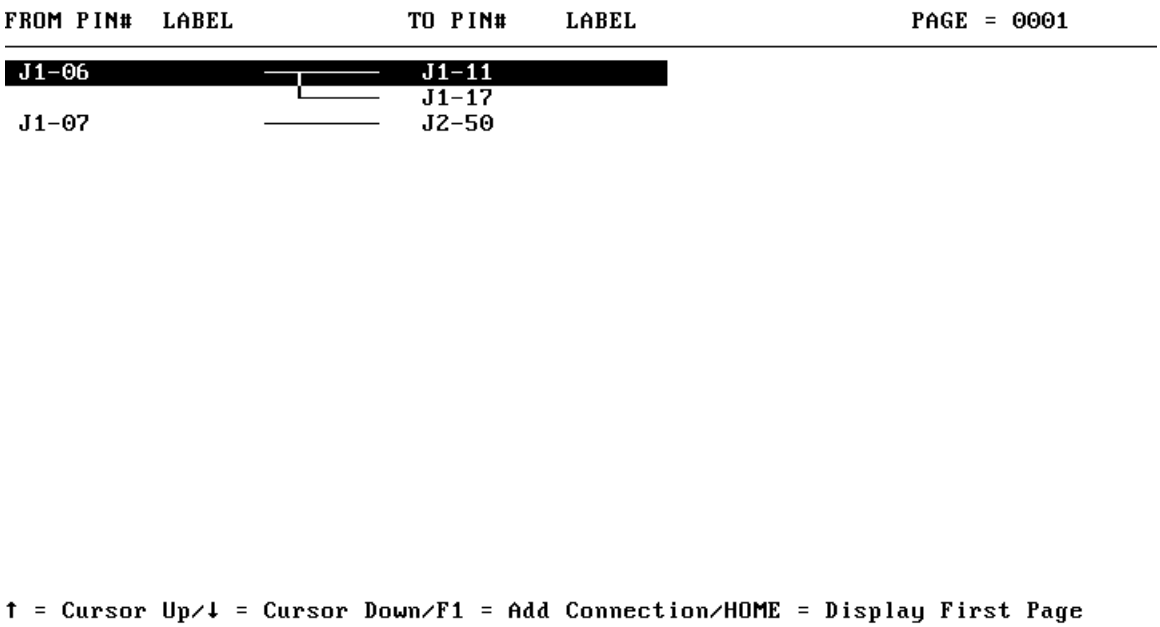
Press the *"ESC"* key to view the new "Net List."



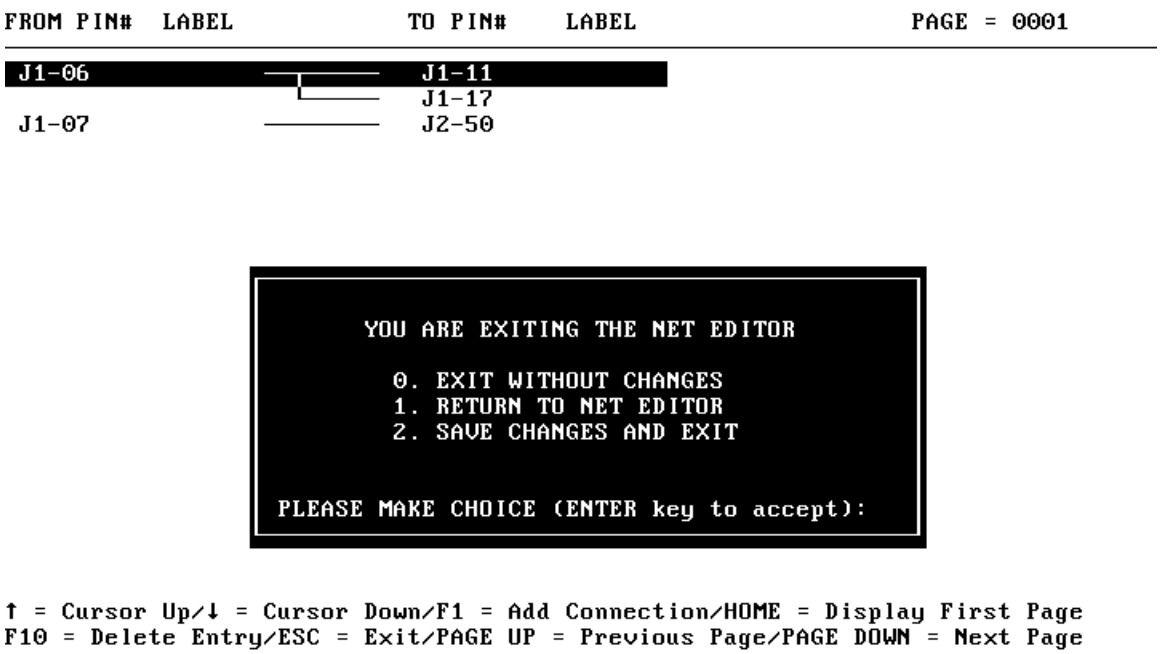
We'll add one more connection to the list by first pressing “F1” to go to the “Add Connection Screen” then selecting **J1-07** and **J2-50,** and then pressing *"F1"* to add this connection to the list too. (Shown Below.)



Hit *"ESC"* to once again view the output of the "Net List" as shown below:



We will now press "ESC" to leave the "Create New Net List" process. The following message will appear:



Select Item #2 **(SAVE CHANGES AND EXIT)**

Upon selection of Item #2, the following message will appear:

```
                              WARNING!!!!!

  NEW CABLE NAME IS NOT SAVED TO DISK UNLESS A WRITE NET COMMAND IS ISSUED!!

        Please Enter Cable Name (ENTER key to Accept, ESC to Abort)

                              >CREATED
```

The name **"CREATED"** should only be used when creating a cable if *the data will be read into memory only and not saved to disk. Otherwise, if it is intended to save this data to disk, a new name should be used as "CREATED" cannot be used as a filename to save to disk.*

```
                              WARNING!!!!!

  NEW CABLE NAME IS NOT SAVED TO DISK UNLESS A WRITE NET COMMAND IS ISSUED!!

        Please Enter Cable Name (ENTER key to Accept, ESC to Abort)

                              >NEW
```

Above we have named our cable file "NEW." ***We must still execute a "Write Net Command" to save the file to disk!*** [Refer to Item *#2* (FILE OPERATIONS), from the **MAIN MENU**.]
We then press the "ENTER" key to return us to the Main Menu.

```
CABLE NAME = NEW                                  I/O PIN NAMING = DEFAULT1
                                                  NUMBER OF BOARDS = 1

                              MAIN MENU

                        0. READ IN A SAMPLE CABLE
                        1. TEST A CABLE
                        2. FILE OPERATIONS
                        3. DISPLAY FILE DATA
                        4. LOCATE A WIRE
                        5. CONFIGURATION
                        6. VIEW/EDIT/CREATE CABLE NET
                        7. TEST FOR INTERMITTENTS
                        8. DATA LOGGER OPERATIONS
                        9. EXIT TO DOS

                    PLEASE MAKE CHOICE (ENTER Key to Accept):
```

Note:

Our cable file name can now be seen in the upper left-hand corner of the MAIN MENU screen.

7. TEST FOR INTERMITTENTS

Selecting Item #7 from the Main Menu will open up the following screen:

```
                INTERMITTENT TEST SELECTION

          0. Return to Main Menu
          1. Continuous Test of All Pins
          2. Continuous Test of Selected Connections
          3. One-at-a-Time Test of Selected Connections
          4. Continuous Test of All Pins - Non Stop

        PLEASE MAKE CHOICE (ENTER Key to Accept):
```

If no cable has been read in yet, the following message will be displayed instead:

Choosing Item #1 **(CONTINUOUS TEST of ALL PINS), from INTERMITTENT TEST SELECTION MENU**:

If a cable file is read in either using Item #0 (READ IN A SAMPLE CABLE) or Item #2 (FILE OPERATIONS) from the **MAIN MENU**, testing can now take place.
The test screen is shown below:

```
                        TESTING CABLE NOW
        Press any key to stop test & return to the MAIN MENU
                                \
```

NOTE: Test Indicator (Above) Spins While Testing.

If the cable passes the test, the indicator will spin until an error is detected or any key is touched. Touching any key will return the user to the Main Menu. *"ESC"* will, also, return you to the Main Menu.
In the event that an error is detected, a beep occurs, all testing is automatically halted and the next screen is shown:

```
                  *** CABLE FAILED ***

                0. Return to Main Menu
                1. Display Errors
                2. Print Errors

        PLEASE MAKE CHOICE (ENTER Key to Accept):
```

You then have the option of displaying or printing the errors.

PIN NO.	LABEL		PIN NO.	LABEL	FAULT	PAGE = 0001
J1-01		- to -	J2-01		OPEN	
J1-02		- to -	J2-02		OPEN	
J1-03		- to -	J2-03		OPEN	
J1-04		- to -	J2-04		OPEN	
J1-05		- to -	J2-05		OPEN	
J1-06		- to -	J2-06		OPEN	
J1-07		- to -	J2-07		OPEN	
J1-08		- to -	J2-08		OPEN	
J1-09		- to -	J2-09		OPEN	
J1-10		- to -	J2-10		OPEN	
J2-01		- to -	J1-01		OPEN	
J2-02		- to -	J1-02		OPEN	
J2-03		- to -	J1-03		OPEN	
J2-04		- to -	J1-04		OPEN	
J2-05		- to -	J1-05		OPEN	
J2-06		- to -	J1-06		OPEN	
J2-07		- to -	J1-07		OPEN	
J2-08		- to -	J1-08		OPEN	
J2-09		- to -	J1-09		OPEN	
J2-10		- to -	J1-10		OPEN	

Press PAGEUP for previous page, ESC to return to MAIN MENU

The above screen shows all open connections. This occurred because the test was conducted with no cable hooked up to the test fixture.

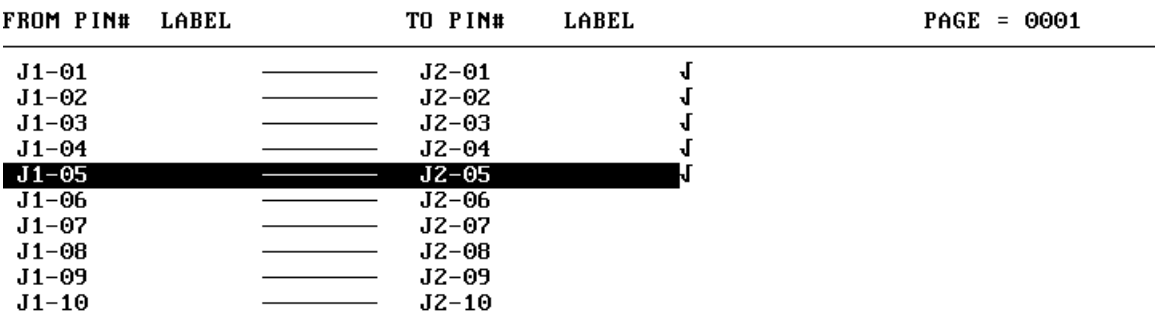
NOTE:

The errors are displayed in both directions due to the fact that the Model 100-PT. is a bi-directional test system.

Choosing Item #2 **(CONTINUOUS TEST of SELECTED CONNECTIONS), from INTERMITTENT TEST SELECTION MENU**:

This test only checks for opens on a cable or harness. No checks for shorts are performed.

We must first select the connections that we would like to test. To accomplish this, the user selects these connections from the "Net List" of the cable that is currently read in. The "Net List" will be shown on the screen. To select, arrow down and highlight the desired connection by pressing the "SPACE BAR." (SPACE BAR toggles selection on or off.) A check mark will be placed next to that connection.




```
UP ARROW = Cursor Up/DOWN ARROW = Cursor Down/SPACE BAR = Toggle Check
ESC = Exit/PAGE UP = Previous Page/PAGE DOWN = Next Page/T = Start Testing
```

When all selections have been chosen, press *"T"* to start the testing process. The Test Activity Indicator spins showing testing in progress. If an error occurs, a beep will sound and the following will be displayed:

```
TESTING CABLE NOW
Press any key to stop test
```

J1-01 - to - J2-01 OPEN

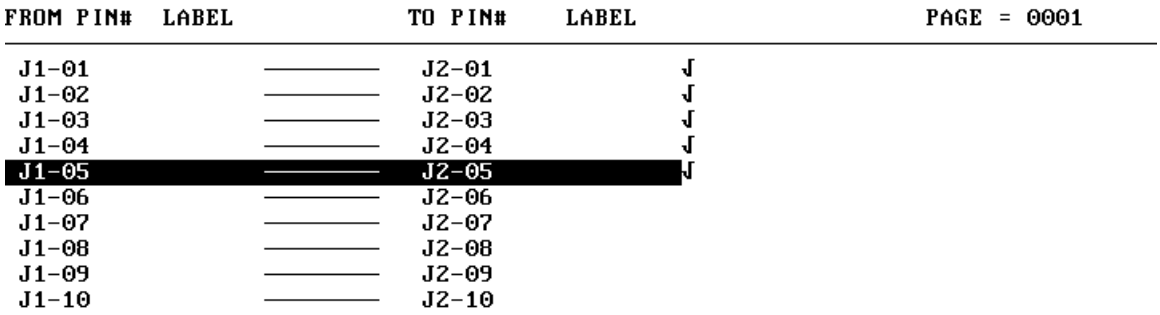
Press SPACE BAR to continue, any other key to exit.

The pins in error will be shown and the defect will be stated. Pressing the "SPACE BAR" will continue the test, moving on to the other selected wires from the "Net List." The test will be halted with every failed pin and the test will repeat from the first selected wire after all pins have been tested.

If the cable passes the test, the test will repeat and the indicator will spin until any key is pressed. You will then be returned to the pin selection screen.

Choosing Item #3 **(ONE-AT-A-TIME TEST of SELECTED CONNECTIONS), from INTERMITTENT TEST SELECTION MENU**:

This option is very similar to that of Item #2, except that this process repeats the testing of each selection until the next desired connection to be tested is chosen or an error occurs. *This test also only checks for opens and not shorts*. First, select the wires to be tested.




```
UP ARROW = Cursor Up/DOWN ARROW = Cursor Down/SPACE BAR = Toggle Check
ESC = Exit/PAGE UP = Previous Page/PAGE DOWN = Next Page/T = Start Testing
```

Then press *"T"* to begin testing and the following message will be displayed:

```
TESTING CABLE NOW
Press any key to stop test
```

NOW TESTING J1-01 - to - J2-01

The Test Activity Indicator will spin indicating testing in progress.
Pressing any key will show the following result:

```
TESTING CABLE NOW
Press any key to stop test
```

NOW TESTING J1-01 - to - J2-01

Press ENTER to retest, SPACE BAR to continue or ESC to exit

We now have the option of pressing **"Enter"** *to restart the test for that wire*, pressing the **"Space Bar"** *to start testing the next wire* or pressing **"ESC"** to *exit to the pin selection screen*.

Pressing the Space Bar will test the next selected pin...**J1-02 to J2-02**

```
TESTING CABLE NOW
Press any key to stop test
/
```

NOW TESTING J1-02 - to - J2-02

If an error is discovered, a beep will sound and the error will be shown.

```
TESTING CABLE NOW
Press any key to stop test
/
```

NOW TESTING J1-01 - to - J2-01 OPEN

Press ENTER to retest, SPACE BAR to continue or ESC to exit

After all selected pins are tested, the process will repeat from the first selected wire from the "Net List."

Choosing Item #4 **(CONTINUOUS TEST of ALL PINS - NON-STOP), from INTERMITTENT TEST SELECTION MENU:**

When this test is selected, the program will continuously check the cable or harness for shorts and opens and display the results on the screen. No user interaction is required with the system other than connecting and disconnecting cables to be tested. While the test is running, the Test Activity Indicator (the spinning character) will indicate that the test is running. Pressing any key while the test is running will return the user to the Main Menu. While this test is running, if a connected cable passes the test, the following message will appear:

TESTING CABLE NOW

Press any key to stop test & return to the MAIN MENU

/

===CABLE PASSED===

In the event that no cable is connected or the cable that is connected has a defect, the following message will appear:

TESTING CABLE NOW
Press any key to stop test & return to the MAIN MENU
/

*****CABLE FAILED*****

This test can be used either as a go/no go production type test or as continuous type of intermittent locator. Although testing is not actually real-time, it may be useful in locating what type of physical stress or action exerted on a cable or harness results in a failure. Its other use is as a simple go/no-go tester for users that do not wish to interact with the keyboard. In this case, cables or harnesses are simply plugged into the system. The user waits for the test activity indicator to move twice to ensure the cable testing is complete, and the results are then just read from the screen.

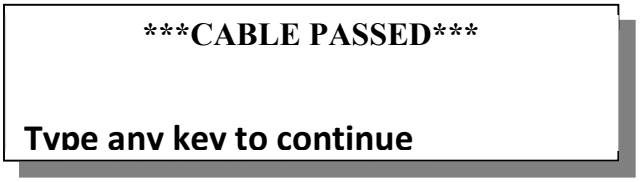
8. DATA LOGGER OPERATIONS

Selecting Item #8 from the MAIN MENU will open the following DATA LOGGER screen:

```
                          BATCH TESTING - DATA LOGGER

FILENAME = SAMPLE

BATCH NUMBER: XXXXXXXX

LOG FUNCTION IS:---------------> ENABLED

NUMBER OF CABLES TESTED: 00000

NUMBER OF CABLES PASSED: 00000                PERCENT CABLES PASSED:   0.0%

NUMBER OF CABLES FAILED: 00000                PERCENT CABLES FAILED:   0.0%

FIRST CABLE TESTED AT: XX/XX/XX   XX:XX AM

LAST CABLE TESTED AT: XX/XX/XX   XX:XX AM

F1=TEST CABLE      ¦ F2=ENTER BATCH NUMBER
F4=CLEAR LOG DATA  ¦ F6=PRINT RESULTS SUMMARY
F8=LOG ON/OFF      ¦ F10=RETURN TO MAIN MENU
```

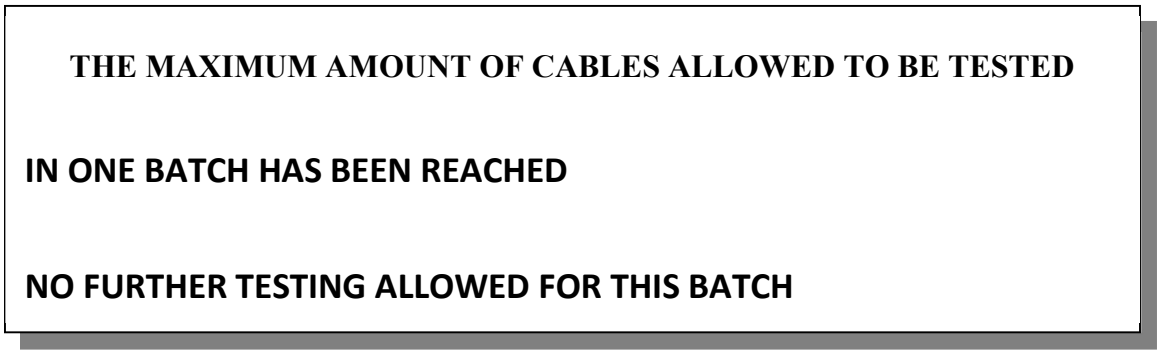
This screen enables the user to perform QC functions by allowing the user to track (for a specific batch of cables) the total number of cables tested, the number of cables that passed along with the percent that passed, the number of cables that failed along with the percent that failed, the time the first cable was tested and the time the last cable was tested. Percentages displayed for cables passed and failed have a resolution of .5 percent. This screen also displays the name of the cable file along with an indicator if the log is active, and a list of function keys effective in this window are shown at the bottom of the screen. The function keys available and their effect are as follows:

Pressing F1 - Test Cable: The currently connected cable or harness is tested. If the cable passes, the following message will appear:



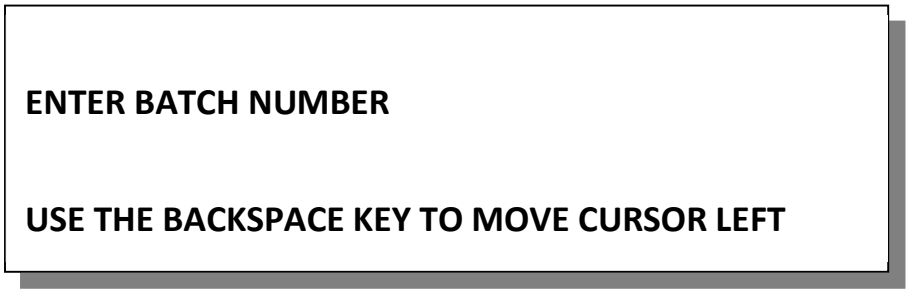
If the cable should fail, the following message will appear:

In both cases, pressing any key will return you to the DATA LOGGER screen. If the log has been enabled, the results will be displayed on the DATA LOGGER screen. Otherwise, only the preceding messages will be displayed without any further action. Additionally in the unlikely event that the maximum allowable cables to be tested is reached (65,535), the following message will appear:



Note that this message will only appear if the log function is enabled**.**

Pressing F2 - Enter Batch Number: Pressing this key will allow the user to enter a unique batch number for the current batch of cables being tested. When this key is pressed, the cursor will move to the left side of the Batch Number field. Additionally, the following message will appear on the screen:



Almost any combination of numbers, characters & letters (including spaces) can be entered. The Backspace key is used to move the cursor to the left for editing purposes. When this field is properly filled in, the ESC key should be pressed to exit the Batch Number Editing Mode.

Pressing F4 - Clear Log Data: This key is used to clear any data previously collected in the Data Logger. To prevent inadvertent erasure of this data, a warning screen will appear before the log data is actually cleared as seen here:

WARNING! YOU ARE ABOUT TO CLEAR

PREVIOUSLY COLLECTED DATA LOG DATA.

ARE YOU SURE YOU WANT TO CLEAR THIS DATA [Y/N]?

Press the Y key to clear the data or the N key to return to the Data Logger without destroying any data. Anytime a new batch is started, the log data must be manually cleared with this key. Log data is never cleared automatically to prevent inadvertent loss of data. However, exiting the program or a loss of power to the PC will cause log data to be lost.

Pressing F6 - Print Results Summary: Pressing this key will cause the data log results to be printed along with the standard print header box used by the program.

Pressing F8 - LOG ON/OFF: Pressing this key toggles the data logging function on and off. When the logging function is on, the screen will show:

LOG FUNTION IS:----------> ENABLED

When the logging function is turned off, the screen will show:

LOG FUNTION IS:----------> DISABLED

Note that when the log function is off, cables can be tested without affecting data previously gathered. This may be useful for debugging purposes where the log results must remain unaltered.

Pressing F10 - RETURN TO THE MAIN MENU: Pressing this key returns you to the MAIN MENU. Log results are not lost and will still be present if the Data Logger is reentered from the MAIN MENU.

9. EXIT TO DOS

The following screen will be displayed when Item #8 from the Main Menu is selected:

Entering “N” returns you to the Main Menu. Entering “Y” leaves the program and returns the user to the operating system.

The following screen will be displayed when Item #8 from the Main Menu is selected:

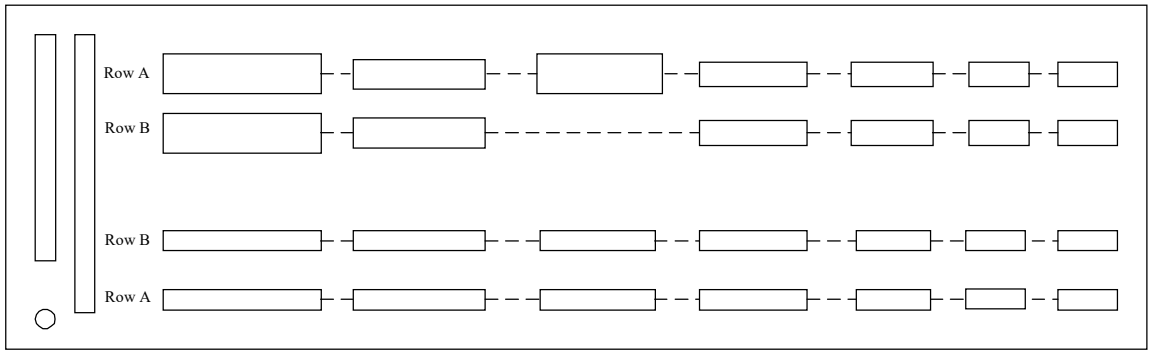
Entering “N” returns you to the Main Menu. Entering “Y” leaves the program and returns the user to the operating system.

VII
APPENDIX A

UNIVERSAL CONNECTOR BOX ASSEMBLY

The Universal Connector Box Assembly comes shipped with the following connectors:

Qty. 2 - DB9 Female Connectors
Qty. 2 - DB15 Female Connectors
Qty. 2 - DB15 High Density Female Connectors (VGA type)
Qty. 2 - DB25 Female Connectors
Qty. 2 - DB37 Female Connectors
Qty. 1 - Champ 36 Pin Female Connector (Centronics / PC printer type)
Qty. 2 - Champ 50 Pin Female Connector (SCSI 1 / Telephone type)
Qty. 2 - .1 pitch 10 Pin IDC (In-line Dual Connector)
Qty. 2 - .1 pitch 16 Pin IDC
Qty. 2 - .1 pitch 20 Pin IDC
Qty. 2 - .1 pitch 26 Pin IDC
Qty. 2 - .1 pitch 34 Pin IDC
Qty. 2 - .1 pitch 40 Pin IDC
Qty. 2 - .1 pitch 50 Pin IDC
Qty. 1 - Banana Jack (for test probe for "LOCATE A WIRE" function)



Connectors in both ROW A's are connected to the first 50 pins on the Model 100-PT. board that it is connected to. Connectors in both ROW B's are connected to the second set of 50 pins on the Model 100-PT. that it is connected to. For this reason, when DEFAULT1 is selected within the software for pin naming, ALL ROW A connectors will be treated as J1 and ALL ROW B connectors will be treated as J2. Therefore, for testing purposes, any ROW A connector can be connected to any ROW B connector. ***DO NOT*** connect ROW A connectors to ROW A connectors on the same box or ROW B connectors to ROW B connectors on the same box. For multi-box operation, any row on one box can be connected to any row on a different box.

With the standard DEFAULT1 pin numbering assigned in software, additional Model 100-PT. boards and connector boxes will have their connectors assigned as follows:

For board #2 in the system. - ROW A will be treated as J3
ROW B will be treated as J4

For board #3 in the system. - ROW A will be treated as J5
ROW B will be treated as J6

CHECKING SHIELD AND GROUNDS

The Universal Connector Box can check shields and ground wires connected to the housing or shells of all the DB connectors and the 36 pin Champ connector. In order for these to be 100% properly tested, the DB connectors should be screwed into the Universal Connector Box. Generally, you can get a very good connection and test results without putting these screws in, and only screw them in later if a cable shows a fault. It is definitely recommended that these screws be put in when reading in a sample cable. Similarly, the bail lock on the 36 pin Champ connector should be engaged.

As a system equipped with a single Model 100-PT. board can only check 100 points (50 on each end of a 50-pin cable), 50 pin Champ cables will not be able to have their housing checked if they are connected to a shield or to another pin (such as a drain wire). In the event that the connector housings are just connected to each other with a shield, this can be separately checked with an ohmmeter. To check for shorts to the shield, use the test probe and the "LOCATE A WIRE" function to ensure that no pins are contacting the housing. If the shield is supposed to be connected to a connector pin, then the test probe and the "LOCATE A WIRE" function can also be used to verify that the shield is in fact connected to these pins by touching each housing and verifying the appropriate pin numbers are displayed on the screen.

When using the Universal Connector Box to check connections to the connector shells, it is important to understand where the shells are connected with respect to pin numbers used within the software. For the DB and 36 pin Centronics connectors, the shell pin number will always be one pin number higher than the highest regular pin number of that connector. That is, for a DB9 (9 pin DB connector), the shell pin number would be 10, for a DB15 (15 pin DB connector), the shell pin number would be 16 and so on.

In addition to the "DB," "IDC" and Centronics Connectors, modular connectors such as RJ11, RJ45, or "DIN" type and a large variety of other various connectors can be tested using adapters. Also, with the aid of "Gender Changers" and custom-made adapter cables by CableTrak, any discrete wire cable can be tested on the Model 100-PT. Continuity Test System.

IMPORTANT... PLEASE READ

If the user will be testing a large volume of cables with D-Subminiature type connectors, it is strongly recommended that the user purchase **"Connector Savers"**. These are male/female adapters that plug into the D-Sub connectors on the Universal Connector Box and provide the same gender to the user that the box would. The reason for this is that the D-Subminiature connectors are rated with a insertion/removal life of between 500-1000 cycles. The use of the "Connector Savers" will prevent early failure and costly repair to the Universal Connector Box when large volumes of D-Sub cables are being tested.

CableTrak can also make custom connector boards to accommodate the testing of any cable with supplied customer specifications.

Please contact CableTrak for further details...

VIII
APPENDIX B

CUSTOMER SUPPORT PLAN

CableTrak LLC Offers:

TELEPHONE SUPPORT
PRODUCT UPDATES

Through the use of "VARS," (Value Added Resellers,) additional channels of support exist to assist the end user!

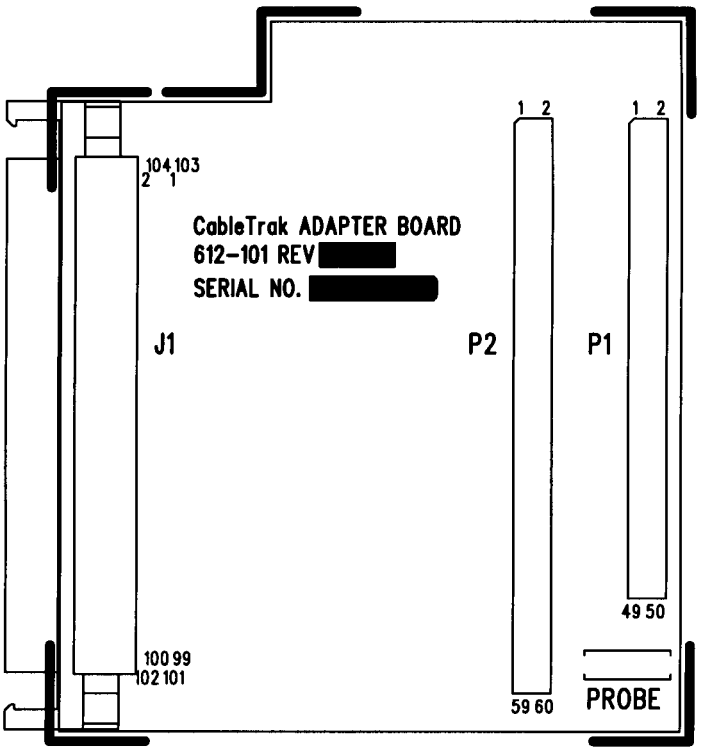
Problems, questions or comments can be directed to our technical support staff at (914) 216-4575.

Please visit CableTrak's Home Page at: http://cabletrakllc.com and download the latest version of the Model 100-PT. Software. Also available for downloading is the Manual, Order Guide and other supporting documentation.

IX
APPENDIX C

ADAPTER BOARD PINOUT

For the users who wish to build their own custom test fixtures as opposed to using a CableTrak supplied fixture and cables, it is necessary to understand the pinout and numbering convention used to be able to interface to the Model 100-PT. PC board. Connection to the Model 100-PT. PC board is accomplished with the CableTrak Adapter PC board (612-101) as shown below:



As can be seen from the figure above, there are two connectors that the user can connect to (P1 and P2). P1 is numbered 1-50 and P2 is numbered 1-60. P1 pins 1-50 and P2 pins 1-50 correspond to the software on a one-to-one basis when DEFAULT1 is selected in the software for pin numbering. P2 pins 51, 52, 53, and 54 are removed which allows the use of a 50-pin connector for P2 instead of a 60-pin connector. Pins 55-60 on P2 are all ground and are used only for the "LOCATE A WIRE" operation. If a 50-pin cable is used for P2 and this function is still required, a ground point is available on the adapter board marked as "PROBE" and an appropriate connector is supplied with each board. If a 60-pin cable is used for P2 with the intention of using the "LOCATE A WIRE" operation, only one of the ground pins (any pin from 55-60) need be used.

In the event that DEFAULT0 is selected in the software, PIN 001 thru PIN 050 on the screen will correspond to J1-1 thru J1-50 on the Adapter Board, however PIN 051 thru PIN 100 on the screen will correspond to J2-1 thru J2-50 on the Adapter Board.

The table below will summarize the pin numbering when multiple Model 100-PT. boards are used.

# OF BOARDS IN SYSTEM	BOARD #	DEFAULT0/		DEFAULT1	
		ADAPTER BOARD CONNECTOR		ADAPTER BOARD CONNECTOR	
		J1 (1-50)	J2 (1-50)	J1 (1-50)	J2 (1-50)
1	1	PIN 001 to PIN 050	PIN 051 to PIN 100	J1-01 to J1-50	J2-01 to J2-50
2	1	PIN 001 to PIN 050	PIN 051 to PIN 100	J1-01 to J1-50	J2-01 to J2-50
	2	PIN 101 to PIN 150	PIN 151 to PIN 200	J3-01 to J3-50	J4-01 to J4-50
3	1	PIN 001 to PIN 050	PIN 051 to PIN 100	J1-01 to J1-50	J2-01 to J2-50
	2	PIN 101 to PIN 150	PIN 151 to PIN 200	J3-01 to J3-50	J4-01 to J4-50
	3	PIN 201 to PIN 250	PIN 251 to PIN 300	J5-01 to J5-50	J6-01 to J6-50

NOTE:

On some older Adapter Boards J1 may be marked as P2, and J2 may be marked as P3. Also, on older versions of the Adapter Board the “PROBE” connection may be a banana jack on the rear of the board as opposed to a pin connector on the front of newer boards.

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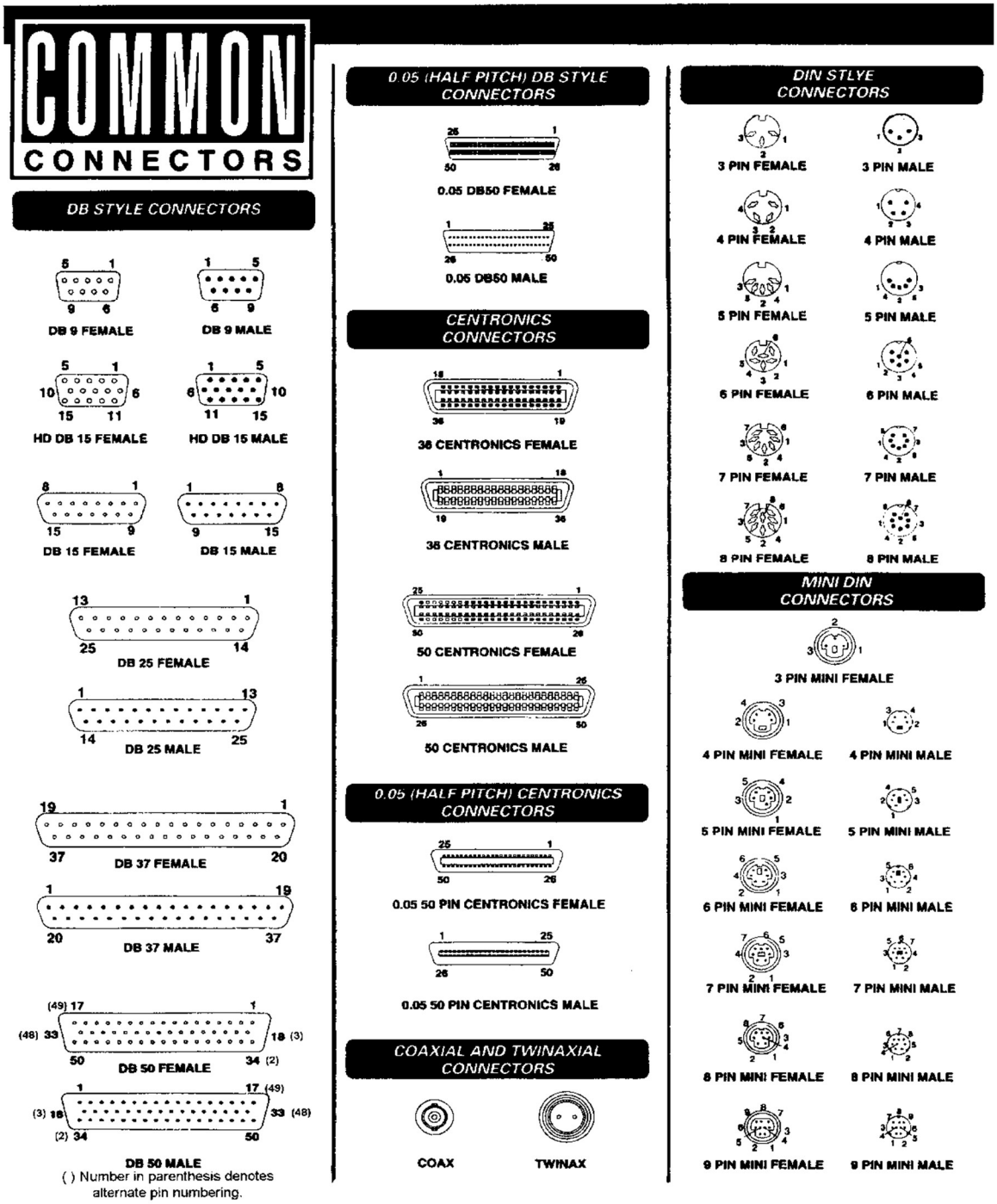
APPENDIX D

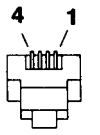
COMMON CONNECTOR PINOUTS

The following figures illustrate some common connectors and their associated pin numbering. These pin numbers will match the CableTrak software when DEFAULT1 is selected and a CableTrak Connector Box is used.

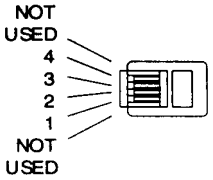


COMMON CONNECTORS

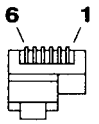
MODULAR CONNECTORS



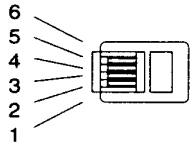
RJ11 END VIEW



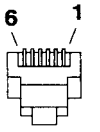
RJ11 TOP VIEW



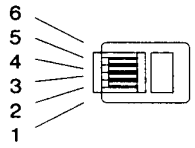
DEC END VIEW



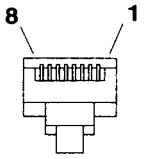
DEC TOP VIEW



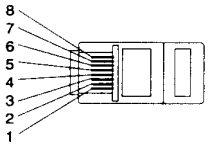
RJ12 END VIEW



RJ12 TOP VIEW

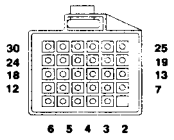


RJ45 END VIEW

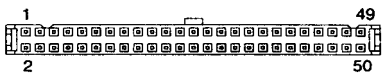


RJ45 TOP VIEW

OTHER CONNECTORS



HDI 30 (POWER BOOK™)



IDC 50 POSITION SOCKET

XI
APPENDIX E

FAQ (Frequently Asked Questions)

RE: NETS AND NET LISTS

QUESTION
What exactly is a net and a net list?

ANSWER
A net is simply 2 or more pins connected together by a wire or a connection. A net list is just a listing of all the individual nets (sets of pins connected by wires) in a cable or harness. When editing or creating net lists, it is not allowed to connect pins in one net to pins in another net together. Only unconnected pins are allowed to be connected to a net. Otherwise, the action of connecting one pin of a net to another would in fact be connecting many (all) the pins of one net to all the pins of the other net.

RE: NUMBERING ORDER OF NET LISTS AND ERRORS

QUESTION
When I display my net list or error list, the pin numbers are not in order. Why is this happening?

ANSWER
You have renumbered the pin names. The CableTrak program always uses its default pin numbering to decide what order to display net lists and error lists. The program cannot possibly know what order you would like these lists displayed as, since you could use any name you want for pin numbers (like WIREXY or HELLO).

RE: REUSING PIN NAMES OR NUMBERS

QUESTION
I have already read in a cable and renamed the pins numbers and created a whole list of labels for this cable and saved it to disk. I would like to use these same names for another cable I am creating and don't wish to retype all this information in again. How can I reuse these names and labels I have already created?

ANSWER
Simply read back in from disk the cable you already created. Then, you can either read in a sample cable or create a new cable with the net list editor and save this cable out to disk. This new cable will have all the pin names and labels of the previously read in cable.

RE: **PC PRINTER CABLES**

QUESTION

I read in a sample PC printer cable and saved it to disk. Later, I tried testing some other PC printer cables against this file and they failed. Why is this happening?

ANSWER

There is no standard when it comes to PC printer cables. Generally, most of the signal wires will be the same from cable to cable (although we have seen printer cables sold that don't even have the RESET signal wire in them), however, the ground wires from cable to cable can be very different as a normal printer cable can have anywhere from 1 to 10 ground wires. Different vendors build these cables with different numbers of ground wires and this is usually the cause of these failures. You should either have a separate file for each printer cable vendor or examine the error or net list to determine if the failure is due to a signal wire or ground wire problem. If the failure is just a ground wire, the cable will probably work just fine. (See Figure 4 at the end of this appendix for a sample PC printer cable).

RE: **TESTING OF MULTIPLE CABLES AT THE SAME TIME**

QUESTION

Can I test more than one cable at the same time?

ANSWER

While it is possible in theory to test more than one cable at a time, it is not recommended. Each cable still has to be connected and disconnected from the unit, and since it takes less than .5 seconds to test a 100-point cable, there is little advantage to doing this. The only time this might make sense is if 4 separate Model 100-PT. boards and fixtures were used. In this case either 4 sample cables would have to be read in or 4 separate "combined" net lists would have to be created before testing is begun. Then an error on any cable(s) that occurred would be easy to spot. Testing multiple cables with 1 board and connector box would make it difficult to interpret the results and is not recommended.

RE: **INTERMITTENT TESTING**

QUESTION

The CableTrak software has three different intermittent tests, which one is best for me to use?

ANSWER

In order to understand which intermittent test to use, it is best to first understand the differences between the tests and how they work. The first intermittent test *(Continuous Test of All Pins)* is basically the same as the Main Menu "Test a Cable" selection except that the test is continuously repeated until an error is detected or the test is manually stopped by the user. This test is useful in that it will check for both shorts and opens on the entire cable.

This test will, however, check every pin so it is not as fast as some of the other tests. This test is also not real-time. That means that the entire cable is read in first and then the results are checked for errors. This means that if a cable is flexed looking for intermittents, an error may not show up until a few seconds later. Also, since each connection is only checked twice in a .5 second period, some very fast intermittents may not be detected.

The second intermittent test *(Continuous Test of Selected Connections)* will continually check only the connections the user selected from the list. This test will only check for opens and not shorts. The test will check each connection in the list one after the other for opens and will stop if an error is detected or the user stops the test. This test is good only if a smaller number of connections are to be checked as the software takes a relatively long amount of time to interpret the list and figure out which pin to check next. For this reason, large lists will cause this test to slow down and very fast intermittents may be missed. It is suggested that no more than 10 wires at a time be checked with this test.

The third intermittent test *(One-at-a Time Test of Selected Connections)* continually checks only one connection from a user selected list. This test also only checks for opens, but it is the best test for very fast intermittents. Each pin is continually checked until an error occurs or until the user elects to stop and check the next pin in the list. Since only one connection is checked until the user decides otherwise, this test will detect the most intermittent of connections, as the connection is checked every couple of microseconds.

The fourth way to detect intermittents is not with the Intermittent Tests, but with the "LOCATE A WIRE" function. In this method, a suspected wire in a cable is connected to the ground probe with a clip lead either directly to the cable or indirectly through an unused pin on the connector box. The "LOCATE A WIRE" option is then selected and the cable is flexed. Any short or open that may occur will immediately be seen on the display as a connection appearing or disappearing, depending on the fault.

RE: **POOR DISPLAY**

QUESTION

When I run the CableTrak program, the display seems too bright. Why is this and what can I do about it?

ANSWER

The reason for a bright display is usually that a gray scale monochrome monitor is connected to your PC. The solution is to go into the CONFIGURATION Sub-Menu and select item #8 (Monitor Type) and select Gray Scale Monitor. After this, save your configuration so this step will not have to be repeated every time you start the CableTrak software. Note, the screen will still be bright when the program is first started, as the configuration file is *NOT* read until after diagnostics have passed. Upon entering the Main Menu, and as long as you do not exit the program, the display should be fine.

FROM PIN#	LABEL	TO PIN#	LABEL	PAGE = 0001
J1-01	-Strobe	J2-01	-Strobe	
J1-02	+Bit 0	J2-02	+Bit 0	
J1-03	+Bit 1	J2-03	+Bit 1	
J1-04	+Bit 2	J2-04	+Bit 2	
J1-05	+Bit 3	J2-05	+Bit 3	
J1-06	+Bit 4	J2-06	+Bit 4	
J1-07	+Bit 5	J2-07	+Bit 5	
J1-08	+Bit 6	J2-08	+Bit 6	
J1-09	+Bit 7	J2-09	+Bit 7	
J1-10	-Ack	J2-10	-Ack	
J1-11	+Busy	J2-11	+Busy	
J1-12	+P. End	J2-12	+P. End	
J1-13	+Select	J2-13	+Select	
J1-14	-AutoFd	J2-14	-AutoFd	
J1-19	Ground	J1-20	Ground	
		J1-21	Ground	
		J1-22	Ground	
		J1-23	Ground	
		J1-24	Ground	
		J1-25	Ground	
		J1-26	Ground	
		J1-27	Ground	
		J1-28	Ground	
		J1-29	Ground	
		J1-30	Ground	
		J1-33	Ground	
		J2-18	Ground	
		J2-19	Ground	
		J2-20	Ground	
		J2-21	Ground	
		J2-22	Ground	
		J2-23	Ground	
		J2-24	Ground	
		J2-25	Ground	
J1-31	-Init	J2-16	-Init	
J1-32	-Error	J2-15	-Error	
J1-36	-Select	J2-17	-Select	
J1-37	Shield	J2-26	Shield	

FIGURE 4

A TYPICAL PC PRINTER CABLE

J1 = CENTRONICS CONNECTOR, J2 = DB25 MALE

XII
APPENDIX F

INTERPRETING NET LISTS AND ERROR LISTS

NET LISTS

When viewing a Net List, it is important to remember that the connection list seen on the screen is an electrical representation only and not a physical diagram. It is critical that the user understand this when interpreting Net Lists. The figures that follow will illustrate this difference. Figure 1 illustrates a Net List for a cable as read in by the CableTrak software. Figure 2A, B, C and D illustrate 4 possible physical constructions of the cable read in (there are more than 4 possible physical cables which will produce the shown Net List, but the ones shown are the most likely). Note, it is impossible for the cable tester to know exactly which physical implementation of the cable is the actual one, as all 4 cable diagrams are exactly the same electrically.

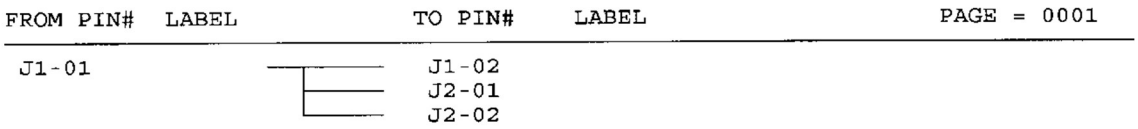


FIGURE 1

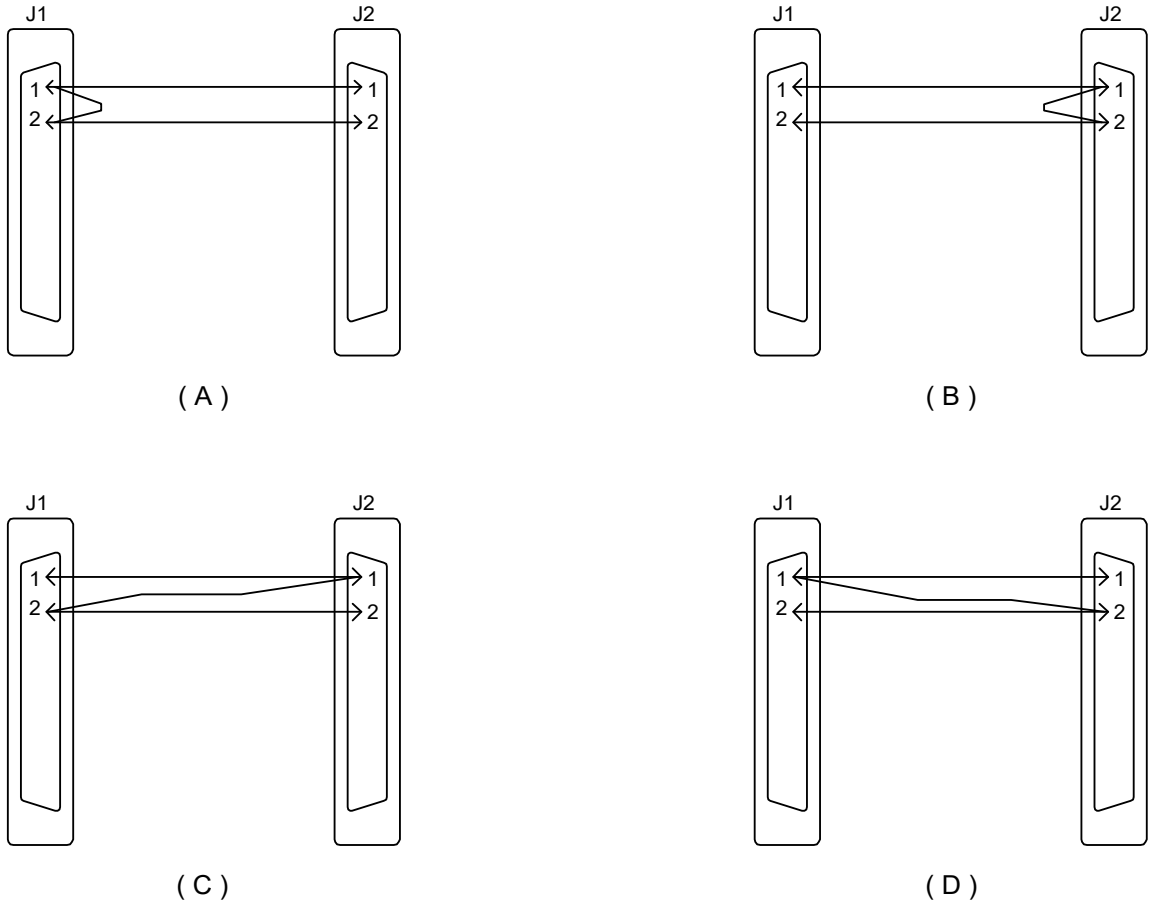


FIGURE 2
FOUR DIFFERENT CABLES WITH THE SAME NET LIST

When CableTrak software displays a Net List, it will always put the first pin detected in a net on the left side, then all the other connections to that pin will be shown on the right side, regardless of the actual physical layout of the cable.

ERROR LISTS

Using the cable of Figure 2A above and the Net List of Figure 1 we can see how errors are displayed. In the above cable, assume that the connection at J2-1 is broken. This fault will in fact produce 3 errors if we test this cable and then display the results. The three errors that are produced are as follows:

J1-01 to J2-01 OPEN
J1-02 to J2-01 OPEN
J2-01 to J2-02 OPEN

These errors are produced because J2-01 was in fact electrically connected to J1-01, J1-02, and J2-02 in the original cable. Opening up J2-01 disconnected this pin from the other 3, hence 3 errors.

The order of the display of the errors is due to the fact that pins are scanned in sequentially, and as errors appear they are displayed in that order. By the same token, if a single short occurs between two nets, multiple errors will be displayed as this causes a connection between many pins. Each set of pins that has a short

will be displayed in the order they are detected. While it may appear confusing to see an error display showing a multitude of shorts when in fact only 2 pins are touching each other in a cable, it is necessary as the system has no way of knowing exactly where a short is occurring, as each pin or point in a Net is electrically equivalent to every other point in that Net. Therefore, all equivalent short conditions are displayed and are valid electrically.

XIII
APPENDIX G

CONNECTOR NUMBERING CONVERSIONS

In the event that the user is making custom cables which connect directly to the Adapter Board, the pin numbers on the connectors used to terminate these cables will probably not match the pin numbers used by the Model 100-PT. software. The reason for this is that on standard IDC ribbon cables (as used with the Adapter Board), pin numbers are consecutive from one wire to the next in the ribbon cable. However, a D-subminiature 25 pin ribbon connector's numbering is 1, 14, 2, 15, 3, 16 .....etc. This is due to the physical layout of the connector. When using this type of cable, an open on the "D" connector pin 14 would show up on the Model 100-PT. software as an open to pin 2. For users using cables connected directly to the Adapter Boards, the following tables show the pinouts of some standard ribbon cable connectors along with the pin numbers that will be shown by the Model 100-PT. software.

FOR DB25 CONNECTORS

CONN pin no.	*CableTrak pin no.	*CableTrak pin no.	CONN pin no.
1	1	1	1
2	3	2	14
3	5	3	2
4	7	4	15
5	9	5	3
6	11	6	16
7	13	7	4
8	15	8	17
9	17	9	5
10	19	10	18
11	21	11	6
12	23	12	19
13	25	13	7
14	2	14	20
15	4	15	8
16	6	16	21
17	8	17	9
18	10	18	22
19	12	19	10
20	14	20	23
21	16	21	11
22	18	22	24
23	20	23	12
24	22	24	25
25	24	25	13

NOTE:

For a second DB25 connector added to the ribbon cable, use the listed pin numbers plus 25. For a third DB25 connector use the listed pin numbers plus 50, and for a fourth DB25 connector, use the listed pin numbers plus 75.

FOR CENTRONICS 50 PIN CONNECTORS

CONN pin no.	*CableTrak pin no.	*CableTrak pin no.	CONN pin no.
1	1	1	1
2	3	2	26
3	5	3	2
4	7	4	27
5	9	5	3
6	11	6	28
7	13	7	4
8	15	8	29
9	17	9	5
10	19	10	30
11	21	11	6
12	23	12	31
13	25	13	7
14	27	14	32
15	29	15	8
16	31	16	33
17	33	17	9
18	35	18	34
19	37	19	10
20	39	20	35
21	41	21	11
22	43	22	36
23	45	23	12
24	47	24	37
25	49	25	13
26	2	26	38
27	4	27	14
28	6	28	39
29	8	29	15
30	10	30	40
31	12	31	16
32	14	32	41
33	16	33	17
34	18	34	42
35	20	35	18
36	22	36	43
37	24	37	19
38	26	38	44
39	28	39	20
40	30	40	45
41	32	41	21
42	34	42	46
43	36	43	22
44	38	44	47
45	40	45	23
46	42	46	48
47	44	47	24
48	46	48	49
49	48	49	25
50	50	50	50

NOTE:

For a second Centronics 50 pin connector added to the ribbon cable, use the listed pin numbers plus 50.

FOR DB50 CONNECTORS (alternate numbering)

CONN pin no.	*CableTrak pin no.	*CableTrak pin no.	CONN pin no.
1	1	1	1
2	4	2	34
3	7	3	18
4	10	4	2
5	13	5	35
6	16	6	19
7	19	7	3
8	22	8	36
9	25	9	20
10	28	10	4
11	31	11	37
12	34	12	21
13	37	13	5
14	40	14	38
15	43	15	22
16	46	16	6
17	49	17	39
18	3	18	23
19	6	19	7
20	9	20	40
21	12	21	24
22	15	22	8
23	18	23	41
24	21	24	25
25	24	25	9
26	27	26	42
27	30	27	26
28	33	28	10
29	36	29	43
30	39	30	27
31	42	31	11
32	45	32	44
33	48	33	28
34	2	34	12
35	5	35	45
36	8	36	29
37	11	37	13
38	14	38	46
39	17	39	30
40	20	40	14
41	23	41	47
42	26	42	31
43	29	43	15
44	32	44	48
45	35	45	32
46	38	46	16
47	41	47	49
48	44	48	33
49	47	49	17
50	50	50	50

NOTE:

For a second DB50 connector added to the ribbon cable, use the listed pin numbers plus 50.

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