



PC-DRILL™

User's Manual

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p-cad™
PERSONAL CAD SYSTEMS INC.

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ABOUT THIS MANUAL

This manual introduces you to PC-DRILL, P-CAD's utility program for generating numerically controlled (NC) drilling data from your PC-CARDS PCB database and for transferring the data to a paper tape punch.

Chapter 1, Introduction, provides an overview of PC-DRILL.

Chapter 2, Using PC-DRILL, provides instructions for preparing the database, configuring PC-DRILL, editing the tool table, running PC-DRILL, and viewing and printing the output files.

Appendix A, Error Messages, provides a list of possible error messages, the cause of each error, and the appropriate user action.

Appendix B, Remex RXS6122 Paper Tape Punch Interface Specifications, describes the requirements for the cable configuration and switch settings to interface to the Remex RXS6122 paper tape punch.



NOTATION

This manual gives step-by-step procedures and examples. To make it easy for you to follow these procedures, we use the following notation.

<xxxx> Angle brackets around lowercase letters indicate a variable name that may be entered by the system or by you. For example:

`<filename>.SCH`

[] Square brackets indicate the name of a key. For example:

`[Return]`

[]-[] Square brackets connected with a hyphen indicate keys that must be pressed simultaneously. For example:

Press `[Ctrl]-[Alt]-[Del]`.

UPPER

Uppercase letters indicate a command or an element that must be typed as shown. For example:

Type PCPLOTS and press [Return].

.XXX

A period followed by up to three uppercase letters indicates a preferred or default filename extension. For example:

PC-FORM outputs the .NDE file.

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CHAPTER 1. INTRODUCTION

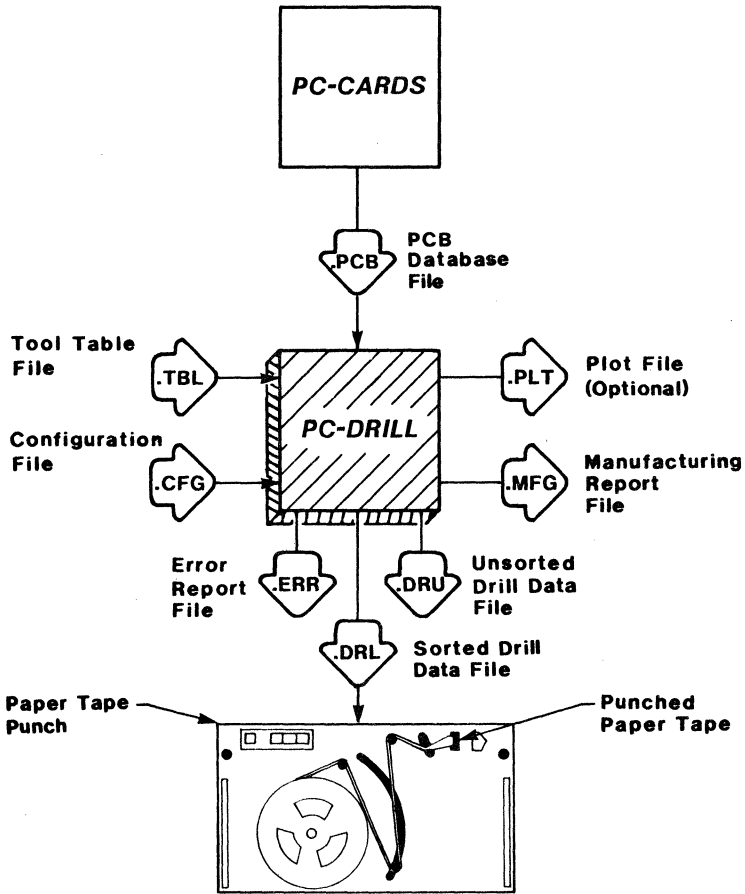
This chapter provides an overview of PC-DRILL, including inputs and outputs.

OVERVIEW

PC-DRILL is a P-CAD computer-aided manufacturing program developed for interfacing to automatic drilling machines.

PC-DRILL extracts pin type coordinates from the PC-CARDS PCB database, creates an ASCII file, and organizes the data according to the user-specified drill bit assortment or "tool table." PC-DRILL then creates another ASCII file from the drilling data in the previous file and sorts the data according to the user-specified configuration file. PC-DRILL then outputs the sorted drilling data file to the paper tape punch, which produces a punched paper tape that contains the drilling data.

Figure 1-1 shows the input and output of PC-DRILL.



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Figure 1-1. PC-DRILL Input and Output

Input

Input to PC-DRILL is a PCB database file, a tool table, and a configuration file.

The PCB Database File

The PCB database file (<filename>.PCB) contains the graphic representation of the physical layout of a PCB and the logical netlist information. It also must contain an origin reference point. See the section titled "Preparing Your PCB Database" in Chapter 2, "Using PC-DRILL," for more information.

The Tool Table File

The tool table file (PCDRILL.TBL) is a user-specified reference table that links pad pin types extracted from the PCB database to tool numbers of the drill machine. It lists the pad pin types, the corresponding tool number that should be used, and the hole size that should be drilled for each pin type. See the section titled "Editing the Tool Table" in Chapter 2, "Using PC-DRILL," for more information.

The Configuration File

The configuration file (PCDRILL.CFG) is a user-specified file that lets you specify values for several options that PC-DRILL uses to identify and format your output files.

You can use the same configuration for each operating session, or you can change it for each session.

Output

PC-DRILL outputs an unsorted drill data file, a sorted drill data file, a manufacturing report file, and an error report file. PC-DRILL also outputs a plot file, if specified on the Configuration Screen.

The Unsorted Drill Data File

The unsorted drill data file (<filename>.DRU) is an ASCII file that contains the extracted pin type coordinates from the PCB database, which are organized according to the tool table.

Figure 1-2 shows an example of a few lines in an unsorted drill data file.

```
      /DBGRID 1  
      /DBUNIT 2  
      T1C0.020  
      X-005000Y002000  
      X013000Y-006000  
      X013000Y002000  
      X011000Y011000
```

Figure 1-2. Unsorted Drill Data File

/DBGRID 1 and **/DBUNIT 2** on the first two lines are plotter instructions that will be used if you specify the plotter option on the Configuration Screen.

T1 on the third line is the tool number that will be used to drill the pad holes.

C0.020 on the third line is the size of the pad holes in inches that will be drilled.

The numbers on the fourth line and all lines thereafter (until a new tool number is listed) specify the x,y coordinate location of the pads on the board that will be drilled according to the tool number and hole size listed above.

The Sorted Drill Data File

The sorted drill data file (<filename>.DRL) is an ASCII file that contains the same data in the unsorted drill data file, but the data is organized not only according to the tool table but is also sorted according to the clustering constant parameter specified on the Configuration Screen. This file is output to a paper tape punch.

Figure 1-3 shows an example of a few lines in a sorted drill data file.

```
/DBGRID 1
/DBUNIT 2
TICO.020
X-00/000Y-007000
X-008000Y-007000
X-008000Y-005000
X-010000Y-006000
```

Figure 1-3. Sorted Drill Data File

The .DRL file can be edited with any text editor, if desired. For more information, see the section titled "Editing the Sorted Drill Data File," in Chapter 2, "Using PC-DRILL."

The Paper Tape Punch

The paper tape punch is a machine that produces a punched paper tape. The punched paper tape contains x,y coordinates and hole sizes of the pads on the board. The punched paper tape is then read by a paper tape reader, which inputs the data to the drilling machine.

To output to a paper tape punch, you must have a paper tape punch that supports the proper RS-232 communications protocol. Two models are the Remex RXS6122 and the Litton 1560-AS. The Remex RXS6122 is currently the only model that has been tested and is supported by P-CAD.

Also, the paper tape punch must be connected to your system as described in Appendix B, "Remex RXS6122 Paper Tape Punch Interface Specifications."

The Manufacturing Report File

The manufacturing report file (<filename>.MFG) provides information about the board to the manufacturer. This report lists the tool number, hole count per tool, the hole size, and the path length. The manufacturer uses this information to determine when to sharpen and replace drill bits.

Figure 1-4 shows a sample of a manufacturing report.

TOOL	COUNT	SIZE	PATH LENGTH
2	107	0.032	14087
3	2898	0.040	347603
4	1	0.045	1550
5	2	0.050	4760
6	17	0.055	8840
10	4	0.075	5960
11	4	0.080	5850
15	1	0.125	0
TOTAL			388650

Figure 1-4. PC-DRILL Manufacturing Report

The hole size and path length are listed in inches in the manufacturing report. For path length, a decimal point is implied four digits from the right. For example, on the first line, 14087 means 1.4087 inches.

The Error Report File

If any errors occur during program operation, these errors are listed in a file called PCDRILL.ERR. Refer to Appendix A, "Error Messages," for a list of possible error messages, the cause of the errors, and appropriate user action.

The Plot File

If you select "Plotter" for the output device option on the Configuration Screen, PC-DRILL outputs a plot file called <filename>.PLT that shows the tool paths of your PCB database. This file can be used as input to PC-PRINT, PC-PLOTS, or PC-PHOTO to produce a plot on a printer, plotter, or photoplotter, respectively.



CHAPTER 2. USING PC-DRILL

This chapter explains how to use PC-DRILL. It describes how to prepare the database, start the program, configure PC-DRILL, edit the tool table, run PC-DRILL, and how to exit the program. It also describes how to view and print the output files.

PREPARING THE PCB DATABASE

Before you start PC-DRILL, you must enter the origin in the PCB database using the ENTR/ORG (Enter/Origin) command in SYMB (Symbol) mode in PC-CARDS. The origin serves as a reference point for PC-DRILL in recording the x,y coordinates of the pin type locations and for the manufacturer in laying out the board. The origin should be marked on a plot of the PCB for the manufacturer. Ask your manufacturer for requirements for the location of the origin on the board and how you should indicate the origin on the plot.

STARTING THE PROGRAM

Before you start PC-DRILL, be sure that:

- Your system has the correct configuration. (See the "System Configuration" section in the *PCB System Overview* manual for a list of requirements.)
- You have a paper tape punch that supports the proper RS-232 communications protocol.

- Your system has been connected to the paper tape punch according to the specifications listed in Appendix B, "Remex RXS6122 Paper Tape Punch Interface Specifications."
- The PCDRILL.EXE program file is in the EXE directory.
- The PCB database file is in the working directory.
- The PCB database file contains an origin.

First, change the current directory to the working directory. Then, to start PC-DRILL, type:

PCDRILL [Return]

The system displays the PC-DRILL Title Screen. Press any key to display the PC-DRILL Opening Menu, shown in Figure 2-1.

PC-DRILL

Options:

Configure PC-DRILL
Edit Tool Table
>> Run PC-DRILL <<
Exit PC-DRILL

Press: [SPACE] for next option; [RETURN] to accept.

Figure 2-1. PC-DRILL Opening Menu

This menu provides the following options:

Configure PC-DRILL - Calls the Configuration Screen to set or change PC-DRILL configuration options. You can use the "Configure PC-DRILL" option to review the configuration default specifications or to change the configuration and create your own.

Tool Table - Calls the Tool Table Screen to edit the tool table.

Run PC-DRILL - Calls the Run PC-DRILL Screen to run PC-DRILL.

Exit PC-DRILL - Returns you to DOS.

When the PC-DRILL Opening Menu is displayed, the default option, "Run PC-DRILL," is highlighted.

If you want to set or change the configuration or edit the tool table, use the space bar to cycle to the appropriate option and press [Return].

If you do not want to set or change the configuration or edit the tool table, press [Return] to select the "Run PC-DRILL" option.

CONFIGURING PC-DRILL

To configure PC-DRILL, select "Configure PC-DRILL" on the Opening Menu. The system displays the PC-DRILL Configuration Screen, shown in Figure 2-2.

PC-DRILL Configuration

Output port..... Port1
Output device..... paper
Output record length..... 80
Sort drill holes..... No

Default Drill..... Excellon

Press [SPACE] for next port;
Press [↑ ↓] or [RETURN] to accept; [Esc] to exit.

Figure 2-2. PC-DRILL Configuration Screen

This screen provides the following options:

Output port - The RS-232 comport connected to the on-line paper tape punch. The options are "Port1" or "Port2." The default is "Port1."

Output device - The output device options are "paper," "plotter," or "disk only." All three options create the .DRU and .DRL files.

"Paper" outputs directly to the paper tape punch.

"Plotter" outputs a plot file (<filename>.PLT), which can be used as input to PC-PRINT, PC-PLOTS, or PC-PHOTO to produce a plot of the tool paths of the PCB.

"Disk only" outputs the drill data files only (<filename>.DRU and <filename>.DRL). This option lets you edit the .DRL file with a text editor before sending the drilling data to the paper tape punch using the DOS MODE and PRINT commands. For more information, refer to the section titled "Editing the Sorted Drill Data File."

The default is "paper."

Output record length - This parameter applies to the disk files only and should not be changed. The default is "80."

Sort drill holes - This option allows you to choose whether or not the drilling data is sorted. Select "Yes" or "No." The default is "No."

If you select "No," the drill data is sorted and organized according to the tool table only and the cursor moves to the next option, "Default Drill." For prototype boards, you might want to select "No" for the sort drill holes option to minimize the runtime of PC-DRILL. However, since the data is not sorted according to the clustering constant (described below), the path length of each tool will not be the shortest possible.

If you select "Yes," the drill data will be sorted according to the clustering constant and the "clustering constant" option is displayed.

Clustering Constant - The drilling machine drills the pad holes in clusters. This parameter specifies the number of drill holes per cluster. The default is "8."

To determine this value, divide the total number of pins in the average component pin count on the board by 2. The clustering constant must be between 3 and 8.

If you are not sure that the clustering constant you used in a run of PC-DRILL produced the shortest tool path length, enter a higher or lower cluster count on the configuration screen and run PC-DRILL again on the database. Then, compare the path length results in the manufacturing reports of each run.

Default Drill - The type of drill machine that will be used in manufacturing. The only option is "Excellon."

To accept a current setting, press [Return], or use the arrow keys to move to another option on the screen.

To change an option setting, use the space bar to cycle to another choice and press [Return].

To change a number setting, type a new number and press [Return].

After you have selected the last option, the system prompts:

Save Configuration : YES

To save these settings for this session and future sessions, press [Return] to accept YES.

To use these settings for this session only, press the space bar to cycle to NO and press [Return].

EDITING THE TOOL TABLE

To edit the tool table, select "Edit Tool Table" on the PC-DRILL Opening Menu. The system displays the screen shown in Figure 2-3.

PC-DRILL Tool Table

Pin Type	Tool No.	Hole Size	Pin Type	Tool No.	Hole Size
0	0	----	13	----	----
1	----	----	14	----	----
2	----	----	15	----	----
3	----	----	16	----	----
4	----	----	17	----	----
5	----	----	18	----	----
6	----	----	19	----	----
7	----	----	20	----	----
8	----	----	21	----	----
9	----	----	22	----	----
10	----	----	23	----	----
11	----	----	24	----	----
12	----	----			

Enter the Tool-No; Press [↑↓→←] or [RETURN] to accept; [Esc] to Exit.

Figure 2-3. Tool Table Screen

The tool table lists the pin types in the PCB database, the corresponding tool number to be used for that pin type, and the size of the hole that should be drilled for that pin type.

The tool table includes the P-CAD limit of up to 24 different pin types.

To enter a tool number, type a value and press [Return]. The cursor will move to the Hole Size column.

To enter the hole size, type a value and press [Return]. The cursor will move to the Tool No. column for the next pin type.

Figure 2-4 shows an example of a tool table with values entered.

PC-DRILL Tool Table

Pin Type	Tool No.	Hole Size	Pin Type	Tool No.	Hole Size
0	1	0.028	13	----	----
1	2	0.032	14	----	----
2	2	0.032	15	----	----
3	2	0.032	16	----	----
4	2	0.032	17	----	----
5	3	0.072	18	----	----
6	----		19	----	----
7	----		20	----	----
8	----		21	----	----
9	----		22	----	----
10	----		23	----	----
11	----		24	----	----

Enter the Tool-No; Press [↑] or [↓] or [RETURN] to accept; [Esc] to Exit.

Figure 2-4. Tool Table Example Screen

This example uses three tools corresponding to 5 pin types. Tool 1 is assigned to pin type 0, the system default feedthru (via), with a hole size of 0.028 inches. Tool 2 is assigned to pin types 1, 2, 3, and 4. These pin types are common in all DIP components throughout the P-CAD libraries. Tool 3 is assigned to pin type 5 and could be used for a mounting hole defined here as 0.072 inches.

After you have finished entering values, press [Esc] to exit. The system prompts:

Save Table : YES

To save the values entered on the table, press [Return] to accept YES.

To disregard any new values entered, use the space bar to toggle to NO and press [Return].

The system displays the PC-DRILL Opening Menu.

RUNNING PC-DRILL

To run PC-DRILL, select "Run PC-DRILL" on the PC-DRILL Opening Menu. The system prompts you for the name of the PCB input file.

Data Input Filename : <Filename>.PCB

Type the name of the PCB input file to be read by PC-DRILL and press [Return].

Then, the system prompts you for the PC-DRILL output filename.

Data Output Filename : <Filename>.DRL

The system will default to the input filename with a .DRL extension.

Type the name of the PC-DRILL output file to be created and press [Return] or press [Return] to accept the default filename. The output filename must be different from the input filename.

If you selected the "Plotter" option on the Configuration Screen, the system also prompts you for the plot filename.

Plot Output Filename : <Filename>.PLT

The system will default to the input filename with a .PLT extension.

Type the name of the PC-DRILL plot file to be created and press [Return] or press [Return] to accept the default filename. The plot filename must be different from the output filename.

After the output filename or after the plot filename (if plotter option specified) has been entered, PC-DRILL begins file processing. It displays progress reports and error messages, if any, at the bottom of the screen. It also displays a clock, which is updated periodically to let you know the program is still running. PC-DRILL runtime depends on the number of component pins in the PCB database file.

To stop processing during program operation, press the [Esc] key.

When processing is complete, the system displays the Data Input Filename prompt. You can enter another input file to be processed, or you can press [Esc] to return to the main menu.

EXITING THE PROGRAM

To return to DOS from the main menu, select the "Exit PC-DRILL" option.

EDITING THE SORTED DRILL DATA FILE

You can edit the sorted drill data file (<filename>.DRL), if desired, before sending it to the paper tape punch. For example, if the drilling machine you are interfacing to accepts character coding without preceding and trailing zeros in the x,y coordinate locations, you can delete the zeros from the file to save space on the paper tape.

To edit the .DRL file, select the "disk only" option on the Configuration Screen before running PC-DRILL.

When PC-DRILL completes processing, edit the .DRL file with a text editor.

After you edit the .DRL file, use the DOS MODE and PRINT commands to send the file to the paper tape punch. At the DOS prompt, type:

```
MODE COM<n>:1200,E,7,2,P
```

where:

<n> is the number of the RS-232 comport connected to the on-line paper tape punch. If your PC is connected to the paper tape punch through COM1, enter 1 for n. If your PC is connected to the paper tape punch through COM2, enter 2 for n.

1200 is the baud rate.

E is even parity.

7 is the databits.

2 is the stopbits.

P indicates that the asynchronous adapter is being used for a serial interface printer. If you enter the P, time-out errors are continuously retried. You can stop the retry loop by pressing [Ctrl]-[Z]. To stop the time-out errors from being continuously retried when you have entered P, you must reinitialize the asynchronous adapter without entering the P.

After you enter the MODE command, type:

PRINT <filename>.DRL

to send the edited drill data file to the paper tape punch.

VIEWING AND PRINTING THE OUTPUT FILES

To display or print an output file, use the DOS TYPE and [Ctrl]-[P] commands. For example, to display a file, type:

TYPE <filename>.MFG [Return]

Or, to print a file, type:

TYPE <filename>.MFG [Ctrl]-[P] [Return]

When the file is printed, press [Ctrl]-[P] again to turn off the print function.

You can also use the DOS PRINT command to print a file.

NOTE: If you use this command to print a file after you sent the sorted drill data file to the paper tape punch using the DOS MODE and PRINT commands, make sure the mode of operation for the printer has been reset to the default values. You can reset the default values by rebooting the system or by typing the default values using the DOS MODE command.

APPENDIX A. ERROR MESSAGES

PC-DRILL error messages may appear on the screen during program operation and in the PCDRILL.ERR output file.

Following is a list of the possible error messages that may be displayed on the screen, the cause of each error, and the appropriate user action.

Message: Failed to open PCDRILL.ERR.

Cause: CONFIG.SYS file does not contain FILES=15.

Action: Increase the number of files to 15 in the CONFIG.SYS file.

Message: Failed to read configuration file.

Cause: Configuration file is corrupted.

Action: Delete PCDRILL.CFG and create a new configuration file.

Message: Failed to load tool table.

Cause: No tool table exists or tool table is corrupted.

Action: Delete PCDRILL.TBL and create a new one.

Message: Tool table format is not compatible.

Cause: You are using a tool table from an old program version or tool table is corrupted.

Action: Delete PCDRILL.TBL and create a new one.

Message: Not enough memory.

Cause: Less than 640K of memory is available on the system.

Action: Expand memory.

Message: <INFNAME> does not exist.

Cause: The system cannot find the input PCB database filename as you typed it.

Action: Check the spelling and re-enter the filename. Check the directory path, if necessary.

Message: <INFNAME> format is incompatible.

Cause: The input PCB database is not P-CAD compatible.

Action: Make sure the database is a PCB database created with PC-CARDS.

Message: Input and output name must be different.

Cause: You entered the same filename for the input and output database.

Action: Enter another output filename.

Message: Output and plot name must be different.

Cause: You entered the same filename for the input and output database.

Action: Enter another output filename.

Message: Failed to open <OUTFNAME>.MFG.

Cause: Not enough files available on the system.

Action: Increase the number of files to 15 in the CONFIG.SYS file.

Message: PC-DRILL unsorted output file is incomplete.

Cause: Program error or the program failed before sorting.

Action: Check the error message that appears above this message on the screen.

Message: Check PCDRILL.ERR file.

Cause: Program has reported an error.

Action: See the PCDRILL.ERR error message report for error.

Message: PC-DRILL output file is incomplete.

Cause: Program error or the program failed before sorting.

Action: Check the error message that appears above this message on the screen.

Message: PC-DRILL is aborted.

Cause: You pressed the [Esc] key to end program processing.

Action: None.

Message: PC-DRILL plot file is incomplete.

Cause: Error reported while generating plot file.

Action: Check the error message that appears before this message.

Message: PC-DRILL drill file is incomplete.

Cause: Error reported while writing file to paper tape punch.

Action: Check the error message that appears before this message.

Message: Failed to open <OUTFNAME>.

Cause: The CONFIG.SYS file does not have FILES=15.

Action: Increase files to 15 in the CONFIG.SYS file.

Message: Failed to load the entire <INFNAME> data base.

Cause: Not enough space on the disk.

Action: Clean up the disk.

Message: The board does not have origin.

Cause: You did not enter the origin on the board.

Action: Enter the origin in the PCB database using the procedure described in the section titled "Preparing the PCB Database" in Chapter 2, "Using PC-DRILL."

Message: The board does not have any symbol.

Cause: There is no graphical data in the database.

Action: In PC-CARDS, enter graphical data in SYMB (symbol) mode or DETL (detail) mode.

Message: No tool table data is specified.

Cause: No data has been entered in the tool table.

Action: Enter data in the tool table.

Following is a list of error messages that may appear in the error report file (PCDRILL.ERR), the cause of each error, and the appropriate user action.

Message: The board does not have origin.

Cause: You did not enter the origin on the board.

Action: Enter the origin in the PCB database using the procedure described in the section titled "Preparing the PCB Database" in Chapter 2, "Using PC-DRILL."

Message: The board does not have any symbol.

Cause: There is no graphical data in the database.

Action: In PC-CARDS, enter graphical data in SYMB (symbol) or DETL (detail) mode.

Message: No tool table data is specified.

Cause: No data has been entered in the tool table.

Action: Enter data in the tool table.

Message: Failed to read configuration file.

Cause: Configuration file is corrupted.

Action: Delete PCDRILL.CFG and create a new one.

Message: Failed to save configuration file.

Cause: Not enough space on the disk.

Action: Clean up the disk and save the PCDRILL.CFG file.

Message: No data exists in the configuration file.

Cause: PCDRILL.CFG file exists but is empty.

Action: Delete PCDRILL.CFG and create a new one.

Message: Failed to load tool table.

Cause: No tool table exists or tool table is corrupted.

Action: Delete PCDRILL.TBL and create a new one.

Message: <INFNAME> format is incompatible.

Cause: The input PCB database is not P-CAD compatible.

Action: Make sure the database is a PCB database created with PC-CARDS.

Message: Failed to save tool table.

Cause: Not enough space on the hard disk.

Action: Clean up the disk and save the tool table again.

Message: Read header failed.

Cause: PCDRILL.TBL is corrupted.

Action: Delete PCDRILL.TBL and create a new one.

Message: Read table failed.

Cause: PCDRILL.TBL is corrupted.

Action: Delete PCDRILL.TBL and and create a new one.

Message: Memory allocation error.

Cause: 640K memory is not available on the system.

Action: If 640K memory is available, then program error. Call P-CAD.

Message: Sequencing error.

Cause: Program error.

Action: Run the program again or call P-CAD.

Message: Cluster init error.

Cause: Program error.

Action: Run the program again or call P-CAD.

Message: Clustering error.

Cause: Program error.

Action: Run the program again or call P-CAD.

Message: File access error.

Cause: Error occurred while reading unsorted file.

Action: Run the program again or call P-CAD.

Message: Point plotting error.

Cause: Error occurred during generation of plot file.

Action: Run the program again, or call P-CAD.

Message: Couldn't open plot file.

Cause: The CONFIG.SYS file does not have
FILES=15.

Action: Increase files to 15 in the in the CONGIG.SYS
file.

Message: Failed to initialize the RS232 interface.

Cause: Program or communication problem.

Action: Check RS-232 protocol for correct connection,
rerun the program, or call P-CAD.

Message: Error opening the <INFNAME>.

Cause: Not enough files on the system.

Action: Increase the files to 15 in the CONFIG.SYS file.

Message: Error closing the <INFNAME>.

Cause: System problem.

Action: Run the program again, or call P-CAD.

The following error messages may appear in the error report file, but are used by the programmer for debugging.

error message:>> <FUNCTION NAME> failed.

failure location:>> <FUNCTION NAME>

APPENDIX B. REMEX RXS6122 PAPER TAPE PUNCH INTERFACE SPECIFICATIONS

For general instructions on connecting your system to the paper tape punch, refer to your Remex RXS6122 manual. However, to process data from PC-DRILL, a special cable configuration and special switch settings are required. These requirements are listed below.

Table B-1 lists the cable configuration required for PC-DRILL to interface to the Remex RXS6122 paper tape punch.

Table B-1. Remex RXS6122 Cable Configuration

Computer Female		Remex Male		
Signal	Pin	Pin	Signal	
ACGnd	1	-----	1	ACGnd
Trans	2	----->	3	Recv
Recv	3	<-----	2	Trans
CTS	5	<-----	20	DTR
DSR	6	<-----	20	DTR
DCGnd	7	-----	7	DCGnd

NOTE: The J21 and J22 connectors must be connected through pin 6 to set a 1200 baud rate.

Figure B-1 shows the switch settings required for the Remex RXS6122 to interface to PC-DRILL.

OFF	ON	
X		— CUR LOOP
	X	— PCH PAR
	X	— PAR EN
X		— 1S B
X		— CL2
	X	— CL1
X		— ODD PARITY
X		— INH PCH

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Figure B-1. Remex RXS6122 Switch Settings

The switches are located on the S1 switch on the control board of the Remex RXS6122 paper tape punch. The X's represent the switch positions. These switch settings transmit data in a format of 7 data bits, 2 stop bits, and even parity.