

Model 390081 CPCCount™ Software

Instruction Manual

*P/N 1933764, Revision F
October 2002*



Manual History

The following is a manual history of the Model 390081 CPCCount™ Software Instruction Manual, P/N 1933764.

Revision	Date
Preliminary	May 1992
Final	July 1992
A	February 1994
B	December 1994
C	May 1996
D	October 1996
	October 1998
E	July 2000
F	October 2002

In revision A, the customer service number was changed.

In revision B, the manual was reformatted and the text was revised to include the use of LPC sensors with CPCCount™ software.

In revision C, the manual was updated to include the Model 3760A/3762 Condensation Particle Counter and TSI's "Limitation of Warranty and Liability" on page iii was updated.

In revision D, a minor revision was made to page 4-10.

In October 1998, TSI's area code was changed from 612 to 651.

In revision E, TSI's Limitation of Warranty and Liability was updated.

In revision F, TSI's phone numbers and address were updated.

Part Number

1933764 / Revision F / October 2002

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(effective July 2000)

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About This Manual

Purpose

This instruction manual provides installation and operating information for CPCCount™ Software.

Organization

The following shows how this manual is organized:

- ❑ **Chapter 1: Product Overview**
This chapter gives an introduction and a brief description of the software.
- ❑ **Chapter 2: Hardware Requirements**
This chapter contains the computer system requirements.
- ❑ **Chapter 3: Installing CPCCount™ Software**
This chapter contains instructions for installing the software.
- ❑ **Chapter 4: Using CPCCount™ Software**
This chapter gives instructions for starting the program, a summary of the menus and menu options, and instructions for running the program.
- ❑ **Appendix A: Equations**
This appendix gives the equations used to calculate displayed data and statistics.
- ❑ **Index**
This index is for reference.

Related Product Literature

- ❑ **Model 3010 Condensation Particle Counter Instruction Manual** (part number 1933010) TSI Incorporated
This manual contains operating instructions for the Model 3010 Condensation Particle Counter, an instrument used to count particles.

- ❑ **Model 3022 Condensation Particle Counter Instruction Manual** (part number 1933022) TSI Incorporated

This manual contains operating instructions for the Model 3022 Condensation Particle Counter, an instrument used to count particles.

- ❑ **Model 3025/27 Condensation Particle Counter Instruction Manual** (part number 1933025) TSI Incorporated

This manual contains operating instructions for Models 3025 and 3027 Condensation Particle Counters, instruments used to count particles.

- ❑ **Model 3703A Remote Processor Instruction Manual** (part number 1933773) TSI Incorporated

This manual contains operating instructions for the Model 3703A Remote Processor, an instrument used to interface sensors.

- ❑ **Model 3753A Laser Particle Counter Instruction Manual** (part number 1933771) TSI Incorporated

This manual contains operating instructions for the Model 3753A Laser Particle Counter, an instrument used to count particles.

- ❑ **Model 3760A/3762 Condensation Particle Counter Instruction Manual** (part number 1933772) TSI Incorporated

This manual contains operating instructions for the Model 3760A/3762 Condensation Particle Counter, a compact single-particle counting instrument.

Notational Conventions

This manual uses the following conventions when describing software:

- <Enter>** Denotes the “Return” or “Enter” key on the keyboard.
- <xx>** Denotes an alphanumeric key on the keyboard. For instance, **<F4>** means press the function “F4” on the keyboard.
- examples* Examples of what you see on the screen and the text you type are shown in monospace type resembling computer output.
- italic* Variable information in computer responses, commands, and options you must supply and type are shown in italics in a font that resembles computer font.
- UPPERCASE Uppercase letters indicate names of programs, files or commands.
- Bold** Bold type indicates names of fittings as they appear on the instrument and commands appearing on the display.

Reusing and Recycling



As part of TSI Incorporated’s effort to have a minimal negative impact on the communities in which its products are manufactured and used:

- This manual uses recyclable paper.
- This manual has been shipped, along with the instrument, in a reusable carton.

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If you have difficulty installing the CPCCount Software, or if you have technical or application questions about this product, contact an applications engineer at TSI Incorporated:

TSI Incorporated
Particle Instrument Division
500 Cardigan Road
St. Paul, MN 55126 USA
Fax: (651) 490-3824
E-mail: particle@tsi.com
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Submitting Comments

TSI values your comments and suggestions on this manual. Please use the comment sheet on the last page of this manual to send us your opinion on the manual's usability, to suggest specific improvements, or to report any technical errors.

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TSI Incorporated
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500 Cardigan Road
St. Paul, MN 55126 USA
E-mail: particle@tsi.com
Fax: (651) 490-3824

CHAPTER 1

Product Overview

CPCount™ Software allows you to monitor particle data generated from a Condensation Particle Counter (CPC). CPCount, designed for use with TSI Model 3010, 3022, 3025/27, 3760A/3762 CPCs, TSI Model 3753A Laser Particle Counter, and TSI Model 3703 Remote Processor, calculates the average concentrations and standard deviations of particle data and displays the results on a computer monitor screen.

As shown in Figure 1-1, CPCount displays data on a short-time graph, showing the latest 200 readings, along with a long-time graph showing averages over time. Collected data can be stored for later retrieval and output to a printer.

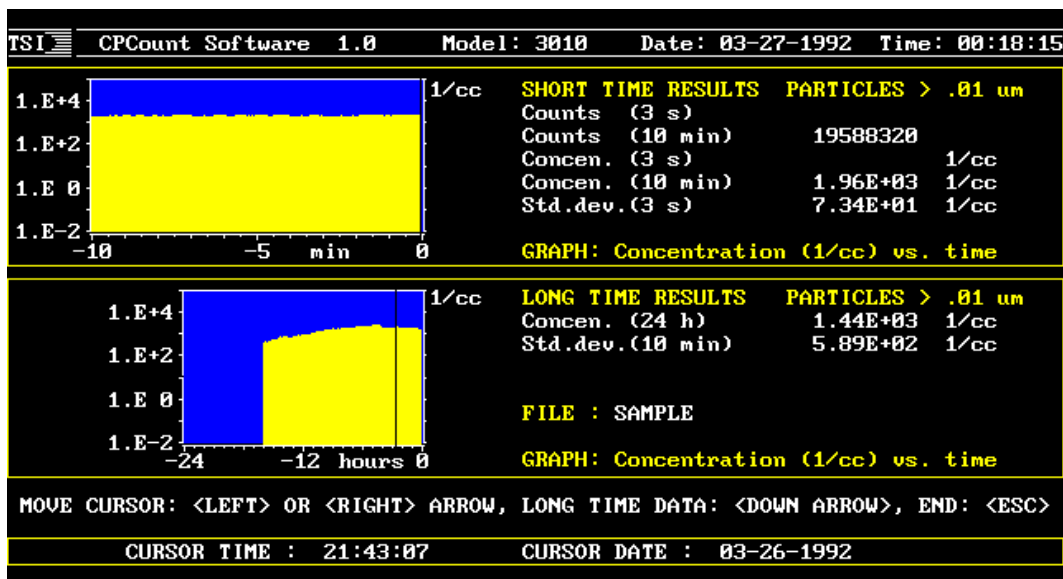


Figure 1-1
CPCount Data Display Screen

CHAPTER 2

Hardware Requirements

This chapter gives hardware requirements for the computer system running CPCount™ Software.

Note: Refer to individual Condensation Particle Counter (CPC), Laser Particle Counter (LPC), or Remote Processor (RP) manuals for information on connecting the sensor to a computer.

Required Hardware

To run CPCount, you need the following computer system hardware:

- MS-DOS version 3.3 or higher
- An IBM or IBM-compatible computer with an Intel 80386, 80386SX (or higher) processor, an EGA or VGA graphics controller, a serial interface (RS-232), a parallel port, and 640K of conventional memory.
- A color monitor.

Restrictions

CPCount software may be used on a network, provided only one system on the network is accessing the software at one time.

Optional Hardware

A mouse and a printer are optional. If you use a mouse, install the mouse driver on your computer system. If you use a printer, TSI recommends a Epson FX or IBM-compatible model. On an Epson printer, set the switch setting to “IBM-mode” so that graphs on a data display screen can be printed.

CHAPTER 3

Installing CPCCount™ Software

This chapter shows you how to install CPCCount™ Software on a computer hard disk.

Before loading software, make sure your computer is set up with a formatted hard disk and DOS operating system. If your hard disk is not formatted, refer to your computer manual for instructions.

Loading CPCCount

CPCCount Software contains an installation program to make it easy to load the files onto your hard disk. For your convenience, the installation program can set up a routine to load GRAPHICS, a DOS file that allows screen graphics to be printed.

For the following instructions, assume your floppy drive is A: and your hard disk drive is C:. If your computer is configured with different drive letters, substitute those drive letters in the instructions.

1. Insert the program disk in the 3.5 inch floppy drive (A:) of the computer.
2. Make a backup copy of the disk.
3. Start the installation program by typing:
A: INSTALL <Enter>
4. To install files from the floppy disk to the hard disk, follow the directions on the screen.
5. The install program asks you to confirm your choices. If you type "Y" to confirm the choices, a directory called CPCOUNT is created on the hard disk and contains these files:

CPCOUNT.EXE	(program)
CPCOUNT.PAR	(start-up parameters)
SAMPLE.ASC	(sample long-time data file)
SAMPLE.STD	(sample short-time data file)
READ-ME.TXT	(new information)
SOURCE	(source directory with source code)

6. A DOS file called GRAPHICS allows screen graphics to be properly printed on an IBM or Epson printer. You can use the install program to automatically load GRAPHICS, or you can manually load GRAPHICS each time before running CPCount.

During CPCount installation, you are asked if you want the install program to modify the computer's AUTOEXE.BAT file. If you answer Y, the GRAPHICS driver is automatically loaded each time you power on your computer. If you answer N, you must manually load the GRAPHICS driver each time you run CPCount by typing, at the DOS prompt:

```
GRAPHICS <Enter>
```

Listing Files

After you have installed CPCount, use the DIR command to list the files on the hard disk. Look at the READ-ME.TXT file to see if there is new information not documented in this manual. To look at the file, type:

```
TYPE READ-ME.TXT <Enter>
```

If you want to print the READ-ME.TXT file, type:

```
PRINT READ-ME.TXT <Enter>
```

CHAPTER 4

Using CPCount™ Software

This chapter gives the following operating information for the CPCount™ Software:

- ❑ Starting the program
- ❑ Menu and option definitions
- ❑ Setting up data collection using the Parameter menu
- ❑ Running the program using the Run menu
- ❑ Saving and recalling data using the File menu.

Starting the Program

To start CPCount, type:

```
CPCOUNT <Enter>
```

The initialization screen appears for a few seconds (Figure 4-1).

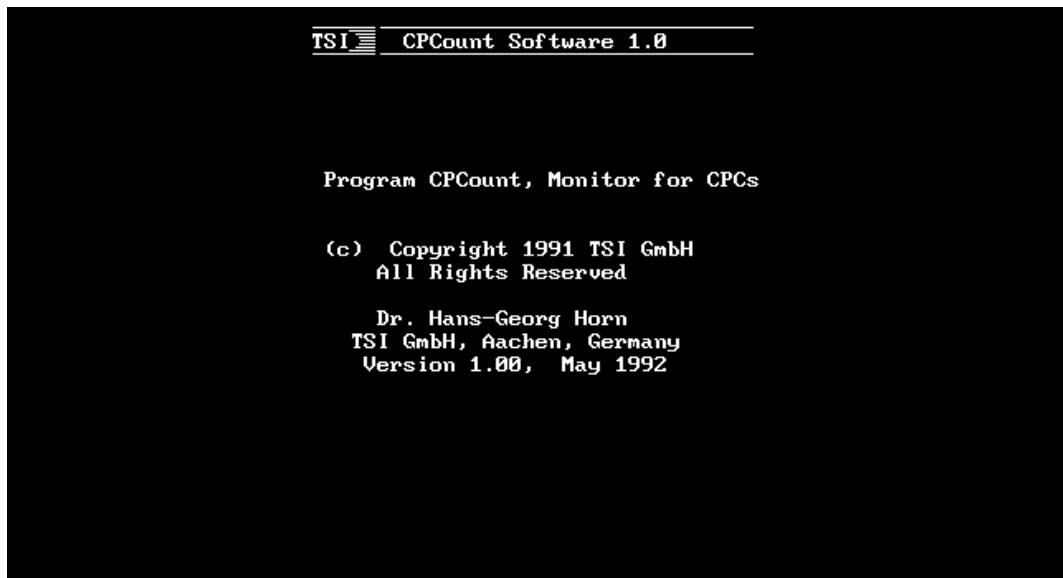


Figure 4-1
Initialization Screen

File Menu

Load Data	Used to recall a saved data file for display or printout.
Save Data	Used to enter a path and filename to store data while measurements are taken.
Exit	Used to stop the program and automatically return to DOS.

Run Menu

Start	Used to start the measurement. When you select this option, a summary of parameter settings is displayed.
Re-Display	Used to display the results of a measurement if the measurement was interrupted with the <Esc> key.
Clear Display	Used to erase measured data from the computer screen.
Comments	Used to enter comments. If comments are entered before or after a measurement, the comments are stored on a disk with the data if the Save option is On and included on a printout if the Print option is On.
Print (Off/On)	Used to enable a printout. Print is automatically turned On if the Print Interval parameter is greater than 0 (zero).
Save (Off/On)	Used to save a file to disk. If Save is On, data is written to disk as the measurement is taken.

Parameters Menu

Read Interval	Used to define the time interval, in seconds, between sensor readings. Results are displayed on a short-time graph (latest 200 readings) and a long-time graph (each point an average of 200 short-time readings).
Print Interval	Used to define the time between individual printouts. This time can be 0 (zero) or any multiple of the Read Interval .
Hardware Connections	Used to define the computer interface with the CPC and LPC. Options consist of the COM port, the baud rate and the model number of the CPC.
Save Settings	Used to save these parameters: read and print intervals, the COM port, the baud rate, and the sensor model number. Parameters are saved when you exit the program.

Read Interval Option

The Read Interval is the time interval, in seconds, in which data is read from the Condensation Particle Counter (CPC). The Read Interval is displayed as a short-time graph and a long-time graph (see Figure 4-10). The short-time graph shows the latest 200 readings from the CPC. A long-time graph shows 144 points, each point an average of 200 short-time readings.

1. Select the Read Interval with a mouse or the **<arrow>** keys. The Read Interval options are displayed (Figure 4-4).
2. Select a read interval from the ranges shown in Figure 4-4. The shortest possible read interval is dependent on whether data is being stored and printed while data is being collected. If the Print and Save options are On during data collection, select a read interval of 3 seconds or more.

Note: For more information on the Print and Save options, see “Using the Run Menu” in this chapter.

```
File Run Parameters
+-----+
|                                               |
|                                     +-----+ |
|                                     |     READ INTERVAL     | |
|                                     +-----+ |
|                                     | RECOMMENDED READ INTERVALS: |
|                                     |                               |
|                                     |   INT. SHORT TIME  LONG TIME |
|                                     |   < 1 >  3s    10 min   24 hours |
|                                     |   < 2 >  6s    20 min   2 days  |
|                                     |   < 3 >  18s   60 min   6 days  |
|                                     |   < 4 >  108s   6 hours  36 days |
|                                     |   < 5 >  432s  24 hours  20 weeks |
|                                     |   < 6 >  540s  30 hours  26 weeks |
|                                     |   < 7 >  * user defined (1 to 999 s) * |
|                                     |   < OK > |
|                                     +-----+ |
|                                     |                                               |
|                                     |                                               |
| < Alt >..... |
| < arrows >.. |
| < Tab >..... |
| < Enter >... |
| < highlighte |
| < Esc >..... |
| < P >.....print screen |
|                                               |
+-----+
```

Figure 4-4
Read Interval Screen

Print Interval Option

The Print Interval is the time interval in which data is printed. The Print Interval is a multiple of the Read Interval and should always be greater than or equal to the Read Interval. If the Print Interval is greater than 0, you receive a tabular printout.

1. Select the Print Interval with a mouse or the <arrow> keys. The print interval options are displayed (Figure 4-5).
2. You can select any print interval but the print interval will automatically adjust to the nearest multiple of the selected Read Interval.

If a print interval is selected, then a report is printed as the measurement is taken (Figure 4-6). If you have used the Comments option to enter remarks before or after the measurement is taken, remarks are added to the summary at the end of the table.

```
File Run Parameters
+-----+
|                                     |
|                                     |
|                                     |
|      PRINT INTERVAL                  |
|                                     |
|   The print interval will be adjusted |
|   to a multiple of the actual read   |
|   interval.                          |
|                                     |
|   0 seconds will switch printing off |
|   !                                   |
|                                     |
| Enter selected print interval in sec(s): |
|                                     |
|                                     |
|          9                            |
|                                     |
| Adjusted print interval:  9 seconds  |
|                                     |
|          < OK >                       |
|                                     |
+-----+
|                                     |
| < Alt >..... |
| < arrows >.. |
| < Tab >..... |
| < Enter >... |
| < highlighte |
| < Esc >..... |
| < P >.....print screen |
|                                     |
+-----+
```

Figure 4-5
Print Interval Screen

Printing Tables

Figure 4-6 shows a sample printout. If the Print option is On, a heading is printed before the measurement begins. One line is added to the printout when the print interval is completed. This line includes the date, time, concentration of particles during the last read interval, the mean concentration for all read intervals, and the standard deviation based on individual read intervals (see Appendix A, "Equations").

Printing Graphs

You can also print the contents of a CPCCount data display screen (shown in Figure 1-1) to display short-time and long-time graphs. For instructions, see "Re-Display Option" and "Load Data Option" in this chapter.

TSI CPCCount Software: PRINTOUT FOR EACH COMPLETED 3 SECONDS

DATE (mm-dd-yy)	TIME (hh:mm:ss)	CONCENTRATION, > .01 MICRON		
		actual (part/cc)	mean (part/cc)	std. dev. (part/cc)
06-26-1992	15:25:39	0.00E+00	0.00E+00	0.00E+00
06-26-1992	15:25:42	0.00E+00	0.00E+00	0.00E+00
06-26-1992	15:25:45	0.00E+00	0.00E+00	0.00E+00
06-26-1992	15:25:48	0.00E+00	0.00E+00	0.00E+00
06-26-1992	15:25:51	0.00E+00	0.00E+00	0.00E+00
06-26-1992	15:25:54	0.00E+00	0.00E+00	0.00E+00
06-26-1992	15:25:57	2.00E-02	2.86E-03	7.00E-03
06-26-1992	15:26:00	2.00E-02	5.00E-03	8.66E-03
06-26-1992	15:26:03	0.00E+00	4.44E-03	8.31E-03
06-26-1992	15:26:06	2.00E-02	6.00E-03	9.17E-03
06-26-1992	15:26:09	2.00E-02	7.27E-03	9.62E-03
06-26-1992	15:26:12	2.00E-02	8.33E-03	9.86E-03
06-26-1992	15:26:15	2.00E-02	9.23E-03	9.97E-03
06-26-1992	15:26:18	2.00E-02	1.00E-02	1.00E-02
06-26-1992	15:26:21	2.00E-02	1.07E-02	9.98E-03
06-26-1992	15:26:24	2.00E-02	1.13E-02	9.92E-03
06-26-1992	15:26:27	2.00E-02	1.18E-02	9.84E-03
06-26-1992	15:26:30	2.00E-02	1.22E-02	9.75E-03
06-26-1992	15:26:33	2.00E-02	1.26E-02	9.65E-03
06-26-1992	15:26:36	4.00E-02	1.40E-02	1.11E-02
06-26-1992	15:26:39	4.00E-02	1.52E-02	1.22E-02
06-26-1992	15:26:42	4.00E-02	1.64E-02	1.30E-02
06-26-1992	15:26:45	6.00E-02	1.83E-02	1.55E-02
06-26-1992	15:26:48	6.00E-02	2.00E-02	1.73E-02
06-26-1992	15:26:51	6.00E-02	2.16E-02	1.87E-02
06-26-1992	15:26:54	6.00E-02	2.31E-02	1.98E-02
06-26-1992	15:26:57	8.00E-02	2.52E-02	2.22E-02
06-26-1992	15:27:00	1.00E-01	2.79E-02	2.58E-02
06-26-1992	15:27:03	1.00E-01	3.03E-02	2.86E-02
06-26-1992	15:27:06	1.00E-01	3.27E-02	3.08E-02
06-26-1992	15:27:09	1.20E-01	3.55E-02	3.40E-02
06-26-1992	15:27:12	8.00E-02	3.69E-02	3.43E-02

TSI CPCCount Software

SUMMARY

Printed: 06-26-1992 15:27:17

TSI Particle Counter Model 3010

Measurement start: 06-26-1992 15:25:36

Measurement end : 06-26-1992 15:27:13

Total number of print intervals sampled : 32

Mean particle concentration >.01 micron : 3.69E-02 particles/cc

Standard deviation: 3.43E-02 particles/cc

Data not stored on disk

ADDITIONAL REMARKS (entered by the operator):

This is a sample run of CPCCount
The run was made at TSI Incorporated
Shoreview, MN U.S.A.

Figure 4-6
Sample Printout

Hardware Connections Option

Hardware Connections parameters consist of the communications port, the baud rate, and the type of sensor.

1. Select Hardware Connections with a mouse or using **<arrow>** keys. Default options are displayed (Figure 4-7).

```
File  Run  Parameters
+-----+
+----- CONFIGURATION -----+
+-----+
|                                     |
| < COM-PORT... >          COM1:    |
| < BAUD-RATE.. >          9600    |
| < SENSOR  .. >          3022    |
|                                     |
|          < OK >          |
|                                     |
|          to change, select an option! |
|                                     |
+-----+
|                                     |
| < Alt >.....            |
| < arrows >.....        |
| < Tab >.....step through options |
| < Enter >.....select option    |
| < highlighted letter >...select option |
| < Esc >.....cancel or backstep  |
| < P >.....print screen        |
|                                     |
+-----+
+-----+
```

Figure 4-7
Hardware Connections Screen

2. Using the information in Table 4-1, select parameters for your configuration. Use a mouse or the **<arrow>** keys to step through options; click the mouse or use the **<Enter>** key to select an option.

Note: *If parameters are incorrect, an error message is displayed when you start data measurement using the Run option.*

Table 4-1
Hardware Connections

Parameter	Options	Definition
COM-PORT	COM 1 or COM 2	Defines the serial interface connecting the sensor to the computer.
BAUD-RATE	300, 1200, 2400, 4800, 9600	Defines the data transfer rate between the CPC and the computer. The 3010 CPC requires a baud rate of 9600; baud rates for 3022, 3025, and 3027 CPCs are selectable.
SENSOR	3010, 3022, 3025, 3027, 3753, 3760/3762	Defines the model number of the sensor. Note: Models 3753A and 3760A/3762 require a Model 3703A Remote Processor to interface the sensor to the computer.

Save Settings Option

Use the Save Settings option to save the data collection parameters to a program file.

To save parameters, select Save Settings with a mouse, or use the <arrow> keys and press <Enter>. This message is displayed:

```
SAVING CONFIGURATION TO CPCOUNT.PAR
```

Then you return to the main menu screen.

If you want to change a saved parameter, select the option (Read Interval, Print Interval, or Hardware Connections), then use the Save Settings option.

Using the Run Menu

After you set up data collection parameters using the Parameters menu, use the information in this section to collect and display data.

1. Select the Run menu with the mouse or by pressing the **<Alt>** and **<arrow>** keys. The Run menu screen appears (Figure 4-8).

```
File  Run  Parameters
+-----+
| Start |
| Re-Display |
| Clear Display |
| Comments |
| Print (OFF) |
| Save (OFF) |
+-----+
|
| KEYS
|
| < Alt >.....turn on main menu
| < arrows >.....step through menu
| < Tab >.....step through options
| < Enter >.....select option
| < highlighted letter >...select option
| < Esc >.....cancel or backstep
| < P >.....print screen
|
+-----+
```

Figure 4-8
Run Menu Screen

2. Use Run menu options to do the following:
 - Start data collections by selecting the Start option.
 - If a measurement is interrupted, re-display by using the Re-Display option.
 - Add remarks to a file and a printed report by using the Comments option.
 - Erase collected data from the screen by selecting the Clear Display option.
 - Enable the print and save data functions by using the Print and Save options.

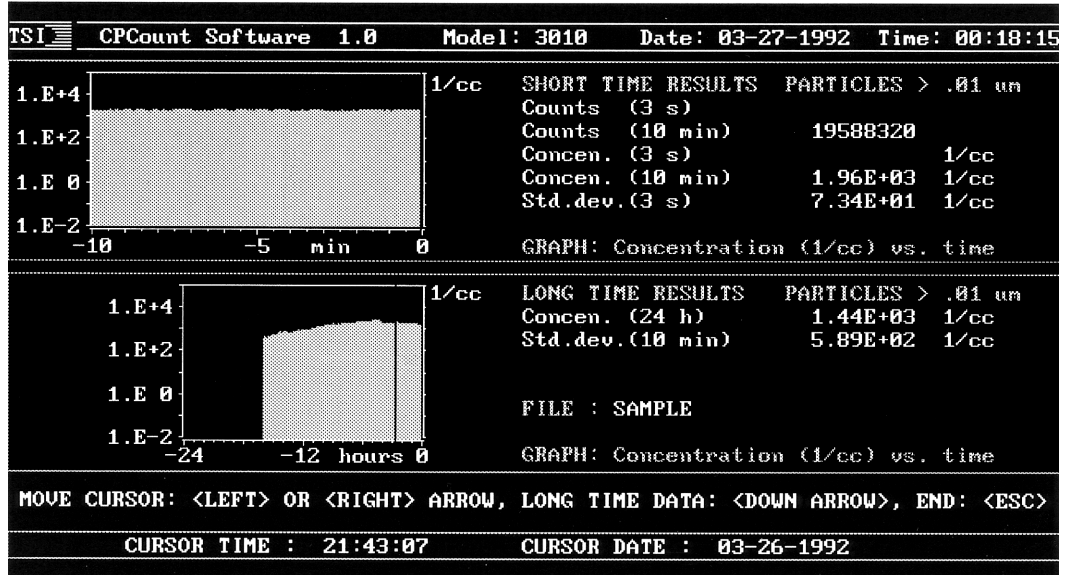


Figure 4-10
Data Display Screen

Data Display Screen

A data display screen shows short time results and long time results. Measurement times are based on the Read Interval parameter, with the latest 200 measurements displayed on the short-time graph and up to 144 points on the long-time graph. Each point on the long-time graph equals the average of 200 short-time measurements.

The Particles column updates each time a read interval occurs. Concentration is based on the read interval and the operating specifications (including flowrate) of the CPC.

If you want to print the contents of the data display screen, see “Re-Display Option” and “Load Data Option” in this chapter.

Stopping and Re-Starting Data Collection

If you want to interrupt data collection, press the <Esc> key. At this time you can add or edit comments (see the “Comments Option” in this chapter). If the Print option is On, a summary report is printed (Figure 4-6).

To resume collecting data, select the Start option and <OK>. Old measurements are separated from new measurements by a vertical black bar. To remove old data from the short-time and long-time graphs, select the Clear Display option before re-starting data collection.

Re-Display Option

Use the Re-Display option to review the last 200 measurements of collected data. Re-Display gives a snapshot of collected data so you can study results or select a specific graph-time for printout.

If you select Re-Display, a data display screen appears. The date and time on the screen (upper right) shows the values when the measurements stopped. The bottom of the screen shows the time and date of the cursor position.

- Press <←> and <→> <arrow> keys to move the cursor and select count and number concentration values.
- Press <↓> and <↑> <arrow> keys to go between the short-time and long-time areas of the screen.
- Press <Esc> to return to the main menu screen.
- To begin a printout, press <P>. The screen colors change to black and white for better contrast. Press <Shift> <Print Screen> to print the contents of the screen.

Note: To properly print the graphs on the data display screen, an Epson printer switch must be set to IBM-mode and the DOS GRAPHICS file must be loaded (see step 6 of “Loading CPCCount” in Chapter 3).

Clear Display Option

Use the Clear Display option to clear old data from a data display screen. Cleared data is not saved to disk and is not included in a printout. The Clear Display option does not erase previously saved data from the disk.

Select Clear Data with a mouse or the <arrow> and <Enter> keys. Data is cleared.

Comments Option

The Comments option allows you to attach remarks to a printout. You can add comments before a measurement is taken or you can add comments after a measurement is taken by pressing <Esc>.

1. Select Comments with a mouse or the <arrow> and <Enter> keys. A Comments screen is displayed (Figure 4-11).

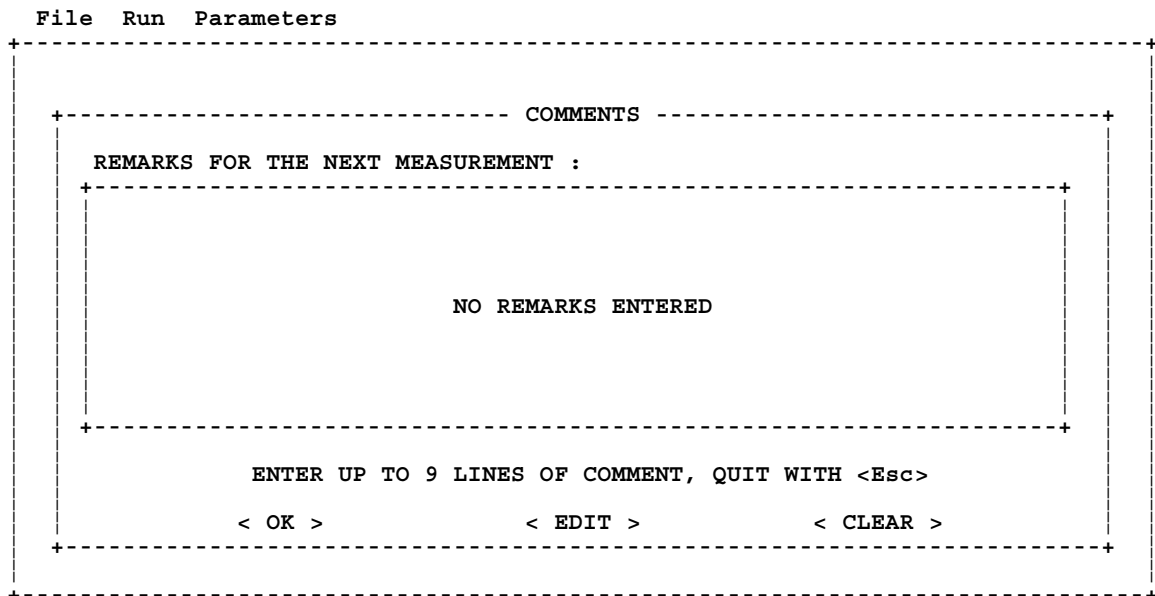


Figure 4-11
Comments Screen

2. Select:

- <OK>** to include typed remarks on a printout (if the Print option is On) or to store remarks with collected data (if the Save option is On). After selecting **<OK>**, you return to the main menu screen.
- <EDIT>** to type up to nine lines of remarks or to edit remarks already typed. Use a mouse or use **<arrow>** keys to move around, use **<Enter>** as a carriage return, and use **<Esc>** when you are finished. If the Print function is On, remarks are included on a printout. If the Save function is On, remarks are stored with collected data.
- <CLEAR>** to erase remarks.

Print Option

The Print option is a toggle function which enables a tabular summary report to be printed. The Print option is automatically toggled On if the Print Interval parameter is greater than 0 (zero). If the Print option is toggled Off, the print interval is set to 0 (zero).

To toggle the Print option, use a mouse or the **<Alt>** and **<arrow>** keys.

Note: Also see “Selecting the Print Interval Option” in this chapter for a description and sample of the printout.

Save Option

The Save option is a toggle function used to save measurement data to disk. If no filename has been entered in the Save Data option (under the File menu), the Save function is Off and must be turned On before the start of a measurement.

- 1.** Select the Save option with a mouse or the **<arrow>** and **<Enter>** keys. The Save Data screen appears (Figure 4-12).

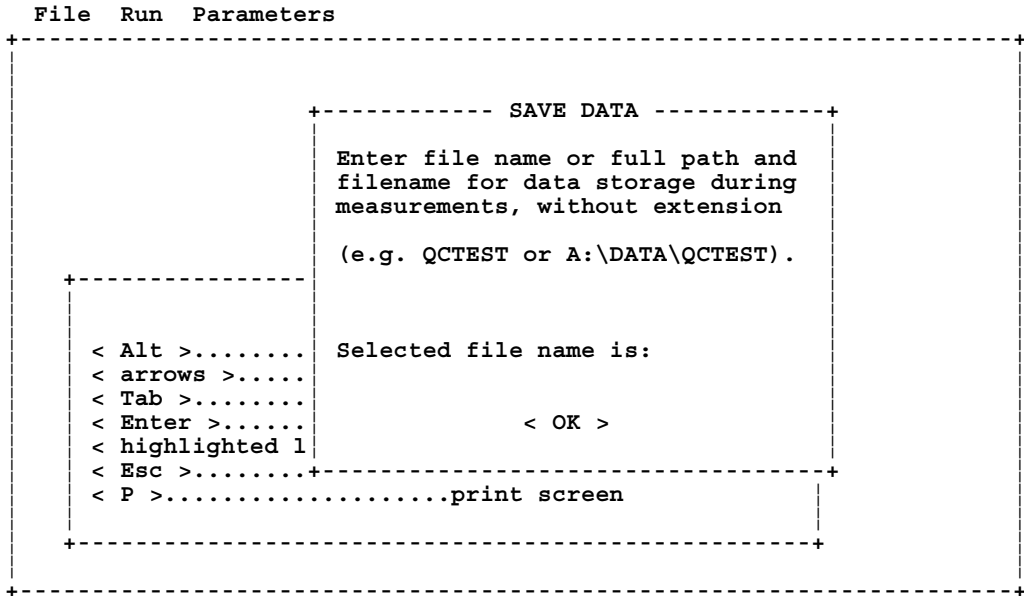


Figure 4-12
Save Data Screen

2. You can save data in the current directory or in a new directory.
 - If you want to save data to the directory you are in, type a filename and press **<Enter>**.
 - If you want to save data to a new directory, type a path name and a filename and press **<Enter>**. If the directory does not exist, an error message displays.
3. Select **<OK>** by using the mouse or **<arrow>** keys. The path name and filename are displayed on the data display screen.

Using the File Menu

Use the information in this section to save data or to recall saved data for display or printout.

1. Select the File menu with the mouse or the **<arrow>** and **<Enter>** keys. The File menu screen appears (Figure 4-13).

```
File Run Parameters
+-----+
| Load Data |
| Save Data |
| Exit      |
+-----+

+-----+
| KEYS      |
+-----+
| < Alt >.....turn on main menu
| < arrows >.....step through menu
| < Tab >.....step through options
| < Enter >.....select option
| < highlighted letter >...select option
| < Esc >.....cancel or backstep
| < P >.....print screen
+-----+
```

Figure 4-13
File Menu Screen

2. Use File menu options to do the following:
 - Recall saved data with the Load Data option.
 - Save data to disk with the Save Data option.
 - Exit CPCCount with the Exit option.

3. Long-time data is displayed.

- ❑ Press <←> and <→> <arrow> keys to move the cursor and select count and number concentration values on the long-time graph.
- ❑ Press the <↑> <arrow> key to load corresponding short-time data; press the <↓> <arrow> to go back to long-time data.
- ❑ Press <Esc> to return to the main menu screen.
- ❑ If data was stored with comments, you can review the comments by selecting the Comment option from the Run menu.
- ❑ To begin a printout, press <P>. The screen colors change to black and white for better contrast. Press <Shift> <Print Screen> to print the contents of the screen.

Note: *To properly print the graphs on the data display screen, an Epson printer switch must be set to IBM-mode and the DOS GRAPHICS file must be loaded (see step 6 of "Loading CPCCount" in Chapter 3)*

Checking for Stored Data Files

Use the Load Data option to check which data files are already stored on the disk. Use the same procedure to load data (step 2 above), but use <Cancel> or <Esc> to exit the window displaying the list of files.

CPCCount lists only long term data files with the extension .ASC. To recall data files, you also need a corresponding short term data file with a .STD extension. If you are not able to recall a file, exit CPCCount and check for a corresponding file with the .STD extension.

If you are not able to recall a data file, it is possible that the file is internally corrupted or that one of the disk's sectors or tracks is not readable. In these cases, the data is lost.

Save Data Option

Select the Save Data option to name a file and save the file to disk.

1. Select the Save Data option with a mouse or the <arrow> and <Enter> keys. The Save Data screen appears (Figure 4-15).

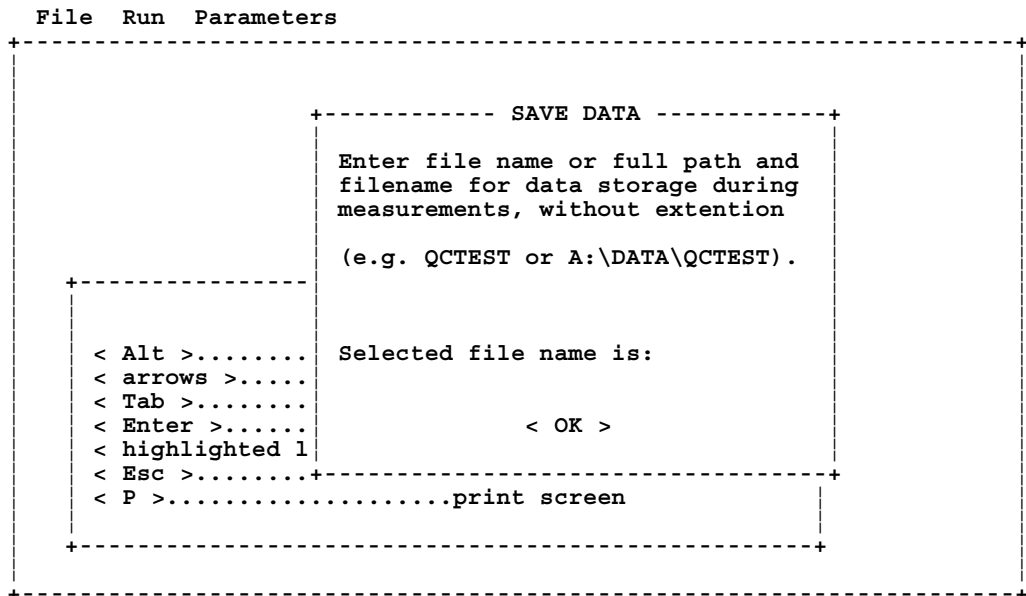


Figure 4-15
Save Data Screen

2. You can save data in the current directory or in a new directory.
 - If you want to save data to the directory you are in, type a filename and press <Enter>.
 - If you want to save data to a new directory, type a filename and a path name and press <Enter>. If the directory does not exist, an error message displays.
3. Select <OK> by using the mouse or <arrow> keys. The filename and path name are displayed on the data display screen.

Exit Option

Select the Exit option if you want to exit the CPCount program. If you select Exit, selected operating parameters (read and print intervals, COM port, baud rate, and CPC model number) are stored and you return to the DOS prompt.

APPENDIX A

Equations

This appendix contains equations used to calculate displayed data and statistics.

At each individual reading (i), the program receives the time since the last reading ($t_{r,i}$) and the counts since the last reading ($N_{r,i}$) from the sensor. Based on these two values, the following figures are calculated:

Number concentration for the individual reading interval i ($C_{r,i}$):

$$C_{r,i} = \frac{N_{r,i}}{t_{r,i} Q_s} \quad \text{with } Q_s = \text{flowrate of the particle counter} \quad (0)$$

Total counts of up to 200 readings N_{200} :

$$N_{200} = \sum_{i=1}^n N_{r,i} \quad (1)$$

Where n is either 200 (200 readings), or the actual number of readings (< 200 readings).

The short time mean number concentration C_{200} is calculated from:

$$C_{200} = \frac{N_{200}}{t_{200} Q_s} \quad (2)$$

where t_{200} is the total short time sampling time.

$$t_{200} = \sum_{i=1}^n t_{r,i} \quad (3)$$

with n : 200 or number of readings if less than 200.

The short time standard deviation SD_{200} is calculated as follows:

$$SD_{200} = \sqrt{\frac{1}{n-1} \sum_{i=1}^n (C_{r,i} - C_{200})^2} \quad (4)$$

with n : 200 or number of readings if less than 200.

The long time mean number concentration C_m is calculated from the individual short time mean number concentration $C_{200,i}$:

$$C_m = \frac{1}{m} \sum_{i=1}^m C_{200,i}$$

where m is the number of available short time mean number concentrations.

The long time standard deviation SD_m is:

$$SD_m = \sqrt{\frac{1}{m-1} \sum_{i=1}^m (C_{200,i} - C_m)^2}$$

where m is the number of available short time mean number concentrations $C_{200,i}$.

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