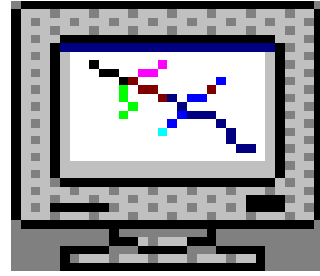


RMT

WATER CHARACTERIZATION
SOFTWARE DEMO



RMT
Operations Guide

RMT: WATER CHARACTERISATION SOFTWARE

Operations Guide

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RMT water characterisation software provides a topographical interpretation of flow and water quality data by utilising the X- and Y-Co-ordinates of a given catchment area. The unique interface allows the User full control of the visual appearance of their water quality data, producing images suitable for reports and presentations.

The Program was developed as an add-on to many of the water quality models currently in use today, but can also be used independently with raw water quality data.

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RMT has been developed for both 16 and 32-bit operating systems, using Visual Basic language. In order to take full advantage of RMT's exciting features the following hardware and software configuration is required as a minimum:

- **Operating System :- Windows 95 And Windows NT**
- **Minimum Processor :- 486MHz (Pentium Recommended)**
- **Minimum Ram :- 4 MB (8 MB Recommended)**
- **Hard Disk Space: - 5 MB for Initial Installation.**

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1. Insert **Disk One** into the floppy disk drive, here denoted as **a:** drive.
 2. In Windows 95, click on the **Start** Button and select **Run** from the **Start Menu**.
 3. In the dialogue box, enter the following command: **a:\setup**
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4. Follow the on screen instructions.





RMT can effectively transform tables of incomprehensible water quality data into maps designed for maximum visual impact. More importantly, RMT can be used as a River Management Tool for evaluating results from the many water quality models in use today.

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The map created using RMT provides a visual representation of a given catchment area, with the width of the river representing flow and the colour of the lines representing the concentration of the chosen pollutant.

The database utility used to create files for RMT can handle data on up to sixteen parameters, as well as water quality indices and biological indices. Please note, however, that data is not required for all of the parameter fields. In this event, empty fields should simply be filled with zeros. The database utility requires two data files, the structure of which is described in the following section.

RMT also incorporates a useful zoom utility: left clicking the mouse allows you to zoom in on any area of the map. By right clicking the mouse button, the map will zoom out to its full size. You can also specify a single river or reach to be plotted out.

In order to increase the sensitivity of the map to changes in quality data, RMT incorporates a utility to edit the value associated with each colour, or to change the designated colours used for each parameter.

Once you have created a map, you may want to enhance the appearance of the output file. For this purpose RMT includes tools for adding titles, including a grid or altering the appearance of the background. This last enhancement is especially useful as it allows you to create a bitmap file, which could consist of labels or even a scanned image of a map of the surrounding area.

RMT also contains a facility for plotting the location of monitoring stations, flow stations and discharge points on the map. The data for this facility is contained in the STATION DATA FILE, the structure of which is outlined below. For each of the records entered in this file, RMT plots a symbol representing the feature on the map. By clicking on any one of these symbols, a description of the feature will be given.

Once you have obtained the desired look for your map, you can choose to print the file. This opens up a Report file in a separate window, which can either be sent to an attached printer or exported in several file formats.

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In order to run RMT, two files are required: the *INPUT DATA FILE* and the *STATION DATA FILE*. These files are comma delimited files (.csv) and can be created using a Spreadsheet Program such as Microsoft s Excel. You can choose to plot up to sixteen parameters and chemical or biological indices, but empty columns should be filled with zeros. The structure of these files is outlined in *Chapter Three, Structure of Data-files*.

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The file system used in RMT is based on a database structure. A facility for creating a database from a series of files is included with the Program, thus eliminating the need for a separate database Program. The following chapter will describe how to use this facility to create input files for RMT.

Structure of Data Files

The following section describes the structure of the two input files required to run RMT, namely the *INPUT DATA FILE* and the *STATION DATA FILE*. These files are comma delimited files (.csv) and should be created using a Spreadsheet Program such as Microsoft's Excel.

When constructing the input data-file, you can either number each river individually or separate the river into reaches. Each Parameter must have a value, and must be separated by a comma. You can choose to plot data for any number of the available parameters, but any empty columns should be filled with zeros.

INPUT DATA FILE: This file is a comma delimited (.csv) file that can easily be created using a Spreadsheet Program. The following column headers (from left to right) can define the structure of this file, which should not be included in the final .csv file. The value of the X and Y Co-ordinate can be derived from any Grid Reference System, as RMT simply takes the largest co-ordinate values and uses them to position your map on-screen.

- RIVER OR REACH NUMBER
 - X-CO-ORDINATE
 - Y-CO-ORDINATE
 - FLOW
 - SUSPENDED SOLIDS
 - BIOCHEMICAL OXYGEN DEMAND
 - PERMANGANATE VALUE
 - DISSOLVED OXYGEN
 - TEMPERATURE
 - PERCENTAGE SATURATION
 - AMMONIA
 - TOTAL OXIDISED NITROGEN (TON)
 - PHOSPHATE
 - pH
 - ALKALINITY
 - CHLORIDE
 - TOTAL HARDNESS (TH)
-

- NITRITE
- NITRATE
- CONDUCTIVITY
- WATER QUALITY INDICES
- BIOLOGICAL INDICES

EXAMPLE INPUT DATA FILE

```

1,979,909,3.98,0,0.3,0,1.7,0,0,0.03,0,0,0,0,0,0,10.85,0,0,0
1,977,908,3.98,0,0.4,0,1.6,0,0,0.05,0,0,0,0,0,0,10.25,0,0,0
.....
15,595,356,61.59,0,2.1,0,4.2,0,0,1.2948,0,0,0,0,0,0,9.3643,0,0,0

```

STATION DATA FILE: This file is also a comma delimited (.csv) file that can easily be created using a Spreadsheet Program. This file is used to plot the location of monitoring stations, gauging stations and discharges on the map. The following column headers can define the structure of this file, which should not be included in the final .csv file.

- RIVER OR REACH NUMBER
 - SITE IDENTIFICATION(i.e. monitoring, gauging or effluent)
 - SITE NUMBER
 - SITE NAME
-

- X-CO-ORDINATE
- Y-CO-ORDINATE

EXAMPLE STATION DATA FILE	
1,Monitoring,head,SOURCE,980,908	After the data- files have
1,Monitoring,ms1,DOWNSTREAM,957,810	
.....	
15,Effluent,S.3.3.,RIVER END,613,376	

been constructed in a spreadsheet environment, you should save the data-file, using the save as option in the file menu in the spreadsheet program. Name the data-file and then select the comma-delimited or .csv format from the file type list.

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Once you have created the two input files described in the previous section you are ready in create a database (.mdb) file.

1. From the **File Menu**, choose the **Create New** option.
 2. Next select the comma delimited (.csv) file which contains your **INPUT** data. The Program will read the input data into the database.
 3. Finally select the comma delimited (.csv) file that contains the **STATION** data. The Program will read the station data into the database.
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Once you have created the database file you are ready to plot your first RMT map file. *Chapter Four* describes each of the features of RMT. Instructions on running RMT for the first time will also be given.

**Introduction**

The features of RMT are described in detail in the following chapter. In order to understand some of the terminology used in this chapter, you are assumed to have a basic understanding of the Windows 95 environment.

Description of Features

The **File Menu** provides the facilities required to create a new database, open and close files or print a report file. There now follows a summary of each of the items found in the **File Menu**.

Create New By selecting the **Create New ...** option from the **File Menu**, you can create a new database from existing data. Two data-files are required to create a database, the structure of which has been discussed in *Chapter 3*.

Open The **Open** option from the **File Menu** is used to open an existing Map database. The program will ask you to specify the location of the existing .mdb database. Once this has been done, the RMT software will read in the data from the database file and plot the map in black. You can now choose which Parameters to plot from the **Parameter Menu**.

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Use the **Close** option on the **File Menu** to close the existing map. You do not have to save the map file as any changes are automatically saved to the database file.

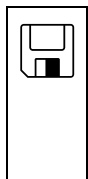
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The **Print** option on the **File Menu** is used to send the map file to an attached printer or save the contents in a range of file formats. The Map can be printed in Portrait format on an A4 Sheet of Paper. When you first select this option, the program will take about 1 minute to write the Map to the report software, at which point a print window should appear. This Print window is the RMT software link to the Printer and can be maximised by clicking the maximised button on the top right corner. The icons provided can perform the following functions.

1. **MAGNIFYING GLASS**: Preview the full page before printing.
2. **PRINTER**: Send the contents of the .RMT file to the default Printer.
3. **SUITCASE**: Save the contents in a range of file formats for export to other applications.
4. **MAIL**: Send the file as email.
5. **CLOSE**: Exit the Print window and return to the RMT Program.

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Use the **Exit** option on the **File Menu** to exit the RMT Program.



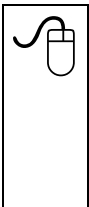
Any changes made to the Map data or settings are saved to the Map database as soon as the changes are made, so you can safely exit the RMT software without having to save

any changes.

The **View Menu** allows you to include a grid with the map and also plot flow, monitoring and effluent discharge points on the map. You can also choose whether to view the full map or specify a single reach or river to be plotted out. There now follows a summary of each of the items found in the **View Menu**.

Grid By selecting the **Grid** option on the **View Menu** an 8 by 8 grid will be displayed across the Map. This allows easy reference of points of interest on the Map by using the grid references.

stations The **Stations** option on the **View Menu** allows the location of stations to be viewed on the Map. By selecting the Station type(s) and clicking OK, each station will be plotted on the Map with one of the following symbols:



By left clicking the mouse when the mouse pointer is over a station, the station data for that particular station is shown in a window. By clicking on this window, the window disappears.

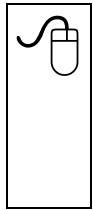
<u>Station Type</u>	<u>Symbol</u>
Flow station	≡
Monitoring station	⊗
Effluent station	⊙

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By selecting the **Whole Map** option on the **View Menu** after you have viewed part of a Map, you will be returned to viewing the entire map.

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The **Part Map** option on the **View Menu** allows viewing of individual rivers or reaches. The RMT software displays a window, asking you to input the river or reach number of the river to plot. After entering the required number and clicking on OK, the individual river or reach will be displayed.



You can also zoom in on the Map by positioning the mouse at the desired location and left clicking the mouse, or zoom back to the original Map by right clicking the mouse.

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The **Settings Menu** allows you to select that parameters are to be activated for the current map. You can also edit the values associated with each colour on the scale along the bottom of the screen for each individual parameter. The **Settings Menu** can also be used to alter the colour of the grid or alter the appearance of the background. This is particularly useful as a bitmap (.bmp) file can be used as a background, allowing you the opportunity to include further information with the map. Finally you can add a title to their map which will appear on the task-bar as well as in the report file. There now follows a summary of each of the items found in the **Settings Menu**.

Parameter Settings The **Parameter Settings** option on the **Settings Menu** allows you to select which parameters can be displayed on the Map. A window is displayed, and you should select the required Parameters by clicking the option box next to the Parameter once. At this stage a tick will be displayed, denoting the Parameters that have been activated.

Colour Values The **Colour Values** option on the **Settings Menu** allows you to change the colour for values, up to, but not including the value specified in each field for each parameter. To change a colour, click on **Change Colour** at which point a colour window will be displayed. From this window you should select the new colour, by clicking on the desired colour and clicking on OK. Use the forward (>,>|) and back (|<,<) controls to navigate through the colour values, and click on the text box for any parameter value you wish to edit. After modifying the parameter value(s), click on **Close** to write the changes to the current database. This action will not affect any other database, which will retain their original colour values.

Grid Colour The **Grid Colour** menu option on the **Settings Menu** allows you to change the grid colour being displayed. A window will be displayed allowing you to choose the colour from a range of colours. Click the box containing the new colour, and then click OK. The new colour should now be shown when the grid is displayed.

Map Background The **Map Background** option on the **Settings Menu** can be used to alter the appearance of the map background. When selected, a colour window will be displayed, from which you should select the desired colour and press OK. The Map Background will now change to the new colour selected.

Map Title The **Map Title** option on the **Settings Menu** can be used to attach a title to the Map. When selected a window with a text box appears. After entering the title for the map and clicking on OK, the new title will be shown at the bottom right hand side of the status bar, and written to the database. When the database is loaded in the future, the new title will be shown each time, until changed again by the user.

The **Parameters Menu** allows you to switch between each of the activated parameters. Parameters can be activated using the **Parameters Settings** option on the **Settings Menu**. Activated parameters are highlighted in bold. The parameters that can be plotted with RMT are as follows:

- **SUSPENDED SOLIDS**
 - **BIOCHEMICAL OXYGEN DEMAND**
 - **PERMANGANATE VALUE**
 - **DISSOLVED OXYGEN**
 - **TEMPERATURE**
 - **PERCENTAGE SATURATION**
 - **AMMONIA**
 - **TOTAL OXIDISED NITROGEN (TON)**
 - **PHOSPHATE**
 - **pH**
 - **ALKALINITY**
-

- **CHLORIDE**
- **TOTAL HARDNESS (TH)**
- **NITRITE**
- **NITRATE**
- **CONDUCTIVITY**
- **WATER QUALITY INDICES**
- **BIOLOGICAL INDICES**

The **Help Menu** contains access to RMT's Help file and information about the RMT.

The **Status Bar** is found along the bottom of the window and contains information on the progress of a file transfer, the name of the open file, the view and the title of the map file.



The **Colour Scale** is found along the top of the status bar. On entering the Program the values attached to each of the defined colours are given a value zero. Once the database has been read in the colour scale attached to each parameter will be displayed when the activated parameter has been selected. When creating a new database, the colour scale has to be defined before the data can be plotted out.

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Once you have created your first database (.mdb) file, as outlined in *Chapter 3*, you are ready to use RMT for the first time. The following section takes you through the procedure for plotting out your first map using RMT.

1. From the File Menu, choose Open and click on your .mdb file. Click on Open. The Program will plot out your map file. Its progress is recorded on the left of the Status Bar.
 2. From the Settings Menu, choose the Parameter Settings option and select the parameters you have entered data for in your input data file.
 3. If you wish to edit the colour values on the scale then select the Colour Values option on the Settings Menu and edit the values as described in Description of Features, Settings Menu.
 4. Select the parameter you wish to plot by clicking on the Parameter Menu and identifying the parameter you wish to plot. The Program will then plot the chosen parameter's data with the allocated scale displayed on top of the Status Bar.
 5. You can then use any of the features discussed in Description of Features to add a grid, title, plot stations or plot a particular river for closer inspection.
 6. When you have finished, go to the File Menu and select the Print option. The program will take about one minute to write the map to the report software, at which point a print window
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should appear. You can then choose to print the file or export the file using various file formats as discussed above.

