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# DatScan Analyser User Guide

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1.2	Updated to match functionality in version 1.02 of the software.	10/4/2018	GP
1.2	Updated to add usage of EP3 CSV converter utility	24/4/2018	GP

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QTech Data Systems Limited  
12 Midas Place, Middleton  
Christchurch 8024  
New Zealand  
Phone: +64-3-366-3713  
Fax: +64-3-365-2815  
[www.qtech.co.nz](http://www.qtech.co.nz)



## INTRODUCTION

DatScan Analyser is a desktop PC application that is used for managing and reporting on the data that is obtained from the QTech Data Loggers via an automated cellular connection or manual downloads using the EP3 Data Manager.

For automated downloads the data is retrieved to the Datahost base station. Your data logger needs to be equipped with a cellular modem or LAN bridge connection for this option. For manual download the data is transferred to your EP3 Data Manager and then needs to be imported from those devices to the DatScan database for analysis. For this mode of operation your Data Logger will be equipped with a 2.4GHz radio module (Q54) or 900 MHz radio module (Wireless Data Logger - WDL).

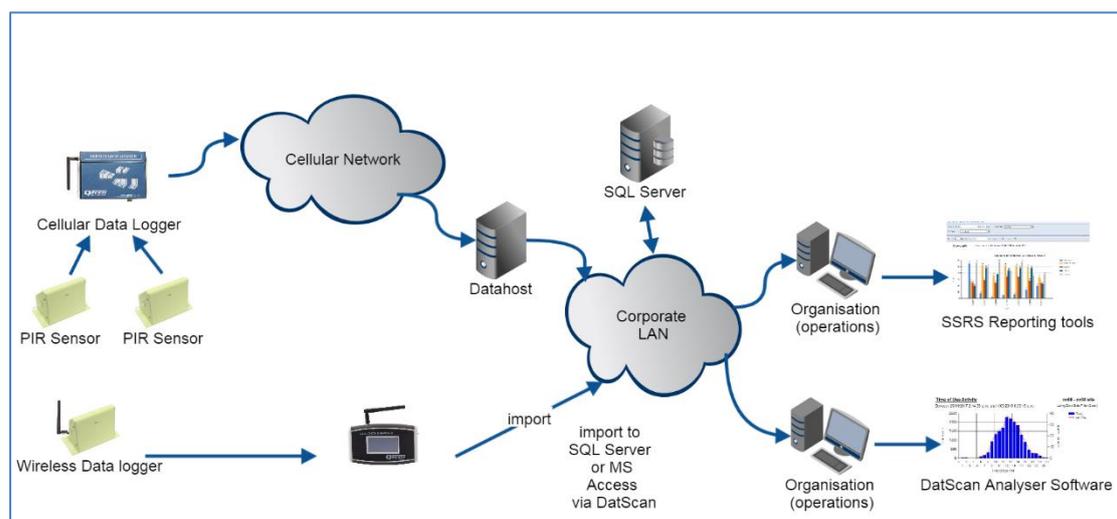


Figure 1 Typical System Configurations

Large amounts of data can be generated by the logger over long periods of time and due to the characteristics of some sensors, particularly PIRs, there may be multiple readings for a single person passing the sensor. This can be removed by filtering processes. The software also manages, import, storage, charting and reporting of the data.

DatScan Analyser simplifies the entire process by:

- Allowing formatted CSV file or RAW data import into a database from the EP3 Data Manager,
- One-click graphical reports that can either be copied to a word processor to form part of a document or sent directly to a printer.

DatScan Analyser enhances the process by:

- Providing a CSV file report that highlights any possible issues with the import process,
- Different filters, which can be applied depending on the type of data that is being logged,
- Graphical reports that can span any time period where data is available,
- Additional site information and notes, which can be stored and easily retrieved,
- The software has been designed to be as simple as possible so no spreadsheet or statistical analysis skills are required,

- Enabling data to be easily exported from the database in a variety of formats allowing further, external analysis.

For Additional information on data retrieval from Loggers, refer to the EP3 Data Manager User Guide.

# INSTALLATION

Download the DatScan installation files from the QTech web site to your PC. A client member account may be required to access the files. If you do not have one please apply to QTech for a membership account. If the files are compressed into a zip file then unzip the files to a folder on your PC.

### Installation Requirements:

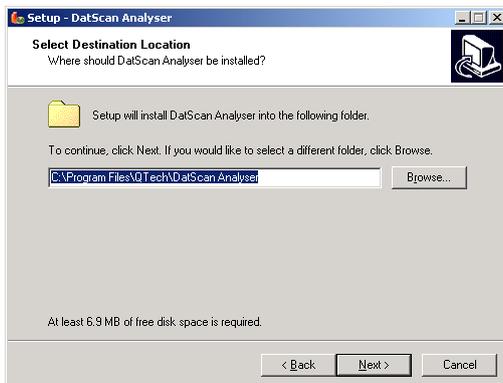
- A PC running Microsoft Windows 7 or later
- Recommended minimum 2 GB ram, 10 GB hard Drive
- Type A-B USB cable (USB 2.0 or later) (optional for data transfer directly from EP3)



At the Welcome screen click **Next**.

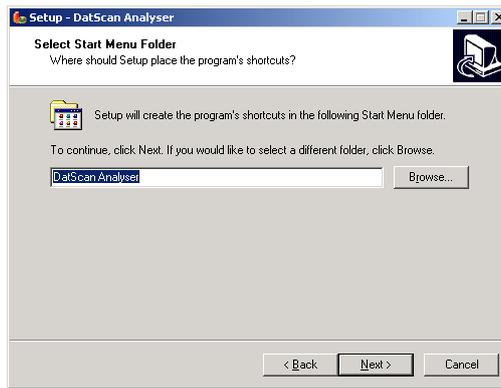


Read and accept the licensing agreement and then click **Next**.



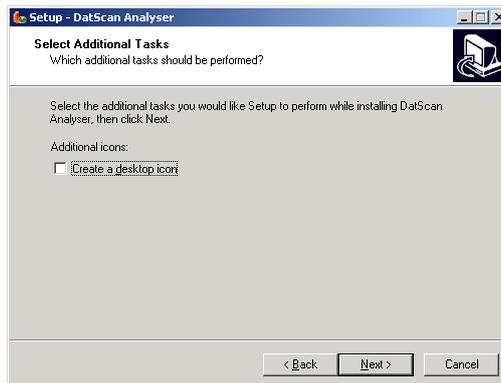
Select the Destination folder or use the supplied default.

Click **Next** to continue.



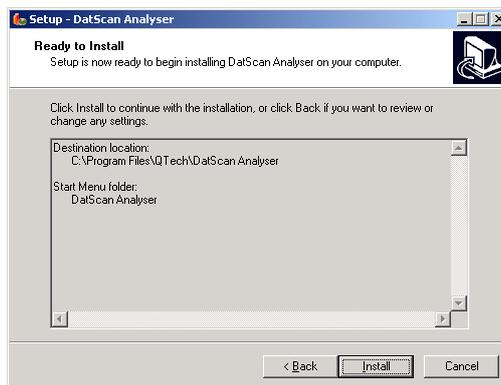
Select the Start Menu folder.

Click **Next** to continue.



Tick the checkbox if you would like an icon created on your desktop.

Click **Next** to continue.



This is the confirmation screen. If you wish to make any changes click **Back** otherwise click **Install** to begin installation.

A new program group will have been created in your Start Menu and, if selected, an icon will have also been placed on your desktop giving easy access to starting the DatScan Analyser application.

## OVERVIEW OF DATASCAN ANALYSER

### First Use

When DatScan Analyser is run for the first time it will automatically display the configuration screen. The configuration sets the default file locations and data filters that you wish to use and information about the site locations of the Data Loggers that you will be extracting data from.

The user should complete the configuration section before proceeding to import and analyse data. Refer to the section in system configuration.

### Main Dashboard Screen

The main screen is arranged like a control panel giving easy access to the most common functionality.

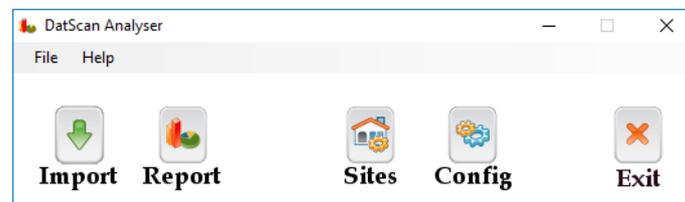


Figure 2 Main Dashboard

The buttons are grouped:

- **Import** and **Report** are action buttons that allowing data to be imported and graphs to be created. These are the buttons you will be using the most.
- **Sites** and **Config** are configuration buttons for Site Configuration such as the location of where your logger(s) reside, and System Configuration such as where to import data from. There will be some configuration that is required on first use.
- **Exit** closes the DatScan Analyser application.

The File Menu provides access to the advanced **Export** functionality.

### Getting Started

Follow these steps to create your first report.

1. Remember, **Configure** the default settings first (config)
2. Connect your EP3 to the PC or Insert an SD Card containing the log files from the Data Logger
3. **Import** the data
4. **Create** a new report using the **Report** button
5. **Export** the data for further analysis using spreadsheet tools if desired.

For a detailed description of obtaining the data files from a Data Logger using your EP3 Data Manager, refer to the DatScan EP3 Data Manager User Guide.

Connect the EP3 via USB cable to the PC or remove the SD Card containing the data files from your EP3 and insert it into the SD card slot of your PC. The first time you connect via USB, Windows will install a USB driver to turn your EP3 into a mass storage device that can be viewed using Windows File Explorer.

The CSV data files are located in the logging folder and can be copied to a folder on your PC (e.g. "My Documents"). Press the **Import** button from the DatScan Analyser main screen and then select if you want to import either a single data file or all of the data files downloaded from the EP3. Depending on how much data you are importing this could take a few minutes. Once all of the data files have been imported, review the data transfer report to ensure there were no unexpected warnings.

Click on the **Report** button from the main screen. Select the Data Logger and time frame you wish to report for and press the **Create** button. This report can then either be sent directly to your printer or copied to the clipboard. If copied to the clipboard it can then be pasted into your word processor. Only one report can be selected at once.

If you need to use a spreadsheet tool like Microsoft Excel for further analysis, then From the File Menu, select **Export**. This provides a screen very similar to the one used to create a report but with the addition of a list of available export types. Select the Data Logger and the time frame and then chose the type of data you want exporting. The output file will be stored in the Export folder as specified in the System Configuration. The data is exported in CSV format which can easily be loaded in to your spreadsheet.

## SYSTEM CONFIGURATION

Clicking the **config** button opens the system configuration dialog windows. All configuration settings are saved and are persistent between sessions.

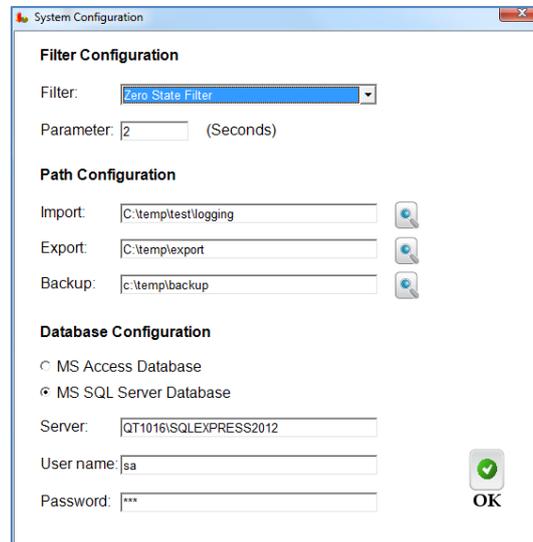


Figure 3: System Configuration

### Path Configuration

**Import.** This specifies where the application will find the CSV data files downloaded from the EP3 Data Manager. The location can be modified at the time of importing. *Note:* this field can be ignored for automated data collection using the Cellular Data Loggers. Click the magnifying glass icon to browse to folder locations.

**Export.** This specifies where the application will put the output CSV data files when the data is exported from the database. The location can be modified at the time of exporting.

**Backup.** This specifies where the application will place the backup copies of the CSV data files once they have been imported. This is an automatic process and therefore this location cannot be modified at the time of importing. *Note:* this field can be ignored for automated data collection using the Cellular Data Loggers.

If the folder pathname does not exist the user will be prompted to create the folder.

### Filter Configuration

Depending on the type of sensor used with the Data Logger and the position of the Data Logger in relation to the area it is sensing you may find that when a person passes under the sensor they are registered more than once. It is the job of the filter to attempt to remove this additional information before the data is analysed.

There is no all-encompassing filter because environmental factors have to be taken in to account such as location, positioning, throughput etc. Optimal settings are usually derived experimentally.

One method is to manually record the times of people going past your Data Logger and then compare your results to that of the generated reports. The same report can then be regenerated multiple times using different filter options until you find your optimum settings.

In general, if you are just looking for trends as opposed to exact figures then the default values work well.

**Zero State Filter** (default 2 seconds). This filter is based on data from the Cellular Logger or EP3 Data Manager providing timestamps for both 1 and 0 events. (i.e. when the PIR detected movement and when it stopped detecting movement). The filter works by ensuring that any new detection of movement is at least 2 seconds apart from when the last movement was detected. E.g. the PIR has been in the zero state for at least 2 seconds.

**Spire Filter** (default 60 seconds). **This filter is not used with data obtained from a Cellular Logger or EP3 Data Manager.** This filter works best for older software that only logs the timestamps for *Entry* events (which occur when the PIR first detects the movement). This filter works by checking both forwards and backwards in the data, if too many triggers occur within a 60 second period then they are eliminated.

## Database Configuration

DatScan supports two methods of database storage for log data:

Select MS Access Database if Microsoft Access is installed on the workstation and reporting functions are to be carried out only on the one workstation

Select MS SQL Server Database to connect to a corporate MS SQL Server Database or to connect to a SQL database on the workstation if MS SQL Server or SQL Server Express is installed.

For remote connections specify the server name in the form:  
 <computer name>\<sql server instance name>.

For installations on the same pc specify the server in the form:  
 .\<sql server instance name>.

Provide a SQL server assigned user name and password for access control.

## Site Configuration

The Analyser can assign data from loggers to specified sites and according to departmental categories. Each Site is allocated a short reference acronym, a brief description of the site and a category so that similar sites can be grouped. Clicking the **Sites** button on the main dashboard enables the user to view and edit site configurations.

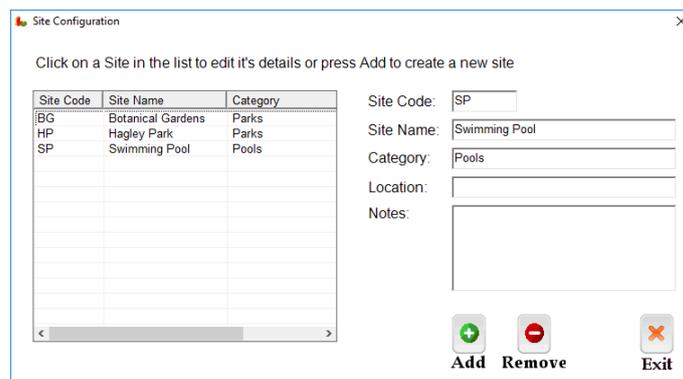


Figure 4 Site Configuration

### Cellular Data Logger

The **Site Code** is a unique identifier for the site. This field is automatically created by the Datahost base station when data is retrieved by the Cellular Data Logger. If multiple sensors are connected to a single Cellular Data Logger then they will be numbered alongside the site name. E.g. CODC1, CODC2 etc.

### EP3 Data Logger

For the data to be imported successfully the site code must match that specified in the EP3 logger\_list configuration as “Logger Shortname” (refer to EP3 Data Manager User Guide). As it is a unique identifier it can not be edited at any point after it is initially created. This field can be a maximum of 4 uppercase characters long and must start with an alphabetic letter. If the site code is not defined it will be created during the import process from log files.

The **Site Name** should be used as the description of the site in a readable form. This text will be added to the heading of any reports/graphs. The field can be up to 50 characters long. A site name should be added to every site code listed.

**Category** is provided solely for the purpose of grouping. In the example above, it can be seen that the ‘parks’ are grouped together. The field can be up to 50 characters long.

**Location** and **Notes** are optional fields, stored in the database but are for your own information (i.e. they are not used by this application for any purpose). Location can be 50 characters long and Notes can be up to 150 characters.

### Sorting the Site List

The site list can be sorted alphabetically either ascending (A to Z) or descending (Z to A) and by any of the 3 columns - this is where the category column becomes useful. To sort by a column, click the mouse over the appropriate column heading. Clicking on the same heading will toggle between ascending and descending.

The sorted order of the list is maintained between sessions and also between this dialog and the reporting dialog.

## IMPORTING DATA

Log files are stored as either binary file format (RAW) or as comma separated variable file format (CSV). RAW files are in the same format as they are stored on the data logger. CSV files are generated in a conversion process from the raw format by the EP3 Data Manager so that the files can be used directly in a spreadsheet. Either format can be selected to import into DatScan.

Cellular systems connected to a SQL database via Datahost automatically import data into the database.

Pressing the **Import** button on the main dashboard will display the following dialog.

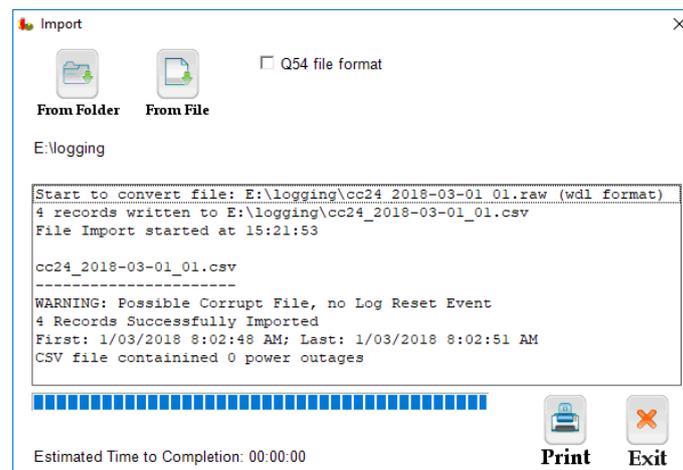


Figure 5: Import Progress and Log

QTech supplies two models of data logger: the Q54 and the WDL. File formats for these devices vary slightly. WDL formats are imported by default. When importing data from Q54 units, select the check box marked **Q54 file format**.

The **From Folder** and **From File** buttons initiate the import process. Just below the buttons, the default file specified import location is displayed. This is configured from the System Configuration dialog but can be changed again when a button is clicked.

Clicking the **From Folder** button will import all CSV files from the specified folder. By default, it is the folder specified in the system configuration for import. When the button is clicked the user can navigate to an alternative folder if required. Click **OK** to commence the import. If a CSV file is not present but the RAW file is, then the RAW file will be converted before importing.

**From File** works the same as the **From Folder** but allows the import of a single file. Once pressed a file selection dialog will be displayed. Select the file format type you wish to import (RAW or CSV). CSV files are imported by default but if the CSV file is not present or corrupt the RAW format can be selected.

The **Report Area** logs information during the import process including: the number of files being imported, the file that is currently being imported, specific information about that file, warnings about the Data Logger such as excessive resets etc. Once the import is complete it is recommended that this report is carefully read and any alerts raised in the report need to be considered - a full list of possible alerts are provided later in this section. The report can be printed once the import is complete.

Large file imports can be quite time consuming, so depending on the usage of your Data Loggers and the number of Data Loggers you have this could easily take several minutes. A gauge indicates progress.

During the import process the **Exit** button will turn into a **Cancel** button. Pressing this will terminate the currently import and remove any partially imported data regarding that Data Logger from the database such that it can be re-imported at a later date.

## Importing New Sites

If files are imported from sites that are not yet configured in the sites table, the site code will be added to the database and can be viewed in **Sites**. However, the data in the log files will not be imported until the remaining configuration information is entered into the sites table. Specifically, the Site Name must be entered. It should match the Site Name listed in the site\_list.csv file on the EP3. Once this information is entered the import process can be rerun and the data will be imported.

## Report Alerts

During the import process a log file is generated to provide additional information and event notifications. The file can be printed on completion of the import process.

### **Battery Level Low [voltage]**

The Data Logger's 'AA' batteries are running low and may need replacing.

### **Failed to backup file, skipping import**

The CSV file already exists in the Backup folder. It has been skipped due to being previously imported and therefore the data is already in the database.

This message will also occur if the site configuration is incomplete or if the backup folder is not present or found.

### **First Record / Last Record**

This represents the span of data within the CSV file. It is worth having a look to ensure that the Last Record date is close to the date of the file, which is shown as the report heading. If these values differ, it could either mean that there was no data on the day (or days before) of collection or there is a problem with the sensor. This could be that the unit has been vandalised (e.g. the slit that the PIR looks out of is blocked) or the 4 'D' cell batteries powering the sensor in the Data Logger need replacing.

### **Import Aborted by User**

During the import process the **Cancel** button was pressed.

### **New Site Added to Database**

The CSV file was associated with a Data Logger whose Site Code did not exist in the database. The Site Code has now been added and you will need to go into the Site Configuration dialog and update the site's additional information (e.g. Site Name, Location etc).

### **Possible Corrupt File, No Log Reset Event**

The Log Reset event should always be the first entry in the CSV file. If it is missing then the file should be manually checked as it could be corrupt.

### **Possible Corrupt File, Timestamp missing seconds**

The timestamps for the entries in the CSV file are incomplete. If the CSV file was viewed using Excel prior to import and then saved when Excel was exited, Excel will lose the seconds from the timestamps! Alternatively, if the Logger has developed a problem with its real time clock then all of the timestamps will be the same (the hours and minutes will also be corrupt).

### **Power Outages**

When the Data Logger starts up (e.g. when the batteries are inserted or replaced) the power outage count is increased. This is one explanation why the Power Outages count is higher than 0. Others include: If the Data Logger's batteries run too low it will power cycle; if the Data Logger becomes faulty multiple Power Outages may be reported. It is recommended that the original data is manually checked to see when the power outages occurred - if they all happened roughly the same time then it is an isolated incident such as the batteries being changed.

### **Backup Procedure**

When a file has been successfully imported it is archived (copied) to a folder of the same name as the Site Code, created in the Backup folder, as specified in the System Configuration dialog. The CSV file is then removed from its import folder location.

To avoid a file being imported multiple times, the Backup folder is checked to see if the file already exists before an import takes place. An alert is displayed in the Report Area and the file is skipped if this is found to be the case.

If the **Cancel** button was pressed during an import then the file will remain in the import folder location and will not be present in the Backup folder.

## CREATING A REPORT

Pressing the **Report** button on the main screen will display the Report Criteria dialog box.

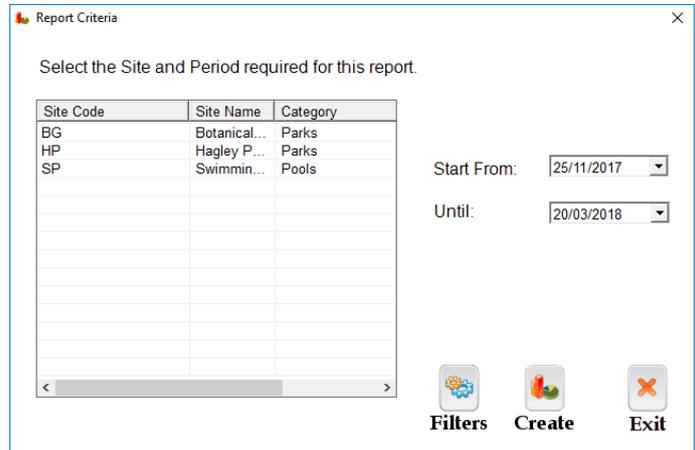


Figure 6: Report Dialog

The list on the left hand side is the same as that specified in the Site Configuration dialog and can be sorted in the same way by clicking on the column headings.

Selecting a site will update the text to the right which states the period within the database where data is available to report on.

The **Start From** and **Until** date selection boxes can then be altered to suit. Maybe you will want your reports to be on month boundaries. To change a date you can either type over the existing one or press the down arrow button (to the immediate right of the date) and select the required date from a pop up calendar.

The **Filters** button will allow you to change the filter and filter parameter from the default filter as specified in the System Configuration dialog.

Press the **Create** button to generate your report.

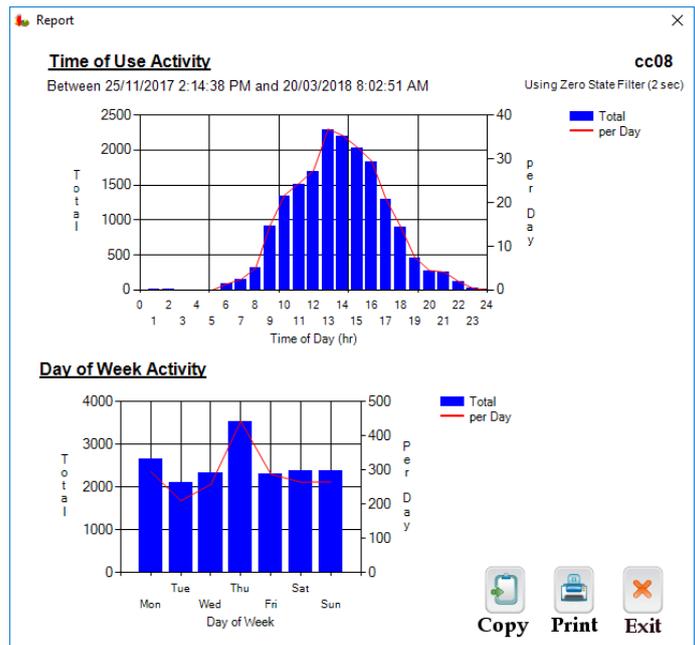


Figure 7: Sample Report

The headings on the report show the period for which the report was created for, the Site Code and Site Name and which filter and parameter was used.

### Time of Use Activity

This graph is split into hours of the day on the horizontal axis where a column, say, 10 refers to Data Logger triggers between the hours of 10am and 11am. The number of Data Logger triggers is divided by 2 as it is assumed that a person will go into a building and then come out again and this is counted as 1.

The blue columns are read from the scale on the left vertical axis. They represent the **Total Count**. This is a tally of the number of Logger triggers for each hour of the day.

The red line represents a normalised **Per Day Count** and is read from the scale on the right vertical axis. This is calculated by taking the total hour tally and dividing it by the number of days that the graph spans. This only includes days that contain data so it could differ from the number of days selected.

### Day of Week Activity

This graph is split into weekdays on the horizontal axis. The example above indicates that there is no use on a Sunday. The number of Data Logger triggers is divided by 2 as it is assumed that a person will go into a building and then come out again and this is counted as 1.

The blue columns are read from the scale on the left vertical axis. They represent the **Total Count**. This is a tally of the number of Data Logger triggers on each day.

The red line represents a normalised **Per Day Count** and is read from the scale on the right vertical axis. This is calculated by taking the total day tally and dividing it by the count of each weekday that the graph spans (for instance some months may have 4 Tuesdays where others may have 5). This only includes days that contain data so it could differ from the number of days selected.

### Copying and Printing Graphs

Pressing the **Copy** button copies the graphs, headings and legend as a single bitmap into the clipboard. It can then be pasted into any application that accepts bitmaps. Multiple graphs could be pasted into a word document for the purposes of creating a report.

Pressing the **Print** button will send the graphs, headings and legend to the printer. There is currently no additional user-controlled layout or formatting that can take place.

## Exporting Data

There may be occasions when you want to do further analysis on the data or to create graphs or textual reports that are not currently supported in DatScan Analyser. Selecting the **Export...** menu option from the File Menu displays the following dialog box.

The Export dialog is the same as the Report Criteria dialog but with the addition of the drop-down list of export options available. Select the criteria you require and press the **Export** button. You will be prompted to enter a filename. The output format is a CSV file.

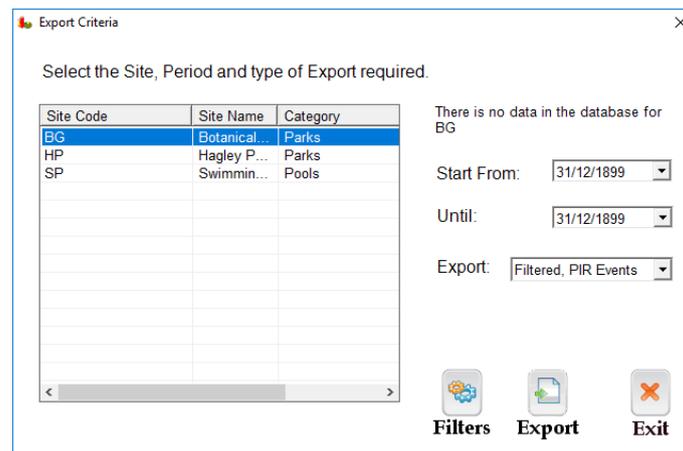


Figure 8 Export Data

Simple analysis that can be achieved using export facility includes:

- Creating an Excel graph that shows monthly usage.
- Creating an Excel graph that has multiple plots on the same axis such that usage recorded by different loggers can be viewed together.
- Retrieving actual figures as visually inspecting the graphs it is not always easy to see the count value.

## Export Options

Data can be selected and filtered for export.

### Unfiltered, Raw Export Format

This option provides a single column in the CSV file providing times when the Logger sensor detected movement. This is unfiltered so it may include additional and unwanted data.

Sample format:

```
1/03/2006 06:06:49
1/03/2006 08:29:48
1/03/2006 08:29:51
1/03/2006 10:51:15
1/03/2006 10:51:39
1/03/2006 11:22:53
1/03/2006 11:23:17
1/03/2006 11:28:21
1/03/2006 11:28:26
1/03/2006 11:28:35
```

### Filtered, PIR Events

This option exports in the same single column format as the Unfiltered, Raw export but applies the selected filter first so that only discrete events are exported.

### Filtered, Plots

This option exports the collated data that is used in generating the graphs. Two sets of data are provided with headings: Time of Use and Day of Week activity.

Sample Format:

```
TSW,Train Station West
Filtered using the Spire Filter (60 sec)
Time Of Use Activity
0,0,0.0
1,0,0.0
2,0,0.0
3,0,0.0
4,0,0.0
5,0,0.0
6,57,2.1
7,1,0.0
8,18,0.7
9,51,1.9
10,68,2.5
11,116,4.3
12,84,3.1
13,108,4.0
14,78,2.9
15,78,2.9
16,43,1.6
17,20,0.7
18,8,0.3
19,3,0.1
20,0,0.0
21,1,0.0
22,0,0.0
23,0,0.0

Day Of Week Activity
Mon,148,30.0
Tue,146,29.0
Wed,168,34.0
Thu,97,24.0
Fri,114,28.0
Sat,60,15.0
Sun,0,0.0
```

## USING THE EP3 CSV CONVERTER UTILITY

Log files extracted from QTech wireless data logger products (Q54 or WDL) are captured in a raw (.RAW) data format by the EP3 data manager. The EP3 then converts the raw format to commas separated variable format (.CSV). This file format can then be imported to a spreadsheet (e.g. Microsoft Excel) or imported into QTech Datscan Analyser reporting tool.

DatScan Analyser will also import and convert the raw format and uses a software utility called EP3CSVConvter.exe to do this. The utility is bundled with the DatScan Analyser installation and the utility is stored in the program files folder where DatScan Analyser is installed. It can be used separately as a command line utility if needed.

Occasionally the EP3 Data manager may fail to convert the raw data files to CSV, or the files get corrupted on the EP3. In this situation, if the user can manually convert the files to CSV form without using DatScan Analyser. In this manner files can be recovered for later processing by a spreadsheet or import to a SQL database.

### Usage

To recover files from the EP3 copy the RAW files to a PC then convert them

Step 1. Remove the SDcard from the EP3 and insert into a PC with an SD Card slot. Copy the files (.RAW) into a folder on the PC hard drive.

Step 2. Open a windows command prompt (note there are other several ways of doing this)

- Win+r will open the windows run dialogue , (“win” means the windows key on the keyboard)
- Type cmd to open a windows command prompt window

Step 3 Navigate to the folder containing the EP3CSVConverter utility. If Datscan Analyser is installed then it will be in the Datscan Folder e.g.

- > cd “c:\program files (x86)\QTech\Datscan Analyser

Step 4 Run the utility. If you supply no command line arguments a command line usage message is displayed

- >ep3csvconverter <filename.raw> [Q54|WDL]

Enter the name of the raw data file to convert

Optionally enter the format that you wish to convert from Q54 or WDL, if this argument is not supplied the default is WDL. The two data loggers use slightly different raw file formats.

The output file will have the same filename but with a .csv suffix.

## WARRANTY

The EP3 Data Manager hardware and software is covered by QTech Limited Warranty Agreement and software End User License Agreement, respectively.

Please refer to the QTech Limited Product Warranty Agreement, which may be downloaded from the QTech website: [www.qtech.co.nz](http://www.qtech.co.nz)

QTech Data Systems Limited does not warrant the suitability of this product for any particular application as the conditions in which it is used are beyond our control. This is notwithstanding warranty of merchantability.





QTech Data Systems Ltd

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12 Midas Place, Middleton, Christchurch 8024

PO Box 9087, Tower Junction, Christchurch 8149

Ph: +64 3 366 3713

Fx: +64 3 365 2815

admin@qtech.co.nz

techsupport@qtech.co.nz

www.qtech.co.nz