SIEMENS

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Sapphire JTM General Handbook

Part no.
667/HB/52040/000

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INTRODUCTION

Scope:

The Sapphire JTM Bluetooth Detector is manufactured by Q-Free TDC Systems and has been approved by Siemens Traffic Solutions Engineering for use within Journey Time Management Systems reporting into the Siemens Stratos Instation.

This document has been prepared and released by the Original Equipment Manufacturer and the detector is referred to throughout as the HI-TRAC® BLUE2 (OEM part number). Additional Siemens specific reference information has been captured in these cover sheets.

Related Documents:

Reference	Title	Author/Contact
667/DZ/52040/000	Sapphire JTM Family Tree	David Anderson
667/HQ/52040/000	Sapphire JTM Quick Reference Guide	Mike Tonkin
667/PA/52040/000	Sapphire JTM Global Support Plan	Mike Tonkin
667/CI/47230/000	Signal Head Mounting Install Instructions	Kevin Wass
667/CI/47235/000	Banded Pole Mounting Install Instructions	Kevin Wass

Change History:

Version	Date	Description
1	June 2015	Initial Review and Release of TDC Reference Manual v1.0
2	July 2015	Review and release of TDC manual 1.1 – Engineer Mode info
3	August 2015	Siemens Specific info added
4	July 2016	Street Lamp Column / Pole Mounting option added

DETECTOR VARIANTS

Two variants of the Sapphire JTM detector are currently available to cater for different connectivity options:

- GPRS/3G
- Ethernet

Both variants are supplied with a dedicated 2-core power cable. The Ethernet variant also requires a dedicated cable for data while the GPRS/3G variant must be fitted with a SIM card. A Power over Ethernet (PoE) variant has also been proposed by the detector manufacturer but this is not yet available for use.

INSTALLATION AND SUPPLY

The Sapphire JTM Bluetooth Detector comes fitted with a RAM mounting bracket that allows it to be installed using the same mounting kits as the WiMag Vehicle Detection System. The supply requirements are as follows:

Supply Voltage: 12 – 36V AC **or** DC
Nominal Current: 90mA (3G variant) or 150mA (Ethernet variant) at 24Vac

The detector can be fitted unto a traffic signal head or band mounted to a pole or street light column. The mounting kits and supply arrangements required for each case are described in the two subsections below.

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Traffic Signal Head Mounting:

For signal head installation use the WiMag Signal Head Mounting Kit – 667/1/47230/000. This gives a mounting height of roughly 4m, based on the normal height of a traffic signal pole. Power can be taken directly from the 24V Detector Supply terminal block within the pole top. No additional PSUs or transformers are required.

Please see 667/CI/47230/000 for further detector mounting instructions.

Pole Mounting:

The Sapphire JTM Bluetooth Detector can also be banded to a pole or street light column where local authority permission is given, using the WiMag Pole-Mount Banding Kit – 667/1/47235/000.

For power, an additional transformer box – 667/1/44825/000 – must also be mounted alongside the detector. This OEM specified transformer converts mains voltages into a 24Vac supply for the detector. The transformer box input cable is fitted with a 2P+E 230V Commando Plug for connecting to the mains.

WARNING: Mains power must be made available via a corresponding 2P+E 230V Commando Socket. This socket must be provided by the customer and must be fitted **within 1m** of the intended detector mounting point.

NOTE: Both the detector and transformer box use Tamtorque clamp banding for mounting. Five band variants are specified to cater for a large range of pole diameter. The correct clip must be selected for a proper secure mount. See the Part Numbers section for band sizes.

Please see 667/CI/47235/000 for further detector mounting instructions.

CONFIGURATION SOFTWARE

The Sapphire JTM detector must be configured using a HI-COMM BLUE2 software package provided by the OEM TDC Systems Ltd. This software is available from Meridian under document number 667/TZ/52040/000.

Connecting to the detector and using the software are described in sections 2 and 3 of this document.

SIM CARDS AND CONNECTIVITY

The GPRS/3G variant of the Sapphire JTM Detector requires a SIM card for connectivity back to the Stratos Instation. Customers may use a SIM card from any provider though Siemens Traffic Solutions Engineering recommends Any-Network SIMs from Eseye – 667/7/52041/ETC.

WARNING: SIM cards must be security enabled to prevent public access to the JTMS instation.

The SIM card used affects the GPRS Server Settings that must be configured within the detector. For Eseye SIMs the following information applies:

APN: eseye.com
Username: user
Password: pass

See section 3.9.2 of this document for more information on connectivity settings.

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SET UP AND COMMISSIONING

The key steps required for set up of the Sapphire JTM detector are listed in the table below.

WARNING: GPRS or Ethernet server information, including 'IP address' and 'Port Number', must be available at the time of installation so the detector can be set up correctly. These **must** be defined by the customer and Project Lead.

#	Description	Refer to
1	Establish a connection with the detector	Section 2
2	Access the detector using the configuration software	Section 3.1
3	Enable Engineer mode	Section 3.2
4	Set the Date and Time	Section 3.3
5	Confirm the detector Antenna is enabled	Section 3.5.1
6	Use the 'Real Time View' to check the unit is detecting Bluetooth devices*	Section 3.11
7	Confirm 'Repeat Buffer' is enabled and set the timeout to 2 minutes	Section 3.5.3
8	Enter the required GPRS / Ethernet information into the Server settings**	Section 3.9.2
9	Use the 'Force Upload' button within 'Query Modem' to confirm a data connection is available	Section 3.7

** The antenna power, elevation and direction can be adjusted to change the detector footprint if required.*
***May differ from project to project*

Once set up has been completed contact the local Stratos Instation, or nominated Stratos user, to confirm the detector is communicating correctly. Contact details **must** be defined by the customer and Project lead before installation.

Details of all other settings are given throughout the rest of this document.

PART NUMBERS

Key part numbers for typical installations are listed here. See 667/DZ/52040/000 for a full list of all Sapphire JTM related part numbers.

Reference	Title
667/7/52040/000	GPRS/3G Sapphire JTM Bluetooth Detector
667/7/52040/100	Ethernet Sapphire JTM Bluetooth Detector
667/TZ/52040/000	HI-COMM BLUE2 Configuration Software
667/7/52041/000	Sapphire JTM 3G SIM Card – 0MB contract (Eseye)
667/7/52041/301	Sapphire JTM 3G SIM Card – 300MB contract (Eseye)
667/7/52041/501	Sapphire JTM 3G SIM Card – 500MB contract (Eseye)
667/1/47230/000	WiMag Signal Head Mounting Kit
667/1/47235/000	WiMag Banded Pole Mounting Kit
667/1/44825/000	Pole Mounted Transformer Box
999/4/44374/100	70mm - 100mm Clamping Band
999/4/44374/130	100mm - 130mm Clamping Band
999/4/44374/160	130mm - 160mm Clamping Band
999/4/44374/190	160mm - 190mm Clamping Band
999/4/44374/250	190mm - 250mm Clamping Band

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TDC Systems Limited

Reference Manual – version 1.1

HI-TRAC® BLUE2

Reference Manual

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Reference Manual

HI-TRAC ® BLUE2

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Document history

Date	Revision	Author	Description
January 2015	1.0	Pallavi	Initial Release
July 2015	1.1	Pallavi	Engineer Mode addition

Contact information

http://www.tdcsystems.co.uk/products#hi-trac-blue

For sales information, please email sales@tdcsystems.co.uk

Table of Contents

1. HI- TRAC® BLUE2 Overview 8
1.1 Introduction 8
1.2 Features 8
1.2.1 Hardware 8
1.2.2 Installation 9
1.2.3 Applications 9
1.3 Unit Communications 9
1.4 HI-TRAC® BLUE2 Software Compatibility 9
1.5 Data Storage 9
1.6 Signal Coverage and Installation 10
2. Connecting to the HI-TRAC® BLUE2 11
3. HI-COMM 100 Traffic Data Collection Software 12
3.1 Connect to the HI-TRAC® BLUE2 Site 12
3.2 Enable & Disable Engineer Mode 15
3.3 SET Date & Time 16
3.4 View Log 17
3.5 BLUE Setup Parameters 18
3.5.1 Antenna 18
3.5.2 Options 19
3.5.3 Repeat Buffer 19
3.5.4 Field Calibration 20
3.5.5 Factory 21
3.5.6 MAC Schedule 22
3.5.7 Bluetooth Schedule 23
3.5.8 Blocked 24
3.5.9 Site Info 25
3.5.10 Temporary Surveys 26
3.5.11 Tags 27
3.5.12 Tags Table 28
3.6 Firmware 30
3.7 Query Modem 31

3.8 Data Memory 32
3.9 Dial Out 33
3.9.1 Modem Functionality 34
3.9.2 Server Settings 35
3.9.3 Dial Out Schedule 36
3.9.4 Dial in Schedule 37
3.9.5 Options 38
3.10 Data Memory 39
3.11 Real Time View 41
3.12 Convert 42
4. Hardware Description 45
4.1 Overall Dimensions 45
4.2 External Connectors & their functions 45
4.2.1 Power connecting Cable 45
4.2.2 6 core Screened cable-Auxiliary Antenna (optional) 45
4.2.3 Ethernet (optional) 45
4.2.4 SIM card holder (optional) 45
4.3 Mounting 46
4.4 Ratings Labels 46
4.5 Neoprene closed cell sponge specification ASTM D1056.68-05-96A 1/2 2A2 48
4.6 SC-1220UR Enclosure 49
5. Declarations 51

Table of Figures

Figure 1: Bluetooth Settings 11
Figure 2: HI-COMM Traffic Data Collection Software 12
Figure 3: Append Hitrac Site List 13
Figure 4: Connect to HI-TRAC Site 14
Figure 5: Main Screen When Connected to HI-TRAC BLUE2 14
Figure 6: Engineer Mode 15
Figure 7: HITRAC Current Status Details 16
Figure 8: View Log 17
Figure 9: Antenna 18
Figure 10: Options 19
Figure 11: Repeat Buffer 20
Figure 12: Field Calibration 21
Figure 13: Factory 22
Figure 14: MAC Schedule 23
Figure 15: Bluetooth Schedule 24
Figure 16: Blocked 25
Figure 17: Site Information 26
Figure 18: Temporary Surveys 27
Figure 19: Tags 28
Figure 20: Tags Table 29
Figure 21: Tags Extracted Table 29
Figure 22: Upload Firmware 30
Figure 23: Firmware Version Details 31
Figure 24: Query 32
Figure 25: Data Memory 33
Figure 26: Modem Functionality 34
Figure 27: GPRS Setting 35
Figure 28: Ethernet Settings 36
Figure 29: Dial out Schedule 37
Figure 30: Dial in Schedule 38
Figure 31: Options 39
Figure 32: Data Memory 40
Figure 33: Real Time View—Options 41
Figure 34: Real Time View 42
Figure 35: Convert to MDB format 43
Figure 36: MDB Example format 44
Figure 37: RAM mounting Options 46
Figure 38: Jubilee Clip Mounting Options 46

1. HI- TRAC® BLUE2 Overview

1.1 Introduction

The HI-TRAC® BLUE2 uses Bluetooth signals to derive Journey Time information and traffic movements (from beginning to journey's end). Bluetooth is an open wireless technology standard using the 2.4 to 2.485GHz unlicensed spectrum for exchanging data over short distances from fixed and mobile devices. The HI-TRAC® BLUE2 reads the MAC address of the Bluetooth devices passing the system. Bluetooth devices include mobile phones, PDA's, hand-free kits, on board GPS units, laptops etc. The HI-TRAC® BLUE2 provides 'invisible detection' for the owner of the detected Bluetooth device and the detection process is unnoticeable to the owner. To ensure the privacy of the user, each detected MAC address is truncated and then encrypted thus ensuring no personal data is collected. Main aid of HI-TRAC® BLUE2 is its deployment onto existing traffic infrastructure such as signal heads, requiring no additional street furniture in many instance. The HI-TRAC® BLUE2 is fully compatible with all Bluetooth versions.

1.2 Features

The hardware features, installation and applications of the HI-TRAC® BLUE2 are listed below:

1.2.1 Hardware

i. Powered by 3.7V Li-ION battery or AC adapter or 6V Solar or 12V solar options.
ii. 4 antennas can be connected to maximise MAC address collection zones.
iii. 32MB on-board memory provides storage to 2 million records and more.
iv. Default size of 8GB SD Card is available.
v. On-board 3G Modem and Ethernet module.
vi. Power over Ethernet [POE] available on Ethernet equipped units.
vii. Optional GPS Plugin Board.
viii. Following IO options are available:
    a. 2 x digital inputs and 2 x digital outputs.
    b. 4 x digital outputs.
    c. 6 x digital inputs.
    d. 2 x digital inputs and 4 x digital outputs.
ix. Sealed to IP68.
x. Battery Voltage monitoring.
xi. Processor Temperature monitoring.

NOTE: The encryption is non-reversible.

1.2.2 Installation

i. An HI-TRAC® BLUE2 unit can cover over 6 lanes of high speed traffic.
ii. Installed on to existing road hardware (lighting poles, traffic light poles, etc.)
iii. Un-obtrusive to road users and pedestrians.
iv. Configurable power settings to change size of detection zone.
v. Different antennas are available for different environments.
vi. Configuration and manual data download via HI-COMM 100 and Bluetooth.

1.2.3 Applications

i. Journey travel times for short and long distance.
ii. Measurements of the time taken to pass-through toll Plazas.
iii. Origin and destination traffic matrix.
iv. Traffic management applications.
v. Web based Journey time monitoring.

1.3 Unit Communications

The vehicle data recorded by the HI-TRAC® BLUE2 can be retrieved into the HI-COMM 100 Traffic Data Collection Windows software package via laptop with Bluetooth capability or the unit can be connected remotely via GSM or GPRS/Ethernet modem. Data can also be collected via a GPRS/Ethernet connection and an INSTATION communication provider, such as TDC's web based journey time system, Drake well C2 Online Reports or Cloud Amber.

1.4 HI-TRAC® BLUE2 Software Compatibility

i. HI-COMM 100 Compatible
ii. HI-COMM EZY Compatible
iii. Drake well C2 Software Suite Compatible
iv. Data hosting by TDC, Drake well, Cloud Amber or by Client Secure data transmission to C2 database

1.5 Data Storage

The HI-TRAC® BLUE2 unit provides 8GB on board SD Card storage to record each individual device that is detected by the system. This allows a total of approximately 500 Million records to be stored on the unit. Each device record comprises of:

i. Time
ii. Serial Number (unique ID number)
iii. Date
iv. Encrypted MAC Address
v. Class of Device

The SD Card size can be increased if more storage is required.

1.6 Signal Coverage and Installation

Two antenna options are available on the HI-TRAC® BLUE2:

i. Directional antenna
ii. Omni directional antenna

The directional antenna is designed to reduce the zone of detection and circular polarisation, thus increasing the possibility of detecting devices with a transmission path that is not vertically polarised.

The Omni-directional antenna is used to collect data within the radius set of the detected location.

Both antennas involve non-intrusive installation on existing infrastructure. For example traffic signal heads, street lighting, overhead gantries, etc.

2. Connecting to the HI-TRAC® BLUE2

The HI-TRAC® BLUE2 has three options to enable the Bluetooth module for communication: Magnet activation, Field Calibration MAC address activation or Bluetooth Schedule activation. Ensure the Bluetooth antenna is connected and a suitable power source (9V to 48V AC/DC) is connected.

To "Pair" the HI-TRAC® BLUE2 device with a laptop follow the instructions below:

1. Right Click on the Bluetooth icon in the System tray and select 'Show Bluetooth Devices'. This may be in different locations on different computers.
2. If using magnet activation, enable the Bluetooth on the HI-TRAC® BLUE2 by passing a magnet over the reed switch of the unit or Bluetooth dongle. If using MAC or schedule activation, ensure these parameters are met before proceeding to the next step. The LEDs will turn on in pattern to indicate the Bluetooth is on.
3. Select the Bluetooth device that corresponds to the HI-TRAC® BLUE2 you are trying to connect with. Start the pairing process by a single click on the corresponding BLUE 2 device and select "Pair".
   NOTE: The friendly name of the device is same as the unit's barcode.
4. Right click on the Bluetooth icon, select the 'Open Settings' and note the windows COM port to which the outgoing port is assigned.

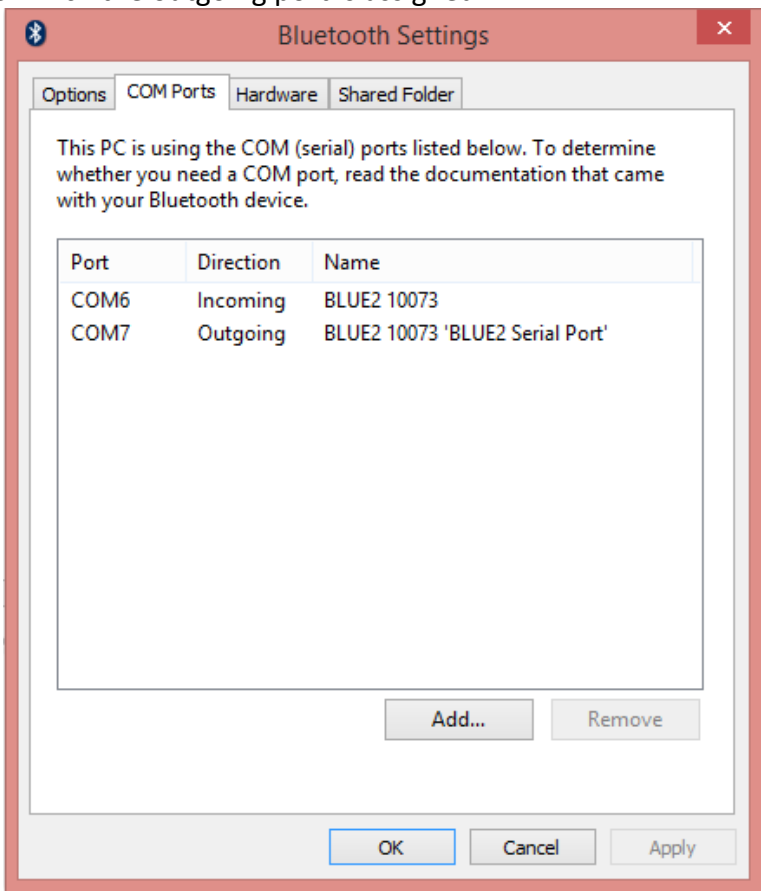


Figure 1: Bluetooth Settings

NOTE: If the COM port information is not available via the laptop Bluetooth information screen. The information can also be obtained at Control Panel -> Administrative Tools-> Computer Management-> Device Manager -> Ports.

3. HI-COMM 100 Traffic Data Collection Software

3.1 Connect to the HI-TRAC® BLUE2 Site

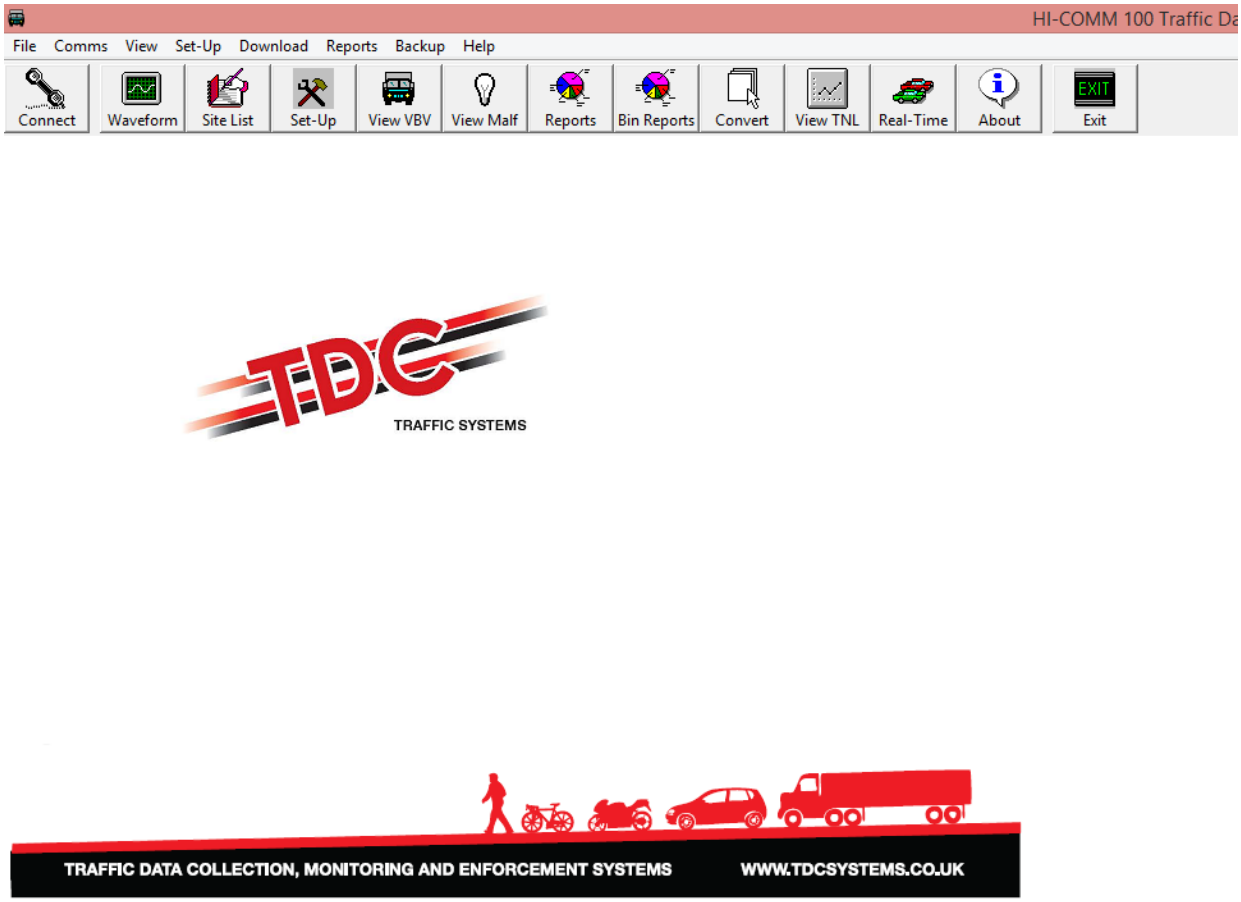


Figure 2: HI-COMM Traffic Data Collection Software

Select the 'Site List' icon, Insert a Site by Clicking the 'Insert' button on the right top corner of the tab. Fill up the 'HITRAC Site Details' and ensure that the 'System Type' is HI-TRAC® BLUE2.

Click 'Update' & then 'Exit'.

NOTE: The security ID number for a HI-TRAC® BLUE2 unit is the last 4 digits of the unit's barcode.

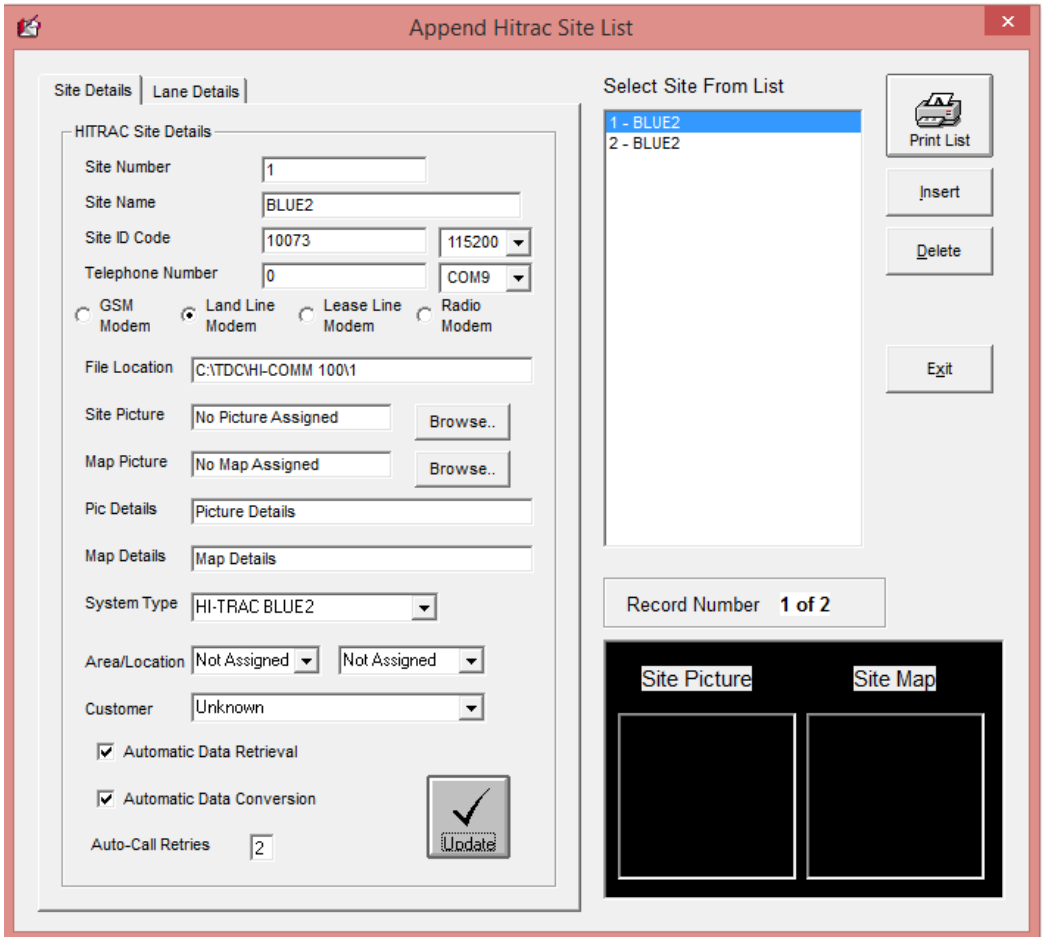


Figure 3: Append Hitrac Site List

Select the 'Connect' icon, the 'Connect to HI-TRAC Site' window pops up. This window allows the user to select the site that they want to connect to.

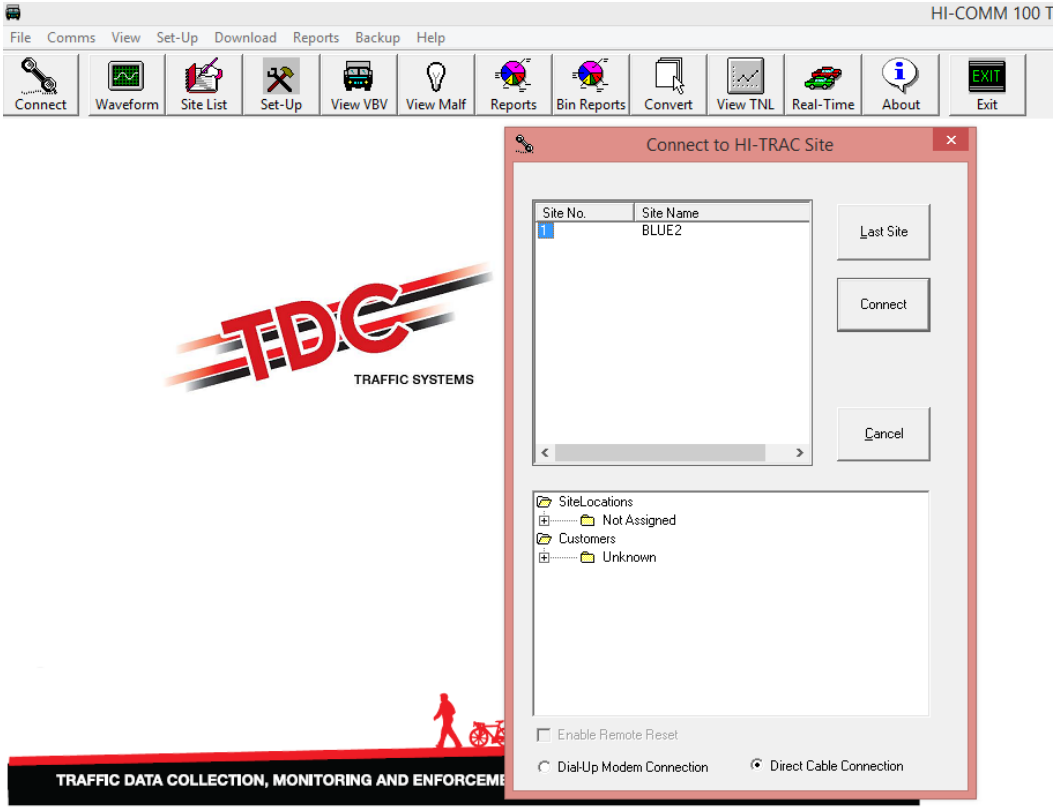


Figure 4: Connect to HI-TRAC Site

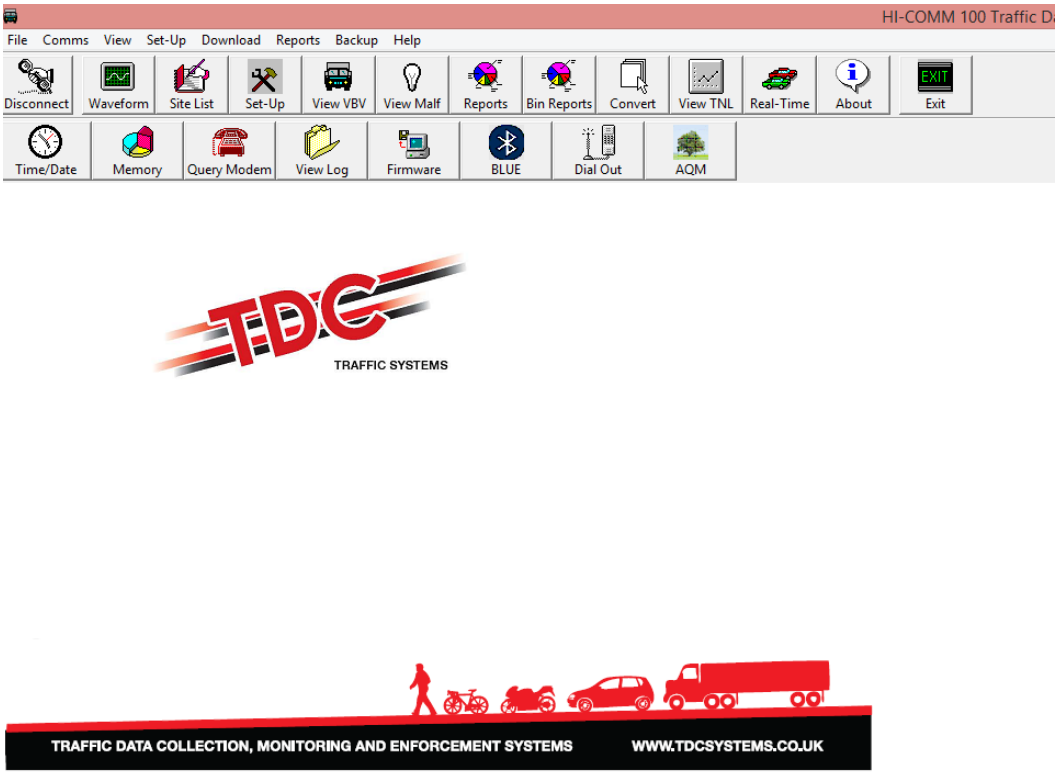


Figure 5: Main Screen When Connected to HI-TRAC BLUE2

3.2 Enable & Disable Engineer Mode

The 'Engineer Mode' allows the user to modify the settings [For example: day of the week, time & date etc] on the HI-TRAC® BLUE2 unit. If the 'Engineer Mode' is not enabled [i.e., in the Normal Mode], the current default settings will be used by the HI-TRAC® BLUE2 unit.

The 'Engineer Mode' can be enabled by following the procedure below:

1. Click 'Set-Up' on the menu bar of the **HI-COMM 100 Traffic Data Collection Software** and select the **'Engineer Mode'.**
2. A tick Symbol appears in the left bar beside the **'Engineer Mode'** in the drop down.
3. Select the drive or the disk in which the HI-COMM 100 Traffic Data Collection software is installed.
4. Double click the '**TDC.key'** from the HI-COMM 100 folder and enter the password as shown in the Figure 6.

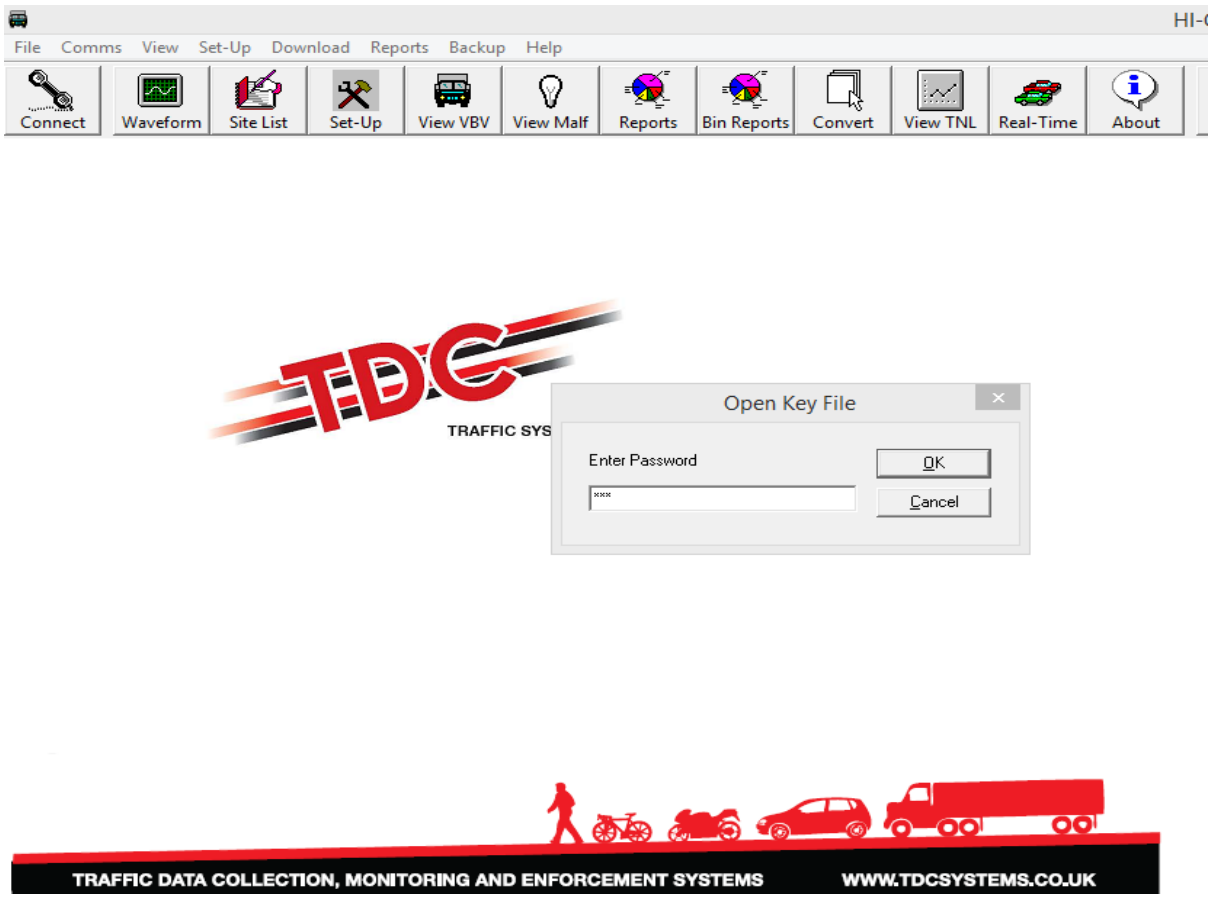


Figure 6: Engineer Mode

To disable 'Engineer Mode', Click the 'Set-Up' in the HI-COMM 100 Traffic Data Collection software and click the 'Engineer Mode' option in the drop down.

3.3 SET Date & Time

Select the 'Time/Date' icon, the computer time and date will upload and the time & date on the HI-TRAC® BLUE2 is set. Ensure 'Engineer Mode' is enabled.

The internal temperature of the processor is shown in the 'ClosedAC Details'. The status of the battery can be monitored but cabinet door monitoring is not a feature of the HI-TRAC® BLUE2.

Environmental Parameters refer to systems integrated with other monitoring systems such as Wind speed, air quality, etc.

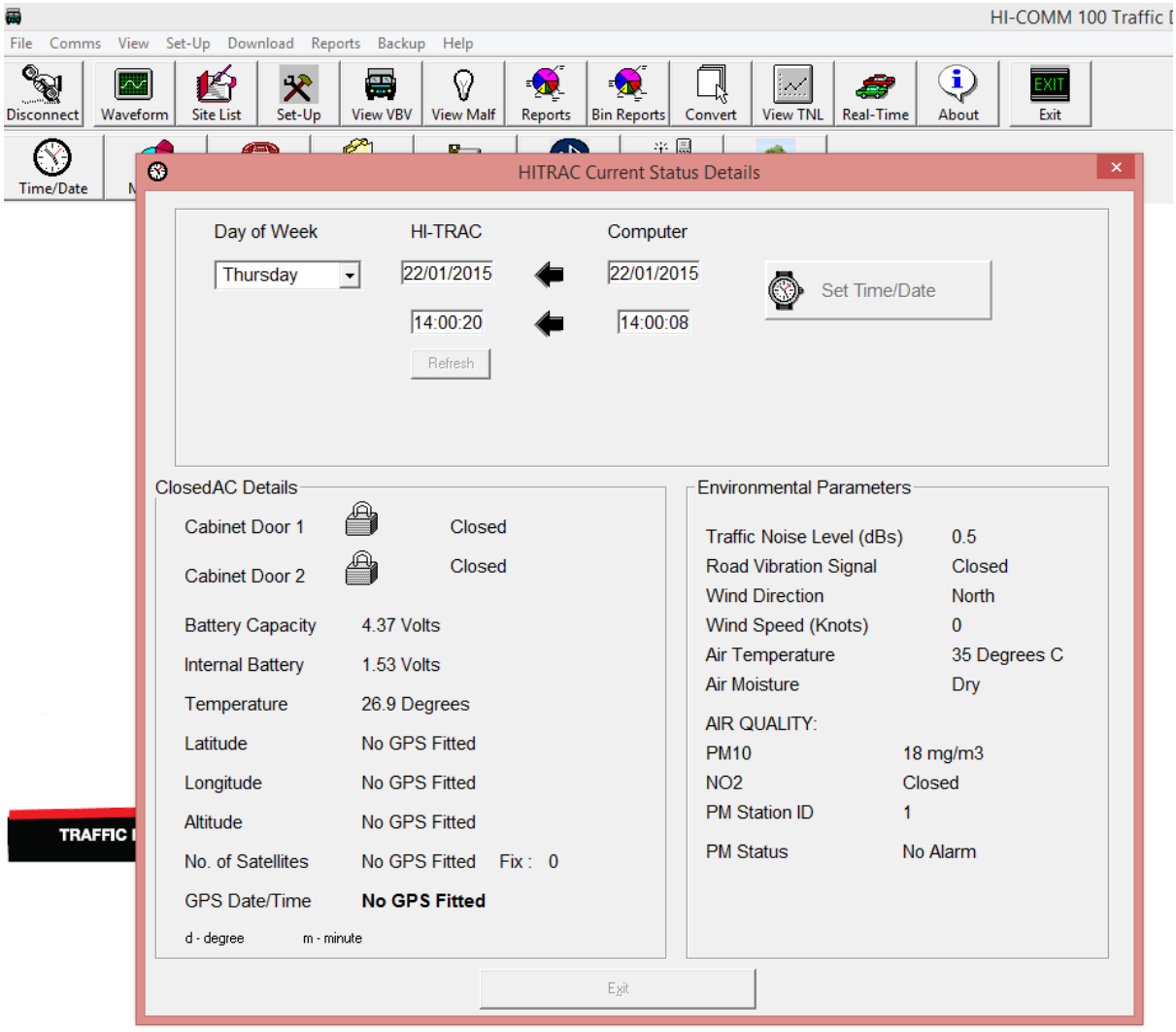


Figure 7: HITRAC Current Status Details

3.4 View Log

The view log fields of the HI-TRAC® BLUE2 are briefly explained as below:

Timestamp:

The Timestamp provides the date and time of the occurred event, according to the on board clock of the unit.

Level:

The Level parameter provides details on the severity of the log message: trace, debug, info, warning, error and fatal.

Message:

The message field provides a brief description of the occurred event.

Parameter Value:

Parameter value provides an associated value for the message.

The log file from a unit may be downloaded for later analysis by the customer or by TDC Systems Technical support. The file will be downloaded to the respective site folder within the HI-COMM directory.

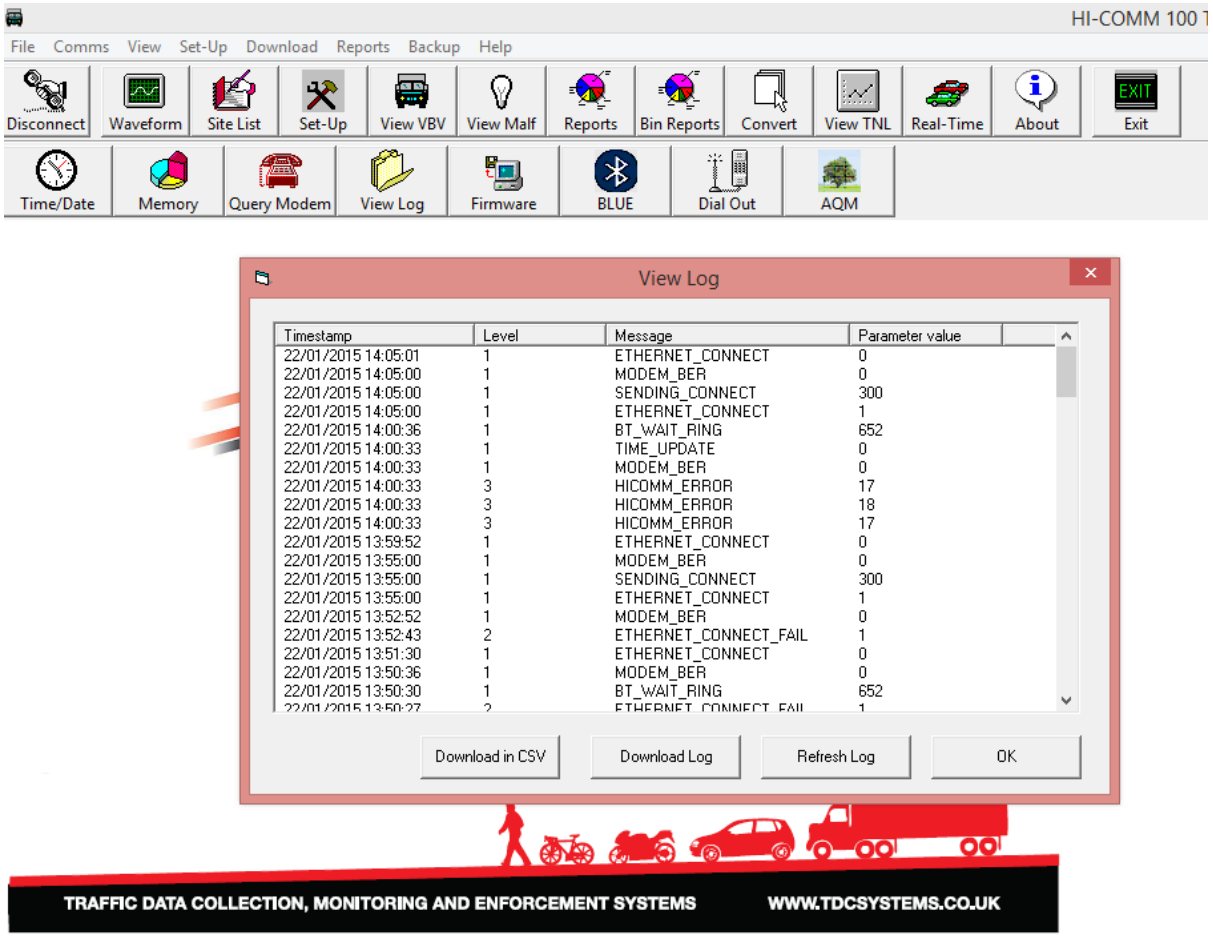
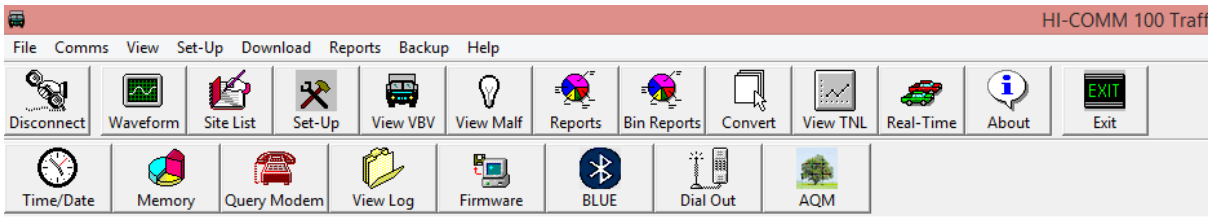


Figure 8: View Log

3.5 BLUE Setup Parameters

Select the 'BLUE' icon to open the setup Parameters window. A number of tabs are shown, each allowing the setup of various parameters as described below:



3.5.1 Antenna

The BLUE2 supports up to four MAC detecting antennas. The Primary antenna is fitted inside the unit and uses TTL logic levels. The standard HI-TRAC® BLUE2 contains an external connector to plug in the 2nd MAC antenna which is known as Auxiliary antenna. The Auxiliary antenna uses RS232 voltage levels. Hence can be placed at a distance of up to 15 metre from the HI-TRAC® BLUE2 device.

The Antenna tab facilitates the setup of:

- Enable Primary and Auxiliary antennas.
- Set power levels for each antenna independently. This affects the size of the detection area. The larger the number, the larger the detection area.

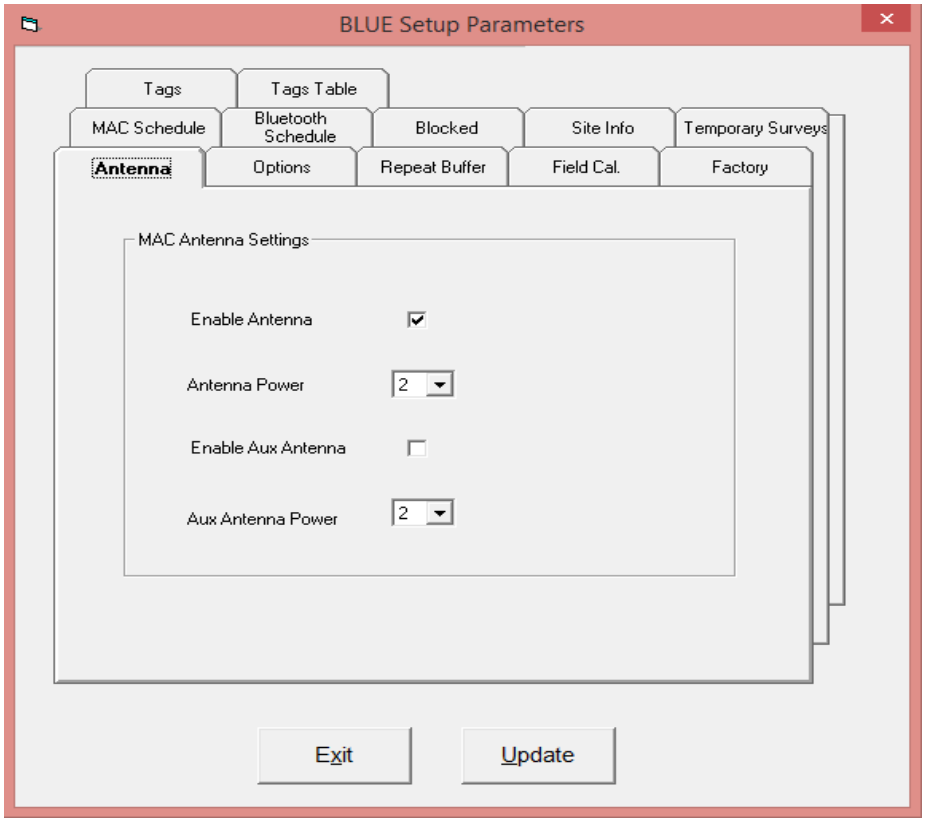


Figure 9: Antenna

3.5.2 Options

i. The Options tab facilitates the setup of the following features:

ii. **Pedestrian mode:** The pedestrian mode is a system test feature and should not be used in the field unless advised by TDC Systems Ltd.

iii. **Field Calibration Mode:** This option is selected when first setting up a site. Refer 'Field Cal' tab.

iv. **Enable Display Mode:** This option can be used to obtain MAC address and friendly name of devices to be used in Field Calibration mode.

NOTE: The unit will not record MAC address data when either 'Field Calibration Mode' or 'Display Mode' options are selected.

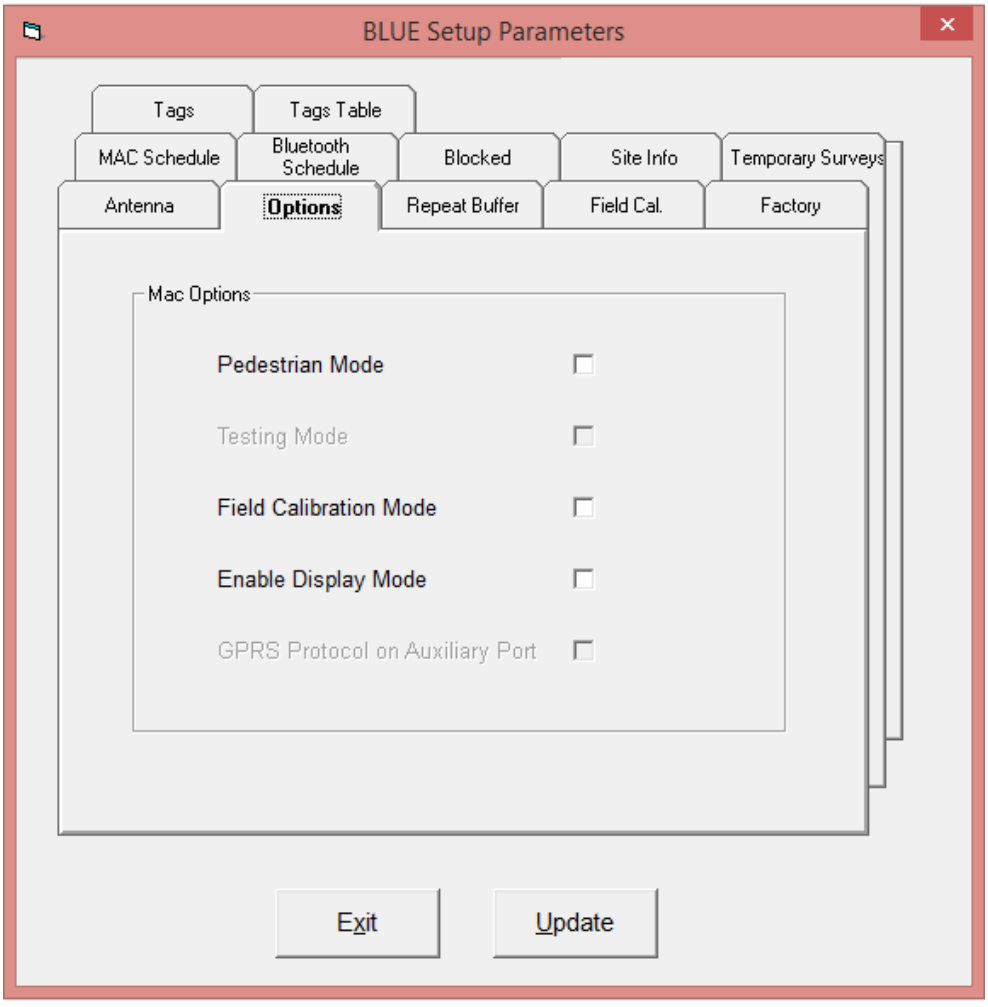


Figure 10: Options

3.5.3 Repeat Buffer

The Repeat Buffer tab facilitates the setup of the following features:

i. **Enable Repeat Buffer:** The repeat buffer allows the user to set a predefined length of time in which MAC records are presumed to be within the 'zone of detection'.

If a MAC address is seen more than once, it will not be added into the stored data again within this time period. If the device is seen within the 'Repeat Timeout' period, the countdown timer on that MAC address will begin again. Using this feature reduces the volume of irrelevant information that must be stored on the unit and communicated with the server.

ii. **Repeat Buffer Size:** It is recommended to always have this value larger than the maximum number of different repeat devices that could be seen within the timeout period (Min: 1, Max: 64).

iii. **Repeat Timeout:** This is the time, in seconds, that a repeat device will not be seen as a new detection in.

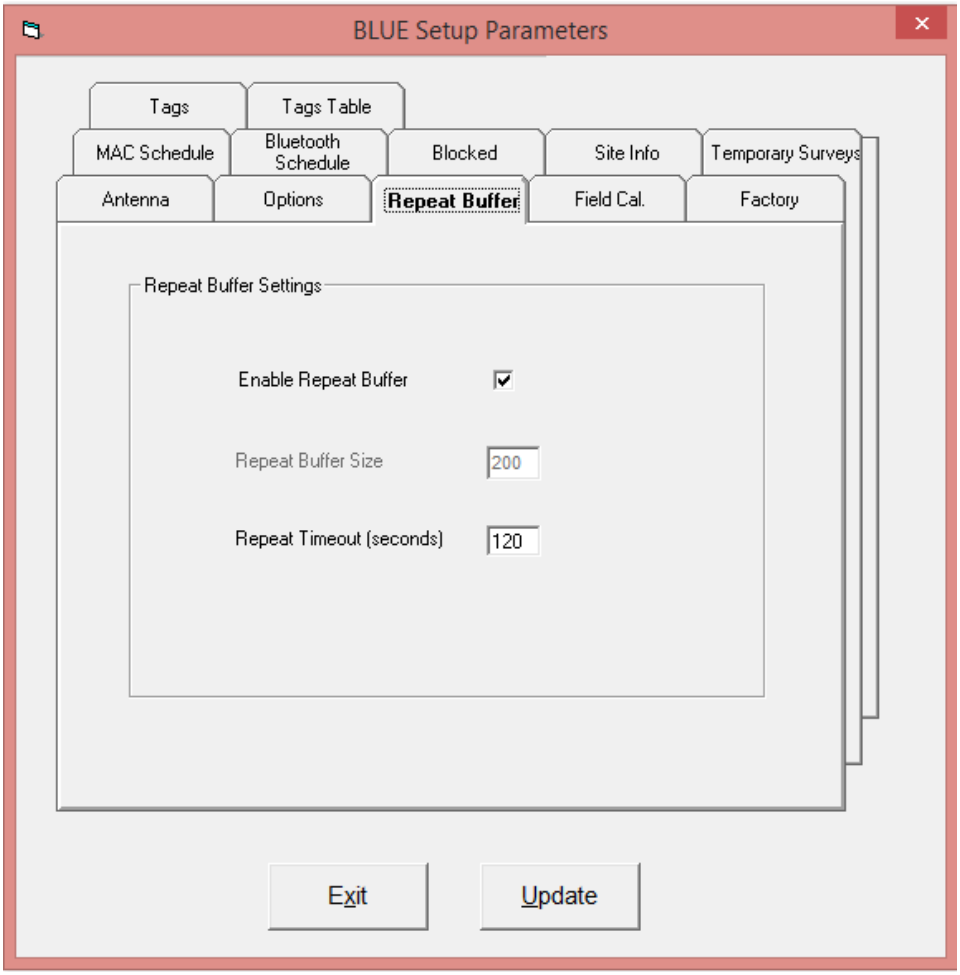


Figure 11: Repeat Buffer

3.5.4 Field Calibration

The Field Calibration tab facilitates the setup of the following features:

i. **MAC Address**: With the **Field Calibration Mode enabled** in the **Options** of the BLUE, the HI-TRAC® BLUE2 will only display (in Real-Time view) the MAC addresses set. The MAC address displayed will be un-encrypted Bluetooth MAC address and will not be

stored in the device. The MAC String field will be displayed in 'Class' column of Real-Time view.

The MAC addresses recorded in this form also act as communication activation addresses for the unit. When the HI-TRAC® BLUE2 detects a MAC address that matches one stored in these fields, it will enable the Bluetooth communication dongle for a period of 5 minutes.

ii. **MAC String:** The MAC string can be customized by the user.

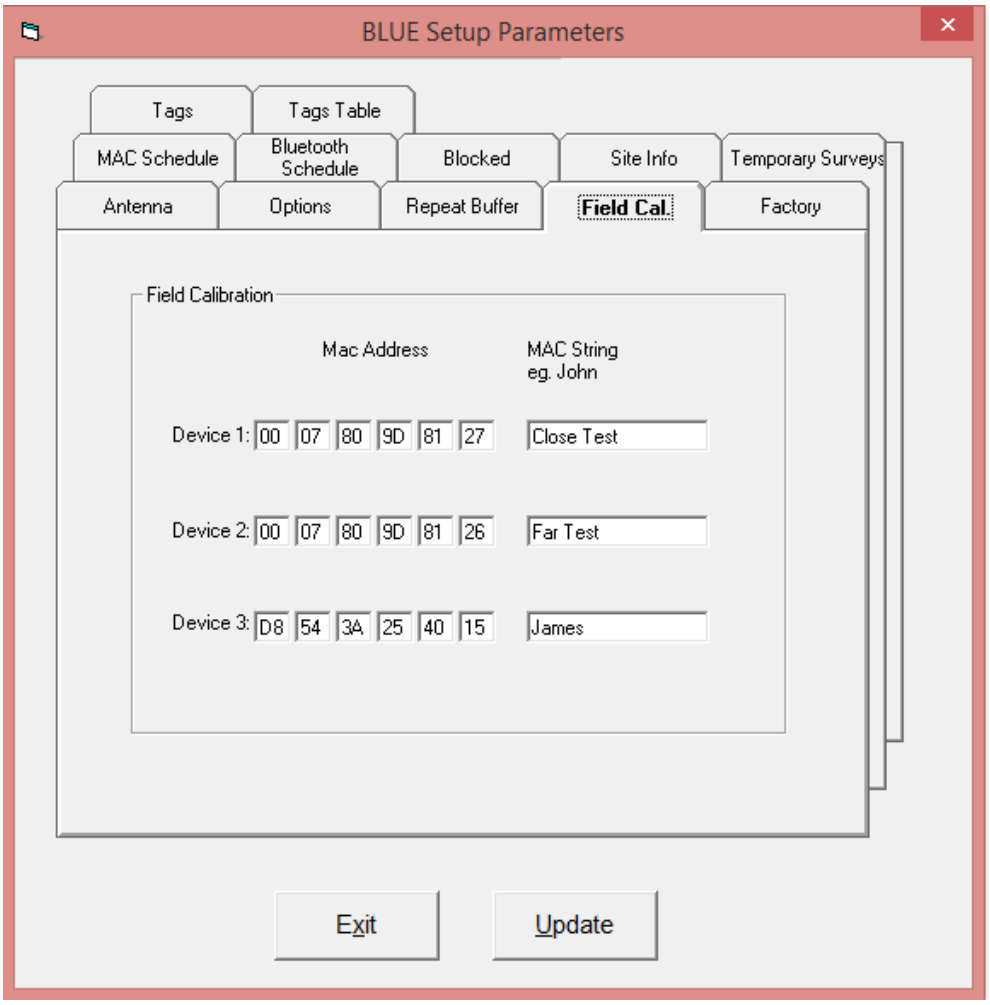


Figure 12: Field Calibration

3.5.5 Factory

The Factory tab facilitates the setup of the following features:

i. **Factory Settings:** The Equipment number and clock frequency (Clock Freq.) features of this form should not be modified by the user, unless instructed to do so by TDC Systems Ltd.

ii. **Clock Frequency Output & Reboot Unit:** The clock frequency output and reboot unit features should not be modified by the user, unless instructed to do so by TDC Systems Ltd.

iii. **Power Source:** The power source reflects the Power source required to activate the HI-TRAC® BLUE2. Using the '6 Volt Battery' option will cause the unit to enable battery protection features once the battery voltage drops below 6.8 Volts or 5 (DC).

iv. **Comms Type & Gps Type:** The comms type and Gps type should not be modified.

v. **Factory Reset & Hard Factory Reset:** The reset feature should be used under the instruction from TDC Systems Ltd.

NOTE: This factory Reset feature **WILL** remove all information stored on the unit, with no recovery possible.

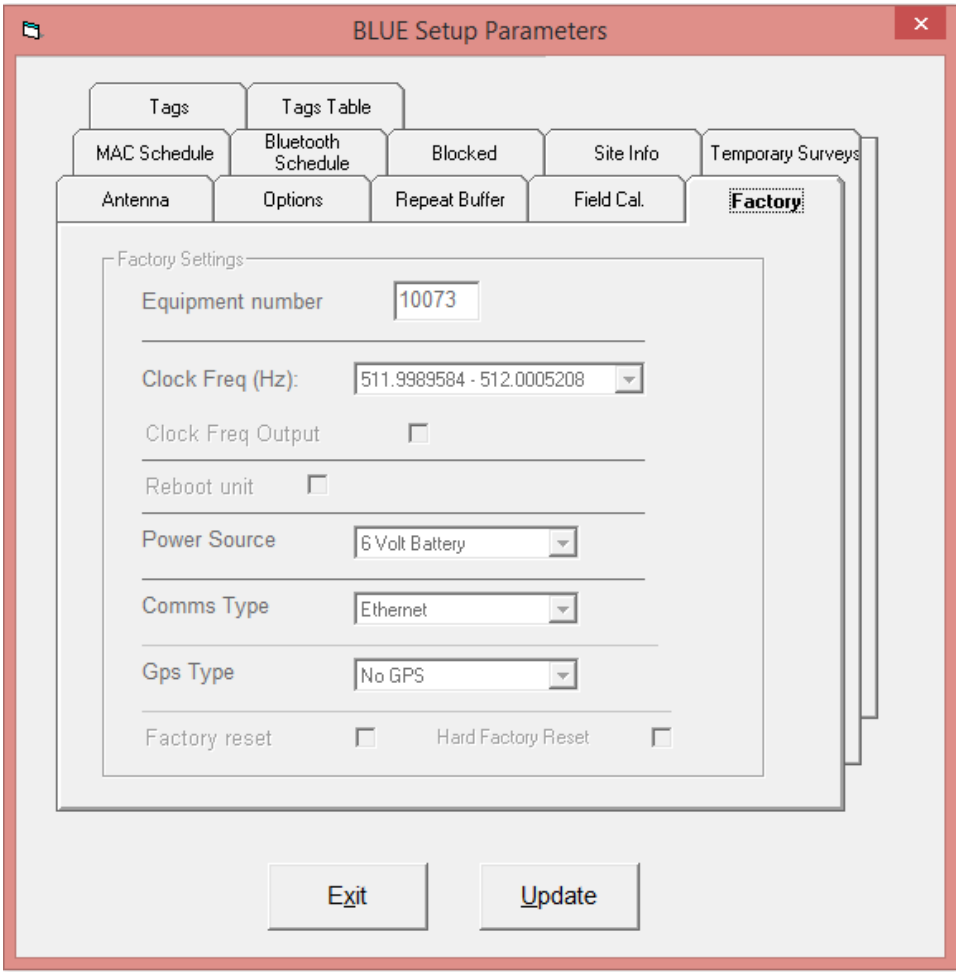


Figure 13: Factory

3.5.6 MAC Schedule

The MAC Schedule tab controls the hours of day, and days of the week that the MAC antenna will collect the data in.

NOTE: The Time and Day of Week features in Time/Date tab must be set correctly for this feature.

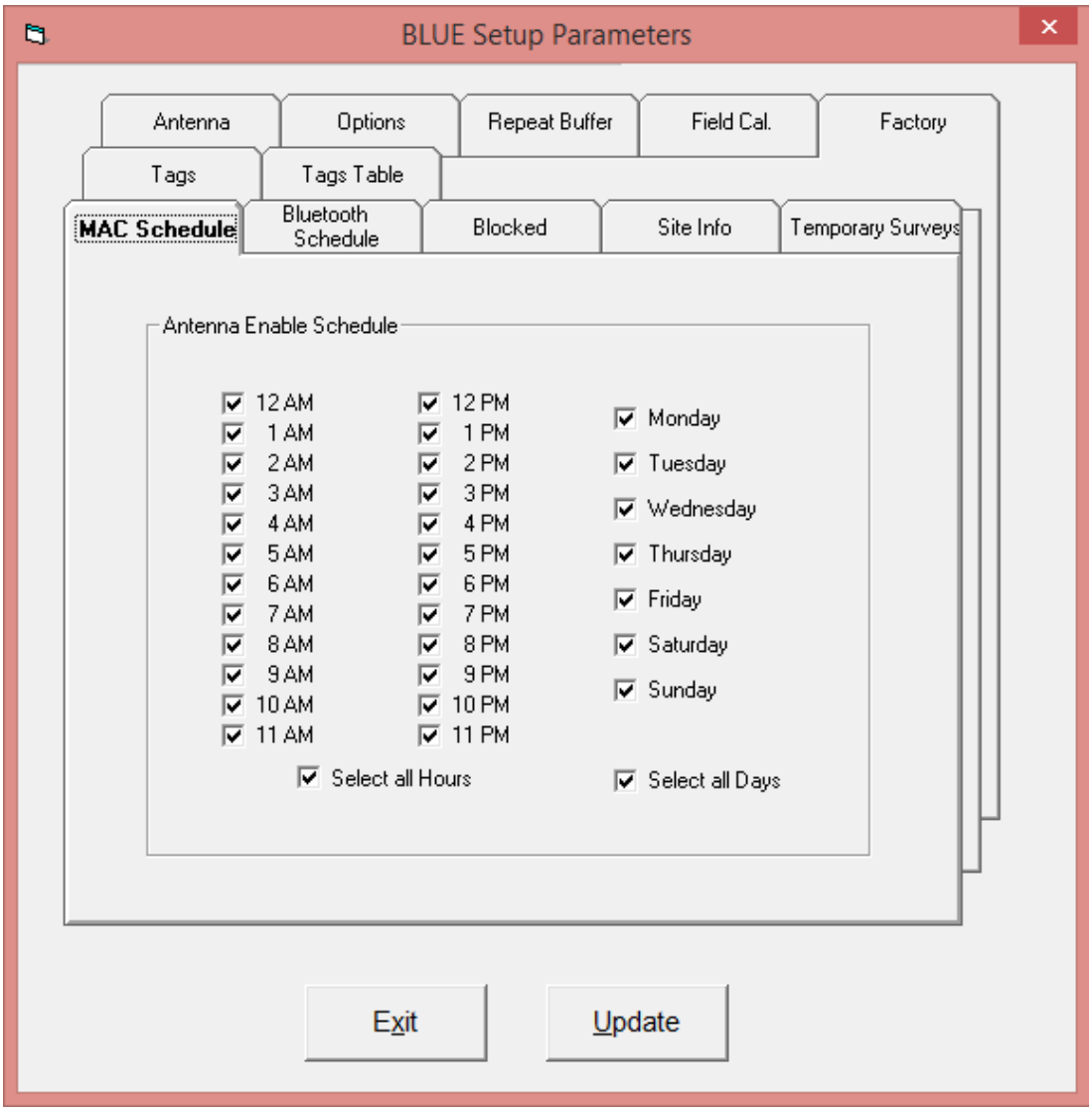


Figure 14: MAC Schedule

3.5.7 **Bluetooth Schedule**

The Bluetooth Schedule tab controls the hours of the day that the Bluetooth communications module will be active for, irrespective of magnet activation or MAC address activation.

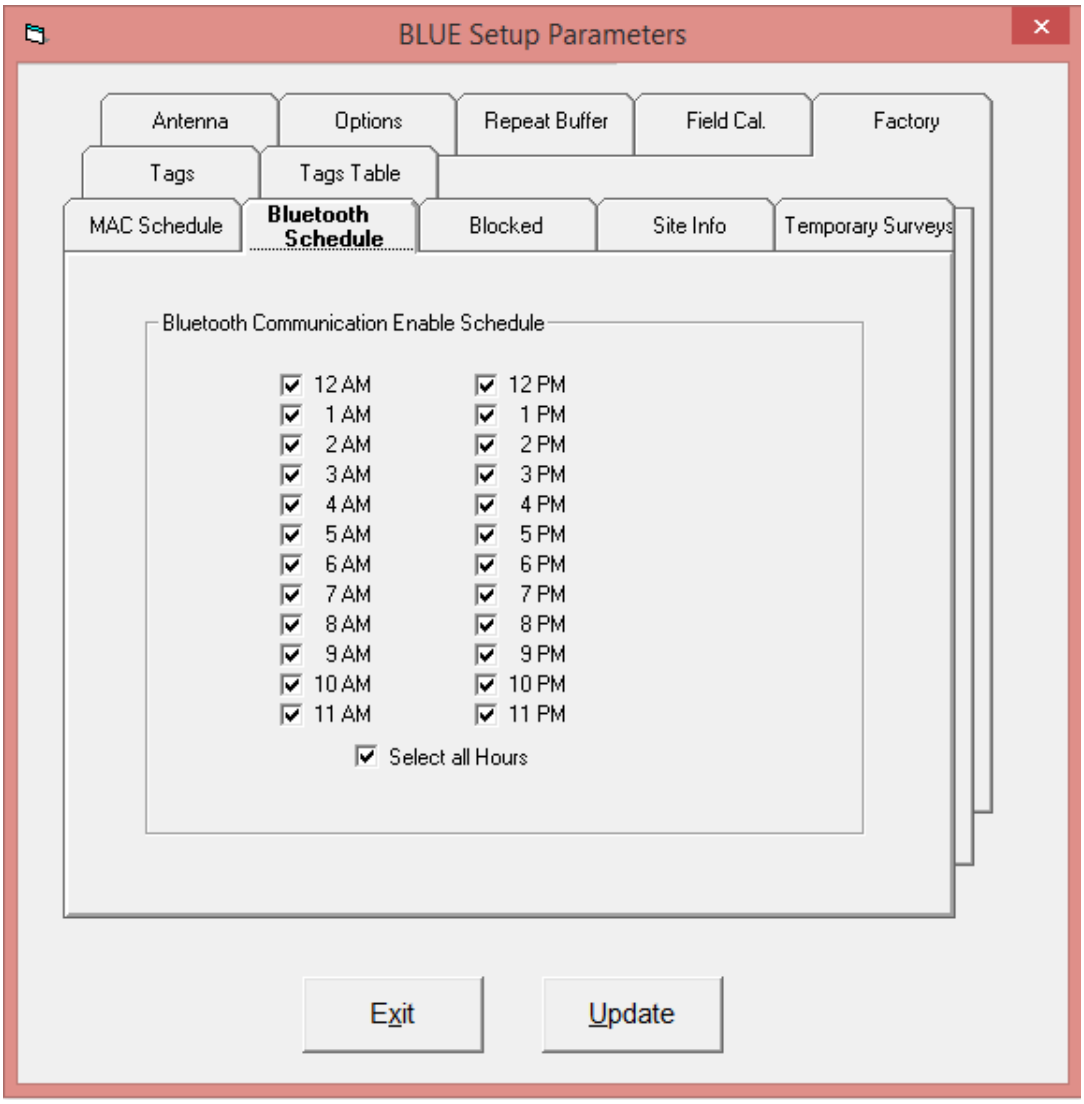


Figure 15: Bluetooth Schedule

3.5.8 **Blocked**

The blocked MAC addresses, if detected by the MAC antenna are not stored in the device. The HI-TRAC® BLUE2 allows the user to enter up to three MAC addresses in the blocked list as shown in the Figure 16.

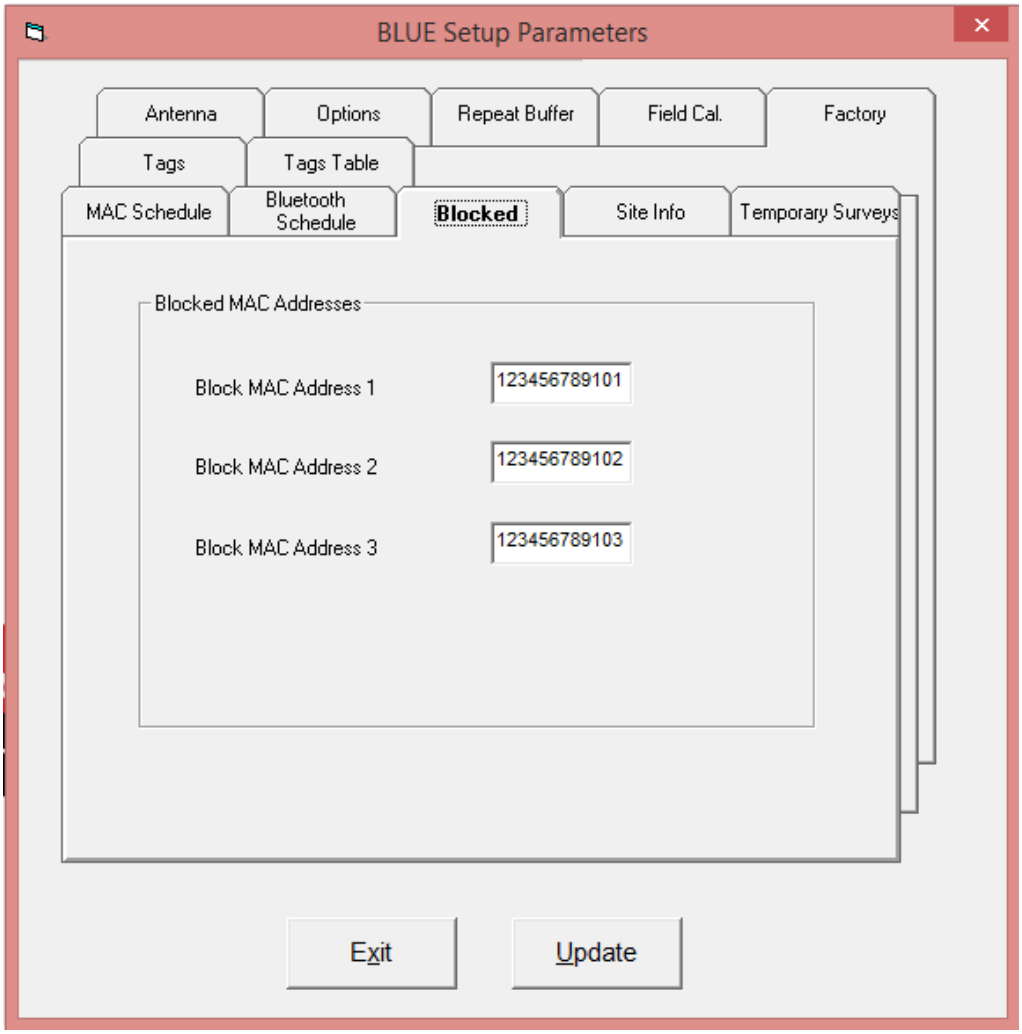


Figure 16: Blocked

3.5.9 Site Info

The Site description field can be used to fill in the following details of the site:

i. **Site Description:** A unique customised site name can be used to identify the HI-TRAC® BLUE2.

ii. **GPS Latitude & GPS Longitude:** The HI-TRAC® BLUE2 with the GPS module, then the GPS Latitude and GPS Longitude fields are automatically populated by the GPS co-ordinates. Otherwise, the user can enter the co-ordinates manually.

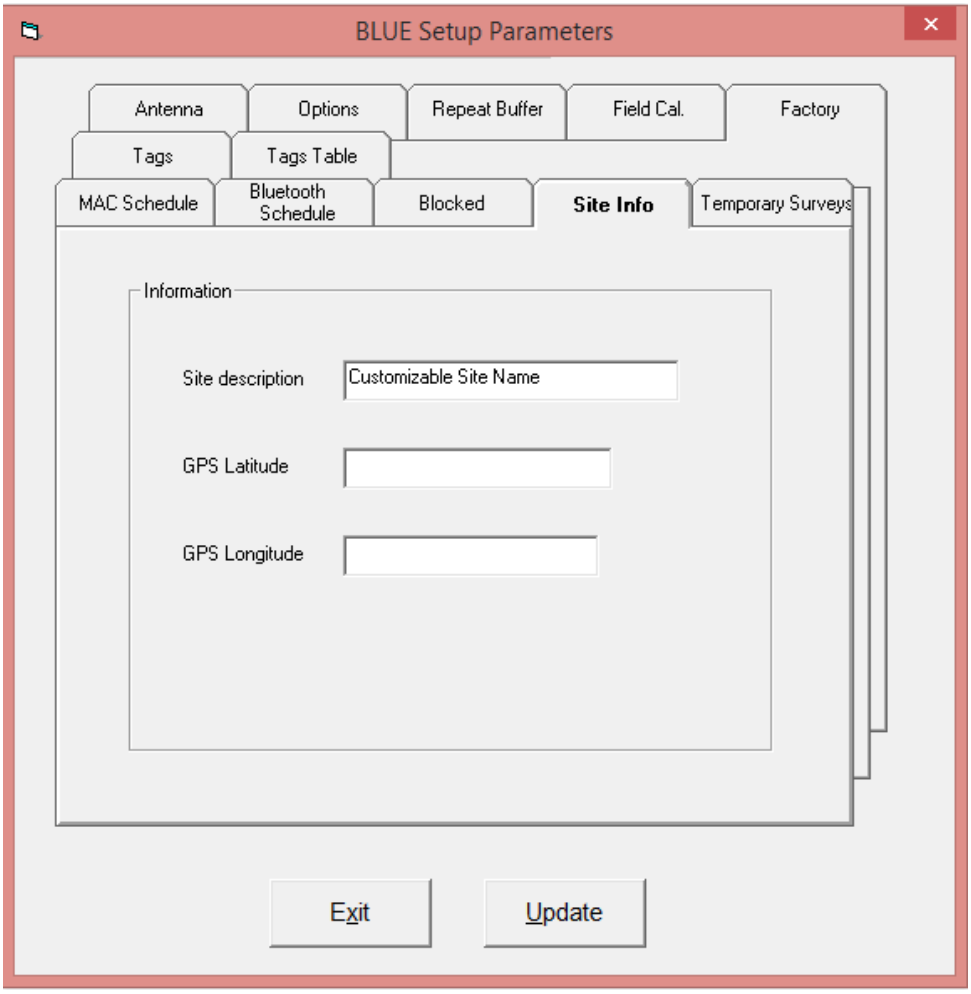


Figure 17: Site Information

3.5.10 **Temporary Surveys**

Temporary Surveys allows the user to start the MAC detection from a specified date and time. This feature is typically used in temporary survey installations saving the battery power by enabling the MAC detections only during the period of interest.

The 'Utilise Modem till Battery Flat' option enables the device to enable modem functionality until the battery is completely flat.

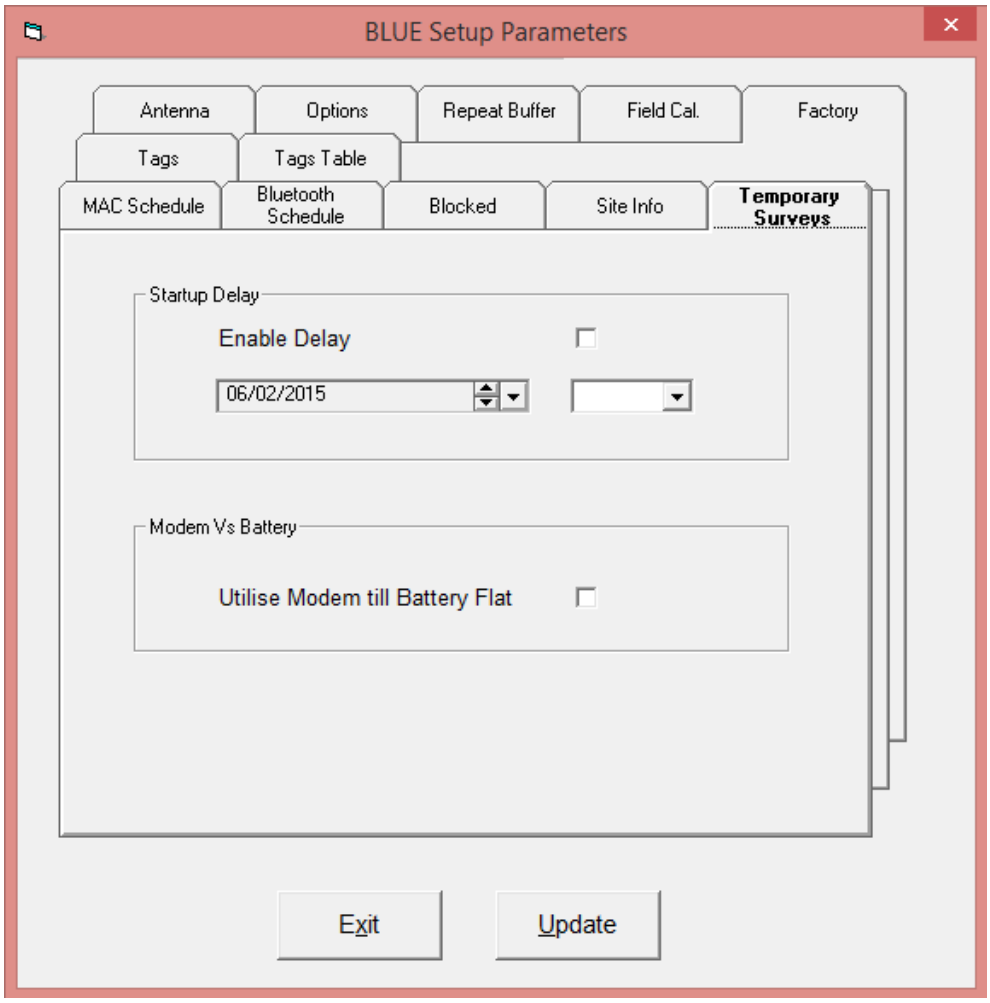


Figure 18: Temporary Surveys

3.5.11 **Tags**

The fields of the tag information with the tag checking enabled are detailed below:

i. **MAC Address:** Tags provide the capability of triggering the output based on particular MAC address detection. The Tags field aid to match any character in the MAC address field by accepting an asterisk (*) and includes an option to enable the feature on MAC detection on particular antenna supporting up to six MAC address match.

ii. **Antenna & Outputs:** The Antenna and outputs can be selected from three dropdown choice: primary antenna detection, auxiliary antenna detection or combination of both antenna.

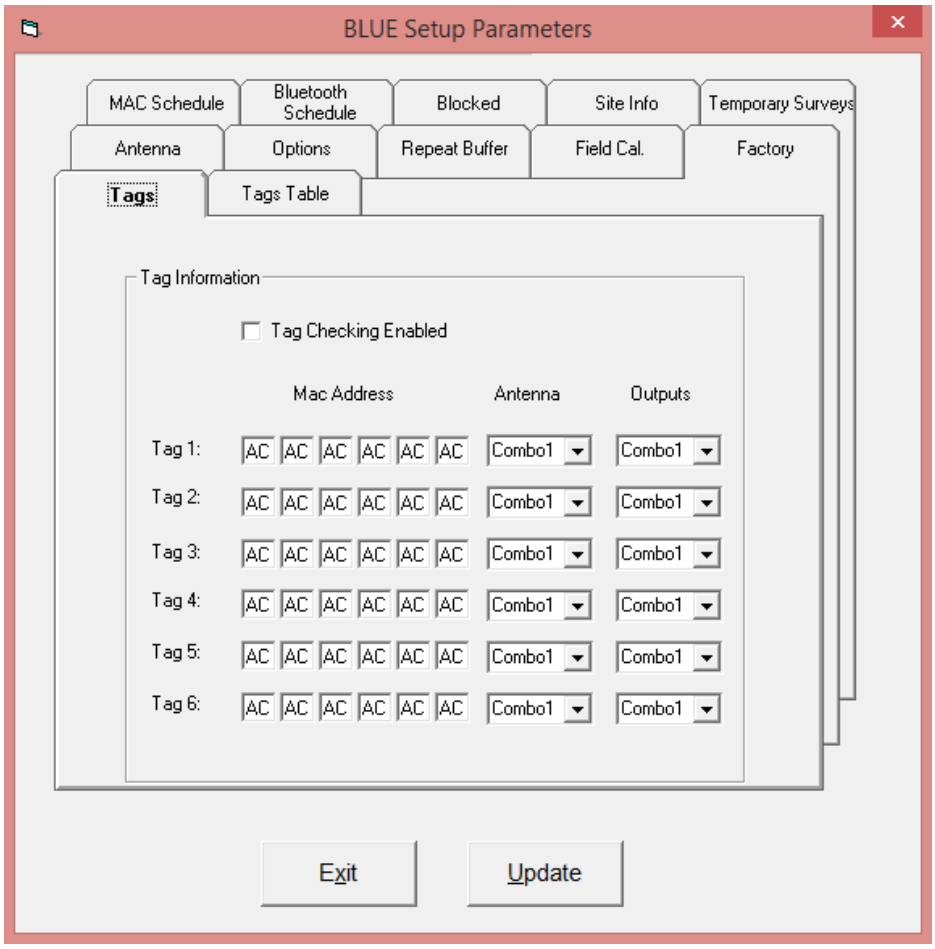


Figure 19: Tags

3.5.12 **Tags Table**

The HI-TRAC® BLUE2 enables uploading a MAC tag table file containing 512 different MAC addresses as shown in the Figure 20. The 6 outputs available on the BLUE2 can be configured to trigger based on a particular MAC address detection on specified MAC detecting antenna.

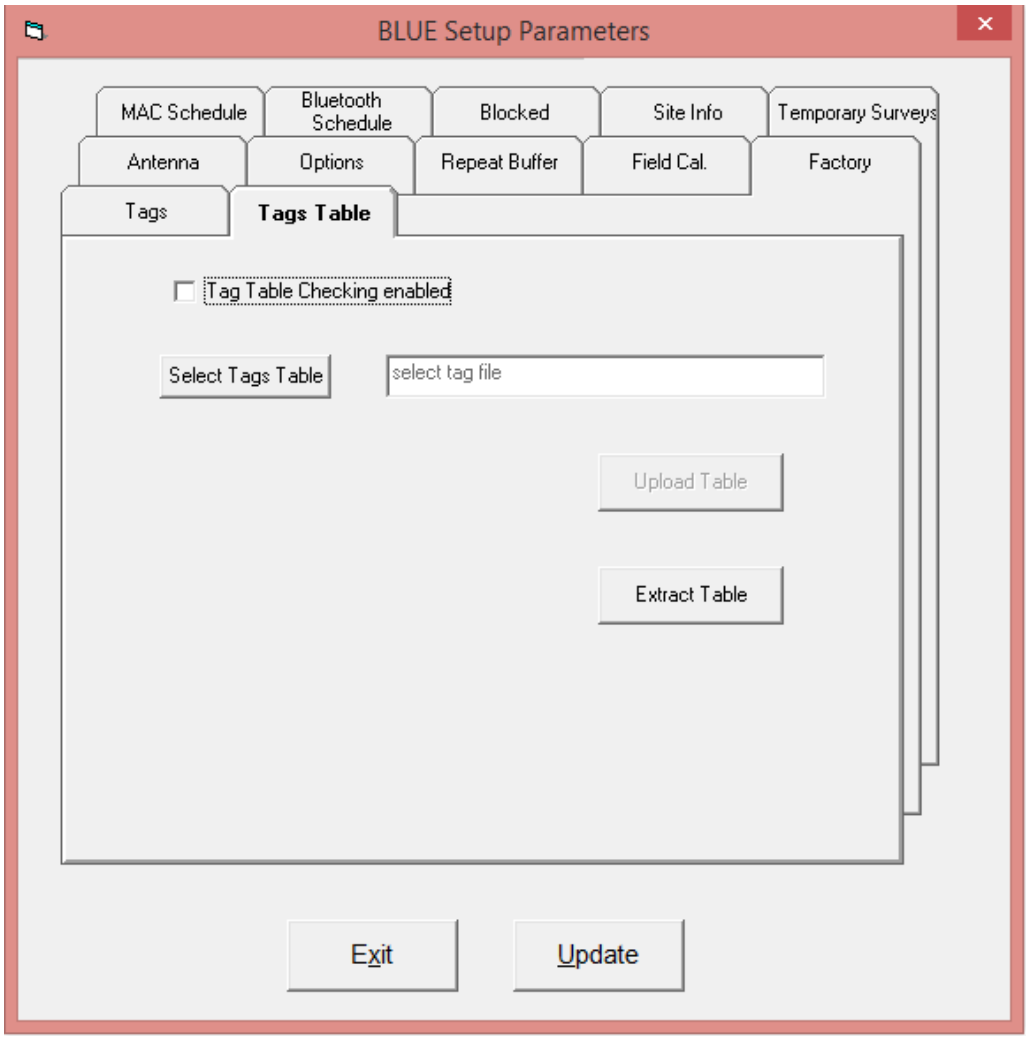


Figure 20: Tags Table

The extracted tags table has the following fields as shown in the Figure 21: Tags Extracted TableFigure 21. The table projects the entry and exit of the MAC address along with the antenna triggering the corresponding output.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Index	MAC Address	OP1/ENTRY_ANT1	OP2/ENTRY_ANT1	OP3/ENTRY_ANT1	OP4/ENTRY_ANT1	OP1/EXIT_ANT1	OP2/EXIT_ANT1	OP3/EXIT_ANT1	OP4/EXIT_ANT1	OP1/ENTRY_ANT2	OP2/ENTRY_ANT2	OP3/ENTRY_ANT2	OP4/ENTRY_ANT2
2	0	11:20:30:40:50:60	0	0	1	0	0	0	0	0	0	0	0	0
3	1	10:20:30:40:50:60	0	0	1	0	0	0	0	0	0	0	0	0
4	2	10:20:30:40:50:60	0	0	1	0	0	0	0	0	0	0	0	0
5	3	10:20:30:40:50:60	0	0	1	0	0	0	0	0	0	0	0	0
6	4	10:20:30:40:50:60	0	0	1	0	0	0	0	0	0	0	0	0
7	5	10:20:30:40:50:60	0	0	1	0	0	0	0	0	0	0	0	0
8	6	10:20:30:40:50:60	0	0	1	0	0	0	0	0	0	0	0	0
9	7	10:20:30:40:50:60	0	0	1	0	0	0	0	0	0	0	0	0
10	8	10:20:30:40:50:60	0	0	1	0	0	0	0	0	0	0	0	0
11	9	10:20:30:40:50:60	0	0	1	0	0	0	0	0	0	0	0	0
12	10	10:20:30:40:50:60	0	0	1	0	0	0	0	0	0	0	0	0

Figure 21: Tags Extracted Table

3.6 Firmware

Locate the firmware file by clicking the Select Firmware button. The firmware file will have a name format of **Firmware_SystemType_ Firmware Version .dat**
Example: Firmware_BLUE2_2.0.3.dat

Please wait while the new firmware is loaded into the unit (approximately 2 minutes). When the firmware has been loaded onto the unit and integrity checks have been conducted, HI-COMM 100 will advise that the unit will now restart to complete the update.

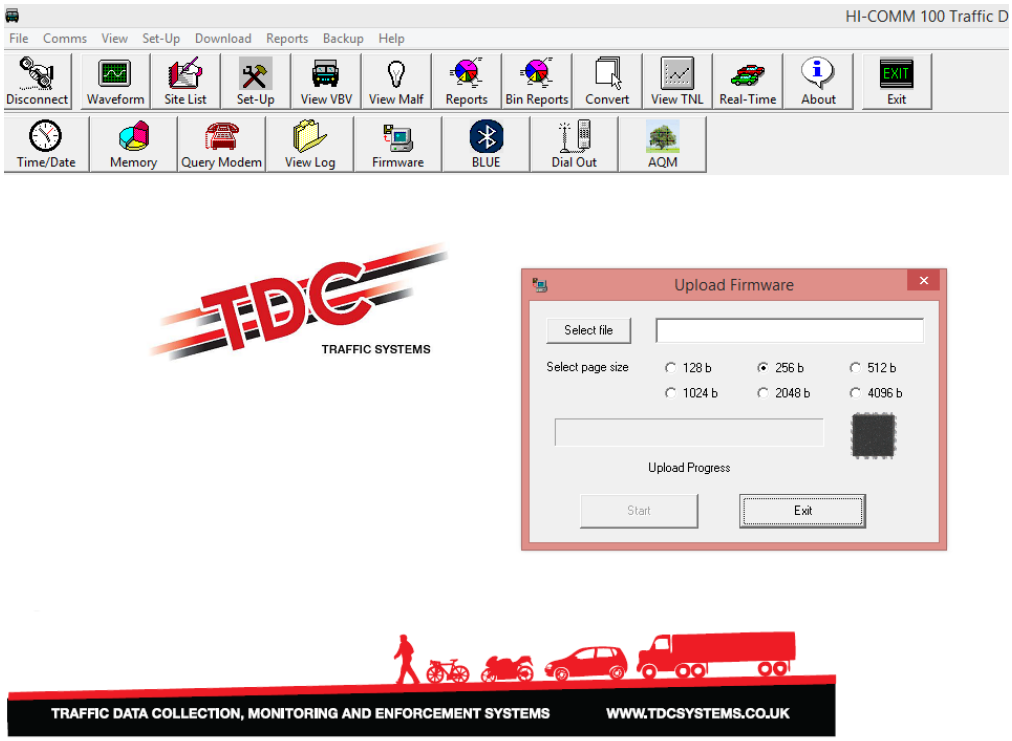


Figure 22: Upload Firmware

If required to confirm the upload version, the information is available by selecting the 'About' option from the top menu bar. The Primary Firmware field contains the firmware version information currently installed and the Secondary 1 contains the first profiler firmware version.

Figure 23: Firmware Version Details

3.7 Query Modem

This function can be used to query the internal modem of the unit to confirm the correct functionality. Obtain the network signal strength in the location installed and force a data upload to configured IP address.

Query: If modem is currently ON (connected to server and waiting for dial in), the Modem Information (right hand side of the screen) will automatically update with unit data from when the modem was started.

If the modem is not operating when **Query** is selected the Modem Console (left hand side of the screen) will display AT commands as the processor communicates with the internal modem. Once the query has completed, the Modem Information will update with the relevant data. If the modem is in the process of establishing a connection according to its 'Modem Schedule' the Modem Console will show AT messages from its current operation.

Force Upload: If the modem is currently established on a GPRS connection clicking on Force Upload will not perform any tasks. If the modem is **'Waiting for Dial in'** or is currently off, this button will enable the modem, go through registration procedure (AT command will scroll through in Modem Console). Once Instation connection established, information in Modem Information will be updated.

NOTE: Pressing **Exit** before the Modem Information is updated will cause current operations to be cancelled (after a preset timeout period). It is therefore important that you wait for the Modem Information to be updated after selecting **Query** or **Force Upload** before exiting from the Modem Query.

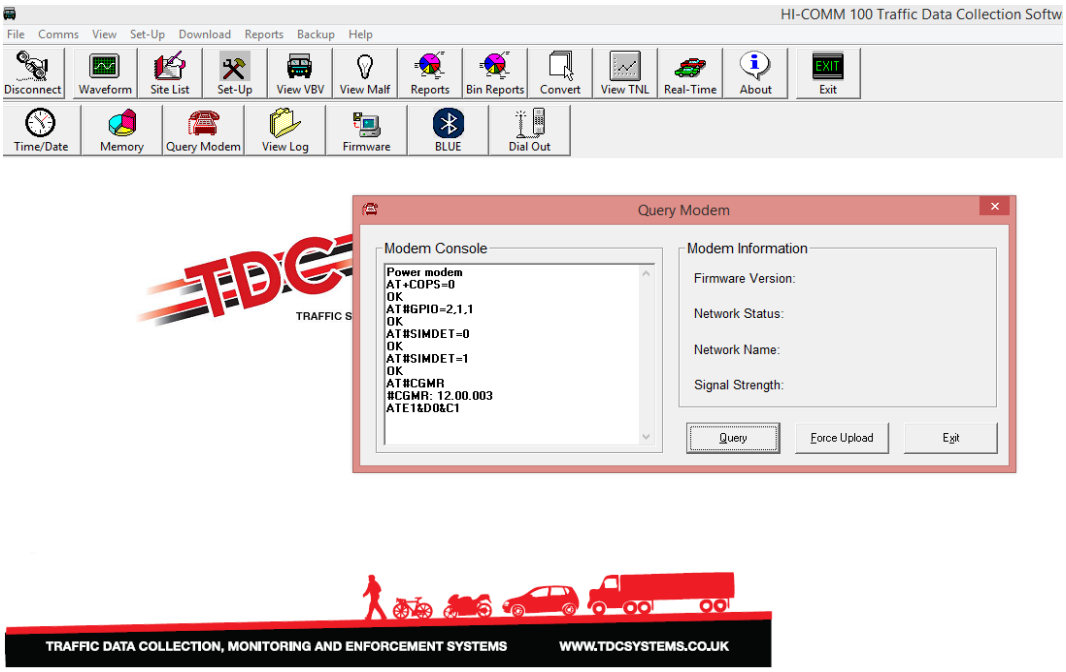
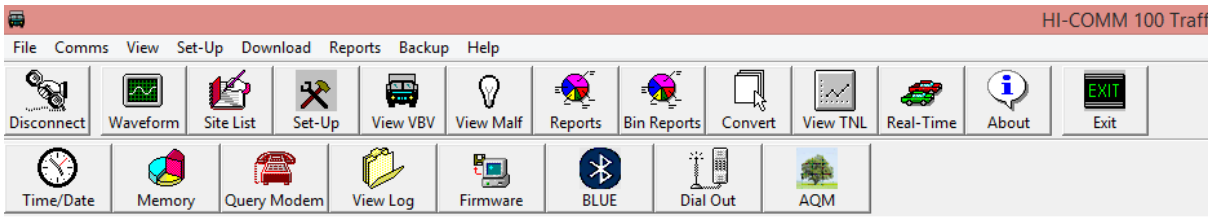


Figure 24: Query

3.8 Data Memory

Select **Memory** icon from the menu bar.



The **Data Memory** function shows total internal memory (GPRS/Manual Download Memory) available on the unit, used memory and free memory. The pie chart is a physical representation of the number shown in the table on the right of the screen and indicates which portion of the memory is currently being used.

Data Memory functionality includes:

- The window shows the total available memory space for data storage on the unit.
- The area marked in red is used memory.
- The area marked in blue is available for use.
- The auto update feature can be used when an Instation connection is established to confirm that the data is being removed from the unit.

Auto Update and Refresh: Auto Refresh can be used when performing GPRS upload to view the read pointer increasing, and therefore data being extracted from the device.

The **Download** button will download the stored data to a connected computer; it does not remove or delete the data from the device. '**Start Time**, **End Time** and **Vehicle ID'** information is displayed from packets as they are downloaded. Data will be downloaded to the designated HI-COMM site folder as shown in the **Site Number**. The **Write** and **Read** pointer values will not change as no data has been removed from the unit.

Delete All Data: Totally deletes all data from the unit. This function cannot be reversed. The Read Pointer value will increase to the Write Pointer value whereas the Write Pointer value will not decrease. Pie Chart will update to show location of read and write pointers.

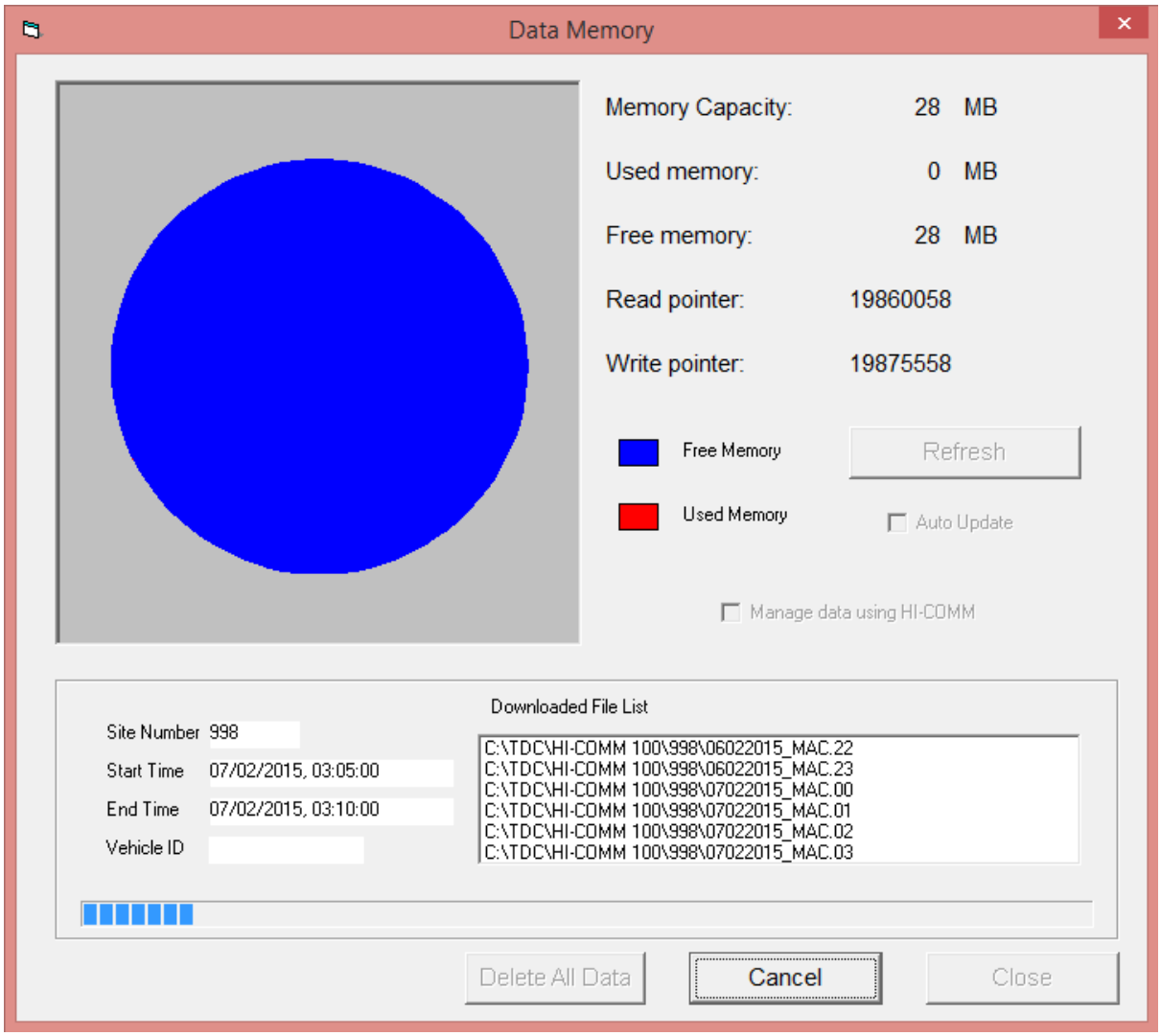
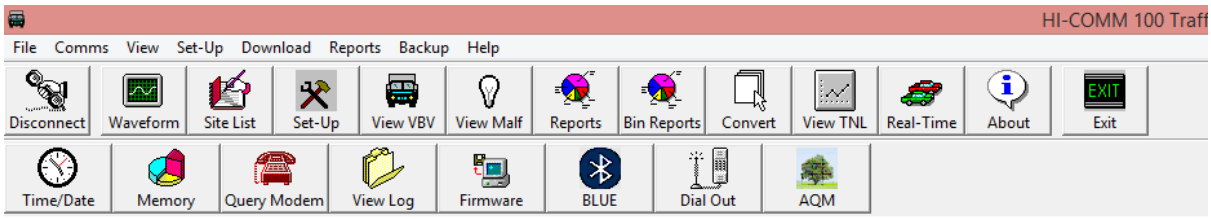


Figure 25: Data Memory

3.9 Dial Out

Select the 'Dial Out' icon to open the Modem Configuration window. A number of tabs are shown each allowing the setup of various parameters as described below:



3.9.1 Modem Functionality

The tab defines the modem functionality as listed below. Any changes in the settings affects the options available in the other tabs.

i. **Disable internal modem:** Internal Modem can be disabled by using this option.
ii. **Enable GSM dial-in connection**: The HI-TRAC® BLUE2 unit can be dialled into, using 'Dial in Schedule' settings. Else the unit will not dial out at all.
iii. **Enable GPRS upload schedule**: The HI-TRAC® BLUE2 unit will dial out according to the setting set in the 'Dial out Schedule', once for every hour selected at the beginning of each hour. With this option selected, the unit can be dialled into according to 'Dial in Schedule' but dial out takes priority.
iv. **Enable GPRS upload interval**: The HI-TRAC® BLUE2 unit will dial out according to Dial out Interval. The unit can be dialled into according to Dial in Schedule but dial out takes priority.
v. **Enable GPRS upload interval per schedule**: The HI-TRAC® BLUE2 will dial out once for every hour selected at the beginning of each hour according to the dial in schedule.

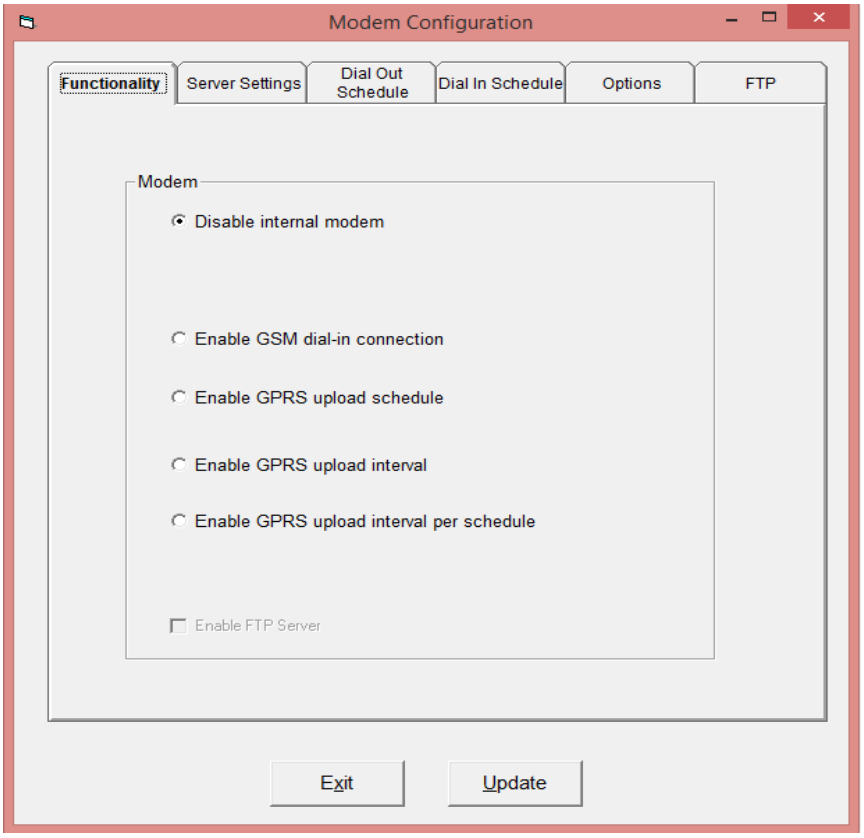


Figure 26: Modem Functionality

3.9.2 Server Settings

The GPRS and Ethernet settings are explained in detail below:

a. GPRS Server Setting

The Autocomplete drop down box has a number of preconfigured options for Drakewell C2 and TDC Instation connection options. The fields of the GPRS server setting should be configured as shown below:

i. **Site Number**: The site number as entered in Instation software for the HI-TRAC® BLUE2 unit.
ii. **IP Address**: The IP address of the server should be entered.
iii. **Port Number**: The port number is the server listening port number.
iv. **APN, Username & Password:** These are the details available on the SIM card.
v. **SIM Pin:** The pin details are available on the SIM card. If not, ignore it.

NOTE: The details entered can be saved for the future use by a tick in the tick box at the end of the tab of the GPRS setting below.

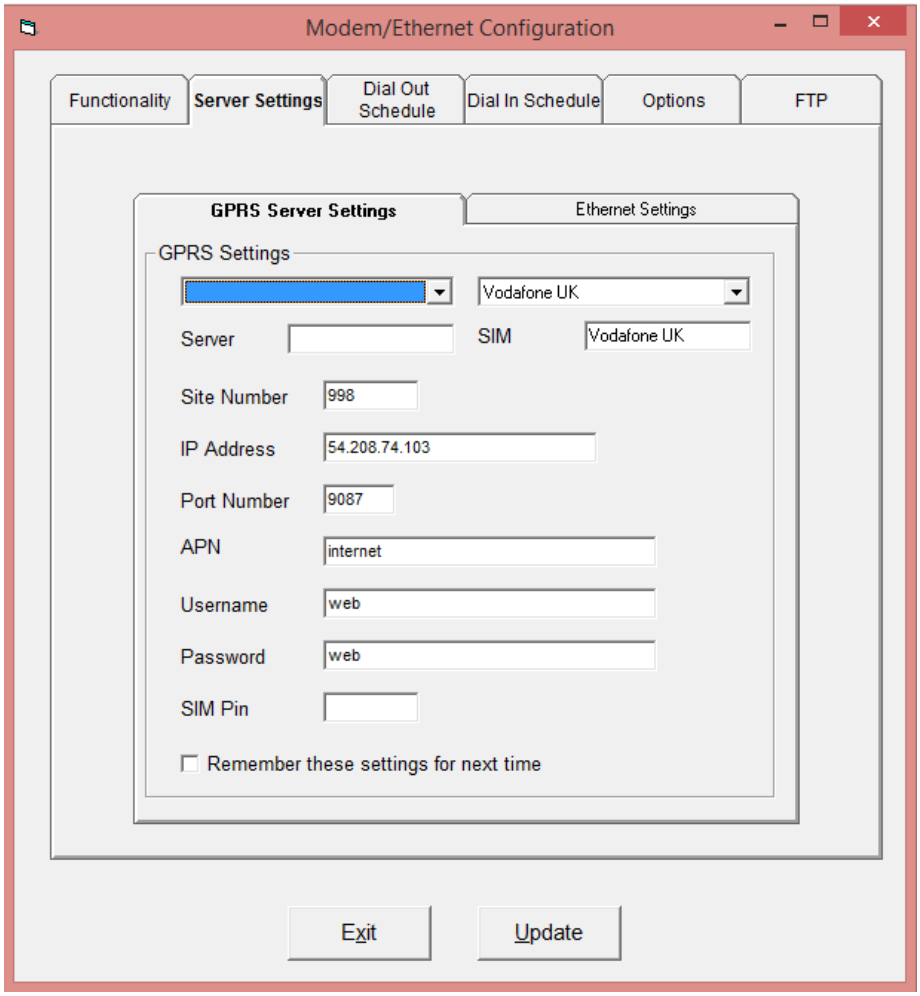


Figure 27: GPRS Setting

b. **Ethernet Settings**

Figure 28 shows the Ethernet module network settings. The fields are populated with the current settings on the TDC's Ethernet module. Any of the fields can be changed and the option "Change Network Settings" should be used to set the new network settings for the Ethernet module.

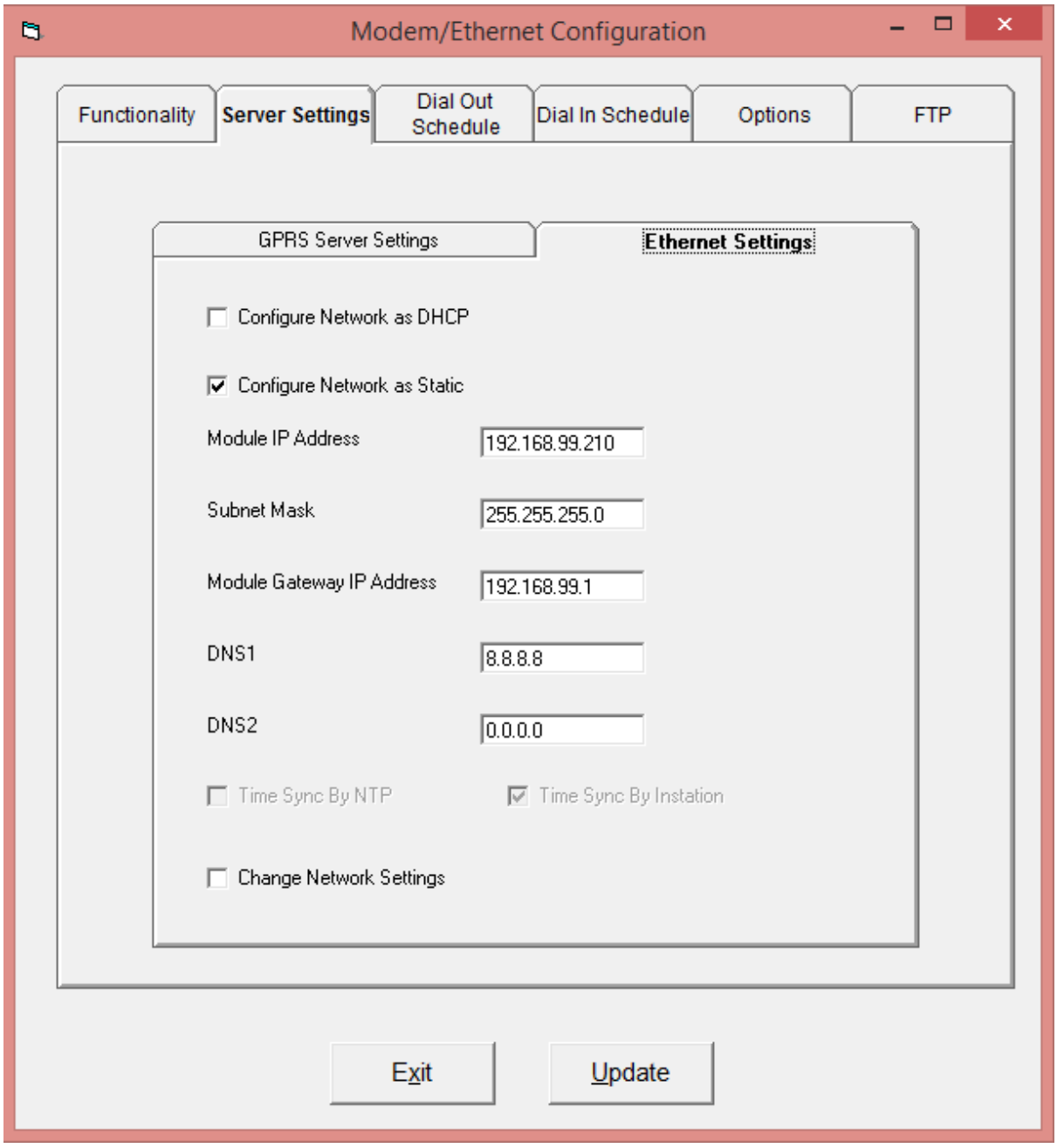


Figure 28: Ethernet Settings

3.9.3 Dial Out Schedule

This sets the transmit interval or hours of day and days of the week that the modem will connect to a configured server. The transmit interval are minute intervals of the hour; i.e.,

setting 5 minutes will connect at X:00, X:05, X:10, X:15, X:20, etc. whereas setting 14 minutes will connect at X:00, X:14, X:28, X:42 etc. but setting 35 minutes will connect at X:00 and X:35 only of each hour.

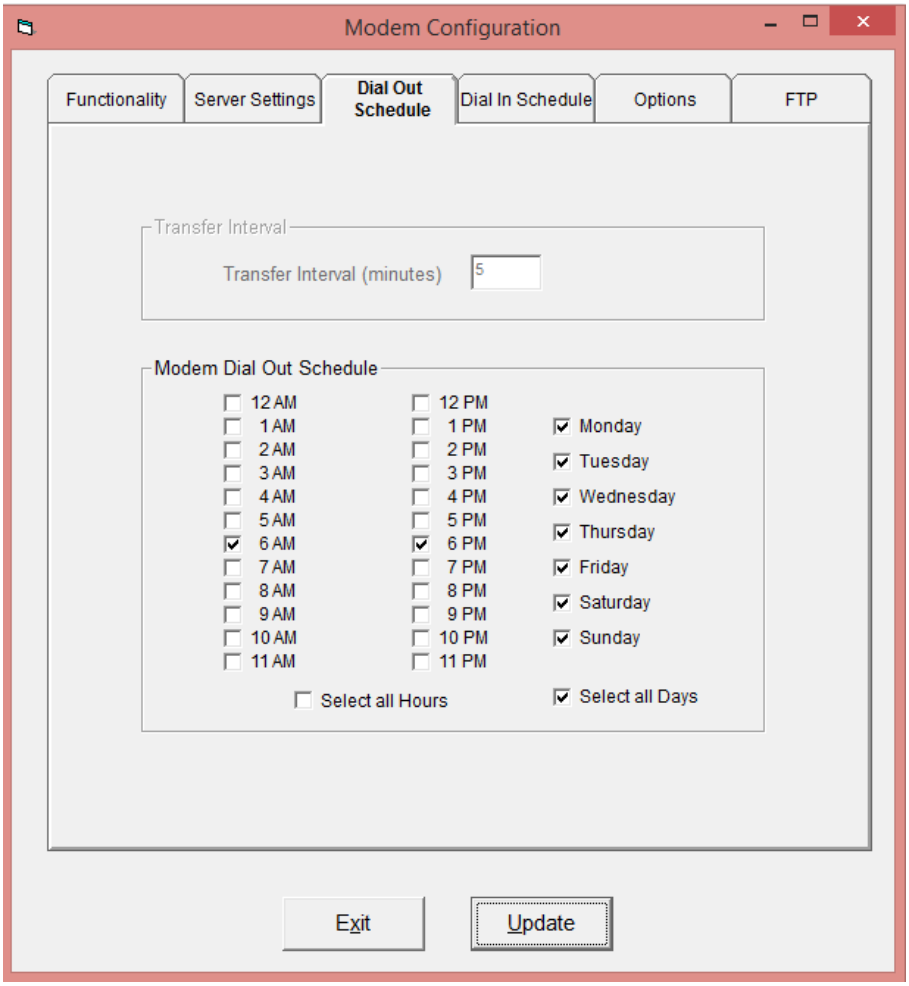


Figure 29: Dial out Schedule

3.9.4 **Dial in Schedule**

This sets the hours of the day and days of the week that modem will be powered on for. The modem will be powered on for the whole hour unless the following settings are invoked.

If Enable GSM dial-in connect is selected the Power down after upload complete option will be enabled. Setting this option will shut down the modem for the remainder of the hour if a GSM connection was established and all data on the unit was downloaded within that hour.

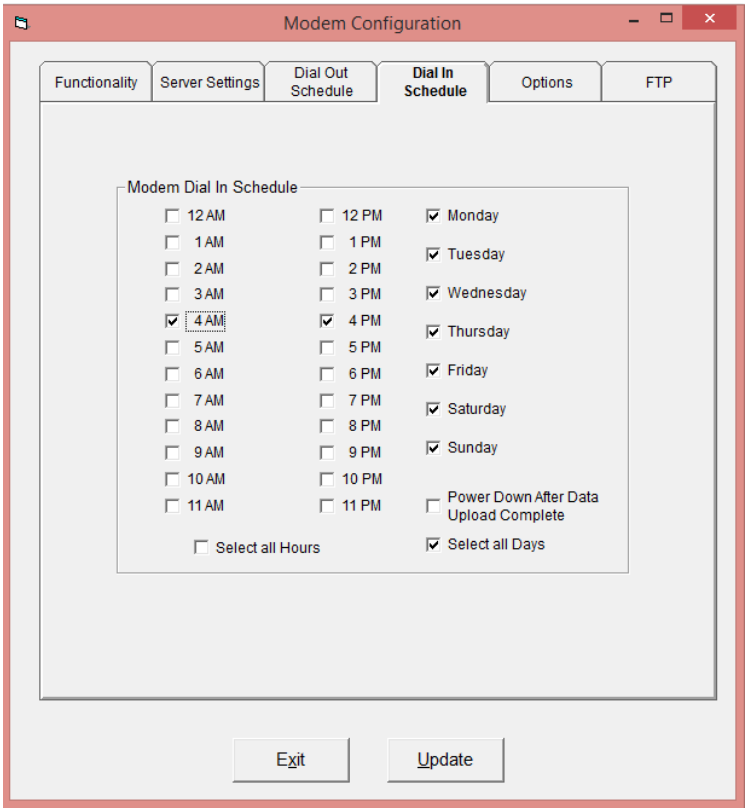


Figure 30: Dial in Schedule

3.9.5 Options

The HI-TRAC® BLUE2 aids the feature to limit the connection based on data volume. The features are detailed below:

i. **Always establish Connection:** Being the default option, the connection to the server is always established updating the detected MAC addresses.

ii. **Connect only when data stored:** If this option is selected, the connection to the server is established only when there is data in the memory. This is mainly useful during the night time since the MAC detection is very less.

iii. **Connect only when stored devices is greater than :** If selected, the connection to the server only when the stored devices are greater than the number chosen from the dropdown as shown in the Figure 31.

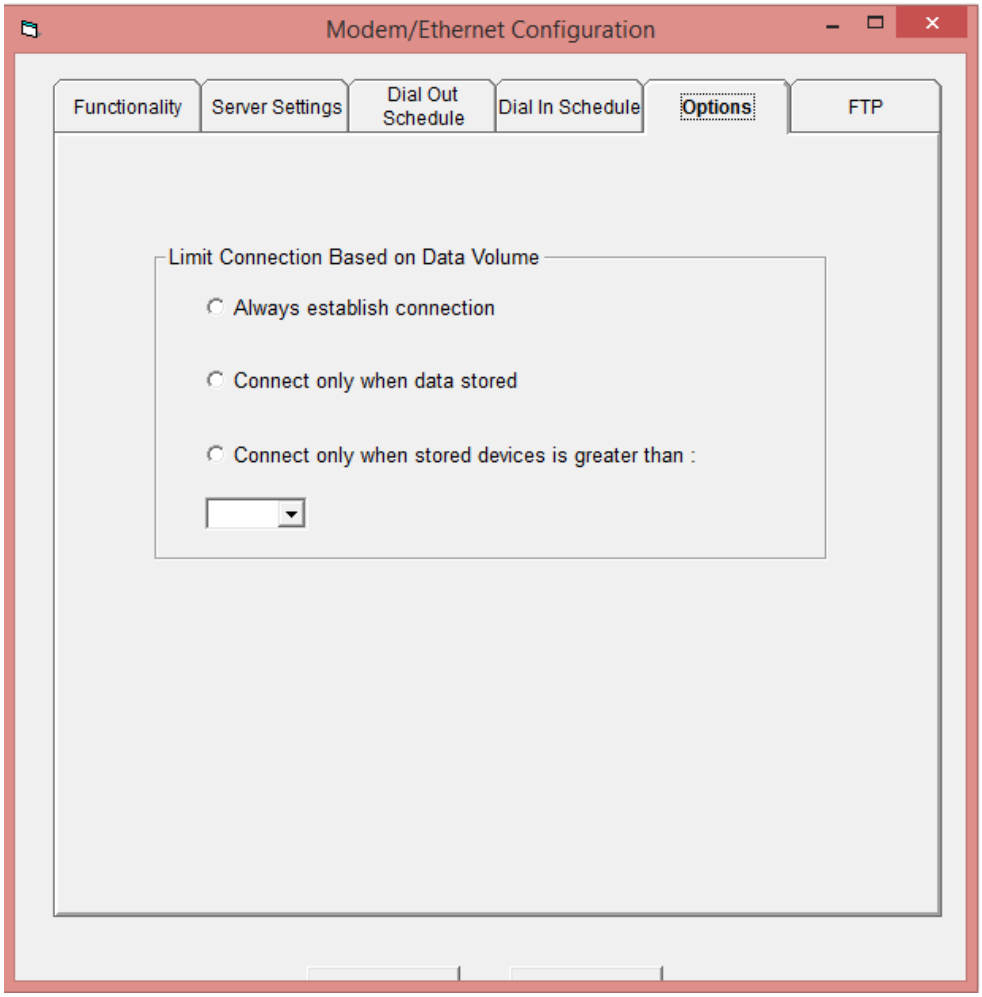
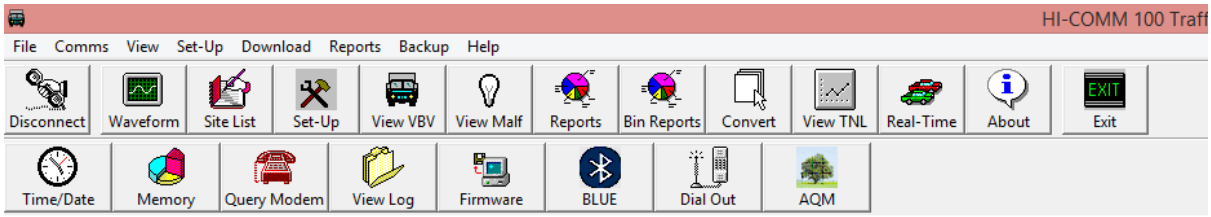


Figure 31: Options

3.10Data Memory

Select **Memory** icon from the HI-COMM 100 menu bar. The **Data Memory** function shows total internal memory (GPRS/Manual Download Memory) available on the unit, used memory and free memory. The pie chart is a physical representation of the number shown in the table on the right of the screen and indicates which portion of the memory is currently being used.



Data Memory indicates the total available memory space for data storage on the unit. The area marked in ‘red’ represents the used memory and the one in ‘blue’ represents free memory which is available for use.

i. **Auto Update and Refresh:** The auto update feature confirms the removal of data from the unit when an Instation connection is established. Auto Refresh confirms an increase in the read pointer count in GPRS upload mode, thus extracting data from the device.

ii. **Download**: The Download button will download the stored data to a connected computer, it does not remove or delete the data from the device. The '**Start Time**, **End Time** and **Vehicle ID'** information is displayed from packets as they are downloaded. Data will be downloaded to the corresponding HI-COMM 100 site folder as shown in the **Site Number**. The values of the Write and Read pointer will not change as no data will be removed from the unit.

iii. **Delete All Data:** Totally deletes all data from the unit. This function cannot be reversed. The Read Pointer value will increase to the Write Pointer value whereas the Write Pointer value will not decrease. Pie Chart will update to show location of read and write pointers.

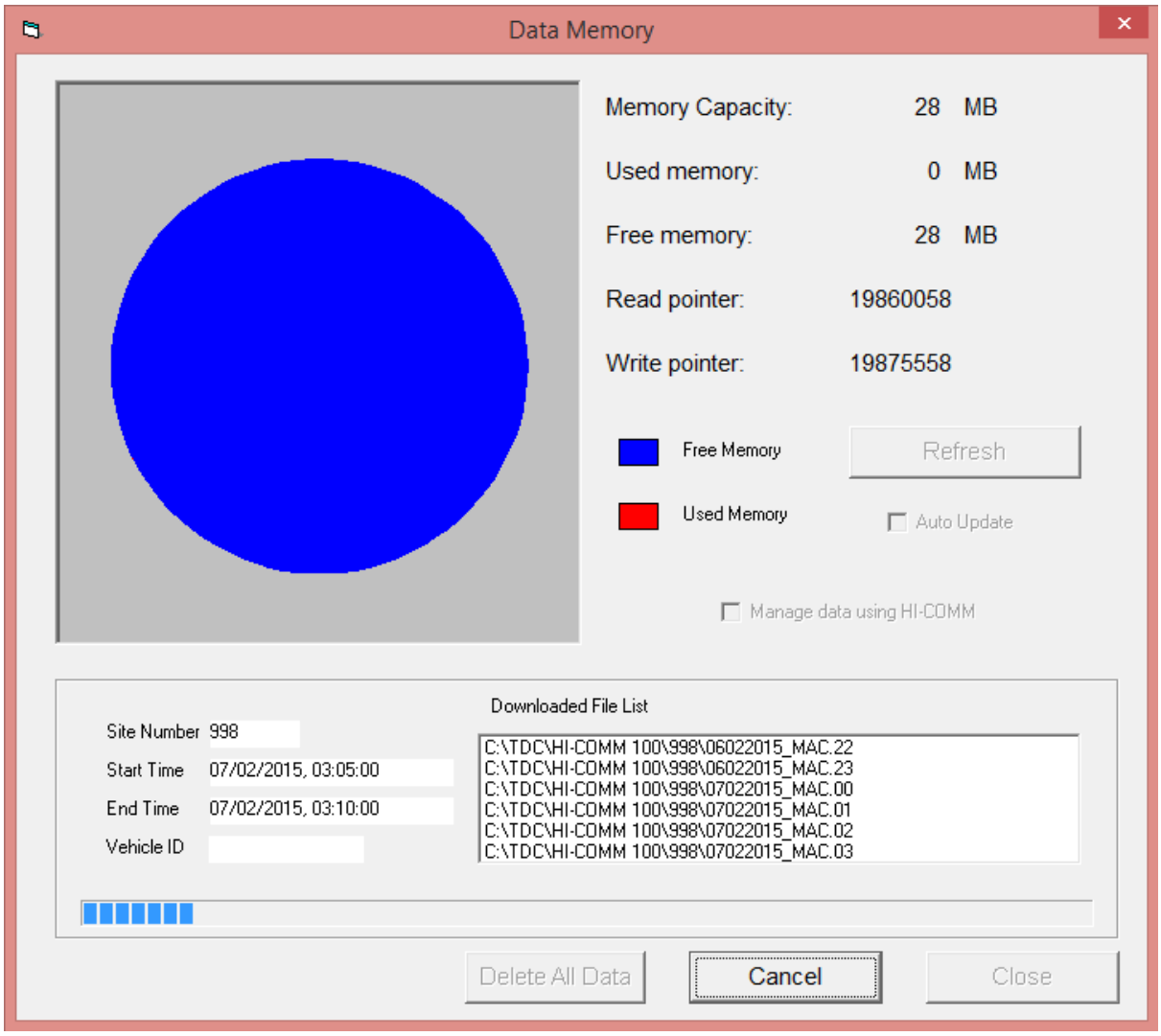


Figure 32: Data Memory

3.11 Real Time View

The real time view provides the live information on the devices that are currently being detected by the HI-TRAC® BLUE2 as shown in the Figure 33 and Figure 34.Ensure to select the Bluetooth MAC address or any other feature as per requirement. The fields of the Real time view are detailed below:

i. **Serial #**: Serial # column displays a unique identification number for every MAC address detection.
ii. **Time:** The time column displays the time of the MAC detection.
iii. **Class Index:** The class index displays the MAC address of the detected device.
iv. **Class:** The class column displays the type of the device: Laptops, Smartphones, HI-TRAC® BLUE2 etc.
v. **Lane:** The lane represents the lane number in which the device was detected.
vi. **Direction:** The direction indicates the entry and exit direction of the detected device.
vii. **RSSI:** The RSSI indicates the received signal strength in decibels.

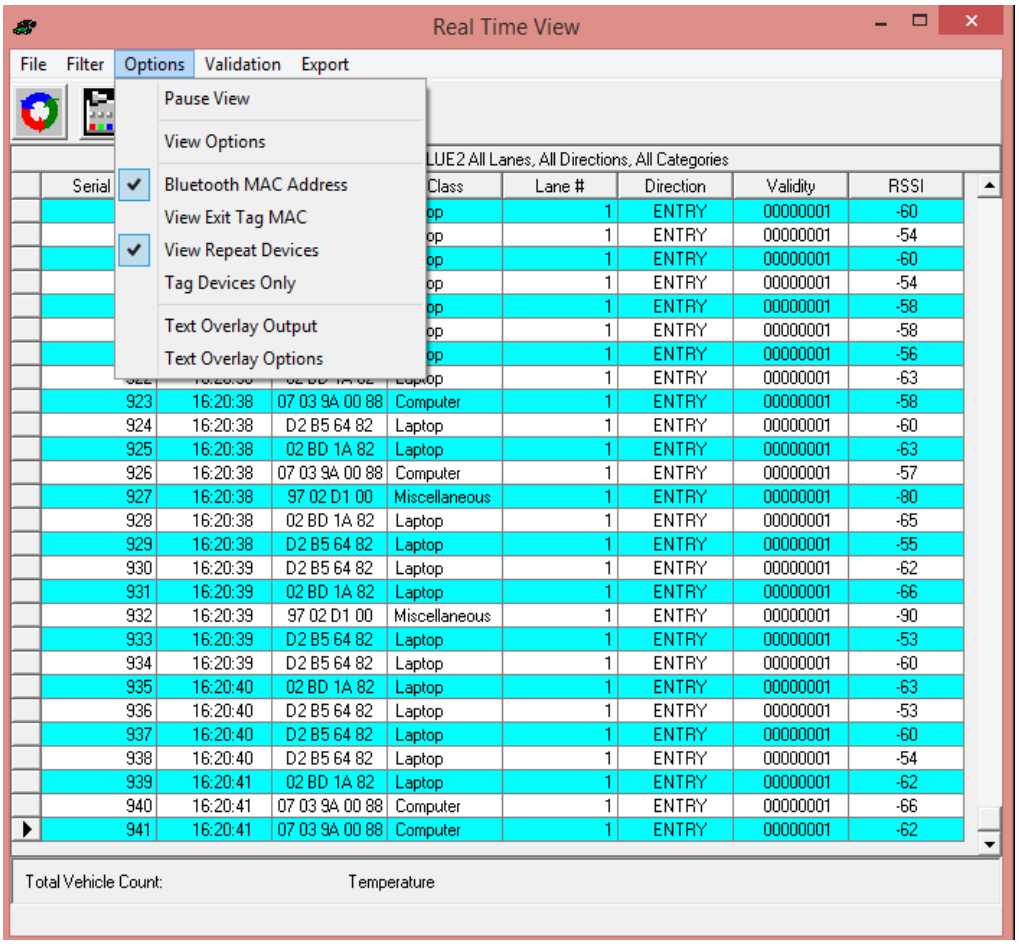
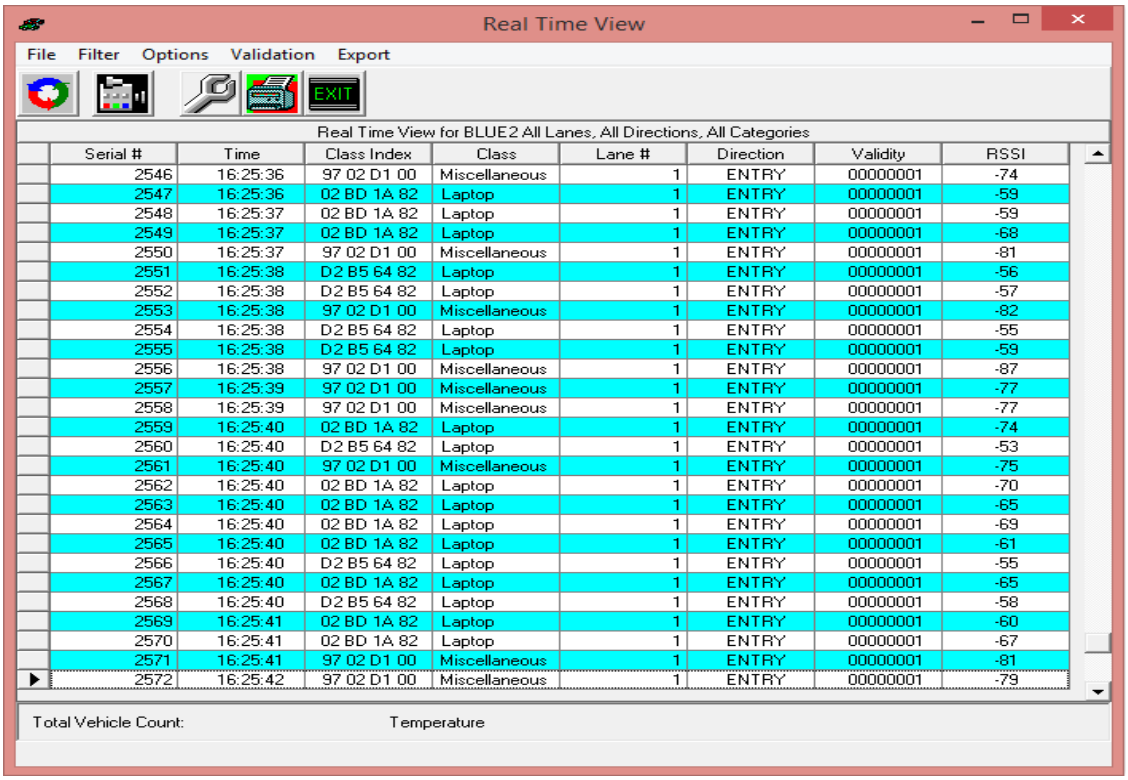


Figure 33: Real Time View—Options

NOTE: Both 'Bluetooth MAC Address' and 'View Repeat Devices' should be selected to view all information the HI-TRAC® BLUE2 is collecting and processing.



Serial #	Time	Class Index	Class	Lane #	Direction	Validity	RSSI
2546	16:25:36	97 02 D1 00	Miscellaneous	1	ENTRY	00000001	-74
2547	16:25:36	02 BD 1A 82	Laptop	1	ENTRY	00000001	-59
2548	16:25:37	02 BD 1A 82	Laptop	1	ENTRY	00000001	-59
2549	16:25:37	02 BD 1A 82	Laptop	1	ENTRY	00000001	-68
2550	16:25:37	97 02 D1 00	Miscellaneous	1	ENTRY	00000001	-81
2551	16:25:38	D2 B5 64 82	Laptop	1	ENTRY	00000001	-56
2552	16:25:38	D2 B5 64 82	Laptop	1	ENTRY	00000001	-57
2553	16:25:38	97 02 D1 00	Miscellaneous	1	ENTRY	00000001	-82
2554	16:25:38	D2 B5 64 82	Laptop	1	ENTRY	00000001	-55
2555	16:25:38	D2 B5 64 82	Laptop	1	ENTRY	00000001	-59
2556	16:25:38	97 02 D1 00	Miscellaneous	1	ENTRY	00000001	-87
2557	16:25:39	97 02 D1 00	Miscellaneous	1	ENTRY	00000001	-77
2558	16:25:39	97 02 D1 00	Miscellaneous	1	ENTRY	00000001	-77
2559	16:25:40	02 BD 1A 82	Laptop	1	ENTRY	00000001	-74
2560	16:25:40	D2 B5 64 82	Laptop	1	ENTRY	00000001	-53
2561	16:25:40	97 02 D1 00	Miscellaneous	1	ENTRY	00000001	-75
2562	16:25:40	02 BD 1A 82	Laptop	1	ENTRY	00000001	-70
2563	16:25:40	02 BD 1A 82	Laptop	1	ENTRY	00000001	-65
2564	16:25:40	02 BD 1A 82	Laptop	1	ENTRY	00000001	-69
2565	16:25:40	02 BD 1A 82	Laptop	1	ENTRY	00000001	-61
2566	16:25:40	D2 B5 64 82	Laptop	1	ENTRY	00000001	-55
2567	16:25:40	02 BD 1A 82	Laptop	1	ENTRY	00000001	-65
2568	16:25:40	D2 B5 64 82	Laptop	1	ENTRY	00000001	-58
2569	16:25:41	02 BD 1A 82	Laptop	1	ENTRY	00000001	-60
2570	16:25:41	02 BD 1A 82	Laptop	1	ENTRY	00000001	-67
2571	16:25:41	97 02 D1 00	Miscellaneous	1	ENTRY	00000001	-81
2572	16:25:42	97 02 D1 00	Miscellaneous	1	ENTRY	00000001	-79

Figure 34: Real Time View

3.12 Convert

The “MEMORY” form in HI-TRAC® BLUE2 can be used to download the MAC address data from the unit. The downloaded data is in the binary format. In order to convert the data into readable format, the **‘CONVERT’** option should be used. Convert can be used independently, without being connected to the unit.

Following steps should be followed to convert the data into readable format:

i. Download MAC data using ‘MEMORY’ in HICOMM 100.
ii. Use ‘CONVERT’ button in HICOMM 100 to convert the MAC data to MDB format.
iii. Ensure ‘**MAC Data’** in ‘Data Type’ is selected.
iv. Select the site number and choose the dates on which the conversion has to be performed.
v. Use the ‘Convert’ button to process the data.
vi. The converted MDB files are created in the HICOMM Installation folder under corresponding folder of the site number.

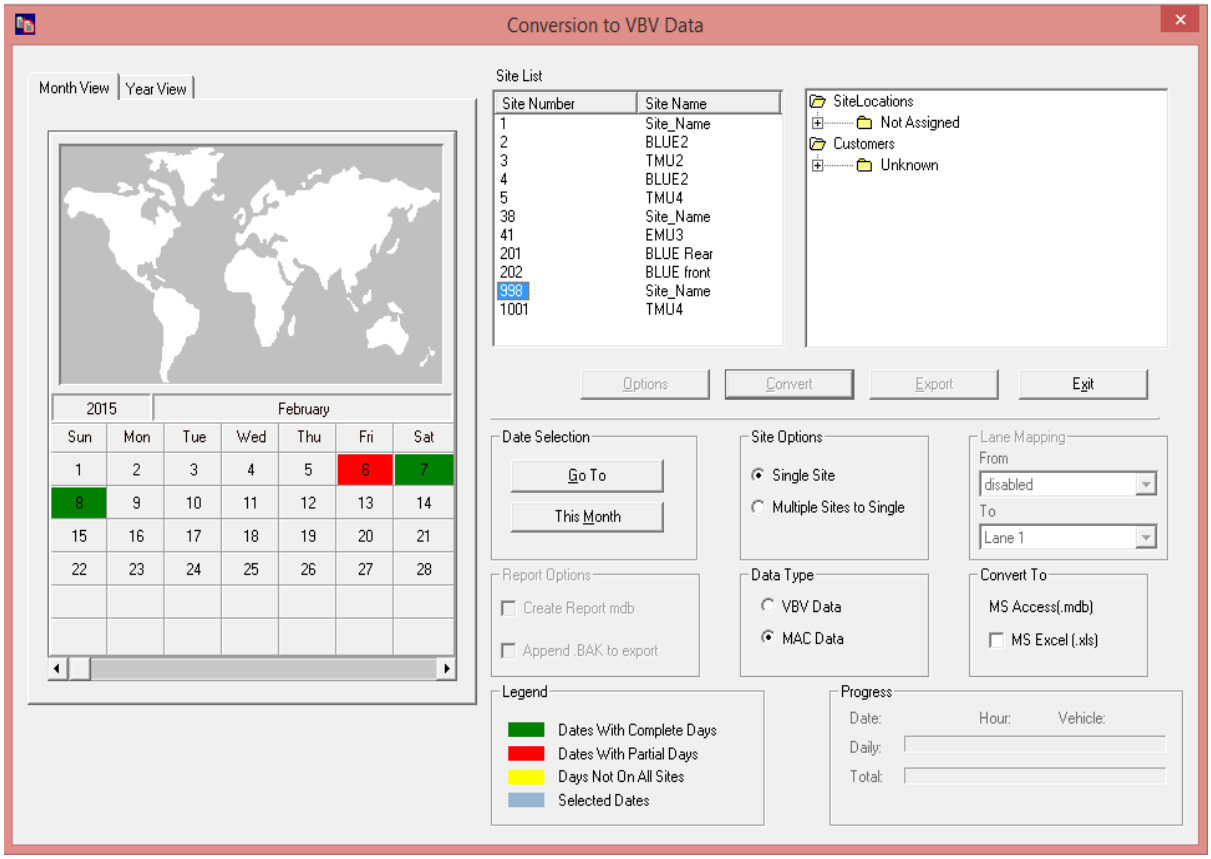
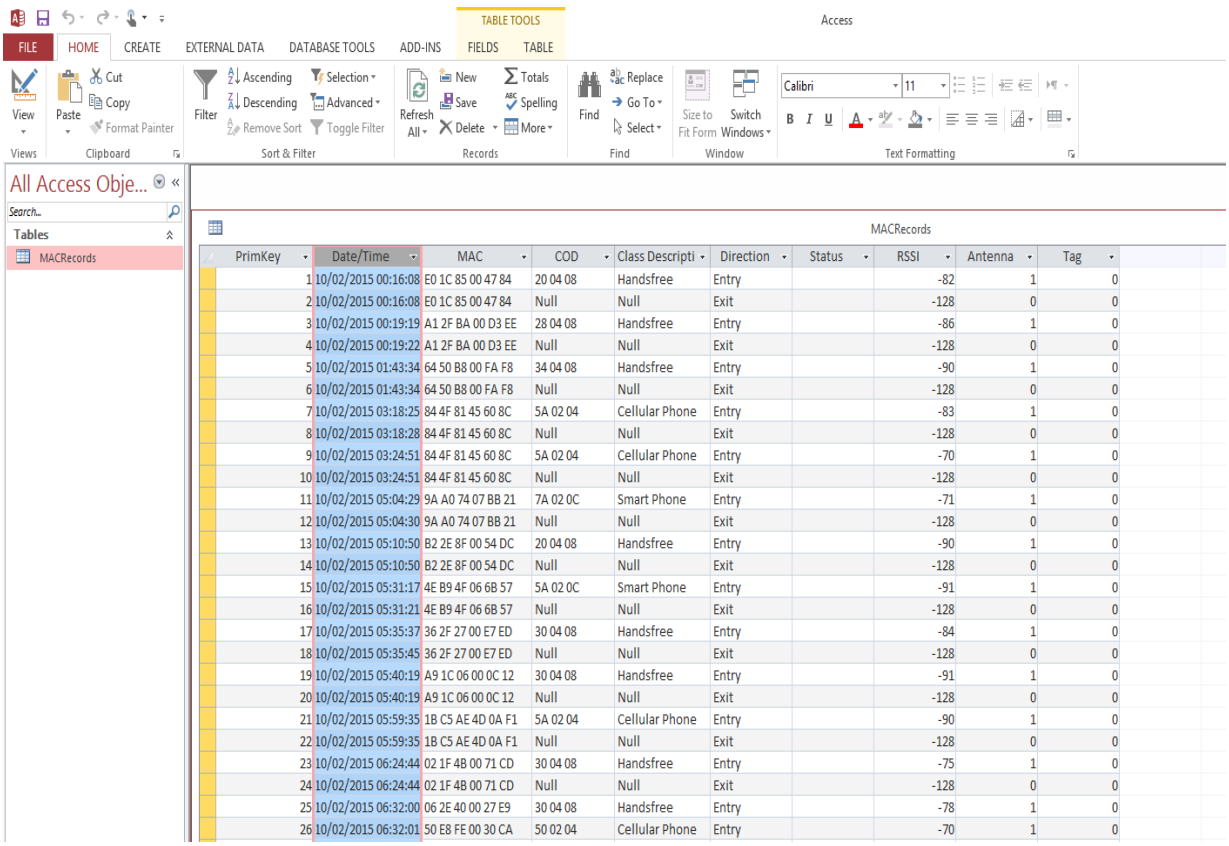


Figure 35: Convert to MDB format

Figure 36 shows the reference converted MDB file available in the respective site number of the HI-COMM 100 folder. The fields of the MAC Records are listed as below:

i. **Prim Key:** The Prim Key is a unique key assigned to the detected device for identification.
ii. **Date/Time:** The field displays the date and time of the detected device.
iii. **MAC:** The MAC addresses of the detected device.
iv. **COD:** COD defines the class of Bluetooth device.
v. **Class Description:** Class description is the decoded form of the Class of Device [COD].
vi. **Direction:** Direction indicates the entry or exit direction status of the device.
vii. **RSSI:** RSSI indicates the received signals strength of the detected device in db.
viii. **Antenna:** Antenna displays the antenna from which the device was detected.



PrimKey	Date/Time	MAC	COD	Class Descripti	Direction	Status	RSSI	Antenna	Tag
1	10/02/2015 00:16:08	E0 1C 85 00 47 84	20 04 08	Handsfree	Entry		-82	1	0
2	10/02/2015 00:16:08	E0 1C 85 00 47 84	Null	Null	Exit		-128	0	0
3	10/02/2015 00:19:19	A1 2F BA 00 D3 EE	28 04 08	Handsfree	Entry		-86	1	0
4	10/02/2015 00:19:22	A1 2F BA 00 D3 EE	Null	Null	Exit		-128	0	0
5	10/02/2015 01:43:34	64 50 B8 00 FA F8	34 04 08	Handsfree	Entry		-90	1	0
6	10/02/2015 01:43:34	64 50 B8 00 FA F8	Null	Null	Exit		-128	0	0
7	10/02/2015 03:18:25	84 4F 81 45 60 8C	5A 02 04	Cellular Phone	Entry		-83	1	0
8	10/02/2015 03:18:28	84 4F 81 45 60 8C	Null	Null	Exit		-128	0	0
9	10/02/2015 03:24:51	84 4F 81 45 60 8C	5A 02 04	Cellular Phone	Entry		-70	1	0
10	10/02/2015 03:24:51	84 4F 81 45 60 8C	Null	Null	Exit		-128	0	0
11	10/02/2015 05:04:29	9A A0 74 07 BB 21	7A 02 0C	Smart Phone	Entry		-71	1	0
12	10/02/2015 05:04:30	9A A0 74 07 BB 21	Null	Null	Exit		-128	0	0
13	10/02/2015 05:10:50	B2 2E 8F 00 54 DC	20 04 08	Handsfree	Entry		-90	1	0
14	10/02/2015 05:10:50	B2 2E 8F 00 54 DC	Null	Null	Exit		-128	0	0
15	10/02/2015 05:31:17	4E B9 4F 06 6B 57	5A 02 0C	Smart Phone	Entry		-91	1	0
16	10/02/2015 05:31:21	4E B9 4F 06 6B 57	Null	Null	Exit		-128	0	0
17	10/02/2015 05:35:37	36 2F 27 00 E7 ED	30 04 08	Handsfree	Entry		-84	1	0
18	10/02/2015 05:35:45	36 2F 27 00 E7 ED	Null	Null	Exit		-128	0	0
19	10/02/2015 05:40:19	A9 1C 06 00 0C 12	30 04 08	Handsfree	Entry		-91	1	0
20	10/02/2015 05:40:19	A9 1C 06 00 0C 12	Null	Null	Exit		-128	0	0
21	10/02/2015 05:59:35	1B C5 AE 4D 0A F1	5A 02 04	Cellular Phone	Entry		-90	1	0
22	10/02/2015 05:59:35	1B C5 AE 4D 0A F1	Null	Null	Exit		-128	0	0
23	10/02/2015 06:24:44	02 1F 4B 00 71 CD	30 04 08	Handsfree	Entry		-75	1	0
24	10/02/2015 06:24:44	02 1F 4B 00 71 CD	Null	Null	Exit		-128	0	0
25	10/02/2015 06:32:00	06 2E 40 00 27 E9	30 04 08	Handsfree	Entry		-78	1	0
26	10/02/2015 06:32:01	50 E8 FE 00 30 CA	50 02 04	Cellular Phone	Entry		-70	1	0

Figure 36: MDB Example format

4. Hardware Description

4.1 Overall Dimensions

The overall dimensions for the equipment excluding mounting bracket and connectors is 168mm by 220mm by 90mm.

4.2 External Connectors & their functions

4.2.1 Power connecting Cable

PIN NUMBER	Description
1	Power
2	Gnd

4.2.2 6 core Screened cable-Auxiliary Antenna (optional)

PIN NUMBER	Description
1	RXDin
2	TXDout
3	Gnd
4	Vsys
5	RTSout
6	CTSin

4.2.3 Ethernet (optional)

Standard Ethernet cat5 cable RJ45 connector. For IP rated applications, an Amphenol RJF RB series connector/cable set should be used.

4.2.4 SIM card holder (optional)

Accepts Mini SIM cards.

4.3 Mounting

TDC offers three mounting technologies. Two utilises the 1.5” RAM ball mounts (either VESA mount or smaller 2” by 1.5” base). A jubilee clip solution is also offered.

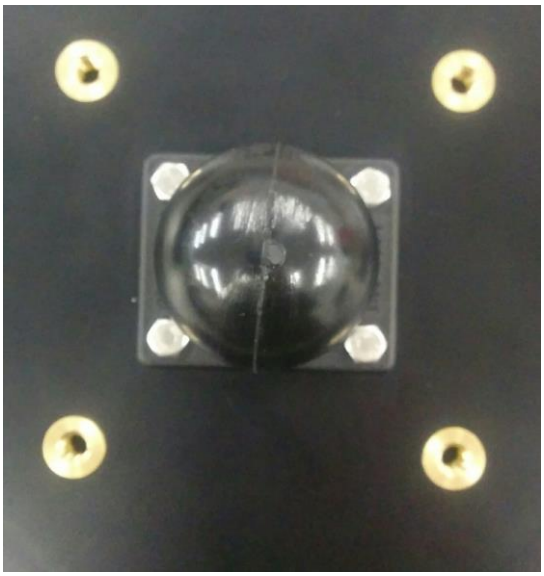


Figure 37: RAM mounting Options

Figure 38: Jubilee Clip Mounting Options

4.4 Ratings Labels

Below are examples of rating labels affixed to the equipment noting power requirements, CE mark, Serial Number and current rating.

Rated Voltage	9VDC - 36VAC
Rated Current	50mA
Part Number	BLUE-2
Serial Number	50000
Manufacturer	TDC Systems
CE RoHS	2014 CE

Rated Voltage	PoE
Rated Current	50mA
Part Number	BLUE-2
Serial Number	50001
Manufacturer	TDC Systems
CE RoHS	2014 CE

4.5 Neoprene closed cell sponge specification ASTM D1056.68-05-96A 1/2 2A2

Property	Value
Hardness Shore	50
Density	96Kg.m3
Compression Deflection	25:48 Kpa
Compression set	< 35%
Tensile Strength	690Kpa
Elongation	125%
Water Absorption	< 5% Max
Colour	Black
Adhesive Backing	05-96ASAB
Service Temperature	
Constant High/low	+93 C / -40 C
Intermittent High/low	+121 C / -57 C

Property	Test Procedure	Units	Value Dry – (Cond).
Specific Gravity	ISO 1183	g/cm^3	1.17
Water Absorption(24Hrs – 50% RH,23C)	ISO 62	%	0.32

4.6 SC-1220UR Enclosure

Inject moulded enclosure from Samsung SC-1220UR plastic, UV stable and impact resistant. The technical data of the enclosure material are listed below:

SAMSUNG CHEIL INDUSTRIES INFINO

Physical properties

■ Grade :SC-1220UR

Item	Condition	Measuring Method	Unit	Representative
Physical				
Specific Gravity	Natural Color	D-792	-	1.2
Water Absorption	23℃	D-570		0.2
Melt Flow Index	300℃ 1.2kg	D-1238	g/10min	22
Mold Shrinkage	-	D-955	-	0.5-0.7
Mechanical				
Tensile Strength	50mm/min	D-638	MPa (psi) kgf/㎠	63 (9,100) 640
Elongation at Break	5mm/min	D-638		90
Flexural Strength	1.3mm/min	D-790	MPa (psi) kgf/㎠	90 (13,100) 920
Flexural Modulus	1.3mm/min	D-790	MPa (psi) kgf/㎠	2,260 (330,000) 23,000
IZOD Impact Strength (notched)	1/8 inch	D-256	J/m (ft·lbf/in) kgf·cm/cm	736 (13.8) 75
IZOD Impact Strength (notched)	1/4 inch	D-256	J/m (ft·lbf/in) kgf·cm/cm	147 (2.8) 15
Rockwell Hardness	R-Scale	D-785	-	120
Rockwell Hardness	M-Scale	D-785	-	77
Thermal				
Heat Deflection Temperature	18.56kgf/㎠	D-648	°F (℃)	257 (125)
Heat Deflection Temperature	4.6kgf/㎠	D-648	°F (℃)	275 (135)
Linear Thermal Coefficient	40~100℃			6-8
Electric				
Volume Resistivity	-			3.0*E16
Dielectric Constant	-			2.9
Dielectric Loss Tangent	-			0.009
Arc Resistance	-	D-495		110
Flammability				
UL 94 Classification	1.6 mm specimen 2.5 mm specimen 3.2 mm specimen		Recognized	V-2

SAMSUNG CHEIL INDUSTRIES

Samsung Cheil Industries Inc.
332-2 Gocheon-dong, Uiwang-si,
Gyeonggi-do

Official statement

July 31, 2013

Dear Valued Customer,

Herewith we confirm that INFINO PC SC-1220UR is UV stabilized material.

-

CHEIL INDUSTRIES INC.
president PARK JONG WOO

5. Declarations

DECLARATION OF CONFORMITY

The Manufacturer of the Products covered by this Declaration is:

TDC SYSTEMS LIMITED

The Directives covered by this Declaration:
89/336/EEC Electromagnetic Compatibilty directive, as amended

The Products Covered by this Declaration:
HI TRAC® BLUE 2

The Basis on which this Conformity is being Declared:
The Manufacturer hereby declares under his sole responsibilty that the products identified above comply with the protection requirements of the EMC directive and that following standards have been applied:

EN 55022:2010 A1	**Radiated Emissions**
EN 61000-4-2:2009	**Electrostatic Discharge**
EN 61000-4-3:2006 A2	**Radiate RF Immunity 80MHz to 1.890 GHz**
EN 61000-4-8:2010	**Power Frequency magnetic Field Immunity**
EN 300 328 V1.7.1	**Electromagnetic compatibility**

and Radio spectrum Matters (ERM);

The technical documentation from Electronic Test & Calibration Ltd. required to demonstrate that the products meet the requirements of the EMC Equipment directive has been compiled and is available for inspection by the relevant enforcement authorities.

Signed: M Keith

Authority: R & D MANAGER

Date: 04/06/2014

CE

URS UKAS

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