

User Guide

Analyser-Manual

Influx ANALYSER





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1 Introduction

1.1 Overview

Analyser is a powerful software environment that provides the user with complete functionality to communicate with and monitor any vehicle or module. The software features include diagnostic scanning - emissions related and extended diagnostics (UDS), CAN and LIN analyser, graphics and data analysis, user customisable messages, scripting and customisable module specific databases. Module Analyser has been specifically developed to be capable of catering to the requirements of all users from dealers and enthusiasts to universities and engineers of all levels and requirements. This unique software environment combines a user-friendly graphical interface with an intuitive layout and robust and powerful online communications to in-vehicle networks to provide a complete module analysis environment.

- CAN and LIN Bus support, including .DBC and .LDF file formats to allow detailed monitoring of signals and incorporated data.
- Support for all common Diagnostic Protocols including ISO 14229 and ISO 15765.
- J2534 'Pass Thru' Protocol support.
- Full Diagnostics package including OBDII, EOBD and Extended Diagnostics functionality, providing self-configuring tools and customisable databases for rapid application to a large variety of modules.
- Support for all common database description files .ODX/.MDX/.GDX and .A2L and .XML
- Powerful graphical data visualisation includes multiple display formats, such as a multi-trace oscilloscope and allows real-time or recorded data to be analysed with data import and export facilities.
- Message Constructor makes user defined message transmission simple and effective with automatic result collection and complex message options. Pre-constructed message library for a number of common applications and tasks.
- Trace Viewer powerful CAN and LIN bus analyser allows multiple message traffic streams to be monitored, filtered and recorded simultaneously.
- Signal monitoring tool allows the automatic or manual specification of individual messages and the interpretation of the contained data with full graphical representation ability.
- Complete central configuration management system allows detailed control of tool databases and specific module settings for rapid interchange of modules and no down time.
- Flexible software provides support for all common interface hardware devices.
- Complete module reprogramming suite for VID block retrieval and complete module flashing.



1.2 Analyser Functionality

- Connecting to a Module
- Performing an OBD Report
- Reading Emissions Related DTCs (Modes 0x03, 0x04, 0x07, 0x0A and 0x02)
- Monitoring CAN Data
- Monitoring Powertrain Data (Mode 0x01)
- Retrieving Freeze Frame Data (Mode 0x02)
- Retrieving Test Results for Non-Continuously Monitored Systems (Mode 0x06)
- Reading Vehicle Information (Mode 0x09)
- Reading Data by Identifier (Mode 0x22)
- Reading Memory by Address (Mode 0x23)
- Fast Data Acquisition (Modes 0x2C, 0x2A and 0x22)
- Writing Data by Identifier (Modes 0x2E and 0x22)
- Routine Control (Mode 0x31)
- Data Visualisation—Oscilloscope, Dial and LED
- CAN and LIN Signals
- CAN and LIN Bus Message Traffic Analysis
- Custom Message Construction and Execution
- ECU Reprogramming
- ECU Security Access
- User Screens
- History
- Reports



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1.4 System Requirements

Minimum computer system requirements for effective running of DiaLog:

Windows XP, Windows Vista, Windows 7, 8, 8.1 or 10 512MB System RAM 800MHz or equivalent Processor

Influx Technology recommended minimum requirements:

Windows XP, Windows Vista, Windows 7, 8, 8.1 or 10 1GB System RAM 1GHz or equivalent



1.5 Software Versions

Analyser is available in 2 software versions supporting different levels of functionality. The features supported and their relevant sections in this document are summarised below.

Feature	Standard	Plus	
Monitoring Powertrain Diagnostic Data (Mode 0x01)	\checkmark	\checkmark	
Retrieving Freeze Frame Diagnostic Data (Mode 0x02)	\checkmark	\checkmark	
Reading Emissions Related Diagnostic Trouble Codes (Modes 0x03, 0x04 and 0x07)	\checkmark	\checkmark	
Retrieving Test Results For Non-Continuously Monitored Systems (Mode 0x06)	\checkmark	\checkmark	
Reading Vehicle Information (Mode 0x09)	\checkmark	\checkmark	
Reading Diagnostic Trouble Code Data (Mode 0x18 or 0x19)	\checkmark	\checkmark	
Reading Data by Identifier (Mode 0x22)	\checkmark	\checkmark	
Read Memory by Address (Mode 0x23)	\checkmark	\checkmark	
Fast Data Acquisition (Modes 0x2C and 0x2A)		\checkmark	
Write Data by Identifier (Mode 0x2E)	\checkmark	\checkmark	
Routine Control (Mode 0x31)	\checkmark	\checkmark	
Oscilloscope	\checkmark	\checkmark	
Dial Displays	\checkmark	\checkmark	
LED Displays	\checkmark	\checkmark	
Signals (DBC and LDF)	\checkmark	\checkmark	
Trace Viewer (CAN/LIN bus analysis)	\checkmark	\checkmark	
Custom User Message Constructor	\checkmark	\checkmark	
Unlock ECU Tool		\checkmark	
Reset ECU Tool	\checkmark	\checkmark	
Module Reprogramming		\checkmark	
Reports	\checkmark	\checkmark	
Security File Support and Management		\checkmark	
Program Status Message Window	\checkmark	\checkmark	
OBD Debug Window	\checkmark	\checkmark	
Configuration Manager	\checkmark	\checkmark	
ODX/MDX/GDX File Support		\checkmark	



CAN (DBC) and LIN (LDF) Database File Support \checkmark \checkmark \checkmark 1 MATLAB (*.MAT) File Support ✓ Vector (*.DAT) File Support \checkmark \checkmark CANDo Interface Device Support Kvaser CAN Interface Device Support \checkmark Kvaser LIN Interface Device Support \checkmark Vector Interface Device Support 1 Softing Interface Device Support ETAS Interface Device Support J2534 'Pass Thru' Protocol Support



2 Getting Started

2.1 Software Installation

To install Analyser follow the following steps:

Step 1

Double Click or otherwise start the Analyser Installation Application



Step 2

Click Next to confirm you wish to install the Application:

🖟 Module Analyser - InstallSh	ield Wizard X
	Welcome to the InstallShield Wizard for Module Analyser
<u> </u>	The InstallShield(R) Wizard will install Module Analyser on your computer. To continue, click Next.
	WARNING: This program is protected by copyright law and international treaties.
	< Back Next > Cancel



If you accept the terms in the Licence Agreement you should click on the radio button next to I accept the terms in the license agreement and then click the Next button to proceed with the Installation.

🕼 Module Analyser - InstallShield Wizard	×
License Agreement Please read the following license agreement carefully.	
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< <u>B</u> ack <u>N</u> ext > Cancel	

Step 4

You will be given an opportunity to read the release notes for the version of Module Anayser you are using, after you are done simply click Next

😸 Module Analyser - InstallShield Wizard —	×
Readme Information	
Please read the following readme information carefully.	-
	^
Module Analyser 3.0	
30 August 2016	
README File	
Module Analyser 2.x is a customer specific diagnostic tool specially developed for engineers to quickly interrogate an ECU for DTCs and check the Generic Diagnostics. The tool has database support that gives	_
good opportunity to the user to compare the results	Ť
< <u>Back</u> <u>Next</u> > <u>C</u> an	el



You will be asked for you User Name and Organisation for the installation. Please populate the fields and click Next.

🕼 Module Analyser - InstallShield Wizard	×
Customer Information	4.
Please enter your information.	
User Name:	
Organization:	
l	
Install this application for:	
Anyone who uses this computer (all users)	
Only for me (LarsWahlmann)	
InstallShield	
< <u>B</u> ack <u>N</u>	ext > Cancel

Step 6

You will be asked confirm or change the default installation location of Analyser on the computer. Once done click Next.

👷 Module	Analyser - InstallShield Wiza	ď		×
Destinati Click Nex	on Folder t to install to this folder, or clid	Change to insta	Il to a different folde	r.
	Install Module Analyser to: C:\Program Files (x86)\Influx 3.0.0.0\	Technology\Mod	uleAnalyser	<u>C</u> hange
InstallShield -		< <u>B</u> ack	Next >	Cancel



Once the Installation of Analyser has completed you can choose whether to immediately execute Analyser you checking the Launch program check box, click Finish once you are ready.

🖟 Module Analyser - InstallShi	ield Wizard	×
	InstallShield Wizard Completed	
	The InstallShield Wizard has successfully installed Module Analyser. Click Finish to exit the wizard.	
	⊡ Launch the program	
	< <u>B</u> ack <u>Finish</u> Cancel	



2.2 Software Introduction

2.2.1 Graphical Overview

Analyser is accessed using either the desktop icon:



or the 'Start Menu' directory—'All Programs\Influx Technology'.

Once started the user is presented with the following opening screen:

4							Module Analyser 3.0	.0.0 [Screen_01	l.maw]					- 8	×
File	View	Scan To	ol Extende	d Monit	oring Settin	gs Rep	orts Reflash	Window	Help						
1 Live Dat	ta 2 F	reeze Frame	6 Test Results	9 Veh Info	347 Trouble Co	des									
Vehicle defau	ult	•	Config _OBD_cor	nf 🗖	Screens Scre	en_01	Screen	- 🗌 🎧 Un	nlock ECU 🗕 🎧	Reset ECU 👻	🖳 Device Manag	er 🖫 Offline	All		
▼ 1 Mode 01	×														
	1						Mode 01 - Powe	ertrain Diagnosti	ic Data					- 🗆 🗙	
	Onlin	e Update	Add Remove	Reload	A 🔎	∠ Zoom Out	LED Dial Scope	Unsupporte	ed Save Trace Sta	art Up	pp. Export Impo	rt			
	Selecte ECU	d Items : Iden t	t Label	Descript	ion		Valı	Je Hex V	'alue Bar Graph		Units	Format	Device		
	Unsunr	orted Items													
	onsop														
⊠ Date/Tin	ne	Origin	Status mess	ages										 	
	6 14:04	Configuration	n Not found dev	rice, assigned fo	r this configuration.										
	514:04	Device	Interface Devi	ice NOT Assign	ed										
Ш					Configuratio	n: _OBD_conf			M	lode: Single Cha	annel			12/09/16 14:04	

The Tabs at the top of the Window allow access to the Various Tool Bars in the software and allow you to use Analyser to perform Diagnostics and other tasks.



3 Quick Start Guide

3.1 Introduction

Analyser is a very capable tool featuring a large array of functionality providing the user a solution for virtually any diagnostic or CAN monitoring task.

This 'Quick Start Guide' is intended to be an introduction for the user to the operation of the software and to performing some of its most common and important applications. As such, this section covers a number of keys abilities of the tool.

The first step in utilising Analyser is to create a successful connection between the software and the module to be analysed. The section then continues considering some key tasks such as retrieving Diagnostic Trouble Codes and monitoring and displaying powertrain data from the module.

Full detail on all tasks considered and the complete functionality of the software can be found in the relevant dedicated sections of this documentation.

3.1.1 Selecting the Interface Device

To connect to a module a suitable connection hardware device must be selected. Analyser supports a large number of 'Interface Devices' and this process ensures the software is set up to utilise the chosen hardware.

-	Note	
	 Aditional Drivers may need to be installed for your Hardware before it is available for Analyser to use. 	

To select your chosen device follow the Steps outlined below:

STEP 1

Click on the settings Tab, then click on the Device Manager button to bring up the Device Manager.





STEP 2

Click on the Checkbox next to the Interface device you wish to use. This will expand the device and allow selection of the BUS as well as other communication parameters such as the Baud Rate.

			Configuration Manager				×
Configuration Image: State of the state of t	Library Exports Imports Config	Supported De Filter Name Devices List C C C C C C C C C C C C C C C C C C C	Configuration Manager vices Status CANdo ETAS PCMCIA Card Influx Rebel CT/LT Channel HS Channel MS J2534 Komodo CAN DUO Kvaser Leaf Light HS Kvaser Leaf Light HS Kvaser Leaf Light HS Kvaser Leaf Light HS Svaser Leaf Light Card Softing PCMCIA Card Vector PCMCIA Card Vector PCMCIA Card	Properties NAME BAUD-RATE ONLINE	Channel HS 500 YES	•	×

3.2.2 Selecting the Module Settings

Once the Interface device has been chosen the required module must be selected. This will specify the communication protocol and settings to be used with the module to be analysed.

To select your chosen module follow the Steps outlined below:

STEP 1

Click on the settings Tab, then click on the Device Manager button to bring up the Device Manager.



STEP 2

Click on the Interface Device (in this case Influx Rebel CT/LT, Channel HS) within the ODB or J1939 configuration that you wish to use.

Configuration	
New Config A	eeuu dd Module
Filter	
Name	Module
Configurations Lis	st
	_conf
	lux Rebel CT/LT, Channel HS
O ⊞ [1] 11838 ⁻	_conf



STEP 3

Click on the Add Module Button



STEP 4

Select the Protocol that you wish to communicate with the Module on:

•	Protocol	×
	Choose protocol for new module	
	ISO 14229	-
	ISO 14229	
	ISO 14230	
	ISO 15765	
	J1939	
	OBD Generic	

STEP 5

You can now adjust the communication parameters to match the capabilities and supported diagnostics modes of your module (Often the Default settings will yield very good results)

		Confi	iguration Manager				×
Configuration	Library						
	Exports	🖌 Commit	🗙 Cancel				
	Imports						
: New Config Add Module Del Module Dup	Config	Module		Identifiers	T	Session	
Filter	0	Name		Module Address	Tester Address	Diagnostic	Programming
Name Module	Madula Cattinan	Module 1	Module Presets	Ux7E8	0x7E0	0x01	0x02
	Module Settings	Protocol	Security	Functional Address	Flow Control Address	Extended	
Configurations List	19	ISO 14229 💌	EmptySecurityD[👻	0x7DF	0x7E0	0x03	
● 🗉 🚻 OBD conf	Read DTC	,					
🖃 📲 Influx Rebel CT/LT, Channel HS	6	Mode 0x23		Tester Present		VID Block	
💷 Module 1	Freeze Frames	Size/Address Config	Address Endian	Parameter	Timeout	Size	Start Address
O ⊞ † † J1939_conf	12	0x14	Use MSB First 0 💌	0x0	2000	0x0	0x0
	DTC Sensor State					PID Address	
	ē"		Security Level	Use Parameter		0x0	VID Block Presets
	T DID.					-	
	PIDS	Options		Others			
	21	🗹 Service 0x10 Ena	🗌 Supp.Simple Requ	Dynamic Signal	Extended Time Out		
	Read by ID	Mode 0x01 Simple	Mode 0x2E securi	0x6A0	60000		
	2E 👻	Eunctional Beque	Beset FCU after C	VIN after DTC B	۹		

STEP 5

Once any changes have been made click the Commit button to update the Configuration





3.2 Common Tasks

Analyser is an incredibly versatile and powerful package capable of a huge variety of tasks. This section is designed to get the user operating Analyser quickly and easily.

The section considers some of the common and key tasks performed with Analyser. The first application of Analyser considered is the reading of emissions related Diagnostic Trouble Codes; a key task enabling DTCs to be retrieved from OBDII compliant vehicle.

The second task considers the Analyser bus analysis ability, using the software to monitor all CAN and LIN data or a user defined selection of the transmitted traffic.

Analyser contains a number of tools designed to utilise the legislated and extended diagnostic services. Here a common example is considered with the Powertrain Diagnostic Data service used to monitor and display the powertrain related data.

Finally, Analyser supports all common industry standard descriptions files, such as ODX/MDX, A2L and DBC file formats and the import of these files is considered.

3.2.1 Diagnostic Trouble Codes

3.2.1.1 How to Read Diagnostic Trouble Codes

Once Configured upon opening Analyser the Scan Tool Tab automatically opens.

Analyser contains a tool which allows the user to retrieve any emissions related Diagnostic Trouble Codes stored on a vehicle or module. This tool utilises Modes 0x03, 0x07 and 0x0A, all OBD services and as such can be applied universally to any compliant vehicle.

To access this functionality simply follow the following steps

Step 1

On the Scan Tool Tab click the Trouble Codes button:

4							
F	ïle	View	Scan Tool	Extended	l Monito	oring	Settings
1 Li	ve Data	2 Freeze	Frame 6	Test Results	9 Veh Info	347	Trouble Codes

Step 2

The following window will be displayed.

347		Emission-related (MIL) DTCs	-	×
Confirmed Pending Permanent	Clear Export Save Trace			
Codes List				
Fault_ID OBD Code Module	Description	Occurances		
Current Freeze Frame data:				•
				\sim
				~



The tool allows the retrieval of three different types of DTC using the three icons along the top of the window.



Displays any stored DTCs with confirmed status stored on the module.



Displays any stored DTCs with pending status stored on the module.



Displays any stored DTCs with permanent status stored on the module.

DTCs that are Confirmed, Pending or Permanent will be shown as follows:

Codes	s List				
	Fault_ID	OBD Code	Module	Description	Occurances
Р	268C	P268C	Module 1		
Р	268F	P268F	Module 1		1
Р	268D	P268D	Module 1		1

For each DTC read the tool also automatically retrieves any associated Freeze Frame data from the module and displays it in the bottom half of the Emission-related (MIL) DTCs window below the Codes List.

3.2.1.2 How to Save Read Diagnostic Trouble Codes

You may export all the Codes found to xls format using the following button.



3.3.1.3 How to Clear Diagnostic Trouble Codes

The tool also provides the facility to remove all the stored emissions related DTCs from the module memory. Simply click Clear to clear all the DTCs



Removes all stored emissions related DTCs from the module and automatically performs the DTC read again to ensure the clear has been successful.



3.2.1.4 How to create a trace of the Communications

The communication that took place between Analyser and the Module is also displayed in the lower right hand corner of the application and the lower left shows the status messages that relate to the communication.

-1					Module Analyser 3.0.0.0 [Screen_01.maw]											
File View	Scan Tool	Extended	Monitoring	Settings	Reports	Reflash	Window	Help								
1 Live Data 2	Freeze Frame 6	Test Results 9	Veh Info 347 Tro	ouble Codes												
Vehicle default	▼ Cor	nfig _OBD_conf	▼ Screen	ens Screen_01	•	Screen	- 🔒 🎧 Unl	ock ECU 🔸 🎧 F	Reset ECU 😽	- 🖳 Device Manag	ger 📮 Offline	All				
▼ 347 Emission-r ×																
														_		
347					Emissi	ion-related (MIL) DTCs						– 🗆 ×			
	n - S	🔒 🛛 🔫	X -(5												
Confirmed	Pending Perma	anent Clear	Export Save T	race												
Codes List																
Fault_II	D OBD Code Mod	ule Descripti	on					Occurances					<i>'</i>	`		
P 268F	P268F Mod	ule 1						1								
P 268D	P268D Mod	ule 1						1								
Current Freez	e Frame data:															
													,	-		
➢ Date/Time	Origin	Status message	5								0x07E8	03 7F 19 78	00 00 00 00	32998	^	
13/09/16 14:56	Device	Device Influx Reb	el CT/LT, Channel H	S' is ONLINE.							0x07E8	03 7F 19 31	00 00 00 00	33178		
13/09/16 14:56	Module Analyzer	Mode 3 successfu	illy requested								0x07E0 0x07E8	06 19 04 01 03 7F 19 78	08 00 FF 00	33180 33218		
											0x07E8	03 7F 19 31	00 00 00 00	33398	~	
			Co	onfiguration: _OBD;	_conf			M	ode: Single C	Channel				13/09/16 1	4:57	

A Trace of the communications may also be saved using the Save Trace button, follow the following steps to save a trace of the communications

Step 1

Click the Save Trace Button.



Step 2

Perform the operations that you wish to save the communications for.

Step 3

Click the Stop Saving button.



Step 4

Enter the Name and location of where you would like the trace to be saved.



Save As						×
Save in:				G 🤌 📂 🖽 🔻		
Quick access Desktop Libraries	Name 🔺			Date modified	Туре	
Network	File <u>n</u> ame: Save as <u>type</u> :	Mode03_Trace.bt	_	v	▶ <u>S</u> ave Cance	•



3.2.2 How to Monitor CAN and LIN Data

Analyser contains a very powerful and sophisticated CAN and LIN traffic monitoring facility which with its simple and intuitive graphical interface allows fast and accurate message traffic analysis.

To access this functionality simply follow the following steps

Step 1

On the Monitoring Tab click the Trace Viewer button.



This will bring up the Trace Viewer Window.





The Trace may be started and stopped at any time,

Pressing the Start button will start the trace



You will see the messages broadcast on the bus displayed in the window as shown below.

₩,											Trace	View	er (log	iging all r	message	:s)						-		×
Stop	Filter	Config	Options	Clear	Load	Save	Scope	•	Eist N	E 1ode	F. Free N	-∎ ∕lode	Extra	acted	O Stop	C Repeat	Play	D Next	Device	▼ 55				
Filters				Гуре	ID		dlc	DO	01 D	2 D 3	D4 D	5 D (5 D 7	Time S	itamp,	ms	1	Delta Tin	ne, ms	Device	Description			
		==		1-bit	0x000000	E0	8	83 9	8 83	98 (0 00) 7D	03	6090	90			15		Influx Rebel CT/LT, Channel HS				^
. i ⊺+	T/ T>	< ₹		L1-bit	0x000000	E1	8	00 0	0 E8	15	F D2	2 FF	FF	6090	91			16		Influx Rebel CT/LT, Channel HS				
🔺 🏟 Def	ault Filter Gi	roup	1	1-bit	0x000001	6E	8	00 0	0 01	FF (0 00	00 (00	6090	95			20		Influx Rebel CT/LT, Channel HS				
	CAN			1-bit	0x000001	93	8	00 0	0 64	00 8	4 00	08	00	6090	95			19		Influx Rebel CT/LT, Channel HS				
	J1939			1-bit	0x000001	B8	8	00 0	0 00	00 (0 00	00 (00	6090	95			19		Influx Rebel CT/LT, Channel HS				
	LIN		:	1-bit	0x000003	26	8	00 0	0 01	F4 8	1 F4	ŧ 00	00	6090	95			19		Influx Rebel CT/LT, Channel HS				
			1	1-bit	0x000003	4B	8	10 8	3 00	00 (0 00	00	00	6090	96			20		Influx Rebel CT/LT, Channel HS				
				1-bit	0x000000	DF	8	02 3	F 00	00 0	2 00	80	00	6091	05			15		Influx Rebel CT/LT, Channel HS				
				1-bit	0x000000	E0	8	83 9	8 83	98 (0 00	70	03	6091	05			15		Influx Rebel CT/LT, Channel HS				
				1-bit	0x000000	E1	8	00 0	0 E8	15	F D2	2 FF	FF	6091	05			14		Influx Rebel CT/LT, Channel HS				
				<																			>	\checkmark
Captured N	lessages:	CAN :274	44	LIN :0	EF	R :0	1	Fotal :2	744															

Pressing the Stop button will halt the capture of the messages



There are a lot of options available for filtering the messages captured, displaying the messages in different ways to aid the understanding of the message content, as well as the ability to display them visually on an oscilloscope, save the communications for reference or playback later, the playback features could be used for testing or simulation tasks.



3.2.2.1 Filtering Messages

To set up filtering of the messages simply follow the following steps:

Step 1

Simply right click on the Bus that you wish to add a filter to and select Add Filter.



Step 2

Enter the Ident of the messages that you wish to filter (in the below example 0xDD), if you will like you can check the Add Range check box and Enter a Filter ID High, in that case all the Idents between Filter ID and Filter ID High will be filtered.

CAN Filter	×
Basic	
Filter ID Filter ID High 0xDD Add Range	
Description	
Define as Stop filter	
Advanced	
Apply Frame Filter (HEX)	
D0 D1 D2 D3 D4 D5 D6 D7	
	<u>C</u> ancel



Click the filter button to activate the filter



You should now see the messages allowed by your filter

e ,			Trace Viewer (logging filtered messages)																-	×						
Stop	Filter	Config	Options	Clear	Load	Save	Scope	• L	ist M	ode T	FL. ree M	ode	Extrac	E cted	O Stop	C Repeat	Play	D Next	Device	-						
Filters			Tj	ре	ID		dlc	DO D	1 D 2	D3 D	4 D5	5 D6	D7 1	Time Sta	атр, п	ns	D)elta Ti	me, ms	Device				Descripti	on	
		==/	11	-bit	0x00000D	D	8	3D 00	14	00 1	9 DE	C1	F4	83564				25		Influx Rebel CT	/LT, Chann	nel HS				^
÷ T+	T∥ T×	: ₹	11	-bit	0x00000D	D	8	3D 00	14	00 1	9 DE	C1	F4	83589				25		Influx Rebel CT	/LT, Chann	nel HS				
🔺 🏽 Defa	ult Filter Gro	oup	11	-bit	0x00000D	D	8	3D 00	14	00 1	9 DE	C1	F4	83614				25		Influx Rebel CT	/LT, Chann	nel HS				
- A 🗹 C	AN		11	-bit	0x00000D	D	8	3D 00	14	00 1	9 DE	C1	F4	83639				25		Influx Rebel CT	/LT, Chann	nel HS				
	Ox00DD		11	-bit	0x00000D	D	8	3D 00	14	00 1	9 DE	C1	F4	83664				25		Influx Rebel CT	/LT, Chann	nel HS				
🗌 J.	1939		11	-bit	0x00000D	D	8	3D 00	14	00 1	9 DE	C1	F4	83689				25		Influx Rebel CT	/LT, Chann	nel HS				
	IN		11	-bit	0x000000D	D	8	3D 00	14	00 1	9 DE	C1	F4	83714				25		Influx Rebel CT	/LT, Chann	nel HS				
			11	-bit	0x00000D	D	8	3D 00	14	00 1	9 DE	C1	F4	83739				25		Influx Rebel CT	/LT, Chann	nel HS				
			11	-bit	0x00000D	D	8	3D 00	14	00 1	9 DE	C1	F4	83764				25		Influx Rebel CT	/LT, Chann	nel HS				
			11	-bit	0x00000D	D	8	3D 00	14	00 1	9 DE	C1	F4	83789				25		Influx Rebel CT	/LT, Chann	nel HS				- 14
				b.ce	02000000	0	•	on ne	4.4	00 1	n ne	C1	си	00014				ne		Toffice Dahal CT	AT Channe	al ue				
			<																							> ~
Captured Me	essages:	CAN :288	83 LI	N :0	ERF	R :0	T	otal :28	83																	

3.2.2.2 Clearing the Messages in the Trace Window

To clear the messages in the Trace window simply click Clear



3.2.2.3 Saving the Messages in the Trace Window

To save the messages in the Trace window simply follow the following steps.

Step 1

If the Trace is running click Stop button.



Step 2

If click the Save button.



Step 3

Specify the location, filename and file format you wish to save the trace in.



Save As							×
Save <u>i</u> n:		v	6	ø	ت	▼	
Quick access							
Desktop							
Libraries							
This PC							
Network							
	File <u>n</u> ame:				▼	<u>S</u> ave	
	Save as type:	Trace Viewer Data (*.tvd)			Ŧ	Cance	
L		Trace Viewer Data (*.tvd) Trace Viewer Text (*.txt) Influx Technology Dialog (*.csv) Vector ASCII (*.asc) Trace Log (*.log)					///

Analyser supports the following formats for saving the traces that are created

- Influx Trace View Data
- Influx Trace View Text
- Influx Trace View Comma Separated Value
- Vector ASCII
- Trace Log

Step 4

Click Save

<u>S</u>ave



3.2.2.4 Loading Traces

Step 1

If click the Load button.



Step 2

Select the Trace You wish to Load.

Open								×
Look <u>i</u> n:		V	G	ø	Þ			
3	🛅 1.tvd							
Quick access								
Desktop								
Libraries								
This PC								
1								
Network						1		_
	File <u>n</u> ame:	1.tvd]	<u>O</u> pen	
	Files of type:	Trace Viewer Data (*.tvd)]	Cance	

Step 2

Select the Trace You wish to Load. Analyser supports the following formats for loading traces.

- Influx Trace View Data
- Influx Trace View Text
- Influx Trace View Comma Separated Value
- Vector ASCII
- Trace Log

Step 3

Click Open.

Open



3.2.2.5 Changing the Trace Viewer Display Mode

The Trace Viewer has 3 Display Modes You can change between them by pressing the following buttons:



The Selected Display Mode will remain active this is indicated by the Button remaining highlighted.





When in List Mode the Messages are displayed as follows:

Туре	ID	dlc	DO	D1	D2	D3	D4	D5	D6	D7	Time Stamp, ms	Delta Time, ms	Device	Description
CAN ID	0x00000182	8	10	00	F8	FF	01	00	E4	FF	254970	101	Influx Rebel CT/LT, Channel HS	ADC_4_7
11-bit	0x000002F0	8	8F	01	B3	01	01	00	00	00	254992	255	Influx Rebel CT/LT, Channel HS	
CAN ID	0x00000300	8	00	00	00	00	00	00	00	00	255013	100	Influx Rebel CT/LT, Channel HS	DigitalInputsStatus
CAN ID	0x00000281	8	C9	E8	C9	E8	C9	E8	C9	E8	255013	100	Influx Rebel CT/LT, Channel HS	TC_0_3
CAN ID	0x00000282	8	C9	E8	C9	E8	05	4D	C9	E8	255013	100	Influx Rebel CT/LT, Channel HS	TC_4_7
CAN ID	0x00000181	8	25	00	D7	00	34	00	F2	FF	255069	100	Influx Rebel CT/LT, Channel HS	ADC_0_3
CAN ID	0x00000182	8	67	00	FA	FF	03	00	E4	FF	255070	100	Influx Rebel CT/LT, Channel HS	ADC_4_7
CAN ID	0x00000281	8	C9	E8	C9	E8	C9	E8	C9	E8	255113	100	Influx Rebel CT/LT, Channel HS	TC_0_3
CAN ID	0x00000282	8	C9	E8	C9	E8	05	4D	C9	E8	255113	100	Influx Rebel CT/LT, Channel HS	TC_4_7



When in Tree Mode the Messages are displayed as follows, you can drill down into the Messages from a particular Ident by clicking the + button beside it (the no of messages displayed per Ident is configurable in the Options):

CA	N Signals:												Time S	tamp,[ms]	Delta Time,[ms]	Devic	e			
-	0x00000181	dlc	8	Data	25	00	D7	00	34	00	F2	FF	255069		100	Influx	Rebel	CT/LT,	Channel	HS
	25 00 5E	00	20	00 F	E F	F		2	549	69										
	25 00 D7	00	34	00 F	2 F	F		2	550	69										
+	0x00000182	dlc	8	Data	67	00	FA	FF	03	00	E4	FF	255070		100	Influx	Rebel	CT/LT,	Channel	HS
+	0x00000281	dlc	8	Data	C9	E8	C9	E8	C9	E8	C9	E8	255113		100	Influx	Rebel	CT/LT,	Channel	HS
+	0x00000282	dlc	8	Data	C9	E8	C9	E8	05	4D	С9	E8	255113		100	Influx	Rebel	CT/LT,	Channel	HS
+	0x00000300	dlc	8	Data	00	00	00	00	00	00	00	00	255113		100	Influx	Rebel	CT/LT,	Channel	HS
+	0x000002F0	dlc	8	Data	8F	01	В3	01	01	00	00	00	254992		255	Influx	Rebel	CT/LT,	Channel	HS



When in Extracted Mode the Messages are displayed as follows, you can drill down into the signals contained in messages from a particular Ident by clicking the + button beside it:

									-						-
ID	Description	Hex Value	Value	Units	D0	D1	D2	D3	D4	D5	D6	D7	Time, [ms]	Delta, [ms]	Device
⊕_0x00000300	DigitalInputsStatus				00	00	00	00	00	00	00	00	255013	100	Influx Rebel CT/LT, Channel HS
⊕ 0x00000282	TC_4_7				C9	E8	C9	E8	05	4D	C9	E8	255013	100	Influx Rebel CT/LT, Channel HS
⊕_0x00000281	TC_0_3				C9	E8	C9	E8	C9	E8	C9	E8	255013	100	Influx Rebel CT/LT, Channel HS
⊕ 0x00000182	ADC_4_7				10	00	F8	FF	01	00	E4	FF	254970	101	Influx Rebel CT/LT, Channel HS
□ 0x00000181	ADC_0_3				25	00	5E	00	20	00	FE	FF	254969	99	Influx Rebel CT/LT, Channel HS
-	ADC_1	0x005E	29.425384	mV			5E	00							
-	ADC_2	0x0020	10.017152	mV					20	00					
-	ADC_3	0xFFFE	-0.626072	mV							FE	FF			
	Channel	0x0025	11.582332	mV	25	00									
0x000002F0					8F	01	B4	01	01	00	00	00	254737	255	Influx Rebel CT/LT, Channel HS



3.2.2.6 Playing back a Trace

Once you have recorded a trace or loaded one from a file you are able to broadcast (play back) the messages both one at a time or the whole trace this functionality is controlled by the following buttons:



Play, immediately starts playing the messages in the trace one after another.



Pause, pauses playback (playback will resume from the current position



Stop, Playback is stopped.



Next, the Highlighted Message will be sent and the selection bar will move to the next message.



3.2.3 How to Monitor and Display Powertrain Data

Analyser is capable of exploiting the complete functionality of all OBD and Extended Diagnostics services. To monitor Powertrain data, the Mode 0x01 service is utilised.

To Monitor Powertrain Data via Mode 0x01 follow the following steps

Step 1

Click on 1 Live Data on the Scan Tool Tab:

•	•					
	File	View	Scan Tool	Extended	Monitor	ing Settings
	1 Live Data	2 Freeze	Frame 6	Test Results	9 Veh Info	347 Trouble Codes

The tool contains a large number of pre-loaded powertrain diagnostic 'Data Items', which are all listed in the Mode 1 : Powertrain Diagnostic Data window when it is launched. However, each module will only support a subset of the data items listed and many will not be supported by the specific module being analysed.

1				Mode 01 - Powertrain	Diagnostic Data				×
Po	Vpdate	Add Remove	Reload A D Coom In Zoom Out	Dial Scope Un	supported Save Trace Start Up	Export Import			
Selected ECU	l Items : Ident	Label	Description	Value	Hex Value Bar Graph	Units	Format	Device	^
Module	1 01	DTC_CNT	# of DTCs stored in this ECU	n/a	n/a		ENG	Influx Rebel CT/LT, Channel HS	
8° Module	1 01	MIL	Malfunction Indicator Lamp (MIL) Status	n/a	n/a		ENG	Influx Rebel CT/LT, Channel HS	
8° Module	1 01	CCM_RDY	Comprehensive component monitoring ready	n/a	n/a		ENG	Influx Rebel CT/LT, Channel HS	
8º Module	1 01	CCM_SUP	Comprehensive component monitoring supported	n/a	n/a		ENG	Influx Rebel CT/LT, Channel HS	
8º Module	1 01	CIM_SUP	Compression ignition monitoring supported	n/a	n/a		ENG	Influx Rebel CT/LT, Channel HS	
8º Module	1 01	FUEL_RDY	Fuel system monitoring ready	n/a	n/a		ENG	Influx Rebel CT/LT, Channel HS	
8º Module	1 01	FUEL_SUP	Fuel system monitoring supported	n/a	n/a		ENG	Influx Rebel CT/LT, Channel HS	
8º Module	1 01	MIS_RDY	Misfire monitoring ready	n/a	n/a		ENG	Influx Rebel CT/LT, Channel HS	
8º Module	1 01	MIS_SUP	Misfire monitoring supported	n/a	n/a		ENG	Influx Rebel CT/LT, Channel HS	
8º Module	1 01	ACRF_SUP	A/C system refrigerant monitoring supported	n/a	n/a		ENG	Influx Rebel CT/LT, Channel HS	
8º Module	1 01	AIR_SUP	Secondary air system monitoring supported	n/a	n/a		ENG	Influx Rebel CT/LT, Channel HS	
2º Module	1 01	CAT SUP	Catalvst monitoring supported	n/a	n/a		ENG	Influx Rebel CT/LT. Channel HS	 ~



Click on the Online button.



The tool is designed to automatically determine the supported items, no input from the user is required.

Initiates the tool, which will then poll the module for each individual data item, determining the unsupported items and relocating them to the 'Unsupported Items' panel. (This may be shown or hiden, toggle with the Unsupported button).

1						Μ	lode 01	- Powertra	ain Diagnostic Da	ta					-		×
Offline	Update	Add Remove	Reload A Font	∠ Zoom In	Zoom Out	OO + LED	Dial	Scope	Unsupported	Save Trace	Start Up	Test Supp.	Export Import				
Selected :	items : Ident	Label	Description					Value	Hex Val	ue Bar Gra	ph		Units	Format	Device		
8º Module 1	1C	OBDSUP	OBD requirement	nts to which	vehicle or end	ine is cert	tified	EOBD	0x06					ENG	Influx Rebel CT/LT, Channel H	s	- ^ .
8º Module 1	1E	PTO_STAT	Power Take Off	(PTO) Statu	IS -			OFF	0x00					ENG	Influx Rebel CT/LT, Channel H	S	_
Module 1	1F	RUNTM	Time Since Engir	ne Start				0	0x0000				sec	ENG	Influx Rebel CT/LT, Channel H	s	_
Module 1	21	MIL_DIST	Distance Travel	ed While MIL	is Activated			0	0x0000				km	ENG	Influx Rebel CT/LT, Channel H	s	_
🔆 Module 1	23	FRP	Fuel Rail Pressu	re				22475	0 0x57CB				kPa	ENG	Influx Rebel CT/LT, Channel H	S	
🔆 Module 1	24	EQ_RAT11	Lambda value, E	Equivalence	Ratio Bank 1,	Sensor 1	(uses Pl	ID \$1.998	B 0xFFFF4	128				ENG	Influx Rebel CT/LT, Channel H	S	
🔆 Module 1	24	O2S11	Wide Range O2	S Voltage,O	2 Sensor Bank	1, Senso	or 1 (use	s PI2.035	0xFFFF4	128			V	ENG	Influx Rebel CT/LT, Channel H	S	
🔆 Module 1	2C	EGR_PCT	Commanded EG	R				0.0	0x00				%	ENG	Influx Rebel CT/LT, Channel H	S	
Module 1	2D	EGR_ERR	EGR Error					-100.0	0x00				%	ENG	Influx Rebel CT/LT, Channel H	S	
🔆 Module 1	2F	FLI	Fuel Level Input	t				33.3	0x55				%	ENG	Influx Rebel CT/LT, Channel H	S	
Module 1	. 30	WARM_UPS	Number of warn	n-ups since (OTCs cleared			0	0x00					ENG	Influx Rebel CT/LT, Channel H	S	\checkmark
Unsuppor	ted Items :																
Ident	Label			Des	cription												^
03	FUELSYS2			Fuel	system 2 stat	JS											
03	FUELSYS1			Fuel	system 1 stat	JIS											~
															Export Un	support	ted

The supported items will remain in the 'Selected Items' panel and the tool will begin continuously cycling the list creating a real-time update of the supported data. This can be seen in the example above.

3.3.3.1 How to display Powertrain Data Graphically

Analyser contains a very powerful data analysis features which provide three separate ways of displaying data. Once the powertrain data tool is online it is possible to select supported data items to be graphically displayed. Follow the following steps to display data items graphically

Step 1

Select the Item you are interested in by clicking on it to select it:

Module 1	3C	CATEMP11	Catalyst Temperature Bank 1, Sensor 1	85	0x04DD	degC	ENG	Influx Rebel CT/LT, Channel HS
Module 1	3E	CATEMP12	Catalyst Temperature Bank 1, Sensor 2	85	0x04DD	degC	ENG	Influx Rebel CT/LT, Channel HS
Module 1	41	CCM_CMPL	Comprehensive component monitoring complete	NO	0x007FE8E8		ENG	Influx Rebel CT/LT, Channel HS
Module 1	41	CCM_ENA	Comprehensive component monitoring enabled	YES	0x007FE8E8		ENG	Influx Rebel CT/LT, Channel HS

It will be highlighted in blue



Click on the toolbar item at the top of the window that corresponds to how you would like the data item displayed



LED will display the individual bits of of the data item as LEDs in rows of 1 byte. Subsequent items displayed as LED may be displayed on the same window or added to a new one (you will be prompted to decide), this type of display often best suits discrete data. The LED display is customisable to allow user preferences.

• • • -	LED_1	×
CATEMP11	₽ ₽ ₽ ₽ ₽ ₽ ₽ ₽ ₽ ₽ ₽ ₽ ₽ ₽ ₽	•••
CATEMP11	→ 🕐 N 💽 7 🕐 🖉 0 💽 0 🕐 →	•••

Dial will show a gauge the needle of the gauge representing the Value of the signal. Only one item can be displayed on each dial. However, multiple dials can be displayed simultaneously. The Dial display is customisable to allow user preferences.



The Scope button will add the signal to an Oscilloscope. Subsequent items added to a scope may be displayed on the same scope or added to a new one (you will be prompted to decide). The Scope display is customisable to allow user preferences.





3.2.4 How to Perform an OBD Report

Analyser allows the user to sequentially perform a test of each of the EOBD/OBDII services while producing a report detailing the results. The feature is accessed using the Reports Tab 'Navigation Bar' menu as shown below.

•							Modul	e Analyser 3
	File	View	Scan Tool	Extended	Monitoring	Settings	Reports	Reflash
<u>III</u>	Simple Rep	port 🔟	Expanded Report	Full Report	BD Report	ts 🍞 DTC	Export - 🖒	າ History

Clicking the 'OBD Reports' button opens OBD Reports window.

Ē.					OBD Rep	orts				- 🗆	×
R	un Clear	Tex	t Excel	7DF Func. Req.	V Test Supp.	Devices -					
Mode (0x01 Mode (0x02 I	Mode 0x03	Mode 0x06	Mode 0x07	Mode 0x09	Mode 0x0A	Read DTC	Freeze Frames	Errors Log	
Mode	e 0x01										

Clicking 'Run' creates the OBD report, performing each individual service and populating the respective tabs as the results are retrieved

B.		OBD Reports		– 🗆 🗙
Run Clear Text Exc	TDF Func. Req. To	est Supp.		
Mode 0x01 Mode 0x02 Mode 0x0	3 Mode 0x06 M	ode 0x07 Mode 0x09 Read	DTC Freeze Frames Errors Log	
Mode 0x01				
Config : _OBD_conf				~
Vehicle : default				
Time : 09:58:53				
Duration : 00:10:889 [mi	n:sec:msec]			
Module: Module 1				
Module. Module 1				
ID Label	Value	Hex	Units Description	
0x01 DTC_CNT	6	0x861FE8E8	<pre># of DTCs stored in this Malfuration Tadiantes I</pre>	B ECU
0x01 CCM RDY	VES	0x861FE8E8	Comprehensive component	monitorir V
			competition competition	

Once the tool has completed the test, you may export the results to either .TXT or Excel format for later review using the toolbar at the top of the window.

This process allows the user rapid access to all OBD data in one place with a single click. This is a very powerful and simple to use feature for all users.


3.2.5 How to Import a Description File

A number of the functions within Analyser use information obtained from the import of description files to identify various 'Data Items'. All the description file import function is located in the File 'Navigation Bar' menu or the Configuration Manager 'Imports' tab as shown below.



- Diag Exchange—Allows the import of OBD codes from ODX (Open Diagnostic Data Exchange) / MDX (Multiplex Diagnostic Data Exchange) / GDX (GMRDB Diagnostic Data Exchange) and XML (Extensible Markup Language) file formats for use with such functions as Advanced DTCs and Read/Write data by Identifier.
- Addresses—Allows the import of Memory Addresses from A2L (ASAP 2 Description) files for the Read Data by Address function.
- CAN Signals—Allows the import of Signal items from .DBC (Communication Database for CAN) files for functions such as the Trace Viewer and Oscilloscope.
- LIN Signals—Allows the import of Signal items from LDF (Lin Description File) files for functions such as the Trace Viewer and Oscilloscope.
- FIBEX—Allows the import of Signal items from FIBEX (The Field Bus Exchange Format The Field Bus Exchange Format) files for the Read Data by Address function.
- Workspace—This will close all active windows and import the workspace saved in a previously saved SPK (screen packaging) file.

'Data Items' are imported into a dedicated database for the module currently selected. The databases can be accessed by the Configuration Manager



Each import function opens a dedicated window for the file import. However, the process for all imports is analogous and an example is considered below.

<u>.</u>	Impo	ort From File [1.6D.odx]	into [Module 1] m	nodu	le		×
Services							
Powertrain diagnostic data	Powertrain	freeze frame data	🔽 On-board me	onito	oring test	Vehicle information	on
Bead by ID	Write by ID		Bead by Lor	cal II	D		
			Z Boutines		_		
E 2003			• Hoddines				
ID: Name:	Ur	iits:					
0x0			Filter				
Filter Tree		Target Tree			Properties		
Service 0x22	~	Service 0x22			In	0xD4EE	
		\pm 22 Acc pedal	position		ONG-NAME	Air Flow Measured	
표 🔁 Additive reservoir volume	>	표 🔁 Additive re:	servoir volume		BYTE-POSITION	0	
22 Air Flow Measured			additive in the ac	l.	UNITS	kg/h	
 Air Flow Measured Amount of addition in the activity of additional states and additiona states and additional states anditional states and additional		E 22 Atmos Pres	isure an of ini of uroa fl	E	BYTE-ORDER	MSB First	
22 Amount of additive in the ac 32 Atmos Pressure	_	22 Authorisatic 4	on of ini of urea fl	E	BIT-LENGTH	16	
		⊞ 22 Battery curi	rent	[DATA-TYPE	Unsigned Word	
		1 22 Battery volt	tage	E	BYTE-SIZE	2	
E 22 Battery current	>	표 22 calc gear		F	FORMULA-TYPE	Algebric	
		E 22 Calc injecto	or flow	F	RESOLUTION	0.01	
	K	E 22 denox cat (22 Denov event)	conv urea load	L	LOWER-LIMIT	0	
22 Calc injector now 22 denox cat conv urea load			em bleeu status maining before L	l	UPPER-LIMIT	255	
		🗄 🔁 Engine Cod	plant				
표 🔁 Distance remaining before u		표 🔁 Engine spe	ed				
Engine Coolant	*	Findine Tor	nue 🔪	×			
			,				
		361 items ready to imp	ort			Import	Close

Step 1

Click 'Open File' and locate and open the file to be imported — the 'Data Items' will appear in the 'Filter Tree' when the file has loaded.

Step 2

Identify the required 'Data Item(s)' manually or use the 'Filters' to aid searching.

Step 3

With the required 'Data Item(s)' highlighted use the 'Right' arrow to place the item(s)s in the 'Target Tree'.

Step 4

If any undesired 'Data Items' are in the 'Target Tree' use the 'Left' arrow to return them to the 'Filter Tree'.

Step 5

With all the required 'Data Items' in the 'Target Tree', click 'Import' to load the items into the relevant database for the current module.

Closing the window automatically opens the relevant tab of the Configuration Manager, which displays the database for the 'Data Items' imported for the current module. This process is universal for all description file imports in Analyser.



4 Emissions Related On-Board Diagnostics

4.1 Introduction

Emissions Related On-Board Diagnostics have been a legislative requirement since the year 2000 and are provided to warn the driver of any possible faults pertaining to the performance of the emissions systems of the vehicle.

The EOBD services can be accessed through the 'Navigation Bar' on the Scan Tool Tab of Analyser:

÷											
File	View	Scan Tool	Extended	Monitoring	Settings						
1 Live Data	2 Freeze	Frame 6	Test Results	Veh Info 347	Trouble Codes						

4.2 Emissions Related On-Board Diagnostic Functionality

Emissions Related On-Board Diagnostics incorporates a number of different capabilities, the tasks and applications considered in this section are summarised below.

Monitoring Powertrain Diagnostic Data

This tool utilises Mode 0x01 to poll the module for a number of powertrain 'Data Items' identified using specific Periodic Data Identifiers (PIDs.)

Retrieving Freeze Frame Powertrain Related Diagnostic Data

This tool utilises Mode 0x02 to obtain an instantaneous snap shot of a number of powertrain 'Data Items', again using specific PIDs.

Reading Emissions Related Diagnostic Trouble Codes

This tool utilises Modes 0x03, 0x07 and 0x0A to read the Confirmed, Pending and Permanent Diagnostic Troubles Codes respectively, from the module memory. The tool also again uses Mode 0x02 to retrieve any Freeze Frame data associated with the DTCs. Mode 0x04 provides the ability to clear the recorded DTCs from the module.

Retrieving Test Results for Non-Continuously Monitored Systems

This tool utilises Mode 0x06 to retrieve any stored data results for on-board tests of non-continuously monitored vehicle systems.

Reading Vehicle Information

This tool provides the user with any vehicle information stored on the module, such as Vehicle Identification Number (VIN) and a number of different 'counters'. The tool uses Mode 0x09 to poll the module for all supported information types.



4.3 Monitoring Powertrain Diagnostic Data (Mode 0x01)

Mode 0x01— Diagnostic Powertrain Data service can read any chosen Periodic Data Identifiers (PIDs) for a given module. The tool is also capable of automatically reading a number of supported PIDs for a particular module. The Diagnostic Powertrain Data service can be accessed through the 'Navigation Bar' on the Scan Tool Tab of Analyser:

1	•							
	File	View	Scan Tool	Extended	d	Monito	oring	Settings
	1 Live Data	2 Freeze	Frame 6	Test Results	9	Veh Info	347	Trouble Codes

The Mode 0x01—Diagnostic Powertrain Data tool window is shown below.

1							Mode 0	1 - Power	train Diagnostic	Data						-	×
Po Online	9 Update	+ × Add Remove	Reload A	y ⊕ Zoom In	∑ Zoom Out	●● ●+ LED	C Dial	Scope	Unsupported	Save Trace	Start Up	Test Supp.	Export Import				
Selected ECU	Items : Ident	Label	Description					Value	Hex Val	ue Bar Gra	ph		Units	Format	Device		^
🔆 Module	1 04	LOAD_PCT	Calculated LOAD	D Value				0.0	0x00				%	ENG	Influx Rebel CT/LT, Channel HS		
🍅 Module	1 05	ECT	Engine Coolant	Temperature	2			-40	0x00				degC	ENG	Influx Rebel CT/LT, Channel HS		
🔆 Module	1 0B	MAP	Intake Manifold	Absolute Pre	essure			255.0	0xFF				kPa	ENG	Influx Rebel CT/LT, Channel HS		
🔆 Module	1 OC	RPM	Engine RPM					0	0x0000				min-1	ENG	Influx Rebel CT/LT, Channel HS		
🔆 Module	1 0D	VSS	Vehicle Speed S	ensor				0	0x00				km/h	ENG	Influx Rebel CT/LT, Channel HS		
🔆 Module	1 0F	IAT	Intake Air Temp	erature				-40	0x00				deg	ENG	Influx Rebel CT/LT, Channel HS		
🔆 Module	1 10	MAF	Air Flow Rate fr	om Mass Air	Flow Sensor			0.00	0x0000				g/s	ENG	Influx Rebel CT/LT, Channel HS		
🔆 Module	1 11	TP	Absolute Thrott	le Position				93.7	0xEF				%	ENG	Influx Rebel CT/LT, Channel HS		
8º Module	1 13	O2SLOC_02S11	1 Location Of Oxy	gen Sensor:	s - Bank 1 Sens	sor 1		Presen	t 0x01					ENG	Influx Rebel CT/LT, Channel HS		
8º Module	1 13	O2SLOC_02S12	2 Location Of Oxy	gen Sensor	s - Bank 1 Sens	sor 2		Absent	t 0x01					ENG	Influx Rebel CT/LT, Channel HS		
8º Module	1 13	02SLOC_02S13	3 Location Of Oxy	gen Sensor	s - Bank 1 Sens	sor 3		Absent	t 0x01					ENG	Influx Rebel CT/LT, Channel HS		
8° Module	1 13	02SLOC_02S14	4 Location Of Oxy	ygen Sensors	s - Bank 1 Sens	sor 4		Absent	t 0x01					ENG	Influx Rebel CT/LT, Channel HS		\sim

Reading Powertrain Diagnostic Data

The Powertrain Diagnostic Data tool has been preloaded with a large number of 'Data Items'. This means that for the large majority of modules data can be immediately retrieved with a single click.



Commences the retrieval of the supported PIDs from the module.

Dependant on manufacturer specifications the module will not support all the PIDs, only a specific subset. However, the tool will automatically poll the module to determine which PIDs are supported. Any unsupported items are then automatically transferred to the 'Unsupported Items' panel and the tool continues to poll only the supported items.

Adding Additional Powertrain Data Items to be Read

Although the tool automatically has a large number of PIDs preloaded, it is also possible to add additional specific PIDs to the tool if required.



Allows the user to manually add any required additional PIDs, opens a dedicated window.



Automatic Loading of Generic PIDs



This allows the user to decide whether or not the tool preloads the generic PIDs upon start up or remains blank for complete customisation by the user.

4.4 Retrieving Freeze Frame Powertrain Related Diagnostic Data (Mode 0x02)

Mode 0x02—Powertrain Freeze Frame Data service reads a 'snap-shot' of data from the module. The tool automatically reads all supported PIDs for the module. The Powertrain Freeze Frame Data service can be accessed through the 'Navigation Bar' on the Scan Tool Tab of Analyser:

4					
File	View	Scan Tool	Extended	Monitorin	g Settings
1 Live Data	2 Freeze	Frame 6	Test Results	Veh Info 34	7 Trouble Codes

The Mode 0x02—Powertrain Freeze Frame Data tool window is shown below.

2			Mode 02	- Powertrain F	reezeframe Da	ita		-	- 🗆	×
V pdate	Reload	A Font Zoom In	Zoom Out Unsupported Save Trace Test Supp.							
Selected I	Items :	Label	Description	Value	Have Malera	Unite	Device			
cco	Ident	Label	Description	value	nex value	Units	Device			^
Module 1	02	DTCFRZF	DTC that caused required freeze frame data storage	P268C	0x268C		Influx Rebel CT/LT, Channel HS			
Module 1	04	LOAD_PCT	Calculated LOAD Value	0.0	0x00	%	Influx Rebel CT/LT, Channel HS			
Module 1	05	ECT	Engine Coolant Temperature	<mark>⊢4</mark> 0	0x00	degC	Influx Rebel CT/LT, Channel HS			
Module 1	0B	MAP	Intake Manifold Absolute Pressure	255.0	0xFF	kPa	Influx Rebel CT/LT, Channel HS			
Module 1	0C	RPM	Engine RPM	0	0x0000	min-1	Influx Rebel CT/LT, Channel HS			
Module 1	OD I	VSS	Vehicle Speed Sensor	0	0x00	km/h	Influx Rebel CT/LT, Channel HS			
Module 1	0F	IAT	Intake Air Temperature	⊢4 0	0x00	deg	Influx Rebel CT/LT, Channel HS			
Module 1	10	MAF	Air Flow Rate from Mass Air Flow Sensor	0.00	0x0000	g/s	Influx Rebel CT/LT, Channel HS			
Module 1	11	тр	Absolute Throttle Position	03.7	OVEE	0/_	Influx Dahal CT/LT Channel HS			~
Unsupport	ted Items :									
Ident	Label		Description							^
01	DTC_CNT		# of DTCs stored in this ECU							~

Retrieving Powertrain Freeze Frame Data from the Module

The Powertrain Freeze Frame Data tool has been preloaded with a number of generic PIDs. This allows the user to collect a 'snap shot' of all data items supported by the module with a single click.

Captures a 'snap shot' of the supported PIDs.



The tool uses Mode 0x02 to poll the module for a single instantaneous value for each of the supported PIDs. Any data items not supported by the module being analysed are automatically relocated to the 'Unsupported PIDs' panel.



4.5 Reading Emissions Related Diagnostic Trouble Codes (Modes 0x03, 0x04, 0x07, 0x0A and 0x02)

Emission Related Diagnostic Trouble Codes is a combined services tool of Modes 0x03, 0x04, 0x07, 0x0A and 0x02. The tool searches for Confirmed (Mode 0x03), Pending (Mode 0x07) and Permanent (Mode 0x0A) Diagnostic Trouble Codes (DTCs.) The tool also uses Mode 0x02 to read any associated freeze frame data for the DTCs and Mode 0x04 to clear all DTCs from the module. The Emission Related Diagnostic Trouble Codes service can be accessed through the 'Navigation Bar' on the Scan Tool Tab of Analyser:

4					
File	View	Scan Tool	Extended	Monitori	ing Settings
1 Live Data	2 Freeze	Frame 6	Test Results 9	Veh Info	347 Trouble Codes

The Emissions Related Diagnostic Trouble Codes tool window is shown below.



The Emissions Related DTCs tool allows the user to read three different types of OBD data from the module while also automatically utilising Mode 0x02 to retrieve any related freeze frame data. The tool functionality is controlled by the toolbar along the top of the window and the three functions are considered below.

Reading Emissions Related Powertrain DTCs



The 'Confirmed' icon utilises Mode 0x03 to read the Emissions Related Powertrain DTCs from the module with a single click. The icon also simultaneously toggles the tool to display the 'Confirmed' panel within the tool.

Reading On-Board Monitoring Test Results for Continuously Monitored Systems



ending

The 'Pending' icon utilises Mode 0x07 to read the On-Board Monitoring Test Results for Continuously Monitored Systems with a single click. The icon also simultaneously toggles the tool to display the 'Pending' panel within the tool.



Reading Permanent Diagnostic Trouble Codes



The 'Permanent' icon utilises Mode 0x0A to read Diagnostic Trouble Codes with Permanent Status from the module with a single click. The icon also simultaneously toggles the tool to display the 'Permanent' panel within the tool.

Clearing Diagnostic Trouble Codes



Allows the user to clear all emissions related diagnostic information from the module using Mode 0x04.

Creating a Diagnostic Trouble Codes Report



Export

Allows the user to export the current diagnostic information panel to Excel format. Note: the function only exports the DTCs currently visible in the panel. An example Excel report is shown below for the Pending DTCs.

	Α	В	С	D
1	Fault_ID	OBD Code	Description	Comment
2	268C	P268C	Module 1	
3	268F	P268F	Module 1	
4	268D	P268D	Module 1	
5	268E	P268E	Module 1	



4.6 Reading Vehicle Information (Mode 0x09)

Mode 0x09—Vehicle Information Service provides the ability to read vehicle specific information such as Vehicle Identification Number (VIN) and Calibration Identification from the module. The Vehicle Information Service can be accessed through the 'Navigation Bar' on the Scan Tool Tab of Analyser:

•											
File	File View		Scan Tool Ext		xtended		Monitoring				
1 Live Data	2 Freeze	Frame	6	Test Results	9	Veh Info	347	Trouble Codes			

The Mode 0x09—Vehicle Information tool window is shown below.

Image: Selected Items : Image: Selected Items : <th>9</th> <th></th> <th></th> <th>Mode</th> <th>09 - Vehicle Information</th> <th></th> <th>_</th> <th>×</th>	9			Mode	09 - Vehicle Information		_	×
Selected Items : Ident Label Description Value Hex Value Device Module 1 08 PMCOND PM Filter Monitor Conditions Encountered Counts 0 0x00000000000000000000000000000000000	V pdate	e Reload	A Font Zoom In	Coom Out Unsupported Save Trace Test Supp.				
Module 1 0B PMCOND PM Filter Monitor Conditions Encountered Counts 0 0x00000000000000000000000000000000000	Selected	Items : Ident	Label	Description	Value	Hex Value Device		
Module 1 0B EGSCOMP Exhaust Gas Sensor Monitor Completion Condition Counts 1 0x00000000000000000000000000000000000	Module	1 0B	PMCOND	PM Filter Monitor Conditions Encountered Counts	0	0x000000000000000000000000000000000000	IS	^
Module 1 0B EGSCOND Exhaust Gas Sensor Monitor Conditions Encountered Counts 0 0x00000000000000000000000000000000000	Module	1 0B	EGSCOMP	Exhaust Gas Sensor Monitor Completion Condition Counts	1	0x000000000000000000000000000000000000	IS	
Module 1 0B EGR COMP EGR and/or VVT Monitor Completion Condition Sunts 0 0x00000000000000000000000000000000000	Module	1 0B	EGSCOND	Exhaust Gas Sensor Monitor Conditions Encountered Counts	0	0x000000000000000000000000000000000000	IS	
Module 1 0B EGRCOND EGR and/or VVT Monitor Conditions Encountered Counts 0 0x00000000000000000000000000000000000	Module	1 0B	EGRCOMP	EGR and/or VVT Monitor Completion Condition Counts	0	0x000000000000000000000000000000000000	IS	
Module 1 0B BPCOMP Boost Presure Monitor Completion Condition Counts 0 0x00000000000000000000000000000000000	Module	1 0B	EGRCOND	EGR and/or VVT Monitor Conditions Encountered Counts	0	0x000000000000000000000000000000000000	IS	- 10
Module 1 08 BPCOND Boost Presure Monitor Conditions Encountered Counts 0 0x00000000000000000000000000000000000	Module	1 0B	BPCOMP	Boost Presure Monitor Completion Condition Counts	0	0x000000000000000000000000000000000000	IS	
Module 1 OA ECUNAME ECU Name ECM -EngineControl 45 43 4D 00 2D 45 6E 67 69 6E 65 43 6F @nflux Rebel CT/LT, Channel HS N Unsupported Items : Ite	Module	1 0B	BPCOND	Boost Presure Monitor Conditions Encountered Counts	0	0x000000000000000000000000000000000000	IS	
Unsupported Items : Ident Label Description	Module	1 0A	ECUNAME	ECU Name	ECM -EngineControl	45 43 4D 00 2D 45 6E 67 69 6E 65 43 6F (Influx Rebel CT/LT, Channel H	IS	\checkmark
	Unsuppo Ident	orted Items : Label		Description				

Reading Vehicle Information from the Module

The tool allows the user to read all supported vehicle information items from the module with a single click. All the items are preloaded in the tool.



Automatically polls the module for each of the items, any unsupported items are automatically relocated to the 'Unsupported Items' panel. Therefore, for any module being analysed, with a single click, the user can retrieve all supported vehicle information.



5 Extended Diagnostics

5.1 Introduction

The Extended Diagnostics Services are an extra group of modes that allow the use of more advanced features from the module. There is no universal requirement for manufacturers and therefore the services and their application can be vehicle/module specific. The services are designed to provide the more advanced user the ability to monitor or in some cases change specific data records or items within a module.

The Extended Diagnostics services can be accessed through the 'Navigation Bar' on the Extended Tab of Analyser:

÷	Module Analyser 3.0.0.0 [
	File	View	Scan Tool	Extended	Monitoring	Settings	Reports	Reflash	Wind		
19	DTC Data	22 21 Read	d By Identifier 23	Read Memory	2A 2C Fast Data	Acquisition 2	Write By Ide	ntifier 31 Ro	outines		

5.2 Extended Diagnostics Functionality

Extended Diagnostics incorporates a number of different capabilities, the tasks and applications considered in this section are summarised below.

Reading Diagnostic Trouble Code Data

This tool utilises Mode 0x19 to retrieve any stored DTCs from the module, it indexes the status bytes of the retrieved DTCs and also allows them to be retrieved according to it. Mode 0x14 can then be used to clear the DTCs.

Reading Data by Identifier

This tool utilises Mode 0x22 to read specific data from the module, determined by the data identifiers.

Reading Memory by Address

This tool utilises Mode 0x23 to read specific data records from the module memory, determined by the memory address.

Fast Data Acquisition

This tool utilises Mode 0x2C to define either Periodic or Dynamic Data Identifiers and Modes 0x2A and 0x22 respectively to read the data with them at the specified rates.

Writing Data by Identifier

This tool provides the user the ability to edit fixed values within the module. Utilising Mode 0x22 the tool reads the current values from the module. The editing can then be performed and the changes written back to the module using Mode 0x2E.

Routine Control

This tool allows the user to run specified routines in the module and to automatically capture the results.



5.3 Reading Diagnostic Trouble Code Data (Modes 0x14, 0x18 and 0x19)

Diagnostic Trouble Code Data is a combined services tool and uses both Modes 0x14 and 0x19. The tool can retrieve all stored DTCs (Mode 0x18 or 0x19) from the module being read and also includes a clear all DTCs function (Mode 0x14). The Diagnostic Trouble Code Data service is accessed through the 'Navigation Bar' on the Extended Tab of Analyser:

•	Module Analyser 3.0.0.0										
	File	View	Scan Tool	Extended	Monitoring	Settings	Reports	Reflash	Wind		
	19 DTC Data	22 21 Re	ad By Identifier	23 Read Memory	2A 2C Fast Data	Acquisition	2E Write By Ide	entifier 31	Routines		

The Diagnostic Trouble Code Data tool window is shown below.

1	Read DTC By :	Status				- 0	⊐ ×
Read Clear Reset KAM	Scan .						
Codes List OBD Fault ID Code Module Description	s	Sensor State	Device	Occurances	Comment		
Current Freeze Frame data:							•
Test not completed this cycle Warning indicator requested Confirmed DTC Pending DTC	 Test Failed since last clear Test failed this cycle 	 Test not complete si Test Failed 	ince last clear				

Reading Diagnostic Trouble Codes

The tool allows the user to instantly read all DTCs and associated freeze frame data with a single click.



Utilises Mode 0x19 to retrieve all stored DTCs from the module. The tool also utilises Mode 0x02 to retrieve any associated freeze frame data simultaneously.

Along the bottom of the window is a list of all the 'Status Byte' types for the protocol being used. This section is used to index the different 'status bytes' for the DTCs retrieved from the module.

Warning indicator requested Confirmed DTC Test not completed this cycle Pending DTC ✓ Test Failed since last clear
✓ Test failed this cycle

Test not complete since last clear Test Failed



Importing Diagnostic Trouble Codes

The DTC function also supports the import of module/manufacturer specific diagnostic trouble codes from MDX/ODX/GDX/XML file formats. The import feature is located in the File 'Navigation Bar' menu or the Configuration Manager 'Imports' tab as shown below. Tip: select Diag. Exchange

4		Imports
File View Scan Tool	Extended Monitoring	EED
- New - 🗂 Open - 🗌 Screen -	📑 Import 🗸 🎦 Export 🗸	Custom Module
· · · · · · · · · · · · · · · · · · ·	Diag. Exchange	From Excel
	A2L Addresses	Diag. Exchange
	DBO CAN Signals	AZŪ
	LIN Signals	Addresses
	Eibex	CAN Signals
	Workspace	LIN Circula
		Fibex
		Workspace

Once the OBD codes have been imported from the file into the database they will now be applied to interpret the DTCs retrieved from the module.

Clearing Diagnostic Trouble Codes

All stored DTCs can be cleared from the module using the 'Clear' feature.



Uses Mode 0x14 to remove all DTCs from the module.

Once the clear function is completed the tool also automatically re-reads the DTCs from the module using Mode 0x19. This immediately confirms to the user whether the clear has been fully successful and identifies any DTCs which have failed to clear or reoccurred immediately.



Reading DTCs by Status Byte

Only available for ISO 14229 application—the tool allows the user to specify which DTCs should be read from the module by their 'Status Byte'.



Status Mask

The icon opens a filter window shown below.

Read DTC By Status	Byte 🗙
Status byte	
Warning indicator requested	Confirmed DTC
Test not completed this cycle	Pending DTC
Test Failed since last clear	Test failed this cycle
Test not complete since last clear	Test Failed
Select All Deselect All	OK Cancel

Exporting Diagnostic Trouble Codes to Microsoft Excel

Allows the user export a record of the Diagnostic Trouble Codes to Excel format. An example Excel report is shown below.

	А	В	С	D	E	F	G	Н	I.
1	Configuration	_OBD_conf							
2	Date	23-09-16							
3	Time	11:37:28							
4	Duration	00:10:189 [min:sec:msec]							
5									
6									
7	Fault_ID	OBD Code	Module	Description	Comment	SensorState	Status	Response Status	Occurenses
8	0x0183	P0183	Module				0x27		
9	0x0108	P0108	Module				OxAF		
10	0x0405	P0405	Module				0x27		
11	0x138A	P138A	Module				0x2F		
12	0x007D	P007D	Module				Ox2F		
13	0x0113	P0113	Module				0x27		
14	0x0193	P0193	Module				OxAF		
15	0x0045	P0045	Module				Ox2F		
16	0x2564	P2564	Module				0x2F		
17	0x0403	P0403	Module				0x26		
18	0x0531	P0531	Module				Ox2F		
19	0x0645	P0645	Module				0x2F		
20	0x0693	P0693	Module				0x2F		



5.4 Reading Data by Identifier (Mode 0x22)

Mode 0x22—Read Data by Identifier service allows the request and retrieval of data record values by one or multiple data identifiers. The tool allows either a single polling of the module for each identifier or the continuous cycling through all items. The Reading Data by Identifier service is accessed through the 'Navigation Bar' on the Extended Tab of Analyser:

•							м	Iodule Analyser	3.0.0.0 [
	File	View	Scan Tool	Extended	Monitoring	Settings	Reports	Reflash	Wind
19	DTC Data	22 21 Read	d By Identifier	23 Read Memory	2A 2C Fast Data	Acquisition 2	Write By Ide	ntifier 31 R	outines

The Mode 0x22—Read Data by Identifier tool window is shown below.

21								N	1ode 22/	'21 - Read	Data By Identi	ìer									-		×
Online	👽 Update I	Range	+ Add	X Remove	A Font	∑ Zoom In	ې Zoom Ou	t LED	Dial	Scope	Unsupporte	d Save Trace	Export	Import	Export	▼ Export	T Import						
Selected ECU	Items : Ident	Label						Descripti	on	Value	Hex Valu	e Bar Graph			Uni	its	Format	Service	e Device	•			
<																							>
Unsuppo Ident	rted Items Label	:				Descri	ption			Servi	ce												
																				× Remo	ove fro	m DB	

Selecting Required Data Items

The Read Data by Identifier window opens with no preloaded items as these are module specific, the required data items must be selected and added by the user.



Allows the user to select the required PIDs and the chosen rate for each. Opens a dedicated window.



Importing Data Items from File

The Read Data by Identifier tool also supports the import of 'Data Items' from ODX/MDX/GDX/XML file formats. The import feature is located in the File 'Navigation Bar' menu or the Configuration Manager 'Imports' tab as shown below. Tip: select Diag. Exchange



Once the PIDs have been imported from the file into the database they still need to be added. The imported items will now be available for selection in the 'Add' window.

Reading Data by Identifier

Once the PIDs to be read have been selected and imported into the tool the data can be read from the module.



Begins the continual cycling of the PIDs, utilising Mode 0x22 to poll the module for each item at their specified rate. Note: for large numbers of data items it may not be possible to achieve the specified data rate due to module response times to each request.



Utilises Mode 0x22 once for each PID to retrieve a single instantaneous data record for each item.



Unsupported Data Items

Upon reading Data by Identifier, any selected PIDs not supported by the module are automatically relocated to the 'Unsupported Items' panel. This leaves only the supported items to be polled each time, increasing the speed of the process.

The tool supports a feature which allows the user to choose to identify and remove any unsupported 'Data Items' for the current module being analysed. If a specific module is being worked with, the unsupported items can be removed from the Read Data by Identifier database for the current module to stop their reselection for this module in the future. Combined with the file import facility this allows the user to build customised databases for specific modules, making the selection of required 'Data Items' in the future quick and simple.

The feature is utilised with the 'Remove Unsupported' button

Remove from DB



Reading Memory by Address (Mode 0x23) 5.5

Mode 0x23—Read Memory by Address service allows the request and retrieval of data record values from one or multiple memory addresses and the specification of the number of bytes to be read starting at the given address. The Reading Memory by Address service is accessed through the 'Navigation Bar' on the Extended Tab of Analyser:

4							м	1odule Analyse	er 3.0.0.0 [
	File	View	Scan Tool	Extended	Monitoring	Settings	Reports	Reflash	Win
19 ¤)TC Data	22 21 Read B	y Identifier	23 Read Memory	2A 2C Fast Data	Acquisition 2	Write By Ide	entifier 31	Routines

The Mode 0x23—Read Memory by Address tool window is shown below.

23		Mode 23 - Read Memory By Address		– 🗆 🗙
Online	+ × A ,⊕ ,⊖ Add Remove Font Zoom In Zoom Out LED Dial	Scope Save Trace Import Export Import		
Selected Iter ECU	ms : Ident Label	Description Value Hex Value Bar Graph	Units Forma	t Device
· 🔆 Module	1000897 minutineecon	AirIntPresController/95.001 0x799A	% ENG	Influx Rebel CT/LT, Channel HS
🔆 Module	100008ees202 tittiggoon liidees	pulse width for the E5.000 0x0CCD	% ENG	Influx Rebel CT/LT, Channel HS
🐨 Module	COULSERS # ITTERNATION STOCK	pulse width for the tr5.000 0x0CCD	% ENG	Influx Rebel CT/LT, Channel HS
🐨 Module	10003666444 (Mini 1920) (con 1980) (cf) 1201	ThrottleCmdPreCtrl/(0.000 0x0000	[%] ENG	Influx Rebel CT/LT, Channel HS
🔆 Module	1000000022 the public on rise of Fight	ThrottleCmdPreCtrl/(0.000 0x0000	[%] ENG	Influx Rebel CT/LT, Channel HS
🔆 Module	TOOL+HEET. (this gaves cas()))	add. correction for tł0.000 0x0000	[%] ENG	Influx Rebel CT/LT, Channel HS
🔆 Module	1000++1222 (fits_powr600)	Pulse width for EGR 15.000 0x0CCD	% ENG	Influx Rebel CT/LT, Channel HS
🕙 Module	1010445244 (Higgsom)	basic pulse width for 5.000 0x0CCD	% ENG	Influx Rebel CT/LT, Channel HS
🕙 Module	100044CEs: (Higgson esc)	pulse width for the E5.000 0x0CCD	% ENG	Influx Rebel CT/LT, Channel HS
· Module	100100 101000 0000000000000000000000000	DpfProtecionMonitor,0.000 0x0000	[%] ENG	Influx Rebel CT/LT, Channel HS
Module	1002555 vit	Battery Voltage 12.423529 0x6E	[V] ENG	Influx Rebel CT/LT, Channel HS

Importing an A2L File



To read data values from memory addresses requires a module specific file which designates the memory address for each 'Data Item' record in the module. This file is known as an .A2L file and is imported using the Import A2L file button.

Selecting Required Data Items

Once the .A2L file has been imported and the Read Memory by Address database for the current module populated, the specific Addresses required must be identified and added to the Read Memory by Address list.



Allows the user to select the required Addresses and the chosen rate for each data item.

Reading Memory by Address

Once the required Addresses have been selected the tool is ready to read the data records from the memory addresses.





5.6 Fast Data Acquisition (Modes 0x2C, 0x2A and 0x22)

Fast Data Acquisition is a combined service that utilises modes 0x2C, 0x2A and 0x22 which provides the ability to request and retrieve data record values by both data identifier and memory address. The tool uses Mode 0x2C to allow the definition of both periodic and dynamic data identifiers and Modes 0x22 and 0x2A to retrieve the data depending on the identifier. The Fast Data Acquisition service is accessed through the 'Navigation Bar' on the Extended Tab of Analyser:

4							Module Analyse	er 3.0.0.0 [
File	Viev	v Scan Tool	Extended	Monitoring	Settings	Reports	Reflash	Wind
<mark>19</mark> DTC	Data 22 21	Read By Identifier	23 Read Memory	2A 2C Fast Data	Acquisition	2E Write By I	dentifier 31	Routines

The Fast Data tool window is shown below.

22				Mode 2C - Fast [Data Acquisition				– 🗆 ×
P Online	+ + ×	A Font Zoom I	n Zoom Out	·i⊂i [] Dial Scope	Dyn Idents Advanced Stop Saving	Import Import Export	Addresses Id	Interview	
Selected I	tems: Ident Label		Descriptio	n Value	Hey Value Bar Graph	Units	Format D	un Ident Service	Device
- Module			AirIntPresCo	ontroller/n/a	n/a	%	ENG E2	200 0x2A	Influx Rebel CT.L.T. (
· Module			AirIntPresCo	ontroller/n/a	n/a	%	ENG F2	200 0x2A	Influx Rebel CT/LT, (
🔆 Module	000086600200000000		pulse width	for the En/a	n/a	%	ENG F2	200 0x2A	Influx Rebel CT/LT, (
🔆 Module	TORD - ESCASI (TET)		Battery Volt	age n/a	n/a	[M]	ENG F2	200 0x2A	Influx Rebel CT/LT, (
🔆 Module	DIDINESS PRODUCES C		pulse width	for the tłn/a	n/a	%	ENG F2	201 0x2A	Influx Rebel CT/LT, (
🔆 Module	DUUHENSIDT LOC NEWS T		Basic precor	ntrol valun/a	n/a	[%]	ENG F2	201 0x2A	Influx Rebel CT/LT, (
🐨 Module	TORD - HE IS CONTRACTOR		Basic precor	ntrol valun/a	n/a	[%]	ENG F2	201 0x2A	Influx Rebel CT/LT, (
🐨 Module			Basic precor	ntrol valun/a	n/a	[%]	ENG F2	202 0x2A	Influx Rebel CT/LT, (
🔆 Module			Throttle pre	control vn/a	n/a	[%]	ENG F2	202 0x2A	Influx Rebel CT/LT, (
🔆 Module	10008 664440 (001000 (00000000)		ThrottleCmd	lPreCtrl/(n/a	n/a	[%]	ENG F2	202 0x2A	Influx Rebel CT/LT, (
🔆 Module			ThrottleCmd	lPreCtrl/(n/a	n/a	[%]	ENG F2	203 0x2A	Influx Rebel CT/LT, (🗸
<									ي <

The window opens with no pre-loaded items as they may be module specific, the tool allows items to be added by memory address or by identifier and either dynamic or periodic identifiers to be assigned along with the data rate. The tool then uses Mode 0x2C to define all the Data Identifiers. Modes 0x22 and 0x2A are then utilised to read the Periodically Defined Dynamic Data Identifiers (PDIDs) or Dynamically Defined Data Identifiers (DDID) respectively to retrieve the required data record values at the specified data rates.

Importing Data Items from File by Memory Address or Data Identifier

The Fast Data tool supports both Data Identifiers and Memory Addresses, therefore description files can be imported to identify the 'Data Items' required. The tool supports the import of ODX/MDX/GDX or A2L files using the toolbar buttons shown below.





Selecting Required Data Items

To begin the data retrieval the required 'Data Items' must be identified and added to the tool.



Allows the user to select items by memory address. Once an .A2L file has been imported and the Read Memory by Address database populated for the specific module, the required data items can be identified and added to the tool.



Add Identifier

Allows the user to select items by data identifier. The window contains a number of preloaded data items in the database. However, any items imported from an ODX/MDX/GDX file will also be listed ready to be added to the tool.

Reading Fast Data

Once the required 'Data Items' have been added, the Fast Data tool is ready to acquire the data.



Commences the continuous acquisition of the selected 'Data Items'. The tool utilises Modes 0x2A and 0x22 to read the data records from the module for each of the dynamically or periodically defined data identifiers.

Dynamically Defined Data Identifiers

The tool works by utilising Mode 0x2C to define Dynamic or Periodic Identifiers for each of the 'Data Items', from either Data Identifiers or Memory Addresses. Either Dynamically Defined Data Identifiers (DDIDs) or Periodically Defined Data Identifiers (PDIDs) are created depending on the choice when adding the data items to the tool.



Dyn Idents

Opens a dedicated window which summarises all the Dynamic Identifiers created within the tool, as shown below.

e .	Dynamically Defined DataIde	entifiers		×
Dynamic Ident	Items	Size	Rate[ms]	Status
□ 0xF200	Created with Memory Addresses	7	100	Inactive 🔥
SHIELD THE SHOP	Throthinee of the	2		
SHARE THE REAL	The statement of the	2		
Sand Differen	TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	2		
SHALL DEFEN		1		
🖃 0xF201	Created with Memory Addresses	6	100	Inactive
SHIELD THE REAL	The second second	2		
SHARE THE REAL	The public in averaging the	2		
SHALL DEFENSE	The public in and is reading	2		
🖃 0xF202	Created with Memory Addresses	6	100	Inactive
Sand BILISH	New York Control	2		×



Dynamic Identifiers Options

The tool contains the ability to edit permanently defined Dynamic Identifiers and to adjust the settings for how Dynamic Identifiers are created and read.



Advanced

Opens a dedicated window for administration of Dynamic Identifiers as shown below.

4	Permanent Dyr	namically Defined	Data Identifier:	s	×
Modify Dyna	amic Data Ide	ntifiers			
Ident	Size	Mode22	Mode2A		^
F200	7		\checkmark		
F201	7		\checkmark		
F202	7		\checkmark		
F203	7		\checkmark		
F204	7		\checkmark		
F205	7		\checkmark		
F206	7		\checkmark		
F207	7		\checkmark		
F208	7		\checkmark		
F209	7		\checkmark		
F20A	7		\checkmark		
F20B	7		\checkmark		
	- te Telentificano (+
Dynamic Da	ta Identifiers i	kange			
Low, [hex]	High, [hex]	Size, [dec] Mode22	Mode2A	
F200	F200	7		\checkmark	
		Delete	Add	Close	

The Permanent Dynamically Defined windows lists all the dynamic data identifiers and the Diagnostic Modes to be used by the tool to read the data items. As default the identifiers beginning with F2xx are assigned as DDIDs and the identifiers beginning with F3xx are assigned as PDIDs. However, the Mode can be selected individually for each PID.

The dynamic identifiers listed are all the identifiers available to be assigned to 'Data Items'.

The dynamic identifiers can be edited or new identifiers created.



5.7 Writing Data by Identifier (Modes 0x2E and 0x22)

Mode 0x2E—Write by Data Identifier tool provides the facility to write changes to the module. The tool uses Mode 0x22 to read the data to be changed and Mode 0x2E to write the changes to the module. The Writing Data by Identifier service is accessed through the 'Navigation Bar' on the Extended Tab of Analyser:

•							м	odule Analyser (3.0.0.0 [
	File	View	Scan Tool	Extended	Monitoring	Settings	Reports	Reflash	Win
19	DTC Data	22 21 Read	By Identifier	23 Read Memory	2A 2C Fast Data	Acquisition 2	Write By Ide	ntifier 31 R	outines

The Mode 0x02—Write Data by Identifier tool window is shown below.

2E								Mode 2E - Write	Data By Ide	entifier					-	□ ×
W rite	Read	 Edit	+ Add	X Remove	A Font	∑ Zoom In 2	Coom Out Save	race Impo	t Export	Export Impo	ort					
Selected I ECU	tems : Ident	Label					Descriptio	n Pendir	ıg Value	Value	Units	Data Type	Format Dev	ice		

Selecting Data Items to be Edited

The first step requires the user to identify the 'Data Items' to be edited and add them to the tool.



Allows the user to select the required data identifiers.



Importing Data Items from File

The Write Data by Identifier supports the import of 'Data Items' from ODX/MDX/GDX/XML file formats. The import feature is located in the File 'Navigation Bar' menu or the Configuration Manager 'Imports' tab as shown below. Tip: select Diag. Exchange

•				Imports
File View	Scan Tool	Extended	Monitoring	ECU
			M	Custom Module
	• Screen •	Import +	Export +	×
		Diag Ex	change	From Excel
			change in	
		A2L Address	es	Diag. Exchange
		DBO CAN Sig	nals	A2L
		LDF LTN Sign		Addresses
				Dec
		FIBEX Fibex		CAN Signals
		Workspa	ace	LDF
				LIN Signals
				rect
				Fibex
				đ
				Workspace

Once the PIDs have been imported from the file into the database they still need to be added. The imported items will now be available for selection in the 'Add' window.

Reading Data by Identifier

Once the required items have been added to the tool, the current values must be read from the module.

Utilises Mode 0x22 to read the current record values for each of the data identifiers from the module. Note: Not all items may be editable.

Editing Data Values

With the current values for each identifier retrieved, the user can utilise the 'Edit' feature to instrument any changes to the items.



The window allows the editing of the data format along with the stored data in the raw message format. Clicking 'OK' confirms the changes to the tool and closes the window. The tool automatically marks any items that have been changed post editing with an icon in the left hand column.



Writing Changes to Module

With any editing completed the user can commit the changes to the module.



The tool utilises Mode 0x2E to write any new values inputted or editing completed in the tool to the module.



Routine Control (Mode 0x31) 5.8

Mode 0x31—Routine Control service allows the commencing and running of predetermined routines. The Routine Control service is accessed through the 'Navigation Bar' on the Extended Tab of Analyser:

4							N	1odule Analyse	er 3.0.0.0 [
	File	View	Scan Tool	Extended	Monitoring	Settings	Reports	Reflash	Wind
19	DTC Data	22 21 Read	d By Identifier	23 Read Memory	2A 2C Fast Data	Acquisition 2	E Write By Ide	entifier 31	Routines

The Mode 0x31—Routine Control tool window is shown below.

31	Mode 31 - Start Routine By Local Identifier	– 🗆 🗙
Image: Contine Image: Head of the second secon	Properties Export Import	
Selected Items : Module - Routine Label	Routine Result :	
Piodule Routille Label	beschption Status Stop Request kun hinkbev Name Value	
٢	>	

Selecting Routines

To begin a routine session, the routines to be performed first need to be identified and added to the tool.



Add

Opens a dedicated window to identify and select the required routines.

Performing Routines

Once the Routines to be performed have been identified and added to the tool the user can instruct the module to perform the routines.



Commences the performance of all the selected routines, utilising Mode 0x31.

As the routines are performed the results are displayed in the 'Routine Result' panel.



6 Data Visualisation

6.1 Oscilloscope (Scope)

6.1.1 Introduction

Module Analyser contains its own Oscilloscope and data analysis function and is denoted in the program by the Scope icon:



Scope

The Scope can be accessed from within a number of the different tool windows using the icon displayed above, where the selected 'Data Item(s)' will automatically be added to the Scope.

Once a Scope is opened, the window will appear as shown below. It is also possible to have multiple oscilloscopes open and running simultaneously. (A Scope window can only be opened with a data field to plot.)



The 'Oscilloscope' window contains two main sections, the 'Information' panel on the left hand side and the 'Main' panel on the right hand side which provides three different features. Each are considered separately below.



With multiple data fields in the oscilloscope the default display is to have separate plots overlaid and the axis scaling toggled between by clicking on the required data row in the left panel. The tool contains a number of plotting features and data recording options and these are explained below.

Ö	6	ß		and a	Ø	L	1	~	111	6	A	€	H	¢.	ŀ	Ð 🕵	 +-+	<u>م</u>	9	I	Q	Q	St	9
1 24	2 25	3	4		5	6	7	8	9	10	11	12	1	.3	14	15	16	17	1	L8	19	20	21 22	23
1 2 3		Onlin Allow Allow	ne - (St vs the vs the	art/S open savin	top ing o g of	plott of a p the p	ing do pre-sav plotteo	es not ved da d data	: affe ta fil valu	et the e to b es in	e data pe re- .csv, .	a flov plott mat	v in o ed o and	othe on th Vec	er op e os tor N	en too cillosco MDF fil	ls in tl ope. e form	he wo nat.	orksp	ace.)			
4 5 6 7		XY So Shov	atter l v all Ite	Plot ems	iiity	to pr		curre	int u	ispiay	eu pi	UL W	itii a	nui	nbei		matti	ig op	tions).				
, 8 9		Shov	v steps rate It	betv ems o	veer on O	n dat Iscillo	a point oscope	ts																
10 11		Axis Shov	display v item	/ moc point	des ts																			
12 13 14		Shov Shov Lock	v point v Curso Curso	r time	e dif	ferer	nce																	
15 16		Loca Rese	te Data t Zoon	a in C n Fact)scill tor	osco	pe fro	m Iter	n Dat	ta Pai	nel													
17 18 19		Set C Rese Zoor	Custom t X axi n X axi	n Time s Zoo s in	e Zo m Fa	om R actor	lange																	
20		Zoor	n X axi	s Out																				

- 21 Fit Items to visible zoom area
- 22 Zoom Y axis in
- 23 Zoom Y axis Out
- 24 Zoom all axis in
- 25 Zoom all axis Out



6.1.2 Export Oscilloscope Signals

Each oscilloscope window allows the user to export the signal data contained within them. The user is provided a number file formats to export to:

- Vector MDF (.DAT)
- MATLAB 5.0 (.MAT)
- MATLAB 5.0 Structured single or double precision (.MAT)
- MATLAB 5.0 Structure Extended (.MAT)
- Comma Separated Variables (.CSV)
- nCode S3 time series files (.S3T)
- National Instruments TDM files (.TDM)
- National Instruments TDM streaming files (.TDMS)

Once the required file format and location to save the file have been selected, the user is provided the option to select various options:

Expo	rt options X
General sample processing options	
 Do not change items sampling rate Change each item sampling rate using Use fixed rate when processing samp Align beginning of file time range by creatin Align ending of file time range by creatin Combine sampling rates from all item 	interpolation
O Configure specific conversion rules for e	New Edit
Items for exporting All items from oscilloscope window Visible item(s) from oscilloscope Only selected item(s) Custom (single item)	Time range Entire log (full time range) Use current time range Use time range between cursors Custom time range (sec) from 0 to 299.624 OK Cancel



6.1.3 Oscilloscope Signals Management

Items in the Scope can be Managed, e.g. removed, grouped, selected, hidden. The functions to do this are available by right clicking on the Items.

۲	<u>R</u> emove	Del
•	<u>P</u> hysical	Ctrl+P
	<u>D</u> ecimal	Ctrl+D
I	Fit selected item(s) data	Shift+F12
	Reset scaling (ungroup)	Ctrl+R
	Group and rescale	Ctrl+G
>>	Group and scale to	
8	Group by units and rescale	Ctrl+M
¥	Group by EventList and reso	ale Ctrl+M
	<u>S</u> elect all	Ctrl+A
	Deselect all	Shift+Ctrl+A
	Invert selection	Shift+Ctrl+I
	S <u>h</u> ow item(s)	Ctrl+S
	Hide i <u>t</u> em(s)	Ctrl+U
₩	Sho <u>w</u> all items	Ctrl+V
L	Hide <u>a</u> ll items	Ctrl+H
	Ti <u>m</u> e offset	Ctrl+T
	Color	+
∎Į́	Edit current analysis name	Ctrl+F3
0	Item properties	



There is also a tool bar to perform commonly used tasks:

🍜 🍝 🐲 fx | 🛄 🛄 | 🗷 - 💁 🕕

6.1.4 Defining Calculated Channels

fx Allows the user to define calculated channels. Opens a dedicated window as shown below.

÷	Calculated signal	□ ×
Custom calculated signals	management	
Name	Units T	ype 64bit IEEE 754 Double 🔻
		< >
Generic formula Pred	lefined Bitwise logic	
<	sin cos tan In Ig exp asin acos atan abs sqrt ^	/ ×) pi + ·)) e g
Rate Use rate from item 🔹		 Use conversion ✓ Define conversion
		OK Cancel



6.1.5 Oscilloscope Settings

Graphical elements of the scope can be adjusted in the Scope preferences which can be found on the Settings Tab by clicking Preferences



Once the preferences window is displayed click on Scope:



Here you may adjust the graphical elements of the scope and save the changes.



6.1.6 Information Panel

The 'Information' panel displays all the 'Data Items' currently added to the Oscilloscope as shown below. The Buttons on the Left allow 'Loaded Files' the 'Explorer' and the 'Items' to be shown or hidden as follows:

Item information										
🍝 🗢 🛄 🖂 🗷 - 🛛	0									
Color Name	Units	Value								
EQ_RAT11		1.9988								
FRP	kPa	224750								
MIL		1								
✓ —— 02S11	V	2.04								
✓ —— TP	%	86.3								
VPWR	V	12.42								

The 'Information' panel functionality is controlled by a dedicated toolbar considered below.



Important Functions include:

- Reset Scaling of Selected Item(s) Removes any scaling operations applied to the selected items.
- Rescale Group of Selected Items Synchronising Axes—Automatically scales the selected items to allow display simultaneously on a single set of axes.
- Custom Scale Group of Selected Items Synchronising Axes—Allows the user to select the scaling to a single axis.
- Group Items by Units and Rescale Each Group Synchronising the Axes—Automatically scales the selected items to a single axis for each unit type.
- Select All Items—Selects all items.
- Deselect All Items—Deselects all items.
- Show Detailed Item Properties—Opens the dedicated window considered below.



6.1.7 Oscilloscope Panel

The 'Oscilloscope' panel displays the plots for all the 'Data Items' currently added to the Oscilloscope, an example plot can be seen below.





Show the steps between Data Items

In the normal plotting mode, the oscilloscope tool automatically interpolates between points to draw a continuous trace through the data points. This mode allows the user to select to display the step in value between each recorded data point. An example of each display mode can be seen below.



Separate Items on Oscilloscope

The default mode for the oscilloscope displays the plots for all the data items overlaid, displaying the axis for the currently selected 'Data Item'. The 'Separate' function allows the user to display each 'Data Item' on an individual set of axis, an example can be seen below.



With the plots separated the user can scroll through the plots user the cursor on the right of the panel. The number of plots displayed at once can be selected by clicking the number at the top of the scroll bar.



Axis display modes

In default mode, the oscilloscope displays a single axis for the currently selected 'Data Item', this mode allows an axis for each data item to be displayed simultaneously as can be seen below.



With the multiple axes displayed, they can be moved independently by the user. The selected axis also highlights the corresponding plot.

Show item points

This feature allows the user to select to display all the recorded data points for the currently plotted 'Data Items' as can be seen below.





Show point labels

The oscilloscope contains a feature which allows the user to label particular data points of interest. A label is added to a data point using the 'right click' menu shown below.

The 'right click' menu item opens a window which allows the user to enter a note for the data item as shown below.



The feature then allows the user to display all the point labels for the plotted 'Data Items' as shown below.





Show cursors

The Oscilloscope features double cursors, which allow the user to measure time differences, but also display the value for each 'Data Item' at the cursor location time as can be seen below.



Lock cursor time difference

The tool also features the ability to lock the cursors at a set time difference, only allowing both to move simultaneously.



6.1.8 Item Data

The 'Item Data' section of the Oscilloscope allows the user to display all the data points collected for the selected 'Data Item' in the 'Item Information' panel. The 'Item Data' panel is accessed using the 'Item Data' tab as shown below.

Item d	Item data											
×C	02S11 × EQ_RAT11	× FRP	X TP	× VPWR	× MIL							
ID	Time(sec)	Raw		Physical		Notes						
31	135.998	0xDE		87.1								
32	137.048	0xDE		87.1								
33	137.839	0xDF		87.5								
34	138.699	0xE2		88.6								
35	139.769	0xEE		93.3								
36	140.539	0xEE		93.3								
37	141.498	0xEF		93.7								
38	142.488	0xEE		93.3								
39	143.409	0xEF		93.7								
40	144.368	0xEE		93.3								
41	145.298	0xEF		93.7								
42	146.089	0xEF		93.7								
43	147.058	0xEF		93.7								
44	147.839	0xEF		93.7								
45	148.649	0xEF		93.7								
46	149.858	0xEF		93.7								
47	151.418	0xEF		93.7								
48	151.899	0xEF		93.7								
49	152.949	0xEF		93.7								
50	153.878	0xEF		93.7								
51	155.199	0xEE		93.3								
52	156.079	0xEF		93.7								

The panel opens displaying the recorded values for the 'Data Item' currently selected in the 'Item Information' panel. Additional 'Data Items' can be added by clicking on them in the 'Item Information' panel. With more than one 'Data Item' present in the oscilloscope window, the 'Item data' panel creates a tab for each 'Data Item' as can be seen above. It is also possible to have both the 'Oscilloscope' and 'Item Data' panels displayed simultaneously by selecting both tabs.

The 'Item Data' panel also contains a 'right click' menu as shown below.



- Export— Allows the item data to be exported to .txt file.
- Item Properties— Re-opens the 'Basic' and 'Recording' tabs of the 'Properties' window.


6.1.9 Statistics

The 'Statistics' tab of the 'Oscilloscope' window allows the user to display a summary of all the data contained in the window. The summary contains data details and also some key statistics for the data such as root-mean-square and standard deviation. The 'Item Statistic Data' panel is accessed using the 'Statistic' tab and is shown below.

Item statistic data										
Name	Units	Samples	Start [sec]	End [sec]	Duration [sec]	Lowest value	Highest value	Average value	RMS	Std. Deviation
EQ_RAT11		137	4294670.775	187.589	484.110	NAN	1.998800	1.998800	1.998795	NAN
FRP	kPa	134	4294670.775	187.459	483.980	NAN	224750.000000	224746.417910	224746.418121	9.727863
MIL		193	0.000	188.079	188.079	NAN	1.000000	0.994819	0.997406	0.071795
O2S11	V	137	4294670.775	187.589	484.110	NAN	2.040000	2.033540	2.033551	0.006553
TP	%	87	4294670.775	187.349	483.870	NAN	93.700000	90.755172	90.843165	3.997406
VPWR	V	109	4294670.775	187.849	484.370	NAN	12.460000	12.418991	12.419151	0.063150

The window contains a toolbar which allows the user to export the summary to .CSV, Excel or HTML format. The data items displayed can also be selected depending on whether the data item has logged data recorded in the IVD. This allows the user to display only data items with recorded data or to display only the data items with no recorded data.



6.1.10 Histogram

The 'Histogram' tab of the 'Oscilloscope' window allows the user to display a Histogram of data items contained in the window, this tab and is shown below.





6.2 Dial

Module Analyser contains a dial type display for quick graphical interpretation of data and provides familiarity with certain data types such as engine speed: becoming a tachometer. It is denoted in the program as 'Dial' or the icon:



The Dial display can be accessed from within a number of the different tool windows using the icon displayed above, where the selected 'Data Item(s)' will automatically be added to a Dial display each.

Once a Dial is opened, the window will appear as shown below. It is also possible to have multiple Dials open and running simultaneously. (A Dial window can only be opened with a data field to plot.)





Dial Preferences

It is only possible to display one data field on each dial and a new window is created for each data field required to be displayed. The tool contains a 'right click' menu which provides a number of options and settings, as seen below:

Preferences						
Dial						
40 ⁵⁰ 60 30 Label 70 20 80 10 90 100						
Main Colors Layout Font Background Border 90 120 Scale Caption 90 300	○ 180 ○ 360					
Scale Scale Needle BK Visible Line Ticks Color Low Color Norm Color High Color Low Color Norm Color High	0 % 30					
DefaultOk	Cancel					

And Also settings as shown below:

• Se	ttings X	;
Min Value: D Low Threshold 21845	Max Value: 65535 High Threshold 43690	
Number of Marks	:: 	
	<u>O</u> K <u>C</u> ancel	

- Min Value—Designates the minimum value for the dial scale and pointer.
- Max Value—Designates the maximum value for the dial scale and pointer
- Low Threshold—Specifies the switching point for low to medium/normal section of the dial, zero signifying default.
- High Threshold—Specifies the switching point for medium/normal to high section of the dial, zero signifying default.
- Number of Marks—Determines the number of valued points marked on the dial, two being the minimum and maximum values.





6.3 LED Display

Module Analyser contains a LED display panel for quick discrete graphical interpretation of data. It is denoted in the program as 'LED' or the icon:



The LED display tool can be accessed from within a number of the different tool windows using the icon displayed above, where the selected 'Data Item(s)' will automatically be added to a LED display each.

••	LED_1	×
TP	∼ 0 0 0 0 0 0 0 0 0 0 − (•
OBDSUP	> ● 0 ● 0 ● 4 ● 0 ● 0 ● +	•
FRP	₩ ●7 ●2 ●2 ●2 ●2 ●2 ●0	• •
FRP	> ○ ○ ○ ○ ○ ○	0-0
EQ_RAT11	₩ ● 7 ● 2 ● 2 ● 2 ● 2 ● 0 ●	●∞ ●
EQ_RAT11	> ● 0 ● 0 ● 4 ● 0 ● 0 ● - 0	
02S11	₩ ● 7 ● 2 ● 2 ● 2 ● 2 ● 0 ●	●
02S11	> ● 0 ● 0 ● 4 ● 0 ● 0 ● - 0	
FLI	> ● ∞ ● ∞ ● < ● ∞ ● < ● ∞ ●	••

Once a LED display is opened, the window will appear as shown below. It is also possible to have multiple displays open and running simultaneously. (A LED window can only be opened with a data field to plot.)



Move Panel Up
Move Panel Down
LED Settings
Preferences

- Move Panel Up—Moves the clicked on panel of the window up one position, displacing the panel above.
- Move Panel Down—Moves the clicked on panel of the window down one position, displacing the panel below.
- LED Settings—Opens a dedicated settings window for the specific display as shown below.

•	Settings	×
LED Panel Caption O2S11 Bit0 Caption I Bit1 Caption 1 Bit2 Caption	Display Byte 1 Bit4 Caption 4 Bit5 Caption 5 Bit6 Caption	
2 Bit3 Caption 3	6 Bit7 Caption 7 OK Cancel	

- LED Panel Caption—Designates the caption for current panel of the current display being edited.
- Display Byte—Designates the number of the display section, if a data item requires more then one display panel.
- BitX Caption—Allows the specification of a specific caption for each of the LEDs, loads with default numeric marks.



6.4 Bar Plots

Module Analyser contains the ability to plot the data being retrieved live on a bar graph, providing the user with an immediate graphical representation of the data.

The graphs are plotted within a dedicated column in the different tool windows. An example is shown below.

1			Mode 01 - 1	Powertrain	Diagnostic Data			- 1	⊐ ×
Po Online	V pdate	Add Remove R	ieload A Dom In Zoom Out ED Dial	Scope	Unsupported Save Trace	Fest Supp. Export Import			
Selected ECU	Items : Ident	Label	Description	Value	Hex Value Bar Graph	Units	Format	Device	^
· 🔆 Module	0B	MAP	Intake Manifold Absolute Pressure	255.0	0xFF	kPa 6	ENG	Influx Rebel CT/LT, Channel HS	
👋 Module	11	TP	Absolute Throttle Position	93.3	0xEE	%	ENG	Influx Rebel CT/LT, Channel HS	
8º Module	1C	OBDSUP	OBD requirements to which vehicle or engine is certified	EOBD	0x06	E	ENG	Influx Rebel CT/LT, Channel HS	
🔆 Module	23	FRP	Fuel Rail Pressure	224750	0x57CB	kPa B	ENG	Influx Rebel CT/LT, Channel HS	
🔆 Module	24	EQ_RAT11	Lambda value, Equivalence Ratio Bank 1, Sensor 1 (uses PII	\$1.9988	0xFFFF4100	E CARACTER E	ENG	Influx Rebel CT/LT, Channel HS	
🔆 Module	24	O2S11	Wide Range O2S Voltage,O2 Sensor Bank 1, Sensor 1 (uses	PI2.030	0xFFFF4100	V E	ENG	Influx Rebel CT/LT, Channel HS	
🔆 Module	2F	FLI	Fuel Level Input	33.3	0x55	% 6	ENG	Influx Rebel CT/LT, Channel HS	
🕙 Module	33	BARO	Barometric Pressure	100	0x64	kPa B	ENG	Influx Rebel CT/LT, Channel HS	
🔆 Module	3C	CATEMP11	Catalyst Temperature Bank 1, Sensor 1	85	0x04DD	degC B	ENG	Influx Rebel CT/LT, Channel HS	
🔆 Module	3E	CATEMP12	Catalyst Temperature Bank 1, Sensor 2	85	0x04DD	degC B	ENG	Influx Rebel CT/LT, Channel HS	
🔆 Module	42	VPWR.	Control module voltage	12.52	0x30E7	V E	ENG	Influx Rebel CT/LT, Channel HS	~

Each bar graph has thresholds for high, medium and low values displayed by a change in colour.

The bar graph plotting is automatically activated in valid tools. However, they can be hidden using the 'right click' 'Grid Properties' menu option.



7 Data Monitoring

7.1 Introduction

This section outlines the facilities for monitoring data of all types available in Analyser. The data monitoring functions can be accessed through the Monitoring Tab as seen below:

4				
File	View	Scan Tool	Extended	Monitoring
CAN Signals →	- 🔣 Trad	ce Viewer 👻 🧮	Messages 👻 📘	Bus Statistics

7.2 Signals

This Signals window provides the facility to monitor any signals sent between a module and the software on either a CAN or LIN network. This allows the user to not only monitor all the data signals not related to diagnostic modes being transmitted by the module but to also automatically extract the data from the messages. The Signals service is accessed by the Signals button on the Monitoring Tab.

•	•				
	File	View	Scan Tool	Extended	Monitoring
	CAN Signals	- 🔣 Tra	ce Viewer 👻 💻	Messages 👻 📘	Bus Statistics

The Signals window is shown below.

				Signal	S		– 🗆 ×
Offline	+ Add	X Remove	A Definition of the second sec	P ··· Import Export	Import Export Import		
Selected Ite ECU	ims : Ident	Message	Signal	Description	Value Hex Value Bar Graph	Units Forma	Device
CANMOdule	181	ADC_0_3	ADC_2		22.225555990x47	mV ENG	Influx Rebel CT/LT, Channel
CAN Module	181	ADC_0_3	ADC_3		-1.56517999!0xFFFB	mV ENG	Influx Rebel CT/LT, Channel
CANMOdule	181	ADC_0_3	Channel		16.277871990x34	mV ENG	Influx Rebel CT/LT, Channel
CANMOdule	181	ADC_0_3	ADC_1		34.120923990x6D	mV ENG	Influx Rebel CT/LT, Channel
CAN Module	182	ADC_4_7	ADC_4		2.8173239990x09	mV ENG	Influx Rebel CT/LT, Channel
CAN Module	182	ADC_4_7	ADC_5		-2.81732399!0xFFF7	mV ENG	Influx Rebel CT/LT, Channel
CAN Module	182	ADC_4_7	ADC_6		1.5651799990x05	mV ENG	Influx Rebel CT/LT, Channel
CANMOdule	182	ADC_4_7	ADC_7		-9.3910799990xFFE2	mV ENG	Influx Rebel CT/LT, Channel
CAN Module	281	TC_0_3	TC_0		18.25 0x124	deg C ENG	Influx Rebel CT/LT, Channel
CAN Module	281	TC_0_3	TC_1		18.5 0x128	deg C ENG	Influx Rebel CT/LT, Channel
CANMOdule	281	TC_0_3	TC_2		18.75 0x12C	deg C ENG	Influx Rebel CT/LT, Channel
CAN Module	281	TC_0_3	TC_3		18.75 0x12C	deg C ENG	Influx Rebel CT/LT, Channel 🗸

Importing Signals from File

The Signals tool is capable of monitoring both CAN and LIN signals, however both are module specific and description files are required to identify the Signals traffic. The description file for a CAN bus is a .DBC file and for a LIN bus an .LDF file, both are imported using the DBC or LDF import buttons or the Settings, Device Manager 'Imports' tab.

They both open dedicated import windows.



Selecting Required Signals

Once the signals for the specific module have been imported into the Signals database for the current module, the Signals to be monitored must be selected and added to the tool.

÷		Select CAN Signals		×
	x 🏹 CAN lin 🛓			
Filters				
Ident: 0x0	Message:	Signal:		
Select Iter	ms Message	Signal	Offset USize bit	
0	CH4	CH4	0	32
181	ADC 0 3	ADC 2	32	16
181	ADC 0 3	ADC 3	48	16
181	ADC 0 3	Channel		16
181	ADC_0_3	ADC_1	16	16
182	ADC_4_7	ADC_4		16
182	ADC_4_7	ADC_5	16	16
				^
Ident, hex	Signal		Offset, bit Size, bit ECU	
			0k Cano	el

 \geq

Allows the user to add all Signal items.

 $\mathbf{\vee}$

Allows the user to add the selected Signal items.



Allows the user to remove the selected Signal items.



Reading Signals

Once the required signals have been added to the tool, the messages can be read and the data transmitted captured and displayed by the tool.



Commences monitoring of the selected Signals utilising the message ident to filter the required messages, interpreting the transmitted data.



7.3 Trace Viewer

This Trace Viewer is designed to allow the detailed analysis of all CAN and LIN bus messages between the software and hardware. It provides a number of filtering options for precise message detection and monitoring. The Trace Viewer is accessed by the Signals button on the Monitoring Tab.



The - button also allows you to create multiple Trace Viewer windows, this may be useful if you want to set up several different filters or use different display modes, it can also be used to simultaneously start, stop or clear the Trace Viewer windows.

A Trace Viewer window is shown below.

B				Trace View	ver			– 🗆 🗙
Start Filter Config Option	ns Clear	Load Save Sco	ope	List Mode	FL Tree Mode E	Extracted Stop Repeat	Play Next Device	5
Filters	Туре І	lD d	dic DO D	D1 D2 D3	3 D4 D5 D6 I	D7 Time Stamp, ms	Delta Time, ms	Device
	11-bit 0)x00000181 8	30 00	0 65 00	42 00 FB F	FF 1002638	100 I	nflux Rebel CT/LT, Channel HS 🔺
ĭ+ ĭ/ ĭ × '₹	11-bit 0)x00000182 8	3 09 00	0 F9 FF	05 00 E4 F	FF 1002639	100 I	nflux Rebel CT/LT, Channel HS
🔺 💌 Default Filter Group	11-bit 0)x00000300 8	3 00 00	0 00 00	00 00 00 0	00 1002691	100 I	nflux Rebel CT/LT, Channel HS
CAN	11-bit 0)x00000281 8	3 2A 0	1 2E 01	32 01 34 0	01 1002691	100 I	nflux Rebel CT/LT, Channel HS
🔲 J1939	11-bit 0)x00000282 8	30 0	1 37 E8	37 E8 37 E	E8 1002691	100 I	nflux Rebel CT/LT, Channel HS
LIN	11-bit 0)x00000181 8	30 00	0 65 00	42 00 FB F	FF 1002738	100 I	nflux Rebel CT/LT, Channel HS
	11-bit 0)x00000182 8	3 09 00	0 F9 FF	05 00 E4 F	FF 1002739	100 I	nflux Rebel CT/LT, Channel HS
	11-bit 0)x00000300 8	3 00 00	0 00 00	00 00 00 0	00 1002791	100 I	nflux Rebel CT/LT, Channel HS
	11-bit 0)x00000281 8	3 2A 0	1 2E 01	32 01 34 0	01 1002791	100 I	nflux Rebel CT/LT, Channel HS
	11-bit 0)x00000282 8	30 0	1 37 E8	37 E8 37 E	E8 1002791	100 I	nflux Rebel CT/LT, Channel HS
	11-hit 0 <	1∨000002E0 8	ε 52 M	1 74 01	01 00 00 0	1002793	255 1	nflux Rebel CT/LT_Channel HS > V
Captured Messages: CAN :723	LIN :0	ERR :0	Total :7	23				

7.3.1 Viewing Bus Traffic

Using the Trace Viewer tool it is possible to immediately view all traffic being transmitted between the module and the software.



Commences viewing and temporary storage of message traffic.

While this feature allows instant viewing of all bus traffic and can be useful to determine that the module is transmitting, it is difficult to identify in particular any specific traffic is being transmitted. The tool therefore contains filtering capability, allowing the display and identification of only desired message traffic.



7.3.2 Traffic Filtering

The tool contains the ability to apply filters to both CAN and LIN to allow the removal of unwanted messages from the displayed traffic, particular messages can also be highlighted to enable their quick identification.

To set up filtering of the messages simply follow the following steps:

Step 1

Simply right click on the Bus that you wish to add a filter to and select Add Filter.



Step 2

Enter the Ident of the messages that you wish to filter (in the below example 0xDD), if you will like you can check the Add Range check box and Enter a Filter ID High, in that case all the Idents between Filter ID and Filter ID High will be filtered.

4					(CAN Fi	lter					×
Basic	:											
	Filter I 0xDD	D] Add	Range	Filter I 0x0	D High	h	
	Descri	otion										
	🗌 Defi	ne as	Stop	filter								
Adva	nced											
	Apply I	Frame	Filter	r (HE	X)							
D	0 D1	D2	D3	D4	D5	D6	D7					
									<u>0</u> K		<u>C</u> ance	el



Step 3

Click the filter button to activate the filter



You should now see the messages allowed by your filter

						Trace Viewer (l	logging filtered mess	ages)			-	□ ×
Stop I	Filter Config	Noptions Clea	r Load Save	Scope	Eist Mode	F_ Tree Mode	Extracted Stop	Repeat Play	Next Device	es		
Filters		Туре	ID	dic D0	D1 D2 D	3 D4 D5 D6	5 D7 Time Stamp	, ms D	elta Time, ms	Device	Description	
	. 🔽 🛛 💷	11-bit	0x00000DD	8 3D	00 14 00	19 DE C1	F4 83564		25	Influx Rebel CT/LT, Channel HS		^
1 T+ T	/ 1× 17	11-bit	0x00000DD	8 3D	00 14 00	19 DE C1	F4 83589		25	Influx Rebel CT/LT, Channel HS		
🖃 🖲 Default	t Filter Group	11-bit	0x00000DD	8 3D	00 14 00	19 DE C1	F4 83614		25	Influx Rebel CT/LT, Channel HS		
💷 🗹 CAN	N	11-bit	0x000000DD	8 3D	00 14 00	19 DE C1	F4 83639		25	Influx Rebel CT/LT, Channel HS		
	0x00DD	11-bit	0x000000DD	8 3D	00 14 00	19 DE C1	F4 83664		25	Influx Rebel CT/LT, Channel HS		
🗌 J19	39	11-bit	0x000000DD	8 3D	00 14 00	19 DE C1	F4 83689		25	Influx Rebel CT/LT, Channel HS		
LIN		11-bit	0x000000DD	8 3D	00 14 00	19 DE C1	F4 83714		25	Influx Rebel CT/LT, Channel HS		
		11-bit	0x000000DD	8 3D	00 14 00	19 DE C1	F4 83739		25	Influx Rebel CT/LT, Channel HS		
		11-bit	0x00000DD	8 3D	00 14 00	19 DE C1	F4 83764		25	Influx Rebel CT/LT, Channel HS		
		11-bit	0x00000DD	8 3D	00 14 00	19 DE C1	F4 83789		25	Influx Rebel CT/LT, Channel HS		
		11.606	0200000000	o 90	00 14 00	10 DE 01	EA 0001A		ne	Toffus Dobal CTAT, Channel MC		
		<										> ~
Captured Mes:	sages: CAN :2	B83 LIN :0	ERR :0	Total	:2883							

7.3.3 Traffic Options

To adjust the Display Options follow the following steps.

Step 1

Click the Options Button



Step 2

Adjust any of the display options you wish:



The Default Colors changes the color of the text in the trace window.

- Color Mode

🖲 Standard

O Reverse

Color Mode Reverse swaps the Font and Background Colors.



Filter Options
 Auto Load

Save only filtered

The Auto Load Filter option automatically defines filters for every Ident that broadcasts on the BUS as shown below, no filters were pre defined when going online 10 filters were created to match each on the 10 Idents that broadcast on the bus:

m	Trace Viewer (logging all messages)													
Stop Filter Config Options	Clear Load Save Scope List Mode Extracted Stop Next Devices													
Filters 🖃	CAN Signals: Time Stamp,[ms] Delta Time,[ms] Device													
Y+ Y/ X× 1	Image: Ox00000DC dlc 8 Data 00 00 00 08 00 00 00 02448614 25 Influx Rebel CT/LT, Channel HS Image: Ox00000DD dlc 8 Data 3D 00 14 00 19 DE C1 F4 2448614 25 Influx Rebel CT/LT, Channel HS													
Oetault Filter Group CAN CAN Ox00DC - 0x00DC Ox00DD - 0x00DD	 ☑ 0x00000DF dlc 8 Data 02 3F 00 00 C2 00 80 00 2448624 ☑ 0x00000E0 dlc 8 Data 83 98 83 98 00 00 7D 03 2448624 ☑ 0x00000E1 dlc 8 Data 83 98 83 98 00 00 7D 03 2448624 ☑ 0x00000E1 dlc 8 Data 00 00 E8 15 7F D2 FF FF 2448625 ☑ 0x00000E1 dlc 8 Data 00 00 E8 15 7F D2 FF FF 2448625 ☑ 0x00000E1 dlc 8 Data 00 00 E8 15 7F D2 FF FF 2448625 ☑ 0x0000E1 dlc 8 Data 00 00 E8 15 7F D2 FF FF 2448625 ☑ 0x0000E1 dlc 8 Data 00 00 E8 15 7F D2 FF FF 2448625 ☑ 0x0000E1 dlc 8 Data 00 00 E8 15 7F D2 FF FF 2448625 ☑ 0x0000E1 dlc 8 Data 00 00 E8 15 7F D2 FF FF 2448625 													
▼ 0x00DF • 0x00DF ▼ 0x00DF • 0x00DF ▼ 0x00E0 • 0x00E0 ▼ 0x00E1 • 0x00E1	① 0x0000016E dlc 8 Data 00 00 01 FF 00 00 00 00 2448615 20 Influx Rebel CT/LT, Channel HS ① 0x00000193 dlc 8 Data 00 00 64 00 84 00 08 00 2448615 20 Influx Rebel CT/LT, Channel HS ① 0x00000188 dlc 8 Data 00 00 00 00 00 00 00 00 00 2448615 20 Influx Rebel CT/LT, Channel HS ① 0x00000188 dlc 8 Data 00 00 00 00 00 00 00 00 2448615 20 Influx Rebel CT/LT, Channel HS													
 ✓ 0x00E + 0x00E + ✓ 0x016E - 0x016E ✓ 0x0193 - 0x0193 	① 0x00000326 dlc 8 Data 00 00 01 F4 81 F4 00 00 2448615 19 Influx Rebel CT/LT, Channel H5 ① 0x0000034B dlc 8 Data 10 83 00 00 00 00 00 00 2448616 20 Influx Rebel CT/LT, Channel H5													
 ♥ 0x0188 0x0188 ♥ 0x0326 0x0326 ♥ 0x0348 0x0348 														
Captured Messages: CAN :16051 LIN	:0 ERR-0 Total:16051													
Imported Signals														

Add to Scope

Add to Currrent Filter

Add to Scope must be checked to enable "Add To Scope (import from DBC file)" accessed from the Add To Scope button as shown below



If Add to Current Filter is checked then Filters are also created for All idents of the signals imported from the DBC file.

Display Unused Bytes	
Yes	
⊖ No	

Display Unused bytes determines if bytes that are not transmitted in a message are shown in a trace, e.g. If a CAN message contains less then the maximum of 8 bytes only those that are transmitted will be shown if this is set to NO, if it is set to YES they will simply be shown as 0x00

Error Frames	
Show	
◯ Hide	

Error Frames allows you to choose whether you wish Error frames (e.g. error frames resulting from improper termination) to be shown.



Tree Mode	
Last Displayed 2	

Tree Mode sets how many lines of Messages per Ident you wish to have shown (when an Ident is expanded) if the display is set to Tree Mode, if it is set to 2 for example it would show two messages per Ident:

	CA	N Si	gnal	s:													I	Time Stamp,[m	ແສ]	Delta	Time,[ms]	Devi	e:				
		0x0	0000	16E	d	llc	8	Dat	a 0	0 00	01	F	F 0	0 00	00	00	1	540741			21	Influx	Reb	el	CT/LT,	Channel	HS
			00 0	0 0	01 1	FF (00	00	00	00			154	072	0												
			00 0	0 0	01 1	FF (00	00	00	00			154	074	1												
	-	0x0	0000	193	d	llc	8	Dat	a 0	0 00	64	0(0 8	4 00	08	00	1	540741			20	Influx	Reb	el	CT/LT,	Channel	HS
			00 0	0 6	54 (00 8	34	00	08	00			154	072	1												
			00 0	0 6	54 (00 8	34	00	08	00			154	074	1												
	11(220 0	orm																								
'	013	5551	Onne	31																							
C) F	lex																									
C)ecin	nal																								

J1939 Format allows the display of the transmitted values to be shown in Hexadecimal or Decimal format (J1939 Protocol only)

Show J1939 Info	
⊖ Yes	
No	

Show J1939 Info toggles the display of the following information for messages that are sent using the J1939 Protocol

- Parameter Group Number
- Message Priority
- Data Page
- Protocol Data Units
- Source Address

7.3.4 Clearing the Messages in the Trace Window

To clear the messages in the Trace window simply click Clear



7.3.5 Saving the Messages in the Trace Window

To save the messages in the Trace window simply follow the following steps.

Step 1

If the Trace is running click Stop button.





Step 2

If click the Save button.



Step 3

Specify the location, filename and file format you wish to save the trace in.

Save As						×
Save in:		•	6	ø 🕫	> 🔃 🕈	
Quick access Desktop						
Libraries						
Network	File name:			,	~	Save
	Save as type:	Trace Viewer Data (*.tvd)		,	v	Cancel
		Trace Viewer Data (*.tvd) Trace Viewer Text (*.txt) Influx Technology Dialog (*.csv) Vector ASCII (*.asc) Trace Log (*.log)				11

Analyser supports the following formats for saving the traces that are created

- Influx Trace View Data
- Influx Trace View Text
- Influx Trace View Comma Separated Value
- Vector ASCII
- Trace Log

Step 4

Click Save

<u>S</u>ave



7.3.6 Loading Traces

Step 1

If click the Load button.



Step 2

Select the Trace You wish to Load.

Open		×
Look <u>i</u> n:	: 🔹 🚱 🏂	📂 🎞 🔻
3	1.tvd	
Quick access		
Desktop		
Libraries		
This PC		
1		
Network		
	File <u>n</u> ame: 1.tvd	▼ <u>O</u> pen
	Files of type: Trace Viewer Data (*.tvd)	▼ Cancel

Step 2

Select the Trace You wish to Load. Analyser supports the following formats for loading traces.

- Influx Trace View Data
- Influx Trace View Text
- Influx Trace View Comma Separated Value
- Vector ASCII
- Trace Log

Step 3

Click Open.

Open



7.3.7 Adding items to the Scope

You can add items that have been predefined or imported a DBC file to an Oscilloscope to aid visual interpretation of the Data, simply use the Add to Scope button to add the items

Scope	•
$\mathbf{\nabla}$	Add To Scope selected
=+	A <u>d</u> d To Scope (use predefined signals)
	Add <u>T</u> o Scope (import from DBC file)

Once Items are added you can either load data already recorded or go online and display live data

Ø					Oscillo	oscope	21	□ ×
1		▲ ⊭	🖾 L 🛃	🍯 III 爹	ж -	6 I	1. • • • • • • • • • • • • • • • • • • •	
	Item info	rmation		×	Oscille	oscop	e	×
*	🗧 🐔 🗯		- 🤉 🚺		Ę	150		5 🔛
	Color	Name	Unit	s Via		100-		
		ADC_1	mV		8	50		
	\checkmark —	ADC_2	mV		ৰ	0	· · · · · · · · · · · · · · · · · · ·	
	\sim —	ADC_3	mV		Ξ	100		- 10 I
	\sim —	ADC_4	mV		2	50-	My Marker And Marker	=
	\sim —	- ADC_5	mV		×	0-		
	\checkmark —	ADC_6	mV		A	-50		
	~	ADC_7	mV		2	150		
	\sim —	CH1			. <u>5</u>	100-		
	\sim —	- CH2				50-	Amplitude the second on the	
	\checkmark	- CH3			A	-50	I I I I V I WI V V V V V V V V V V V V V	
		- CH4			Σ	100		
	\checkmark	- Channel	mV		트	100		
	~	Digital_input_	status_chanr		- 5	0-		
	~	Digital_input_	status_chanr		କ	-100		
	\checkmark	Digital_input_	status_chanr		Σ	300		
		Digital_input_	status_chanr		E	200-		
		Outputs_PIN	L		5	100-		
	\checkmark —	Outputs_PIN2	2		- Ř	0		
		Outputs_PIN3	}				₹ <u>, , , , , , , , , , , , , , , , , , , </u>	
		Outputs PIN4	ł	~			Time [seconds]	
	<			>				•

7.3.8 Changing the Trace Viewer Display Mode

The Trace Viewer has 3 Display Modes You can change between them by pressing the following buttons:



The Selected Display Mode will remain active this is indicated by the Button remaining highlighted.





When in List Mode the Messages are displayed as follows:

Туре	ID	dlc	DO	D1	D2	D3	D4	D5	D6	D7	Time Stamp, ms	Delta Time, ms	Device	Description
CAN ID	0x00000182	8	10	00	F8	FF	01	00	E4	FF	254970	101	Influx Rebel CT/LT, Channel HS	ADC_4_7
11-bit	0x000002F0	8	8F	01	B3	01	01	00	00	00	254992	255	Influx Rebel CT/LT, Channel HS	
CAN ID	0x00000300	8	00	00	00	00	00	00	00	00	255013	100	Influx Rebel CT/LT, Channel HS	DigitalInputsStatus
CAN ID	0x00000281	8	C9	E8	C9	E8	C9	E8	C9	E8	255013	100	Influx Rebel CT/LT, Channel HS	TC_0_3
CAN ID	0x00000282	8	C9	E8	C9	E8	05	4D	C9	E8	255013	100	Influx Rebel CT/LT, Channel HS	TC_4_7
CAN ID	0x00000181	8	25	00	D7	00	34	00	F2	FF	255069	100	Influx Rebel CT/LT, Channel HS	ADC_0_3
CAN ID	0x00000182	8	67	00	FA	FF	03	00	E4	FF	255070	100	Influx Rebel CT/LT, Channel HS	ADC_4_7
CAN ID	0x00000281	8	C9	E8	C9	E8	C9	E8	C9	E8	255113	100	Influx Rebel CT/LT, Channel HS	TC_0_3
CAN ID	0x00000282	8	C9	E8	C9	E8	05	4D	C9	E8	255113	100	Influx Rebel CT/LT, Channel HS	TC_4_7



When in Tree Mode the Messages are displayed as follows, you can drill down into the Messages from a particular Ident by clicking the + button beside it (the no of messages displayed per Ident is configurable in the Options):

CA	N Signals:												Time S	tamp,[ms]	Delta Time,[ms]	Devic	e			
-	0x00000181	dlc	8	Data	25	00	D7	00	34	00	F2	FF	255069		100	Influx	Rebel	CT/LT,	Channel	HS
	25 00 5E	00	20	00 F	E F	F		2	549	69										
	25 00 D7	00	34	00 F	2 F	F		2	550	69										
+	0x00000182	dlc	8	Data	67	00	FA	FF	03	00	E4	FF	255070		100	Influx	Rebel	CT/LT,	Channel	HS
+	0x00000281	dlc	8	Data	C9	E8	C9	E8	C9	E8	C9	E8	255113		100	Influx	Rebel	CT/LT,	Channel	HS
+	0x00000282	dlc	8	Data	C9	E8	C9	E8	05	4D	С9	E8	255113		100	Influx	Rebel	CT/LT,	Channel	HS
+	0x00000300	dlc	8	Data	00	00	00	00	00	00	00	00	255113		100	Influx	Rebel	CT/LT,	Channel	HS
+	0x000002F0	dlc	8	Data	8F	01	В3	01	01	00	00	00	254992		255	Influx	Rebel	CT/LT,	Channel	HS



When in Extracted Mode the Messages are displayed as follows, you can drill down into the signals contained in messages from a particular Ident by clicking the + button beside it:

															-
ID	Description	Hex Value	Value	Units	D0	D1	D2	D3	D4	D5	D6	D7	Time, [ms]	Delta, [ms]	Device
⊕-0x00000300	DigitalInputsStatus				00	00	00	00	00	00	00	00	255013	100	Influx Rebel CT/LT, Channel HS
0x0000282	TC_4_7				C9	E8	C9	E8	05	4D	C9	E8	255013	100	Influx Rebel CT/LT, Channel HS
	TC_0_3				C9	E8	C9	E8	C9	E8	C9	E8	255013	100	Influx Rebel CT/LT, Channel HS
⊕ 0x00000182	ADC_4_7				10	00	F8	FF	01	00	E4	FF	254970	101	Influx Rebel CT/LT, Channel HS
□ 0x00000181	ADC_0_3				25	00	5E	00	20	00	FE	FF	254969	99	Influx Rebel CT/LT, Channel HS
-	ADC_1	0x005E	29.425384	mV			5E	00							
-	ADC_2	0x0020	10.017152	mV					20	00					
-	ADC_3	0xFFFE	-0.626072	mV							FE	FF			
	Channel	0x0025	11.582332	mV	25	00									
0x000002F0					8F	01	B4	01	01	00	00	00	254737	255	Influx Rebel CT/LT, Channel HS



7.3.9 Playing back a Trace

Once you have recorded a trace or loaded one from a file you are able to broadcast (play back) the messages both one at a time or the whole trace this functionality is controlled by the following buttons:



Play, immediately starts playing the messages in the trace one after another.



Pause, pauses playback (playback will resume from the current position



Stop, Playback is stopped.



Next, the Highlighted Message will be sent and the selection bar will move to the next message.



7.4 Messages

The Messages function provides the facility to edit or create custom messages or message sequences and execute them; sending them to the module. The function also contains a number of preloaded messages for different ISO standards. The Messages window is accessed by the Signals button on the Monitoring Tab.



The - button also allows you to create Message Constructor windows.

The Message Constructor window is shown below.

9				Messag	e Constructor									- 0	⊐ ×
Execute Current New Task Open Task Sa	Ve Save A:	X Delete Task	Settings Help	Run Tf	P Devices										
Task Library	Messages														
Mode 0x01 Example	+ >	< + 1		/											
	Active	Name	1	ID	Diagnoctic	D0 D1	D2	D3	D4 D5	D6 D	7 /	Advanced			
		Message 1	7	7E0		00 00	00	00 0	00 00	00 00				Exit Conditions	
	<									_	>	Identifiers Tx ID 7E0	Rx ID 7E8	Position Value	-
Overwrite		Show Lin	nk Task/Message: Or	6	Stop on Exit condit	on: Yes									

The window is split into three main sections, the left is the 'Task Library' which contains all the preloaded tasks or any subsequently created and saved. These are designed to provide quick access to a number of complex tasks or simpler 'building blocks' and can be edited to suit user requirements. The middle section is the main message construction panel, which allows message creation and editing and response display. The right-hand section provides a number of message options

Task Library

A message can be created from scratch in which case the required message can be entered directly into the construction section of the window as discussed below. However, the Message Constructor contains a 'Task Library'. The library can have a number of pre-loaded tasks which can be utilised to speed up message creation. Any tasks created and saved by the user will appear here. The 'Task library' can be seen below.

Task Library ⊕ Mode 0x01 Example







Imports the selected line of the message into the current task in the message construction panel at the current line.

-	Mode 0x01 Example
	07 01 00 20 40 60 80 A0
	02 01 01 00 00 00 00 00
	02 01 0C 00 00 00 00 00
	02 01 0D 00 00 00 00 00





Imports the entire selected Task into the current task in the message construction panel, starting at current line.





Overrides the current message(s) in the construction panel, erasing the message and importing the selected Task from the library.







Message Construction

Once a task has been selected or if simply a new message is to be created, the main function of the tool is to allow the user to create any message required. This is performed in the central message panel of the message constructor as shown below.

Task [M	ode 0x01 Exa	ample] Message [4]														
+	× +	🕈 🔽 🔽 🧹														
Active	Name	ID	Diagnoctic	D0	D1	D2	D3	D4	D5	D6	D7	Туре	Continue	Period	TimeOut	Delay
\checkmark	Message 1	7E0	\checkmark	07	01	00	20	40	60	80	A0	None	100	1	1000	500
\checkmark	Message 2	7E0	\checkmark	02	01	01	00	00	00	00	00	Periodic	100	3	1000	100
\checkmark	Message 3	7E0	\checkmark	02	01	0C	00	00	00	00	00	Periodic	100	1	1000	500
	Message 4	00		10	09	02	01	0D	00	00	00	Periodic	100	1	1000	100
				21	00	00	00	00	00	00	00					

The Message Constructor contains a number of automatic operational shortcuts which allow the effective and efficient production of messages, such as assigning message length and first and consecutive frames. To create a message: Click in the first non bold word and begin typing the message. (The first word is automatically calculated message length. Upon the filling of a word the tool automatically scrolls to the next or if required designates a first frame and begins a consecutive frame.

To end a message row and begin another click the 'addition' symbol.

Rows can also be deleted and reordered and the 'brush' tool allows the clearing of the entire message. In this way the required message can very rapidly be constructed.

Advanced Message Constructor Options

Ad	Vanced Identifiers	¥.	Exit Condi Exit Cond	tions
	Tx ID	Rx ID	Position	Value
	7E0	7E8		

Identifiers: Designates the Tester and Module IDs for the current line.

Exit Conditions: Selects to enable the exit conditions settings. Analyser will transmit until a message meeting the exit conditions is received.

Tester Present

The message constructor also provides the ability for the user to continuously transmit a 'Tester Present' message.



Activates the 'Tester Present' transmission.



Message Execution

Once the required message has been constructed and the appropriate message settings chosen, the tool can be used to execute the message or line of the message.



Attempts to execute the current message.



Execute

Attempts to execute the messages in the current task.

Upon attempting execution of the task or message the Message Constructor will automatically display the response and outcome of the message in the bottom of the central panel, as can be seen below.

Task Execution Started: 14:09

0x07E0	07 01	00.2	20 40	60	80 A0	4516901	Message 1
0x07E8	10 1A	41 (00 98	3B	A0 17	221937	Message 1
0x07E0	30.00	00 0	00 00	00	00 00	4516914	Message 1
0x07E8	21 20	B0 (1B A(0 1 5	40 C4	221951	Message 1
0x07E8	22 DE	E 00	19.60	00 (80 00	221957	Message 1
0x07E8	23 01	80 0	00 80	00	00 00	221960	Message 1
0x07E0	02 01	01.0	00 00	00	00 00	4517422	Message 2
0x07E8	06 41	01.8	36 1 F	E8	E8 00	222457	Message 2
0x07E0	02 01	01.0	00 00	00	00 00	4517642	Message 2
0x07E8	06 41	01.8	36 1 F	E8	E8 00	222676	Message 2
0x07E0	02 01	01.0	00 00	00	00 00	4517750	Message 2
0x07E8	06 41	01.8	36 1 F	E8	E8 00	222786	Message 2
0x07E0	02 01	0C (00 00	00	00 00	4517860	Message 3
0x07E8	04 41	0C (00 00	00	00 00	222897	Message 3
0x07E8	02 01	0D	00 00	00	$00 \ 00$	4518359	Message 4
Task Fini	ished:	14:0	09				
Duration:	01:59	4 [s	ec:m	sec]		



8 ECU Programming

8.1 Re-Flash Tab

Analyser contains the facility to re-flash the memory of individual modules, this feature is accessed through the Reflash Tab as seen below:

•							Module	Analyser 3.0.0
	File	View	Scan Tool	Extended	Monitoring	Settings	Reports	Reflash
.	VID 4	Reflashing						

8.1.1 VID Block

This tool allows the user to retrieve the Vehicle Identification block from the module, it also allows the blocks to be saved and loaded for later review. The dedicated window is shown below.

8		VID Block			-	×
Get VID Bloc	k Save VID File Load VID File					
VID Block Fro	m Device:					
						^
						 ×
Name	Data		Offset	Size	Format	
VIN			0	17	ASCII	
Octane Adjust/S	park		17	1	ASCII	
Octane of Fuel			18	1	ASCII	
Fuel Type			19	1	ASCII	
Tyre Size			20	2	HEX	
Axle Ratio			22	2	HEX	



8.1.2 Module Reprogramming

This tool allows the user to flash a module using the required binary files. The tool requires all other features to be automatically disabled and opens in the window shown below.

5	,			Modul	e Reprogrammin	g				- 🗆	×
	+ New project	Edit project	F Reflas	Get VID Block	Load VID File	Save VID File	Boot Loader	auto Loader	Devices	Rec On	
				Item name			Value				
	Controls										

Adding Calibration Files

To flash a module the required calibration files must be added to the tool. To do this a new 'Project' must be created using the window below.

4	New projec	t [Reflash]		×
Project Settings				
Project name		Reprogramming se	equence	
Reflash		ISO 15765		•
Module		Security DLL		
Module	•	EmptySecurityDL	L.dll	•
Template Sequence				_
			•	•
VID Start VID Size	VID PI)		
0x0 0x0	0×0	Send VID	block separately	/
Reprogram software are	ea	VID Block	Security access	;
Binary files				
File Name	Ri	ange Start Range Size	Block Size	
				HEX +
				+
				÷.,
		ОК	Cancel	



Project Settings:

- Project name—Assigns the project name.
- Module—Drop down menu selects the required 'Module' for the 'Module Library'.
- Security DLL—Drop down menu selects the appropriate security file from the library.
- Template settings—Specifies details for module being reprogrammed.
- VID start address—Specifies the memory address for the start of the VID block.
- VID size—Specifies the size of the VID block.
- VID address PID—PID sent to retrieve VID.

The bottom of the window contains the panel to which the required binary files must be added, this is performed using the icons on the right of the panel.

Reflashing a Module

Once a project has been created, with the required module connected the re-flashing can be performed.

The re-flash can only be performed with the engine switched off, to allow the module to enter programming mode. If this is not the case the user will see the following 'failed' message.

5	Module Reprogramming		- 🗆	×
New project Edit project Reflash	Get VID Block Load VID File Save V	ID File Boot Loader Auto Loader Devic	es Rec On	
🖃 💶 Reflash	Item name	Value		^
	Module name	Module		
	Module ident	0x7E8		
	Tester ident	0x7E0		\sim
15:31:23.027 Reading VID block Done 15:31:23.464 Activating Bosch settings Do 15:31:23.464 Switch to programming session	ne Failed			
Controis				_
Active project: Reflasł				

Once the re-flash has begun the tool will update the user of the status with a 'Progress' window.

It will show the progress through various stages of the reflashing process such as:

- Submitting SBL
- Submitting Software

And finally if the reflashing process is successful a message will indicate that. It is important you do not disconnect power to the module before you see the message stating the reflashing process was successful.



8.2.1 Unlock ECU

This facility allows the user to enter Security mode for the connected module. However, for the module to allow access the correct settings must be selected for 'Module' and 'Security DLL'

Once the correct settings have been selected, Security Mode can be entered for the module.



Attempts to unlock the ECU and enter security mode.

If the unlock is successful the icon will change to display 'Lock ECU' which can be used to exit security mode.

8.3 Reset ECU

This facility allows the user to instruct the ECU/module to reset.

Reset ECU

Instructs Analyser to reset the current ECU.

The user will be informed of a successful reset in the 'Status Message' panel as shown below.

×	Date/Time	Origin	Status messages
~	/ 24/09/16 14:52	ECU	'Module' module was reset.



9 Reports

Analyser contains the facility to create Reports, this feature is accessed through the Reports Tab as seen below

•							Modu	le Analyser 3.
	File	View	Scan Tool	Extended	Monitoring	Settings	Reports	Reflash
illu	Simple Rep	port 📶	Expanded Report	X Full Report	📑 OBD Repo	orts 🕑 DTC	Export - 🗘	History

Creating an Activity Report

The facility allows the production of a number of different reports. The complete activity reports are available in three levels as below:

- Simple—Published as a .QRP file the report contains daily dated reports with the VIN and Call ID and any codes and comments recorded.
- Expanded—Published as a .QRP file the report is based on the 'Simple' report but also contains a Freeze-Frame data retrieved with the DTCs if present.
- Full—Published as Excel Workbook the report summarises all codes and comments found with separate pages generated specific to each Mode.

The reports can also be exported to a number of external programs including Word and Excel and .html and .txt file formats.

Performing an OBD Report

There is also a tool which produces a complete OBD report for all modes in one process. Full details can be found in Section 3.2.4.

Exporting Diagnostic Trouble Codes

All DTCs retrieved by the software are saved in the 'Vehicle History' (Appendix A.2.2). The stored codes from a specific date or the complete 'History' can be exported to a number file formats. The feature is accessed using the 'DTC Codes Export' menu item, providing a number of export formats as shown below.



Selecting a format to export the DTC data to opens a window allowing the user to select a location to save the report.



Once a location has been selected a window appears allowing the user to select the required settings for the report.

•	Select Report Details: 🗙
	Vehicle
	default 👻
	Date:
	24/09/16
	Eull History
	Ok Cancel

- Vehicle—Drop down menu allows the user to select the 'Vehicle History' to export the DTC data from.
- Date—Provides a calendar view for the user to select the date to publish the DTC data from.
- Full History—Allows the user to select the export the complete DTC data history stored for the vehicle.

Clicking 'OK' exports the DTC data and instantly produces the report for review.



Appendix 1 Config Manager

The Configuration Manager contains all the main settings for the software and allows the user to specify a large number of details integral to the operation of the program and as such is aimed at the more advanced user. The Configuration Manager is accessed by the Config Manager button on the Settings Tab.

4						
	File	View	Scan Tool	Extended	Monitoring	Settings
•	Config	Manager	🔒 Security Mana	ager 🖳 Devic	e Manager 🛛 🕇 P	references

The Configuration Manager window is shown below.

Configuration Manager X									
Configuration Expo Libra New Config Add Module Del Module Dupl Filter	norts rary Commit Cancel orts Module Name	Identifiers Module Address Tester Address	Session Diagnostic Programming						
Name Module Configurations List	Settings Protocol Security DB Generic EmptySecurityDe Mode 0x23	UX7E0 UX7E0 Functional Address Flow Control Address [0x7DF [0x7E0	Uk01 UK02 Extended Uk03 VID Block						
	Size/Address Config Address Endian 0x14 Use A2L Setting Security Level	Parameter Timeout 0x0 2000 Use Parameter 2000	Size Start Address 0x0 0x0 PID Address 0x0 0x0 VID Block Presets						
	Options	Others Dynamic Signal Extended Time Out [0x6A0 60000 VIN after DTC Re							

The Configuration Manager window contains three main sections, the left panel lists all the existing module libraries stored in the software, each of the modules can be duplicated to allow similar modules to be created efficiently. The central section contains a menu listing all the settings available for configuration split into tabs—Imports, Exports, Library and Config. Within each tab there are a number of options. The right hand section contains all the configuration settings to be edited.



A1.1 Module Settings

Once the required module has been selected, the settings can be configured. To do this ensure the 'Module' tab is selected in the middle of window, this will expose the various sections which can be edited concerning the module. The default opening tab is 'Module Settings', each section is considered below.

Exports								
Library	🖌 🖌 Commit	🗙 Cancel						
Imports								
Config	Module		Identifiers		Session			
A	Name		Module Address	Tester Address	Diagnostic	Programming		
U	_OBD	Module Presets	0x7E8	0x7E0	0x01	0x02		
Module Settings	Protocol	Security	Functional Address	Flow Control Address	Extended			
P ^{iD}	OBD Generic 💌	EmptySecurityD[-	0x7DF	0x7E0	0x03			
PIDs					L			
	Mode 0x23		Tester Present		VID Block			
	Size/Address Config	Address Endian	Parameter	Timeout	Size	Start Address		
	0x14	Use A2L Setting 👻	0x0	2000	0x0	0x0		
					PID Address			
		Security Level	🗹 Use Parameter		0x0	VID Block Presets		
	Ontione		Othere					
	Options		Durneis Durneis Cimul	Estandad Tira Ost				
	✓ Service 0x10 En≀ USupp.Simple Requ ✓ Mode 0x01 Simple Mode 0x2E securi		Dynamic Signal					
			UX6AU					
	🗹 Functional Reque	Reset ECU after C	VIN after DTC R	e				

- Dynamic Signal—Defines the identifier for Dynamically Defined Data Identifier CAN messages.
- Flow Control—Defines the identifier for Flow Control Frames.
- Get VIN after DTC request—Instructs the tool to automatically retriever the VIN after a DTC request.
- Mode 23 Endian Settings—Specifies byte order.
- Mode 23 Security level—Specifies if Mode 23 required security.
- Mode 23 Size/Address Config—Designates the size of the module memory address (Normally 14 or 27).
- Mode 2E Security Specifies if Mode 2E requires security.
- Module Ident—Designates the identifier for module generated CAN messages.
- Name—Assigns the name of the module library.
- Protocol—Nominates the Diagnostic ISO standard protocol to be used in communicating with the module.
- Security—Selects the Security Library .DLL file to be used with the module.
- Session Diagnostic Mode Defines the byte for the Mode 10 diagnostic session 'Diagnostic Mode'.
- Session Extended Mode—Defines the byte for the Mode 10 diagnostic session 'Extended Mode'.
- Session Program Mode—Defines the byte for the Mode 10 diagnostic session 'Program Mode'.
- Tester Ident—Designates the identifier for tester originated CAN messages.
- Tester Present Parameter—Specifies tester present command.
- Time Out (Tester Present Message)
- VID Address PID—PID sent to retrieve VID.
- VID Block Size—Specifies the size of the VID block.
- VID Start Address—Specifies the memory address for the start of the VID block.



A1.2 Module – OBD Codes

Library	OBD Cod	es									
Exports	┊╺┻╸╻	🗕 Add 🛛 — Delete 🏑 Commit 💥 Cancel 🏑 Delete All									
Imports	÷ • ′										
Config	Filter	r 🔺									
0	OBD Cod	DBD Code Description									
Module Settings	FaultID ♥	Description	^								
19	0001	P0001	Fuel airbagVolume Regulator Control Circuit / Open								
Read DTC	0002	P0002	Fuel Volume Regulator Control Circuit Range/Performance								
5	0003	P0003	Fuel Volume Regulator Control Circuit Low								
Freeze Frames	0004	P0004	Fuel Volume Regulator Control Circuit High								
5	0005	P0005	Fuel Shutoff Valve A Control Circuit / Open								
DTC Sensor State	0006	P0006	Fuel Shutoff Valve A Control Circuit Low								
ē ⁿ	0007	P0007	Fuel Shutoff Valve A Control Circuit High								
T DID -	8000	P0008	Engine Position System Performance - Bank 1								
PIDS	PIDs 0009 P0009 Engine Position System Performance - Bank 2		Engine Position System Performance - Bank 2	\checkmark							
21	Group										
Read by ID											
ZE ▼											

The Read DTC tab displays the OBD fault codes database for the selected module. It allows the definition and editing of the OBD fault codes. The section is controlled by the icons along the top of the window, which allows codes to be added or deleted and changes to be committed to the library or cancelled. The current codes can also be edited for Fault ID, ODB Code and the Description.

Any OBD codes imported from a description file will also be stored in this database



A1.3 Module – Freeze Frames

Library	Freeze Frames	;						
Exports	Add	— Delete 🗸	Commit 🗙 Ca	ancel	Delete All			
Imports	-							
Config	Filter		Creation					-
O	0x00	Label	No Filter	~ +	×			
Module Settings	Ident ♥ Label			Unit S	ettings			
19					-			
Read DTC					Ident Group			
5						\ \	× .	
<u>Freeze Frames</u>					Data Type	Formula Type		
C2					-		·	
DTC Sensor State					Size	Byte Position	Byte Order	
₽ ™								•
PIDs					Precision			
22								
Read by ID					Formula:		-	
2E								
Write By ID								
31	Description							
Routines								\sim
<u>~</u>								~

This tab displays the Freeze Frame database for the selected module. It allows the definition and editing of the Freeze Frame data identifiers. The section is controlled by the icons along the top of the window. They allow the creation and deletion of identifiers and also any editing changes to be committed to the library or cancelled—identifiers can be edited for Ident, Label and Units.

Filter:

• Ident—Filters the Ident types to be edited. Types can be added or deleted.

Settings:

- Byte Order—Drop down menu selects the order of the item data bytes within a CAN message.
- Byte Position—Designates the position of the data byte in the message.
- Data Type—Designates the data type for the Ident.
- Formula Type—Drop down menu selects the type of formula to be applied to the data.
- Formula—Specifies any formulation to be applied to the data.
- Precision—Displayed decimal places.



A1.4 Module—DTC Sensor State

Sensor	Status	Value (Hex)								
+	Add	- Delete	1	Commit	X Cance	🖌 Delete Al	I			
Value 🕷	Text									

This tab displays the DTC Sensor State database. These codes determine the nature of the fault of any sensors reported in the DTCs. It allows the designation and editing of sensor states. The section is controlled by the icons along the top of the window. They allow values to be added or deleted and any changes committed to the library or cancelled. The value and the test description columns can be edited. The bottom of the window also contains a description section which allows more detail to be added to each state.


A1.5 Module—Routines

Routines		
🕂 Add — Delete 🗸 Commit 🗙 Cancel	Delete All Security EmptySecurity	yDLL.dll 🔻
ID ♥ Name	ISO 14229 Result types	
	Start Stop Result	
	🗄 — Delete 🖌 Commit 🗙 Ca	incel
	Result	Value
Description		

This tab displays the Routines database for the selected module. Any Routines imported from a description file will also be stored in this database. It allows routines to be edited and is controlled by the icons along the top of the window. They allow routines to be added or deleted and any changes to be committed to the library or cancelled. The Routines can be edited and the window also includes a description panel to allow more detail to be added to each routine.

The right hand section of panel contains three tabs—Start, Stop and Result. These tabs are used to list the results from the running of the routines.



A1.6 Module—PIDs

This section displays the PID database for the selected module. It allows the editing of the Periodic Identifiers and is controlled by the icons along the top of the window. The PIDs can be added or deleted and any changes committed to the library or cancelled. The window also contains a descriptions pane which allows more detail to be added to each PID.

PIDs					
+	Add — Delete 🗸 Commit 🗙 Cance		elete All		
Filter					
PID 0x00	Label Mode Mode 1 - Pol	•			
PID 🛛 🕷	Label	Units 🔺	Settings		
01	ACRF_RDY				
01	ACRF_SUP		Data Type		
01	AIR_RDY		Bitfield 💌		
01	AIR_SUP			Byte Position	Byte Order
01	CAT_RDY			3	MSB First 🔹
01	CAT_SUP		Precision	MSBit Position	Number of bits
01	CCM_RDY		0	4	1
01	CCM_SUP		Formula Type		
01	CIM_SUP		State Variable 💌		
01	DTC_CNT				
01	EGR_RDY		Add —	Delete 🖌 Con	nmit 🗙 Cancel
Descript A/C sys	ion tem refigerant monitoring ready	Ť	•		^
					~

Filter by Mode:

• Mode—Drop down menu Selects the PIDs to be edited from the different diagnostic Modes which utilise.

- Byte Order—Allows the selection of which of the data bytes comes first.
- Byte Position—Designates the position of the data byte in the message.
- Data Type—Specifies the data type for each PID.
- Formula Type—Selects the type of formula to be applied to the data.
- MSBit Position—Specifies location of first data bit.
- Number of bits—Specifies number of bits in data packet.
- Precision—Displayed decimal places.



A1.7 Module—Write by ID

Write B	y ID										
+	Add	Delete	Cor	mmit 🗙 (Cancel	🖌 Delete All					
Filter											
Ident 0x00		Label		Group No Filter	~	H X					
Ident 🕷	Label				Uni	it: Settings					
						Ident Group					
									\sim		
						Data Type		Formula Type			
							-		•		
						Size		Byte Position		Byte Order	
											-
						Precision					
						Formula		Reverse Formu	ıla		

This tab displays the database of the identifiers utilised by Mode 0x2E. Any identifiers imported from description files will also be stored here. It allows the editing of the identifiers and is controlled by the icons along the top of the window. The identifiers can be added or deleted and any changes committed to the library or cancelled. The window also contains a descriptions pane which allows more detail to be added to each Ident.

Filter by Ident:

• Ident—Allows the identifiers to be displayed by type.

- Byte Order—Allows the selection of which of the data bytes comes first.
- Byte Position—Designates the position of the data byte in the message.
- Data Type—Specifies the data type for each PID.
- Formula Type—Selects the type of formula to be applied to the data.
- Formula—Specifies any formulation to be applied to the data.
- Precision—Displayed decimal places.
- Reverse Formula—Specifies the reverse formula if applicable.
- Size—Designates the size of the data.



A1.8 Module—Signals

Signals											
Filter			Settings								
Ident	Signal		Message								
0x0			CH1								
Signal Ty	De		Signal								
CAN			CH1								
CAN Sign	als		Description								
Ident	Signal	~									
310	CH1		Ident	Units	Formula						
320	CH2		0x310		×						
330	CH3		Scale								
0	CHA		1.0000000	7 6 5 4 3	3 2 1 0						
200	Disitel insult status shareset 1		Offset	0 <u>A_A_A_A</u>	A A A A						
300	Digital_input_status_channel_1		0.0000	1 <u>A A A A</u>	<u>A A A</u>						
300	Digital_input_status_channel_2		Minimum	2	A A A						
300	Digital_input_status_channel_3		0.00	3 A A A A A	A A A						
300	Digital_input_status_channel_4		Maximum	4							
400	Outputs_PIN1		0.00	5							
400	Outputs_PIN2		Low Threshold	6							
400	Outputs_PIN3		0.0000	7							
400	Outputs_PIN4		Memory Representati	on							
181	ADC_1		Data Type	Formula Type	Byte Order						
181	ADC_2		Unsigned 💌	Algebric <	MSB Last 🔻						
181	ADC_3		dlc:	Bit Count:	Start Bit:						
181	Channel		8	32	0						
182	ADC_4										
182	ADC_5		Import	bbA	Delete Applu						
182	ADC_6	\checkmark			- upply						

This tab displays the Signals database for the selected module. Any signals imported from description files will be stored here. The panel also contains an 'Import' feature button. It allows the import of further CAN/LIN signals as in Section 7.2.

Filter:

- Ident—Provides a search by Ident facility.
- Signal—Provides a search by signal name facility.
- CAN/LIN Signals

- Bit Count— Number of bits within the bytes.
- Byte Count—Number of bytes.
- Byte Order—Endian settings.
- Data Type—Drop-down menu selects data type.
- Description—Allows a short description.
- Formula Type—Drop-down menu selects formula type.
- Formula—Specifies a formula if applicable.
- Ident—Specifies signal CAN/LIN ident.
- Maximum
- Memory Representation:
- Minimum
- Offset—Specifies any value offset.
- Scale—Specifies any applied scaling.
- Signal—Signal name.
- Start Bit—Location of first data bit.
- Units





A1.9 Module—Addresses

Addresses					
Filter			Settings		
Address	Label		Label		
0x0			VehStopSpeedAftrR	Gear	
			Description		
			Vehicle Stop Speed	After Reverse Gear	
	11.1		Address	Units	Formula
Addresses	List		CONTRACT? CONTRACT	km/h	0.01*x
Address	Label		Scale	Minimum	Maximum
	Stall Deservice to The Line		0.0100000	0.00	320.00
-RULTING	StailRCVryIntv_IMs_Lim		Offset	Low Threshold	High Threshold
-AUDIO	StopInnbtAftrRGearSpeedInres		0.0000	0.0000	0.0000
A CONTRACTOR	StopInhbtAftrRGearTout		Precision		
4.0500	StopInhbtAftrStartSpeedThres		2		
	StopInhbtAftrStartTout				
1200-1 10 -00	StopInhbtSpeedThres				
4000000	StopOpOnDoorTout				
- Minthe	TimrShutdown				
AND STREET	TimrStartup		Memory Representati	on	•
4,025,72	TrnGearNtrlReselect_B_StrtTrg		Data Type	Formula Type	Byte Order
4014577	TrnInGearToNtrl_No_Dbnc		Unsigned Word 🔻	Algebric 🔻	MSB First 💌
40045/785	TrnNtrlToInGear_No_Dbnc		Byte Count	Start Bit	
	VehSpeedDnstsize		2	0	
	VehSpeedOffset		Bit Mask	Shift Left	Shift Right
1005574	VehSpeedTrgLvl		0xFFFF	0	0
4025575	VehSpeedUpstsize				L
40005666	VehStopSpeedAftrRGear	~	Import	Add	Delete Apply

This section displays the Addresses database for the selected module. Any addresses imported from .A2L files will be stored here.

Filter:

- Address—Allows searching by specific address.
- Label—Allows searching by address label.

- Bit Count—Number of bits within the bytes.
- Bit Mask—
- Byte Count—Number of bytes.
- Byte Order—Endian settings.
- Data Type—Drop down menu selects data type.
- Description—Extra detail for the selected address.
- Formula—Any formula applied to the data.
- Ident— Identifier
- Label—Address label.
- Maximum—Data permissible maximum value.
- Memory Representation:
- Minimum—Data permissible minimum value.
- Precision—Displayed decimal places.
- Shift Left—Allows offset.
- Shift Right—Allows offset
- Start Bit—Location of first data byte.
- Unit—Data Units



Appendix 2 Security Manager

The Security Manager tool provides the user with the option to edit or create a security .DLL file, which are required by some modules to allow security access to some functionality. The Security Manager is accessed by the Security Manager button on the Settings Tab.

•						
	File	View	Scan Tool	Extended	Monitoring	Settings
ן וּ	Config Ma	nager	Security Manage	er 📮 Devi	ice Manager 🛛 💙 Pr	eferences

The Security Manager window is shown below.

ê	Security Manager								
Library Properties									
Module Name Module 1 Title Empty Security DLL Description Empty Security DLL	Security Library Name EmptySecurityDLL.dll]							
Security bytes, [hex] *******	Algorithm/Method Security Level								
New Library Update	e Library Delete Library Enter Security								

The window opens with no security library file selected, the tool allows the selection and editing of an existing .dll file or the creation of a new library.

- Algorithm
- Description—Allows more detail about the security file to be stored.
- Security bytes
- Security Level
- Title—Specifies the name of the security library.

Once a security library has been selected or created the option to use features that require security become available.



Appendix 3 Device Manager

This facility is provided to determine the hardware interface devices that the software will use to communicate for CAN or LIN traffic. . The Device Manager is accessed by the Device Manager button on the Settings Tab.

4						
	File	View	Scan Tool	Extended	Monitoring	Settings
•	Config M	anager	Security Manage	er 🖳 Devid	ce Manager 📑 P	references

The Device Manager is shown below.

Supporte Filter	ed Dev	ices		
		Chattan		
Name				
Devices	List		Properties	
	+	CANdo	NAME	Channel HS
	+	ETAS PCMCIA Card	BAUD-RATE	500 💌
✓		Influx Rebel CT/LT	ONLINE	YES
		Channel HS		
		🛑 Channel MS		
	+	J2534		
	+	Komodo CAN DUO		
	+	Kvaser Leaf Light HS		
	+	Kvaser Leaf LIN		
	+	Kvaser Memorator HS/HS		
	+	Softing PCMCIA Card		
	+	Softing Usb2Can		
	+	Vector PCMCIA Card		
	+	VectorXL PCMCIA Card		

Communication

Here the interface device for both CAN and LIN communication can be chosen and the selected device settings adjusted.

'Properties' Settings:

- CAN Channel—Some interface devices support more than one connection, this allows the selection of the required channel.
- Bitrate—Allows specification of the bus speed.



Appendix 4 Preferences

This tool provides the user with the ability to customise a number of elements within the software to personal preference. The preferences can be accessed by the Preferences button on the Settings Tab.



The Preferences window is shown below.

	Preferences	×
default 💌	Save Delete	
General Dial Scope Trace CED	General Save Screen Always Always Never Multi Channel General Open Screen Open Screen Chast Saved Open Screen Open	
	Ok Cancel	

The window opens with the 'General' settings tab open, the tool is navigated by the 'Current Theme' panel on the left of the window. The tool also allows the changes made to the preferences to be saved and recalled by the user when required. This is done using the icons and drop down menu at the top of the window. Allowing the creation and deletion of preference library files. The files can also be exported and imported to allow transfer of user preferences between software installations.



A4.1 Dial tab

	Preferences			×
default	Save Delete			
Current Theme General Dia Scope Trace LED	Dial	Layout		
	Scale Caption) 90 () 270	○ 120 ○ 300	○ 180 ○ 360
	Scale BK Visible Line Ticks Color Low Color Norm Color High	Needle Color Body Color Line	Length 100 9 Head Size 30	/o
	😱 General 🤔 Dial 🗹 Scope 🛄 Trace 💡 L	ED		
			Ok	Cancel

This section allows the customisation of the dial display, all changes are automatically previewed.

- Main Colours—Provides colour options for the font, background, border, scale and caption of the dial.
- Layout—Allows selection of the dial sweep angle.
- Scale— Allows customisation of the dial scale, including graduation colours.
- Needle—Specification of the colour of the pointer and the line as well as length and head size.



A4.2 Scope tab



This section allows the customisation of the Scope.

- Main Colours—Allows customisation of display colours for the background, label and axis.
- View Options—Selection of default view setting.
- Points—Option to show individual data points and the size and shape.



A4.3 Trace tab

	Preferences										×			
Current Theme	Save Delet	e 02	10	81	00	00	00	00	00					
-œ- Dial ☑ Scope ➡ Trace 8º LED	0x07E8 0x07E0 0x07E8 0x07E0 0x07E8 0x07E0 0x07E8 0x07E8 0x07E8 0x07E8	02 07 06 02 10 30 21 22 07 10	50 09 49 09 14 00 44 49 01 10	81 00 02 49 00 41 4C 00 41	00 20 54 00 20 20 45 20 00	00 40 00 01 00 4E 40 98	00 60 00 46 00 41 20 60 3B	00 80 00 4F 00 20 20 80 A0	00 A0 00 52 00 4D 20 A0 13					
	Col Buffer S	ize 10	nt 100000	■ 00 lin	es cope		Back		LED		Ok]	Cancel	

Allows customisation of the trace message panel including font and background colour and the maximum line limit of the trace. All changes are automatically previewed.



A4.4 LED tab

		Preferences			×			
Current Theme General Dial	Save Delete							
Scope ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	Color Color	Scope Trace	Spot Color O Blue Green	O Red O Yellow				

This section allows the customisation of the LED display, all changes are automatically previewed.

- Main—Selects the background colour of the display.
- Spot Colour—Allows selection of the LED colour.



Appendix 5 Glossary

Terminology	Definition					
A2L	ASAM MCD 2 MC-language					
CAN	Controller Area Network					
ССР	CAN Calibration Protocol					
CSV	Comma Separated Values file					
DBC	CAN Database file					
DPV	DiaLog Project Vehicles file					
DTC	Diagnostic Trouble Code					
EEPROM	Electrically Erasable Programmable Read-Only Memory					
FAT32	File Allocation Table 32 bit					
IVD	Influx Vehicle Data file					
IVS	Influx Vehicle Structure file					
LIN	Local Interconnect Network					
LDF	LIN Database File					
LSB	Least Significant Byte					
MSB	Most Significant Byte					
OBD	On-Board Diagnostics					
ODX	Open Diagnostics Exchange file					
PID	Periodic Identifier					
ROB	ROB Description File					
ТХТ	Text file					



Appendix 6 CAN Modes

01	Current Powertrain Diagnostic Data
02	Powertrain Freeze Frame Data
03	Emissions Related Powertrain Diagnostic Trouble Codes
04	Clear/Reset Emissions Related Diagnostic Information
06	On-Board Monitoring Test Results for Non-Continuously Monitored Systems
07	On-Board Monitoring Test Results for Continuously Monitored Data
09	Request Vehicle Information
0A	Permanent Status Diagnostic Trouble Codes
10	Diagnostic Session Control Service
11	ECU Reset
14	Clear Diagnostic Information
19	Read Diagnostic Trouble Codes
22	Read Data by Identifier
23	Read Memory by Address
2C	Dynamically Define by Data Identifier
2E	Write Data by Identifier
31	Routine Control
3E	Tester Present
27	Security Access Service
2A	Read Data by Periodic Identifier



Appendix 7 CAN Definitions

Protocol Control Symbol			Byte 1							Byte 2	Byte 3
Information Name		7	6	5	4	3	2	1	0		
Single Frame	SF	0	0	0	0	DL			N/A	N/A	
First Frame	FF	0	0	0	1	DL high			DL low	N/A	
Consecutive Frame	CF	0	0	1	0	SN			N/A	N/A	
Flow Control Frame	FC	0	0	1	1		F	S		BS max	ST min

· Single Frame (SF) – Protocol for short messages, contained in one frame, includes a length descriptor.

 Data Length (DL) – Encoded in at the beginning of the message, the PCI is not included in the data length calculation. DL high and DL low encodes the data length for long messages into twelve bits, allowing a message length of up to 4095 bytes.

• First Frame (FF) – The procedure for starting a long message, to be therefore segmented into multiple frames. It is only generated once for each long message, by the sender of the segmented transfer.

 Data Length (DL) – DL high and DL low encodes the data length for long messages into twelve bits, allowing a message length of up to 4095 bytes.

• Flow Control Frame (FC) – Used in a long message to control the Consecutive Frame transmissions. Generated by the receiver of a long message, it is the response to a First Frame or the last Consecutive Frame.

• Flow Status (FS) – Codes in the PCI of the Flow Control Frame, it instructs the Consecutive Frame transmission, with two possible values:

* Clear to Send (CTS, 000B) – Resume message transmission, BS max and ST min taken into account by sender on reception of the Flow Control frame.

* Wait (WT, 001B) – Pause transmission and wait for a CTS FC frame. ECU will only except not generate. • Block Size (BS max) – Designates the maximum number of Consecutive Frames that are accepted in a block

(between two Flow Control frames.) Possible values:

* 0 – No other Flow Control frame expected, therefore sender free to transmit all the following Consecutive Frames with the ST min value.

* 1≤BS max≤255

• Separation Time (St min) – Specifies the minimum gap between the transmission of the Consecutive Frames only and not between the Flow Control frame and the next Consecutive Frame. Units are milliseconds.

 Consecutive Frame (CF) – When sending segmented data in a long message, all frames from sender containing the data are encoded as Consecutive Frames. On receipt of Consecutive Frames the receiver shall assemble the data bytes until whole message received.

• Sequence Number (SN) – Designated the Consecutive Frame number in the current block. Used to detect duplication or loss of Consecutive Frames from a long message.



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