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# JCOM1939 Monitor Pro/Pro-X

Windows Software to Monitor, Record, Analyze, and Simulate SAE J1939 Data Traffic

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# Introduction

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544 545 546 547 548 549 570 570	61443 65245	120 48	255	4	ł			aition	

The JCOM1939 Monitor Software is the perfect tool to monitor, record, analyze, and simulate SAE J1939 data traffic. The system works in combination with our SAE J1939 gateways.

This comprehensive and easy-to-use, easy-to-understand Windows software displays not only SAE J1939 data traffic; it also allows to scan the network, simulate an ECU (incl. full node address negotiation features), and respond to data request messages.

The communication protocol between the gateway and the host system (PC, Embedded System, Android System, etc.) is well documented, and we provide C/C# source code to read and write CAN data frames.

# Features (Pro, Pro-X)

- FREE download
- ECU Simulation Setup (Preferred Node Address, Negotiable Address Range, NAME, and more)
- Filter J1939 PGNs for Display
- Design J1939 PGNs for Transmission (Data and Request Messages)
- Design J1939 PGNs for Request Responses
- Simulate Digital and Analog Signals
- Scan a J1939 Network (Number of Nodes, Node IDs, NAMEs)
- Record SAE J1939 Data Traffic
- Simulate SAE J1939 Data Traffic
- Check Gateway Status (Error Messages, Software/Hardware Version)
- Set Gateway Parameters (Heartbeat Frequency, Message Acknowledgment)
- Free Updates

# Extended Features (Pro-X Only)

- SAE J1939 Data Display and Recording Includes Timestamp
- PGN Filter Setup Includes a Sample Frequency
- SAE J1939 Data Recording to Micro SD Card Independent from PC Connection
- Recorded SAE J1939 Data Transfer to PC In Preparation

The extended features are explained in chapter <u>JCOM1939 Monitor Pro-X – Extensions &</u> <u>Modifications</u>.

# SAE J1939 Gateways

The JCOM1939 Monitor software versions work directly with the following SAE J1939 gateways:

# JCOM1939 Monitor Pro

- SAE J1939 ECU Simulator Board with USB Port
- JCOM.J1939 Starter Kit and Network Simulator
- SAE J1939 to Bluetooth Gateway with 9-Pin Deutsch Connection Cable
- SAE J1939 to RS232 & USB Gateway with 9-Pin Deutsch Connection Cable

# JCOM1939 Monitor Pro-X

- SAE J1939 Gateway Module with USB Port, RTC, MicroSD Memory Card
- SAE J1939 Gateway and Data Logger with Real-Time Clock

# Main Screen

1.	M1939 Monit	or								×
-	Gate	eway								
1	Сом	Port: CC	DM10	~		Stop COM Hearthe	sat: \ COM Errors:	0		
ECU S	etup   Filter	Transmit	Network	Gateway						
0	Monitoring Mod	de 🖲 E	CU Simulatio	on Mode		NAME: Dx80FEFF00F	FFFFFF	Set Default		
EC	U Address					SAE Settings		Manufacturer Settings		
F	Preferred Addr	ess:	128			Industry Group:	0	Arbitrary Adress Capable:	1	
1	Address Rang	e Low:	128			Vehicle System:	127	Vehicle System Instance:	0	
4	Address Rang	e High:	247			Function:	255	Function Instance:	0	
0	Claimed Addre	55:	128			Manufacturer Code:	2047	ECU Instance:	0	
			Claim A	Address				Identity Number: 2097151	-	
(	Clear	Auto	Scrolling							
3	PGN	SA	No.26	1.0000	12230000	1.49/06/06/07/06/06/06				
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When you run the Windows software for the first time, you need to first select the COM port that relates to the J1939 Gateway. In the *Windows Device Manager* look for and select "Ports (COM & LPT)". If the driver was installed successfully, you will see "Silicon Labs CP210x USB to UART Bridge" followed by the COM port associated with it. This is the port you must select in the Windows software. Should the software not show that particular COM port, please try again after rebooting the computer.

Also, it is mandatory that the simulator hardware is connected to a J1939 network. The simulator cannot send or monitor any data without being connected to a network.

The jCOM1939 Monitor software for Windows contains three main areas:

 On top, you will find the COM port section where you select the port number associated with your USB port. Click on *Start COM* to initiate the connection to the J1939 gateway. When the connection is made, you will see the Heartbeat bar changing in a one-second interval. If the heartbeat does not change, please check that you have selected the correct COM port number and that you have a connection with the gateway. If this does not help, try with re-booting your computer.

- 2. The next section is divided through several tabs such as ECU Setup, Filter, Transmit, Network, and Gateway. They are explained in the following chapters.
- 3. The bottom section shows the SAE J1939 data as it is received or transmitted through the gateway.

In general, you can save the complete current setup to a file or load an existing file by using the File menu items.

# Switching the CAN Baud Rate

File								
-	Gateway							
	COM Port: COM3	Start COM	Stop COM	Heartbeat: 🖊	COM Errors:	0	CAN Baud Rate:	250 k 🗸

The JCOM1939 Monitor program allows the switching of the CAN baud rate between 250k and 500k.

Use the selector in the top right-hand corner of the screen to select the baud rate. The default is 250k.

Please be aware that switching the baud rate requires the program to switch to mere monitoring mode (in case you already acquired a node address).

# Data Display

As you can gather from the previous image, the program lists all received PGNs according to the PGN filter settings. The displayed information includes:

- PGN Index
- PGN
- Source Address SA
- Destination Address DA
- Priority
- Message Length
- Data
- Description (assigned in PGN filter settings as described below)

As of Version 3.11.00, the data display has been extended to indicate whether the SAE J1939 data frame has been received or transmitted:

#	RX	TX	PGN	SA	DA	P	Len	Data (Hex)	Description
5050		х	65281	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	Sample PGN 2
5051	x		65288	136	255	6	8	31 32 33 34 35 36 37 38	
5052		х	65299	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	Sample PGN 1
5053		х	65281	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	Sample PGN 2
5054		х	65290	200	255	3	8	44 55 66 77 88 99 AA BB	Sample PGN
5055	1	х	65281	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	Sample PGN 2
5056		х	65281	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	Sample PGN 2
5057		х	65290	200	255	3	8	44 55 66 77 88 99 AA BB	Sample PGN
5058		х	65299	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	Sample PGN 1
5059	1	х	65281	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	Sample PGN 2
5060	x		65288	136	255	6	8	31 32 33 34 35 36 37 38	
5061		х	65281	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	Sample PGN 2

#### Special Case: Transport Protocol (TP)

Please be aware that the displayed priority will be 255 when a data frame of more than 8 bytes was received (TP – Transport Protocol). The Transport Protocol itself uses a Priority = 7 but it does not transmit the priority of the original message.

#### **ECU Setup**

Monitoring Mode	CU Simulation Mode	NAME: Qx80	FEFF00FFFFFFF	Set Default	
CU Address		SAE Settings		Manufacturer Settings	
Preferred Address:	128	Industry Group:	0	Arbitrary Adress Capable:	1
Address Range Low:	128	Vehicle System:	127	Vehicle System Instance:	0
Address Range High:	247	Function:	255	Function Instance:	0
Claimed Address:	128	Manufacturer Code:	2047	ECU Instance:	0
	Claim Address			Identity Number: 2097151	

If your intention is the mere monitoring of SAE J1939 data traffic, you don't need to do anything here, but if you want to transmit SAE J1939 data (PGNs), you need to claim a node address.

This section is where you configure an SAE J1939 ECU through parameters such as Preferred Node Address, Negotiable Address Range, and the NAME setup. If you are not sure how to set the parameters, simply go with the default parameters. They are set up to have the ECU operate on the safe side without interfering with your J1939 network.

Don't forget to click on *ECU Simulation Mode* and then the *Claim Address* command button before proceeding.

# **Filter Messages**

iN: 65269 Description: Ambient Conditions	Save Delete
GN Description	Apply Filter PGNa
5267 Vehicle Position	As Defined in Table
5269 Ambient Conditions	O Pass All

The Filter section allows you to filter any PGNs (Parameter Group Numbers) from your network. Simply enter the PGN of your choice and a description (optional), then hit the *Save* command button. The PGN, provided it is part of your J1939 data traffic will show on the data screen below. If you are not sure which PGN to filter, you can also click on the *Pass All* option. This will give you an overview of all PGNs in the network, and you can choose which one to filter.

In order to modify a specific PGN, simply click on it in the table. All parameters will appear in the editing section. Modify the parameters to your liking, then hit *Save* again.

#### Transmit Messages

Please be aware that you can only transmit messages when you have chosen *ECU Simulation Mode* in the *ECU Setup* tab and you have claimed an ECU address (see paragraph *ECU Setup* above). Otherwise, the software will indicate that there is no node ID available. You can design messages by entering the PGN, Destination Address (255 = Global Address = Broadcasting), Priority, Data, Transmit Interval (optional), and Description (optional).

Click the *Save* command button to transfer the PGN into the Transmit table. If you have entered a transmission frequency, you will see the PGN appear in the Receive window below. For single (manual) transmission, leave the Interval at zero, select the PGN in the table and click on the *Transmit* command button.

In order to modify a specific PGN, simply click on it in the table. All parameters will appear in the editing section. Modify the parameters to your liking, then hit *Save* again.

#### **Display Options**

PGN:	65280		Request	ECU Ad	ldress: 128	Dest.	Address: 255	5 Priori	ity: 6 Transmission Rate: Manually V Interval [msec]: 0
Data:	0								
Descr.:	Sample	PGN					🗹 Display	Save	Transmit Delete
PGN	DA	P	Len	Data			Interval	Display	Description
Clea	ər 🔤	A	uto Scrolling	Display 1	x Messages	individual	O Enable Al	O Disable	e Al
	PGN 59904	SA O	DA 255	P 6	Len 3	Data (Hex) E5 FE 00		I	Description
	59904	0	255	6	3	DC FE 00			

In cases where you set up PGN transmission at high frequencies (e.g., 10 milliseconds), it doesn't make sense to display the message on the screen since the human eye will have problems following the data flow. Also, you will most likely miss other, received messages. For this case, the program offers a "Display" option.

To stress the point, checking the "Display" option for messages with a frequency of fewer than 100 milliseconds will put some burden on the communication with the PC, which should be avoided when possible.

In addition, it also offers a display mode affecting all transmitted PGNs by providing options such as Individual (as assigned through the "Display" option), Enable All, or Disable All.

Transmitting PGNs Using a Frequency

1.00	[	1	-		·		(	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
PGN:	65280		Request	ECU Address: 128 De	st. Address: 25	5 Priorit	r: 6 Transmissio	on Rate: Interval	V Interval [msec]: 1000
Data:	0x11 0x	22 Ox33	0x44 0x55	0x66 0x77 0x88					
Descr.:	Sample	PGN			Display	Save	Transmit	Delete	
PGN	DA	P	Len	Data	Interval	Display	Description		
65280	255	6	8	11 22 33 44 55 66 77 88	1000	Y	Sample PGN		

In case you want to transmit a PGN using a frequency, select the corresponding option in the "Transmission Rate" list box, then enter the frequency in milliseconds and click *Save*. The program will automatically send the PGN using the assigned frequency.

# Transmitting PGNs Upon Request

PGN:	65280		Request	ECU Address: 128 De	st. Address: 25	5 Priorit	y: 6 Transmission Rate: On Request ~ Interval [msec]: 0
Data:	Ox11 Ox	22 Ox33	3 Ox44 Ox55	0x66 0x77 0x88			
Descr.:	Sample	PGN			Display	Save	Transmit Delete
PGN	DA	P	Len	Data	Interval	Display	Description
65280	255	6	8	11 22 33 44 55 66 77 88	ON REQ	У	Sample PGN

In order to simulate an SAE J1939 ECU, it may be necessary to simulate the transmission of a PGN upon request. Edit the PGN as you would do with any regular PGN but select "On Request" in the "Transmission Rate" list box, then click *Save*. The message will be transmitted as soon as the program receives a request for it.

#### Setting Up a Request Message

GN:	65253		Request	ECU Address: 128	Dest. Address: 255	5 Priorit	ity: 6 Transmission Rate: Manually $\checkmark$ Interval [msec]:
Data:	0x00						
Descr.:	Engine	Hours			Display	Save	Transmit Delete
PGN	DA	P	Len	Data	Interval	Display	Description

A small set of PGNs are only available per Request message. In this example, we are setting up a request for "Engine Hours" – PGN 65253. Please not that you cannot set a frequency for request messages; the program will override any such entries. After editing the PGN, click on the *Request* command button (not the *Save* button).

The PGN for a Request message is 59904 and the data represents the requested PGN (LSB first, MSB last). All this reflects on the screen after hitting *Request*.

CU Setup		_	Hound	rk Gateway			
PGN:	59904		Request	ECU Address: 128	Dest. Address: 25	5 Priorit	y: 6 Transmission Rate: Manually V Interval [msec]: 0
Data:	OxE5 Ox	FE <mark>0x00</mark>					
Descr.:	Engine I	Hours			Display	Save	Transmit Delete
PGN	DA	P	Len	Data	Interval	Display	Description
59904	255	6	3	ES FE 00	0	Y	Engine Hours

# Transmitting Messages Longer Then 8 Bytes (TP – Transport Protocol)

The setup of a TP (Transport Protocol) message, i.e., a message with more than 8 data bytes, is identical to the process as described above, with the only exception that you cannot assign a transmit frequency since TP messages are only transmitted after a *Message Request*. The number of transmitted data can be between 9 and 1785 bytes.

The USB gateway will automatically manage the switching between regular PGNs (8 data bytes) and a TP transmission.

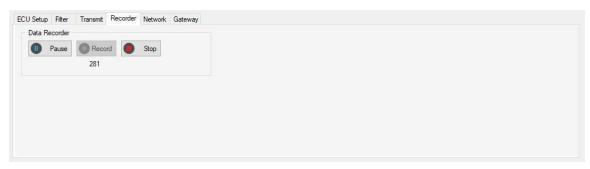
# Data Recorder

The *Recorder* function allows the user to store received (filtered) PGNs into an MS-Excelcompatible *csv* file.



<u>Note</u>: The JCOM1939 Monitor Pro-X version shows the tab as **PC Recorder**, in order to separate it from the second recording mode, the **Gateway Recorder**.

The control buttons are self-explanatory, since they resemble those of any standard recording device. Click *Record* to start the recording process, and the program will display the number of current records as shown below.



After clicking the *Stop* button, the software will prompt you to store the file with a name and at a location of your choice.

The data format is .csv (comma-separated values), which can be viewed either per an ASCII text editor or Microsoft Excel.

jCOM1939-Rec - Notep	ad
----------------------	----

ile Edit Format View Help	1	A	В	С	D	E	F	G	Н
GN, DA, SA, P, LEN, DATA	1	PGN	DA	SA	P	LEN	DATA		
281,200,255,4,8,78 79 7A 7B 7C 7D 7E 7F	2	65290	1000 C	7.0012		0.00000		7 88 99 AA	RR
290,200,255,3,8,44 55 66 77 88 99 AA BB 281,200,255,4,8,78 79 7A 7B 7C 7D 7E 7F	3								
288,136,255,6,8,31 32 33 34 35 36 37 38	- 74	65281	1 100	7856				7B 7C 7D 7E	<u>-869</u>
299,200,255,4,8,78 79 7A 7B 7C 7D 7E 7F	4	65299	200	255	4	8	3 78 79 7A 7	7B 7C 7D 7E	7F
281,200,255,4,8,78 79 7A 7B 7C 7D 7E 7F	5	65281	200	255	4	8	3 78 79 7A 7	7B 7C 7D 7E	7F
290,200,255,3,8,44 55 66 77 88 99 AA BB	6	65290	200	255	3	8	44 55 66 7	7 88 99 AA	BB
281,200,255,4,8,78 79 7A 7B 7C 7D 7E 7F	7	65288	136	255	6	; 8	3 31 32 33 3	4 35 36 37 3	38
281,200,255,4,8,78 79 7A 7B 7C 7D 7E 7F	8	65281	200	255	4	5	3 78 79 7A 7	7B 7C 7D 7E	7F
290,200,255,3,8,44 55 66 77 88 99 AA BB	9	65299				1		7B 7C 7D 7E	
299,200,255,4,8,78 79 7A 7B 7C 7D 7E 7F 281,200,255,4,8,78 79 7A 7B 7C 7D 7E 7F	10	65281	1 7775	7858				7B 7C 7D 7E	
288,136,255,6,8,31 32 33 34 35 36 37 38						-			
81,200,255,4,8,78 79 7A 7B 7C 7D 7E 7F	11	65290	1000					7 88 99 AA	777)
90,200,255,3,8,44 55 66 77 88 99 AA BB	12	65281	200	255	4	8	3 78 79 7A 7	7B 7C 7D 7E	7F
99,200,255,4,8,78 79 7A 7B 7C 7D 7E 7F	13	65281	200	255	4	8	8 78 79 7A 7	7B 7C 7D 7E	7F
281,200,255,4,8,78 79 7A 7B 7C 7D 7E 7F	14	65290	200	255	3	8	44 55 66 7	7 88 99 AA	BB
281,200,255,4,8,78 79 7A 7B 7C 7D 7E 7F	15	65299	200	255	4	L 8	3 78 79 7A 7	7B 7C 7D 7E	7F
290,200,255,3,8,44 55 66 77 88 99 AA BB 281,200,255,4,8,78 79 7A 7B 7C 7D 7E 7F	16	65288	136	255	e	5	31 32 33 3	4 35 36 37 3	28
299,200,255,4,8,78 79 7A 7B 7C 7D 7E 7F	17	65281						7B 7C 7D 7E	
288,136,255,6,8,31 32 33 34 35 36 37 38		17777	1.000		-	100 (C)			
281,200,255,4,8,78 79 7A 7B 7C 7D 7E 7F	18	65281						7B 7C 7D 7E	
290,200,255,3,8,44 55 66 77 88 99 AA BB	19	65290	200	255	3	5	3 44 55 66 7	7 88 99 AA	BB
281,200,255,4,8,78 79 7A 7B 7C 7D 7E 7F	20	65299	200	255	4	8	8 78 79 7A 7	7B 7C 7D 7E	7F
299,200,255,4,8,78 79 7A 7B 7C 7D 7E 7F	21	65281	200	255	4	<mark>۶ ا</mark>	8 78 79 7A 7	7B 7C 7D 7E	7F
281,200,255,4,8,78 79 7A 7B 7C 7D 7E 7F	22	65281	200	255	4	5	3 78 79 7A 7	7B 7C 7D 7E	7F
90,200,255,3,8,44 55 66 77 88 99 AA BB	23	65290				1		7 88 99 AA	
281,200,255,4,8,78 79 7A 7B 7C 7D 7E 7F 288,136,255,6,8,31 32 33 34 35 36 37 38	23	65288		100				4 35 36 37 3	371
299,200,255,4,8,78 79 7A 7B 7C 7D 7E 7F	24	05288			C	2	51 52 33 3	4 55 30 37 3	00
281,200,255,4,8,78 79 7A 7B 7C 7D 7E 7F		< >	jCOM1	939-Rec	æ				

#### Extensions

The JCOM gateways with Real-Time Clock (RTC) allow the storing of extended features, such as timestamp, reception mode (RX or TX), and PGN description:

File	Edit	Format	View	Help							
TIME,	M, PGN	,DA,SA,P,	LEN, DAT	TA, DESCR							
11:33	:57.5	86,RX,652	81,200,	255,4,8,78	79	7A	7B	70	7D	7E	7F,-
11:33	:57.6	00, RX, 652	90,200,	255,3,8,44	55	66	77	88	99	AA	BB,-
11:33	:57.6	20, RX, 652	81,200,	255,4,8,78	79	7A	7B	7C	7D	7E	7F,-
11:33	:57.6	50,RX,652	81,200,	255,4,8,78	79	7A	7B	7C	7D	7E	7F,-
11:33	:57.7	00,RX,652	99,200,	255,4,8,78	79	7A	7B	70	7D	7E	7F,
11:33	:57.7	06,RX,652	90,200,	255,3,8,44	55	66	77	88	99	AA	BB,-
11:33	:57.7	20,RX,652	81,200,	255,4,8,78	79	7A	7B	7C	7D	7E	7F,
11:33	:57.7	50,RX,652	81,200	255,4,8,78	79	7A	7B	70	7D	7E	7F,
11:33	:57.8	00,RX,652	90,200	255,3,8,44	55	66	77	88	99	AA	BB,
11:33	:57.8	20, RX, 652	99,200	255,4,8,78	79	7A	7B	70	7D	7E	7F,
11:33	:57.8	26,RX,652	81,200,	255,4,8,78	79	7A	7B	7C	7D	7E	7F,
11:33	:57.8	50,RX,652	81,200,	255,4,8,78	79	7A	7B	7C	7D	7E	7F,
11:33	:57.9	00,RX,652	90,200,	255,3,8,44	55	66	77	88	99	AA	BB,
11:33	:57.9	20, RX, 652	99,200	255,4,8,78	79	7A	7B	7C	7D	7E	7F.
11:33	:57.9	46,RX,652	81,200,	255,4,8,78	79	7A	7B	7C	7D	7E	7F,
11:33	:57.9	50,RX,652	81,200	255,4,8,78	79	7A	7B	7C	7D	7E	7F,
11:33	:58.0	00,RX,652	90,200	255,3,8,44	55	66	77	88	99	AA	BB,
11:33	:58.0	20, RX, 652	81,200	255,4,8,78	79	7A	7B	7C	7D	7E	7F,
11:33	:58.0	50,RX,652	99,200,	255,4,8,78	79	7A	7B	7C	7D	7E	7F,
11:33	:58.0	66,RX,652	81,200	255,4,8,78	79	7A	7B	7C	7D	7E	7F,
11:33	:58.1	00,RX,652	90,200,	255,3,8,44	55	66	77	88	99	AA	BB,
11:33	:58.1	20,RX,652	81,200	255,4,8,78	79	7A	7B	7C	7D	7E	7F,
				255,4,8,78							

	A	В	C	D	E	F	G	Н	1
1	TIME	м	PGN	DA	SA	Ρ	LEN	DATA	DESCR
2	11:33:58	RX	65281	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	-
3	11:33:58	RX	65290	200	255	3	8	44 55 66 77 88 99 AA BB	-
4	11:33:58	RX	65281	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	-
5	11:33:58	RX	65281	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	-
6	11:33:58	RX	65299	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	-
7	11:33:58	RX	65290	200	255	3	8	44 55 66 77 88 99 AA BB	-
8	11:33:58	RX	65281	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	-
9	11:33:58	RX	65281	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	-
10	11:33:58	RX	65290	200	255	3	8	44 55 66 77 88 99 AA BB	-
11	11:33:58	RX	65299	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	-
12	11:33:58	RX	65281	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	-
13	11:33:58	RX	65281	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	-
14	11:33:58	RX	65290	200	255	3	8	44 55 66 77 88 99 AA BB	-
15	11:33:58	RX	65299	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	-
16	11:33:58	RX	65281	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	-
17	11:33:58	RX	65281	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	-
18	11:33:58	RX	65290	200	255	3	8	44 55 66 77 88 99 AA BB	-
19	11:33:58	RX	65281	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	-
20	11:33:58	RX	65299	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	-
21	11:33:58	RX	65281	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	-
22	11:33:58	RX	65290	200	255	3	8	44 55 66 77 88 99 AA BB	-
23	11:33:58	RX	65281	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	-
24	11:33:58	RX	65299	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	-
25	11:33:58	RX	65281	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	-
26	11:33:58	RX	65290	200	255	3	8	44 55 66 77 88 99 AA BB	-
27	11:33:58	RX	65281	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	-
28	11:33:58	RX	65281	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	-
29	11:33:58	RX	65299	200	255	4	8	78 79 7A 7B 7C 7D 7E 7F	-

<u>Note</u>: The Time column in the Excel file view has been modified to display the data correctly.

# **Network Scanner**

_	letwork ECU Address: 1				10					
Addr 128	NAME 0x80fEff00ffffffff	AAC 1	Ind. Grp. 0	Veh. Sys. O		Fct. 255	Fct.Inst.	ECU Inst.	Manuf. 2047	Identity No. 2097151

Please be aware that you can only scan the network when you have chosen *ECU Simulation Mode* in the *ECU Setup* tab. Otherwise, the software will indicate that there is no node ID available.

Click on the *Scan Network* command button, and the system will send a *Request for Address Claimed* message into the network. All other ECUs will respond and send their information, which will be displayed in the table.

# **Gateway Modus**

RXDATA RXDATA		Hardware Version: 1.00.00	Software Version: 1.00.00
IXDATA LOOPBACK - ACK RXDATA RXDATA	Request Status	Heartbeat Frequency [msec]: 100	00 Submit Heartbeat
XDATA LOOPBACK - ACK XDATA		Enable ACK (Acknowledgment)	
XDATA LOOPBACK - ACK XDATA XDATA		Checksum Errors: 0	-
XDATA LOOPBACK - ACK XDATA XDATA		Stuff Byte Errors: 0	

The *Gateway Modus* allows you to check the communication between your Windows computer and the gateway. The information as displayed here is described in the manual for the *JCOM1939 Protocol*.

<u>Note</u>: The FLASH command button will set the gateway into programming mode, meaning it will cease its regular operation. The only way to resume regular operation is to reset the device per power-cycle (off-on). This feature can be used to load firmware updates into the device. Please check with the product page on this website for possible updates.

Gateway Hardware and Firmware Version

The *Gateway Modus* section also displays the gateway's hardware and firmware version, which helps to determine whether or not an update will be necessary.

In the upper right position of the tab, check the *Software Version* number and verify it with the newest version as documented as shown above on this page.

<u>Note</u>: For a detailed description of the firmware update procedure, please refer to the <u>wiki section</u> <u>on our website</u> dedicated to the JCOM gateway's hardware. The firmware updating procedure is identical between devices but the reference to the firmware file will be different.

# Byte & Bit Editing Mode

As of version 3.20.00, we have added two sections to the software that allows the comfortable editing of selected data bits and bytes, resembling digital and analog signals:

Byte Data Editing – Simulation of Analog Signals

GN: 65281 ∨ Start Position: 2 ∨ Length: 1 ∨	PGN: 65285 V Start Position: 9 V Length: 2 V
Data: 121	Data: 43673
	PGN: 65299 V Start Position: 6 V Length: 2 V
PGN: 65290 V Start Position: 5 V Length: 3 V	

In the *Byte Data* section of the jCOM1939Monitor software, the user can select a previously designed PGN, the data start position, and the data length (1, 2, 3, or 4 bytes). The program will display the data as selected and allows the user to modify the data either per text input or sliding the associated track bar.

This mode was specifically designed with simulation of analog signals in mind. However, due to the generic nature of the software, it does not verify that the selected PGN data represents an analog parameter. In the above sample, we chose a random selection of proprietary PGNs, and, while the screen shows four different PGNs, the program also allows the simultaneous modification of several bytes in the PGN data field.

PGN:	65280	)( <mark>.</mark>	<ul> <li>✓ Start I</li> </ul>	Position:	· ~ ·	Length:	I ∨ PG	N: 6528	30 V Start Position: 2 V Length: 1 V	
Data:	106		_				Dat	a: 64		
PGN:	65280	) (( ) ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) (	<ul> <li>✓ Start</li> </ul>	Position:	3 ~ 1	Length: 2	2 ~ PG	N: 6528	00 V Start Position: 5 V Length: 4 V	
Data:	26067	1		_			Dat	a: 1548	3746751	
	х тх	PGN	to Scrolling SA	DA	P	Len	dividual () Enable All () Dia Data (Hex)		Description	
	x		128	255	6	8	11 22 33 44 55 66 77	34460	Sample PGN	
		65280	128	255	6	8	9B 22 33 44 55 66 77		Sample PGN	
		65280	128	255	6	8	9B 22 33 44 55 66 77		Sample PGN	
	x		128	255	6	8	9B 22 33 44 55 66 77		Sample PGN	
		65280	128	255	6	8	9B 22 33 44 55 66 77		Sample PGN	
		65280 65280	128	255	6	8	9B 63 33 44 55 66 77 9B 63 33 44 55 66 77		Sample PGN Sample PGN	
	x	65280	128	255	6	8	9B 63 93 B9 55 66 77		Sample PGN Sample PGN	
	x		128	255	6	8	9B 63 93 B9 55 66 77		Sample PGN	
0	x		128	255	6	8	9B 63 93 B9 55 66 77		Sample PGN	
1		65280	128	255	6	8	9B 63 93 B9 FF FF F1		Sample PGN	
2	x	65280	128	255	6	8	9B 63 93 B9 FF FF F1		Sample PGN	
3	x	65280	128	255	6	8	9B 63 93 B9 FF FF F1	8A	Sample PGN	
4	x	65280	128	255	6	8	9B 63 93 B9 FF FF F1	8A	Sample PGN	
5	x	65280	128	255	6	8	9B 63 93 B9 FF FF F1	8A	Sample PGN	
	х	65280	128	255	6	8	9B 63 93 B9 FF FF F1	8A	Sample PGN	
6	x	65280	128	255	6	8	9B 63 8D B9 FF FF F1	8A	Sample PGN	
-	x				4	8	9B 63 D3 65 FF FF F1	83	Sample PGN	
6 7 8	x	65280	128	255	6	0	35 63 D3 63 FF FF FI	UA.		
7			128 128	255 255	6	8	6A 63 D3 65 FF FF F1		Sample PGN	

The following screenshot demonstrates how several bytes in one PGN were modified:

Note that the data is being updated and transmitted as soon as it is modified by the user.

Bit Data Editing – Simulation of Digital Signals

```
ECU Setup Filter Transmit Byte Data Bit Data Recorder Network Gateway
  PGN: 65281
                                                                        PGN: 65281
                                                                                           ✓ Byte Position: 2 ✓
                     ✓ Byte Position: 8 ✓
  1 2 3 4 5 6 7 8
D D D D D D D D
                                                                        1 2 3 4 5 6 7 8
D D D D D D D
                            Data: 0x7F / 127d
                                                                                                    Data: 0x79 / 121d
                     ✓ Byte Position: 3 ✓
                                                                        PGN: 65299
                                                                                           ✓ Byte Position: Ⅰ ✓
  PGN: 65290
  1 2 3 4 5 6 7 8
0 0 0 0 0 0 0 0
                                                                                                    Data: 0x78 / 123d
                              Data: 0x66 / 102d
```

The *Bit Data* section was designed with the modification of digital signals in mind. It functions very similar to the *Byte Data* section, however, limited to one byte. Also, instead of a slider, the program uses check boxes to set or reset digital information.

The following screenshot demonstrates how several bits in one PGN were modified:
--

Prove and a second seco

PG 1	2 3	5280 3 4 2 2	1 5 6	<ul> <li>✓ Byte</li> <li>7 8</li> <li>✓</li> </ul>	Position: [ Data: (	1 ~ kF1 / 24	1d		PGN: 65	4 5 6 7 8	
PG 1	2	5280 3 4 2 E	4 5 6	> Byte 7 8	Position: [ Data: C		2d		PGN: 65	4 5 6 7 8	
(	Clear	TV	PGN	to Scrolling	Display T	x Messag P	es:	dividual (Hex)	O Disable All	Description	
+ 1	n/	1002.5	65280	128	255	6	7	11 22 33 44 55	66 77	Sample PGN	
	-		65280	128	255	6	7	11 22 33 44 55		Sample PGN	
			65280	128	255	6	7	F1 22 33 44 55		Sample PGN	
: ;			65280	128	255	6	7	F1 22 33 44 55		Sample PGN	
		х	65280	128	255	6	7	F1 22 33 44 55	66 77	Sample PGN	
			65280	128	255	6	7	F1 22 33 44 55		Sample PGN	
		x	65280	128	255	6	7	F1 3E 33 44 55	66 77	Sample PGN	
1		х	65280	128	255	6	7	F1 3E 73 44 55	66 77	Sample PGN	
	1	х	65280	128	255	6	7	F1 3E 70 44 55	66 77	Sample PGN	
0		х	65280	128	255	6	7	F1 3E 70 C4 55	66 77	Sample PGN	
1		х	65280	128	255	6	7	F1 3E 70 C3 55	66 77	Sample PGN	
2		х	65280	128	255	6	7	F1 3E 70 C3 55	66 77	Sample PGN	
3		x	65280	128	255	6	7	F1 3E 70 C3 55	66 77	Sample PGN	
4		х	65280	128	255	6	7	F1 3E 70 C3 55	66 77	Sample PGN	
		х	65280	128	255	6	7	F1 3E 70 C3 55	66 77	Sample PGN	
5		х	65280	128	255	6	7	F1 3E 70 C3 55	66 77	Sample PGN	
		х	65280	128	255	6	7	F1 3E 70 C3 55	66 77	Sample PGN	
6						6	7	F1 3E 70 C3 55	66 77	Sample PGN	
15 16 17 18		x	65280	128	255	0	1	FI 35 70 C3 33	00 //	Dampie Fou	

# JCOM1939 Monitor Pro-X – Extensions & Modifications

# The following features are only supported by JCOM gateways with Real-Time Clock (RTC).

<u>Note</u>: Please make sure to check that your current JCOM1939 Monitor version and the gateway's firmware version are up to date. Otherwise, there will be inconsistencies in functionality.

# PGN Filters – Assigning a Sample Frequency

Starting with V 4.01.00 (Gateway firmware version 2.01.00), the JCOM1939 Monitor Pro-X software, besides some slight design modifications, comes with an extended "Filter" section:

PGN	65289	Samp	ole Time [msec]	1000		Descrip	ption: S	ample Time Demo		Save	Delete
PGI	Time	Time Description									
652	89 1000	Sat	mple Time H	Demo						Apply Filter PGNs     As Defined In Ta	able
										O Pass All	
-											
	5.0									1	
1	Clear 🔽	Auto Sc	rolling Displa	ay Tx Mes	sages: (	Indi	ividual (	) Enable All 🔘 Disable All		1	
	Clear 🗸 . Time		rolling Displa	ay Tx Mes	sages: ( DA	Indi	ividual (	) Enable All () Disable All	Description	1	
							10000		Description Sample Time Demo	1	
	Time	RX	TX PGN	SA	DA	P	Len	Data	The sector enterty.	1	
	Time 11:11:34.147	RX x	TX PGN 65289	SA 136	DA 255	P	Len 8	Data 38h 37h 36h 35h 34h 33h 32h 31h	Sample Time Demo	1	
	Time 11:11:34.147 11:11:35.147	RX x x	TX PGN 65289 65289	SA 136 136	DA 255 255	P 6 6	Len 8 8	Data 38h 37h 36h 35h 34h 33h 32h 31h 38h 37h 36h 35h 34h 33h 32h 31h	Sample Time Demo Sample Time Demo	1	
	Time 11:11:34.147 11:11:35.147 11:11:36.147	RX x x x	TX PGN 65289 65289 65289	SA 136 136 136	DA 255 255 255	P 6 6	8 8 8 8	Data 38h 37h 36h 35h 34h 33h 32h 31h 38h 37h 36h 35h 34h 33h 32h 31h 38h 37h 36h 35h 34h 33h 32h 31h	Sample Time Demo Sample Time Demo Sample Time Demo	1	
	Time 11:11:34.147 11:11:35.147 11:11:36.147 11:11:37.147	RX x x x x	TX PGN 65289 65289 65289 65289	SA 136 136 136 136	DA 255 255 255 255	P 6 6 6	Len 8 8 8 8	Data 38h 37h 36h 35h 34h 33h 32h 31h 38h 37h 36h 35h 34h 33h 32h 31h 38h 37h 36h 35h 34h 33h 32h 31h 38h 37h 36h 35h 34h 33h 32h 31h	Sample Time Demo Sample Time Demo Sample Time Demo Sample Time Demo	1	
	Time 11:11:34.147 11:11:35.147 11:11:36.147 11:11:37.147 11:11:38.147	RX x x x x x	TX PGN 65289 65289 65289 65289 65289	SA 136 136 136 136 136	DA 255 255 255 255 255 255	P 6 6 6 6	Len 8 8 8 8 8 8 8	Data           38h         37h         36h         35h         34h         33h         32h         31h	Sample Time Demo Sample Time Demo Sample Time Demo Sample Time Demo Sample Time Demo	1	
	Time 11:11:34.147 11:11:35.147 11:11:36.147 11:11:37.147 11:11:38.147 11:11:39.147	RX x x x x x x	TX PGN 65289 65289 65289 65289 65289 65289 65289	SA 136 136 136 136 136 136	DA 255 255 255 255 255 255 255	P 6 6 6 6 6	Len 8 8 8 8 8 8 8 8 8 8	Data           38h         37h         36h         35h         34h         33h         32h         31h	Sample Time Demo Sample Time Demo Sample Time Demo Sample Time Demo Sample Time Demo Sample Time Demo	1	
	Time 11:11:34.147 11:11:35.147 11:11:36.147 11:11:37.147 11:11:38.147 11:11:39.147 11:11:40.147	RX x x x x x x x x x x	TX PGN 65289 65289 65289 65289 65289 65289 65289 65289	SA 136 136 136 136 136 136 136	DA 255 255 255 255 255 255 255 255	P 6 6 6 6 6 6	Len 8 8 8 8 8 8 8 8 8 8 8	Data           38h         37h         36h         35h         34h         33h         32h         31h	Sample Time Demo Sample Time Demo Sample Time Demo Sample Time Demo Sample Time Demo Sample Time Demo Sample Time Demo		
	Time 11:11:34.147 11:11:35.147 11:11:36.147 11:11:36.147 11:11:38.147 11:11:39.147 11:11:40.147 11:11:41.148	RX x x x x x x x x x x x	TX PGN 65289 65289 65289 65289 65289 65289 65289 65289 65289 65289	SA 136 136 136 136 136 136 136 136	DA 255 255 255 255 255 255 255 255 255	P 6 6 6 6 6 6 6	Len 8 8 8 8 8 8 8 8 8 8 8 8 8	Data           38h         37h         36h         35h         34h         33h         32h         31h           38h         37h         36h         35h         34h         33h <td>Sample Time Demo Sample Time Demo Sample Time Demo Sample Time Demo Sample Time Demo Sample Time Demo Sample Time Demo</td> <td></td> <td></td>	Sample Time Demo Sample Time Demo Sample Time Demo Sample Time Demo Sample Time Demo Sample Time Demo Sample Time Demo		

This new version allows editing a sample rate. Keeping the sample time at zero will result in realtime data reception, i.e., the original data rate.

In the screenshot above, we have assigned a sample rate of one second (1000 milliseconds) to PGN 65289 (we used a transmission rate of 50 milliseconds through our simulator).

#### Gateway Recorder – J1939 Data Recording Programming

Starting with V 4.10.00 (Gateway firmware version 2.20.00), the onboard microSD card is being used to store SAE J1939 data traffic and to set up the recording configuration. For that purpose, the JCOM1939 Monitor software has been extended by the "Gateway Recorder" section, as shown in the following image:

в					
Gateway COM Port:	COM14 ~ S	tart COM	Stop COM Heartbeat: 7 COM Errors: 0	CAN Baud Rate:	250 k 🗸
CU Setup PGN: 65		-	Recorder Gateway Recorder Network Gateway Settings Time [msec]: 5000 Description: Test 4		
	SAE J19	39 Tx Rate			Save
PGN		mple Rate	Description		
65280	User Sampe Rate	1000	Test 1		Delete
65281	User Sampe Rate	2000	Test 2		Copy Filter Setup
65282	SAE J1939 Tx Rate	0	Test 3		
65283	User Sampe Rate	5000	Test 4		Program Gateway
65284	User Sampe Rate	1000	Test 5		

The setup allows defining which PGN to record and which sample frequency to use. A sample frequency of zero indicates that the recorder should store the data immediately, i.e., according to the frequency defined by the SAE J1939 Standard.

This model assumes the recording of selected PGNs (message filtering) for diagnostics and analysis purposes. Depending on the number of PGNs, the maximum recording time can be between 4 to 12 weeks at 8 hours/day using a 16 GB microSD card.

Once the board is programmed (clicking the "Program Gateway" command button), the PC connection can be removed, and the gateway can be connected to a running SAE J1939 network (as simulated in our setup). Upon the next power-up cycle (Reset), the gateway will record the PGNs as defined in the setup without a PC connection.

The board will resume regular gateway operation as soon as it is re-connected to the PC running the JCOM1939 Monitor software.

#### Data Record Retrieval

At this time, data retrieval is accomplished by removing the SD card from the board and using a PC card reader.

For the purpose of improved data sampling and storage time, part of the real-time information, namely the date and hour of day, is integrated into the filename. This will reduce a great amount of redundant information.

Since the filename includes the recording date and hour, there will be one file per hour and a new file will be created at the beginning of a new hour (precision is plus/minus five seconds without loss of data).

#### Filename Format: DATAYYMMDDHH.txt

YY – Years since 2000 MM – Month DD – Day HH – Hour (0...23)

All information (data) is stored in ASCII text format, providing easy readability and adding basic means to verify data validity.

The file format is, however, MS-Excel-compatible. The screenshot below shows an example of one of our recording sessions.

<u>Note</u>: It almost appears that only PGN 65282 (FF02) is being recorded. However, this PGN is sampled at the highest frequency (20 msec). We checked, and the recording session does sample all PGNs as specified.

	DATA201130.txt ~	
H:MM:SS,MS ,D,PGN ,DA,SA	A,P,L,D1,D2,D3,D4,D5,D6,D7,D8,	
00:00:02,985,0,FF02,FF,C	8,6,8,10,11,12,13,14,15,16,11,	
	8,6,8,10,11,12,13,14,15,16,11,	
	8,6,8,10,11,12,13,14,15,16,11,	
	8,6,8,10,11,12,13,14,15,16,11,	
	8,6,8,10,11,12,13,14,15,16,11,	
	8,6,8,10,11,12,13,14,15,16,11,	
	8,6,8,10,11,12,13,14,15,16,11,	
	8,6,8,10,11,12,13,14,15,16,11,	
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	8,6,8,10,11,12,13,14,15,16,11,	
	8,6,8,10,11,12,13,14,15,16,11,	
	8,6,8,10,11,12,13,14,15,16,11,	
	8,6,8,10,11,12,13,14,15,16,11,	
	8,6,8,10,11,12,13,14,15,16,11,	
	8,6,8,10,11,12,13,14,15,16,11,	
· · · · · · · · · · · · · · · · · · ·	8,6,8,10,11,12,13,14,15,16,11,	
	8,6,8,10,11,12,13,14,15,16,11,	
	8,6,8,10,11,12,13,14,15,16,11,	
	8,6,8,10,11,12,13,14,15,16,11,	
	8,6,8,10,11,12,13,14,15,16,11,	
	8,6,8,10,11,12,13,14,15,16,11,	
	8,6,8,10,11,12,13,14,15,16,11, 8,6,8,10,11,12,13,14,15,16,11,	
	8,6,8,10,11,12,13,14,15,16,11,	
	8,6,8,10,11,12,13,14,15,16,11,	
	8,6,8,10,11,12,13,14,15,16,11,	

The data columns include time of day, milliseconds, Data Page, PGN, destination address (DA), source address (SA), and the data.

<u>Note</u>: We separated the milliseconds from the time of day to maintain a basic level of MS-Excel-Compatibility (Excel does not support time formatting down to milliseconds).

The next screenshot shows the same data as read by MS-Excel:

		AutoSave	OFF	^ 🖬	టె ఈ ∿	৫ =									B	DATA2
н	ome In	sert D	raw	Page Lay	out For	rmulas	Data	Re	eview	Vi	ew	Ô.	Tell n	ne		
	Paste	× B	ibri (Boc I <u>U</u>	iy) ▼   ⊞	<ul> <li>12 </li> <li>✓</li> <li< th=""><th>A^ A` A ~</th><th>Ξ</th><th>=   =</th><th>Ξ</th><th>≫7 <b>√</b> ∓=</th><th>, <u>→=</u></th><th>ab C</th><th></th><th>Text</th><th>♥ enter ヽ</th><th>Ge \$</th></li<></ul>	A^ A` A ~	Ξ	=   =	Ξ	≫7 <b>√</b> ∓=	, <u>→=</u>	ab C		Text	♥ enter ヽ	Ge \$
R:	11 🛔	× ✓	$f_X$													
1	A	В	С	D	E	F	G	Н	1	J	K	L	Μ	N	0	Р
1	HH:MM:SS	MS	D	PGN	DA	SA	Р	L	D1	D2	D3	D4	D5	D6	D7	D8
2	0:00:02	985	0	FF02	FF	C8	6	8	10	11	12	13	14	15	16	11
3	0:00:02	986	0	FF02	FF	C8	6	8	10	11	12	13	14	15	16	11
4	0:00:02	990	0	FF02	FF	C8	6	8	10	11	12	13	14	15	16	11
5	0:00:03	10	0	FF02	FF	C8	6	8	10	11	12	13	14	15	16	11
6	0:00:03	30	0	FF02	FF	C8	6	8	10	11	12	13	14	15	16	11
7	0:00:03	50	0	FF02	FF	C8	6	8	10	11	12	13	14	15	16	11
8	0:00:03	70	0	FF02	FF	C8	6	8	10	11	12	13	14	15	16	11
9	0:00:03	90	0	FF02	FF	C8	6	8	10	11	12	13	14	15	16	11
10	0:00:03	110	0	FF02	FF	C8	6	8	10	11	12	13	14	15	16	11
11	0:00:03	130	0	FF02	FF	C8	6	8	10	11	12	13	14	15	16	11
12	0:00:03	150	0	FF02	FF	C8	6	8	10	11	12	13	14	15	16	11
13	0:00:03	170	0	FF02	FF	C8	6	8	10	11	12	13	14	15	16	11
14	0:00:03	190	0	FF02	FF	C8	6	8	10	11	12	13	14	15	16	11
15	0:00:03	210	0	FF02	FF	C8	6	8	10	11	12	13	14	15	16	11
16	0:00:03	230	0	FF02	FF	C8	6	8	10	11	12	13	14	15	16	11
17	0:00:03	250	0	FF02	FF	C8	6	8	10	11	12	13	14	15	16	11
18	0:00:03	270	0	FF02	FF	C8	6	8	10	11	12	13	14	15	16	11
19	0:00:03	290	0	FF02	FF	C8	6	8	10	11	12	13	14	15	16	11
20	0:00:03	310	0	FF02	FF	C8	6	8	10	11	12	13	14	15	16	11
21	0:00:03	330	0	FF02	FF	C8	6	8	10	11	12	13	14	15	16	11
22	0:00:03	350	0	FF02	FF	C8	6	8	10	11	12	13	14	15	16	11
23	0:00:03	370	0	FF02	FF	C8	6	8	10	11	12	13	14	15	16	11
24	0:00:03	390	0	FF02	FF	C8	6	8	10	11	12	13	14	15	16	11

However, in order to create this view, we made a few modifications: We renamed the file from .txt to .csv to establish Excel-compatibility. We formatted the time column (HH:MM:SS) according to Excel format. Lastly, we formatted all columns to left margin and adjusted the column width.

The test setup created text file sizes of 250MB per 24-hour recording session, which translates into roughly 48 days recording capacity at 24 hours per day using a 16GB SD card.