Komodo GUI Software User Manual

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1 Overview

The Komodo CAN Interface is a CAN interface capable of active CAN data transmission as well as non-intrusive CAN bus monitoring. The Komodo CAN Interface GUI software interacts directly with the Komodo interface.

The Komodo GUI is built upon the freely available Komodo Software API as detailed in the Komodo CAN Interface datasheet.

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1.1 Komodo CAN Duo Interface

The Komodo CAN Duo Interface has two independent, customizable CAN channels along with eight configurable GPIOs. The Komodo interface also has two virtual USB ports (via a single physical USB port).

The two CAN channels make simultaneous communication on and/or monitoring of two separate CAN buses possible using a single Komodo CAN Duo Interface.

GPIO, General Purpose IO, allows users to synchronize external logic with a CAN channel, as well as output events to external devices, such as oscilloscopes.

The two virtual USB ports allow users to communicate with a single Komodo interface simultaneously from two software applications.

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1.2 Komodo CAN Solo Interface

The Komodo CAN Solo Interface has one customizable CAN channel along with eight configurable GPIOs. The Komodo interface also has one virtual USB port.

GPIO, General Purpose IO, allows users to synchronize external logic with a CAN channel, as well as output events to external devices, such as oscilloscopes.

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1.3 Changes in version 1.51

- Improved USB driver support for Linux.

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1.4 Changes in version 1.50

CAN

- Added Komodo CAN Solo Interface.

Top

1.5 Changes in version 1.40

CAN

- Added batch mode interface.

Top

1.6 Changes in version 1.30

CAN

- Added ability to send messages periodically.
- Improved performance during long captures.

Top

1.7 Changes in version 1.20

CAN

- Added GPIO interface.

Top

1.8 Changes in version 1.11

CAN

- Fixed an issue when exporting in General CAN mode.

Top

1.9 Changes in version 1.10

CAN

- Added ability to send arbitrary CAN packets.
- Added automatic CAN bitrate detection.
- Fixed minor sizing issues.
- Minor bug fixes.

2 Getting Started

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2.1 Requirements

System Requirements for the Komodo GUI Software, including supported versions of Windows, Linux, and macOS, are provided on the Komodo GUI Software product page under System Requirements. Be sure the device driver has been installed prior to plugging in the Komodo interface.

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2.2 Installing the Komodo GUI

The Komodo GUI software is a self-contained application. Installing the software is as easy as unpacking the archive containing the software package. To install the Komodo GUI:

1. Download the latest version of the software from the Total Phase website.
2. Unzip the zip archive to your desired location.

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2.3 Launching the Komodo GUI

2.3.1 Windows

1. Go to the folder where the software package was extracted.
2. Click on **"Komodo GUI.exe**"

2.3.2 Linux

1. Go to the installation directory where the software package was unzipped.
2. Run `>./Komodo\ GUI`

To communicate on or monitor a CAN bus, the Komodo GUI software must be connected to a Komodo interface. When a Komodo interface virtual port is connected to the software, it will be unavailable for use by another process until the port is disconnected from the process or the application is terminated. Because each Komodo CAN Duo Interface has two virtual ports, two application instances can be simultaneously connected to a single Komodo CAN Duo Interface. Only one application instance can be connected to a single Komodo CAN Solo Interface.

2.3.3 Connect a Komodo Port

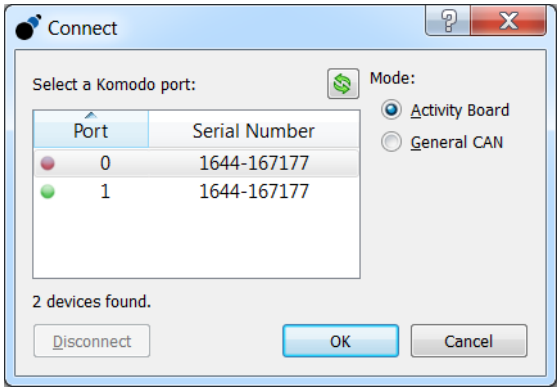


***Figure 1** : Komodo Interface Connect Window*
The Connect window displays a list of available Komodo ports and their serial numbers.

The configuration window (Figure 1) has a list of available Komodo ports and their version information.

List of Available Komodo Ports

Top

In the connect window, there is a list of all the available Komodo ports. If no Komodo ports appear in the list, then there are no available Komodo interface ports connected to your computer.

Refresh rescans the USB bus and updates the list of Komodo ports

Please note that Komodo ports that are in use by other applications are not available for use. These ports are shown with a red connection dot to the left of the port number in the Connect window (see Figure 1).

The list of Komodo ports provides the following information:

Port

The port number is a zero based identifier. For more information about Komodo port assignments please consult the relevant sections of the Komodo CAN Interface datasheet.

Serial Number

The serial number of the Komodo interface with which the port number is associated.

Selecting the Mode

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Ports can be opened in either **Activity Board Mode**, **Batch Mode**, or in **General CAN Mode**. For more information on GUI modes, refer to Section 3.

Opening a Komodo Port

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Click **"OK"** to connect to the desired Komodo port. You can also double-click on the selected entry in the list.

The port and serial number of the Komodo interface will appear in the status bar at the bottom of the window to indicate which Komodo interface is being used in this instance of the application.

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2.4 Switching Modes

The current application mode can be changed by clicking on the **Mode** menu. The shortcut keys for the two modes are:

Table 1 : Mode Shortcuts

Mode Shortcuts	
`Activity Board`	Ctrl + B
`General CAN`	Ctrl + G
`Batch`	Ctrl + A

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2.5 Disconnecting from the Komodo Port

The Komodo port can be disconnected from the current application. To do so, click on the **"Connect"** button or go to the menu item: **Analyzer | Connect**. Once the Connect window opens, click on the **"Disconnect"** button.

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2.6 Exiting the Application

To exit the application, go to the menu item: **File | Quit**.

3 Application

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3.1 General

3.1.1 Setting the Bitrate Automatically

The bitrate can be set automatically by pressing the **"Auto Bitrate Button"**. When the button is pressed, a dialog will appear, displaying the operations progress. The operation can be canceled at any time by pressing the **"Abort"** button in the dialog.

The Komodo interface will cycle through the following bitrates and determine if any match the bitrate used on the connected CAN bus.

- 1000 kHz
- 500 kHz
- 250 kHz
- 125 kHz

- 100 kHz
- 50 kHz
- 25 kHz
- 20 kHz

Once the bitrate detection operation completes, the pass/fail result is displayed in the progress dialog. Red text indicates a failure to detect bitrate. Green text indicates a successful bitrate lock.

The progress dialog is automatically dismissed shortly after the bitrate operation result is displayed. The new bitrate will appear in the **Bitrate Field** of the toolbar. The Bitrate Field will pulse red to indicate failure to detect bitrate, or green to indicate successful bitrate detection.

3.1.2 Setting the Bitrate Manually

The bitrate can be manually configured by entering a bitrate value in the **Bitrate Field** of the toolbar. Once a bitrate has been entered, click Enter or click on the green check icon to set the bitrate. Click the red X icon to revert to the previous bitrate.

The resulting bitrate may slightly different from the entered value, as only certain discrete bitrates are permitted. The application will set the bitrate to the value nearest the entered bitrate.

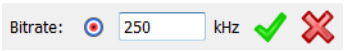


Figure 2 : Bitrate setting widgets in the toolbar

3.1.3 Toggling the CAN Channel

The Komodo GUI can use either CAN channel (A or B) on the connected Komodo CAN Duo Interface. The default channel is A. Only channel A is available on the Komodo CAN Solo Interface, and this button is disabled.



CAN Channel toggles between A and B when the button is pressed

3.1.4 Session Management

The session management controls and indicators in the toolbar are as follows:



Start Capture begins a capture

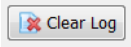


Stop Capture ends a running capture

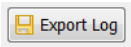


Capture Indicator shows that a capture is running by pulsing green

3.1.5 Log Management



Clear Log clears the transaction log (**File | Clear Log** or **Ctrl + L**)



Export Log opens a CSV export dialog (**File | Export Log** or **Ctrl + E**)



Create Batch Script creates the batch script for replaying the log in the batch mode (**File | Create Batch Script** or **Ctrl + P**)



Scroll Off disables log scrolling



Scroll On enables log scrolling, but scrolling will disable on user interaction with the log



Scroll Locked enables scrolling and locks scrolling against user interaction with the log

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3.2 Activity Board Mode

The Activity Board mode of the Komodo GUI is designed specifically for the CAN/I^{2}C Activity Board Pro. In this mode, the application polls the CAN devices on the CAN/I^{2}C Activity Board Pro and updates the GUI accordingly. The mode is shown in Figure 3.

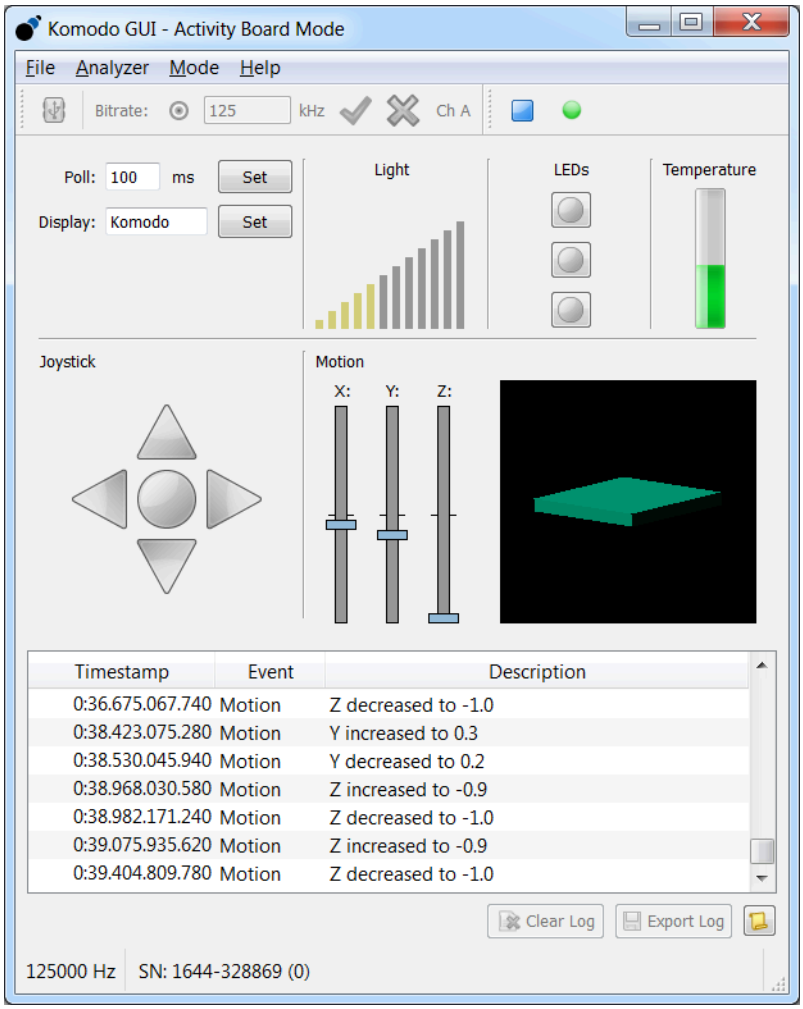


Figure 3 *: Activity Board Mode*
Activity Board Mode presents the status of the CAN/I²C Activity Board Pro CAN devices through graphical widgets and a transaction log.

3.2.1 Inputs

Polling Interval

Top

The rate in milliseconds at which the application will poll the CAN/I²C Activity Board Pro for sensor updates (light, temperature, etc.). See Figure 4.

Display

Top

The text to display on the CAN/I²C Activity Board Pro LCD. See Figure 4.

LEDs

Top

The LED buttons toggle the on/off value of the CAN/I²C Activity Board Pro user-configurable LEDs. The LED buttons are arranged, top to bottom, in this order: LED 3, 2, 1. The order of LEDs on the CAN/I²C Activity Board Pro is, left to right, in this order: LED 3, 2, 1. See Figure 4.



Figure 4 *:* ***(a)*** *Polling and Display inputs* ***(b)*** *LED settings*

3.2.2 Outputs

Light

Top

The light intensity, as detected by the the CAN/I^{2}C Activity Board Pro light sensor. The more yellow bars, the higher the light intensity. See Figure 5.

Temperature

Top

The ambient temperature, as detected by the CAN/I^{2}C Activity Board Pro temperature sensor. The more filled the temperature bar, the higher the temperature. See Figure 5.

Joystick

Top

The current position of the CAN/I^{2}C Activity Board Pro 8-way hat switch (joystick). Filled green arrows show the direction of the joystick. A filled green center indicates that the joystick is being pressed into the board. See Figure 5.

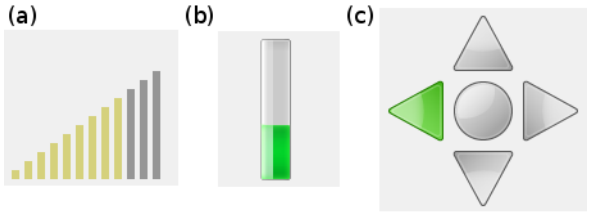


***Figure 5** : **(a)** Light Sensor intensity **(b)** Temperature Sensor Value **(c)** Joystick position*

Motion

Top

The 3-axis position of the CAN/I^{2}C Activity Board Pro. Motion is represented via X, Y and Z axis bars and a visual representation of the board. See Figure 6.

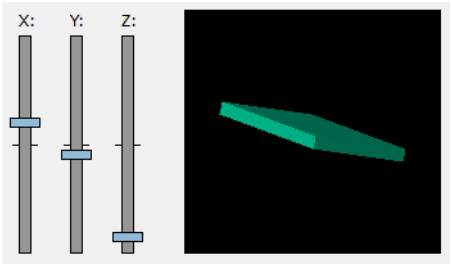


***Figure 6** : Komodo GUI motion widget for CAN/I^{2}C Activity Board Pro Motion Sensor*

3.2.3 Transaction Log

The transaction log is a scrolling log of the CAN bus events that are related to the CAN/I^{2}C Activity Board Pro. Log information is arranged into three columns, which are described below. For information on log scrolling, clearing, and exporting, see Section 3.1.5.

Timestamp

Top

The time at which the event occurred, relative to the start of capture. The time is displayed in the format (minutes, seconds, milliseconds, microseconds, nanoseconds):

```
M:ss.mmm.uuu.nnn
```

Event

Top

A text description of a CAN/I^{2}C Activity Board Pro event. The following are valid events:

Table 2 : Activity Board Transaction Log Events

Activity Board Transaction Log Events	
`Display`	The LCD text value was changed

`Joystick`	The board joystick was moved
`LEDs`	The LED configuration changed
`Light`	The light intensity changed
`Motion`	The board position changed
`Temperature`	The ambient temperature changed

Top

Description

A brief description of the board event.

Timestamp	Event	Description
0:14.333.438.920	Motion	Y increased to 0.8
0:14.395.231.940	Motion	X increased to -0.4
0:14.431.647.980	Light	Decreased to 39%
0:14.434.092.000	Motion	Y decreased to 0.7, Z decreased to -0.2
0:14.505.168.640	Motion	X decreased to -0.5, Z decreased to -0.5
0:14.532.337.400	Light	Increased to 47%
0:14.534.777.700	Motion	Y decreased to 0.6, Z decreased to -0.7

***Figure 7** : Komodo GUI Activity Board mode transaction log*

Top

3.3 General CAN Mode

The General CAN mode of the Komodo GUI is designed for general purpose CAN communication. In this mode, the application monitors the CAN bus and reports CAN packets, events and errors in the transaction log. With active CAN enabled, General CAN mode also offers the ability to send arbitrary CAN packets. The mode is shown in Figure 8.

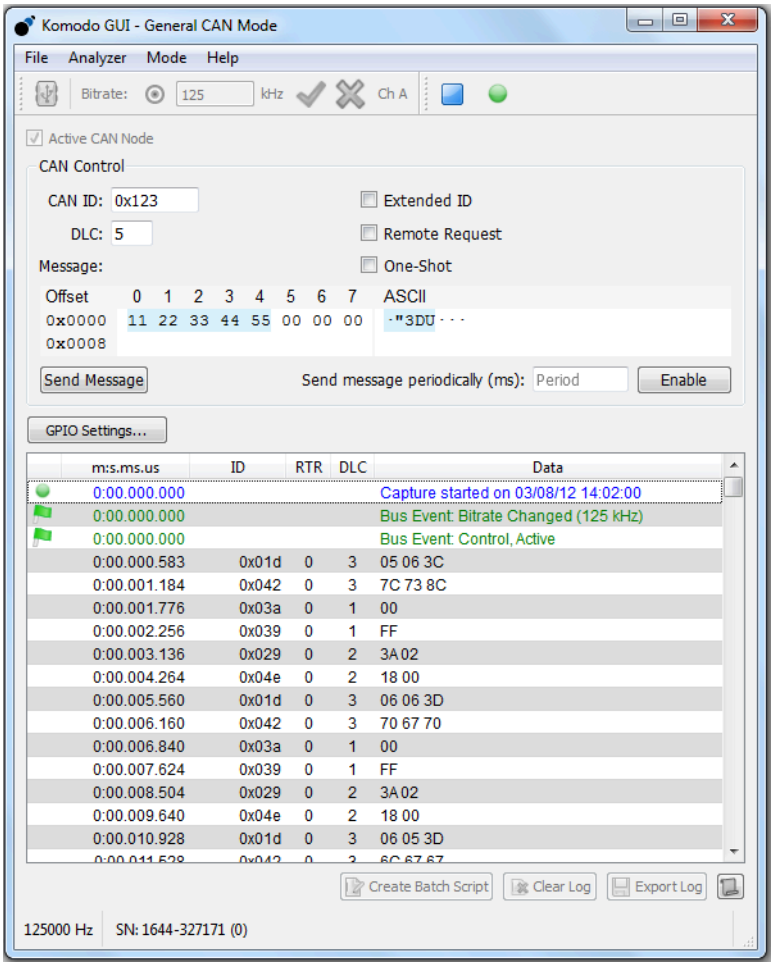


***Figure 8** : General CAN Mode reports CAN packets, events, and errors through a transaction log.*

3.3.1 Settings

Active CAN Node

Top

The **Active CAN Node** checkbox enables packet ACKing on the Komodo port. When the box is checked, the application will acquire the **Control** feature from the Komodo port. When the box is unchecked, the port will act as a passive monitor (listen-only) on the CAN bus. For more information, refer to the Komodo CAN Interface datasheet.

3.3.2 CAN Control

The **CAN Control** group box offers a way to send customized packets over a CAN bus. The various fields and options are described below.

CAN ID

Top

The packet destination node ID. For normal packets, the ID is the node to which the data is delivered. For remote requests, the ID is the node to which the request is delivered. Note that the Extended ID field dictates the acceptable CAN ID range.

DLC

Top

Data length code field. Specify the number of data bytes you wish to send here. The application also uses this value for the DLC field of the outgoing CAN packet.

Extended ID

Top

If checked, the CAN packet ID field will be 29 bits, rather than 11 bits.

Remote Request

Top

Check to make the CAN packet a remote request packet, instead of a normal data packet. No data will be transmitted in this mode.

One-Shot

Top

If checked, the Komodo will only attempt to transmit the CAN packet once. If a delivery failure occurs, the packet will not be retransmitted. If one-shot is disabled, the default timeout of 10 ms is used. That is, the Komodo will attempt to retransmit for up to 10 ms upon failure.

Message

Top

Enter up to 8 bytes of data in the message field. The data will be transmitted to the destination node, unless the packet is marked as a remote request. The highlighted data bytes, as determined by DLC and Remote Request, indicate the portion of the message that will be transmitted.

Send Message

Top

Press the Send Message Button or **Ctrl + S** to transmit the CAN packet. If the CAN ID or DLC field entries are not valid, the packet will not be transmitted, and a red pulse will indicate the field needing attention.

Send message periodically

Top

Periodic sending options offer a way to periodically send a message on the CAN bus. While this option is enabled, it is not possible to change the message parameters or send messages manually.

Period(ms)

Enter a time period in milliseconds to specify how often the message will be transmitted.

Enable/Disable button

Toggle this button to enable and disable the periodic sending. If you click **"Enable**" while capture is running, periodic sending will begin right away. If you click **"Enable**" while capture is not running, periodic sending will begin as soon as the capture starts.

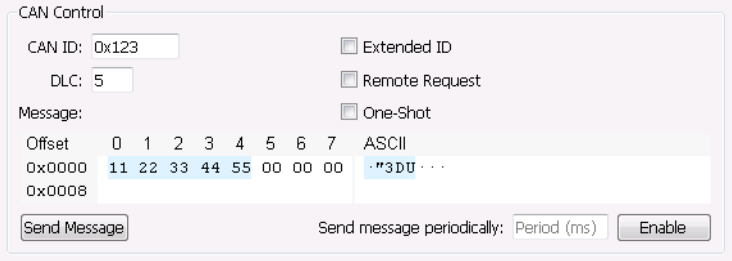


Figure 9 *: Komodo GUI General CAN mode CAN Control box*

3.3.3 GPIO Settings

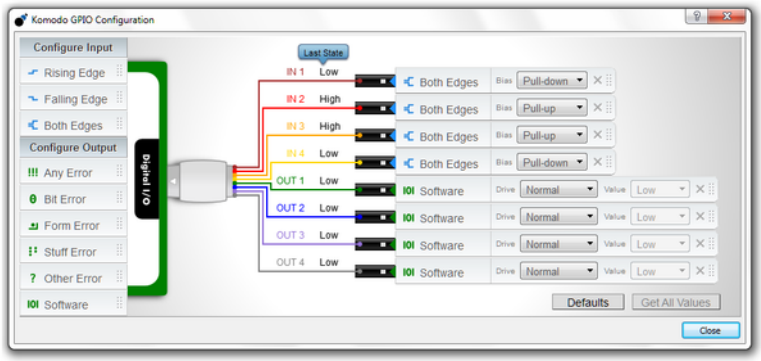


Figure 10 *: The GPIO Settings dialog offers a way to configure, get current values and set new values of GPIO pins*

The **GPIO Settings** dialog offers a way to configure, get current values of and set new values of general purpose input and output (GPIO) pins. While the dialog is open, all options in the main window are also accessible.

Changing the pin configuration is allowed only when the application is connected to the Komodo interface and the Komodo interface is not in the running state. Changing the pin values and querying for the current state of the pins is only allowed when the Komodo interface is in the running state.

Each of the pins labeled with IN 1, IN 2, IN 3, IN 4 can be configured as an input by dragging one of the inputs from **Configure Input** section and dropping it on one of these pins. Each of the pins labeled with OUT 1, OUT 2, OUT 3, OUT 4 can be configured as an output by dragging one of the outputs from **Configure Output** section and dropping it on one of these pins. The various options for each pin type are described below.

Configure Input

Top

Digital inputs allow users to synchronize external logic with a CAN channel. Whenever the state of an enabled digital input changes, an event will be sent to the analysis PC and displayed in the transaction log.

- **Rising Edge** – Report change on rising edge.
- **Falling Edge** – Report change on falling edge.
- **Both Edges** – Report change on both edges.

The digital input options are as follows:

Bias

Specify a voltage bias for an input pin.

- **Pull-Down** – Pulls down input voltage using high impedance resistor to GND.
- **Pull-Up** – Pulls up input voltage using high impedance resistor to 3.3 V.
- **Hi-Z** – No modification to input voltage.

Configure Output

Top

Digital outputs allow users to output events to external devices. A common use for this feature is to trigger an oscilloscope or logic analyzer to capture data. The output pins can be activated on the various conditions below. Refer to the Komodo datasheet for details on the output signal characteristics and refer to the CAN specification for details on the different error types.

- **Any Error** – Output pulse on any error.
- **Bit Error** – Output pulse on bit error.
- **Form Error** – Output pulse on form error.
- **Stuff Error** – Output pulse on stuff error.
- **Other Error** – Output pulse on other error.
- **Software** – Control the output levels via software.

The digital output options are as follows:

Channel

Specify a source channel for an error activated output pin.

- **A** – Active on CAN A error.
- **B** – Active on CAN B error.
- **Both** – Active on CAN A or B error.

Drive

Specify the voltage drive for an output pin.

- **Normal** – Active is 3.3V; Inactive is GND.
- **Inverted** – Active is GND; Inactive is 3.3V.
- **Open Drain** – Active is GND; Inactive is floating.
- **+Pullup** – Equivalent to **Open Drain** with a high impedance pullup.

Value

Set a value for a software controlled output pin. Changing the value for one of the pins will also update last state for all of the pins.

- **Low/High** for **Normal** drive.
- **Float/Low** for **Open Drain**.
- **Pullup/Low** for **Open Drain+Pullup**.

Last State

Shows the state of each pin from the last time it was checked. Values in this column get updated when one of the following happens:

- Komodo is activated.
- "Get All Values" button is clicked.
- State of one of the software activated pins is manually changed in this dialog.

Get All Values

Update **Last State** for all of the pins.

Defaults

Set the default configuration for all of the pins. This will configure IN pins as inputs with pull-downs that report changes on both edges and OUT pins as software controlled outputs.

3.3.4 Transaction Log

The transaction log is a scrolling log of CAN bus events, including CAN packets, errors, capture start, and capture stop. Log information is arranged into five columns, which are described below. For information on log scrolling, clearing, and exporting, see Section 3.1.5.

Timestamp

Top

The **Timestamp** field is identical to the Timestamp field in Activity Board Mode. See Section 3.2.3.1.

ID

Top

The **ID** of the source CAN node of the CAN packet. When a packet is marked as **RTR**, the ID, instead, corresponds to the destination CAN node (the requestee).

RTR

Top

RTR (Remote Transmission Request) is either 0 (not RTR) or 1 (RTR), and indicates whether or not the CAN packet is marked as a Remote Transmission Request.

DLC

Top

DLC (Data Length Code) is the specified number of bytes transmitted in a single CAN packet.

Data

Top

The **Data** field contains the data payload for CAN packets, and a textual description for CAN events, errors, and capture events.

Timestamp	ID	RTR	DLC	Data
1:00.463.217.960	0x039	0	1	00
1:00.464.102.160	0x029	0	2	30 03
1:00.465.242.860	0x04e	0	2	1B 80
1:00.466.536.220	0x01d	0	3	01 FF 37
1:00.467.139.480	0x042	0	3	03 03 03
1:00.563.028.780	0x03a	0	1	00
1:00.563.809.280	0x039	0	1	00
1:00.564.701.780	0x029	0	2	30 03
1:00.565.835.600	0x04e	0	2	1B 80
1:00.567.138.220	0x01d	0	3	01 01 39
1:00.567.748.800	0x042	0	3	03 03 03

***Figure 11** : Komodo GUI General CAN mode transaction log*

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3.4 Batch Mode

The Batch mode of the Komodo GUI is designed for creating and executing batch scripts for sending arbitrary CAN packets. In this mode, the application also monitors the CAN bus and reports CAN packets, events and errors in the transaction log. The mode is shown in Figure 12. Batch script can be automatically created from the existing capture in the General CAN Transaction Log by clicking the **"Create Batch Script**" button. One **send** command will be generated for each CAN data or remote packet in the log.

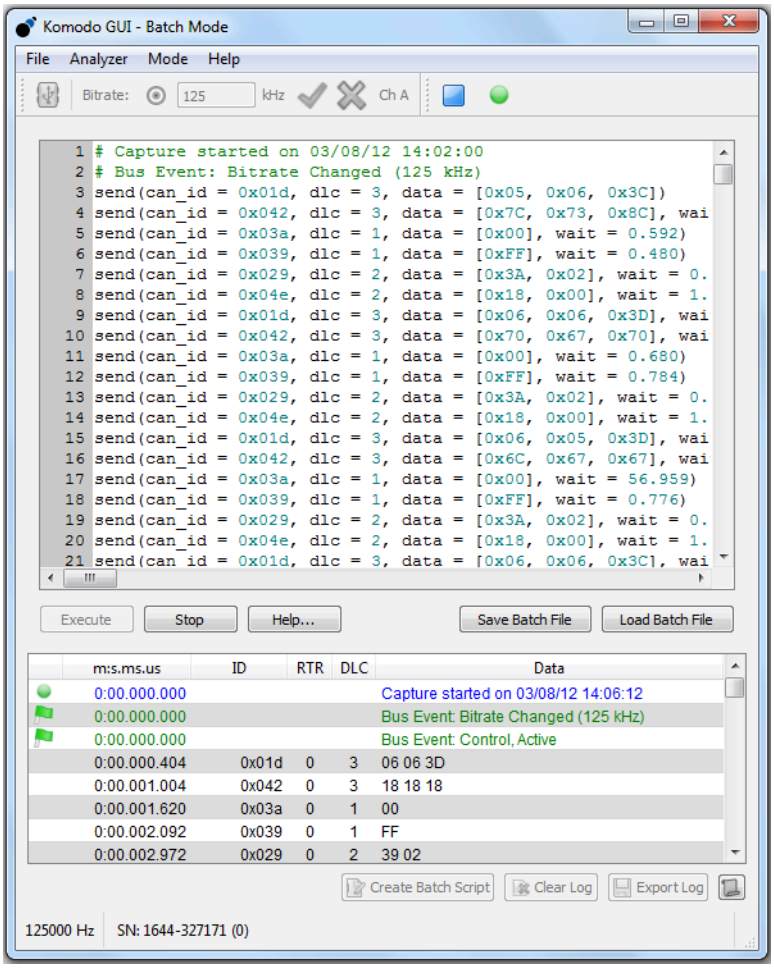


Figure 12 *: Batch Mode allows creating and executing batch scripts for sending arbitrary CAN packets.*

3.4.1 Batch Script Editor

Batch Script Editor uses Python syntax. This means that local variables can be defined, control structures can be used, and comments starting with a hash character (#) can be inserted as well. For more information on Python syntax and data structures, see http://www.python.org. For the specifics of the Komodo CAN Interface commands, please refer to the Batch Mode documentation accessible from the Batch Mode panel of the Komodo GUI application.

3.4.2 Output Window

The output window is located right below the script editor and contains all the output generated from the script including print statements and exceptions thrown during the execution or compilation of the script. At the start of the program, the output window is hidden, and it will become visible as soon as some output is generated. Script editor and output window can be re-sized by dragging the boundary between them.

3.4.3 Execute

Start the script. The capture will automatically start before execution of the script if it is not running already.

3.4.4 Stop

Abort the script. The script will also be aborted if capture is stopped.

3.4.5 Help

Open the Batch Mode documentation.

3.4.6 Save Batch File

Save current script.

3.4.7 Load Batch File

Load a script from file.

3.4.8 Transaction Log

Please see Section 3.3.4 for the description of the Transaction Log.

4 Notes

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4.1 Multiple Application Instances

It is possible to access a single Komodo CAN Duo Interface from two separate applications, simultaneously. To do so from the Komodo GUI, simply launch a second instance of the application and connect to the second Komodo port. It is not possible to do this with Komodo CAN Solo Interface.

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4.2 Technical Specifications

Detailed Technical Specifications for the Komodo CAN Interface and the CAN/I^2C Activity Board Pro are available on the Total Phase website: https://www.totalphase.com/

5 Legal / Contact

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5.1 Disclaimer

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5.2 Life Support Equipment Policy

Total Phase products are not authorized for use in life support devices or systems. Life support devices or systems include, but are not limited to, surgical implants, medical systems, and other safety-critical systems in which failure of a Total Phase product could cause personal injury or loss of life. Should a Total Phase product be used in such an unauthorized manner, Buyer agrees to indemnify and hold harmless Total Phase, its officers, employees, affiliates, and distributors from any and all claims arising from such use, even if such claim alleges that Total Phase was negligent in the design or manufacture of its product.

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5.3 Contact Information

Total Phase can be found on the Internet at https://www.totalphase.com/. If you have support-related questions, please go to the Total Phase website. For sales inquiries, please contact sales@totalphase.com.

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