

KLOWTM
DRIVE  GREEN
SAVE  GAS

Patent Pending
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1 Introduction

The Kiwi, designed by PLX Devices Inc., was created in response to the rising gas prices and increasing concern of global warming CO2. This simple to use device is perhaps the easiest way to reduce your yearly expenditures on gasoline and to do your part in reducing your CO2 signature. The Kiwi is a culmination of over 5 years of research and development in internal combustion engine technologies and was designed by Stanford University, Cornell University and University of California graduates. Kiwi provides you with information on how you can maximize your fuel economy by modifying your driving behavior. Up to 33% improvement in your MPG is possible by simply modifying your driving habits. We hope that you enjoy using Kiwi as much as we did creating it.

1.1 Patents

PLX Devices Inc. currently has patents pending on Kiwi's architecture, algorithms and customizable gauge implementations.

1.2 Warnings

Do not operate this product under direct sunlight or in high temperatures. Damage and malfunction may occur.

To prevent fire or shock hazard, do not expose this product to rain or moisture.

Do not operate this product while driving. This may interfere with driving operations, resulting in an accident or even death.

Do not drive with this product if you have not securely tied the OBD cable away from your vehicle controls such as your gas pedal and/or brake pedal. This may interfere with the operation of your vehicle resulting in injury or death.

Do not use this product and its accessories in any way other than specified by PLX Devices Inc. PLX Devices Inc. is not liable for accidents or damage caused by misuse of this product.

Do not tamper, disassemble, or modify this product. This may cause an accident, fire, electric shock, or product malfunction.

1.3 Key Features

1. Plug and play to 1996 vehicles and later
2. Engine code check and reset
3. 2.2" Color OLED Display
4. 5 Button interface
5. Mini USB
6. Portable

1.4 Package Contents

1. Kiwi main unit
2. User Guide
3. Mounting stand
4. Double stick tape
5. 2 zip ties

1.5 Software Requirements

In Kiwi's "fun mode" you can upload your own animation with Kiwi Programmer, available here <http://plxkiwi.com/product/fun.html>

Recommended System Requirements:
Windows 95 or higher operating system
Pentium 4/III/II Celeron 1GHz+
Athlon/Duron 1 GHz+
256MB Ram

2 Overview



2.1 Installation

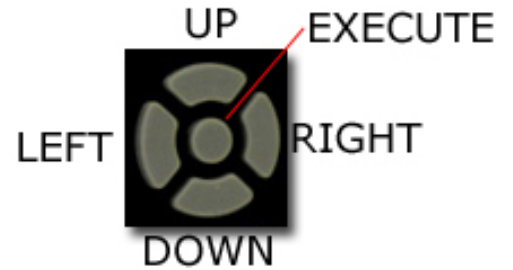


Connect Kiwi to Vehicle

Locate the OBDII connector and simply plug Kiwi in. This connector is often located on the driver's side near or under the steering column.

2.2 Navigating

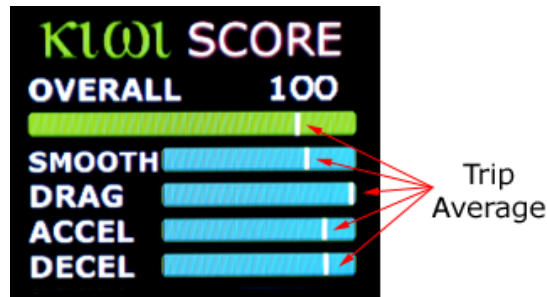
Navigate through Kiwi's menu system with the 5 buttons. The 'CENTER' or execute button is used to enter into a new mode or return you back to the main menu. There are a total of 9 icons. Press the down button to see the 3rd row of icons.



3 Functions

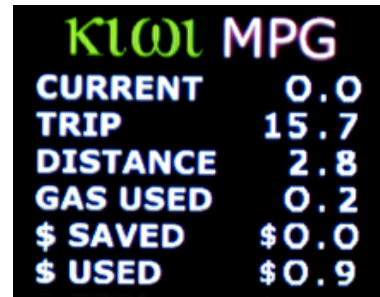
3.1 Kiwi Score

The Kiwi score represents the efficiency of your driving style. A score of 100 represents the most efficient condition and a score of 0 represents wasteful driving conditions. The Kiwi score represents the sum average of 4 parameters, smoothness, drag, acceleration and deceleration. By maximizing your Kiwi score, you'll maximize your fuel efficiency.



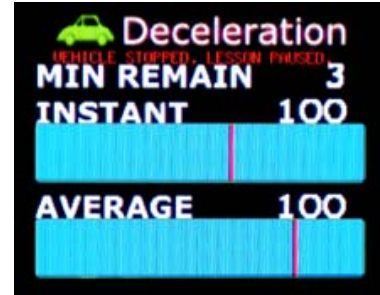
3.2 MPG Mode

The MPG mode consists of 2 menus, a basic view and a detailed view. The basic view shows you your current instantaneous MPG and your trip MPG since you've started your trip. In the detailed view, you'll see your current MPG, trip MPG, distance traveled, gallons of gas used, dollars of gas saved and dollars of gas used since you've started your vehicle. Press the 'RIGHT' and 'LEFT' button to toggle between basic and advanced view.



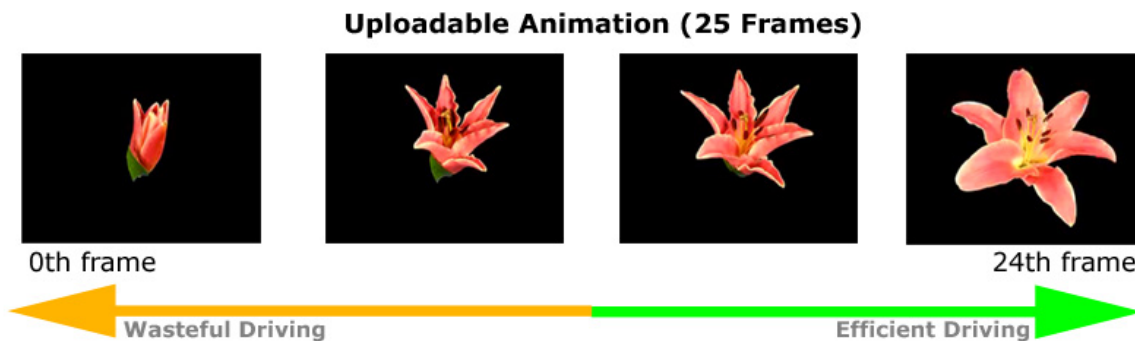
3.3 Drive Green

Drive green mode provides you with a series of 20 lessons designed to optimize your Kiwi score. Each lesson consists of a 3 minute drive where your goal is to keep your instantaneous and average bars above the red lines seen below. Lessons get increasingly more difficult as you progress. If your vehicle comes to a stop, the lesson pauses and resumes again once your vehicle is back in motion. By completing the lessons on a regular basis, you will be adequately equipped with the knowledge and training necessary to keep your Kiwi score at a high level.



3.4 Fun

In "Fun Mode" Kiwi becomes personal and customizable. As you drive, a series of animations appear. For example, the greener or more efficient you drive, the more the flower will bloom. Different animations can be uploaded to the Kiwi via the USB port. You can also make your own animation. Please see the section titled Kiwi Programmer for more details.



3.5 Engine Check

Kiwi becomes a scan tool in this mode. If your vehicle has an engine check light illuminated, Kiwi can identify the cause of your engine trouble code and clear the light. If a trouble code exists, Kiwi will display it in the following format. A typical trouble code looks like the following:

P0171

First Character – System

The first character identifies the system related to the trouble code.

- P = Powertrain
- B = Body
- C = Chassis
- U = Undefined

Second Digit - Code Type

The second digit identifies whether the code is a generic code (same on all OBD-II equipped vehicles) or a manufacturer specific code.
 0 = Generic (this is the digit zero -- not the letter "O")
 1 = Enhanced (manufacturer specific)

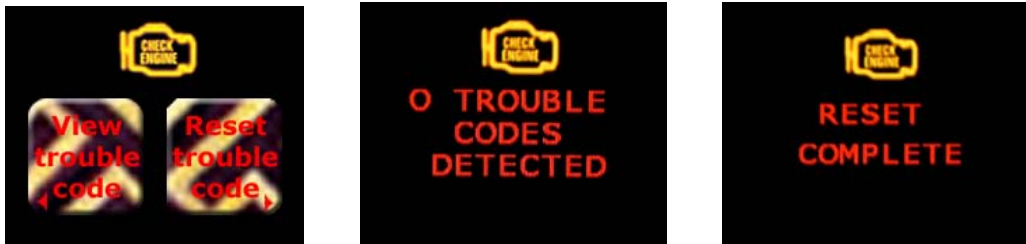
Third Digit - Sub-System

The third digit denotes the type of sub-system that pertains to the code

- 1 = Emission Management (Fuel or Air)
- 2 = Injector Circuit (Fuel or Air)
- 3 = Ignition or Misfire
- 4 = Emission Control
- 5 = Vehicle Speed & Idle Control
- 6 = Computer & Output Circuit
- 7 = Transmission
- 8 = Transmission
- 9 = SAE Reserved
- 0 = SAE Reserved

Fourth and Fifth Digits

These digits, along with the others, are variable and relate to a particular problem. For example, a P0171 code means P0171 - System Too Lean (Bank 1). To lookup your particular code, visit http://www.obd-codes.com/trouble_codes



Please note that by resetting the engine trouble code turns off the engine check light indicator only. It does not prevent the light from returning if the root cause of the problem does not get fixed.

3.6 Sensors

In the Sensors mode, Kiwi can view your basic engine parameters.



Page1:

Sensor	US STD	Metric
Throttle Position	%	%
Engine Speed	rev/min	rev/min
Vehicle Speed	MPH	KMH
Engine Load	%	%
Engine Timing	Degrees	Degrees
Intake Pressure (MAP)	inHG	Kpa

Page2:

Sensor	US STD	Metric
Air Flow Rate (MAF)	LBS/min	grams/sec
Fuel System Status	Open, Closed	Open, Closed
Short Term Fuel Trim Bank1	%	%
Long Term Fuel Trim Bank1	%	%
Short Term Fuel Trim Bank2	%	%
Long Term Fuel Trim Bank2	%	%

Page3:

Sensor	US STD	Metric
Air Intake Temperature	Fahrenheit	Celsius
Water Temperature	Fahrenheit	Celsius
Fuel Pressure	PSI	Kpa
OBD Type	Type	Type
Narrowband O2 Sensor Voltage Sensor 1 Bank 1	Volts	Volts
Narrowband O2 Sensor Voltage Sensor 2 Bank 1	Volts	Volts

Page4:

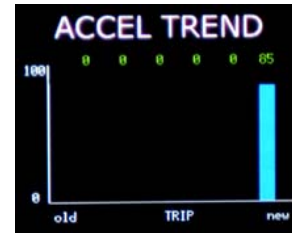
Sensor	US STD	Metric
Narrowband O2 Sensor Voltage Sensor 1 Bank 2	Volts	Volts
Narrowband O2 Sensor Voltage Sensor 2 Bank 2	Volts	Volts
Ambient Air Temperature	Fahrenheit	Volts
Relative Fuel Pressure	PSI	Kpa
Fuel Level	%	%
Barometric Pressure	inHG	Kpa

Page5:

Sensor	US STD	Metric
Catalytic Converter Bank 1 Sensor 1	Fahrenheit	Celsius
Catalytic Converter Bank 2 Sensor 1	Fahrenheit	Celsius
Catalytic Converter Bank 1 Sensor 2	Fahrenheit	Celsius
Catalytic Converter Bank 2 Sensor 2	Fahrenheit	Celsius
ECU Voltage	Volts	Volts
Absolute Engine Load	%	%

3.7 Logs

In Logs, you're able to review past trip data in the form of bar graphs. Your most recent trip is displayed on the far right. Each new trip shifts the bar graph over to the left by one slot. By pressing the 'RIGHT' and 'LEFT' buttons you toggle between the different logs.



3.8 Trip Summary

Every time you turn off your engine, Kiwi displays the trip summary menu. The dollars used, dollars saved, total dollars saved, kiwi score, trip MPG, distance traveled, and gas used are displayed before going into a standby mode.

While the trip summary menu is being displayed, you have the option of saving your reference MPG by pressing the 'RIGHT' button. While in the reference MPG menu, the current MPG and your most recent MPG are displayed. If you wish to replace your current MPG with the most recent MPG, press the 'RIGHT' button.

```

TRIP SUMMARY
$ USED      $1.0
$ SAVED     $0.0
$ TOTAL     $0.0
KIWI SCORE  83
MPG         13.3
DISTANCE    2.8
GAS USED    0.2

```

```

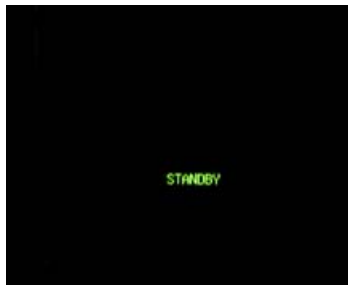
REFERENCE MPG
CURRENT     21.5
RECENT      13.3

SAVE NEW?
< NO      YES >

```

3.9 Standby

The standby mode appears when your vehicle's engine is off and becomes a screen saver. In standby mode, Kiwi still consumes power (~120mA), however it is much less than the power it consumes when the Kiwi is running in normal operation. If your vehicle is driven only once every three weeks or more, it is likely that your battery will completely drain. If this is the case, power the Kiwi down with the hard switch located on the left side of the Kiwi. The power switch turns the Kiwi off completely and does not consume any power. If your vehicle is driven on a regular basis (at least once a week), it is recommended that you leave Kiwi powered on at all times.



3.10 Dollars Saved

Dollars saved is calculated by comparing your current trip MPG with your saved reference MPG. If your current MPG is greater than the saved reference MPG, Kiwi calculates the difference and reports the dollars saved. Dollars saved is displayed in the detailed MPG view and in the trip summary. This feature works best when you save your reference MPG value the first few days you use your Kiwi. After progressing through the Drive Green lessons, you should notice significant improvements in your MPG. This feature is great for calculating your dollars saved by driving more efficiently. In the trip summary, \$ saved, is your dollar savings for your most recent trip. The \$ total is your accumulated savings over time by adding all your trip savings together. This is great for seeing how much money you've saved by using Kiwi over the span of weeks, months, and years. \$ Total can be reset to zero by resetting Logs or by resetting Kiwi to factory defaults.

```

KIWI MPG
CURRENT     0.0
TRIP        15.7
DISTANCE    2.8
GAS USED    0.2
$ SAVED     $0.0
$ USED      $0.9

```

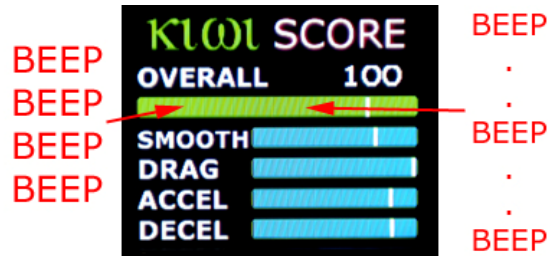
```

TRIP SUMMARY
$ USED      $1.0
$ SAVED     $0.0
$ TOTAL     $0.0
KIWI SCORE  83
MPG         13.3
DISTANCE    2.8
GAS USED    0.2

```

3.11 Audible Beep

The audible beep is a feature that can be turned on or off from the setup menu. This feature allows the driver to receive an audible alert if poor driving efficiency exists. The audible alert is based on your Kiwi Score. The lower your Kiwi score the faster you'll hear beeping. The audible alert works in all menus; this means that you're not restricted to having to be on the Kiwi Score menu for this feature to work. In the setup menu you can also adjust the sensitivity of your audible beep from (Low, Mid, High).



4 Setup



4.1 Set Gas Price

Set the gas price so that Kiwi displays your used and saved dollar amounts correctly. Press the 'LEFT' or 'RIGHT' button to toggle between the digits. Press the 'UP' and 'DOWN' button to set the value. Press the 'CENTER' button to save and exit.



4.2 Set Gas Type

Kiwi is compatible with gasoline, diesel, E85, ethanol, methanol, LPG and CNG. Set the appropriate gas type your vehicle is using. 'UP' and 'DOWN' changes the gas type. Press the 'CENTER' button to save and exit.



4.3 Calibrate MPG

It is recommended that you leave this setting set at 0% unless you've observed discrepancies in your reading. If your vehicle is equipped with a "MAF" sensor, calibration is typically not necessary. Vehicles with a "MAP" sensor typically require more calibration to obtain accurate readings. The type of sensor equipped on your vehicle is displayed on the bottom left corner of this screen. If your vehicle is equipped with both types of sensors, Kiwi will automatically use "MAF" to obtain the most accurate reading possible.

One method to calibrate your MPG is to drive your vehicle on the freeway on flat and level ground around 50-55MPH. Keep your vehicle speed constant and smooth. Your readings should be close to your advertised highway EPA MPG sticker that came with your car. Your vehicle MPG information is also available online at www.fueleconomy.gov. If your Kiwi is reading MPG too low, increase the adjustment factor to a higher number. If your Kiwi is reading MPG too high, decrease the adjustment factor to a lower number. The press the 'CENTER' button to save changes and exit.



4.4 Set Reference MPG

This menu allows you to manually set the Reference MPG value. The reference MPG is used to calculate your dollars saved. For example if your reference MPG is set at 20 MPG, and your most recent trip MPG is 25. Your dollars saved will reflect a 5 MPG difference and Kiwi automatically calculates your savings.



4.5 Units

This menu allows you to set the unit of measurement you wish to use on your Kiwi. US Standard and Metric unit of measurements are available. Press the 'LEFT' or 'RIGHT' button to change the unit type. Press the 'UP' and 'DOWN' button to toggle between your options. Press the 'CENTER' button to save and exit.

Volume: Select between US Gallons or Liters.

Distance: Select between Miles or Kilometers

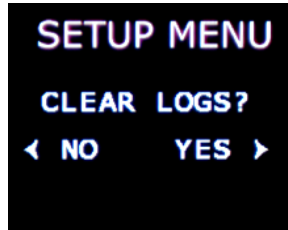
Fuel: Select between miles per gallon, kilometers per liter, or liters per 100 kilometers

Sensor: Select between US Standard or Metric. See section 3.6 for details.



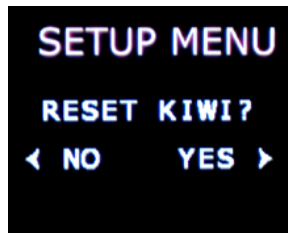
4.6 Reset Logs

This menu clears all the information from the logs menu and \$ total from the trip summary menu.



4.7 Reset Kiwi

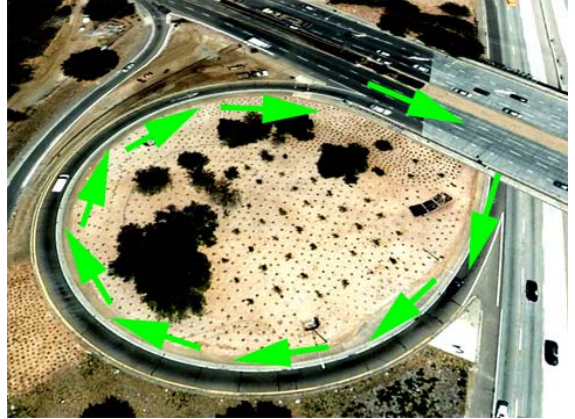
This menu restores Kiwi back to factory default settings, it also resets logs.



5 Efficient Driving Tips



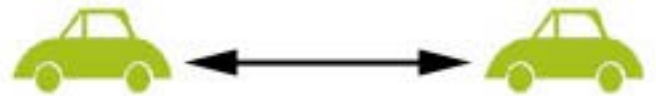
Drive the speed limit. Driving at speeds above 55 MPH greatly increases drag and significantly reduces fuel efficiency.



Maintain your momentum on freeway onramps. This increases smoothness and avoids having to reaccelerate out of it.



When exiting the freeway, plan far ahead. Use your speed to coast the off ramp to optimize your deceleration.



Keep a good distance between the vehicle in front of you. This gives you a buffer zone and prevents you from having to suddenly brake and accelerate your vehicle.



Look ahead, if you see a red light, coast to a stop as early as you can. This avoids having to brake at the last minute. The earlier you remove your foot off the gas the more fuel you'll save.



When merging onto the freeway, accelerate gradually and consistently up to speed. A linear acceleration saves more fuels than a burst of acceleration at the beginning.

6 Kiwi Programmer

The Kiwi Programmer is used to upload “Fun” image animations for personalizing your Kiwi.

6.1 Device Driver

The Kiwi connects to your laptop via the USB port. You must have the USB device driver installed on your PC before connecting Kiwi to it. The device driver can be downloaded from here:

http://plxkiwi.com/support/CDM_Setup.exe

Once you’ve downloaded the device driver, run the program to install the device driver.

6.2 Connecting Kiwi to your Laptop.

Please note that Kiwi must be powered on from your vehicle. Kiwi DOES NOT turn on from power supplied from the USB port.

After you’ve installed your USB device driver, connect Kiwi to your laptop.



6.3 Installing the Program

Download the Kiwi Programmer, unzip it, and run the executable.

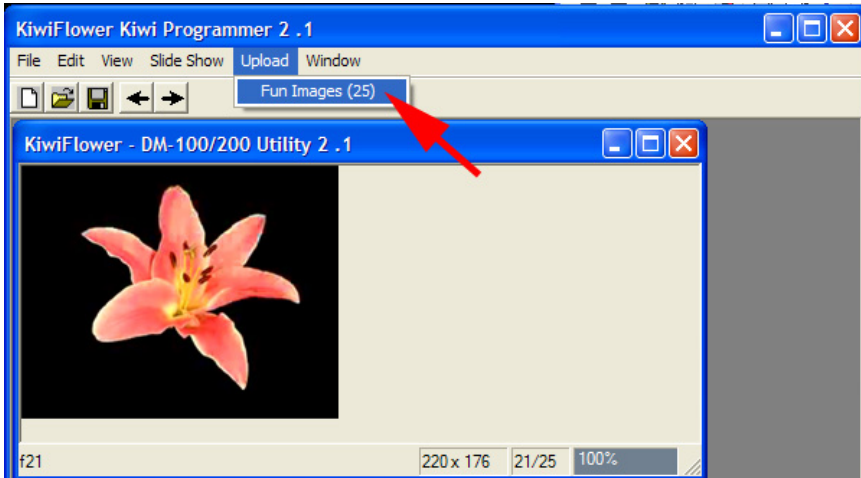
<http://plxkiwi.com/support/KiwiProgrammer.zip>

6.4 Uploading Fun Animation

The Kiwi must be powered on and toggled to the menu “Connect to PC.” You can get to this menu by toggling to the info menu then push the ‘RIGHT’ button.



To upload an animation sequence, go to File, Open. Select the album (*.abm) file and click open. Then click on Upload, Fun Images to upload the animation to Kiwi.



6.5 Creating Personal Animations

If you wish to create your own Fun animations, you'll need to create a series of 25 images of 220 x 176 pixels in JPG, BMP or TIFF format. Once you've created the 25 images, you need to add the images into the Kiwi Programmer's album in sequential order. You can do this by clicking file, New. Add all 25 images to your album by clicking Edit, Add. Then once you've added all 25 images to the album, verify the sequence of your animation by clicking on Slideshow from the toolbar. Click File Save to save your album.

7 Technical Specifications

Physical Dimensions	2.2" x 3.4" x 0.5" inches
Compatible Fuels	Gasoline, Diesel, Ethanol, E85, CNG, Methanol, LPG
Power Consumption	2 Watts
OBDII/CAN Protocols	ISO-9141, VPW, PWM, KWP 2000, 11Bit CAN, 29Bit CAN
OBDII PIDs	26 PIDs
Processors	Custom PLX 32 Bit Processor, Custom PLX GPU (Graphics Processor Unit)
Operation Temperature	0 - 85 Deg C
Operating Voltage	10V-18V
Human Interface	5 Button Remote
PC Interface	USB 2.0
Firmware Upgradeable	Yes
Enclosure	ABS Plastic

TERMS OF USE - PLX Devices Inc. does not guarantee product functionality with ALL vehicles. Implementation and integration of the PLX products with any other device(s) must be done at your own risk. Improper installation and usage may lead to engine damage. Mount and install PLX products in a location where it does not obstruct the driver's view and/or ability or safely control the vehicle.

LIMITED WARRANTY - PLX Devices Inc. warrants this product to be free from defects for 1 year from the date of purchase. If applicable, Oxygen sensors and other non-serviceable items are excluded from stated warranty. Serviceable goods must be determined by PLX Devices to be defective before any warranty or replacement is issued. PLX Devices' obligation under warranty shall be limited to repairing or replacing, under the discretion of PLX Devices, any part proven defective. This warranty is limited to the repair or replacement of parts in the manufactured good and the necessary labor done to affect its repair or replacement.

SERVICE UNDER WARRANTY - In the unlikely event that your PLX Devices hardware should fail during the warranty period, a Return Material Authorization number (RMA) must be first retrieved from PLX Devices Customer Support. Support can be contacted through email: support@plxkiwi.com or by phone: 408-745-7591. All serviceable goods must be packaged securely with proof of purchase, RMA number, with all shipping charges prepaid and shipped to PLX Devices Inc. Goods returned under warranty must be received by PLX Devices Inc. within ten (10) business days after the RMA number has been issued. Goods received after this period is subject to fees for the service of repair or replacement. All repaired or replaced items shall be warranted for the remainder of the original product warranty.

RETURNS AND RESTOCKING FEE - A 15% restocking fee will apply to applicable PLX Devices products for refund. All returns are to be packed in original condition including packaging, documentation, manuals, and accessories. Returns that do not include all the accessories and components may be returned to the customer or charged on a per item basis. The customer assumes responsibility for product until receipt at PLX Devices Inc., shipping via an insurable carrier is recommended. Any unauthorized shipping charges will be billed to the customer or shipment will be refused.

DISCLAIMER - PLX Devices Inc. shall not be liable for direct, special, incidental, or consequential damages resulting from any legal theory including, but not limited to, lost profits, downtime, goodwill, damage, injury to persons, or replacement of equipment and property due to improper installation, integration and/or misuse of any PLX Devices Inc.'s product(s). This warranty applies to the original purchaser of product and is non-transferable. All implied warranties shall be limited in duration to the said 1 year warranty period.