Use Link’s G4 Plug-ins and free yourself from the constraints of the factory ECU

Link Engine Management
Overview

Plug-In ECUs that deliver:

1. Take your car into a qualified Link Installer. They will....
2. Locate the original factory ECU, unplug the loom and remove the enclosure from the car.
3. Open the enclosure and remove the original PCB. Install the Link G4 Plug-In ECU, it will fit beautifully.
4. Re-install the enclosure into the car and plug in the loom.
5. Fit a MAP (Manifold Air Pressure) line from the ECU to the engines inlet manifold.
6. Plug the supplied USB cable into their laptop and connect using PCLink.
7. Start the engine (it should start immediately and run smoothly) and drive the car onto the dyno.
8. Dyno tune the car to make it the best it can be, all in a minimum of time.
9. Enjoy you car now that it makes exciting power, idles beautifully, starts cleanly and drives smoothly.

All G4 Plug-In ECUs run the same powerful micro controller and firmware as the G4 Xtreme.

Key Features

• Invisible installation — fits inside the factory enclosure
• Up to 6D fuel and ignition mapping
• Precision closed loop cam control (four cam, independent control)
• Sequential fuel delivery
• Digital triggering, all OEM patterns
• Rotary - fully sequentially staged injection and sequential ignition
• OEM idle hardware supported
• 6D boost control with three switchable tables
• Motorsport features - antilag, launch control, flat shift
• Continuous barometric correction (on board)
• CAN port
• QuickTune - automated fuel tuning
• Individual cylinder correction
• USB tuning cable included
• Stats recording into on-board memory
• Gear compensations for spark, boost etc
• Real time selectable dual fuel, ignition and boost maps
• Sync and crank sensors can be a combination of Hall effect, variable reluctance or optical
• Boost control referenced to gear, speed or throttle position
• Up to 4MB internal logging memory
• Firmware updates available online (linkecu.com)
• Knock with “windowing” via additional G4 KnockBlock
# Models Available

<table>
<thead>
<tr>
<th>Make &amp; Model</th>
<th>Version</th>
<th>Specification</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Holden</strong></td>
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<tr>
<td>G4 VLLink</td>
<td></td>
<td>VL Commodore</td>
<td>HVLC</td>
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<tr>
<td><strong>Honda</strong></td>
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<tr>
<td>G4 CivicLink</td>
<td>1992 - 1995</td>
<td>B16a Includes boost control (add our three port solenoid)</td>
<td>HC92</td>
</tr>
<tr>
<td>G4 CivicLink</td>
<td>1996 - 1999</td>
<td>B16a Includes boost control (add our three port solenoid)</td>
<td>HC96</td>
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<tr>
<td><strong>Mazda</strong></td>
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<tr>
<td>G4 Rx7Link</td>
<td>Series 6</td>
<td>Includes “oil metering pump” control, single turbo only</td>
<td>RX7S6</td>
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<tr>
<td>G4 Rx7Link</td>
<td>Series 7, 8</td>
<td>Includes “oil metering pump” control, single turbo only</td>
<td>RX7S7</td>
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<tr>
<td>G4 MX5Link</td>
<td>Miata/MX-5, 323 GT-X</td>
<td>BP / BPT</td>
<td>MX5G4</td>
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<tr>
<td><strong>Mitsubishi</strong></td>
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<tr>
<td>G4 EVOLink</td>
<td>EVO I – III</td>
<td>GSR &amp; EVO (On-board PCB 2.5 bar MAP sensor)</td>
<td>EVO3G4</td>
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<tr>
<td>G4 EVOLink</td>
<td>EVO IV – VIII</td>
<td>Includes 2.5 bar MAP sensor</td>
<td>EVO8G4</td>
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<tr>
<td>G4 EVOLink</td>
<td>EVO IX</td>
<td>Includes 2.5 bar MAP sensor</td>
<td>EVO9G4</td>
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<tr>
<td>G4 VR4Link</td>
<td>VR4</td>
<td>4G63 (On-board PCB 2.5 bar MAP sensor)</td>
<td>VR4G4</td>
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<tr>
<td><strong>Nissan</strong></td>
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<tr>
<td>G4 GTSLink</td>
<td>R32-R33</td>
<td>(Blue header plug) (76 pin)</td>
<td>NGT4</td>
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<tr>
<td>G4 GTRLink</td>
<td>R32-R34</td>
<td>(Blue header plug) (76 pin)</td>
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<td>R34GTS</td>
<td>RB25DET “NEO” (Grey header)</td>
<td>NGTT4</td>
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<td>G4 S15Link</td>
<td>Silvia</td>
<td>SR20DET (64 pin)</td>
<td>NS15G4</td>
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<td>S14 &amp; S15</td>
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<tr>
<td>G4 GTIRLink</td>
<td>GTIR</td>
<td>SR20DET (64 pin)</td>
<td>NS15G4</td>
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<td>G4 S13Link</td>
<td>Silvia</td>
<td>SR20DET, CA18DET (76 pin)</td>
<td>NS13G4</td>
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<tr>
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<td>S13 &amp; S14</td>
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<tr>
<td><strong>Subaru</strong></td>
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<tr>
<td>G4 WRXLk</td>
<td>V1 &amp; V2</td>
<td>Impreza WRX &amp; STI (MY93 – MY96) + RS Legacy</td>
<td>WRX2G4</td>
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<tr>
<td>G4 WRXLk</td>
<td>V3 &amp; V4</td>
<td>Impreza WRX &amp; STI (MY97, MY98 &amp; 22B)</td>
<td>WRX4G4</td>
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<tr>
<td>G4 WRXLk</td>
<td>V5 &amp; V6</td>
<td>Impreza WRX &amp; STI (MY99 &amp; MY00) &amp; Forester</td>
<td>WRX6G4</td>
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<tr>
<td>G4 WRXLk</td>
<td>V7 &amp; V8 &amp; V9</td>
<td>Impreza WRX &amp; STI, cam control</td>
<td>WRX9G4</td>
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<td>G4 WRXLk</td>
<td>V10</td>
<td>Impreza WRX &amp; STI, cam control &amp; e-throttle (does not fit inside original enclosure) (G4 Xtreme + AdaptaLink)</td>
<td>G4X + AXS10</td>
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<tr>
<td><strong>Toyota</strong></td>
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<tr>
<td>G4 CelicaLink</td>
<td>ST205</td>
<td>3SGTE</td>
<td>TST205</td>
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<tr>
<td>G4 CelicaLink</td>
<td>ST185</td>
<td>3SGTE</td>
<td>TST185</td>
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<tr>
<td>G4 MR2Link</td>
<td>3SGTE Rev 2 &amp; 3</td>
<td>3SGTE</td>
<td>TST205</td>
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<tr>
<td>G4 MR2Link</td>
<td>3SGTE Rev 1</td>
<td>3SGTE</td>
<td>TST185</td>
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G4 Plug-In Features

Individual Cylinder, Closed Loop Knock Control
KnockBlock G4 Interface

Knock, also known as detonation, refers to the spontaneous combustion of an air/fuel mixture inside a combustion chamber. Knock is induced by excessive pressure within the combustion chamber causing the air/fuel mixture to self detonate. These pressures can be a result of high engine temperature, inappropriate turbo boost pressure, excessive inlet air temperature, and ignition timing which is over advanced.

The Link G4 Plug-In with the addition of the KnockBlock G4 as an interface enables knock control. Information is passed between the two devices using one auxiliary channel and one digital input. This allows configurable ‘time windowing’ techniques enabling the Plug-In to determine which cylinder has knock, and the severity of the knock. 3D knock level threshold tables are used to prevent false detection caused by mechanical engine noise.

Up to Six Dimensions of Fuel & Ignition Tuning

Under most circumstances a 3D Fuel Table is sufficient. RPM is typically used for one axis with load (typically represented by MAP or MGP) on another axis. The 3rd axis/dimension is the fuel zone value.

This 3D mapping will be very familiar to the average tuner and a 3D surface representing the fueling can be easily visualised or physically displayed by selecting Surface Graph.

In special cases 3D mapping may not be adequately flexible to cope with all operating parameters.

Multi-throttle, turbo charged engines typically show an example of this. With the throttle wide-open at a MAP value of, for example, 200kPa and an engine speed of 5000rpm the engine will have considerably different fueling requirements than with the throttle half open and the same MAP and engine speed. In this case the 4D Fuel Table table may be used. This second table may be spanned using throttle position on the load axis.

When a 4D/5D/6D table is turned on, its Table Activation mode can be selected. This allows the 4D or 5D Fuel Table to become active only under certain conditions. This is useful if an external switch or switching output is required to activate the table (e.g. switching in the 4D Fuel Table and ignition when the nitrous solenoid becomes active). If the table is required to be always active, set this adjustment to Always ON.

As with all tables, 4D and 5D Fuel Tables can have their X and Y axis parameters selected and their row/column locations adjusted.
**QuickTune Your Fuel**

Using PCLink, QuickTune is an interactive tuning tool that assists in time efficient fuel tuning. A graphical display of Target AFR (desired AFR) and Actual AFR (measured AFR) is provided. A dual pointer gauge allows the tuner to quickly see how close Actual AFR is to the Target AFR. QuickTune can be setup to operate over the entire fuel table or just over a particular area.

QuickTune can be used in Manual or Automatic modes. In Manual mode, QuickTune guides you to cell centering and advises you when is a suitable time to make a fuel table adjustment. With the press of a key a calculated adjustment is made. Often only one or two adjustments are required to tune each cell. In Automatic mode QuickTune does all the adjustments for you. This leaves the tuner free to operate the Dyno or perform other tuning work such as making ignition or cam angle adjustments.

**Dynamic Configuration**

This means that the tuner can now configure the ECU to meet any requirements they may deem necessary. Previously tuners had to operate within what the Link engineers defined, at the time of writing the firmware. The result of this absolute flexibility is that G4 ECUs can be customised by the tuner to optimise any engine.

**Fully Configurable, Variable Cam Control**

Precision closed loop cam control for up to four cams, independently controlled, with feedback so that the ECU knows exactly where they are at all times. Precise cam control is the window to performance for modern, high performance engines and G4 ECUs provide precision cam control as a standard feature.

**Diagnostics - “What’s Been Happening”**

G4 ECUs log all information for display at a later date via PCLink. Max/min temperatures, pressures, number of times limits are hit etc. are all recorded.

**Compatibility**

Engine, triggering and VVT (variable valve timing) is pre-configured and selectable via “drop-down” menus. If your engine is not listed you can configure your own requirements.

**Configurability**

All inputs and outputs and completely configurable e.g. any analogue input can be used for any input type and as the axis for any table or input switching function.

**Sensors**

Choose from our list or custom configure the input channels to match your sensor.

**Boost Control**

Select up to three boost tables and configure when they are applied. Gear/TPS/temperature, any condition you want to apply to boost control.

**AFR Target Table**

The AFR (air, fuel ratio) is a critical part of the G4’s fuel calculation. Once the engine is tuned, adjustments to the AFR can be made, just by changing the AFR target table, without the need to retune the fuel table.
DisplayLink

“Full Information at your Fingertips”

Plug in and go, real time driver display. Users love the DisplayLink due to its ease of use, fascinating insight into what is happening with the engine and the fact that they can’t “mess up the ECU”.

Connect the DisplayLink, it works “out of the box”. Select what you need to see, the DisplayLink provides the instrumentation and information desired, both while the engine is running and subsequently from the internal memory.

All settings, menus and information are accessible using the five built-in buttons. Warnings are activated if inputs go out of range, a built in warning light alerts the driver and the condition presented graphically (even in direct sunlight).

PCLink - Tuning Your G4 Plug-In

• Compatible with all G4 based ECUs
• The most comprehensive, integrated ECU tuning and logging software.
• Windows (XP, Vista & 7)
• Mouse or Keyboard driven
• Fully configurable multi-page layout.
• Large number of different “views” for displaying ECU and log data.
• Advanced time saving tuning features and shortcuts
• Single key access to all critical runtime values.

ECU Configuration
• Logically organised tree style navigation of ECU settings
• Comprehensive context sensitive help for all features.

Tuning
• Popout settings menu saves screen space.
• Interactive 3D surface graph.
• Multiple table display.
• Configurable gauges, plotting and runtime values.
• Warnings and Status information.
• All runtime displays automatically changed based on selected table.

Gauges
• Variety of different configurable gauge types
• Highly visible warnings

Logging
• Record, save, download and analyse data log files.
• Customisable color themes
• Log analysis views: Time Plot, Navigator, XY Plot, Statistics, Histogram, Value List, Parameter List.
• Overlay and offset laps and files for comparison.
• Global time and cursor linking
• Record, analyse and compare logs while tuning an ECU
• Compatible with all G4 based ECUs
• The most comprehensive, integrated ECU tuning and logging software.
• Windows (XP, Vista & 7)
• Mouse or Keyboard driven
• Fully configurable multi-page layout.
• Large number of different “views” for displaying ECU and log data.
• Advanced time saving tuning features and shortcuts
• Single key access to all critical runtime values.
G4 Plug-In Technical Specifications

General
Oddfire cylinder support
3 / 5 / 7 / 9 cylinder support
Adjustable X and Y axis parameters on all 3D tables
Adjustable zone centers on all 3D tables
Custom top dead centers (odd fire)
Adjustable baud rate
Adjustable firing order
Various datastream outputs

Power Supplies
E-throttle supply

Fuel
Peak and Hold injector control - VL only
Number of Injector drives - 6 to 8
Sequential injection Mode
Grouped injection mode
Staged injection mode
Single point injection mode
BA peak current
5A auxiliary current
Sequential, grouped, staged and single point fueling
Quick tune (automated fuel tuning)
Multiple fuel equations
Barometric pressure compensation
Multiple switched fuel tables
Multipleoverlayed fuel tables
AFR target table
Individual cylinder fuel trims (3D)
Staged injection
Pre-crane prime (2D)
Crank enrichment (2D)
Post start enrichment (2D)
Warm up enrichment (3D)
Acceleration enrichment (3D)
Air temperature correction (3D)
Injector deadtime voltage correction (3D)
Overrun fuel cut (2D)
Fuel temperature correction
Idle load trims
Master fuel adjustment
Injector test function
Injection angle adjustment (3D)
Narrowband closed loop lambda
Wideband closed loop lambda

Ignition
Direct spark, wasted spark, distributed
4 (twin)
4 Ignition drives
4 Direct spark ignition mode
8 Wasted spark ignition mode
12 Distributed ignition mode
12 Twin distributed ignition mode
3, 4 Rotor Leading/Wasted/Leading Direct Modes
2 Rotary wasted leading spark, direct trailing spark
2 Rotary direct leading spark, direct trailing spark
7V squawave drive signal
2.2A auxiliary current
Adjustable dwell mode
Dwell control (3D)
Engine temperature trim (3D)
Inlet air temperature trim (3D)
Multiple switched ignition tables
Multiple overlayed ignition tables
Individual cylinder ignition trims (3D)
Transient ignition retard

Limits
RPM limit (engine temperature controlled)
Boost limit (engine temperature controlled)
Speed limit (set or switchable)
Dual general purpose limits (e.g. oil pressure)
Overvolt age limit
Optional hard cut
Progressive cut control

Selective fuel or ignition limiting
Ignition trim
Adjustable control range
Selective cut effect (adaptive or constant)

Auxiliary Outputs
8 Auxiliary Outputs
8 Lowside outputs
Highside outputs - optional
2.2 Normal lowside current limit (A)
Highpower (6.5 Amp) push-pull outputs
Unused fuel drives can be used as outputs
Unused ignition drives can be used as outputs
Test mode (PWM or ON/OFF)
Idle speed control solenoid
Boost control solenoid
General purpose PWM (3D)
General purpose switched (conditional)
Fuel pump
Fuel pump speed
Engine fan
Air-con fan
Air-con clutch
Intercooler water spray
Tacho
Check engine light
Purge solenoid
VVT solenoid
Hold power relay
Speedo signal
E-throttle relay
Oxy heater
Cam solenoid (lift or angle adjust)
Inlet runner control solenoid
Tumble generation valve
Stepper motor control (4 wire / bi-polar)
Stepper Motor Control (6 Wire / Unipolar)

Digital Inputs
6 inputs (total)
General purpose switch
6 General purpose frequency
1.6V rising trigger
1.0V falling trigger
Vehicle speed
Air-con request
Intercooler water spray request
Anti-thief request
Power steering pressure switch
Neutral switch
Throttle closed switch
Speed limit request
VVT cam position
Gear shift cut request
Start position switch
Clutch switch
Brake switch
Turbo RPM
Digital mass airflow sensor
Various wheel and shaft speeds
Seimens EBS sensor

Calculated Inputs
Gear position
Wheel slip

Analog Inputs
3 temperature inputs
Engine coolant temperature
Inlet air temperature
Fuel temperature
Engine oil temperature
Gearbox oil temperature
Diff oil temperature
Mass airflow sensor
Air temperature sensor
General purpose temperature
6 voltage inputs
Onboard 4.0bar manifold pressure sensor
Manifold pressure sensor
Mass airflow sensor
Throttle position sensor
Foot position sensor

Wideband lambda signal
General purpose voltage
General purpose input
Oil pressure
Fuel pressure
General purpose pressure
Exhaust gas temperature (from external controller)
Knock SV signal (from external controller)
Narrow band 02 sensor
Rotary oil metering pump position
Tumble generation valve position
Stepper motor position
Crankcase pressure
Damper position
Configurable calibration tables
Configurable fault settings
Voltage channels can measure
temperature with external resistor
Internal barometric pressure sensor
ECU temperature

Triggering
Reluctance, optical, proximity or hall effect sensors
Programmable filters
Programmable arming thresholds
Configurable trigger patterns
Preset trigger patterns
Supports many OEM applications
Supports cam position on sync signal

Launch Control
Progressive cut control
Selective fuel or ignition limiting
Selective cut effect (adaptive or constant)
Adjustable control range
Vehicle speed controlled
Clutch switch controlled
Launch fuel trim (3D)
Launch ignition trim (3D)

Anti-lag System
Various activation modes
Fuel enrichment (3D)
Ignition cut (3D)
Ignition retard (3D)
Cyclic idle (normal and cool-down)
Dual enrichment, cut and retard tables
Idle speed solenoid override
Safety timeout

Gear Cut Control
Timed or controlled modes
Adjustable progressive cut levels
Power re-introduction control
Ignition retard control
Fuel enrichment control
Cut duration based on gear

Idle Speed Control
Stepper motor control (4 wire / bi-polar)
Stepper Motor Control (6 Wire / Unipolar)
Solenoi d control
Electronic throttle control
Idle up tables

Internal E-throttle
External E-Throttle
Idle speed control
Comprehensive safety features
Automated setup
Supports OEM applications
Multiple throttle position target tables
Supports anti-lag

Closed loop control
Open loop control
Multiple tables (3D)
Engine temperature trim
Inlet air temperature trim
Gear based trim
External adjustment (high/low switch)

Knock Control
Requires External Module
Adjustable frequency
Adjustable gain (per cylinder)
Individual cylinder detection
Individual cylinder ignition retard
Adjustable detection angle (start/end)
Noise threshold table (3D)
Adjustable ignition retard sensitivity
Configurable ignition reintroduction

Variable Valve Timing Control
Up to 4 cams independent control
Supports many OEM applications
Closed loop control
Cam angle target tables (3D)
Optional cam centerline display

ECU Logging
Various activation methods
512k Board Logging
4MB Board Logging
Log analysis with PCLink

Diagnostics
ECU Statistics

Tuning Software
Configurable panels
Surface plotting
Password protection
Error logging
Multiple gauges
Keyboard support
Time plot
XY plot
Histogram
Multiple pages
Parameter search function
Context sensitive help browser
Fixture setup
Fault code display
PC logging
Runtime values dialog
Full wiring manual
Full tuning manual
Mixture map (datalog fuel tuning)

Manufacturing
Comprehensive testing
ISO 13485
Made in New Zealand

Physical
Length (mm)
Width (mm)
Height (mm)

ECU Weight (grams)
Status LED

Package Contents
Quick Start Guide
Installation Manual
Package Weight Total (grams)

Operation (was environment)
Operating temperature range -10 to 85 deg C
Ambient temperature range -30 to 90 deg C
Input Voltage 8 to 22V
Power Consumption (mA)
Electrical Protection on inputs and outputs
Mil Spec acrylic coating on PCB and components
40 MHz dedicated automotive engine management microprocessor
Link Engine Management

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(949) 646 7461

For more information, contact your local Link Engine Management dealer

linkecu.com