Atom

Link Engine Management

G4

The all new G4 Atom is your entry level ECU
that blows the opposition away.

Full configurability, no preset input/outputs.
Logging, motor-sport, even closed loop fuel and knock if external devices are added. Industry standard waterproof connectors, mounting bracket and loom, all supplied with your G4 Atom.

Configurable Engine Management

G4 Atom
Wire-In Engine Management

- Four injection drives
- Four ignition outputs
- Two analog inputs (e.g. TPS, external MAP sensor, oil pressure, O2 sensor, etc.)
- Two temperature inputs (usually water and inlet air temperature)
- Two digital inputs (e.g. vehicle speed, logging switch, dual map, clutch - you choose)
- Four auxiliary outputs (e.g. fuel pump, fans, boost control, inlet runner, O2 heater etc.)
- One, twenty six pin, waterproof connector
- Built in, 2.5 bar, MAP sensor (1.5 bar of boost - 22 lbs)
- 5V out
- 79 mm long, (W 126 mm, H 42 mm are same as G4 Storm and G4 Xtreme)

Key Features

- External MAP sensors available up to 5 bar
- Up to 6D fuel and ignition mapping
- Sequential fuel and ignition delivery
- Digital triggering, all common OEM patterns
- Rotary (also available is the G4 Rx which is specifically designed for Rotary applications)
  - Up to two rotors
  - Sequentially staged injection and sequential ignition
  - Includes Ignition Split
- OEM idle hardware supported - not stepper motors (use the G4 Storm)
- 6D boost control with three switchable tables
- Continuous barometric correction (on board)
- QuickTune - automated fuel tuning
- Individual cylinder correction for fuel trimming and ignition timing (3D correction tables available for fuel and ignition optimisation)
- Odd-fire engines & two-strokes
- USB tuning cable included
- Stats recording into on-board memory
- Gear compensations tables, user selectable e.g. 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
- Up to 512k internal logging memory
- Boost control referenced to gear, speed or throttle position
- Staged injection

G4 Atom 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 Atom 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 Atom 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.

Each individual cylinder can be assigned with a 3D knock ignition trim table. These tables are generally spanned using 'RPM' and 'Load' as their axis, and zones within these tables are modified dynamically by the ECU upon detection of knock. Timing is retarded on detection of knock in the particular zone, using configurable sensitivity and clamping properties. This all happens within the bounds of microseconds.

The G4 Atom can be configured to gradually re-introduce timing advance, at a rate governed by the speed and delay of which the user has specified in the settings when knock is no longer detected..

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.

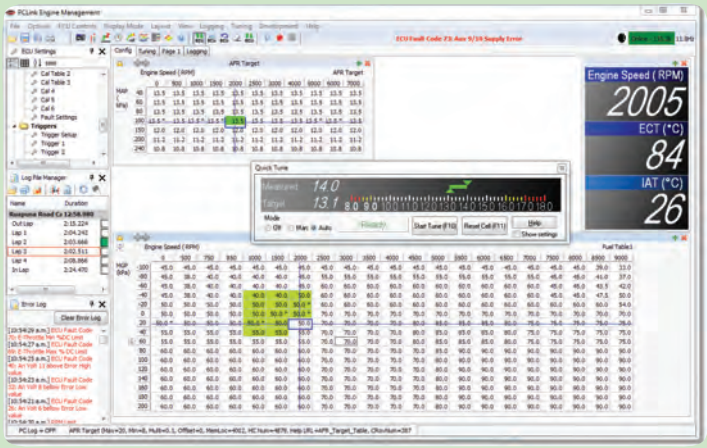
Multi-throttle turbo charged engines typically show an example of this. With the throttle wide-open at a MAP value of, for example, 200kPa and an engine speed of 5000rpm the engine will have considerably different fueling requirements than with the throttle half open and the same MAP and engine speed. 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 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 when the NOS 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. To do this, click on the table and press X or Y.

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. Quick Tune can be setup to operate over the entire fuel table or just over a particular area. Quick Tune can be used in Manual or Automatic modes. In Manual mode, Quick Tune 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 Quick Tune 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.

The Atom Firmware

When tuning, the twelve major tables are now dynamically allocated. What this means is the tuner can now configure the ECU to meet any requirements they may deem necessary. Previously tuners had to operate within what was defined by the ECUs programmer. The result of this absolute flexibility is that the Atom ECU cam be customised by the tuner to optimise any engine.

QuickKeys for Fast Tuning

Tuners are delighting in the new PCLink 4. One of the many reasons for this is that all major tuning can be done without using the mouse using QuickKeys. Another powerful feature is the copy/paste function within the various maps.

Sensors

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

Diagnostics - so you know 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

Engines, triggering 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.

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"

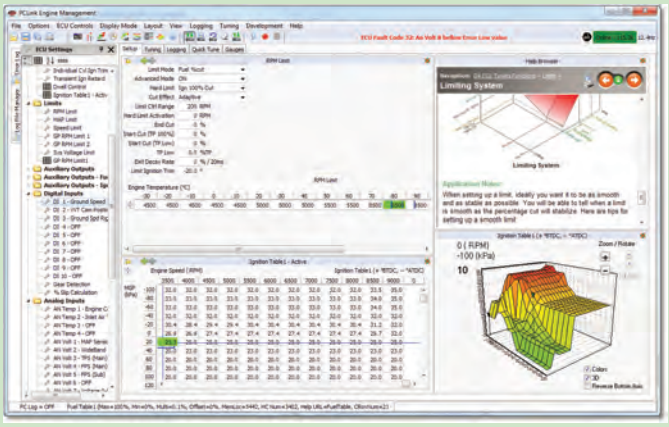
Plug in and go, real time driver display. Users love the DisplayLink due to its ease of use, fascinating insight into what is happening with the engine and the fact that they can't "mess up the ECU".

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 Atom

- 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

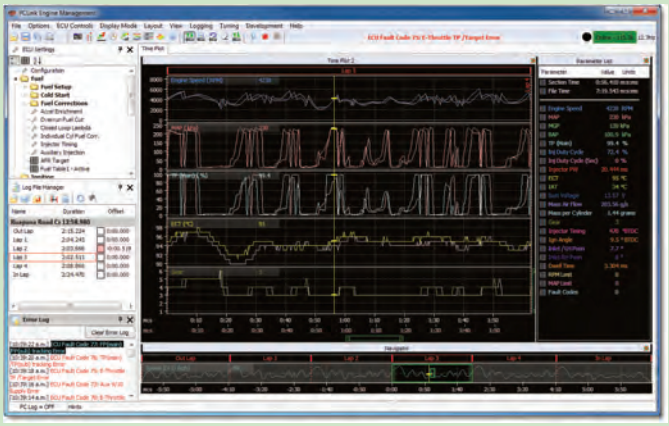
Tuning

- 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

G4 Atom 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
5V output

Fuel
4 Injector drives
Sequential injection Mode
Grouped injection mode
Staged injection mode
Single point injection mode
5A maximum saturated current
Sequential, grouped, staged and single point fueling
Quick tune (automated fuel tuning)
Multiple fuel equations
Barometric pressure compensation
Multiple switched fuel tables
Multiple overlayed fuel tables
AFR target table
Individual cylinder fuel trims (3D)
Staged injection
Pre-crank 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 (twin)
4 Ignition drives
4 Direct spark ignition mode
8 Wasted spark ignition mode
12 Distributed ignition mode
12 Twin distributed ignition mode
1, 2 Rotor Leading Wasted/Leading Direct Modes
2 Rotary wasted leading spark, direct trailing spark
2 Rotary direct leading spark, direct trailing spark
7V squarewave 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)
Overvoltage limit
Optional hard cut
Progressive cut control
Selectable fuel or ignition limiting
Ignition trim
Adjustable control range
Selectable cut effect (adaptive or constant)

Auxiliary Outputs
4 Auxiliary Outputs
4Lowside outputs
2.2 Normal lowside current limit (A)
5 Normal highside current limit (A)
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
Hold power relay
Speedo signal
E-throttle relay
Oxy heater
Cam solenoid (lift or angle adjust)
Inlet runner control solenoid
Tumble generation valve
Virtual auxiliary channels x3

Digital Inputs
2 inputs (total)
General purpose switch
2 General purpose frequency
1.6V rising trigger
1.0V falling trigger
Vehicle speed
Air-con request
Intercooler water spray request
Anti-theft 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 E85 sensor

Calculated Inputs
Gear position
Wheel slip

Analog Inputs
2 temperature inputs
Engine coolant temperature
Inlet air temperature
Fuel temperature
Engine oil temperature
Gearbox oil temperature
Diff oil temperature
Mass air flow sensor air temperature
General purpose temperature
2 voltage inputs
Onboard 2.5bar manifold pressure sensor
Manifold pressure sensor
Mass air flow sensor
Throttle position sensor
Foot position sensor
Wideband lamba signal
General purpose voltage
General purpose input
Oil pressure
Fuel pressure
General purpose pressure
Exhaust gas temperaturel (from external controller)
Knock 5V signal (from external controller)
Narrow band 02 sensor
Rotary oil metering pump position
Tumble generation valve postion
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

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
Closed loop and open loop modes
Solenoid control
Idle up tables

Boost 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

ECU Logging
Various activation methods
Adjustable logging rate
512kB Onboard Logging
Log analysis with PCLink

Diagnoistics
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
Firmware updater
Fault code display
PC logging
Runtime values dialog
Full wiring manual
Full tuning manual
Full software operation manual

Manufacturing
Comprehensive testing
ISO 13485
Made in New Zealand

Physical
Length 76mm
Width 126mm
Height 42mm
ECU Weight (grams)
26 Way Connector waterproof automotive
Status LED

Package Contents
G4 ECU
2.5m AVSS Wiring Harness
Mounting Bracket
Quick Start Guide
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

G4 Xtreme and Storm / Atom Supported Engine Configurations

Engine		Injection				Ignition		
		Sequential	Group	Staged Sequential	Group Sequential	Direct Spark	Wasted Spark	Distributed
4 Stroke / 2 Stroke Even Fire / Odd Fire	2 Cyl	✔ ✔	✔ ✔	✔ ✔	✔ ✔	✔ ✔	✔ ✔	✔ ✔
	3 Cyl	✔ ✔	✔ ✔	✔	✔ ✔	✔ ✔	✔ ✔	✔ ✔
	4 Cyl	✔ ✔	✔ ✔	✔	✔ ✔	✔ ✔	✔ ✔	✔ ✔
	5 Cyl	✔	✔ ✔	✔	✔ ✔	✔	✔ ✔	✔ ✔
	6 Cyl	✔	✔ ✔	✔	✔ ✔	✔	✔ ✔	✔ ✔
	8 Cyl	✔	✔ ✔		✔ ✔	✔	✔ ✔	✔ ✔
	10 Cyl		✔ ✔		✔ ✔		✔	✔ ✔
	12 Cyl		✔ ✔		✔ ✔		✔	✔ ✔
Rotary	2 Rotor	✔ ✔	✔ ✔	✔ ✔	✔ ✔	✔ ✔	✔ ✔	✔ ✔
	3 Rotor	✔	✔	✔	✔	✔		
	4 Rotor	✔	✔	✔	✔	✔		

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For more information, contact your local Link Engine Management dealer

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