XtremeX PlugIn ECU Specifications

Link PlugIn ECUs are based off the G4X XtremeX ECU. Given the constraints of the factory header and car set-up, a G4X PlugIn ECU is capable of the following features if the supports them.

Inputs/Outputs

- 8 x High Current Injector Drives (suits high impedance injectors)
- 8 x Ignition Channels
- 8 x Auxiliary Outputs (All PWM capable). Aux5–8 can control Stepper Motors and drive High or Low
- 11 Digital Inputs (All capable of reading frequencies up to 10kHz)
- +5V Out
- 4 Temperature Inputs (Configurable pull-ups on ANT1&2)
- 12 x 0–5V Analog Inputs
- 2 x Trigger Inputs (Reluctor, Optical or Hall Sensors)
- On Board Baro
- 3 Axis Accelerometer

Fueling adjustments

- Traditional, Modelled and Modelled Multi–Fuel Equations
- Single–Point Group, Multi–Point Group, Sequential, Semi–Sequential, Group Staged, Sequential Staged and Sequential/Multi Point Group Staged injection modes
- Asynchronous injection (can add more fuel after initial injection if conditions change)
- Quick tune (automated fuel tuning)
- Up to 440 Zone Fuel Table with configurable load and RPM centers. Configurable X and Y Axis Parameters
- Multiple Fuel Tables
- Up to 6D Fuel Mapping (3D Fuel Table + 3x3D Overlay trim tables)
- Injection Rate Control for Group Injection Modes
- Master Enrichment for Traditional Fuel tuning
- Pre–Crank Prime
- First Crank Prime
- Crank Enrichment
- Post Start Enrichment
- Warm Up Enrichment
- Acceleration Enrichment
- IAT Fuel Correction
- Injector Deadtime Compensation
- Injector Short Pulse Width Compensation
- Injector Timing Control with Beginning, Middle or End Injection Definable
- AFR Table Correction
- Dual Closed Loop Lambda
- Individual Cylinder Fuel Trims
- Overrun Fuel Cut
- Idle Load Trims
- Fuel Temperature Correction
- Barometric pressure compensation
- Injector test function

Ignition Adjustments

- Distributor, Twin Distributor, Wasted Spark, Direct Spark, Rotary leading Wasted and Rotary
- Leading Direct Ignition Modes
- Up to 440 Zone Ignition Table with configurable load and RPM centers. Configurable X and Y Axis Parameters
- Configurable Maximum Advance
- Configurable Spark Duration
- Configurable Spark Edge
- Dwell Time Table with configurable X and Y Axis Parameters
- Multiple Ignition Tables
- Up to 6D Ignition Mapping [3D Ignition Table + 3x3D Overlay Trim Tables]
- Individual Cylinder Ignition Trim
- IAT Trim
- Voltage Correction
- ECT Trim
- OEM Compatibility
- CDI Compatibility
- Transient ignition retard
- Adjustable ignition delay compensation
- Ignition test function
- Idle ignition control

Limits

- Engine Temperature Dependent Progressive Limiting
- Dual Vehicle Speed Limits
- System Voltage Limit
- User Configurable RPM Limits based on external input
- MAP Limit with dual tables
- Optional hard cut
- Progressive cut control
- Selectable fuel or ignition limiting
- Ignition trim and configurable trim decay
- Adjustable control range
- Selectable cut effect (adaptive or constant)

Auxiliary Output Options

- Each Output independently configurable
- Unused ignition and Fuel outputs available as auxiliary outputs
- General Purpose Outputs
• General Purpose PWM Outputs
• Fuel Pump Control
• Fuel Pump Speed Control
• Engine Fan Control
• Air Con Clutch Control
• Air Con Fan Control
• Intercooler Spray Control
• Tacho Control
• Speedo Control
• Check Engine Light
• Purge Solenoid
• Oxygen Sensor Heater
• Switched Cam Solenoid Control
• ECU Hold Power Control
• Shift Light Control
• Starter Control
• VVT Cam Solenoid
• Boost Control Solenoid
• Test functions for each output
• Closed loop Stepper Control & Rotary Oil Pump Control
• Idle Speed Solenoid
• Idle Speed Stepper
• Internal Ethrottle Controller
• External EThrottle

Digital Inputs

• Each channel independently configurable with pull-up resistors and active state control
• All digital inputs capable of reading frequencies of up to 10kHz
• Duty Cycle measuring on all digital inputs
• Turbo speed
• Ethanol Sensor Control
• Wheel Speed Detection on all digital inputs with additional general-purpose speed inputs
• Anti-Theft control through digital inputs, over CAN or both
• General Purpose switches, speeds, rpms and frequencies
• large variety of input types

Analog Inputs

• Each input independently configurable with preset or custom calibrations and configurable fault conditions
• Built in 3 axis accelerometer
• Built in Barometric Pressure Sensor
• Large variety of Analog input functions
• General Purpose Temperatures, Pressures, Rotary Switches and more
• Analog Inputs can also be used as Digital Inputs
• Large number of built in calibrations
• Ten Calibration Tables and 3 Linear Calibrations for when a custom calibration is required

Triggering

• Digital Trigger Decoding
- Reluctor, Optical Proximity or Hall Sensors
- Programmable filtering and arming thresholds
- Configurable trigger patterns or preset triggering options
- Supports nearly all OEM trigger patterns and custom trigger arrangements

Programmable Math Processing

- Eight individually controllable math channels with up to four parameters in each
- Math channels can be used as table axis’s and as digital or analog inputs

Motor-Sport Features

- Anti Lag
- Launch control
- Gear Shift Control (Digital Inputs, Gear Lever Force or Gear Barrel Position)
- Traction control

Anti-Lag System

- Dual 3D Fuel enrichment, Ignition cut and Ignition retard Tables
- Optional Cyclic idle [normal and cool-down]
- Optional 3D Idle controller Override Tables [one for Antilag and one for Cyclic Idle]
- Lockout conditions based on engine speed and throttle position with hysteresis

Launch Control

- Single RPM, 3D RPM Table or Latched [RPM when button pressed] Launch modes
- Progressive cut control
- Selectable fuel or ignition limiting
- Selectable cut effect [adaptive or constant]
- Adjustable control range
- Vehicle speed controlled
- Ignition Trim with optional 3D table and relative or absolute ignition angle options
- Optional 3D Fuel Trim table

Gear Shift Control

- Digital input [clutch switch], gear lever force [sequential gearbox], gear lever force [H pattern gearbox], and gear barrel position sensor input options
- Timed or controlled modes
- Adjustable progressive cut levels
- Power re-introduction control
- Ignition retard control
- Fuel enrichment control
- Cut duration based on gear

Traction Control

- Disable switch
- Various Lockout conditions
- Multiple 3D slip Threshold tables

G4X
• Traction Control – controlled tyre slip to improve vehicle safety and driveability
• Uses an advanced Torque Management system to reduce engine torque

Idle Control
• Solenoid, Stepper or EThrottle Control
• Open or Closed loop actuator control and Closed loop Ignition control available
• Large variety of position offsets for open loop and additional target offsets for closed loop actuator control
• Specific start-up offsets and hold times
• Dashpot functionality to smooth re-entry into idle and prevent undershoot

Electronic Throttle Control
• Has an internal EThrottle Controller and supports external controllers
• Multiple 3D target tables

Boost Control
• Open or Closed Loop Boost Control
• Multiple Target and Base Position Tables
• Multiple Trim tables
• Boost by Gear control

Knock Control
• 2 Built in Knock inputs
• Fuel Enrichment and Ignition Retard functionality
• Adjustable frequency filter
• Adjustable gain (per cylinder)
• Individual cylinder detection
• Individual cylinder ignition retard and fuel enrich
• Adjustable detection angle [start/end]
• Noise threshold table (3D)
• Adjustable ignition retard and fuel enrich sensitivity
• Configurable ignition reintroduction and fuel enrich decay

Variable Valve Timing Control
• Up to 4 cams independent control
• Supports many OEM applications
• Closed loop control
• Multiple 3D Cam angle target tables
• Optional advanced PID control settings for advanced tuners
• Automatic function for calibrating cam angles

Chassis and Body
• AC Control – Basic and Advanced modes available
• AntiTheft – Via Digital Input, CAN or both
• Speed based cruise control (ETrottle only)
• Gear Detection – CAN, RPM/Speed or Analog Position Sensor
Individual wheel speed sources with the ability to specify Driving and Non-Driving wheel speed sources

Starter control – Multiple options available from very basic to Touch to start.

Torque Management

Logging

- 512 Megabytes of Datalogging
- Up to 250 ECU Logging channels
- Up to 1kHz per channel with a maximum total sample rate of 100kSamples/s when using ECU Logging
- Unlimited channels when using PCLink logging

Communications

- Tuning Port USB on board
- Two CAN buses
- Custom CAN configuration allowing tuners and end users to add support for new CAN devices

Processing

- 150 MHz Specialised Engine Management Microprocessor
- Ignition control to 0.1 degree, fuel to 0.01 ms
- 32 Bit Floating Point Calculation
- 12 Bit ADC Resolution
- 20000+ RPM
- 4Gb Non Volatile Flash

Environment

- Internal Temperature Range –10 – 85°C
- Ambient Temperature Range –30 – 90°C
- Voltage 8 – 22V
- Operating Current 200mA
- Electrical protection on all inputs and outputs
- Onboard Barometric Pressure Sensor

Packaging Contents

- G4X PlugInX ECU
- Wiring and Installation Instructions
- 2 large Link Stickers
- 2 small Link Stickers

Manufacturing Standard – ISO 13485