Volume

1

# *ENGINE CONTROLS*

## **ECU-882-C AND ECU-422-C**

## MANAGEMENT SYSTEMS

# Specifications and Ordering Guide

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ELECTRONIC ENGINE CONTROLS AND INATAKE CASTINGS

# Product Guide
# Engineering Specification Guide

# Introduction:

This family of the engine controller has been created with truly 21st Century components. The IC's and most of the discrete parts were not manufactured before the year 2000. The Digital Signal Processor has a Forty ( 40 ) Million Instruction Per Second through put. The machine code, in " C ", was complied with the latest version of Code Warrior.

The eight fully sequential IGBT coil drivers are rated at 35 amps, almost 500 mj. of energy can be switched in micro-seconds. The eight sequential injector drivers will support either high or low impendence injectors. There are four General Purpose Output drivers, two high current (8) AMP and two low current (.25) AMP. This approach allows an engine to operate at over 25,000 RPM, even with two stroke applications.

There are eight channels of twelve-bit Analogue to Digital conversion including the on-board " Baro " sensor. A MAP sensor is also board mounted with a range (1) BAR, (2.5) BAR, or (5) BAR specified at the time of ordering.

Digital inputs include one channel for crank position, one channel for crank TDC, and one for camshaft TDC. A Quadrature encoder may be used, when trigger " A " and " B " signals are combined.

Software development has taken an opposite direction. The Software needed to be simple and user friendly. The concept of a " Main Jet " fuel Adjustment, and an " Idle Jet " fuel adjustment have been created. This allows the same engine Map to be used on many different configurations with minimal changes.

There are many other features that will be reviled shortly. A brief description, includes "DMI" Dual Map Input, TTL outputs for certain " Coil On Plug " applications, and the CAN 2.0 interface.

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# Creating the ECU-882-C a Professional Manual

*Like a favorite recipe a little change here or there can add greatly to the overall Style and Flavor. This reflects to the build parameters given at the time of ordering your ECU-882/422.*

To save time, a brief description with values is given below.

## DESCRIPTION

This Hybrid Controller combines the processing power of a DSP and the functionality of a microcontroller with a flexible set of peripherals to create an extremely powerful solution. The core is based on a Harvard-style architecture consisting of three execution units operating in parallel, allowing as many as six operations per instruction cycle. The Serial Peripheral Interface is available by a pin header allowing future additions to the outside world.

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| ❑ Voltage Range | 6V - 42V |
| ❑ Ignition Drivers | 8 IGBT/8TTL or mixed |
| ❑ Injector Drivers | 8 low/high (12) amp each |
| ❑ GPO Drivers | 4 (2) 8 amp (2) ¼ amp |
| ❑ Tachometer | 1 (12) v+ square wave |
| ❑ Crank Sensors | 2 Inductive or Hall |
| ❑ Camshaft Sensor | 1 Hall Effect |
| ❑ Temp Sensor Inputs | 2 1K pull up |
| ❑ Voltage Sensor Inputs | 2 TPS/ AUX |
| ❑ Amplified Sensor Inputs | 2 Dual EGO |
| ❑ Digital | 1 DMI |
| ❑ Internal Sensors | 3 MAP, BAP, BAT |
| ❑ A/D Accuracy | 12bit |
| ❑ Communication | 1 DB-9 RS-232 |
| ❑ CAN 2.0 | 1 144 nodes |
| ❑ Flash Ram | 32k Words |
| ❑ Flash Memory Logging | 8M-bit ( 4,096 pages) |
| ❑ Engine Configurations | 1-12 cylinders |
| ❑ 2, 4, 6, stroke | even / odd fire |
| ❑ Engine Phases | 12 separate |
| ❑ Resolution of Timing | .25 degree |
| ❑ Resolution of Injector PW | .001 |
| ❑ Temperature Range | -40* C – 105* C |

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## How to Customize Your ECU Order

The first and most important thing is to understand your engine. What is the phase angle of the cylinders? What is the firing order? What type of coils are mounted onto the engine?



About the "Phase Angle "

The "picture" of a cylinder block and crankshaft as it relates to the position of the piston when it reaches TDC in each cylinder. This is the Phase Angle. This number of degrees of crankshaft revolution for each piston after the first is the next phase. The maximum for two revolutions is seven hundred and twenty (720) degrees . One revolution is three hundred and sixty (360) degrees. Hence the second phase of a ninety-degree V-8 is "ninety" or (90) degrees of crankshaft revolution. This is only true with a (90) degree crankshaft and a (90) degree block.

The firing order is now able to be determined. Our V-8 has two pistons "up" at ninety degrees after TDC of the first cylinder. One cylinder has the valves open ( overlap ) and the other has them closed ( firing ). The one firing is the cylinder that is next in the Firing Order.

To change the order, to match your engine, you only need go to " Configuration " and check the opproate box. The degree of engine rotation is then entered for the start of each ignition phase. The start of injection may also have a " virtual phase " separate from the ignition phase. Thus each cylinder of the engine may be controlled separately. The exact degree required for best fuel consumption, lowest emissions, power, and engine life, could now be entered into a phase table.