



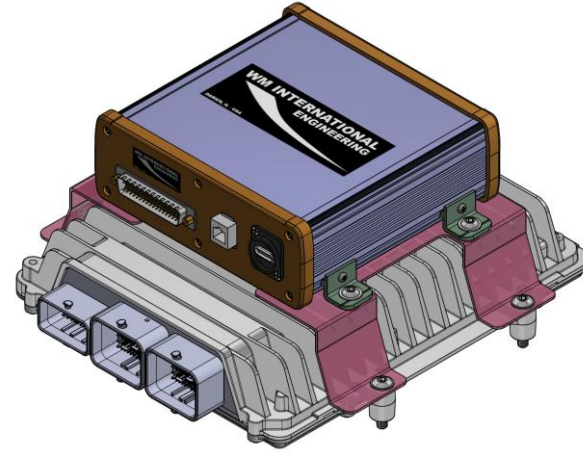
ENGINE CONTROLLER HIGH SPEED OVERSIGHT UNIT

By WM International Engineering, Darien, IL - USA

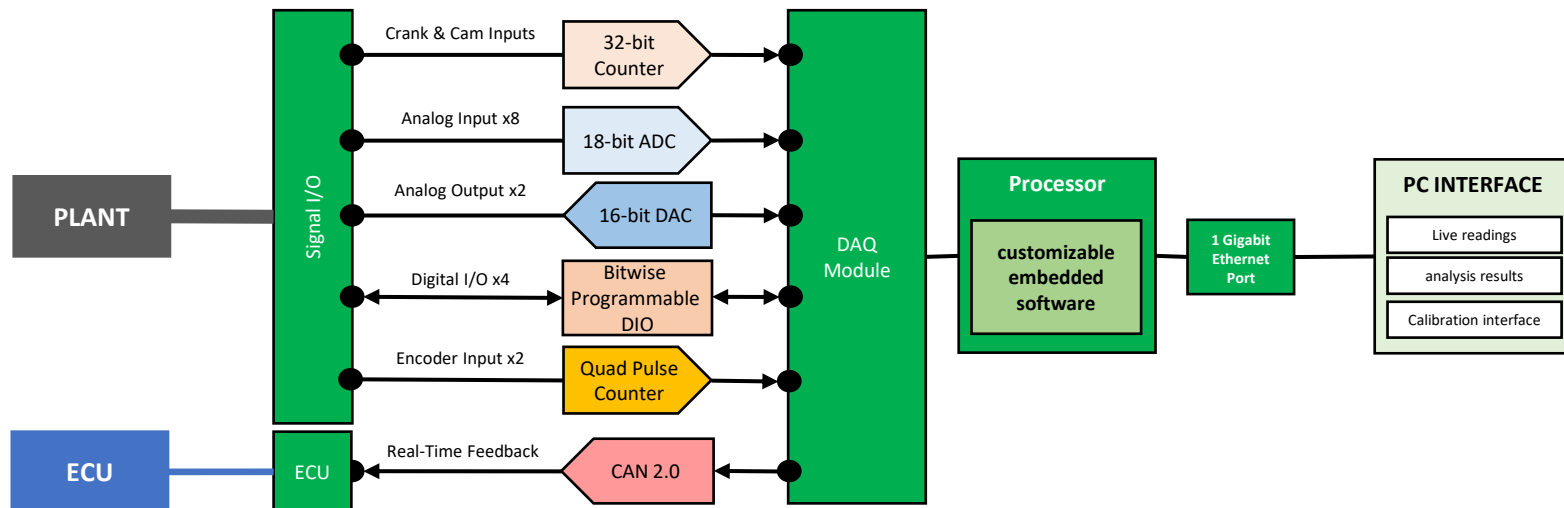
ECHO is an Engine Controller High speed Oversight unit designed to provide controllers such and engine ECUs with the ability to incorporate diagnostics and extremely fast feedback control on critical systems.

ECHO features provide added data acquisition channels targeting critical, high speed events. Data may be sampled at rates of 200ks/s on ea. channel, data can be analyzed with a powerful 1.5 GHz processor, CAN communication establishes fast handshake with ECU.

With the ECHO platform users can easily incorporate customizable codes for dedicated analysis and modeling.

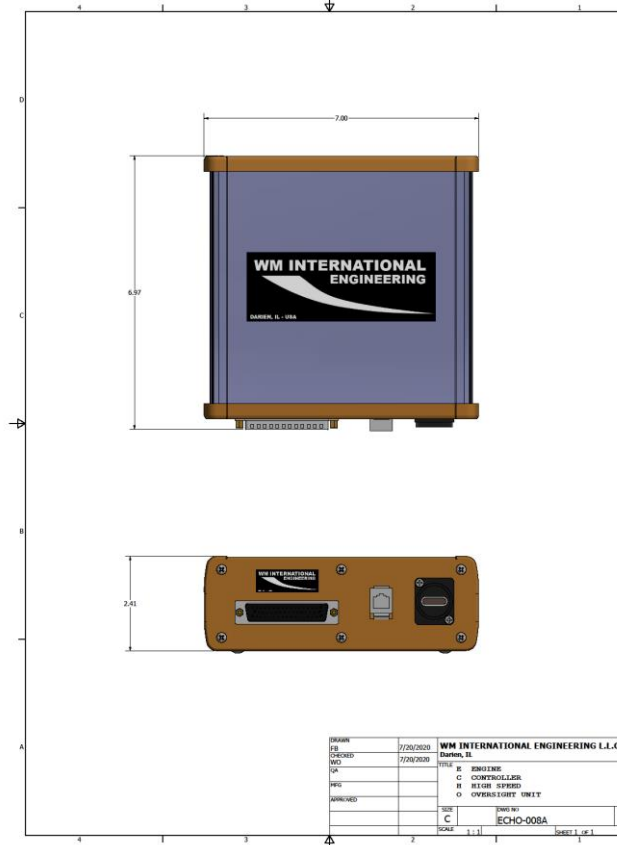


ECHO mounted on a PI INNOVO M670 open ECU platform programmed for real time combustion feedback.



M670 ECU (optional) Heavy-duty engine control	ECHO DAQ	ECHO Embedded Software	ECHO PC Software
<ul style="list-style-type: none"> Supports 4 and 2-stroke engines 8 boosted peak-and-hold injectors Programmable injector waveforms 8 smart spark coil outputs Up to 12 injections per cycle 2 wideband exhaust oxygen sensor 4 CAN Bus 2.0 Dual knock sensor interface <p>WMI base engine strategies support gasoline PDF, GCI and Diesel modes</p>	<ul style="list-style-type: none"> Sampling at 50 to 200kHz Read CRANK & CAM signals Angular sampling at 0.1 - 0.5° † 8 analog inputs, 18-bit res 2 analog outputs 4 digital I/O 1 CAN Bus 2.0 BC Cortex-A72 1.5GHz CPU 2GB DRAM <p>† ECHO synchronizes with the crank wheel to operate in the angular domain</p>	<p>Base strategies include:</p> <ul style="list-style-type: none"> Synced data in angular domain Cycle specific combustion phasing and torque estimation Knock detection Fast feedback, including engine cycle-to-cycle. Customizable analysis algorithms <p>Supports custom control strategies such as advanced combustion modes.</p>	<ul style="list-style-type: none"> Live calibration Data recording Real-time data visuals Control visualization Upload custom algorithms Software updates <p>Supports feature requests</p>

Common applications of ECHO



Power Connection	Nominal	max	min	Connector Type
Power Supply	5V DC	5.25	4.5	USB-C
Power Consumption	10W	15	0.9225	
DATA ACQUISITION				
DIGITAL				
Cam	5V	2.2 .. 30V	-0.5 .. 1.5V	
Crank	5V	2.2 .. 30V	-0.5 .. 1.5V	
ANALOG INPUTS 0,1,2,3,4,5,6,7	-10 .. 10V	15	-15	
Sampling resolution	50kHz / 0.5deg	200kHz / 0.1deg		
Bit Resolution	18-bit			
ANALOG OUTPUTS 0,1				
DIGITAL I/O 0,1,2,3	50kHz / 0.5deg	200kHz / 0.1deg		
Bit Resolution	18-bit			
CAN Bus				
Connector 2,3,7	CAN Low, GND, CAN High			9-pin D-SUB Male
Ethernet Connection				
Suggested Adapter				USB 3.0
PROCESSOR				
CPU	Quad Core Cortex-A72; 64-bit SoC @1.5GHz			
RAM	2GB LPDDR4; 2400 SDRAM			
STORAGE	16GB			
OS	Linux Based			

