



SOFTWARE

CONTROLLERS

CONNECTORS & KITS

DEV TOOLS

HARNESSES

SYSTEM COMPONENTS



MotoHawk Control Solutions

Product Guide

Fast • Flexible • Affordable • Production Controls in a Flash

Fast and Flexible Electronic Control Systems

Bring exciting new products and sophisticated product features to market quickly.

Woodward's MotoHawk Control Solutions product line offers fast development cycle times, high flexibility and customer ownership of control strategy intellectual properties. Based on a suite of controller products, software tools, and application engineering expertise, you can build your production controls in a flash.

- Auto-Code Enabled Operating System
- Model-Based Control Technology
- Rugged Product Controllers
- On-Board Diagnostics
- CAN Multiplexing

Woodward engineers have many years of experience supplying to and developing complex applications serving a wide range of industries, including:

Gasoline Engine and Transmission Control

Diesel Engine / Emissions Control

Hybrid Vehicle Systems

Chassis – Hydraulics Control

Autonomous Vehicles

On and Off-Highway

Recreational

Industrial

Marine

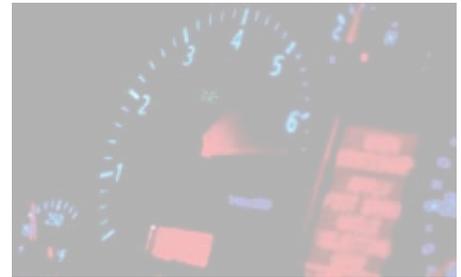
Aviation

Power Generation

Small Engine Management

Electric Motor and Power Inverters

Integration – Multiplexing / CAN Based Control



Product Overview

Woodward offers an array of rugged electronic control modules (ECMs) for automotive, marine and heavy-duty vehicle applications. Woodward's control modules have been specified for engine, hydraulic, powertrain, hybrid vehicle and general purpose control. Our engineers are continually adding new levels of functionality to our ECMs.

Many companies find that specifying an existing Woodward Control Solutions ECM for their application is a way to eliminate costly tooling bills and is often faster and provides a fast path to production compared to developing a new ECM. For customers with existing hardware solutions, Woodward also supports custom hardware with our tools and software.

Intended for extreme environmental conditions, our ECMs are durable and completely sealed, making them suitable for automotive, commercial truck, marine, and industrial applications.

Our modules meet full production, environmental, and packaging requirements. Over 1 million Woodward MotoHawk Control Solutions ECMs are currently in the field.

Woodward's ECMs are economical both in small quantities for rapid prototyping and fleet testing, and large quantities for production. They range from 24 pins to 128 pins and come with 16-bit and 32-bit microprocessors.

In addition to engine control modules, Woodward offers a full range of sensors, actuators and custom wiring harnesses for complete control systems. These components can be combined to create complete control systems such as engine management systems and are shipped directly to your manufacturing floor.



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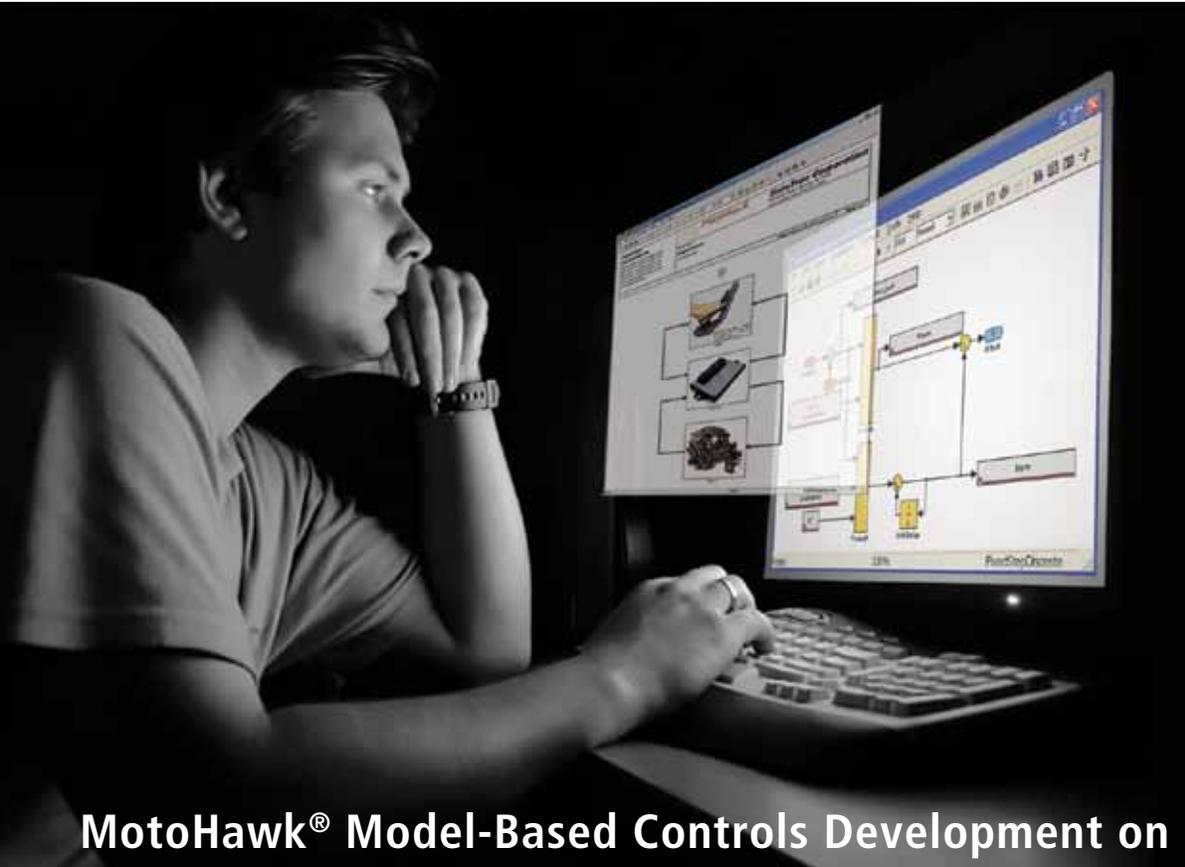
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SOFTWARE

MotoHawk® — Model-Based Embedded Development



MotoHawk® Model-Based Controls Development on Real Hardware

Your Rapid Control Development System

MotoHawk, an add-on to MATLAB/Simulink, allows you to create control system software in the familiar graphical language of Simulink. It allows you to run control system software not only on your PC, but on rugged embedded control hardware suitable for harsh production environments.

Why use MotoHawk?

MotoHawk enables application designers to create algorithm solutions directly from Simulink without the need to write source code. MotoHawk supports a model-based design philosophy and enhances this process with the ability to directly target the solution to production hardware.

Model-based designs employ heavy use of simulation and analysis within the design environment of MATLAB and Simulink. MotoHawk extends this environment directly into the run time of the embedded controller. MotoHawk is bundled with MotoTune®, our calibration tool. MotoHawk applications can also communicate via CCP, Keyword 2000, UDP, and other industry standard protocols.

Is MotoHawk only useful for Control Algorithms? What about the rest of the embedded system?

MotoHawk allows you to design not only the control algorithms but also the difficult and abstract features of modern control systems. CAN interfaces, Faults and Diagnostics, Complex I/O, such as Fuel Injection sequences and Engine Synchronization, and Operating System configuration like task priorities and coherent data transfer are all easy to implement with MotoHawk.

Does MotoHawk run on any hardware?

MotoHawk runs only on Woodward's ControlCore™ enabled hardware — a full line-up of modules from small 24 pin, 16-bit based micro controllers to 128 pin, 32-bit based microprocessors capable of running 12 cylinder engines.

Our modules feature pin count and I/O options suitable for a wide variety of applications including Engine Management Systems, Diesel Emissions, Hydraulic Control, Electric Motor Control, Navigation Systems, and Distributed I/O systems.

Creating applications for all of these different modules and markets is done in one familiar design environment of MotoHawk. Switching an application from one module to another is simple. We can also port MotoHawk to your hardware.

Is MotoHawk suitable for Prototyping and Production Development?

Yes. The MotoHawk workflow was designed to enable design, analysis, and development of robust control systems for production deployment, as well as rapid prototyping. By using similar hardware and processes, prototyping with a large I/O module early in the discovery phase allows the algorithms and models to start maturing very early in the life cycle.

MotoHawk models flow into production development and validation without the need for translation (from another prototyping solution). Because the algorithms have run on production intent hardware, their resource impact is well known, thus avoiding the super computer solutions that will not scale to production.

Constrained Rapid Prototyping allows reuse of code throughout the life cycle — providing a faster overall path to production.

Features

- Auto-code generation of Simulink/Stateflow models using Embedded Coder/Stateflow Coder
- Rugged controllers for prototyping and production
- ControlCore enabled software
- Off-the-shelf engine control libraries
- Calibration using MotoTune or CCP based tools
- Responsive engineering and support services for a wide-range of applications
- Electronic control modules available for development, fleet and production

Benefits

- Simpler, faster development
- Better testing using real ECM hardware
- Quickly develop and enhance software features in Simulink
- Analyze and control real-time OS from Simulink/Stateflow
- Direct access to the production controller's I/O from Simulink
- Readable documentation of system design automatically created from models
- Lower cost for fleet testing; outfit an entire test fleet with rapid prototyping capability
- Custom block-set allows for integration of both handwritten and auto-code

System Requirements Hardware:

- 256 MB RAM
- USB 1.1 or higher
- 1024x768 monitor†
- Serial port

Microsoft Software:

- Windows 7, Windows Vista, XP, or 2000

The Mathworks Software:

- MATLAB
- Simulink
- Embedded Coder
- Simulink Coder
- MATLAB Coder
- Stateflow*

Training DVD's and Streaming

- 9700-1019 MotoHawk Training - Streaming
- 9700-1020 MotoHawk Training - DVD

Compilers

- Green Hills Multi C 3.6 & 4.2.1 & 4.2.4 for the MPC5XX
- Green Hills Multi C 4.2.1 & 4.2.4 for the MPC55X
- GCC for the MPC5xx and MPC55xx
- Freescale Metrowerks 4.6 & 4.7 for the HCS12/S12X

*Optional, but recommended | †Higher resolution recommended



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What do I get if I purchase MotoHawk?

MotoHawk is bundled into a developer's kit, which includes a module, harness, CAN to USB interface, MotoTune software, MotoHawk software, and compilers for the target module. Our modules and accessories are available in small quantities with attractive pricing.

A MotoHawk purchase should be followed up by three days of in-depth training. Led by our team of experienced developers, the hands-on training enables the new practitioner to fully experience the tool chain by building, deploying, calibrating, and refining a real world control application.

MOTOHAWK SOFTWARE MAINTENANCE

MotoHawk Software Maintenance enables you to stay up to date with the latest version of MotoHawk by providing licenses for the current MotoHawk version and the next release including all the service packs for those versions. Each new MotoHawk and MotoTune kit will now include a licensed dongle, including maintenance upgrades and support for the current MotoHawk version and the next release. License is per dongle.

Why might you want updates and support?

We are enhancing the MotoHawk build engine to only use the ControlCore features and functions your application needs.

Your application can grow without the need to upgrade to a larger ECU.

Support for S12/S12x may allow your application to run on a lower cost module.

Support for MPC55xx platforms allows the use of MotoHawk on Freescale's latest and most powerful microprocessors.

Enhanced validation and compatibility testing helps assure your application can easily migrate from ECU to ECU.

If you're planning to keep up-to-date with The MathWorks latest version, consider budgeting annually to retain access to the latest MotoHawk versions.

Woodward Item No.	Reference Number	Description
8928-5047	PROD-PLAN-001C	MOTOHAWK SOFTWARE MAINTENANCE

SOFTWARE & HARDWARE

MotoHawk® Development Kits



ORDERING INFORMATION

MotoHawk Development Kits include everything you need to begin developing your control system application. Purchase options include the standard 128-pin MotoHawk kit (shown), a customizable MotoHawk Development Suite (you choose the module), or a bare bones MotoHawk license (without hardware and software). Kit options are available with or without the required Green Hills or GNU C Compiler.

Woodward Item No.	Reference Number	Description
8928-1267	ASMHAWK005D00	128-pin MotoHawk kit

Everything you need to get started with MotoHawk using our 128-pin module. (C compiler sold separately.)

Note: This kit contains a 12V development harness.

- (1) ASSEMBLY CD - MOTOHAWK DEVELOPMENT
- (1) DUAL CHANNEL USB TO CAN CABLE
- (1) MOTOHAWK & MOTOTUNE LICENSED DONGLE
- (2) JUNCTION BOX - (6) WAY
- (1) CONNECTOR TERMINATOR - 120 OHM (CD,JK) - BLUE CAP
- (1) KEY POWER TO BUS
- (1) KEY SWITCH WITH BEZEL
- (2) HARNESS EXTENSION- 6' CAN1 & CAN2 DATA CABLE
- (1) HARNESS EXTENSION- 10' CAN1 & CAN2 DATA CABLE W/RESISTOR
- (1) DB9 TO CAN1 & CAN2 (CD,JK)
- (1) KEY SWITCH TO JUNCTION BOX - 3'
- (1) SmartCraft to J1939 (CD, JK)
- (1) 128-PIN CALIBRATIBLE MODULE WITH MOUNTING HARDWARE
- (1) ECM565-128 PIN DEVELOPMENT HARNESS
- (1) BOOT KEY
- (1) HARNESS USB INTERFACE

Order one of the following Green Hills C Compiler licenses.

8928-1275	ASM-GHS-001A	Node Locked Green Hills Software License
8928-1273	ASM-GHS-001B	Domestic (US) Dongle Locked Green Hills Software License
8928-1272	ASM-GHS-001C	International (non-US) Dongle Locked Green Hills Software License
8928-1307	ASM-GHS-001A	Node Locked Green Hills 4.2.4 Software License
8928-1305	ASM-GHS-001B	Domestic (US) Dongle Locked Green Hills 4.2.4 Software License
8928-1306	ASM-GHS-001C	International (non-US) Dongle Locked Green Hills 4.2.4 Software License

Note: For Greenhills 3.6 or 4.2.1 please contact Woodward for part number information.

Woodward Item No.	Reference Number	Description
8928-1172	ASMHAWK006D01	MotoHawk Development Suite

The MotoHawk Development Suite includes everything you need to get started with MotoHawk using any of our electronic control modules — allowing you to customize your rapid control development system.

- (1) ASSEMBLY CD - MOTOHAWK DEVELOPMENT
- (1) DUAL CHANNEL USB TO CAN CABLE
- (1) MOTOHAWK & MOTOTUNE LICENSED DONGLE
- (2) JUNCTION BOX - (6) WAY
- (1) CONNECTOR TERMINATOR - 120 OHM (CD,JK) - BLUE CAP
- (1) KEY POWER TO BUS
- (1) KEY SWITCH WITH BEZEL
- (2) HARNESS EXTENSION- 6' CAN1 & CAN2 DATA CABLE
- (1) HARNESS EXTENSION- 10' CAN1 & CAN2 DATA CABLE W/RESISTOR
- (1) DB9 TO CAN1 & CAN2 (CD,JK)
- (1) KEY SWITCH TO JUNCTION BOX - 3'
- (1) SmartCraft to J1939 (CD, JK)
- (1) HARNESS USB INTERFACE

Order one of the following Green Hills C Compiler licenses.

8928-1307	ASM-GHS-001A	Node Locked Green Hills 4.2.4 Software License
8928-1305	ASM-GHS-001B	Domestic (US) Dongle Locked Green Hills 4.2.4 Software License
8928-1306	ASM-GHS-001C	International (non-US) Dongle Locked Green Hills 4.2.4 Software License

Select an Electronic Control Module to suit your needs. (See the Controllers section for more information.)

Order the associated development harness. (See the Controllers section for more information.)

Add boot key below for any of the following electronic control modules:
ECM-0555-048, GCM-0563-048, HCM-0563-048, ECM-0555-080, ECM-0565-128, ECM-555X-112

1635-1800	HARNINTR00801	Boot Key
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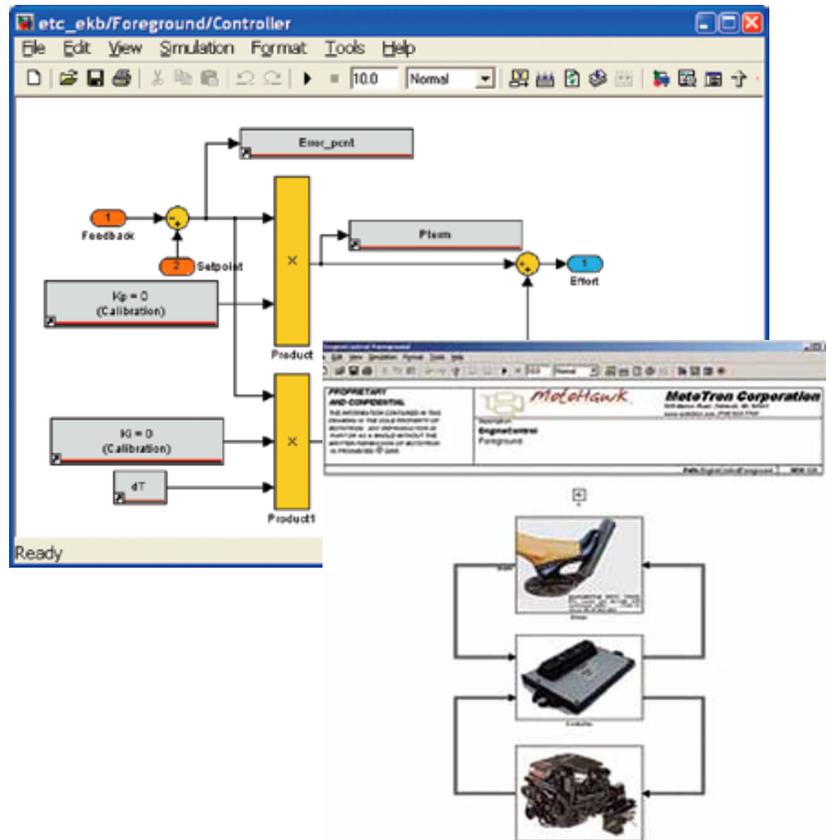
Woodward Item No.	Reference Number	Description
8928-1191	ASMHAWK999C	MotoHawk license

The bare bones MotoHawk license includes a software CD and licensed dongle – no other software or hardware.

Speed Your Time to Market...

Spark Ignition Base Engine Control (Gas)

- Closed Loop Fuel Control
- Diagnostic Engine Protection
- EGO Based Adaptive Fuel
- Electronic or Mechanical Throttle Control
- Energy Based Coil Characterization with Voltage Compensation
- Fault Buffer and Freeze Frame
- Fault Code MIL Operation
- Idle Air and Spark Control
- MAF Based Adaptive Volumetric Efficiency
- Make-Up Pulse Transient Fueling
- Mass Based Fuel Injector Characterization with Voltage and Pressure Compensation
- Min, Max, and All-Speed Governor Control
- Modelled Airflow and Fuel Flow
- Power Enrichment
- Redundancy Arbitration For ETC System
- Rev Limiting
- Sensor & Actuator Open and Short Circuit Fault Detection
- Sequential or Batch Fueling
- Sequential, Wasted, or Distributed Spark
- Tau-X Transient Fueling
- Temperature and Pressure Spark and Fuel Compensators
- TPS Based Transient Fueling



Compression Ignition Base Engine Control (Diesel)

- Airflow Model
- Boost Control
- Diagnostic Engine Protection
- Electronic Throttle Control
- Equivalence Ratio (Smoke) Limiting
- Fault Buffer and Freeze Frame
- Fault Code MIL Operation
- Fuel Flow Model
- Fuel Pump Control
- Glow Plug Control
- Min, Max, and All-Speed Governor Control
- Multiple Pulse Injection Strategy
- Redundancy Arbitration For ETC System
- Rev Limiting
- Sensor & Actuator Open and Short Circuit Fault Detection
- Torque and Friction Model
- Warm-Up Compensation

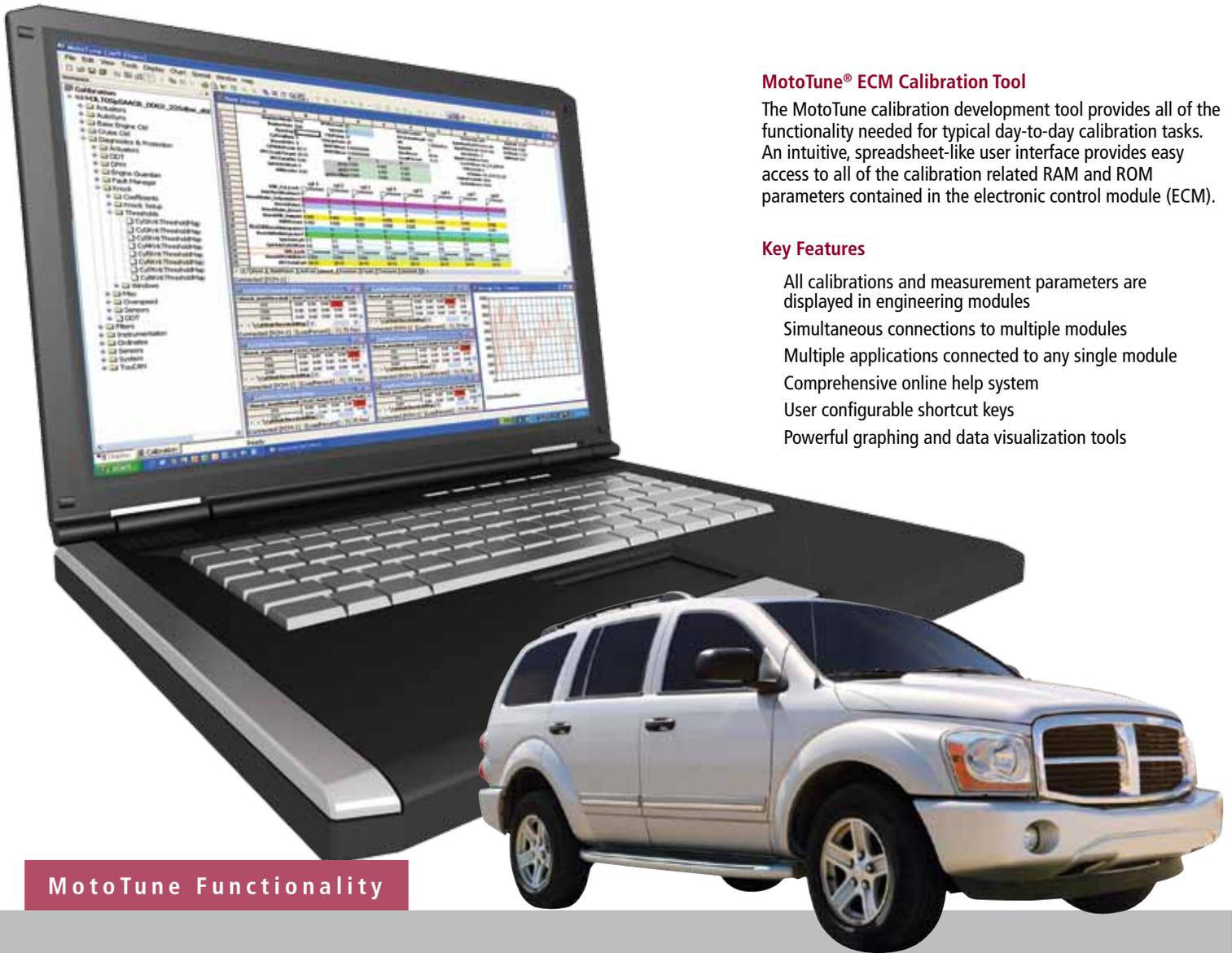
ORDERING INFORMATION

Base Engine Control MotoHawk Models are available for gas and diesel engine control. The software family also includes a variety of add-ons to speed your development time. Woodward's knowledgeable sales team can help you determine which models best suit your application needs.

Woodward Item No.	Reference Number	Description
5418-3254	IA-MHBECSI001	MOTOHAWK MODEL — SPARK IGNITION BASE ENGINE CONTROL
5418-3253	IA-MHBECCI001	MOTOHAWK MODEL — COMPRESSION IGNITION BASE ENGINE CONTROL
5418-3645	IA-MH4L80E001	GM 4L80E TRANSMISSION CONTROLLER
5418-3256	IA-MHFREZZFRAME001	SYSTEM STATE CAPTURE AT FAULT OCCURRENCE
5418-3258	IA-MHKNOCK001	KNOCK CONTROLLER WITH BAND PASS FILTER
5418-3259	IA-MHLOGGER001	EEPROM BASED DATA LOGGER
5418-3260	IA-MHMAPSYNC001	MAP BASED CAMLESS SYNC
5418-3261	IA-MHMISSFIRE001	MISFIRE DETECTION MONITOR
5418-3262	IA-MHPOSTO2001	POST O2 SENSOR CONTROL
5418-3264	IA-MHSTEPPER001	STEPPER MOTOR CONTROLLER TORQUE BASED CONTROL FOR SPARK
5418-3265	IA-MHTORQCTRL001	MOTOHAWK MODEL TORQUE CONTROL
5418-3266	IA-MHUEGO001	WIDE BAND O2 SENSOR CONTROLLER KNOCK CONTROLLER
5418-3267	IA-MHVCT001	VARIABLE CAM TIMING INTERPRETATION
5418-3644	IA-MHCANJ1939001	J1939 CAN IMPLEMENTATION
5418-3643	IA-MHMODBUS001	SERIAL PROTOCOL FOR INDUSTRIAL APPLICATIONS
5418-3642	IA-MHOBDI001	PROTOCOL TO INTERFACE APPLICATION TO GENERIC SCAN TOOL

SOFTWARE

MotoTune



MotoTune® ECM Calibration Tool

The MotoTune calibration development tool provides all of the functionality needed for typical day-to-day calibration tasks. An intuitive, spreadsheet-like user interface provides easy access to all of the calibration related RAM and ROM parameters contained in the electronic control module (ECM).

Key Features

- All calibrations and measurement parameters are displayed in engineering modules
- Simultaneous connections to multiple modules
- Multiple applications connected to any single module
- Comprehensive online help system
- User configurable shortcut keys
- Powerful graphing and data visualization tools

MotoTune Functionality

Calibration (ROM) Editing

- Multi-document, spreadsheet-like calibration map interface
- 1-D and 2-D linear interpolation autofill capability
- Map operating point auto-follow mode
- Multi-type calibration map graphical display capability
- On-line and off-line editing with automatic synchronization
- Cut and paste to other PC applications
- Intelligent calibration map print utility
- High/low resolution parameter incrementing via PC keyboard
- Calibration scroll-back buffer
- Calibration creation via upload from module
- Intuitive parameter directory tree structure with "find" function

ECM Flash Programming

- Built-in ECM programming capability
- Programming directly from merge utility

Calibration/Software File Management

- File version management with unlimited, internally stored user comments
- Partial-calibration management (calibration parameters subsets)
- Automated file transfer/upgrade to new software formats and map breakpoint array scalings (includes automated rescaling and interpolation)
- Calibration file compare utility
- Calibration/software merge utility

Parameter (RAM) Display, Override, and Logging

- Multi-document, user-configurable display parameter interface (spreadsheet-like display configuration - fonts, colors, borders, etc.)
- Many graphing styles and data visualization tools
- Configurable parameter lock and offset capability
- Configurable parameter warning limits
- Integral spreadsheet-like math formula capability
- Built-in parameter strip charting and logging capability
- Full interactive diagnostic tool interface

ORDERING INFORMATION

Each MotoTune kit part number differs based upon the number of USB to CAN channels your application requires. We offer up to 2 CAN channels and supply you with the needed MotoTune hardware, allowing you to quickly begin your calibrations.

Each kit contains one silver USB dongle specifically designed for developers. Need additional non-developer dongles? Contact us — specific keys are available.

Woodward Item No.	Reference Number	Description
8928-1208	ASMTUNE40000	STANDARD MOTOTUNE KIT (USB TO CAN CABLES NOT INCLUDED)
8923-1498	ASMTUNE41000	STANDARD MOTOTUNE KIT WITH 1 CHANNEL USB TO CAN CABLE
5404-1259	ASMINTR01300	1 CHANNEL USB TO CAN KVASER CABLE
1626-1116	CONJBOX00201	JUNCTION BOX - (6) WAY
1649-1078	CONTERM00200	CONNECTOR TERMINATOR - 120 OHM (CD,JK) - BLUE CAP
5404-1152	HARNEXTN002A00	HARNESS EXTENSION- 6' CAN1 & CAN2 DATA CABLE
5404-1157	HARNEXTN003A00	HARNESS EXTENSION- 10' CAN1 & CAN2 DATA CABLE W/RESISTOR
8923-1512	ASMTUNE42000	STANDARD MOTOTUNE KIT WITH 2 CHANNEL USB TO CAN CABLE
5404-1324	ASMINTR00600	KVASER USB-CAN PROFESSIONAL w/MAGISYNC
1626-1116	CONJBOX00201	JUNCTION BOX - (6) WAY
1649-1078	CONTERM00200	CONNECTOR TERMINATOR - 120 OHM (CD,JK) - BLUE CAP
5404-1152	HARNEXTN002A00	HARNESS EXTENSION- 6' CAN1 & CAN2 DATA CABLE
5404-1157	HARNEXTN003A00	HARNESS EXTENSION- 10' CAN1 & CAN2 DATA CABLE W/RESISTOR

SOFTWARE

MotoFlash



ECM Production Programming Tool

The MotoFlash™ production programming system provides a complete solution for low to high volume Electronic Control Module programming requirements.

Key Features

- Simple scan of 2 barcodes to initiate the start of programming sequence
- Product label printed automatically after the completion of download
- Comprehensive online help system
- User configurable toolbar
- For kit purchases: phone support provided for customer-specific programming process setup
- For software only purchases: limited support for integration of non-standard hardware



Your Production Programming & Labeling System

Order These Items To Get Started with MotoFlash

Woodward Item No.	Description
8923-1431	KIT - ASMFLSH001B00, MOTOFLASH COMMON PARTS SINGLE USB/CAN
KIT INCLUDES:	
2018-095	RIBBON - ZEBRA 5095, 3.27" / 83 MILLIMETERS WIDE
3061-489	LABEL - 3.50 X 4.00 BLANK (IDENTCO) - Qty 4000
1009-1501	AUXILIARY EQUIPMENT - COMPHDWR00100, KEYBOARD WEDGE
1626-1116	BOX - CONJBOX00201, JUNCTION BOX - (6) WAY
1649-1078	RESISTOR - CONTERM00200, 120 OHM CAN1 & CAN3 (CD,JK)
1751-8016	PRINTER - COMPPRNT00100, ZEBRA THERMAL ***ORDER WITH THERMAL TRANSFER OPTION*
1796-1083	CD-ROM - ASMCD00900, ASSEMBLY CD - MOTOFLASH
5404-1103	HARNESS - HARND00400, KEY POWER TO BUS
5404-1152	HARNESS - HARNEXTN002A00, FEMALE 10 POSN CONN, 6' CAN1 & CAN2 DATA
5404-1164	HARNESS - HARNEXTN00501, 6" 10-PIN SMARTCRAFT FEMALE TO 10-PIN SMARTCRAFT FEMALE HARNESS EXTENSION
5404-1186	HARNESS - HARNINTRO0900, PRINTER CABLE FOR THE ZEBRA
5404-1249	HARNESS - ASMDC00100, POWER 12DC 5AMP TO JBOX
5404-1259	HARNESS - ASMINTR01300, 1 CHANNEL USB2CAN
5404-1267	HARNESS - HARNADPT006, SMARTCRAFT TO 14-PIN DEUTSCH ADAPTER
* 8928-5225	SOFTWARE LICENSE - SOFTPROG04100, PROGRAM FOR DONGLE - STANDARD - MOTOFLASH- LICENSE



The appropriate programming harness:

Platform	Programming Harness
ECMS12-24	5404-1241
GCMS12-24	N/A
ECM555-48	5404-1122
ECM563-48	5404-1123
GCM563-48 "FIRE48 Family"	5404-1235
HCM563-48 "FIRE48 Family"	5404-1235
ECM555-80	5404-1225
ECM565-128	5404-1220
ECM555x-112	5404-1217
ECMS12X-70	5404-1144

* Note: 8928-5225 can be ordered separately. Requires customer integration with scanning and printing components. Software only orders must be approved by Account Manager



MotoViewer — ECM Data Display Tool

Product Summary

The MotoViewer™ system provides an economical solution for basic electronic control module data and diagnostic needs.

Key Features

- Comprehensive online help system
- Graphical data logging
- Detailed fault diagnostic list
- Activate and test a variety of loads (ignition, injectors etc.)
- View controller fault history
- Clear active and historic faults
- View engine runtime hours
- View engine sensor data
- Chart option to graph data
- User familiarity through use of Microsoft GUI standards

MotoUpdate — ECM Field Re-Programming Tool

Product Summary

The MotoUpdate™ tool provides an easy solution for reprogramming ECMs in the field or service shop.

Key Features

- Allow field/service personnel to update a module when new calibrations are required
- Simple one step process
- Save time and money by updating the module on site

Functionality

- Simple and easy to use application
- Operator friendly – requires basic computer skills to initiate the programming download to ECU
- Programming file can be configured to only allow reprogramming based on previous software ID eligibility
- Includes a detailed user information update read me file authored by authorized engineering staff



ORDERING INFORMATION

MotoService kits ship with or without a USB2CAN cable as indicated below. Order the appropriate kit to fit your needs.

MOTOSERVICE KITS

Woodward Item No.	Reference Number	Description
8928-1203	ASMMSVC003A	KIT - STANDARD - NO USB2CAN
8923-1464	ASMMSVC003A-1	KIT - STANDARD - 1CH USB2CAN
8923-1641	ASMMSV003A-2	KIT - STANDARD - 2CH USB2CAN



Electronic Control Modules



Woodward provides rugged electronic control modules that are especially designed and built for use in harsh automotive, heavy duty and industrial environments. With a wide range of processing power and input/output capabilities, the product line encompasses modules designed for almost every application – from the very simple to the very complex – and also provides straightforward migration paths to meet changing application requirements.

Woodward control modules are available in configurations optimized for various applications, including engine and powertrain control (ECM); general-purpose control (GCM), and hydraulic control (HCM). Designs and capabilities are updated regularly, so consult with your Woodward representative to select the control that is best suited for your application requirements.



24-Pin Form Factor

For simple applications, our 24-pin modules are available in an engine and powertrain control (ECM) configuration, using a Freescale HCS12 processor running at 24 Mhz, and in a general-purpose (GCM) configuration based on Freescale HCS12 (24 MHz) or MPC565 (56 MHz) processors. Typical applications include single cylinder and single point injected 4 cylinder engines, CAN gateways, and diesel after-treatment control systems.



48-Pin Form Factor

Delivering more I/O and processing power, our 48-pin modules are available in engine / powertrain (ECM), general purpose (GCM), and hydraulic (HCM) control configurations. Depending on configuration, the 48-pin modules are based on Freescale MPC555 (40 MHz) or MPC563 (56 MHz) processors. Typical applications include engine-emissions control, transmissions, and hydraulics for small industrial 4 cylinder sequential and 8 cylinder batch-fire engines.



70-Pin Form Factor

Our new 70-pin modules are designed for engine and powertrain (ECM) control. Based on a Freescale HCS12XE processor running at 50 MHz, these modules incorporate a solid complement of memory storage; multiple frequency, crank position and EGO oxygen sensor inputs; as well as CAN2.0B and RS-485 communications. These modules are targeted for low cost, fixed-point, 4 cylinder engine applications.



80-Pin Form Factor

Our 80-pin modules are designed for engine and powertrain (ECM) control. Based on a Freescale MPC555 processor running at 40 Mhz, the 80-pin module includes multiple DSP knock inputs, optional EGO oxygen sensor inputs, as well as a high-current H-Bridge driver. Typical applications include knock control and peak/hold fuel injection for 12 cylinder sequential engines.



112-Pin Form Factor

For demanding engine and powertrain (ECM) control applications, our 112-pin modules are based on Freescale MPC5553 or 5554 processors running at 80 MHz. The 112-pin modules offer a full complement of memory storage, as well as multiple frequency, crank position, and DSP knock detection inputs. The module also includes four differential EGO oxygen sensor inputs. Typical applications include full OBD2 8 cylinder sequential engines.



128-Pin Form Factor

Designed for large scale engine and powertrain (ECM) control, our 128 pin module delivers optimal flexibility for complex control strategies. Built on the proven MPC565 processor, the onboard floating point unit and high clock frequency allow software to be developed in shorter times. Dual CAN 2.0B datalinks ensure interoperability with other vehicle systems. Typical applications include general rapid prototyping, peak/hold fuel injection, and 12 cylinder sequential engines.

ECM-0565-128

Engine Control Module



Product Summary

The ECM-0565-128 module is a rugged embedded control system capable of operating in harsh automotive, marine, and off-highway applications. This ECM is part of the Woodward's family of electronic control modules with **over 1 million units successfully deployed in the field**. Numerous successful marine applications prove the capability of this module. Based on a proven microprocessor, the ECM-0565-128 is capable of delivering complex control strategies. The onboard floating point unit and high clock frequency allow software to be developed in shorter times. Dual CAN 2.0B datalinks ensure interoperability with other vehicle systems.

The ECM-0565-128, part of the ControlCore™ product line, uses Woodward's production-proven ControlCore operating system. Control software for specific applications is developed with autocode generation, calibration and visualization tools from Woodward's MotoHawk development suite.

IMPORTANT! Woodward does not warranty this ECM based on information supplied in this datasheet, but only with an expressed and specific production supply agreement based on customer's operating mode. Information in this datasheet is subject to change without prior notice. Please contact Woodward sales for more information.

Hardware Features

Microprocessor: MPC565, 56MHz
Memory: 1M Flash, 548K RAM, 8K Serial EEPROM, 64Kx8 Parallel EEPROM
Operating Voltage: 9-32VDC
Operating Temperature: -40° to 105° C
Sealed connectors operable to 10ft submerged

Inputs

- 30 Analog Inputs
- 4 Low Frequency Discrete Inputs
- 4 VR Frequency Inputs
- 2 Wide Range O₂ Sensor Inputs
- Dual Lambda Sensor Interface
- 2 Dual Sensor Wide Band Knock Detectors

Outputs

- 6 3A /1A Peak/Hold Injector Drivers
- 6 7A/3A or 3A/1A Peak/Hold Inj. Drivers
- 16 TTL Level Ignition System Outputs
- 10 3A Low Side PWMs
- 1 1.5A Tachometer Output
- 2 5A H-Bridge PWMs
- 1 10A H-Bridge PWM
- 1 Relay Driver (Main Power)

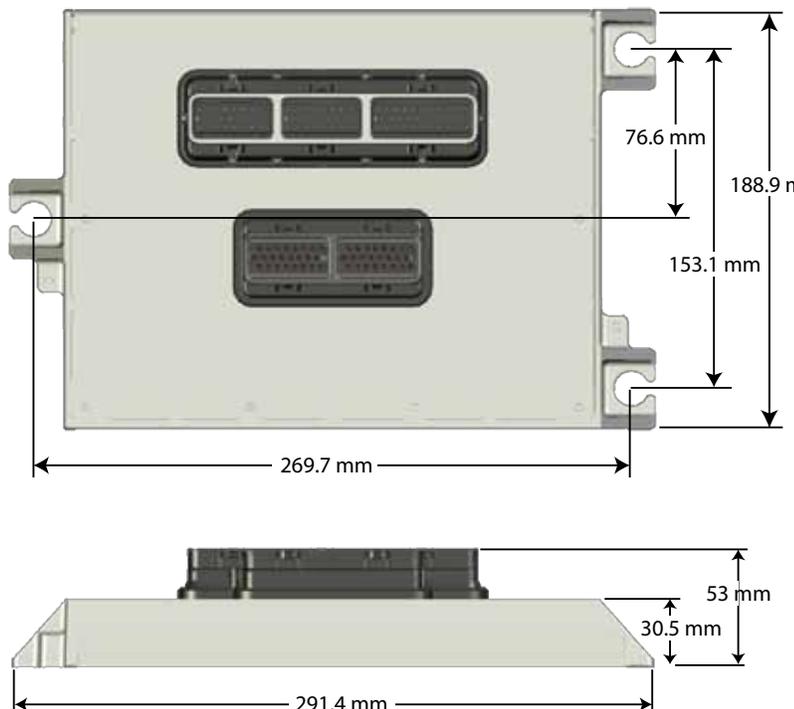
Datalinks

- 2 CAN 2.0B Channels
- 1 ISO 9141 Channel (KWP2000/HWP2000, 10.4kbps)
- 1 RS485 Channel

Notes

GHS 3.6, 4.2.1, or 4.2.4 version required

PHYSICAL DIMENSIONS (Drawings and models available upon request.)



ORDERING INFORMATION

PLATFORM ECM565-128 — ACTIVE CONTROLLERS

Flash Controllers			Calibratable Controllers		
Woodward Item No.	w/ Mounting Harware	Controller ID	Woodward Item No.	w/ Mounting Harware	Reference Number
8237-1237	8923-1572	ECM0565128H701F00	8237-1448	8923-1573	ECM0565128L704C00M
8237-1364	8237-1145	ECM0565128H1001F00	8237-1363	N/A	ECM0565128L1001C00M

ECM565-128 RELATED HARDWARE

Woodward Item No.	Reference Number	Description
8923-1408	ASMCON00300	Connector Kit
8996-2150	TOOLCON00800	Crimp Tools
8996-2052		Extraction Tool
1635-1800	HARNINTR00801	Boot Key
	N/A (not required)	Boot Cable
5404-1218	HARNP12800100	Pigtail Harness
5404-1219	HARNP12800200	Development Harness (12V)
	N/A (not required)	Programming Harness
8923-1405	ASMBBOX1281002	Breakout box
5404-1206	HARNINTR027A	Desktop Simulator Front End Harness
5404-1317	HARNP12800200	Development Harness (24V)

SOFTWARE

CONTROLLERS

CONNECTORS & KITS

DEV TOOLS

HARNESSES

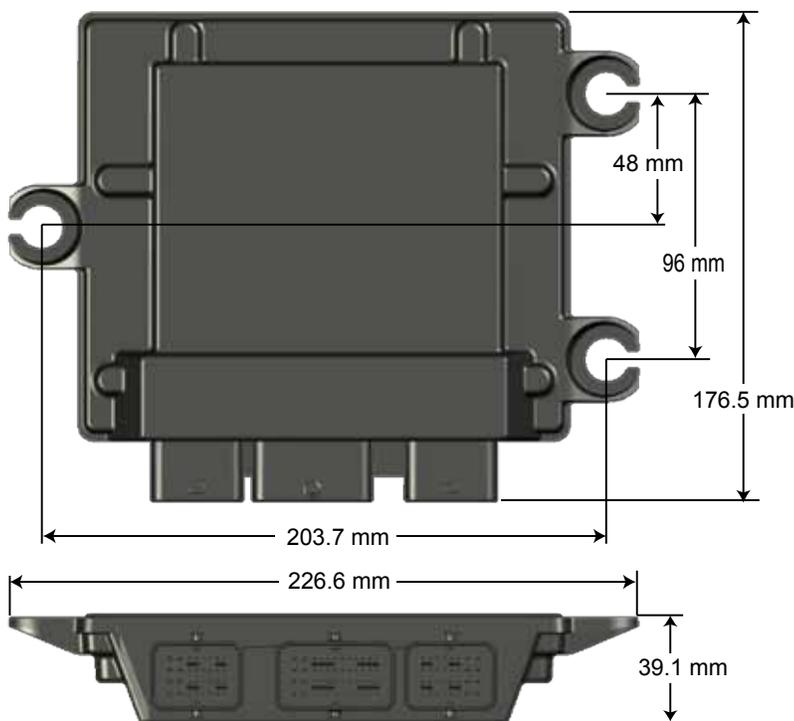
SYSTEM COMPONENTS

ECM-5554-112

Engine Control Module



PHYSICAL DIMENSIONS (Drawings and models available upon request.)



Product Summary

The ECM-5554-112 is a high-end control module capable of operating in harsh automotive, marine, and off-highway applications. Its connector system is environmentally sealed and suitable for engine mounting in many applications.

This unit provides 112 connector pins with inputs, outputs, and communications interfaces that support a wide variety of applications.

The ECM-5554-112 is part of the ControlCore™ family of embedded controls systems. Woodward's ControlCore operating system, MotoHawk® code generation product, and MotoHawk's suite of development tools enable rapid development of complex control systems.

Each Controller is available in 'F' (Flash) or 'C' (Calibratable) versions. Flash modules are typically used for production purposes. Calibratable modules are typically for prototyping/development only; they can be calibrated in real time using MotoTune.

IMPORTANT! Woodward does not warranty this ECM based on information supplied in this datasheet, but only with an expressed and specific production supply agreement based on customer's operating mode. Information in this datasheet is subject to change without prior notice. Please contact Woodward sales for more information.

Hardware Features

Microprocessor: Motorola MPC5554, 80 MHz
Memory: 2MB Flash, 64K RAM, + 32K Cache, 32K EEPROM
Calibratable Memory: 512k (256k x2) RAM
Operating Voltage: 9-16VDC, 24V (Jump start), 4.5V (Crank)
Operating Temperature: -40° to 105° C

Inputs

VR and Digital Engine Position Sensor (crank and cam) Inputs
33 Analog Inputs
4 Oxygen Sensor Inputs
3 Speed (digital) Inputs
2 Knock Sensor Inputs
1 Emergency Stop Input

Outputs

8 Injector (high impedance) Outputs
8 Electronic Spark Trigger (5V) Outputs
1 Tachometer or Link Interface Output
14 Low Side Outputs
1 Main Power Relay Driver Output
2 H-Bridge Outputs
Datalinks
3 CAN buses
1 RS485 Channel

Notes

GHS 3.6, 4.2.1, or 4.2.4 version required

ORDERING INFORMATION

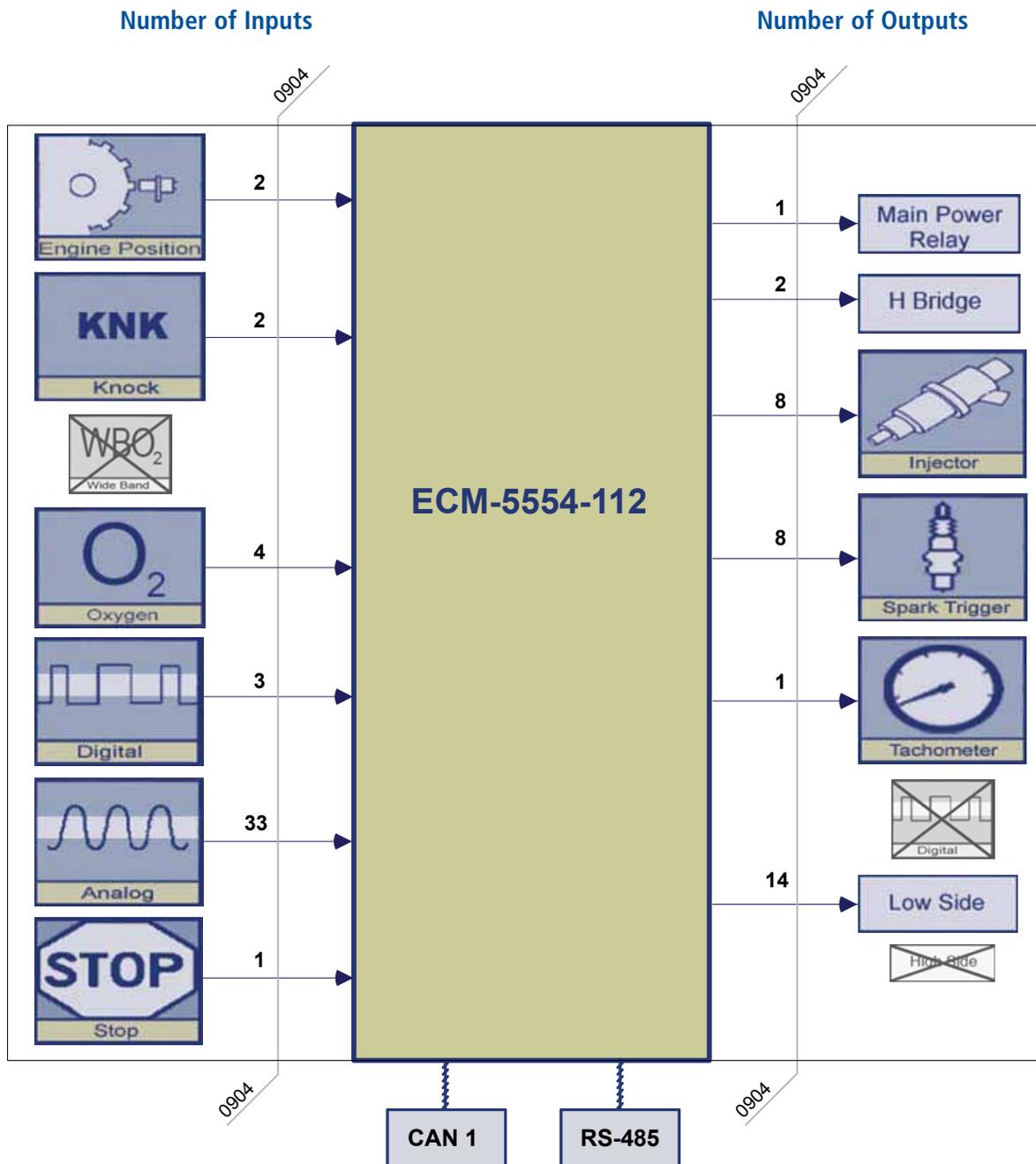
PLATFORM ECM5554-112 — ACTIVE CONTROLLERS

Flash Controllers			Calibratable Controllers		
Woodward Item No.	w/ Mounting Hardware	Controller ID	Woodward Item No.	w/ Mounting Hardware	Reference Number
1751-6454	8923-1628	ECM55541120904-F00	1751-6455	8923-1629	ECM55541120904-C00M

ECM5554-112 RELATED HARDWARE

Woodward Item No.	Reference Number	Description
8923-1413	ASMCN042	Connector Kit
8996-2158/8996-2159	TOOLCON016/017	Crimp Tools
8996-1059/8996-2161	TOOLCON018/019	Removal Tools
1635-1800	HARNINTR00801	Boot Key
	N/A (not required)	Boot Cable
5404-1215	HARNP112001	Pigtail Harness
5404-1216	HARNP112002	Development Harness
5404-1217	HARNP112003	Programming Harness
8923-1404	ASMBBOX1121002	Breakout box
5404-1205	HARNINTR026A	Desktop Simulator Front End Harness

SIMPLE BLOCK DIAGRAM



INACTIVE
FOR REFERENCE ONLY



Product Summary

The ECM-0555-080 engine control module is a rugged embedded control system capable of operating in harsh automotive, marine, and off-highway applications. **Over 300,000 successful marine applications prove the capability of this module.**

Based on a proven microprocessor, the ECM-0555-080 is capable of delivering complex control strategies. The onboard floating point unit and the high clock frequency allow software to be developed in shorter times. Dual CAN 2.0B datalinks ensure interoperability with other system components.

The ECM-0555-080 is part of the ControlCore family of embedded controls systems. Software for this module can be created utilizing model-based automatic code generation via Woodward's MotoHawk development suite.

IMPORTANT! Woodward does not warranty this ECM based on information supplied in this datasheet, but only with an expressed and specific production supply agreement based on customer's operating mode. Information in this datasheet is subject to change without prior notice. Please contact Woodward sales for more information.

Hardware Features

Microprocessor: MPC555, 40MHz
Memory: 448K Flash, 26K RAM, 8K EEPROM
128Kx8 Parallel EEPROM (ECM-0555-080-0703-C)
Operating Voltage: 9-16VDC
Operating Temperature: -40° to 105° C
Sealed connectors operable to 10 ft. submerged.

Inputs

15 Analog Inputs
3 Low Frequency Digital Inputs
1 VR Frequency Input
Up to 2 Hall Effect Frequency Inputs
Dual Sensor Wide Band Knock Detection Input
Dual O₂ (Lambda) Sensor
1 Emergency Stop Input

Outputs

12 3A Peak/1A Hold Injector Drivers
8 TTL Level Ignition System Outputs
6 6A Low Side PWM
1 5A Discrete H-Bridge
1 5A PWM H-Bridge
1 Relay Driver (Main Power)
2 1.5 A Low Side PWM

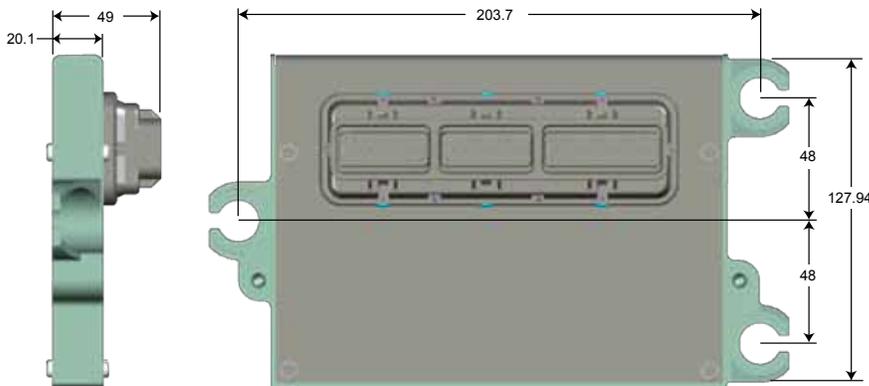
Datalinks

2 CAN 2.0B Channels
1 RS485 Channel

Notes

GHS 3.6, 4.2.1, or 4.2.4 version required

PHYSICAL DIMENSIONS (Drawings and models available upon request.)



**INACTIVE
FOR REFERENCE ONLY**

ORDERING INFORMATION

PLATFORM ECM555-80 — ACTIVE CONTROLLERS

Flash Controllers			Calibratable Controllers		
Item No.	w/Mounting Hardware	Controller ID	Item No.	w/Mounting Hardware	Controller ID
1751-6401	8923-1559	ECM05550800801F00			
1751-6403	8923-1561	ECM05550800802F00	1751-6397	8923-1731	ECM05550800702-CPO-M
1751-6405	8923-1563	ECM05550800803F00	1751-6399	8923-1713	ECM05550800703-CPO-M

ECM555-80 RELATED HARDWARE

Item No.	Reference Number	Description
8923-1406	ASMC000100	Connector Kit
8996-2150	TOOLCON00800	Crimp Tools
8996-2052		Extraction Tool
1635-1800	HARNINTR00801	Boot Key
	N/A (not required)	Boot Cable
5404-1221	HARNPCM002	Pigtail Harness
5404-1224	HARNPCM008	Development Harness
5404-1225	HARNPCM012	Programming Harness
8923-1403	ASMBBOX0801002	Breakout box
5404-1204	HARNINTR025A	Desktop Simulator Front End Harness

SOFTWARE

CONTROLLERS

CONNECTORS & KITS

DEV TOOLS

HARNESSES

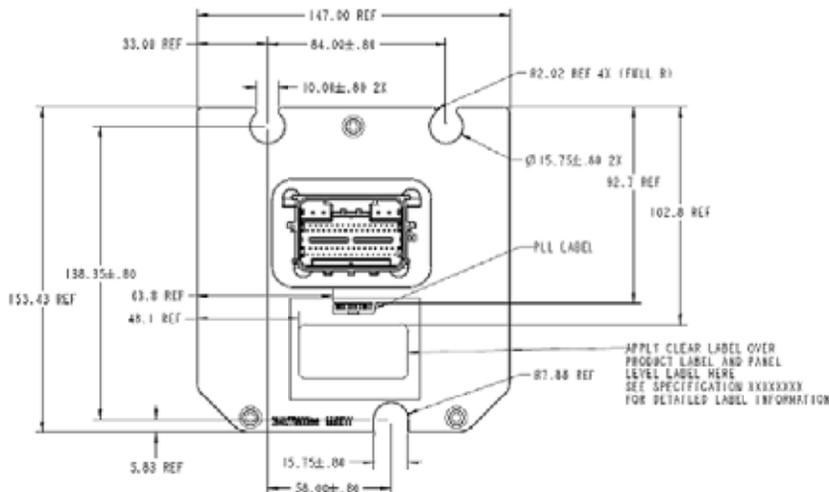
SYSTEM COMPONENTS

ECM-S12X-070

Engine Control Module



PHYSICAL DIMENSIONS (Drawings and models available upon request.)



Product Summary

The ECM-S12X-070 family of engine control modules are rugged controllers capable of operating in harsh automotive, marine, and off-highway applications. The module and its connector system are environmentally sealed and suitable for engine mounting in many applications.

This unit provides 70 connector pins with inputs, outputs, and communication interfaces that support a wide variety of applications.

The ECM-S12X-070 is part of the MotoHawk Control Solutions ControlCore® family of embedded control solutions. The ControlCore operating system, MotoHawk® code generation product, and MotoHawk's suite of development tools enable rapid development of complex control systems.

Each controller is available in 'F' (Flash) or 'C' (Calibratable) versions. Flash modules are typically used for production purposes. Calibratable modules are typically for prototyping/development only; they can be calibrated in real time using MotoTune®.

IMPORTANT! Woodward does not warranty this ECM based on information supplied in this datasheet, but only with an expressed and specific production supply agreement based on customer's operating mode. Information in this datasheet is subject to change without prior notice. Please contact Woodward sales for more information.

Hardware Features

70-Pin platform

Microprocessor: Freescale S12XE, 50MHz

Memory: 256K Flash, 16K RAM, 4K Internal

EEPROM, 64K serial FRAM

Calibratable Memory: 1M Flash, 64K RAM

Operating Voltage: 6.5-16 Vdc, 24 V (Jump Start), 5V (Crank)

Operating Temperature: -40 to +85 °C

(105 °C possible in some applications)

Inputs

VR or digital crank position sensor

Digital cam position sensor

17 analog

1 oxygen sensor

4 switch

1 speed

1 emergency stop

Outputs

4 injector (high impedance) drivers

3 ignition coil drivers

1 tachometer driver

9 low-side drivers

1 main power relay driver

2 sensor supply (5V) outputs

Datalinks

2 CAN 2.0B Channels

1 RS485 Channel

ORDERING INFORMATION

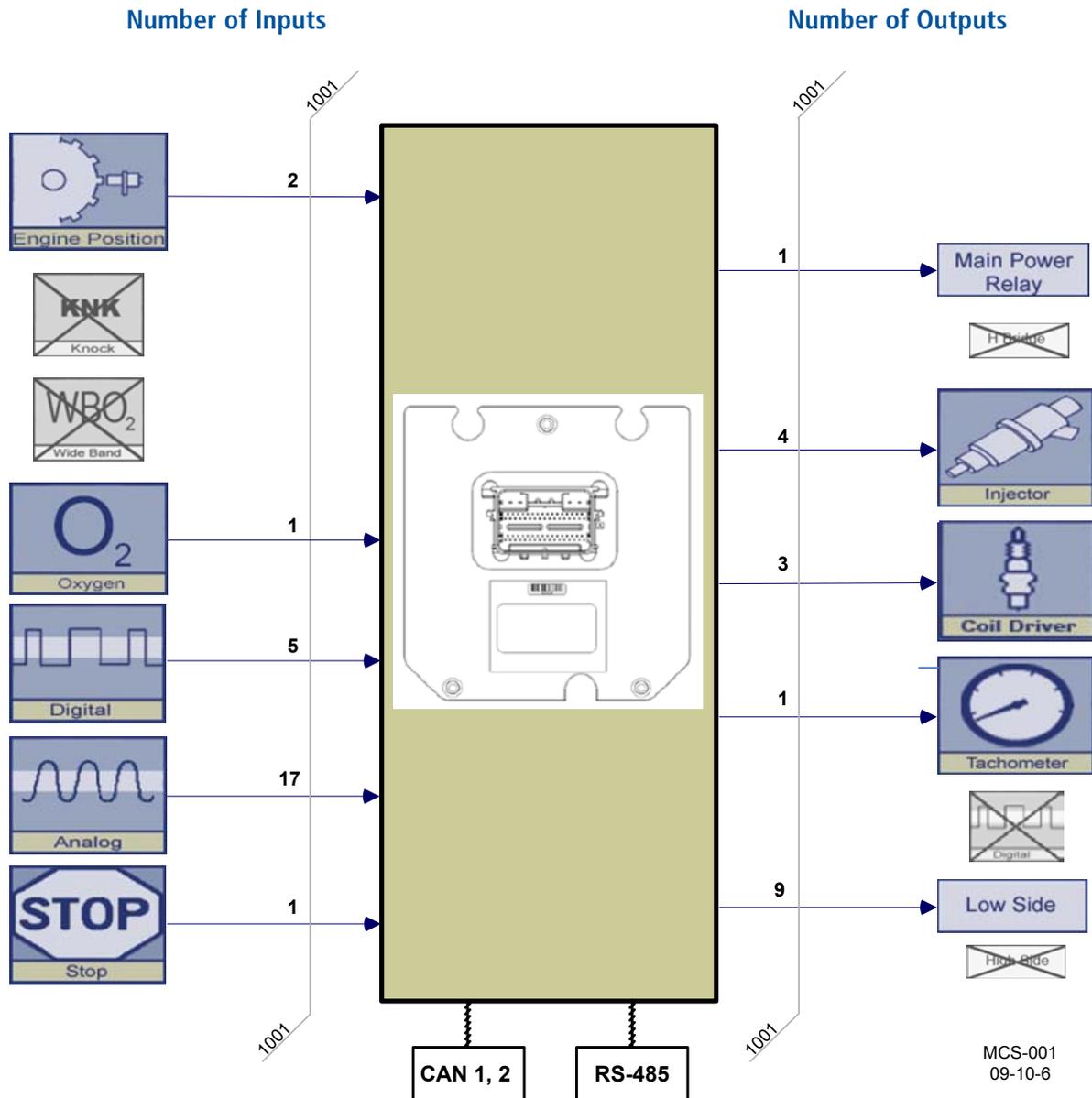
PLATFORM ECM-S12X-070 — ACTIVE CONTROLLERS

Flash Controllers			Calibratable Controllers		
Item No.	w/Mounting Hardware	Controller ID	Item No.	w/Mounting Hardware	Controller ID
1751-6458	8923-1620	ECMS12X0701001F00	1751-6466	8923-1640	ECMS12X0701001-CP0

ECM-S12X-070 RELATED HARDWARE

Item No.	Reference Number	Description
8923-1761	ASMCON046	Connector Kit
8996-2163	TOOLCON021	Crimp Tool
8996-2164	TOOLCON022	Crimp Tool
8996-2167	TOOLCON025	Removal Tool
N/A	N/A	Boot Key not needed for this module
5404-1144	HARNECM029	Boot Cable
5404-1141	HARNECM026	Pigtail Harness
5404-1143	HARNPCM028	Development Harness
5404-1144	HARNECM029	Programming Harness
5404-1207	HARNINTRO29A	Desktop Simulator Front End Harness

SIMPLE BLOCK DIAGRAM



HCM-0563-048

Hydraulic Control Module



Product Summary

The HCM-0563-048 hydraulic control module is a rugged embedded control system capable of operating in harsh automotive, marine, and off-highway applications.

Thousands of successful marine applications prove the capability of this module design.

Based on a proven microprocessor, the HCM-0563-048 is capable of delivering complex control strategies. The onboard floating point unit and high clock frequency allow software to be developed in shorter times. Dual CAN 2.0B datalinks ensure interoperability with other system components.

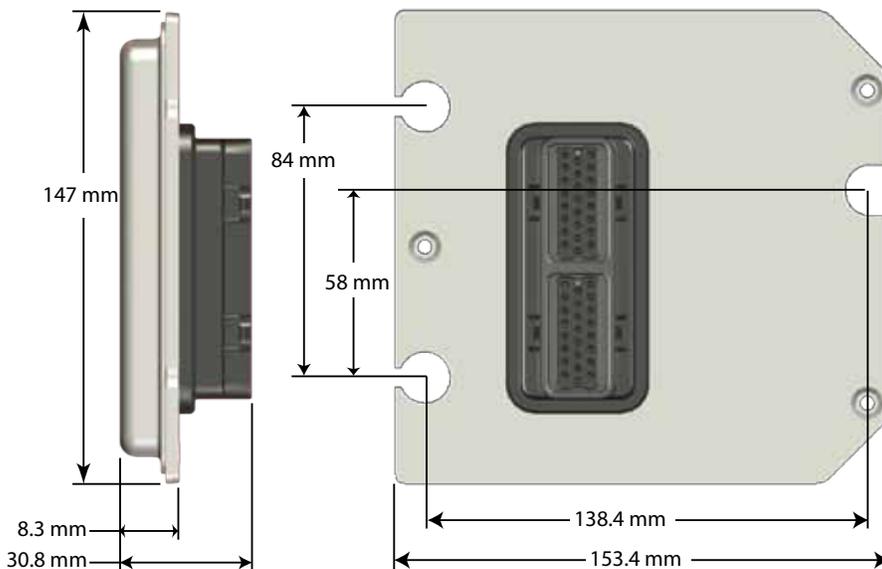
The HCM-0563-048 is part of the ControlCore family of embedded controls systems. Software for this module can be created utilizing model-based automatic code generation via Woodward's MotoHawk development suite.

IMPORTANT! Woodward does not warranty this ECM based on information supplied in this datasheet, but only with an expressed and specific production supply agreement based on customer's operating mode. Information in this datasheet is subject to change without prior notice. Please contact Woodward hsales for more information.

Hardware Features

Microprocessor: MPC563, 40MHz
Memory: 512K Flash, 32K RAM (4K overlayable)
16K serial EEPROM
128K parallel EEPROM
Operating Voltage: 8-32VDC
Operating Temperature: -40° to 85° C
Sealed Connectors Operable to 10ft. submerged

PHYSICAL DIMENSIONS (Drawings and models available upon request.)



Inputs

Up to 16 Analog Inputs
Up to 6 Discrete/Frequency Inputs
Up to 2 VR/Hall Frequency Inputs
1 Knock/Drive Noise Detector Input
1 Stop Input

Outputs

6 2.5A Low Side Drivers w/Current Feedback
4 3A Low Side Drivers
1 1A EasyLink/Low Side Driver
1 Relay Driver (Main Power)

Datalinks

2 CAN 2.0B Channels
1 EasyLink Channel

Notes

GHS 3.6, 4.2.1, or 4.2.4 version required

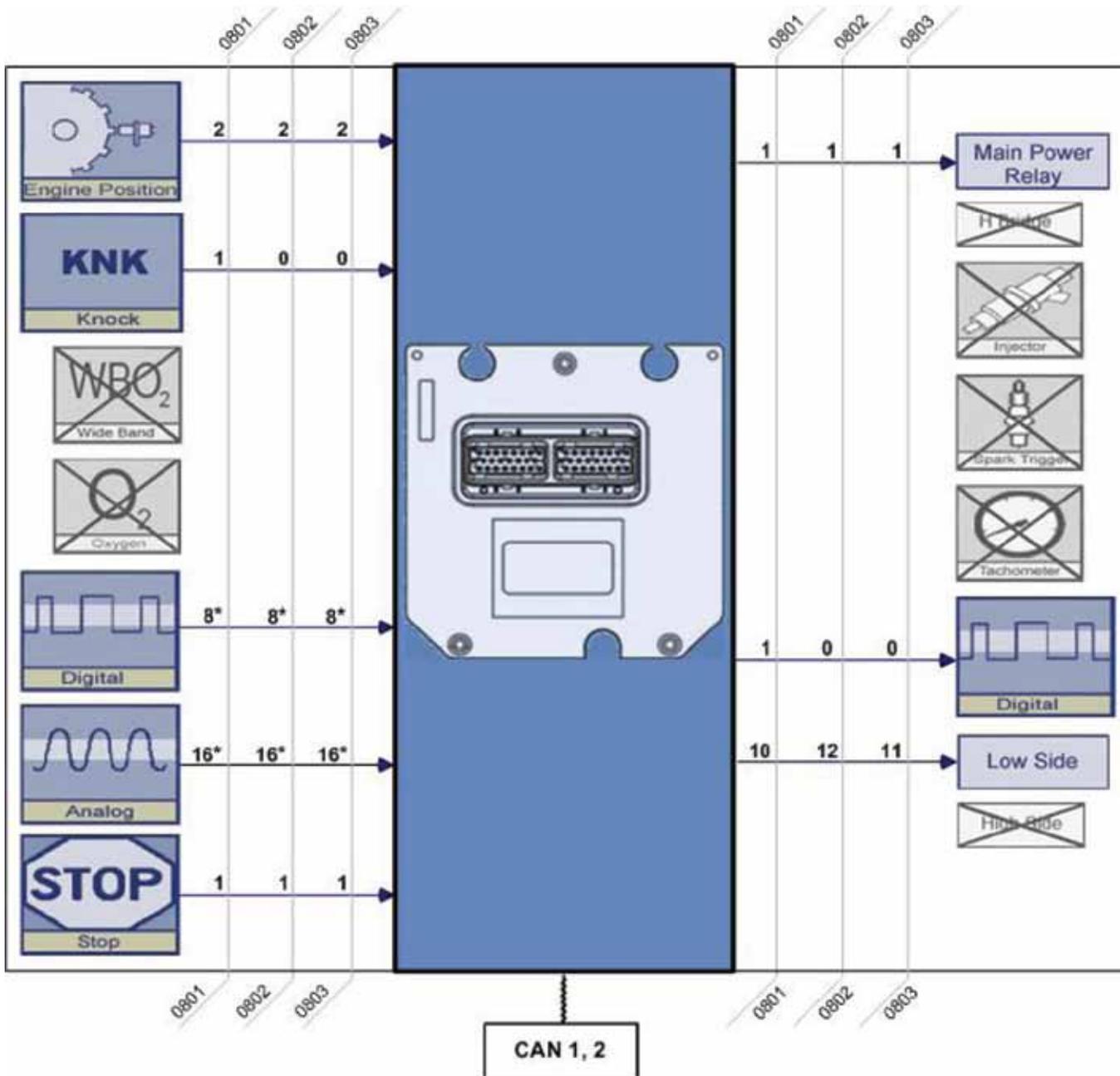
ORDERING INFORMATION

PLATFORM HCM563-48 — ACTIVE CONTROLLERS

Flash Controllers			Calibratable Controllers		
Item No.	w/Mounting Hardware	Controller ID	Item No.	w/Mounting Hardware	Controller ID
1751-6354	8923-1607	HCM05630480801F00	1751-6506	8923-1709	HCM05630480801CP0
1751-6358	8923-1609	HCM05630480802F00	1751-6528	8923-1727	HCM05630480802CP0
1751-6361	8923-1611	HCM05630480803F00	1751-6529	8923-1728	HCM05630480803CP0

HCM563-48 RELATED HARDWARE

Item No.	Reference Number	Description
8923-1407	ASMCON00200	Connector Kit
8996-2150	TOOLCON00800	Crimp Tools
8996-2052		Extraction Tool
1635-1800	HARNINTR00801	Boot Key
5404-1138	HARNECM022	Boot Cable
5404-1109	HARNECM004D0	Pigtail Harness
5404-1124	HARNECM014	Development Harness
5404-1235	HARNPROG009	Programming Harness
8923-1402	ASMBBOX0481002	Breakout box
5404-1203	HARNINTR024C	Desktop Simulator Front End Harness



GCM-0563-048

General Control Module



Product Summary

The GCM-0563-048 general control module is a rugged embedded control system capable of operating in harsh automotive, marine, and off-highway applications. Thousands of successful marine applications prove the capability of this module design.

Based on a proven microprocessor, the GCM-0563-048 is capable of delivering complex control strategies. The onboard floating point unit and high clock frequency allow software to be developed in shorter times. Three CAN 2.0B datalinks ensure interoperability with other system components.

The GCM-0563-048 is part of the ControlCore family of embedded controls systems. Software for this module can be created utilizing model-based automatic code generation via Woodward's MotoHawk development suite.

IMPORTANT! Woodward does not warranty this ECM based on information supplied in this datasheet, but only with an expressed and specific production supply agreement based on customer's operating mode. Information in this datasheet is subject to change without prior notice. Please contact Woodward sales for more information.

Hardware Features

Microprocessor: MPC563, 40MHz
Memory: 512K Flash, 32K RAM (4K overlayable)
16K serial EEPROM
128K parallel EEPROM (GCM-0563-048-0801-C)
Operating Voltage: 8-32VDC
Operating Temperature: -40° to 105° C
Sealed Connectors Operable to 10ft. submerged

Inputs

Up to 16 Analog Inputs
Up to 7 Discrete/Frequency Inputs
Up to 2 VR/Hall Frequency Inputs
1 Emergency Stop Input

Outputs

2 3A Low Side Drivers w/Current Feedback
4 3A Low Side Drivers
2 2.9A High Side Drivers
1 1A EasyLink/Low Side Driver
1 Relay Driver (Main Power)
1 10A H-Bridge Driver

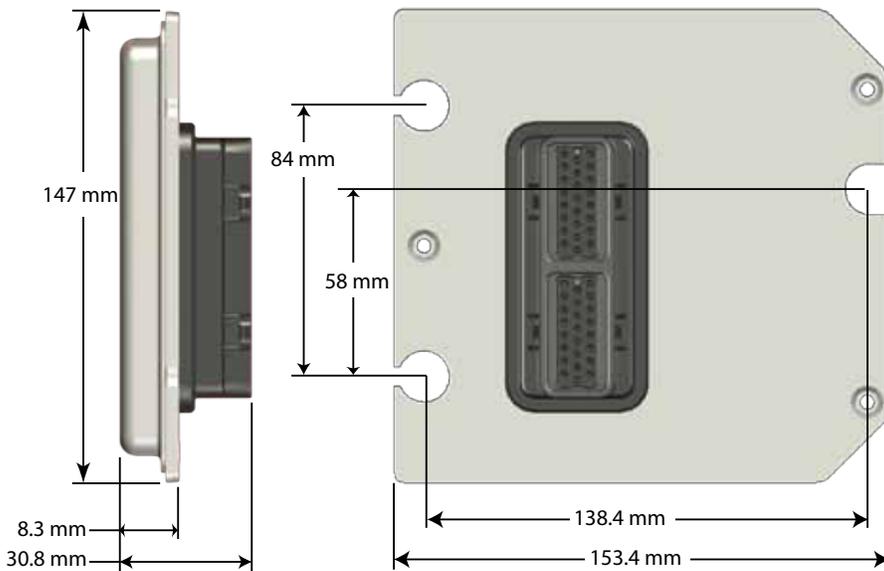
Datalinks

3 CAN 2.0B Channels
1 EasyLink Channel

Notes

GHS 3.6, 4.2.1, or 4.2.4 version required

PHYSICAL DIMENSIONS (Drawings and models available upon request.)



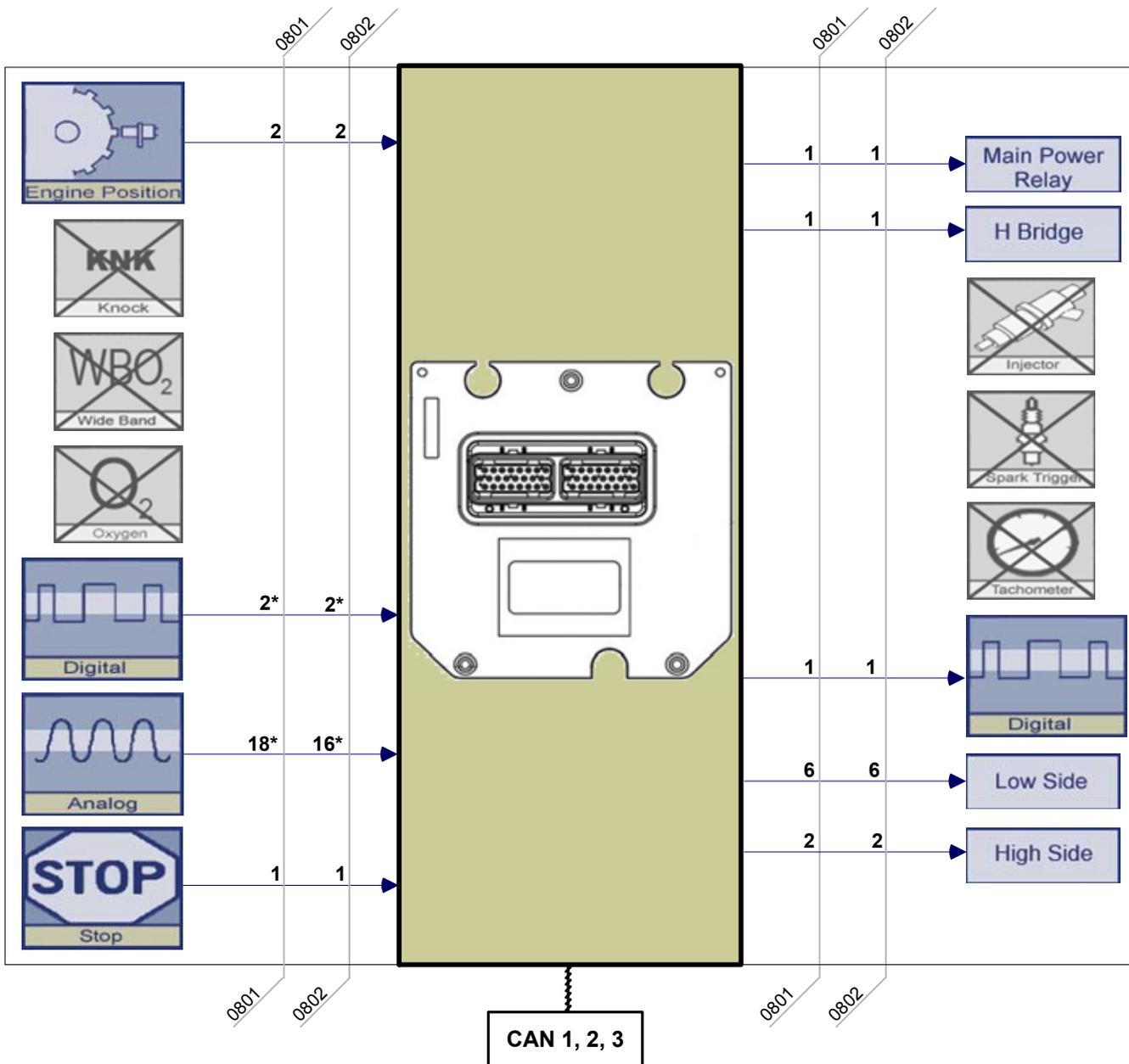
ORDERING INFORMATION

PLATFORM GCM563-048 — ACTIVE CONTROLLERS

Flash Controllers			Calibratable Controllers		
Item No.	w/Mounting Hardware	Controller ID	Item No.	w/Mounting Hardware	Controller ID
1751-6326	8923-1591	GCM05630480801F00	1751-6508	8923-1711	GCM05630480801CP0
1751-6332	8923-1593	GCM05630480802F00	1751-6509	8923-1712	GCM05630480802CP0

GCM563-048 RELATED HARDWARE

Item No.	Reference Number	Description
8923-1407	ASMCN00200	Connector Kit
8996-2150	TOOLCON00800	Crimp Tools
8996-2052	GCM-0563-048	Extraction Tool
1635-1800	HARNINTR00801	Boot Key
5404-1138	HARNECM022	Boot Cable
5404-1109	HARNECM004D0	Pigtail Harness
5404-1124	HARNECM014	Development Harness
5404-1235	HARNPROG009	Programming Harness
8923-1402	ASMBBOX0481002	Breakout box
5404-1203	HARNINTR024C	Desktop Simulator Front End Harness



SOFTWARE

CONTROLLERS

CONNECTORS & KITS

DEV TOOLS

HARNESSES

SYSTEM COMPONENTS

ECM-0563-048

Engine Control Module



Product Summary

The ECM-0563-048 is a rugged embedded control system capable of operating in harsh automotive, marine, and off-highway applications. Based on a proven microprocessor, this engine control module is capable of delivering complex control strategies.

The onboard floating point unit and high clock frequency allow software to be developed in shorter times. The CAN 2.0B datalink ensures interoperability with other vehicle systems.

The ECM-0563-048 is part of the ControlCore family of embedded controls systems. Software for this module can be created utilizing model-based automatic code generation via Woodward's MotoHawk development suite.

IMPORTANT! Woodward does not warranty this ECM based on information supplied in this datasheet, but only with an expressed and specific production supply agreement based on customer's operating mode. Information in this datasheet is subject to change without prior notice. Please contact Woodward sales for more information.

Hardware Features

Microprocessor: MPC563, 56MHz
Memory: 512K Flash, 32K RAM(24K+4K overlayable)
128K parallel EEPROM (ECM-0563-048-0701-C)
Operating Voltage: 8-16VDC
Operating Temperature: -40° to 105° C
Sealed Connectors Operable to 10ft submerged

Inputs

13 Analog Inputs
2 VR/Hall Frequency Inputs

Outputs

4 Low Side Injector Drivers
8 TTL Level Ignition System Outputs
5 High Current Low Side PWMs
2 5A H-Bridge PWMs with Current Feedback
Independent Transducer Power Supply
1 Low Side Relay Driver (Main Power)

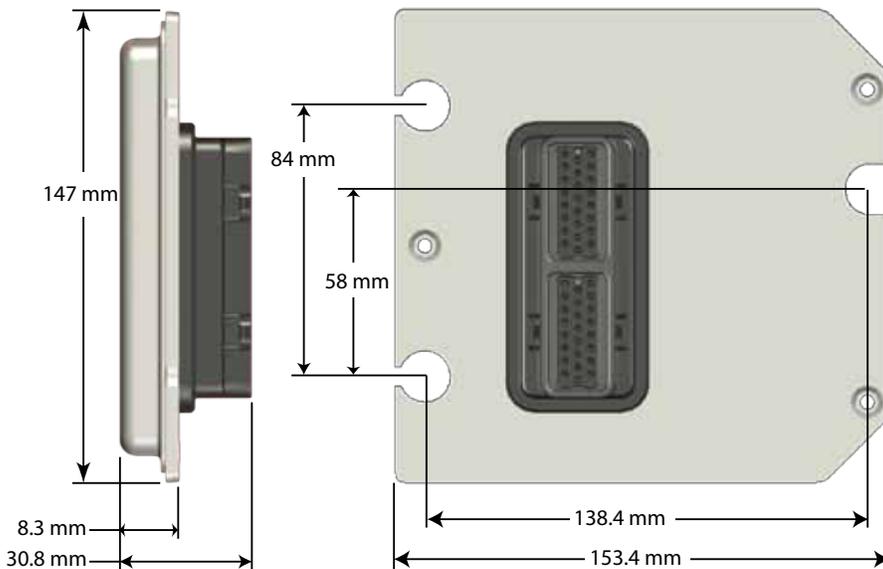
Datalinks

1 CAN 2.0B Channel

Notes

GHS 3.6, 4.2.1, or 4.2.4 version required

PHYSICAL DIMENSIONS (Drawings and models available upon request.)



ORDERING INFORMATION**PLATFORM ECM563-48 — ACTIVE CONTROLLERS**

Flash Controllers			Calibratable Controllers		
Item No.	w/Mounting Hardware	Controller ID	Item No.	w/Mounting Hardware	Controller ID
1751-6407	8923-1565	ECM05630480701F00	1751-6533	8923-1732	ECM05630480701CP1
1751-6410	8923-1568	ECM05630480704F00	1751-6527	8923-1716	ECM05630480704CP2
1751-6068	1751-6110	ECM05630480705F00	1751-6511	1751-6515	ECM05630480705CP0

ECM563-48 RELATED HARDWARE

Item No.	Reference Number	Description
8923-1407	ASMCN00200	Connector Kit
8996-2150	TOOLCON00800	Crimp Tools
8996-2052		Extraction Tool
	N/A (not required)	Boot Key
5404-1123	HARNECM013	Boot Cable
5404-1109	HARNECM004D0	Pigtail Harness
5404-1142	HARNECM027	Development Harness
5404-1123	HARNECM013	Programming Harness
8923-1402	ASMBBOX0481002	Breakout box
5404-1202	HARNINTR024B	Desktop Simulator Front End Harness

SOFTWARE

CONTROLLERS

CONNECTORS & KITS

DEV TOOLS

HARNESSES

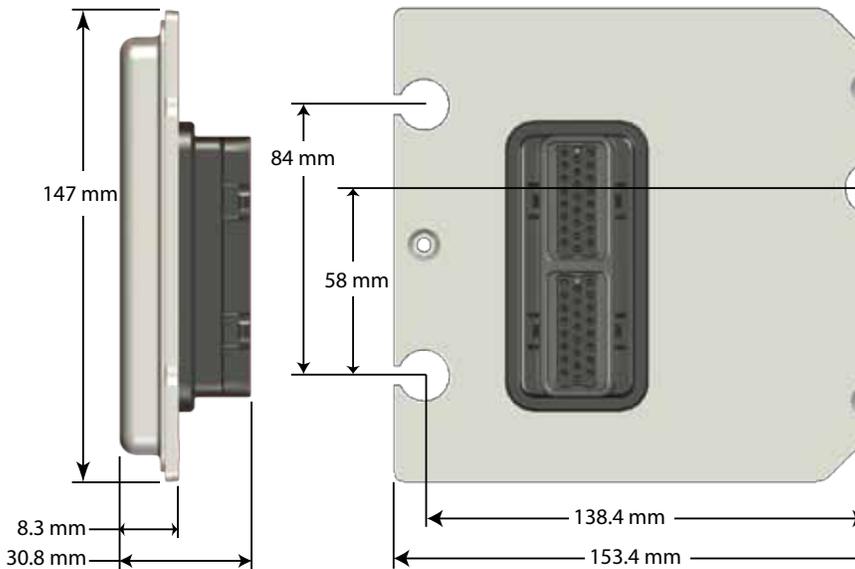
SYSTEM COMPONENTS

ECM-0555-048

Engine Control Module



PHYSICAL DIMENSIONS (Drawings and models available upon request.)



Product Summary

The ECM-0555-048 engine control family consists of rugged controllers capable of operating in harsh automotive, marine, and off-highway applications. Numerous marine applications have proven the capability of this family. Based on the Freescale MPC555 family of microprocessors, the ECM-0555-048 is capable of delivering complex control strategies. The onboard floating-point unit and high clock frequency allow software to be executed in shorter times. The CAN 2.0B datalink ensures interoperability with other vehicle systems.

The ECM-0555-048 is part of the ControlCore™ family of embedded control systems. Woodward's ControlCore operating system, MotoHawk® code generation product, and MotoHawk's suite of development tools enable rapid development of complex control systems.

Each Controller is available in 'F' (Flash) or 'C' (Calibratable) versions. Flash modules are typically used for production purposes. Calibratable modules are typically for prototyping/development only, they can be calibrated in real time using MotoTune.

IMPORTANT! Woodward does not warranty this ECM based on information supplied in this datasheet, but only with an expressed and specific production supply agreement based on customer's operating mode. Information in this datasheet is subject to change without prior notice. Please contact Woodward sales for more information.

Hardware Features

Microprocessor: Freescale MPC555, 40MHz
Memory: 448K Flash, 26K RAM,
4K serial EEPROM Flash, Except: 0710 - 8K serial EEPROM
Calibratable Memory: 64K parallel EEPROM
Operating Voltage: 8-16VDC
Operating Temperature: -40° to 85° C
(in benchmark marine engine application)
Sealed Connectors Operable to 10 ft. submerged

Inputs*

- 12 to 15 Analog Inputs
- 3 or 4 Low Frequency Digital Inputs
- 1 or 2 Hall Effect Frequency Inputs (cam)
- 0 or 1 Variable Reluctance Frequency Input (crank)
- 0 to 2 Knock Sensor Inputs
- 1 Stop Input

Outputs*

- 4 Injector Driver Outputs
- 1 to 4 Electronic Spark Trigger (5V) Outputs
- 1 Tachometer Output
- 4 or 5 Low Side Outputs
- 1 Main Power Relay Driver Output

Datalinks

- 1 CAN 2.0B Channel
- 1 RS-485 Channel

Notes

GHS 3.6, 4.2.1, or 4.2.4 version required

*For I/O information specific to each model refer to the Simple Block Diagram on the following page.

ORDERING INFORMATION

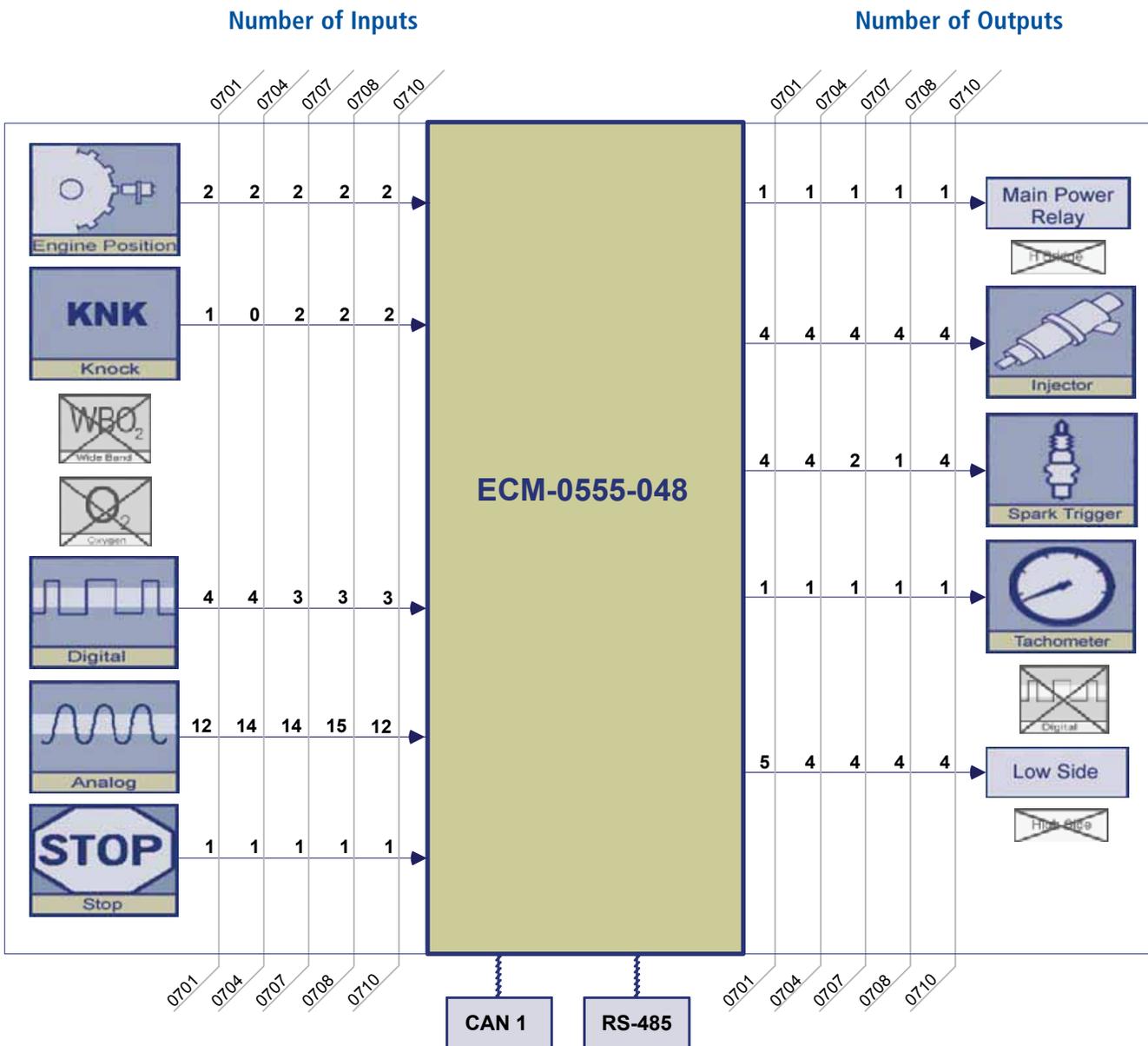
PLATFORM ECM555-48 — ACTIVE CONTROLLERS

Flash Controllers			Calibratable Controllers		
Item No.	w/Mounting Hardware	Controller ID	Item No.	w/Mounting Hardware	Controller ID
1751-6385	8923-1546	ECM05550480701F00	1751-6530	8923-1729	ECM05550480701CP0
1751-6387	8923-1548	ECM05550480704F00	1751-6504	8923-1707	ECM05550480704CP0
1751-6389	8923-1550	ECM05550480707F00	1751-6505	8923-1708	ECM05550480707CP0
1751-6391	8923-1552	ECM05550480708F00	1751-6531	8923-1730	ECM05550480708CP0
1751-6393	8923-1554	ECM05550480710F00	1751-6513	8923-1714	ECM05550480710CP0

ECM555-48 RELATED HARDWARE

Item No.	Reference Number	Description
8923-1407	ASMCN00200	Connector Kit
8996-2150	TOOLCON00800	Crimp Tools
8996-2052		Extraction Tool
1635-1800	HARNINTR00801	Boot Key
	N/A (not required)	Boot Cable
5404-1109	HARNECM004D0	Pigtail Harness
5404-1111	HARNECM00700	Development Harness
5404-1122	HARNECM012	Programming Harness
8923-1402	ASMBBOX0481002	Breakout box
5404-1201	HARNINTR024A	Desktop Simulator Front End Harness

SIMPLE BLOCK DIAGRAM

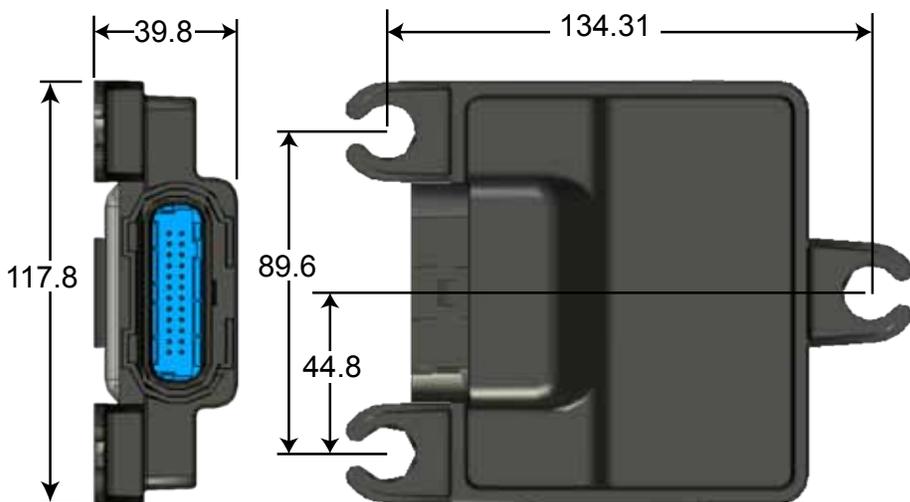


GCM-0S12-024

General Control Module



PHYSICAL DIMENSIONS (Drawings and models available upon request.)



Product Summary

The GCM-0S12-24 is a rugged controller capable of operating in harsh automotive, marine, and off-highway applications. **Hundreds of successful marine applications** prove the capability of this module.

Based on a proven microprocessor, the GCM-0S12-24 is capable of delivering complex control strategies. The 2 CAN 2.0B datalinks ensure interoperability with other vehicle systems. As part of the ControlCore family of embedded controls systems, software for this module can be created utilizing model-based automatic code generation via Woodward's MotoHawk development suite.

IMPORTANT! Woodward does not warranty this ECM based on information supplied in this datasheet, but only with an expressed and specific production supply agreement based on customer's operating mode. Information in this datasheet is subject to change without prior notice. Please contact Woodward sales for more information.

Hardware Features

Microprocessor: MC9S12DT128, 24MHz
Memory: (MC9S12DT128BMPV) 128K Flash, 8K RAM, 2K EEPROM
Operating Voltage: 8-16VDC
Operating Temperature: -40 to 105 C
Sealed Connectors Operable to 10ft submerged

Inputs

6 Analog Inputs
4 Discrete Inputs

Outputs

4 1.5A Low Side PWMs
Multi-function ESTOP (Detect/Assert)
Optional 0-12V LSO (Easy Link Interface)

Datalinks 2 CAN 2.0B Channel

Notes Code Warrior H12 Pro Ed C Compiler required

ORDERING INFORMATION

PLATFORM GCMS12-24 — ACTIVE CONTROLLERS

Flash Controllers		
Item No.	w/Mounting Hardware	Controller ID
1751-6338	8923-1595	GCM0S120240401F00

PLATFORM GCMS12-24 RELATED HARDWARE

Item No.	Reference Number	Description
8923-1410	ASMC0N00600	Connector Kit
8996-2144	TOOLCON00200	Crimp Tools
	Flat screw driver	Removal Tools
	N/A (not required)	Boot Key
5404-1213	HARNMCHI003D0	Boot Cable
5404-1212	HARNMCHI001D0	Pigtail Harness
	N/A (not required)	Development Harness
	N/A (not required)	Programming Harness
8923-1401	ASMBBOX0241002	Breakout box
5404-1200	HARNINTR023B	Desktop Simulator Front End Harness



Product Summary

The ECM-0S12-024 engine control module is a rugged embedded control system capable of operating in harsh automotive, marine, and off-highway applications. **Hundreds of successful industrial applications prove the capability of this module.**

Based on a proven microprocessor, the ECM-0S12-024 is capable of delivering complex control strategies. A CAN 2.0B datalink ensures interoperability with other vehicle systems.

The ECM-0S12-024 is compatible with the ControlCore embedded software framework. Software for this module can be created utilizing model-based automatic code generation via Woodward's MotoHawk development suite.

IMPORTANT! Woodward does not warranty this ECM based on information supplied in this datasheet, but only with an expressed and specific production supply agreement based on customer's operating mode. Information in this datasheet is subject to change without prior notice. Please contact Woodward sales for more information.

Hardware Features

- Microprocessor: MC9S12DT128, 24MHz
- Memory: (MC9S12DT128BMPV) 128 K Flash, 8K RAM
- Operating Voltage: 8-20VDC
- Operating Temperature: -40 to 105 C
- Sealed Connectors Operable to 10ft submerged

Inputs

- Up to 11 Analog Inputs
- 1 VR Frequency Input

Outputs

- 3 TTL Level Ignition System Outputs
- 2 10A Low Side PWMs
- 1 1.0A Tachometer Output
- 1 5A H-Bridge PWM

Datalinks

- 1 CAN 2.0B Channel

Notes

- Code Warrior H12 Pro Ed C Compiler required

ORDERING INFORMATION

PLATFORM ECMS12-24 — ACTIVE CONTROLLERS

Flash Controllers			Calibratable Controllers		
Item No.	w/Mounting Hardware	Controller ID	Item No.	w/Mounting Hardware	Controller ID
1751-6426	8923-1576	ECM0S120240801F00	1751-6536	8923-1735	ECM0S120240801CP0
1751-6428	8923-1578	ECM0S120240802F00	1751-6507	8923-1710	ECM0S120240802CP0
1751-6430	8923-1581	ECM0S120240803F00	1751-6535	8923-1734	ECM0S120240803CP0
1751-6432	8923-1583	ECM0S120240804F00	1751-6534	8923-1733	ECM0S120240804CP0

PLATFORM ECMS12-24 RELATED HARDWARE

Item No.	Reference Number	Description
8923-1409	ASMCON00400	Connector Kit
8996-2144	TOOLCON00200	Crimp Tools
	Flat screw driver	Removal Tools
	N/A (not required)	Boot Key
5404-1238	HARNSECM005D1	Boot Cable
5404-1237	HARNSECM004D0	Pigtail Harness
	N/A (not required)	Development Harness
5404-1241	HARNSECM01200	Programming Harness
8923-1401	ASMBBOX0241002	Breakout box
5404-1199	HARNINTR023A	Desktop Simulator Front End Harness

8923-1409 / ASMCON00400 - 24 PIN CONNECTOR KIT



Item	Qty	Unit	Item No.	Reference Number	Description
1	1	EA	1635-1764	CONFEML03500	CONNECTOR FEMALE - 24 PIN
2	30	EA	1602-1101	CONTMFL03400	CONNECTOR TERMINAL FEMALE
3	1	EA	1391-0135	CONSEAL01100	CONNECTOR - WIRE SEAL
4	1	EA	1633-1003	CONSTRN00300	CONNECTOR STRAIN RELIEF RH - 24 PIN
5	1	EA	1010-1116	CONLOCK01300	CONNECTOR LOCK - 24 POS BLACK
6	1	EA	1010-1119	CONLOCK02200	CONNECTOR LOCK - POSITION ASSU

8923-1410 / ASMCON00600 - 24 PIN CONNECTOR KIT



Item	Qty	Unit	Item No.	Reference Number	Description
1	1	EA	1635-1764	CONFEML03500	CONNECTOR FEMALE - 24 PIN
2	30	EA	1602-1101	CONTMFL03400	CONNECTOR TERMINAL FEMALE
3	1	EA	1391-0135	CONSEAL01100	CONNECTOR - WIRE SEAL
4	1	EA	1633-1003	CONSTRN00300	CONNECTOR STRAIN RELIEF RH - 24 PIN
5	1	EA	1010-1119	CONLOCK02200	CONNECTOR LOCK - POSITION ASSU
6	1	EA	1010-1117	CONLOCK01600	CONNECTOR LOCK - 24 POS CLEAR

8923-1407 / ASMCON00200 - 48 PIN CONNECTOR KIT



Item	Qty	Unit	Item No.	Reference Number	Description
1	1	PC	1635-1726	CONFEML001A00	CONNECTOR FEMALE-24POS
2	1	PC	1635-1727	CONFEML001B00	CONNECTOR FEMALE-24POS
4	100	PC	1602-1080	CONTMFL00200	CONNECTOR TERMINAL FEMALE
5	50	PC	1223-1344	CONPLUG00200	CONNECTOR PLUG
6	2	PC	1634-1010	CONCOVR001A01	CONNECTOR COVER-24 POS

8923-1761 / ASMCON046 - 70 PIN CONNECTOR KIT



Item	Qty	Unit	Item No.	Reference Number	Description
1	80	EA	1602-1108	CONTMFL054	FEMALE CONNECTOR TERMINAL
2	8	EA	1602-1109	CONTMFL055	FEMALE CONNECTOR TERMINAL
3	8	EA	1602-1110	CONTMFL056	FEMALE CONNECTOR TERMINAL
4	80	EA	1607-1010	1607-1010	CONNECTOR PLUG
5	1	EA	1633-1007	CONSTRN007	CONNECTOR STRAIN RELIEF
6	1	EA	1635-1772	CONFEML05600	FEMALE CONNECTOR

8923-1406 / ASMCON00100 - 80 PIN CONNECTOR KIT



Item	Qty	Unit	Item No.	Reference Number	Description
1	1	PC	1635-1726	CONFEML001A00	CONNECTOR FEMALE-24POS
2	1	PC	1635-1727	CONFEML001B00	CONNECTOR FEMALE-24POS
3	1	PC	1635-1728	CONFEML002A00	CONNECTOR FEMALE-32POS
4	100	PC	1602-1080	CONTMFL00200	CONNECTOR TERMINAL FEMALE
5	100	PC	1223-1344	CONPLUG00200	CONNECTOR PLUG
6	2	PC	1634-1010	CONCOVR001A01	CONNECTOR COVER -24 POS
7	1	PC	1634-1011	CONCOVR001B01	CONNECTOR COVER -32POS

8923-1412 / ASMCON041 - FEMALE 10-PIN SMART CRAFT CONNECTOR KIT YIELDS 10 CONNECTORS



Item	Qty	Unit	Item No.	Reference Number	Description
1	100	EA	1223-1346	CONPLUG004	CONNECTOR PLUG
2	110	EA	1391-0127	CONSEAL002	CONNECTOR SEAL
3	110	EA	1391-0137	CONSEAL013	CONNECTOR SEAL
4	110	EA	1602-1084	CONTMFL009	FEMALE CONNECTOR TERMINAL
5	10	EA	1633-1002	CONSTRN001	CONNECTOR STRAIN RELIEF
6	10	EA	1635-1737	CONFEML006G	CONNECTOR

8923-1413 / ASMCON042 - 112 PIN CONNECTOR KIT



Item	Qty	Unit	Item No.	Reference Number	Description
1	2	EA	1634-1012	CONCOVR008	CONNECTOR COVER - 32 PIN MOLEX
2	1	EA	1634-1013	CONCOVR009	CONNECTOR COVER - 48 PIN MOLEX
3	1	EA	1635-1768	CONFEML05100	32 PIN FOR 112 PIN CONTROLLER - BLACK KEY, RIGHT DRESS
4	1	EA	1635-1769	CONFEML05200	48 PIN FOR 112 PIN CONTROLLER -BROWN KEY, RIGHT DRESS
5	1	EA	1635-1771	CONFEML05400	32 PIN FOR 112 PIN CONTROLLER -GREY KEY, LEFT DRESS
6	30	EA	1602-1105	CONTMFL04900	TERMINAL FEMALE - 1.5 FOR 112PIN CONTROLLER
7		EA	1602-1106	CONTMFL05000	TERMINAL FEMALE - .63MM FOR 112PIN CONTROLLER

8923-1408 / ASMCON00300 - 128 PIN CONNECTOR KIT



Item	Qty	Unit	Item No.	Reference Number	Description
1	2	PC	1635-1726	CONFEML001A00	CONNECTOR FEMALE-24POS
2	2	PC	1635-1727	CONFEML001B00	CONNECTOR FEMALE-24POS
3	1	PC	1635-1728	CONFEML002A00	CONNECTOR FEMALE-32POS
4	200	PC	1602-1080	CONTMFL00200	CONNECTOR TERMINAL FEMALE
5	100	PC	1223-1344	CONPLUG00200	CONNECTOR PLUG
6	4	PC	1634-1010	CONCOVR001A01	CONNECTOR COVER -24 POS
7	1	PC	1634-1011	CONCOVR001B01	CONNECTOR COVER -32POS

ACCESSORIES Crimpers



Crimper - GCM Datalogger - Micropack:
8996-2144 / TOOLCON00200



Crimper - Molex .63mm for 112 Pin:
8996-2158 / TOOLCON016



Crimper - SmartCraft:
8996-2154 / TOOLCON012



Crimper - 48/80/128 Pin:
8996-2150 / TOOLCON00800



Crimper - Molex 1.5mm for 112 Pin:
8996-2159 / TOOLCON017

Works with the following Deutsch Stamped and Formed Contacts P/N'S:

1060-16-0722 - Size 16 Pin, (Male) 14, & 16 AWG wire
1062-16-0772 - Size 16 Socket, (Female) 14, & 16 AWG wire
1060-16-0622 - Size 16 Pin, (Male) 16 AWG wire
1062-16-0672 - Size 16 Socket, (Female) 16 AWG wire
1060-16-0122 - Size 16 Pin, (Male) 16 AWG wire
1062-16-0172 - Size 16 Socket, (Female) 16 AWG wire
1060-14-0122 - Size 16 Pin, (Male) 14, & 16 AWG wire
1062-14-0172 - Size 16 Socket, (Female) 14, & 16 AWG wire

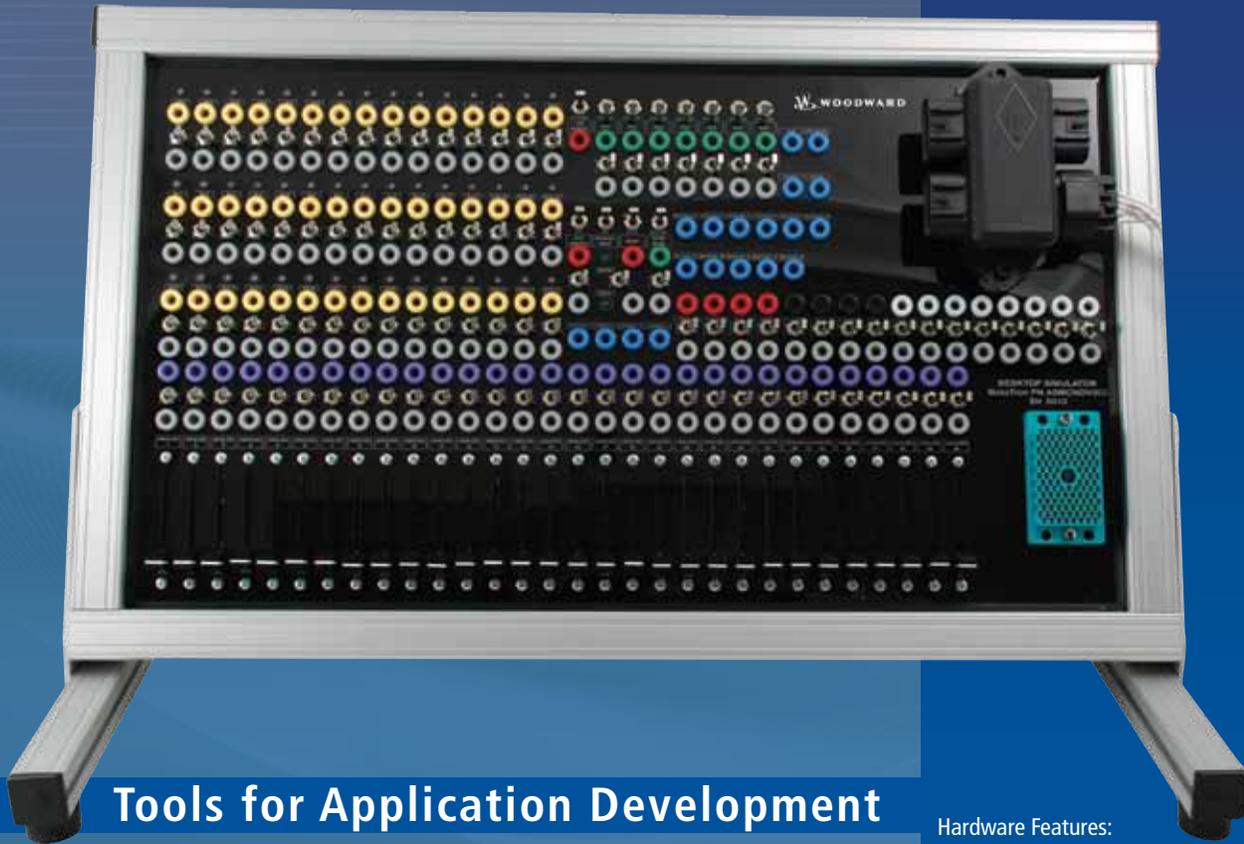
REMOVAL TOOL DETAILS

Item	Item No.	Reference Number	Description
1	8996-2146	TOOLCON004	REMOVES SMARTCRAFT TERMINALS
2	8996-1059	TOOLCON018	REMOVES .63MM MOLEX FOR 112-PIN
3	8996-2161	TOOLCON019	REMOVES 1.5MM MOLEX FOR 112-PIN
4	8996-2167	TOOLCON025	REMOVES 70-PIN TERMINALS
5	8996-2052		REMOVES 48, 80, AND 128-PIN TERMINALS

DEVELOPMENT TOOLS

Desktop I/O Simulator and Breakout Box Assemblies

DESKTOP I/O SIMULATOR



Tools for Application Development

The ASMCNDV002 Desktop I/O Simulator is a powerful development tool designed to easily simulate signals to the controller and measure signals generated by the controller. The desktop simulator is capable of working with any of our MotoHawk Control Solutions electronic control modules. It is a must have tool for application developers to easily verify functionality without the expense of dedicated HIL test stands or expensive test cells.

The I/O simulator provides access points for all signals, making it easy to connect oscilloscopes, voltmeters, current meters or other lab devices. In addition, CAN and serial links are available for easy databus connections. The I/O simulator requires the purchase of a module specific companion harness. You must also supply a DC power source. We recommend outfitting each application developer with this simulator, harness, and a dedicated ECM. To complete your development toolkit, breakout boxes are also available, which insert into your production harness allowing measurement and opening of each signal. The desktop simulator and breakout boxes are highly recommended as a part of every application developer's toolkit.

Hardware Features:

- Aluminum frame, 70° mounting for ease of use
- Scratch-free rubber feet
- Over 200 banana jacks for I/O
- 30 Channels of Analog Input (switchable - On / Off)
- 45 Channels of Low or High Side Output (switchable - On / Off)
- 3 CAN Channels (switchable - On / Off)
- 1 RS485 Channel (switchable - On / Off)
- 8 Digital Inputs (switchable - On / Off or pulled High / Low)
- 10 Power and Ground Channels (switchable - On / Off), including ECM Input Voltage+/-, XDRP, XDRG, MPRD, DRVP, DRVG, and Key Switch
- 4 Channels of Knock Sensor Inputs
- 4 Channels of Encoder Inputs
- 11 Channels of Miscellaneous Banana Inputs

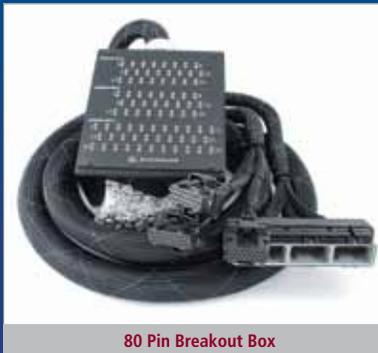
BREAKOUT BOXES



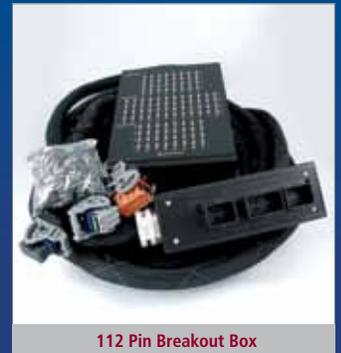
24 Pin Breakout Box



48 Pin Breakout Box



80 Pin Breakout Box



112 Pin Breakout Box

ORDERING INFORMATION

The Desktop Simulator connects to your module via a pre-built front end harness. (Sold separately.) Select the appropriate harness to fit your controller.

8909-1043 / ASMCNDV002 - Front End Harnesses

CONTROLLER	FRONT END HARNESS	
	Item No.	Reference Number
ECMS12-24	5404-1199	HARNINTR023A
GCMS12-24	5404-1200	HARNINTR023B
GCM565-24	5404-1199	HARNINTR023A
ECM555-48	5404-1201	HARNINTR024A
ECM563-48	5404-1202	HARNINTR024B
GCM563-48	5404-1203	HARNINTR024C
HCM563-48	5404-1203	HARNINTR024C
ECM555-80	5404-1204	HARNINTR025A
ECM565-128	5404-1206	HARNINTR027A
ECM5554-112	5404-1205	HARNINTR026A
ECMS12X-070	5404-1207	HARNINTR029A



Front End Harness sold separately

Harness Breakout Boxes

Performing ECM signal measurement and failure testing without modifying the harness can be difficult and time consuming. Woodward's ECM breakout boxes are ruggedized harness inserts designed to make this painful job easy.

Breakout boxes were designed by Woodward's own application developers to assist troubleshooting and failure mode testing activities and are a highly recommended part of every developer's toolkit. The family of breakout boxes covers the entire range of Woodward's MotoHawk Control Solutions modules.

The breakout box plugs into the existing harness connectors and ECM, but also provides an extension with measurement points and circuit breaking bars. Each pin to the ECM can be probed, open circuited, or connected to any other signal.

Each breakout box assembly comes with an Expander toolkit (CONKIT012C) of patch cables, shorting bars, and banana jacks.



ORDERING INFORMATION

Select the appropriate breakout box assembly to fit your controller.

CONTROLLER	BREAKOUT BOX ASSEMBLY	
	Item No.	Reference Number
ECMS12-24	8923-1401	ASMBBOX0241002
GCMS12-24	8923-1401	ASMBBOX0241002
GCM565-24	8923-1401	ASMBBOX0241002
ECM555-48	8923-1402	ASMBBOX0481002
ECM563-48	8923-1402	ASMBBOX0481002
GCM563-48	8923-1402	ASMBBOX0481002
HCM563-48	8923-1402	ASMBBOX0481002
ECM555-80	8923-1403	ASMBBOX0801002
ECM565-128	8923-1405	ASMBBOX1281002
ECM5554-112	8923-1404	ASMBBOX1121002

ACCESSORIES

Break Out Box Assembly Kits

Small



8923-1540 / CONKIT012A

Large



8923-1541 / CONKIT012B

Expander



8923-1542 / CONKIT012C

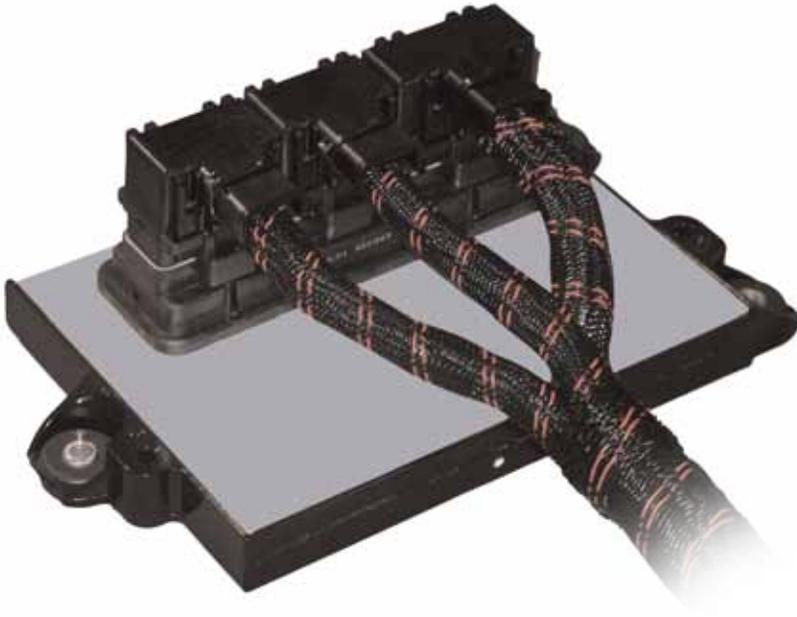
Mini Plug Kit



8923-1543 / CONKIT012D

Harnesses

Development Harnesses



Product Summary

Development harnesses are specifically designed for each respective electronic control module, and are ready-made for application development. The harnesses provide labeled wiring to all ECM pins — I/O, power, ground, etc., along with 10-pin connectors for module programming via CAN, and standard power, ground, and keyswitch connections.

Hardware Features

18 gauge wire
 Rated for use in harsh industrial and automotive environments
 Includes a main power relay, and fused power connection



ECM555-48 PIN Development Harness:
 5404-1112 / HARNECM00700



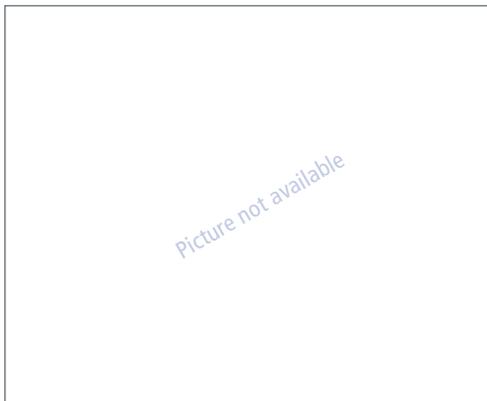
ECM555-80 Development Harness:
 5404-1224 / HARNPCM008



HCM563-48 PIN; GCM563-48 PIN Development Harness:
 5404-1124 / HARNECM014



ECM565-128 PIN Development Harness:
 5404-1219 / HARNP12800200



ECM512X-070 PIN Development Harness:
 5404-1143 / HARNECM028

ORDERING INFORMATION

Select the appropriate development harness to fit your controller.

Module Platform	Development Harness	
	Item No.	MotoHawk Item No.
ECMS12-24	N/A	N/A
GCMS12-24	N/A	N/A
GCM565-24	5404-1211	HARNISDL00100
ECM555-48	5404-1112	HARNECM00700
ECM563-48	5404-1142	HARNECM027
GCM563-48	5404-1124	HARNECM014
HCM563-48	5404-1124	HARNECM014
ECMS12X-70	5404-1143	HARNECM028
ECM555-80	5404-1224	HARNPCM008
ECM565-128	5404-1219	HARNP12800200
ECM5554-112	5404-1216	HARNP112002

Product Summary

Pigtail harnesses provide dedicated labeled wires to all pins — I/O, power, ground, etc. of the respective electronic control module, and are indispensable for wiring in prototype development and testing efforts.

Hardware Features

18 gauge wire
 Rated for use in harsh industrial and automotive environments
 Available in a variety of pre-cut harness wire lengths



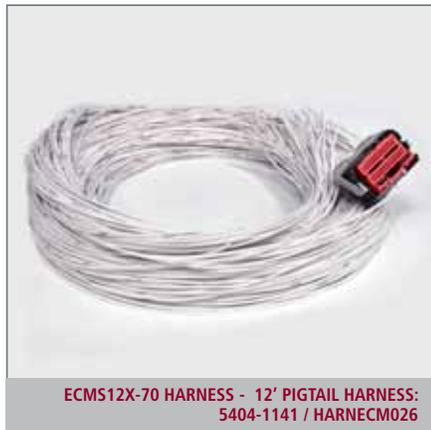
ECMS12-24 HARNESS - 12' PIGTAIL HARNESS:
5404-1237 / HARNSECM004D0



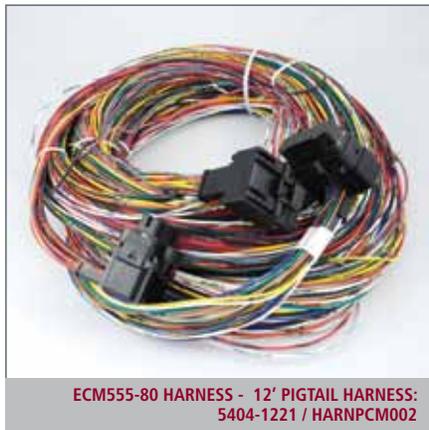
GCMS12-24 HARNESS - 12' PIGTAIL HARNESS:
5404-1212 / HARNMCHI001D0



ECM, GCM, HCM - 48 HARNESS - 12' PIGTAIL HARNESS:
5404-1109 / HARNECM004D0



ECMS12X-70 HARNESS - 12' PIGTAIL HARNESS:
5404-1141 / HARNECM026



ECM555-80 HARNESS - 12' PIGTAIL HARNESS:
5404-1221 / HARNPCM002



ECM565-128 HARNESS - 12' PIGTAIL HARNESS:
5404-1218 / HARNP12800100



ECM5554-112 HARNESS - 12' PIGTAIL HARNESS:
5404-1215 / HARNP112001

ORDERING INFORMATION

Select the appropriate pigtail harness to fit your controller.

Module Platform	Pigtail	
	Item No.	MotoHawk Item No.
ECMS12-24	5404-1237	HARNSECM004D0
GCMS12-24	5404-1212	HARNMCHI001D0
GCM565-24	5404-1237	HARNSECM004D0
ECM555-48	5404-1109	HARNECM004D0
ECM563-48	5404-1109	HARNECM004D0
GCM563-48	5404-1109	HARNECM004D0
HCM563-48	5404-1109	HARNECM004D0
ECMS12X-070	5404-1141	HARNECM026
ECM555-80	5404-1221	HARNPCM002
ECM565-128	5404-1218	HARNP12800100
ECM5554-112	5404-1215	HARNP112001

Harnesses

Boot Cable Harnesses, Connectors, and Keys

Product Summary

Errors in configuration, logic or other electronic control module programming made during application development efforts can cause a temporary loss of CAN communications with the module under development. Woodward provides the must-have boot keys and cables to remedy this occurrence.

Each are designed to match the boot connection requirements of the particular ECM model type.

Product Functions

Boot keys provide a signal to the STOP pin of the ECM.

Boot cables tie certain analog inputs together to a specific signal level.

Order the recommended item(s) for your ECM model.



ECMS12-24 Boot Cable Harness:
5404-1238 / HARNSECM005D1



GCMS12-24 Boot Cable Harness:
5404-1213 / HARNMCHI003D0



ECM563-48 Boot Cable Harness:
5404-1123 / HARNECM013



ECM563-48 Boot Cable Harness:
5404-1123 / HARNECM013



ECMS12X-70 Boot Cable Harness:
5404-1144 / HARNECM029



Boot Key:
1635-1800 / HARNINTR00801



GCM565-24 Boot Adaptor:
5404-1265 / HARNADPT004

ORDERING INFORMATION

Select the appropriate boot cable harness, boot connector, and boot key to fit your controller.

Module Platform	Boot Key		Boot Cable	
	Item No.	Reference Number	Item No.	Reference Number
ECMS12-24	N/A	N/A	5404-1238	HARNSECM005D1
GCMS12-24	N/A	N/A	5404-1213	HARNMCHI003D0
GCM565-24	N/A	N/A	5404-1265	HARNADPT004
ECM555-48	1635-1800	HARNINTR00801	N/A	N/A
ECM563-48	N/A	N/A	5404-1123	HARNECM013
GCM563-48	1635-1800	HARNINTR00801	5404-1138	HARNECM022
HCM563-48	1635-1800	HARNINTR00801	5404-1138	HARNECM022
ECMS12X-70	N/A	N/A	5404-1144	HARNECM029
ECM555-80	1635-1800	HARNINTR00801	N/A	N/A
ECM565-128	1635-1800	HARNINTR00801	N/A	N/A
ECM5554-112	1635-1800	HARNINTR00801	N/A	N/A

Product Summary

Programming harnesses are specifically designed for programming the respective Woodward electronic control module via CAN connection and the 10-pin connector. Use with the appropriate CAN-to-PC cable (Kvaser, etc.) connected from the PC USB port to the 10-pin connector junction.



ECMS12-24 Programming Harness:
5404-1241 / HARNSECM01200



ECM555-80 Programming Harness:
5404-1225 / HARNPCM012



ECMS12X-70 Programming Harness:
5404-1144 / HARNECM029



ECM555-48 Programming Harness:
5404-1122 / HARNECM012

ORDERING INFORMATION

Select the appropriate programming harness to fit your controller.

Module Platform	Programming Harness	
	Item No.	Reference Number
ECMS12-24	5404-1241	HARNSECM01200
GCMS12-24	N/A	N/A
GCM565-24	5404-1211	HARNISDL00100
ECM555-48	5404-1122	HARNECM012
ECM563-48	5404-1123	HARNECM013
GCM563-48	5404-1235	HARNPROG009
HCM563-48	5404-1235	HARNPROG009
ECMS12X-70	5404-1144	HARNECM029
ECM555-80	5404-1225	HARNPCM012
ECM565-128	N/A	N/A
ECM5554-112	5404-1217	HARNP112003

CAN TO USB CABLES

Kvaser Cables



Kvaser Dual Channel USB-CAN
Professional with MagiSync
5404-1324



Single Channel USB-CAN
Kvaser Leaf-Lite Cable
5404-1259 / ASMINTR01300

CAN TO USB CABLES		
Item No.	Reference Number	Description
5404-1324	5404-1324	Dual Channel
5404-1259	ASMINTR01300	Single Channel

SOFTWARE

CONTROLLERS

CONNECTORS & KITS

DEV TOOLS

HARNSESSES

SYSTEM COMPONENTS



www.woodward.com