



MotoHawk Control Solutions

# ECM-0565-128-0704-C

**Engine Control Module** (Part No. 8237-1448)

# Description

Presenting the ECM-0565-128-0704-C engine control module from Woodward's new MotoHawk Control Solutions product line. This rugged embedded controller is capable of operating in harsh automotive, marine, and off-highway applications. Numerous marine applications have proven the capability of this module. Based on the Freescale MPC565 family of microprocessors, the ECM-0565-128-0704-C modules are capable of delivering complex control strategies. The onboard floatingpoint unit and high clock frequency allow software to be executed in shorter times. The CAN 2.0B data-link ensures interoperability with other vehicle systems.

The ECM-0565-128-0704-C module is part of the ControlCore<sup>®</sup> family of embedded control systems. MotoHawk Control Solutions' ControlCore operating system, MotoHawk<sup>®</sup> code-generation product, and MotoHawk's suite of development tools enable rapid development of complex control systems.

IMPORTANT MotoHawk version 2010bSP0 or higher is required for this

module.

## IMPORTANT

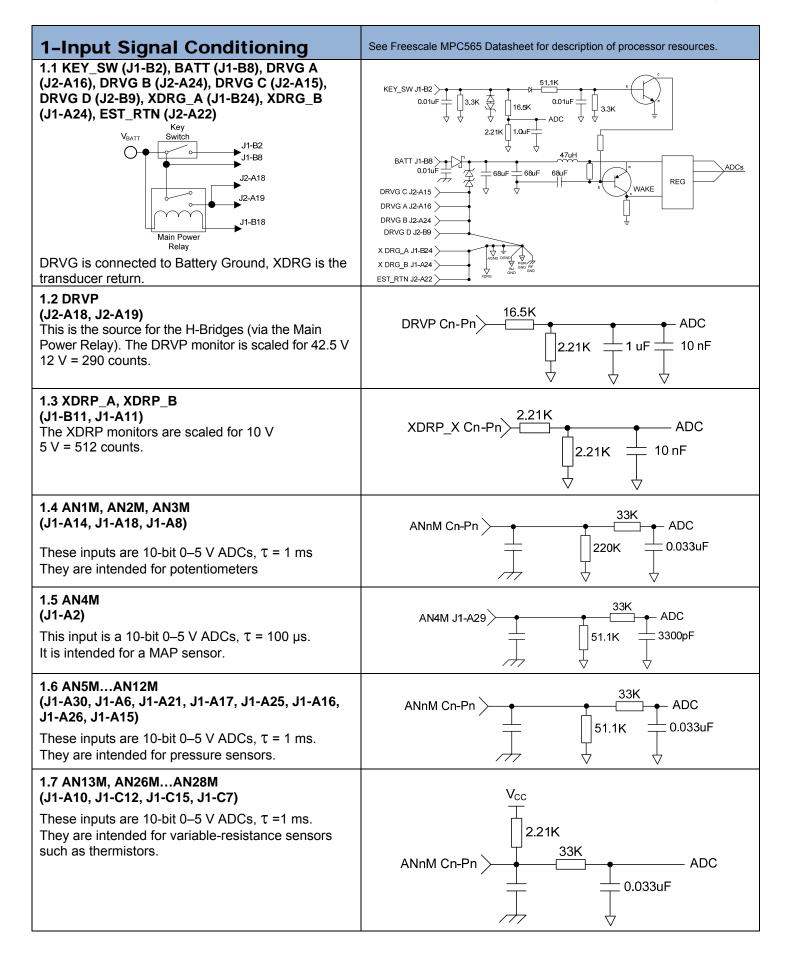
Woodward does not warranty this ECM based on information supplied in this datasheet, but only with an express and specific production supply agreement based on customer's operating mode. Information in this datasheet is subject to change without prior notice. Please contact MotoHawk Control Solutions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

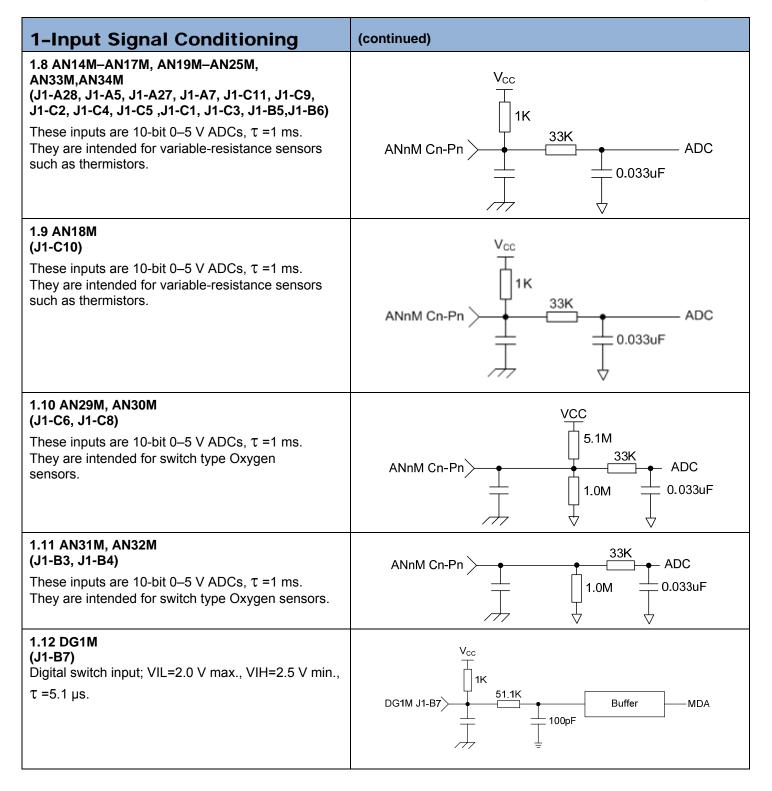
- Microprocessor: Freescale MPC565, 56 MHz
- Memory: 1M Flash, 36K RAM, 8K Serial EEPROM, 64Kx8 Parallel EEPROM. 512K External RAM
- Operating Voltage: 9-32 Vdc
- Operating • Temperature: -40 to +105 °C (in benchmark marine engine application)
- Sealed connectors • operable to 10 ft (3 m) submerged
- Inputs: • 34 Analog 4 Low Frequency Digital 4 VR Frequency 2 Wide Range  $O_2$  (I) Sensor-Inputs (Bosch LSU4.2) 4 Dual Sensor Wide Band Knock Detector Inputs

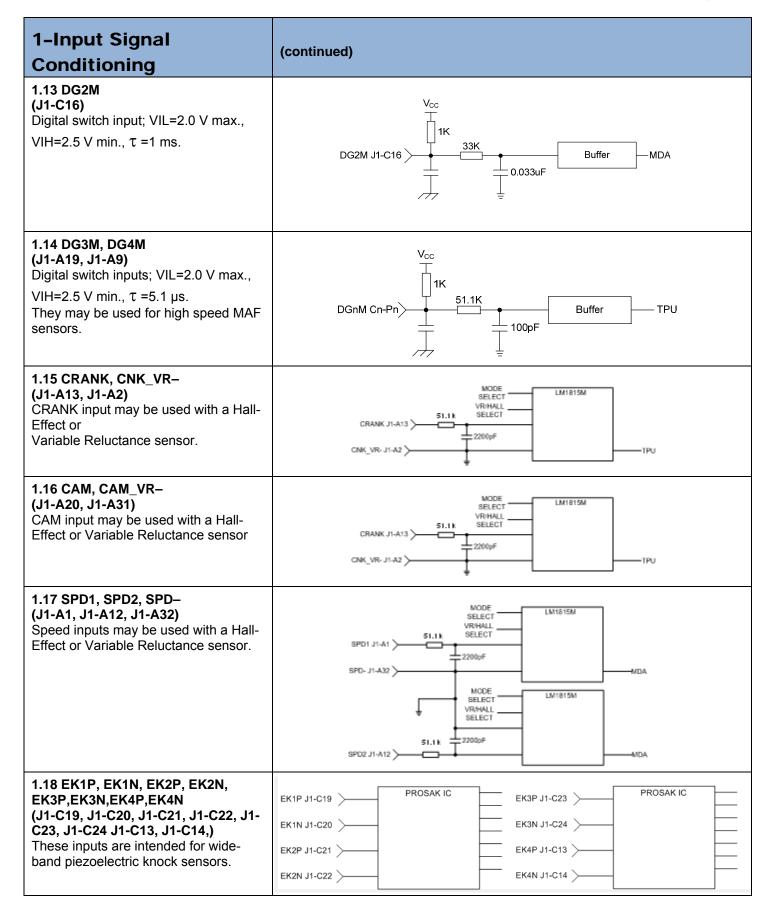
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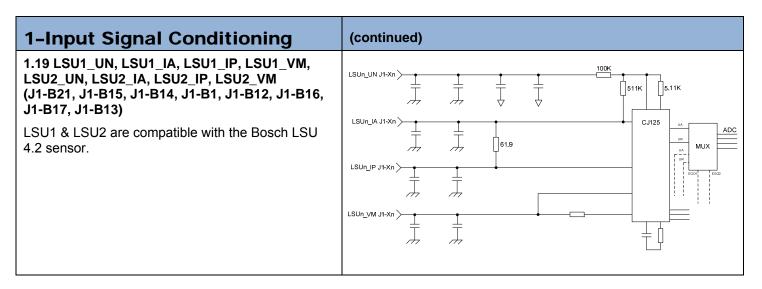
### Outputs: 6x 3 A Peak/1 A Hold **Injector Drivers** 6x 7 A/3 A or 3 A/1 A Peak/Hold Inj. Drivers 16x TTL Level Ignition System Up to 10x 3 A Low Side **PWMs** 1x 1.5 A Tachometer Output 2x 5 A H-Bridge PWM 1x 10 A H-Bridge PWM 1x Relay Driver (Main Power)

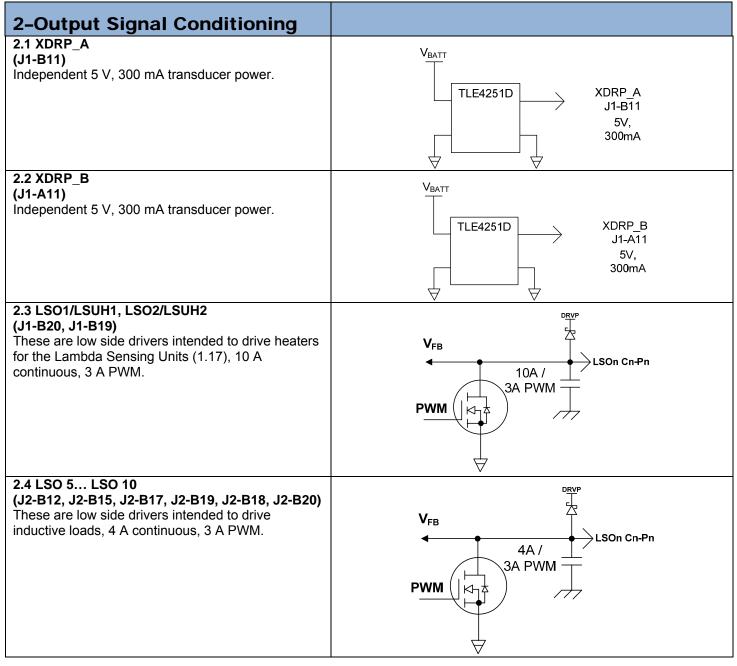
#### Datalinks: 2 CAN 2.0B Channels 1 ISO 9141 Channel (KWP2000/HWP2000, 10.4 kbps) 1 RS-485 Channel

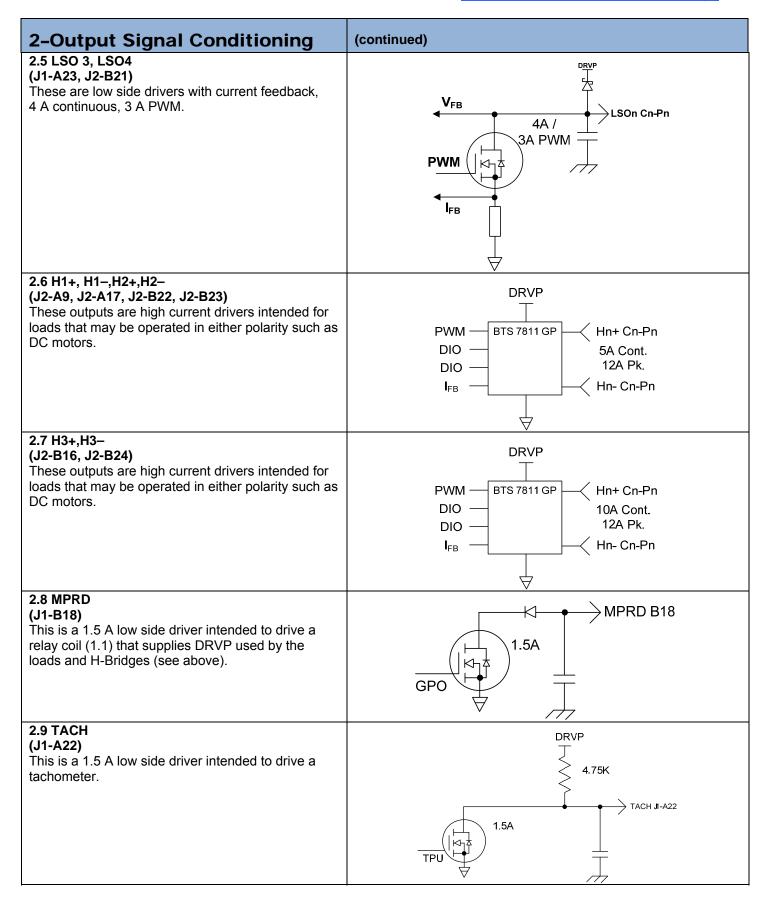


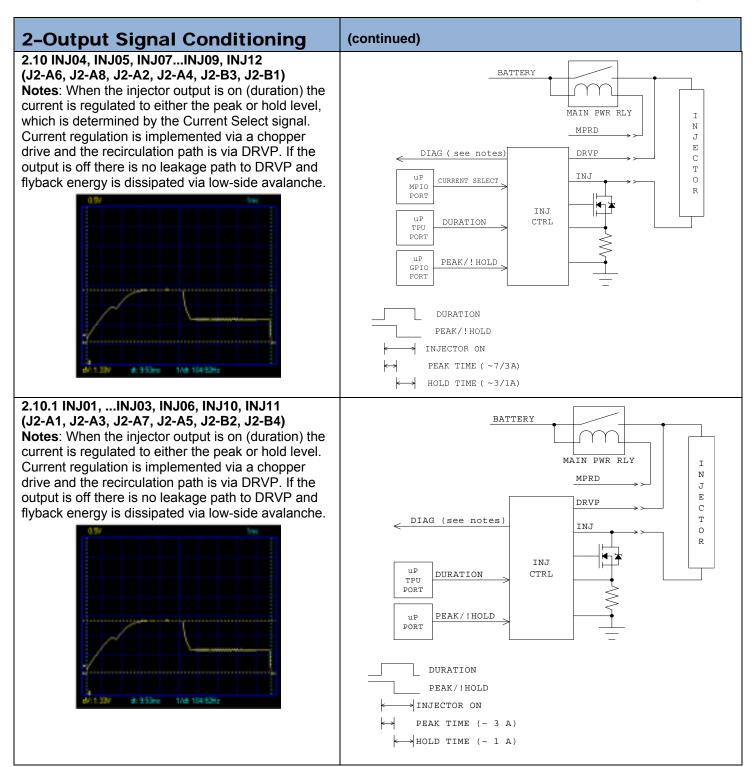












### 2-Output Signal Conditioning

### (continued)

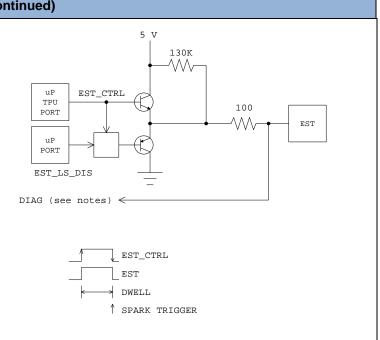
2.11 EST1...EST12, EST13/LAMP1...EST16/LAMP4 (J2-A12, J2-A13, J2-A14, J2-A20, J2-A10, J2-A11, J2-A21, J2-A23, J2-B14, J2-B13, J2-B11, J2-B10, J2-B6, J2-B5, J2-B7, J2-B8)

These are TTL level outputs intended for intelligent coil modules.

Notes: Short circuit protection, open circuit and short circuit detection.

Since EST\_RTN (not shown) is a direct path to the ECM ground care must be taken not to introduce ground loops. EST RTN is not designed to carry any significant current; it is a reference only. It should be open circuit unless the smart coil electronics provides an isolated logic ground reference. Care must also be taken not to introduce noise on EST RTN. Electrical transients on EST\_RTN can cause module upsets.

EST13/LAMP1...EST16/Lamp4 may be used to drive resistive loads requiring up to 1.5 A.



3-Communications	
3.1 CAN1+, CAN1–, CAN2+, CAN2– (J1-B9, J1-B10, J1-C17, J1-C18)	CAN 2.0B, Standard or Extended ID, up to 1 MBd.
3.2 RS-485+, RS-485– (J1-B22, J1-B23)	RS-485, programmable baud rate 1200 – 57600. 8 Bits, No parity, 1 Stop Bit
3.3 ISO 9141-K, ISO 9141-L (J1-A3, J1-A4)	KWP2000/HWP2000, 10.4 kBd
Note: ISO 9141 is not supported in MotoHawk.	

4-Con	nector Pinou	ts			
Pin # ECM	ControlCore Resource Name	Function	Notes	Wire Color	Wire #
J1-A1	SPD1	Auxiliary Speed Input	put VR or HALL Effect		1
J1-A2	CNK_VR-	Return for CRANK VR sensor	Return for CRANK VR sensor		2
J1-A3	ISO_9141_K	Social Data Link	ISO 0111 Compliant	yellow	3
J1-A4	ISO_9141_L	Serial Data Link	ISO 9141 Compliant	blue/black	4
J1-A5	AN15M	Variable Resistance Input	1K Pull Up	white/orange	5
J1-A6	AN6M	Pressure Input	51K Pull Down	light blue/white	6
J1-A7	AN17M	Variable Resistance Input	1K Pull Up	white/yellow	7
J1-A8	AN3M	Pressure Input	220K Pull Down	brown/white	8
J1-A9	DG4	Discrete Switch, Frequency	1K Pull Up	yellow/pink	9
J1-A10	AN13M	Potentiometer Input	2.2K Pull Up	red/pink	10
J1-A11	XDRP_B	Transducer Power B (5 V)	Transducer Power	white	11
J1-A12	SPD2	Auxiliary Speed Input	VR or HALL Effect	white/red	12
J1-A13	CNK	Crank Position Signal	VR or HALL Effect	tan/orange	13
J1-A14	AN1M	Pressure Input	220K Pull Down	tan	14
J1-A15	AN12M	Pressure Input	51K Pull Down	tan/green	15
J1-A16	AN10M	Pressure Input	51K Pull Down	green	16
J1-A17	AN8M	Pressure Input	51K Pull Down	brown	17
J1-A18	AN2M	Pressure Input	220K Pull Down	white/dark blue	18
J1-A19	DG3	Discrete Switch, Frequency	1K Pull Up	black/red	19
J1-A20	CAM	Cam Position Signal	VR or HALL Effect	yellow/orange	20
J1-A21	AN7M	Pressure Input	51K Pull Down	dark blue	21
J1-A22	TACH	Tachometer Output	4.75K Pull Up	black/orange	22
J1-A23	LSO3	PWM with current feedback	4 A continuous, 3 A PWM	purple/yellow	23
J1-A24	XDRG	Transducer Ground	Return for Transducers	red/purple	24
J1-A25	AN9M	Pressure Input	51K Pull Down	light blue/black	25
J1-A26	AN11M	Pressure Input	51K Pull Down	pink/black	26
J1-A27	AN16M	Variable Resistance Input	1K Pull Up	orange/pink	27
J1-A28	AN14M	Variable Resistance Input	1K Pull Up	dark blue/white	28
J1-A29	AN4M	Pressure Input	51K Pull Down	white/light blue	29
J1-A30	AN5M	Pressure Input	51K Pull Down	white/black	30
J1-A31	CAM_VR-	Return for CAM VR sensor		yellow	31
J1-A32	SPD-	Return for SPD VR sensors		brown	32

4-Cor	nnector Pinou	ts (continued)			
Pin # ECM	Linction		Notes	Wire Color	Wire #
J1-B1	LSU1_VM	Lambda Sensing Unit	See datasheet for Bosch LSU4.x and CJ125.	black/green	33
J1-B2	KEY_SW	ECM Wake	Wake Up Module	green/black	34
J1-B3	AN31M	Switch Type Oxygen Sensors	1M Pull Down	gray/dark blue	35
J1-B4	AN32M	Switch Type Oxygen Sensors	1M Pull Down	yellow/purple	36
J1-B5	AN33M	Variable Resistance Inputs	1K Pull Up	white	37
J1-B6	AN34M	Variable Resistance Inputs	1K Pull Up	white/purple	38
J1-B7	DG1	Discrete Switch, Frequency, IRQ	1K Pull Up	light blue/black	39
J1-B8	BATT	Battery Connection		yellow/black	40
J1-B9	CAN1+	Coriol Communications	Terminating Resistance	green/purple	41
J1-B10	CAN1-	Serial Communications	Required	green/brown	42
J1-B11	XDRP_A	Transducer Power A (5 V)	300 mA Source for Transducers	orange	43
J1-B12	LSU2_UN			gray	44
J1-B13	LSU2_VM	Lambda Sensing Unit2		red	45
J1-B14	LSU1_IP	Lombdo Consing Lipit1	See datasheet for Bosch	white/brown	46
J1-B15	LSU1_IA	Lambda Sensing Unit1	LSU4.xand CJ125.	black/blue	47
J1-B16	LSU2_IA			orange/black	48
J1-B17	LSU2_IP	Lambda Sensing Unit2		red/blue	49
J1-B18	MPRD	Main Power Relay Driver	Wire to Coil of Main Power Relay	red/blue	50
J1-B19	LSO2/LSUH2			yellow/white	51
J1-B20	LSO1/LSUH1	PWM Output/ LSU Heater	10 A continuous, 3 A PWM	pink/light blue	52
J1-B21	LSU1_UN	Lambda Sensing Unit1	See datasheet for Bosch LSU4.x and CJ125.	orange/white	53
J1-B22	SCL+	RS-485 HI		pink/dark blue	54
J1-B23	SCL-	RS-485 LO		black/yellow	55
J1-B24	XDRG	Transducer Ground	Return for Transducers	purple/pink	56

4-Con	nector Pinou	ts (continued)			
Pin # ECM	ControlCore Resource Name	Function	Notes	Wire Color	Wire #
J1-C1	AN24M	Variable Resistance Input	1K Pull Up	yellow/orange	57
J1-C2	AN21M	Variable Resistance Input	1K Pull Up	brown/white	58
J1-C3	AN25M	Variable Resistance Input	1K Pull Up	red/white	59
J1-C4	AN22M	Variable Resistance Input	1K Pull Up	brown/yellow	60
J1-C5	AN23M	Variable Resistance Input	1K Pull Up	brown/white	61
J1-C6	AN29M	High Impedance Input	5.1M Pull Up, 1M Pull Down	pink/black	62
J1-C7	AN28M	Potentiometer Input	2.2K Pull Up	green/orange	63
J1-C8	AN30M	High Impedance Input	5.1M Pull Up, 1M Pull Down	green/blue	64
J1-C9	AN20M	Variable Resistance Input	1K Pull Up	yellow/red	65
J1-C10	AN18M	Variable Resistance Input	10K Pull Up	yellow/white	66
J1-C11	AN19M	Variable Resistance Input	1K Pull Up	pink/brown	67
J1-C12	AN26M	Potentiometer Input 2.2K Pull Up		green/red	68
J1-C13	EK4P	Knock Sensor Positive	Compatible with the	green/white	69
J1-C14	EK4N	Knock Sensor Negative	Motorola PROSAK IC	green/yellow	70
J1-C15	AN27M	Potentiometer Input	2.2K Pull Up	black	71
J1-C16	DG2	Discrete Switch, Frequency, IRQ	1K Pull Up	black	72
J1-C17	CAN2+		Terminating Resistance	gray/white	73
J1-C18	CAN2–	- Serial Communications	Required	gray/red	74
J1-C19	EK1P	Knock Sensor Positive		yellow/pink	75
J1-C20	EK1N	Knock Sensor Negative		green/white	76
J1-C21	EK2P	Knock Sensor Positive	Compatible with the	pink/purple	77
J1-C22	EK2N	Knock Sensor Negative	Motorola PROSAK IC	light blue/white	78
J1-C23	EK3P	Knock Sensor Positive		pink/orange	79
J1-C24	EK3N	Knock Sensor Negative		black	80

4-Connector Pinouts (continued)					
Pin #ControlCoreFunctionECMResource NameFunction		Notes	Wire Color	Wire #	
J2-A1	INJ01	Injector 1 Driver	3 A/1 A peak/hold	pink/light blue	81
J2-A2	INJ07	Injector 7 Driver	Injector 7 Driver 7 A/3 A or 3 A/1 A peak/hold pi		82
J2-A3	INJ02	Injector 2 Driver	3 A/1 A peak/hold	yellow/black	83
J2-A4	INJ08	Injector 8 Driver	7 A/3 A or 3 A/1 A peak/hold	white	84
J2-A5	INJ06	Injector 6 Driver	3 A/1 A peak/hold	white/ dark blue	85
J2-A6	INJ04	Injector 4 Driver	7 A/3 A or 3 A/1 A peak/hold	black/red	86
J2-A7	INJ03	Injector 3 Driver	3 A/1 A peak/hold	yellow/orange	87
J2-A8	INJ05	Injector 5 Driver	7 A/3 A or 3 A/1 A peak/hold	light blue	88
J2-A9	H1+	H-Bridge Output	High Current (5 A)	tan/light blue	89
J2-A10	EST5			gray	90
J2-A11	EST6			dark blue	91
J2-A12	EST1	Electronic Spark Timing	TTL	dark blue/white	92
J2-A13	EST2			white/ light blue	93
J2-A14	EST3			white/black	94
J2-A15	DVRG	Deixer Orecord	Composition Detterns Ones and	black/yellow	95
J2-A16	DVRG	Driver Ground	Connect to Battery Ground	black/white	96
J2-A17	H1–	H-Bridge Output	High Current (5 A)	pink/purple	97
J2-A18	DRVP		Device to LL Drideos and Lands	pink/brown	98
J2-A19	DRVP	Driver Power (VBATT)	Power to H-Bridges and Loads	orange	99
J2-A20	EST4	Electropic Coorts Timics		orange/white	100
J2-A21	EST7	Electronic Spark Timing	TTL	black/blue	101
J2-A22	EST_RTN	Low Current Return		yellow/purple	102
J2-A23	EST8	Electronic Spark Timing	TTL	red/blue	103
J2-A24	DVRG	Driver Ground	Connect to Battery Ground	black/white	104

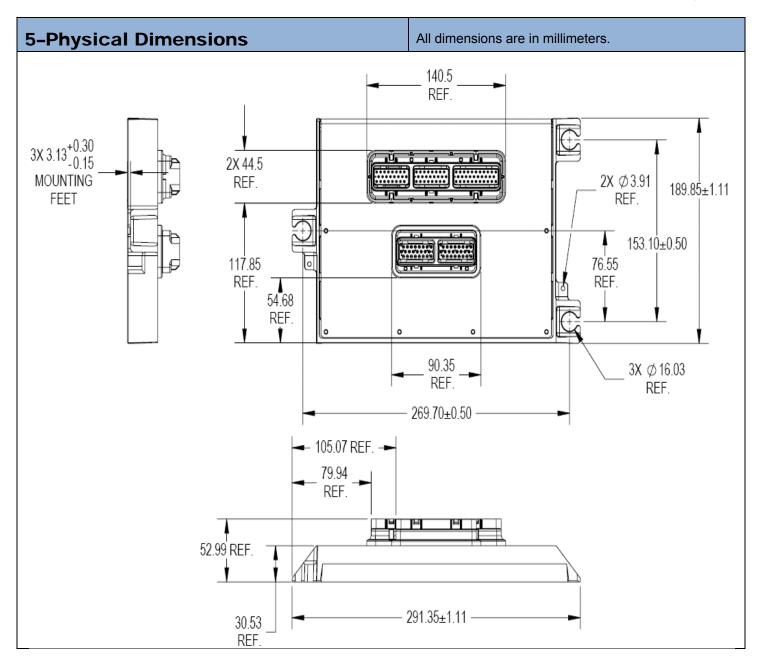
4-Con	nector Pinou	S (continued)			
Pin # ECM	ControlCore Resource Name	Function	Notes	Wire Color	Wire #
J2-B1	INJ12	Injector 12 Driver	7 A/3 A or 3 A/1 A peak/hold	black/orange	105
J2-B2	INJ10	Injector 10 Driver	3 A/1 A peak/hold	tan	106
J2-B3	INJ09	Injector 9 Driver	7 A/3 A or 3 A/1 A peak/hold	yellow	107
J2-B4	INJ11	Injector 11 Driver	3 A/1 A peak/hold	dark blue/pink	108
J2-B5	EST14/LAMP2	Electronic Spark Timing/	Llink Quantum (1.4)	red/pink	109
J2-B6	EST13/LAMP1	Low Side Lamp Driver	High Current (1 A)	white	110
J2-B7	EST15LAMP3	Electronic Spark Timing/	Llink Quantum (1.4)	white/green	111
J2-B8	EST16/LAMP4	Low Side Lamp Driver	High Current (1 A)	brown/white	112
J2-B9	DVRG	Driver Ground	Driver Ground Connect to Battery Ground		113
J2-B10	EST12		Marco Occurrent OF an A	orange/black	114
J2-B11	EST11	Low Side Lamp/LED Drivers	Max Current 25 mA	blue/black	115
J2-B12	LSO5	PWM Output	PWM Output 4 A continuous, 3 A PWM		116
J2-B13	EST10		Mary Ourreads 05 and	white/yellow	117
J2-B14	EST9	Low Side Lamp/LED Drivers	Max Current 25 mA	tan/green	118
J2-B15	LSO6	PWM Output	4 A continuous, 3 A PWM	green/yellow	119
J2-B16	H3+	H-Bridge Output	High Current (10 A)	green/red	120
J2-B17	LSO7			black/green	121
J2-B18	LSO9	PWM Output	4 A continuous, 3 A PWM	purple	122
J2-B19	LSO8			tan/purple	123
J2-B20	LSO10	PWM Output	4 A continuous, 3 A PWM	light blue/white	124
J2-B21	LSO4	PWM Output with current feedback	4 A continuous, 3 A PWM	purple/yellow	125
J2-B22	H2+	LI Deider - Outruit	Llinh Ourset (E.A.)	tan/white	126
J2-B23	H2–	H-Bridge Output	High Current (5 A)	green/black	127
J2-B24	H3–	H-Bridge Output	High Current (10 A)	green/blue	128

4.1-Additional Development Harness Wires

Highlighted wires are not directly accessible.

	Additional Harness Wires							
Wire #	FUNCTION	COLOR	FROM	PIN	ТО	PIN		
129	SC GND	BLACK	SPL01	А	C07	В		
130	BATTERY +	RED	C09		C08	В		
131	FUSED PWR	RED	C08	А	SPL04	Α		
132	SC PWR	RED	SPL04	В	C07	А		
133	FUSED PWR	RED	<b>C</b> 06	30	SPL04	В		
134	COIL PWR	RED	<b>C</b> 06	85	SPL04	С		
135	DRVP	RED	<b>C</b> 06	87	SPL03	Α		
136	DRVP	RED	SPL03	В	OUTPUT			
137	BATTERY -	BLACK	SPL02	А	C10			
138	GND CONN	BLACK	SPL01	А	SPL02	Α		
139	KEYSWITCH	GRN-BLK	SPL05	А	C07	F		
140	BOOT CKT	<b>GRN-BLK</b>	SPL05	С	C12	В		
141	BOOT CKT	YEL-BLK	C11	А	SPL06	С		
142	BOOT CKT	YEL-BLK	C12	А	SPL06	В		
143	BOOT CKT	RED	SPL04	E	C11	В		
144	FUSED PWR	RED	SPL04	F	OUTPUT			
145	GROUND	BLACK	SPL02	А	OUTPUT			





# 5.1-Block Diagram

Development Harness Connections (HARN-P128-002)

♀ ∞ ●		T.				
	W34 18AWG, TXL GRN-BLK	31-82 E	CUE/ KEY_SW	PCM128~ RACE LV (6A ) MPRD	J1-818 J2-A18	W50 18AWG, TXL RED BLU
₩~~≥.	W40 18AWG, TXL YEL-BLK	J1-B8 B	NATT NK+ (VR + or DG)	DRVP		W98 18AWG, TXL PNK BRN • 00000000000000000000000000000000000
	W13 18AWG, TXL TAN-ORG W2 18AWG, TXL WHT-YEL		NK+ (VR+)			
[ <sup>2</sup> ]	W20 18 AWG TXL YEL-ORG	J1-A20	THE INP & OF THE			
		CA-MOA C	(VR-)			
1	B W1 18AWG, TXL PPL-WHT W12 18AWG, TXL WHT-RED		PDI + (VR + or DG) PDI + (VR + or DG)	(3A/1A ) FI01	J2-A1	W81 18AWG, TXL PNK- LTBLU
2 2	00 W32 18AWG, TXL BRN	J1-A32 3	IPD= (VR-)	(3A/1A ) FI02	J2-A3	W83 18AWG, TXL YEL-BLK
80,43	W43 18AWG, TXL ORG	J1-B11		(38/1A ) FI03	J2-A7	W87 18AWG, TXL YEL-ORG
1	W11 18AWG, TXL WHT	V2 111.4	(DRP B(5 V 300mA)	(3A/1A ) FI04	J2-A6	W86 18AWG, TXL BLK-RED
	W56 18AWG, TXL PPL-PNK W24 18AWG, TXL RED PPL	J1-B24 X J1-A24 X	CDRG A	(3A/1A ) FI05	J2-A8	W88 18AWG, TXL LTBLU
	W14 18AWG, TXL TAN		W 01 (220K GND)	(3A/1A ) FI06	J2-A5	W85 18 AWG, TXL WHT- DKBLU
	W18 18AWG, TXL WHT- DKBLU		AN 02 (220K GND)	(3A/1 A or 6A/2A )F107	J2=A2	W82 18AWG, TXL PNK-ORG
	W8 18 AWG, TXL BRN-WHT		N 03 (220K GND)	(3A/1 A or6A/2A )F108	J2-74	W84 18AWG, TXL WHT
	Wo TOAWG, TAL BRN WHI			(3A/1 A or6A/2A )F109	J2-B3	W107 18AWG, TXL YEL
	W29 18AWG, TXL WHT- LTBLU	J1=A29	W 04 (51K 1 GND)	(3A/1 A or 6A/2A )FI10	J2=B2	W106 18AWG, TXL TAN
	W30 18AWG, TXL WHT-BLK	J1-A30	N 05 (51K1 GND)	(3A/1 A or6A/2A )FI11	J2=B4	W108 18AWG, TXL DKBLU PNK
				(3A/1 A or 6A/2A )FI12	J2-B1	W105 18 AWG, TXL BLK- ORG
	W6 18AWG, TXL LTBLU WHT		AN 06 (51K1 GND)			
	W21 18 AWG, TXL DKBLU	J1-A21	AN 07 (51K 1 GND)			
~	W17 18AWG, TXL BRN		AN 08 (51K 1 GND)	(5V ) EST1	J2-A12	W92 18AWG, TXL DKBLU WHT
	W25 18 AWG, TXL LTBLU BLK	J1=A25	AN 09 (51K 1 GND)	(5V) EST2	J2-A13	W93 18AWG, TXL WHT- LTBLU
	W16 18AWG, TXL GRN	J1-A16	AN 10 (51K 1 GND)	(5V) E873	J2-A14	W94 18AWG, TXL WHT-BLK
	W26 18AWG, TXL PNK-BLK		AN 11 (51K 1 GND)	(5V) EST4	J2-A20	W100 18AWG, TXL ORG WHT
	W15 18 AWG, TXL TAN- GRN	J1-A15	AN 12 (51K 1 GND)	(5V) EST5	J2-A10	W90 18AWG, TXL GRY
				(5V) EST6	J2=A11	W91 18AWG, TXL DKBLU
	W10 18AWG, TXL RED PNK		NN 13 (2K2 5V)	(5V) EST7	J2-A21	W101 18AWG, TXL BLK-BLU
	W28 18AWG, TXL DKBLUWHT	J1-A28	AN 14 (1KO 5V)			
	W5 18 AWG, TXL WHT- ORG	J1-A5	W 15 (1K0 5V)	(5V) EST8	J2-A23	W103 18AWG, TXL RED-BLU
				(SV ) ESTS	J2-B14	W118 18AWG, TXL TAN- GRN
	W27 18AWG, TXL ORG PNK		NN 16 (1KO 5V)	(5V ) EST10	J2-B13	W117 18AWG, TXL WHT-YEL
	W7 18AWG, TXL WHT-YEL	J1-A7 P	AN 17 (1KO 5V)	(5V ) EST11	J2-B11	W115 18AWG, TXL BLU BLK
	W66 18AWG, TXL YEL-WHT	J1-C10 p	N 18 (1K0 5V)		J2-B10	
		J1-C11	N 19 (1K0 5V)	(5V ) EST12		W114 18AWG, TXL ORG BLK
	W67 18AWG, TXL PNK-BRN			(5V ) EST13/Lampl	J2-B6	W110 18AWG, TXL WHT
	W65 18AWG, TXL YEL-RED	A	AN 20 (1K0 5V)	(5V ) EST14/Lamp2	J2=B5	W109 18AWG, TXL RED PNK
	W58 18 AWG, TXL BRN WHT	J1-C2	AN 21 (1K0 5V)	(5V ) EST15/Lamp3	J2-B7	W111 18AWG, TXL WHT-GRN
	W60 18AWG, TXL BRN YEL		N 22 (1KO 5V)	(5V ) EST16/Lamp4	J2-B8	W112 18AWG, TXL BRN-WHT
	Not IDANO, TAE BRIFTEE		at 22 (200 50)			
	W61 18 AWG, TXL BRN-WHT	J1-C5 /	N 23 (1K0 5V)	EST RTN		W102 18AWG, TXL YEL-PPL
	W57 18AWG, TXL YEL- ORG	J1-C1 ,	N 24 (1KO 5V)			
	W59 18AWG, TXL RED WHT	J1=C3 p	N 25 (1K0 5V)			
	W68 18 AWG, TXL GRN RED	J1-C12	AN 26 (2K2 5V)			
	W71 18AWG, TXL BLK	J1-C15	AN 27 (2K2 5V)	(6A LSU1 HEATER) LSOL_UH	J1-B20	W52 18, TXL PNK- LTBLU
	W/T TOAWG, THE BER			(6A LSU2 HEATER) LSO2_UH	J1-B19	W51 18AWG, TXL YEL- WHT
	W63 18AWG, TXL GRN ORG	J1-C7 7	AN 28 (2K2 5V)	(6A W/ISENSE) LSO3 CS	J1-A23	W23 18AWG, TXL PPL-YEL
		.11 - 24		(6A W/ISENSE) LSO4_CS	J2-B21	W125 18AWG, TXL PPL-YEL
	W62 18AWG, TXL PNK-BLK	01-C6 A	AN 29 (1M GND)	(6A ) LS05	J2-B12	W116 18AWG, TXL WHT- ORG
	W64 18AWG, TXL GRN-BLU	J1-C8	AN 30 (1M GND)	(6A) LSO6	J2-B15	W119 18AWG, TXL GRN YEL
	W64 18AWG, TAL GRN-BLU			(6A.) LS07	J2-B17	W121 18AWG, TXL BLK-GRN
	W39 18AWG, TXL LTBLUBLK	J1-B7 J1-C16	G1(1K5V, 2-15k	Hz.5.1 us)	J2-B19	W123 18AWG, TXL TAN-PPL
	W72 18AWG, TXL BLK W19 18AWG, TXL BLK-RED	DI-AIS	WG 2 (1 K 5V , 2- 15 XG 3 (1 K 5V , 5. 1 u	s) (6A ) LSO9-	J2=B18	W122 18AWG, TXL PPL
	W9 18AWG, TXL YEL-PNK	J1-A9	G4(1K5V,5.1u	s) (6A ) LSO10	J2=B20	W124 18AWG, TXL LTBLUWHT
	W53 18 AWG, TXL ORG-WHT	J1-B21	.SU1-UN			
	W33 18AWG, TXL BLK-GRN	J1-B1 ,	0111-3.07			
	W46 18 AWG, TXL WHT- BRN	J1-B14	SU1 - TP	(6 A 4K 75 SV ) TACH	J1=A22	W22 18 AWG, TXL BLK ORG
		J1-B15 L	SU1-IA	IN MARY D DV J 174CH		
	W47 18AWG, TXL BLK-BLU	J1-812				
	W44 18AWG, TXL GRY	J1-B12 J1-B13	SU2=VM			
		J1-B12 J1-B13 J1-B17	.SU2=VM			
	W44 18AWG, TXL GRY W45 18AWG, TXL RED	J1-812 J1-813 L J1-817 L J1-816 L	.SU2-VM .SU2-IP .SU2-IA			
	W44 18AWG, TXL GRY W45 18AWG, TXL RED W49 18AWG, TXL RED BLU W48 18AWG, TXL ORG BLK W35 18AWG, TXL GRY- DKBLU	J1-B12 J1-B13 J1-B17 L J1-B16 L J1-B3				
	W44 18AWG, TXL GRY     W45 18AWG, TXL RED     W49 18AWG, TXL RED BLU     W48 18AWG, TXL RED BLU     W48 18AWG, TXL GRY- DKBLU     W36 18AWG, TXL GRY- DKBLU     W36 18AWG, TXL YEL PPL	J1-B12 L J1-B13 L J1-B17 L J1-B16 L J1-B3 A J1-B4 A	.SU2=VM .SU2=IP .SU2=IA NO 11 (M GND)			
	W44 18AWG, TXL GRY     W45 18AWG, TXL RED     W49 18AWG, TXL RED BLU     W49 18AWG, TXL RED BLU     W48 18AWG, TXL ORG BLK     W35 18AWG, TXL GRY- DKBLU     W35 18AWG, TXL YEL-PPL     W37 18AWG, TXL YEL-PH     W37 18AWG, TXL WHT	J1-B12 L J1-B13 L J1-B17 L J1-B17 L J1-B16 L J1-B3 A J1-B4 A J1-B5 A	.SU2-VM .SU2-IP .SU2-IA W131 (1M GMD) W132 (1M GMD) W132 (1M GMD)	(55.) H1+	J2-A9	W89 18AWG, TXL TAN LTBLU
	W44 18AWG, TXL GRY     W45 18AWG, TXL RED     W49 18AWG, TXL RED BLU     W49 18AWG, TXL RED BLU     W48 18AWG, TXL ORG BLK     W35 18AWG, TXL GRY- DKBLU     W36 18AWG, TXL YEL-PPL     W37 18AWG, TXL WHT-PPL     W38 18AWG, TXL WHT-PPL	J1-B12 L J1-B13 L J1-B17 L J1-B16 L J1-B16 L J1-B3 A J1-B4 A J1-B5 A	LSU2 = VM LSU2 = I P LSU2 = I R NI 31 ( IM GND) NI 32 ( IM GND) NI 33 ( IM 59) NI 34 ( IM 59)	H1-	J2-A17	W89 18AWG, TXL TAN LTBLU W97 18AWG, TXL PNK PPL
	W44 18AWG, TXL GRY           W45 18AWG, TXL RED           W49 18AWG, TXL RED BLU           W48 18AWG, TXL ORG BLK           W35 18AWG, TXL GRY- DKBLU           W36 18AWG, TXL GRY- DKBLU           W38 18AWG, TXL GRY- DKBLU           W38 18AWG, TXL WHT- PL           W38 18AWG, TXL WHT- PPL           W75 18AWG, TXL YEL- PNK	J1-B12 J1-B13 J1-B17 J1-B17 J1-B16 J1-B3 J1-B3 J1-B4 J1-B5 J1-B6 J1-C19 E J1-C20	.SU2 = VM .SU2 = T P .SU2 = T A .W131 ( M GMGs .H132 ( M GMGs .H133 ( R M)s .H14 ( R M)s .H14 ( R M)s .H14 ( R M)s	H1- (5A) H2+	J2-A17 J2-B22	W97 18AWG, TXL PNK-PPL W126 18AWG, TXL TAN-WHT
	W44 18AWG, TXL GRY     W45 18AWG, TXL RED     W49 18AWG, TXL RED BLU     W49 18AWG, TXL RED BLU     W48 18AWG, TXL ORG BLK     W35 18AWG, TXL GRY- DKBLU     W36 18AWG, TXL YEL-PPL     W37 18AWG, TXL WHT-PPL     W38 18AWG, TXL WHT-PPL	J1-B12 J1-B13 J1-B17 J1-B17 J1-B16 J1-B16 J1-B16 J1-B16 J1-B16 J1-B16 J1-C19 E J1-C21 E	.802-VM .802-TP .802-TP .803 (M 666) M33 (M 666) M33 (M 66) M33 (M 66) M34 (M	H1= (5A) H2+ H2-	J2-A17	W97 18AWG, TXL PNK PPL W126 18AWG, TXL TAN WHT W127 18AWG, TXL GRN BLK
	W44 18AWG, TXL GRY W45 18AWG, TXL RED W49 18AWG, TXL RED BLU W49 18AWG, TXL RED BLU W35 18AWG, TXL QRG BLK W35 18AWG, TXL QRC PKL W36 18AWG, TXL QRC PKL W37 18AWG, TXL WHT W37 18AWG, TXL WHT PPL W75 18AWG, TXL YEL-PNK W76 18AWG, TXL PKPH W77 18AWG, TXL PKPH	J1-B12 J1-B13 J1-B17 J1-B16 J1-B16 J1-B16 J1-B16 J1-B16 J1-C19 J1-C20 J1-C21 g J1-C21 g J1-C22 g	SU2=VM SU2=TP SU2=TA NIX (MGR0) NIX (MGR0) NIX (MGR) NIX (MGR) XLP XLN XLN XLP	H1- (5A) H2+	J2-R17 J2-B22 J2-B23	W97 18AWG, TXL PNK-PPL W126 18AWG, TXL TAN WHT W127 18AWG, TXL GRN BLK
	W44 18AWG, TXL GRY W45 18AWG, TXL RED W49 18AWG, TXL RED BLU W48 18AWG, TXL ORG BLK W35 18AWG, TXL ORG BLK W35 18AWG, TXL GRV DKBLU W35 18AWG, TXL WHT PPL W75 18AWG, TXL WHT PPL W75 18AWG, TXL GRN WHT W77 18AWG, TXL GRN WHT W77 18AWG, TXL LTBLU WHT W79 18AWG, TXL ITBLU WHT	J1-B12 J1-B13 J1-B17 J1-B16 J1-B16 J1-B3 J1-B3 J1-B5 J1-B5 J1-B6 J1-C21 E J1-C21 E J1-C22 E J1-C22 E J1-C22 E J1-C24 E	2012 – 194 2012 – 174 2012 – 174 NEX (1466) NEX (1	H1= (5A) H2+ H2= (10A) H3+	J2-A17 J2-B22 J2-B23 J2-B16	W97 18AWG, TXL PNK PPL W126 18AWG, TXL TAN WHT W127 18AWG, TXL GRN BLK W120 18AWG, TXL GRN RED
	W44 18AWG, TXL GRY           W45 18AWG, TXL RED           W49 18AWG, TXL RED BLU           W48 18AWG, TXL GRY- DBLU           W35 18AWG, TXL GRY- DKBLU           W35 18AWG, TXL GRY- DKBLU           W36 18AWG, TXL GRY- DKBLU           W37 18AWG, TXL WHT           W37 18AWG, TXL WHT           W37 18AWG, TXL WHT           W75 18AWG, TXL YEL-PNK           W76 18AWG, TXL PNK-PPL           W77 18AWG, TXL PNK-PPL           W77 18AWG, TXL PNK-PPL           W79 18AWG, TXL PNK- ORG           W80 18AWG, TXL GRN WHT	J1-B12 J1-B13 J1-B16 J1-B16 J1-B16 J1-B16 J1-B16 J1-B16 J1-B16 J1-B16 J1-C22 J1		H1= (5A) H2+ H2= (10A) H3+	J2-A17 J2-B22 J2-B23 J2-B16	W97 18AWG, TXL PNK PPL W126 18AWG, TXL TAN WHT W127 18AWG, TXL GRN BLK W120 18AWG, TXL GRN RED
	W44 18AWG, TXL GRY     W45 18AWG, TXL RED     W49 18AWG, TXL RED BLU     W48 18AWG, TXL ORG BLK     W35 18AWG, TXL ORG BLK     W35 18AWG, TXL QRY- DKBLU     W38 18AWG, TXL WHT- PPL     W75 18AWG, TXL WHT- PPL     W75 18AWG, TXL WHT- PPL     W75 18AWG, TXL GRW- WHT     W77 18AWG, TXL DRIK- PPL     W75 18AWG, TXL DRIK- PPL     W75 18AWG, TXL BLW WHT     W79 18AWG, TXL PRIK- PRE     W80 18AWG, TXL BLK     W99 18AWG, TXL BLK     W90 18AWG, TXL GRW- WHT     F     W70 18AWG, TXL GRW- WHT     W70 18AWG,	J1-812 J1-813 J1-814 J1-816 J1-814 J1-814 J1-814 J1-814 J1-814 J1-814 J1-815 J1-814 J1-815 J1-814 J1-815 J1-814 J1-815 J1-814 J1-815 J1-814 J1	2012-VM 2012-ID NOT-INO	H1= (5A) H2+ H2= (10A) H3+	J2-A17 J2-B22 J2-B23 J2-B16	W97 18AWG, TXL PNK PPL W126 18AWG, TXL TAN WHT W127 18AWG, TXL GRN BLK W120 18AWG, TXL GRN RED
	W44 18AWG, TXL GRY           W45 18AWG, TXL RED           W49 18AWG, TXL RED BLU           W49 18AWG, TXL ORG BLK           W35 18AWG, TXL GRY- DKBLU           W35 18AWG, TXL GRY- DKBLU           W35 18AWG, TXL GRY- DKBLU           W35 18AWG, TXL WHT-PL           W37 18AWG, TXL WHT-PPL           W75 18AWG, TXL GRY- WHT           W75 18AWG, TXL GRY- WHT           W77 18AWG, TXL L GRN- WHT           W79 18AWG, TXL PNK- PPL           W79 18AWG, TXL PNK ORG           W99 18AWG, TXL BLW WHT           W70 18AWG, TXL GRN- WHT           W70 18AWG, TXL GRN WHT           W70 18AWG, TXL GRN PPL           W41 18AWG, TXL GRN PPL	J1-812 J1-813 J1-816	2022-VM 2022-IP 4022-IA 4031(40.986) 4031(40.66) 4031(	H1= (5A) H2+ H2= (10A) H3+	J2-A17 J2-B22 J2-B23 J2-B16	W97 18AWG, TXL PNK PPL W126 18AWG, TXL TAN WHT W127 18AWG, TXL GRN BLK W120 18AWG, TXL GRN RED
	W44 18AWG, TXL GRY           W45 18AWG, TXL RED           W49 18AWG, TXL RED BLU           W49 18AWG, TXL RED BLU           W35 18AWG, TXL GRY- DKBLU           W35 18AWG, TXL GRY- DKBLU           W38 18AWG, TXL GRY- DKBLU           W38 18AWG, TXL WHT- PKL           W37 18AWG, TXL WHT- PPL           W75 18AWG, TXL WHT- PPL           W76 18AWG, TXL PKN WHT           W76 18AWG, TXL PKN WHT           W76 18AWG, TXL PKN WHT           W77 18AWG, TXL PKN WHT           W79 18AWG, TXL PKN WHT           W79 18AWG, TXL BLW WHT           W79 18AWG, TXL GRN WHT           W18 18AWG, TXL GRN PEL           J           W41 18AWG, TXL GRN PEN           K         W42 18AWG, TXL GRN BRN	JJ-B12         J           JJ-B13         J           JJ-B14         J           JJ-B16         J           JJ-B16         J           JJ-B16         J           JJ-B16         J           JJ-B16         J           JJ-B16         J           JJ-C19         J           JJ-C21         J           JJ-C22         J           JJ-C23         J           JJ-C24         J           JJ-C25         J           JJ-C24         J           JJ-C25         J           JJ-C24         J           JJ-C25         J           JJ-C24         J           JJ-C35         J <td></td> <td>H1= (5A) H2+ H2= (10A) H3+</td> <td>J2-A17 J2-B22 J2-B23 J2-B16</td> <td>W97 18AWG, TXL PNK PPL W126 18AWG, TXL TAN WHT W127 18AWG, TXL GRN BLK W120 18AWG, TXL GRN RED</td>		H1= (5A) H2+ H2= (10A) H3+	J2-A17 J2-B22 J2-B23 J2-B16	W97 18AWG, TXL PNK PPL W126 18AWG, TXL TAN WHT W127 18AWG, TXL GRN BLK W120 18AWG, TXL GRN RED
C07	W44 18AWG, TXL GRY           W45 18AWG, TXL RED           W49 18AWG, TXL RED BLU           W49 18AWG, TXL ORG BLK           W35 18AWG, TXL ORG BLK           W35 18AWG, TXL GRY-DKBLU           W38 18AWG, TXL GRY-DKBLU           W38 18AWG, TXL WHT-PL           W37 18AWG, TXL WHT-PPL           W75 18AWG, TXL WHT-PPL           W75 18AWG, TXL PKN WHT           W76 18AWG, TXL PKN WHT           W77 18AWG, TXL PKN WHT           W78 18AWG, TXL BLU WHT-           W79 18AWG, TXL BLN WHT           W79 18AWG, TXL BLN WHT           W70 18AWG, TXL GRN WHT           F           W70 18AWG, TXL GRN YEL           J           W71 18AWG, TXL GRN WHT           F           W70 18AWG, TXL GRN WHT           F           W70 18AWG, TXL GRN WHT           F           W70 18AWG, TXL GRN WHT           K           W41 18AWG, TXL GRN BRN           C           W73 18AWG, TXL GRN WHT           J           W1 18AWG, TXL GRN WHT           D           W74 18AWG, TXL GRN RED	J1-812 J1-813 J1-816		H1= (5A) H2+ H2= (10A) H3+	J2-A17 J2-B22 J2-B23 J2-B16	W97 18AWG, TXL PNK PPL W126 18AWG, TXL TAN WHT W127 18AWG, TXL GRN BLK W120 18AWG, TXL GRN RED
co7 c	W44 18AWG, TXL GRY           W44 18AWG, TXL RED           W49 18AWG, TXL RED BLU           W49 18AWG, TXL ORG BLK           W35 18AWG, TXL ORG BLK           W35 18AWG, TXL GRY DRBLU           W36 18AWG, TXL GRY DRBLU           W36 18AWG, TXL GRY DRBLU           W37 18AWG, TXL YEL PPL           W75 18AWG, TXL YEL PNK           W76 18AWG, TXL GRL PHK PPL           W77 18AWG, TXL GRN WHT           W77 18AWG, TXL GRN WHT           W79 18AWG, TXL GRN WHT           W79 18AWG, TXL GRN WHT           W70 18AWG, TXL GRN WHT           W71 18AWG, TXL GRN WHT           W73 18AWG, TXL GRN WHT	JJ-B12         JJ-B12           JJ-B13         J           JJ-B14         J           JJ-B16         J           JJ-B16         J           JJ-B16         J           JJ-B17         J           JJ-B16         J           JJ-B16         J           JJ-B17         JJ-B16           JJ-B16         J           JJ-B16         J           JJ-C18         J           JJ-C21         J           JJ-C22         J           JJ-C23         J           JJ-C24         J           JJ-C25         J           JJ-C24         J           JJ-C25         J           JJ-C24         J	2012-VM 2012-IP 2012-IA 833 (1996) 833 (1996) 833 (1996) 833 (1996) 834 (1996) 835 (1996) 835 (1997) 835 (1997	H1= (5A) H2+ H2= (10A) H3+	J2-A17 J2-B22 J2-B23 J2-B16 J2-R24	W97 18AWG, TXL PNK PPL           W126 18AWG, TXL TAN WHT           W127 18AWG, TXL GRN BLK           W120 18AWG, TXL GRN BLK           W120 18AWG, TXL GRN BLK           W128 18AWG, TXL GRN BLU
C07	W44 18AWG, TXL GRY           W45 18AWG, TXL RED           W49 18AWG, TXL RED BLU           W49 18AWG, TXL ORG BLK           W35 18AWG, TXL ORG BLK           W35 18AWG, TXL GRY- DKBLU           W35 18AWG, TXL GRY- DKBLU           W35 18AWG, TXL GRY- DKBLU           W35 18AWG, TXL WHT- PL           W37 18AWG, TXL WHT- PPL           W75 18AWG, TXL GRY- MHT           W75 18AWG, TXL GRN- WHT           W77 18AWG, TXL BRN- WHT           W79 18AWG, TXL BRK- ORG           W80 18AWG, TXL GRN- WHT           W70 18AWG, TXL GRN- WHT           W1 18AWG, TXL GRN- WHT           W41 18AWG, TXL GRN- WHT           W1 18AWG, TXL GRN- MHT           W1 18AWG, TXL GRN- MHT           W1 18AWG, TXL GRN- MHT           W18 4 18AWG, TXL GRN- MHT	J-B32         J-B32           J-B33         J           J-B33         J           J-B33         J           J-B34         J           J-B34         J           J-B35         J           J-B36         J           J-C32         F           J-C34         J           J-C37         C           J-C37         C           J-C37<	JUIZ-VM. JUIZ-IP AUX-IP N31(W986) N31(W986) N31(W96) N31(W96) N31(W96) N31(P N31(W96) N31(P N31(N) N31(P N31(N) N31(P N31(P) N31	H1- (3A) H2+ H2- (10A) H3+ H3-	J2-A17 J2-B22 J2-B23 J2-B16 J2-B16 J2-B24 J2-R24	W97 18AWG, TXL PNK PPL           W126 18AWG, TXL TAN WHT           W127 18AWG, TXL GRN BLK           W120 18AWG, TXL GRN BLK           W128 18AWG, TXL GRN BLU
C07	W44 18AWG, TXL GRY           W45 18AWG, TXL RED           W49 18AWG, TXL RED BLU           W49 18AWG, TXL ORG BLK           W35 18AWG, TXL ORG BLK           W35 18AWG, TXL GRY- DKBLU           W38 18AWG, TXL GRY- DKBLU           W38 18AWG, TXL GRY- DKBLU           W38 18AWG, TXL WHT- PL           W37 18AWG, TXL WHT- PPL           W75 18AWG, TXL GRW HTT           W76 18AWG, TXL GRW HTT           W77 18AWG, TXL SRN WHT           W78 18AWG, TXL SRN WHT           W79 18AWG, TXL SRN WHT           W70 18AWG, TXL GRW HT           W71 18AWG, TXL GRW HT           W71 18AWG, TXL GRW HT           W73 18AWG, TXL GRW HT           W74 18AWG, TXL GRW HT           W74 18AWG, TXL GRY RED           H           W55 18AWG, TXL BLK YEL	JJ-833         J           JJ-833         J           JJ-834         J           JJ-836         J           JJ-837         J           JJ-838         J           JJ-833         J           JJ-833         J           JJ-833         J           JJ-833         J	2012-VM 2012-IP 2012-IA 831(Mode) 831(Mode) 831(Mode) 831(Mode) 831(Mode) 831(Mode) 831(Mode) 831(Mode) 831(Mode) 833(Mo	H1- (5A) H2+ H2- (10A) H3+ H3-	J2-A17 J2-B22 J2-B13 J2-B14 J2-R24 J2-R24 J2-A16 J2-A24 J2-A15	W97 18AWG, TXL PNK PPL           W126 18AWG, TXL TAN WHT           W120 18AWG, TXL GRN BLK           W120 18AWG, TXL GRN BLK           W128 18AWG, TXL GRN BLU
C07	W44 18AWG, TXL GRY           W45 18AWG, TXL RED           W49 18AWG, TXL RED BLU           W49 18AWG, TXL ORG BLK           W35 18AWG, TXL ORG BLK           W35 18AWG, TXL GRY- DKBLU           W35 18AWG, TXL GRY- DKBLU           W35 18AWG, TXL GRY- DKBLU           W35 18AWG, TXL WHT- PL           W37 18AWG, TXL WHT- PPL           W75 18AWG, TXL GRY- MHT           W75 18AWG, TXL GRN- WHT           W77 18AWG, TXL BRN- WHT           W79 18AWG, TXL BRK- ORG           W80 18AWG, TXL GRN- WHT           W70 18AWG, TXL GRN- WHT           W1 18AWG, TXL GRN- WHT           W41 18AWG, TXL GRN- WHT           W1 18AWG, TXL GRN- MHT           W1 18AWG, TXL GRN- MHT           W1 18AWG, TXL GRN- MHT           W18 4 18AWG, TXL GRN- MHT	JJ-833         J           JJ-833         J           JJ-834         J           JJ-836         J           JJ-837         J           JJ-838         J           JJ-833         J           JJ-833         J           JJ-833         J           JJ-833         J	JUIZ-VM. JUIZ-IP AUX-IP N31(W986) N31(W986) N31(W96) N31(W96) N31(W96) N31(P N31(W96) N31(P N31(N) N31(P N31(N) N31(P N31(P) N31	И1- (5А) И2+ И2- (10А) И3+ И3- ОВУИЗ А	J2-A17 J2-B22 J2-B23 J2-B16 J2-B16 J2-R24 J2-R24	W97 18AWG, TXL PNK PPL           W126 18AWG, TXL TAN WHT           W127 18AWG, TXL GRN BLK           W120 18AWG, TXL GRN BLK           W128 18AWG, TXL GRN BLU

6-Environmental Ratings					
6.1 GENERAL:	The ECM is designed to meet automotive industry standard under hood environmental requirements for 12 volt and 24 volt systems, and also meets marine industry environmental requirements.				
	Validation tests included extreme operating temperatures (–40 to +105 °C), thermal shock, humidity, salt spray, salt fog, immersion, fluid resistance, mechanical shock, vibration, and EMC.				
	It is the responsibility of the application engineer to assure that the application does not exceed the demonstrated capabilities of the unit; vibration or thermal. It may be necessary to perform additional tests to validate the unit in the application.				
6.2 STORAGE TEMPERATURE:	–40 to +125 °C				
6.3 OPERATING TEMPERATURE:	–40 to +105 °C				
6.4 THERMAL SHOCK:	-40 to +125 °C transition within 10 s for 500 c	ycles			
6.5 FLUID RESISTANCE:	Two stroke motor oil, Four-stroke motor oil, U ASTM Reference 'C' fuel	nleaded gasoline,			
6.6 HUMIDITY RESISTANCE:	85% humidity at 85 °C for 1000 hours of opera	ation			
6.7 SALT FOG RESISTANCE:	1000 hours				
6.8 IMMERSION:	Submersible in 8% saltwater solution to 10 ft (	(3 m)			
6.9 MECHANICAL SHOCK:	50 hours of 50 g's				
6.10 DROP:	Random drop tests on concrete from 6 ft (1.8 m)				
<b>6.11 VIBRATION:</b> For engine-mounted applications, rubber isolators are required and available from	3 hours per axis per the below accelerated hard-mount profile. Application vibration levels must be reviewed and approved by Woodward for warranty coverage.				
Woodward.	MRV1 PSD vs. Freque	1000			
6.12 ABNORMAL SUPPLY VOLTAGE RE	SISTANCE:				
Conditions	Supply Voltage	Time			
Reverse Battery	24 Vdc	5 Minutes			
Abnormal Alternator Output	36 Vdc	5 Minutes			
Minimum Battery	6 Vdc Indef.				

mating end

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WAKE (ECUP)

CAN2+

CAN2-

CAN1+

CAN1-

#### 7-Using a Boot Key/Cable Use Boot Key and Reprogram the Module Errors in configuration, logic and/or other NOTICE programming made during program development for Remove other ECUs from CANbus for this procedure. this module (via .srz file), can cause a persistent loss 1. Connect the module for programming via necessary of CAN communications with the module under cables, CAN converter, etc. development. 2. Select a known, valid .srz file for programming. If this happens, apply the boot key to force the module 3. With key off, disconnect battery power from module. into reboot mode, reloading the module with functional With module power off, initiate programming of the program code (a known, valid .srz file) in order to module using MotoTune<sup>®</sup>. allow resumption of module communication. Follow 4. When the "Looking for an ECU" prompt appears in the steps listed in this section. the dialog, reconnect Battery, and then turn key on, to power up and "wake-up" ECU. Refer to diagram below for connections. The module must "wake-up" (KEYSW on) with the boot Remove the ECU from direct key or cable connections applied as described in order to control connections before performing the reboot initiate a reboot and to absorb the selected program. procedure, as outputs are set to defaults or undefined states, with unpredictable and possibly hazardous results if applied. SmartCraft Junction Box / SmartCraft VBATT Connectors **Connector Pins** Wires to ECU Pins STOP A A F в D В В SPARE / CAN3-GROUND С SPARE / CAN3+ C С D в D GND Е BATT E А F DGM1 F C в F F E D A Viewed from KEY SW

# WOODWARD

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**USB/CAN** 

Cable to PC

CAN1+

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CAN1+

CAN1-

Boot Key

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