WOODWARD

Datasheet
36369
(Revision A, 6/2021)

MotoHawk Control Solutions

Desktop I/O Simulator

8909-1043

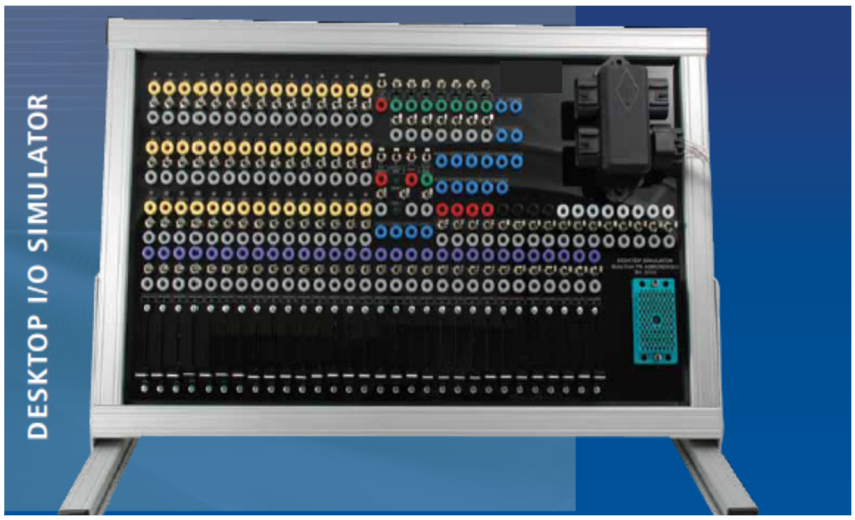
Description

The 8909-1043 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.

The I/O simulator provides easy access points for all signals, making it convenient to connect oscilloscopes, voltmeters, current meters, or other lab devices.

LED loads can easily be added to outputs for measurement and visualization by changing the switch position, or an external load can be applied via the grey banana jack ports. Slider potentiometers are provided to give (0 to 5) V input for sensors, or external sensors can easily be applied as well. 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.



- 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 RS-485 channel (switchable – On / Off)
- 8 digital inputs (switchable – On / Off or pulled high / low)
- 10 power and ground channels (switchable – On/ Off)
- XDRG, MPRD, DRVP, DRVG, and Key Switch
- 4 channels of knock sensor inputs
- 4 channels of encoder inputs
- 11 channels of miscellaneous banana inputs

Installation

NOTE: The 8909-1043 I/O simulator ships with a 12 V relay installed. It is required to change the relay for 24 V applications to avoid damage to the relay.

The 8909-1043 is intended for 12 V or 24 V operation. Voltages exceeding 36 V will burn out the LEDs and damage the simulator.

An external harness to the ECU is also required and is sold separately.

8909-1043 / ASMCNDV002 - Front End Harnesses		
CONTROLLER	FRONT END HARNESS	
	Item No.	Reference Number
ECM-0S12-024-xxxx	5404-1199	HARNINTR023A
GCM-0S12-024-xxxx	5404-1200	HARNINTR023B
GCM-0563-48-xxxx	5404-1203	HARNINTR024C
HCM-0563-48-xxxx	5404-1203	HARNINTR024C
ECU565-128	5404-1206	HARNINTR027A
ECM-5554-112-09xx	5404-1205	HARNINTR026A
ECM-S12X-070-xxxx	5404-1207	HARNINTR029A
ECN-5642A-112-049-xxxx ECM-5644A-112-048-xxxx	5404-1321	N/A
ECM-5634M-070-061-xxxx ECM-5642A-070-070-xxxx	5404-1341	N/A
LECM-5566-210 ECM-5644A-086 GCM-5644A-080	8928-7541	N/A

Note: For information related to LECM Simulator Front End Harnesses refer to LECM Desktop I/O Simulator Kit Datasheet 35078.

Make the following connections:

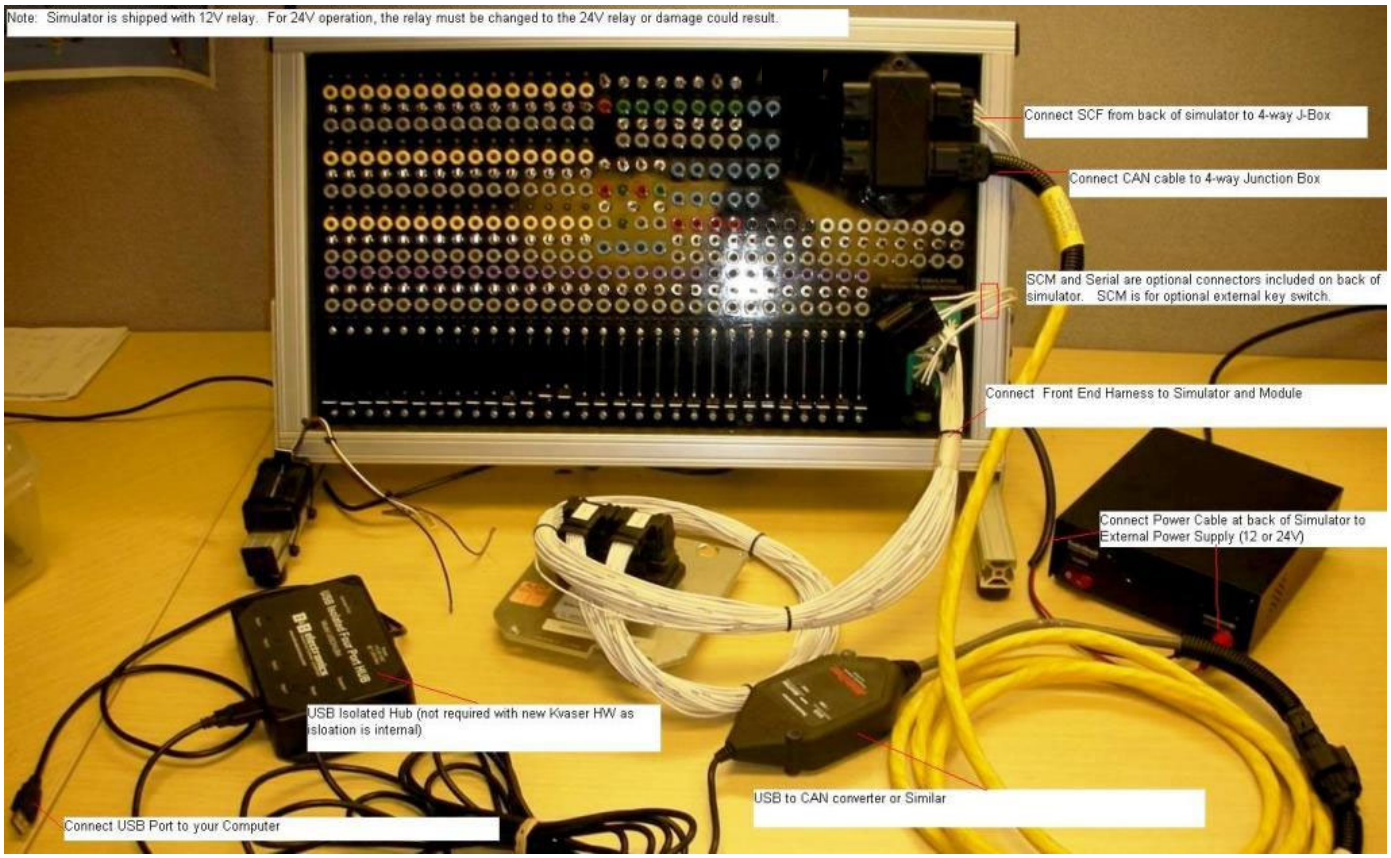
- SCF: Plug connector labeled SCF on the back of the simulator into the 4-way junction box on the front of the simulator.
- Power Cable: Plug the power supply cables on the back of the simulator into your power supply.
- CAN: Connect your CAN or communications cable (sold separately) into the simulator 4-way junction box.

Optional Connections:

- SCM: Optional connector for external key switch
- Serial: Optional connector for external serial communications

Reference Dimensions:

Panel: 57.5cm wide x 34.5cm high
Desktop footprint: 58cm wide x 36.5cm high x 31cm deep including the feet
The panel is angled to the back for easier viewing

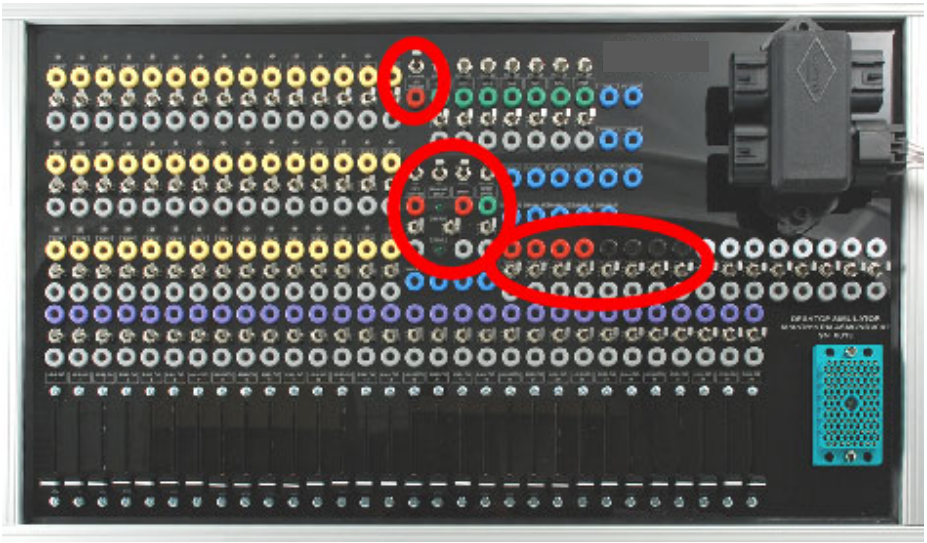


Specifications

Power and Ground Channels

The simulator is configured for 12 V systems. For 24 V systems, the relay connected on the back side must be changed to the 24 V relay or failure may occur. The maximum voltage is 36 V, and higher voltages will result in damage to the LEDs.

The Power and Ground Channels are located in the center of the simulator, and include BATT, XDRP A/B, XDRG, MPRD, DRVP, DRVG, EST RTN, and Key Switch. These are connected to the ECM via the harness, though the jacks allow optional external connections. The switches are normally in the ON position for normal operation.

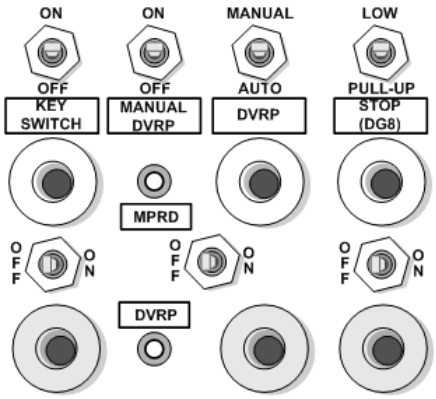


KEY SWITCH (ECUP): The KEY SWITCH interface includes a top, vertical-direction ON/OFF switch, which connects directly to the key-switch (ECUP) input to the ECM, to turn the ECM keyswitch on/off. The other, side-to-side switch enables/disables the ON/OFF function of the top switch. The red jack allows connection of an external keyswitch input. Note: Some ECMs use the key switch input, others do not. Refer to the datasheet for your ECM.

MANUAL/DVRP (driver power): This switch controls whether DVRP is controlled manually or by the application software. You can turn the DVRP to the ECM on/off via the MANUAL/DVRP ON/OFF switch, if the DVRP switch (below) is set to MANUAL. The other, side-to-side switch enables/disables the ON/OFF function of the top switch.

DVRP (driver power): You can turn the MANUAL DVRP on/off via the DVRP ON/OFF switch. When the switch is OFF, the DRVP power is automatically supplied. When ON, use of the MANUAL DVRP ON/OFF switch controls the DVRP power.

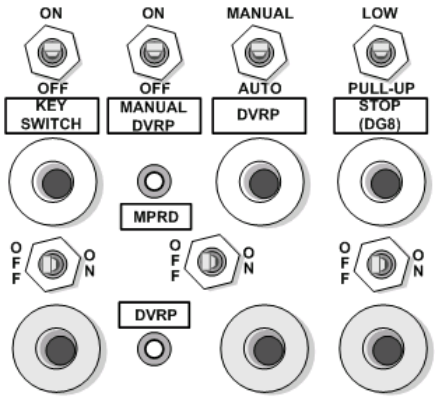
STOP (DG8): The STOP interface includes a top, vertical-direction LOW/PULL-UP, which connects directly to the E-STOP input to the ECM (the DG8 input acts as a STOP input on the 128 pin ECM). The other, side-to-side switch enables/disables the ON/OFF function of the top switch. The red jack allows connection of an external STOP input.



XDRP A/B: The two XDRP jacks, A and B, each include a side-to-side ON/OFF switch, which turns the respective transducer power on/off.

BATT: Battery power to the ECU can be turned on/off via the BATT ON/OFF switch.

MPRD: The main power relay driver can be turned on/off via the MPRD ON/OFF switch.

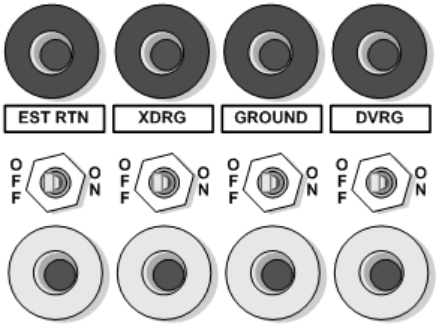


EST RTN: The EST RTN input provides connection to the EST return resource on the connected ECM. You can connect or disconnect the EST return to the ECM via the EST RTN ON/OFF switch.

XDRG: The transducer ground to the ECM can be turned on/off via the XDRG ON/OFF switch.

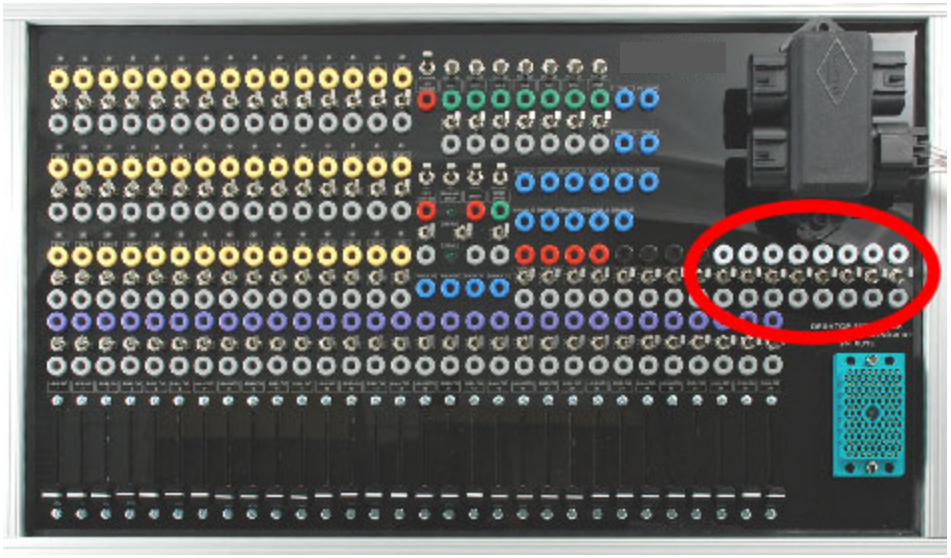
GROUND: The power ground to the ECM can be connected/disconnected via the GROUND ON/OFF switch.

DVRG: Driver ground can be connected/disconnected via the DRVG ON/OFF switch.



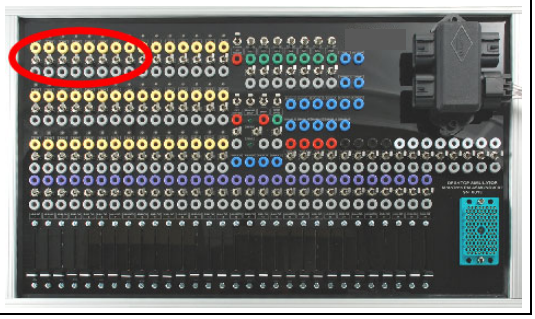
Communications

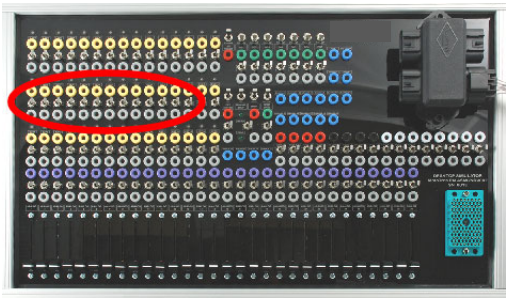
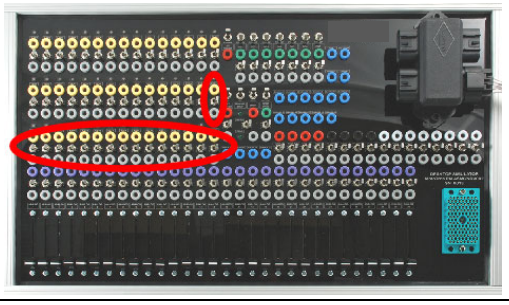
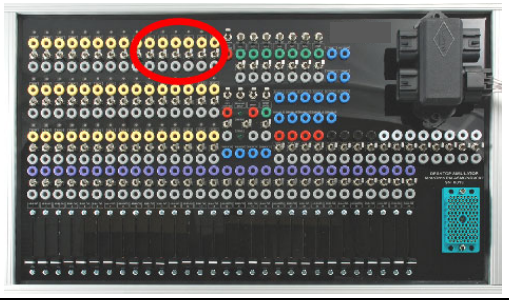
The simulator supports connecting up to three CAN channels, and an RS-485 channel. The jacks are located at the right side of the simulator just below the junction box and above the harness connector. Each connection includes an OFF/ON switch to disable/enable the channel connection. The CAN channels are internally terminated with 120 Ω resistance.



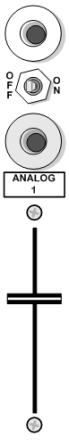
Output Sections

These outputs connect to your ECM output pins, by designation, and in order of resource number. Refer to the datasheet for your particular ECM for resources available. Depending on the resources of the particular ECM in use, some of the simulator output jacks may not be in use. See the end of this guide for ECU/simulator pin cross reference chart. The grey banana jack connects directly to the ECU pins.

LEDs: The LEDs above connect through 1.5 kΩ resistors such that the outputs show current direction. The LEDs turn on green if a Low Side Output is active and set up as “low-side.” The LED shows red if the output is active as “high-side.” **ON/OFF**: You can turn the output on/off via the switch. When off, the yellow (top) jack is inactive and the monitor (gray) jack is usable with the switch in either the ON or OFF position. An External load can be connected via the grey input.	
Low Side Outputs Labeled LSO1-LSO8, eight Low Side Outputs are located in the upper left corner of the simulator.	

INJ Outputs Labeled INJ1-INJ12, twelve fuel injector Outputs are located at the left side of the simulator.	
EST Outputs Labeled EST1-EST16, the 16 electronic spark timing outputs are located at the left side of the simulator. **NOTE**: In order to see EST firing indications, turn the respective EST LED ON/OFF switch to OFF.	
H-Bridge Outputs Labeled H1+, H1–, H2+, H2–, and H3+, H3–, the six H-bridge connections are located at the top center of the simulator. The LED will light green when the H-bridge is sinking current, and red when the H-bridge is sourcing current (high side).	

Input Sections

Analog Inputs Labeled Analog 1 to Analog 30, the Analog Inputs (switchable – On / Off) are located along the bottom of the simulator, together with dedicated potentiometer sliders, (0 to 5) V. The slider potentiometers form a voltage divider with XDRP and XDRG. To connect your own sensor, use the gray jack, and switch the corresponding ON/OFF switch to OFF.	

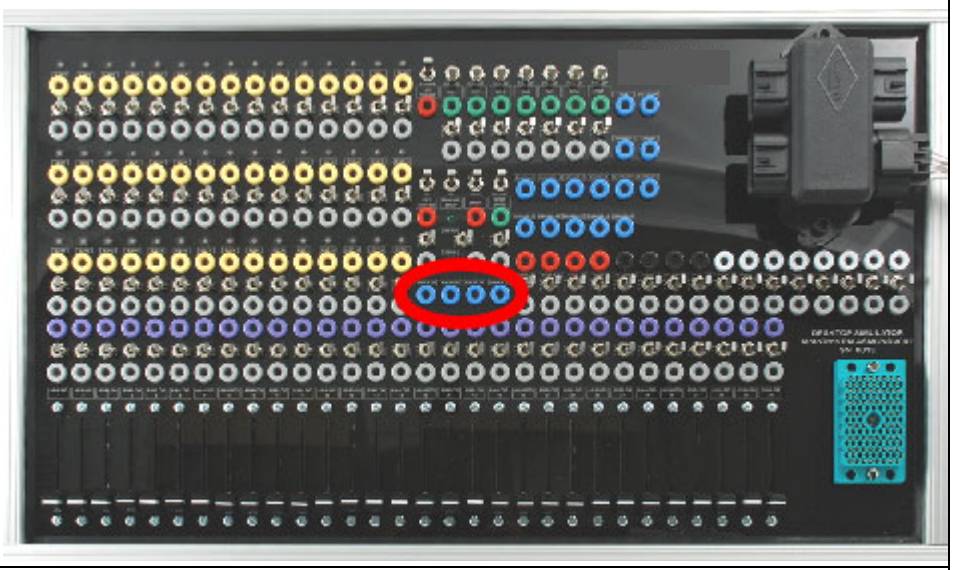
Digital Inputs
The simulator supports up to seven digital inputs, labeled DG1-DG7. The jacks are located at top center of the simulator. The digital inputs each have a switch for setting input to low or pull-up, along with on-off switches.

LOW/PULL-UP: Switch input as needed for either pull-down or pull-up connection.

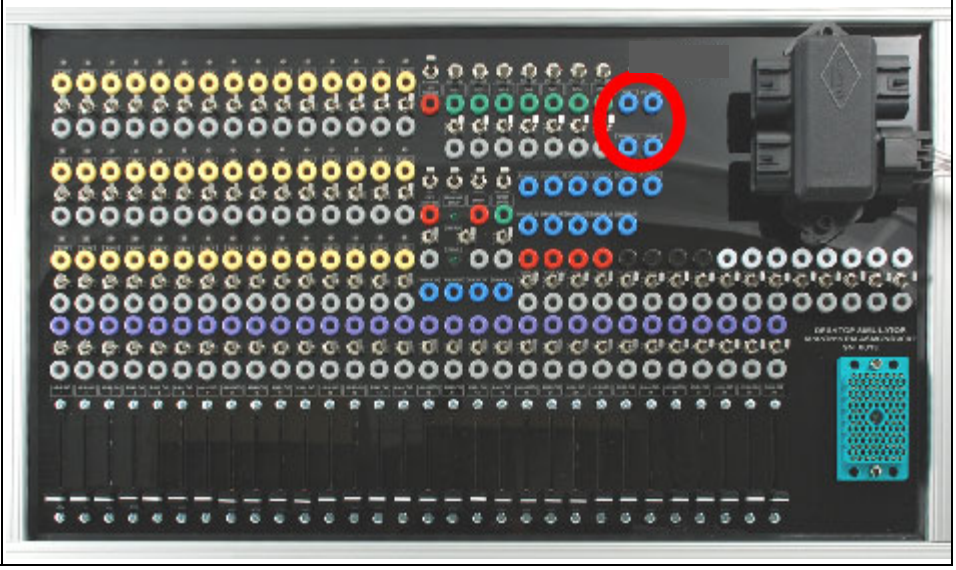
INPUT JACKS: The bottom jack (grey) of each output directly connects to the respective ECM input resource.

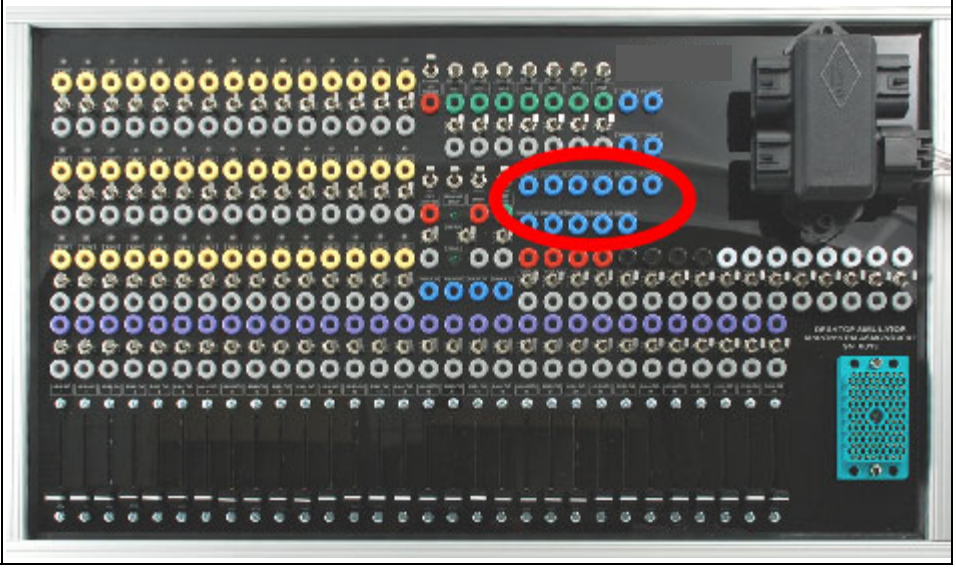
ON/OFF: You can turn the input on/off via the switch. When off, the green input (top) jack is inactive, and signal can be sourced from an external Boolean signal to the ECU pin. When the switch is on, moving the LOW/PULL-UP switch connects a LOW/HIGH signal to the ECU pin from the simulator.

Knock Sensor Inputs
Labeled Knock0 -/+ and Knock1 -/+, the four knock sensor connector jacks are located in the center of the simulator. There are no associated switches or monitors; user must supply the knock input signal to the simulator. These are for modules with knock input and may be disconnected or connected to other module resources. See your module datasheet.

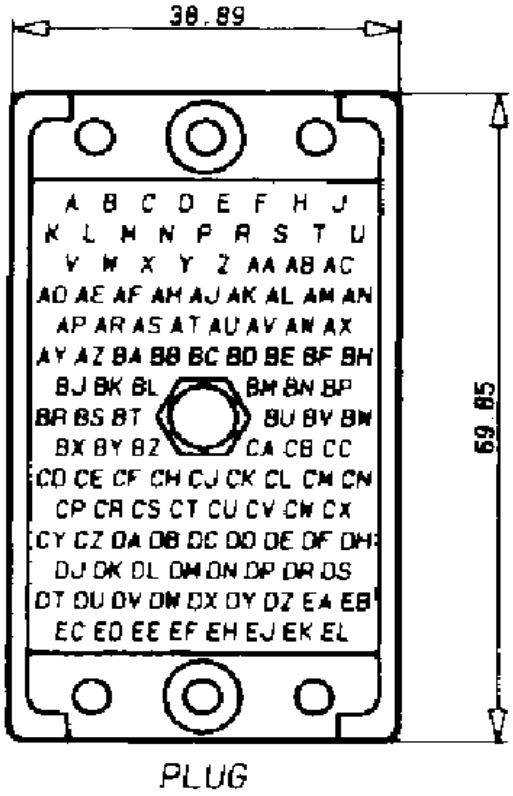


Cam/Crank Inputs
The four Cam and Crank inputs are located at the top of the simulator, labeled CAM and DG CAM, and Crank+/-. There are no associated switches or monitors; user must supply the respective sensor input signal to the simulator.



Miscellaneous Non-assigned Jacks There are 11 general assignment jacks. See next page for cross reference to your module hardware.	

Pinout of Front Panel Connector



PLUG

Module – Simulator Cross Reference

24-Pin Modules

Module			Type	GCM-0S12-024		ECM-0S12-024			
Simulator				ALL		0502/0802		0503/0801/ 0803/0804	
	Pin	Label	Type	Pin	Name	Pin	Name	Pin	Name
1	A	GROUND	Ground	A14	DRVG	A14	DRVG	A14	DRVG
2	B	DRVG	Ground						
3	C	ETC B	LED						
4	D	ETC A	LED						
5	E	EST6	LED						
6	F	INJ6	LED						
7	H	EST7	LED						
8	J	LSO8	LED						
9	K	BANANA 9	Banana						
10	L	INJ8	LED						
11	M	INJ2	LED						
12	N	LSO6	LED						
13	P	INJ7	LED						
14	R	INJ1	LED						
15	S	INJ5	LED						
16	T	EST4	LED						
17	U	EST8	LED						
18	V	EST RTN	Ground						
19	W	EST5	LED						
20	X	EST1	LED			A07	EST 1	**A07**	**AN10M**
21	Y	EST3	LED			A08	EST 3	**A08**	**AN12M**
22	Z	ANALOG 22	POT						
23	AA	DRVP	Pow er						
24	AB	BANANA 10	Banana						
25	AC	EST2	LED			A20	EST 2	**A20**	**AN11M**
26	AD	STOP (DG8)	Sw itch	A21	ESTOP				
27	AE	LSO5	LED						
28	AF	LSO3	LED	A23	LSO3				
29	AH	MPRD	Pow er						
30	AJ	TACH	LED						
31	AK	INJ4	LED						
32	AL	LSO7	LED						
33	AM	INJ3	LED						
34	AN	LSO1	LED	A12	LSO1	A12	LSO1	A12	LSO1
35	AP	LSO2	LED	A24	LSO2	A21	LSO2	A21	LSO2
36	AR	ANALOG 20	POT						
37	AS	ANALOG 21	POT						
38	AT	ANALOG 1	POT	A05	AN1M				
39	AU	ANALOG 2	POT	A17	AN2M				
40	AV	ANALOG 3	POT	A04	AN3M	A05	AN3M	A05	AN3M
41	AW	ANALOG 4	POT	A16	AN4M	A17	AN4M	A17	AN4M
42	AX	ANALOG 5	POT	A03	AN5M	A04	AN5M	A04	AN5M
43	AY	ANALOG 6	POT	A15	AN6M	A16	AN6M	A16	AN6M
44	AZ	ANALOG 7	POT			A03	AN7M	A03	AN7M
45	BA	ANALOG 8	POT			A15	AN8M	A15	AN8M
46	BB	ANALOG 9	POT			A02	AN9M	A02	AN9M
47	BC	ANALOG 10	POT			A23	AN10M	A23	**LSO3**
48	BD	ANALOG 11	POT			A11	**TACHLINK**	A11	**LSO6**
49	BE	ANALOG 12	POT						
50	BF	ANALOG 13	POT						
51	BH	ANALOG 14	POT						
52	BJ	ANALOG 15	POT						
53	BK	ANALOG 16	POT						
54	BL	ANALOG 17	POT						
55	BM	ANALOG 18	POT						
56	BN	ANALOG 19	POT						
57	BP	CAN 1+ (P)	Coms	A09	CAN 1+	A06	CAN 1+	A06	CAN 1+
58	BR	KEYSWITCH	Pow er	A02	KEYSW	A13	ECUP	A13	ECUP
59	BS	XDRP A	Pow er	A18	XDRP	A18	XDRP	A18	XDRP
60	BT	XDRP B	Pow er						

Module			Type	GCM-0S12-024		ECM-0S12-024			
Simulator				ALL		0502/0802		0503/0801/ 0803/0804	
	Pin	Label	Type	Pin	Name	Pin	Name	Pin	Name
60	BT	XDRP B	Pow er						
61	BU	CAN 2+ (X)	Coms	A07	CAN2+				
62	BV	CAN 2- (X)	Coms	A06	CAN2-				
63	BW	CAN 1- (P)	Coms	A08	CAN 1-	A19	CAN 1-	A19	CAN 1-
64	BX	XDRG	Ground	A01	XDRG	A01	XDRG	A01	XDRG
65	BY	POW SUP+	Pow er	A13	BATT				
66	BZ	BANANA 12	Banana						
67	CA	BANANA 13	Banana						
68	CB	BANANA 14	Banana						
69	CC	BANANA 15	Banana						
70	CD	RS485+	Coms						
71	CE	RS485-	Coms						
72	CF	CRANK+	Banana			A09	CNK+	A09	CNK+
73	CH	BANANA 5	Banana						
74	CJ	CAM	Banana						
75	CK	DG CRANK	Banana						
76	CL	CRANK-	Banana			A10	CNK-	A10	CNK-
77	CM	DG1	Sw itch	A11	DG1M				
78	CN	DG2	Sw itch	A10	DG2M				
79	CP	DG3	Sw itch	A20	DG3M				
80	CR	DG4	Sw itch	A19	DG4M				
81	CS	INJ10	LED						
82	CT	INJ9	LED						
83	CU	LSO4	LED	A22	LSO4				
84	CV	CAN 3+ (V)	Coms						
85	CW	CAN 3- (V)	Coms						
86	CX	BANANA 11	Banana						
87	CY	H1-	LED			A22	H+	**A22**	**LSO5**
88	CZ	H1+	LED			A24	H-	**A24**	**LSO4**
89	DA	INJ12	LED						
90	DB	INJ11	LED						
91	DC	DG5	Sw itch						
92	DD	DG6	Sw itch						
93	DE	DG7	Sw itch						
94	DF	BANANA 8	Banana						
95	DH	BANANA 6	Banana						
96	DJ	ANALOG 23	POT						
97	DK	ANALOG 24	POT						
98	DL	ANALOG 27	POT						
99	DM	ANALOG 28	POT						
100	DN	ANALOG 29	POT						
101	DP	ANALOG 30	POT						
102	DR	ANALOG 26	POT						
103	DS	ANALOG 25	POT						
104	DT	H2-	LED						
105	DU	H2+	LED						
106	DV	H3-	LED						
107	DW	H3+	LED						
108	DX	EST10	LED						
109	DY	EST9	LED						
110	DZ	EST15	LED						
111	EA	EST11	LED						
112	EB	EST13	LED						
113	EC	EST14	LED						
114	ED	EST12	LED						
115	EE	EST16	LED						
116	EF	BANANA 7	Banana						
117	EH	KNOCK 0+	Banana						
118	EJ	KNOCK 0-	Banana						
119	EK	KNOCK 1+	Banana						
120	EL	KNOCK 1-	Banana						

48-Pin Modules 555 Processor

Module			Type	ECM-0555-048									
Simulator				0701		0707		0708		0704		0710	
	Pin	Label	Type	Pin	Name	Pin	Name	Pin	Name	Pin	Name	Pin	Name
1	A	GROUND	Ground	A16	DRVG	A16	DRVG	A16	DRVG	A16	DRVG	A16	DRVG
2	B	DRVG	Ground	A24	DRVG	A24	DRVG	A24	DRVG	A24	DRVG	A24	DRVG
3	C	ETC B	LED										
4	D	ETC A	LED										
5	E	EST6	LED										
6	F	INJ6	LED										
7	H	EST7	LED										
8	J	LSO8	LED										
9	K	BANANA 9	Banana										
10	L	INJ8	LED										
11	M	INJ2	LED	A2	FUEL2	A2	FUEL2	A2	FUEL2	A2	FUEL2	A2	FUEL2
12	N	LSO6	LED										
13	P	INJ7	LED										
14	R	INJ1	LED	A17	FUEL1	A17	FUEL1	A17	FUEL1	A17	FUEL1	A17	FUEL1
15	S	INJ5	LED										
16	T	EST4	LED	B16	EST4	**B16**	**AN20M**	**B16**	**AN20M**	B16	EST4	B16	EST4
17	U	EST8	LED										
18	V	EST RTN	Ground	B17	EST_RTN	B17	EST_RTN	B17	EST_RTN	B17	EST_RTN	B17	EST_RTN
19	W	EST5	LED										
20	X	EST1	LED	B23	EST 1	B23	EST 1	B23	EST 1	B23	EST 1	B23	EST 1
21	Y	EST3	LED	B15	EST3	**B15**	**AN17M**	**B15**	**AN17M**	B15	EST3	B15	EST3
22	Z	ANALOG 22	POT										
23	AA	DRVP	Power	A23	DRVP	A23	DRVP	A23	DRVP	A23	DRVP	A23	DRVP
24	AB	BANANA 10	Banana										
25	AC	EST2	LED	B24	EST2	B24	EST2	**B24**	**AN16M**	B24	EST2	B24	EST2
26	AD	STOP (DG8)	Switch	A15	STOP	A15	STOP	A15	STOP	A15	STOP	A15	STOP
27	AE	LSO5	LED	A03	SPARE	A03	SPARE	A03	SPARE	A03	SPARE	A03	SPARE
28	AF	LSO3	LED	A19	FUELP	A19	FUELP	A19	FUELP	A19	FUELP	A19	FUELP
29	AH	MPRD	Power	A22	MPRD	A22	MPRD	A22	MPRD	A22	MPRD	A22	MPRD
30	AJ	TACH	LED	A10	TACH	A10	TACH	A10	TACH	A10	TACH	A10	TACH
31	AK	INJ4	LED	A18	FUEL4	A18	FUEL4	A18	FUEL4	A18	FUEL4	A18	FUEL4
32	AL	LSO7	LED										
33	AM	INJ3	LED	A01	FUEL3	A01	FUEL3	A01	FUEL3	A01	FUEL3	A01	FUEL3
34	AN	LSO1	LED	A20	LAIC	A20	LAIC	A20	LAIC	A20	LAIC	A20	LAIC
35	AP	LSO2	LED	A09	HORN	A09	HORN	A09	HORN	A09	HORN	A09	HORN
36	AR	ANALOG 20	POT										
37	AS	ANALOG 21	POT										
38	AT	ANALOG 1	POT	B03	AN1M	B03	AN1M	B03	AN1M	B03	AN1M	B03	AN1M
39	AU	ANALOG 2	POT	B11	AN2M	B11	AN2M	B11	AN2M	B11	AN2M	B11	AN2M
40	AV	ANALOG 3	POT	B12	AN3M	B12	AN3M	B12	AN3M	B12	AN3M	B12	AN3M
41	AW	ANALOG 4	POT	B20	AN4M	B20	AN4M	B20	AN4M	B20	AN4M	B20	AN4M
42	AX	ANALOG 5	POT	B08	AN5M	B08	AN5M	B08	AN5M	B08	AN5M	B08	AN5M
43	AY	ANALOG 6	POT										
44	AZ	ANALOG 7	POT										
45	BA	ANALOG 8	POT										
46	BB	ANALOG 9	POT	B02	AN9M	B02	AN9M	B02	AN9M	B02	AN9M	B02	AN9M
47	BC	ANALOG 10	POT	B14	AN10M	B14	AN10M	B14	AN10M	B14	AN10M	B14	AN10M
48	BD	ANALOG 11	POT	B13	AN11M	B13	AN11M	B13	AN11M	B13	AN11M	B13	AN11M
49	BE	ANALOG 12	POT										
50	BF	ANALOG 13	POT										
51	BH	ANALOG 14	POT	B04	AN14M	B04	AN14M	B04	AN14M	B04	AN14M	B04	AN14M
52	BJ	ANALOG 15	POT	B19	AN15M	B19	AN15M	B19	AN15M	B19	AN15M	B19	AN15M
53	BK	ANALOG 16	POT										
54	BL	ANALOG 17	POT										
55	BM	ANALOG 18	POT	B07	AN18M	B07	AN18M	B07	AN18M	B07	AN18M	B07	AN18M
56	BN	ANALOG 19	POT	B22	AN19M	B22	AN19M	B22	AN19M	B22	AN19M	B22	AN19M
57	BP	CAN 1+ (P)	Coms	A04	CAN 1+	A04	CAN 1+	A04	CAN 1+	A04	CAN 1+	A04	CAN 1+

Module			Type	ECM-0555-048									
Simulator				0701		0707		0708		0704		0710	
	Pin	Label	Type	Pin	Name	Pin	Name	Pin	Name	Pin	Name	Pin	Name
58	BR	KEY SWITCH	Power	B18	ECUP	B18	ECUP	B18	ECUP	B18	ECUP	B18	ECUP
59	BS	XDRP A	Power	B21	XDRP	B21	XDRP	B21	XDRP	B21	XDRP	B21	XDRP
60	BT	XDRP B	Power										
61	BU	CAN 2+ (X)	Coms										
62	BV	CAN 2- (X)	Coms										
63	BW	CAN 1- (P)	Coms	A11	CAN 1-	A11	CAN 1-	A11	CAN 1-	A11	CAN 1-	A11	CAN 1-
64	BX	XDRG	Ground	B01	XDRG	B01	XDRG	B01	XDRG	B01	XDRG	B01	XDRG
65	BY	POW SUP+	Power										
66	BZ	BANANA 12	Banana										
67	CA	BANANA 13	Banana										
68	CB	BANANA 14	Banana										
69	CC	BANANA 15	Banana										
70	CD	RS485+	Coms	A12	SCL+	A12	SCL+	A12	SCL+	A12	SCL+	A12	SCL+
71	CE	RS485-	Coms	A05	SCL-	A05	SCL-	A05	SCL-	A05	SCL-	A05	SCL-
72	CF	CRANK+	Banana	B05	CNK+	B05	CNK+	B05	CNK+	B05	CNK+	B05	CNK+
73	CH	BANANA 5	Banana										
74	CJ	CAM	Banana	B10	CAM_DG	B10	CAM_DG	B10	CAM_DG	B10	CAM_DG	B10	CAM_DG
75	CK	DG CRANK	Banana										
76	CL	CRANK-	Banana	B06	CNK-	B06	CNK-	B06	CNK-	B06	CNK-	B06	CNK-
77	CM	DG1	Switch	A21	DG1M	A21	DG1M	A21	DG1M	A21	DG1M	A21	DG1M
78	CN	DG2	Switch	A08	DG2M	A08	DG2M	A08	DG2M	A08	DG2M	A08	DG2M
79	CP	DG3	Switch										
80	CR	DG4	Switch	B09	DG4M	B09	DG4M	B09	DG4M	B09	DG4M	B09	DG4M
81	CS	INJ10	LED										
82	CT	INJ9	LED										
83	CU	LSO4	LED										
84	CV	CAN 3+ (V)	Coms										
85	CW	CAN 3- (V)	Coms										
86	CX	BANANA 11	Banana										
87	CY	H1-	LED										
88	CZ	H1+	LED										
89	DA	INJ12	LED										
90	DB	INJ11	LED										
91	DC	DG5	Switch										
92	DD	DG6	Switch										
93	DE	DG7	Switch										
94	DF	BANANA 8	Banana										
95	DH	BANANA 6	Banana										
96	DJ	ANALOG 23	POT										
97	DK	ANALOG 24	POT										
98	DL	ANALOG 27	POT										
99	DM	ANALOG 28	POT										
100	DN	ANALOG 29	POT										
101	DP	ANALOG 30	POT										
102	DR	ANALOG 26	POT										
103	DS	ANALOG 25	POT										
104	DT	H2-	LED										
105	DU	H2+	LED										
106	DV	H3-	LED										
107	DW	H3+	LED										
108	DX	EST10	LED										
109	DY	EST9	LED										
110	DZ	EST15	LED										
111	EA	EST11	LED										
112	EB	EST13	LED										
113	EC	EST14	LED										
114	ED	EST12	LED										
115	EE	EST16	LED										
116	EF	BANANA 7	Banana										
117	EH	KNOCK 0+	Banana	A13	EK0P	A13	EK0P	A13	EK0P	**A13**	**AN12M**	A13	EK0P
118	EJ	KNOCK 0-	Banana	A06	EK0N	A06	EK0N	A06	EK0N	**A06**	**AN13M**	A06	EK0N
119	EK	KNOCK 1+	Banana	**A14**	**DG3M**	A14	EK1P	A14	EK1P	**A14**	**DG3M**	A14	EK1P
120	EL	KNOCK 1-	Banana	**A07**	**LSO1**	A07	EK1N	A07	EK1N	**A07**	**N/C**	A07	EK1N

48-Pin Modules—ECM/GCM 0563

Module			Type	ECM-0563-048				GCM/HCM-0563-048									
Simulator				0701		0704/0705/0806		GCM-0801		GCM-0802		HCM-0801		HCM-0802		HCM-0803	
	Pin	Label	Type	Pin	Name	Pin	Name	Pin	Name	Pin	Name	Pin	Name	Pin	Name	Pin	Name
1	A	GROUND	Ground	A16	DRVG	A16	DRVG	A16	DRVG	A16	DRVG	A16	DRVG	A16	DRVG	A16	DRVG
2	B	DRVG	Ground														
3	C	ETC B	LED														
4	D	ETC A	LED														
5	E	EST6	LED	A21	EST6	A21	EST6										
6	F	INJ6	LED														
7	H	EST7	LED	A12	EST7	A12	EST7										
8	J	LSO8	LED	A11	LSO8	A11	LSO8										
9	K	BANANA 9	Banana	B17	DRVG	B17	DRVG										
10	L	INJ8	LED														
11	M	INJ2	LED	A08	FUEL2	A08	FUEL2	A18	**HSO2**	A18	**HSO2**	A18	**LSO9**	A18	**LSO9**	A18	**LSO9**
12	N	LSO6	LED	A14	LSO6	A14	LSO6	A05	STOP	A05	LSO6	A05	LSO6_CS6	A05	LSO6	A05	LSO6_CS6
13	P	INJ7	LED														
14	R	INJ1	LED	A05	FUEL1	A05	FUEL1	A04	**HSO1**	A04	**HSO1**	A04	**LSO8**	A04	**LSO8**	A04	**LSO8**
15	S	INJ5	LED														
16	T	EST4	LED	A06	EST4	A06	EST4										
17	U	EST8	LED	A15	EST8	A15	EST8										
18	V	EST RTN	Ground														
19	W	EST5	LED	A19	EST5	A19	EST5										
20	X	EST1	LED	A09	EST1	A09	EST1										
21	Y	EST3	LED	A03	EST3	A03	EST3										
22	Z	ANALOG 22	POT														
23	AA	DRVP	Power	A23	DRVP	A23	DRVP	A20	DRVP-1	A20	DRVP-1	A20	DRVP-1	A20	DRVP-1	A20	DRVP-1
24	AB	BANANA 10	Banana														
25	AC	EST2	LED	A10	EST2	A10	EST2										
26	AD	STOP (DG8)	Switch					B23	STOP	B23	STOP	B23	STOP	B23	STOP	B23	STOP
27	AE	LSO5	LED	A13	LSO5	A13	LSO5	A14	LSO5	A14	LSO5	A14	LSO5_CS5	A14	LSO5	A14	LSO5_CS5
28	AF	LSO3	LED					A07	LSO3	A07	LSO3	A07	LSO3	A07	LSO3	A07	LSO3
29	AH	MPRD	Power	A22	MPRD	A22	MPRD	A22	MPRD	A22	MPRD	A22	MPRD	A22	MPRD	A22	MPRD
30	AJ	TACH	LED	A20	TACH	A20	TACH										
31	AK	INJ4	LED	A07	FUEL4	A07	FUEL4										
32	AL	LSO7	LED					A23	LSO7	A23	LSO7	A23	LSO7	A23	LSO7	A23	LSO7
33	AM	INJ3	LED	A04	FUEL3	A04	FUEL3	A24	**DRVG**	A24	**DRVG**	A24	**LSO11**	A24	**LSO11**	A24	**LSO11**
34	AN	LSO1	LED					A02	LSO1	A02	LSO1_CS1	A02	LSO1	A02	LSO1	A02	LSO1
35	AP	LSO2	LED					A13	LSO2	A13	LSO2_CS2	A13	LSO2_CS2	A13	LSO2_CS2	A13	LSO2_CS2
36	AR	ANALOG 20	POT														
37	AS	ANALOG 21	POT														
38	AT	ANALOG 1	POT	B18	AN1M	B18	AN1M	B02	AN1M	B02	AN1M	B02	AN1M	B02	AN1M	B02	AN1M
39	AU	ANALOG 2	POT	B23	AN2M	B23	AN2M	B03	AN2M	B03	AN2M	B03	AN2M	B03	AN2M	B03	AN2M
40	AV	ANALOG 3	POT	B04	AN3M	B04	AN3M	B10	AN3M	B10	AN3M	B10	AN3M	B10	AN3M	B10	AN3M
41	AW	ANALOG 4	POT	B07	AN4M	B07	AN4M	B11	AN4M	B11	AN4M	B11	AN4M	B11	AN4M	B11	AN4M
42	AX	ANALOG 5	POT	B16	AN5M	B16	AN5M	A10	AN5M	A10	AN5M	A10	AN5M	A10	AN5M	A10	AN5M
43	AY	ANALOG 6	POT	B02	AN6M	B02	AN6M	A11	AN6M	A11	AN6M	A11	AN6M	A11	AN6M	A11	AN6M
44	AZ	ANALOG 7	POT	B03	AN7M	B03	AN7M	A09	AN7M	A09	AN7M	A09	AN7M	A09	AN7M	A09	AN7M
45	BA	ANALOG 8	POT	B12	AN8M	B12	AN8M	A12	AN8M	A12	AN8M	A12	AN8M	A12	AN8M	A12	AN8M
46	BB	ANALOG 9	POT	B15	AN9M	B15	AN9M	B09	AN9M	B09	AN9M	B09	AN9M	B09	AN9M	B09	AN9M
47	BC	ANALOG 10	POT	B14	AN10M	B14	AN10M	B12	AN10M	B12	AN10M	B12	AN10M	B12	AN10M	B12	AN10M
48	BD	ANALOG 11	POT	B13	HEGO1_AN11	B13	HEGO1_AN11	B18	AN11M	B18	AN11M	B18	AN11M	B18	AN11M	B18	AN11M
49	BE	ANALOG 12	POT	B19	HEGO2_AN12	B19	HEGO2_AN12	B19	AN12M	B19	AN12M	B19	AN12M	B19	AN12M	B19	AN12M
50	BF	ANALOG 13	POT	B09	HEGO3_AN13	B09	HEGO3_AN13	A15	AN13M	A15	AN13M	A15	AN13M	A15	AN13M	A15	AN13M
51	BH	ANALOG 14	POT					A06	AN14M	A06	AN14M	A06	AN14M	A06	AN14M	A06	AN14M
52	BJ	ANALOG 15	POT					A03	AN15M	A03	AN15M	A03	AN15M	A03	AN15M	A03	AN15M
53	BK	ANALOG 16	POT					A19	AN16M	A19	AN16M	A19	AN16M	A19	AN16M	A19	AN16M
54	BL	ANALOG 17	POT														
55	BM	ANALOG 18	POT														
56	BN	ANALOG 19	POT														
57	BP	CAN 1+ (P)	Coms	B20	CAN 1+	B20	CAN 1+	B20	CAN1+	B20	CAN1+	B20	CAN1+	B20	CAN1+	B20	CAN1+

Module			Type	ECM-0563-048				GCM/HCM-0563-048									
Simulator				0701		0704/0705/0806		GCM-0801		GCM-0802		HCM-0801		HCM-0802		HCM-0803	
	Pin	Label	Type	Pin	Name	Pin	Name	Pin	Name	Pin	Name	Pin	Name	Pin	Name	Pin	Name
58	BR	KEY SWITCH	Power	B08	KEY_SW	B08	KEY_SW	B08	KEY_SW	B08	KEY_SW	B08	KEY_SW	B08	KEY_SW	B08	KEY_SW
59	BS	XDRP A	Power	B24	XDRP	B24	XDRP	B24	XDRP	B24	XDRP	B24	XDRP	B24	XDRP	B24	XDRP
60	BT	XDRP B	Power														
61	BU	CAN 2+ (X)	Coms					B07	CAN2+	B07	CAN2+	B07	CAN2+	B07	CAN2+	B07	CAN2+
62	BV	CAN 2- (X)	Coms					B06	CAN2-	B06	CAN2-	B06	CAN2-	B06	CAN2-	B06	CAN2-
63	BW	CAN 1- (P)	Coms	B21	CAN 1-	B21	CAN 1-	B21	CAN1-	B21	CAN1-	B21	CAN1-	B21	CAN1-	B21	CAN1-
64	BX	XDRG	Ground	B01	XDRG	B01	XDRG	B01	XDRG	B01	XDRG	B01	XDRG	B01	XDRG	B01	XDRG
65	BY	POW SUP+	Power	B22	BATT	B22	BATT	B22	BATT	B22	BATT	B22	BATT	B22	BATT	B22	BATT
66	BZ	BANANA 12	Banana														
67	CA	BANANA 13	Banana														
68	CB	BANANA 14	Banana														
69	CC	BANANA 15	Banana														
70	CD	RS485+	Coms														
71	CE	RS485-	Coms														
72	CF	CRANK+	Banana	B05	CNK_VR_HALL+	B05	CNK_VR_HALL+	B05	DG1M	B05	VR1+DG1M	B05	VR1+DG1M	B05	VR1+DG1M	B05	VR1+DG1M
73	CH	BANANA 5	Banana					A21	DRVP-2	A21	DRVP-2	A21	DRVP-2	A21	DRVP-2	A21	DRVP-2
74	CJ	CAM	Banana	B10	VR_DG2+	B10	VR_DG2+	B16	DG2	B16	VR2+_DG2	B16	VR2+_DG2	B16	VR2+_DG2	B16	VR2+_DG2
75	CK	DG CRANK	Banana	B11	VR_DG2-	B11	VR_DG2-	B15	**AN18M**	B15	VR2-	B15	VR2-	B15	VR2-	B15	VR2-
76	CL	CRANK-	Banana	B06	CNK_VR_HALL-	B06	CNK_VR_HALL-	B04	**AN17M**	B04	VR1-	B04	VR1-	B04	VR1-	B04	VR1-
77	CM	DG1	Switch														
78	CN	DG2	Switch														
79	CP	DG3	Switch														
80	CR	DG4	Switch														
81	CS	INJ10	LED														
82	CT	INJ9	LED														
83	CU	LSO4	LED					A08	LSO4	A08	LSO4	A08	LSO4_CS4	A08	LSO4	A08	LSO4_CS4
84	CV	CAN 3+ (V)	Coms					B14	CAN3+	B14	CAN3+	B14	**DNS-**	B14	N/C	B14	N/C
85	CW	CAN 3- (V)	Coms					B13	CAN3-	B13	CAN3-	B13	**DNS+**	B13	N/C	B13	N/C
86	CX	BANANA 11	Banana														
87	CY	H1-	LED	A02	H2B-	A02	**LSO10**	A17	H1-_CS	A17	H1-	A17	N/C	A17	LSO12	A17	N/C
88	CZ	H1+	LED	A01	H2B+	A01	**LSO11**	A01	H1+_CS	A01	H1+	A01	**LSO10**	A01	**LSO10**	A01	**LSO10**
89	DA	INJ12	LED														
90	DB	INJ11	LED														
91	DC	DG5	Switch														
92	DD	DG6	Switch														
93	DE	DG7	Switch														
94	DF	BANANA 8	Banana														
95	DH	BANANA 6	Banana					B17	**DRVG**	B17	**DRVG**	B17	**DRVG**	B17	**DRVG**	B17	**DRVG**
96	DJ	ANALOG 23	POT														
97	DK	ANALOG 24	POT														
98	DL	ANALOG 27	POT														
99	DM	ANALOG 28	POT														
100	DN	ANALOG 29	POT														
101	DP	ANALOG 30	POT														
102	DR	ANALOG 26	POT														
103	DS	ANALOG 25	POT														
104	DT	H2-	LED	A24	**LSO9**	A24	**LSO9**										
105	DU	H2+	LED														
106	DV	H3-	LED	A18	H1A-	A18	H1A-										
107	DW	H3+	LED	A17	H1A+	A17	H1A+										
108	DX	EST10	LED														
109	DY	EST9	LED														
110	DZ	EST15	LED														
111	EA	EST11	LED														
112	EB	EST13	LED														
113	EC	EST14	LED														
114	ED	EST12	LED														
115	EE	EST16	LED														
116	EF	BANANA 7	Banana														
117	EH	KNOCK 0+	Banana														
118	EJ	KNOCK 0-	Banana														
119	EK	KNOCK 1+	Banana														
120	EL	KNOCK 1-	Banana														

70, 112, and 128-Pin Modules

Module			Type	ECM-0S12-70		ECM-555-80		ECM-5554-112		ECM-0565-128	
Simulator				ALL		ALL		ALL		ALL	
	Pin	Label	Type	Pin	Name	Pin	Name	Pin	Name	Pin	Name
1	A	GROUND	Ground	A68	VBATT-	C15	DRVG	C-G1	PWRGNDA	J2A16	DVRGA
2	B	DRVG	Ground	A70	VBATT-	C16	DRVG	C-G2	PWRGNDB	J1A24	XDRG_B
3	C	ETC B	LED			C02	ETC B	A-C4	LSO14	J2B20	LSO10
4	D	ETC A	LED			C04	ETC A	A-D1	LSO13	J2B18	LSO9
5	E	EST6	LED			C12	EST 6	A-B3	EST6	J2A11	EST6
6	F	INJ6	LED			C21	FI6D	A-G2	INJ6	J2A05	INJ06
7	H	EST7	LED			C13	EST 7	A-B2	EST7	J2A21	EST7
8	J	LSO8	LED	A56	LSO8	C10	HSOL4	A-E2	LSO8	J2B19	LSO8
9	K	BANANA 9	Banana			C24	DRVG	B-K4	O2D+	J1A01	SPD1
10	L	INJ8	LED			C03	AI2D(FI8D)	A-F4	INJ8	J2A04	INJ08
11	M	INJ2	LED	A50	INJ2	C11	FI2D	A-H2	INJ2	J2A03	INJ02
12	N	LSO6	LED	43	LSO6	C19	HSOL2	B-M1	LSO6	J2B15	LSO6
13	P	INJ7	LED			C05	AI1D(FI7D)	A-F3	INJ7	J2A02	INJ07
14	R	INJ1	LED	A49	INJ1	C06	FI1D	A-H1	INJ1	J2A01	INJ01
15	S	INJ5	LED	A60	**LSO9**	C23	FI5D	A-G1	INJ5	J2A08	INJ05
16	T	EST4	LED			C07	EST 4	A-A1	EST4	J2A20	EST4
17	U	EST8	LED			C14	EST 8	A-B1	EST8	J2A23	EST8
18	V	EST RTN	Ground			B01	EST_RTN	B-L4	GNDREF	J2A22	EST_RTN
19	W	EST5	LED			B09	EST 5	A-B4	EST5	J2A10	EST5
20	X	EST1	LED	A32	SPRK_IGBT1	B02	EST 1	A-A4	EST1	J2A12	EST1
21	Y	EST3	LED	A66	SPRK_IGBT3	B10	EST 3	A-A2	EST3	J2A14	EST3
22	Z	ANALOG 22	POT					C-E3	AN22	J1C04	AN22M
23	AA	DRVP	Pow er	A57	DRVP1	B18	DRVP	C-G3	DRIVEPWRA	J2A18	DRVP
24	AB	BANANA 10	Banana			B17	DRVP			J1A12	SPD2
25	AC	EST2	LED	A33	SPRK_IGBT2	C08	EST 2	A-A3	EST2	J2A13	EST2
26	AD	STOP (DG8)	Sw itch	A41	STOP	B23	STOP	B-H3	STOP	J1C14	EK4N/DG8
27	AE	LSO5	LED	A63	LSO5	C01	HSOL1	B-M4	LSO5	J2B12	LSO5
28	AF	LSO3	LED	A16	LSO3	B11	FUELP	A-F1	LSO3	J1A23	LSO3
29	AH	MPRD	Pow er	A8	MPRD	B04	MPRD	A-D3	MPRD	J1B18	MPRD
30	AJ	TACH	LED	A4	TACH_LINK	B12	TACH	A-C1	TACH LINK	J1A22	TACH
31	AK	INJ4	LED	A48	INJ4	B20	FI4D	A-G4	INJ4	J2A06	INJ04
32	AL	LSO7	LED	A2	LSO7	C09	HSOL3	B-M2	LSO7	J2B17	LSO7
33	AM	INJ3	LED	A65	INJ3	B22	FI3D	A-G3	INJ3	J2A07	INJ03
34	AN	LSO1	LED	A69	LSO1	B07	OILP	A-F2	LSO1	J1B19	LSO2_LSUH2
35	AP	LSO2	LED	A3	LSO2	B08	START	A-E1	LSO2	J1B20	LSO1_LSUH1
36	AR	ANALOG 20	POT					B-L3	AN20	J1C09	AN20M
37	AS	ANALOG 21	POT					B-B4	AN21	J1C02	AN21M
38	AT	ANALOG 1	POT	A22	AN1	A03	AN1M	B-E3	AN01	J1A14	AN1M
39	AU	ANALOG 2	POT	A20	AN2	A04	AN2M	B-F1	AN02	J1A18	AN2M
40	AV	ANALOG 3	POT	A21	AN3	A05	AN3M	B-F2	AN03	J1A08	AN3M
41	AW	ANALOG 4	POT	A53	AN4	A06	AN4M	C-C3	AN04	J1A29	AN4M
42	AX	ANALOG 5	POT	A54	AN5	A07	AN5M	C-A1	AN05	J1A30	AN5M
43	AY	ANALOG 6	POT	A39	AN6	A08	AN6M	C-A2	AN06	J1A06	AN6M
44	AZ	ANALOG 7	POT	A55	AN7	A09	AN7M	C-F2	AN07	J1A21	AN7M
45	BA	ANALOG 8	POT	A18	AN8	A10	AN8M	C-A4	AN08	J1A17	AN8M
46	BB	ANALOG 9	POT	A12	AN9	A14	AN9M	C-B1	AN09	J1A25	AN9M
47	BC	ANALOG 10	POT	A35	AN10	A15	AN10M	C-B2	AN10	J1A16	AN10M
48	BD	ANALOG 11	POT	A6	AN11	A16	AN11M	C-B3	AN11	J1A26	AN11M
49	BE	ANALOG 12	POT	A38	AN12	A17	AN12M	C-B4	AN12	J1A15	AN12M
50	BF	ANALOG 13	POT	A37	AN13	A25	AN13M	C-C1	AN13	J1A10	AN13M
51	BH	ANALOG 14	POT	A36	AN14	A26	AN14M	B-F3	AN14	J1A28	AN14M
52	BJ	ANALOG 15	POT	A40	AN15	A27	AN15M	C-A3	AN15	J1A05	AN15M
53	BK	ANALOG 16	POT	A7	AN16	A02	AN16M-O2BHI	B-A4	AN16	J1A27	AN16M
54	BL	ANALOG 17	POT	A44	AN17	A12	AN17M-O2BLO	C-E2	AN17	J1A07	AN17M

Module			Type	ECM-0S12-70		ECM-555-80		ECM-5554-112		ECM-0565-128	
Simulator				ALL		ALL		ALL		ALL	
	Pin	Label	Type	Pin	Name	Pin	Name	Pin	Name	Pin	Name
52	BJ	ANALOG 15	POT	A40	AN15	A27	AN15M	C-A3	AN15	J1A05	AN15M
53	BK	ANALOG 16	POT	A7	AN16	A02	AN16M-O2BHI	B-A4	AN16	J1A27	AN16M
54	BL	ANALOG 17	POT	A44	AN17	A12	AN17M-O2BLO	C-E2	AN17	J1A07	AN17M
55	BM	ANALOG 18	POT	A19	AN18	A24	AN18M-O2ALO	B-C4	AN18	J1C10	AN18M
56	BN	ANALOG 19	POT			A13	AN19M-O2AHI	B-D4	AN19	J1C11	AN19M
57	BP	CAN 1+ (P)	Coms	A23	CAN1H	A11	CAN 1+	B-A1	CAN1H	J1B09	CAN1+
58	BR	KEYSWITCH	Pow er	A52	KEYSW	A01	ECUP	B-G4	KEY	J1B02	KEY_SW
59	BS	XDRP A	Pow er	A34	XDRP1	A23	XDRP	C-D4	XDRP1	J1B11	XDRP_A
60	BT	XDRP B	Pow er	A51	XDRP2	B24	XDRP_B	C-E4	XDRP2	J1A11	XDRP_B
61	BU	CAN 2+ (X)	Coms	A26	CAN2H	A31	CAN 2+	B-C1	CAN2H	J1C17	CAN2+
62	BV	CAN 2- (X)	Coms	A25	CAN2L	A32	CAN 2-	B-C2	CAN2L	J1C18	CAN2-
63	BW	CAN 1- (P)	Coms	A24	CAN1L	A21	CAN 1-	B-A2	CAN1L	J1B10	CAN1-
64	BX	XDRG	Ground	A42	XDRG1	A22	XDRG	B-D3	XDRGND1	J1B24	XDRG_A
65	BY	POW SUP+	Pow er	A67	VBATT+			C-F4	BATT	J1B08	BATT
66	BZ	BANANA 12	Banana					B-L1	O2A-	J1B12	LSU2_UN
67	CA	BANANA 13	Banana					B-L2	O2B-	J1B13	LSU2_VM
68	CB	BANANA 14	Banana					B-J3	O2C-	J1B16	LSU2_IA
69	CC	BANANA 15	Banana					B-J4	O2D-	J1B17	LSU2_IP
70	CD	RS485+	Coms	A28	SCL+	A28	SCL+	A-C3	RS485A	J1B22	SCI+
71	CE	RS485-	Coms	A29	SCL-	A18	SCL-	A-C2	RS485B	J1B23	SCI-
72	CF	CRANK+	Banana	A14	CNKVR+	B13	CNK+	B-J2	CNKVR+	J1A13	CRANK
73	CH	BANANA 5	Banana	A58	**DRVP2**			C-H3	DRIVEPWRB	J1B21	LSU1_UN
74	CJ	CAM	Banana	A30	CAMDG	B06	CAM_DG	B-G1	CAMDG	J1A20	CAM
75	CK	DG CRANK	Banana	A5	CNKDG	B14	CNK_DG	B-H4	CNKDG	J1A31	CAM_VR-
76	CL	CRANK-	Banana	A13	CNKVR-	B05	CNK-	B-J1	CNKVR-	J1A02	CNK_VR-
77	CM	DG1	Switch	A11	SWG1	B15	DG1M	C-E1	AN31	J1B07	DG1
78	CN	DG2	Switch	A9	SWG2	B16	DG2M	C-D2	AN32	J1C16	DG2
79	CP	DG3	Switch	A31	SWG3			C-D3	AN33	J1A19	DG3
80	CR	DG4	Switch	A62	SWG4	B03	DG4M			J1A09	DG4
81	CS	INJ10	LED			B19	AI4D	A-E4	LSO10	J2B02	INJ10
82	CT	INJ9	LED			B21	AI3D	A-E3	LSO9	J2B03	INJ09
83	CU	LSO4	LED	A61	LSO4			B-M3	LSO4	J2B21	LSO4
84	CV	CAN 3+ (V)	Coms					B-B2	CAN3H	J1A03	ISO_9141_K
85	CW	CAN 3- (V)	Coms					B-B1	CAN3L	J1A04	ISO_9141_L
86	CX	BANANA 11	Banana					A-D4	XDRGND2	J1A32	SPD-
87	CY	H1-	LED			C18	ESC_B	C-H4	HBRIDGE1B	J2A17	H1-
88	CZ	H1+	LED			C17	ESC_A	C-G4	HBRIDGE1A	J2A09	H1+
89	DA	INJ12	LED			C20	AI6D	A-H3	LSO12	J2B01	INJ12
90	DB	INJ11	LED			C22	AI5D	A-H4	LSO11	J2B04	INJ11
91	DC	DG5	Switch	A15	**DFRQ**			B-G2	SPEED1_DG	J1C23	EK3P/DG5
92	DD	DG6	Switch					B-H2	SPEED2_DG	J1C24	EK3N/DG6
93	DE	DG7	Switch					B-H1	SPEED3_DG	J1C13	EK4P/DG7
94	DF	BANANA 8	Banana					B-K3	O2C+	J1B01	LSU1_VM
95	DH	BANANA 6	Banana					B-K1	O2A+	J1B14	LSU1_IP
96	DJ	ANALOG 23	POT					C-C4	AN23	J1C05	AN23M
97	DK	ANALOG 24	POT					C-D1	AN24	J1C01	AN24M
98	DL	ANALOG 27	POT					B-G3	AN27	J1C15	AN27M
99	DM	ANALOG 28	POT					B-E4	AN28	J1C07	AN28M
100	DN	ANALOG 29	POT					C-C2	AN29	J1C06	AN29M
101	DP	ANALOG 30	POT					C-F3	AN30	J1C08	AN30M
102	DR	ANALOG 26	POT					B-F4	AN26	J1C12	AN26M
103	DS	ANALOG 25	POT					C-F1	AN25	J1C03	AN25M
104	DT	H2-	LED					C-H1	HBRIDGE2B	J2B23	H2-
105	DU	H2+	LED					C-H2	HBRIDGE2A	J2B22	H2+
106	DV	H3-	LED							J2B24	H3-
107	DW	H3+	LED							J2B16	H3+
108	DX	EST10	LED							J2B13	EST10
109	DY	EST9	LED							J2B14	EST9
110	DZ	EST15	LED					B-C3	CANSHIELD3	J2B07	EST15/LAMP3
111	EA	EST11	LED							J2B11	EST11
112	EB	EST13	LED					B-A3	CANSHIELD1	J2B06	EST13/LAMP1
113	EC	EST14	LED					B-B3	CANSHIELD2	J2B05	EST14/LAMP2
114	ED	EST12	LED							J2B10	EST12
115	EE	EST16	LED					A-D2	FUELPR	J2B08	EST16/LAMP4
116	EF	BANANA 7	Banana					B-K2	O2B+	J1B15	LSU1_IA
117	EH	KNOCK 0+	Banana			A29	EK0P	B-D1	KNK1+	J1C19	EK1P
118	EJ	KNOCK 0-	Banana			A19	EK0N	B-D2	KNK1-	J1C20	EK1N
119	EK	KNOCK 1+	Banana			A30	EK1P	B-E2	KNK2+	J1C21	EK2P
120	EL	KNOCK 1-	Banana			A20	EK1N	B-E1	KNK2-	J1C22	EK2N

SECM70, SECM112, and PCM112-14 Modules

The table shows many population variations for some pins. Consult your specific product manual for the population variant that applies.

Simulator				SECM112 (ECM-OH)		SECM70 (ECM-MI)		PCM112-14	
	Pin	Label	Type	Pin	Name	Pin	Name	Pin	Name
1	A	GROUND	Ground	B-L4	PWRGND1	69	PWRGND1	B-L4	PWRGND1
2	B	DRVG	Ground	B-M4	PWRGND2	70	PWRGND2	B-M4	PWRGND2
3	C	ETC B	LED					C-G4	LSO14 (HEGO2 HEATER)
4	D	ETC A	LED	A-B3	LSO13			C-F3	LSO13 (HEGO1 HEATER)
5	E	EST6	LED	B-A2	SPK6	19	EST6		
6	F	INJ6	LED	C-G1	INJ6/H3+	14	INJ6/EST8	B-J4	INJ6
7	H	EST7	LED	B-J1	SPK7/AN32				
8	J	LSO8	LED	A-A3	LSO8/INJ7	20	LSO8	A-B3	LSO8
9	K	BANANA 9	Banana	B-H4	CAMVR+			C-E1	XDRPWR3
10	L	INJ8	LED					A-D4	INJ8
11	M	INJ2	LED	C-H3	INJ2	35	INJ2	C-G2	INJ2
12	N	LSO6	LED	C-F3	LSO6	10	LSO6	A-B1	LSO6
13	P	INJ7	LED					A-E1	INJ7
14	R	INJ1	LED	C-H4	INJ1	34	INJ1/H2	C-G3	INJ1
15	S	INJ5	LED	C-G4	INJ5/H3-	13	INJ5/EST7	B-H1	INJ5
16	T	EST4	LED	B-A1	SPK4	21	EST4	B-J1	SPARKD
17	U	EST8	LED	B-K1	SPK8/LSO				
18	V	EST RTN	Ground	A-H2	XDRG2	2	EST_RTN	B-J2	PWRGND3
19	W	EST5	LED	B-B4	SPK5	18	EST5		
20	X	EST1	LED	B-A3	SPK1	6	EST1	B-A3	SPARKA
21	Y	EST3	LED	B-A4	SPK3	11	EST3	B-B4	SPARKC
22	Z	ANALOG 22	POT	A-E3	AN22			C-D3	AN22 (AN26)
23	AA	DRVP	Power	B-L1	DRVP1	67	DRVP	B-L1	DRVPWRA
24	AB	BANANA 10	Banana	B-H3	CAMVR-				
25	AC	EST2	LED	B-B1	SPK2	8	EST2	B-A4	SPARKB
26	AD	STOP (DG8)	Switch	A-G3	STOP	26	SWG4	C-A3	ESTOP
27	AE	LSO5	LED	C-F1	LSO5	9	LSO5	A-B2	LSO5
28	AF	LSO3	LED	C-F4	LSO3	4	LSO3	A-A4	LSO3
29	AH	MPRD	Power	B-K2	MPRD	55	MPRD	B-K2	LSO1 (MPRD)
30	AJ	TACH	LED	A-A4	TACH			B-A2	TACH LINK
31	AK	INJ4	LED	C-H1	INJ4	12	INJ4	C-F2	INJ4
32	AL	LSO7	LED	A-A1	LSO7	15	LSO7	A-A1	LSO7
33	AM	INJ3	LED	C-H2	INJ3	1	INJ3	C-F4	INJ3
34	AN	LSO1	LED	C-G3	LSO1	7	LSO1		
35	AP	LSO2	LED	C-G2	LSO2	3	LSO2	B-K4	LSO2
36	AR	ANALOG 20	POT	A-C4	AN20			A-C4	AN20
37	AS	ANALOG 21	POT	A-G4	AN21			A-G4	AN21
38	AT	ANALOG 1	POT	C-C3	AN01	28	AN01	C-A1	AN01
39	AU	ANALOG 2	POT	C-C2	AN02	24	AN02	C-A2	AN02
40	AV	ANALOG 3	POT	A-F3	AN03	22	AN03	C-D4	AN03
41	AW	ANALOG 4	POT	A-E4	AN04	42	AN04	C-A4	AN04
42	AX	ANALOG 5	POT	C-A1	AN05	43	AN05	C-B1	AN05
43	AY	ANALOG 6	POT	C-A2	AN06	47	AN06	C-B2	AN06
44	AZ	ANALOG 7	POT	C-D4	AN07	44	AN07	C-C3	AN07
45	BA	ANALOG 8	POT	C-A4	AN08	45	AN08	C-C2	AN08
46	BB	ANALOG 9	POT	C-B1	AN09	39	AN09	A-F3	AN09
47	BC	ANALOG 10	POT	C-B2	AN10	40	AN10	A-E4	AN10
48	BD	ANALOG 11	POT	C-B3	AN11	41	AN11	C-C4	AN11
49	BE	ANALOG 12	POT	C-B4	AN12	59	AN12	C-D1	AN12
50	BF	ANALOG 13	POT	C-C1	AN13	60	AN13	A-F2	AN13
51	BH	ANALOG 14	POT	C-D3	AN14	61	AN14	C-C1	AN14
52	BJ	ANALOG 15	POT	C-A3	AN15			C-H1	AN15

Simulator				SECM112 (ECM-OH)		SECM70 (ECM-MI)		PCM112-14	
	Pin	Label	Type	Pin	Name	Pin	Name	Pin	Name
53	BK	ANALOG 16	POT	A-E2	AN16/DG6			C-B4	AN16
54	BL	ANALOG 17	POT	A-F4	AN17			C-F1	AN17
55	BM	ANALOG 18	POT	A-F1	AN18			A-E3	AN18
56	BN	ANALOG 19	POT	C-D2	AN19			C-D2	AN19
57	BP	CAN 1+ (P)	Coms	A-D1	CAN1H	36	CAN1H	A-D1	CAN1H
58	BR	KEYSWITCH	Power	A-H3	KEY	38	KEYSW	A-H3	WAKE1
59	BS	XDRP A	Power	C-E3	XDRP1-A	48	XDRP	C-E3	XDRPWR1
60	BT	XDRP B	Power	A-H1	XDRP2			A-H1	XDRPWR2
61	BU	CAN 2+ (X)	Coms	A-C1	CAN2H	37	CAN2H	A-C1	CAN2H
62	BV	CAN 2- (X)	Coms	A-C2	CAN2L	54	CAN2L	A-C2	CAN2L
63	BW	CAN 1- (P)	Coms	A-D2	CAN1L	53	CAN1L	A-D2	CAN1L
64	BX	XDRG	Ground	C-E4	XDRG1-A	32	XDRG	C-E4	XDRGND1
65	BY	POW SUP+	Power	A-H4	BATT	68	BATT	A-H4	BATT
66	BZ	BANANA 12	Banana	C-E1	XDRP1-B/AN33			A-G3	WAKE3
67	CA	BANANA 13	Banana	C-E2	XDRG1-B/SW3			A-F1	SWB1
68	CB	BANANA 14	Banana	A-C3	LIN				
69	CC	BANANA 15	Banana	B-J2	12VOUT				
70	CD	RS485+	Coms	A-G2	RS485A/SW1			A-G2	RS485A
71	CE	RS485-	Coms	A-G1	RS485B/SW2			A-G1	RS485B
72	CF	CRANK+	Banana	B-F4	CNKVR+	17	CNKVR+	B-F3	CNKVR+ (CNKVR-)
73	CH	BANANA 5	Banana	B-D2	EGO1	50	EGO1	A-C3	CNKOUT
74	CJ	CAM	Banana	B-B2	CAMDG	30	CAMDG	B-B2	CAMDG
75	CK	DG CRANK	Banana	B-B3	CNKDG	31	CNKDG	B-B3	CNKDG
76	CL	CRANK-	Banana	B-F3	CNKVR-	16	CNKVR-	B-F4	CNKVR- (CNKVR+)
77	CM	DG1	Switch	A-D3	DG3	25	SWG1	A-E2	SWG1
78	CN	DG2	Switch	B-J3	AN31/DG7	29	SWG2	C-H2	SWG2
79	CP	DG3	Switch			27	SWG3	B-H2	SWG3
80	CR	DG4	Switch					B-J3	SWG4
81	CS	INJ10	LED	A-A2	LSO10	58	LAMP1	A-A3	LSO10
82	CT	INJ9	LED	A-B1	LSO9/INJ8	23	LSO9	A-B4	LSO9
83	CU	LSO4	LED	C-F2	LSO4	5	LSO4	B-K3	LSO4
84	CV	CAN 3+ (V)	Coms	B-C3	CAN3H			B-C3	CAN3H
85	CW	CAN 3- (V)	Coms	B-C4	CAN3L			B-C4	CAN3L
86	CX	BANANA 11	Banana	B-M1	DRIVEPWRB			A-F4	WAKE2
87	CY	H1-	LED	B-M3	HBRIDGE1B			B-M3	HBRIDGE1B
88	CZ	H1+	LED	B-L3	HBRIDGE1A	51	H1	B-L3	HBRIDGE1A
89	DA	INJ12	LED	A-B4	LSO12	56	LAMP3		
90	DB	INJ11	LED	A-B2	LSO11	57	LAMP2		
91	DC	DG5	Switch			33	SPEED	A-D3	DGFREQ1
92	DD	DG6	Switch					B-H4	DGFREQ2
93	DE	DG7	Switch						
94	DF	BANANA 8	Banana	B-C1	EGO2RTN	65	EGO2RTN	C-H3	GAUGE3
95	DH	BANANA 6	Banana	B-C2	EGO1RTN	49	EGO1RTN	C-G1	GAUGE1
96	DJ	ANALOG 23	POT	C-C4	AN23			C-B3	AN23 (AN27)
97	DK	ANALOG 24	POT	C-D1	AN24			B-D2	HEGO1+
98	DL	ANALOG 27	POT	B-H1	AN27/DG5/LSO16			B-D1	HEGO2+
99	DM	ANALOG 28	POT	B-J4	AN28/LSO17				
100	DN	ANALOG 29	POT	A-E1	AN29/LSO18				
101	DP	ANALOG 30	POT	A-D4	AN30/LSO19				
102	DR	ANALOG 26	POT	B-H2	AN26/DG4				
103	DS	ANALOG 25	POT	A-F2	AN25				
104	DT	H2-	LED	B-M2	HBRIDGE2B			B-M2	HBRIDGE2B
105	DU	H2+	LED	B-L2	HBRIDGE2A	52	H3	B-L2	HBRIDGE2A
106	DV	H3-	LED	B-K3	LSO14			B-B1	PWM1

	Simulator			SECM112 (ECM-OH)		SECM70 (ECM-MI)		PCM112-14	
	Pin	Label	Type	Pin	Name	Pin	Name	Pin	Name
107	DW	H3+	LED	B-K4	LSO15			B-A1	PWM2
108	DX	EST10	LED	B-D4	LSU1_VM/AN37				
109	DY	EST9	LED	B-D3	LSU1_UN/AN34				
110	DZ	EST15	LED	B-E2	LSU2_IA/EGO4+				
111	EA	EST11	LED	B-E4	LSU1_IA/AN35				
112	EB	EST13	LED	B-F1	LSU2_UN/EGO3-				
113	EC	EST14	LED	B-F2	LSU2_VM/EGO4-				
114	ED	EST12	LED	B-E3	LSU1_IP/AN36				
115	EE	EST16	LED	B-E1	LSU2_IP/EGO3+				
116	EF	BANANA 7	Banana	B-D1	EGO2	50	EGO2	C-H4	GAUGE2
117	EH	KNOCK 0+	Banana	B-G4	KNK1+	64	KNK1+	B-G4	KNK1+
118	EJ	KNOCK 0-	Banana	B-G3	KNK1-	63	KNK1-	B-G3	KNK1-
119	EK	KNOCK 1+	Banana	B-G2	KNK2+	46	KNK2+	B-G2	KNK2+
120	EL	KNOCK 1-	Banana	B-G1	KNK2-	62	KNK2-	B-G1	KNK2-

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