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Genine Connector Pin List
10-4227E-A-CP01

Revision History

Revision	Date	Author	Comments
1.0	June 27, 2000	J Malm	Initial Release
2.0	November 10, 2000	J Malm	Updated for version B-A
3.0	May 22, 2001	J Malm	Updated for version C-A
3.1	July 11, 2001	P. Iden	Updated for revision C-B
3.2	May,23,2003	P.Iden	No changes on this document expect version change from C-B to D-A. The main changes are on the assembling procedure by applying thermal compound on the stepper chips and heatsink.
4.0	January 24, 2007	S.Cheung	No changes on this document expect version change from D-H to E-A. The main changes are on the Flash Memory (12-4219) on U22 is obsolete. New Flash memory (120-00138) is being introduced. A jumper wire is added on pin1 and pin2 of J16.

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0. INTRODUCTION

This document summarizes the connector pinouts for GENINE.

0. CONNECTOR SUMMARY

Desig-nator	Silkscreen	Schem. Page #	Type	Description
J1	ANALOG1	10	6pin MTA	4-20mA Connector #1 OPTOREFL1
J2	DIG_IN3	6	2X15 Shrouded	Digital In Connector #3 SENS[9..15]
J3	ANALOG0	10	6pin MTA	4-20mA Connector #0 OPTOREFL0
J4	DIG_IN2	5	2X10 Shrouded	Digital In Connector #2 SENS[4..8]
J5	DIG_IN4	7	2X17 Shrouded	Digital In Connector #4 SENS[16..23]
J6	ANALOG2	10	6pin MTA	4-20mA Connector #2 OPTOREFL2
J7	BDM	3	2X5 Shrouded	BDM Port
J8	-	3	1X2 Jumper	IRQ/7 Jumper
J9	-	3	1X2 Jumper	IRQ/6 Jumper
J10	DIG_IN1	5	2X7 Shrouded	Digital In Connector #1 (Plate Registration Board Connector) PREG[0..3] **Note: On Rev. B and C boards, Pin 14 is removed on the connector so that the plug can be keyed.**
J11	TEMP	9	2X3 AMP MinimateNLock	External Temperature Sensor Connector
J12	BMM	3	2X50 SMT	BMM Connector
J13	RS232 PORT	15	DB9 Female	RS232 Port
J14	HA-0	12	2X6 Shrouded	Home/Away Connector #0 **Note: On Rev. B and C boards, Pin 9 is removed on the connector so that the plug can be keyed.**
J15	BOOT	2	1X2 Jumper	Boot Jumper
J16	VREG	4	2X4 Jumper	Version Register Jumpers
J17	STPR-CTRL	13	2X10 Shrouded	5A Stepper Motor Interface
J18	SOL-DRV0	11	2X8 Shrouded	Solenoid Output Connector #0 ACT+[0..7]
J19	JTAG	4	1X5 Header	CPLD JTAG Connector
J20	HA-1	12	2X6 Shrouded	Home/Away Connector #1 **Note: On Rev. B and C boards, Pin 9 is removed on the connector so that the plug can be keyed.**
J21	SOL-DRV1	11	2X13 Shrouded	Solenoid Output Connector #0 ACT+[8..31]
J22	CAN-EXP	15	2X3 Shrouded	CAN Expansion Port
J23	LAMP-OUT	10	2X4 Molex Minifit Jr	Lamp Driver Connector
J24	SCON2	15	2X5 Molex Minifit Jr	Expansion Bus Connector #2

J25	STPR-DRIVE	14	2X4 AMP MinimateNLock	3A Stepper Motor Cable
J26	SCON1	15	2X8 Molex Minifit Jr	Expansion Bus Connector #1
J27	STPR-PWR	16	2X3 Molex Minifit Jr	5A Stepper Motor Power Connector

0. CONNECTOR PINOUTS

0.0 Configuration Jumpers

IRQ/7 and IRQ/6 Jumpers (J8, J9)

Pin #s		Function
J8 1-2	Installed	IRQ/7 pulled low
	Uninstalled	No effect on IRQ/7
J9 1-2	Installed	IRQ/6 pulled low
	Uninstalled	No effect on IRQ/6

Boot Jumper (J15)

Pin #s		Function
1-2	Installed	Enter debug boot routine on reset
	Uninstalled	Enter normal operation on reset

Version Register (VREG) Jumpers (J16)

Pin #s		Function
1-2	Installed	Version Register bit 0 = high
	Uninstalled	Version Register bit 0 = low
3-4	Installed	Version Register bit 1 = high
	Uninstalled	Version Register bit 1 = low
5-6	Installed	Version Register bit 2 = high
	Uninstalled	Version Register bit 2 = low
7-8	Installed	Version Register bit 3 = high
	Uninstalled	Version Register bit 3 = low

1.2 Debug/Programming

BDM Port Connector (2X5 Shrouded Header) (J7)

Pin #	Pin Name	I/O (relative to GENINE)	Function
1	DS/	Output	DS/
2	BERR/	Input	BERR/
3	GND		
4	DSCLK/BKPT/	Input	DSCLK/BKPT/
5	GND		
6	FREEZE	Output	FREEZE
7	RESET/	Output	Reset/ signal
8	DSI/IFETCH/	Output	DSI/IFETCH/
9	+5V	Output	+5V.I supply
10	DSO/IPIPE/	Output	DSO/IPIPE/

BMM Connector (2X50 SMT) (J12)

There are 100 pins on this connector, so to avoid wasting too much space, it's not included here. Please see "Related Documents" section for more information.

JTAG Connector (1X5 PCB Header) (J19)

The JTAG connector is used to program the CPLD.

Pin #	Pin Name	I/O (relative to GENINE)	Function
1	+5V	Output	+5V.I supply
2	Ground		Signal Ground
3	TAP.TMS	Input	TMS
4	TAP.TDI	Input	TDI
5	TAP.TCK	Input	TCK
6	TAP.TDO	Output	TDO (RD)

0.0 Digital Inputs

Plate Registration Board Connector (DIGITAL_IN1) (2X7 Shrouded Header) (J10)

Pin #	Pin Name	Signal	I/O (relative to GENINE)	Function
1	+24V		Output	+24V.I supply
2	+24V		Output	
3	EREG.PD+		Output	+5V.I to cable detect loopback

4	EREG.PD-		Input	Cable detect input
5	EREG.SEN0+	PREG0	Output	Connected to 100 Kohm resistor to +5V.I, and collector of phototransistor
6	EREG.SEN0-		Input	Connected to GND and emitter of phototransistor
7	EREG.SEN1+	PREG1	Output	
8	EREG.SEN1-		Input	
9	EREG.SEN2+	PREG2	Output	
10	EREG.SEN2-		Input	
11	EREG.SEN3+	PREG3	Output	
12	EREG.SEN3-		Input	
13	GND			
14	-	-	-	On Rev. B PCB's, Pin is removed on the connector so that the plug can be keyed.

Digital In Connector #2 (DIGITAL_IN2) (2X10 Shrouded Header) (J4)

SENS[7:4] are used as secondary home/away sensors.

Pin #	Pin Name	Signal	I/O (relative to GENINE)	Function
1	SENS4.LED+	SENS4	Output	Connected to +5V.I, and anode of LED
2	SENS4.C		Output	Connected to 100 Kohm resistor to +5V.I, and collector of phototransistor
3	SENS4.E		Input	Connected to GND and emitter of phototransistor
4	SENS4.LED-		Input	Connected to 220 ohm resistor to ground, and cathode of LED
5	SENS5.LED+	SENS5	Output	
6	SENS5.C		Output	
7	SENS5.E		Input	
8	SENS5.LED-		Input	
9	SENS6.LED+	SENS6	Output	
10	SENS6.C		Output	
11	SENS6.E		Input	
12	SENS6.LED-		Input	
13	SENS7.LED+	SENS7	Output	
14	SENS7.C		Output	
15	SENS7.E		Input	
16	SENS7.LED-		Input	
17	SENS8.LED+	SENS8	Output	
18	SENS8.C		Output	
19	SENS8.E		Input	
20	SENS8.LED-		Input	

Digital In Connector #3 (DIGITAL_IN3) (2X15 Shrouded Header) (J2)

Pin #	Pin Name	Signal	I/O (relative to GENINE)	Function
1	SENS9.LED+	SENS9	Output	Connected to +5V.I, and anode of LED
2	SENS9.C		Output	Connected to 100 Kohm resistor to +5V.I, and collector of phototransistor
3	SENS9.E		Input	Connected to GND and emitter of phototransistor
4	SENS9.LED-		Input	Connected to 220 ohm resistor to ground, and cathode of LED
5	SENS10.LED+	SENS10	Output	
6	SENS10.C		Output	
7	SENS10.E		Input	
8	SENS10.LED-		Input	
9	SENS11.LED+	SENS11	Output	
10	SENS11.C		Output	
11	SENS11.E		Input	
12	SENS11.LED-		Input	
13	SENS12.LED+	SENS12	Output	
14	SENS12.C		Output	
15	SENS12.E		Input	
16	SENS12.LED-		Input	
17	SENS13.LED+	SENS13	Output	
18	SENS13.C		Output	
19	SENS13.E		Input	
20	SENS13.LED-		Input	
21	SENS14.LED+	SENS14	Output	
22	SENS14.C		Output	
23	SENS14.E		Input	
24	SENS14.LED-		Input	
25	SENS15.LED+	SENS15	Output	
26	SENS15.C		Output	
27	SENS15.E		Input	
28	SENS15.LED-		Input	
29	GND			
30	GND			

Digital In Connector #4 (DIGITAL_IN4) (2X17 Shrouded Header) (J5)

Pin #	Pin Name	Signal	I/O (relative to GENINE)	Function
1	SENS16.LED+	SENS16	Output	Connected to +5V.I, and anode of LED
2	SENS16.C		Output	Connected to 100 Kohm resistor to +5V.I, and collector of phototransistor
3	SENS16.E		Input	Connected to GND and emitter of

				phototransistor
4	SENS16.LED-		Input	Connected to 220 ohm resistor to ground, and cathode of LED
5	SENS17.LED+	SENS17	Output	
6	SENS17.C		Output	
7	SENS17.E		Input	
8	SENS17.LED-		Input	
9	SENS18.LED+	SENS18	Output	
10	SENS18.C		Output	
11	SENS18.E		Input	
12	SENS18.LED-		Input	
13	SENS19.LED+	SENS19	Output	
14	SENS19.C		Output	
15	SENS19.E		Input	
16	SENS19.LED-		Input	
17	SENS20.LED+	SENS20	Output	
18	SENS20.C		Output	
19	SENS20.E		Input	
20	SENS20.LED-		Input	
21	SENS21.LED+	SENS21	Output	
22	SENS21.C		Output	
23	SENS21.E		Input	
24	SENS21.LED-		Input	
25	SENS22.LED+	SENS22	Output	
26	SENS22.C		Output	
27	SENS22.E		Input	
28	SENS22.LED-		Input	
29	SENS23.LED+	SENS23	Output	
30	SENS23.C		Output	
31	SENS23.E		Input	
32	SENS23.LED-		Input	
33	GND			
34	GND			

1.4 Temperature Sensor

Temperature Input Connector (TEMP) (2X3 AMP Mini Mate-N-Lock) (J11)

Pin #	Pin Name	Signal	I/O (relative to GENINE)	Function
1	+5VDC		Output	+5V.I power
2	GND			
3	TEMP+	TEMP.SENS	Input	Temperature sensor + input
4	TEMP-		Input	Temperature sensor – input
5	PD.TEMP+		Output	+5V.I to cable detect loopback
6	PD.TEMP-		Input	Cable detect input

0.0 Analog (4-20mA) Inputs

4-20mA Input Connector #0, #1, and #2 (ANALOG0, ANALOG1, ANALOG2) (1X6 MTA Header) (J3, J1, J6)

Be careful when interfacing with these connectors, as +24V is exposed!

Pin #	Pin Name	Signal	I/O (relative to GENINE)	Function
1	+24V		Output	+24V.I power to the sensor
2	SIG	OPTOREFLx	Input	Analog current input from the sensor (0 to 20 mA)
3	N/C (Rev. A) PD- (Rev. B)		N/C (Rev. A) Input (Rev. B)	Not connected on Rev. A. Cable detect input on Rev. B *(do not use this pin if Rev A's might be used in a design).*
4	GND			Signal ground
5	PD+		Output	+5V for cable detect loopback
6	PD-		Input	Cable detect

0.0 Lamp Driver

Lamp Driver Output Connector (LAMP-OUT) (2X4 Molex Minifit Jr.) (J23)

There is a possibility of accidentally plugging this connector into the 3A stepper motor connector. For this reason, the cable detects on the two connectors are on different pins.

Pin #	Pin Name	I/O (relative to GENINE)	Function
1	LAMP0.+24V	Output	+24V.I to Lamp1
2	LAMP1.+24V	Output	+24V.I to Lamp2
3	PD+	Output	+5 volts for cable detect loopback
4	Not connected		
5	LAMP0.EN/	Output	Open collector pull-down for Lamp0

6	LAMP1.EN/	Output	Open collector pull-down for Lamp1
7	PD-	Input	Cable detect input
8	Not connected		

0.0 Solenoid Outputs

Solenoid Output Connector #0 (SOL-DRV0) (2X8 Shrouded Header) (J18)

Pin #	Pin Name	I/O (relative to GENINE)	Function
1	ACT0+		Open collector output to coil (also used as Cable Detect Input; should be looped to Pin 3 {ACT1+}). If either ACT0+ or ACT1+ are driven LOW, then the cable detect will not work.
2	+24V.SAFE	Output	+24V.SAFE to coils
3	ACT1+		Open collector output to coil (also used as +24V to Cable Detect Input; should be looped to Pin 1 {ACT0+}). If either ACT0+ or ACT1+ are driven LOW, then the cable detect will not work.
4	+24V.SAFE	Output	+24V.SAFE to coils
5	ACT2+		Open collector output to coil
6	+24V.SAFE	Output	+24V.SAFE to coils
7	ACT3+		Open collector output to coil
8	+24V.SAFE	Output	+24V.SAFE to coils
9	ACT4+		Open collector output to coil
10	+24V.SAFE	Output	+24V.SAFE to coils
11	ACT5+		Open collector output to coil
12	+24V.SAFE	Output	+24V.SAFE to coils
13	ACT6+		Open collector output to coil
14	+24V.SAFE	Output	+24V.SAFE to coils
15	ACT7+		Open collector output to coil
16	+24V.SAFE	Output	+24V.SAFE to coils

Solenoid Output Connector #1 (SOL-DRV1) (2X13 Shrouded Header) (J21)

This connector is a standard pinout to be used with an off-the-shelf solenoid device.

Pin #	Pin Name	I/O (relative to GENINE)	Function
1	ACT8+		Open collector output to coil
2	ACT9+		Open collector output to coil (also used as Cable Detect Input; should be looped to Pin 4 {ACT11+}). If either ACT9+ or ACT11+ are driven LOW, then the cable detect will not work.
3	ACT10+		Open collector output to coil
4	ACT11+		Open collector output to coil (also used as +24V to Cable Detect Input; should be looped to Pin 2 {ACT9+}). If either ACT9+ or ACT11+ are driven LOW, then the cable

			detect will not work.
5	ACT12+		Open collector output to coil
6	ACT13+		Open collector output to coil
7	ACT14+		Open collector output to coil
8	ACT15+		Open collector output to coil
9	ACT16+		Open collector output to coil
10	ACT17+		Open collector output to coil
11	ACT18+		Open collector output to coil
12	ACT19+		Open collector output to coil
13	ACT20+		Open collector output to coil
14	ACT21+		Open collector output to coil
15	ACT22+		Open collector output to coil
16	ACT23+		Open collector output to coil
17	ACT24+		Open collector output to coil
18	ACT25+		Open collector output to coil
19	ACT26+		Open collector output to coil
20	ACT27+		Open collector output to coil
21	ACT28+		Open collector output to coil
22	ACT29+		Open collector output to coil
23	ACT30+		Open collector output to coil
24	ACT31+		Open collector output to coil
25	+24V.SAFE	Output	+24V.SAFE to coils
26	+24V.SAFE	Output	+24V.SAFE to coils

0.0 Home/Away

The two home/away connectors are the same type, however their cable detects are keyed to prevent one cable from being accidentally connected to the wrong connector.

Home/Away Connector #0 (HA-0) (2X6 Shrouded Header) (J14)

Pin #	Pin Name	I/O (relative to GENINE)	Function
1	HOME0.LED+	Output	Connected to +5V.I, and anode of LED
2	HOME0.C	Output	Connected to +5V.I, and collector of phototransistor
3	HOME0.E	Input	Connected to 10K ohm resistor to GND and emitter of phototransistor
4	HOME0.LED-	Input	Connected to 220 ohm resistor to ground, and cathode of LED
5	AWAY0.LED+	Output	
6	AWAY0.C	Output	
7	AWAY0.E	Input	
8	AWAY0.LED-	Input	
9	-	-	**On Rev. B and C PCB's, pin is removed on connector so that plug can be keyed.**
10	PD+	Output	+5 volts for cable detect loopback
11	Not connected		

12	PD-	Input	Cable detect input

Home/Away Connector #1 (HA-1) (2X6 Shrouded Header) (J20)

Pin #	Pin Name	I/O (relative to GENINE)	Function
1	HOME1.LED+	Output	Connected to +5V.I, and anode of LED
2	HOME1.C	Output	Connected to +5V.I, and collector of phototransistor
3	HOME1.E	Input	Connected to 10K ohm resistor to GND and emitter of phototransistor
4	HOME1.LED-	Input	Connected to 220 ohm resistor to ground, and cathode of LED
5	AWAY1.LED+	Output	
6	AWAY1.C	Output	
7	AWAY1.E	Input	
8	AWAY1.LED-	Input	
9	Not connected		**On Rev. B and C PCB's, pin is removed on connector so that plug can be keyed.**
10	PD+	Output	+5 volts for cable detect loopback
11	PD-	Input	Cable detect input
12	Not connected		

0.0 5A Stepper Motor Driver Interface

5A Stepper Motor Interface Connector (STPR-CNTRL) (2X10 Shrouded Header) (J17)

This connector has the same pinout as the MCE's carriage amp interface. It is the same type as the Digital In Connector #2.

Pin #	Pin Name	I/O (relative to GENINE)	Function
1	CA.SIN+	Output	Phase A output
2	CA.SIN-	Output	Connected to GND
3	CA.COS+	Output	Phase B output
4	CA.COS-	Output	Connected to GND
5	+5V	Output	
6	GND		
7	CA.TMP+	Input	Temperature input
8	CA.TMP-	Input	Connected to GND
9	CA.ENABLE/+	Output	RS422 positive CA.ENABLE/ signal
10	CA.ENABLE/-	Output	RS422 negative CA.ENABLE/ signal
11	CA.CLEAR/+	Output	RS422 positive CA.CLEAR/ signal
12	CA.CLEAR/-	Output	RS422 negative CA.CLEAR/ signal
13	CA.FAULT/+	Input	RS422 positive CA.FAULT/ signal
14	CA.FAULT/-	Input	RS422 negative CA.FAULT/ signal

15	CA.STATUS0/+	Input	RS422 positive CA.STATUS0/ signal
16	CA.STATUS0/-	Input	RS422 negative CA.STATUS0/ signal
17	CA.STATUS1/-	Input	RS422 positive CA.STATUS1/ signal
18	CA.STATUS1/-	Input	RS422 negative CA.STATUS1/ signal
19	CM.CBL/+	Input	RS422 positive cable detect signal
20	CM.CBL/-	Input	RS422 negative cable detect signal

5A Stepper Motor Power Connector (STPR-PWR) (2X3 Molex Minifit Jr) (J27)

Pin #	Pin Name	I/O (relative to GENINE)	Function
1	+48V	Output	Connected to LOC48V.SAFE
2	GND		
3	PD-	Input	Cable detect input
4	+24V	Output	Connected to +24V.SAFE
5	GND		
6	PD+	Output	+5 volts for cable detect loopback

0.0 3A Stepper Motor Cable

3A Stepper Motor Connector (STPR-DRIVE) (2X4 AMP Mini Mate-N-Lock) (J25)

There is a possibility of accidentally plugging this connector into the Lamp Driver connector. For this reason, the cable detects on the two connectors are on different pins.

Pin #	Pin Name	I/O (relative to GENINE)	Function
1	A+	Output	Positive phase A output
2	B-	Output	Negative phase B output
3	CHASSIS		
4	PD+	Output	+5 volts for cable detect loopback
5	A-	Output	Negative phase A output
6	B+	Output	Positive phase B output
7	CHASSIS		
8	PD-	Input	Cable detect input

0.0 Expansion Bus

Expansion Bus Connector #1 (SCON1) (2X8 Molex Minifit Jr) (J26)

This connector's pinout is defined in the SCON Physical Layer document.

Pin #	Pin Name	I/O (relative to GENINE)	Function
1	SAT_+48SAFE	Input	Safe +48V (9A maximum current)

2	SAT_+48RTN		Safe +48V Return (9A maximum current)
3	SAT_+24SAFE	Input	Safe +24V (9A maximum current)
4	SAT_+24SRTN		Safe +24V Return (9A maximum current)
5	SAT_+24V	Input	Unsafe +24V (9A maximum current)
6	BRD_LOC+	Output	+5V to board detect inputs
7	BRD_LOC1-	Input	Board Detect Bit 1
8	BRD_LOC3-	Input	Board Detect Bit 3
9	CAN_H	I/O	CanBus High communcation signal
10	CAN_L	I/O	CanBus Low communcation signal
11	CHASSIS		
12	TERM_DET	I/O	Expansion Bus Termination detect
13	SAT_+24RTN		Unsafe +24V Return (9A maximum current)
14	BRD_LOC+	Output	+5V to board detect inputs
15	BRD_LOC0-	Input	Board Detect Bit 0
16	BRD_LOC2-	Input	Board Detect Bit 2

Expansion Bus Connector #2 (SCON2) (2X5 Molex Minifit Jr) (J24)

This connector's pinout is defined in the SCON Physical Layer document.

Pin #	Pin Name	I/O (relative to GENINE)	Function
1	SAT_+48SAFE	Input	Safe +48V (9A maximum current)
2	SAT_+48RTN		Safe +48V Return (9A maximum current)
3	SAT_+24SAFE	Input	Safe +24V (9A maximum current)
4	SAT_+24SRTN		Safe +24V Return (9A maximum current)
5	SAT_+24V	Input	Unsafe +24V (9A maximum current)
6	CAN_H	I/O	CanBus High communcation signal
7	CAN_L	I/O	CanBus Low communcation signal
8	CHASSIS		
9	TERM_DET	I/O	Expansion Bus Termination detect
10	SAT_+24RTN		Unsafe +24V Return (9A maximum current)

0.0 RS232

RS232 Connector (RS232 PORT) (Female DB9) (J13)

Pin #	Pin Name	I/O (relative to GENINE)	Function
1	Data Carrier Detect (DCD)	Output	Not connected
2	Receive Data (RD)	Output	Data output to connected DTE device
3	Transmit Data (TD)	Input	Data input from connected DTE device
4	Data Terminal Ready (DTR)	Input	DTR is looped to DSR.
5	Signal Ground (GND)		Signal ground.
6	Data Set Ready (DSR)	Output	DSR is looped from DTR.
7	Request to Send (RTS)	Input	RTS is looped to CTS.
8	Clear to Send (CTS)	Output	CTS is looped from RTS.

9	Ring Indicator (RI)	Output	Not connected.
10	Connector Case		Connected to chassis ground.
11	Connector Case		Connected to chassis ground.

0.0 CAN Expansion Port

CAN Expansion Port Connector (CAN-EXP) (2X3 Shrouded Header) (J22)

Note that no CHASSIS connection is available on this connector.

Pin #	Pin Name	I/O (relative to GENINE)	Function
1	+24V	Output	+24V power
2	GND		
3	TX	Output	CAN transmit (+5V CMOS)
4	RX	Input	CAN receive (+5V CMOS)
5	PD+	Output	+5 volts for cable detect loopback
6	PD-	Input	Cable detect input