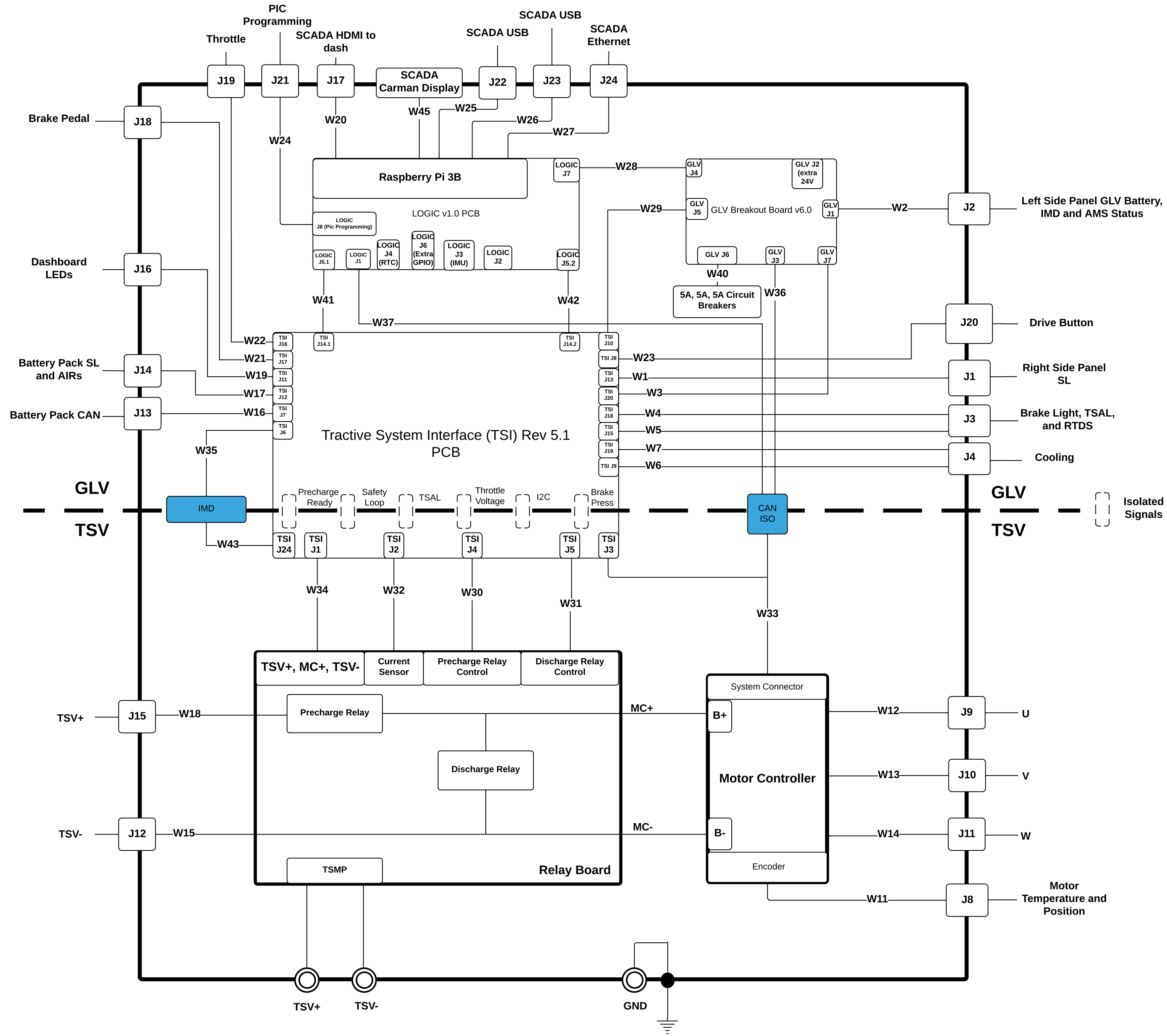


CarMan Interconnect Diagram V. 3.0



Made by: Zachary Martin, John Burk, and Nate Beal
3/17/21

CARMAN Interconnect Diagram

INTERCONNECT Documentation

CARMAN Documentation

Description Of Connection	Connects To	Pin Out	Signal	Cable	Wire	Signal	Pin Out	Connects To	Connector Type	Wire Gauge
Right Side Panel	CARMAN J1	1	SL (TSVMS_RTN)	W1	W1.1	AIRS+	1	TSI J13 Right Side Panel Safety Loop Signals	Molex_MiniFit-JR-5556-04A_2x02x4_20mm_Straight (#39281043 Vertical)	
		2	SL (MRESET+)		W1.2	MRESET_contact	2			
		3	VD (CPRELAY_COIL_RTN & MRESET_COIL_RTN & SSOX_RT)		W1.3	GLV_RTN	3			
Left Side Panel	CARMAN J2	1	GLV+ (LBRB_RTN)	W2	W2.1	BATT+	1	GLV J1 / CARMAN Voltmeter/Ammeter	MiniFit-JR-5556-02A_2x01x4_4pin (#1726470102 Vertical)	
		2	GLV_RTN		W2.2	GLV_RTN	2			
Left Side Panel IMD and AMS Signals	CARMAN J2	3	IMD_STATUS	W3	W3.1	IMD_Status	1	TSI J20 Left Side Panel IMD and AMS Reset Buttons	Molex_MiniFit-JR-5556-04A_2x02x4_20mm_Straight (#39281043 Vertical)	
		4	IMD_STATUS_RTN		W3.2	IMD_Button_RTN	2			
		5	AMS_STATUS		W3.3	AMS_Status	3			
		6	AMS_STATUS_RTN		W3.4	AMS_Button_RTN	4			
Drive Indicators	CARMAN J3	1	BP_LIGHT+	W4	W4.1	Brake_Light	1	TSI J18 RTDS & Brakes	Molex_MiniFit-JR-5556-04A_2x02x4_20mm_Straight (#39281043 Vertical)	
		2	BP_LIGHT_RTN		W4.2	Brake_Light_RTN	2			
		5	RTDS+		W4.3	RTDS	3			
		6	RTDS_RTN		W4.4	RTDS_RTN	4			
TSAL to Roll Hoop Power	CARMAN J3	3	TSAL+	W5	W5.1	TSAL	1	TSI J15 TSAL Roll Hoop Power	Molex_MiniFit-JR-5556-02A_2x01x4_20mm_Straight (#1726470102 Vertical)	
4	TSAL_RTN	W5.2	TSAL_RTN		2					
TSI to Cooling	CARMAN J4	1	12V+	W6	W6.1	12V_Cooling	1	TSI J9 Cooling Subsystem Power	Molex_MiniFit-JR-5556-04A_2x02x4_20mm_Straight (#39281043 Vertical)	
		2	12V_RTN		W6.2	GLV_RTN	2			
Cooling Sensors	CARMAN J4	3	FLOWRATE	W7	W7.1	Flowrate	3	TSI J19 Cooling Sensors	Molex_MiniFit-JR-5556-06A_2x03x4_20mm_Straight (#39281063 Vertical)	
		4	FLOWRATE_SV+		W7.2	Flowrate_SV	4			
		5	FLOWRATE_RTN		W7.3	Flowrate_RTN	5			
		6	COOLTEMP_IN		W7.4	CoolTemp_In	6			
		7	COOLTEMP_RTN		W7.5	CoolTemp_RTN	7			
		8	X		W7.6	X	8			
HV+ TSMP	CARMAN J5	-	HV+	W8	-	HV+	-	HV+ Relay Board Bus Bar	Banana Jack	
HV- TSMP	CARMAN J6	-	HV-	W9	-	HV-	-	HV- Relay Board Bus Bar	Banana Jack	
Chassis Ground TSMP	CARMAN J7	-	Chassis Ground	W10	-	Chassis_gnd	-	Chassis_gnd	Banana Jack	
Motor Encoder	CARMAN J8	1	V_A	W11	W11.1	SIN	1	Encoder Cable enters CARMAN and is passed to Motor	Molex_MiniFit-JR-5556-06A_2x03x4_20mm_Straight (#39281063 Vertical)	
		2	V_B		W11.2	COS	2			
		3	GND		W11.3	GND	3			
		4	V_dd		W11.4	VCC	4			
		5	MOTOR_TEMP_1		W11.5	MOTOR_TEMP_1	5			
		6	MOTOR_TEMP_2		W11.6	MOTOR_TEMP_2	6			
Motor Phase Wiring	CARMAN J9	-	MOTOR_PHASE_U	W12	-	MOTOR_PHASE_U	-	MOTOR U		
Motor Phase Wiring	CARMAN J10	-	MOTOR_PHASE_V	W13	-	MOTOR_PHASE_V	-	MOTOR V		
Motor Phase Wiring	CARMAN J11	-	MOTOR_PHASE_W	W14	-	MOTOR_PHASE_W	-	MOTOR W		
TSV Pack Return	CARMAN J12	-	TSV_RTN	W15	-	TSV_RTN	-	HV+ Relay Board Bus Bar		
CAN TO PACKS	CARMAN J13	1	CHASSIS_GND	W16	W16.1	Chassis_GND	1	TSI J7 Battery Pack CAN Lines & Power	Molex_MiniFit-JR-5556-05A_2x04x4_20mm_Straight (#39281083)	
		2	24V+		W16.2	24V	2			
		3	24V_RTN		W16.3	24V_RTN	3			
		4	CAN_LOW		W16.4	BP_CAN-	4			
		5	CAN_HIGH		W16.5	BP_CAN+	5			
		6	CAN_SHIELD		W16.6	CAN_SHIELD	6			
Power and Return to R_AMS and L_AMS to Battery Packs	CARMAN J14	1	SL(AIRS_RTN)	W17	W17.1	AIRS-	1	TSI J12 Battery Pack Safety Loop Signals	Molex_MiniFit-JR-5556-04A_2x02x4_20mm_Straight (#39281043 Vertical)	
		2	SL(AIRS+)		W17.2	AIRS+	2			
		3	AMS_RTN		W17.3	24V_AMS_RTN	3			
		4	AMS_IN		W17.4	24V_AMS_IN	4			
TSV Pack In	CARMAN J15	-	TSV+	W18	-	TSV	-	HV+ Relay Board Bus Bar		
DASHBOARD	CARMAN J16	1	LED_RTN	W19	W19.1	GLV_RTN (FAULT_LED_RTN)	1	TSI J11 Dashboard LED Signals	Molex_MiniFit-JR-5556-02A_2x01x4_20mm_Straight (#1726470102 Vertical)	
		2	AIRS		W19.2	Safety_Loop_EPAL	2			
		3	FAULT		W19.3	GEN_FAULT_EPAL	3			
		4	TSAL		W19.4	TSAL_Cockpit	4			
		5	IMD_FAULT		W19.5	IMD_FAULT_LED	5			
		6	AMS_FAULT		W19.6	AMS_FAULT_LED	6			
		7	24V		W19.7	24V	7			
		8	X		W19.8	X	8			
HDMI from Pi to the enclosure	CARMAN J17	-	SCADA_HDMI	W20	-	SCADA_HDMI	-	HDMI from Pi to the enclosure	HDMI	
Brake Pedals & BOT	CARMAN J18	1	SL (BOT)	W21	W21.1	SL1_Out	1	TSI J17 Brake Pedals & BOT Switch (Safety Loop)	Molex_MiniFit-JR-5556-02A_2x01x4_20mm_Straight	
		2	SL (BOT_RTN)		W21.2	BOT_Out	2			
		3	BRAKE_SWITCH+ (24V+)		W21.3	AIRS+	3			
		4	BP (BRAKE_SWITCH_RTN)		W21.4	Brake_Pressed	4			
THROTTLE	CARMAN J19	1	APPS1_10V+	W22	W22.1	APPS1_10V	1	TSI J16 Throttle Plausibility	Molex_MiniFit-JR-5556-04A_2x03x4_20mm_Straight (#39281063 Vertical)	
		2	APPS1		W22.2	APPS1	2			
		3	APPS1_RTN		W22.3	APPS1_RTN	3			
		4	APPS2_5V+		W22.4	APPS2_5V	4			
		5	APPS2		W22.5	APPS2	5			
		6	APPS2_RTN		W22.6	APPS2_RTN	6			
Drive Button	CARMAN J20	1	Drive_BTN+	W23	W23.1	Drive_BTN	1	TSI J8 Cockpit	Molex_MiniFit-JR-5556-04A_2x02x4_20mm_Straight (#39281043 Vertical)	
		2	Drive_LED+		W23.2	Drive_LED	2			
		3	Drive_RTN		W23.3	Drive_RTN	3			
		4	X		W23.4	X	4			
PIC 32 Programming	CARMAN J21	-	PICKIT3_USB	W24	-	PICKIT3_USB	-	Logic J8 - PICKIT 3	USB mini-B connector	
USB from Raspberry Pi	CARMAN J22	-	SCADA_USB	W25	-	SCADA_USB	-	CARMAN - SCADA USB Direct Connection to Pi	USB 2.0 Type A	
USB from Raspberry Pi	CARMAN J23	-	SCADA_USB	W26	-	SCADA_USB	-	CARMAN - SCADA USB Direct Connection to Pi	USB 2.0 Type A	
ETHERNET Cable connecting Pi to the enclosure	CARMAN J24	-	SCADA_ETHERNET	W27	-	SCADA_ETHERNET	-	CARMAN - SCADA Ethernet Direct Connection to Pi	Ethernet	

CARMAN Intraconnect Documentation

Description Of Connection	Connects To	Pin Out	Signal	Cable	Wire	Signal	Pin Out	Connects To	Connector Type	Wire Gauge
GLV -> Logic I2C	GLV J4	1	GLV_SCL	W28	W28.1	GLV_SCL	1	LOGIC J7 GLV I2C8	Molex MiniFit-JR-5556-04A_2x02x4_20mm_Straight (#26013115 Right Angle)	
		2	GLV_SDA		W28.2	GLV_SDA	2			
		3	GLV_RTN		W28.3	GLV_RTN	3			
		4	24V		W28.4	24V	4			
TSI Power	GLV J5	1	24V	W29	W29.1	24V	1	TSI J10 Breakered 24V GLV to TSI	Molex MiniFit-JR-5556-04A_2x02x4_20mm_Straight (#39281043 Vertical)	
		2	GLV_RTN		W29.2	GLV_RTN	2			
		3	SLOOP_TO_IMD		W29.3	SL1_In	3			
		4	COOL_24V		W29.4	COOL_24V	4			
PC Relay	TSI J4 Precharge Relay	1	PC_RELAY+	W30	W30.1	PC_RELAY+	1	Relay Board	Molex MiniFit-JR-5556-02A_2x01x4_20mm_Straight (#1726470102 Vertical)	
		2	PC_RELAY-		W30.2	PC_RELAY-	2			
DC Relay	TSI J5 Discharge Relay	1	DC_RELAY+	W31	W31.1	DC_RELAY+	1	Discharge Relay	Molex MiniFit-JR-5556-02A_2x01x4_20mm_Straight (#1726470102 Vertical)	
		2	DC_RELAY-		W31.2	DC_RELAY-	2			
TSV Current Sensor	TSI J2 Current Sensor	1	A1_HV	W32	W32.1	A1_HV	1	Relay Board	Molex MiniFit-JR-5556-04A_2x02x4_20mm_Straight (#39281043 Vertical)	
		2	A2_HV		W32.2	A2_HV	2			
		3	I/O_Ground		W32.3	I/O_Ground	3			
		4	5HV		W32.4	5HV	4			
Motor Controller	Internal connection from TSI to Motor Controller	1	IGN1_GND	W33	W33.1	IO_Ground	1	TSI J3 Motor Controller Pins	Molex MiniFit-JR-5556-06A_2x04x4_20mm_Straight (#39281083)	
		2	IGN1_VCC		W33.2	IGN1_VCC	2			
		3	IO_GND		W33.3	IO_Ground	3			
		4	X		W33.4	X	4			
		5	Throttle_HV		W33.5	Throttle_HV	5			
		6	These two pins are tied together via 2 fuses		W33.6	These two pins are tied together via 2 fuses and tied to IO_Ground	6			
		7			W33.7		7			
		8	BP_HV		W33.8	Brake_Pressed_HV	8			
Relay Board	Internal Connection	1	MC+	W34	W34.1	MC+	1	TSI J1 High Voltage	Molex MiniFit-JR-5556-04A_20mm_Straight (#39281043)	
		2	HV-		W34.2	HV-	2			
		3	HV+		W34.3	HV+	3			
IMD Connection	TSI J6 IMD	1	GLV_RTN	W35	W35.1	GLV_RTN	1	IMD	Molex MiniFit-JR-5556-06A_2x04x4_20mm_Straight (#39281083)	
		2	24V+		W35.2	24V	2			
		3	GLV_RTN		W35.3	GLV_RTN	3			
		4	GLV_RTN		W35.4	GLV_RTN	4			
		5	IMD_MHS		W35.5	IMD_MHS	5			
		6	NC		W35.6	NC	6			
		7	NC		W35.7	NC	7			
		8	IMD_STATUS		W35.8	IMD_STATUS	8			
Can ISO	Power to blue box	1	24V	W36	W36.1	24V	1	GLV J3 24V to CAN ISO	Molex MiniFit-JR-5556-02A_2x01x4_20mm_Straight	
		2	GLV_RTN		W36.2	GLV_RTN	2			
Can ISO	Can Signals to LOGIC	1	CAN_H	W37	W37.1	CAN_H	1	LOGIC J1 Motor Controller CAN	Molex MiniFit-JR-5556-04A_2x02x4_20mm_Straight (#26013115 Right Angle)	
		2	CAN_L		W37.2	CAN_L	2			
		3	CAN_GND (CAN_Shield)		W37.3	CAN_GND (CAN_Shield)	3			
		4	X		W37.4	X	4			
IMU	Inertial Measuring Unit	1	3.3V	W38	W38.1	3.3V	1	LOGIC J3 IMU	Molex MiniFit-JR-5556-04A_2x02x4_20mm_Straight (#26013115 Right Angle)	
		2	5V_RTN		W38.2	5V_RTN	2			
		3	SDA		W38.3	SDA	3			
		4	SCL		W38.4	SCL	4			
RTC	Real Time Clock	1	3.3V	W39	W39.1	3.3V	1	LOGIC J4 RTC	Molex MiniFit-JR-5556-04A_2x02x4_20mm_Straight (#26013115 Right Angle)	
		2	5V_RTN		W39.2	5V_RTN	2			
		3	SDA_pi		W39.3	SDA_pi	3			
		4	SCL_pi		W39.4	SCL_pi	4			
Breakered signal passed from LRBR_RTN (CARMAN J18)	GLV J6 Breaker In and Rtns	1	BREAKER_IN_GENERAL	W40	W40.1	BREAKER_IN_GENERAL	1	5A Circuit Breakers	Circuit Breaker PP11-2-5.00A-036V (Mouser # 874-PP1125.00A03V)	
		2	BREAKER_IN_COOL		W40.2	BREAKER_IN_COOL	2			
		3	BREAKER_IN_SL		W40.3	BREAKER_IN_SL	3			
		4	BREAKER_OUT_GENERAL		W40.4	BREAKER_OUT_GENERAL	4			
		5	BREAKER_OUT_COOL		W40.5	BREAKER_OUT_COOL	5			
		6	BREAKER_OUT_SL		W40.6	BREAKER_OUT_SL	6			
Mega Connector	LOGIC J5.1 TSI Connector 1	1	SCL_TSI	W41	W41.1	SCL_TSI	1	TSI J14.1 Logic Connector 1		
		2	SDA_TSI		W41.2	SDA_TSI	2			
		3	5V_ISO_RTN		W41.3	5V_ISO_RTN	3			
		4	Safety_Loop		W41.4	Safety_Loop	4			
		5	Cooling_CTRL		W41.5	Cooling_CTRL	5			
		6	Throttle_SEL		W41.6	Throttle_SEL	6			
Mega Connector	LOGIC J5.2 TSI Connector 2	1	AMS_FAULT_LED	W42	W42.1	AMS_FAULT_LED	1	TSI J14.2 Logic Connector 2		
		2	SR_CTRL		W42.2	SR_CTRL	2			
		3	CAN_Logic		W42.3	CAN_Logic	3			
		4	CAN+_Logic		W42.4	CAN+_Logic	4			
		5	RTDS_CTRL		W42.5	RTDS_CTRL	5			
		6	PC_Ready		W42.6	PC_Ready	6			

* NOTE: Highlighted segments of the table represents issues between ICD and current CarMan documentation*