

## Bill of Materials

## LIGO Project

## D040180

## Revision E

Project: CM.PrjPCB All variants

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Number of CM boards variants

5

Number of MC boards variants

5

Number of ALS boards variants

18

Number of total boards

28

Quantity	Distributor	Part Number	Comment	Description	Common Designator	CM	MC	ALS	Footprint	Assembly Type	Quantity to Order
222	Digi-Key	311-1140-1-ND	100n	Capacitor	C1, C2, C3, C6, C7, C9, C10, C11, C12, C14, C16, C17, C19, C21A, C21B, C21C, C22A, C22B, C22C, C23A, C23B, C23C, C25A, C25B, C25C, C31A, C31B, C31C, C33A, C33B, C33C, C34A, C34B, C34C, C36A, C36B, C36C, C37A, C37B, C37C, C40A, C40B, C40C, C41A, C41B, C41C, C42A, C42B, C42C, C43A, C43B, C43C, C44A, C44B, C44C, C47A, C47B, C47C, C48A, C48B, C48C, C49A, C49B, C49C, C52A, C52B, C52C, C53A, C53B, C53C, C54A, C54B, C54C, C57A, C57B, C57C, C58A, C58B, C58C, C59A, C59B, C59C, C62A, C62B, C62C, C63A, C63B, C63C, C66A, C66B, C66C, C67A, C67B, C67C, C69, C73, C74, C76, C84, C85, C90, C92, C97, C101, C102, C103, C104, C105, C110, C111, C112, C113, C122, C123, C124, C125, C127, C131, C132, C133, C134, C137, C139, C142, C144, C145, C147, C151, C152, C153, C154, C158, C160, C162, C164, C165, C166, C168, C169, C171, C172, C175, C177, C178, C180, C183, C184, C187, C188, C190, C192, C197, C200, C204, C209, C210, C211, C217, C218, C219, C230, C233, C234, C236, C244, C247, C252, C254, C255, C264, C265, C268, C273, C274, C281, C282, C298, C299, C305, C306, C313, C315, C316, C317, C320, C322, C323, C325, C326, C327, C328, C329, C332, C333, C334, C337, C338, C341, C342, C343, C344, C348, C349, C350, C352, C353, C354, C357, C358, C360, C361, C363, C364, C367, C369, C373, C374, C377, C380, C381, C383, C386				CC2013-0805		6530
	None		NL	Not loaded	C4, C5, C77, C78, C80, C81, C86, C87, C91, C94, C95, C96, C98, C100, C138, C157, C176, C191, C193, C198, C199, C201, C202, C205, C206, C207, C208, C223, C224, C226, C227, C228, C229, C231, C232, C237, C238, C239, C240, C241, C251, C257, C259, C266, C267, C283, C284, C285, C286, C289, C290, C293, C303, C308, C310, C312, C314, C321, C376, C379, C385, R6, R11, R51, R61, R63, R117, R121, R123, R127, R131, R132, R134, R141, R148, R149, R150, R154, R156, R159, R183, R184, R187, R191, R204, R270, R280, R282, R294, R302, R303, R314	C194, C195, C260, C287, C288, R125, R181, R182, R185	C260, C275, C276, C279, R179	C194, C195, C275, C276, C287, C288, R125, R179, R181, R182, R185	CA117065, CA-ALL3, CA-ALL6, CA-ALL8, CC2013-0805, CR2012-0805	TH	
54	Digi-Key	311-1109-1-ND	68p	Capacitor	C8, C13, C15, C18, C26A, C26B, C26C, C28A, C28B, C28C, C29A, C29B, C29C, C32A, C32B, C32C, C61A, C61B, C61C, C64A, C64B, C64C, C65A, C65B, C65C, C88, C89, C106, C107, C108, C109, C126, C135, C146, C155, C167, C173, C185, C186, C196, C212, C213, C214, C250, C253, C277, C278, C302, C304, C318, C319, C375, C378, C384				CC2013-0805		1590
23.1786	Digi-Key	311-1099-1-ND	10p	Capacitor	C20A, C20B, C20C, C38A, C38B, C38C, C50A, C50B, C50C, C70, C79, C93, C129, C149, C170, C179, C189, C243, C295, C311, C371, C372, C382		C288		CC2013-0805		690
10	Digi-Key	399-3836-1-ND	3.3u	Polarized Capacitor	C24A, C24B, C24C, C39A, C39B, C39C, C130, C143, C150, C163				TC3528-1411		300
10	Digi-Key	311-1103-1-ND	22p	Capacitor	C27A, C27B, C27C, C30A, C30B, C30C, C128, C141, C148, C161				CC2013-0805		300

Quantity	Distributor	Part Number	Comment	Description	Common Designator	CM	MC	ALS	Footprint	Assembly Type	Quantity to Order
12	Digi-Key	311-1104-1-ND	27p	Capacitor	C35A, C35B, C35C, C75, C99, C136, C140, C156, C159, C174, C203, C235				CC2013-0805		360
3	Digi-Key	478-1300-1-ND	4.7p	Capacitor	C45A, C45B, C45C				CC2013-0805		90
3	Digi-Key	311-1102-1-ND	18p	Capacitor	C46A, C46B, C46C				CC2013-0805		90
6	Digi-Key	311-1101-1-ND	15p	Capacitor	C51A, C51B, C51C, C60A, C60B, C60C				CC2013-0805		180
6	Digi-Key	311-1105-1-ND	33p	Capacitor	C55A, C55B, C55C, C68A, C68B, C68C				CC2013-0805		180
3	Digi-Key	311-1107-1-ND	47p	Capacitor	C56A, C56B, C56C				CC2013-0805		90
8	RTI Electronics	WA2A105F	1u	Film Capacitor, axial lead	C71, C181, C263, C271, C291, C346, C356, C366				CA-ALL3	TH	225
27.5357	Mouser	81-GRM2165C1H102FA01	1n	Capacitor	C72, C82, C114, C115, C116, C117, C182, C216, C221, C222, C248, C249, C262, C269, C272, C292, C300, C301, C345, C347, C351, C355, C359, C362, C365, C368, C370	C279, C280	C195		CC2013-0805		810
3.35714	RTI Electronics	WA2A206F	20u	Film Capacitor, axial lead	C83, C215, C270	C275, C276			CA-ALL8	TH	95
3.64286	RTI Electronics	WA2A104F	100n	Film Capacitor, axial lead	C118, C119, C120			C260	CA-ALL3	TH	103
1.17857	RTI Electronics	WA2A333F	33n	Film Capacitor, axial lead	C121		C194		CA-ALL3	TH	34
6	RTI Electronics	WA2A334F	330n	Film Capacitor, axial lead	C220, C225, C245, C246, C296, C297				CA-ALL3	TH	169
2	Digi-Key	311-1114-1-ND	180p	Capacitor	C242, C294				CC2013-0805		70
37.2857	Digi-Key	541-0.0ACT-ND	0	Jumper	C256, C258, C307, C309, R57, R59, R62, R66, R67, R90, R103, R113, R119, R129, R130, R135, R138, R147, R151, R152, R153, R163, R169, R197, R207, R269, R279, R281, R293, R306, R309, R310, R311, R317, R318	R128	C280, R178, R182	C279, C280, R128, R169	CC2013-0805		1100
0.17857	Mouser	81-GRM2165C1H472GA01	4.7n	Capacitor			C261		CC2013-0805		10
0.17857	Mouser	81-GRM40C331F50D	330p	Capacitor			C287		CC2013-0805		10
0.82143	Mouser	81-GRM40C471F50L	470p	Capacitor		C261		C261	CC2013-0805		28
2	Digi-Key	490-1709-1-ND	10u	Capacitor	C324, C340				CC2013-0805		70
3	Digi-Key	493-2290-1-ND	100u	Electrolyte capacitor, surface mount	C330, C335, C339				AC083-033/F		90
2	Digi-Key	587-1782-1-ND	4.7u	Capacitor	C331, C336				CC2013-0805		70
10	Digi-Key	1N4148W-FDICT-ND	DIODE	Single diode	D1, D2, D3, D4, D5, D6, D7, D8, D9, D10				DO-SOD123		294
2	Digi-Key	BZT52C2V7-FDICT-ND	zener diode	Single zener diode	D11, D12				DO-SOD123		61
3	Digi-Key	641-1258-1-ND	shotky diode	Single shotky diode	D13, D14, D15				DO-SMA		89
1	Digi-Key	67-1218-ND	LED	Panel mount LED	DS1				LED-1	TH	29
45	Digi-Key	490-1056-1-ND	BLM31PG121	ferrite bead, 120Ohm at 100MHz, 1206	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12, F13, F14, F15, F16, F17, F18, F19, F20, F21, F22, F23, F24, F25, F26, F27, F28, F29, F30, F31, F32, F33, F34, F35, F36, F37, F38, F39, F40, F41, F42, F43, F44, F45				CL3216-1206		1324
5	Newark	16M3246	IN1, IN2, OUT1, OUT2, SERVO	TNC Elbow Connector	J1, J2A, J3A, J4, J5A				BNC1	TH	141
1	Digi-Key	A32119-ND	DB9	Receptacle Assembly, 9 Position, Right Angle, .318 Series	J2				DB9F-RA	TH	29
3	Mouser	736-EPG0B302HLN	EPG.0B.302.HLN	2-pin LEMO connector	J2B, J3B, J5B				LEMO2	TH	85
6	Digi-Key	A32258-ND	A EXC, A IN1, A IN2, B EXC, B IN1, B IN2	BNC, PCB Mount, Right Angle	J7, J8, J9, J10, J11, J12				BNC1	TH	169
6	Digi-Key	S6106-ND	Header 10X2A	Header, 10-Pin, Dual row	JP1, JP2, JP3, JP4, JP5, JP6				HDR2X10_CEN	TH	169
18	Digi-Key	24434K-ND	M3 standoff, 12mm	M3 standoff, 12mm	M1, M3, M5, M7, M9, M11, M19, M21, M23, M25, M27, M29, M37, M39, M41, M43, M45, M47					M	530
36	McMaster-Carr	90317A115	M3 pan, 8mm	M3 pan head screw w/ lock washer, 8mm	M2, M4, M6, M8, M10, M12, M13, M14, M15, M16, M17, M18, M20, M22, M24, M26, M28, M30, M31, M32, M33, M34, M35, M36, M38, M40, M42, M44, M46, M48, M49, M50, M51, M52, M53, M54					M	1059
2	Digi-Key	A31174-ND	09 18 550 7324	Flat Cable Connector (IDC), Low-Profile Male Header, Straight Solder Pin, 50 Contacts, Performance Level 3	P1, P2				918550x324	TH	57
1	Newark	58K8856	FDV301N	FDV301N, Digital FET, N-channel, SOT23	Q1				SO-G3/C2.25		33
4	Digi-Key	RR12Q10DCT-ND	10	Resistor	R1, R2, R3, R313				CR2012-0805		120

Quantity	Distributor	Part Number	Comment	Description	Common Designator	CM	MC	ALS	Footprint	Assembly Type	Quantity to Order
20	Digi-Key	RG20P100KBCT-ND	100K	Resistor	R4, R8, R9, R13, R49, R53, R133, R136, R261, R262, R267, R268, R276, R277, R284, R285, R288, R289, R298, R299				CR2012-0805		590
43.8214	Digi-Key	RG20P100BCT-ND	100	Resistor	R5, R7, R10, R12, R26A, R26B, R26C, R27A, R27B, R27C, R28A, R28B, R28C, R41A, R41B, R41C, R48, R58, R65, R71, R73, R75, R80, R85, R93, R98, R106, R110, R122, R142, R162, R172, R188, R194, R203, R264, R265, R274, R275, R286, R305, R308, R316	R186		R186	CR2012-0805		1290
38	Digi-Key	RG20P2.0KBCT-ND	2.00K	Resistor	R14A, R14B, R14C, R15A, R15B, R15C, R16A, R16B, R16C, R20A, R20B, R20C, R24A, R24B, R24C, R25A, R25B, R25C, R39A, R39B, R39C, R40A, R40B, R40C, R44, R45, R47, R83, R84, R88, R96, R97, R101, R108, R109, R112, R166, R198				CR2012-0805		1120
31.7143	Digi-Key	RG20P3.32KBCT-ND	3.32K	Resistor	R17A, R17B, R17C, R31A, R31B, R31C, R43A, R43B, R43C, R50, R56, R60, R64, R92, R105, R114, R116, R118, R120, R124, R126, R160, R161, R170, R192, R193, R200, R205, R211, R271	R168, R169	R169, R181, R185, R186	R168	CR2012-0805		940
11.3571	Digi-Key	RG20P1.5KBCT-ND	1.50K	Resistor	R18A, R18B, R18C, R19A, R19B, R19C, R32A, R32B, R32C, R72, R74	R178, R179			CR2012-0805		340
6	Digi-Key	RG20P620BCT-ND	620	Resistor	R21A, R21B, R21C, R33A, R33B, R33C				CR2012-0805		180
14	Digi-Key	RG20P1.0KBCT-ND	1.00K	Resistor	R22A, R22B, R22C, R23A, R23B, R23C, R34A, R34B, R34C, R82, R91, R95, R104, R208				CR2012-0805		420
75.6429	Digi-Key	RG20P10.0KBCT-ND	10.0K	Resistor	R29A, R29B, R29C, R30A, R30B, R30C, R35A, R35B, R35C, R36A, R36B, R36C, R52, R87, R89, R100, R102, R174, R177, R201, R202, R210, R213, R216, R218, R219, R220, R221, R222, R223, R224, R225, R226, R227, R228, R229, R230, R231, R232, R233, R234, R235, R236, R237, R238, R239, R240, R241, R242, R243, R244, R245, R246, R247, R248, R249, R252, R253, R254, R255, R256, R257, R258, R259, R290, R292, R295, R296, R300, R301, R304, R307, R312, R315	R173, R175		R173, R175	CR2012-0805		2230
9.17857	Digi-Key	RG20P1.2KBCT-ND	1.20K	Resistor	R37A, R37B, R37C, R68, R70, R143, R144, R145, R155		R128		CR2012-0805		270
3	Digi-Key	RG20P499BCT-ND	499	Resistor	R38A, R38B, R38C				CR2012-0805		90
7.17857	Digi-Key	RG20P374BCT-ND	374	Resistor	R42A, R42B, R42C, R79, R158, R190, R272		R125		CR2012-0805		220
6	Digi-Key	RG20P20.0KBCT-ND	20.0K	Resistor	R46, R115, R171, R176, R180, R251				CR2012-0805		180
2	Digi-Key	3296W-203LF-ND	20K	Potentiometer	R54, R137				HDR1X3	TH	57
3	Digi-Key	RR12P280DCT-ND	280	Resistor	R55, R139, R250				CR2012-0805		90
3	Digi-Key	RG20P120KBCT-ND	120K	Resistor	R69, R140, R146				CR2012-0805		90
3	Digi-Key	RG20P4.99KBCT-ND	4.99K	Resistor	R76, R212, R215				CR2012-0805		90
2	Digi-Key	RG20P82.0BCT-ND	82	Resistor	R77, R78				CR2012-0805		70
7	Digi-Key	RR12Q49.9DCT-ND	49.9	Resistor	R81, R86, R94, R99, R107, R111, R206				CR2012-0805		210
2	Digi-Key	RG20P33.2KBCT-ND	33.2K	Resistor	R157, R189				CR2012-0805		70
4	Digi-Key	RG20P48.7KBCT-ND	48.7K	Resistor	R164, R165, R195, R196				CR2012-0805		120
2	Digi-Key	RG20P14.3KBCT-ND	14.3K	Resistor	R167, R199				CR2012-0805		70
0.17857	Digi-Key	RG20P16.5KBCT-ND	16.5K	Resistor			R168		CR2012-0805		10
0.35714	Digi-Key	RG20P49.9KBCT-ND	49.9K	Resistor			R173, R175		CR2012-0805		15
10	Digi-Key	RG20P200KBCT-ND	200K	Resistor	R209, R260, R263, R266, R273, R278, R283, R287, R291, R297				CR2012-0805		300
2	Digi-Key	RG20P1.0MBCT-ND	1.00M	Resistor	R214, R217				CR2012-0805		70
46	Digi-Key	5009K-ND	Testpoint	Testpoint, yellow	TP1A, TP1B, TP1C, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, TP21, TP22, TP23, TP24, TP25, TP26, TP27, TP28, TP29, TP30, TP31, TP32, TP33, TP34, TP35, TP36, TP37, TP38, TP39, TP40, TP41, TP52, TP53, TP54				TP1	TH	1289
2	Digi-Key	5005K-ND	Testpoint	Testpoint, red	TP42, TP44				TP1	TH	57
1	Digi-Key	5007K-ND	Testpoint	Testpoint, white	TP43				TP1	TH	29
7	Digi-Key	5006K-ND	Testpoint	Testpoint, black	TP45, TP46, TP47, TP48, TP49, TP50, TP51				TP1	TH	197
18	Digi-Key	MAX333ACWP+-ND	MAX333A	Quad Switch	U1, U6A, U6B, U6C, U12A, U12B, U12C, U15A, U15B, U15C, U20, U29, U32, U37, U41, U47, U51, U56				SO-G20		530

Quantity	Distributor	Part Number	Comment	Description	Common Designator	CM	MC	ALS	Footprint	Assembly Type	Quantity to Order
72	Digi-Key	AD829ARZ-ND	AD829	Video Operational Amplifier	U2, U3, U4, U5, U7A, U7B, U7C, U8A, U8B, U8C, U9A, U9B, U9C, U10A, U10B, U10C, U13A, U13B, U13C, U14A, U14B, U14C, U16A, U16B, U16C, U17A, U17B, U17C, U18A, U18B, U18C, U19A, U19B, U19C, U21, U22, U23, U24, U25, U26, U27, U28, U31, U33, U34, U35, U36, U38, U39, U40, U42, U43, U44, U46, U48, U49, U50, U52, U53, U54, U55, U57, U58, U60, U61, U62, U63, U64, U65, U83, U84, U85				SO-G8		2117
4	Digi-Key	74ACT157SC-ND	74ACT157	Quadruple 2-Line to 1-Line Data Selector/Multiplexer	U11A, U11B, U11C, U30				SO-G16		118
1	Digi-Key	296-16982-1-ND	SN74LVC1G19	Single configurable multi-function gate	U45				SO-G6		33
6	Digi-Key	OP27GSZ-ND	OP27	Low Noise Operational Amplifier	U59, U74, U75, U77, U78, U80				SO-G8		177
1	Digi-Key	MAX4648EUT+TCT-ND	MAX4648	Single SPST analog switch, NO	U66				SO-G6		33
1	Digi-Key	296-9250-5-ND	74HCT123	Retriggerable Monostable Multivibrator	U67				SO-G16		33
1	Digi-Key	LM319AM-ND	LM319M	High-Speed Dual Comparator	U68				SO-G14		33
6	Digi-Key	296-1129-1-ND	74ALS573	Octal D-Type Transparent Latches with 3-State Outputs	U69, U70, U71, U72, U73, U81				SO-G20		177
3	Digi-Key	AD706ARZ-ND	AD706	Dual Picoampere Input Current Bipolar Operational Amplifier	U76, U79, U82				SO-G8		89
1067.8	Total pieces										31517

### Summary per Board

Total # of unique parts	79
SMT Placements per board	909.6
Thru-Hole placement per board	104.2
Fine pitch placement per board	0
BGA placement per board	0
Mechanical placement per board	54