


<div><div></div><div><div>Project</div><div>HGC Sensor Probe Card</div></div><div><div>Title</div><div>HGC Sensor 512 Channels - Switching Matrix</div></div><div><div>EDA Number</div><div>EDA-03518-V3-0</div></div><div><div>Designer</div><div>Szymon Kulis</div></div><div><div>File</div><div>EDA-03518-V3-0_pcb-mat.xls</div></div><div><div>Date</div><div>21 February 2019</div></div><div><div>Rev.</div><div></div></div><div><div>Drawn by</div><div>JMW</div></div><div><div>EDMS URL</div><div>https://edms.cern.ch/item/EDA-03518-V3-0</div></div></div>							
Ref	Qty	Scem	Description	Val&Device	Manufacturer	Part Number	Case
C1 > C3	3		±5% 1200VDC Metallized Polypropylene Film Capacitor (MKP1848C DC-Link)	1uF	VISHAY ROEDERSTEIN	MKP1848C51012JK2	LS27.5 W11 x L32 x H21
C4 > C6 C17 > C171 C173 > C186 C189 > C191 C199 > C201 C203 > C208 C210 > C213	188		±10% 50V X7R SMD Multilayer Chip Ceramic Capacitor	100nF	GENERIC	CC0603_100NF_50V_10%_X7R	0603
C7 > C14	8		±10% 20V Low ESR 0R4 Solid Tantalum Chip Capacitor	22uF	GENERIC	CTE3528-21_22UF_20V_10%_LESR0400	B
C15	1		±10% 250V X7R SMD Multilayer Chip Ceramic Capacitor	4.7nF	GENERIC	CC0805_4.7NF_250V_10%_X7R	0805
C172	1		±20% 16V X5R SMD Multilayer Chip Ceramic Capacitor	10uF	GENERIC	CC0603_10UF_16V_20%_X5R	0603
C198 C202 C209	3		±10% 50V X7R SMD Multilayer Chip Ceramic Capacitor	10nF	GENERIC	CC0603_10NF_50V_10%_X7R	0603
D1 > D4	4		10V 500mW Voltage Regulator Diode	BZV55-B10	NEXPERIA	BZV55-B10	SOD-80C
DS1 > DS3	3		13.2mm Single Digit 7-Segment Red Display, Common Anode, Right Hand Dot Point	SA52-11SRWA	KINGBRIGHT	SA52-11SRWA	
F1	1		PTC Resettable Fuse	500mA-6V	BOURNS	MF-PSMF050X-2	
IC1 > IC73 IC76, IC77	75		Ultra-Low Leakage Monolithic CMOS Analog Multiplexers	MAX328EWE+	MAXIM	MAX328EWE+	SOIC16W
IC74	1		2.048V Output, ±1mV ±0.05% Accuracy, 3ppm/°C Ultralow Noise XFET Voltage References with Current Sink and Source Capability	ADR440BRZ	ANALOG DEVICES	ADR440BRZ	SOIC8
IC75	1		8/16-bit AVR XMEGA A1U Microcontroller, 1.6-3.6V, 128KB + 8KB Flash, 2KB EEPROM, 8KB SRAM, 100-pin TQFP, Industrial Grade (-40°C to 85°C), Pb-Free	ATXMEGA128A1U-AU	ATMEL	ATXMEGA128A1U-AU	QFP100
IC83	1		5V ±10% to 5V, Iout (max) 200mA, 1W DC-DC Converter	TMV 0505EN	TRACO POWER	TMV 0505EN	
IC84 IC88	2		20V, 500mA, Low Noise, CMOS LDO Linear Regulator	ADP7104ARDZ-R7	ANALOG DEVICES	ADP7104ARDZ-R7	SOIC8
IC85	1		-1.22V to -27V, -200mA, Adjustable, Low Noise, Negative Linear Regulator	ADP7182AUJZ-R7	ANALOG DEVICES	ADP7182AUJZ-R7	SOT23-5
IC86	1		5V ±10% to ±15V, Iout (max) ±65mA, 1W DC-DC Converter	TMV 0515D	TRACO POWER	TMV 0515D	
IC87	1		USB to serial UART Interface	FT232RL	FUTURE TECHNOLOGYDEVICES INTERNATIONAL (FTDI)	FT232RL	SSOP28
IC89	1		Dual Channel Digital Isolator	ISO7221AD	TEXAS INSTRUMENTS	ISO7221AD	SOIC8
IC90	1		2 Data-Line Protection, Very Low Capacitance ESD Protection	USBLC6-2P6	ST MICROELECTRONICS	USBLC6-2P6	SOT666
IC91 > IC154	64		9.5 Ohm ON Resistance, ±15 V/+12 V/±5 V iCMOS, Serially-Controlled Octal SPST Switches	ADG1414BRUZ	ANALOG DEVICES	ADG1414BRUZ	TSSOP24
IC155 > IC165	11		Hex Inverters	74HC04D	NXP SEMICONDUCTORS	74HC04D	SOIC14
IC166 > IC168	3		8-Bit Shift Register With 3-State Output Registers	SN74HC595D	TEXAS INSTRUMENTS	SN74HC595D	SOIC16
J2 J4 > J7 J10	6		50 Ohms BNC Elbow PCB Socket With Mounting Posts		TYCO ELECTRONICS	1-1337543-0	
J8	1		6 Contacts, Pitch 2.54mm, Dual Row Through Mount Straight Header (Post Lead = 6.35mm, Tail Lead 3.05mm, Insulator 1.52mm)		SAMTEC	MTLW-103-07-L-D-250	
J12	1		Thru Hole, Right Angle, 4 Position, Type B, USB Receptacle		TYCO ELECTRONICS	292304-1	
J13	1		4 Contacts, Pitch 2.54mm, Single Row Through Mount Straight Socket (Lead Length 4.93mm)		SAMTEC	SSW-104-02-L-S	
J14 J23	2		12 Contacts, Pitch 2.54mm, Dual Row Through Mount Straight Elevated Socket, Low Insertion Force (Lead Length 4.57mm)		SAMTEC	ESW-106-69-L-D	
J15 > J22	8		32 Contacts, Pitch 2.54mm, Dual Row Through Mount Straight Elevated Socket, Low Insertion Force (Lead Length 4.57mm)		SAMTEC	ESW-116-69-L-D	
J24 > J31	8		50 Contacts, Pitch 2.54mm, Dual Row Through Mount Straight Elevated Socket, Low Insertion Force (Lead Length 4.57mm)		SAMTEC	ESW-125-69-L-D	
L1	1		±10% 450mA Chip Inductor (Chip Coil) for Choke Wire Wound Type	10uH	MURATA	LQH32CN100K33L	
L2 > L4	3		±20% 650mA Chip Inductor (Chip Coil) for Choke Wire Wound Type	4.7uH	MURATA	LQH32CN4R7M33L	
L5	1		±25% 2A SMD EMI Suppression Chip Ferrite Bead (WE-CBF Series)	330R@100MHz	WURTH ELEKTRONIK	742792037	0805
LD1, LD2 LD5	6		Surface Mount Green LED (1206 Case)		AVAGO TECHNOLOGIES	HSMG-C150	1206

Ref	Qty	Scem	Description	Val&Device	Manufacturer	Part Number	Case
LD8 > LD10							
LD3 LD6, LD7	3		Yellow Diffused Surface Mount LED (1206 Case)		AVAGO TECHNOLOGIES	HSMY-C150	1206
LD4	1		Surface Mount Red LED (1206 Case)		AVAGO TECHNOLOGIES	HSMC-C150	1206
R1 > R16 R18 > R249 R251 > R514 R526 R529 R569, R570 R579, R580 R650 R672, R673 R686 R688 R690 R692	525		±1% 0.1W ±100ppm/°C General Purpose Thick Film Chip Resistor	10k	GENERIC	R0603_10K_1%_0.1W_100PPM	0603
R17 R250 R589 R592 R603, R604 R623 R640 R649 R651	10		2A (0.05R Max DC Resistance) Zero Ohm Jumper	0	GENERIC	R1206_0R_JUMPER	1206
R515 R521	2		±1% 0.1W ±100ppm/°C General Purpose Thick Film Chip Resistor	10M	GENERIC	R0603_10M_1%_0.1W_100PPM	0603
R516 R522	2		±1% 0.1W ±100ppm/°C General Purpose Thick Film Chip Resistor	1M	GENERIC	R0603_1M_1%_0.1W_100PPM	0603
R517, R518 R565 R654 R657 R687 R689 R691 R693	9		±1% 0.1W ±100ppm/°C General Purpose Thick Film Chip Resistor	100k	GENERIC	R0603_100K_1%_0.1W_100PPM	0603
R519	1		±1% 0.1W ±100ppm/°C High-Value High-voltage (150V) Wraparound Chip Resistor	5M	OHMITE	HVC0603T5004FET	0603
R520	1		±1% 0.1W ±100ppm/°C General Purpose Thick Film Chip Resistor	510k	GENERIC	R0603_510K_1%_0.1W_100PPM	0603
R523 R527 R530 R534 R548 R550	6		1A (0.05R Max DC Resistance) Zero Ohm Jumper	0	GENERIC	R0603_0R_JUMPER	0603
R524	1		±5% 0.1W ±100ppm/°C High-Value High-voltage (150V) Wraparound Chip Resistor	50M	OHMITE	HVC0603T5005FET	0603
R525	1		±1% 0.1W ±100ppm/°C General Purpose Thick Film Chip Resistor	2M	GENERIC	R0603_2M_1%_0.1W_100PPM	0603
R528	1		±1% 0.1W ±100ppm/°C Precision High-Value High-Voltage Wraparound Chip Resistor	100M	OHMITE	HVC0603T1006FET	0603
R549	1		±1% 0.1W ±100ppm/°C General Purpose Thick Film Chip Resistor	51	GENERIC	R0603_51R_1%_0.1W_100PPM	0603
R551	1		±1% 0.25W ±100ppm/°C General Purpose Thick Film Chip Resistor	36k	GENERIC	R1206_36K_1%_0.25W_100PPM	1206
R552	1		±1% 0.25W ±100ppm/°C General Purpose Thick Film Chip Resistor	62k	GENERIC	R1206_62K_1%_0.25W_100PPM	1206
R555, R556	2		±1% 0.1W ±100ppm/°C General Purpose Thick Film Chip Resistor	220	GENERIC	R0603_220R_1%_0.1W_100PPM	0603
R557 > R560 R655	5		±1% 0.1W ±100ppm/°C General Purpose Thick Film Chip Resistor	330	GENERIC	R0603_330R_1%_0.1W_100PPM	0603
R561 R566	2		±1% 0.25W ±100ppm/°C General Purpose Thick Film Chip Resistor	91k	GENERIC	R1206_91K_1%_0.25W_100PPM	1206
R562, R563	2		±1% 0.25W ±100ppm/°C General Purpose Thick Film Chip Resistor	8k2	GENERIC	R1206_8K2_1%_0.25W_100PPM	1206
R564	1		±1% 0.1W ±100ppm/°C General Purpose Thick Film Chip Resistor	1k	GENERIC	R0603_1K_1%_0.1W_100PPM	0603
R567	1		±1% 0.1W ±100ppm/°C General Purpose Thick Film Chip Resistor	1M1	GENERIC	R0603_1M1_1%_0.1W_100PPM	0603

Ref	Qty	Scem	Description	Val&Device	Manufacturer	Part Number	Case
R571 > R578 R581 > R588 R595 > R602 R605 > R612 R615 > R622 R624 > R639 R641 > R648	64		±1% 0.1W ±100ppm/°C General Purpose Thick Film Chip Resistor	33k	GENERIC	R0603_33K_1%_0.1W_100PPM	0603
R590, R591 R593, R594	4		±1% 0.25W ±100ppm/°C General Purpose Thick Film Chip Resistor	10k	GENERIC	R1206_10K_1%_0.25W_100PPM	1206
R656	1		±1% 0.1W ±100ppm/°C General Purpose Thick Film Chip Resistor	750	GENERIC	R0603_750R_1%_0.1W_100PPM	0603
R658 R671	2		±1% 0.1W ±100ppm/°C General Purpose Thick Film Chip Resistor	2k4	GENERIC	R0603_2K4_1%_0.1W_100PPM	0603
R659 > R670 R674 > R685	24		±1% 0.1W ±100ppm/°C General Purpose Thick Film Chip Resistor	3k3	GENERIC	R0603_3K3_1%_0.1W_100PPM	0603
ST1	1		3 Contacts, Pitch 2.54mm, Single Row Through Mount Straight Header (Post Lead = 6.35mm, Tail Lead 3.05mm, Insulator 1.52mm)		SAMTEC	MTLW-103-07-L-S-250	
ST2 > ST6	5		2 Contacts, Pitch 2.54mm, Single Row Through Mount Straight Header (Post Lead = 6.35mm, Tail Lead 3.05mm, Insulator 1.52mm)		SAMTEC	MTLW-102-07-L-S-250	
SW1 > SW3	3	09.55.10.950.1	Closed Insulated Red Jumper Pitch 2.54mm		STELVIO-KONTEK	3131730000402	
T4	1		-20V -3.7A P-Channel HEXFET® Power MOSFET	IRLML6402PBF	INTERNATIONAL RECTIFIER	IRLML6402PBF	SOT23-3
T6	1		60V 280mA N-Channel Enhancement Mode Field Effect Transistor (FET)	2N7002	FAIRCHILD SEMICONDUCTOR	2N7002	SOT23-3
T7	1		-30V -470mA P-Channel Enhancement Mode MOS Transistor	BSH203	NXP SEMICONDUCTORS	BSH203	SOT23-3

Sensitive

IC78	1		I2C Digital Humidity 0 – 100% RH and Temperature -40°C to +125°C Sensor	SHT25	SENSIRION	SHT25	SON6
PB1 > PB5	5		12VDC 50mA, 6x6mm Model, 13mm Stem Height Vertical Pushbutton Switch, ALPS SKHH Series		ALPS	SKHHDTA010	

Not Mounted

C16	1		±10% 250V X7R SMD Multilayer Chip Ceramic Capacitor	4.7nF	GENERIC	CC0805_4.7NF_250V_10%_X7R	0805
C187, C188 C192 > C197	8		±10% 50V X7R SMD Multilayer Chip Ceramic Capacitor	100nF	GENERIC	CC0603_100NF_50V_10%_X7R	0603
IC79, IC80	2		Dual Low-Noise JFET-Input Operational Amplifier	TL072CD	TEXAS INSTRUMENTS	TL072CD	SOIC8
IC81	1		Ultra-Low Leakage Monolithic CMOS Analog Multiplexers	MAX328EWE+	MAXIM	MAX328EWE+	SOIC16W
IC82	1		Low Power, Low Noise Precision FET Operational Amplifier	AD795JRZ	ANALOG DEVICES	AD795JRZ	SOIC8
J1 J3 J9 J11	4		TRB (Twinax/Triax 500MHz) Right Angle PCB Jack		TROMPETER/CINCH	CBBJR79A	
R531 R536 R538 R541 R553, R554	6		1A (0.05R Max DC Resistance) Zero Ohm Jumper	0	GENERIC	R0603_0R_JUMPER	0603
R532	1		±1% 0.1W ±100ppm/°C General Purpose Thick Film Chip Resistor	470	GENERIC	R0603_470R_1%_0.1W_100PPM	0603
R533 R535	2		±1% 0.1W ±100ppm/°C General Purpose Thick Film Chip Resistor	100	GENERIC	R0603_100R_1%_0.1W_100PPM	0603
R537 R539, R540 R542 R653	5		±1% 0.1W ±100ppm/°C General Purpose Thick Film Chip Resistor	10k	GENERIC	R0603_10K_1%_0.1W_100PPM	0603
R543 R613, R614	3		±1% 0.1W ±100ppm/°C General Purpose Thick Film Chip Resistor	100k	GENERIC	R0603_100K_1%_0.1W_100PPM	0603
R544	1		±1% 0.1W ±100ppm/°C General Purpose Thick Film Chip Resistor	1M	GENERIC	R0603_1M_1%_0.1W_100PPM	0603
R545	1		±1% 0.1W ±100ppm/°C Precision High-Value High-Voltage Wraparound Chip Resistor	100M	OHMITE	HVC0603T1006FET	0603
R546	1		±1% 0.1W ±100ppm/°C General Purpose Thick Film Chip Resistor	10M	GENERIC	R0603_10M_1%_0.1W_100PPM	0603
R547	1		±1% 0.3W ±100ppm/°C Thick Film Chip Resistor, High Voltage	1G	VISHAY TECHNO	CRHV1206AF1G00FKFT	1206
R568	1		±1% 0.1W ±100ppm/°C General Purpose Thick Film Chip Resistor	1M1	GENERIC	R0603_1M1_1%_0.1W_100PPM	0603
R652	1		2A (0.05R Max DC Resistance) Zero Ohm Jumper	0	GENERIC	R1206_0R_JUMPER	1206
T1	1		1500V 2A N-Channel Power MOSFET	2SK4177-DL-1E	ON SEMICONDUCTOR	2SK4177-DL-1E	TO-263-2L
T2, T3	3		60V 280mA N-Channel Enhancement Mode Field Effect Transistor (FET)	2N7002	FAIRCHILD SEMICONDUCTOR	2N7002	SOT23-3

Ref	Qty	Scem	Description	Val&Device	Manufacturer	Part Number	Case
T5							
TP1 > TP35	35		Black Bead PCB Terminal Test Pin for 1.6mm PCB Thickness (1.32mm Hole)		VERO TECHNOLOGIES	20-2136	

Dimensions: 220 x 230mm	Through Pins	811
	SMD pins on Top	2548
	SMD pins on Bottom	2372
	Total number of pins	5731