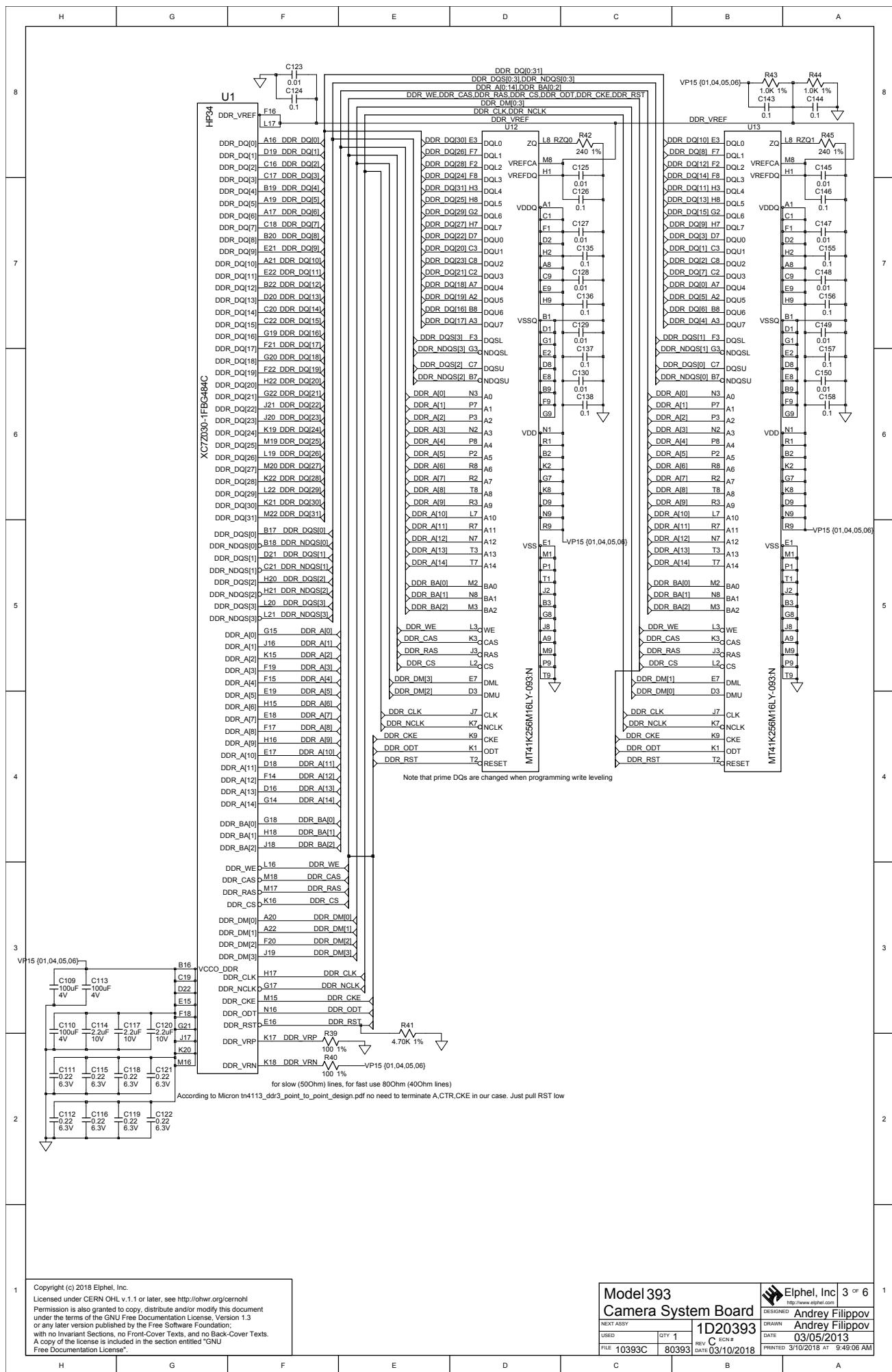
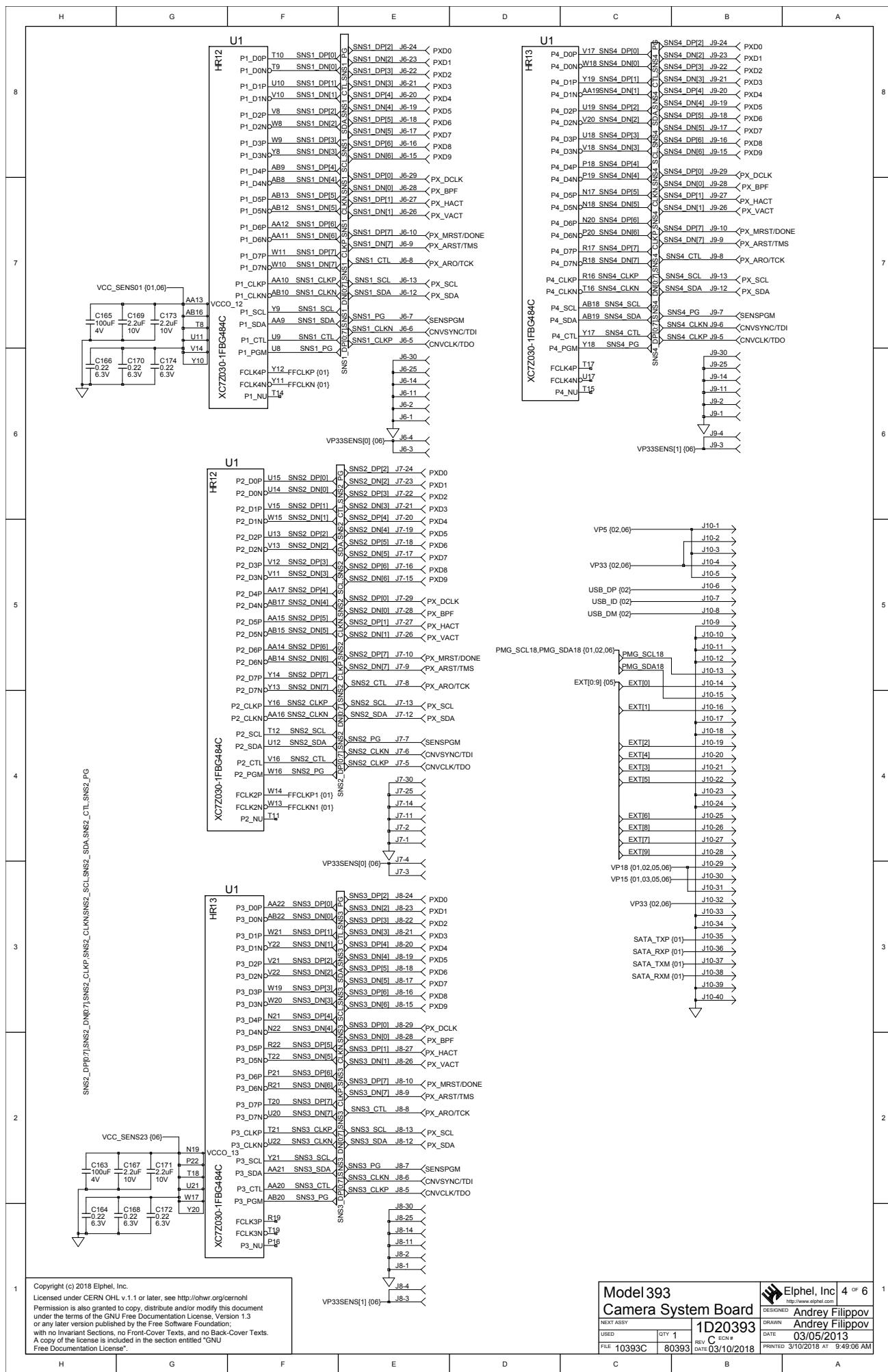
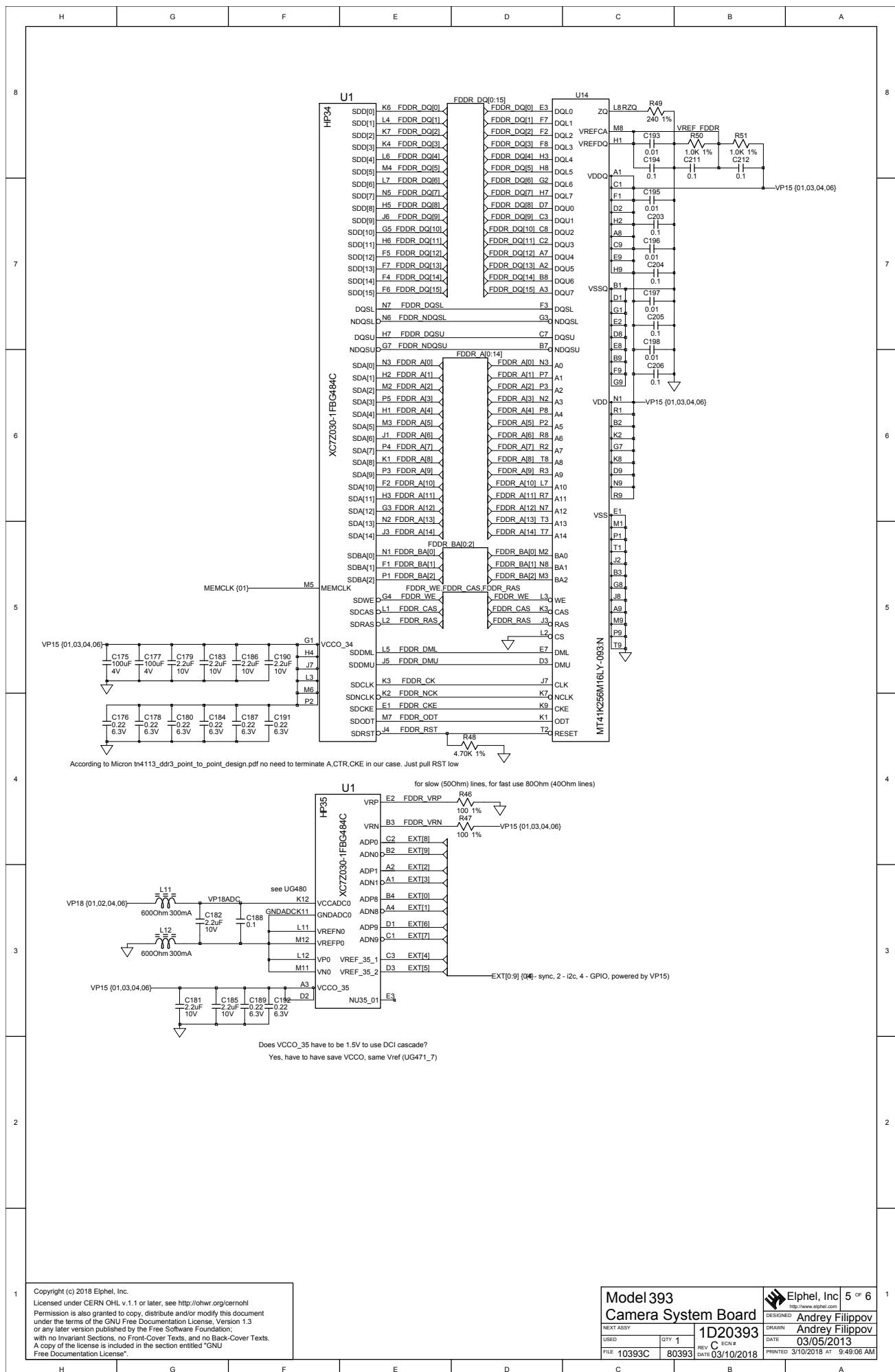


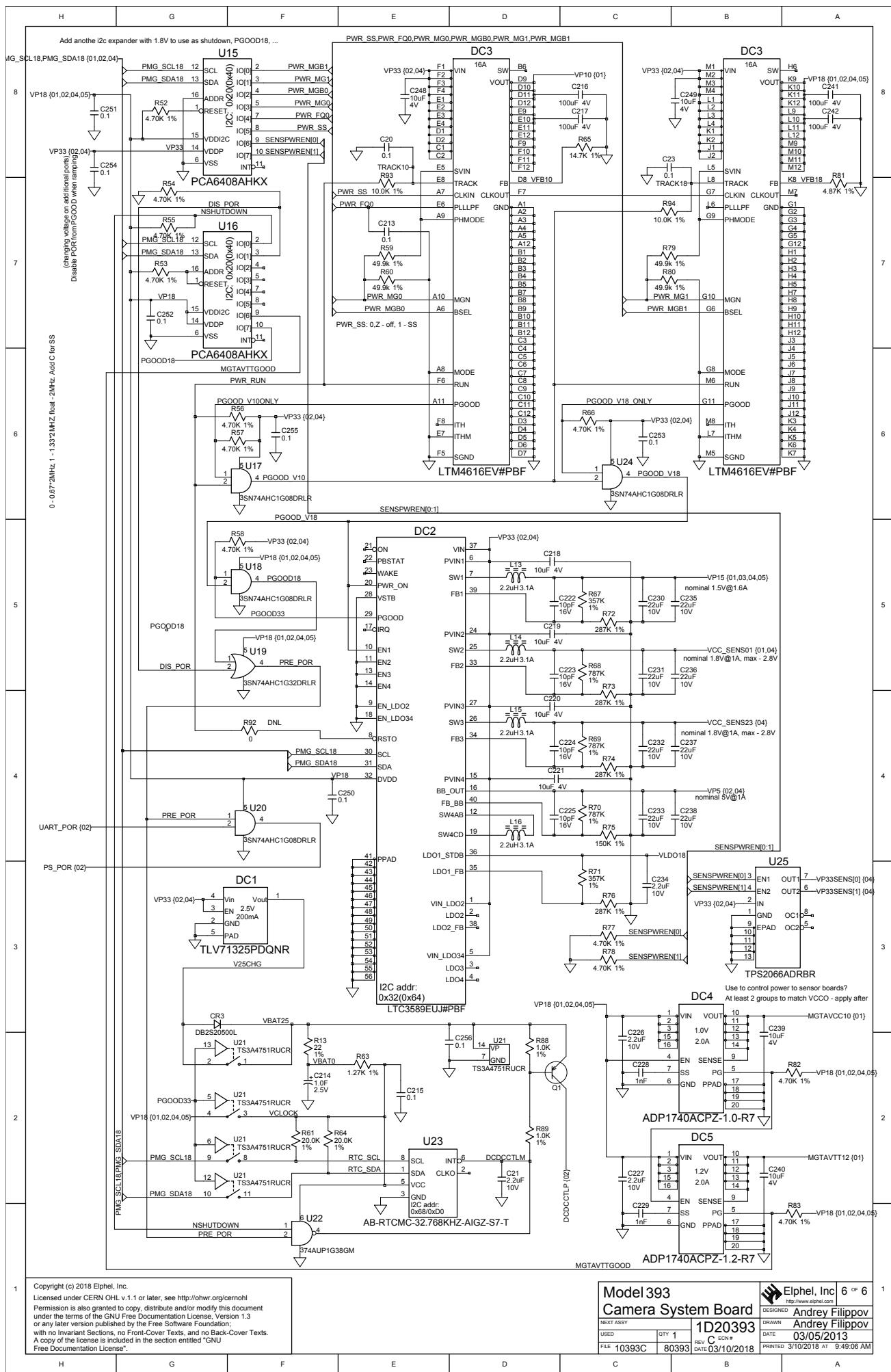
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Model 393
Camera System Board
1D20393
NEXT ASY: 1
USED: QTY 1
FILE: 10393C 80393
REV: ECA-4
DATE: 03/05/2013
PRINTED: 3/10/2018 AT: 9:49:06 AM
Elphel, Inc 2 of 6
http://www.elphel.com
DESIGNED: Andrey Filippov
DRAWN: Andrey Filippov
DATE: 03/05/2013
PRINTED: 3/10/2018 AT: 9:49:06 AM









SUB-ASSEMBLY											
USAGE	#	NO.	4A20393			RELEASE DATE	03/09/18	P/L	REV.	REV.	Units to Total Cost per
-----	-----	-----	-----			-----	-----	DATE	LTR	DATE	Build Cost Unit
393	1	TITLE	Model 393 Camera System Board		PCB Assembly 80393	JOB#	N/A	3/5/2013	C	9/27/2017	1 \$406.47 \$406.47
		# TO	MFGR		1	WORK ORDER #	N/A				
		NEXT	ASSY	4A-?????		NON STANDARD					
						NOTATIONS					
DESIGNATOR	ITEM	QTY	EXT	STK	ROHS	PART	MANUFAC	VENDOR	PURCH	UNIT	NEW
NUMBER	#	REQ	QTY	CHK		DESCRIPTION	#	TURER	VENDOR	PART #	PRICE TOTAL STOCK
-----	---	---	---	---	---	-----	-----	-----	-----	-----	-----
-----	---	---	---	---	---	Related Documents	-----	-----	-----	-----	-----
	0.5	1	1			Schematic 10393C (80393), Model 393	1D20393 Rev.C	Designed by Andrey Filippov			
	20	1	1			Fabrication (80393), Model 393	4F20393 Rev.C				
	21	1	1			Artwork (80393), Model 393	4G20393 Rev.C				
-----	---	---	---	---	---	Integrated Circuits	-----	-----	-----	-----	-----
U12-U14	40	3	3	Y	DDR3 Synchronous DRAM, 4Gbit (256Mx16), 256MX16, 1.5V , FBGA-96-TW	MT41K256M16LY-093:N	Micron		0	0	0 -3
U11	41	1	1	Y	8Gb (1Gx8) NAND Flash, 1GX8, 1.8V , VFBGA-63-9x11	MT29F8G08ADBD AH4-IT:D	Micron	Arrow	1	10.575	10.575 0
U7	42	1	1	Y	USB to UART bridge with GPIO, 3.3V , QFN-28	CP2103-GM	Silicon Laboratories	Digi-Key	336-1164-ND	1	5.36 5.36 0
U2, U26	43	2	2	Y	Oscillator MEMS, 25MHZ , OSC4-2520	ASDMB-25.000MHZ-XY-T	Abracan Corporation	Digi-Key	535-11157-1-ND	2	3.64 7.28 0
U27	44	1	1	Y	Oscillator MEMS, 26MHZ , OSC4-2520	ASDMB-26.000MHZ-XY-T	Abracan Corporation	Digi-Key	535-11158-1-ND	1	3.64 3.64 0
U4	45	1	1	Y	Oscillator MEMS, 33.333MHZ , OSC4-2520	ASDMB-33.333MHZ-XY-T	Abracan Corporation	Digi-Key	535-11143-1-ND	1	3.64 3.64 0
U22	46	1	1	Y	2 Input NAND Gate, Open Drain, 0.5µA , XSON-6, marked as aB	74AUP1G38GM	NXP Semiconductors	Digi-Key	568-9156-1-ND	1	0.68 0.68 0
U15-U16	47	2	2	Y	8 bit I2C 8-bit I/O port with 3-state outputs, XQFN-16, marked as P8	PCA6408AHKX	NXP Semiconductors	Digi-Key	568-9909-1-ND	2	1.7 3.4 0
U25	48	1	1	Y	Dual Current-Limited Power Distribution Switch, SON-8	TPS2066ADRBR	Texas Instruments	Digi-Key	296-23393-1-ND	1	1.78 1.78 0

DESIGNATOR	ITEM	QTY	EXT	STK	ROHS	DESCRIPTION	PART	MANUFAC		VENDOR	PURCH	UNIT		NEW
NUMBER	#	REQ	QTY	CHK			#	TURER	VENDOR	PART #	QTY	PRICE	TOTAL	STOCK
U3	49	1	1	Y		Four Channel MyltiSynth CLock Generator with Single low-jitter PLL, 1.8V, QFN-24-1MM	SI5338A-B-GM	Silicon Laboratories	Digi-Key	336-4326-1-ND	1	14.79	14.79	0
U10	50	1	1	Y		Gigabit Ethernet Transceiver, QFN-40	AR8035-AL1A	Atheros	http://www.arrow.com/		1	10	10	0
U21	51	1	1	Y		Quad SPST-NO Analog Switch, VQFN-14, marked as 3M	TS3A4751RUCR	Texas Instruments	Digi-Key	296-24478-1-ND	1	1.36	1.36	0
U23	52	1	1	Y		Real Time Clock/Calendar with I2C, RTC , WCDFN-8	AB-RTCMC-32.768KHZ-AIGZ-S7-T	Abracan Corporation	Digi-Key	535-12052-1-ND	1	5.14	5.14	0
U8	53	1	1	Y		SDIO port expander, WQFN-24	TXS02612RTWR	Texas Instruments	Digi-Key	296-23869-1-ND	1	1.7	1.7	0
U17-U18, U20, U24	54	4	4	Y		Single 2-AND Gate, SOT-553, marked as AE?	SN74AHC1G08D RLR	Texas Instruments	Digi-Key	296-19376-1-ND	1000	0	0	996
U5-U6	55	2	2	Y		Single 2-NAND Gate, SOT-553, marked as HA7~HAR	SN74AUP1G00D RLR	Texas Instruments	Digi-Key	296-18712-1-ND	2	0.44	0.88	0
U19	56	1	1	Y		Single 2-OR Gate, SOT-553, marked as AG	SN74AHC1G32D RLR	Texas Instruments	Digi-Key	296-19378-1-ND	1	0.54	0.54	0
U29	57	1	1	Y		Single Bidirectional Level Shifter, SOT-563, marked as 2G	TXS0101DRLR	Texas Instruments	Digi-Key	296-22865-1-ND	1	0.82	0.82	0
U30	58	1	1	Y		Single Channel Power Distribution Switch, MLF-6, marked as F05	MIC2005-0.5YML	Micrel	Digi-Key	576-1678-1-ND	1	1.83	1.83	0
U28	59	1	1	Y		Single Unidirectional Level Shifter, UFDFN-6, marked as U2	SN74AUP1T34DR YR	Texas Instruments	Mouser	595-SN74AUP1T34D RYR	1	0.59	0.59	0
U9	60	1	1	Y		USB Transceiver, VFBGA-36	TUSB1211A1ZRQ R	Texas Instruments	Digi-Key	296-28357-1-ND	1	2.73	2.73	0
U1	61	1	1	Y		ZZynq 7030 configured for 10393, FBG484	XC7Z030-1FBG484C	Xilinx	Avnet	XC7Z030-1FBG484C	1	150	150	0
Power Supply Modules														
DC4	62	1	1	Y		LDO regulator, 1V, 2A , VQFN-16	ADP1740ACPZ-1.0-R7	Analog Devices	Digi-Key	ADP1740ACPZ-1.0-R7CT-ND	1	3.11	3.11	0
DC5	63	1	1	Y		LDO regulator, 1.2V, 2A , VQFN-16	ADP1740ACPZ-1.2-R7	Analog Devices	Digi-Key	ADP1740ACPZ-1.2-R7CT-ND	1	3.11	3.11	0
DC1	64	1	1	Y		LDO regulator, 2.5V, 200mA , X2SON-4, marked as AZ	TLV71325PDQNR	Texas Instruments	Digi-Key	296-35468-1-ND	1	0.47	0.47	0
DC3	65	1	1	Y		Dual 8A per Channel Low Vin DC/DC uModule, 16A , LGA-144	LTM4616EV#PBF	Linear Technology	Digi-Key	LTM4616EV#PB F-ND	1	33.23	33.23	0
DC2	66	1	1	Y		Power Management IC for Li-Ion Powered Systems, VFQFN-40	LTC3589EUJ#PB F	Linear Technology	Digi-Key	LTC3589EUJ#P BF-ND	1	7.3	7.3	0
Transistors														
Q1	67	1	1	Y		Transistor PNP, 45V, 500mA , SOT-723, marked as BW	2SA2030T2L	Rohm	Digi-Key	2SA2030T2LCT-ND	1	0.51	0.51	0

DESIGNATOR	ITEM	QTY	EXT	STK	ROHS	DESCRIPTION	PART	MANUFAC		VENDOR	PURCH	UNIT		NEW
NUMBER	#	REQ	QTY	CHK			#	TURER	VENDOR	PART #	QTY	PRICE	TOTAL	STOCK
QN1	68	1	1	Y		Dual matched NPN transistors, 45V, 100mA , SOT-666, marked as EA	PMP4201V	Nexperia	Digi-Key	1727-5850-1-ND	1	0.53	0.53	0
						Diodes								
CR1-CR2	69	2	2	Y		4-Line ESD Protection with Clamp, 5V, 12A, 60W , UFDFN-6, marked as F5	TPD4S012DRYR	Texas Instruments	Digi-Key	751-1413-1-ND	2	0.78	1.56	0
CR3	70	1	1	Y		Schottky Barier Diode, 15V, 200mA , SOD-523, marked as BA	DB2S20500L	Panasonic	Digi-Key	ZHCS500CT-ND	1	0.3	0.3	0
						Resistors								
R9, R13, R15, R19, R84-R86	71	7	7	Y		Resistor, 22Ω, ±1% , SMD 0201, marked as 22R0	ERJ-1GEF22R0C	Panasonic	Digi-Key	P22.0ABCT-ND	7	0	0	0
R16	72	1	1	Y		Resistor, 49.9Ω, ±1% , SMD 0201, marked as 49R9	ERJ-1GEF49R9C	Panasonic	Digi-Key	P49.9ABCT-ND	10	0.11	1.1	9
R6, R39-R40, R46-R47	73	5	5	Y		Resistor, 100Ω, ±1% , SMD 0201, marked as 1000	ERJ-1GEF1000C	Panasonic	Digi-Key	P100ABCT-ND	10	0.11	1.1	5
R42, R45, R49	74	3	3	Y		Resistor, 240Ω, ±1% , SMD 0201, marked as 2400	ERJ-1GEF2400C	Panasonic	Digi-Key	P240ABCT-ND	10	0.11	1.1	7
R30, R35-R36	75	3	3	Y		Resistor, 510Ω, ±1% , SMD 0201, marked as 5100	ERJ-1GEF5100C	Panasonic	Digi-Key	P510ABCT-ND	3	0	0	0
R17, R43-R44, R50-R51, R88-R89	76	7	7	Y		Resistor, 1KΩ, ±1% , SMD 0201, marked as 1001	ERJ-1GEF1001C	Panasonic	Digi-Key	P1.00KABCT-ND	10	0.11	1.1	3
R63	77	1	1	Y		Resistor, 1.27KΩ, ±1% , SMD 0201, marked as 1271	ERJ-1GEF1271C	Panasonic	Digi-Key	P1.27KABCT-ND	10	0.11	1.1	9
R34, R62, R90	78	3	3	Y		Resistor, 2.37KΩ, ±1% , SMD 0201, marked as 2371	ERJ-1GEF2371C	Panasonic	Digi-Key	P2.37KABCT-ND	3	0	0	0
R1-R5, R11-R12, R14, R21, R28, R37-R38, R41, R48, R52-R58, R66, R77-R78, R82-R83	79	26	26	Y		Resistor, 4.7KΩ, ±1% , SMD 0201, marked as 4701	ERJ-1GEF4701C	Panasonic	Digi-Key	P4.70KABCT-ND	26	0.11	2.86	0
R81	80	1	1	Y		Resistor, 4.87KΩ, ±1% , SMD 0201, marked as 4871	ERJ-1GEF4871C	Panasonic	Digi-Key	P4.87KABCT-ND	1	0.11	0.11	0
R7-R8, R22-R24, R32-R33, R91, R93-R97	81	13	13	Y		Resistor, 10KΩ, ±1% , SMD 0201, marked as 1002	ERJ-1GEF1002C	Panasonic	Digi-Key	P10.0KABCT-ND	13	0.11	1.43	0
R65	82	1	1	Y		Resistor, 14.7KΩ, ±1% , SMD 0201, marked as 1472	ERJ-1GEF1472C	Panasonic	Digi-Key	P14.7KABCT-ND	1	0.11	0.11	0
R18, R20, R25-R27, R29, R31, R61, R64	83	9	9	Y		Resistor, 20KΩ, ±1% , SMD 0201, marked as 2002	ERJ-1GEF2002C	Panasonic	Digi-Key	P20.0KABCT-ND	10	0.11	1.1	1
R10, R59-R60, R79-R80	84	5	5	Y		Resistor, 49.9KΩ, ±1% , SMD 0201, marked as 4992	ERJ-1GEF4992C	Panasonic	Digi-Key	P49.9KABCT-ND	5	0.11	0.55	0

DESIGNATOR	ITEM	QTY	EXT	STK	ROHS	DESCRIPTION	PART	MANUFAC		VENDOR	PURCH	UNIT		NEW
NUMBER	#	REQ	QTY	CHK			#	TURER	VENDOR	PART #	QTY	PRICE	TOTAL	STOCK
R75	85	1	1	Y		Resistor, 150KΩ, ±1%, SMD 0201, marked as 1503	ERJ-1GEF1503C	Panasonic	Digi-Key	P150KABCT-ND	10	0.11	1.1	9
R72-R74, R76	86	4	4	Y		Resistor, 287KΩ, ±1%, SMD 0201, marked as 2873	ERJ-1GEF2873C	Panasonic	Digi-Key	P287KABCT-ND	10	0.11	1.1	6
R67, R71	87	2	2	Y		Resistor, 357KΩ, ±1%, SMD 0201, marked as 3573	ERJ-1GEF3573C	Panasonic	Digi-Key	P357KABCT-ND	2	0.11	0.22	0
R68-R70	88	3	3	Y		Resistor, 787KΩ, ±1%, SMD 0201, marked as 7873	ERJ-1GEF7873C	Panasonic	Digi-Key	P787KABCT-ND	10	0.11	1.1	7
R87, R92	89	2	2	Y		Jumper, 0Ω, SMD 0402, marked as 0	ERJ-2GE0R00X	Panasonic	Digi-Key	P0.0JCT-ND	2	0.05	0.1	0
C22, C26, C28	90	3	3	---	Capacitors									
C214	91	1	1	Y		Low ESR (0.012 Ohm), Tantalum Chip Capacitor 6.0mm x 3.2mm x 1.9mm, 330µF, 2.5V, CP-2312	T520L337M2R5A TE012	Kemet	Digi-Key	399-10345-1-ND	3	3.14	9.42	0
C61, C218-C221, C239-C240, C248-C249	92	9	9	Y		Electric Double Layer Capacitors, 1F, 2.5V, D8L22	EECA0EL105	Panasonic	Digi-Key	P6963-ND	1	4.15	4.15	0
C27, C29-C30, C35, C42, C64, C72, C109-C110, C113, C163, C165, C175, C177, C216-C217, C241-C242	93	18	18	Y		Capacitor, Ceramic Chip, X7S,20%, t=1.6mm, 100µF, 4V, C-1206	C3216X6S0G107 M160AC	TDK	Digi-Key	445-9100-1-ND	9	0.49	4.41	0
C33-C34, C36, C75-C76, C81-C83, C91-C92, C103, C123, C125, C127-C130, C145, C147-C150, C193, C195-C198	94	27	27	Y		Capacitor, Ceramic Chip, 0.01µF, 6.3V, C-0201	ECJ-ZEB0J103K	Panasonic	Digi-Key	399-1278-1-ND	27	0.1	2.7	0

DESIGNATOR	ITEM NUMBER	QTY #	EXT REQ	STK QTY	ROHS CHK	DESCRIPTION	PART #	MANUFAC TURER	VENDOR	PURCH PART #	UNIT QTY	TOTAL PRICE	NEW STOCK	
C5-C10, C12-C20, C23, C37-C39, C45-C48, C63, C67, C71, C77-C78, C84, C86-C90, C94, C98-C99, C101-C102, C104-C108, C124, C126, C135-C138, C143-C144, C146, C155-C158, C188, C194, C203-C206, C211-C213, C215, C245-C246, C250-C256	95	76	76	---	Y	Capacitor, Ceramic Chip, 0.1µF, 6.3V , C-0201D	ECJ-ZEB0J104M	Panasonic	Digi-Key	PCC2336CT-ND	100	0.0466	4.66	24
C32, C41, C44, C50, C52, C54, C56, C58, C60, C62, C66, C68, C70, C74, C80, C111-C112, C115-C116, C118-C119, C121-C122, C164, C166, C168, C170, C172, C174, C176, C178, C180, C184, C187, C189, C191-C192	96	37	37	---	Y	Capacitor, Ceramic Chip, X7S,20%, 0.22µF, 6.3V , C-0201	C0603X7S0J224M 030BC	TDK	Digi-Key	445-9075-1-ND	37	0.173	6.401	0
C85, C93	97	2	2	---	Y	Capacitor, Ceramic Chip, 10%, 1µF, 6.3V , C-0402	ECJ-0EB0J105K	Panasonic	Digi-Key	PCC2393CT-ND	10	0.144	1.44	8
C3-C4, C11	98	3	3	---	Y	Capacitor, Ceramic Chip, 20%, 4.7µF, 6.3V , C-0402	ECJ-0EB0J475M	Panasonic	Digi-Key	PCC2475CT-ND	10	0.29	2.9	7
C97, C100	99	2	2	---	Y	Capacitor, Ceramic Chip, X5R,20%, 10µF, 6.3V , C-0603	ECJ-1VB0J106M	Panasonic	Digi-Key	PCC2395CT-ND	2	0.45	0.9	0
C257-C261	100	5	5	---	Y	Capacitor, Ceramic Chip, 0.1µF, 10V , C-0402D	C0402C104K8PA CTU	Kemet	Digi-Key	399-3027-1-ND	10	0.083	0.83	5

DESIGNATOR	ITEM NUMBER	ITEM #	QTY REQ	EXT QTY	STK CHK	ROHS	DESCRIPTION	PART #	MANUFAC TURER	VENDOR	VENDOR PART #	PURCH QTY	UNIT PRICE	UNIT TOTAL	NEW STOCK
C1-C2, C21, C31, C40, C43, C49, C51, C53, C55, C57, C59, C65, C69, C73, C79, C114, C117, C120, C167, C169, C171, C173, C179, C181- C183, C185- C186, C190, C226-C227, C234, C243- C244, C247	101	36	36	36	Y		Capacitor, Ceramic Chip, X7S,20%, 2.2µF, 10V , C-0402	C1005X7S1A225K 050BC	TDK	Digi-Key	445-9097-1-ND	36	0.28	10.08	0
C230-C233, C235-C238	102	8	8	8	Y		Capacitor, Ceramic Chip, X7S,20%, 22µF, 10V , C-0805	C2012X7S1A226 M125AC	TDK	Digi-Key	445-14560-1-ND	8	1.01	8.08	0
C222-C225	103	4	4	4	Y		Capacitor, Ceramic Chip, 10pF, 16V , C- 0201	C0201C100D3GA CTU	Kemet	Digi-Key	399-8924-1-ND	10	0.021	0.21	6
C228-C229	104	2	2	2	Y		Capacitor, Ceramic Chip, 1nF, 25V , C- 0201	ECJ-ZEB1E102K	Panasonic	Digi-Key	PCC2130CT-ND	10	0.075	0.75	8
C24, C95-C96	105	3	3	3	Y		Capacitor, Ceramic Chip, 330pF, 50V , C-0201	ECJ-ZEB1H331K	Panasonic	Digi-Key	PCC2390CT-ND	10	0.075	0.75	7
	---	---	---	---	---		Inductors and LC filters	-----	-----	-----	-----	-----	-----	-----	-----
L13-L16	106	4	4	4	Y		SMD Shielded Inductor, 21mOhm, 4mm x 4mm x 2.1mm, 2.2µHn, 3.1A ,	XFL4020-222ME	Coilcraft	Coilcraft		4	2.13	8.52	0
L9	107	1	1	1	Y		SMD Inductor, 3mm x 3mm x 1.2mm, 4.7µHn, 1A , VLS3012	VLS3012T- 4R7M1R0	TDK	Digi-Key	445-3686-1-ND	1	0	0	0
L1-L5, L8, L10- L12, L17-L18	108	11	11	11	Y		SMD Inductor, 600 Ohm, 600Unknown inductance units - "OHM" , 300mA, SMD 0402	BLM15HD601SN1 D	Murata	Digi-Key	490-4002-1-ND	11	0	0	0
L6-L7	109	2	2	2	Y		SMD Inductor, 120 Ohm, 1.2A , SMD 0402	MPZ1005S121C	TDK	Digi-Key	445-2981-1-ND	2	0	0	0
	---	---	---	---	---		Connectors	-----	-----	-----	-----	-----	-----	-----	-----
J1-J2	110	2	2	2	Y		Connector Receptacle Low profile Milli- Grid 2mm, 2 rows, 6contacts total, 500V, 2A , SMD 873400624	0873400624	Molex	Digi-Key	WM18689-ND	2	0.92	1.84	0
J6-J9	111	4	4	4	Y		0.5 mm-Pitch Vertical Slide-Lock FPC Connector, 30 pos., FH1230S05SV	FH12-30S-0.5SV- 55	Hirose	Digi-Key	HFL130CT-ND	4	3.11	12.44	0
J10	112	1	1	1	Y		Connector Header 40 pins, 0.5mm pitch, DF1240DS05V	DF12-40DS-0.5V	Hirose	Digi-Key	H5217CT-ND	1	1.63	1.63	0
J5	113	1	1	1	Y		Connector micro-SD, Push In/Pull Out, SMD 1040310811	1040310811	Molex	Digi-Key	WM6357CT-ND	1	1.92	1.92	0

DESIGNATOR	ITEM	QTY	EXT	STK	ROHS	DESCRIPTION	PART	MANUFAC		VENDOR	PURCH	UNIT		NEW
NUMBER	#	REQ	QTY	CHK			#	TURER	VENDOR	PART #	QTY	PRICE	TOTAL	STOCK
J4	114	1	1	---	Y	Connector Micro-USB type AB, 5 contacts, no through-holes, 1A , 1981584-1	1981584-1	Tyco Electronics	Digi-Key	A97799CT-ND	1	1.58	1.58	0
J3	115	1	1	---	Y	Gigabit Ethernet PoE connector with Integrated Magnetics, 0826-1X1T-M1-F	0826-1X1T-M1-F	Bel Fuse	Digi-Key	380-1122-ND	1	10.27	10.27	0