RELIABILITY PREDICTION

REPORT for the

TI AM64x SOM (SRT6442WC1D01GE008V10I0)

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Prepared For SolidRun Ltd.

by RAM CRAFT Ltd.

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1. GENERAL

1.1. Scope

This document presents the reliability prediction of the module TI AM64x SOM (SRT6442WC1D01GE008V10I0) – hereafter TI AM64x SOM.

The reliability prediction was performed according to TELCORDIA SR-332, Issue 4, Reliability Prediction Procedure for Electronic Equipment [Ref. 1], using dedicated software – RAM Commander™, Version 8.7.

1.2. Abbreviations and Acronyms

FIT	-	Failures/10^9 hours
λ/FR	-	Failure Rate [Fit]
NHA	-	Next Higher Assy
G_B	-	Ground, Fixed, Controlled
MTBF	-	Mean Time Between Failures

2. APPLICABLE DOCUMENTS

[Ref. 1]	TELCORDIA SR332, Issue 4	Reliability Prediction Procedure for Electronic Equipment
[Ref. 2]	RiAC-CPE	Reliability Toolkit: Commercial Practices Edition

3. OVERVIEW

SolidRun's Marvell based CN9130 SOM is designed for next generation intelligent networking, security and edge computing applications such as 5G DU, 5G CU, routers and gateways, edge servers and software defined storage / NAS. The system on a module packs the CPU, power management, memory and storage all in a 50 x 35mm package allowing compact and modular designs.

4. RELIABILITY PREDICTION TECHNIQUE

4.1. Reliability Prediction Method and Data Sources

The reliability prediction was performed in accordance with:

- Telcordia SR-332 [Ref. 1] for electronic components.
- For chosen components (usually highest contributors to overall failure rate) Telcordia SR-332 [Ref. 1] procedure is substituted by the manufacturer reliability data after adequate adjustment to current temperature and environment using Reliability toolkit [Ref. 2].

4.2. Environment & Temperature

The reliability prediction of the TI AM64x SOM Module was performed according to the Telcordia SR-332 [Ref. 1] for following environment and temperatures:

- Environmental condition: G_B (Ground, Benign)
- Ambient temperature (T_A): 25°C
- Temperature rise of component above ambient temperature is 30°C

4.3. General Assumptions

The following are the general assumptions for the reliability prediction:

- Components failure rate is constant during equipment life period.
- The failures of different components are considered statistically independent.
- The assembly reliability model is a series one - failure of any component causes an assembly failure.
- Software failures are not applicable to the Module.

4.4. Calculations Methods

The formula for module/card MTBF calculation is:

$$\mathrm{MTBF} = \frac{1}{\sum_{i=1}^{n} \lambda(i)}$$

where:

$\lambda(i)$ = Failure rate of i^{th} item

n = Number of items

4.5. Component's Quality Levels

The assumed quality level for electronic components is Quality Level II according to the definitions of SR-332 [Ref. 1].

4.6. Component electrical stresses

The following electrical stress were applied for reliability prediction:

- For transistors power and voltage stress was defined as 50% of rated value in accordance with related component specification.
- For resistor Film Chip the PSR=20%
- For resistor Power Chip the PSR=50%
- For Ceramic Chip capacitor the VSR=20%
- For Aluminium capacitor the VSR=50%

5. SUMMARY OF RESULTS AND RECOMMENDATIONS

5.1. Module Level Reliability Prediction Results

The following are the results of the reliability prediction for the TI AM64x SOM Module at 55°C Ambient temperature and G_B Environmental condition.

λ = 445.9 FIT

MTBF = 2,242,855 hours

Figure 1 represents TI AM64x SOM Module MTBF vs. Ambient Temperature.

T(°C)	MTBF
15	6,308,528
20	6,211,351
25	6,001,250
30	5,767,160
35	4,938,999
40	4,173,248
45	3,389,061
50	2,740,108
55	2,242,855
60	1,831,060
65	1,492,817

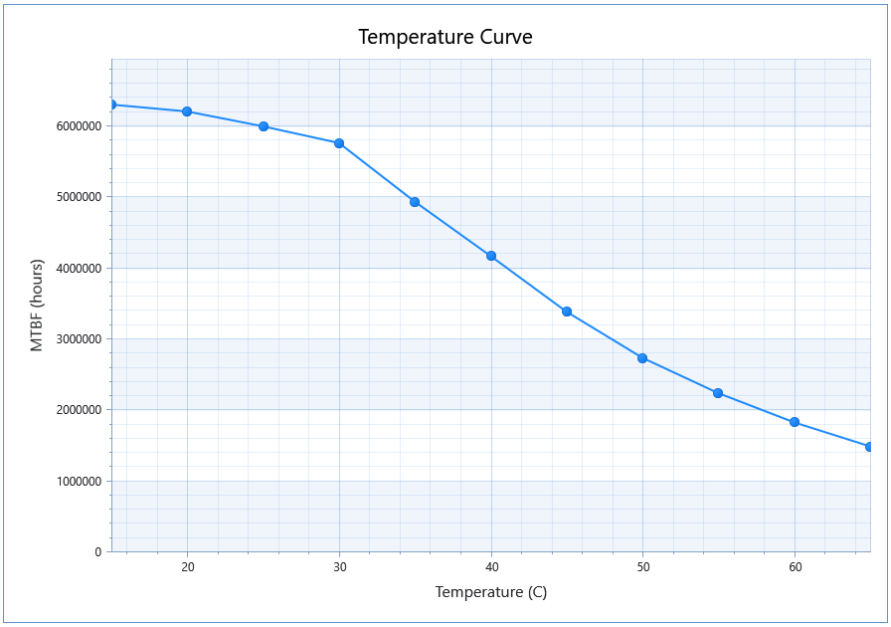

Figure 1: - TI AM64x SOM Module Temperature Curve

5.2. Conclusions

Table 1 depicts the main TI AM64x SOM contributors to overall failure rate.

Table 1 – Main Contributors To Overall Failure Rate

PN	Description	Qty	Total Failure rate	Item Failure rate contribution	Cumulative contribution
XAM6442ASFGGAALV	TI Sitara 2 x A53, 2 x R5F	1	122.756	27.532%	27.532%
KLM8G1GETF-B041	8GB eMMC	1	68.133	15.281%	42.814%
CC1312R1F3RGZT	IC RF TxRx + MCU 431MHz	1	52.756	11.832%	54.646%

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6. APPENDICES CONTENTS

6.1. Appendix A - Assembly Composite Report

This Appendix describes in detail the results of the reliability prediction at operating state. It provides also the contribution of each component failure rate to the next higher level.

6.2. Appendix B - Pareto Analysis

This appendix provides the list of components sorted by their contribution to total failure rate.

6.3. Appendix C- Applied Values

This appendix provides the list of components parameters that were used for reliability prediction.

APPENDIX A - ASSEMBLY COMPOSITE REPORT

Project name: SR_CARDS_4
Operating conditions: Environment: GB, Temperature: 25.00 °C
Current mode: Operating
FR Units: FIT
Default prediction Method: Telcordia Issue 4

Assembly Ref.Des.: TI AM64x SOM, ID: 1.4, Description: .
Environment: GB, Temperature: 55.00 °C,F.R.(FIT): 445.86 , MTBF(hours): 2242855.3

ID	PN	RefDes	Qty	F.R. FIT	F.R.(K) FIT	F.R.(K,Qty) FIT	Contrib. to NHA[%]
1.4.1	JMK063BJ224MP-F	C206 C207 C230	3	0.03181	0.03181	0.09544	0.02141
1.4.2	GRM033R70J103KA01D	C109 C123 C124 C125 C126 C132 C133 C134 C135 C136	15	0.03181	0.03181	0.4772	0.107
1.4.3	GRM033R61A104KE15D	C151 C152 C153 C154 C160 C162 C163 C167 C168 C172	25	0.03181	0.03181	0.7954	0.1784
1.4.4	CL03A105MQ3CSNC	C4 C5 C7 C8 C9 C10 C11	7	0.03181	0.03181	0.2227	0.04995
1.4.5	GRM155R71C104KA88	C141 C143 C144 C210 C249 C250 C251 C253 C255 C256	10	0.03181	0.03181	0.3181	0.07136
1.4.6	GRM155R60J225ME95D	C145	1	0.03181	0.03181	0.03181	0.007136
1.4.7	CL05C101JB5NNND	C240 C248	2	0.03181	0.03181	0.06363	0.01427
1.4.8	GRM155C80J106ME11D	C46 C83 C159 C166 C171 C178 C182 C188 C195 C200 C2	23	0.03181	0.03181	0.7317	0.1641
1.4.9	CL05B105KQ5NQNC	C48 C61 C70 C85 C95 C111 C112 C113 C114 C115 C119	44	0.03181	0.03181	1.40	0.314
1.4.10	GRM155R60J225ME15D	C228 C236	2	0.03181	0.03181	0.06363	0.01427
1.4.11	04025A120JAT2A	C208 C209 C241 C242	4	0.03181	0.03181	0.1273	0.02854
1.4.12	C0402C475M9PACTU	C14 C17 C20 C23 C26 C29 C36 C39 C42 C45 C47 C60 C8	17	0.03181	0.03181	0.5408	0.1213
1.4.13	C0402C225M8PACTU	C118 C140 C142	3	0.03181	0.03181	0.09544	0.02141
1.4.14	C1005X5R1A335K050BC	C6	1	0.03181	0.03181	0.03181	0.007136
1.4.15	CC0402JRNPO9BN121	C213 C218 C221 C226 C234	5	0.03181	0.03181	0.1591	0.03568
1.4.16	CC0402BRNPO9BN3R6	C239 C243	2	0.03181	0.03181	0.06363	0.01427
1.4.17	CC0402CRNPO9BN2R7	C244	1	0.03181	0.03181	0.03181	0.007136
1.4.18	GRM1555C1H6R2CA01D	C245	1	0.03181	0.03181	0.03181	0.007136
1.4.19	CC0402CRNPO9BN3R0	C246	1	0.03181	0.03181	0.03181	0.007136
1.4.20	GRM188R60J226MEA0D	C127 C214 C215 C252 C254	5	0.03181	0.03181	0.1591	0.03568
1.4.21	LLL153C80J104ME01E	C12 C15 C18 C21 C24 C27 C30 C32 C35 C37 C40 C43 C4	39	0.03181	0.03181	1.24	0.2783

ID	PN	RefDes	Qty	F.R. FIT	F.R.(K) FIT	F.R.(K,Qty) FIT	Contrib. to NHA[%]
1.4.22	DF40C-80DP-0.4V(51)	J7 J9	2	6.30	6.30	12.61	2.83
1.4.23	DF40C-70DP-0.4V(51)	J5001	1	5.52	5.52	5.52	1.24
1.4.24	U.FL-R-SMT-1(10)	J6	1	0.5713	0.5713	0.5713	0.1281
1.4.25	MMZ2012S102AT000	FB12	1	0.1032	0.1032	0.1032	0.02314
1.4.26	CAT24AA01TDI-GT3	U11	1	4.34	4.34	4.34	0.9731
1.4.27	KLM8G1GETF-B041	U3	1	68.13	68.13	68.13	15.28
1.4.28	K4A8G165WC-BITD000	U2	1	31.07	31.07	31.07	6.97
1.4.29	XAM6442ASFGGAALV	U1	1	122.76	122.76	122.76	27.53
1.4.30	TPS51206DSQR	U17	1	7.73	7.73	7.73	1.73
1.4.31	TPS74601PDRVR	U18 U20	2	5.53	5.53	11.06	2.48
1.4.32	DP83869HMRGZT	U6 U7 U8	3	9.22	9.22	27.67	6.21
1.4.33	TPSM82822SILR	U12 U14 U15 U16 U19	5	7.73	7.73	38.65	8.67
1.4.34	TPS63806YFFR	U13	1	5.53	5.53	5.53	1.24
1.4.35	TPS3703A5180DSER	U10	1	5.53	5.53	5.53	1.24
1.4.36	CC1312R1F3RGZT	M1	1	52.76	52.76	52.76	11.83
1.4.37	LQG15HN6N8J02D	L3 L4	2	0.3095	0.3095	0.619	0.1388
1.4.38	BLM18KG300TN1D	FB5 FB7 FB9	3	0.1032	0.1032	0.3095	0.06941
1.4.39	BKP1005HS121-T	FB1 FB2 FB3 FB4 FB6 FB8 FB10 FB11	8	0.1032	0.1032	0.8253	0.1851
1.4.40	VLS252012HBX-R47M-1	L1	1	0.3095	0.3095	0.3095	0.06941
1.4.41	MHQ1005P7N5JT000	L2 L6	2	0.3095	0.3095	0.619	0.1388
1.4.42	MHQ1005P27NJT000	L5	1	0.3095	0.3095	0.3095	0.06941
1.4.43	MLZ1608M6R8WT000	L7	1	0.3095	0.3095	0.3095	0.06941
1.4.44	RT2016-25.000-8-F-2020-TR	Y1	1	6.11	6.11	6.11	1.37
1.4.45	RT2012-32.768-12.5-TR	Y2	1	6.11	6.11	6.11	1.37
1.4.46	LFXTAL069528REEL	Y3	1	6.11	6.11	6.11	1.37
1.4.48	RC1005J000CS	R44 R45 R61 R68 R88 R89 R112 R120 R123 R129 R131 R	18	0.06984	0.06984	1.26	0.282
1.4.49	CR-02FL6---10K	R14 R47 R48 R49 R87 R107 R110 R114 R117 R118 R144	11	0.06984	0.06984	0.7683	0.1723
1.4.50	CR0402-FX-2400GLF	R7 R39	2	0.06984	0.06984	0.1397	0.03133
1.4.51	CRCW040221K0FKED	R142 R150	2	0.06984	0.06984	0.1397	0.03133
1.4.52	RK73H1ETTP2003F	R130	1	0.06984	0.06984	0.06984	0.01567
1.4.53	RC0402FR-0722RL	R42 R46 R84	3	0.06984	0.06984	0.2095	0.047
1.4.54	RC0402FR-0749K9L	R43	1	0.06984	0.06984	0.06984	0.01567
1.4.55	RC0402FR-0716K5L	R86	1	0.06984	0.06984	0.06984	0.01567
1.4.56	RC1005F222CS	R5 R62 R65 R72 R76 R79 R93	7	0.06984	0.06984	0.4889	0.1097
1.4.57	RC0402FR-0741K2L	R124	1	0.06984	0.06984	0.06984	0.01567
1.4.58	RC0402FR-0711KL	R4 R64 R71 R78	4	0.06984	0.06984	0.2794	0.06266
1.4.59	RC0402FR-072K49L	R66 R67 R73 R74 R75 R80 R81 R82 R83	9	0.06984	0.06984	0.6286	0.141
1.4.60	RC0402FR-071K15L	R113	1	0.06984	0.06984	0.06984	0.01567
1.4.61	RC0402FR-0775KL	R140	1	0.06984	0.06984	0.06984	0.01567
1.4.62	RC0402FR-0747K5L	R147	1	0.06984	0.06984	0.06984	0.01567
1.4.63	RC0402FR-07100KL	R3 R97 R100 R125 R127 R132 R133 R134 R135 R141 R14	18	0.06984	0.06984	1.26	0.282

ID	PN	RefDes	Qty	F.R. FIT	F.R.(K) FIT	F.R.(K,Qty) FIT	Contrib. to NHA[%]
1.4.64	RC0402FR-074K7L	R85 R108 R109 R115 R116 R163 R164 R165 R166 R171 R	11	0.06984	0.06984	0.7683	0.1723
1.4.65	RC0402FR-071KL	R22 R94 R95 R96 R98 R99 R175 R177	8	0.06984	0.06984	0.5588	0.1253
1.4.66	RC0402FR-073K01L	R92	1	0.06984	0.06984	0.06984	0.01567
1.4.67	RC0402FR-0739R2L	R8 R9	2	0.06984	0.06984	0.1397	0.03133
1.4.68	RC0402FR-07316KL	R145	1	0.06984	0.06984	0.06984	0.01567
1.4.69	RC0402FR-0784K5L	R137	1	0.06984	0.06984	0.06984	0.01567
1.4.70	RC0402FR-07511KL	R126	1	0.06984	0.06984	0.06984	0.01567
1.4.71	5110	R178	1	0.06984	0.06984	0.06984	0.01567
1.4.72	RC0603FR-0791KL	R128	1	0.06984	0.06984	0.06984	0.01567
1.4.73	YC124-FR-0739RL	RN1 RN2 RN3 RN4 RN5 RN6 RN7	7	2.28	2.28	15.96	3.58

APPENDIX B - PARETO ANALYSIS

Project name: SR_CARDS_4
Operating conditions: Environment: GB, Temperature: 25.00 °C
Current mode: Operating
FR Units: FIT
Default prediction Method: Telcordia Issue 4

Start from: TI AM64x SOM
Limited by: 90.000

PN	Qty	Total Failure rate	Item Failure rate contribution	Cumulative contribution
XAM6442ASFGGAALV	1	122.756	27.532%	27.532%
KLM8G1GETF-B041	1	68.133	15.281%	42.814%
CC1312R1F3RGZT	1	52.756	11.832%	54.646%
TPSM82822SILR	5	38.654	8.669%	63.316%
K4A8G165WC-BITD000	1	31.067	6.968%	70.283%
DP83869HMRGZT	3	27.674	6.207%	76.490%
YC124-FR-0739RL	7	15.963	3.580%	80.070%
DF40C-80DP-0.4V(51)	2	12.608	2.828%	82.898%
TPS74601PDRVR	2	11.056	2.480%	85.378%
TPS51206DSQR	1	7.731	1.734%	87.112%
LFXTAL069528REEL	1	6.107	1.370%	88.482%
RT2012-32.768-12.5-TR	1	6.107	1.370%	89.851%
RT2016-25.000-8-F-2020-TR	1	6.107	1.370%	91.221%

APPENDIX C - APPLIED VALUES

Project name: SR_CARDS_4
Operating conditions: Environment: GB, Temperature: 25.00 °C
Current mode: Operating
FR Units: FIT
Default prediction Method: Telcordia Issue 4

Project name: SR_CARDS_4 <GPRD>
Assembly Ref.Des.: TI AM64x SOM, IC-Memory

ID	Ref.des.	PN	Environment	Temperature
1.4.27	U3	KLM8G1GETF-B041	GB	55.00
1.4.28	U2	K4A8G165WC-BITD000	GB	55.00

Project name: SR_CARDS_4 <Telcordia Issue 4>
Assembly Ref.Des.: TI AM64x SOM, IC-Memory

ID	Ref.des.	PN	Device type	Technology	Number of bits or bits range	Qual
1.4.26	U11	CAT24AA01TDI-GT3	ROM	CMOS	1000	2

Assembly Ref.Des.: TI AM64x SOM, IC-Analog

ID	Ref.des.	PN	# of transistors or range	Qual
1.4.30	U17	TPS51206DSQR	91-170	2
1.4.31	U18 U20	TPS74601PDRVR	33-90	2
1.4.33	U12 U14 U15 U16 U19	TPSM82822SILR	91-170	2
1.4.34	U13	TPS63806YFFR	33-90	2
1.4.35	U10	TPS3703A5180DSER	33-90	2

Assembly Ref.Des.: TI AM64x SOM, IC-Digital

ID	Ref.des.	PN	Device type	Technology	# of gates or range	Qual	# of trans. (for PAL)	bus width (for Mkproc)
1.4.29	U1	XAM6442ASFGGAALV	Mkproc	CMOS	1000	2	---	64
1.4.32	U6 U7 U8	DP83869HMRGZT	Logic	CMOS	100001-1000000	2	---	---
1.4.36	M1	CC1312R1F3RGZT	Mkproc	CMOS	1000	2	---	32

Assembly Ref.Des.: TI AM64x SOM, Resistor

ID	Ref.des.	PN	Device type	# of resist.	Resistance	PSR	P oper.	P.rated	Qual
1.4.48	R44 R45 R61 R68 R88 R8	RC1005J000CS	Discrete Fixed Film	---	0.00 Ohm	0.200	20.00	0.06	2
1.4.49	R14 R47 R48 R49 R87 R1	CR-02FL6---10K	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.4.50	R7 R39	CR0402-FX-2400GLF	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.4.51	R142 R150	CRCW040221K0FKED	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.4.52	R130	RK73H1ETTP2003F	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.4.53	R42 R46 R84	RC0402FR-0722RL	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.4.54	R43	RC0402FR-0749K9L	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.4.55	R86	RC0402FR-0716K5L	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.4.56	R5 R62 R65 R72 R76 R79	RC1005F222CS	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.4.57	R124	RC0402FR-0741K2L	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.4.58	R4 R64 R71 R78	RC0402FR-0711KL	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.4.59	R66 R67 R73 R74 R75 R8	RC0402FR-072K49L	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.4.60	R113	RC0402FR-071K15L	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.4.61	R140	RC0402FR-0775KL	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.4.62	R147	RC0402FR-0747K5L	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	0.06	2
1.4.63	R3 R97 R100 R125 R127	RC0402FR-07100KL	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.4.64	R85 R108 R109 R115 R11	RC0402FR-074K7L	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.4.65	R22 R94 R95 R96 R98 R9	RC0402FR-071KL	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.4.66	R92	RC0402FR-073K01L	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	0.06	2
1.4.67	R8 R9	RC0402FR-0739R2L	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.4.68	R145	RC0402FR-07316KL	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.4.69	R137	RC0402FR-0784K5L	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.4.70	R126	RC0402FR-07511KL	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.4.71	R178	5110	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.4.72	R128	RC0603FR-0791KL	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2

ID	Ref.des.	PN	Device type	# of resist.	Resistance	PSR	P oper.	P.rated	Qual
1.4.73	RN1 RN2 RN3 RN4 RN5 RN	YC124-FR-0739RL	Discrete Elements Network	9	--- --	---	---	---	2

Assembly Ref.Des.: TI AM64x SOM, Capacitor

ID	Ref.des.	PN	Capacitor type	Capacitance	VSR	V.appl.DC	V.peak AC	V.rated	Qual
1.4.1	C206 C207 C230	JMK063BJ224MP-F	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.4.2	C109 C123 C124 C125 C1	GRM033R70J103KA01D	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.4.3	C151 C152 C153 C154 C1	GRM033R61A104KE15D	Ceramic	100.00 nF	0.20	20.00	0.00	100.00	2
1.4.4	C4 C5 C7 C8 C9 C10 C11	CL03A105MQ3CSNC	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.4.5	C141 C143 C144 C210 C2	GRM155R71C104KA88	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.4.6	C145	GRM155R60J225ME95D	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.4.7	C240 C248	CL05C101JB5NNND	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.4.8	C46 C83 C159 C166 C171	GRM155C80J106ME11D	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.4.9	C48 C61 C70 C85 C95 C1	CL05B105KQ5NQNC	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.4.10	C228 C236	GRM155R60J225ME15D	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.4.11	C208 C209 C241 C242	04025A120JAT2A	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.4.12	C14 C17 C20 C23 C26 C2	C0402C475M9PACTU	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.4.13	C118 C140 C142	C0402C225M8PACTU	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.4.14	C6	C1005X5R1A335K050BC	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.4.15	C213 C218 C221 C226 C2	CC0402JRNPO9BN121	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.4.16	C239 C243	CC0402BRNPO9BN3R6	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.4.17	C244	CC0402CRNPO9BN2R7	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.4.18	C245	GRM1555C1H6R2CA01D	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.4.19	C246	CC0402CRNPO9BN3R0	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.4.20	C127 C214 C215 C252 C2	GRM188R60J226MEA0D	Ceramic	--- --	0.20	20.00	0.00	100.00	2

ID	Ref.des.	PN	Capacitor type	Capacitance	VSR	V.appl.DC	V.peak AC	V.rated	Qual
1.4.21	C12 C15 C18 C21 C24 C2	LLL153C80J104ME01E	Ceramic	--- --	0.20	20.00	0.00	100.00	2

Assembly Ref.Des.: TI AM64x SOM, Connector

ID	Ref.des.	PN	Configuration	# active contacts	Quality
1.4.22	J7 J9	DF40C-80DP-0.4V(51)	Multi-Pin	80	2
1.4.23	J5001	DF40C-70DP-0.4V(51)	Multi-Pin	70	2
1.4.24	J6	U.FL-R-SMT-1(10)	Coaxial, Electric	---	2

Assembly Ref.Des.: TI AM64x SOM, Inductive

ID	Ref.des.	PN	Device type	Quality
1.4.25	FB12	MMZ2012S102AT000	Ferrite Beads	3
1.4.37	L3 L4	LQG15HN6N8J02D	Coil - Power Filter	2
1.4.38	FB5 FB7 FB9	BLM18KG300TN1D	Ferrite Beads	3
1.4.39	FB1 FB2 FB3 FB4 FB6 FB	BKP1005HS121-T	Ferrite Beads	3
1.4.40	L1	VLS252012HBX-R47M-1	Coil - Power Filter	2
1.4.41	L2 L6	MHQ1005P7N5JT000	Coil - Power Filter	2
1.4.42	L5	MHQ1005P27NJT000	Coil - Power Filter	2
1.4.43	L7	MLZ1608M6R8WT000	Coil - Power Filter	2

Assembly Ref.Des.: TI AM64x SOM, Crystal

ID	Ref.des.	PN	Device type	Quality
1.4.44	Y1	RT2016-25.000-8-F-2020-TR	Quartz Crystal	2
1.4.45	Y2	RT2012-32.768-12.5-TR	Quartz Crystal	2
1.4.46	Y3	LFXTAL069528REEL	Quartz Crystal	2