RELIABILITY PREDICTION

REPORT for the

CN9130 SOM (SRS9130S64D04GE008V11C0)

Doc.:RC 100-8340-0803, Rev. 00

Prepared For SolidRun Ltd.

by RAM CRAFT Ltd.

www.ramcraft.co.il

	Name	Position	Date
Prepared by:	Boris Aranavich	RAMS Engineer	23/03/2022
Checked by:	Boris Zaets	RAMS Manager	23/03/2022
Approved by:	Vily Lupo	Operations Manager, SolidRun Ltd.	

SolidRun Ltd. 7 Hamada Street, Yokneam Illit, 2069201, Israel
Phone: +972 4-844-9010; Email: info@solid-run.com; Website: https://www.solid-run.com/

Document History

Rev.	Description	Date
00	First Edition	23/03/2022

CONTENTS

TABLES

FIGURES

1. GENERAL

1.1. Scope

This document presents the reliability prediction of the module CN9130 SOM (SRS9130S64D04GE008V11C0) – hereafter CN9130 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 environment using Reliability toolkit [Ref. 2].

4.2. Environment & Temperature

The reliability prediction of the CN9130 SOM Module was performed 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:

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

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 CN9130 SOM Module at 55°C Ambient temperature and G_B Environmental condition.

λ = 533.2 FIT

MTBF = 1,875,361 hours

Figure 1 represents CN9130 SOM Module MTBF vs. Ambient Temperature.

T(°C)	MTBF
15	4,553,130
20	4,455,551
25	4,248,613
30	4,024,321
35	3,608,580
40	3,192,711
45	2,670,053
50	2,216,970
55	1,875,361
60	1,578,281
65	1,322,908

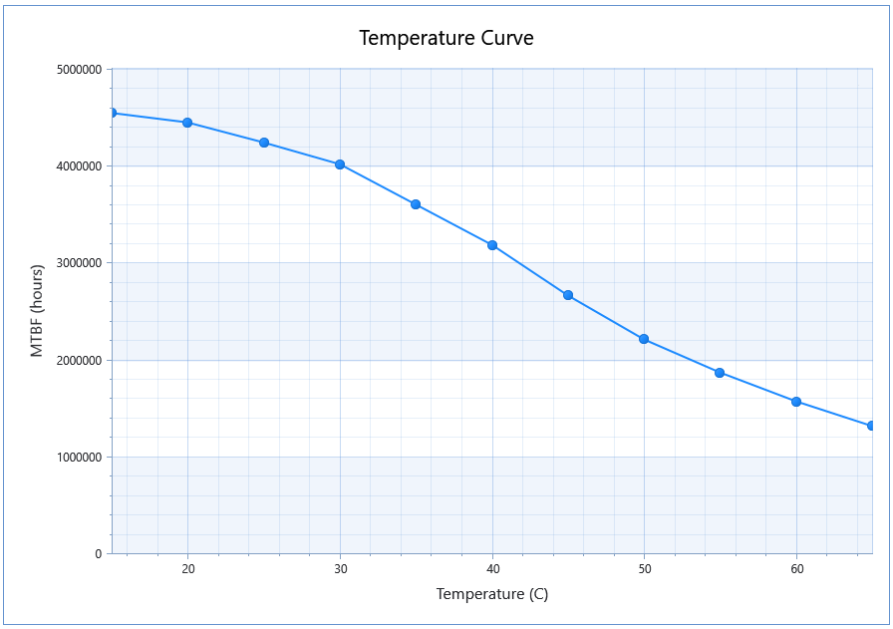

Figure 1: - CN9130 SOM Module Temperature Curve

5.2. Conclusions

Table 1 depicts the main CN9130 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
K4A8G165WB-BCRC	8Gb B-die DDR4	4	124.267	23.304%	23.304%
CN9130-2200-NG-AUS-G	Quad Core ARMv8 Cortex-A72 CPU	1	122.756	23.021%	46.326%
KLM8G1GETF-B041	8GB eMMC	1	68.133	12.777%	59.103%

.

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.: CN9130 SOM , ID: 1.1, Description: CN9130 SOM Commercial.
Environment: GB, Temperature: 55.00 °C,F.R.(FIT): 533.23 , MTBF(hours): 1875361.0

ID	PN	RefDes	Qty	F.R. FIT	F.R.(K) FIT	F.R.(K,Qty) FIT	Contrib. to NHA[%]
1.1.1	0402ZC104KAT2A	C22,C25,C26,C28,C29,C31,C37,C39,C44,C70,C75,C82,C8	53	0.03181	0.03181	1.69	0.3162
1.1.2	GRM155R61A105KE15D	C18,C20,C48,C174,C175,C185,C76,C83,C89,C109,C118,C	21	0.03181	0.03181	0.6681	0.1253
1.1.3	04025C102KAT2A	C65,C188	2	0.03181	0.03181	0.06363	0.01193
1.1.4	GRM155R60J224KE01D	C132	1	0.03181	0.03181	0.03181	0.005966
1.1.5	GRM1555C1H220JA01D	C23,C30,C52,C53	4	0.03181	0.03181	0.1273	0.02387
1.1.6	CL05B332KB5NNNC	C2,C3	2	0.03181	0.03181	0.06363	0.01193
1.1.7	GRM155R60J225ME95D	C157	1	0.03181	0.03181	0.03181	0.005966
1.1.8	GRM155C80J106ME11D	C41,C51,C56,C57,C144,C165,C168,C181,C182,C3125,C31	11	0.03181	0.03181	0.35	0.06563
1.1.9	CL05B105KQ5NQNC	C58	1	0.03181	0.03181	0.03181	0.005966
1.1.10	04025C152JAT2A	C4	1	0.03181	0.03181	0.03181	0.005966
1.1.11	GRM155R71H104KE14D	C12,C15,C19,C55,C60,C62	6	0.03181	0.03181	0.1909	0.0358
1.1.12	C0402C475M9PACTU	C34,C133,C134,C190	4	0.03181	0.03181	0.1273	0.02387
1.1.13	GRM188R60J106KE47D	C24,C45,C72	3	0.03181	0.03181	0.09544	0.0179
1.1.14	GRM188R60J226MEA0D	C9,C10,C13,C16,C17,C81,C84,C97,C149,C46	10	0.03181	0.03181	0.3181	0.05966
1.1.15	GRM188R61C106KAAL	C11,C14,C63,C66,C67	5	0.03181	0.03181	0.1591	0.02983
1.1.16	GRM188R61C475KAAJD	C59	1	0.03181	0.03181	0.03181	0.005966
1.1.17	C1206C107M9PACTU	C5,C6,C7,C8	4	0.03181	0.03181	0.1273	0.02387
1.1.18	0306ZC224KAT2A	C21,C27,C43,C74,C78,C79,C88,C102,C90,C91,C105,C106	19	0.03181	0.03181	0.6045	0.1134
1.1.19	LLL153C80G105ME21D	C38,C42,c85,C92,C96,C98,C107,C108,C112,C113,C114,C	31	0.03181	0.03181	0.9862	0.185
1.1.20	DF40C-80DP-0.4V(51)	J1,J2	2	6.30	6.30	12.61	2.36
1.1.21	DF40C-70DP-0.4V(51)	J3	1	5.52	5.52	5.52	1.03
1.1.22	1SA0603G32A0CB01	LED1	1	0.8189	0.8189	0.8189	0.1536
1.1.23	M74VHC1GT08DFT1G	U13	1	4.47	4.47	4.47	0.8384
1.1.24	TS9011KCX	U9	1	5.53	5.53	5.53	1.04
1.1.25	NCP51200MNTXG	U23	1	5.53	5.53	5.53	1.04
1.1.26	88E1512-A0-NNP2I000	U8	1	15.05	15.05	15.05	2.82
1.1.27	K4A8G165WB-BCRC	U6,U7,U15,U16	4	31.07	31.07	124.27	23.30
1.1.28	M24C02-WMN6TP	U5	1	4.98	4.98	4.98	0.9348
1.1.29	W25Q64JVZPIQ	U14	1	37.23	37.23	37.23	6.98
1.1.30	KLM8G1GETF-B041	U21	1	68.13	68.13	68.13	12.78
1.1.31	TPS53515RVER	U11	1	5.53	5.53	5.53	1.04
1.1.32	TPS82130SILR	U2,U3	2	5.53	5.53	11.06	2.07

ID	PN	RefDes	Qty	F.R. FIT	F.R.(K) FIT	F.R.(K,Qty) FIT	Contrib. to NHA[%]
1.1.33	FXL2TD245L10X	U4,U20	2	4.94	4.94	9.88	1.85
1.1.34	TMUX1575YCJR	U10058	1	7.73	7.73	7.73	1.45
1.1.35	CN9130-2200-NG-AUS-G	U1	1	122.76	122.76	122.76	23.02
1.1.36	RT6276BHGQUF	U10	1	7.73	7.73	7.73	1.45
1.1.37	SDB0420MT1R5	L2	1	0.3095	0.3095	0.3095	0.05804
1.1.38	PBY160808T-121Y-N	FB5	1	0.1032	0.1032	0.1032	0.01935
1.1.39	MH1608-601Y	FB3,FB6,FB9,FB10	4	0.1032	0.1032	0.4126	0.07738
1.1.40	BLM15AX601SN1D	FB1,FB2,FB7,FB8	4	0.1032	0.1032	0.4126	0.07738
1.1.41	PA4341.471NLT	L1	1	0.3095	0.3095	0.3095	0.05804
1.1.42	S3225A025000-F10CCAA	Y1,Y3	2	6.11	6.11	12.21	2.29
1.1.43	RT3215-32.768-9-TR	Y2	1	6.11	6.11	6.11	1.15
1.1.45	RC1005J472CS	R31,R9303,R118	3	0.06984	0.06984	0.2095	0.0393
1.1.46	CR0402-FX-6041GLF	R81,R101	2	0.06984	0.06984	0.1397	0.0262
1.1.47	RC0402JR-07240RL	R20,R21,R29,R82,R104,R127,R128,R129,R130	9	0.06984	0.06984	0.6286	0.1179
1.1.48	RC1005F4990CS	R51	1	0.06984	0.06984	0.06984	0.0131
1.1.49	RC1005J000CS	R19,R46,R56,R57,R59,R61,R64,R9308,R65,R95	10	0.06984	0.06984	0.6984	0.131
1.1.50	RC1005J102CS	R69,R70,R102	3	0.06984	0.06984	0.2095	0.0393
1.1.51	CR0402-FX-49R9GLF	R71,R72,R78,R80,R91,R92	6	0.06984	0.06984	0.4191	0.07859
1.1.52	CR-02FL6---10K	R1,R2,R3,R5,R9,R11,R13,R16,R17,R18,R22,R35,R36,R41	29	0.06984	0.06984	2.03	0.3799
1.1.53	RC1005J220CS	R27,R28,R143,R63,R68,R73,R76,R94,R103,R23	10	0.06984	0.06984	0.6984	0.131
1.1.54	RC0402JR-07510RL	R107,R108,R119	3	0.06984	0.06984	0.2095	0.0393
1.1.55	RC0402FR-0731K6L	R4	1	0.06984	0.06984	0.06984	0.0131
1.1.56	RC1005F4991CS	R105	1	0.06984	0.06984	0.06984	0.0131
1.1.57	CR02FL6--200R	R33	1	0.06984	0.06984	0.06984	0.0131
1.1.58	RC0402FR-0768KL	R8	1	0.06984	0.06984	0.06984	0.0131
1.1.59	RC0402FR-0749K9L	R40,R114	2	0.06984	0.06984	0.1397	0.0262
1.1.60	RC1005F222CS	R34,R53,R54,R93,R99,R139	6	0.06984	0.06984	0.4191	0.07859
1.1.61	RC0402FR-0711KL	R47	1	0.06984	0.06984	0.06984	0.0131
1.1.62	RC0402FR-07249KL	R52,R62	2	0.06984	0.06984	0.1397	0.0262
1.1.63	RC0402FR-0720KL	R49,R50	2	0.06984	0.06984	0.1397	0.0262
1.1.64	CRCW04023R00FKED	R7	1	0.06984	0.06984	0.06984	0.0131
1.1.65	RC0402FR-0712K4L	R6	1	0.06984	0.06984	0.06984	0.0131
1.1.66	RC0402FR-0739RL	R89,R90	2	0.06984	0.06984	0.1397	0.0262
1.1.67	RC0402FR-074K02L	R48	1	0.06984	0.06984	0.06984	0.0131
1.1.68	RCG06030000Z0EA	R123	1	0.06984	0.06984	0.06984	0.0131
1.1.69	YC124-JR-0710KL	RN3,RN12,RN13,RN14	4	2.28	2.28	9.12	1.71
1.1.70	YC124-FR-0739RL	RN5,RN6,RN7,RN8,RN9,RN10,RN11	7	2.28	2.28	15.96	2.99
1.1.71	YC124-JR-072K2L	RN1,RN2,RN4	3	2.28	2.28	6.84	1.28
1.1.72	RYE002N05TCL	Q2,Q3,Q4	3	4.99	4.99	14.98	2.81
1.1.73	RE1J002YN	Q1	1	4.99	4.99	4.99	0.9367

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: CN9130 SOM
Limited by: 90.000

PN	Qty	Total Failure rate	Item Failure rate contribution	Cumulative contribution
K4A8G165WB-BCRC	4	124.267	23.304%	23.304%
CN9130-2200-NG-AUS-G	1	122.756	23.021%	46.326%
KLM8G1GETF-B041	1	68.133	12.777%	59.103%
W25Q64JVZPIQ	1	37.232	6.982%	66.085%
YC124-FR-0739RL	7	15.963	2.994%	69.079%
88E1512-A0-NNP2I000	1	15.053	2.823%	71.902%
RYE002N05TCL	3	14.984	2.810%	74.712%
DF40C-80DP-0.4V(51)	2	12.608	2.364%	77.077%
S3225A025000-F10CCAA	2	12.214	2.290%	79.367%
TPS82130SILR	2	11.056	2.073%	81.441%
FXL2TD245L10X	2	9.875	1.852%	83.293%
YC124-JR-0710KL	4	9.122	1.711%	85.003%
RT6276BHGQUF	1	7.731	1.450%	86.453%
TMUX1575YCJR	1	7.731	1.450%	87.903%
YC124-JR-072K2L	3	6.841	1.283%	89.186%
RT3215-32.768-9-TR	1	6.107	1.145%	90.331%

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.: CN9130 SOM , IC-Memory

ID	Ref.des.	PN	Environment	Temperature
1.1.27	U6,U7,U15,U16	K4A8G165WB-BCRC	GB	55.00
1.1.30	U21	KLM8G1GETF-B041	GB	55.00

Project name: SR_CARDS_4 <Telcordia Issue 4>
Assembly Ref.Des.: CN9130 SOM , IC-Memory

ID	Ref.des.	PN	Device type	Technology	Number of bits or bits range	Qual
1.1.28	U5	M24C02-WMN6TP	ROM	CMOS	2000	2
1.1.29	U14	W25Q64JVZPIQ	SRAM	CMOS	6.4E+07	2

Assembly Ref.Des.: CN9130 SOM , IC-Analog

ID	Ref.des.	PN	# of transistors or range	Qual
1.1.24	U9	TS9011KCX	33-90	2
1.1.25	U23	NCP51200MNTXG	33-90	2
1.1.31	U11	TPS53515RVER	33-90	2
1.1.32	U2,U3	TPS82130SILR	33-90	2
1.1.34	U10058	TMUX1575YCJR	91-170	2
1.1.36	U10	RT6276BHGQUF	91-170	2

Assembly Ref.Des.: CN9130 SOM , IC-Digital

ID	Ref.des.	PN	Device type	Technology	# of gates or range	Qual	# of trans. (for PAL)	bus width (for Mkproc)
1.1.23	U13	M74VHC1GT08DFT1G	Logic	CMOS	20	2	---	---
1.1.26	U8	88E1512-A0-NNP2I000	Logic	CMOS	10000001-100000000	2	---	---
1.1.33	U4,U20	FXL2TD245L10X	Logic	CMOS	51-100	2	---	---

ID	Ref.des.	PN	Device type	Technology	# of gates or range	Qual	# of trans. (for PAL)	bus width (for Mkproc)
1.1.35	U1	CN9130-2200-NG-AUS-G	Mkproc	CMOS	1000	2	---	64

Assembly Ref.Des.: CN9130 SOM , Resistor

ID	Ref.des.	PN	Device type	# of resist.	Resistance	PSR	P oper.	P.rated	Qual
1.1.45	R31,R9303,R118	RC1005J472CS	Discrete Fixed Film	---	4700.00 Ohm	0.200	20.00	0.06	2
1.1.46	R81,R101	CR0402-FX-6041GLF	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.1.47	R20,R21,R29,R82,R104,R	RC0402JR-07240RL	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.1.48	R51	RC1005F4990CS	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.1.49	R19,R46,R56,R57,R59,R6	RC1005J000CS	Discrete Fixed Film	---	0.00 Ohm	0.200	20.00	0.06	2
1.1.50	R69,R70,R102	RC1005J102CS	Discrete Fixed Film	---	1000.00 Ohm	0.200	20.00	0.06	2
1.1.51	R71,R72,R78,R80,R91,R9	CR0402-FX-49R9GLF	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.1.52	R1,R2,R3,R5,R9,R11,R13	CR-02FL6---10K	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.1.53	R27,R28,R143,R63,R68,R	RC1005J220CS	Discrete Fixed Film	---	22.00 Ohm	0.200	20.00	0.06	2
1.1.54	R107,R108,R119	RC0402JR-07510RL	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.1.55	R4	RC0402FR-0731K6L	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.1.56	R105	RC1005F4991CS	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.1.57	R33	CR02FL6--200R	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.1.58	R8	RC0402FR-0768KL	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.1.59	R40,R114	RC0402FR-0749K9L	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.1.60	R34,R53,R54,R93,R99,R1	RC1005F222CS	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.1.61	R47	RC0402FR-0711KL	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.1.62	R52,R62	RC0402FR-07249KL	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.1.63	R49,R50	RC0402FR-0720KL	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.1.64	R7	CRCW04023R00FKED	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.1.65	R6	RC0402FR-0712K4L	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.1.66	R89,R90	RC0402FR-0739RL	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.1.67	R48	RC0402FR-074K02L	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.1.68	R123	RCG06030000Z0EA	Discrete Fixed Film	---	1.00 KOhm	0.200	20.00	100.00	2
1.1.69	RN3,RN12,RN13,RN14	YC124-JR-0710KL	Discrete Elements Network	9	--- --	---	---	---	2
1.1.70	RN5,RN6,RN7,RN8,RN9,RN	YC124-FR-0739RL	Discrete Elements Network	9	--- --	---	---	---	2
1.1.71	RN1,RN2,RN4	YC124-JR-072K2L	Discrete Elements Network	9	--- --	---	---	---	2

Assembly Ref.Des.: CN9130 SOM , Capacitor

ID	Ref.des.	PN	Capacitor type	Capacitance	VSR	V.appl.DC	V.peak AC	V.rated	Qual
1.1.1	C22,C25,C26,C28,C29,C3	0402ZC104KAT2A	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.1.2	C18,C20,C48,C174,C175,	GRM155R61A105KE15D	Ceramic	1.00 uF	0.20	20.00	0.00	100.00	2
1.1.3	C65,C188	04025C102KAT2A	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.1.4	C132	GRM155R60J224KE01D	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.1.5	C23,C30,C52,C53	GRM1555C1H220JA01D	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.1.6	C2,C3	CL05B332KB5NNNC	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.1.7	C157	GRM155R60J225ME95D	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.1.8	C41,C51,C56,C57,C144,C	GRM155C80J106ME11D	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.1.9	C58	CL05B105KQ5NQNC	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.1.10	C4	04025C152JAT2A	Ceramic	1.50 nF	0.20	20.00	0.00	50.00	2
1.1.11	C12,C15,C19,C55,C60,C6	GRM155R71H104KE14D	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.1.12	C34,C133,C134,C190	C0402C475M9PACTU	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.1.13	C24,C45,C72	GRM188R60J106KE47D	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.1.14	C9,C10,C13,C16,C17,C81	GRM188R60J226MEA0D	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.1.15	C11,C14,C63,C66,C67	GRM188R61C106KAAL	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.1.16	C59	GRM188R61C475KAAJD	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.1.17	C5,C6,C7,C8	C1206C107M9PACTU	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.1.18	C21,C27,C43,C74,C78,C7	0306ZC224KAT2A	Ceramic	--- --	0.20	20.00	0.00	100.00	2
1.1.19	C38,C42,c85,C92,C96,C9	LLL153C80G105ME21D	Ceramic	--- --	0.20	20.00	0.00	100.00	2

Assembly Ref.Des.: CN9130 SOM , Connector

ID	Ref.des.	PN	Configuration	# active contacts	Quality
1.1.20	J1,J2	DF40C-80DP-0.4V(51)	Multi-Pin	80	2
1.1.21	J3	DF40C-70DP-0.4V(51)	Multi-Pin	70	2

Assembly Ref.Des.: CN9130 SOM , LF Transistor

ID	Ref.des.	PN	Type	Application	PSR	VSR	P oper.	P rat.	V oper.	V rat.	Qual
1.1.72	Q2,Q3,Q4	RYE002N05TCL	FIELD EFFECT	Switch	0.50	--	1.000	2.000	---	---	2
1.1.73	Q1	RE1J002YN	FIELD EFFECT	Switch	0.50	--	1.000	2.000	---	---	2

Assembly Ref.Des.: CN9130 SOM , Optoelectronic

ID	Ref.des.	PN	Device type	Qual	Cooling	Configuration	# of channels	Prat
1.1.22	LED1	1SA0603G32A0CB01	Single LED/LCD Segment	2	---	---	---	---

Assembly Ref.Des.: CN9130 SOM , Inductive

ID	Ref.des.	PN	Device type	Quality
1.1.37	L2	SDB0420MT1R5	Coil - Power Filter	2
1.1.38	FB5	PBY160808T-121Y-N	Ferrite Beads	3
1.1.39	FB3,FB6,FB9,FB10	MH1608-601Y	Ferrite Beads	3
1.1.40	FB1,FB2,FB7,FB8	BLM15AX601SN1D	Ferrite Beads	3
1.1.41	L1	PA4341.471NLT	Coil - Power Filter	2

Assembly Ref.Des.: CN9130 SOM , Crystal

ID	Ref.des.	PN	Device type	Quality
1.1.42	Y1,Y3	S3225A025000-F10CCAA	Quartz Crystal	2
1.1.43	Y2	RT3215-32.768-9-TR	Quartz Crystal	2