ASSOCIATION CONNECTING
ELECTRONICS INDUSTRIES®

IPC-1710A

OEM Standard for Printed Board Manufacturers' Qualification Profile

Developed by the OEM council of the IPC, the MQP sets the standard for assessing PWB manufacturers capabilities and allows PWB manufacturers to more easily satisfy customer requirements.

IPC-1710A
May 2004

A standard developed by IPC

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The material in this standard was developed by the OEM Council of the Institute for Interconnecting and Packaging Electronic Circuits.

FOREWORD

It is not intended that this Manufacturers' Qualification Profile (MQP) satisfies all the requirements of the customer, however, conscientious maintenance of this document and or registration to ISO 9000 requirements should satisfy the major concerns. Thus, audits should be simpler, required less frequently, and facilitate less paper work as customers and suppliers work closer to meeting each others needs.

ACKNOWLEDGMENTS

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CONTENTS

SECTION 1.1
COMPANY DESCRIPTION

DATE COMPLETED
5/5/2020

GENERAL INFORMATION

LEGAL NAME Sierra Circuits, Inc. DBA Sierra Proto Express, Inc.		
PHYSICAL ADDRESS 1108 West Evelyn Avenue		
CITY Sunnyvale	STATE CA	ZIP 94086
PROVINCE CA	COUNTRY USA	
TELEPHONE NUMBER 408 735-7137	FAX NUMBER 408 735-1408	TELEX NUMBER
E-MAIL ADDRESS files@protoexpress.com	MODEM NUMBER	DATE FOUNDED 1986 ☐ PUBLIC ☒ PRIVATE
INTERNET URL www.protoexpress.com	FTP SITE ftp.protoexpress.com	

MANAGEMENT

PRESIDENT Ken Bahl
CHIEF OPERATING OFFICER Ken Bahl
VICE PRESIDENT OF MANUFACTURING Steve Arobio
VICE PRESIDENT OF QUALITY Ken Bahl
VICE PRESIDENT OF MARKETING/SALES Amit Bahl
VICE PRESIDENT OF CUSTOMER SERVICE Amit Bahl
WASTE TREATMENT MANAGER (POLLUTION PREVENTION) Victor Talavera

CORPORATE DESCRIPTION		NUMBER OF EMPLOYEES CORPORATE	SITE	COMMENTS
DESIGN AND DEVELOPMENT		3	N/A	
ENGINEERING		36		Process and Pre production
MANUFACTURING CONTROL		17		
MANUFACTURING	DIRECT	190		
	INDIRECT	65		
QUALITY CONTROL	QUALITY ENGINEERS	3		
	INTERNAL AUDITORS	15		
	GENERAL MANAGEMENT	15		
ADMINISTRATION		63		
TOTAL		407		

SECTION 1.2
SITE DESCRIPTION

(TO BE COMPLETED FOR EACH SITE) DATE COMPLETED 5/5/2020 ATTACH APPROPRIATE CHARTS (OPTIONAL)

MANUFACTURING FACILITY

COMPANY NAME	Sierra Circuits Inc. Sierra Proto Express, Inc.		
PHYSICAL ADDRESS	1108 West Evelyn Avenue		
CITY Sunnyvale	STATE CA	ZIP 94086	
PROVINCE	COUNTRY USA		
TELEPHONE NUMBER 408 735-7137	FAX NUMBER 408 735-7135	TELEX	
E-MAIL ADDRESS files@protoexpress.com	MODEM NUMBER	YEARS IN BUSINESS 33	
INTERNET URL www.protoexpress.com	FTP ftp.protoexpress.com		
PRINCIPLE PRODUCTS/SERVICES/SPECIALTIES Printed Circuit Boards Manufacturing	BUSINESS CHARACTERIZATION (HIGH VOLUME, QUICK TURN-AROUND, ETC.) Quick turn proto types		

FACILITY MANAGEMENT	TITLE	REPORTS TO (Function/Job Title)
OVERALL OPERATION RESPONSIBILITY FOR THIS SITE Ken Bahl	President/Owner	NA
MANUFACTURING Steve Arobio	VP of Manufacturing	President
TECHNICAL/ENGINEERING Steve Arobio /	VP of Manufacturing	President
PROCESS Eng'g / EH&S Steve Arobio / Victor Talavera	Engineering Manager / EH&S, Facilities and Maintenance Manager	President
PURCHASING / MATERIALS Kimberly Nguyen	Purchasing Manager	Co-President
QUALITY Jeff Hoey	Director of Quality	President
SALES REPRESENTATIVE Amit Bahl	Director of Sales and Marketing	President
WASTE MANAGEMENT Victor Talavera / Steve Arobio	EH&S, Facilities and Maintenance Manager	President

BUILDINGS / SYSTEMS (INDICATE % COVERAGE)

	AGE	AREA (Sq. Ft.)	Construction (Wood/Brick)	Power Conditioning	Heating	Ventilation	Air Conditioning	Sprinklers	Waste Treatment	Other
Office	30	7800	Brick							
Manufacturing	30	3800	Brick							
Storage	30	7800	Brick							
Planned additions		2100	Brick							

SAFETY AND REGULATORY AGENCY REQUIREMENTS

Are fire extinguishers functional and accessible to employees?	☒ YES	☐ NO	What is the distance to the nearest fire station? (in minutes)	5 Minutes
Do you conform to local/federal environment protection agency requirements?	☒ YES	☐ NO	Date of last OSHA visit Date of last EPA visit	No recent visit No recent visit
Are you currently operating under a waiver or in violation of local government requirements?	☐ YES	☒ NO	Other Agency Audits, UL, ISO 9000, NECQ, CSA Approval and Number	☒ UL # E70742 ☒ ISO 9000# 9001 ☐ CSA # _____ ☒ Other Mil-PRF-55110 and 31032
Do you have a safety program? Describe below.	☒ YES	☐ NO	Hazardous Waste Number Trade Waste Account Number	CAD092616184

PLANT PERSONNEL (TOTAL EMPLOYEES)

Regular	Contract	Office	Technical/ Engineering	Production	Full-Time QA	Part-Time QA	Union	Non-Union	Union Name	Contract Expires (Date)
407	0	50	36	190	39	0	No	All	NA	N/A

COMMENTS

SECTION 2.1
PROCESS

DATE COMPLETED
5/5/2020

This section is intended to provide overview information on the processes used to fabricate printed board products.

Site Capability Snapshot (Please Check all that apply)

	Designators		Remarks
A	Conductor Forming Processes	☒Subtractive ☒Thin Foil Subtractive less than .5 oz. ☒Semi-Additive ☐Additive (Electro-less) ☐Black Hole ☐Thick Film Paste and Fire ☐Thin Film Semi-conductor Sputtering ☒Other:	
B	PTH Materials and Processes	☒Acid Copper ☐Pyro-Phosphate Copper ☐Full Built Electro-Less ☐Gold Paste ☐Copper Paste ☐Gold Conductor Sputtering ☐Nickel Conductor Sputtering ☐Other:	
C	Permanent Over-plating	☐Tin ☐Tin-Lead ☒Tin-Nickel Alloy ☒Nickel ☒Nickel Gold (Hard) ☒Nickel Gold (Soft) ☐Nickel Rhodium ☒Conductive Polymer ☐Other:	Carbon paste

D	Permanent Selective Plating	☐Tin ☐Tin-Lead ☐Tin-Nickel Alloy ☒Nickel ☒Nickel Gold (Hard) ☒Nickel Gold (Soft) ☐Nickel Rhodium ☐Other:	
E	Permanent Mask or Coating	☒Photo Dry Film ☒Photo Liquid ☐Image Transfer Screen Mask ☐Conformal Coating Solder Mask ☐Cover Coat ☐Other:	Outside service
F	Other Surface Finishes	☐Tin-Lead Fused ☒Immersion Tin ☒Solder Leveled ☐Roll Soldered ☐Electro-less Solder Fused ☐Solder Bumped Lands ☐Solder Paste Fused ☒Azole Organic Protective Covering ☐Flux Protective Covering ☒Other: ENEPIG	

SECTION 2.2
ELECTRICAL TEST EQUIPMENT

DATE COMPLETED
5/5/2020

This section is intended to provide overview information on the test equipment and testing capability of the manufacturer.

Site Capability Snapshot (Please Check the column that applies furthest to the right.)

	Designators		Remarks
A	Number of Nets	☐<200 ☐200 ☐500 ☐1000 ☐2000 ☐3000 ☐4000 ☐5000 ☒>5000 ☐Other:	ATG Flying probe systems
B	Number of Nodes	☐<500 ☐500 ☐1000 ☐2000 ☐3000 ☐4000 ☐5000 ☐6000 ☒>6000 ☐Other:	
C	Probe Point Pitch	☐>1.0 [.040] ☐1.0 [.040] ☐0.8 [.032] ☐0.65 [.025] ☐0.50 [.020] ☐0.40 [.016] ☒0.30 [.012] ☐0.20 [.008] ☐<0.20 [.008] ☐Other:	

D	Test % Single Pass	☐None ☐<60% ☐60% ☐70% ☐80% ☐90% ☐95% ☐99% ☒100% ☐Other:	
E	Probe Accuracy (DTP)	☐>0.2 [.008] ☐0.2 [.008] ☐0.15 [.006] ☐0.125 [.005] ☐0.1 [.004] ☐0.075 [.003] ☒<0.075 [.003] ☐Other:	
F	Grid Density	☐Single Side Grid ☐Double Sided Grid ☐Double Density Grid ☐Double Density Double Sided ☐Quad Density ☐Double Sided Quad Density ☒Flying Probe ☐Other:	
G	Netlist Capability	☐Golden Board ☒IPC-D-356 ☒Net List Extraction ☒CAD/CAM Net List Compare ☐Other:	

H	Test Voltage	☐<20 VDC ☐20 VDC ☐40 VDC ☐60 VDC ☐80 VDC ☐100 VDC ☒500 VDC ☐1000 VDC ☐>1000 VDC ☐ Other:	
J	Impedance Meas	☒Micro Section ☒Inboard Circuit ☒Coupon ☒Manual TDR ☐Automated TDR ☐Other:	
K	Impedance Tolerance	☐None ☐>20% ☐20% ☐15% ☒10% ☐7% ☒5% ☐2% ☐<2% ☐Other:	Standard Must characterize construction

SECTION 2.3
PRODUCT TYPE

DATE COMPLETED
5/5/2020

This section is intended to provide overview information on the printed board product types being fabricated by the manufacturer.

Site Capability Snapshot (Please Check all that apply.)

Designators			Remarks
A	Product Type	☒Rigid Printed Board ☒Flex Printed Board ☒Rigid/Flex Board ☒Rigid Back Plane ☐Molded Product ☒Ceramic Printed Board ☐Multichip Module ☒Liminated Multichip Module ☐Deposited Dielectric Multichip Modules ☐Other:	
B	Circuit Mounting Type	☒Single Sided ☒Double Sided ☒Miltilayer ☒Single-sided Bonded to Substrate ☒Double-sided Bonded to Substrate ☒Multilayer Bonded to Substrate ☒Constrained Multilayer ☐Distributed Plane Multilayer ☐Other:	
C	Via Technology	☒No-Vias ☒Thru Hole Vias ☒Buried Vias ☒Blind Vias ☒Thru Hole & Blind Vias] ☒Thru Hole & Buried Vias ☒Thru Hole Buried & Blind Vias ☒Buried & Blind Vias ☐Other:	

D	Laminate Material	☒Phenolic ☐Epoxy Paper ☒Epoxy Glass ☒Modified Epoxy Composite ☒Polyimide Film & Reinforce ☒Cynanate Ester ☒Teflon ☒Ceramic Glass Types ☐Various Combinations ☐Other:	
E	Core Material	☐No Core ☐Polymer ☒Copper ☒Aluminum ☐Graphite ☐Copper Invar/Copper ☐Copper Moly/Copper ☐Other:	
F	Copper Thickness (Oz.)	☒1/8 Minimum ☒1/4 Minimum ☒3/8 Minimum ☒1/2 Nominal ☒1 Nominal ☒2 Nominal ☐3-5 Max ☐6-9 Max ☒>10 ☐Other:	
G	Construction	☒≤4 Planes ☒>4 Planes ☐THK to TOL ≤0.2 mm ☒THK to TOL >0.2 mm ☒Bow/Twist ≤1% ☐Bow/Twist >1% ☒≤0.3 mm Profile Tolerance ☐0.3 mm Profile Tolerance ☐Other:	

H	Coatings and Markings	☒≤0.1 mm Mask Clearance ☐>0.1 mm Mask Clearance ☒One Side (Legend) ☒Two Side (Legend) ☐None (Legend) ☒UL Material Logo ☒U.L. V_0 Logo ☐U.L. V_1 Logo ☐U.L. V_2 Logo ☐ Other:	

SECTION 2.4
PRODUCT COMPLEXITY

DATE COMPLETED
5/5/2020

This section is intended to provide overview information on product complexity being fabricated by the manufacturer.

(Please check the column that applies farthest to the right)

Designators			Remarks
A	Board Size Diagonal	☐<250 [10.00] ☐250 [10.00] ☐350 [14.00] ☐450[17.50] ☐550 [21.50] ☒650 [25.50] ☐750 [29.50] ☐850 [33.50] ☐>850 [33.50] ☐Other:	14 x 26 [12 x 24 working area] and 18 x 24 [16 x 22 working area].
B	Total Board Thickness	☐1,0 [.040] ☐1,0 [.040] ☐1,6 [.060] ☐2,0 [.080] ☐2,5 [.100] ☐3,5 [.135] ☐5,0 [.200] ☒6,5 [.250] ☐>6,5 [.250] ☐Other:	
C	Number Conductive Layers	☐1-4 ☐5-6 ☐7-8 ☐9-12 ☐13-16 ☐17-20 ☐21-24 ☒25-28 ☐>28 ☐Other:	

D	Dia Drilled Holes	☐>0,5 [.020] ☐0,5 [.020] ☐0,4 [.016] ☐0,35 [.014] ☐0,30 [.012] ☐0,25 [.010] ☐0,20 [.008] ☐0,15 [.006] ☒<0,15 [.006] ☐Other:	Mechanical drill
E	Total PTH TOL (Max-Min)	☐>0,250 [.010] ☐0,250 [.010] ☐0,200 [.008] ☒0,150 [.006] ☐0,125 [.005] ☒0,100 [.004] ☐0,075 [.003] ☐0,050 [.002] ☐<0,050 [.002] ☐Other:	Standard Compliant pins
F	Hole Location TOL DTP	☐>0,50 [.020] ☐0,50 [.020] ☐0,40 [.016] ☐0,30 [.012] ☐0,25 [.010] ☐0,20 [.008] ☒0,15 [.006] ☐0,10 [.004] ☐<0,10 [.004] ☐Other:	
G	Internal Layer Clearance (Min)	☐>0,350 [.014] ☐0,350 [.014] ☐0,250 [.010] ☐0,200 [.008] ☐0,150 [.005] ☐0,125 [.005] ☐0,100 [.004] ☒0,075 [.003] ☒<0,075 [.003] ☐Other:	Special

H	Internal Layer Conductor Width (Min)	☐>0,250 [.010] ☐0,250 [.010] ☐0,200 [.008] ☐0,150 [.006] ☐0,125 [.005] ☐0,100 [.004] ☒0,075 [.003] ☒0,050 [.002] ☐<0,050 [.002] ☐Other:	Standard Special
J	Internal Layer Process Allowance	☐>0,100 [.004] ☐0,100 [.004] ☒0,075 [.003] ☒0,050 [.002] ☐0,040 [.0015] ☐0,030 [.0012] ☐0,025 [.001] ☐0,020 [.0008] ☐<0,020 [.0008] ☐Other:	
K	External Layer Clearance (Min)	☐>0,350 [.014] ☐0,350 [.014] ☐0,250 [.010] ☐0,200 [.008] ☐0,150 [.006] ☐0,125 [.005] ☐0,100 [.004] ☒0,075 [.003] ☒<0,075 [.003] ☐Other:	special
L	External Layer Conductor Width (Min)	☐>0,250 [.010] ☐0,250 [.010] ☐0,200 [.008] ☐0,150 [.006] ☐0,125 [.005] ☐0,100 [.004] ☒0,075 [.003] ☒0,050 [.002] ☐<0,050 [.002] ☐Other:	Standard Special

M	External Layer Process Allowance	☐>0,100 [.004] ☒0,100 [.004] ☐0,075 [.003] ☐0,050 [.002] ☐0,040 [.0015] ☐0,030 [.0012] ☐0,025 [.001] ☐0,020 [[.0008] ☐<0,020 [.0008] ☐Other:	
N	Feature Location DTP	☐>0,50 [.020] ☐0,50 [.020] ☐0,40 [.016] ☐0,30 [.012] ☐0,25 [.010] ☒0,20 [.008] ☐0,15 [.006] ☐0,10 [.004] ☐<0,10 [.004] ☐Other:	

All Dimensions are in millimeters [inches shown in brackets]

SECTION 2.5
QUALITY DEVELOPMENT

DATE COMPLETED
5/5/2020

This section is intended to provide overview information on the quality systems in place in the manufacturing facility.

Site Capability Snapshot (Please Check all that apply.)

Designators			Remarks
A	Strategic Plan	☐Functional Steering Committee Formed ☐TQM Plan & Philosophy Established & Published ☒Documented Quality Progress Review ☐Implementation & review of Project Team Recommendations ☒TQM Communicated throughout organization ☒Controlled New process Start-up ☒Management Participates in TQM Audits ☐Employee Recognition Program ☐Total TQM Plan/Involvement Customer Training ☐Other:	
B	Employee Involvement	☐Certified Training Available ☒Training of Employee Base ☐TQM Team Trained ☐Design of Experiment Training and Use ☒New Process Implementation Training ☒Support Personnel Training ☐Advanced Statistical Training ☒Quality Functional Deployment ☒Ongoing Improvement Program for Employees ☐Other:	
C	Quality Manual	☐Quality Manual Started ☐Generic Quality Manual for Facility ☐10% of manufacturing depts. have process specifications ☐25% of manufacturing depts. have process specifications ☐50% of manufacturing depts. have process specifications ☐Non-manufacturing Manuals Developed ☐25% of all departments have quality manuals ☐50% of all departments have quality manuals ☒All Manufacturing and support depts. have controlled quality manual ☐Other:	

D	Instructions	☐Work Instructions Started ☐Quality Instructions Started ☐10% Work Instructions Completed ☐10% Quality Instructions Completed ☐25% Work Instructions Competed, Controlled ☐25% Quality Instructions Completed, Controlled ☐50% Work Instructions Completed, Controlled ☐50% Quality Instructions Completed, Controlled ☒Quality and work Instruct. Completed, Controlled ☐Other:	
E	SPC Implementation IPC-PC-90	☐Plan Exists ☐Training Started ☒Process Data Collected & Analyzed ☐All Employees Trained ☐First Process Stable & Capable ☒Several Major Processes Stable & Capable ☒Continued Improvement of Stable Processes ☐Additional Mfg Processes under Control ☐All Processes Under Control ☐Other:	
F	Supplier Programs/Controls	☐Supplier Rating Program ☐Monthly Analysis Program ☒Key Problems Identified ☐Supplier Reviews Performance Data provided ☐TQM Acceptance by suppliers ☐10% of Suppliers Using SPC ☒25% of Suppliers Using SPC ☐50% of Suppliers Using SPC ☐All Key Suppliers using Certified parts program ☐Other: Laminate and chemical suppliers	
G	Third Party IPC-QS-95	☐Instrument Controls in Place ☐Measurement System in Control IPC-PC-90 ☐Document Controls in Place ☐Reduced Lot Sampling ☐10% of Processes Under Audit Control ☐50% or Greater of Processes Under Audit Control ☐ISO-9003 Certified ☐ISO-9002 Certified ☒ISO-9001:2015 Certified ☐Other: ISO13485:2016 Certified	

SECTION 3

EQUIPMENT PROFILE (Pre-Site Audit)

DATE COMPLETED
5/5/2020

* Examples of equipment limitations include: min/max board size & min/max working area

3.1 PHOTOTOOL CAPABILITY	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) AOI of phototool	☒	☐	See Equipment list for all equipment	5	
B) AOI CAD reference (CAM)	☒	☐		5	
C) Photoplotting	☒	☐		2	
D) Photo reductions	☐	☒	Outside service	0	
E) Film scan and conversion	☐	☒	Outside service	0	
F) Film processing ☐ air-dried ☐ force-dried ☒ processed in automatic processor	☒	☐		1	
G) Media types ☒ silver halide film ☒ glass ☒ diazo	☒	☐	Glass if requested or required	2	

3.2 DRILLING EQUIPMENT	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Manual	☐	☒			
B) Optical (single spindle)	☒	☐	Hitachi,Micronics	4	
C) N.C. drill	☒	☐	Hitachi, Micronics, Schmoll		

3.3 ROUTING EQUIPMENT	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Edge beveler	☒	☐		1	
B) Hand router (pin router)	☐	☒		0	
C) N.C. router	☒	☐	Hitachi, Excellon		
D) N.C. driller/router	☒	☐			
E) Scoring (profile)	☒	☐			
F) Scoring (straight line)	☒	☐		1	

3.4 MECHANICAL EQUIPMENT	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Punch press	☐	☒		1	
B) Shear	☒	☐		1	
C) Milling machine	☐	☒	Milling using the router	0	

3.5 HOLE PREPARATION (DESMEAR)	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Permagnate	☒	☐		1	
B) Plasma	☒	☐	Nordson plasma machines	1	
C) Mechanical	☐	☐		0	
D) Etchback	☒	☐	Nordson plasma machines	1	

3.6 PRIMARY IMAGE APPLICATION	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Dry film	☒	☐	Sowotech laminaters	2	
B) Hand screening	☒	☐		1	
C) Machine screening	☐	☒		2	
D) Wet film	☐	☒		0	
E) Liquid photoimageable	☒	☐		2	

3.7 TYPE OF TREATMENT FOR MULTILAYER INNERLAYERS	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Black oxide	☐	☒		0	
B) Red oxide	☐	☒		0	
C) Copper scrub	☐	☒		1	
D) Durabond	☐	☒		0	
E) Other	☒	☐	Alternative oxide	1	

3.8 LAMINATION	YES	NO	MATERIAL	QTY	APPLICATION TECHNIQUE
A) High pressure	☒	☐		3	
B) High temperature	☒	☐		3	
C) Vacuum	☒	☐		3	
D) Vacuum assist	☒	☐		3	
E) Foil heat assist	☐	☒		0	
F) Separate cool-down	☒	☐		1	

3.9 ELECTROLESS COPPER PLATING	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Fully additive application	☐	☒		1	
B) Electroless deposition (semiadditive)	☒	☐		0	
C) Through-hole and via	☒	☐		1	

3.10 COPPER ELECTROPLATING	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Copper sulfate	☒	☐		4	
B) Pyrophosphate	☐	☒		0	
C) Copper fluoborate	☐	☒		0	
D) Other	☐	☐			

3.11 TIN/LEAD SURFACE PLATINGS/COATINGS	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Tin/lead electroplated	☐	☒		1	
B) Immersion tin or tin/lead (electroless)	☐	☒		1	
C) Hot air solder leveled (HASL)	☒	☐		2	

3.12 FUSING PROCESSES	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) I.R. reflow	☐	☒		0	
B) Hot oil reflow	☒	☐	Outside service	0	
C) Horizontal (hot air level)	☐	☒		0	
D) Vertical (hot air level)	☒	☐		2	

3.13 NICKEL SURFACE PLATING	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Electroless nickel	☒	☐		1	
B) Electroplated nickel	☒	☐		1	

3.14 GOLD SURFACE PLATING	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Electroless gold	☒	☐		1	
B) Electroplated gold	☒	☐		1	

3.15 PALLADIUM SURFACE PLATING	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Electroless palladium (immersion)	☒	☐		1	
B) Electroplated palladium	☐	☒		0	

3.16 SOLDERMASK	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Screened deposited image	☒	☐		1	
B) Dry film photoimageable	☒	☐	Orbotech	1	
C) Liquid photoimageable	☒	☐		1	
D) Dry film/liquid combination	☐	☒		1	

3.17 ORGANIC SURFACE PROTECTION	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Benzotriazole	☒	☐		1	
B) Imidazole	☐	☐		0	
C) Benzimidazole	☐	☐		0	

3.18 MICROSECTION CAPABILITY	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Manual	☒	☐			
B) Single cavity automated	☐	☒			
C) Multiple cavity automated	☒	☐			
D) Plating thickness analysis	☒	☐		1	

3.19 CHEMICAL ANALYSIS	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Etching chemistry	☒	☐			
B) Plating chemistry	☒	☐			
C) Effluent (PPM) analysis	☒	☐			

3.20 ELECTRICAL TEST EQUIPMENT	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Continuity and shorts	☒	☐			
B) Fixture development	☐	☒			
C) Flying probe test	☒	☐			
D) Impedance control	☒	☐			

MASTER EQUIPMENT LISTING

DATE COMPLETED
5/5/2020

FORM MQP 10

Please complete a Master Equipment List. You may use your own form or the MQP Form 10.

IDENTIFICATION	EQUIPMENT NAME/DESCRIPTION	MANUFACTURER TYPE/MODEL	EQUIPMENT LIMITS	ACCURACY	CALIBRATION FREQUENCY	REMARKS

DATE COMPLETED
5/5/2020

SECTION 4
TECHNOLOGY PROFILE SPECIFICS

4.1 ADMINISTRATION

4.1.1 CAPACITY PROFILE	EST %	COMMENTS
A) Total annual capacity in square meters (surface area) per month		
B) Presently running at ____ % of capacity	75	

4.1.2 PERCENTAGE OF DOLLAR VOLUME	EST %	COMMENTS
A) Single sided (rigid)	2	
B) Double sided (rigid)	10	
C) Multilayer (rigid)	80	
D) Single side (unreinforced-flex)	2	
E) Double sided (unreinforced-flex)	2	
F) Multilayer (unreinforced-flex)	2	
G) Multilayer (rigid/flex) ———	2	

4.1.3 PANEL PRODUCTION PROFILE	UNITS PER MONTH
A) Size of a production lot in panels	
1) Normal	5
2) Smallest	1
B) Number of panels per month	
1) High Production	0
2) Medium Production	5000
3) Low Production	3000
3) Short run	1000
4) Prototype	10000

C) Average lead time (delivery) as defined in B)			
1) High Production	NA		
2) Medium Production	7 days		
3) Low Production	3 days		
3) Short run	1 day		
4) Prototype Quick turn - No. of days 1.			
D) Product delivered in full panel or array sub-panel format			
1) Total in panel or array format	30%		
2) Scored format	20%		
3) Tab breakaway format	10%		
4) Other	30%		
5) Total to customer layout	60%		
6) Total to manufacturing layout	40%		
E) Product delivered in board format			
1) Total in board format	20		
2) Extracted: scored to size	30		
3) Extracted: sheared to size	0		
4) Extracted: routed to size	50		
4.1.4 APPROVAL AND CERTIFICATION	**YES**	**NO**	**COMMENTS**
A) Company approvals			
1) UL approval	☒	☐	94V Level 0.
2) Canadian standards	☐	☐	
3) MIL-P-55110	☒	☐	
4) MIL-P-50884	☐	☒	
5) ISO-9002	☐	☐	
6) ISO-9001	☒	☐	
7) ISO-14000	☐	☒	
8) BABT	☐	☒	

9) EEC	☐	☒	
10) Customer satisfaction	☒	☐	
B) Other certification information			
1)Laminate	☒	☐	
2)Quality standards	☒	☐	
3)Equipment calibration	☒	☐	

4.1.5 CUSTOMER INTERFACE PROFILE	YES	NO	COMMENTS
A) Modem capability	☐	☐	FTP site
B) Baud rate			
C) Data verification technique	☒	☐	
D) Engineering change order process	☒	☐	
E) Job status reporting to customers	☒	☐	

4.1.6 OTHER CAPABILITIES	YES	NO	COMMENTS
A) Facility research and development	☒	☐	
B) (Automated) On-line shop floor control/MRP system	☒	☐	
C) Process control system	☒	☐	
D) Operator training system	☒	☐	

4.2 PROCESS ORIENTATION

4.2.1 LAMINATE MATERIAL	EST %	COMMENTS
A) Most commonly used laminates (G10, FR4, etc.)	<80% <10% <10%	Brand name Nanya Type FR4 Brand name ISOLA Type FR406 Brand name Nelco Type FR4 Brand name Type
B) Other laminate material	<10%	Rogers, Taconic, Arlon
1) Planar resistor layers		UL approved ☐
2) BT epoxy		UL approved ☐
3) Kevlar		UL approved ☐
4) Teflon	<5%	UL approved ☐
5) Polyimide	<5%	UL approved ☒
6) Cyanate ester		UL approved ☐
7) Other		UL approved ☐
C) Specification to which laminate is purchased (check all that apply) ☐MIL-P-13949 ☐IPC-4204 ☒IPC-4101 ☒UL Approved ☐IPC-4103 ☐Other ☐IPC-4202 ☐IPC-4203		
D) Laminate storage ☐ Uncontrolled ☒ Humidity controlled ☒ Temperature controlled ☐ Dry box ☒ JIT inventory		
E) Panel size configurations in X, Y dimesions maximum X 25 Y 29in minimum X 12 Y 18 in other X 18 Y 24 in		

4.2.2 PROCESS PRECISION SPECIFICS	YES	NO	VALUE	COMMENTS
A) Maximum printed board thickness built in volume				
1) Single sided			3 125	mm Inches
2) Double sided			4 175	mm Inches
3) Multilayer			4 180	
4) Rigid flex				
B) Printed board electrical performance capability				
1) Impedance control	☒	☐	+/-10%	
2) Capacitance control	☐	☒	0	
3) Microstrip boards	☒	☐	+/-10%	
C) Tooling system description				
1) Same holes in panels used for all processes	☐	☒		
2) Optical registration	☒	☐		Process: Hitachi
3) Other	☒	☐		X-Ray Pluritec for drill tooling

4.2.3 OTHER PROCESS ORIENTATION SPECIFICS	YES	NO	SYSTEM	COMMENTS
A) Solder mask over bare copper	☒	☐	DP1500	
B) Plating/coating information				
1) Tin/lead reflow	☐	☒		
2) Hot air leveling	☒	☐	Penta 500	
3) Azole organic	☐	☒		
4) Conductive	☒	☐	Cuposit	
C) Hole formation				
1) Hole cleaning	☒	☐		
2) Hole cleanliness verified	☒	☐		Visual

4.3 PRODUCT DESCRIPTION

***CONSISTENCY IMPLIES YIELDS IN EXCESS OF 80%**

4.3.1. THROUGH HOLE INSERTION	EST %	SIZE (MM) - +/- TOL	COMMENTS
A) Smallest conductor width and tolerance produced with consistency			
1) Outer layers (print and etch)		Size 0.05 mm Tol ± .01 .mm	
2) Inner layers (print and etch)		Size .05 mm Tol ± .01 .mm	
3) Outer layers (plated)		Size .05 mm Tol ± .01 .mm	
4) Inner layers (plated)		Size .05 mm Tol ± .01 .mm	
5) Outer layers (additive plating)		Size .05 mm Tol ± .01 .mm	
6) Inner layers (additive plating)		Size .05 mm Tol ± .01 .mm	
B) Smallest plated-through hole (PTH) and tolerance consistently produced in 1.5mm thickness material or multilayer board			
1) Minimum PTH diameter		Size .15 mm Tol ± .075 .mm	Drill, Finished = 0.075
2) Largest panel where this hole can be controlled (across diagonal)		Size 2.3 mm Tol ± .22 .mm	
C) Largest hole size that can be drilled and plated through in a 1.25mm diameter land while maintaining an annular ring of 0.125mm in large/small boards		Size 6.52 mm	This is a maximum drill size. Larger holes available by routing.
1) Largest board size (across diagonal)		Size 690 mm	457 x 609 panel (406 x 558 board area)
2) Largest hole diameter		Size 6.52 mm	This is a maximum drill size. Larger holes available by routing.
3) Smallest board size (across diagonal)		Size 6.35 mm	
4) Largest hole diameter		Size 3.17 mm	
D) Surface mount land pattern pitch (check all that apply) ☒1.27mm [.050] ☒0.63mm [.025] ☒0.5mm [.020] ☒0.4mm [.016] ☒0.3mm [.012] ☐0.25mm [.010] ☐Other _____ .			

E) Solder mask dam between lands (check all that apply) ☒1.27mm [.050] ☒0.63mm [.025] ☒0.5mm [.020] ☒0.4mm [.016] ☒0.3mm [.012] ☒0.25mm [.010] ☒Other 0.1 .				
F) Flatness tolerance (bow & twist) after reflow or solder coating ☐1.5% ☐1.0% ☐0.5% ☐Other ____				

4.3.2 PRODUCT QUALITATIVE AND QUANTITATIVE INFORMATION	YES	NO	QUANTITY OF PANELS	NUMBER or DIMENSION	COMMENTS
A) Multilayer layer count					
1) Maximum layers fabricated in volume (Maximum Lot)			22		See maximum layers
2) Maximum layers fabricated in prototype (Minimum Lot)			22		See maximum layers
B) Buried vias produced consistently in volume	☒	☐			
1) Size					Per customer requirement
2) Number of layers					Per customer requirement
B) Blind vias produced consistently in volume	☒	☐			
1) Size					Per customer requirement Perferred aspect ratio < 1:1
2) Number of layers					Per customer requirement
1) Controlled depth drilling	☒	☐			
2) Total number of layers					Per customer requirement

4.4. TESTING CAPABILITY

4.4.1 TEST AND TEST EQUIPMENT CAPABILITY	YES	NO	COMMENTS
A) SMT centerline pitch that can be electrically tested ☒ 0.63mm [.025] ☒ 0.5mm [.020] ☒ 0.4mm [.016] ☒ 0.3mm [.012] ☐ 0.25mm [.010] ☐ Other			
B) Double sided simultaneous electrical testing	☒	☐	
1) Equipment type	☒	☐	ATG Flying probe
2) X-ray fluorescence inspection equipment	☒	☐	Fischer
3) TDR equipment	☒	☐	Polar
4) Hi-pot test equipment	☒	☐	
5) Four-wire kelvin tester	☐	☒	

6) Capacitance meter	☐	☒	
7) Cleanliness testing	☒	☐	

4.4.2 AUTOMATED OPTICAL INSPECTION USAGE	EST %	COMMENTS
A) Before etching	50	
B) After etching	75	
C) Internal layers	100	
D) Final inspection	0	
E) Other		
F) Conductor/clearance normally inspected by AOI equipment		
1) ☒ 0.05mm [.002]		
2) ☒ 0.05-.10mm [.002-.004]		
3) ☒ >.10mm [.004]		
4) ☒ Planes		
G) CAD download to AOI	100%	

DATE COMPLETED
5/5/2020

SECTION 5
QUALITY PROFILE

GENERAL INFORMATION	
COMPANY NAME Sierra Proto Express, Inc.	
CONTACT Ken Bahl	
TELEPHONE NUMBER 408 735-7137	FAX NUMBER 408 735-0175

This section of the Manufacturer's Qualification Profile is intended to describe the Total Quality Management (TQM) activity in place of being implemented at the manufacturing facility identified in the site description of this MQP.

To ease in the task of identifying the TQM program being planned or underway at the manufacturing site, the activities have been divided into twenty sections which when completed, provide the total picture of the posture toward managing quality issues. Each section contains a number of questions with regard to the topic under review.

It is not the intent to have the questions be all encompassing, nor is every question applicable to all manufacturers. However, identification of the status, related to each questions, when considered as a whole will convey an impression of the progress that the company has achieved in adopting the principles of total quality management.

The twenty sections, in order of the occurrence are:

5.1 General Quality Programs
5.2 New Products/Technical Services
5.3 Customer Satisfaction
5.4 Computer Integrated Manufacturing
5.5 Process Documentation
5.6 Quality Records
5.7 Skill, Training & Certification
5.8 Subcontractor Control
5.9 Calibration Control
5.10 Internal Audits
5.11 Statistical Process Control
5.12 Problem Solving
5.13 In-Process Control
5.14 Receiving Inspection
5.15 Material Handling
5.16 Non-Conforming Material Control
5.17 Inspection and Test Plan
5.18 Product Inspection/Final Audit
5.19 Tooling Inspection, Handling, & Storage
5.20 Corrective Action

Each section provides a status report related to each question. The question may not be applicable, no activity has started as yet, or the company may have developed an approach to the issues raised by the questions. An (X) is indicated in the appropriate column. If deployment/implementation has started, the status is reported as percent deployment; this is indicated in column 4. The percentage number closely approximates the status of deployment. If deployment exists, the percentage results that have been achieved is indicated in column 5. Results are based on expected goals. Not providing percent information in either the deployment or results column implies a lack of activity in the particular area.

The quality descriptions requested are completed on the following pages by checking (X) the appropriate column to reflect the status of the manufacturing facility TQM program. Additional information may be provided as comments shown below, or on individual sections, or additional sheets as necessary.

COMMENTS

5.1 GENERAL QUALITY PROGRAMS		STATUS				
	DESCRIPTION OF PROGRAM	Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Are quality objectives and responsibilities clearly stated, widely distributed and understood through the company?				100	100
2.	Is there a quality function or well defined organization which provides customer advocate guidance to the total organization and is this position fully supported by management?				100	100
3.	Does a quality measurement system exist with clearly defined metrics and is it utilized as a management tool?				100	100
4.	Are work instructions approved and controlled; and are they under revision control?				100	100
5.	Are the quality procedures and policies current and available at the point of application; and are they under revision control?				100	100
6.	Are benchmark and customer satisfaction studies done to determine best in class for all products, services, and administrative functions; and are quality goals set?			X	50	
7.	Are Statistical Process Control (SPC) principles understood by all levels of management?				70	40
8.	Are there programs with sufficient resources assigned to support corrective actions and prevention?				100	100
9.	Does management solicit and accept feedback from the work force?				100	100
10.	Is there management support of ongoing training (including quality training), and is it documented by an organizational training plan?				100	100
11.	Are there regular management reviews of elements of the quality improvement process, including feedback for corrective action, and are the results acted upon?				100	100
12.	Are the quality and reliability goals aggressive relative to customer expectations and targeted at continuous improvement?				100	100
13.	Are the people who are responsible for administering the quality assurance function technically informed?				100	100
14.	Does Management have a “defect prevention” attitude to achieve continuous improvement?				100	100

5.2 NEW PRODUCTS/TECHNICAL SERVICES		STATUS				
	DESCRIPTION OF PROGRAM	Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Do new product/technology/service development policies and procedures exist, and do they result in clearly defined project plans with appropriate measureables and approvals?			X	80	70
2.	Is quantitative benchmarking used to evaluate all new products/technologies/services in comparison to best-in-class offerings?			X		
3.	Does a roadmap exist to ensure continued development of leading edge, best-in-class products/technology/services?					
4.	Is the capability of each operation which controls critical-to-function characteristics for new products, fully certified?					
5.	Are statistical tools used in the development of robust (high yield) new processes, products, and services?			X	70	70
6.	When new product/technology/service requires a new process, is it developed jointly and concurrently with the customer and/or suppliers?				100	100
7.	Are design reviews conducted on a scheduled basis which properly address the process capability indices of critical-to-function and product/service characteristics?		X			
8.	Is the new product/technology/service, as produced by the process, verified to meet all customer satisfaction requirements?				100	100

COMMENTS

5.3 CUSTOMER SATISFACTION

	DESCRIPTION OF PROGRAM	STATUS				
		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Is there a measurement system in place to assess the customer's perception of complete performance?			X	50	
2.	Is an independent (unbiased) customer survey routinely conducted?			X		
3.	Is there an internal measurement system within the organization which correlates to the level of customer satisfaction?			X		
4.	Are there specific goals for achieving Total Customer Satisfaction, both internal and external?			X	80	80
5.	To what extent are customer satisfaction goals disseminated and understood by everyone in the organization?			X		
6.	Does management regularly review and assess all operating systems to determine if barriers to customer satisfaction exist and are appropriate action plans then implemented?				100	100
7.	Is there a method in place to obtain future customer requirements?				100	100
8.	Are all findings of customer dissatisfaction reported back to the proper organization for analysis and corrective action?				100	100
9.	Are customer satisfaction requirements formally defined and documented, and are they based on customer input?			X		
10.	Do all support organizations understand their role in achieving total customer satisfaction?				100	100

5.4 COMPUTER INTEGRATED MANUFACTURING

	DESCRIPTION OF PROGRAM	STATUS				
		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Are systems integrated to allow electronic transfer of information between multiple systems to eliminate redundant data entry?				100	100
2.	Can customers electronically transfer CAD/CAM directly into manufacturing?				0	
3.	Can customers electronically transfer order information directly into the business system?				0	
4.	Is data electronically shared between shop floor control and process control systems (i.e., CNC, SPC, Electrical Test, AOI, etc.)?				80	100
5.	Are planning systems (MRP, forecasting, capacity planning, financial planning, etc.) electronically integrated with operation systems (order processing, purchasing, inventory management, shop floor control, financial/cost control, etc.)?				100	100
6.	Is information available from system processes in real time (vs. batch processing)?				100	100
7.	Are processes and procedures documented and available on-line?				100	100
8.	Do all functional departments have system access to key financial, manufacturing, sales, and operational data, as it relates to their functional objectives?				80	100
9.	Are computer simulation and design tools used to the maximum extent practicable in the design of new products/technologies/services	X				

COMMENTS

5.5 PROCESS DOCUMENTATION

STATUS

DESCRIPTION OF PROGRAM		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Are manufacturing product, process, and configuration documents under issue control?				100	100
2.	Are “preliminary” and “special product” specifications controlled?				100	100
3.	Does the system ensure that the most current customer specifications are available to the manufacturing personnel?				100	100
4.	Does the system ensure that the most current material specifications are available to the procurement function?				100	100
5.	Are incoming orders reviewed for revisions and issue changes?				100	100
6.	Is conformance to customer specifications assured before an order is accepted?				100	100
7.	Is customer feedback provided when designs do not meet manufacturability requirements?				100	100
8.	Are critical characteristics classified, relative to impact on product performance?			X	50	80
9.	Are customers informed of changes made to products controlled by customer drawings or specifications?				100	100
10.	Is there an effective internal deviation control procedure and, are customer requested deviations documented and followed?				100	100
11.	Do new product development procedures exist, and are they followed in the design development process?	X				

5.6 QUALITY RECORDS

STATUS

DESCRIPTION OF PROGRAM		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Are records of inspection and process control maintained and available for review?				100	100
2.	Are records of equipment and equipment maintenance kept?				100	100
3.	Is the record and sample retention program defined?				100	100
4.	Are quality data used as a basis for corrective action?				100	100
5.	Are quality data used in reporting performance and trends to management?				100	100
6.	Are quality data used in supporting certifications of quality furnished to customers?				100	100
7.	Is field information used for corrective action?				100	100
8.	Does a cost of quality measurement system exist?				100	100
9.	Are customer reported quality problems responded to, and resolved in the time period requested?				100	100
10.	Is quality information on production material rejects provided to sub-suppliers with required corrective action?				100	100
11.	Are computers used to collect and analyze quality data?			X	75	60

COMMENTS

5.7 SKILLS, TRAINING, & CERTIFICATION

STATUS

DESCRIPTION OF PROGRAM	Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results

1.	Does management ensure that all personnel are trained in their role for achieving Total Customer Satisfaction?				100	80
2.	Do all personnel understand how their performance impacts internal and external customer satisfaction?				100	100
3.	Do all personnel who contact external customers reflect quality improvement programs?				100	80
4.	Do personnel participate in professional societies and growth programs?				100	100
5.	Are all personnel trained in sufficient detail to support key initiatives?				100	100
6.	Are the results of training evaluated and indicated program changes made?			X	70	
7.	Does a policy exist which encourages the cross training and rotation of personnel, and is this policy used as the basis of job progression?					
8.	Are performance standards participatively developed, and regularly applied for all personnel?					
9.	Are Total Customer Satisfaction programs and resulting successes publicized to all personnel?					
10.	Do goal setting and reward/incentive programs support the quality improvement process?					

5.8 SUBCONTRACTOR CONTROL

DESCRIPTION OF PROGRAM		STATUS				
		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Are requirements defined, communicated, and updated to ensure that the supplier understands expectations?			X	100	75
2.	Does a system exist which measures the performance of the supplier and communicates such information to the supplier? (i.e., supplier rating system)			X	10	100
3.	Have the organization's processes been characterized to identify the critical requirements for the suppliers products?			X	90	75
4.	Have the capabilities of the supplier's processes been assessed and considered in the establishment of the requirements?			X	100	90
5.	Have partnerships been established with suppliers, and is assistance provided to ensure that each supplier has the capability to consistently supply conforming products?			X	100	90
6.	Have quality and cycle time metrics and improvement goals been established participatively with the supplier?			X	25	75
7.	Has a system been established with the supplier for identification and verification of corrective action?			X	100	100
8.	Have the requirements for supplier materials been properly characterized and specified to ensure conformance of the product/service to the customer satisfaction requirements?			X	90	100
9.	Is there a supplier certification program or equivalent procured material/service continuous quality improvement program?		X		50	50
10.	Can all personnel who contract suppliers properly reflect appropriate quality improvement programs and status to them?			X	75	100

COMMENTS

5.9 CALIBRATION CONTROL

DESCRIPTION OF PROGRAM		STATUS				
		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Are calibration and preventative maintenance programs in place and documented?				100	100

2.	Are calibration and maintenance personnel trained?				100	100
3.	Is traceability to NIST maintained?				100	100
4.	Is quality measurement and control equipment current, effective, and sufficiently integrated with production equipment?				100	100
5.	Is the history of quality measurement and control equipment documented?				100	100
6.	Has repeatability of measuring devices and inspection or testing processes been established and monitored; are gauge capability studies conducted and GR&R ratios acceptable(<10%)?		X			
7.	Are calibration and preventative maintenance cycles on schedule?				100	95
8.	Is the use of non-calibrated equipment for design and production purposes prohibited?				100	100
9.	Are tools and fixtures used as criteria or acceptability of product/work fully qualified and identified?				100	100
10.	Are calibration intervals defined in accordance with industry standards or manufacturer's recommendations and the calibration history of the equipment?				100	100

5.10 INTERNAL AUDITS		**STATUS**				
DESCRIPTION OF PROGRAM		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Are regular reviews of the product/process conducted and are goals/plans established to continually improve?				100	100
2.	Are the processes/products properly documented and controlled? Do they include appropriate customer requirements and are they executed in conformance to the documentation?				100	90
3.	Are the required quality checks built into the operations within the manufacturing, field installation, and service process, and is the resulting data maintained and promptly acted upon?				100	100
4.	Are all pertinent methods of statistical quality control properly, effectively and efficiently used?				50	50
5.	Does a process change control system exist, and are customers informed of changes made to products and processes with customer approval prior to the change, when required?				100	100
6.	Are the operators within the process provided with written work instructions and are they trained?				100	100
7.	Is the receipt, handling, storage, packaging and release of all material, including customer provided items, at all stages, specified and controlled to prevent damage or deterioration, and to address obsolete material?				100	100
8.	Is there a first in/first out (FIFO) system in place, and is it followed?				100	100

COMMENTS

5.11 STATISTICAL PROCESS CONTROL		STATUS				
	DESCRIPTION OF PROGRAM	Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Have the personnel who will be responsible for guiding the implementation of SPC been designated?				100	100
2.	Are statistical techniques used to reduce variation in the engineering process before the start of production?				50	
3.	Is the quality system dependent upon process rather than product controls?				50	
4.	Is the capability of critical processes and machines measured and monitored with CPK's >1.5, and targeted with CP of 2.0?			X	50	
5.	Are incapable processes or machines targeted for improvement or replacement?			X		
6.	Is SPC implemented for all critical processes?			X		
7.	Are procedures that control the reaction to out-of-control situations adequate and effective?			X		
8.	Are operators trained in the use of appropriate statistical techniques, and are they properly applying them?			X		
9.	Are advanced problem solving techniques used by engineers to solve problems? (Design of Experiments, planned experimentation, advanced diagnostic tools, etc.)		X			
10.	Are control charts and other process controls properly implemented?				50	50
11.	Is statistical process control being practiced in work centers and are yields being recorded and plotted on a scheduled basis, with respect to upper and lower control limits?		X			

5.12 PROBLEM SOLVING		STATUS				
	DESCRIPTION OF PROGRAM	Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Are employees trained in problem solving techniques, in comparison to the needs of the organization?		X			
2.	Does the organization utilize participative problem solving techniques to identify, measure and resolve internal and external problems?				60	60
3.	Are problem solving efforts timely and effective?				80	80
4.	Are applied resources sufficient to remove problem solving constraints?				80	80
5.	Are statistical techniques used for problem solving?			X		
6.	Are quality data used to identify barriers, and to determine the priority of problems?				80	80
7.	Is there a policy/procedure that includes the use of problem solving techniques to systematically drive reduction in variability?		X			

COMMENTS

5.13 IN-PROCESS CONTROL		STATUS				
	DESCRIPTION OF PROGRAM	Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Are process capabilities established and maintained on all major processes? (critical parameters)				50	60
2.	Are in-process inspections, test operations, and processes properly specified and performed?				100	100
3.	Are in-process inspection facilities and equipment adequate?				100	100
4.	Are the results of in-process inspections used in the promotion of effective preventative action and corrective action?				100	100
5.	Is preventative maintenance performed on the equipment and facilities?				100	100
6.	Are housekeeping procedures adequate and how well are they followed?				100	85
7.	Are process management plans established, and are critical parameters followed?				100	85
8.	Are work areas uncluttered and free of excess work-in-process, supplies, debris, etc? Is the environment conductive to producing quality work? Is proprietary information adequately protected?				100	85
9.	Are certifications and in-process inspection results used in making final acceptance decisions?				100	100
10.	Are methods and procedures for the control of metallurgical, chemical, and other special processes established and followed?				100	100

5.14 RECEIVING INSPECTION		STATUS				
	DESCRIPTION OF PROGRAM	Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Are receiving inspection facilities and equipment adequately and properly maintained?				100	100
2.	Are receiving inspection procedures documented and followed?				100	100
3.	Are receiving inspection results used for corrective and preventive action?				100	100
4.	Are the procedures for storage and timely disposition of discrepant material in place and followed?				100	100

COMMENTS

5.15 MATERIAL HANDLING		STATUS				
	DESCRIPTION OF PROGRAM	Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Are procured material releases from receiving inspection clearly identified, as to acceptance status?				100	100
2.	Are procedures to facilitate limited life materials, such as prepreg, in place, properly controlled, and monitored?				100	100
3.	Are procured items identified with some means of traceability (serial number, lot number, date code, etc.)?				100	100
4.	Are procedures and facilities adequate for storage, release and control of materials?				100	100
5.	Are in-store and in-process materials properly identified and controlled?				100	100
6.	Is in-process material protected from corrosion, deteriorization, and damage?				100	100

5.16 NON-CONFORMING MATERIAL CONTROL		STATUS				
	DESCRIPTION OF PROGRAM	Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Is non-conforming material identified, segregated from regular production material, and properly dispositioned?				100	100
2.	Are non-conforming materials properly identified and controlled to prevent inadvertent use?				100	100
3.	Is the review and disposition of non-conforming materials defined, and are provisions made for inclusion of the customer in disposition decision?				100	90
4.	Are procedures for controlling non-conforming materials, and for ensuing corrective action, in place and followed?				100	100
5.	Do procedures provide for material review by a committee consisting of Quality and Engineering (as a minimum), to determine the disposition of non-conforming materials? (deviating from drawings or specification)				100	100
6.	Do supplier's procedures and controls for corrective action prevent recurrence of non-conformances?				100	80
7.	Is there a system for coordinating necessary corrective action with purchasing personnel?				100	100
8.	Does the corrective action extend to all applicable causes of non-conformance (e.g., design, workmanship, procedures, equipment, etc.)?				100	100

COMMENTS

5.17 INSPECTION AND TEST PLAN	STATUS

DESCRIPTION OF PROGRAM		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Are statistical techniques used in determining the acceptability of finished goods to customer requirements?		X			
2.	Are periodic tests conducted to audit reliability and environmental performance of the final product?			X	50	80
3.	Is CPK tracking performed for critical characteristics, with plans to achieve CPK = 1.5 with a target of CP of 2.0?			X		
4.	Is root cause failure analysis performed for internal and external failures, and is appropriate corrective action implemented?				80	100
5.	Are test and inspection personnel trained in the procedures of their operations, and are those procedures being followed?				100	80
6.	Is the new product/technology/service, as produced by the processes, verified to meet all customer satisfaction requirements?				100	95

5.18 PRODUCT INSPECTION/FINAL AUDIT

STATUS

DESCRIPTION OF PROGRAM		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Are final product acceptance procedures documented and followed?				100	95
2.	Are all specific customer product audits conducted, as required?				100	98
3.	Are inspectors trained for the tasks performed?				100	100
4.	Are flow charts or milestones developed with checkpoints readily available?				100	100
5.	Is a system in place which denotes inspection performed; e.g., use of initials, stamps, labels, bar codes, etc., affixed to production documentation?				100	100
6.	Is a quality system established and maintained for control of product/production documentation?				100	95
7.	Is “accept/reject” criteria defined and available for use?				100	100
8.	Is a final audit performed to ensure that all required verifications and tests, from receipt of materials through point of product completion, have been accomplished?			X		
9.	Are packing and order checking procedures documented and followed?				100	85

COMMENTS

5.19 TOOLING INSPECTION, HANDLING, & STORAGE

STATUS

DESCRIPTION OF PROGRAM	Not	Not	Approach	Percent	Percent

		Applicable	Started	Developed	Deployed	Results
1.	Are temperature, humidity, laminar flow controls in place to prevent contamination, and to assure dimensional stability?			X	50	85
2.	Do operators use hairnets, gloves & lab coats in all photolab and photoexposure areas?				85	90
3.	Are work instructions and related forms in place to control all applicable tooling requirements, as stated in the customer's purchase order?				100	95
4.	Are customer provided artworks controlled with regard to handling, storage, revision control and relationship to converted production phototools (working films)?	X				
5.	Are production phototools (working films) controlled with regard to handling, storage, use life, and relationship to customer purchase order?				100	100
6.	Are customer provided artworks and production phototools (working films) inspected, including dimensional checks?				100	100
7.	Are all tools, fixtures, and other devices, used for tooling inspection and control, maintained under the calibration control procedure?				100	100
8.	Are records showing initial acceptance, periodic checks, and any needs for rework and/or modification available?				80	90

5.20 CORRECTIVE ACTION

STATUS

	DESCRIPTION OF PROGRAM	Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Are final acceptance inspection results used for corrective and preventative action?				100	100
2.	Is root-cause analysis performed for non-conformances? This includes, but is not limited to, non-conformances (problems) caused by suppliers, found/caused "in-house" during processing, or those reported by the customer.				100	100
3.	Is positive action taken to prevent recurrence of problems, and are there documented reports/records of each occasion?				100	100
4.	Do procedures and systems provide for ensuring that replies are made to customer requests for correction action within the time limit specified?				100	100
5.	Is corrective action controlled and documented for all applicable work centers?				100	100
6.	When corrections are made, is their effectiveness subsequently reviewed and monitored?				90	90

COMMENTS

DATE COMPLETED
5/5/2020

SECTION 6 (CHECK ONE IN EACH LINE THAT APPLIES)
MANUFACTURING HISTORY (See Section 2 Site Capability)

Please complete as many history profiles so that the total descriptions of products you manufacture account for production orders that reflect 70% of your business. History profiles are for board or board family (board types may be grounded together if they are similar).

BOARD TYPE	DATE OF ORDER	MATERIAL	HISTORY #
VIA TYPE	PRODUCTION QUANTITY	TOTAL YEARLY PRODUCTION %	

Dimensions in millimeters (inches in brackets)

BOARD			HOLES		
BOARD SIZE DIAGONAL	TOTAL BOARD THICKNESS	NUMBER CONDUCTIVE LAYERS	DIA DRILLED HOLES	TOTAL PTH TOL (MAX-MIN)	LOCATION TOL DTP
☐<250 [<10.00]	☐<1,0 [<.040]	☐1-4 [1-4]	☐>0,5 [>.020]	☐>0,250 [> .010]	☐**>0,50 [>.020]**
☐250 [10.00]	☐1,0 [.040]	☐5-6 [5-6]	☐0,5 [.020]	☐0,250 [.010]	☐**0,50 [.020]**
☐350 [14.00]	☐1,6 [.060]	☐7-8 [7-8]	☐0,4 [.016]	☐0,200 [.008]	☐**0,40 [.016]**
☐450[17.50]	☐2,0 [.080]	☐9-12 [9-12]	☐0,35 [.014]	☐0,150 [.006]	☐**0,30 [.012]**
☐550 [21.50]	☐2,5 [.100]	☐13-16 [13-16]	☐0,30 [.012]	☐0,125 [.005]	☐**0,25 [.010]**
☐650 [25.50]	☐3,5 [.135]	☐17-20 [17-20]	☐0,25 [.010]	☐0,100 [.004]	☐**0,20 [.008]**
☐750 [29.50]	☐5,0 [.200]	☐21-24 [21-24]	☐0,20 [.008]	☐0,075 [.003]	☐**0,15 [.006]**
☐850 [33.50]	☐6,5 [.250]	☐25-28 [25-28]	☐0,15 [.006]	☐0,050 [.002]	☐**0,10 [.004]**
☐>850 [>33.50]	☐>6,5 [>.250]	☐>28 [>28]	☐<0,15 [.006]	☐<0,050 [<.002]	☐**<0,10 [<.004]**
☐Other:	☐Other:	☐Other:	☐Other:	☐Other:	☐**Other:**

CONDUCTORS						
INTERNAL ELEC CLEARANCE (MIN)	INTERNAL COND WIDTH (MIN)	INTERNAL PROCESS ALLOWANCE	EXTERNAL ELEC CLEARANCE (MIN)	EXTERNAL COND WIDTH (MIN)	EXTERNAL PROCESS ALLOWANCE	FEATURE LOCATION DTP
☐>0,350 [>.014]	☐>0,250 [>.010]	☐>0,100 [>.004]	☐>0,350 [>.014]	☐>0,250 [>.010]	☐>0,100 [>.004]	☐>0,50 [>.020]
☐0,350 [.014]	☐0,250 [.010]	☐0,100 [.004]	☐0,350 [.014]	☐0,250 [.010]	☐0,100 [.004]	☐0,50 [.020]
☐0,250 [.010]	☐0,200 [.008]	☐0,075 [.003]	☐0,250 [.010]	☐0,200 [.008]	☐0,075 [.003]	☐0,40 [.016]
☐0,200 [.008]	☐0,150 [.006]	☐0,050 [.002]	☐0,200 [.008]	☐0,150 [.006]	☐0,050 [.002]	☐0,30 [.012]
☐0,150 [.005]	☐0,125 [.005]	☐0,040 [.0015]	☐0,150 [.006]	☐0,125 [.005]	☐0,040 [.0015]	☐0,25 [.010]
☐0,125 [.005]	☐0,100 [.004]	☐0,030 [.0012]	☐0,125 [.005]	☐0,100 [.004]	☐0,030 [.0012]	☐0,20 [.008]
☐0,100 [.004]	☐0,075 [.003]	☐0,025 [.001]	☐0,100 [.004]	☐0,075 [.003]	☐0,025 [.001]	☐0,15 [.006]
☐0,075 [.003]	☐0,050 [.002]	☐0,020 [.0008]	☐0,075 [.003]	☐0,050 [.002]	☐0,020 [.0008]	☐0,10 [.004]
☐<0,075 [<.003]	☐<0,050 [<.002]	☐<0,020 [<.0008]	☐<0,075 [<.003]	☐<0,050 [<.002]	☐<0,020 [<.008]	☐<0,10 [<.004]
☐Other:	☐Other:	☐Other:	☐Other:	☐Other:	☐Other:	☐Other:

DATE COMPLETED
10/13/16

SECTION 7

IDENTIFICATION OF PREVIOUS AUDITS (Optional)

Please complete as many forms as you feel reflect the intensity of your customer visits.

COMPANY AUDITORS	DATE OF AUDIT
AUDIT TEAM MEMBERS	AUDITOR REMARKS
	SPECIFICATIONS USED IN AUDIT
LENGHT OF AUDIT	
TEAM MEMBERS MAY BE CONTACTED AT	

COMPANY AUDITORS	DATE OF AUDIT
AUDIT TEAM MEMBERS	AUDITOR REMARKS
	SPECIFICATIONS USED IN AUDIT
LENGHT OF AUDIT	
TEAM MEMBERS MAY BE CONTACTED AT	

COMPANY AUDITORS	DATE OF AUDIT
AUDIT TEAM MEMBERS	AUDITOR REMARKS
	SPECIFICATIONS USED IN AUDIT
LENGHT OF AUDIT	
TEAM MEMBERS MAY BE CONTACT AT	

*REPEAT THIS FORM AS NECESSARY

DATE COMPLETED
3/04/19

SECTION 8

FINANCIAL REVIEW (OPTIONAL)

Please complete the following financial information that coincides with the company description and site information provided in section 1.

COMPANY FINANCIAL DESCRIPTION

LEGAL NAME Sierra Circuits		
TAXPAYER ID NUMBER 77-0120789	DUNS NUMBER 092616184	TRADING SYMBOL
ANNUAL SALES	PRIOR YEAR	YEAR-TO-DATE
FISCAL YEAR		
BANK Comerica Bank	ACCOUNT NUMBER 1895125522	
BANK ADDRESS 333 W. Santa Clara Street,	STATE CA	ZIP 95113
PROVINCE San Jose	COUNTRY USA	
BANK TELEPHONE NUMBER 408-556-5300	FAX NUMBER 408-298-6449	
COMMENTS		

SITE FINANCIAL DESCRIPTION

SITE NAME		
TAXPAYER ID NUMBER	DUNS NUMBER	TRADING SYMBOL
ANNUAL SALES	PRIOR YEAR	YEAR-TO-DATE
FISCAL YEAR		
BANK	ACCOUNT NUMBER	
BANK ADDRESS	STATE	ZIP
PROVINCE	COUNTRY	
BANK TELEPHONE NUMBER	FAX NUMBER	
COMMENTS		

SECTION 9

MQP ELECTRONIC EDITING

This MS Word template comes with editable fields. IPC has made this electronic document available for ease of completing, updating, and filing the MQP, as well as to give the laminate manufacturer and customer a common interface. Using the template enables laminate manufacturers to maintain several customer specific files without the endless stream of paperwork.

Editable fields are highlighted in gray. To complete the fields in the template, use the TAB key to toggle from field to field, entering the information as instructed in the introductory text for each section.

The developers of this MQP strongly suggest the person at the laminate manufacturing facility responsible for creating and maintaining the MQP write protect the file to be sent.