SECTION 1.1
COMPANY DESCRIPTION

DATE COMPLETED
7/09/2013

GENERAL INFORMATION

LEGAL NAME Alpha Circuit Corporation			
PHYSICAL ADDRESS 730 North Oaklawn Avenue			
CITY Elmhurst		STATE Illinois	ZIP 60126-4015
PROVINCE N/A		COUNTRY USA	
TELEPHONE NUMBER 630617-5555		FAX NUMBER 630-617-5598	TELEX NUMBER
E-MAIL ADDRESS Alpha@AlphaCircuit.com	MODEM NUMBER		DATE FOUNDED 1981 X PRIVATE
INTERNET URL www.AlphaCircuit.com		FTP SITE FTP.AlphaCircuit.com	

MANAGEMENT

PRESIDENT
Mr. Yash Sutariya

Vice-President- Parag Bhatt

Plant Manager - Bhart Dungrani

Quality Assurance Manager- Don Stevens

SALES Manager
Steve Ryan

Front End Engineering Manger- Joe Ciukaj

WASTE TREATMENT Technician (POLLUTION PREVENTION)-Daxa Patel

CORPORATE DESCRIPTION		NUMBER OF EMPLOYEES CORPORATE	SITE	COMMENTS
DESIGN AND DEVELOPMENT		N/A	730 Oaklawn	No Design work is done in-house
ENGINEERING		4	730 Oaklawn	CAD and Production
MANUFACTURING CONTROL		2	730 Oaklawn	1st Shift and 2nd
MANUFACTURING	DIRECT	25	730 Oaklawn	
	INDIRECT	6	730 Oaklawn	Includes members from below
QUALITY CONTROL	QUALITY ENGINEERS	6	730 Oaklawn	Includes members from below
	INTERNAL AUDITORS	6	730 Oaklawn	Includes members from above
	GENERAL MANAGEMENT	3	730 Oaklawn	
ADMINISTRATION		8	730 Oaklawn	Office & Sales included
TOTAL		47	730 Oaklawn	Numbers above may be higher than total due to multiple responsibilities per person.

SECTION 1.2
SITE DESCRIPTION

(TO BE COMPLETED FOR EACH SITE) DATE COMPLETED 6/28/2013 ATTACH APPROPRIATE CHARTS (OPTIONAL)

MANUFACTURING FACILITY

COMPANY NAME	Alpha Circuit Corporation		
PHYSICAL ADDRESS	730 North Oaklawn Avenue		
CITY Elmhurst	STATE Illinois	ZIP 60126-4015	
PROVINCE N/A	COUNTRY USA		
TELEPHONE NUMBER 630-617-5555	FAX NUMBER 630-617-5598	TELEX N/A	
E-MAIL ADDRESS Alpha@AlphaCircuit.com	MODEM NUMBER	YEARS IN BUSINESS 32	
INTERNET URL	FTP		
PRINCIPLE PRODUCTS/SERVICES/SPECIALTIES Bare Board Printed Circuit Manufacturer Flex/Rigid Flex/Rigid/Multilayer	BUSINESS CHARACTERIZATION (HIGH VOLUME, QUICK TURN-AROUND, ETC.) Quick Turn to Medium Volume/Technology Driven		

FACILITY MANAGEMENT	TITLE	REPORTS TO (Function/Job Title)
OVERALL OPERATION RESPONSIBILITY FOR THIS SITE Yash Sutariya	President	N/A
MANUFACTURING Parag Bhatt	Vice-President	President
TECHNICAL/ENGINEERING Natu Vaghani	Engineering Manager	President and/or Vice-President
MATERIALS/PRODUCTION CONTROL Bharat Dungrani	Plant Manager	President and/or Vice-President
PURCHASING Ankit Dungrani	Purchasing Manager	President and/or Vice-President
QUALITY Don Stevens	Quality Assurance Manager	President
SALES REPRESENTATIVE		Sales Manager
WASTE MANAGEMENT Daxa Patel	Laboratory Supervisor	Plant Manager

BUILDINGS / SYSTEMS (INDICATE % COVERAGE)

	AGE	AREA (Sq. Ft.)	Construction (Wood/Brick)	Power Conditioning	Heating	Ventilation	Air Conditioning	Sprinklers	Waste Treatment	Other
Office	43	5K	Brick	100%	100%	100%	100%	100%	100%	
Manufacturing	43	41K	Brick	100%	100%	100%	48%	100%	100%	AC as process requires
Storage	0									
Planned additions	0									

SAFETY AND REGULATORY AGENCY REQUIREMENTS

Are fire extinguishers functional and accessible to employees?	X YES		What is the distance to the nearest fire station? (in minutes)	5 Minutes
Do you conform to local/federal environment protection agency requirements?	X YES		Date of last OSHA visit Date of last EPA visit	June 2012 March 2012
Are you currently operating under a waiver or in violation of local government requirements?		X NO	Other Agency Audits, UL, ISO 9000, NECQ, CSA Approval and Number	X UL # E80943 X ISO 9000# A2722US X CSA # ZPMV8. E80943 X ITAR CH544 X TS16949
Do you have a safety program? Describe below.	X YES		Hazardous Waste Number Trade Waste Account Number	203-EB-3274 IEPA

PLANT PERSONNEL (TOTAL EMPLOYEES)

Regular	Contract	Office	Technical/ Engineering	Production	Full-Time QA	Part-Time QA	Union	Non-Union	Union Name	Contract Expires (Date)
47	0	8	4	31	4	0	0	47	N/A	N/A

COMMENTS

SECTION 2.1
PROCESS

DATE COMPLETED
6/28/2013

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	X Subtractive X Thin Foil Subtractive less than .5 oz. Semi-Additive Additive (Electro-less) X Black Hole Thick Film Paste and Fire Thin Film Semi-conductor Sputtering ☐Other:	 1/8 and standard ¼ ounce foil is used Direct Metalization/Shadow/OMG
B	PTH Materials and Processes	X Acid Copper Pyro-Phosphate Copper Full Built Electro-Less Gold Paste Copper Paste Gold Conductor Sputtering Nickel Conductor Sputtering ☐Other:	Automatic plating line/Conforming to IPC-6012A Class 2 & Class 3 and MIL-C-14550
C	Permanent Over-plating	X Tin X Tin-Lead X Tin-Nickel Alloy X Nickel X Nickel Gold (Hard) X Nickel Gold (Soft) X Conductive Polymer X Other:Carbon Ink/Immersion Silver/OSP	 SN100CL/Lead Free Service used ENIG PROCESS Conductive Silver Compliant to IPC-TF-870

D	Permanent Selective Plating	X Tin X Tin-Lead X Tin-Nickel Alloy X Nickel X Nickel Gold (Hard) X Nickel Gold (Soft) Nickel Rhodium ☐Other:	
E	Permanent Mask or Coating	X Photo Dry Film X Photo Liquid X Image Transfer Screen Mask Conformal Coating Solder Mask X Cover Coat/FLEX ☐Other:	Spray Process
F	Other Surface Finishes	X Solder Leveled X Azole Organic Protective Covering X Flux Protective Covering X Other:Silver and Conductive Silver Domes	Copper Bump Technology/BGA

SECTION 2.2
ELECTRICAL TEST EQUIPMENT

DATE COMPLETED
6/28/2013

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 X >5000 ☐Other:	Genesis 2000 CAD Software Compliant to IPC-9252 Compliant to IPC-6012A Class 2 for withstanding voltage, circuit continuity and isolation.
B	Number of Nodes	<500 500 1000 2000 3000 4000 5000 6000 X >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] X Other:0.1 (.004)	

D	Test % Single Pass	None X 95% ☐Other:	
E	Probe Accuracy (DTP)	X 0.1 [.004] ☐Other:	
F	Grid Density	Single Side Grid X Double Sided Grid Double Density Grid Double Density Double Sided Quad Density Double Sided Quad Density X Flying Probe ☐Other:	EMMA/Mania and Fastek systems are used
G	Netlist Capability	X Golden Board X IPC-D-356 X Net List Extraction X CAD/CAM Net List Compare ☐Other:	As required Auto Comparison at CAD As required As required
H	Test Voltage	<20 VDC 20 VDC 40 VDC 60 VDC 80 VDC 100 VDC X 500 VDC ☐1000 VDC ☐>1000 VDC ☐ Other:	+ 15, -0 For spacing 80 micrometer or greater
J	Impedance Meas	X Micro Section Inboard Circuit X Coupon X Manual TDR Automated TDR ☐Other:	Verificatioin as required Serialized Coupon Panelization Single ended/Differential
K	Impedance Tolerance	X 10%	Conforming to IPC-2141 Polar ICD Stackup Planner

		<2% ☐Other:	

SECTION 2.3
PRODUCT TYPE

DATE COMPLETED
6/28/2013

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	X Rigid Printed Board X Flex Printed Board X Rigid/Flex Board X Rigid Back Plane Molded Product Ceramic Printed Board Multichip Module Liminated Multichip Module Deposited Dielectric Multichip Modules ☐Other:	We fabricate Heavy Copper/Thermal Managed Bds/Blind & Buried Vias/Internal Cavity/Bump BGA/Core Bds and Edge Plated Bds Rigid/Multilayer/Flex and Rigid Flex product.
B	Circuit Mounting Type	X Single Sided X Double Sided X Multilayer X Single-sided Bonded to Substrate X Double-sided Bonded to Substrate X Multilayer Bonded to Substrate X Constrained Multilayer X Distributed Plane Multilayer ☐Other:	
C	Via Technology	No-Vias X Thru Hole Vias X Buried Vias X Blind Vias X Thru Hole & Blind Vias] X Thru Hole & Buried Vias X Thru Hole Buried & Blind Vias X Buried & Blind Vias X Other:Sequential Via Construction	We daily fabricate a wide range of VIA TECHNOLOGY from Blind/Buried to Sequential.

D	Laminate Material	X Phenolic X Epoxy Paper X Epoxy Glass X Modified Epoxy Composite X Polyimide Film & Reinforce X Cynanate Ester X Teflon X Various Combinations Other:	
E	Core Material	X copper X Aluminum ☐Other:	
F	Copper Thickness (Oz.)	X 1/8 Minimum X 1/4 Minimum X 3/8 Minimum X 1/2 Nominal X 1 Nominal X 2 Nominal X 3-5 Max X 6-9 Max ☐>10 ☐Other:	Special request only HEAVY Copper bds are a very significant part of our business.
G	Construction	X ≤4 Planes X >4 Planes X THK to TOL ≤0.2 mm X Bow/Twist ≤1% X ≤0.3 mm Profile Tolerance ☐Other:	

H	Coatings and Markings	X ≤0.1 mm Mask Clearance X >0.1 mm Mask Clearance X One Side (Legend) X Two Side (Legend) X None (Legend) X UL Material Logo X U.L. V_0 Logo X U.L. V_1 Logo X U.L. V_2 Logo ☐ Other:	In addition to GREEN we provide Blue/Yellow/Red/Black and White LPI Mask.

SECTION 2.4
PRODUCT COMPLEXITY

DATE COMPLETED
6/28/2013

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	X 0 [25.50] X >850 [33.50] ☐Other:	Majority of production In low volume
B	Total Board Thickness	X >6,5 [.250] ☐Other:	Numerous flex projects exceed 0.250" in overall thickness.
C	Number Conductive Layers	X 25-28 ☐>28 ☐Other:	We have fabricated 28 layer boards.
D	Dia Drilled Holes	X <0,15 [.006] ☐Other:	We have drilled and plated (0.004") diameter holes in 0.031" FR-4 for Multilayer Construction.
E	Total PTH TOL (Max-Min)	X 0,100 [.004] ☐Other:	
F	Hole Location TOL DTP	X <0,10 [.004] ☐Other:	
G	Internal Layer Clearance (Min)	X <0,075 [.003] ☐Other:	
H	Internal Layer Conductor Width (Min)	X 0,050 [.002] ☐Other:	
J	Internal Layer Process Allowance	X 0,025 [.001] ☐Other:	
K	External Layer Clearance (Min)	X <0,075 [.003] ☐Other:	

L	External Layer Conductor Width (Min)	X 0,050 [.002] ☐Other:	
M	External Layer Process Allowance	X 0,025 [.001] ☐Other:	
N	Feature Location DTP	X 0,10 [.004] ☐Other:	

All Dimensions are in millimeters [inches shown in brackets]

SECTION 2.5
QUALITY DEVELOPMENT

DATE COMPLETED
7/09/2013

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	X Functional Steering Committee Formed X Documented Quality Progress Review X Implementation & review of Project Team Recommendations X TQM Communicated throughout organization X Controlled New process Start-up X Total TQM Plan/Involvement Customer Training ☐Other:	MRB
B	Employee Involvement	X Certified Training Available X Training of Employee Base X Design of Experiment Training and Use X New Process Implementation Training X Support Personnel Training X Quality Functional Deployment X Ongoing Improvement Program for Employees ☐Other:	

C	Quality Manual	X All Manufacturing and support depts. have controlled quality manal ☐Other:	Alpha has completed our ISO/TS16949:2009 audit and has been recommended for certification.
D	Instructions	Work Instructions Started X Quality and work Instruct. Completed, Controlled ☐Other:	
E	SPC Implementation IPC-9191	Plan Exists X Several Major Processes Stable & Capable X Continued Improvement of Stable Processes X All Processes Under Control ☐Other:	
F	Supplier Programs/Controls	X Supplier Rating Program X Key Problems Identified X Supplier Reviews Performance Data provided X 25% of Suppliers Using SPC ☐Other:	
G	Third Party IPC-QS-95	Instrument Controls in Place X Measurement System in Control IPC-9191 X Document Controls in Place Reduced Lot Sampling	

		X ISO-9001 X Other:ISO/TS 16949:2009	

SECTION 3

DATE COMPLETED
6/28/2013

EQUIPMENT PROFILE (Pre-Site Audit)

* 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	X		CAMTEK Orion 860 Orbotech SK-75	1	State of the Art/purchased 2012
B) AOI CAD reference (CAM)	X			1	
C) Photoplotting	X		FIRST EIE	1	
D) Photo reductions	X				
E) Film scan and conversion	X				
F) Film processing air-dried force-dried processed in automatic processor	X		GLUNZ & JENSEN Pro Silver Processor	1	
G) Media types silver halide film glass diazo	X		Silver/diazo		

3.2 DRILLING EQUIPMENT	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Manual		X			
B) Optical (single spindle)		X			
C) N.C. drill	X		Excellon/Plutitec/Mania/ESI All air bearing	8 machines	20 spindles

3.3 ROUTING EQUIPMENT	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Edge beveler	X		Edgemaster		
B) Hand router (pin router)		X			
C) N.C. router	X				

D)	N.C. driller/router	X		Excellon	6	21 Spindles
E)	Scoring (profile)	X		Accusystem AS150 JE Ver.4	1	
F)	Scoring (straight line)	X		Accusystem AS150		Jump Scoring

3.4 MECHANICAL EQUIPMENT	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Punch press		X	Removed		
B) Shear	X		JET Equipment	3	
C) Milling machine	X		ENCO Lathe South Bend Lathe	1 1	

3.5 HOLE PREPARATION (DESMEAR)	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Permagnate	X		Hoist System		Western Technology
B) Plasma	X		2 Units/March		
C) Mechanical		X			
D) Etchback	X				

3.6 PRIMARY IMAGE APPLICATION	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Dry film	X		Manual/Automatic	3	DuPont & Morton Cut Sheet Systems
B) Hand screening	X			2	
C) Machine screening	X			1	
D) Wet film		X			
E) Liquid photoimageable		X			

3.7 TYPE OF TREATMENT FOR MULTILAYER INNERLAYERS	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Black oxide		X			
B) Red oxide		X			
C) Copper scrub	X		Pumice		IS Conveyorized

D) Durabond		X			
E) Other	X		Automatic Brown Oxide Conveyorized Line	1	Western Technology

3.8 LAMINATION	YES	NO	MATERIAL	QTY	APPLICATION TECHNIQUE
A) High pressure	X		2 Vacuum systems /1 Manual		14 heated openings
B) High temperature	X				500 degree F MAX
C) Vacuum	X				TMP 5 opening with cooldown 30 inch x 30 inch Platens
D) Vacuum assist	X				4 opening with cooldown
E) Foil heat assist		X			
F) Separate cool-down	X				Both Vacuum systems

3.9 ELECTROLESS COPPER PLATING	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Fully additive application	X		Manual Dip Line	2	
B) Electroless deposition (semiadditive)	X				
C) Through-hole and via	X				

3.10 COPPER ELECTROPLATING	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Copper sulfate	X		Automatic Hoist Line	1	Global Line 16 to 1 aspect ratio Per IPC-6012A, Class 2 and 3
B) Pyrophosphate		X			
C) Copper fluoborate		X			
D) Other	☐	☐			

3.11 TIN/LEAD SURFACE PLATINGS/COATINGS	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Tin/lead electroplated		X	Tin only	1	Global Line
B) Immersion tin or tin/lead		X			

(electroless)					
C) Hot air solder leveled (HASL)	X		Argus Vertical Line 5224		

3.12 FUSING PROCESSES	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) I.R. reflow		X			
B) Hot oil reflow		X			
C) Horizontal (hot air level)		X			
D) Vertical (hot air level)	X		Argus HASL and Latronic Lead Free		

3.13 NICKEL SURFACE PLATING	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Electroless nickel	X		Hoist supported		
B) Electroplated nickel		X			

3.14 GOLD SURFACE PLATING	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Electroless gold	X		ENIG LINE/hoist supported		
B) Electroplated gold		X			

3.15 PALLADIUM SURFACE PLATING	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Electroless palladium (immersion)		X			
B) Electroplated palladium		X			

3.16 SOLDERMASK	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Screened deposited image	X				
B) Dry film photoimageable		X			
C) Liquid photoimageable	X		Argus Spray Conveyorized System With IR Oven	1	
D) Dry film/liquid combination	X				

3.17 ORGANIC SURFACE PROTECTION	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Benzotriazole	X		Organic Solderability Preservative		
B) Imidazole		X			
C) Benzimidazole		X			

3.18 MICROSECTION CAPABILITY	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Manual	X				
B) Single cavity automated	X				
C) Multiple cavity automated	X				
D) Plating thickness analysis	X		Fischer X-Ray Florescence XRX-SD MRX Analysis PTX-200		

3.19 CHEMICAL ANALYSIS	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Etching chemistry	X		Full Lab including Perkin-Elmer AA Unit		
B) Plating chemistry	X		Full Lab including Perkin-Elmer AA Unit		
C) Effluent (PPM) analysis	X		Full Lab including Perkin-Elmer AA Unit		

3.20 ELECTRICAL TEST EQUIPMENT	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Continuity and shorts	X		Mania/Microcraft/Fastek	7	
B) Fixture development	X		In-house for Fastek 300 and 210	2	
C) Flying probe test	X		Mania with Scan System Microcraft Emma	4 1	
D) Impedance control		X	Cross section		

MASTER EQUIPMENT LISTING

DATE COMPLETED
6/28/2013

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
7/09/2013

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	2,500-5,000	The capacity range reflects our multilayer program as the designated growth area.
B) Presently running at ____ % of capacity	40%	For Rigid and Multilayer processes

4.1.2 PERCENTAGE OF DOLLAR VOLUME	EST %	COMMENTS
A) Single sided (rigid)	3%	
B) Double sided (rigid)	55%	
C) Multilayer (rigid)	22%	
D) Single side (unreinforced-flex)	5%	
E) Double sided (unreinforced-flex)	8%	
F) Multilayer (unreinforced-flex)	3%	
G) Multilayer (rigid/flex)	4%	

4.1.3 PANEL PRODUCTION PROFILE	UNITS PER MONTH
A) Size of a production lot in panels	Panel defined as 18 x 24 or 3 sq ft regardless of single/double or multilayer construction.
1) Normal	25
2) Smallest	2
B) Number of panels per month	
1) High Production 40-100 PNLS	668
2) Medium Production 15-39 PNLS	1,564
3) Low Production 6-14 PNLS	748
Short run 3-5 PNLS	720
4) Prototype 1-2 PNLS	300

C) Average lead time (delivery) as defined in B)			
1) High Production	10-15 days		
2) Medium Production	5-10 days		
3) Low Production	3-7 days		
3) Short run	3-5 days		
4) Prototype Quick turn - No. of days same.	1-3 days		
D) Product delivered in full panel or array sub-panel format			
1) Total in panel or array format	90% (Scored and/or CNC Routed)		
2) Scored format	70%		
3) Tab breakaway format	30%		
4) Other	Per customer specification		
5) Total to customer layout	60%		
6) Total to manufacturing layout	40% Customer required to sign-off on layout		
E) Product delivered in board format			
1) Total in board format	10% Single pcs		
2) Extracted: scored to size	5%		
3) Extracted: sheared to size	1% Very seldom specificed		
4) Extracted: routed to size	95% of the single pcs shipped are CNC Routed and extracted		
4.1.4 APPROVAL AND CERTIFICATION	**YES**	**NO**	**COMMENTS**
A) Company approvals			
1) UL approval	X		94V Level 0, 1,2, {E80943}
2) Canadian standards	X		94V Level 0,1,2
3) MIL-P-55110		X	Mil-31032 planned for Winter 2013
4) MIL-P-50884		X	
5) ISO-9002		X	
6) ISO-9001	X		
7) ISO-14000		X	
8) BABT		X	

9) EEC		X	
10) Customer satisfaction	X		98% in 2012
B) Other certification information			
1)Laminate	X		100% CAF Resistant
2)Quality standards	X		CERTIFICATION audit completed for ISO/TS 16949:2009
3)Equipment calibration	X		Per ISO

4.1.5 CUSTOMER INTERFACE PROFILE	YES	NO	COMMENTS
A) Modem capability	X		
B) Baud rate			
C) Data verification technique	X		Genesis 2000 (3 work stations) NC CAM6 Fabrication Station
D) Engineering change order process	X		Per ISO Procedure/TS16949
E) Job status reporting to customers	X		Supported by BACON scan system

4.1.6 OTHER CAPABILITIES	YES	NO	COMMENTS
A) Facility research and development	X		4-28 Layer/Flex and Rigid Flex Technology Driven
B) (Automated) On-line shop floor control/MRP system	X		
C) Process control system	X		
D) Operator training system	X		

4.2 PROCESS ORIENTATION

4.2.1 LAMINATE MATERIAL	EST %	COMMENTS
A) Most commonly used laminates (G10, FR4, etc.)	75% 10% 10% 5%	Brand name Ventec Type FR-4 Tg170 Brand name ITEQ Type FR-4 Brand name Panasonic Type FR-4 Brand name NanYa Type FR-4
B) Other laminate material		CEM-1, CEM-3, Flex/Rigid Flex Materials
1) Planar resistor layers	<1%	UL approved ☐
2) BT epoxy		UL approved ☐ Fabricated per customer request
3) Kevlar		UL approved ☐
4) Teflon	<1%	UL approved ☐ Fabricated per customer request
5) Polyimide	10%	UL approved ☐ Fabricated per customer request/High Density Flex/Rigid Flex
6) Cyanate ester	<1%	UL approved ☐
7) Other		UL approved ☐
C) Specification to which laminate is purchased (check all that apply) X MIL-P-13949 ☐IPC-4204 X IPC-4101 X UL Approved ☐IPC-4103 ☐Other ☐IPC-4202 ☐IPC-4203		
D) Laminate storage Uncontrolled X Humidity controlled X Temperature controlled X Dry box X JIT inventory		Walk in pre-preg cooler/temperature & Humidity controlled
E) Panel size configurations in X, Y dimesions maximum X 508 mm Y 609 mm minimum X 304.8 mm Y 304.8 mm other X _____ Y _____mm		Majority of panels 18 x 24, and 12 x18; Can run up to 30”x30”

4.2.2 PROCESS PRECISION SPECIFICS	YES	NO	VALUE	COMMENTS
A) Maximum printed board thickness built in volume				
1) Single sided	X		0.062”	Fabricated per commercially available thickness ranges
2) Double sided	X		0.125”	
3) Multilayer			0.250”	Per specification
4) Rigid flex			0.250”	Per specification
B) Printed board electrical performance capability				
1) Impedance control	X			Conforming to IPC-2141
2) Capacitance control		X		Working on buried Capacitance and Annular Buried Resistors
3) Microstrip boards	X			Supported by Calculator
C) Tooling system description				
1) Same holes in panels used for all processes	X			Same Yes/however Multiple tooling holes (meaning more than the usual four) eare far more accurate and are used
2) Optical registration	X			Computer guided registration system with two hole and four hole capacity
3) Other	☐	☐		Advanced Multiline systems

4.2.3 OTHER PROCESS ORIENTATION SPECIFICS	YES	NO	SYSTEM	COMMENTS
A) Solder mask over bare copper	X			100%
B) Plating/coating information				ENIG/Immersion Silver/Immersion Nickel/OSP/HASL/LF-HASL in-house
1) Tin/lead reflow		X		Discontinued process
2) Hot air leveling	X			In-house HASL and Lead Free systems (SN-100CL)
3) Azole organic	X		OSP	
4) Conductive	X		Silver paste Carbon Ink	
C) Hole formation				
1) Hole cleaning	X			High pressure/Plasma/Permangnate
2) Hole cleanliness verified	X			Cross section

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)	98%	Size .0508 mm Tol ± .005.mm	
2) Inner layers (print and etch)	98%	Size .0508 mm Tol ± .005.mm	
3) Outer layers (plated)	93%	Size .0508 mm Tol ± .005 .mm	
4) Inner layers (plated)	95%	Size .0508 mm Tol ± .005 .mm	
5) Outer layers (additive plating)	N/A		
6) Inner layers (additive plating)	N/A		
B) Smallest plated-through hole (PTH) and tolerance consistently produced in 1.5mm thickness material or multilayer board	98%	0.0889 mm +/- .025 mm	0.00349" +/- 0.001" Registration supported by Glenbrook X-Ray systems Cross section supported by two scope systems with camera
1) Minimum PTH diameter	95%	Size 0.0762 mm Tol ± .0381.mm	
2) Largest panel where this hole can be controlled (across diagonal)	90%	Size 457.2 mm x 609.6 mm Tol ±0.05 .mm	18 X 24
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	99%	1.0612 mm	
1) Largest board size (across diagonal)	100%	Size 711mm	
2) Largest hole diameter	100%	Size 0.762 mm	
3) Smallest board size (across diagonal)	100%	Size 5.06 mm	
4) Largest hole diameter	100%	Size 0.762 mm	
D) Surface mount land pattern pitch (check all that apply) X 1.27mm [.050] X 0.63mm [.025] X 0.5mm [.020] X 0.4mm [.016] X 0.3mm [.012] X 0.25mm [.010] ☐Other _____ .			We are producing SMT spacing: Min Quad Pack with PITCH of 0.016"

E) Solder mask dam between lands (check all that apply) X 1.27mm [.050] X 0.63mm [.025] X 0.5mm [.020] X 0.4mm [.016] X 0.3mm [.012] X 0.25mm [.010] Other .003" .				
F) Flatness tolerance (bow & twist) after reflow or solder coating 1.5% 1.0% 0.5% Other 0.75%				

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)			50	18 x 24	(max 50 panel count for Lot Control)
2) Maximum layers fabricated in prototype (Minimum Lot)			1	18 x 24	
B) Buried vias produced consistently in volume	X				
1) Size				0.1016 mm	.0039"
2) Number of layers				28	As specific
B) Blind vias produced consistently in volume	X				We fabricate: Low aspect Blind Via/Stacked Via/ Sequentially Laminated Microvias.
1) Size				0.1016 mm	.0039"
2) Number of layers				16	As specified
1) Controlled depth drilling	X				Approximately 250,000 Limited Depth holes per week
2) Total number of layers				28	

4.4. TESTING CAPABILITY

4.4.1 TEST AND TEST EQUIPMENT CAPABILITY	YES	NO	COMMENTS
A) SMT centerline pitch that can be electrically tested X 0.63mm [.025] X 0.5mm [.020] X 0.4mm [.016] X 0.3mm [.012] X 0.25mm [.010] ☐ Other			
B) Double sided simultaneous electrical testing	X		
1) Equipment type			Microcraft EMMA-High Speed probe tester and verification station Mania Technologie- Ultim 8 High Speed Probe Tester Mania Technologie- LOC 8 Mania Technologie- Exceler 8 Scanner Mania Technologie- Speedy Probe Fastek 300 Fixture Bare Board Tester Fastek 210 Fixture Bare Board Tester
2) X-ray fluorescence inspection equipment	X		Fischer XRX-SD Metal Coating Tester
3) TDR equipment	X		ICD Stackup Planner
4) Hi-pot test equipment		X	

5) Four-wire kelvin tester		X	
6) Capacitance meter	X		
7) Cleanliness testing	X		Alpha Metal 500M SMD11 Ionic Test System

4.4.2 AUTOMATED OPTICAL INSPECTION USAGE	EST %	COMMENTS
A) Before etching	5%	CAMTEK AOI PR1026700 Orion 860 ORBOTECH AOI SK-75
B) After etching	100%	
C) Internal layers	100%	
D) Final inspection	75%	
E) Other		
F) Conductor/clearance normally inspected by AOI equipment		
1) X 0.05mm [.002]		
2) X 0.05-.10mm [.002-.004]		
3) X>.10mm [.004]		
4) X Planes		
G) CAD download to AOI	100%	Genesis 2000 (3 work stations) NC CAM6 Fabrication Station

SECTION 5
QUALITY PROFILE

DATE COMPLETED
6/28/2013

GENERAL INFORMATION	
COMPANY NAME Alpha Circuit Corporation	
CONTACT Don Stevens	
TELEPHONE NUMBER 630-617-5555 Ext 117	FAX NUMBER 630-617-5598

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
Our goal is to be a technology driven rigid and flex board fabricator. We understand and fully support the critical role of quality in our program.

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?			X	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?			X	100	100
3.	Does a quality measurement system exist with clearly defined metrics and is it utilized as a management tool?			X	100	85
4.	Are work instructions approved and controlled; and are they under revision control?			X	100	85
5.	Are the quality procedures and policies current and available at the point of application; and are they under revision control?			X	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	100	100
7.	Are Statistical Process Control (SPC) principles understood by all levels of management?			X	100	100
8.	Are there programs with sufficient resources assigned to support corrective actions and prevention?			X	100	100
9.	Does management solicit and accept feedback from the work force?			X	100	100
10.	Is there management support of ongoing training (including quality training), and is it documented by an organizational training plan?			X	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?			X	100	100
12.	Are the quality and reliability goals aggressive relative to customer expectations and targeted at continuous improvement?			X	100	100
13.	Are the people who are responsible for administering the quality assurance function technically informed?			X	100	100
14.	Does Management have a “defect prevention” attitude to achieve continuous improvement?			X	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	100	100
2.	Is quantitative benchmarking used to evaluate all new products/technologies/services in comparison to best-in-class offerings?			X	100	90
3.	Does a roadmap exist to ensure continued development of leading edge, best-in-class products/technology/services?			X	100	95
4.	Is the capability of each operation which controls critical-to-function characteristics for new products, fully certified?			X	100	100
5.	Are statistical tools used in the development of robust (high yield) new processes, products, and services?			X	90	90
6.	When new product/technology/service requires a new process, is it developed jointly and concurrently with the customer and/or suppliers?			X	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	100	100
8.	Is the new product/technology/service, as produced by the process, verified to meet all customer satisfaction requirements?			X	100	100

COMMENTS

The ranking in this section (5.2) is an indication of the development of our multilayer, flex and rigid flex programs.

5.3 CUSTOMER SATISFACTION		STATUS				
	DESCRIPTION OF PROGRAM	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	100	100
2.	Is an independent (unbiased) customer survey routinely conducted?			X	100	100
3.	Is there an internal measurement system within the organization which correlates to the level of customer satisfaction?			X	100	100
4.	Are there specific goals for achieving Total Customer Satisfaction, both internal and external?			X	100	100
5.	To what extent are customer satisfaction goals disseminated and understood by everyone in the organization?			X	100	100
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?			X	100	100
7.	Is there a method in place to obtain future customer requirements?			X	100	100
8.	Are all findings of customer dissatisfaction reported back to the proper organization for analysis and corrective action?			X	100	100
9.	Are customer satisfaction requirements formally defined and documented, and are they based on customer input?			X	100	100
10.	Do all support organizations understand their role in achieving total customer satisfaction?			X	100	100

5.4 COMPUTER INTEGRATED MANUFACTURING		STATUS				
	DESCRIPTION OF PROGRAM	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?			X	100	95
2.	Can customers electronically transfer CAD/CAM directly into manufacturing?			X	100	100
3.	Can customers electronically transfer order information directly into the business system?			X	100	100
4.	Is data electronically shared between shop floor control and process control systems (i.e., CNC, SPC, Electrical Test, AOI, etc.)?			X	100	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.)?			X	100	100
6.	Is information available from system processes in real time (vs. batch processing)?			X	100	100
7.	Are processes and procedures documented and available on-line?			X	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?			X	100	100
9.	Are computer simulation and design tools used to the maximum extent practicable in the design of new products/technologies/services			X	100	100

COMMENTS

#2- Customer CAD/CAM data is always verified and signed off before being sent to manufacturing.
#6- We have a fully integrated bar code scanning system supported as necessary by operator signoff.
#7- All processes are documented per ISO/TS1649 requirements.
#9- Alpha does not provide design services. Computer integration is followed for new technology and/or services. One of our company goals is to become a paperless facility.

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

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?			X	100	100
2.	Are records of equipment and equipment maintenance kept?			X	100	100
3.	Is the record and sample retention program defined?			X	100	100
4.	Are quality data used as a basis for corrective action?			X	100	100
5.	Are quality data used in reporting performance and trends to management?			X	100	100
6.	Are quality data used in supporting certifications of quality furnished to customers?			X	100	100
7.	Is field information used for corrective action?			X	100	100
8.	Does a cost of quality measurement system exist?			X	100	100
9.	Are customer reported quality problems responded to, and resolved in the time period requested?			X	100	100
10.	Is quality information on production material rejects provided to sub-suppliers with required corrective action?			X	100	100
11.	Are computers used to collect and analyze quality data?			X	100	100

COMMENTS

5.5 {#7& #9} -Customer sign-off is required. #9 No modification is allowed without written customer approval with the exception of artwork compensation for shrinkage and etch factors and silkscreen modifications.

5.6 {#2}-These records are supported by several outside calibration services as required.
{#8}- The cost of the calibration system is reviewed per internal audit requirements.
{#11}- Our entire calibration system has been developed as a spreadsheet program.

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?			X	100	100
2.	Do all personnel understand how their performance impacts internal and external customer satisfaction?			X	100	100
3.	Do all personnel who contact external customers reflect quality improvement programs?			X	100	100
4.	Do personnel participate in professional societies and growth programs?			X	100	100
5.	Are all personnel trained in sufficient detail to support key initiatives?			X	100	100
6.	Are the results of training evaluated and indicated program changes made?			X	100	100
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?			X	100	100
8.	Are performance standards participatively developed, and regularly applied for all personnel?			X	100	100
9.	Are Total Customer Satisfaction programs and resulting successes publicized to all personnel?			X	100	100
10.	Do goal setting and reward/incentive programs support the quality improvement process?	N/A				

5.8 SUBCONTRACTOR CONTROL		STATUS				
	DESCRIPTION OF PROGRAM	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	100
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	100	100
3.	Have the organization's processes been characterized to identify the critical requirements for the suppliers products?			X	100	100
4.	the supplier's processes been assessed and considered in the establishment of the requirements?			X	100	100
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	100
6.	Have quality and cycle time metrics and improvement goals been established participatively with the supplier?		X			
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	100	100
9.	Is there a supplier certification program or equivalent procured material/service continuous quality improvement program?			X	100	100
10.	Can all personnel who contract suppliers properly reflect appropriate quality improvement programs and status to them?			X	100	100

COMMENTS

5.7 Goal setting and reward/incentive programs are being considered for 2014 by the new President Yash Sutariya.

5.9 CALIBRATION CONTROL		STATUS				
	DESCRIPTION OF PROGRAM	Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Are calibration and preventative maintenance programs in place and documented?			X	100	100
2.	Are calibration and maintenance personnel trained?			X	100	100
3.	Is traceability to NIST maintained?			X	100	100
4.	Is quality measurement and control equipment current, effective, and sufficiently integrated with production equipment?			X	100	100
5.	Is the history of quality measurement and control equipment documented?			X	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	100	90
7.	Are calibration and preventative maintenance cycles on schedule?			X	100	100
8.	Is the use of non-calibrated equipment for design and production purposes prohibited?			X	100	100
9.	Are tools and fixtures used as criteria or acceptability of product/work fully qualified and identified?			X	100	100
10.	Are calibration intervals defined in accordance with industry standards or manufacturer's recommendations and the calibration history of the equipment?			X	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?			X	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?			X	100	100
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?			X	100	100
4.	Are all pertinent methods of statistical quality control properly, effectively and efficiently used?			X	85	85
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?			X	100	100
6.	Are the operators within the process provided with written work instructions and are they trained?			X	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?			X	100	100
8.	Is there a first in/first out (FIFO) system in place, and is it followed?			X	100	100

COMMENTS

5.9 #6 We do not recognize GR &R ratios?

Our calibration system and internal audit systems were designed to support our ISO/TS 16949:2009 certification.

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?			X	100	50
2.	Are statistical techniques used to reduce variation in the engineering process before the start of production?			X	85	85
3.	Is the quality system dependent upon process rather than product controls?			X	75	75
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	100	100
5.	Are incapable processes or machines targeted for improvement or replacement?			X	75	75
6.	Is SPC implemented for all critical processes?			X	75	75
7.	Are procedures that control the reaction to out-of-control situations adequate and effective?			X	100	95
8.	Are operators trained in the use of appropriate statistical techniques, and are they properly applying them?			X	65	65
9.	Are advanced problem solving techniques used by engineers to solve problems? (Design of Experiments, planned experimentation, advanced diagnostic tools, etc.)			X	100	100
10.	Are control charts and other process controls properly implemented?			X	75	75
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	75	75

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	100	100
2.	Does the organization utilize participative problem solving techniques to identify, measure and resolve internal and external problems?			X	100	100
3.	Are problem solving efforts timely and effective?			X	100	100
4.	Are applied resources sufficient to remove problem solving constraints?			X	100	95
5.	Are statistical techniques used for problem solving?			X	100	100
6.	Are quality data used to identify barriers, and to determine the priority of problems?			X	100	100
7.	Is there a policy/procedure that includes the use of problem solving techniques to systematically drive reduction in variability?			X	100	95

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)			X	100	100
2.	Are in-process inspections, test operations, and processes properly specified and performed?			X	100	100
3.	Are in-process inspection facilities and equipment adequate?			X	100	100
4.	Are the results of in-process inspections used in the promotion of effective preventative action and corrective action?			X	100	100
5.	Is preventative maintenance performed on the equipment and facilities?			X	100	90
6.	Are housekeeping procedures adequate and how well are they followed?			X	100	100
7.	Are process management plans established, and are critical parameters followed?			X	100	100
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?			X	100	100
9.	Are certifications and in-process inspection results used in making final acceptance decisions?			X	100	100
10.	Are methods and procedures for the control of metallurgical, chemical, and other special processes established and followed?			X	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?			X	100	100
2.	Are receiving inspection procedures documented and followed?			X	100	100
3.	Are receiving inspection results used for corrective and preventive action?			X	100	100
4.	Are the procedures for storage and timely disposition of discrepant material in place and followed?			X	100	100

COMMENTS

5.13 #1 Our rigid, multilayer and flex process capabilities are always being reviewed by the MRB to ensure customer growth. The TS16949 program is an example of this commitment.

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?			X	100	100
2.	Are procedures to facilitate limited life materials, such as prepreg, in place, properly controlled, and monitored?			X	100	100
3.	Are procured items identified with some means of traceability (serial number, lot number, date code, etc.)?			X	100	100
4.	Are procedures and facilities adequate for storage, release and control of materials?			X	100	100
5.	Are in-store and in-process materials properly identified and controlled?			X	100	100
6.	Is in-process material protected from corrosion, deteriorization, and damage?			X	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?			X	100	100
2.	Are non-conforming materials properly identified and controlled to prevent inadvertent use?			X	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?			X	100	100
4.	Are procedures for controlling non-conforming materials, and for ensuing corrective action, in place and followed?			X	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)			X	100	100
6.	Do supplier's procedures and controls for corrective action prevent recurrence of non-conformances?			X	100	100
7.	Is there a system for coordinating necessary corrective action with purchasing personnel?			X	100	100
8.	Does the corrective action extend to all applicable causes of non-conformance (e.g., design, workmanship, procedures, equipment, etc.)?			X	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	100	100
2.	Are periodic tests conducted to audit reliability and environmental performance of the final product?	NA				
3.	Is CPK tracking performed for critical characteristics, with plans to achieve CPK = 1.5 with a target of CP of 2.0?			X	75	75
4.	Is root cause failure analysis performed for internal and external failures, and is appropriate corrective action implemented?			X	100	100
5.	Are test and inspection personnel trained in the procedures of their operations, and are those procedures being followed?			X	100	100
6.	Is the new product/technology/service, as produced by the processes, verified to meet all customer satisfaction requirements?			X	100	100

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?			X	100	100
2.	Are all specific customer product audits conducted, as required?			X	100	100
3.	Are inspectors trained for the tasks performed?			X	100	100
4.	Are flow charts or milestones developed with checkpoints readily available?			X	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?			X	100	100
6.	Is a quality system established and maintained for control of product/production documentation?			X	100	100
7.	Is “accept/reject” criteria defined and available for use?			X	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	100	100
9.	Are packing and order checking procedures documented and followed?			X	100	100

COMMENTS

5.19 TOOLING INSPECTION, HANDLING, &	STATUS

STORAGE						
	DESCRIPTION OF PROGRAM	Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Are temperature, humidity, laminar flow controls in place to prevent contamination, and to assure dimensional stability?			X	100	100
2.	Do operators use hairnets, gloves & lab coats in all photolab and photoexposure areas?			X	100	100
3.	Are work instructions and related forms in place to control all applicable tooling requirements, as stated in the customer's purchase order?			X	100	100
4.	Are customer provided artworks controlled with regard to handling, storage, revision control and relationship to converted production phototools (working films)?			X	100	100
5.	Are production phototools (working films) controlled with regard to handling, storage, use life, and relationship to customer purchase order?			X	100	100
6.	Are customer provided artworks and production phototools (working films) inspected, including dimensional checks?			X	100	100
7.	Are all tools, fixtures, and other devices, used for tooling inspection and control, maintained under the calibration control procedure?			X	100	100
8.	Are records showing initial acceptance, periodic checks, and any needs for rework and/or modification available?			X	100	100

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?			X	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.			X	100	100
3.	Is positive action taken to prevent recurrence of problems, and are there documented reports/records of each occasion?			X	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?			X	100	100
5.	Is corrective action controlled and documented for all applicable work centers?			X	100	100
6.	When corrections are made, is their effectiveness subsequently reviewed and monitored?			X	100	100

COMMENTS

Our responses to section 5.1 through 5.20 reflect our overall commitment to support our ISO/TS 16949:2009 certification.

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

DATE COMPLETED
6/28/2013

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 #
Flex/with stiffner	6/10/2013	Polymide/FR-4	AC12382-01 PN 6360Y1091_B
VIA TYPE	PRODUCTION QUANTITY	TOTAL YEARLY PRODUCTION %	
PTH	105 boards	5	

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]	X 1-4 [1-4]	X 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]	X 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]**
X 750 [29.50]	☐5,0 [.200]	☐21-24 [21-24]	☐0,20 [.008]	X 0,075 [.003]	**X 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
X >0,350 [>.014]	X >0,250 [>.010]	☐>0,100 [>.004]	X >0,350 [>.014]	☐>0,250 [>.010]	☐>0,100 [>.004]	☐>0,50 [>.020]
☐0,350 [.014]	☐0,250 [.010]	X 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]	X 0,200 [.008]	X 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]	X 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
6/28/2013

SECTION 7

IDENTIFICATION OF PREVIOUS AUDITS (Optional)

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

COMPANY AUDITORS National Controls Corp 1725 Western Dr. West Chicago, IL 60185-1864	DATE OF AUDIT June 25, 2013
AUDIT TEAM MEMBERS 2 Member team/Engineering/QA Not available per customer request	AUDITOR REMARKS Pass-no exceptions
	SPECIFICATIONS USED IN AUDIT IPC-6012 and IPC-A- 600
LENGHT OF AUDIT 6 hours	
TEAM MEMBERS MAY BE CONTACTED AT N/A	

COMPANY AUDITORS GHSP 1250 S. Beechtree Street Grand Haven, MI 49417	DATE OF AUDIT 11/16/2012
AUDIT TEAM MEMBERS Chris Collier Kelly Lyle Tina Pruitt	AUDITOR REMARKS PASS- capacity verified
	SPECIFICATIONS USED IN AUDIT IPC-6012
LENGHT OF AUDIT 1 Day	
TEAM MEMBERS MAY BE CONTACTED AT N/A	

COMPANY AUDITORS GIC LTD Graphics 7 Industrial Circle 100 N. Sixth St Kirkland, Il 60146	DATE OF AUDIT May 15, 2012
AUDIT TEAM MEMBERS Mark Meuchie Dave Adams	AUDITOR REMARKS PASS
	SPECIFICATIONS USED IN AUDIT

	IPC- 6012
LENGHT OF AUDIT 6 hours	
TEAM MEMBERS MAY BE CONTACT AT N/A	

*REPEAT THIS FORM AS NECESSARY

SECTION 8

DATE COMPLETED
7/01/2013

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 Alpha Circuit Corporation		
TAXPAYER ID NUMBER 300778852	DUNS NUMBER 033156951	TRADING SYMBOL N/A
ANNUAL SALES 2012 $4,900,000	PRIOR YEAR 2011 $4,800,000	YEAR-TO-DATE $2,654,878
FISCAL YEAR		
BANK	ACCOUNT NUMBER	
BANK ADDRESS	STATE	ZIP
PROVINCE	COUNTRY	
BANK TELEPHONE NUMBER	FAX NUMBER	
COMMENTS Banking information is considered to be confidential and is not released unless written authorization is provided by Monica Vaghani/Alpha Circuit AP Manager.		

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.