

# ELMA BUSTRONIC



## QA PLAN

&

## First Article Reports

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## 1.0 OBJECTIVE

To document the generic Quality Assurance plan currently in place at ELMA Bustronic as well as the First Article Inspection (FAI) report options available.

## 2.0 SCOPE :

This document defines the Quality inspection processes at various stages during the manufacture of product at ELMA Bustronic. This also provides information on the First article documentation that can be made available

## 3.0 RESPONSIBILITY :

Director-QA/ Mgr QA is responsible for developing and implementing the QA plan.

## 4.0 REFERENCES & ACRONYMS:

- QM- Quality Manual
- QMS- Quality Management system
- BQMIS- Bustronic Quality Management information system
- C of C – Certificate of Conformance
- FAI- First Article Inspection
- CA- Corrective action
- ATP- Acceptance test procedure
- PAT- Production acceptance test

## 5.0 ELMA Bustronic's Quality Assurance Plan

ELMA Bustronic's Quality management system is certified to ISO 9001:2008 STD  
The Quality manual QM-001 provides an overview of the Quality Management system .The QA plan is best described under the following headings.

### 5.1 Management approach to control and assure program quality

- Pre contract and Post PO reviews to ensure compliance to customer specifications.
- Project schedule and periodic monitoring
- Design verification / validation reviews

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- Ensuring customer's quality requirement flow downs wherever specified on the PO.
- Quality inspection processes at various stages of manufacture.
- Process control and applicable documents.
- Standard Product inspection at Incoming, In process and Final stages
- Product testing
- Acceptance tests when contracted
- FAI reports where applicable.

## 5.2 Quality Plan -Vendors

- Vendor qualification (vendor survey or onsite audits)
- Purchase orders
- Quality requirement flow downs
- In coming inspection
- Supplier Score cards

## 5.3 Inspection at various processing stages .

The quality system addresses all inspection needs required during from incoming materials to finish products. The quality data is collected on a daily basis, analyzed monthly and is available on the BQMIS which is an real time online Quality management information system accessible to all.

The inspections done at various stages are explained below.

### Incoming inspection

- Component parts procured as commodity items to manufacturers specification (data sheets) are inspected to verify part number and qty against the specific PO against which the part was procured .Whenever specified on the PO , the supplier provided C of C is maintained as quality records. Sampling Inspection is per AQL.
- PCB/ Bare boards fabricated to meet engineering drawings are inspected to verify part number and qty as well as drawing requirements . All PCB are required to be supplied with Electrical test reports and FAI documentation (for first time supplies).Whenever specified in the PO, the supplier provided C of C is maintained as quality records. Visual inspection is 100% and dimensional inspection is per AQL.

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- Customized mechanical piece parts (busbars etc) are inspected to verify mechanical dimensions and finish. Sampling Inspection is per AQL. If contractually agreed FAI reports for piece parts are provided. See attached for more details

## **In process Inspection**

- In process inspection is performed after soldering ( both SMT and Through hole soldering ) to verify that the product meets drawing requirements.
- Soldering Workmanship is verified to meet IPC 610 Class 2/3 and/or J-STD-001 requirements. Inspection is performed by certified personnel.
- Where applicable (Eg;BGA's ) X ray inspection is performed to ensure soldering quality.
- Quality checklists are used to verify various aspects of Quality. Also soldering personnel perform self inspection using checklists

## **Product testing-**

- 100% Netlist tests are carried out by test engineer using a 'Adaptronic' make tester. Results of these tests are recorded in the Backplane test report.
- High Voltage tests can also be if contractually agreed upon using 'Adaptronic' make HV tester.

## **Final Inspection**

- Final inspection is carried out by Final QA inspector to verify customer and drawing requirements are met . Workmanship is again verified to meet IPC -610 -Class 2/3 and J-STD-001 requirements. Inspection is 100% using Quality checklists.

## **Special test reports like ATP, PAT**

- Special ATP and/or PAT tests are carried out in specific cases when contractually agreed upon. These tests procedures are developed by the Engineering dept and is derived from the customers product specification or source control documents. The formats for these

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reports are customized and is released as custom document specific to that project and is usually in the form of a Matrix.

The methods specified in the ATP/PAT for verifying the product's compliance to customer's specification is listed below . Any of this is applied to each of the product's parameter being inspected /tested .

- A : Analysis – Engineering analysis that demonstrates compliance.
- I : Inspection – Visual inspection of the parameter.
- T/D : Testing or demonstration – Involves product testing to validate the parameter being tested.

## **First Article reports**

When contractually agreed upon (at extra cost) detailed First article dimension inspections (FAI) are performed and documented. Below are the options available and associated lead times. Bustronic sales department to be contacted for pricing.

### **Basic FAI - Comprising of documents below (on internal BT formats ) No extra lead time**

- Standard Electrical test report from the PCB shop
- Manufacturing Checklist per MAF-102.
- In process Inspection and Final inspection checklist per QAF-103
- Backplane connectivity test report per format ENS-107
- C of C

### **Intermediate FAI report - Comprising of the below documents (on internal BT formats) Available at additional cost .Lead time - Additional 2 days after product is completed.**

- PCB dimensional inspection report per Vendor format
- PCB electrical test report per Vendor format
- Manufacturing checklist per MAF-102
- In process Inspection and Final inspection checklist per QAF -103
- X ray inspection photos if applicable ( for BGA's )
- Final assembly Inspection report verifying BOM, dimensions and notes per QAP-117
- Backplane connectivity test report per format –ENS-107
- C of C

### **Comprehensive FAI report – Available at additional cost Leadtime -1 week .**

- PCB dimensional inspection report per Vendor format
- PCB electrical test report per Vendor format
- Manufacturing checklist per MAF-102
- In process Inspection and Final inspection checklist per QAF -103
- X ray inspection photos if applicable ( for BGA's )

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- Final assembly Inspection report verifying dimensions and notes per QAP-117
- Backplane connectivity test report per format –ENS-107
- C of C's for critical items on the BOM ( connectors , capacitors , IC's etc )
- Product C of C.

This would apply to major defense orders and only if contractually required

## **FAI - AS9102 format**

**FAI reports required to be documented to customer provided drawing and /or in AS9102 format shall be reviewed by QA Director / Manager and will be quoted ( cost and lead time ) at the RFQ stage .**

## **5.4 Process control :**

Process control is achieved at all stages of order execution as below

**Sales processes** - Through Conformance to operating procedures

**Design Process** - Through Contract reviews ,design and development plan, Design reviews and verification , ECN reviews before release.

**Procurement Process** – Through PO's with QA flow downs.

**Manufacturing process** –Through conformance to Engg documentation. Checklists, schematics , photos etc .

**Quality process** – Through applicable inspections , recording results , data reporting on Bustronic QMIS system .Monthly review and analysis of data ,monitoring of results against defined quality objectives/goals, implementing continuous improvements and CA's wherever applicable .

**Annual Management reviews are conducted in accordance with the requirements of the ISO 9001:2008 standard.**

## **5.5 Corrective Actions and Preventive actions (CAPA).**

**ELMA Bustronic has an established process for Corrective and preventive actions**