# TABLE OF CONTENTS

## Introduction
About the Study, Using the Study and Definition of Measurements ..............................................1

## Summary of Key Findings ..................................................................................................................2

### *Detailed Results for All Companies*
- Respondent Demographics ...........................................................................................................5
- Production ..................................................................................................................................10
- Quality Control ............................................................................................................................11
- Customer Satisfaction .......................................................................................................................14
- Supplier Performance .......................................................................................................................15
- Certification .....................................................................................................................................16

### *Detailed Results by Company Size*
- Small Companies (Annual Sales Less Than $25 Million) ...............................................................18
- Medium-Sized Companies (Annual Sales $25 Million to $99 Million) ............................................28
- Large Companies (Annual Sales $100 Million or More) .................................................................38

### *Detailed Results by Region*
- Americas .........................................................................................................................................49
- Asia .................................................................................................................................................59
- Europe, Middle East & Africa (EMEA) ............................................................................................69

### *Detailed Results by Type of Production*
- Rigid Printed Board Assembly ........................................................................................................80
- Flexible Circuit & Rigid Flex Assembly ...........................................................................................91
- Mechanical Assembly Operations ...................................................................................................102
- Cable & Harness (Multiple Wires) ..................................................................................................113
- Discrete Wiring Terminals & Connectors ......................................................................................124
- Finished End Product or System .....................................................................................................135

## Appendices
- Vertical Market Category Definitions .................................................................................................147
- Survey Questionnaire ..........................................................................................................................148
- Current IPC Market Research Studies and Reports .............................................................................152

*Detailed results include demographics, averages, medians (50th percentile), 25th percentile and 75th percentile data. Each set of detailed results includes the subjects listed on the following two pages.*
MEASUREMENTS COVERED IN THIS STUDY

Production

- Percentage of components placed that were:
  - SMT
  - PTH
- Inventory accuracy as a percentage of components on hand:
  - SMT components
  - PTH components
- Product types produced (percent of responding companies)

Quality Control

- Percentages of products utilizing assembly inspection methods:
  - Automated optical inspection (AOI)
  - Automated x-ray inspection (AXI)
- Percentages of products utilizing electrical assembly test methods:
  - In-circuit test (ICT)
  - Manufacturing defects analyzer (MDA)
  - Flying probe
  - Boundary scan
  - Final functional test
- Average first-pass yields:
  - In-circuit test (ICT)
  - Manufacturing defects analyzer (MDA)
  - Flying probe
  - Boundary scan
  - Final functional test
- Average yields at final inspection
- Average first-pass yields at final inspection
- Internal yields of key processes:
  - Surface-mount
  - Wave solder
  - Selective solder
- Defect rate in defects per million opportunities (DPMO):
  - At testing
  - At final inspection
- Facility's yield or DPMO targets
- Average cost of poor quality (COPQ) to gross sales:
  - Rework
  - Scrap
- Percentages of products utilizing selected tests
- Percentages of companies utilizing selected quality control methods
- Frequency with which companies evaluate SPC control limits

Customer Satisfaction

- Measurement system in place to assess the customer satisfaction (percent of responding companies)
- Rate of customer returns in parts per million (PPM):
  - PCB assemblies
  - System build items
  - Cable and harness
  - Other
- Percentage of RMA returns during the last calendar year
- Percent of printed circuit assemblies (PCAs) shipped “dock-to-stock”
- Average rate of on-time customer deliveries during the last calendar year
- Rate of customer-returned items that failed:
  - Zero KM (Infant mortality, dead on arrival)
  - Within 1-year warranty
  - After 1 year

Supplier Performance
- Track supplier performance (percent of responding companies)
- Percent of on-time deliveries from PCB suppliers
- Percent of on-time deliveries from component suppliers
- Lot reject rate

Certification
Percent of responding companies that have received, are in process of obtaining, and have no plans to obtain the following certifications:
- ISO 9001
- ISO 14001
- ISO 13485
- AS 9100
- QS 9000
- TS16949
- TL 9000
- QSO 80000
- FDA 820 Registration
- ITAR
- IPC Qualified Manufacturer List (QML)
- IPC Qualified Product List (QPL)