
THE MERCHANT EMBEDDED COMPUTING MARKET

2016 EDITION

**Copyright © 2016
New Venture Research Corp.
337 Clay Street, Suite 101
Nevada City, CA 95959
(Tel) 530-265-2004
(Fax) 530-265-1998**

All rights reserved

ABOUT THE AUTHORS

Jerry Watkins is an independent senior analyst with more than 20 years of experience in the field of market research and consulting. He has worked for leading research companies such as Frost & Sullivan, Lucid Information Services, and NSI Research both in management and as a writer. Mr. Watkins has authored many syndicated reports, previously in the telecommunications sector and more recently in the computing and merchant embedded computing industry. He holds three university degrees including a B.A. in History, as well as an M.A. in International Studies. He was the principal author of this report.

Randall Sherman is the president and principal analyst of New Venture Research Corp., a technology market research and business consulting firm focused on the EMS and OEM electronics manufacturing industries. Mr. Sherman has more than 25 years' experience in technology and business research. He began his career as a telecom network design engineer and holds an undergraduate degree in Astrophysics. He has held senior positions at various market research firms, including Creative Strategies, Frost and Sullivan, BIS Strategic Decisions and Lucid Information Services. Mr. Sherman holds an MSEE from the University of Colorado and an MBA from the Edinburgh School of Business. His contribution to this report was to update the numbers and the product and technical announcements that have taken place since the last edition in 2013.

ABOUT NEW VENTURE RESEARCH CORPORATION

New Venture Research (NVR) was formed in 1988 to assist industry executives in their decision making. We began as an independent consultancy and have recently evolved into a publisher of off-the-shelf market research reports in key areas of the electronics industry. The reports are written by a team of staff analysts and independent consultants. We also offer consulting services when our clients need information not found in our reports.

The backbone of each report is based upon primary market research information. Our market information originates from direct interviews with vendors, users, and other industry participants. We use secondary research to test for reasonableness, technical backgrounds, and, in some cases, for top-level forecasts. We distill the research into coherent forecasts and recommendations.

We are dedicated to providing our customers with accurate reporting on our targeted markets. One of our reports can save our customers months or years of research. The reports enable executives to make decisions in a structured manner. Our customers tell us these reports are excellent tools for building consensus regarding their company's real market opportunities.

NEW VENTURE RESEARCH

337 Clay Street, Suite 101
Nevada City, California 95959

Tel: (530) 265-2004 • Fax: (530) 265-1998

www.newventureresearch.com

DISCLAIMER

The author and publisher have used their best efforts to assure the accuracy of the material used in preparing this report.

The author and publisher make no warranty of any kind, expressed or implied, with regard to the information contained in this report. The author and publisher shall not be liable in any event for incidental or consequential damages in connection with, or arising from, the information contained in this report.

Any reference to particular products or manufacturers to illustrate points made in this report should not be construed as an endorsement of said products or manufacturers.

The opinions contained herein are those of the author or authors and are based upon published and unpublished information obtained from a variety of sources, telephone and personal interviews with industry participants, and many years of experience.

SOFTWARE LICENSE AGREEMENT

This report is provided in PDF electronic file format. For considerations received, New Venture Research Corp. (NVR) hereby licenses this electronic copy of the report as described in this License Agreement to “You” the corporate or individual licensee as specified in the sales agreement. This License Agreement applies to all electronic file copies of the report for which you have purchased or otherwise been granted a license by NVR. Any use of the electronic file copy of the report indicates your acceptance of these terms.

The report and all electronic copies thereof are protected by both United States copyright law and international treaty provisions. You may not distribute any portion of the report. Unless otherwise specified in your purchase agreement with NVR, the electronic file copy of the report may be freely moved from one computer location to another, but may not be used by more than one (1) person simultaneously.

THE MERCHANT EMBEDDED COMPUTING MARKET - 2016 EDITION

Table of Contents

Chapter 1 INTRODUCTION	2
1.1 Objectives of the Report	2
1.2 Scope of the Report	2
1.2.1 Market Definitions	2
1.2.1.1 What is Merchant Embedded Computing?.....	3
1.2.1.2 What is NOT Included in the MEC Definition?	4
1.2.1.3 Who are the "Merchants" of Embedded Computing?.....	4
1.2.2 Market Segmentation	5
1.2.2.1 Five Application Areas.....	5
1.2.2.2 Nine Bus Architectures.....	6
1.2.2.3 Four Functional Categories	7
1.3 Report Organization.....	8
1.3.1 Methodology.....	8
1.3.2 Chapter Structure.....	8
Chapter 2 EXECUTIVE SUMMARY	10
2.1 Introduction	10
2.2 MEC Industry Trends.....	11
2.3 Application Markets.....	13
2.4 Bus Architecture Markets	17
2.5 Board Function Markets	21
Chapter 3 TECHNICAL TRENDS	24
3.1 Industry Overview	24
3.1.1 Introduction	24
3.1.2 Early Market Drivers	25
3.1.3 "Open Bus" Architectures	26
3.1.4 Emerging Technologies	28

3.2	Broad Market Trends	29
3.2.1	Major Changes and Initiatives.....	29
3.2.2	Microprocessor Trends	31
3.2.3	DSP and FPGA Trends.....	32
3.2.4	Competing Processor Unit Trends	33
3.2.5	Silicon photonics	34
3.2.6	3DIC.....	34
3.2.7	Operating Systems	35
3.2.8	General Conclusions.....	35
3.3	VMEbus International Trade Association.....	36
3.3.1	2eSST (VITA 1.5) – 2 edged Source-Synchronous Transfers.....	37
3.3.2	Serial I/O on VME64x (VITA 31) – Serial with Ethernet Added	39
3.3.3	PMC (IEEE 1386.1) – PCI Mezzanine Card	40
3.3.4	PrPMC (VITA 32) – Processor PMC.....	41
3.3.5	PMC-X or PCI-X PMC (VITA 39)	43
3.3.6	VXS or VMEbus Switched Serial (VITA 41)	43
3.3.7	XMC (VITA 42) – Switched Mezzanine Card.....	46
3.3.8	VPX (VITA 46) – Designed for Harsh Environments	46
3.3.9	ANSI (VITA 47) – Ruggedized Enhanced Design Implementation	49
3.3.10	REDI (VITA 48) – Ruggedized Enhanced Design Implementation	49
3.3.11	FMC (VITA 57.1) – FPGA I/O Mezzanine Card	50
3.3.12	LRIE (VITA 58.0) – Line Replaceable Integrated Chassis.....	51
3.3.13	OpenVPX (VITA 65) Industry Working Group.....	51
3.4	PCI Industrial Computer Manufacturers Group (PICMG)	51
3.4.1	PCI-ISA (PICMG 1.x).....	53
3.4.1.1	ePCI-X (PICMG 1.2) – adds PCI-X.....	53
3.4.1.2	PCI Express (PICMG 1.3) – SHB Express.....	54
3.4.2	CompactPCI (PICMG 2.x) – PCI with Rugged Connectors	55
3.4.3	AdvancedTCA (PICMG 3.x) – Adds ATCA to PCIMG	59
3.4.3.2	Ethernet (PICMG 3.1).....	62

3.4.3.3	InfiniBand (PICMG 3.2).....	63
3.4.3.4	StarFabric (PICMG 3.3).....	63
3.4.3.5	PCI Express (PICMG 3.4).....	63
3.4.3.6	RapidIO (PICMG 3.5)	63
3.4.3.7	Extensions for Applications Outside the Telecom Central Office (PICMG 3.7).....	63
3.4.3.8	xTCA for Physics (PICMG phyTCA).....	64
3.4.4	Advanced Mezzanine Card (AMC).....	64
3.4.5	MicroTCA (MTCA.0).....	66
3.5	PC/104 Embedded Consortium.....	69
3.5.1	PC/104.....	71
3.5.2	PC/104-Plus	73
3.5.3	PCI-104	74
3.5.4	PCI/104-Express and PCIe/104	74
3.5.5	EBX and EBX Express	76
3.5.6	EPIC and EPIC Express	78
3.6	Motherboard Form Factors – Intel and VIA Technologies.....	80
3.6.1	ATX	81
3.6.2	MicroATX.....	82
3.6.3	FlexATX.....	83
3.6.4	BTX	83
3.6.5	Mini-ITX	84
3.6.6	Nano-ITX.....	85
3.6.7	Pico-ITX.....	85
3.7	Computer on Module (COM).....	85
3.7.1	ETX – Embedded Technology eXtended	86
3.7.2	COM Express (PICMG COM.0).....	87
3.7.3	XTX	90
3.7.4	Rugged System-on-Module Express (VITA 59).....	91
3.7.5	Qseven	91
3.7.6	CoreExpress.....	93

3.7.7	SMARC.....	94
3.7.8	Embedded NUC.....	96
3.8	SFF-SIG: Small Form Factor Special Interest Group	98
3.8.1	SUMIT Interface	98
3.8.2	COMIT	99
3.9	Historical Analysis of the MEC Market 2007-2015	100
3.9.1	Qualitative Analysis.....	100
3.9.2	Quantitative Analysis	102
Chapter 4 INDUSTRY STRUCTURE		106
4.1	Chapter Overview	106
4.2	The Global Economy	106
4.3	Assembly – Total Available Market.....	107
4.3.1	Electronics Assembly Overview	107
4.3.2	Communications Assembly.....	110
4.3.3	Industrial Assembly	114
4.3.4	Medical Assembly	117
4.3.5	Military/Aerospace and Other Assembly.....	120
4.3.6	Other Assembly.....	124
4.4	Corporate Strategy.....	124
4.4.1	Outsourcing.....	125
4.4.2	Partnerships and Joint Ventures	126
4.4.3	Mergers and Acquisitions	129
4.4.4	Industry Consolidation.....	132
4.5	Competitive Strategies.....	133
4.5.1	Time to Market	134
4.5.2	Life Cycle Management.....	134
4.5.3	Intellectual Property	135
4.5.4	Margin versus Volume	136
4.6	The Standards Environment	136
4.6.1	Proliferation of Standards-based Architectures	136

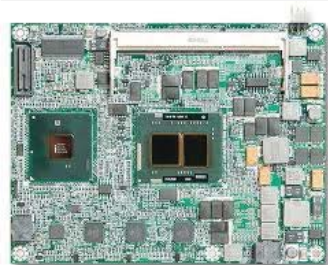
4.6.2	Standards Consortia	137
Chapter 5 REVENUE FORECASTS BY APPLICATION, 2015–2020		139
5.1	Overall MEC Industry Forecast.....	139
5.2	Applications Market Summary.....	140
5.2.1	State of the Industry	140
5.2.2	Security Issues.....	142
5.2.3	Revenue Summary by Application	143
5.3	MEC Communications Application Market.....	148
5.3.1	MEC Communications Market Trends and Forecast	149
5.3.2	Telecommunications Versus Data Communications	151
5.3.3	MEC Communications by Bus Architecture	153
5.3.4	MEC Communications by Function	156
5.4	MEC Industrial Automation Market.....	158
5.4.1	MEC Industrial Automation Market Trends and Forecast	159
5.4.2	MEC Industrial Automation by Bus Architecture	161
5.4.3	MEC Industrial Automation by Board Function	164
5.5	MEC Medical Market	166
5.5.1	MEC Medical Market Trends and Forecast.....	168
5.5.2	MEC Medical by Bus Architecture.....	170
5.5.3	MEC Medical by Board Function.....	172
5.6	MEC Military/Aerospace Market	174
5.6.1	MEC Military/Aerospace Market Trends and Forecast.....	176
5.6.2	MEC Military/Aerospace by Bus Architecture	179
5.6.3	MEC Military/Aerospace by Board Function.....	181
5.7	MEC Other Applications Market	183
5.7.1	MEC Other Applications Market Trends and Forecast	184
5.7.2	MEC Other Applications by Bus Architecture	186
5.7.3	MEC Other Applications by Board Function	188
Chapter 6 – REVENUE FORECASTS BY BUS ARCHITECTURE, 2012–2020		191
6.1	Bus Architecture Market Summary.....	191

6.2	PCI Architecture Market Trends and Forecast.....	196
6.3	CompactPCI Architecture Market Trends and Forecast	201
6.4	VMEbus Architecture Market Trends and Forecast.....	206
6.5	AdvancedTCA Architecture Market Trends and Forecast.....	214
6.6	PMC Architecture Market Trends and Forecast	222
6.7	PC/104-Family and Motherboard Architectures Market Trends and Forecast	227
6.8	COM Architecture Market Trends and Forecast	235
6.9	AdvancedMC and MicroTCA Architectures Market Trends and Forecast	240
6.10	Other Bus Architectures Market Trends and Forecast	248
	Chapter 7 REVENUE FORECASTS BY BOARD FUNCTION, 2012–2020	253
7.1	Board Function Market Summary.....	253
7.2	SBC Board Functions Market Trends and Forecasts	258
7.3	DSP Board Function Market Trends and Forecast	264
7.4	I/O Board Function Market Trends and Forecast	270
7.5	Other Board Function Market Trends and Forecast	276
	Chapter 8 COMPANY PROFILES.....	284
8.1	Overview of Profiled Companies	284
	AAEON Technology, Inc. (an ASUS assoc. Co).....	285
	AcQ Inducom.....	288
	Acromag, Inc.	291
	Acrosser Technology Co., Ltd.....	293
	ADLINK Technology, Inc.	295
	AdvancedIO Systems, Inc.....	298
	Advantech Co., Ltd.	300
	Aitech Defense Systems, Inc.	303
	ARBOR Technology Corporation	305
	Artesyn Embedded Technologies	308
	AudioCodes, Ltd.	311
	Avalue Technology, Inc.	313
	AXIOMTEK Co., Ltd.....	315

b-plus GmbH	317
BittWare, Inc.	319
Concurrent Technologies Plc.	321
congatec AG	323
Connect Tech, Inc.....	325
Cornet Technology, Inc.	326
Critical I/O, LLC.....	328
Curtiss-Wright Defense Solutions	330
Cyclone Microsystems	333
Data Device Corporation.....	335
Data Modul AG.....	337
DFI, Inc.....	339
Dialogic Inc.	341
Diamond Systems Corporation	343
DSM Computer GmbH	346
Dynatem, Inc.	348
Electronic Equipment Produktion & Distribution GmbH	349
Elma Electronic AG	351
ELTEC Elektronik AG	353
Embedded Planet, Inc.	355
Eurotech Group.....	356
EVOC Intelligent Technology Co., Ltd.....	358
Exceet Medtec Romania	360
Extreme Engineering Solutions, Inc. (X-ES)	362
Fastwel	364
GE Automation and Controls	366
General Micro Systems, Inc.	368
Hectronic AB	370
iBASE Technology.....	372
I-Bus Corporation	374

IEI Integration Corp.....	375
ies GmbH & Co. KG.....	377
Interface Concept.....	379
iWave Systems Technologies Pvt. Ltd.....	381
Kontron	384
Lanner Electronics, Inc.	388
Magma, Inc.....	390
MEN Mikro Elektronik GmbH.....	392
Mercury Systems, Inc.....	394
Micro/sys, Inc.....	396
MPL AG.....	398
MSC Technologies GmbH.....	401
N.A.T. GmbH	403
Nallatech	405
National Instruments Corporation.....	407
NEXCOM International Co., Ltd.....	409
Nutaq Inc.....	412
Octagon Systems.....	414
One Stop Systems, Inc.....	415
Pactron, Inc.	417
Pentair Electronics	419
Pentek, Inc.....	421
PFU Systems, Inc.	423
Portwell, Inc.	425
RadiSys Corporation.....	427
RTD Embedded Technologies Inc.....	429
SECO srl	431
ShiraTech.....	433
Sintecs BV.....	435
SKY Computers, Inc.	437

Solectrix GmbH	439
Technobox, Inc.	441
TEK Microsystems Inc. (Tekmicro)	443
TES Electronic Solutions, GmbH.....	445
Telco Systems.....	447
TEWS TECHNOLOGIES GmbH.....	449
Themis Computer.....	451
Trenton Systems, Inc.....	453
V Rose Microsystems, Inc.	455
VadaTech, Inc.....	457
VersaLogic Corporation.....	459
VIA Technologies, Inc.	461
WinSystems, Inc.	463
Glossary – Embedded Computing Terminology.....	465



Buses: VME, PCI, PCIe, cPCI, PC/104, COM, SFF, ATCA, AMC, PMC

Chapter 1

INTRODUCTION

1.1 Objectives of the Report

This Merchant Embedded Computing (MEC) Market report provides a comprehensive analysis of the global marketplace for standards-based single-board computing systems and solutions. The report examines the size, trends and technologies of the market, and the opportunities for companies who compete in the market. It provides an overview of technological advances and the development of various product specifications, and trends and issues of importance to the industry, as well as the market forces that are changing the nature of the business, including trends toward outsourcing, the impact of industry consolidation by mergers and acquisitions, and the fallout of the economic downturn that started in 2008 and affected market growth for several years afterward. The report analyzes various business issues and forecasts the market size and growth for the major segments and technologies. Data used for these forecasts is current as of August 2015. Finally, the report profiles selected vendors, giving a brief summary of each company and an overview of its products.

The MEC report is designed to aid executives in senior management, sales, business development, marketing among current and potential manufacturers, and users of embedded computing products, in making important strategic and product decisions.

1.2 Scope of the Report

1.2.1 Market Definitions

The MEC marketplace is extremely complex, encompassing a large array of technologies, standards, form factors and products; therefore defining the precise dimensions that comprise this report is difficult. There are many overlaps in products and markets. Attempting to put everything into neat categories does not always work to everyone's satisfaction, which makes markets hard to size and issues difficult to characterize.

The term "embedded computing" has become a favorite buzzword in high-tech circles. It is freely used throughout the industry to refer to anything that can be characterized as a computer in a box, whether it is to be used for industrial, military or commercial purposes. If it consists of a printed circuit board with a microcontroller and other components (memory or I/O, for example) attached, and is assigned a specific performance task as part of a sub-system within a larger device, it can often qualify as an embedded system. In this section, we will try to specify exactly how the term is used within the context of this report.

1.2.1.1 What is Merchant Embedded Computing?

Merchant embedded computing (or MEC) is defined as a standards-based computer system consisting of a single-board computer or a series of boards and a backplane. The key differentiator from a simple embedded computing device is the inclusion of the requirement that an MEC system supports an industry standard bus architecture for the signaling, bus, connectors, and physical form factors. It is usually in a pluggable format with multiple boards. MEC boards are designed for multiple applications and (usually) not a single, dedicated application. In addition:

- MEC systems are usually products available from multiple vendors, offering a variety of "off-the-shelf" boards available from merchant vendors within the open market;
- The system may run a proprietary operating system or a generic off-the-shelf operating system, with the application software usually product specific;
- The operating and application systems are not exposed to the end user, nor can the user change or run general-purpose applications software; and
- Generally, the user does not see the actual function of the computer inside, but may only access its operation with a button control panel, menu system, or screen with a dedicated application.

Typical MEC applications might include use in a medical scanner, industrial robot, manufacturing process control system, various communications equipment, complex military equipment, etc. Some embedded computing systems are operated in such a manner that the

computer function is not apparent in the final application, while other embedded systems are clearly operated by computers which are integrated into a machine's functionality. An example of the former is the highly complex imaging system of a CAT, PET, or MRI diagnostic system or an industrial automation robot.

1.2.1.2 What is NOT Included in the MEC Definition?

Logically, we consider "a microprocessor on a board of electronics" as including a much broader market than is covered in this report, especially if the item in question does not conform to an industry bus standard. Such a product could encompass virtually everything with a microprocessor. Other factors that exclude particular products or devices from consideration include:

- Single application-specific micro-controller-operated products - "single" applications such as a musical greeting card, appliance, stereo system, thermostat, etc., or any device that embeds a microprocessor of some kind;
- Complex, single-chip embedded solutions and systems on chip (SoCs);
- Consumer PC motherboards and add-in boards, as well as data center server boards.

To be sure, PC motherboards are bus-based and popular in many industrial applications. However, most such products are designed primarily for general desktop applications, not for dedicated applications. Capturing data on PC-grade motherboards that are used in the embedded market is quite difficult, especially because a large percentage of such boards are sold through commercial channels. In the context of this report, motherboards sold by merchant vendors are included in our "PC/104, EPIC, EBX, ATX, and ITX" architecture category, as they typically have been enhanced beyond the normal PC-grade quality used to run Windows and other general purpose computer operating systems.

1.2.1.3 Who are the "Merchants" of Embedded Computing?

The MEC business consists of several dozen large companies with diversified product portfolios and perhaps a hundred or more small companies targeting product niches, often with special, long-established relationships with buyers. Many, if not most, of the competitors have been in existence for 15 to 20 years or more. Not surprisingly, with so many competitors the

vendor landscape is in continuous flux. Several of the companies profiled in our last MEC report are gone, either having been acquired by larger competitors or having simply closed their doors.

Given the number of vendors in the market, operating from countries across the globe, detailed data is often not available in all cases. MEC products number in the thousands and unit shipments in the hundreds of thousands. Therefore, much of the data provided about the market and about the marketers must be estimated based on the information and data that is available.

1.2.2 Market Segmentation

This report sizes the major applications and segments by revenue as well as analyzes both market and technology trends and key issues facing MEC executives. The quantitative analysis covers three "views" of the market:

1. Vertical Market Applications
2. Bus Architectures
3. Functional Categories

1.2.2.1 Five Application Areas

While there are hundreds of sub-applications, MEC vendors generally compete in five broad vertical market application categories:

1. Communications (cellular infrastructure, CPE, etc.)
2. Industrial (process control, test and measurement, and other)
3. Medical (diagnostics/imaging, therapeutic, and surgical/monitoring)
4. Military/Aerospace (flight navigation, weapons, C3, and other)
5. Other (automotive, off-road, ships, trains, kiosks, etc.)

Each of these applications typically has unique product characteristics and operating environments. Military/Aerospace applications, for example, require battlefield-rugged

architecture, whereas medical equipment typically operates in the "72 degrees and fluorescent lighting" environment of a hospital. Industrial automation boards may be used in process control, mining, chemical, or agricultural equipment, or a production line robot. Communication boards might be focused on high-speed, optical transfer data rates. Outside plant equipment often operates in harsh environments and requires the ability to withstand -40°C to +80°C temperatures and greater levels of shock, vibration, humidity, and electrostatic discharge.

1.2.2.2 Nine Bus Architectures

The bus architectures established by industry-standard committees and trade associations are defined in this report as follows:

1. PCI
2. CompactPCI (cPCI)
3. AdvancedTCA (ATCA)
4. VMEbus
5. PMC
6. AdvancedMC (AMC) and MicroTCA (μ TCA)
7. PC/104, EPIC, EBX, ATX, and ITX
8. Computer on Module (COM)
9. Other

Each bus architecture has either evolved from a specific technology or from a company spinoff that became an industry standard. In general, each specific architecture originally filled well-defined product requirements, although over time, considerable overlap evolved among many of the different buses. In the current market environment, the bus structures compete head-on with each other in some applications, while in others they are completely independent and do not compete.

In general, one or another (or a few) bus architectures are best suited for specific applications. Some buses are designed for harsh operating environments such as outside plant, military-grade, etc., and others are designed for less stringent indoor applications. Some

applications require high-speed interconnection while others require only low-speed interconnects—this can have a dramatic impact on how the boards are designed and which bus structures are selected for a given application. Some applications are price sensitive and the bus structures most suitable for these are ones that can be manufactured in very high volumes in order to charge low unit prices.

1.2.2.3 Four Functional Categories

The MEC industry revenues can be broken into four functional categories:

1. **Single-Board Computer (SBC) Boards/Modules:** A board or module whose primary function is data or control processing and that incorporates a combination of computing engines and I/O devices
2. **Digital Signal Processing (DSP) Boards/Modules:** A board or module whose primary function is processing a stream of analog signals and also converting from analog to digital formats. This could be voice processing, image processing, communication signals, etc. The processor may be a "traditional" DSP or a general-purpose processor used as a signal processor, and now even graphic engines are being used. DSP processing usually involves Fourier waveform analysis and signal processing.
3. **I/O Boards/Modules:** A board or module whose primary function is its connection to other parts of a system or network (or user interface). Such boards may contain various processors, but the primary function is moving data in and out of the system through various electrical or optical interfaces.
4. **Other:** Any board that does not fit the above categories, including the following:
 - **Switchboards/Modules:** Switch fabric card
 - **Other Boards/Modules:** Any board that does not fit into another category, such as memory boards
 - **Chassis/Backplanes:** The physical components, including power supplies, connecting the system's boards and modules
 - **Software:** Software-typically OS or middleware-products sold by the merchant vendors

- System Integration: The value placed by the merchant vendors on the integration of various products sold as a unit

1.3 Report Organization

1.3.1 Methodology

The information presented in this report was gathered from a variety of sources. The primary sources were engineering, marketing, business development, and communications managers in merchant embedded computing companies who were contacted directly. These individuals were asked to respond to a survey. In some cases, the answers to the survey were delivered as written responses. In other cases, the information was conveyed via telephone interviews.

The secondary sources were company literature, such as Web sites, investment reports (e.g., annual reports and SEC filings), white papers, and press releases; investor analyses; and trade publications.

1.3.2 Chapter Structure

This report is organized into eight chapters plus an appendix:

- Chapter 1, Introduction: this chapter outlines the scope and organization of the report.
- Chapter 2, Executive Summary: provides an overview of the market and highlights of the top-level market segments.
- Chapter 3, Technology Trends: presents key technology issues that are affecting the embedded computing market today and that will impact the future market environment. Also provides a quantitative analysis of the market over the past decade.
- Chapter 4, Market Trends and Analysis: provides recent historical data and trends as well as analysis and forecasts for the marketplace.
- Chapter 5, Application Forecast: analyzes the key issues and trends by the five application areas defined in the report.

- Chapter 6, Bus Architecture Forecast: analyzes the key issues and trends for the nine standards-based bus architectures defined in the report.
- Chapter 7, Board Functional Forecast: analyzes the market data by the type of board and bus used in the manufacture.
- Chapter 8, Company Profiles: provides brief profiles of the key vendors competing in the MEC marketplace.
- Glossary of Terms: short descriptions of many of the technical and trade terms used in the report.