

Electronic Systems Technicians: Occupational Profile and Outlook

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**by
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Contents

I. Executive Summary.....	4
II. Introduction	6
Purpose of Report	6
Trends in the Electronic Premises Systems Industry.....	8
Methodology of This Research.....	9
III. Definitions and Distinctions.....	10
Nature of the Work	10
Work Settings	11
Training	12
Advancement.....	13
Official Recognition.....	13
IV. Employment and Establishments.....	16
Estimates.....	16
Projections.....	17
V. Appendix.....	22
Resources	22
Survey	23

I. Executive Summary

Over the past 30 years, tens of thousands of companies that install electronic premises systems have been established. Such companies install electronic systems for security, entertainment, communications, temperature control, and other functions in residential, commercial, and industrial facilities, both during and after building construction.

This report describes and quantifies employment in the channels for installing electronic systems. Properly defining the occupation of “electronic systems technician” (EST) is a crucial step in several processes. First, an accurate definition is essential if the field is to be counted correctly. Second, it is essential for increasing the number of entrants into the occupation. Before students can enter the field, or educational institutions can train students for it, they must know clearly what the occupation is and is not.

The electronic systems business has traditionally been regarded as part of the electrical contracting industry and its technical professionals viewed as electricians. However, an examination of electronics systems companies (such as alarm and automation companies, audiovisual contractors, and communications cabling contractors) reveals fundamental differences from electrical contracting. Electrical contractors primarily install and service products that distribute electrical power. They also work with high-voltage appliances, such as lighting fixtures, furnaces, and some alarm annunciators. By contrast, for electronics systems companies, technicians require an understanding of digital and analog signal distribution, the networking of products, and customer interface with what are essentially information appliances.

Several trends are driving the growth of the electronic premises systems industry and the need for electronic systems technicians: the switch from analog to digital technology, the information explosion, the development of home automation, the growth of home offices, and technological convergence.

An analysis of *industry* data leads to a 1998 estimate of 200,000 electronic systems technicians in the United States and Canada. The number of North American business establishments employing those technicians is estimated at 36,000. By contrast, an

analysis of *government* data leads to a 1998 estimate of 230,000 electronic systems technicians in the United States and Canada, who are employed by an estimated 24,500 business establishments.

Whatever the current employment figure may be, the demand seems to be even larger. It is widely considered difficult to find qualified technicians, and that problem is expected to worsen.

Growth in employment opportunities will be affected by trends in demographics, construction and renovation, and widespread market developments. Opportunities for skilled ESTs are expected to be good as the growth in demand outpaces the supply of trained workers. A shortage of skilled workers is expected during the next decade because of the anticipated smaller pool of young workers entering training programs. As the population and economy grow and market penetration of electronic systems increases (it currently ranges from 1 percent to 20 percent), more ESTs will be needed to install and maintain systems in homes, offices, factories, and other structures. Increasingly, buildings will be pre-wired during construction to accommodate networking of computers, telecommunications equipment, and other electronics. Additional jobs will be created by rehabilitation and retrofitting of existing structures.

Overall, the employment prospects for electronic systems technicians look favorable. Significantly, for the first time ever, a key industry survey recently found that one of the top worries of security systems dealer, installer, and monitoring firms is this: *finding and retaining good employees*.

II. Introduction

Driven by the development of information, entertainment, communications, and control technology, the dismantling of related monopolies, and the onset of entrepreneurial competition in services, tens of thousands of electronic premises systems installing companies have been established over the past 30 years. Some specialize in the installation of electronic security or custom entertainment systems. Some install and maintain communications cabling for commercial and residential computer and telephone systems. Some install and service sophisticated control systems that automate heating, cooling, and lighting. Some focus on residences, others on commercial or industrial facilities. Their work is performed both during and after building construction.

Common to all the businesses are certain core technical and business competencies. Based on an understanding of electricity and certain mechanical and structural considerations, the central competencies involve electronic system interconnection, integration, networking, software programming, calibration of visual displays and sound systems, and user-interface design. Business competencies include the ability to train end users and to provide 24-hour service, sometimes on a remote basis through on-line connections.

Purpose of Report

This report describes and quantifies employment in the channels for installing electronic systems. Properly defining the occupation of “electronic systems technician” (EST)—and distinguishing it from the occupation of “electrician”—is a crucial step in several processes. First, an accurate definition is essential if the field is to be counted correctly. Until recently, government industrial and occupational statistical agencies have overlooked the occupation through a failure to recognize low-voltage electronic systems installation as distinct from traditional high-voltage electrical work. The federal government is aware that its industrial and occupational classifications are imperfect, noting that a weakness of “the current SIC [Standard Industrial Classification] system structure is that new or emerging industries are not recognized very rapidly. Thus, the

present system lags in recording these kinds of changes in the structure of the economy.”¹ The new North American Industry Classification System (NAICS), which is only now beginning to come into use, suffers the same defect.² In late 1998, after pressure from industry groups, the Standard Occupational Classification system was revised to better recognize certain technology sectors. However, it will be some time before enough data is collected in those categories to be useful.

Second, properly defining the occupation of EST is essential for increasing the number of entrants into the occupation. Before students can enter the field, or educational institutions can train students for it, they must know clearly what the occupation is and is not.

Because of its less mature state and reliance on electrical power sources, the electronic systems business has traditionally been regarded as part of the electrical contracting industry and its technical professionals viewed as electricians. However, an examination of electronics systems companies (such as alarm and automation companies, audiovisual contractors, and communications cabling contractors) reveals fundamental differences from electrical contracting.

Electrical contractors primarily install and service products that distribute electrical power. They also work with high-voltage appliances, such as lighting fixtures, furnaces, and some alarm annunciators. By contrast, electronic systems companies are not concerned with distributing electrical power or dealing with high-voltage systems. Instead, they concentrate on distributing signals and information. Naturally, the technical personnel in each field have skills matched to the requirements of the products handled. For electrical contractors, the technical emphasis is on the safe and efficient distribution of electrical power. For electronics systems companies, technicians require an understanding of digital and analog signal distribution, the networking of products, and customer interface with what are essentially information appliances. Of course, the fields do overlap to a degree, as some electricians also install electronic systems.

¹ Economic Classification Policy Committee, International Conference on the Classification of Economic Activities, Issues Paper No. 1, “Conceptual Issues,” p. 6.

² NAICS, which is slated to replace the SIC system, was developed jointly by the United States, Canada, and Mexico to provide comparability in statistics about business activity across North America. However, like the SIC and SOC (Standard Occupational Classification) systems, it lumps together the work of electricians and electronic systems technicians.

Trends in the Electronic Premises Systems Industry

Several trends are driving the growth of the electronic premises systems industry and the need for electronic systems technicians:

- The *switch from analog to digital* technology is revolutionizing consumer electronics, creating countless new products and services that change the way people live and work.
- The *information explosion* has created a vast need among consumers and businesses for electronic systems that will help users manage that information and communicate more efficiently.
- The development of *home automation* is creating a need for technicians who can design, install, and maintain those integrated systems. Cost savings are increasing home automation's market penetration, and home automation is getting easier to use as our whole society becomes more technically oriented.
- The growth of *home offices* has led to a large demand for "wired" premises, both in new construction and through retrofitting.
- The largest trend fueling the occupation of electronic systems technician is *convergence*. That convergence is occurring on several levels. Increasingly, homes and offices use a wide range of equipment that is controlled similarly, whose signals are transmitted similarly, and that can communicate with other equipment. For example, much equipment in the categories of temperature control, entertainment, communications, security, data, and lighting is controlled by microprocessors. Those microprocessors or other similar devices can transmit their control signals via common wired or wireless channels, and the various devices and systems in a building can be made to communicate with each other by way of communications protocols. In other words, once-disparate systems are beginning to resemble each other. One effect of this technological convergence is that the installation of such systems increasingly requires a common set of skills. In fact, not only are the various electronic systems becoming similar, but they are merging into new products altogether. For example, on the residential front, "the technologies of home entertainment (the living room) and home information (the home office) are merging into a new product category."³ Electronic systems designers and installers will be in great demand as computers and consumer electronic devices converge. Computers will serve as the control center of a network that controls home electronic systems, including delivery, storage, and recall of audio and video entertainment for use throughout the home.⁴

³ Consumer Electronics Manufacturers Association, *U.S. Consumer Electronics Industry Today*, June 1997, p. 3.

⁴ Avram Miller, vice president and director of business development for Intel Corporation, in keynote speech to Custom Electronic Design and Installation Association (CEDIA) Expo 98.

Methodology of This Research

This paper is based on interviews with industry members, observers, and association leaders; research into U.S. and state government statistics, laws, and guidelines; information from consultants and statistical organizations; and a review of both trade publications and mainstream news sources. In addition, the research used figures from a quantitative survey conducted by the Consortium for Electronic Systems Technician Training. Details of that survey are presented in the Appendix.

III. Definitions and Distinctions

“Electronic systems technician” (EST) is a distinct, definable occupation. People who work in the field are variously known as technicians, installers, and system designers.

The types of systems they work on perform the following functions:

- entertainment (audio, video, multimedia, and home and corporate theater)
- communications (telephone, fax, modem, Internet, local area networks, paging, intercoms, and public address systems)
- life safety (access control, burglar and fire alarms, and video surveillance)
- control of indoor, outdoor, and specialty lighting
- control of heating, ventilation, and air conditioning (HVAC) and energy management
- other forms of home and building automation

In general, the systems ESTs design, install, and maintain are placed permanently, as opposed to being portable.

While ESTs make use of a home or building’s 120V AC power to activate control panels, audio and video sources, and signal amplifiers, their work focuses on the distribution of low-voltage signals among microprocessor-based devices and controls. Thus, a common set of skills applies to EST work on all of those functions.

Nature of the Work

ESTs install, connect, calibrate, and service products that move voice, video, audio, and data signals around premises; products that capture and display signals; products that control signals; and products that use signals to control mechanical and electrical apparatuses. ESTs need a general knowledge of relevant terminology, safety and legal considerations (including engineering and building codes), general electricity and electronics, microprocessors and computers, and signal and data communications. Before working in homes and businesses, they review system requirements and documentation (such as blueprints, system documentation, and as-built drawings), organize their

work plan, complete pre-assembly and fabrication of subsystems, gather parts and tools, and pre-test components.

On-site, they rough in device component locations, install cable support structures or drill wire paths, pull and secure wire, and label wires and cables. In addition, they prepare cable ends, route cable, connect passive devices, and install outlets and patch panels.

ESTs install remote and main components, calibrate and align them electronically and physically, install or enter control programs, and set up system instruction labels. They then test, troubleshoot, and debug the system. They also typically train users of the system and later perform various maintenance and repair services.⁵

To perform those tasks, ESTs require an understanding of digital and analog signal distribution, product networking, and customer interface with what are essentially information appliances.

Work Settings

Electronic systems technicians work in a variety of settings. Some are self-employed, while others work for firms ranging from small to very large. A few work mainly in their employer's facility, while most work out in the field at customers' homes and workplaces.

ESTs' work is sometimes strenuous. They may stand for long periods and frequently work on ladders and scaffolds. They often work in awkward or cramped positions. Electronic systems technicians risk injury from electrical shock, falls, and cuts. To avoid injuries, they must follow strict safety procedures. Sometimes ESTs have to travel to distant job sites.

Most electronic systems technicians work a standard 40-hour week, although overtime may be required. Most electronic systems companies operate 24 hours a day, with technicians on call for troubleshooting and repair work.

The work of an electronic systems technician is performed indoors and outdoors; in homes as well as factories, stores, offices, and other businesses; and in both old and new construction.

⁵ Consortium for Electronic Systems Technician Training, "Major Job Functions: Electronic Systems Technician for the Residential & Commercial Building Industry."

Because of the widespread need for electronic systems, jobs for ESTs are found in all parts of the United States and Canada.

Training

Most ESTs learn their skills through employer-run training, which familiarizes them with products, installation and troubleshooting procedures, work site safety, and applicable codes. These training programs use specialized training materials developed by electronic systems trade associations, such as the Associated Locksmiths of America (ALOA), Building Industry Consulting Services International (BICSI), Canadian Alarm & Security Association (CANASA), Consumer Electronics Manufacturers Association (CEMA), Continental Automated Buildings Association (CABA), Custom Electronic Design & Installation Association (CEDIA), Electronic Industries Alliance (EIA), Home Automation Association (HAA), National Burglar & Fire Alarm Association (NBFAA), National Systems Contractors Association (NSCA), and Security Industry Association (SIA). New ESTs also begin to learn the trade informally by working as helpers or assistants to experienced ESTs. They may also learn through union training programs and apprenticeships.

Recognizing the need for more systematic training of entry-level ESTs, the electronic systems associations mentioned above have begun development of a Level One education and training program, which may be taught through two full-time semesters of course work at community colleges or vocational schools. The curriculum will also feature instructor training, institution accreditation, and a national registry of course modules passed by students. The curriculum is scheduled to be taught in fall 1999.

Regardless of how one learns the trade, previous training is very helpful. High school courses in mathematics, electricity, electronics, mechanical drawing, science, and shop provide a good background.

Special training offered in the armed forces and by postsecondary technical schools also is beneficial. A person considering a career as an EST should be in good health and have at least average physical strength. Agility and dexterity are also important. Good color vision is needed because workers must frequently identify cable and

wires by color. Most applicants for EST positions are at least 18 years old and have a high school diploma or its equivalent.

Some localities require ESTs to be licensed. Licensing requirements vary based on the region and the field of specialty.

No single certification covers all ESTs. BICSI certifies telecommunications cabling apprentices, installers, and technicians. CANASA and the NBFSA certify alarm technicians and salespeople. NSCA certifies audio technicians, and EIA administers the Certified Electronics Associate exam, covering subjects and skills necessary for general servicing of electronics. Other electronic systems associations are developing additional certification programs.

Advancement

Technicians in entry-level positions can earn starting salaries of as much as \$25,000. The average technician makes \$23,000 to \$35,000 a year. Experienced consumer electronics technicians can expect yearly earnings in the \$35,000 to \$40,000 range.⁶ One survey⁷ found 1998 EST gross compensation levels to be as follows

- Highest: \$43,753
- Average: \$34,494
- Lowest: \$23,291

Typical paths of advancement include rising to supervisor or manager or establishing one's own business. In fact, 57 percent of companies that responded to the aforementioned survey indicated that their CEO or GM got his or her start in the electronic systems business as an EST.

Official Recognition

As was alluded to earlier, the federal government's SOC, SIC, and NAICS systems, as well as the numerous other industry and labor categorization systems used by the government, tend to lump together the work performed by ESTs and electricians. For

⁶ Consumer Electronics Manufacturers Association, "The Power Profession: Your Career as an Electronics Technician," p. 6.

⁷ Spring 1999 Electronic Systems Technician Employment Survey, conducted by the Consortium for Electronic Systems Technician Training (see Appendix).

example, the Bureau of Labor Statistics Occupational Handbook states, “Electricians install, connect, test, and maintain electrical systems for a variety of purposes, including climate control, security, and communications. They also may install and maintain the electronic controls for machines in business and industry.”⁸ But it is electronic systems technicians, not electricians, who typically install most of those types of systems.

Similarly, NAICS conflates the two occupations despite its claim to group businesses together primarily based on their production processes. (NAICS is deemed a “supply-side” classification system.⁹) However, electronic systems technicians (such as alarm and automation companies, audiovisual contractors, and communications cabling contractors) work with a fundamentally different group of products and processes (microprocessors and control protocols) than do electrical contractors, who primarily install and service (1) products that distribute electrical power and (2) high-energy appliances like lighting fixtures and HVAC systems.

NAICS 235310 (equivalent to the old SIC 1731) defines the “Electrical Contractors” industry as establishments primarily engaged in one or more of the following: “(1) performing electrical work at the site (e.g., installing wiring); (2) servicing electrical equipment at the site; and (3) the combined activity of selling and installing electrical equipment. The electrical work performed includes new work, additions, alterations, and maintenance and repairs.” That sounds—accurately—more like traditional electrical contracting than the business of installing microprocessor-controlled, low-voltage electronic systems.

However, the occupations included in NAICS 235310 are these: cable splicing, electrical, and construction contractors; cable television hookup construction contractors; communication equipment construction contractors; computer cable construction contractors; electrical construction contractors; electrical repair construction contractors; electronic control system construction contractors; fiber optic cable construction contractors; highway lighting and electrical signal construction contractors; home automation system construction contractors; lighting system construction contractors; sound equipment construction contractors; and telecommunications wiring installation contractors.

⁸ Bureau of Labor Statistics Occupational Handbook (on Web).

⁹ Economic Classification Policy Committee, p. 4.

As the list shows, NAICS does not distinguish between the person who runs a new circuit for a ceiling fan and the person who plans and installs the communications network for a company's information technology system.

On the other hand, recent changes to the Standard Occupational Classification system suggest that some federal agencies are beginning to distinguish between electricians and electronic systems technicians. Although still overly broad, seemingly haphazard, and for some sectors incomplete, the new SOC codes come closer to making it possible to count ESTs. The following are some key SOC codes: 27-4011, broadcast technicians; 27-4013, sound engineering technicians; 49-2022, telecommunications equipment installers and repairers; 49-2097, electronic home entertainment equipment installers and repairers; 49-2098, security and fire alarm installers; and 49-2094, electrical and electronic repairers (commercial and industrial). An August 5, 1998, *Federal Register* notice suggests that the revised SOC system will be used by all federal agencies that collect occupational data. As the various federal agencies have up to now gathered and presented occupational data using their own, conflicting occupational definitions, only time will tell if uniformity—and more useful data—will result from the latest SOC changes.

IV. Employment and Establishments

Statistics precisely describing the occupation of electronic systems technician are not available. Why? The electronic systems market is still relatively immature, it is fragmentary and complex, and there is a lack of central reporting of manufacturers' production or sales statistics.¹⁰ Further, the federal government's occupation and business categories do not match the reality of the electronic systems field, so its numbers do not directly produce any count of EST employment or number of establishments.

Nevertheless, it is possible to arrive at broad estimates. The figures in this section are based on information from numerous federal agencies, trade associations, and industry statisticians. In addition, this research made use of data developed in a quantitative survey conducted by the Consortium for Electronic Systems Technician Training (see Appendix).

Estimates

This research effort used two different approaches to estimate the number of business establishments and the number of jobs in the electronic systems technician field. The first approach examines industry (primarily trade association) sources and works upwards to include businesses and employees that are not members of those groups. The second approach examines government data and works downwards to exclude businesses and employees that are included in the rather broad government categories but that do not qualify as electronic systems technicians.

Approach 1 (industry sources) leads to a 1998 estimate of 200,000 electronic systems technicians in the United States and Canada. The number of North American business establishments employing those technicians is estimated at 36,000. More than half of ESTs are employed in the construction industry. Others work on non-construction related retrofit projects, and a small percentage are members of an in-house electronic technical staff at a commercial or industrial facility. About 1 out of 5 ESTs is self-employed.

¹⁰ John Stiernberg, "How Big Is Our Industry?" *Systems Contractor News*, December 1997, p. 41.

Approach 2 (government sources) leads to a 1998 estimate of 230,000 electronic systems technicians in the United States and Canada, who are employed by an estimated 24,500 business establishments.

Projections

Whatever the current employment figure may be, the demand seems to be even larger. In a typical comment, an electronic systems trade publication observes that “finding good technicians is becoming increasingly difficult” and suggests that “offering competitive wages and benefits may lure some technicians.”¹¹

Employment Trends. Employment of ESTs has experienced strong growth over the last several years. The 9,000 companies that belong to the trade associations that constitute the Consortium for Electronic Systems Technician Training employed the following numbers of ESTs in the last four years:

- 117,000 electronic systems technicians in 1995
- 135,000 electronic systems technicians in 1996 (+15 percent)
- 153,000 electronic systems technicians in 1997 (+13 percent)
- 180,000 electronic systems technicians in 1998 (+18 percent)

Note that those 9,000 companies do not constitute all the employers of ESTs, so total employment is in fact higher. Nevertheless, the trend is clearly and significantly upward.

Job openings for ESTs among the pool of 9,000 companies are projected as follows:

- 81,000 in 1999
- 45,000 in 2000
- 63,000 in 2001
- 81,000 in 2002

Demographics. Job opportunities for skilled ESTs are expected to be good as the growth in demand outpaces the supply of trained workers. A shortage of skilled workers during the next decade can be expected because of the anticipated smaller pool of young workers entering training programs.

¹¹ Joe Moses, “A Good Technician Is Hard to Find,” *Security Sales*, April 1998.

Construction and Renovation. Employment of ESTs is sensitive to changes in the economy and in construction markets.

Housing Forecast¹²					
	1995	1996	1997	1998	1999
Total Starts (000)	1,361	1,470	1,478	1,592	1,467
Single-family (000)	1,082	1,155	1,140	1,249	1,156
Multifamily (000)	279	315	338	343	311
New Home Sales (000)	672	756	807	872	828
Existing Home Sales (000)	3,799	4,086	4,206	4,689	4,364

Although housing starts are projected to decline slightly from 1998 to 1999, the total figure remains at a historically high level. Furthermore, *spending* on construction is not expected to decline. Spending on residential construction is expected to increase 0.8 percent per year to 2006, and spending on non-residential construction is expected to increase 1.1 percent per year to 2006.¹³ Builders' main complaint seems to be the growing shortage of skilled labor.¹⁴

Home construction is a significant driver of EST employment because of pre-wiring. Pre-wiring not only constitutes immediate work for ESTs but also lays the foundation for future installations of home automation, security, entertainment, communications, and other electronic systems. Many electronic systems companies are beginning to perform more pre-wiring jobs. As manufacturers build new and enhanced products, end users demand the ability to use them. In turn, home builders are forced to pre-wire homes for those products. For example, one survey found that 68 percent of home buyers either desire or must have security as a feature in their new homes.¹⁵ A different study found that 61 percent of home builders expect to see electronic security systems as a standard feature in new homes by the year 2000.¹⁶

¹² National Association of Home Builders, October 30, 1998.

¹³ Thomas Boustead, "The U.S. Economy to 2006," *Monthly Labor Review*, November 1997, p. 13.

¹⁴ Kim Kennedy, "Housing Market: We're Somewhere over the Rainbow," from Insider Report at SDM (*Security Distributing & Marketing*) website.

¹⁵ National Association of Home Builders and Fulton Research, Inc., in association with Housing Guides of America.

¹⁶ "Pre-Wiring for Home Entertainment Boosts Revenue, Saves Time," *Security Sales*, August 1998, referring to a study by the National Association of Home Builders.

Locksmiths, too, are getting into the electronic systems installation business by increasing their involvement in electronic security systems. Likewise, security companies are expanding their work to include non-security systems that can put sensors and monitoring devices to good use—regulating heating and cooling systems in high-rise buildings, factories, and plants, and regulating and supervising automated factory machinery.¹⁷

Moreover, “almost half of the money spent on building construction in the U.S. is spent on renovation, additions, or replacements of major systems in existing buildings, ... and *renovation tends to grow at relatively stable rates from year to year*, while new construction can fluctuate a lot depending on credit availability, federal tax-law depreciation provisions, and the general health of the economy”¹⁸ (emphasis added). The trend in renovation spending is clearly upward.

Remodeling Expenditures 1990-2000¹⁹	
	Improvements (Billions of Dollars)
1990	55.5
1991	47.7
1992	58.6
1993	66.6
1994	72.1
1995	69.6
1996	77.9
1997	80.0
1998*	84.3
1999*	83.9
2000*	86.8

*Forecast

Market Trends. Market projections for the entire electronic systems industry are not available, but projections are available for some of its subsectors. For example, the

¹⁷ National Burglar and Fire Alarm Association, “Why You Should Consider a Career in the Electronic Security and Life Safety Industry,” 1998, p. 3.

¹⁸ Kermit Baker, “Renovation Is Market to Watch,” *Systems Contractor News*, December 1997, p. 44, using U.S. Department of Commerce figures.

¹⁹ National Association of Home Builders.

sector of the security industry that resells, installs, and monitors electronic systems for residential and commercial customers experienced 5.2 percent growth in 1997. The largest installing dealers reported growth of 14.8 percent over that same period.²⁰

In fact, over the next five years, the residential segment of the security systems monitoring industry “is expected to have a 54 percent growth rate in monitored systems with a \$5 billion increase in monitoring revenues.” On the commercial side, the number of monitored systems is expected to increase 14 percent, with a 33 percent increase in monitoring revenue.”²¹ Those new systems will need to be installed by ESTs.

Another specific indicator can be found in home automation. Market research suggests that the home automation market, already said to be \$4.3 billion in 1998, will reach \$27 billion by 2007.²²

An additional barometer of the electronic systems market can be seen in the growth of communications installation. With T1 line sales and installation growing at 50 percent per year, one industry commentator observes that “systems contractors who refocus on CTI [computer/telephony integration] to harmonize PBX, audio, video, media retrieval, and intranet access will be positioned for explosive growth.”²³

In general, the electronic systems market’s stage of development leaves much room for growth. For example, only 5.4 percent of commercial buildings in the U.S. use automated energy management and control systems, and less than 3 percent use lighting occupancy sensors.²⁴ By several measures, 95 percent of the market for integrated systems is still available.²⁵

The big picture for employment in installing electronic systems is bright. Analyzing the communications industry (which, as defined by the Bureau of Labor Statistics (BLS), contains much of the electronic systems industry), BLS writes, “Three factors re-

²⁰ Bill Zalud, “Whose Advantage?” from Insider Report at SDM (*Security Distributing & Marketing*) website.

²¹ Donna Englander, “Study Predicts 54% Growth in Monitored Residential Systems,” *Security Sales*, August 1998, quoting the “1998 Report on the U.S. Security Monitoring Market” by J.P. Freeman and Co.

²² David Keene, “Systems at the Crossroads,” *Systems Contractor News*, December 1997, p. 46, quoting the “1997 Home Automation Market Report” by J.P. Freeman & Co.

²³ Keene, quoting Larry Henderson, president of Dukane Corporation, speaking at a fall 1997 NSCA board meeting.

²⁴ Energy Information Administration, *Commercial Building Characteristics 1995*, August 1997, p. 28.

²⁵ Stiernberg.

main key to the Bureau's projections...: communications is the lifeblood of the information age and the commerce built during this era; the capital equipment of the communications industry is built around the microprocessor and electronic components; and, finally, the application of the electronic capital equipment has resulted in high rates of productivity growth historically."²⁶

Another driver of growth in installing electronic systems is personal spending. Per capita disposable income is expected to grow 1.1 percent annually in real terms until 2006, and more of that money will be spent, not saved. Personal consumption will rise to 81.6 percent of personal income in 2006, up from 79.8 percent in 1996 and 79.3 percent in 1986."²⁷

Overall, the employment prospects for electronic systems technicians look favorable. Significantly, for the first time ever, a key industry survey recently found that one of the top worries of security systems dealer, installer, and monitoring firms is this: *finding and retaining good employees*.²⁸

²⁶ James C. Franklin, "Industry Output and Employment Projections to 2006," *Monthly Labor Review*, November 1997, p. 50.

²⁷ Thomas Boustead, "The U.S. Economy to 2006," *Monthly Labor Review*, November 1997, p. 17.

²⁸ Zalud.

V. Appendix

Resources

Several organizations have a keen interest in building up the occupation of electronic systems technician. Chief among them is the Consortium for Electronic Systems Technician Training. In February 1998, leading trade associations representing electronic systems contracting companies and their suppliers banded together to identify the specific technical competencies sought in technical personnel and to consider options for addressing a chronic shortage of entry-level technical employees. The consortium then joined forces with the National Center for Construction Education & Research, a provider of technical and craft training curricula.

With the consortium's guidance and support, the center will produce a Level 1 Curriculum for Electronic Systems Technicians. The equivalent of two full-time community college or vocational school semesters of coursework, the curriculum is scheduled to be available for instruction in Fall 1999. A second-year, Level 2 Curriculum is expected to follow.

For more information on the consortium, please contact John Galante, Staff Administrator, Consortium for Electronic Systems Technician Training, P.O. Box 38, Oakton, VA 22124. Phone: (703) 352-9211. Fax: (703) 352-9212. Web: www.hightechjobs.org. E-mail: jgalante@bellatlantic.net.

Members of the consortium are the following:

- Associated Locksmiths of America
- Building Industry Consulting Services International
- Canadian Alarm and Security Association
- Consumer Electronics Manufacturers Association
- Continental Automated Buildings Association
- Custom Electronic Design and Installation Association
- Electronic Industries Alliance
- Home Automation Association
- National Burglar and Fire Alarm Association

- National Systems Contractors Association
- Security Industry Association

Survey

During the spring of 1999, the Consortium for Electronic Systems Technician Training worked with the Electronic Industries Alliance Market Research Department and Polk-Verity Research to create a survey of the electronics installing member companies of the consortium regarding issues of employment. Selecting random records from BICSI, CABA, CANASA, CEDIA, HAA, NBFSA, and NSCA in proportion to the installation company memberships of each, a sample of 3,300 records was built. 274 companies (8 percent) responded by reply fax to a two-page broadcast fax questionnaire. The survey sample is representative of 9,000 unique Canadian and U.S. electronics systems installing companies.

Highlights

Using the 9,000 company universe as a basis,

1. Consortium member companies employed:
 - 117,000 electronic systems technicians in 1995
 - 135,000 electronic systems technicians in 1996 (+15 percent)
 - 153,000 electronic systems technicians in 1997 (+13 percent)
 - 180,000 electronic systems technicians in 1998 (+18 percent)
2. Total 1998 employment (all job functions) by consortium members was 660,000.
3. The following number of job openings for electronic systems technicians will exist among consortium member companies in the specified years:
 - 81,000 in 1999
 - 45,000 in 2000
 - 63,000 in 2001
 - 81,000 in 2002
4. Electronic systems technicians earned \$6.3 billion in wages and benefits from consortium member companies during 1998.

Consortium member companies are strongly focused on electronics work. 89 percent indicated electronic systems was their primary business, while only 4 percent indicated electrical work was their business focus.

Job creation for electronic systems technicians has been very strong. Since 1995, the number of electronic systems technicians employed by consortium member companies has grown by 63,000 (54 percent).

Electronic systems technicians employed by consortium member companies earn healthy livings with average gross compensation of roughly \$34,500 annually in 1998.

Electronics systems technicians have a career path that leads right to the top, with 57 percent of responding companies indicating that their chief executive officer or general manager got his or her start in the electronic systems business as an electronic systems technician.

Detailed Results

This section shows the definitions and questions used in the survey, along with answers to those questions.

An electronic systems technician is an individual whose primary occupation is the design and/or integration, installation, and field maintenance/service of

- cabling infrastructure and products that transport voice, video, audio and data signals in a commercial or residential premises;
 - products that capture and display or otherwise annunciate signals;
 - products that control signals; and
 - products that use signals to control mechanical and electrical apparatus.
1. What is the total number of full-time employees in your company who performed such work as their primary occupation in the following years:

<u>Year</u>	<u>Average Number of Employees</u>
1995	13
1996	15
1997	17
1998	20

2. Assuming you could find individuals with solid basic skills and knowledge of electronic systems installation, how many new and replacement full-time electronic systems technicians would you hire in each of the following years:

<u>Year</u>	<u>Average Number of Employees</u>
1999	9
2000	5
2001	7
2002	9

3. What was the highest, lowest, and average annual gross compensation of full-time electronic systems technicians at your company in 1998?

<u>Level of Gross Compensation, 1998</u>	
Highest	\$43,753
Lowest	\$23,291
Average	\$34,494

4. What was the total number of employees in your company in 1998?

16%	1-5
26%	6-10
20%	11-19
9%	20-29
7%	30-39
5%	40-49
15%	Over 50
2%	DK/R
<i>Average</i>	<i>70</i>

5. Is your company's primary business the design and/or integration, installation, and field maintenance/service of electronic premises systems such as security, A/V, communications cabling, or home/building automation?

89%	Yes
10%	No
1%	DK/R

5a. If no, please specify your company's primary business.

- 42% Electrical contractor
- 19% Sound and lighting systems
- 28% Other
- 11% DK/R

6. To which of the following trade associations does your company belong?

- 33% National Burglar & Fire Alarm Association
- 30% National Systems Contractors Association
- 21% Custom Electronic Design & Installation Association
- 20% Building Industry Consulting Services International
- 6% Home Automation Association
- 6% Canadian Alarm & Security Association
- 1% Associated Locksmiths of America
- 1% Continental Automated Buildings Association
- 5% DK/R

7. Please indicate the states/provinces your company does business in.

- 10% NY
- 10% PA
- 8% OH
- 8% NJ
- 8% NC
- 7% GA
- 7% CA
- 7% IN
- 7% FL
- 6% TX
- 6% ONT
- 6% MI
- 6% VA
- 6% AL

8. Did the owner/operator or chief executive officer of your company begin his or her career in this field as an electronic systems technician?

57% Yes

42% No

8a. If no, please specify what field he or she began career in:

17% Sales

12% Electrician

7% Electrical engineer

6% Self-taught/no experience

5% Management

5% Business administration

5% Music business

5% Accounting