

**NRI HOME TRAINING IN**

# **COMPUTERS & ELECTRONICS**

**THERE'S NEVER BEEN  
A BETTER TIME TO  
PREPARE FOR A NEW JOB,  
CAREER ADVANCEMENT,  
OR A PROFITABLE  
BUSINESS  
OF YOUR OWN.**



**All New Training  
Equipment!**

**NRI** Schools

# Welcome to NRI

## You've made the right choice!

Find a quiet spot, a comfortable chair, and get ready for a glimpse into your future! You're about to discover how NRI can prepare you for an exciting career in computers and electronics. Best of all, as an NRI student, you'll learn new skills quickly, efficiently, and at the lowest tuition cost possible.

NRI is one of the few home study schools that maintains its own full-time staff of technical writers, editors, illustrators, development engineers, and publications specialists. These experts work with leading companies in the field to keep up with the latest technologies and training. As a result, NRI students are not only qualified to handle all state-of-the-art equipment, they're also perfectly poised for new opportunities generated by the high-technology revolution.

## No experience necessary — we build it in

The best way to learn a skill is to simply do it yourself, not just read about it. Unlike most schools that offer you only technical manuals, NRI training is truly "hands on" — we give you professional tools you train with, keep, and use as you build your career. In many cases, those tools include a high-end PC of your choice!

## Caring instructors, an NRI trademark

We're with you every step of the way — with practical, "bite-sized" lessons that guide you from basic principles through complicated procedures. And, if you ever need a helping hand or a bit of encouragement, your NRI instructor will be happy to assist you — by phone, mail, fax, even online!

Again, on behalf of the entire NRI staff, thank you for your interest in our innovative training programs. We look forward to guiding you on your journey toward an exciting new future!

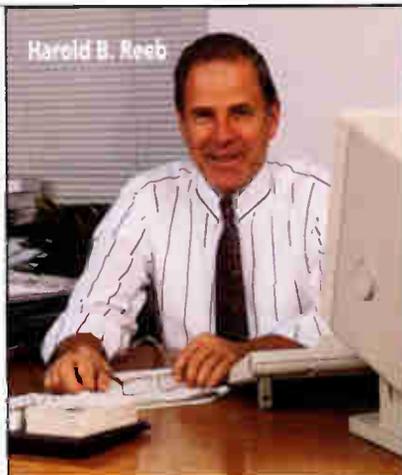
Sincerely,



Harold B. Reeb, Executive Director

P.S. Remember, at NRI, we put you first. You could say it's our way of doing things. After all, we've enjoyed a few "firsts" ourselves.

- ◆ First school to offer hands-on training with practical experiments, professional instruments, and a unique PC Options Plan to help you keep up with changes in technology!
- ◆ First courses to provide students multimedia PCs.
- ◆ First interactive Online Connection for students and alumni.
- ◆ First training in electronic music technology with computer, synthesizer, and MIDI software.
- ◆ First telecommunications training using computer terminal and exclusive communications network.
- ◆ First training in Local Area Networks (LANs) designed to produce specialists in this emerging technology.



## Prepare for exciting opportunities in your choice of these high-demand technical careers:

### PC Servicing

#### Page 5

Prepare for A+ Certification, the mark of a successful computer service pro. All-new features, including a Pentium II 300 PC!

### Master Courses in Video/Audio Servicing

#### Page 15

Whichever course you choose, you get the skills you need for a high-paying career in home entertainment electronics.

### Telecommunications Technology

#### Page 21

Become the in-demand technician who installs, maintains, and troubleshoots the systems that keep the world "in-touch."

### Electronic Music Technology

#### Page 25

Discover the revolutionary capabilities of today's electronic music equipment as you build your own computer-controlled music center.

### Industrial Electronics and Robotics

#### Page 29

Master real-world industrial control and robotics techniques for an opportunity-rich career.

### Networking With Windows NT

#### Page 33

Explore Local and Wide Area Network technology as you prepare for Microsoft Certification in Windows NT 4.

### Basic Electronics

#### Page 37

Learn more about the fascinating field of electronics — with or without our hands-on lab.

*NRI is accredited by the Accrediting Commission of the Distance Education and Training Council, licensed by the District of Columbia, member of the Washington, D.C. Board of Trade, with courses approved for Veterans training. All training manuals and interactive instructional materials are produced by NRI's own authors, engineers, and developers, and are copyrighted by NRI. NRI reserves the right to substitute equipment of equal or greater value.*

# The NRI Advantage

Here are seven reasons why NRI's benefits are second to none...

## 1 You get hands-on experience with professional, on-the-job equipment.

If you want an insider's grasp of today's electronics and computer technology, look no further than NRI — the only school to provide you with actual, real-world equipment to experiment with, learn from, and keep for use in your career. From a hand-held digital multimeter all the way up to a powerful multimedia computer system, you get first-hand experience with exactly the kind of equipment you'll encounter on the job.

## 2 You learn better through NRI's proven Discovery Learning Method.

At NRI, we know that practice is the best way to reinforce theory. That's why NRI pioneered at-home technical training with our interactive instructional approach. NRI students learn by doing, so they learn quicker and more easily than those who study theory alone. You'll move step by step through expertly written lessons that provide a comprehensive background. Then you'll apply that theory to hands-on experiments that build your confidence as they challenge you to build your practical skills.

## 3 You need no previous experience to get started.

Even if computers or electronic devices are a mystery to you, NRI will get you up and running fast. The training experts behind your NRI course know how to make even the most difficult concepts crystal-clear. As you progress step by step from the basics to advanced techniques, you move closer to your goal of advancement, a new career, or a business of your own.

## 4 Convenience and expert instruction ensure that you enjoy learning.

As an NRI student, you'll look forward to your studies! You can set your own schedule, working at the pace that suits you best. There's no classroom pressure or competition to worry about. Instead, you have a team of experienced instructors ready to advise and encourage you every step of the way. Best of all, you can now contact them by phone, mail, fax, and even online!



## 5 NRI training is flexible, serving your individual needs and career goals.

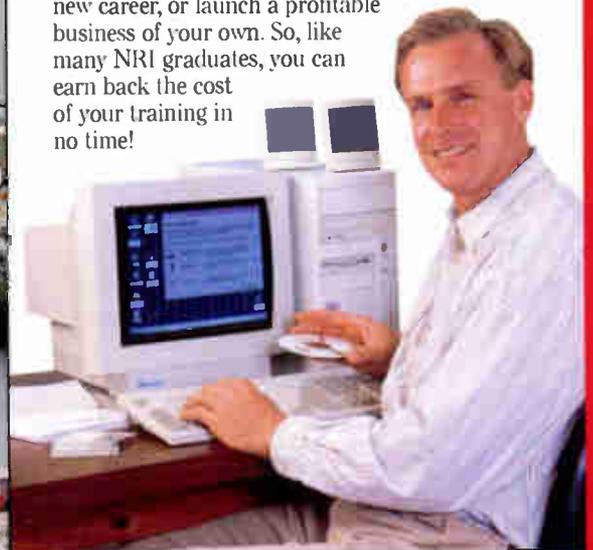
NRI's full-time staff of consultants is available to help you tailor your training experience to meet your immediate interests. So remember, you aren't limited to what you see in this catalog. You'll look forward to receiving announcements throughout your training about discounted short courses, PC upgrades, additional equipment, and more. It's our aim to keep you up on technological breakthroughs as soon as they happen.

## 6 Employers recognize NRI training — by using it!

For more than 80 years, we've helped thousands of people achieve their dreams of success. NRI students are now working in major corporations and government agencies around the world. In fact, dozens of Fortune 500 companies currently make NRI training available to their employees to keep them on top of the latest technology. What's more, countless NRI students have acquired the skills and initiative to start their own businesses. It could happen to you, too!

## 7 There's no better training value — anywhere!

NRI training is arguably the best educational investment in the country today. For example, tuition for NRI's PC Servicing course — which actually includes a Pentium® II 300 MHz computer system with professional software you keep — is less than the cost for one semester's attendance at most colleges. It's also less than the same training would cost at a private technical school. Most important, NRI training gives you the knowledge and hands-on skills to move up in your present job, start a new career, or launch a profitable business of your own. So, like many NRI graduates, you can earn back the cost of your training in no time!



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# Keep Pace With The Latest Technology

## Prepare now for the new opportunities and new challenges in today's electronics...

As automation becomes more and more widespread, jobs once considered "secure" change dramatically or fall away entirely. At the same time, new jobs rapidly surface — jobs that require a working knowledge of the electronics that's transforming today's homes, offices, and industries. With the right preparation, these jobs are there for the taking.

Everywhere you turn, high technology is challenging you to discover its secrets and match its pace. You can meet this challenge with complete training that builds hands-on experience and lasting confidence...NRI training is all you need.

### A revolution in the way we work

No other technology since the industrial revolution has been applied more aggressively than electronics to change and enlarge the scope of human activity. Starting with the invention of the first practical amplifier, electronics has quickly grown from a radio and communications industry into a powerful array of enterprises, spawning digital electronic components and equipment for just about every conceivable application: computers, industrial controls, transportation, education, military,

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*"After completing my course, I looked back amazed at how simple it was to learn what I thought I would never understand."*

William R. Everitt  
Jane Lew, WV

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the arts, and manufacturing... to name just a few!

### Electronics invades every aspect of living

Look at any current electronics, computer, or general interest magazine and you'll see an explosion of electronic products and services. Portable fax machines that send important documents across the country instantaneously. Interactive cable TV. Palm-size camcorders. MIDI-equipped musical instruments and computers. Incredibly powerful supercomputers used in industries ranging from steel to pharmaceuticals. Two-way cable television. Lasers and fiber optics. Electronic mail. CD-ROM encyclopedias. Digital audio tape. Networks and bulletin board systems. Robots. Artificial intelligence systems. Microprocessor-controlled automotive systems. Video phones. And much more.

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*"NRI training helped me obtain a promotion and has aided me in earning extra money on a part-time basis — in fact, NRI training has allowed me to increase my average monthly income by approximately \$1500! My course material was presented in a straightforward and logical manner, making difficult information easier to comprehend. I recommend NRI training to anyone!"*

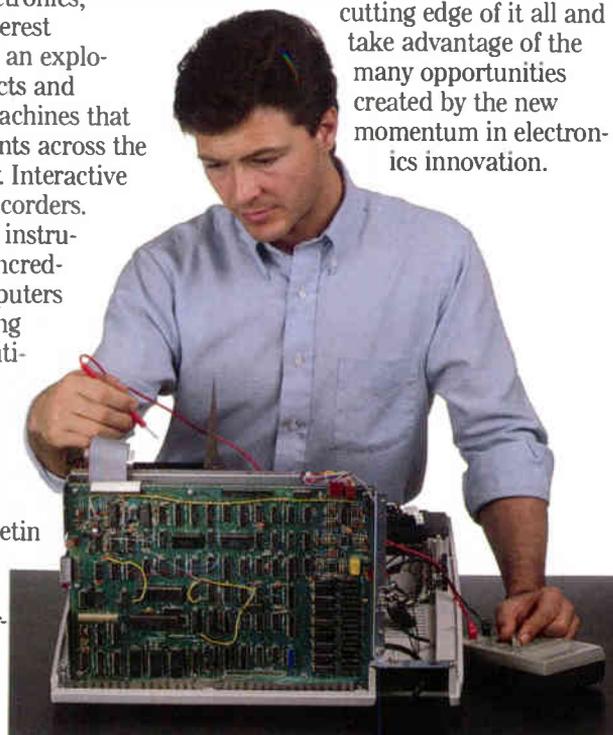
Arlindo A. Borges  
Fredericksburg, VA

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### It's just the beginning

Make no mistake. The revolution in every branch of electronics has only started! In just the last eighteen months, we are seeing an acceleration of new products and applications — both on the shelf and slated for immediate introduction — at a rate undreamed of since the microchip was born.

Train with NRI to stay on the cutting edge of it all and take advantage of the many opportunities created by the new momentum in electronics innovation.



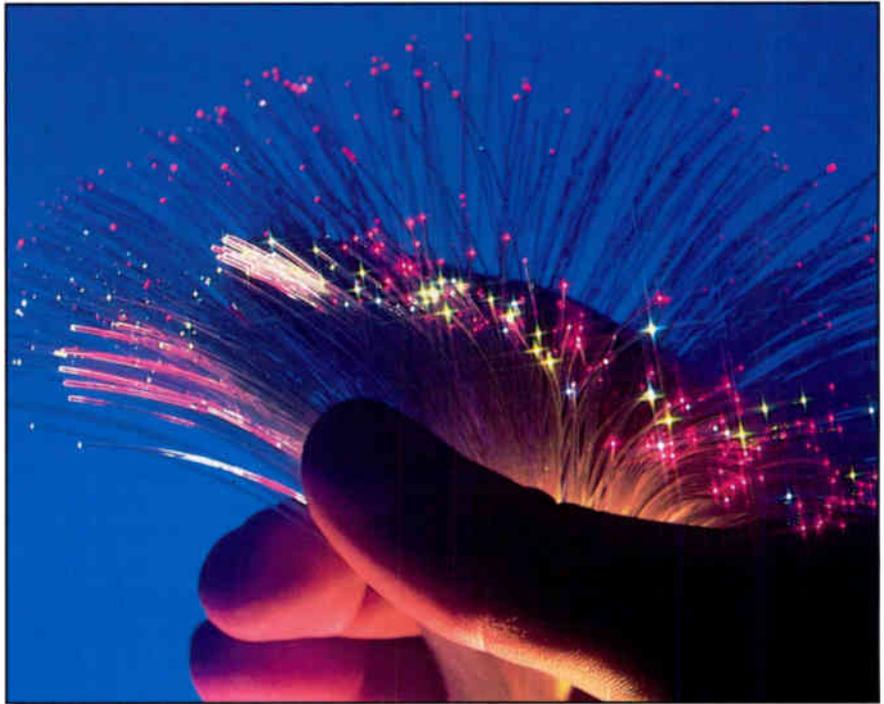
## Job-relevant training, only from NRI

Complete the NRI electronics course of your choice, and you'll be in position to move into a secure, profitable field. While other schools explain just the basics, NRI gives you hands-on skills that make a difference in real-world situations.

Here are just some of the careers NRI electronics training can prepare you for:

- Computer service technician
- Telecommunications technician
- Digital equipment specialist
- TV/video/audio service technician
- Robotics technician
- Electronic circuit designer
- Networking specialist
- Business machine servicing technician
- Industrial electronics and controls technician
- VCR specialist
- Recording technician
- Broadcast technician
- Field service technician

By giving you a thorough understanding of essential electronics principles and practical, hands-on experience with modern equipment, NRI sees to it that you accomplish your career objectives in electronics. That must be why NRI has enrolled more students in electronics courses than any other school!



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*"NRI gave me far more than an understanding of how something worked. They explained why it did what it did, in a way that was easy for me to remember and explain to someone else. With the support and encouragement of my instructors, I gained the confidence to go beyond being a tinkerer to working on complex electronic equipment that baffled me before."*

Claus P. Mathis  
Sheridan, WY

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## 3 Great Ways NRI Training Can Help You Succeed

### A new or better career to challenge you

Again and again, studies prove that training determines who sinks or swims in the high-tech workplace. Why? Employers appreciate workers who stay current with rapidly evolving electronic products and services. Read the freely offered testimonials in this catalog and you'll see that NRI training gives students the practical experience they need to handle new responsibilities. So whether you want to qualify for an entry-level position or move up in your current job and make more money, NRI is the way to go!

### Part-time earnings... even a full-time business of your own

NRI training is the best way to get the know-how and equipment you need to start earning extra money in your spare time. You train at home, when you can, so there's no need to quit your present job. No matter what your field, you'll find it easy to get started. And as most students discover, part-time income ventures usually become full-time businesses. Ask any graduate: By the time you complete your NRI course, you'll have the initiative and credentials to be your own boss!

### The satisfaction of knowing "how things work"

Find out what electronics makes possible, even if you don't plan on using your knowledge in a new job or business. You'll be able to apply what you learn in your course to your present job, to the electronic equipment in your home, and to the electronic devices you encounter everywhere from schools to supermarkets to banks. NRI training can help you understand how today's electronic equipment works, knowledge that will serve you well as technological advances continue to reshape our world.

# Discover What Sets NRI Training Apart

## Step-by-step training

NRI breaks down your course into logical training modules, then organizes each module into a series of "bite-sized" study units. You'll never be bogged down or overwhelmed, because NRI training materials are written in easy-to-understand, everyday language and are packed with diagrams, photos, and illustrations.

## Hands-on projects

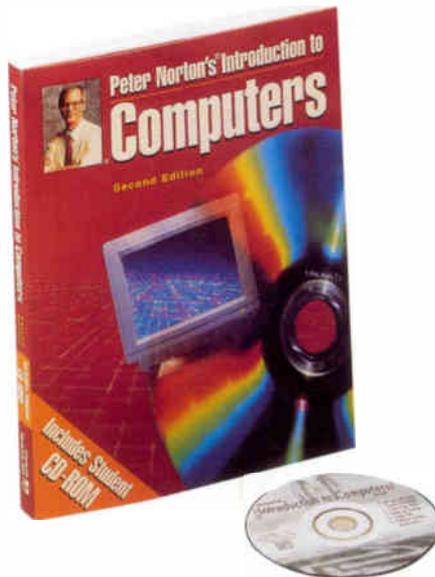
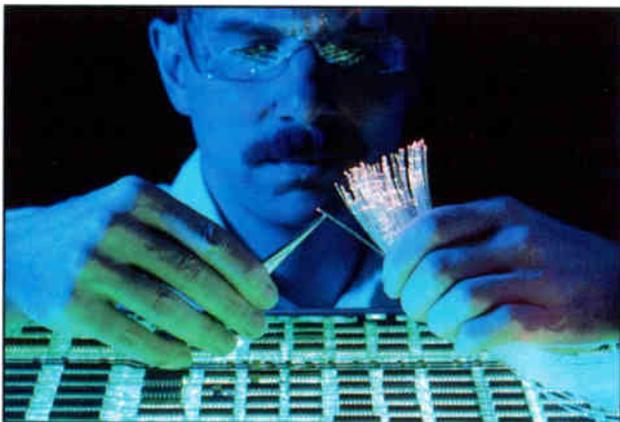
There's no question about it...you learn better by doing. So your NRI course is designed to give you that invaluable practical experience. While other schools just offer you things to read, NRI gives you opportunities to examine, remove, replace, build, and repair. You discover for yourself the feel of the real thing, the confidence gained only with experience. That's what will turn you into a pro!

## Personalized instruction

Studying at home doesn't mean you study alone. Instead, you're "a class of one" with a full team of NRI instructors to monitor your progress and back you up throughout your course. Your instructors answer your questions, help you over the humps, and make sure you're getting the quality training that will pay off on the job.

## Real-world equipment

To do the job properly, you need to have — and understand — the right kind of equipment. So NRI helps you



*"I feel I have as much or more knowledge than others who have gone to colleges or technical schools. The hands-on experience — plus going at your own speed — almost guarantees you a better understanding of what you are trying to learn."*

Steven A. St. Louis  
South Milwaukee, WI

select professional equipment to train with and keep. Working with the real thing, you'll be on the road to proficiency and top earnings.

## Up-to-the-minute technology

Under the impetus of the revolution in electronics, new devices and applications are surfacing at an incredible rate. To maintain NRI courses at the highest possible level of existing technology, NRI reserves the right to substitute equipment or materials of equal or greater value when appropriate to your course.

## Get ahead with the leader in electronics training



J.E. Smith, founder of NRI and pioneering leader in successful home study training.

It was in 1914 that a high school teacher named James E. Smith started giving extra instruction to four of his students in a mysterious and fascinating new field called "wireless radio." When Mr. Smith turned his part-time efforts into a full-time career, the National Radio Institute was born...six years before the world's first commercial radio broadcast on KDKA in Pittsburgh.

From that small beginning, the school has achieved phenomenal growth. Now known as NRI Schools, and a division of The McGraw-Hill Companies, NRI is the leading training institution of its kind in the world. The NRI School of Electronics covers the complete field of electronics, from video and audio equipment servicing to computers and microprocessors...telecommunications...robotics...local area networks...electronic music technology...and more.

Over a million and a half students have enrolled with NRI. And more than 80 years of dedication and innovation stand behind all of our courses. This rich experience is the kind of backup you as an NRI student can depend on for easier, more interesting, and more rewarding training.

See for yourself by enrolling in an NRI course today!

# PC Servicing

Newly updated  
course features  
Pentium® II  
300 MHz PC,  
much more!



**H**igh speed, proven reliability, full-scale multimedia capabilities, Windows 98, fax/modem, and more. You're looking at the most advanced computer system offered in any at-home training program ... and it's yours to train with and keep when you enroll in NRI's newly updated PC Servicing course.

NRI knows: To be today's sought-after

computer service technician, you must understand what makes sophisticated computers like this one tick. That's why NRI — and *only* NRI — gives you step-by-step, hands-on training. Training that pays off in more money, career advancement, even a business of your own! The following pages tell all. ►

# Become An In-Demand Computer Service Technician With NRI's Comprehensive, Hands-On, Up-To-The-Minute Training

## Expanded lessons, improved equipment

Today's world of computers calls for training on the cutting edge. From the electronics principles at the heart of computer technology through digital logic, hardware and software, troubleshooting, and repair, NRI's innovative PC Servicing course gives you the broad-based understanding you need to handle any computer servicing task with confidence.

Theory is constantly reinforced with hands-on training... experiments, exercises, and practical projects bring your studies to life as you demonstrate important concepts and take part in A+ Certification tutorials, now on CD-ROM!



**NEW!**  
Pentium® II  
300 MHz  
Computer!

NRI, and only NRI, will give you every advantage. Scores of successful graduates back us up when we say: There's no better way to break into computer servicing, the career of the future.

## Job security, excellent income

According to Department of Labor projections, jobs in computers are expected to soar past all other occupations throughout this decade, with a growth rate

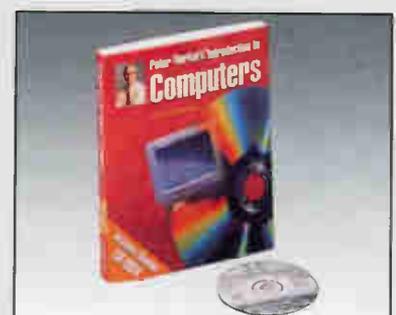
## Only NRI offers computer training this complete



Using NRI's unique Action Audio Cassette, you're talked through the operation of a hand-held digital multimeter. You'll use this indispensable test instrument throughout your computer electronics career.



You set up and perform electronics experiments and demonstrations using your NRI Discovery Lab, a complete breadboarding system you assemble yourself! There's no better way to see for yourself how electronic circuits operate.



You get a comprehensive, colorful overview of computers, from power supplies to applications software. As you progress through your course, NRI's lessons and projects go on to build your know-how step by step.

*"Thanks to NRI's Micro course, I fulfilled my dream. My full working knowledge of computers enabled me to work part-time as a PC Technician for a small computer store and get an exciting job with Creative Labs, Inc. (the Sound Blaster people). I'm very glad I chose NRI!"*

Peter J. Romano  
Mount Vernon, NY

of 96.8%. That's why there's never been a better time to prepare for advancement, a new career, or a business of your own as a computer service technician.

Whether you choose to apply your NRI training to a responsible position as a bench or field technician, factory technician, or computer sales and services consultant, there's plenty of opportunity for good pay, plus unlimited growth potential. Organizations throughout North America continue to automate their operations in search of greater productivity and improved service. Microcomputers are unquestionably a necessity for businesses today, so service technicians are guaranteed security.

Plus, according to the Department of Labor, entry-level computer service jobs begin at \$23,000, with experienced A+ certified technicians earning \$40,000 and up. Not only is the advancement potential strong, but overtime wages are always available. Companies have come to rely heavily on their computer systems and will pay whatever it takes to ensure that their computers stay on line. That's just another way you profit from being in demand!



### Career training, personal rewards

Starting a whole new career is just one way you can use your NRI training. Many graduates find their new computer knowledge to be the ticket to greater responsibilities and quicker promotions. And at home, you can use your new knowledge — and your new Pentium® II computer system — for household budgeting, correspondence, recordkeeping, even running your own computer servicing business!

Technology is changing so fast that continuing education is essential just to keep up. NRI's at-home training is the ideal way to stay on top of the latest developments without sacrificing time off the job. In every way, you'll appreciate the challenge *and* the convenience of NRI's PC Servicing training.

With more and more of our society becoming increasingly dependent on computers, the future belongs to the person who makes the most of this incredible electronic tool. That person can be you ...

## ite, practical, and effective



You check the power supply, CPU, and motherboard of your new computer, then learn all about upgrading, data recovery, virus protection, and more. Plus, you get to work with top-rated upgrading, data recovery, virus protection, and more. Plus, you get to work with top-rated Troubleshooter™ diagnostic software from ForeFront. It even tests multimedia components!



After learning how to browse the Internet and World Wide Web, you can start communicating with your instructor and fellow students online. You even prepare for A+ Certification, thanks to NRI's one-of-a-kind CD-ROM that features the tips and tutorials you need to pass with flying colors!

*"The training and confidence I obtained from NRI surpassed what I had received from every other school I have attended. The course is a very easy, step-by-step learning experience. The well-planned study pattern impressed me. The material was thorough and assistance at times of need was very quick.*

*"With the training and equipment I received from NRI's course in Microcomputers and Microprocessors, I have been able to start my own computer services business. I would recommend NRI training to anyone considering training, whether motivated by professional or personal reasons."*

Kathy Hodulik  
Kenai, AK

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# Here Begins A Detailed Description Of The Lessons, Equipment, And Hands-On Projects In Your NRI PC Servicing Course

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## Introduction to Computers

*In this first training module, you get a comprehensive overview of how computers work and what functions they serve in today's world. The main text you'll work with in this module is Peter Norton's Introduction to Computers, a highly acclaimed manual that features full-color illustrations, crystal-clear explanations, and an interactive CD-ROM that vividly demonstrates fundamental computer principles.*

**Introduction to PCs** You first explore how the microcomputer became the "PC" and, in less than two decades, revolutionized the way our society lives, works, and plays. You start to build computer literacy as you're introduced to major types of PC hardware and software.

**PC Peripheral Devices** We now help you sort through the myriad PC peripherals on the market today, examining printers, CD-ROM drives, modems, and even such recent innovations as light pens, touch screens, and devices that connect musical instruments and VCRs to your computer.

### PC Storage Devices

Now you get an "inside look" at storage devices as you

examine the internal structure of different data collection/retrieval units. You'll study a pictorial guide to the physical organization of a disk, then move on to learn definitions of various PC storage components.

**PC Networks and Communications** Here you examine a PC's input/output ports and the nature of serial communications. You learn the main features and technical fine points of fax/modems. Plus, you get a chance to study fascinating Local Area Network (LAN) technology.

**Introduction to PC Software** Now you learn how the Basic Input/Output System (BIOS) and the Disk Operating System (DOS) together manage the hardware resources of your PC. You explore the major aspects of DOS and see why using it with the Windows graphical user interface (GUI) creates a powerful operating environment.

**PC Applications Software** Learning about the three most common types of applications programs — word processors, spreadsheets, and database managers — will help you get the most out of your computer system. Little-known time-saving features of each application are explored, as well as the advantages of an integrated package.

**Advanced PC Applications** You move on to examine three areas that go beyond basic PC applications. You become familiar with the fundamental concepts of the Internet, you examine various graphics formats, and you explore multimedia and its impact on information distribution in today's computer world.

**Legal and Personal Concerns With PCs** Many of today's computers are part of a vast, interconnected network. However, data transmitted over this network can be highly sensitive and easily diverted from its intended purposes. Here you explore concepts of hardware, software, and data security, as well as programming ethics as they relate to program copying and modification.

**Business Applications for Computers** Today's business world demands information that's timely and accurate. Software companies work to meet this demand by developing databases, spreadsheets, word processors, and other programs designed with the business user in mind. Here you explore all that's involved in developing, installing, and maintaining business applications.

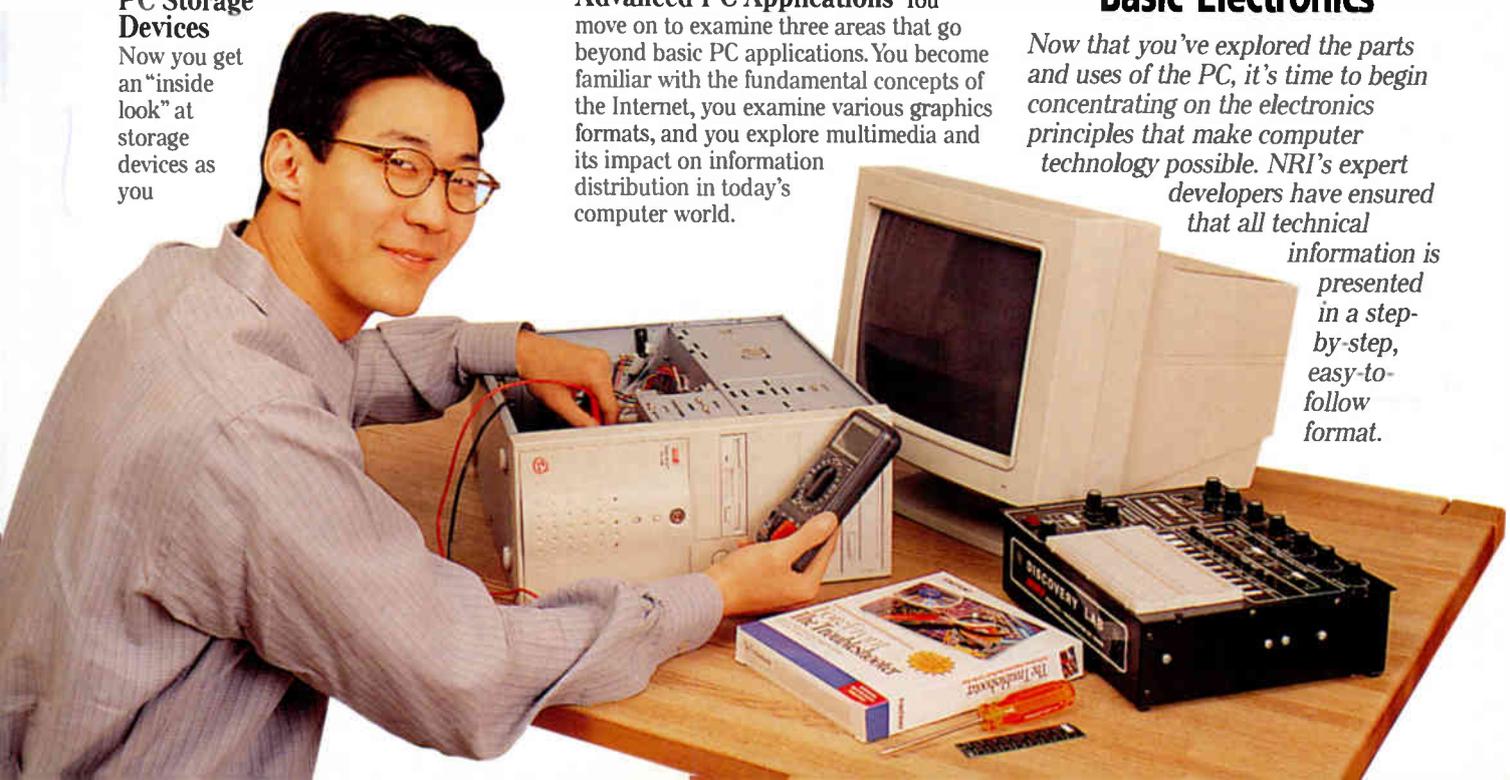
**Introduction to Computer Programming** You round out your introduction to computers with this look at the fascinating world of programming. You discover how programming instructions relate to the operation of the microprocessor, then learn about various types of high- and low-level languages. Several of today's popular languages are described and compared.

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## Basic Electronics

*Now that you've explored the parts and uses of the PC, it's time to begin concentrating on the electronics principles that make computer technology possible. NRI's expert developers have ensured that all technical*

*information is presented in a step-by-step, easy-to-follow format.*



**Introduction to Electronics** You begin with a look at opportunities within the electronics industry. You move on to examine the nature of electricity, how electrical current is made to flow in a circuit, and the relationship among voltage, current, and resistance.

### Voltage, Current, and Resistance

Now you take a more in-depth look at voltage, current, and resistance, examining how they are measured and how voltage sources act when connected. You also discover how the three forms of Ohm's law are used.

**Series Circuits** You now go on to examine more complex circuits. You learn about resistance and voltage drops in series circuits and the important relationship between voltage drops and the source voltage.

**Parallel Circuits** Here you learn how parallel circuits differ from series circuits. You also examine complex circuits that are combinations of both series and parallel circuits.

**Power Sources** You now explore the five important types of batteries. You're also introduced to direct current (dc) and alternating current (ac) generators.

**How Resistors Are Used** You learn about resistor value, standard color code variations, and resistors with special characteristics, such as the temperature-sensitive thermistor and the voltage-dependent varistor.

## Intermediate Electronics

*To better understand the principles of electronics, you might think of electronic devices as a symphony of components — resistors, coils, capacitors, semiconductors, transistors — working together to produce a desired effect. In this module, you build on your study of resistors to examine the roles of other discrete components. In the next two modules, you'll move on to an exploration of*

## NEW! Computer-Aided Electronics Troubleshooting

We've just added an exciting new dimension to your NRI training! As you progress through your study of basic, intermediate, analog, and digital electronics, you'll now receive interactive computer-aided electronics troubleshooting diskettes relating to four key areas: DC electronics, AC electronics, semiconductors, and electronic circuits.

Here's your chance to simulate real-world troubleshooting-



ing situations on any IBM-compatible PC. You experience all the practical situations you'll encounter on the job, make troubleshooting and repair decisions, and get constructive feedback — all without having to worry about damaging equipment.

By the time you complete your computer-based electronics training, you'll be well prepared to handle any troubleshooting task with confidence!

*modern circuits that integrate multiple component functions within a single chip.*

**How Coils Are Used** You now examine different types of coils, their uses, and basic coil action in electronic circuits. You study Lenz's law and learn how changing flux linkages can produce a voltage. You also learn how Ohm's law is applied in simple circuits having resistance and inductance.

**How Capacitors Are Used** Here you examine variable, paper, mica, ceramic, electrolytic, and other types of capacitors. You see how a capacitor stores electricity and how it works in ac circuits.

**How Coils and Capacitors Are Used Together** Now you see how circuits that contain both capacitance and inductance can form resonant circuits. You learn about both series-resonant and parallel-resonant circuits.

**Semiconductors** Here you learn how the two types of semiconductor materials, n-type and p-type, are used together to form a diode. You also examine several types of diodes, each designed for a specific use.

**How Transistors Work** You now see how n-type and p-type semiconductor

materials are used to form npn transistors. You learn how the junctions in these two types of transistors are biased and about currents that flow in each. You also learn about two basic types of field-effect transistors (FETs).

**How Transistors Are Used** Here you study the three basic circuit configurations used with bipolar devices and see how some provide a voltage gain and others a current gain. You also see how field-effect transistors, called unipolar devices, are used.

## Analog Electronics

*Analog electronics — based on measuring and comparing — is the core of electronics theory as we know it. In practice, analog electronics is still at work in today's most sophisticated computer systems. That's why, as a computer technician, you'll need to understand the analog principles behind power supplies, regulators, amplifiers, and oscillators.*

**Integrated Circuits** Entire circuits containing transistors, diodes, and resistors may be contained in a single

### HANDS-ON PROJECTS

#### Exploring Basic Circuit Concepts

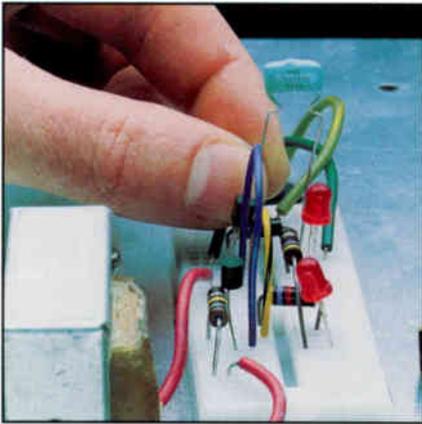
Even if you've never worked with electronic components before, NRI's step-by-step instructions will help you read schematic drawings and construct some simple circuits that will allow you to see Ohm's law at work.

#### Capacitors and Coils at Work

The next set of experiments shows you how capacitors charge through resistors and how capacitors act in series and parallel. You also demonstrate basic coil action and determine the opposition to the flow of direct current.

#### Exploring Basic Transistor Concepts

Using your digital multimeter, you test bipolar transistors and demonstrate different methods of biasing transistors. You also build simple transistor circuits to show how they provide a voltage or current gain.



device called an integrated circuit (IC). Here you learn about IC fundamentals and discover how ICs are classified. Knowing about integrated circuits, you'll be prepared for future developments in electronics.

**Power Supplies for Electronic Equipment** Because power supplies are so essential to the proper operation of computers and other electronic equipment, you now study transformer action, losses, and efficiency. You go on to explore types of rectifiers, ripple filters, overload protection, and power supplies.

**How Amplifiers Work** Here you examine how bipolar transistors and junction FETs are used as voltage amplifiers. You then explore voltage followers, power amplifiers, and IC operational amplifiers, ultimately coming to understand how signals are copied in both the simplest radio and the most sophisticated computer system.

**How Oscillators Work** You now discover how resonant circuits can be used with transistors to produce oscillation. You then turn your attention to the various types of oscillators, including multivibrators and function generators, seeing how they relate to waveshaping circuits.

## Digital Electronics

*A bit more complicated than analog electronics, digital electronics is all about number systems and codes. In this next module, you master the principles of digital logic, then consider how the computer stores and manipulates binary data. What's more, as you perform the hands-on projects featured here, you complete assembly of your NRI Discovery Lab.*

**Logical Operations and Functions** After learning the basic language and fundamental behavior of digital circuits, you examine each of the logical functions used to construct digital circuits and

### HANDS-ON PROJECTS

#### Working With Power Supplies

On what will later become a complex breadboarding system, you demonstrate the operation of transformers, rectifiers, and filters, exploring how they're used to produce high and low voltages. This project will enable you to understand how electronic equipment gets the "electrical potential" necessary for operation.

#### Controlling Voltage

Using materials provided, you show how voltages are regulated by Zener diodes and "special purpose" ICs. Then you watch how electrical current flow is manipulated with the use of a JFET (junction field-effect transistor).

#### Using Voltage Amplifiers

Here you demonstrate voltage amplification using discrete transistors and IC operational amplifiers (op amps). This first-hand experience is essential as you begin studying oscillators, the sources of all electrical signals.

#### A Demonstration of Waveforms

As you experiment with the components provided, you observe the operation of an npn transistor multivibrator, a diode clipper, and an IC function generator so that you fully understand the applications of analog electronics.

## You master the use of this DIGITAL MULTIMETER, an indispensable tool for all electronics and computer specialists



Using NRI's Action Audio Cassette and specially coordinated diagrams, you're "talked through" the operation and applications of your 3-1/2 digital multimeter. You learn the professional way to take voltage, current, and resistance measurements and demonstrate fundamental electronics principles. Later, you'll use your DMM to measure power supply voltages and verify the performance of many circuits.

manipulate digital signals. You're also introduced to Boolean algebra, a kind of "logical arithmetic" that's an essential tool in designing and analyzing logical circuits.

**Logic Families** You move on to explore the hardware used to implement logical functions. Here you get to know a number of different families of logical circuits, learning the strengths and weaknesses of each.

**Combinational Logic** Now you see how Boolean algebra can be used to analyze and simplify logic circuits that use several gates in different combinations. You also explore logic circuits that are essential in the operation of all digital devices, including multiplexers and demultiplexers, encoders and decoders, magnitude comparators, binary adders, and parity generator/checkers.

**Flip-Flops and Clock Generators** Flip-flop circuits, unlike combinational ones, have the ability to remember what has happened in the past and adjust their future operation accordingly. Here, you

explore the operation of the flip-flop, learn why it is useful to control the timing of flip-flop operation with a clock signal, and discover how such a clock signal can be generated.

**Counters, Registers, and Sequential Logic** Now you see what happens when you put individual flip-flops together. You study binary counters, shift registers, and accumulators, learning how the same circuits can be made to perform different tasks at different times, using sequential logic. And you explore methods of converting signals from digital to analog and back again.

## Microcomputer Hardware and Peripherals

*Now you're ready to examine the hardware and peripherals you'll most often be called on to troubleshoot and*

## HANDS-ON PROJECTS

**Basic Logic Gates**

In this project, you construct and demonstrate logic gates using diode logic (DL), resistor-transistor logic (RTL), and diode-transistor logic (DTL). You see for yourself how these circuits work, then measure their performance. You even demonstrate and test the operation of commercial logic gates, working with integrated-circuit forms of gates found in the TTL and CMOS logic families.

**Logic Circuit Demonstrations**

Here's your opportunity to construct multiplexers and demultiplexers and demonstrate binary addition and comparison. In this project, you build and examine logic circuits that will make the breadboarding system you've been building really come to life!

**Flip-Flops at Work**

Now you have a chance to build and examine a variety of flip-flop circuits. You start by constructing and testing your own flip-flops using IC logic gates. At first, you simulate a clock signal; then you go on to construct a basic clock generator circuit. Finally, you demonstrate and verify the operation of several IC flip-flops.

*service. Achieving a solid understanding of this equipment will allow you to quickly identify core problems and execute simple solutions. You'll want to refer to this module often in your new career.*

**Microprocessors** You begin by studying the structure and internal operation of all Intel microprocessors. You go on to explore general features such as instruction pipelining, cache memory, and the concept of RISC (Reduced Instruction Set Computers).

**Microcomputers** Here you discover how the microcomputer's "bus" system allows information to be passed from one location to another, how different kinds of memory work, how input/output operations can be performed, and more.

**Understanding Disk Drives** You explore the operation of floppy and hard disk drives, while learning problems that can be encountered with both types — from dirty heads to full hard disk crash.

**Recovering Lost Data** Most "lost" data actually still exists and can be

retrieved. Here you learn why data disappears, even when the drive is in good working order, and how to go about getting the missing data back.

**Expanding and Upgrading Your Computer** The three common areas of expansion covered here are extended memory, addition of a math coprocessor, and installation of auxiliary disk drives. You also explore the most dramatic upgrade: replacement of the main circuit board.

**Installing and Testing Peripheral Devices** This lesson concentrates on the installation and testing of peripheral devices that can be easily "plugged in" to available "slots" on the main circuit board.

**Identifying and Solving RAM Problems** The main memory (RAM) in any computer is absolutely essential for proper computer operation. At the same time, it's the most likely part of the computer to fail. Here you learn how to identify, locate, and correct RAM problems.

**Locating and Eliminating Hardware Interactions** You now learn the different ways plug-in adapter cards interfere with each other. What's more, you learn how to make adjustments to these cards, enabling them to work together without clashing.

**TSR (Terminate and Stay Resident) Programs** TSR routines can help you perform specific tasks on your computer, even while you're running another program. You explore the nature and use of these time-saving programs, then learn how to create a number of TSRs — without using excessive memory space.

**Protecting Your Data From Viruses** Computer viruses are about as welcome as the flu, but they have become almost inevitable. Here you discover what viruses are, how they work, and how you can fight them — both before and after they get into your client's computer.

## PC Troubleshooting and Servicing

*In this module, you pick up the professional secrets you need to service computers with confidence. NRI's team of skilled technicians has developed easy-to-follow study guides that lead you step by step through two authoritative texts: Troubleshooting, Maintaining, and Repairing Personal Computers and Troubleshooting and Repairing Computer*

*Printers, both authored by acclaimed computer expert Stephen J. Bigelow.*

**Typical Troubleshooting Techniques** You begin by learning standard procedural approaches for isolating and identifying the most common computer problems relating to the PC power supply, motherboards, plug-in cards, disk drives, and more. Real-world examples help you sharpen your diagnostic skills.

**Servicing Disk Drives** Here you examine the operation of floppy and hard disk drives, then learn special procedures and techniques for servicing these important computer peripherals.

**Servicing Video Terminals/Monitors** Video terminals and monitors can malfunction in a number of ways. Here you examine how these peripherals operate, then go on to discover ways of correcting operational problems.

**Servicing Impact and Inkjet Printers** Now you study the operation, maintenance, and repair of both impact and inkjet printers. You learn to perform special diagnostic tests and correct such typical problems as paper jams, malfunctions in carriage movement, and poor print quality.

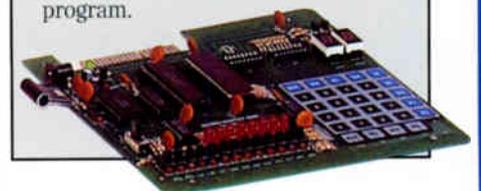
**Servicing Laser Printers** Here you discover how today's state-of-the-art laser printers produce such a distinctive look. You then learn specialized troubleshooting and servicing techniques for these high-end printers.

**Servicing Keyboards, Mice, Track Balls, and Modems** While the peripherals covered here make computing tasks much easier, any malfunction can cause considerable user frustration. Now

## HANDS-ON PROJECT

**The 8085 Microprocessor**

In this exciting project, you learn how to take a few integrated circuits and build a working microprocessor system. You experiment with input and output devices; memory, address, data and control buses; and the CPU itself. Ultimately, this project asks you to demonstrate how the instruction set in a computer program defines particular tasks. You manually load a program into RAM, then sit back and observe how the 8085 microprocessor executes the program.



you discover how to diagnose problems with these essential computer components and make the adjustments necessary to keep PC systems running smoothly.

## Introduction to Windows 98

When Windows 98 was first released, it immediately took the computing world by storm. Rapidly becoming the operating system of choice for savvy computer users, Windows 98 is today the foundation for high-performance, feature-rich applications.

This module shows you all that Windows 98 can do to help you get your work done quickly and smoothly. You master the tips and tricks essential to computing today, even learning how to personalize your desktop.

### Introduction to Windows and DOS

Before the Windows revolution, DOS got computers up and running. You begin your study of Windows 98 by examining how Windows grew from and improved on DOS principles and commands.

**Navigating Windows 98** Here you take part in a thorough exploration of Windows 98's desktop, menus, file system, applications, and accessories. Along the way, you learn the basics of taskbar use, window switching, toolbar manipulation, and more.

### Running Programs With Windows

**98** Now you get a detailed look at how to open and run programs of all types (including DOS programs) in Windows 98. You also examine methods for editing, saving, and printing documents.

**Personalizing Windows 98** With a few basic skills at your command, it's time to learn customizing techniques such as changing mouse settings, keyboard settings, color schemes, and display characteristics.

**Your computer is shipped here!**

## Working With Windows 98

This module introduces Windows 98's most talked-about features while giving you the opportunity to use Windows 98 on your new computer system.

### HANDS-ON PROJECTS

## Exploring and Testing Your Pentium® II 300 MHz Computer

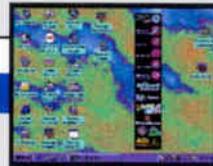


**Only NRI Gives You Hands-On Training With a Feature-Packed PC You Keep!**

At this point\* in your course, you receive the centerpiece of your NRI training: your Pentium® II computer. If you wish, you may upgrade your system to tomorrow's technology at special student prices through NRI's PC Options Plan, details of which will be sent to you just before your computer is released for shipment.

- ◆ Reliable Pentium® II processor
- ◆ MMX™ technology
- ◆ Fast 300 MHz clock
- ◆ 32X CD-ROM drive
- ◆ 64 meg RAM installed
- ◆ Windows 98
- ◆ 5 gigabyte hard drive
- ◆ 56K baud fax/modem
- ◆ 512K external cache memory
- ◆ 16-bit sound card and speakers
- ◆ Super VGA color monitor with tilt-swivel base
- ◆ PCI Super VGA video with 1 meg RAM, MPEG capable
- ◆ PCI bus
- ◆ 104-key enhanced keyboard
- ◆ Math coprocessor
- ◆ Mouse and mouse pad
- ◆ Netscape Navigator™ Web browser (shipped separately)

\* Your computer system is shipped after you have completed at least 50% of the module, "Introduction to Windows 98," as well as all previous required assignments, and as long as you have met your financial requirements. NRI reserves the right to substitute equipment of equal or greater value.



### HANDS-ON PROJECT

## Using Windows 98

Eagerly anticipated by the computing world, Windows 98 boasts a number of exciting enhancements to Windows 95. The complete integration of the Windows operating system with Internet Explorer 4.0 turns your desktop into an extension of the World Wide Web. Known as Active Desktop, this new feature gives you single-click access to applications, floating toolbars, and much more.

Windows 98 also offers built-in support for high-performance Universal Serial Bus peripherals, Accelerated Graphics Port graphics cards, MMX processors, and DVD drives. Plus, as long as you have multiple graphics cards, you're able to connect more than one display to a single Windows machine.

New Multilink Channel Aggregation technology gives Internet users a performance boost; you're now able to multiply total bandwidth by combining

two or more communications lines, including analog modems and ISDN channels.

Other new features of Windows 98 include:

- ◆ Update Wizard, which can connect to a Microsoft Web site to download the latest patches, drivers, and enhancements automatically
- ◆ Tune-Up Wizard, which helps users defragment their disks and delete unnecessary files on a regular schedule
- ◆ System File Checker, which looks at critical files to see if they've been corrupted or modified, restoring the original if necessary
- ◆ Help Desk, which links the user to local and Internet help resources
- ◆ and much more!

In this project, you explore first-hand the major components of this innovative operating system.

Putting your new Windows 98 skills to the test, you perform a hands-on project that you submit to your NRI instructor for evaluation and grading. At this point in your course, you may also begin communicating with your instructor online!

### Working With Files in Windows 98

You learn how to find, copy, move, and delete files using Windows Explorer, the powerful new file manager. You then discover how the Windows 98 Recycle Bin lets you easily retrieve files you've deleted.

**Using Windows 98 Accessories** You move on to study WordPad, Windows' built-in word processing program, and Paint, Windows' built-in art program.

Then you're introduced to NotePad, Phone Dialer, and Calculator — convenient accessories that will save you time and energy.

### Communications in Windows 98

After briefly examining Windows 98's networking capabilities, you focus on its E-Mail Exchange and fax utilities — the tools you need to keep in touch with coworkers, clients, and friends. Plus, you see how Windows' HyperTerminal is your first step towards accessing the Internet.

### Managing Your System in Windows 98

Here you explore simple-to-use utilities that help you optimize, troubleshoot, and safeguard your work. Your study of Windows 98 ends with a discussion of how this remarkable software makes it easy to install and configure hardware devices on your system.

## PC Communications and the Internet

*This module takes you from the fundamentals of PC communications to the intricacies of the World Wide Web. Best of all, you get first-hand experience browsing, searching, and downloading Internet files. Buckle your seat belt — you're about to get up to speed with the newest revolution in computing!*

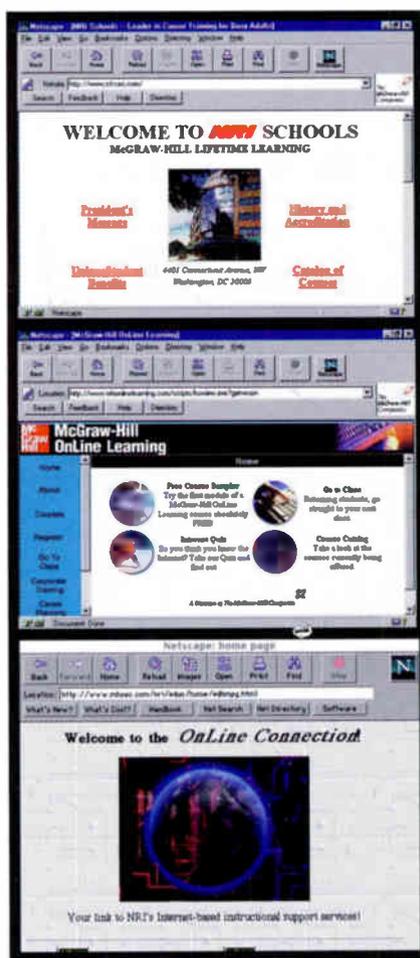
### Using a PC for Communications

You first review the various categories of communications and their protocols. Then you examine hardware, including cables and modems. Finally, you look at the differences between DOS- and Windows-based software for faxing, using Bulletin Board Systems (BBS), and general PC-to-PC communications.

**Internet Basics** What is the Internet? What's available online? How do I gain access? You answer these and many more questions in this exciting lesson. You learn what to look for in a commercial service provider, plus you study Internet connection schemes (ISDN, wireless, and fiber optic), address designations, e-mail, "Netiquette," and much more.

**Navigating the Internet I** Here you learn to use common navigational and information-gathering tools as well as Usenet, which allows you to "chat" in real time with other Net surfers. You also discover methods of transferring files using file transfer protocol (FTP), how to download documents, tar and untar files, and compress files for transfer using uuencode.

**Navigating the Internet II** You now explore another Internet avenue, the World Wide Web. You learn about Web browsers, such as Netscape Navigator, and learn how to search the Web for information using search engines, bookmarks, and hyperlinks. You also cover security issues surrounding the use and abuse of the Internet.



Soon after your computer arrives, you learn how to explore the Internet and the World Wide Web, locate NRI's Home Page, upload and download files, use e-mail, and communicate with your NRI instructor online!

### HANDS-ON PROJECTS

#### Using the Internet Server

In this hands-on project, you demonstrate your ability to use your modem and communications software to access the Internet — with NRI's own Internet server as your first stop.

#### Using Netscape and Navigating the World Wide Web

In this additional project, you use Netscape Navigator™, your Web browser, to contact NRI in a variety of ways. You start by logging on to the Internet and using search tools to find several resources. You then download a file from the NRI server and, finally, demonstrate your understanding of FTP. By the time you complete this project, you'll be able to get the very most out of the Internet and the World Wide Web — both on the job and in your personal life.

### HANDS-ON PROJECTS

#### Using The Troubleshooter™

Now, using The Troubleshooter, the award-winning diagnostic software and CD-ROM from ForeFront, you begin to get a sense of what your work as a computer service technician will be like from day to day.

In this practical project, you learn to use The Troubleshooter to handle today's most common computer problems. You go over step-by-step diagnosis and repair procedures, even learning what test equipment to use. Also included in this project are PC troubleshooting reference books — easy-to-follow guides designed to make your job as a computer service technician easier.

By the time you complete this valuable project, you'll be able to handle these common complaints and much more:

- ◆ computer won't boot
- ◆ no sound
- ◆ memory-related error messages
- ◆ no display
- ◆ computer won't print
- ◆ computer locks up



## ForeFront's The Troubleshooter™ ... State-of-the-Art Professional Diagnostic Software You Master Step by Step

Don Bradbury of Practical PC Magazine called ForeFront's The Troubleshooter "one of the most comprehensive test and reporting tools (he's) ever seen," declaring that "no competent PC technician should be without it." Experts everywhere agree with Mr. Bradbury's strong recommendation. Now you get the opportunity to put this diagnostic software and CD-ROM to the test. We're sure you'll make this product your most trusted companion on the job.

Here are some of the reasons why ForeFront's The Troubleshooter will give you a competitive edge in your new career:

- Works on all IBM-compatible PCs
- Has its own operating system
- Runs comprehensive tests, from cache memory to hard drives and multimedia components
- Will run a continuous burn-in test without any monitoring
- Can report on PCI and PCMCIA architecture
- Identifies system information, including SCSI drives
- Produces extensive reports to share with your clients

"We designed The Troubleshooter with the intention of getting 100% accurate test results every time. It enables the user to walk into virtually any situation and pinpoint the exact source of any PC problem in minutes. It doesn't make sense to use DOS-based diagnostics that are prone to inaccurate results," says Mike Kaplan, President of ForeFront Direct. Indeed, this comprehensive diagnostic package will do the detective work for you, then advise you how to take it from there!

Used in  
top-quality  
service labs  
worldwide!



## NRI's Exclusive Training Bonus: A+ Certification Test Prep

With coveted A+ Certification, your value as a computer service technician soars! That's why NRI now provides you with supplemental lessons covering the additional subjects you'll need to take the A+ exam with confidence. Best of all, NRI goes one step further to prepare you for the unique challenges of computer-based testing by including our exclusive CD-ROM tutorial.

To help you gain A+ Certification, the hallmark of a computer service pro, NRI's innovative CD-ROM gives you study tips, test-taking strategies, sample questions, correct answers with explanations, and much more.

The following bonus lessons



complement the training you've received up to now, rounding out your knowledge with the additional subjects you'll encounter on the A+ exam:

Windows 3.1: An Introduction  
Windows 3.1: Using the Program Manager

Windows 3.1: Applications and Accessories

Introduction to MS-DOS  
MS-DOS Internal Commands  
MS-DOS External Commands  
MS-DOS Batch Files  
Introduction to LANs  
Data Communications  
LAN Hardware  
Typical LAN Systems  
LAN Software  
Advanced Networking Technologies

## An Alternative... NRI's Professional Course in PC Servicing

NRI also offers a specialized Professional Course in PC Servicing, designed for people who have a solid background in electronics and who want to get into the exciting field of computer troubleshooting and repair without delay.

It's also perfect for those individuals who already work in the field of computers and electronics but feel that they need to expand or update their knowledge. If this is your situation, be sure to check with your employer to see if you can benefit from a tuition assistance program or tax deduction.

### Accelerated course for experienced technicians

We created this special course by eliminating from our complete course the training and materials that cover basic electronics theory.

The Professional Course features all computer-related lessons and hands-on projects, including the Pentium® II 300 MHz computer and all its accessories. You'll learn how to get the most out of your computer, practice using Windows 98, master professional troubleshooting techniques using ForeFront diagnostics, and prepare for coveted A+ Certification.

The following instructional materials, described on the previous pages, are featured in NRI's Professional Course:

PC Peripheral Devices  
PC Storage Devices  
PC Networks and Communications  
Introduction to PC Software  
PC Applications Software  
Advanced PC Applications  
Legal and Personal Concerns With PCs  
Business Applications for Computers  
Introduction to Computer Programming  
Microprocessors  
Microcomputers  
Understanding Disk Drives  
Recovering Lost Data  
Expanding and Upgrading Your Microcomputer  
Installing and Testing Peripheral Devices  
Identifying and Solving RAM Problems  
Locating and Eliminating Hardware Interactions  
TSR (Terminate and Stay Resident) Programs  
Protecting Your Data From Viruses  
Typical Troubleshooting Techniques  
Servicing Disk Drives  
Servicing Video Terminals/Monitors  
Servicing Impact and Inkjet Printers  
Servicing Laser Printers  
Servicing Keyboards, Mice, Track Balls, and Modems  
Introduction to Windows and DOS  
Navigating Windows 98  
Running Programs With Windows 98  
Personalizing Windows 98  
Working With Files in Windows 98  
Using the Windows 98 Accessories  
Communications in Windows 98  
Managing Your System in Windows 98  
Using a PC for Communications  
Internet Basics  
Navigating the Internet I  
Navigating the Internet II  
Bonus Lessons for A+ Certification (13 in all)  
**PLUS HANDS-ON PROJECTS:**  
The 8085 Microprocessor  
Exploring and Testing Your Pentium® II Computer  
Using Windows 98  
Using the Internet Server  
Using Netscape and Navigating the World Wide Web  
Using The Troubleshooter™  
A+ Certification Test Prep on CD-ROM

# Video/Audio Servicing

**NOW!**  
Even better  
equipment!

**A**s innovations sweep the home entertainment industry, NRI jumps in to give you two choices for complete training in video and audio servicing...choices that lead to exciting, profitable career opportunities you won't want to pass up!

These comprehensive courses prepare you for tomorrow with hands-on training in either VCR systems only *or* TV, VCR, *and* audio systems — depending on your special interest.

In each course, you get high-quality equipment

along with skill-building lessons that cover every aspect of home entertainment electronics. Find out more in the following pages. ►



# Choose From Two Comprehensive Courses in Video/Audio Servicing And Get The Skills You Need To Build An Exciting Career In Home Entertainment Electronics

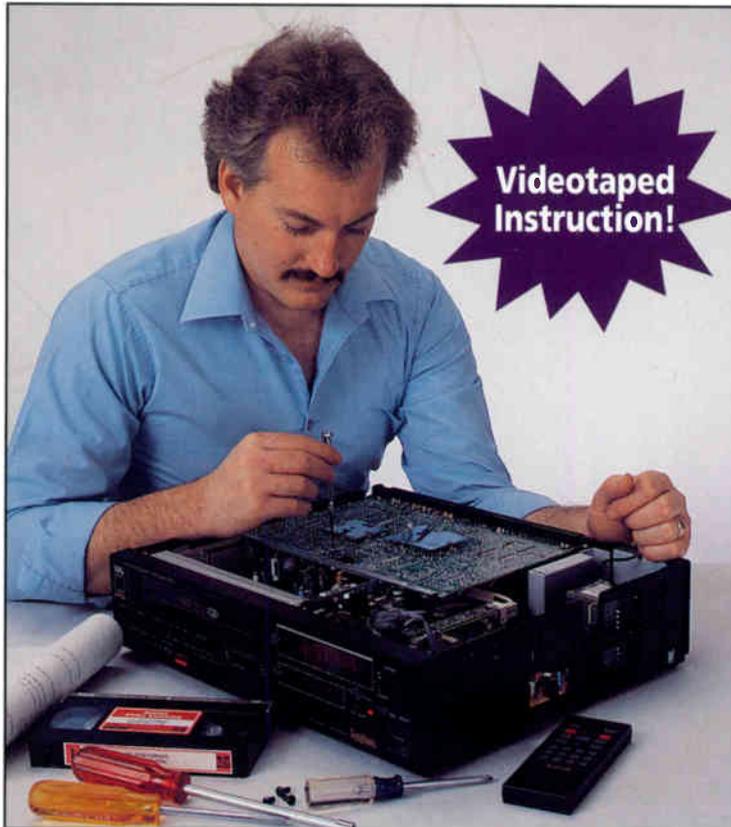
Only NRI gives you two choices of home training in Video/Audio Servicing, yet covers the field so thoroughly in both courses. Choose NRI's Video/Audio Servicing course with hands-on TV, VCR, and Audio System training ... or NRI's Video/Audio Servicing course with hands-on VCR training alone.

Regardless of which course you select, you get complete master lessons covering the entire TV, VCR, and audio spectrum. The only difference in the courses is the specialized hands-on training. No matter which way you go, your training prepares you completely for today's explosive acceleration of new product innovations in home entertainment electronics.

## There's never been a better time to get involved in home entertainment electronics

High-definition TV systems ... flat screen TVs ... palm-sized camcorders that rival film in terms of picture quality, sound, and home editing capabilities ... compact disc and digital audio systems that capture sound with clarity and purity unimaginable just a few short years ago.

These are just some of the technologies sweeping the home entertainment electronics world, creating extraordinary new opportunities for the person who's trained to service and repair today's full range of TV, video, and audio equipment.



## Qualify for the good jobs — even start a business — of your own

This new explosion in consumer electronics means qualified technicians will command excellent wages. According to the U.S. Department of Labor, the average salary for entertainment electronics technicians is over \$30,000, with experienced technicians making \$40,000 and more! Because of the growing number of TVs, VCRs, and other home entertainment products in use — and in spite of improvements in their reliability — opportunities are expected to continue to be good through the year 2006.

What's more, about 15% of the people now working in the field are self-employed with their own full- or part-time businesses. This is a greater

proportion than in most skilled trades and shows that video/audio electronics is an excellent choice if you want to be your own boss.

## Now! NRI gives you the most complete training in video/audio servicing ever offered

Now, more than ever, NRI training prepares you for success as a video/audio servicing technician. You start with lessons that give you a strong foundation in electronics fundamentals. Then you build on that foundation as you master the high technology of digital controls, CDs and digital audio tape

players, state-of-the-art TV systems, cable TV, VCRs, and camcorders.

Best of all, as you work with the state-of-the-art equipment included in your training, you get real-world, hands-on experience with the types of equipment you'll be called on to service and repair.

Choose hands-on TV, VCR, and Audio System training and gain practical experience as you work with a 20" color stereo TV, programmable VCR, and integrated remote control audio system. Choose hands-on VCR training and get inside a high-quality, programmable VHS stereo VCR.

Whichever course you choose, NRI prepares you thoroughly for success in today's explosive-growth video/audio servicing field.

# Here's The High-Quality Equipment Included In Each Course!

## OPTION 1

### Video/Audio Servicing with hands-on TV, VCR, and Audio System training

In this exciting master course, you receive step-by-step lessons and hands-on projects that prepare you to handle virtually any servicing need for TVs, VCRs, and audio systems. And unlike other schools, you get your own top-notch equipment to train with and keep!

Your 20" color TV incorporates high-tech features such as wireless remote control, one-gun in-line picture tube, electronic tuning, front-panel and rear-panel audio/video inputs, and surface acoustic wave (SAW) filter. Your 111-channel, cable-ready VCR has a 14-day, 4-event timer, electronic tracking, auto rewind, and much more.

Plus, you receive an integrated audio system with unified AV remote control, 50+1 CD jukebox, 32-track APMS (Automatic Programmable

Music Selector), APSS (Auto Program Search System), random and repeat CD playback, dual cassette player, high-speed dubbing, AM/FM digital synthesized tuner with 40 station presets, 3-position preprogrammed equalizer, 50-watt amplifier, 3-way speaker system with detachable grille, and electronic volume control.

Using your NRI Discovery Lab, digital multimeter, and the know-how



you gain from your lesson texts and instructional videos, you get inside the state-of-the-art equipment everyone wants!

## OPTION 2

### Video/Audio Servicing with hands-on VCR training

This master course prepares you to enter the video/audio servicing field with a specialization in VCRs. You receive an exemplary VHS HQ stereo VCR to help you master this lucrative trade!

Your VCR boasts many outstanding features that will help you learn how to service even the most sophisticated VCR equipment. Some of these features include:

- ◆ VHS HQ stereo for unsurpassed sound quality
- ◆ MTS (multichannel TV sound) tuner for receiving stereo, bilingual, and SAP (second audio program) broadcasts
- ◆ Twin video heads for undistorted recording and playback quality
- ◆ PLL quartz frequency synthesizer for random and direct access tuning
- ◆ 139 channel cable readiness

- ◆ 3-mode tape speed that allows up to 8 hours of taping on T-160 videotape

- ◆ Advanced random access wireless remote

control with 21-key/15 function format for clear, stable freeze-frames and special effects

- ◆ 14-day/4-event program timer for 4 daily or 4-weekly program selections
- ◆ Automatic power on/off system plus automatic rewind system
- ◆ One-touch recording

As you explore and observe the function of the main parts of your VCR, you learn to quickly isolate problem areas when performing VCR servicing. Plus you get the opportunity to run tests using your NRI Discovery Lab and digital multimeter.

And before picking up this first-hand experience with VCR systems, your lessons and instructional videos give you a broad-based knowledge of TVs, audio systems, camcorders, and other high-tech equipment...so your career possibilities are unlimited!



# Both Courses Cover the Full Video/Audio Spectrum

No matter which NRI Video/Audio Servicing course you choose, your training begins with an exploration of basic electronics theory. The following expertly written lessons and hands-on projects are described on pages 8 through 10 of this catalog.

## Basic Electronics

- Introduction to Electronics
- Voltage, Current, and Resistance
- Series Circuits
- Parallel Circuits
- Power Sources
- How Resistors Are Used

## Intermediate Electronics

- How Coils Are Used
- How Capacitors Are Used
- How Coils and Capacitors Are Used Together
- Semiconductors
- How Transistors Work
- How Transistors Are Used
- Basic Electronics Experiments

## Analog Electronics

- Integrated Circuits
- Power Supplies for Electronic Equipment
- How Amplifiers Work
- How Oscillators Work
- Analog Electronics Experiments

## Digital Electronics

- Logical Operations and Functions
- Logic Families
- Combinational Logic
- Flip-Flops and Clock Generators
- Counters, Registers, and Sequential Logic
- Digital Electronics Experiments

In addition to NRI's step-by-step lessons and hands-on projects, you'll now receive interactive computer-aided electronics troubleshooting diskettes relating to four key areas: DC electronics, AC electronics, semiconductors, and electronic circuits.

Here's your chance to simulate real-world troubleshooting situations on any IBM-compatible PC. Although not required for graduation from your Video/Audio Servicing course, these innovative training tools are an enhancement that will prepare you well for the electronics troubleshooting situations you're likely to encounter on the job.

## Construct Actual Circuits, Perform Essential Tests and Measurements with the NRI Discovery Lab and Your Hand-Held Digital Multimeter

### Build a Complete Breadboarding System

As you work through your electronics lessons and projects, you'll create NRI's Discovery Lab, an exclusive breadboarding system you can use to set up and modify prototype circuits, perform tests, and evaluate electronic components. Everything from transistor operation to integrated circuit technology is easier to understand when you work with this unique lab!



### Your Digital Multimeter Will Be Your Most Trusted Tool

Using NRI's Action Audio Cassette and specially coordinated diagrams, you're "talked through" the operation and practical application of your 3-1/2-digit, hand-held multimeter — an indispensable tool for the electronics technician. As you practice working with your new DMM, you'll learn the professional way to measure power supply voltages and verify the performance of many circuits.

eter — an indispensable tool for the electronics technician. As you practice working with your new DMM, you'll learn the professional way to measure power supply voltages and verify the performance of many circuits.

## Audio System Servicing

*It's time to concentrate on the tried-and-true techniques needed to troubleshoot, service, and repair today's audio systems. You explore how sounds are created, stored, reproduced, and received. Once you've completed this training module, you'll already have the skills you need to start earning part-time income!*

### Modulation and Demodulation

First you investigate the fundamentals of amplitude modulation (AM) and frequency modulation (FM), learning about the detectors for both, including diode detectors, discriminators, and radio detectors.

**AM-FM Receivers** Here you concentrate on the superheterodyne AM receiver. You then go on to examine FM receivers before studying typical FM circuits including AFC and stereo multiplex.

**Electronic Troubleshooting** Step-by-step outlines and diagrams take you through the basic principles of troubleshooting and maintaining both digital and analog equipment. You learn here how to use popular troubleshooting tools and equipment with confidence and ease.

**Audio Amplifiers** Here you learn about integrated circuit audio amplifiers. You cover tone control, equalizer circuits, and power amplifier operation and specifications. Finally, you study common

amplifier troubleshooting and servicing procedures, including tests and measurements of frequency response, distortion, and power output.

**Audio System Equipment** You now survey the equipment that makes up today's complete audio systems, including receivers and amplifiers, cassette players, acoustics and speakers, even accessories such as remote controls and antennas. General testing and troubleshooting procedures are also presented here.

### Compact Disc Players/Digital Audio

Here you learn about today's popular CD players, how they work, and the techniques used to store and reproduce audio sound information on compact disc. You study the optional pickup, motor, servos, and circuits used in typical CD players, going on to learn CD troubleshooting and repair techniques. You finish with an introduction to digital audio tape (DAT) systems.

## Color Television Servicing

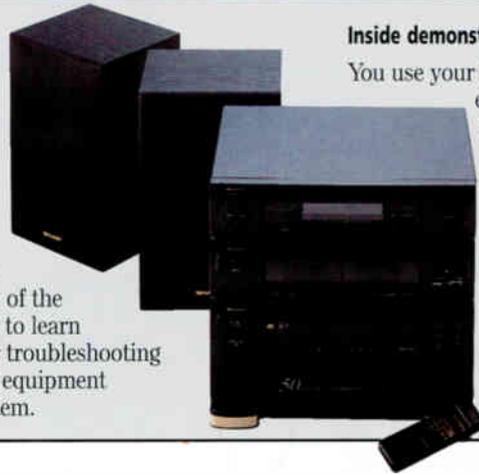
*Here, moving beyond general concepts, you master the principles that control TV signal transmission, processing, and reception. You even get a first-hand look at the complex circuitry behind projection TVs, stereo TVs, and cable TV systems.*

**TV Signals and Circuits** Now you learn the basic principles of television, from camera to home receiver. You study television signal characteristics and FCC

**HANDS-ON PROJECT (OPTION ONE ONLY)**

**Getting To Know Your New Audio System**

You now receive your integrated audio system featuring remote control, 50+1 CD jukebox, dual cassette deck, AM-FM tuner, 50-watt amplifier, and 3-way speaker system. You study the operation and features of each of the units of your system, going on to learn procedures and techniques for troubleshooting and servicing the full range of equipment represented in your audio system.



**Inside demonstrations of circuits and components**

You use your DMM and oscilloscope (optional) to analyze and evaluate the components and circuits of your stereo system. You learn how to take typical measurements needed to help isolate problems, and you learn to make appropriate adjustments.

Once you've completed all of the demonstrations, experiments, tests, and measurements featured in this project, you'll have a thorough, professional understanding of how today's audio equipment works. And, of course, you'll have a state-of-the-art stereo audio system that will give you years of superb performance.

standards for transmission of TV signals. You then trace both sound and picture signals through a TV, investigating each stage in detail as you learn about signal reception, amplification, and conversion.

**Electronic Tuning** You're introduced here to conventional TV channel tuning techniques with LC circuits, varactor diodes, and automatic frequency control. You then examine principles of frequency synthesis, including phase-locked-loop and heterodyne circuits. You go on to study remote control channel selection. Finally, you learn techniques for troubleshooting and servicing electronic tuning systems.

**Video/Audio Signal Processing** Now you examine the i-f, video, and audio processing circuits found in today's TVs. You examine typical circuits as well as frequency-selective circuits such as LC and SAW circuits. After studying popular types of video and audio demodulators, you learn general servicing and alignment procedures using a typical set configuration as a guide.

**Color Signal Processing** Now you explore the circuits used for recovering color information from the TV signal. You study the essential color signal manipulation processes as well as the fundamentals of color signal multiplexing. You go on to examine special color processing ICs, then wrap up by learning fault diagnosis and repair procedures.

**Deflection and Synchronization Circuits** Here you thoroughly explore the circuits used to generate the picture tube vertical and horizontal sweep signals and sync pulses that control them. You cover typical horizontal and vertical sweep oscillators, the sync separator, sync signal processing and convergence circuits, and common integrated circuits.

**How Picture Tubes Work** You begin with a study of basic raster scanning and vision principles. You learn about the

concept of "persistence of vision" in the context of the basic NTSC TV signal. You then study the evolution from vacuum tubes to cathode ray tubes, black-and-white CRTs, and color picture tubes. Finally, you examine picture tube replacement and readjustment procedures, including convergence and degaussing.

**TV Power Supplies and Remote Controls**

Now you expand your understanding of power supply principles by examining regulation and high-voltage (HV) supplies, as well as power supply circuits unique to TVs. Other topics covered here include hand-held remote controls, infrared principles, and digital coding techniques. You even learn troubleshooting and servicing procedures for both power supplies and remote controls.

**Stereo TV** Here you learn how stereo sound is produced and recreated. You examine all of the circuits and special techniques used in today's stereo TV sets, and you learn how to troubleshoot typical stereo sound problems.

**Projection TV** Now you explore the operation and characteristics of both front-projection and rear-projection TVs. You go on to study setup, adjustment, and servicing procedures for both types of projection TV systems.

**Digital TV and HDTV** Digital techniques and circuits are revolutionizing television. Here you examine various enhanced-definition and high-definition systems designed to improve picture quality.

**Cable Television** You wrap up your study of color TV servicing by reviewing the different types of cable TV systems in

**HANDS-ON PROJECT (OPTION ONE ONLY)**

**Color TV Servicing**

Now you begin working with your 20" portable color TV, which incorporates such state-of-the-art features as wireless remote control, one-gun in-line picture tube, electronic tuning, and surface

acoustic wave (SAW) filter. This lightweight, easy-to-operate color TV receiver is ideal for learning practical troubleshooting techniques.



**See circuits and components at work**

You use your DMM and oscilloscope (optional) to analyze and evaluate the circuits and components of your color TV. You go on to experiment with the variety of circuits used to process the signals needed to produce a TV picture. With your TV on, you perform additional experiments that demonstrate the operation of live circuits.

Working with your NRI training manual, the manufacturer's service manual, and NRI's exclusive TV servicing videotape, you master the circuitry found in today's TVs, learn professional bench techniques, and get the hands-on confidence to service all types of color receivers.

use today. You learn about cable distribution systems and the equipment used to amplify and condition signals as they pass through cable to home subscribers.

## Video Recording Systems

*This final training module gives you the opportunity to explore today's sought-after video equipment. As you uncover the secrets to keeping VCRs and camcorders working at peak performance, you round out your skills as a complete TV/video/audio service technician.*

**Video Cassette Recorders** You begin by learning basic principles of magnetic tape recording. Then, using a detailed block diagram as a guide, you thoroughly examine each section of a typical VCR. You go on to analyze the VCR's tuner and video processing circuits before learning basic VCR troubleshooting techniques.

**VCR Control Systems** Now, through block diagram analysis and detailed descriptions, you focus on the various servo and control circuits that make up a large part of VCR circuitry. You go on to learn procedures for hooking up VCRs to external equipment.

**Repairing VCRs** Here, you take a comprehensive look at VCR troubleshooting procedures. You learn recommended techniques for testing, measuring, and adjusting VCR components. Soon, you'll be ready to handle virtually any VCR

repair you're likely to encounter in your servicing work.

**Camcorders** After reviewing video magnetic recording principles, you examine the most common video recording formats. Then you analyze the components and circuits of a popular camcorder unit. Finishing up, you explore common problems, fault diagnosis procedures, and preferred servicing techniques.

### Test Equipment

Rounding out your training, you learn the importance of using good test instruments, then survey the operation and applications of typical test equipment, including multimeters and oscilloscopes, signal generators, signal tracers, and specialized equipment.



### Special Notice: Optional oscilloscope experiments

While an oscilloscope is not necessary to complete the hands-on training in either of NRI's Video/Audio Servicing courses, we have included optional experiments that can assist you in analyzing video/audio circuits. We do not furnish an oscilloscope with your course, since many students already own or have access to one, while others prefer to acquire a specific model on their own. If you do not already own or have access to an oscilloscope and you'd like to perform the optional experiments, a quality 25 MHz scope is available for purchase through the NRI Bookstore.

## Exclusive Videotaped Instruction

Whichever Video/Audio Servicing course you choose, you receive two special NRI Action Videos covering TV and VCR servicing fundamentals. These video lessons bring to life the principles you've been studying and ensure your mastery of servicing techniques.



Using your VCR, companion workbooks, and study guides, you get superb one-on-one instruction covering the theory, operation, and servicing of TVs and VCRs. Live-action demonstrations — including graphic closeups of test equipment in action — add immeasurably to your understanding of typical troubleshooting and servicing procedures.

Using your VCR, companion

### HANDS-ON PROJECT

#### Video Cassette Recorder Servicing

##### OPTION ONE ONLY

You now receive a quality VHS VCR, featuring 111-channel, cable-ready, frequency-synthesized tuner; electronic tracking; three recording speeds (SP, LP, EP); infrared remote control; and 14-day, 4-event timer recording.



Through hands-on demonstrations and experiments, you develop a first-hand understanding of the operation, maintenance, and servicing of today's commercial VCR equipment. By the time you complete this project, you'll have the practical skills you need to service VCRs with confidence.

##### OPTION TWO ONLY

If you choose Option Two (Hands-On VCR Training), you receive your VHS HQ VCR here. Featuring VHS HQ stereo for unsurpassed sound quality, an MTS (multichannel TV sound) tuner for receiving stereo, bilingual, and SAP (second audio program) broadcasts, 139-channel cable readiness, one-touch recording, 14-day, 4-event program timer, and much more, this VCR represents the state-of-the-art in video recording.

In this fascinating project, you discover how recording speeds affect

picture quality, analyze the circuits used to avoid crosstalk interference between adjacently recorded video paths, explore the function of the electronic tuner, learn how to service VCR tape transport systems, and much more. In addition to your

NRI training manual and the manufacturer's literature, you also work with a complete troubleshooting guide you'll refer to again and again once you begin servicing VCRs professionally.



# Telecommunications Technology

NEW!  
266 MHz PC  
With  
MMX™  
Technology!

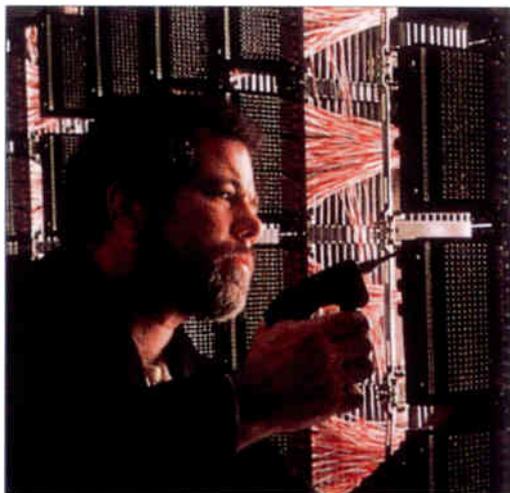
**W**atch the evening news and you'll probably discover there's been another breakthrough in telecommunications technology. Now NRI training makes it possible, even *easy*, for you to start a career in this wide-open field.

This up-to-the-minute course includes a top-notch computer and the accessories you'll need to assemble your own telecommunications system! Once you do, you'll learn how to gain access to a world of people and information at the touch of a button.

Read the following pages if you believe that a career maintaining, troubleshooting, and servicing today's telecommunications systems is the career for you. ▶



# Master The Telecommunications Systems At The Heart Of Today's Worldwide Information Explosion



## New technologies open new doors for you

The breakup of American Telephone & Telegraph (AT&T) marked the beginning of a dramatic new era — a time of growth and opportunity. No longer subject to monopoly rule, scores of companies are competing for a place in today's rapidly expanding telecommunications market. Today, when you think "telecommunications," you must also think of ITT, GTE, MCI, US Sprint, Comsat, the independent Bell companies, and many others. And new players join the game every day. Market researchers are confident that the age of electronic

superhighways and high-tech interactive services is just beginning. Internet, portable fax machines, and video phones are all examples of what's in store for us in the next century.

This rapid expansion has produced an undeniable need for people to help troubleshoot and service the sophisticated telecommunications systems igniting today's information explosion. That's why NRI training is so right for the times. With in-demand servicing skills and respected credentials, you can earn an annual salary of \$25,000, \$30,000, \$35,000 — and more!

## Prepare for a money-making new future

NRI is ready to help you get a fast start as today's telecommunications technician with hands-on training built around a powerful AMD K6/266 MHz computer and 56K baud fax/modem — yours to train with and keep. Indeed, you get everything you need to assemble your own telecommunications system!

Your easy-to-follow lessons take you one step at a time from fundamental electronics theory to advanced telecommunications applications. From the ins and outs of electronic telephones to the inner workings of centrex systems and PBX products...from satellite, microwave, and cellular technologies to analog and digital switching systems...from the widespread digital applications of today's local area networks (LANs) to the voice, video, and data services of tomorrow's integrated services digital networks (ISDNs) — you cover the whole range of telecommunications technology in one complete course.

*Before you begin exploring sophisticated telecommunications concepts, you need the background provided by these valuable lessons and projects, all described in detail on pages 8 through 10 of this catalog.*

### Introduction to Computers:

- Introduction to PCs
- PC Peripheral Devices
- PC Storage Devices
- PC Networks and Communications
- Introduction to PC Software
- PC Applications Software
- Advanced PC Applications
- Legal and Personal Concerns With PCs
- Business Applications for Computers

### Basic Electronics

- Introduction to Electronics
- Voltage, Current, and Resistance
- Series Circuits
- Parallel Circuits
- Power Sources
- How Resistors Are Used

### Intermediate Electronics

- How Coils Are Used
- How Capacitors Are Used
- How Coils and Capacitors Are Used Together
- Semiconductors
- How Transistors Work
- How Transistors Are Used
- Basic Electronics Experiments*

### Analog Electronics

- Integrated Circuits
- Power Supplies for Electronic Equipment
- How Amplifiers Work
- How Oscillators Work
- Analog Electronics Experiments*

### Digital Electronics

- Logical Operations and Functions
- Logic Families
- Combinational Logic
- Flip-Flops and Clock Generators
- Counters, Registers, and Sequential Logic
- Digital Electronics Experiments*

Years ago we relied on smoke signals or a pony express to communicate over a distance. But with the invention of electricity, long-distance communication began to take on a new shape. The telegraph — a revolutionary device that created and transmitted signals by the simple opening and closing of an electrical circuit — opened vast new territory and became the standard until radio and telephone technology stretched communications capabilities beyond man's wildest dreams.

## The world becomes "global village"

Today, telecommunications is the term used to describe all of the methods, media, and technologies that allow people — and machines — to communicate across town and around the world. Telecommunications technology is creating a virtual "global village," shattering age-old barriers among nations, economies, and cultures. It has established an integrated worldwide financial community, enabled the exploration of new markets, and promoted innovative concepts in learning and information acquisition.

Via microwave, satellite, land lines, or fiber optic transmission networks, data flashes from one person to another, from one computer terminal to another. New technologies like facsimile, voice messaging, teleconferencing, electronic mail, and global digital private lines make it possible for voice, video, and data messages to travel anywhere, instantly. Today, for example, you can "dial up" a face-to-face video conference between New York and Los Angeles almost as simply as you would make an ordinary telephone call!

# Lessons And Hands-On Projects Give You The Skills You Need For A Profitable Telecommunications Career

Master electronic circuitry and test and measurement procedures as you work with The NRI Discovery Lab and this quality multimeter



As you work through your NRI electronics modules, you'll create NRI's Discovery Lab, an exclusive breadboarding system for setting up and modifying prototype circuits, performing tests, and evaluating electronic components.

Your NRI training also features a hand-held digital multimeter, the indispensable tool for your new career. Using NRI's Action Audio cassette and specially coordinated diagrams, you're "talked through" the operation and practical applications of this quality meter.

## The Telephone Communications System

*You begin your concentration on telecommunications with this exploration of telephones — how different types of phones work and how they will evolve in the years to come.*

National Telephone Networks  
Telephones, Teleequipment, and Systems  
Cellular Telephone Base Stations  
Telephone Installation: Business Equipment  
Telephone System Troubleshooting and Repair  
Analog and Digital Switching Systems  
Voice and Data PBX Applications  
Electronic Telephones and PBX Products  
T-1 Networks  
Integrated Services Digital Networks (ISDN)

## Microwave and Satellite Communications

*Now you move on to study today's cutting-edge telecommunications equipment. A thorough understanding of today's microwave and satellite devices will position you well for tomorrow's opportunities.*

Microwave Relay Systems  
Introduction to Satellite Communications  
Spacecraft Systems  
Modulation and Multiplexing  
Satellite Antennas  
Earth Stations  
Satellite Applications  
Consumer Satellite Services

## Introduction to Windows 98

*This first in a series of two modules shows you all that Windows 98 can do to help you get your work done quickly and smoothly.*

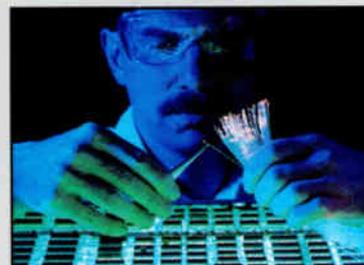
Introduction to Windows and DOS  
Navigating Windows 98  
Running Programs With Windows 98  
Personalizing Windows 98

**Your computer is shipped here!**

## Working With Windows 98

*This module introduces Windows 98's most talked-about features while giving you the opportunity to use Windows 98 on your new computer system.*

### HANDS-ON PROJECT



### UARTs and Fiber Optics

Now you get first-hand experience with the circuitry used in data communications equipment. By constructing a Universal Asynchronous Receiver/Transmitter (UART), you see how "transmit" data is converted from a parallel format into a serial bit-stream and how "receive" data is converted from serial to parallel form for use in microcomputer circuits.

Using an optoisolator, you learn how circuits are electronically isolated from each other. You then build and test an actual optoisolator circuit using an infrared light-emitting diode (IRED) and photo-sensitive transmitter.

With the UART and support circuitry you breadboarded earlier, you learn how to transmit data from your Discovery Lab to an LED display using electrical wires. Finally, you build a fiber optic transmission system using an IRED optical transmitter, fiber optic cable, a phototransistor receiver, and various mounts and couplers.

Working With Files in Windows 98  
Using Windows 98 Accessories  
Communications in Windows 98  
Managing Your System in Windows 98

### HANDS-ON PROJECT

### Using Windows 98

Preinstalled on your computer system is Windows 98, the popular operating system/graphical user interface from Microsoft. Windows 98 offers full integration of the Windows operating system with Internet Explorer 4.0, turning your desktop into an extension of the World Wide Web...built-in support for high-performance peripherals, graphics cards, DVD drives, and more...updated and improved accessories...and much more. In this project, you explore first-hand the major components of this innovative operating system.

## Exploring and Testing Your Multimedia Computer



At this point\* in your course, you receive the centerpiece of your NRI training: your 266 MHz AMD K6 computer with MMX™ technology. If you wish, you may upgrade your system to tomorrow's technology at special student prices through NRI's PC Options Plan, details of which will be sent to you just before your computer is released for shipment.

- ◆ Reliable AMD K6 processor
- ◆ MMX™ technology
- ◆ Fast 266 MHz clock
- ◆ 16X CD-ROM drive
- ◆ 64 meg RAM installed
- ◆ Windows 98
- ◆ 5 gigabyte hard drive
- ◆ 56K baud fax/modem
- ◆ 256K external cache memory
- ◆ 16-bit sound card and speakers
- ◆ Math coprocessor
- ◆ Super VGA color monitor with tilt-swivel base
- ◆ PCI Super VGA video with 1 meg RAM, MPEG capable
- ◆ PCI bus
- ◆ 104-key enhanced keyboard
- ◆ Mouse and mouse pad
- ◆ Netscape Navigator™ Web browser (shipped separately)

\* Your computer system is shipped after you have completed at least 50% of the module, "Introduction to Windows 98," as well as all previous required assignments, and as long as you have met your financial requirements. NRI reserves the right to substitute equipment of equal or greater value.

## PC Communications and the Internet

This module takes you from the fundamentals of PC communications to the intricacies of the World Wide Web. Best of all, you get first-hand experience browsing, searching, and downloading Internet files.

Using a PC for Communications  
Internet Basics  
Navigating the Internet I  
Navigating the Internet II

## Data Communications

With the know-how you acquire in this module, you'll have what it takes to recommend, install, and maintain complete data communications systems.

Concepts of Data Communications  
Transmission Media  
Protocols  
Interface Standards  
Data Communications for Microcomputers  
Local Area Networks  
Modems and Multiplexers  
Terminals and Communications Processors  
Value-Added Networks  
Data Communications Monitoring and Test Equipment

### HANDS-ON PROJECTS

#### Using the Internet Server

In this hands-on project, you demonstrate your ability to use your modem and communications software to access the Internet — with NRI's own Internet server as your first stop.

#### Using Netscape and Navigating the World Wide Web

In this additional project, you use Netscape Navigator™, your Web browser, to contact NRI in a variety of ways. You start by logging on to the Internet and using search tools to find several resources. You then download a file from the NRI server and, finally, demonstrate your understanding of FTP.

### HANDS-ON PROJECTS

#### Microcomputer Serial Communications

Here you begin to assemble your telecommunications system, exploring the interface components that will allow you to convert and send data from your terminal to another.

You begin by exploring the RS-232C interface built into the motherboard of your computer. Then you program your RS-232C interface to change baud rate, data-word length, number of stop bits per character, and parity.

You also learn how to operate and control the I/O ports and the status registers. You discover the difference between status instructions and control instructions, then check out the communications software you'll use in the next project.

#### Using Your Modem and Communications Software

This project prepares you to go online with your NRI instructor, classmates, and remote computer systems the world over.

Using your 56K baud internal modem and communications software, you command your computer to automatically dial and answer the telephone. Then you learn how to monitor the phone lines as your commands are executed.

As you build your knowledge of your modem's capabilities, you learn to access the Internet, private networks such as America Online, business and financial services, professional and educational databases, and much more.

**NEW!**  
**56,000**  
**BAUD!**

### An Alternative... NRI's Professional Course in Telecommunications Technology

NRI's Professional Course in Telecommunications Technology is for you if you already have a solid background in basic electronics. If you're uncertain about your understanding of the basics, or if your knowledge was acquired more than 10 years ago, the full Telecommunications Technology course may better suit your needs.

#### 266 MMX™ computer with 56,000 baud modem included

Only the NRI Discovery Lab, digital multimeter, and electronics modules mentioned on pages 22 and 23 have been eliminated from the Professional Course. You still get all of the specialized lessons in telecommunications theory and all of the equipment necessary to reinforce this theory with practical experience.

#### Breadboarding lab required

If you do not own or have access to a lab, you will have the opportunity to purchase the NRI Discovery Lab separately.

# Electronic Music Technology

NEW!  
266 MMX™ PC  
and Cakewalk™  
Home Studio  
Software!



**T**oday's digital technology is often applied in artistic ways! If you're curious about electronics *and* you enjoy music, turn your hobbies into profits — train now for a career using, selling, maintaining, or servicing today's electronic musical instruments. NRI can show you how! This one-of-a-kind course helps you take

advantage of the booming music industry by giving you hands-on training with a full-featured computer system and the peripherals you need to build your own electronic music studio, including a Pentium®-class AMD K6/266 MHz computer and Kawai synthesizer. For more details, check out the following pages. ▶

# Follow The Latest Innovations In Electronic Music Technology

This year alone, more than \$3 billion will be spent on electronic music instruments — including keyboards, synthesizers, drum machines, and related equipment. And experts predict that this booming industry will continue to grow.

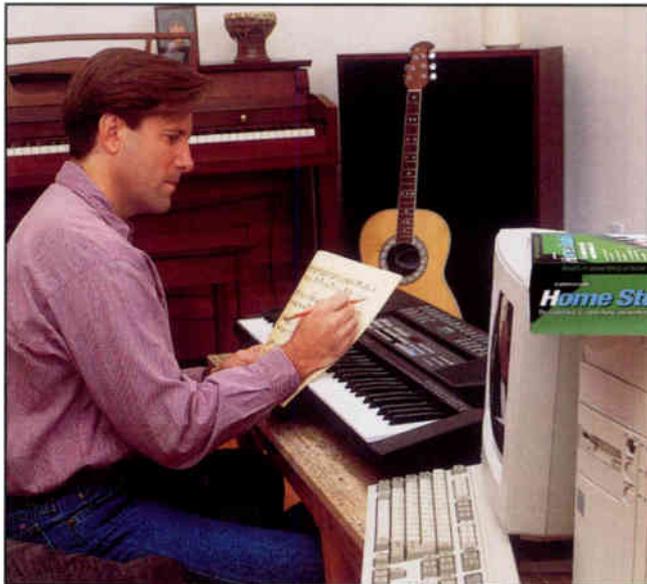
Two breakthrough developments are responsible for this phenomenal interest in electronic music — the digitalization of today's new musical instruments and the universal acceptance of MIDI (Musical Instrument Digital Interface), an industry standard that allows the hookup of synthesizers, drum machines, and other instruments not only to each other, but also to a sequencer or even a personal computer. Suddenly MIDI has made it possible for anyone to create their own computer-controlled music center.

Today, consumers everywhere — even thousands of people who have never touched a musical instrument before — are discovering the astonishing challenge and creative freedom made possible by modern advances in electronic music equipment.

And booming sales mean an increasing need for people trained to install, maintain, and service the expanding range of electronic instruments and related equipment available and currently in use.

## Now you can be part of the excitement — even if you have no experience in electronics or music

Step by step, NRI gives you all the fundamental electronics skills essential for technicians and musicians alike. Even if you've never tried playing a musical instrument before, NRI gives you enough background in basic music theory and notation to appreciate the far-reaching applications of today's exciting new music equipment.



From there, you move on to analyze sound generation techniques, digital logic, circuitry fundamentals, as well as sampling and recording techniques...ultimately getting first-hand experience with today's explosive new technology as you explore MIDI, waveshaping, patching, sequencing, mixing, special effects, and more.

Best of all, NRI gives you hands-on training with the equipment that's revolutionizing the music industry — a powerful 266 MMX™ computer with 16X CD-ROM drive and 16-bit sound card, a feature-packed Kawai X55-D synthesizer with General MIDI capabilities, Cakewalk™ Home Studio software, and more — all yours to train with and keep!

## Train for a well-paid, high-demand career

Your NRI training in electronic music technology will open up an exciting new world of opportunities for you.

You may choose to apply your new skills to a career as a studio technician, recording engineer, sound technician, or road technician. Or start your own business both selling today's popular new equipment and providing in-store service on the products you've sold.

If you're already a musician, your NRI training will prepare you to use today's technology to create music in bold new ways — and help you keep your music equipment running at peak performance.

Step-by-step lessons take you from the basics to advanced music generating techniques

### Introduction to Computers

- Introduction to PCs
- PC Peripheral Devices
- PC Storage Devices
- PC Networks and Communications
- Introduction to PC Software
- PC Applications Software
- Advanced PC Applications
- Legal and Personal Concerns With PCs
- Business Applications for Computers
- Introduction to Computer Programming

### Basic Electronics

- Introduction to Electronics
- Voltage, Current, and Resistance
- Series Circuits
- Parallel Circuits
- Power Sources
- How Resistors Are Used

### Intermediate Electronics

- How Coils Are Used
- How Capacitors Are Used
- How Coils and Capacitors Are Used Together

### Semiconductors

- How Transistors Work
- How Transistors Are Used
- Basic Electronics Experiments

### Analog Electronics

- Integrated Circuits
- Power Supplies for Electronic Equipment
- How Amplifiers Work
- How Oscillators Work
- Analog Electronics Experiments

### Digital Electronics

- Logical Operations and Functions
- Logic Families
- Combinational Logic
- Flip-Flops and Clock Generators
- Counters, Registers, and Sequential Logic

### Digital Electronics Experiments

### Generating Sounds Electronically

- Sound Theory
- Generating Audio Waveforms
- Filtering and Waveshaping
- Distortion and Special Effects
- Electronic Instruments
- Sampling & Waveform Duplication
- Musical Theory and Notation
- Electronic Music Circuits

### Introduction to Windows 98

- Introduction to Windows and DOS
- Navigating Windows 98
- Running Programs With Windows 98
- Personalizing Windows 98

### Exploring and Testing Your 226 MMX PC

- Working With Windows 98
- Working With Files in Windows 98
- Using the Windows 98 Accessories
- Communications in Windows 98
- Managing Your System in Windows 98
- Using Windows 98

### PC Communications & the Internet

#### Creating Electronic Music

- Analog Synthesizers
- Digital Synthesizers
- The MIDI Interface and MIDI Standards
- Analog Sequencers
- Digital Sequencers
- Composing With the Computer
- Recording Sound
- Mixers and Multitrack Recording
- Maintaining and Repairing Electronic Instruments
- Using the Sound Card
- Using Cakewalk

### The Keyboard Synthesizer and MIDI Interface

- The Keyboard Synthesizer
- Examining the MIDI Interface

# Only NRI Gives You Thorough Training Designed Around The Latest Digital Electronic Music Equipment

With another in a remarkable series of training firsts, NRI now gives you hands-on experience with the equipment that's changed forever the way the world makes music. Only NRI has the foresight and expertise to conceive and implement such ground-breaking training.

Your work with electronic music technology starts with NRI's comprehensive, straightforward lessons. These educator-acclaimed texts don't miss a beat. Step by step, you acquaint yourself with the fundamentals on which you'll base your new career. But at NRI, we don't stop there. Throughout your course, theory becomes understanding as you reinforce concepts presented in your lessons with practical, real-world experiments.

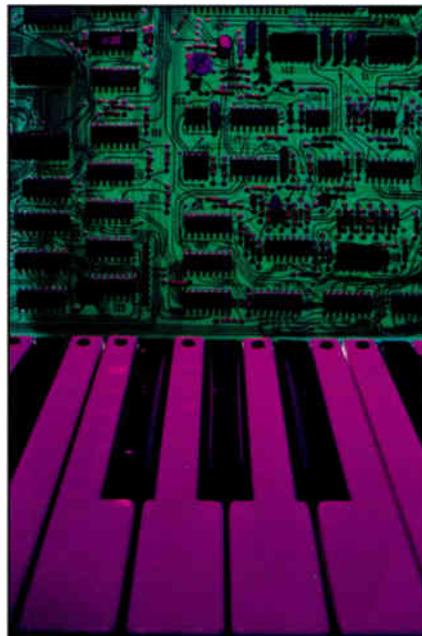
You begin by constructing live electronic and sound-generating circuits, in the process gaining a working familiarity with the components at the heart of today's music technology. You then master the operations of your professional digital multimeter, the tool you'll use to accurately test and measure the live circuits you construct.

## Gain practical, profitable skills as you build the ultimate electronic music studio

Your hands-on experience continues as you explore the operations and applications of the full-featured 266 MMX™ computer included in your course. On this high-end multimedia computer, you'll install SoundSculptor software, then test the built-in MIDI interface and stereo speakers. And, as you work with Cakewalk Home Studio software, you learn to lay sound tracks in creative new ways.

Plus, your course now includes the digital synthesizer of choice, the Kawai X55-D, featuring a five-octave keyboard with built-in monitor speakers, pattern and chord memory, tone and rhythm banks, and much more. Thanks to its cross-brand portability, known as General MIDI, you'll be able to read standard music hassle-free.

No matter what your background — whether you're a musician who wants to get the most from today's electronic instruments, or a nonmusician who is eager to see how technology is applied



creatively to generate contemporary sounds — NRI gives you thorough, practical training designed around today's most innovative technology.

## Here are the real-world tools you train with and keep...

- ◆ A powerful AMD K6/266 MHz computer with MMX™ technology, 64 meg RAM, 5 gigabyte hard drive, 16X CD-ROM drive, 56K baud fax/modem, 16-bit sound card installed, built-in MIDI interface, SuperVGA color monitor, Windows 98, Netscape Navigator, and more. Plus, you can now move up to an even more feature-packed system through NRI's PC Options Plan!

- ◆ Kawai X55-D General MIDI synthesizer with touch-sensitive keyboard, digital effects with reverb and chorus built-in, one-finger ad-lib, mixing, and dozens of other progressive features that let you take your creativity to new heights

**NEW!**  
226 MMX™  
computer  
and Kawai  
synthesizer!



- ◆ Your own desktop recording studio — Cakewalk Home Studio software helps you record, mix, edit, and play back multiple MIDI and audio tracks. It's the fastest, easiest way to create music and sound on a PC!

- ◆ SoundSculptor software that visually demonstrates the operation of FM music synthesis
- ◆ 3-1/2-digit, hand-held digital multimeter with "talk-you-through" instruction on audio cassette
- ◆ NRI Discovery Lab for building and testing prototype circuits
- ◆ Computer-aided electronics troubleshooting diskettes that bring theory to life

*Your computer system is shipped after you have completed at least 50% of the module, "Introduction to Windows 98," as well as all previous required assignments, provided that you have met your required financial obligations.*

# A Perfect Matchup For Training And State-Of-The-Art Music Synthesis

**Introducing the control center of your new electronic music studio — your 266 MMX™ computer and professional software**

Experts agree: A powerful computer is what you need to take full advantage of electronic music-related hardware and software. That's why NRI now includes a full-featured AMD K6/266 MHz computer in your course. Complete with MMX™ technology, 64 meg RAM, 5 gigabyte hard drive, 16X CD-ROM drive, 16-bit sound card, 56K baud fax/modem, SuperVGA color monitor, and built-in MIDI interface, your computer will support all of your music applications.

Your Cakewalk Home Studio software sees to it that each element in your digital audio workstation efficiently communicates with the rest. It's been the most popular music software in the U.S. for three years now, and even received the Editor's Choice award from PC Magazine. Why? Perhaps because Home Studio includes MIDI files, mapping, and metronome in addition to automatic features, track looping, and fit improvisation. As always, NRI believes in putting the most sought-after professional tools in your hands.

Thanks to the Sound Blaster Pro II-compatible sound card, you'll be able to hear your own compositions coming through your audio speaker system or headphones. And the SoundSculptor software brings FM music synthesis to life on your color video display.

This amazing equipment, paired with your Kawai synthesizer, allows you to produce sophisticated musical effects right from the start. Imagine: In your own home studio, you'll be able to create original sounds and

achieve the exact effects you want. And the inspiration is never lost — you can save each note and pattern for future reference.

You'll thrive on each new challenge as you experiment with the voice and music audio mixer/amplifier...discover how the computer reads and controls keyboard operation...and analyze how the computer reads data and works as a sequencer.

What's more, your computer can be upgraded to tomorrow's technology at special student prices. That's NRI's PC Options Plan — your state-of-the-art guarantee!



## Specifications for your computer:

- Reliable AMD K6 processor
- Fast 266 MHz clock
- MMX™ technology
- 64 meg RAM
- 5 gigabyte hard drive
- 16X CD-ROM drive and 16-bit sound card
- SuperVGA color monitor with .28mm dot pitch
- 56K baud fax/modem
- Windows 98
- Netscape Navigator (shipped separately)

## Your training includes the critically acclaimed Kawai X55-D digital synthesizer

With extraordinary features both inside and out, your Kawai X55-D digital synthesizer puts your hands-on training at the leading edge of today's electronic music technology.

You can rely on the Kawai name, with its tradition of musical excellence, to give you instant credibility in your new field. It will help you realize your creative potential by producing and saving any sound you can imagine — and many you never thought possible. From organs to movie sound effects, from jazz to salsa — you can master the medium completely, as you practice such techniques as sampling, recording, waveshaping, patching, mixing, and more!

To save you both time and stress, your Kawai's General MIDI capabilities help you load and play

songs without having to convert them to the standard patch numbers. This means all the chords programmed into your keyboard are defined by the industry's regulations — a benefit you won't find with other synthesizers.

The Kawai synthesizer is also the ideal complement to your 266 MMX computer. Through the miracle of MIDI technology, you can connect your synthesizer and other electronic music equipment to your computer and control them all from a single keyboard!

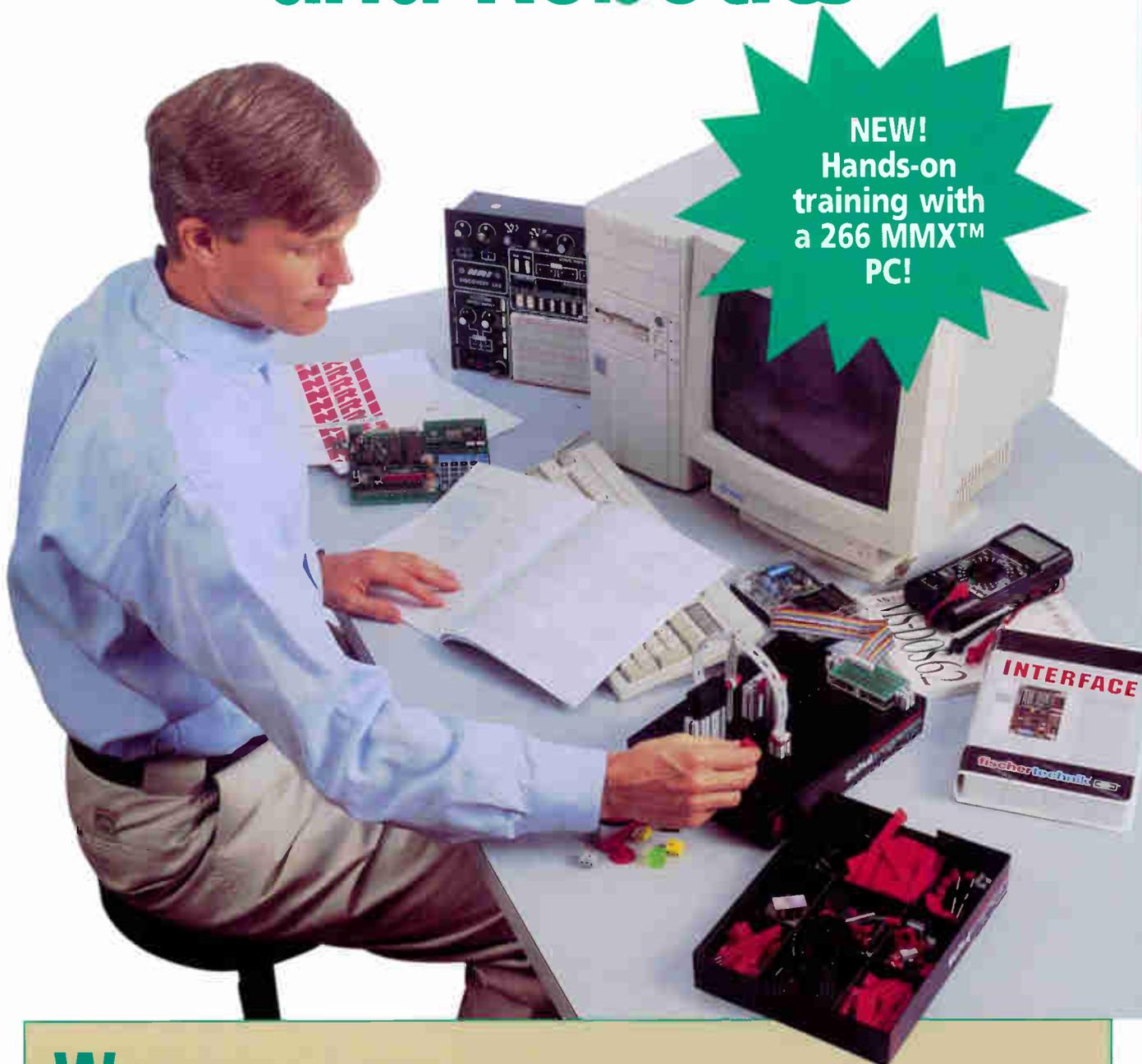
As you work with the X55-D — examining its architecture, testing its many features, and exploring its unlimited creative applications — you'll gain a first-hand understanding of the technology that's revolutionizing the music industry.



## Specifications for your Kawai X55-D synthesizer:

- Keyboard: 61 keys, full-size (velocity sensitive)
- Sounds: 129
- Accompaniment controls: 100 styles + 98 variations
- Polyphony: Maximum 28 notes
- Effects: Stereo Chorus, Sustain, Duet, Touch Response On/Off, Digital Reverb, Pitch Bend Wheel
- Accompaniment Controls: Start/Stop, Intro/Ending, Sync./Fill-In, Tempo, Variation
- Recorder: Rec./End, Play/Stop, Overdubbing Function
- Programming: Style Maker, One finger Ad-lib Phrases
- Volume Controls: Master Volume, Accompaniment Volume
- Volume Part On/Off: One Finger Ad-Lib, Bass/Rhythm/Chords
- Miscellaneous Controls: Demo, Super 3D, Wheel Assign
- Speakers: 12 cm x 2, 8cm x 2
- Rated Voltage: 10 Volts DC. Works with six size C dry cell batteries or power adapter
- Accessory Jacks: MIDI In/Out, Pedal, Output 1, Output 2, DC in (10V), Stereo Phones
- Included Accessories: Music rack, AC adapter
- Dimensions: 36-1/2" W x 14" D x 4-1/2" H

# Industrial Electronics and Robotics



**NEW!**  
Hands-on  
training with  
a 266 MMX™  
PC!

**W**ith confidence-building training and professional equipment, you can be the technician paid top dollar to handle industrial control and robotic devices. NRI's unique course gives you everything you need, even if you have no experience in the field!

You'll master industrial electronics and robotics through expertly written lessons

and a top-of-the-line computer system, robotics trainer, and SmartPak programmable logic controller. Soon you can be the one who programs, monitors, and services tomorrow's sophisticated automation systems. The next few pages will give you more information about this newly expanded course. ▶

# Master Real-World Industrial Control And Robotics Techniques For A High-Paying New Career

It's no secret: Technology has created a revolution in the way industry works. From microprocessor-controlled units that assemble delicate electronic circuitry to mammoth robots designed to build cars and locomotives, technology is redefining the industrial workplace.

## Big demand for control and instrumentation technicians

It takes skilled personnel to keep today's advanced production lines and machinery rolling. Industries need people trained to install, maintain, troubleshoot, and repair computer-controlled industrial systems ... people who can handle robotics, computers, lasers and optoelectronics, motors, generators, and motor control.

Already, more than 60,000 such skilled individuals are on the job. But experts predict that the demand for industrial electronics technicians will grow faster than the average over the next 10 years. That means plenty of opportunity at high-demand wages. In fact, qualified technicians are already commanding over \$30,000 a year.

## Only NRI gives you such practical, effective training

NRI's innovative course in Industrial Electronics and Robotics trains you to take advantage of this demand for skilled technicians. Starting with electronics basics, you build your knowledge in carefully organized learning steps to become a well-trained professional. You not only learn theory, but you put it to use in actual electronics experiments and demonstrations, using professional instruments to give you hands-on experience and priceless confidence.

## Robotics principles come to life as you build your own robotic control system

You get real-world, practical robotics experience as you use the full-featured AMD K6/266 MHz computer included in your course to control the robotic devices you create with the remarkable Robotic Discovery Kit.



Your computer and robotic devices become a fully integrated automation system, programmed by you to do the types of operations performed in today's industrial environments.

## Train with the SmartPak PLC

Your NRI lessons even cover programmable logic controllers (PLCs), the solid-state devices designed to replace relay-logic control and to automate systems.

As you train with the SmartPak PLC included in your course, you learn firsthand how PLCs operate, how they can be installed and programmed, and how you can troubleshoot and service them on the job as today's instrumentation and control technician.

## NRI trains you for today's high-technology careers

There's no question about it: Industry is moving ahead using more complex and sophisticated systems to improve productivity, cut costs, and enhance quality. The technician who can handle these systems and keep plants humming has a secure, rewarding career to look forward to. And preparing you for that kind of future is what NRI training is all about.

### Easy-to-Follow Lessons Move You Quickly From Computer and Electronics Basics to Advanced Industrial Controls

#### Introduction to Computers

- Introduction to PCs
- PC Peripheral Devices
- PC Storage Devices
- PC Networks and Communications
- Introduction to PC Software
- PC Applications Software
- Advanced PC Applications
- Legal and Personal Concerns With PCs
- Business Applications for Computers
- Introduction to Computer Programming

#### Basic Electronics

- Introduction to Electronics
- Voltage, Current, and Resistance
- Series Circuits
- Parallel Circuits
- Power Sources
- How Resistors Are Used

#### Intermediate Electronics

- How Coils Are Used
- How Capacitors Are Used
- How Coils and Capacitors Are Used Together

#### Semiconductors

- How Transistors Work
- How Transistors Are Used

#### Analog Electronics

- Integrated Circuits
- Power Supplies for Electronic Equipment
- How Amplifiers Work
- How Oscillators Work

#### Digital Electronics

- Logical Operations and Functions
- Logic Families
- Combinational Logic
- Flip-Flops and Clock Generators
- Counters, Registers, and Sequential Logic

#### Focus on Microprocessors

##### Introduction to Windows 98

- Introduction to Windows and DOS
- Navigating Windows 98
- Running Programs With Windows 98
- Personalizing Windows 98

##### Exploring & Testing Your 286 MMX PC

##### Working With Windows 98

- Working With Files in Windows 98
- Using the Windows 98 Accessories
- Communications in Windows 98
- Managing Your System in Windows 98

##### PC Communications & the Internet

- Using a PC for Communications
- Internet Basics
- Navigating the Internet I
- Navigating the Internet II

##### Automatic Control and Robotics

- Computer Integrated Manufacturing
- Electronic Manufacturing
- Industrial Sensors
- Motors, Generators, and Motor Control
- Computer-Aided Design and Manufacturing
- Process Control Methods and Equipment
- Fundamentals of Robotics
- Robot Applications

##### Programmable Logic Controllers

- Introduction to Programmable Logic Controllers
- Programmable Logic Controller Operation
- PLC Programming
- PLC Specifications and Applications
- Installing and Maintaining Programmable Controllers

# Put Theory To Practice As You Perform Fascinating Hands-On Projects

Examine live circuits and take circuit measurements as you work with The NRI Discovery Lab and quality digital multimeter



As you work through your NRI electronics modules, you'll create NRI's Discovery Lab, an exclusive breadboarding system for setting up and modifying prototype circuits, performing tests, and evaluating electronic components.

Your NRI training also features a hand-held digital multimeter, the indispensable tool for your new career. Using NRI's Action Audio cassette and specially coordinated diagrams, you're "talked through" the operation and practical applications of this quality meter.

## HANDS-ON PROJECT

### Working With the 8085 Microprocessor

In this exciting project, you learn how to take a few integrated circuits and build a working microprocessor system. You experiment with input and output devices, memory, address, data and control buses, and the CPU itself.



Ultimately, this project asks you to demonstrate how the instruction set in a computer program is designed to perform a particular task.

## HANDS-ON PROJECT

### Programming Robots

Now you're ready to turn your computer into the heart of your own robotic control system. First, you're introduced to a specially developed Robotic Programming Language — based on the languages actually used by engineers working with full-scale industrial robots. You'll find the Robotic Programming Language both interactive and friendly, and soon you'll be writing operational programs that work right the first time you try them.

At this point, you also receive your Robotic Discovery Kit, with all the

hardware you need to construct a variety of robotic devices, including structural members, motors, sensors, gears, wires, connectors, and a special Robotics Interface that links the robots you build to your computer.

You assemble, program, and test different robotic devices, each one demonstrating a specific aspect of industrial automation. From a simple lift mechanism to sophisticated "teachable" robots used to perform repetitive tasks, you recreate the operation of industrial robots in widespread use today.

## Exploring and Testing Your 266 MMX™ Computer

- ◆ **Reliable AMD K6 processor**
- ◆ **Fast 266 MHz clock**
- ◆ **5 gigabyte hard drive**

The centerpiece of your NRI training is this powerful computer system you'll use to control the robotic devices you build later on in your course. And now, through NRI's PC Options Plan, you can move up to an even more feature-packed system at special student prices.



- ◆ **64 meg RAM**
- ◆ **16X CD-ROM drive**
- ◆ **16-bit sound card and speakers**
- ◆ **Super VGA color monitor with .28mm dot pitch**
- ◆ **1 meg video memory**
- ◆ **56K baud fax/modem**
- ◆ **Windows 98**

*Your computer is shipped after you have completed at least 50% of the module, "Introduction to Windows 98," as well as all previous required assignments, and as long as your financial requirements are met.*

**Included  
at no  
extra cost!**



### Using Your SmartPak PLC

Now you gain a firsthand understanding of your SmartPak PLC, a revolutionary programmable logic controller featuring: a compact size (4-1/2" x 6"), powerful 10 kHz high-speed counter, 5-function math, timers, counters, shift registers, RS-232 port, and software for easy programming with your K6/286 computer.

From assembly line monitoring for production efficiency, to supervising task-specific motors, to activating thermostatic controls through remote ambient temperature sensors, the uses for the SmartPak PLC — even beyond manufacturing, mechanical, and environmental control applications — are virtually unlimited.

This hands-on project has you try basic and advanced relay logic instructions, programming with software, program editing, programming and running simulations, monitoring the PLC online, input and output wiring, and accessing data registers — making you fully prepared for the opportunities ahead!

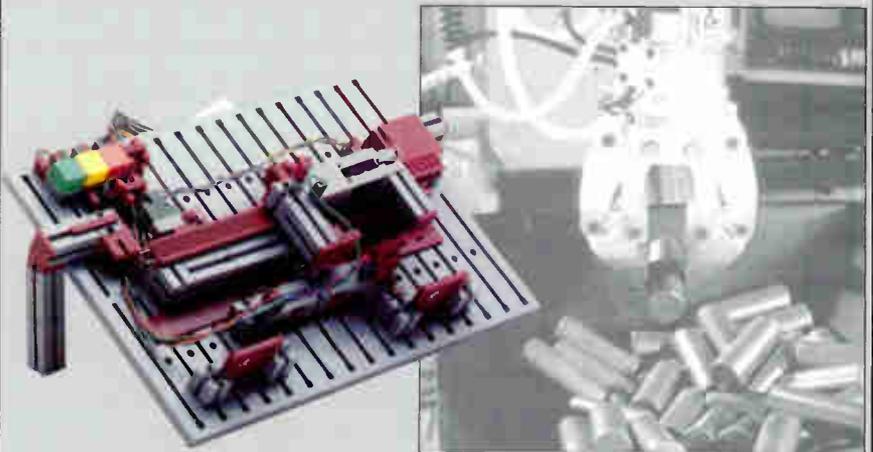
*"I enrolled in Industrial Electronics to augment my technical background in industrial control and automation. Since taking the course, I have increased machine productivity at work by 50% by designing, building, and installing machine controls that eliminate time-consuming hand motions. NRI provided me with the knowledge and training to meet my career objectives."*

Richard Schneider  
Cincinnati, OH

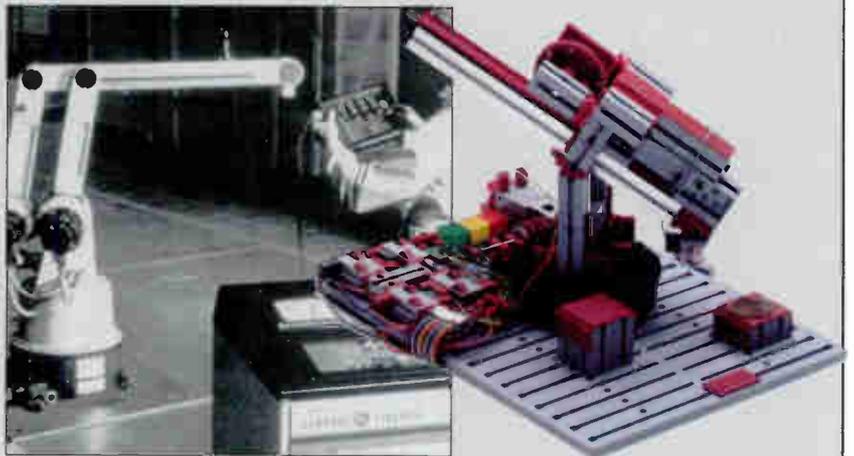
## You Assemble, Program, And Test A Variety Of Working Robotic Machines — Models Designed To Operate Just Like Robotic Equipment Used In Industry Today



Robots are often used to display in graphic form the results of computer calculations. The polar coordinates plotter you build accepts analog data and positioning commands to create graphic displays.

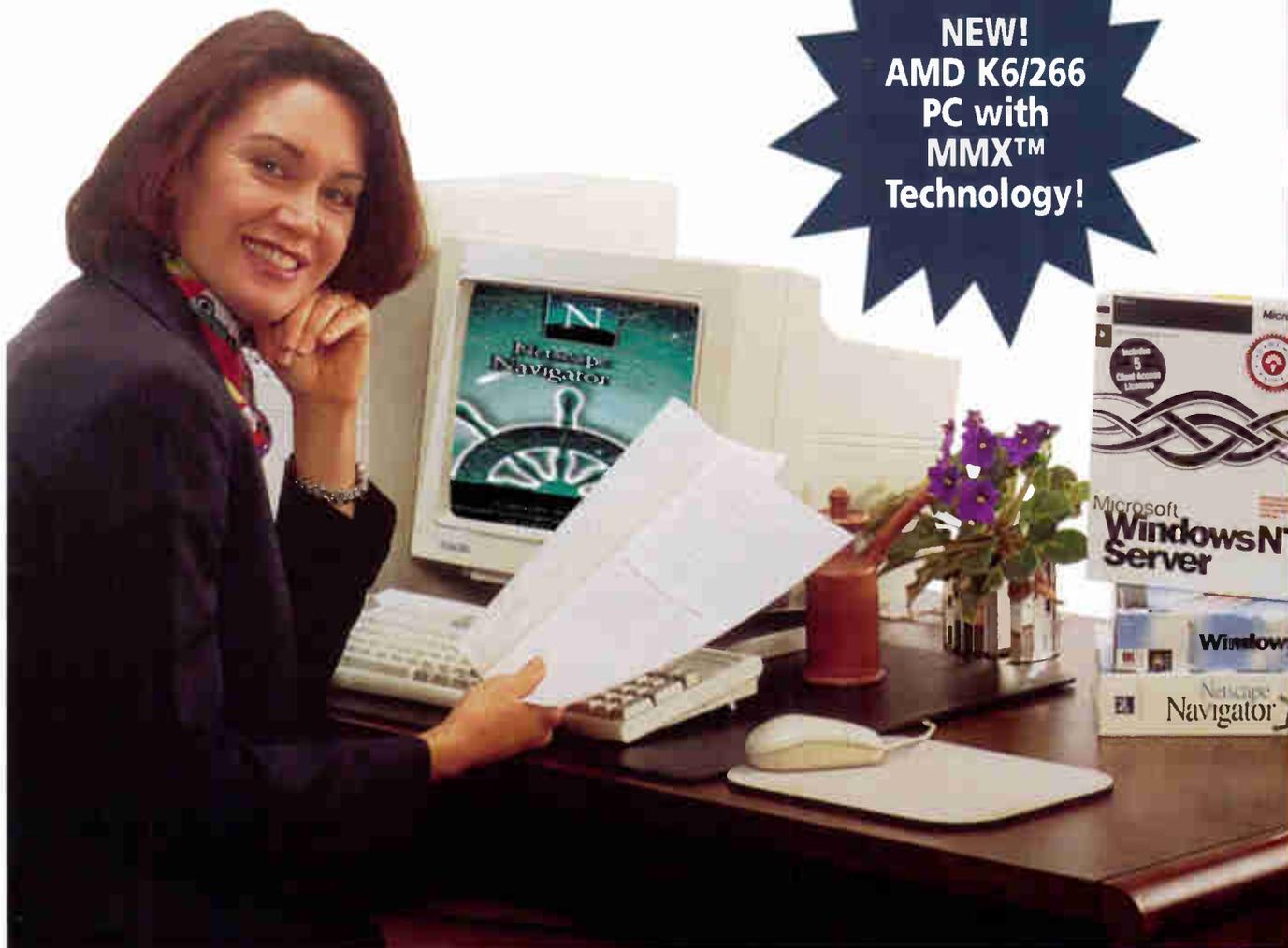


Two tasks frequently performed by robots are measuring and sorting. You build a robotic system programmed to sort different-sized blocks.



Industrial robots are most often used to perform a sequence of actions repeatedly without operator fatigue and with unflinching accuracy. The "teachable" robotic arm is the most complex robotic device you construct.

# Networking With Windows NT



**NEW!**  
AMD K6/266  
PC with  
MMX™  
Technology!

**E**xperts agree that networks have done wonders to change and enlarge the scope of human activity, especially in the business sector. That's why companies of every size and kind need in-house specialists to set up fast-moving, cost-effective networks and keep them running smoothly. Check your newspaper's classifieds for Network Specialist positions. You'll see that the salaries are just as high as the demand!

NRI's innovative Networking With Windows NT course gives you the knowledge and hands-on skill to recommend, install, and maintain local- and wide-area network systems. Best of all, you train with and keep a powerful 266 MMX™ computer system and Windows NT 4 software, ultimately preparing to sit for and pass the Microsoft Certification Test for Windows NT 4. ►

# Prepare For A Profitable New Career As An NT Certified Technician!



As companies everywhere prepare for the technology-rich 21st century, network specialists are in high demand. Now you can be the one called on to make purchasing, configuration, and maintenance decisions for both local- and wide-area networks.

With NRI training, you quickly gain expertise in topologies, protocols, servers, domain models, and more ... even if you have no prior experience with computers!

## Computers have become "team players"

By making it possible for computers — and therefore people — to share resources, local area network technology improves office productivity and efficiency in ways unimaginable just a few short years ago.

For example, it used to be that it was necessary to call a meeting to discuss the development of a new product. Now it's possible to get information from your colleagues and perform market research without ever leaving your office. And rather than having to hunt down the one person with access to the company's inventory database, with a few simple

keystrokes you can now use the network to check inventory levels, monitor shipping information, look up stock numbers, or do whatever it takes to perform your job better.

With NRI's Networking With Windows NT course, you discover the technology behind today's networks, then go a step further to learn how to keep networks performing at optimum efficiency. And with that kind of know-how, you'll be in an ideal position to move up on the job, start a new career, or set up a network consulting business of your own.

## Professional Equipment and Cutting-Edge Online Training Help You Bring Theory to Life!

To really learn the ins and outs of networking, you need practical, hands-on experience with the equipment and software you'll see on the job. That's why NRI's Networking With Windows NT course includes a remarkable 266 MMX™ computer system and Microsoft Windows NT 4 software as part of your course materials.

What's more, the last three modules of your course are administered online through McGraw-Hill OnLine Learning. Here's your chance to see how today's global network — the Internet — has revolutionized the workplace, our personal lives, and the educational process itself.

## Prepare for NT Certification

By the time you complete NRI's Networking With Windows NT course, you'll be fully prepared to take the Microsoft Certification Test for Windows NT 4. This is one of the six tests required for certification as a Microsoft Certified Systems Engineer (MCSE). You'll take a practice exam online, get feedback on your performance, and discover what areas you may need to review for further study.

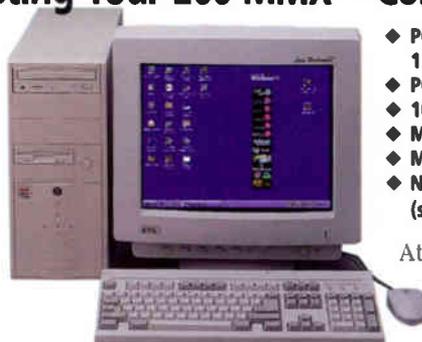
NT Certification will open up tremendous opportunities for you — in fact, according to *The Wall Street Journal*, MCSEs can earn as much as \$11,000 more per year than technicians without certification.

Enroll today, and get started on the path to a new career or a business of your own as a network specialist.

### HANDS-ON PROJECT

## Exploring and Testing Your 266 MMX™ Computer

- ◆ Reliable AMD K6 processor
- ◆ MMX™ technology
- ◆ Fast 266 MHz clock
- ◆ 16X CD-ROM drive
- ◆ 64 meg RAM installed
- ◆ Windows 98
- ◆ 5 gigabyte hard drive
- ◆ 56K baud fax/modem
- ◆ 256K external cache memory
- ◆ 16-bit sound card and speakers
- ◆ Super VGA color monitor with tilt-swivel base



- ◆ PCI Super VGA video with 1 meg RAM, MPEG capable
- ◆ PCI bus
- ◆ 104-key enhanced keyboard
- ◆ Math coprocessor
- ◆ Mouse and mouse pad
- ◆ Netscape Navigator™ Web browser (shipped separately)

At this point\* in your course, you receive the centerpiece of your NRI training: your AMD K6/266 MHz computer. If you wish, you may upgrade your system to tomorrow's technology at special student prices through NRI's PC Options Plan, details of which will be sent to you just before your computer is released for shipment.

\* Your computer system is shipped after you have completed at least 50% of the module, "Introduction to Windows 98," as well as all previous required assignments, and as long as you have met your financial requirements. NRI reserves the right to substitute equipment of equal or greater value.

Only NRI  
Training With a Feature-  
Packed PC You Keep!

# NRI's Unique Modular Approach Takes You Step By Step From The Basics To Advanced Networking Concepts

## Introduction to Computers

*In this first training module, you get a comprehensive overview of how computers work and what functions they serve in today's world. The main text you'll work with in this module is Peter Norton's Introduction to Computers, a highly acclaimed manual that features full-color illustrations, crystal-clear explanations, and an interactive CD-ROM that vividly demonstrates fundamental computer principles. In particular, you'll examine these four subjects, which will set the stage for subsequent coverage of local- and wide-area networks:*

- PC Applications Software
- Advanced PC Applications
- Business Applications
- Introduction to Programming

## Local Area Networks I

*Now you're ready to define a local area network and see how it's used in today's workplace. You go on to explore LAN design and the various hardware and software configurations available, comparing the advantages and disadvantages of each and determining which are best suited to specific applications.*

- What Is a Local Area Network?
- LANs in the Workplace
- LAN Applications
- LAN Topologies and Media
- LAN Servers
- The Ethernet Interface
- The Token Ring Interface
- The FDDI Interface

## Local Area Networks II

*This advanced study of today's LANs focuses on the internal "language" of protocols, network operations systems, procurement, and maintenance. You study Open Systems Interconnection (used to control the network layer protocols); the use of*

### HANDS-ON PROJECT

#### Performing a Needs Analysis

Now you're asked to do an actual needs analysis, one of the main responsibilities of network specialists. This report of the office work environment helps you determine basic network design and system requirements.

Using specifications provided by NRI, you perform a needs analysis and relay your findings to your NRI instructor, who offers you specific feedback on your work. It's this type of hands-on experience that will build your confidence quickly.

*repeaters, bridges, and routers; peer-to-peer network operating systems; network needs assessment, configuration, and expansion strategies; and more.*

- LAN Protocols
- LAN Internetworking
- Network Operating Systems
- Planning and Procurement of LANs
- LAN Management

## Wide Area Networks I

*Wide Area Networks are capable of connecting individual offices with vast groups of people and storehouses of information. You begin this phase of your training by considering the need for and application of WANs, along with a variety of advanced principles regarding open system design and implementation. Before long, you'll be ready to explore such concepts as Digital Network Architecture (DNA) and gateways in the next module.*

- Concepts of Distributed Computing
- Asynchronous Transfer Mode
- Frame Relay
- Integrated Services Digital Network X.25
- Advanced Peer-to-Peer Networking (APPN)
- Synchronous Data Link Control
- Systems Network Architecture
- Open Systems Interconnection

## Wide Area Networks II

*Now that you've examined distributed computing and advanced network protocols, you move on to the Internet protocol, the most popular vendors, the setup of servers and gateways, and the use of high-powered hardware for internal routing. This module will give you a sense of excitement about the Information Age.*

- TCP/IP and the Unix Protocols
- Network
- Digital Network Architecture
- DECnet
- AppleTalk
- Servers and Gateways
- Routing Protocols, Repeaters, Bridges, and Routers
- Managing Internetworks

### HANDS-ON PROJECT

#### Determining WAN Requirements

Using your lesson materials for guidance, you perform a larger-scale needs analysis — this one for a wide area network. You study sample information and plan network design elements, providing for global application, media usage rates, cost efficiency, and user accessibility.

Finally, you receive helpful feedback from your NRI instructor, who will critique your work and offer advice, encouragement, and suggestions on improving your work.

## Introduction to Windows 98

*When Windows 98 was first released, it immediately took the computing world by storm. Rapidly becoming the operating system of choice for savvy computer users, Windows 98 is today the foundation for high-performance, feature-rich applications.*

*This module shows you all that Windows 98 can do to help you get your work done quickly and*

smoothly. You master the tips and tricks essential to computing today, even learning how to personalize your desktop.

Introduction to Windows and DOS  
Navigating Windows 98  
Running Programs With Windows 98  
Personalizing Windows 98

**Your computer is shipped here!**

## Working With Windows 98

This module introduces Windows 98's most talked-about features while giving you the opportunity to use Windows 98 on your new computer system.

Putting your new Windows 98 skills to the test, you perform a hands-on project that you submit to your NRI instructor for evaluation and grading. At this point in your course, you may also begin communicating with your instructor online!

Working With Files in Windows 98  
Using Windows 98 Accessories  
Communications in Windows 98  
Managing Your System in Windows 98

### HANDS-ON PROJECT



### Using Windows 98

Preinstalled on your computer system is Windows 98, the popular operating system/graphical user interface from Microsoft. Windows 98 offers full integration of the Windows operating system with Internet Explorer 4.0, turning your desktop into an extension of the World Wide Web...built-in support for high-performance peripherals, graphics cards, DVD drives, and more...updated and improved accessories...and much more. In this project, you explore firsthand the major components of this innovative operating system.

## PC Communications and the Internet

This module takes you from the fundamentals of PC communications to the intricacies of the World Wide Web. Best of all, you get firsthand experience browsing, searching, and downloading Internet files. Buckle your seat belt — you're about to get up to speed with the newest revolution in computing!

Using a PC for Communications  
Internet Basics  
Navigating the Internet I  
Navigating the Internet II

### HANDS-ON PROJECT

#### Using the Internet Server

In this hands-on project, you demonstrate your ability to use your modem and communications software to access the Internet — with NRI's own Internet server as your first stop.

#### Using Netscape and Navigating the World Wide Web

In this additional project, you use Netscape Navigator™, your Web browser, to contact NRI in a variety of ways. You start by logging on to the Internet and using search tools to find several resources. You then download a file from the NRI server and, finally, demonstrate your understanding of FTP. By the time you complete this project, you'll be able to get the very most out of the Internet and the World Wide Web — both on the job and in your personal life.



### Authoritative NT Reference Manual and The Windows NT Resource Kit—included in your course at no extra charge!

In addition to your NRI lesson materials and online training, you also receive *Inside Windows NT Server 4* by New Riders, an authoritative reference manual that provides invaluable tips and techniques for using Windows NT to its full potential. In addition, The Windows NT Resource Kit included in your course gives you behind-the-scenes information and tools essential for the networking professional. The texts and CD-ROM that make up the Resource Kit show you how to download technical information and take part in online forums, even practice for the NT Certification exam.

## Windows NT Core Concepts Advanced NT Server Concepts NT Certification

The last three modules in the NT course are taken online through McGraw-Hill OnLine Learning. They are geared towards preparing you to take and pass the Microsoft Certification Test for Windows NT 4.

You begin by exploring Windows NT fundamentals, from basic installation to common applications. You move on to cover advanced NT server concepts before concentrating on the specific information you'll need to know to pass the Microsoft Certification Test for Windows NT 4.

### HANDS-ON PROJECT

You will perform an assortment of interactive online exercises related to:

- ◆ NT installation and configuration
- ◆ Planning and managing resources
- ◆ Running applications
- ◆ Monitoring and optimizing
- ◆ Troubleshooting

In addition, in the final online module, you'll take a practice NT Certification exam online, giving you a firsthand understanding of the test's format and the type of questions you'll encounter on the actual exam.



# Basic Electronics

A great way to get started!



**W**ant a concise, fast idea of what electronics is all about? NRI training in Basic Electronics is designed for the curious, the skeptical, the nontechnical, and the busy. This streamlined, hands-on course is ideal for accountants, bookkeepers, doctors, supervisors, salespeople, military personnel, hobbyists, ANYONE...because practically every

industry and profession is affected in some way by today's proliferation of electronic devices and systems.

The next page explains what this quick course is all about, what kind of equipment it includes, and what it can do for you and your career.

# Use Basic Electronics Training As Your Ticket To Advancement — No Matter What Your Career!

This short, to-the-point course is intended for people who want to know more about electronics, but never before had a chance. With electronics invading every aspect of our daily lives — from the way we shop to the ways we communicate — NRI's Basic Electronics course is a great way to keep up with modern advances and understand the technology behind them.

## Two course versions available

NRI offers two introductory courses: Basic Electronics and Basic Electronics With Lab. You decide whether you want to study the lessons only, or put the theory covered in your NRI lessons to work through hands-on projects. Either way, NRI takes the mystery out of modern electronics by bringing the subject to life.

## A Stepping Stone

NRI's Basic Electronics courses work especially well for people who have not yet decided which particular field of electronics they wish to explore. Special tuition rates and course credits are available to graduates of NRI Basic Electronics training who re-enroll with NRI or transfer to another, more lengthy electronics course before graduating.

The following expertly written lessons and hands-on projects are described on pages 8 through 10 of this catalog.

### Basic Electronics

- Introduction to Electronics
- Voltage, Current, and Resistance
- Series Circuits
- Parallel Circuits
- Power Sources
- How Resistors Are Used

### Intermediate Electronics

- How Coils Are Used
- How Capacitors Are Used
- How Coils and Capacitors Are Used Together
- Semiconductors
- How Transistors Work
- How Transistors Are Used
- Basic Electronics Experiments—Lab Version of Course

### Analog Electronics

- Integrated Circuits
- Power Supplies for Electronic Equipment
- How Amplifiers Work
- How Oscillators Work
- Analog Electronics Experiments—Lab Version of Course

### Digital Electronics

- Logical Operations and Functions
- Logic Families
- Combinational Logic
- Flip-Flops and Clock Generators
- Counters, Registers, and Sequential Logic
- Digital Electronics Experiments—Lab Version of Course

If you choose NRI's Basic Electronics With Lab course, you'll now also receive interactive computer-aided electronics troubleshooting diskettes relating to four key areas: DC electronics, AC electronics, semiconductors, and electronic circuits.

Here's your chance to simulate real-world troubleshooting situations on any IBM-compatible PC. Although not required for graduation from your Basic Electronics With Lab course, these innovative training tools are an enhancement that will prepare you well for the electronics troubleshooting situations you're likely to encounter on the job.

*"NRI's Basic Electronics With Lab course was very informative and easy to understand. It helped me to move up within my company into a technical position. Because our work is shifting from mechanical to electronic, this course was a must. I have advised others to take this course in hopes it would help them as much as it helped me."*

William James Setzer  
Raleigh, NC

## Professional equipment brings electronics to life

To reinforce the theory presented in your lessons, you may choose the version of this course that includes everything you need to build your own home laboratory:



A hand-held digital multimeter for easy, portable circuit testing and measurement...featuring "talk-you-through" instructions on audio cassette



The NRI Discovery Lab, a complete breadboarding system for setting up and modifying circuits, performing tests, demonstrations, and more



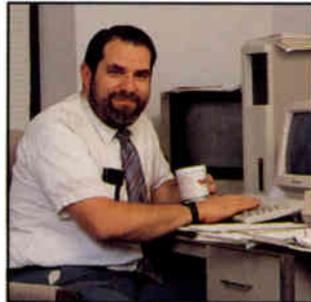
PLUS a 25 MHz triggered-sweep, dual-trace oscilloscope that lets you measure and monitor voltages and currents in electronic equipment

# Here Are A Few Of The People Who Make Your Training Both Effective and Enjoyable



**RICHARD HOPKINS**  
Product Development  
Manager

Rick oversees the development of NRI's comprehensive lessons, the creation of meaningful hands-on experiments that clearly demonstrate important electronics principles, and the selection of test equipment that will give you first-hand experience with the tools you'll encounter on the job. Rick's experienced leadership ensures that your NRI course is thorough, practical, and at the leading edge of technology.



**KEN BIGELOW**  
Editor-in-Chief

With an impressive background in electronics and computers, Ken stays on top of fast-breaking developments in technology and makes sure that NRI training covers each important new breakthrough. Thanks to Ken's special attention, NRI electronics courses continue to set the standard for high-quality technical training worldwide.



**SKIP FENDLEY**  
Electronics Instructor

One of many NRI instructors ready to provide you with technical support throughout your training, Skip has years of training and experience in the electronics and computer fields. A dedicated educator with a firm belief in one-on-one instruction, Skip is ready to give you all of the individual guidance you may need to complete your NRI course with confidence.



**OLEATHIA (LEDE)  
BULLOCK**  
Director of  
Student Services

Lede and her staff handle students' administrative concerns, providing up-to-the-minute information on academic records, lesson and kit shipments, correspondence, and more. Having worked with thousands of students over the 20 years she's been with NRI, Lede knows how invaluable a helping hand can be. With Lede in your corner, you'll always get the personal service you need to make your NRI training the best it can be.



## The NRI Diploma: a symbol of your achievement

Upon graduation, you'll be awarded this impressive diploma signifying your achievement and certified by NRI's Executive Director. Printed on fine-quality paper, this handsome award testifies to your training and competence in the field of electronics.

McGraw-Hill's vast educational and information resources contribute to the quality and effectiveness of your NRI training. You'll find that the standing of The McGraw-Hill Companies within the technical and business communities will serve you well once you've earned your NRI diploma.



### Accredited training

Since the educational, ethical, and business standards of NRI Schools have met the rigid requirements of the Distance Education and Training Council, the Accrediting Commission of the Council has judged NRI Schools worthy of distinction as a fully accredited institution. For you, DETC accreditation (which is recognized by the U.S. Department of Education) means that your NRI training is academically sound, fairly administered, and clearly effective.

### Backed by The McGraw-Hill Companies

NRI is proud to be a part of McGraw-Hill Lifetime Learning, a division of The McGraw-Hill Companies. Without question,

### Special Services

NRI is always striving to make your learning experience as convenient and flexible as possible. That's why we developed TeleGrading and TeleService. Now you can get your lesson exams graded over the phone, and you can check on your tuition account balance or get other administrative questions answered by our automated service attendant any time of the day or night.

In addition, check out NRI's **Bookstore** for great values on hardware, software, supplementary training packages, and much more. And, with NRI's new PC Options Plan, you can move up to the computer system of your dreams at special student prices! You'll find out more about this great new service shortly before your computer is scheduled to be shipped.

# Information, Policies, and Procedures

## Educational Requirements

NRI's career diploma courses are designed for individuals who have no prior experience with computers or electronics. These courses start with the basics and build on that foundation with each new module. However, NRI recommends that all of its students have a high school diploma, good reading comprehension skills, and basic math skills in order to get the most out of their training.

## Credit for Prior Electronics Experience

NRI lessons covering basic fundamentals serve as an excellent refresher for people with some knowledge or experience in electronics. However, if you wish, you may take an entrance exam before enrolling. If you pass this exam, NRI will give you tuition credit for completion of early lessons. Write or call for complete details.

## Eliminating the Computer From Your Course

If you wish to enroll in a career diploma course that normally includes a computer, you may eliminate the computer from your course provided that you have access to a comparable system. NRI will give you a tuition credit equal to NRI's cost for the system normally provided. Please contact our InfoLine for specific details.

## Tools Recommended for Electronics Experiments

Virtually everything you need to complete your NRI training is included in your course. However, you will need access to a few hand tools — such as a screwdriver, pliers, wire cutters, and a soldering gun or iron — that are not supplied. Please contact NRI's instruction staff if you need assistance in obtaining these items.

## Starting Your Course

Although NRI courses are self-paced, we expect you to start your course within 30 days of receiving your first materials. Students who do not start their course within at least 90 days of enrolling risk cancellation of their course. If circumstances for some reason prevent you from starting your course right away, please contact an NRI Student Services representative to work out special arrangements.

## Completing Your Course

Depending on the complexity and breadth of coverage of the course you select, you

can expect to complete your training within anywhere from six months to two years. NRI's PC Servicing course, for example, should be completed within 18 to 24 months. If you feel that you need more time to complete your course than the amount of time recommended, please contact an NRI Student Services representative.

## Progress Reports

At various points throughout your course, you will be sent progress reports detailing the assignments you've completed thus far in your training and your cumulative grade point average. These progress reports will not only help you stay on track with your studies, but they can also be used to verify to your employer the amount of coursework you've completed in a given time frame.

## Credit Policy

NRI reserves the right to issue a credit check before accepting your enrollment and/or before releasing certain course materials. However, a marginal credit report does not necessarily mean that your enrollment will be rejected. Instead, we may encourage you to enroll in a shorter, lower-priced course or individual module in order to build a credit relationship with NRI.

## Shipping Policy

NRI's step-by-step training is carefully planned so that you'll always have enough material on hand for uninterrupted study, but not so much material that you feel

overwhelmed. As long as you've completed all previous required assignments, are current in your tuition payments, and have acceptable credit (in the case of modules that include high-value equipment or software), the next module is triggered for shipment once you have completed 50 percent of the current module. If you pay in full for any course, you may request that all materials be shipped at one time.

## Cancellation Policy

On the reverse side of your enrollment form, you will find NRI's detailed cancellation policy, which complies fully with Distance Education and Training Council guidelines. This is your protection if you find that you must discontinue your training. Naturally, we hope that you will complete your NRI course, and we'll do everything we can to help you toward that objective.

## Tax Benefits

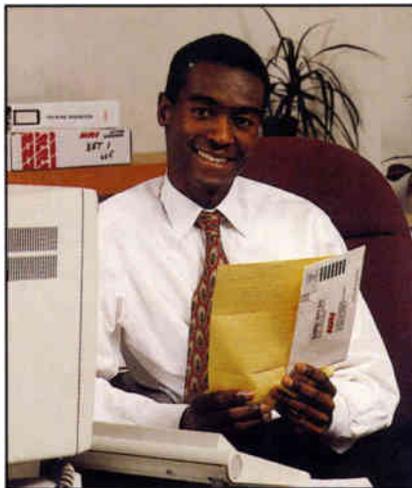
Under certain conditions, such as maintaining or improving skills required in your present job, your training may be tax deductible. However, be sure to consult a tax professional or call the IRS income tax information service for advice on your particular situation.

## Employer Tuition Assistance

NRI courses are approved for tuition assistance under hundreds of employer-sponsored plans. Be sure to check to see whether your company has a tuition assistance program that may cover all or part of your tuition costs. Special accommodations can be made for training multiple employees of a given company. Please contact E. Dwight Lipin, Industrial Sales Manager, at 202/244-9815 for more information.

## NRI's Commitment to Lifelong Learning

NRI promises to work hard to establish a strong relationship with you, our student. We are committed to providing you with quality instruction in state-of-the-art subjects, reliable service, and training value. It is our hope that once you take one NRI course, you will want to move on to another. To encourage this continuing relationship, NRI makes available special discounts and incentives to NRI graduates. Specific details on these incentives will be provided shortly before you complete your NRI course.



*If you have any questions about NRI policies or procedures, please call the NRI InfoLine at 202/244-9792. You'll speak with Marc Jean-Michel, pictured above, or another of NRI's friendly, knowledgeable Information and Guidance Specialists.*

# Your Future's In Your Hands

Now that you've had a chance to read through this catalog, it's time to decide on your next course of action. If you like the idea of a money-making career in computers or electronics, there's really only one thing left to do: Enroll with NRI.

Once you do, you'll see that NRI gets you started quickly — guiding you step by step from the basics all the way up to today's most sophisticated technology. Through hands-on

projects and practical experience with real-world equipment, NRI encourages you to try what you're learning right away.

Soon you'll realize why NRI at-home training has helped so many people — even people with busy schedules and no previous experience in electronics or computers — get the training they need to move into today's high-paying careers.

The moment you enroll, you can count on nonstop support from NRI. And even after you graduate, you'll still be part of the NRI family — eligible for discounts on additional training, letters of recommendation, transcripts when you need them, help from NRI's instructors, and much more.

So take the next step. Enroll now, and take charge of your future!



## It's easy to enroll...

Getting started is always the most challenging part of any new venture. That's why we now give you several enrollment options that can get you started even faster:

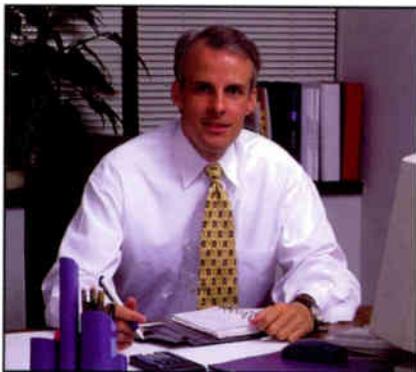
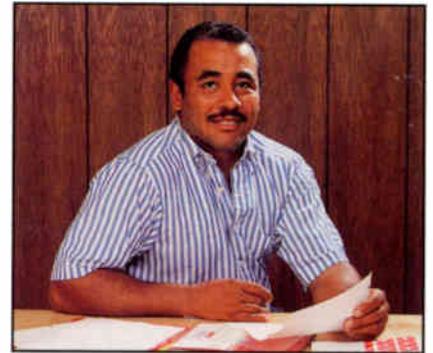
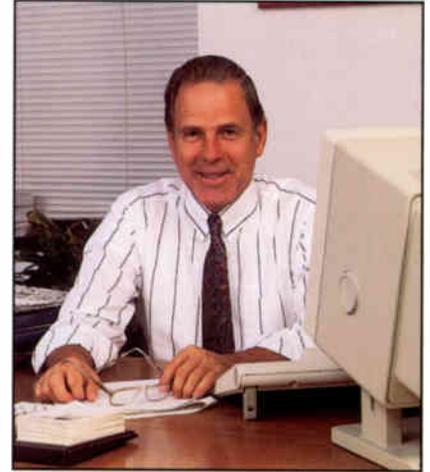
- 1 Fill out the enclosed enrollment application and mail it to us with your down payment in the enclosed postage-paid envelope.
- 2 Call our InfoLine at (202) 244-9792 and speak with one of our Information Specialists, who can take your enrollment information and down payment by credit card over the phone.
- 3 Fax your completed enrollment application and credit card information to us 24 hours a day at (202) 244-2047.

No matter which method you choose, we'll rush your first materials to your door as soon as we process your enrollment. Inside, you'll find your first several assignments, an introduction to your new school and the people behind it, tips on getting the most from your course, and much more ... all designed to make your learning experience rewarding and effective.

**Get started today!**

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# Enroll With NRI...And Put Our More Than 80 Years Of Experience, Know-How, And Dedication To Work For You



**NRI** School of Electronics

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