### Contacting LEGO MINDSTORMS Technical Support:

For 24-hour access to updates and answers to frequently asked questions, or to e-mail a technical question to us, please visit our Technical Support Web site at:

http://www.LEGOMINDSTORMS.com/help/

To speak to a Technical Support Representative, you can reach us at the following numbers:

- For toll-free support within the United States, +1 800 363-2140
  (You may also contact U.S. support directly at +1 781 830-6865)

- For support within the United Kingdom only, 0 1715 126 090

- For European support outside the United Kingdom, +31 20 586 4630

Hours of service may vary based on geography and time of year.

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### Minimum System Requirements

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Windows® 95</th>
</tr>
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<tbody>
<tr>
<td>CPU</td>
<td>Pentium 90 MHz</td>
</tr>
<tr>
<td>RAM</td>
<td>16MB</td>
</tr>
<tr>
<td>Available Hard Disk Space</td>
<td>50 GB</td>
</tr>
<tr>
<td>Mouse</td>
<td>Windows® 95 Compatible</td>
</tr>
<tr>
<td>Available 9-Pin Serial Port For Infrared Transmitter</td>
<td>1 Pin</td>
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<tr>
<td>Sound</td>
<td>Sound Blaster 16™ Windows compatible Sound Device</td>
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<td>CD-ROM Speed</td>
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<tr>
<td>Modem (Optional)</td>
<td>28.8 Kbps</td>
</tr>
<tr>
<td>Internet Browser (Optional)</td>
<td>Netscape Navigator or Microsoft Internet Explorer</td>
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</table>
The LEGO® MINDSTORMS™ ROBOTICS INVENTION SYSTEM™ is the core set in a new line of technology-based products from the LEGO Group. It is the product of a longstanding relationship with the Massachusetts Institute of Technology (MIT).

The ROBOTICS INVENTION SYSTEM enables you to design and program real robots that move, act, and think on their own. With the Robotics Invention System, you can create everything from a light-sensitive intruder alarm to a robotic rover that can follow a trail, move around obstacles, and even duck into dark corners.

The brain of the ROBOTICS INVENTION SYSTEM is the RCX, a LEGO microcomputer that can be programmed using a PC or can be run with its own built-in programs.

The RCX uses sensors to take input from its environment, to process data, and to signal motors to turn on and off.
You first build your robot using the RCX and the LEGO® pieces included in the ROBOTICS INVENTION SYSTEM™ (RIS).

Then create a program for your invention using RCX Code, a simple, powerful programming language. RCX code is part of the software which comes on the RIS CD-ROM. Next, download your program to the RCX using the special Infrared Transmitter. Your creation can now interact with the environment, fully independent from the computer.

MINDSTORMS™

The ROBOTICS INVENTION SYSTEM™ includes 727 LEGO® pieces, the RCX, Infrared Transmitter and cable, light and touch sensors, motors, gears, a Constructopedia™ building guide, and the ROBOTICS INVENTION SYSTEM software on CD-ROM. The ROBOTICS INVENTION SYSTEM provides you with the guidance to build simple working robots, as well as inspiration for more complex robotic inventions.
1. Introduction

The LEGO® Group has a philosophy about how one learns to master technology:

The best way to learn is by doing.

That is why LEGO® MINDSTORMS™ projects provide goals, not solutions.

There is no single “right answer” to any given challenge. Everyone develops the solution that he or she feels is best.

“Knowledge is only part of understanding. Genuine understanding comes from hands on experience.”

Dr. Seymour Papert
LEGGO Professor of Learning Research
MIT Media Lab
2. Hardware

LEGO MINDSTORMS

The RCX
RCX Features
RCX Display Window
IR Transmitter
Once the Robotics Invention System™ is set up on your computer, you can check the RCX battery level status in Software. Set Up Options in the software.

Starts: Set up options in the software.

Possible power considerations: Batteries are recommended.

With AC plugged in, the RCX will bypass the batteries to access AC. When plugged in, the RCX will bypass the batteries to access AC. The RCX operates using 6 AA batteries housed in the RCX unit or using an AC adapter (not included). Connecting to the AC port which is located at the opposite end of the RCX from the Internet eGee™.

The RCX requires 6 AA batteries per RCX. The RCX operates using 6 AA batteries housed in the RCX unit of your RCX from your PC.

Your programs again into your RCX from your PC, and the user programs are erased. You will then have to download and replace the batteries within 1 minute of the RCX memory is cleared. When changing batteries, make sure you turn off the RCX first.

When downloading them to the RCX, creating alternate programs on a computer.

When downloading them to the RCX, creating alternate programs on a computer.

A click on the RCX panel, the button to download the RCX program button.

See more information in section 3.

The RCX comes with five built-in programs.

- Hardware

2. Hardware
**RCX Features**

- The RCX has three input ports, three output ports, four control buttons, an LCD display, an AC adapter connector, and an Infrared Transmitter Receiver "eye." It also has LEGO® studs for easy connection of LEGO bricks and beams, as well as holes for inserting LEGO connector pegs.

- The three input ports are connection points for sensors (light, touch, temperature, and rotation). The three output ports are connection points for LEGO motors and other LEGO output devices such as lamps.

- The four control buttons are the red On-Off in the bottom left corner, the black View button in the upper left corner, the gray Prgm (or Program) button in the upper right corner, and the green Run button in the lower right corner.
2. HARDWARE

RCX FEATURES

The On-Off button toggles the RCX on or off.

The View button allows the user to select what function is monitored in the display window. For example, you can see the sensor value at input port 1, 2, or 3, or motor speed at output port A, B, or C.

The Prgm or Program button allows the user to select between programs in RCX slots 1 through 5. The number of the program selected appears to the right of the “little person” in the display window.

The Run button starts and stops the downloaded, stored program that has been selected via the Program button. In the “Run” mode, the “little person” will appear to be running in the display window.
**RCX Display Window**

- The battery-low indicator lights up when battery charge is low. It flashes when the battery charge is very low.

- The infrared communication "cone" lights up to indicate that communication between the Infrared Transmitter and the RCX is taking place.

- Dots light in sequence when a program is downloading from the computer to the RCX.

- An arrow displayed above an output port indicates the output port is active. The direction of the arrow shows the direction of a motor connected to the port.

- An arrow displayed below an input port indicates that the input port is active.

- The "little person" running indicates that the RCX is executing a program. The "little person" starts running when the Run button is pressed.

- The number (1-5) which appears to the right of the "little person" indicates which of 5 downloaded programs will be activated when the Run button is pressed.

- The Software Watch indicates how long the RCX has been on from last setting or resetting. The Watch is only active after the firmware has been downloaded, and can be controlled from Set Up Options in Getting Started. Downloading firmware again or turning the RCX off and on automatically resets the Watch.
## RCX Display Window

### Boot Mode: Active without firmware or upon full reset
- "Little Person" in display window
- 5 built-in programs
- Prgm button
- Run button
- Icons showing input/output
- Battery power indicator
- IR communication icon

### Active after Firmware is downloaded
- "Little Person" in display window
- 5 built-in programs*
- Prgm button
- Run button
- View button
- Software Watch
- Number Field
- Icons showing input/output
- Battery power indicator
- IR communication icon

- The first time the RCX is powered, either with new batteries or with an AC adapter, it starts up in a special "Boot Mode" without firmware (running the internal code stored in ROM). Boot Mode offers only those functions indicated on the left side of the table.

- Firmware is special software the RCX needs to communicate with the computer. When firmware is downloaded to the RCX, more display features are available. See the right side of the table.

- The RCX also has a built-in speaker which can produce a series of "beeps."

- The RCX includes an 8-bit microprocessor and internal memory. The memory is used to store firmware, and programs downloaded to the RCX from the PC.

*Note: The Set Up: Part 2 program runs a special sequence and downloads only 2 of the built-in programs plus a test program.
IR Transmitter

- The Infrared Transmitter works by establishing a wireless link between a computer and the RCX when connected to the computer's serial port by the cable. Control programs can be communicated from the computer through the Infrared Transmitter to the RCX. This is called “downloading.” These programs can then be executed by the RCX.

- To make the communication between the RCX and Infrared Transmitter work, there must be an uninterrupted field of vision to the “eye” located on the RCX. Two ranges of transmission are available, and can be selected with the Short/Long Infrared Range switch located on the front of the Infrared Transmitter.

- Note: There is a corresponding Short/Long Range setting for the RCX which can be changed in Getting Started: Set Up Options on the RIS CD-ROM. If you have downloaded the firmware using Set Up; Part 2, the RCX is set to Long Range.

- Even though 4-6 inches between the RCX and IR Transmitter works best for downloading, the RCX can communicate up to 90 feet if unobstructed and set to Long Range.

- Note: If you place the IR Transmitter or the RCX in direct sunlight or under direct lamp light, you may experience difficulties in downloading. To solve the problem, move the IR Transmitter and RCX out of the sunlight or turn off the lamp.
The Infrared Transmitter requires one 9-volt battery. Alkaline batteries are recommended.

To connect the Infrared Transmitter to your computer, first make sure that your computer is shut down.

You need a free serial port. The Infrared Transmitter cable, which comes with your LEGO® MINDSTORMS® ROBOTICS INVENTION SYSTEM™, plugs directly into a 9-pin male serial connector. If your computer has a 25-pin male connector, you will need a 9-pin male to 25-pin female adapter.

In order to download your own programs through the Infrared Transmitter to the RCX, the LEGO MINDSTORMS ROBOTICS INVENTION SYSTEM "firmware" must be downloaded to the RCX. The firmware is the RCX operating system. Step-by-step instructions for downloading firmware are available in Set Up: Part 2. You can also use Set Up Options. See Section 3, Software for more information.

Once the firmware is downloaded, the RCX can be programmed using the programming language called RCX Code. See Section 3, Software for more information.
When you login as a new user, or if you have not completed the Training Center Missions, the "Guided Mode" will introduce you to the different sections of the software. The Guided Mode sequence includes the Tour, Set Up: Part 1, Set Up: Part 2, Set Up: Options, the Training Center Introduction and Missions 1-6. If you have already completed the Training Center Missions, you will no longer be in the "Guided Mode" when you login.

The Main Menu of the ROBOTICS INVENTION SYSTEM allows the user to access all features of the software. It includes Getting Started, Program RCX, Challenges, Help, and WWW.

Tip: It is not advised; however, you can bypass Guided Mode and make the full menu active by holding down the Control key and clicking the mouse pointer on the About button in the main menu. To make Guided Mode active again, you will need to login with a different user name.
Getting Started

In the Getting Started section of the software, you will find the Tour movie and set up instructions.

Tour

The Tour is about a two-minute introduction to the LEGO® MINDSTORMS™ product and its concept of invention. The Tour orients and familiarizes you with the key ideas you will encounter in the ROBOTICS INVENTION SYSTEM™, and introduces the LEGO MINDSTORMS process and terminology.

Set Up: Part 1

In Set Up: Part 1, follow step-by-step instructions that explain how to insert batteries, how to use the buttons, how to turn on motors and read sensors, and how to use some of the built-in programs.

Set Up: Part 2

In Set Up: Part 2, follow step-by-step instructions that explain how to prepare the Infrared Transmitter for use and connect it to the computer, and how to download the firmware so that you can program the RCX yourself.

Set Up Options

The Set Up Options screen allows you to check or change the way the RCX and IR Transmitter are set up without going back through the Set Up: Parts 1 and 2 programs.
3. Software

Program RCX

The Program RCX section of the software includes the Training Center programming instructions, the RCX Code programming environment, and the Program Vault for storing programs.

Training Center

Once you have completed the Tour and Set Up programs, you can enter the Training Center. In the Training Center, you will be guided through the following: an explanation of RCX Code, creating a program in RCX Code, downloading a program to the RCX, saving a program in the Program Vault, and other important functions. Through the Training Missions you will learn the purpose of Commands, Sensor Watchers, Stack Controllers, and My Commands. You will also learn how to select and progress through the ROBOTICS INVENTION SYSTEM™ Challenges. When you have finished the Training Center, you will be familiar with programming RCX robots.
**RCX Code**

RCX Code is a computer programming environment in which graphics are used to build a program.

In RCX Code, each block displayed on the screen represents an instruction. You click, grab, and link graphical blocks on the computer screen. The blocks build (stack) one under another, like pieces in a puzzle, to create a program.

- The aim is to program the RCX to carry out an action or behavior; for example, controlling the movement of two motors in a LEGO robot. Once developed, the program must be downloaded from the computer to the RCX for execution.

- Programming takes place in the RCX Code workspace on the computer screen. The workspace area changes depending on the size of the RCX Code program. If the program is larger than the size of the computer screen, move the pointer to scroll across and down to bring off-screen areas into view.
3. Software

**RCX Code**

To develop a program, decide what behavior the RCX is to exhibit. For example, if controlling the movement of two motors in a LEGO robot is the behavior chosen, you can create a program by building a stack of sequentially executed RCX Code blocks to do the job.

- The stack may contain any or all the following types of RCX Code blocks:
  - RCX Code blocks that execute Commands; for example, turn on motor A.
  - RCX Code blocks such as Sensor Watchers or Stack Controllers. These control the stack by selecting and checking sensors, repeating the commands in the stack for a number of times, and/or initiating pauses in the execution of commands.
  - RCX Code blocks that contain commands created by you (My Commands).
- Up to five programs can be stored in the RCX. Each of these programs:
  - Can consist of up to 9 different stacks which can be executed in parallel (multi-tasking). A stack is either the Program block stack or a Sensor Watcher stack.
  - Can enable two RCX units to communicate with one another through infrared transmitters and receivers in the RCX. The first RCX sends the message through its internal infrared transmitter. If the second RCX is within range, it can receive the message through its infrared receiver. The second RCX can then react to this message.

- Within the RCX, only one program can be active at a time. Programs on the same RCX cannot control one another, nor can they be linked.

- See RCX Code Reference in Help on the LEGO® MINDSTORMS® ROBOTICS INVENTION SYSTEM™ CD-ROM for more information.

**Program Block**

The Program Block is the beginning of every RCX Code program. RCX Code blocks attached to the Program Block run from top to bottom when the program is run by the RCX. By right-clicking the pointer on the Program block, you flip it over and can then save, clear, or download the program.
Commands

Command blocks are instructions that tell the RCX what to do. They are found within the green Commands block container.

Some Commands blocks control the output ports. For example, On, Off, On For, Set Power, Set Direction, and Reverse Direction control the output ports to which motors are attached. Many of these blocks flip over when you right-click on them to allow you to change the ports and other values. See RCX Code Reference in Help on the CD-ROM for more details.

The RIS set contains two motors.

- **On**

  The On command block turns on ports A, B, or C on the RCX. Motors and lamps can be attached to these ports.

- **On For**

  The On For block turns on ports A, B, and C for a certain amount of time. Motors and lamps can be attached to these ports.

- **Off**

  The Off block turns off ports A, B, and C. Motors and lamps can be attached to these ports.

- **Set Power**

  Adding the Set Power block to your stack allows you to change the power of a selected motor in a range from 1 (minimum) to 8 (maximum).

- **Set Direction**

  When a motor port is first turned on, the attached motor turns in a particular direction. This direction on the Set Direction block is indicated by the arrow which points to the right. The arrow to the left indicates the opposite direction. (You can also change the direction of a motor by turning the connector plate of the wire attaching the motor to the RCX 180°.)
Commands (continued)

- **Reverse Direction**
  The Reverse Direction block allows you to change the direction of motors. Whichever direction a motor is turning, the Reverse Direction block causes it to turn in the opposite direction. (You can also change the direction of a motor by turning the connector plate of the wire attaching the motor to the RCX 180°.)

- **Wait**
  The Wait command block in your program tells the RCX to wait a certain amount of time before going on to the next command. Time is in tenths of a second; so, 10 means one second and 15 means one and a half seconds.

- **Beep**
  Adding a Beep command block allows you to add one of 6 different beep sounds to your program. The RCX has a built-in speaker for playing the beep sounds.

- **Tone**
  The Tone command block tells the RCX to play a tone of a selected pitch for a selected amount of time. You specify the pitch of the note (as a frequency in Hertz). For example, to play middle C, specify the frequency as 523.

<table>
<thead>
<tr>
<th></th>
<th>Very Low</th>
<th>Low</th>
<th>Middle</th>
<th>High</th>
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</table>

- **Reset Counter**
  The Counter is an internal sensor in the RCX which can count events such as a condition becoming true (such as, a touch sensor being touched). Add the Reset Counter block to your stack to reset the RCX counter to 0. For example, if you have a Check and Choose Counter or Counter Sensor Watcher in your program which is counting events, the Reset Counter block brings the count back to 0.
Add to Counter

The Counter is an internal sensor in the RCX. It can count events such as a touch sensor being touched. For example, to add 1 to the counter when a touch sensor is pressed, put the "add to counter" block on a Touch Sensor Watcher block.

Reset Rotation

The rotation sensor keeps track of the rotation of an axle which runs through the sensor. The rotation sensor is set at 0 each time the RCX starts to run a program. You can use the Reset Rotation block at another point in your program to set back the rotation sensor setting to 0.

Note: Reset Rotation is not active unless the Rotation sensor is selected on the Advanced page of Set Up Options on the RIS CD-ROM.

Reset Message

The Reset Message block clears out any previously received message number received from another RCX. For example, you may want to use the Reset Message block in Sensor Watchers or Stack Controllers that respond to messages.

Reset Timer

The Timer starts at 0 each time the RCX begins to run a program and counts time as the program runs. You can use the Reset Timer block at another point in your program to reset the timer sensor back to 0 to begin the count over again. See also the Timer Sensor Watcher.

Send to RCX

The Send to RCX message block tells the RCX to send out an infrared message to another RCX. The message can be any number from 1 to 255. See also the RCX Sensor Watcher.
Sensor Watchers

Sensor Watchers monitor the sensor readings during your program for the temperature, light, rotation, or touch sensors. There are also Sensor Watchers for the timer, counter, and RCX message; these sensors exist within the RCX itself. Sensor watchers are found in the blue container. The RIS set comes with two touch sensors and one light sensor.

You can choose sensor readings or levels on a Sensor Watcher and add a program stack to a stack connector. When the level chosen on the Sensor Watcher is reached, the attached program stack begins. Once the Sensor Watcher program stack finishes, the RCX goes back to where it left off on the Program Block program stack.

Sensor Watchers have a button in the upper left corner which allows you to resize the block.

The Rotation and Temperature Sensor Watchers are not active by default. To make them active, go to the Advanced page in Set Up Options.

Touch

The Touch Sensor Watcher has two states: pressed and released. Use the Touch Sensor Watcher to trigger a program stack when the touch sensor changes state.

Light

Use the Light Sensor Watcher to trigger an attached program stack when the first of two consecutive readings falls outside a chosen interval and the second reading falls within a chosen interval; for example, when the sensor sees a “bright” light value of 70% and then a “dark” light value of 30%.

Rotation

The Rotation Sensor Watcher keeps track of how many times the axle in the sensor turns, in increments of sixteen counts per rotation. (Not included in the RIS.)
Temperature

Use the Temperature Sensor Watcher to trigger an attached RCX Code stack when the temperature reading of your sensor falls within the chosen interval. For example, when the temperature goes from a "warm" 40°C to a "cold" 25°C. (Not included in the RIS.)

Counter

The Counter Sensor Watcher allows you to trigger a program stack when the count falls within a chosen range of numbers. To set the counter to watch for a specific numbers make the "from" and "to" values the same.

Timer

Use the Timer Sensor Watcher to trigger an attached program stack when the selected amount of time passes. The Timer is within the RCX itself, so you do not need to choose a port.

RCX

The RCX Sensor Watcher allows you to trigger a program stack when the message number received from another RCX using the Send to RCX command block falls within a selected range. To set the RCX to watch for a specific number, make both values the same.
Stack Controllers

Stack Controllers, found in the red container, allow you to choose different ways for parts of your program to run using sensor input, counter, timer, and messages to control RCX Code stacks. Stack Controllers have a button in the upper left corner which allows you to resize the Stack Controller block to save room on the workspace.

- **Check and Choose**

  The Check and Choose block tells one of two different program stacks to act, based on the condition you decide; for example, if pressing the touch sensor is true.

- **Repeat**

  The Repeat block tells an RCX Code stack to run a chosen number of times.

- **Repeat Forever**

  The Repeat Forever block tells an RCX Code stack to run forever.

- **Repeat While**

  Repeat While tells a stack to continue running as long as a selected condition is true (such as a touch sensor being pressed.)

- **Wait Until**

  Using a Wait Until stack controller block makes the RCX wait until a chosen sensor condition is true (such as a touch sensor being pressed) before going on to the next command.
**My Commands**

The yellow My Commands container holds the New My Command block, as well as any My Commands already created by you. My Commands created in RCX Code can be edited or changed. See the Programmepedia in Help on the RIS CD-ROM for instructions on creating My Commands.

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**Test Panel**

The Test Panel allows you to check the direction and timing of motors and to check the current state of sensors as you are programming in RCX Code. To see the RCX Code Test Panel, click the Test Panel tab. To close it, click the Test Panel tab again. See Training Mission 6 on the RIS CD-ROM for instructions on using the Test Panel.
Program Vault

The Program Vault allows users to manage storing their RCX Code programs on their computer's hard disk or floppy drive. Command paddles down the side of the screen are New, Import, Export, and Delete. To the left of center is a "conveyor," operated by the top and bottom arrow at the left of the screen. Each conveyor item represents an RCX Code program (and associated files).

Built-in Programs

Built-in programs 1-5 are included in the RCX. The programs can be seen as RCX Code programs by selecting them from the Program Vault.

Using the Infrared Transmitter connected to a computer, these built-in programs may be overwritten by creating alternate programs on a computer and downloading them to the RCX.

Program 1

Purpose: To provide a constant source of power to two (2) motors connected to ports A and C.

How the Program Functions: Power is supplied when the user activates the RCX, selects "Program 1," and presses "Run." Pressing the Run button again manually stops the program.

Program 2

Purpose: To move a two-motor robot forward and enable it to turn. Assumes motors are connected to ports A and C and touch sensors to ports 1 and 3.

How the Program Functions: Uses two (2) Touch Sensor Watchers to control the two (2) motors. Sensor Watcher #1 (input port 1) monitors touch sensor #1 constantly as it controls Motor A, while Sensor Watcher #2 (input port 3) monitors the second touch sensor which controls Motor C.
Program 3

Purpose: To move a robot forward, then stop it when sensors register a change of light intensity (for example when the robot reaches the dark colored surface). Assumes motors are connected to ports A and C and a light sensor to port 2.

How the Program Functions: Controls power to ports A and C. A Light Sensor Watcher monitors a light sensor and interrupts power when the light sensor detects light intensity in the range 0–40%.

Program 4

Purpose: To provide a two-motor program that repeats five times and then stops. Assumes motors are connected to ports A and C.

How the Program Functions: Provides power to output ports A and C and carries out the following sequence five times:

- reverses direction on both output ports A and C
- pauses for a random time period (between 0 and 3 seconds)
- reverses direction to output port A
- pauses for a random time period (between 0 and 3 seconds)
- reverses direction on port A once more

Program 5

Purpose: To enable a robot to move forward and change its direction if it encounters an obstacle in its path. Assumes two motors are connected to ports A and C and a touch sensor to port 2.

How the Program Functions: Provides power to output ports A and C. A Touch Sensor Watcher monitors the touch sensor constantly and each time the sensor is pressed, activates the following sequence:

- reverses direction on both output ports A and C
- pauses 1 second, reverses direction on port A
- pauses 0.5 second
- reverses direction on port C

Sample Programs

Several RCX Code programs are provided on the RIS CD-ROM. Twelve of the sample programs, one for each of the RIS Challenges, are included. Also included are RCX Code versions of the built-in programs. If you install the expansion sets, you may have additional sample programs added to the Program Vault.
Challenges

Challenges are intriguing invitations to create mechanical, programmable robots and other exciting devices all capable of performing one or another specific tasks. The challenges are open-ended and can be met in various ways, but each task is always clearly described by measurable or observable outcomes.
**ROBOTICS INVENTION SYSTEM™**

This is the main set of challenges for LEGO® MINDSTORMS™ users. It gives the basic training in robot making and robot programming. There are three main types of robot challenges: Robo, Pathfinder, and Acrobat, each with four levels.

**RoboSports™ (Must be purchased separately.)**

This add-on is about making robots that can play games with balls or pucks. There are three types of robots: Dunkbots, Puckbots, and Grabbots. Each challenge has four levels.

**Extreme Creatures™ (Must be purchased separately.)**

Extreme Creatures is an add-on about designing, making, and programming twelve creatures of three types: Helptiles, Mutimals, and Big Bugs. Each Challenge has four levels.

**Exploration Mars™ (Must be purchased separately.)**

This is an add-on about remote exploration of the planet Mars by means of tele-operated landers and rovers. You can build rovers, design Mars surfaces, and operate the rovers on these surfaces by means of images from a camera.
**Help**

The Help System is a reference of the features on the LEGO® MINDSTORMS™ ROBOTICS INVENTION SYSTEM™ hardware and software.

The Help System includes:

- the Programmapedia, a guide to solving common programming and robotics problems
- RCX Reference, with information about the RCX and related hardware features
- RCX Code Reference, with details on the programming language
Clicking the WWW button launches the web browser for your computer. You must have a browser installed and an Internet connection or clicking the button will have no effect.

You can create a personal homepage where you can upload pictures of your robot and display programs. You can talk to other users, chat in the chat rooms, and access the forum. On-line tutorials will help you master programming and building. New challenges are placed available for downloading throughout the year.

Your Robotics Network membership card is enclosed in the RIS set. On this card, you will find your exclusive membership number which you will need when you log on for the first time.

http://www.legomindstorms.com