X80

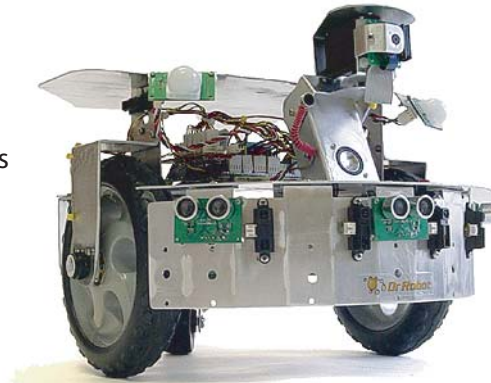**An Industrial Grade Robot for Research and Development Applications**

educational · research

residential · consumer

Product Information · March 2005

This ready to use mobile robot platform is designed for researchers developing advanced robot applications such as remote monitoring, telepresence and autonomous navigation/patrol.
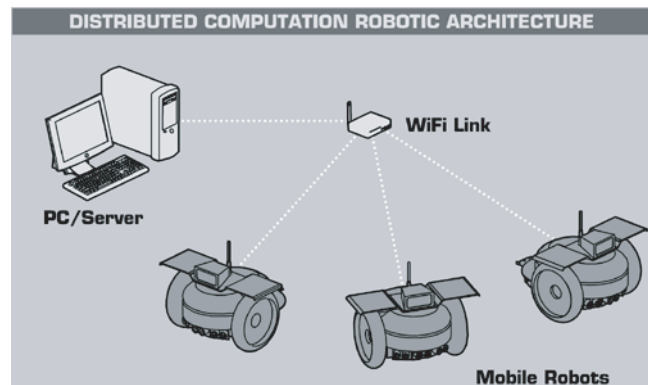
Mechanics

The X80 is the result of efforts to develop a robot that would be fast and strong, while itself remaining lightweight and nimble. The wheel-based platform's two 12V DC motors each supply 300 oz.-inches of torque to the X80's 18 cm (7 in.) wheels, yielding a top speed in excess of 1 m/s (3.3 ft/s). Two high-resolution (1200 count per wheel cycle) quadrature encoders mounted on each wheel provide high-precision measurement and control of wheel movement. Weighing only 3.5 kg (7.7 lb.), the system is light, but it can carry an additional payload of 10 kg (22 lb.).

Sensors

X80 offers full WiFi (802.11b) wireless, multimedia, sensing and motion capabilities and comes with a wide range of sensor, camera, and audio modules, sufficient to serve in any variety of applications. The X80 offers broad expandability as well for projects that may require additional sensors, even specialized modules. Powered by separate RC servo motors, the integrated camera head can pan and tilt independently.

Architecture

The X80's underlying technology evolved from Dr Robot's Distributed Computation Robotic Architecture, originally developed for Dr Robot's Humanoid (HR) Robot. Using this approach, high-level control of the robot is maintained by a remote or local PC/server communicating by a secure wireless link. Low-level functionality is managed by an onboard digital signal processor (DSP) while computationally intensive operations are performed offboard. The result is a robot that's lighter, draws less power, runs longer and is dramatically less expensive than a fully bundled or self-contained system. Moreover, since primary processing resides in a server, any hardware upgrades to the central unit are shared by all the robots it controls.

DISTRIBUTED COMPUTATION ROBOTIC ARCHITECTURE

With its integrated high bandwidth (11Mbps) WiFi 802.11 wireless module, the system can upload all sensor data (including encoder sensor readings) to a PC or server at rates in excess of 10Hz. Similarly, streaming audio (8Hz x 8bits) and video (up to 4 fps) either for direct monitoring or for

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The X80 includes all WiRobot development software components (for MS Windows 2000 and up), enabling easy access to all data and information in a standard Microsoft Windows programming environment (e.g., MS VB and VC++). Under the approach of using a separate PC for high-level control, there are no longer onboard restrictions on a mobile system's processing power, memory and storage.

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Versatile and service-ready, right out of the box

With the X80 system, researchers can develop a specialized intelligent robotic assistant, security robot or simply use it as a platform for a variety of projects built around applications such as human-machine interaction, mobile system navigation, robot behavior, image processing, object recognition, voice recognition, teleoperation, remote sensing, map building and localization etc.
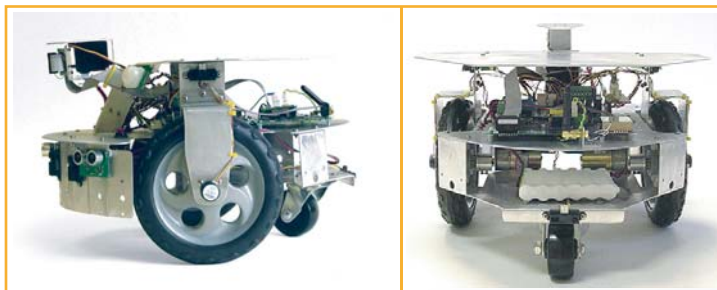
The X80 system is fully integrated and each robot is assembled and tested prior to shipping so that it arrives ready for use.

Availability

The X80 is presently available at a unit price of CAD$2795. Pricing inquiries for volume orders can be directed to **info@drrobot.com**.

Product Specifications

Mechanical and Control Highlights:

- Two 12V motors with over 300oz.-inch torque each
- 7 inch driving wheel
- Max speed of 1 m/sec
- Dimensions:
    - o 39.5 cm (15.5 inch) diameter
    - o 26.5 cm (10.5 inch) height
- Weight: 3.5 kg (7.7 lb.)
- Large top mounting deck for additional devices such as a notebook computer
- Additional carrying payload: 10 kg (22 lb.)
- Pre-programmed fine speed and position control achieved by an integrated PMS5005 module employing two 1200 count per wheel-cycle quadrature encoders.

Electronic System Highlights:

- Fully integrated WiFi (802.11b) system with dual serial communication channels (max of 912.6 Kbps per channel), supporting both UDP and TCP/IP protocol.
- Full color video and two-way audio capability. (CMOS color image module and audio module are fully integrated.)
- Battery: 3800mAh with over 3 hours for nominal operation.
- Collision detection sensors include 3 sonar range sensors and 7 IR range sensors
- Additional sensors such as supplementary sonar sensors, temperature sensors, acceleration/tilting sensor, or customized sensors can be added.

Applications: [E] **educational/research**   [C] **residential/consumer**

Components:

Code	Description	Qty
X80-ME	X80 Mechanical Construction Set	1
PMS5005	Robot Sensing and Motion Controller	1
PMB5010	Multimedia Controller	1
MDM5253	DC Motor Driver Module with Position and Current Feedback	1
MCI3908	Color Image Module with Camera	1
DUR5200	Ultrasonic Range Sensor Module	3
DHM5150	Pyroelectric Human Motion Sensor Module	2
GP2Y0A21YK	Sharp IR Distance Measuring Sensor	7
MCR3210	RS232 Interface Module	1
WFS802b	WiFi 802.11b Wireless Module	1
BAS8100	8Ohm 1W Speaker	1
MAC5310	Audio Codec and Audio Power Amplifier Module	1
SAM5247	Uni-directional Electret Microphone	1
CCR2150	RS232 Cross-over Serial Cable	1
-	Servo	2
-	DC Motor	2
BPN7240	7.2V Ni-MH 3800mAh Battery Pack	1
2300333	7.2V/9.6V Ni-Cd/Ni-MH R/C Pack Charger	1

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