6270 Technologies Catalog

6270 Technologies
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The goal of 6270 Technologies is to try to provide access to the 6.270 technology developed at MIT for the 6.270 Course. The main products are the 6.270 boards, LEGO, batteries, and spare parts, but now we are trying to distribute additional mobile robot kits.

SPECIALS

All specials are delay delivery specials. Orders must be placed by October 20th, and delivery will be by the end of November.

RUGWARRIOR-U
Unassembled Rug Warrior mobile robot kit. Includes all components to build a Rug Warrior from the book *Mobile Robots:Inspiration to Implementation* by Jones and Flynn. Contains the parts listed in the book to make the processor board with the PCB board. Also included are enough LEGO pieces to build the chasis for the robot, the servos to allow the robot to move, a copy of the public domain IC, with manuals, and a serial download cable. This kit will allow you to get going with your Rug Warrior project. This is a special offer good until October 31st. Delivery will be by mid December, so this is an ideal holiday gift.
Cost: $300 Shipping: $15

6270RBK-US
Unassembled Rev 2.21 6.270 board kit which contains the part to make the 6.270 controller system described later. Includes assembly manual. Place an order by October 31st, and delivery will be by the end of November.
Cost: $140 Shipping: $7.50

6270RBK-AS
Assembled Rev 2.21 controller and expansion boards with parts for remaining boards win the 6.270 controller system. Includes assembly manual. Place an order by October 31st and delivery will be made by the end of November.
Cost: $300 Shipping: $7.50

6.270 Controller System

The 6.270 Controller System is comprised of 3 main components and 2 side components. The heart of the system is the Controller Board, Expansion Board, and LCD. The system was designed to teach undergraduates at MIT about robotics, and systems intergration during a one month intensive course. The boards were designed to allow for flexibility and creativity in the robots the students built. Therefore, the boards do not contain any sensors built on them like the Rug Warrior system, but instead contain ports in which you can plug your sensors and actuators into

Controller Board

The 6.270 system is based on the Motorola 6811 microprocessor with a 32K RAM. The controller board can run on its own, but an additional expansion board allows for more ports and an LCD helps in debugging the system. The memory is battery backed with the processor batteries in place. When using the Interactive C environment, about 16K is available for programming space.

Outputs:
The controller board features the control of 4 bidirectional motors. The motors are controlled through dual H-Bridge circuits to allow for separate motor battery and controller battery power. Using the IC environment, the motors can be pulse width modulated to get different speeds. In addition, the currents supplied to the motors are fed back to the processor's A/D to give you access to how hard the motors are working. In addition to the motor outputs there is a 40kHz modulated output which can be used for ultrasonics, or IR transmission. An LCD can is connected to the board to allow for printing of states and values. This assists in debugging the system. Also one servo output.

Inputs:
The board has 8 digital inputs and 4 analog inputs. Two of the digital inputs can be used to read shaft encoders and as accumulators. Four of the inputs can be used with the IR transmitter to look for specific frequencies with the IC environment. There is a serial input to connect to a host computer for downloading.

Expansion Board

The expansion board provides for an addition 2 bidirectional motor outputs, and multiplexes the analog input into 16 analog inputs. There are 4 dip switches and a frob knob for whatever comes to mind. There is also a prototyping space where you can interface your own circuits to the board.

IR Transmitter

The IR transmitter board is used for broadcasting IR in all directions. In the MIT contest, each robot transmits a modulated 40kHz of IR so the other robot(s) can locate it. This in conjunction with the SHARPIR can allow for robot interaction.

Battery Charger Boards

The battery charger board is used for recharging the Gates Cyclon batteries configured for 6 Volts.

6270RBK-U -- Unassembled 6.270 Board kit Cost: $225 S&H: $5

Unassembled kit containing all the parts for the 6.270 controller system. The unassmbled kit is not recommended for people who do not have soldering experience. It contains the assembly manuals.

6270RBK-AX -- Assembled 6.270 Board kit
Contains fully assembled 6.270 controller board, and expansion board. The IR transmitter board, battery charger and LCD are unassembled, but the parts are included. The 6.270 microprocessor system is fully functional and in operational condition upon arrival. This prevents endless time in debugging and soldering that you may not want to spend.
Cost: $375 S&H: $7.50

Complete 6.270 Kits

The set of 6.270 kits provides you with a complete set of components to explore mobile robots. The kits were designed similar to the kits that are given to the MIT 6.270 students. They have been used at other Universities and for robot competitions. The kits are based on the 6.270 Controller system, and the LEGO Dacta system. They allow you flexibility to design many different types of robots from task specific to generic robots. These kits are idea for setting up a course or a robot compeition

Included in the complete kits:

1. 6.270 Controller System (assembled or unassembled) described earlier.
2. 6.270 manuals. These are the course notes that are handed out to the students when they are taking the course at MIT. It includes information about the boards, LEGO, senors, and Interactive C.
3. LEGOKIT1. Contains LEGO for building the chasis and appendages for your robot. See LEGO section in the catalog for more information.
4. Sensors. Assortment of touch sensors that can be used as bump sensors, or internal switches for actuators. An assortment of IR transmitter reciever pairs which can be used for reflectance, shaft encoding, or determining ambiant light. Also contains CdS photocells for regular light. The Sharp IR sensors are included for detecting 40kHz of IR light.
5. Motor Batteries. Contains 2 sets of Gates Motor batteries. One can be recharging while using the other set. These batteries are combined in series to provide 6V at 2.5ahr.
6. Acutators. 4 Mabuchi motors which can be interfaced with the LEGO system, and one servo.
7. Serial Cable. Serial cable to connect a DB9 RS232 with the controller board.
8. Interactive C. Pubically available version of Interactive C. To get an upgraded verion with One year of support for version 3.0 Please add $70.

6270KIT-U --Unassembled Controller Cost: $550
6270KIT-A --Assembled Contoller Cost: $700
Shipping: $15

LEGO PARTS

6270 Technologies offers discounts on spare parts and some Resource Sets from the LEGO DACTA line. Purchases from $100 to $300 receive 5% discount, $300 to $500 -- 10%, and over $500 is a 15% discount. These discounts apply to LEGO components that do not have a special price.

Since LEGO has been the key structural component to the 6.270 Robots developed at MIT, we offer two sets of spare parts which provide ample building material for small Mobile Robots. These kits are the same as the ones used in the MIT course. Other kits provide by LEGO such as the Resource Kits provide a good basic collection of LEGO.

6270 Technologies only deals with the LEGO DACTA division. We do not sell retail LEGO components. LEGO DACTA is the Educational division of LEGO System, and is used in schools throughout the school. We feel that it is a great tool along with the 6.270 System to teach systems integration between mechanical and electrical components.

Add 5% to LEGO Prices for Shipping.

Kits Assembled from Spare Parts:

TUTEBOT KIT: (TUTE-L)

Qty	Part No	Description	Retail
2	**9859**	**4.5V Motor**	**38.00**
1	**9851**	**Connectors and Toggle**	**24.25**
1	**9853**	**Gear Set**	**17.85**
1	**9855**	**Tire and Wheel Set**	**13.80**
1	**9856**	**Axel Set**	**15.50**
2	**9857**	**Plate Set**	**39.70**
1	**9858**	**Brick Set**	**23.25**
2	**9867**	**Touch Sensors**	**22.00**
1	**9861**	**Connecting Leads**	**19.00**
		Total Retail	**213.35**
		Special Price	**190.00**

LEGO ROBOT KIT I from 6270 Technologies (LEGOKIT-I)

Qty	Part No	Description	Retail
1	**9851**	**Connectors , Piston Rod**	**24.25**
1	**9852**	**Chain Links**	**18.00**
2	**9853**	**Gear Set**	**35.70**
1	**9854**	**Gear Racks**	**7.00**
1	**9855**	**Tires, Pulley Wheels**	**13.80**
1	**9856**	**Cross Axels**	**15.50**
2	**9857**	**Plates**	**39.70**
1	**9858**	**Red/Blue Beams**	**23.25**
1	**9862**	**Universal Joints**	**15.5**
.33	**9869**	**Base Plate**	**2.75**
1	**9871**	**Yellow Beams**	**15.50**
		Total Retail	**211.00**
		Special Price	**190.00**

No longer available after 1994

LEGO ROBOT KIT 2 from 6270 Technologies (LEGOKIT-II)

Qty	Part No	Description	Retail
3	**9822**	**Beams**	**42.00**
1	**9852**	**Chain Links**	**18.00**
1	**9854**	**Worm Gear Pack**	**7.00**
3	**9963**	**Bushings, Axel Ext.**	**27.00**
3	**9964**	**Connector Pegs**	**21.00**
5	**9965**	**8, 16 Gears**	**25.00**
3	**9966**	**24, 40 Gears**	**18.00**
1	**9967**	**Differential**	**6.00**
1	**9968**	**Pulley Wheels**	**6.00**
1	**9969**	**Tires**	**9.00**
2	**9970**	**Small Axles**	**12.00**
1	**9971**	**Large Axles**	**6.00**
4	**9972**	**Plates**	**48.00**
.33	**9869**	**Base Plate**	**2.75**
		Total Retail	**247.75**
		Special Price	**218.00**

If you would like images of these parts, or copies of a DACTA catalog, send email to pkoberoi@delphi.com

1994 LEGO DACTA CATALOG

1030 TECHNIC I Set
179 elements including gears, beams, pulleys, wheels, and more. 20 sctivity cards to build 29 models and 23 challeng problems
Retail Price: $60.00

9702 LEGO DACTA Simple Control Building Set (NEW ITEM 9V Motor). 220 elements, including grear, pulleys, beams, ets.
9 Volt motor, lamp, sound elements, and connecting leads. 4 Activity cards with step-by-step model building instructions. 4 Challenging models Plastic Tray
Retail Price: $67.50

1032 TECHNIC II Set
278 elements including chain links, differenetial gear, worm gear,etc. 4.5 volt motor and battery box for 3 'C' batteries. 20 activity cards. Storage Tray
Retail Price: $80.00

9605 4.5V TECHNIC Resource Set
1516 elements including many from the TECHNIC I (#1030) and TECHNIC II (#1032) (4.5 volt)sets.Large Storage Trays.Activity Cards are not included.
Retail Price: $206.00

9609 9V Technology Resource Set (NEW ITEM)1733 pieces including new elements such as: 9 volt motor,battery box, 9 bvolt wire system, cam wheels, axel extenders,and a metal crane hook.Building instructions are not included.Not compatible with the 4.5 volt materials.
Retail Price: $199.00

9820 Geared turntable
(12) Swivel Plate 1 x 2 studs - blue
(20) Turntable 2 x 2 grey
Retail Price: $5.75

9821 Rubber Bands
(1) String
(16) Rubber band - small
(32) Rubber band - medium
(24) Rubber band - large
(24) Rubber band - extra large
Retail Price: $14.00

9822 Beams (Red)
(24) Brick 1 x 2 studs
(16) Brick 1 x 4 studs
(8) Brick 1 x 6 studs
(8) Brick 1 x 8 studs
(4) Brick 1 x 10 studs
(4) Brick 1 x 12 studs
(4) Brick 1 x 16 studs
Retail Price: $14.00

9823 Beams (Blue)
Same as 9822 except color

9824 Beams (Blue)
Same as 9822 except color

9825 Pneumatic Elements
(1) Pneumatic spring pump
(1) Pneumatic cylinder
(1) Two way valve
Retail Price: $7.00

9826 Pneumatic Tubing
2 x 100 cm black tubing
1 x 40 cm grey tubing
Tee connector
Retail Price: $11.25

9852 Chain Link Pack
(175) Chain Link
(54) Broad Link
Retail Price: $18.00

9854 Worm Gear Pack
(12) Gear Rack
(10) Worm Gear
Retail Price: $7.00

9863 Weighted Brick pack
(4) Weighted element (6 x 2 x 2) studs
Retail Price: $6.50

9864 Green building plates (3) (8 x 16) studs
Retail Price: $6.50

9876 Turntables
(2) TECHNIC Turntable
Retail Price: $8.50

9960 Crane hook, Cam, Propeller
(1) Crane hook
(8) cam gear
(4) Propeller
Retail Price: $7.00

9961 White Belts
4 x 2.0cm
4 x 2.4cm
4 x 2.8cm
4 x 3.3cm

Retail Price: $10.00

9962 Flat tiles
(4) 1 x 2 Flat
(4) 1 x 4 Flat
(2) 1 x 8 Flat
(2) 2 x 2 Flat
Retail Price: $7.00

9963 Axel Extenders, bushings
(12) Not sure
(32) Stop Bush
(24) Small pulley
(4) Universal joint
(16) Piston Rod
Retail Price: $9.00

9964 Connector Pegs
(16) Black Connectors (???)
(32) Grey Connectors (???)
(8) Connector peg with stud
(8) Connector peg with cross axel
Retail Price: $7.00

9965 Gears 8, 10 tooth
(10) 8 Tooth Gears
(8) 16 Tooth Gears
Retail Price: $5.00

9966 Gears 24, 40 tooth
(12) 24 Tooth Gears
(4) 40 Tooth Gears
Retail Price: $6.00

9967 Differential, bevel gears
(12) Bevel Gears
(1) Differential
(1) Small Differential (??)
(4) Crown Gears
Retail Price: $6.00

9968 Pulley Wheels
(12) Pulley Wheel
(8) O ring Tires
(2) Steering Wheel
Retail Price: $6.00

9969 Tires, Spoked Hubbs
(8) Small Tires
(4) Large Tires
(12) Hubs
Retail Price: $9.00

9970 Axels - Short
(4) 2 Stud Long Axel
(8) 3 Stud Long Axel
(12) 4 Stud Long Axel
(12) 6 Stud Long Axel
Retail Price: $6.00

9971 Axels - Long
(8) 8 Stud Long Axel
(8) 10 Stud Long Axel
(8) 12 Stud Long Axel
Retail Price: $6.00

9972 Plates (Red)
(24) Plate 1 x 2 studs
(8) Plate 1 x 3 studs
(8) Plate 1 x 4 studs
(8) Plate 1 x 6 studs
(8) Plate 1 x 8 studs
(4) Plate 1 x 10 studs
(8) Plate 2 x 10 studs
(8) Plate 2 x 8 studs
(4) Plate 2 x 6 studs
(8) Plate 2 x 4 studs
(4) Plate 2 x 3 studs
(4) Plate 2 x 2 studs
(2) Plate 4 x 4 studs
(2) Plate 2 x 10 studs
(2) Plate 4 x 6 studs
Retail Price: $12.00

9973 Plates - Blue
Same as 9972 except for color

9974 Plates - Yellow
Same as 9972 except for color

9262 438 Extra LEGO Bricks
Retail Price: $28.70

9454 LEGO Function Set (350 Pieces)
Retail Price: $42.45

9859 TECHNIC Motor 4.5 volt
Retail Price: $18.00

9860 Battery Box (4.5 volt)
Retail Price: $11.15

9861 Connecting leads (8)
Retail Price: $18.00

9867 Touch Sensor
Retail Price: $9.55

9892 Brick Separator (2)
Retail Price: $3.75

Spare Parts Sets

6270RBK-BB -- 6.270 Bare Boards
All 5 6.270 bare boards. There are no additional parts with this item. You must supply your own parts.
Cost: $30 S&H: $3

6270RBK-HP -- Hard to get parts for the 6.270 Board
These are parts that are difficult to get in small quantities. This item includes: (1) 68HC11A1, (1) 32K Static Ram, (5) L293D, (1) 52 pin PLCC socket, (1) 16X2 LCD, (1) DS12333-10
Cost: $80 S&H: $3

IBMCAB9 -- DB9 RS-232 to RJ11 cable for downloading to the microprocessor board.
Cost: $15 S&H: $3

IBMCAB25 -- DB25 RS-232 to RJ11 cable for downloading to the microprocessor board.
Cost: $15 S&H: $3

ICDISK -- IC on a disk for IBM PC's. Includes getting started manual.
Cost: $5 S&H: $3

SHARPIR -- Set of 4 Sharp IR Sensors GP1U52x
Cost: $15 S&H: $3

L293D -- $4.00

6270MAN -- 6.270 Notes
Includes section on IC, a new section on all the past contests, a section on getting familiar with the kit, and everything we distribute to the students in the MIT course.
Cost: $20

GATEBAT -- New Gates Sealed Lead Acid Cells
Sold in sets of three. These are the "Cyclon" cells that are D-size cells with a rating of 2.5AHr at 2V. 3 can be soldered in series to get 6V. Weight: .41 lbs per cell. Expected Float Life: 8 years. Peak power: (@135A) 135W. Cycle Life: 200 at 100% discharge on a daily basis, 2000 at 25% discharge. New cells !!!
Cost: $18.00 S&H: $5

VID-PAST -- Videos from past 6.270 contest. A collection of video clips from the past 5 years 93 -- RoboKnights ; 92 -- Robo Cup Soccer (unavailable); 91 -- RoboPong (15 min) ; 90 -- RoboPuck ; 89 -- King of the Mountain (10 min).
Order Form

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Fax: (617) 492-5425

Name: _____
Address: _____
_____
City: _____
State: _____ Zip: _____
Date Ordered: _____
Payment:
Check: _____ Money Order: _____
PO Number: _____
Telephone: _____
Fax: _____

Cost: $10 S&H: $3

VIID-93 -- Entire Video Footage from the 1993 RoboKnights competition.
Cost: $10 S&H: $3

TSA -- Touch Sensor Assortment
(2) Long Lever Switch
(2) Roller Switch
(4) Small Lever Switch
(4) Micro Lever Switch
(4) Micro Push Switch
Cost: $30 S&H: $3

LSA -- Light Sensor Assortment
(2) Break beam sensors
(4) IR transmitter/ Reciever Pair Bundle
(4) Phototransistors
(6) CdS Photo Cells
Cost: $30 S&H: $3

Shipping:All shipping will be done via UPS ground unless otherwise stated on order. If faster service is desired, please contact for shipping charges. Most parts are delivered from 2-4 weeks from the order date. International orders are shipped via Federal Express, and charges are sent to the recipient. Please contact for international shipping charges.

How to order:The best form of ordering is through the mail or electronic mail. You may also phone or fax in orders. The phone is: (617) 492-5425. The fax is on a voice line, but will switch if a fax is dectected. A check or approved PO must be recieved before any parts are shipped.

Payment:You may send a check/money order in the mail for the cost of the components and shipping. COD may be sent in the US, but not to Post Office Boxes, and there is no Fed. Express COD. An addition $5.00 service fee will be charged for all COD orders. Refused shipments will be subject to a 20% restocking fee and the shipping charges.