SELF-FUSING RUBBER TAPE
Stretch and wrap self-fusing rubber tape for a moisture-tight, insulating seal on electrical connections. High resistance to salt water, steam and oil. Stretch a 2-3" piece of tape and wrap it spirally around the object with a 50% overlap. Can be removed easily without leaving any residue. 1" x 16.4' roll.
CAT# SFT-5 $4.50 each

ALLIGATOR CLIP JUMPERS
5 test leads. 2" Clips.
CAT # HDTL-5 $2.75 each

SOLDERLESS BREADBOARD, 400 CONTACTS
Design and change circuits quickly and cleanly. Breadboards accommodate all sizes of dips and discrete components with lead diameters up to 0.032". Interconnect with solid hook-up wire (#22 AWG recommended). Wires and components can be used and re-used many times without damage to board or components. 400 tie points. 300 contacts on main board and 50 contacts on each of two power distribution strips. Distribution strips are removable.
CAT # PB-400 $4.00 each
10 for $3.75 each

2-CONDUCTOR LOCKING CONNECTORS W/ LEADS
Mating pair of polarized multi-pin connectors with wire leads. Pins on 2.5mm centers. Black nylon housing with release on male side of connector. Female side of connector can be snap-mounted into a rectangular chassis mounting hole. 12" color-coded leads, 22 AWG stranded wire on both connectors.
CAT # CON-240 $1.35 each
10 for $1.20 each • 100 for 95¢ each

6-24 VDC GEAR MOTOR, 1:84 RATIO
Hennkew# PZ22GR9120R-084BB Good quality 22mm diameter planetary gear brush motor. Smooth, quiet operation. Wide operating range, 6-24Vdc. Dual ball bearings. Rated 142RPM @ 24Vdc, no-load. 113 RPM with load. 6mm diameter x 14mm shaft with hole. 2mm diameter shaft at rear of motor. Overall length of motor and gearbox, 60mm. Solder lug terminals.
CAT# DCM-9120 $7.95 each

12 VDC ULTRABRIGHT WHITE LED, 5MM
Water-clear 5mm package. Clear in off-state. 12Vdc operation, built-in resistor. Operates at lower voltages with lower brightness.
CAT # LED-12WP 50¢ each
10 for 45¢ each • 100 for 40¢ each

ECONOMY PROJECT BOXES
Black ABS plastic project enclosure. Inter-locking lid secured with self-tapping screws. Interior slots for PC boards. Includes hardware.

TIME - TEMPERATURE - VOLTAGE METER
3 in 1 module -- clock, thermometer, voltmeter, using the DS3231 chip. Can display any one or cycle through all three. Power supply voltage: DC5.0 ~ 30V, Temperature range: -40 to 85°C, resolution 0.1°. Voltmeter range: DC5 ~ 30V. Dimensions: 40 x 13mm. Requires connector we suggest our CAT# CON-240. Requires power supply, any 5-30 Vdc 300 mA.
CAT # DCLK-1 $5.50 each

THROUGH-BEAM PHOTO-ELECTRIC SENSOR PAIR
SICK Optics WS15-D1130 / WE15-A1130. Photo-electric sender and receiver pair detects the presence of an object when the beam between the two is interrupted. When the beam is broken, the receiver produces a current that can be used to trigger an audio-visual signal or relay-operated device. 5 Meter range. Built-in LED alignment and power indicators. Modules are 38 x 21 x 16.2mm and can be front or side-mounted. Front-mount hardware is included. Operate on 10-30Vdc. Power supply not included. cULus.
CAT # OSU-1130 $15.00
$11.35 pair

HIGH VOLTAGE TASER COMPONENT
Converts 3.7 Volts to approximately 18,000 Volts. The main component in a taser/ stun gun, it creates quite a spark and a loud crackling noise when the probes are within 1/2" inch of each other. 1.35" x 1.55" x 0.31". The output leads have pointed probes attached. Warning: Operate carefully!
CAT# HVS-01 $9.90– $7.50 each

VISIT OUR WEBSITE - WWW.ALELECTRONICS.COM
**JOYSTICK SHIELD**

Turn your Arduino board into a gamepad similar to a Nintendo controller. Can communicate with other wireless interfaces. Features the Nokia 5110 LCD / nRF24L01 interface. Seven push buttons (four big, two small, joystick select button) and a two-axis thumb joystick. Operates on 3.3-5Vdc. Board dimensions 83mm x 54mm.

**CAT # HC-05**

$8.50 each

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**HC-05 BLUETOOTH MODULE**

HC-05 / ZS-040 Bluetooth module. 37 x 16.5 x 4.0mm pc board with 6-pin header. Can be set for master or slave operation. Onboard 3.3V regulator. Operates on 3.3-6V. For use with Arduino.

**CAT # HC-05**

$8.50 each

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**LIGHT SENSORS**

**CdS PHOTOCELLS – PHOTO RESISTORS**

Light dependent Cadmium sulfide (CdS) resistors. Plastic coated resistors on ceramic, 0.2-0.25" diameter. Light and dark resistances are approximate.

- 2MO Dark 1K – 60KO Light
  - **CAT# PRE-24** 1.25 each
  - 10 for $1.10 each

- 30K Dark – 1.5K Light
  - **CAT# PRE-25** 95¢ each
  - 10 for 85¢ each

Arduino-style Module

Approximately 100Ω light, 10KΩ+ dark resistance. 0.60" x 0.75" pc board with 3-pin output, 0.10" spacing.

**CAT# SE-12** $2.40 each

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**VOICE RECORD / PLAY MODULE W/ SPEAKER**

Based on the ISD1820 chip, this multiple-message record/playback device offers true single-chip voice recording, non-volatile storage, and playback capability for 8-20 seconds. Features on-board microphone as well as internal audio amplifier which can drive the included 8 Ohm 0.5W speaker directly. Can be manually operated with on-board pushbuttons or by microcontroller. Supply voltage 3.3-5 Vdc. Board dimensions 54mm x 38mm x 15mm high.

**CAT # ME-63S**

$7.00 each

Above module without the speaker, **CAT # ME-63** $6.00 each

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**INFRARED SENSORS**

**LINE FOLLOWING / REFLECTIVITY SENSOR**

Measures the reflectivity of a surface using infrared emitter/detector pair. Built around the LM393 comparator, it requires only 3 connections, V+, 5Vdc, and GND. LED indicator. Can make a robot follow a painted line or count rotations of a motor shaft. 1.64" x 0.42" x 0.40". Three pin header, 0.1" centers. Operates on 3.3-5Vdc. 20mA @ 5Vdc.

**CAT# ST-1140** $3.50

$2.75 each

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**IR OBSTACLE AVOIDANCE SENSOR**

Uses IR beam to detect proximity of obstacles. Great for sounding an alarm or changing direction of a robot or self-propelled vehicle. Potentiometer to adjust detection distance (2-40cm). Supply voltage 5 Vdc. 45mm x 16 mm x 9mm.

**CAT# ST-1081** $2.75 each

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**PIR SENSOR**

HC-SR501 Passive InfraRed (PIR) motion sensor can be used alone or with Arduino or other microcontroller. Adjustable sensitivity and timing. 33 x 24mm pc board. 25mm overall depth.

**CAT# PIR-7** $4.95

$3.25 each

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**INFRARED SENSOR**

RE 200B passive infrared sensor. Two active elements helping compensate for differences in environmental temperature. Used in alarm systems and automatic switches that respond to human body motion. Hermetically sealed TO5 metal case with 3 leads.

**CAT# PIR-200B** $1.00 ea. • 10 for 90¢ ea.
ULTRASONIC SENSORS

ULTRASONIC DISTANCE SENSOR
The HC-SR04 is an affordable proximity/distance sensor that can be used for object avoidance in various applications from robotics to car parking. The module has integral ultrasonic transmitters, receiver and control circuit and is for use in conjunction with Arduino boards. 45 x 27 x 17mm.

CAT# UST-4 $4.50 each

ULTRASONIC TRANSDUCER
Matsushita #0D24K2.
0.95" diameter x 0.38" metal case.
0.65" long pc leads on 0.4" centers.

CAT # XDR-24 4 for $1.20

32 KHZ ULTRASONIC TRANSDUCER
Nippon Ceramics R32-16CN
0.64" diameter x 0.37" metal case.
0.70" long pc leads on 0.45" centers.

CAT # UST-32 4 for $1.40

40 KHZ ULTRASONIC TRANSDUCER
Nippon Ceramics AT40-12PK
0.50" diameter x 0.36" black plastic case.
0.30" long pc leads on 0.32" centers.

CAT # UST-40P 4 for $1.40

TEMPERATURE SENSORS

TMP36 TEMPERATURE SENSOR, TO92
Low voltage, precision centigrade temperature sensor. It provides a voltage output that is linearly proportional to the Celsius temperature. It also doesn't require any external calibration to provide typical accuracies of ±1°C at +25°C and ±2°C over the -40°C to +125°C temperature range.

CAT # TMP-36 $2.50 $2.00 each

DIGITAL TEMPERATURE SENSOR
DS18B20 1-Wire digital temperature sensor. Reports degrees C with 9 to 12-bit precision, -55°C to 125°C (+/-0.5°C). Each sensor has a unique 64-Bit Serial number etched into it - allows for a huge number of sensors to be used on one data bus. The corner stone of many data-logging and temperature control projects.

TO-92 package.

CAT# DS18B20 $1.50 each

TEMPERATURE / HUMIDITY SENSOR

CAT# SEN-4 $3.50 each

DIGITAL TEMPERATURE SENSOR MODULE
Dallas DS18B20 temperature sensor chip mounted on a pc board with pins for plug-in use with Arduino and other platforms.

CAT # TS-12 Reduced Price $2.75 each

TEMPERATURE SENSOR
National Semi # LM34DZ
Precision Fahrenheit sensor. Voltage is linearly proportional to the temperature. Operates on 5-30Vdc TO-92 package.

CAT# LM34DZ $3.30 each

THERMOSTATIC CONTROL MODULE
Digital module can be programmed to turn equipment on or off at specific, pre-set temperatures. Also has hysteresis setting, delay setting, upper-limit setting and upper limit alarm setting. Displays temperature in Celsius on 3-digit LED display. On-board 20A relay. Waterproof temperature sensor. Three buttons for navigating temperature parameters and other functions. Operating voltage 12 Vdc. Overall dimensions 48mm x 40mm x 14mm.

CAT # THM-4 $6.00 each

TEMPERATURE SENSOR MODULE
Ntc thermistor sensor. LM393 voltage comparator for clean output waveform. Driving ability more than 15mA. Working voltage 3.3V-5V. Digital switching outputs (0 and 1). PC board. 32 x 14mm.

CAT # SEN-19 Reduced Price $1.50 each

HALL EFFECT SENSORS

HALL EFFECT SENSOR BOARD
44E938 and related components on a pc board designed for use with Arduino boards. 30 x 15mm overall dimensions. Operates on 5V.

CAT# SE-54 $2.25 each

HALL EFFECT SENSOR
Allegro MicroSystems # UGN3503U
Ratio metric, linear hall-effect sensor in a miniature three-lead plastic SIP package. Flat Response to 23 kHz. 4.5V to 6V Operation.

CAT# HES-2 $1.50 each

LINEAR MAGNETIC HALL SENSOR
Simple analog hall sensor module used for proximity switching, positioning, speed detection, and current sensing applications. Signal output is low when magnetic field is present, signal output is high when magnetic field is absent. LED indicator. Potentiometer for adjustable sensitivity. Operating voltage 5Vdc. 44mm x 15mm x 13mm.

CAT# SE-14 $2.50 each
FLOAT SWITCH WITH INTEGRATED THERMISTOR
Gems Sensors 222727
Horizontal liquid level float switch. For sensing rising or falling liquid levels (normally open or normally closed). Hermetically sealed magnet and reed switch for accurate, reliable long-life operation. Integrated 10k ohm NTC thermistor allows monitoring of liquid temperature as well. Threaded 13/16” male Nylon stem. Polypropylene float, 2.4” long from hinge to end. Four 10” leads, two for switch (red) and two for thermistor (green).
CAT# FLW-1 $3.50 ea. • 10 for $3.00 ea.

LIQUID LEVEL SENSOR
Float switch closes circuit when float rises to top of switch (end opposite leads). Can be used in opposite direction as well to close circuit when water level drops. 0.96” diameter plastic float and 0.35” threaded bushing with plastic nuts and rubber O-ring. 2.64” overall length. 14” pigtail leads.
CAT # FLW-2 $3.35 each

LIQUID FLOW SENSOR
Measures the rate of liquid flowing through it. Consists of a plastic valve body, flow rotor and hall effect sensor. When liquid flows through the sensor, a magnetic rotor will rotate and the rate of rotation will vary with the rate of flow. The hall effect sensor will then output a pulse width signal. Can be used with a microcontroller such as Arduino to monitor devices. Operates on 5vdc @ 15mA. Water flow range 0.3-6 L/min. Water pressure <0.8MPa. 4mm I.D. x 6mm O.D. inlets. Overall dimensions 35mm x 35mm x 26mm. 6” 3-wire leads with 3-pin connector.
CAT # FLW-3 $5.00 each

FLUID PRESSURE SENSOR
Using a 5 Vdc input, the fluid pressure sensor provides a 0.25 - 4 Vdc output proportional to pressure from 0-5” H2O max. Typical applications include duct air flow, filter pressure monitoring, combustion air flow and gaseous leak detection. Measures 1-5/16” x 17/32” on a pair of 7/8” long slotted mounting wings. Two 3/16” O.D. barbs. 3-pin connector with 3” wire leads for power and output.
CAT # FLS-4 $3.15 each

MOTION / VIBRATION SENSORS

MERCURY TILT SWITCH
Glass bulb with mercury bead that closes circuit when tilted above position parallel to ground. 4mm dia. x 13mm long bulb.
CAT # MS-121 2 for $1.00

MERCURY TILT SWITCH
Single-pole, plastic encapsulated tilt switch with 28” wire leads. When leads are up the contact is open. When leads are down the contact is closed. 1.47” x 0.35” x 0.39”. Double stick tape on back.
CAT # MS-230 $7.00 each

3-AXIS ACCELEROMETER
The ADXL335 is a small, thin, low power, complete 3-axis accelerometer with signal conditioned voltage outputs. Measures acceleration with a minimum full-scale range of ±3 g. It can measure the static acceleration of gravity in tilt-sensing applications, as well as dynamic acceleration from motion, shock, or vibration.
CAT # ACX-61 $8.95 each

PHOTO DETECTOR
Photonic Detectors Inc # 1541-80A Miniature photovoltaic cell in a 5mm diameter LED-type package. 0.53Vdc. CAT# PD-8 2 for $1.00 • 3 for 99¢

STEREO AMPLIFIER MODULES
Based on the PAM8610 chip, this little board just needs speakers, power and a signal source to provide lots of crisp, clear stereo sound. Operates on 7-15Vdc. The audio source (ie. Cellphone, MP3 player) provides the volume control. Clearly marked solder spots for easy assembly. 25 x 30mm pc board.
CAT# AMP-8610 $7.95 each

High-quality 3W stereo amplifier based on the PAM8403 chip. 24.5 x 15.0 x 3.5mm pc board. Low current drain. Operates on 2.5-5Vdc. Clearly marked solder or header connections.
CAT# AMP-8403 $4.00 each

CLOCK MODULE
The DS1302 trickle-charge timekeeping chip contains a Real-Time Clock/calendar. It communicates with a microprocessor via a simple serial interface. On-board CR2032 backup battery. Operates on 2.5-5VDC @ 300mA. 44mm x 23mm x 11mm.
CAT # ME-48 $3.00 each
**TRANSFORMERS**

**10V / 5V @ 5VA TRANSFORMER**
Triad # VPL10-500
Primary: 115/230V 50-60Hz
Secondary: Series: 10Vct @ 0.5A
 Parallel: 5V @ 1A
36.52 x 4.40 x 36.52mm h.
8" wire leads. ULus.
CAT# TX-105 $6.85 ea. • 10 for $6.65 ea.

**24V @ 30VA**
Part# YD5719-001.
Primary: 128 Vac, 60 Hz.
2.33" x 1.96" x 1.78".
Mounting holes on
3.10" centers. Four 5.5" wire leads. UL.
CAT# TX-2434 $7.95 each

**COUPLING TRANSFORMERS**

Midcom 671-1538.
Designed to reflect 600 Ohms on primary with 536 Ohms on secondary. 1.12" x 0.75" x 0.47".
CAT# TCTX-18 $2.75 each

Datatronic # SM501-1.
600:600 Ohms.
12.50 x 9.60 x 7.36mm. Surface-mount.
UL60950-1. Cut-tape (tape and reel) packaging.
CAT# TCTX-501 $2.00 each
10 for $1.80 each • 100 for $1.65 each

**IMPEDEANCE MATCHING TRANSFORMER**

Current Controls Inc. CC030517.
Primary: 60 Ohms, 10mH/0.8Q.
Secondary: 1K Ohms,
170mH/0.9Q @1KHz.
Secondary: 12K Ohms, 2.8H/1Q @ 1KHz.
0.78" x 0.66" x 0.48" high. PC pins.
CAT# MTX-4 $1.00 each

**VARIABLE TRANSFORMERS**

Input: 110 Vac
Output: 0 - 130 Vac
Fully enclosed variable transformers in ventilated steel cases with 6" power cord, 3 prong grounded receptacle, output voltage meter, on/off switch, fuse and power cord.

<table>
<thead>
<tr>
<th>Amps</th>
<th>Size</th>
<th>Weight</th>
<th>CAT#</th>
<th>Each</th>
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<td>3</td>
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<td>8 lbs.</td>
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<td>22 lbs.</td>
<td>SC-20M</td>
<td>198.00</td>
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**CURRENT TRANSFORMER**

**5A CURRENT SENSOR MODULE ZHT103**
A simple and effective way of monitoring current in your project. Accurate AC current measurement up to 5 Amps. A proportional voltage signal is provided on the output pin, at a 1000:1 ratio.
CAT# TXC-4 $3.85 each

**DC-DC UP/DOWN REGULATORS**

**1.2 AMP**
Input: 4-32V, 1.2A continuous current. 3A max.
Output: 1.25-35V adjustable. 1.90" x 0.98" x 0.5". Mounting holes.
CAT# UDC-5 $7.50 each

**7 AMP**
Input: 5-32 Vdc.
Output: 1-30 Vdc, continuously adjustable.
Output current: 7A continuous, 10A peak.
Output power: 80W continuous, 130W peak.
Output ripple: 50Mv. 1.83" x 3.05" x 0.58".
CAT# UDC-10 $27.50 each

**2A STEP-UP VOLTAGE CONVERTER**
Step-up voltage "Boost" converter based on the MT3608 chip.
1.47" x 0.69" x 0.25" pc board with solder spots for input and output voltage. On-board trimmer for adjustment.
• Input: 2-24 Vdc
• Output: up to 28 Vdc @ 2A
CAT# UDC-2 $4.60 each

**STEP-UP VOLTAGE CONVERTER**
XL6009 DC-DC UP voltage regulator (boost driver).
Input: 4-32V, 1.2A continuous current. 3A max.
Output: 5-35V adjustable. 1.90" x 0.98" x 0.5". Mounting holes.
CAT# UDC-3 $4.50 each

**DC STEP-DOWN REGULATORS**

Circuit based on LM2596 Step-Down regulator (buck driver).
Input: 4-40V. Output: 1.25-37V adjustable, 1.5A continuous current. 3A max.
With LED digital display and screw terminals. 2.6" x 1.4"
CAT# DCC-3M $12.50 • 10 for $11.95 each
1.95" x 0.96"
CAT# DCC-3 $7.95 each

VISIT OUR WEBSITE - WWW.ALELELECTRONICS.COM
CAIG CLEANERS, CHEMICALS & COATINGS

CONDUCTIVE SILVER/CARBON COATING CAIKOTE 44™
1 oz. Repair membrane buttons and keypads and other carbon and silver based surfaces. EMI/ESD shielding. Use on rubber, epoxy, glass and plastic surfaces. No mixing required.
CAT# CK-44 $12.00 each

DEOXIT® CONNECTION CLEANER
A fast-acting deoxidizing solution that cleans, lubricates, protects and improves conductivity on metal connectors, contacts and surfaces. It is ideal for stationary and moving contact connectors. Stabilizes connections between similar and dissimilar metals.
1.6mL bottle with mini-brush applicator. DeoxIT® D-Series D100L-16BX.
CAT# D100L $6.95 each
5 oz. spray can. DeoxIT® D5 CAT# D5S-6 $18.95 each

DEOXIT® GOLD CONNECTION CLEANER
DeoxIT® G-Series G100L-16BX. Formulated to improve conductivity, lubricate and protect plated connectors and contacts for maximum performance & protection. It deoxidizes minor amounts of surface contamination, penetrates plated surfaces and molecularly bonds to the base metals - NO OTHER PRODUCT DOES THIS. 1.6mL bottle with mini-brush applicator.
CAT# G100L $7.95 each

ADHESIVES

SUREHOLD® PYTHON GLUE
A high strength adhesive used to bond tough projects including wood, ceramics, stone, metal, brick, foam, fiberglass and more. Fully cures 72 hours. 2 fl. oz.
CAT# SH-352 $4.25 each

SUPER GLUE DOUBLE PACK
Bonds non-porous surfaces in seconds. Works on artificial nails, ceramics, crafts, china, jewelry, rubber, leather, wood, metal, many plastics and more. Two tube net weight 0.14 oz (4g) total.
CAT# SH-375 $1.99 pack

SUREHOLD® PERMANENT STRENGTH THREADLOCKER
CAT# SH-481 $1.99 each

90 SECOND EPOXY HARDENER
Surehold® 90 second epoxy. Self-mixing applicator tube dispenses with one push. Perfect for bonding glass, metal, china, glass, fiberglass, ceramics, etc. No mess, no spilling and no dried out tubes. Net volume: 24 mL.
CAT# SH-335 $3.95 each

TAPE AND SEALERS

3/4” X 60’ ELECTRICAL TAPE
Vinyl electrical tape, 3/4 inch x 60 feet. Suitable for use at not more than 600V and not more than 80ºC (176ºF). UL.
BLACK CAT# PET-1 $1.25 each • 10 for $10.00
COLORS CAT# PET-XX (XX=color) $1.25 ea. i.e. orange (OR), green (GN), brown (BR), blue (BL), grey (GY), red (RD), white (WT), yellow (YL)

COAX SEAL
A hand-moldable plastic material which quickly and effectively seals all types of coax fittings from moisture and corrosion. Stays flexible for years. Allows you to disconnect fittings and reseal them with the same material. Non-conductive. Adheres to vinyl and poly-vinyl insulation. 60” x 1/2” wide roll suitable for 9 fittings.
CAT# COS-1 $3.65 each

SELF-FUSING RUBBER TAPE
Stretch and wrap self-fusing rubber tape for a moisture-tight, insulating seal on electrical connections. High resistance to salt water, steam and oil. Can be removed easily without leaving any residue. 1” x 16.4’ roll. (0.8mm x 25mm x 5m).
CAT# SFT-5 $4.50 each

THERMISTORS

NTC – Negative Temperature Coefficient. Resistance drops as temperature increases.

10K OHM NTC THERMISTOR
5mm epoxy coated disc. 500mW max power rating. -20 to 125ºC operating temperature.
CAT# TNR-103 65¢ each
10 for 55¢ each • 100 for 40¢ each

10K NTC TEMPERATURE SENSOR
Gold-plated 3mm dia. x 14.5mm long probe compresses, with spring-return, into a 4.2mm dia. x 9mm long collar. Removed from new equipment in excellent condition.
CAT# THM-43 $1.00 each

INRUSH CURRENT SUPPRESSOR, 3.9 OHM
Murata # NTPAD3R9LDB0. 3.9 Ohm NTC thermistor. Current rating: 3.3A. Voltage: 264V.
CAT# TNR-3.9 65¢ ea. • 150 for 40¢ ea.