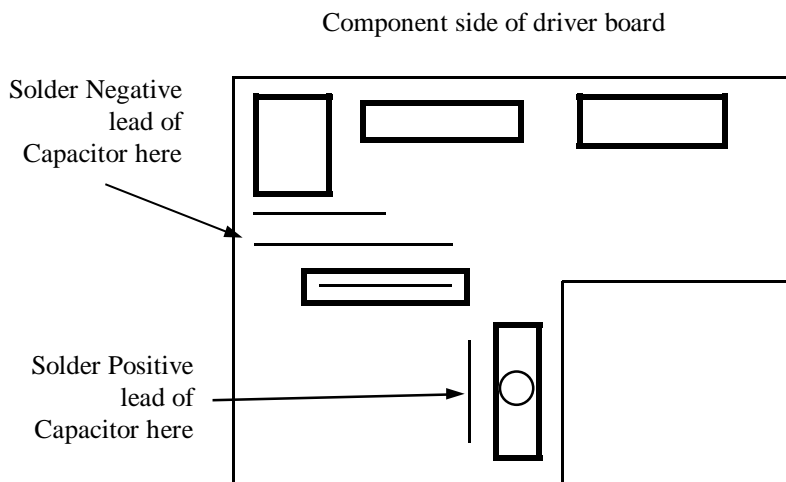# AROBOT

This application note describes how to attach a Polaroid Sonar (Ultrasonic) range finder to ARobot. Sonar will allow your robot to detect the distance to the nearest objects to aid navigation. The Polaroid sonar system includes a #6500 driver board and a transducer. Several transducers are available that will work with the #6500 driver board. You will have to modify the driver board, build a cable to connect the driver board to ARobot's controller board, and mount the driver board and the transducer to the robot's body. You may also mount the transducer on a movable servo motor to allow scanning.

Driver Modification

A 100uf 16 volt capacitor must be added to the driver board to prevent power dips during usage. This capacitor is available at most electronic supply stores including Mouser (www.mouser.com), DigiKey (www.digikey.com), and Radio Shack (www.radioshack.com) - RS catalog #: RSU-11935210. Mount and solder the capacitor to the driver board according to the drawing below. Notice polarity.

Component side of driver board

Solder Negative lead of Capacitor here

Solder Positive lead of Capacitor here

Cable

Next you'll need to make a cable to connect the driver board to the robot's expansion port. The expansion port uses a common 40 pin flat cable connector. Solder the wires from the 40 pin connector directly to the special flat cable which is normally provided with the driver board. If you don't have the special flat cable which attaches to the driver board, you'll need to solder the wires directly to the driver board. Follow the pin out shown. Make sure that the flat cable is installed in the driver board's connector correctly.

Cable Pinout

Expansion Connector	Driver Board Connector
2 (Gnd)	1 (Gnd)
3 (+5v)	9 (+5v)
9 (P4)	4 (Init)
10 (P5)	7 (Echo)
11 (P6)	8 (Binh)

See our web site at http://www.robotics.com/arobot for the latest additions to this information.

Very Important

The driver board and transducer my have 100 volts or more present at various locations. Do not touch!

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Mounting

Mount the driver board and transducer to ARobot's body using metal or plastic brackets and hardware as needed. Drilling of the body may be necessary – prevent metal filings from getting on electronic circuits. Make sure that no wire or exposed part of the driver board makes contact with any metal hardware or the robot's body.

Note: DO NOT place the driver board or transducer near the ARobot controller board or other controller boards to prevent electrical noise from causing malfunctions.

Software

```
'sonar example program.

dist      var    word    'sonar distance.
redled    con    10
speaker   con    9
                         'sonar pins.
init      con    4       'change these if needed.
binh      con    6
echo      con    5


output init              'sonar init.
output binh              'sonar binh.
output speaker           'speaker output.
output redled            'red led.
input echo               'echo pin.

                         'setup for sonar.
low init                 'init pin.
low binh                 'binh pin.

low speaker              'turn off speaker.
low redled               'turn on red led.


test
        gosub sonar        'get sonar reading.
        debug dec ? dist   'print it to serial port.
        pause 1000         'pause 1 sec.
goto test                  'loop back.


sonar
        high init          'hit transducer.
        pause 1            'pause for ringing.
        high binh          'raise inhibit.

        rctime echo,0,dist  'wait for echo.

        dist=dist/73+9     'dist has number of inches.
                           'offset for ringing is 9 inches.
                           'sound travels 1 inch in  73us.
                           'rctime increments 2us.

        pause 40           'give it a rest.
        low init           'reset sonar pins.
        low binh
        return             'done.
```

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