AIRMAR®

OPERATING INSTRUCTIONS

T1 Development Kit

IMPORTANT: *Please read the instructions completely before proceeding.*

Applications

- For use with Airmar's line of AT ultrasonic transducers.

- To aid in designing ultrasonic systems.

- Allows the designer to quickly and easily transmit and receive echoes.

Features

- Jumper selectable frequency and pulse width for optimal interfacing.

- Transmit pulse is amplified to 400 Vpp via a power MOSFET and transformer.

- Received echoes can be viewed at X1, X10, X100, and X1000 amplification.

Operation

1. Connect J4 to a 12 V power supply capable of at least 125 mA.
2. Connect the transducer to J5.
3. Aim the transducer directly at a flat reflecting surface.
4. Connect a scope to one of the four echo amplification positions on J3.
5. Insert jumpers J1 and J2 at the position corresponding to the AT model being evaluated. This sets the initial values for frequency, pulse width, and pulse rate.
6. Using P2, tune the operating frequency for the maximum echo.
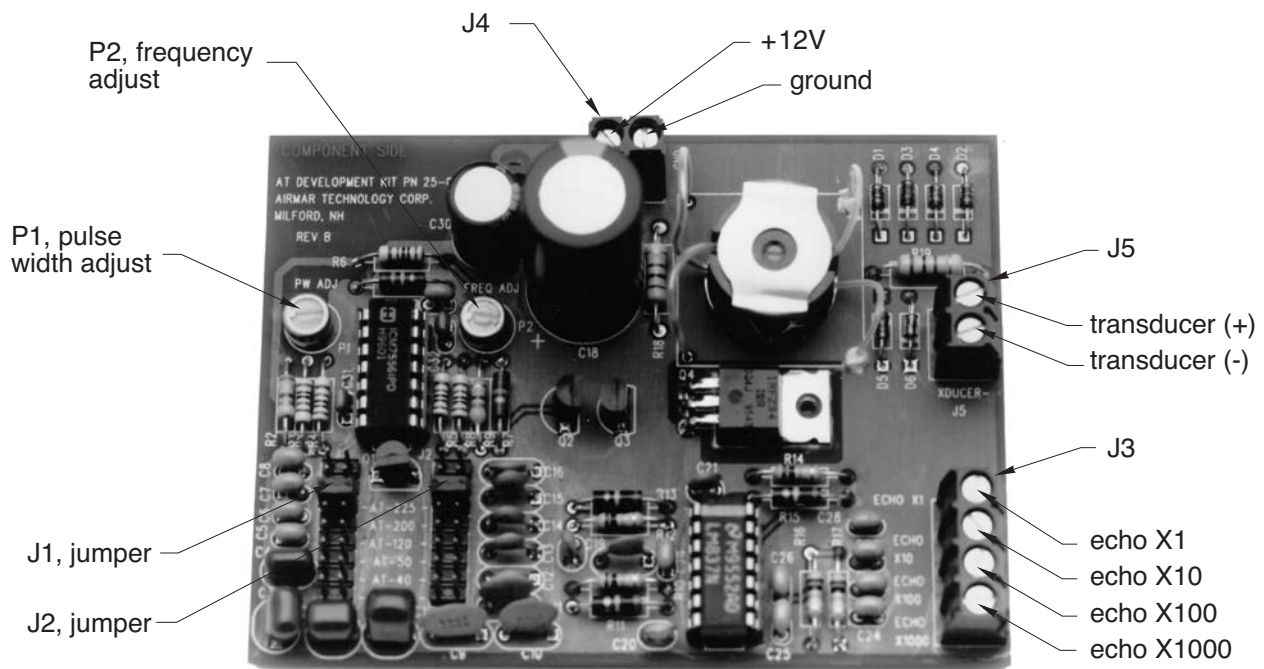7. Using P1, adjust the pulse width to give the desired echo width.

Figure 1. T1 development board

Table 1: Jumper position and adjustability

Model	J1 and J2 Position	Range	Pulse Rate	Pulse Width	Frequency
AT-25	1	80cm-30m	3Hz	120-2400μs	25-34kHz
AT-41	2	30cm-20m	5Hz	80-1600μs	35-46kHz
AT-50	3	25cm-15m	6Hz	60-1200μs	43-56kHz
AT-120	4	15cm-7m	10Hz	40-800μs	100-130kHz
AT-200	5	10cm-3m	25Hz	16-320μs	180-220kHz
AT-225	6	8cm-2.5m	25Hz	16-320μs	200-260kHz
Custom	7	—	—	—	—
Custom	8	—	—	—	—

Jumper Position and Adjustability

The currently available AT models with their corresponding pulse width and frequency adjustability using the T1 development board are shown on Table 1. (These values are approximate.)

Custom Application

Rows 7 and 8 on the table above are left open for the designer. On the T1 development board, insert the new capacitors at C7 and C15 and/or C8 and C16.

Calculate the capacitance value for C7 and/or C8 to produce a new minimum pulse width as follows:

C = PW/175, where C is in μF and PW is in μsec.

The maximum pulse width will be approximately 20 times the minimum pulse width. To find the capacitance value for C15 and/or C16 which will produce a new operating frequency, refer to Figure 2.

Alternatively, an external pulsed signal (such as one generated by a microprocessor) may be amplified and applied to a transducer using the T1 development board. In this case, disconnect the circuit at R9 (bypassing the signal generation portion of the T1 development board) and connect the external signal to Q2 and Q3.
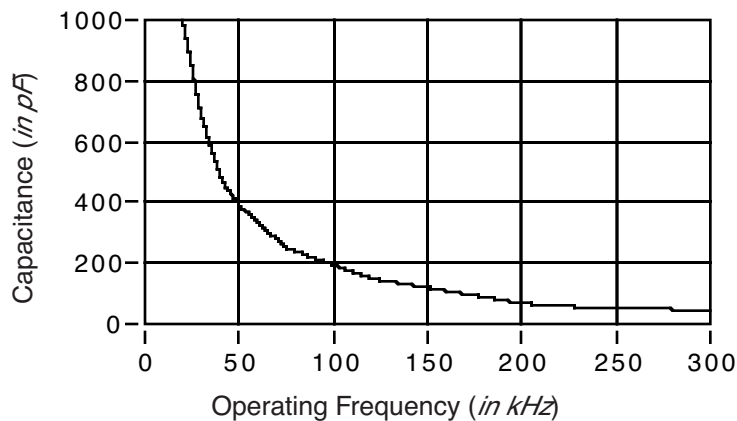

Figure 2. Capacitance vs. operating frequency