Info from New Focus, manufacturer of picomotors (MRAs), about picomotors on long wires

Add'l MRA cable length-impedance Entered 4/18/00 ESC

The cable for the MRA is a 4-wire telephone cable. The wire in telephone cable has a fairly small diameter (approximately 28 gage). With this type of wire the MRA cable can be extended up to a maximum length of about 25 feet (7.6 meters). Beyond this length the Picomotor will not function well because resistance in the long wire causes significant distortion to the high voltage waveform that drives the piezo.

Using thicker wire (something like 22 gage) it is possible to extend the MRA cable to longer distances (up to about 100 feet). In the MRA only two of the four wires are used, and so if you decide to cut and splice to make a longer cable, you only need to extend the yellow and green wires (the red and black wires are not connected).

Note that the overall cable impedance should be < 2 Ohms to ensure that the high voltage waveform will not be distorted.

Aside notes: Standard cable capacitance is approximately 10 pF/foot. You also want to keep the capacitance of the cable < 10 nF. Note that impedance will be the overriding factor.

Aside notes: Picomotor capacitance (standard 830X) is specified as 0.18 uF +(-) 20% (from PZT manufacturer)

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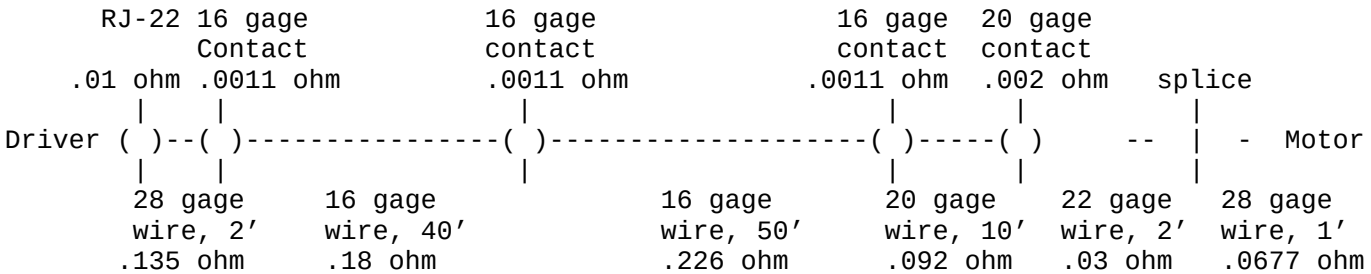
At Lockheed we designed, built, and successfully tested a 100', .75 ohm cable to drive the 8301-v picomotor (we calculated the resistance of the stock 25' cable at 1.1 ohms so this design has plenty of margin). Below are the lengths and gages of wire, the contacts in between, and the associated resistances for each link. The relationship between wire length and gage is proportional, so for resistance per foot, just divide the total cable length by the total resistance of that link. The key is the long stretch of 16 gage wire.



Sent to Eduardo Cortez from Lockheed, 4/21/2003.