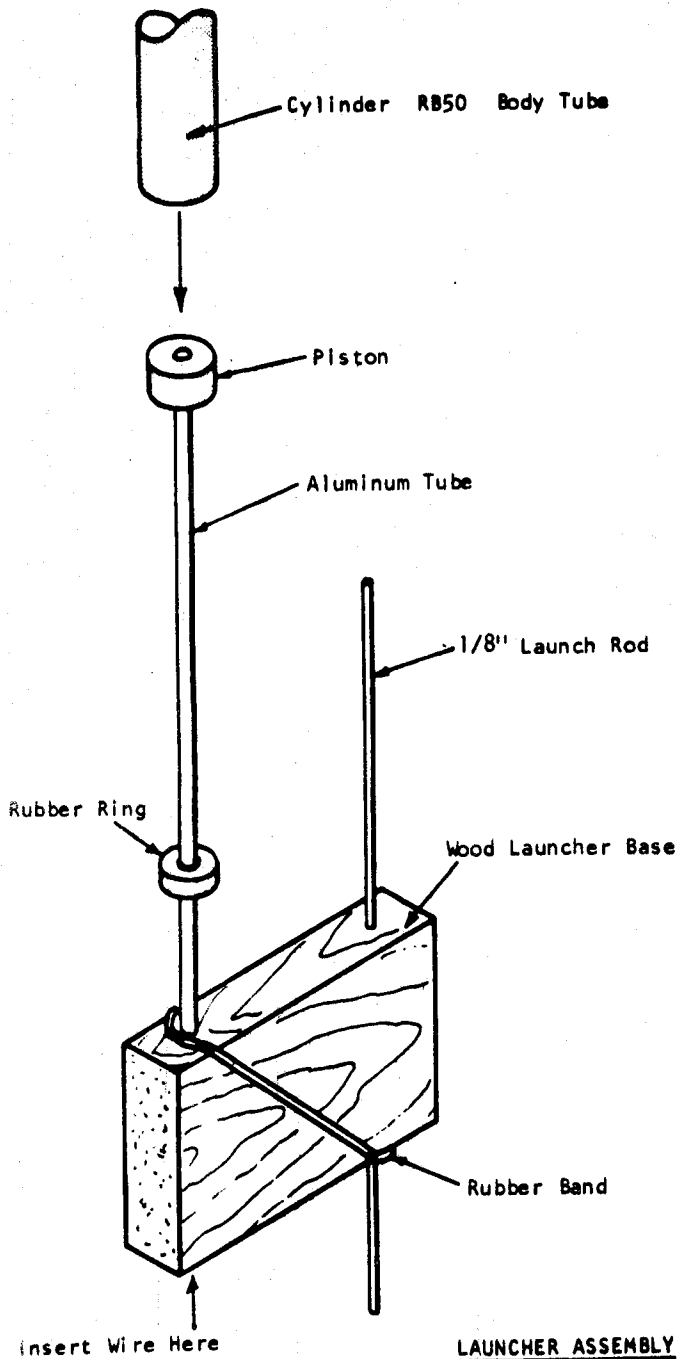
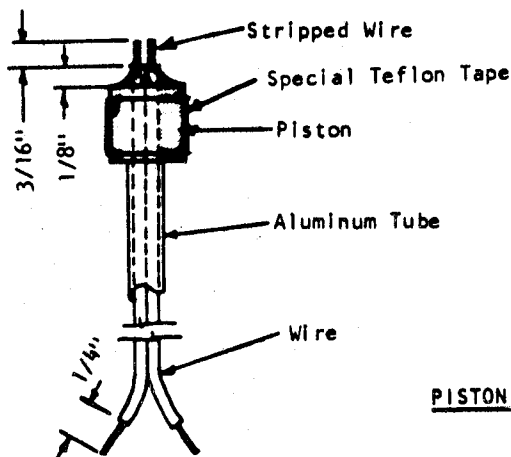


# Piston Launcher



LAUNCHER ASSEMBLY



PISTON DETAIL

## THE "BOOM TUBE"

The CMR Piston Launcher has been operating successfully for a number of years. It was used exclusively by the 1974 U.S. International Model Rocket Team at the 2nd World Championships held in Dubaica, Czechoslovakia on 4 to 9 September 1974, and enabled the U.S. to score numerous victories.

## THEORY OF OPERATION:

The Piston Launcher fits over a model rocket engine much the same way a cylinder fits around a piston in an automobile engine. The rocket engine acts both as a piston and a source of power. When the engine ignites, gases are expelled and build up pressure in the chamber formed between the piston and the rocket engine. Since the engine in the rocket is movable and the launcher is stationary the increasing pressure of the gas pushes the engine out of the cylinder. These gases which are normally wasted add additional velocity to the rocket at the moment of launch. No launch lug is required because of the additional velocity and the fact that the cylinder itself stabilizes the rocket during the first part of the flight. The lack of launch lug and the additional power produced by the piston can increase the performance up to 30% or more.

## ASSEMBLY:

Insert the aluminum tube into the hole in the wood base about 1".

Place rubber ring over the aluminum tube.

Push piston on aluminum tube until tube is flush with piston.

Prepare wire for installation by stripping 3/16" of insulation from each wire.

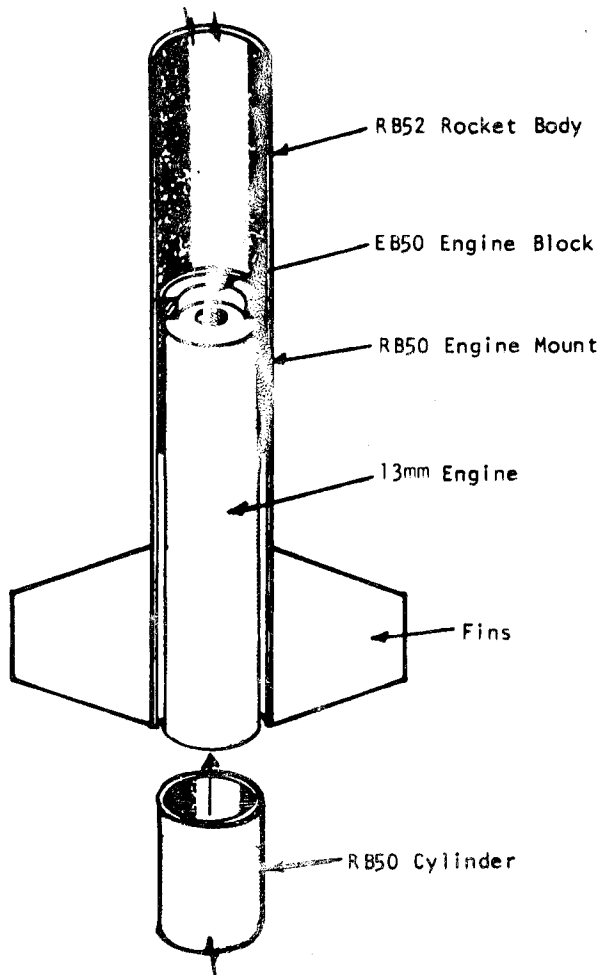
Insert the prepared end of the wire into the bottom of the aluminum tube and push it until 1/8" of the insulation is above the piston. Glue in place with a fillet of epoxy glue. Make sure glue covers entire face of the piston but not the sides.

A special Teflon tape is furnished to provide a smooth surface and a tighter seal. Cut a 3" piece of tape and remove the tape from the backing. Wrap it carefully around the piston. Check fit to insure a smooth operating cylinder. Remove or add tape as required.

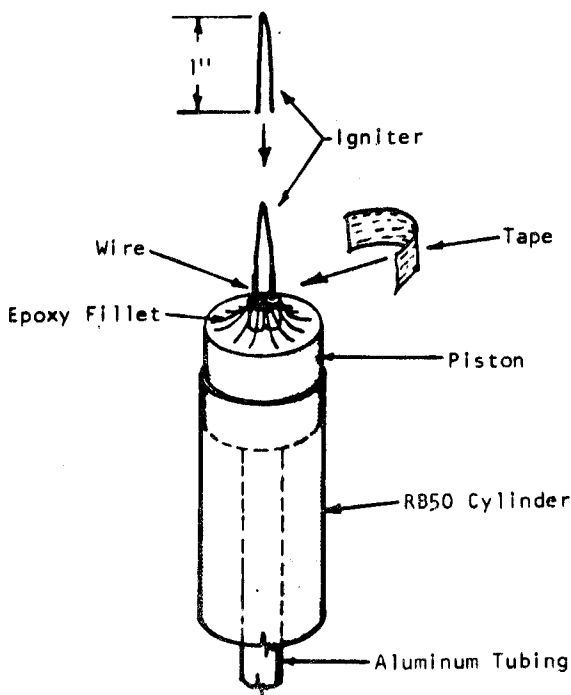
Strip about 1/4" of insulation off the wire sticking out of the bottom of the launcher.

Slip cylinder down over piston and push rubber ring into bottom of cylinder. Rubber ring acts as a stop and a guide for the cylinder.

The piston launcher is now ready for operation.



ROCKET CONSTRUCTION DETAIL



IGNITER DETAIL

To use the piston launcher safely and efficiently the model rocket must be designed to accept this system. The main body tube must be RB52 for 13mm MiniJet engines, or RB77 for 18mm engines. Since the cylinder is RB50 or RB74 it fits around the engine and into the body tube forming a seal and minimizing the chance of the rocket leaving the cylinder before it reaches the top of its travel. In no case should this launcher be used by just slipping it over the end of a protruding engine.

Build the rocket of RB52 or RB77 for the main body tube.

Make an engine mount of RB50 or RB74 1" long. Glue an engine block flush with one end.

Insert an engine in the mount and glue the mount in place with the engine flush with the bottom of the rocket body.

INSTALLATION:

The piston launcher is installed on a regular launch pad by merely slipping a rubber band and then the wood base over a 1/8" diameter launch rod. It is held in place by pulling the rubber band over the wood block to the junction of the block and the aluminum tube.

PREPARATION FOR FIRING:

Tape the engine on the forward end only and install firmly into the engine mount leaving the thickness of a body tube between the engine and the rocket. The cylinder slides up around the engine filling this space and completing the seal.

Bend an igniter in half and cut ends equally at 1".

Insert ends of igniter at least 1/8" into bare wires protruding from piston. Straighten and center igniter so that it will fit into engine nozzle when cylinder is attached to rocket.

Cut a piece of masking tape about 3/16" wide x 1" long. Put tape around the igniter and launcher wires. This protects the launcher wires from the blast and insures a good contact.

Place rocket carefully over the launcher so that the igniter is in the nozzle of the engine as far as it will go. Hold in place and gently slide the cylinder up around the engine.

The piston is now ready for firing.

Attach igniter clips to wires in base and fire the rocket in the usual manner.

CLEANING:

After the launcher is fired the residue from the engine usually coats the side walls of the cylinder. This has to be cleaned out or the tube replaced before the piston launcher can be operated properly for the next flight. Better operation is assured if the inside of the body is coated with epoxy, clear dope, silicon, teflon spray, etc.