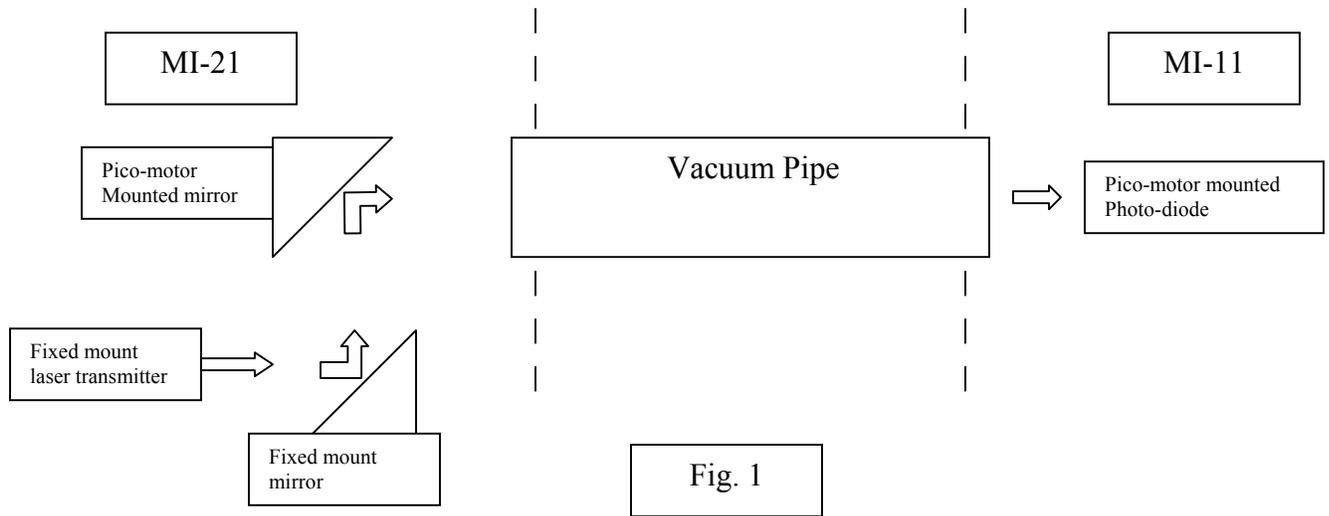


RECYCLER STOCHASTIC COOLING SYSTEM PICO-MOTOR MIRRORS

Dave McDowell

The Recycler stochastic cooling system utilizes a laser link communication system between the pick-up tanks electronics located in the MI-21 peanut and the kicker tanks electronics located in the MI-11 peanut. The three laser beams are transmitted through an underground vacuum pipe connecting the MI-21 & MI-11 peanuts. It is necessary to have a precise means of adjusting the laser beam position transmission at both the transmitter end (MI-21) and the receiver end (MI-11) in order to maximize transmission efficiency. This is accomplished by using pico-motor (piezoelectric transducer) driven mirrors at the transmitting end to control the laser beam angle and pico-motor mounted photo-diode receivers at the receiving end. See figure 1.



The pico-motors can be controlled via ACNET or locally with hand paddles. The transmitter motors are 3-axis motors and the receiver motors are multi-stage axis motors. The following ACNET device names control the pico-motors:

R:21P1	.5-4Ghz Laser Link Mot.		*
R:21P1A	.5-4Ghz Picomotor axis A	< >	
R:21P1B	.5-4Ghz Picomotor axis B	< >	
R:21P1C	.5-4Ghz Picomotor axis C	< >	
R:21P2	1-2Ghz Laser Link Mot.		*
R:21P2A	1-2Ghz Picomotor axis A	< >	
R:21P2B	1-2Ghz Picomotor axis B	< >	
R:21P2C	1-2Ghz Picomotor axis C	< >	
R:21P4	2-4Ghz Laser Link Mot.		*
R:21P4A	2-4Ghz Picomotor axis A	< >	
R:21P4B	2-4Ghz Picomotor axis B	< >	
R:21P4C	2-4Ghz Picomotor axis C	< >	

R:11P1H	.5-4Ghz Laser Link HORIZ		*
R:11P1A	.5-4Ghz Picomotor axis A	< >	
R:11P1B	.5-4Ghz Picomotor axis B	< >	
R:11P1V	.5-4Ghz Laser Link VERT		*
R:11P1AA	.5-4Ghz Picomotor axis AA	< >	
R:11P1BB	.5-4Ghz Picomotor axis BB	< >	
R:11P2H	1-2Ghz Laser Link HORIZ		*
R:11P2A	1-2Ghz Picomotor axis A	< >	
R:11P2B	1-2Ghz Picomotor axis B	< >	
R:11P2V	1-2Ghz Laser Link VERT		*
R:11P2AA	1-2Ghz Picomotor axis AA	< >	
R:11P2BB	1-2Ghz Picomotor axis BB	< >	
R:11P4H	2-4Ghz Laser Link HORIZ		*
R:11P4A	2-4Ghz Picomotor axis A	< >	
R:11P4B	2-4Ghz Picomotor axis B	< >	
R:11P4V	2-4Ghz Laser Link VERT		*
R:11P4AA	2-4Ghz Picomotor axis AA	< >	
R:11P4BB	2-4Ghz Picomotor axis BB	< >	

The digital control devices allow for the individual axis motors to be controlled via the step commands. The individual axis motors can be controlled by a MULT if desired (i.e. turning on device R11P4V allows axis motors R:11P4AA and R:11P4BB to be controlled either individually or via a MULT). The digital control devices are currently set to turn off after 10 minutes. Only one digital device can be turned on at a time. Turning on another digital device will automatically turn off the energized device.