Command:PM

This is a Tiger only command, that has different usage for micro-mirrors and piezos.

Micro-mirror

Shortcut	PM
Format	PM [axis]=[0 or 1] ...
Units	Integer code
Type	Axis-Specific
Remembered	Using [addr#]SS Z
Firmware Required	v2.8+

This command is “recycled” for a different use in MicroMirror axes than for piezo. In the context of a MicroMirror axis this command is used to put the axis in internal or external mode.

1 is external input mode. Mirror is positioned based on analog input voltage. Default mode until v3.10, except for SPIM-enabled systems.

0 is internal input mode. Mirror can be positioned thru serial command or onboard routines. Default mode for SPIM-enabled systems and v3.10+.

Example

```
PM A=1 B=1
:A
```

Puts the axes in external input mode

```
PM A? B?
A=1 B=1 :A
```

Queries the mode of axes

Piezo

Shortcut	PM
Format	PM [axis]=[0 to 3,+,-]
Units	Integer code
Type	Axis-Specific
Remembered	Using [addr#]SS Z

PM command sets the ADEPT card in various modes, Open Loop, Closed loop, Internal Input and External Input. In MS-2000 this is set by the ''PZ Z'' command; in TG-1000 either PM or PZ Z can be used.

PM [axis] =	**Mode of Operation**
0	TG-1000 input, Closed Loop (default)
1	External input, Closed Loop

PM [axis] =	Mode of Operation
2	TG-1000 input, Open Loop
3	External input, Open Loop
PM [axis]+	Fast Mode
PM [axis]-	Slow Mode

In Open Loop mode, a set voltage is applied to the piezo and the feedback from strain gauge is ignored. Useful during system calibration.

In Closed Loop mode, the voltage applied to the piezo is adjusted according to the feedback coming from the strain gauges. This is the default mode of operation.

TG-1000 input, in this mode the TG-1000 controller generates the positioning input for the piezo top-plate. This is the default mode of operation.

In External input mode, the piezo top-plate is positioned according to 0 to 10V analog signal provided by the user. Every one volt change moves the piezo 1/10 the range. We recommend that frequency of the signal be kept less than 10Hz for long moves, to give the piezo top-plate sufficient time to settle and come to a complete stop.

PM [axis]+ : Requires v3.10+ firmware and Rev M5 or later ADEPT card. Switches in a faster more responsive piezo position controller. However it is less stable and prone to oscillation. Suitable for 150um piezos.

PM [axis]- : Requires v3.10+ firmware and Rev M5 or later ADEPT card. Switches in a slower but more stable piezo position controller. Ideal for 300um or 500um piezos and when using heavier payload or samples.

The modes will revert back to default state, i.e. TG-1000 input with Closed Loop when system is powered off. Use the `[#Addr]ss z` command to save your preference.

The settings set with this command can also be done with PZ commands. One does not have an advantage over another; usage is left to user preference.

Tunable Lens (TGTLC)

Shortcut	PM
Format	PM [axis]=[0 or 3] ...
Units	Integer code
Type	Axis-Specific
Remembered	Using [addr#]SS Z
Firmware Required	v3.19+

This command is “recycled” for a different use in Tunable Lens axes than for piezo. In the context of a Tunable Lens axis this command is used to put the axis in internal or external mode, and also to enable or disable Temperature Compensation. Temperature compensation is only available when tunable lens is in TG-1000 input mode. When using external input(s), make certain that JP1 and/or JP2 have been changed. These jumpers determine whether the BNC connectors are used as TTL Output/Input or as analog inputs. With *Axis Mode 1* and *JP1:2-3 shorted*, the left BNC labeled **TTL OUT** becomes a 0-5v analog input. With *Axis Mode 3* and *JP2:2-3 shorted*, the right BNC labeled **TTL IN** becomes a 0-5v analog input.

PM [axis] =	Mode of Operation
0	TG-1000 input, Temperature Compensation disabled (default)
1	External input, Temperature Compensation disabled (Requires JP1: 2-3 shorted)
2	TG-1000 input, Temperature Compensation enabled
3	~~External input, Temperature Compensation disabled (Requires JP2: 2-3 shorted)~~

Note: Mode 3 not implemented as of Tiger 3.39 due to hardware limitations.

Example

```
PM R=1 S=1
:A
```

Puts the axes in external input mode

```
PM R? S?
R=1 S=1 :A
```

Queries the mode of axes

TGGALVO

Shortcut	PM
Format	PM [axis]=[0-7] ...
Units	Integer code
Type	Axis-Specific
Remembered	Using [addr#]SS Z
Firmware Required	v3.2+

For TGGALVO card, the bits 0-2 of the specified code sets the output range (values 0-7 in decimal). Bits 3-7 are reserved for future use. **Controller reset or restart (after doing [Addr#]SAVESET Z) is needed for setting to take full effect.** Note that the internal axis units remain from -4000 to +4000, but that range of internal units is mapped to the output range set using the PM command.

in case of **SIGNAL_DAC** or **DAC_XY** firmware, this operation is performed with Command:PR command instead.

Code (Decimal)	Code (Binary)	Output range
0	000	0V to 2.048V
1	001	0V to 4.096V
2	010	0V to 10.24V
3	011	not supported
4	100	-1.024V to 1.024V
5	101	-2.048V to 2.048V

Code (Decimal)	Code (Binary)	Output range
6	110	-5.120V to 5.120V
7	111	-10.24V to 10.24V

Example

```
PM A=2 B=7
:A
```

Puts the output A in 0-10V mode and output B in +/- 10V mode.

```
PM A? B?
A=2 B=7 :A
```

Queries the mode of axes

commands, tiger, piezo, micromirror, tlens, TGTLC, temperature