

Command:RTIME (RT)

General Usage

On MS2000 and RM2000

Shortcut	RT
Format	RT [X=report_time] [Y=pulse_length in ms] [Z=delay_time in ms] [F=num_aves] [M]±
Remembered	Using SS Z

On Tiger

Shortcut	RT
Format	[Addr#]RT [X=report_time] [Y=pulse_length in ms] [Z=delay_time in ms] [F=num_aves] [T=finish_error_time in ms] [M]±
Type	Card-Addressed
Remembered	Using [Addr#]SS Z

X: The X argument sets the time interval between report events when using the [TLL_REPORT_INT](#) firmware module. The report_time value has an acceptable range from 20 to 32700 milliseconds. The default value is 200 ms.

Y: The Y argument sets the length of the TTL output pulse in milliseconds when using any OUT0_mode that triggers a TTL pulse. (The Y arguments command has a slightly different usage on a TGLED card. Refer to TGLED card user guide for more details.) Note that this delay is prematurely ended (and TTL state set LOW) if any move is initiated. For automatic array scanning with TTL outputs, also use the Z argument below, to make sure the array does not move on before the TTL timer is finished.

Z: The Z argument sets the post-move delay time in milliseconds for array moves (using the [ARRAY MODULE](#)), and/or the delay between ring buffer moves when RM F is set to autoplay (mode 2, 3 or 4). Note that for ring buffer moves the delay time specifies the interval between attempted moves, whereas for arrays the delay specifies the time between arriving at the desired position and initiating movement to the next position. For ring buffer if the delay time is set to be 0 then the actual time between moves will be the axis loop time (generally 0.25 ms times the number of axes, e.g. 1 ms for a four axis card). For array moves, if [TTL Y=2 or 11](#) then this Z argument is normally set to be at least as long as as RT Y to achieve full-length TTL pulses. Note that this Z argument is distinct from the time set using the [WAIT](#) setting which introduces a user-set delay after landing at a position before the move is considered complete (affects both busy status and any TTL output pulse). **Important note for use with TTL Y=11 mode:** the timer that implements the RT Z setting starts counting when the XY stage lands, regardless of CRISP status.

F: The F argument is used with the [CRISP](#) firmware module. Set num_aves, the power-of-two exponent for the number of samples to be averaged ($2^N = \text{Number of Samples}$). The default value is 0, 1 sample, no averaging.

This feature performs a [rolling average](#) on the error correction signal ([LK Y?](#)), where the window size is the number of samples (2^N).

Table: Number of Samples

Number of Averages	
N	Samples 2 ^N
0	1
1	2
2	4
3	8
4	16
5	32
6	64
7	128
8	256

Tiger v3.34 required.

T: The T argument sets *finish_error_time*, which is the total amount of time that a motorized stage has to spend within the finish error of the target position at the end of a commanded move (PC setting) before the busy flag is cleared and the move is considered complete. Defaults to 3 ms (previously the setting didn't exist but its effective value was 0.5 ms).

MS-2000 v9.54 or Tiger v3.53 required.

M: The M argument enables [serial position reporting](#). Sending the command RT M+ enables the reports. To disable the reports send the command RT M-.

On Tiger with Micro-mirror for SPIM

Shortcut	RT
Format	RT [Z=delay_time] [F=scan_duration] [R=laser_duration] [T=camera_duration]
Units	Milliseconds
Type	Card-Addressed
Remembered	Using SS Z
Firmware Required	MM_SPIM

Sets up timings used in the high-level operation of SPIM state machine coordinated by Micro-mirror card. They are specified in ms with 0.25 ms resolution. These commands augment, not replace, the other RTIME parameters applicable to all TG-1000 cards. For SPIM state machine triggered by TTL after arming, these values are usually “locked in” during the arming step (i.e. upon SN X=97).

Z: *delay_time* is the delay between ring buffer moves just as normal, however it serves an added function: it is also the delay between the receipt of the trigger and the start of the SPIM state machine operation, allowing a systematic delay to be added. Note that resolution is 1 ms for this setting.

F: *scan_duration* sets the duration of each beam scan during SPIM operation. Total beam scan time will be multiplied by the number of scans (NR X). Introduced in v3.14; in v3.13 and earlier the value for SAF <axis> was used instead. Cannot be less than 1 ms.

R: *laser_duration* sets the duration that the laser control output stays high. Cannot be less than 0.25 ms.

T: *camera_duration* sets the duration that the camera trigger output stays high. Cannot be less than 0.25 ms.

All units in milliseconds and are currently rounded to the nearest 0.25 ms

On Tiger with MicroMirror and Phototargeting

Shortcut	RT
Format	[Addr#]RTIME [Y=laser_duration] [Z=delay_time]
Units	Milliseconds
Type	Card-Addressed
Remembered	Using [Addr#]SS Z

Y: The Y parameter *laser_duration* sets the time that the laser is turned on in milliseconds, essentially the same as TTL pulse length as described in the main TG-1000 programming manual. The setting applies to both moves initiated by **AJ** as well as to ring buffer moves. Normal moves using **MOVE** or **MOVREL** commands will not turn on the laser. Its value should be between 1 and 65000.

Z: The Z parameter *delay_time* is the delay between ring buffer moves just as normal. However if *delay_time* is less than (*laser_duration* + *settle_delay*) then the ring buffer behavior is unspecified. Its value should be between 1 and 16000.

On Tiger with TGLED

Shortcut	RT
Format	[Addr#]RT Y=[LED ON time on TTL trigger in ms]
Units	Time in millisecond between 1 to 65000
Type	Card-Addressed
Remembered	Using [Addr#]SS Z

Y: The RT command's Y argument is "recycled" for a different purpose for the TGLED cards. Here it is used to set the duration the LEDs stay on after a TTL trigger.

Other behaviors and function of RT command have been left unchanged. Refer to the TG-1000 programming manual for more info.

On Tiger with TGPMT

Shortcut	RT
Format	[Addr#]RT Y=[PMT overload reset pulse duration]
Units	Time in millisecond between 1 to 65000
Type	Card-Addressed
Remembered	Using [Addr#]SS Z

Y: The RT command's Y argument is "recycled" for a different purpose for the TGPMT cards. Here it is used to set the duration the Reset pulse to clear the PMT from Overload state.

Overload reset pulse is generated when the **LOCK** command is issued.

Example

Assuming TGPMT card address is **7**

```
7RT Y=100
:A
```

```
7RT Y?
:A Y=100.000000
```

On Phototrack systems

Shortcut	RT
Format	RT [X=report_time]
Remembered	Using SS Z

Sets the time interval between report events when using **TTL X=5** TTL triggered serial interface asynchronous reporting. The report_time value has an acceptable range from 20 to 32700 milliseconds. The default value is 200 ms.

To turn ON/OFF serial position logging first set the ttl_function to serial logging using **TTL X=5**. Then either RM command without any arguments, or a TTL pulse on the INPUT BNC will toggle the serial reporting function ON or OFF. To change the reporting time interval use **RT X=report_time**. Save any changes you wish to keep using **SS Z**.

With SERVOLOCK_TTL Function

Shortcut	RT
Format	RT [R= duration threshold]
Remembered	Using SS Z

Sets the trigger duration threshold for the SERVOLOCK_TTL functionality (pulses longer that the threshold are considered "long" = negative move and shorter are considered "short" = positive move. Restricted to units of 0.25 milliseconds. Defaults to 0.75 ms.

[commands](#), [led](#), [tiger](#), [ms2000](#), [tgled](#), [crisp](#), [ttl](#), [micromirror](#), [phototargeting](#), [tgpmt](#), [spim](#), [servolock ttl](#)

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