

# TCSng Commands

This is the most comprehensive list to date of the TCSng requests and commands.

## Requests

ALL Bulk information

Args: N/A

Returns: [MOT] [RA] [DEC] [HA] [UT] [ALT] [AZ] [SECZ] [Epoch]

MOT = (see MOTION)

RA(Right Assention) = HH:MM:SS.ss

DEC(Declination) = +DD:MM:SS.ss

HA(Hour Angle) = HH:MM:SS

UT(Universal Time) = HH:MM:SS

ALT(Elevation) = XXX.xx

AZ(Azmouth) = XXX.xx

SECZ(airmass) = XX.xx

EPOCH = EEEE.e

AZ Azimuth

Args: N/A

Returns: [ddd.dd]

BEAM Chop/Nod info for chopping secondary

Args: N/A

Returns: ???

CORRECTIONS String describing what corrections and rates are enabled/disabled

Args: N/A

Returns: MPNARFp+tob

M=Proper Motion

P=Precession

N=Nutation

A=Aberration

R=Refraction

F=Flexure

p=Parallax

+ =pointing model used... can change to a,b,c,d?

t=Sidereal

o=Object

b=Bias

If disabled, character will be replaced by "\_"

DATE date based on UT

Args: N/A

Returns: [MM/DD/YYYY]

DEC Declination  
Args: N/A  
Returns [ddmmss.ss]

DISABLE Output state  
Args: N/A  
Returns: 1 for disabled, 0 for enabled

DISEPOCH Current Epoch  
Args: N/A  
Returns: XXXX.x

EL Elevation  
Args: N/A  
Returns: [ddd.dd]

EQ Equinox  
Args: N/A  
Returns: XXXXX.x

HA Hour Angle  
Args: N/A  
Returns: [dd:mm:ss]

JD Julian Date  
Args: N/A  
Returns: [JJJJJJJ.j]

FLEXFILE Path and file name of current flex map Added by Scott  
12/2012  
Args: N/A  
Returns: [PATH/][pctcs\_.tp]

LIMITPROF Horizon limit profile as a function of azimuth Added by  
Scott 12/2012  
The first (and last) value given is the horizon limit  
at 0 degrees azimuth  
each subsequent value is a horizon limit at increments  
of 15 degrees of azimuth  
so the 2nd value is the limit at 15 degrees azimuth,  
the third is the horizon limit  
at 30 degrees azimuth etc.  
Args: N/A  
Returns [hh] [hh] [hh] [hh] ... (25 in all)

LIMIT limit status bits (ACCORDING TO JAVA GUI)  
Args: N/A  
Returns: this returns an 8 bit integer whose bits represent the  
following  
bit0(LSB) = RA

```

bit1    =    DEC
bit2    =    Derotator
bit3    =    Hardware Horizon
bit4    =    Software Horizon
bit5    =    Focus Upper
bit6    =    Focus Lower
a 1 indicates limit active, 0 indicates limit not active

```

LIMIT limit status bits (ACCORDING TO ERIC CHRISTIENSEN)

Args: N/A

Returns: this returns an 8 bit integer whose bits represent the following

```

bit0(LSB) =    RA/HA limit
bit1    =    DEC limit
bit2    =    derot.
bit3    =    hor. hard limit
bit4    =    hor. soft limit
bit5    =    focus lo limit?
bit6    =    focus hi limit?
a 1 indicates limit active, 0 indicates limit not active

```

LIMITINHIBIT limit inhibit status

args N/A

Returns: 0 if limits are active and 1 if limits are inactive

## SOFTLIMITS

[S1 and S2 limits are defined here](#)

SOFTLIMITS Software limit status

args N/A

Returns : 6 bit software limit status

```

bit 0 = RA S2
bit 1 = RA S1
bit 2 = DEC S2
bit 3 = DEC S1
bit 4 = Horizon S2
bit 5 = Horizon S1

```

[[tcs:limit\_logic|Limit Logic in TCS]]

MOTION Motion status bits

Args: N/A

Returns: this returns an 8 bit integer whose bits represent the following

```

bit0(LSB) =    RA/AZ
bit1    =    DEC/EL
bit2    =    FOC
bit3    =    DOME

```

bit4-8    =    undefined  
a 1 indicates axis in motion, 0 indicates no motion

PAD String describing hardware paddle button states

Args: N/A

Returns: any combination of the following characters

N = North

S = South

E = East

W = West

D = Drift (if not present, assume Guide)

A character is present if switch active, otherwise switch inactive

PADDRIFT Hardware paddle drift rate arcsec/sec

Args: N/A

Returns: -XXXXXXXXX.xxx

PADGUIDE Hardware paddle guide rate arcsec/sec

Args: N/A

Returns: -XXXXXXXXX.xxx

RA Right Ascension

Args: N/A

Returns: [ddmmss.ss]

SECZ Air Mass

Args: N/A

Returns: [XXXXX.XX]

ST Sidereal Time

Args: N/A

Returns: [hh:mm:ss]

TIME Universal Time

Args: N/A

Returns: [HH:MM:SS]

VERIFY Verify that an RA/DEC position is within telescope limits

Args: [RA] [DEC] [Epoch]

RA=HH:MM:SS.ss

DEC=DD:MM:SS.ss

Epoch=EEEE.eeee

Returns: 1 if coordinate is within limits

XALL "Extended ALL"

Args: N/A

Returns: [FOC] [DOME] [IIS] [PA] [UTD] [JD]

FOC(focus pos) = +XXXXXX

DOME(Dome Position) = -180 (always this value...)

IIS(???) = -224.4 (always this value...)

```

PA(Paralactic Angle) = -145.7 (always this value...)
UTD(UT Date) = MM/DD/YYYY
JD(Julian Date) = XXXXXXXX.x

```

#### XDEC "Extended DEC"

Args: N/A

Returns: [COM] [NEXT] [REF] [OFF] [WOB] [DIFF] [BIAS] [GUIDE] [DRIFT]

```

COM(Commanded Position) = +HH:MM:SS.ss
NEXT(Next Position) = +HH:MM:SS.ss
REF(Reference Position) = +HH:MM:SS.ss
OFF(Offset Position) = +HH:MM:SS.ss
WOB(Wobble) = +HH:MM:SS.ss
DIFF(Difference) = +XXXXXXXXXX.xxx
BIAS(Bias Rate) = +XXXXXXXXXX.xxx
GUIDE(Guide Rate) = +XXXXXXXXXX.xxx
DRIFT(Drift Rate) = +XXXXXXXXXX.xxx

```

#### XRA "Extended RA"

Args: N/A

Returns: [COM] [NEXT] [REF] [OFF] [WOB] [DIFF] [BIAS] [GUIDE] [DRIFT]

```

COM(Commanded Position) = HH:MM:SS.ss
NEXT(Next Position) = HH:MM:SS.ss
REF(Reference Position) = HH:MM:SS.ss
OFF(Offset Position) = +HH:MM:SS.ss
WOB(Wobble) = +HH:MM:SS.ss
DIFF(Difference) = +XXXXXXXXXX.xxx
BIAS(Bias Rate) = +XXXXXXXXXX.xxx
GUIDE(Guide Rate) = +XXXXXXXXXX.xxx
DRIFT(Drift Rate) = +XXXXXXXXXX.xxx

```

### Satellite Requests

GETSATELAZ Satellite horizontal coordinates

Args: N/A

returns [EL] [AZ]

GETSATECI Satellite Earth Centered Inertial Cartesian coords

Args: N.A

Returns: [X] [Y] [Z]

GETSATECEF Satellite Earth Centered Earth Fixed Cartesian coords

Args: N.A

Returns: [X] [Y] [Z]

### undefined Request

TEST1 ??? >> probably useless but is currently in the command set

Args: ???

Returns: ???

INDEX ???  
Args: ???  
Returns: ???

PP ???  
Args: ???  
Returns: ???

SRVFRQ ???  
Args: ???  
Returns: ???

### Dome Request

DOME Dome control information  
Args: "PARAM" returns dome setup parameters, all other strings return control info  
Returns:  
Parameters: [CPD] [SD] [W] [SDW] [NU] [RHO] [PHI] [LOOK] [HOLD]  
CPD(Counts Per Degree) = XXX.xxxxxxx  
SD(Stow Degrees)= XXX.xxxxxxx  
W(Dome Width) = XXX.xxxxxxx  
SDW(Stow Dome Width)= XXX.xxxxxxx  
NU = XXX.xxxxxxx  
RHO = XXX.xxxxxxx  
PHI = XXX.xxxxxxx  
LOOK(Lookahead) = XX  
HOLD(Hold Dome) = XX  
Control Info: [DEL] [MOD] [INIT] [TELAZ] [AZ] [HOME]  
DEL(Delta Position) = +XXX.XXXXXXX  
MOD(Mode) = XX  
INIT(Initialized) = XX  
TELAZ(Telescope Azmouth) = +XXX.XXXXXXX  
AZ(Dome Azmouth) = +XXX.XXXXXXX  
HOME(Home Position) = +XXX.XXXXXXX

### Focus Request

FOCSPEED Focus Speed  
Args: N/A  
Returns: ["FAST" or "SLOW"]

FOCUS Focus position  
Args: N/A  
Returns: +XXXXX

## DIO Request

**TODO make this consistent with Softlimits (use binary, not hex)**

```
DIO All 6 bytes of DIO
  Args: N/A
  Returns: A1 B1 C1 A2 B2 C2 as hex numbers
  A1:
    Bit0: FOCUS UP
    Bit1: FOCUS DN
    Bit2: FOCUS F/S
    Bit3: ESTOP STATUS
    Bit4  HA ALT LIMIT
    Bit5  DEC ALT LIMIT
    Bit6  DEROT ALT LIMIT
    Bit7  SPARE A7A
  B1: Paddle Buttons
    Bit0: NORTH
    Bit1: SOUTH
    Bit2: EAST
    Bit3: WEST
    Bit4: GUIDE/DRIIFT
    Bit5: SLEW
    Bit6: DOME RIGHT
    Bit7  DOME LEFT
  C1:
    Bit0: HA LIMIT
    Bit1: DEC LIMIT
    Bit2: HOR LIMIT
    Bit3: HS NORTH
    Bit4: HS EAST
    Bit5: Dome Home
    Bit6: Focus Up Limit
    Bit7: Focus
  A2:
    Bit0: HA E SLEW
    Bit1: HA W SLEW
    Bit2: DEC N SLEW
    Bit3: DEC S SLEW
    Bit4  HOR SLEW LIMIT
    Bit5  DEROT CW SLEW LIMIT
    Bit6  DEROT CCW SLEW LIMIT
    Bit7  REMOTE LOCKOUT
  B2:
    Bit0: HA DIR
    Bit1: DEC DIR
    Bit2: FOCUS DIR
    Bit3: DEROT DIR
    Bit4: HA INHIBIT
    Bit5: DEC INHIBIT
```

```
    Bit6: FOCUS INHIBIT
    Bit7: DEROT INHIBIT
C2:
    Bit0: RING BIT 0
    Bit1: RING BIT 1
    Bit2: SLEW PERMIT
    Bit3: DEROT LIMIT
    Bit4: DOME RIGHT OUT
    Bit5: DOME LEFT OUT
    Bit6: DOME ENABLE OUT
    Bit7: SPAREC7B
```

## Commands

```
ABERRATE Aberration corrections enable/disable
  Args: "ON" = enable, any other string will disable
  Returns: "OK" or "FAILED"
```

```
BIAS Bias enable/disable
  Args: "ON" = enable, any other string will disable
  Returns: "OK" or "FAILED"
```

```
BIASDEC DEC bias rate in arcseconds/second
  Args: [XXXXX.XX]
  Returns: "OK" or "FAILED"
```

```
BIASRA RA biasrate in arcsseconds/second
  Args: [XXXXX.XX]
  Returns: "OK" or "FAILED"
```

```
CANCEL Cancel current move
  Args: N/A
  Returns: "OK" or "FAILED"
```

```
CLEARDIFF Clear RA and DEC difference value
  Args: N/A
  Returns: N/A
```

```
DISABLE disable motion output
  Args: N/A
  Returns: "OK" or "FAILED"
```

```
DISEPOCH Set Epoch
  Args: XXXX.x
  Returns: "OK" or "FAILED"
```

```
DECLARE Initialize current position
  Args: "INITNEXT" to initialize "NEXT" position as current position
        "INITCOM" to initialize "COMMANDED" position as current position
```



Returns: "OK" or "FAILED"

ELAZ Move to position in Elevation and Azmouth

Args: [EE.EE] [AAA.AA]

Returns: "OK" or "FAILED"

ENABLE enable motion output

Args: N/A

Returns: "OK" or "FAILED"

FLEX Flexure corrections enable/disable

Args: "ON" = enable, any other string will disable

Returns: "OK" or "FAILED"

LIMIT Limit override >> USE WITH EXTREME CAUTION!!!!

Args: "INHIBIT" will override limits, all other strings will enable limits

Returns: "OK" or "FAILED"

MOVNEXT Move to NEXT position

Args: N/A

Returns: "OK" or "FAILED"

MOVOFF move to OFFSET position

Args: N/A

Returns: "OK" or "FAILED"

MOVRADEC Move to RA-DEC position

Args: RA DEC EPOCH RAPM DECPM

RA = HH:MM:SS.ss

DEC = +DD:MM:SS.ss

EPOCH = EEEE.eeee

RAPM(RA Proper Motion) = XXXXX.xxx

DECPM(DEC Proper Motion) = XXXXX.xxx

Returns: "OK" or "FAILED"

MOVSTOW Move to stow position

Args: N/A

Returns: "OK" or "FAILED"

MOVWOB MOVWOB beam

Args: ???

Returns: ???

NEXTPOS Set NEXT position

Args: RA DEC EPOCH RAPM DECPM

RA = HH:MM:SS.ss

DEC = +DD:MM:SS.ss

EPOCH = EEEE.eeee

RAPM(RA Proper Motion) = XXXXX.xxx

DECPM(DEC Proper Motion) = XXXXX.xxx  
Returns: "OK" or "FAILED"

NUTAT Nutation corrections enable/disable  
Args: "ON" = enable, any other string will disable  
Returns: "OK" or "FAILED"

PAD Software paddle command [Direction] [rate] or PAD XX for termination  
This function is not recommended for use near the horizon limits!  
Args: [Direction] [rate]  
DIRECTION = NORTH, SOUTH, EAST, WEST, NE, NW, SE, SW  
RATE = XXXXXX.xx (arcsecs/sec)  
any string not described in DIRECTION will terminate paddle  
this terminate string must be sent at the end of each movement  
when the button is released.  
Returns: "OK" or "FAILED"

PADDLE Paddle enable/disable  
Args: "ON" = enable, any other string will disable  
Returns: "OK" or "FAILED"

PADDRIFT Paddle Drift rate in arcseconds/second  
Args: [XXXXX.XX]  
Returns: "OK" or "FAILED"

PADGUIDE Paddle Guide rate in arcseconds/second  
Args: [XXXXX.XX]  
Returns: "OK" or "FAILED"

PARALLAX Parallax corrections enable/disable  
Args: "ON" = enable, any other string will disable  
Returns: "OK" or "FAILED"

PARAM ???  
Args: ???  
Returns: ???

PRECES Precession corrections enable/disable  
Args: "ON" = enable, any other string will disable  
Returns: "OK" or "FAILED"

PROPMO Proper motion corrections enable/disable  
Args: "ON" = enable, any other string will disable  
Returns: "OK" or "FAILED"

REFPOS REFerence POSition (tod)  
Args: ???  
Returns: ???

REFRAC Refraction corrections enable/disable  
Args: "ON" = enable, any other string will disable  
Returns: "OK" or "FAILED"

STEPDEC Move Declination XXXXX.XX arcseconds  
Args: [XXXXX.XX]  
Returns: "OK" or "FAILED"

STEPRA Move Right Assention XXXXX.XX arcseconds  
Args: [XXXXX.XX]  
Returns: "OK" or "FAILED"

TRACK Enable/Disable sidereal tracking  
Args: "ON" = enable, any other string will disable  
Returns: "OK" or "FAILED"

WOBBLE WOBBLE -HH:MM:SS.ss -DD:MM:SS.ss  
Args: ???  
Returns: ???

## Catalogs Command

ABELL ABELL Catalog object XXXXXXXX  
Args: XXXXXXXX  
Returns: "OK" or "FAILED"

FK5 FK5 Catalog object XXXXXXXX  
Args: XXXXXXXX  
Returns: "OK" or "FAILED"

IC IC Catalog object XXXXXXXX  
Args: XXXXXXXX  
Returns: "OK" or "FAILED"

NGC NGC Catalog object XXXXXXXX  
Args: XXXXXXXX  
Returns: "OK" or "FAILED"

OKESTONE Okestone Catalog object XXXXXXXX  
Args: XXXXXXXX  
Returns: "OK" or "FAILED"

PPM PPM Catalog object XXXXXXXX  
Args: XXXXXXXX  
Returns: "OK" or "FAILED"

SAO SAO Catalog Object XXXXXXXX  
Args: XXXXXXXX

Returns: "OK" or "FAILED"

YBSC YBSC Catalog Object XXXXXXXX

Args: XXXXXXXX

Returns: "OK" or "FAILED"

ZWICKY ZWICKY Catalog object XXXXXXXX

Args: XXXXXXXX

Returns: "OK" or "FAILED"

## Planets Command

MERCURY Track Mercury

Args: N/A

Returns: "OK" or "FAILED"

VENUS Track Venus

Args: N/A

Returns: "OK" or "FAILED"

MARS Track Mars

Args: N/A

Returns: "OK" or "FAILED"

JUPITER Track Jupiter

Args: N/A

Returns: "OK" or "FAILED"

SATURN Track Saturn

Args: N/A

Returns: "OK" or "FAILED"

URANUS Track Uranus

Args: N/A

Returns: "OK" or "FAILED"

NEPTUNE Track Neptune

Args: N/A

Returns: "OK" or "FAILED"

PLUTO Track Pluto

Args: N/A

Returns: "OK" or "FAILED"

MOON Track Moon

Args: N/A

Returns: "OK" or "FAILED"

SUN Track Sun

Args: N/A  
Returns: "OK" or "FAILED"

**DOME** Command dome control  
Args: This command takes one argument at a time from the following  
**AUTO** Autodome enable  
 Args: ON = autodome on, any other = autodome off  
 Returns: "OK" or "FAILED"

**INIT** Initialize dome  
 Args: N/A  
 Returns: "OK" or "FAILED"

**STOW** Stow dome  
 Args: N/A  
 Returns: "OK" or "FAILED"

**LOOKAHEAD** Lookahead enable  
 Args: positive nonzero number=enable, any other = disable  
 Returns: "OK" or "FAILED"

**PARAM** Set Dome Parameters  
 Args: [CPD] [SD] [W] [SDW] [NU] [RHO] [PHI] [LOOK] [HOLD]  
 CPD(Counts Per Degree) = XXX.xxxxxxx  
 SD(Stow Degrees)= XXX.xxxxxxx  
 W(Dome Width) = XXX.xxxxxxx  
 SDW(Stow Dome Width)= XXX.xxxxxxx  
 NU = XXX.xxxxxxx  
 RHO = XXX.xxxxxxx  
 PHI = XXX.xxxxxxx  
 LOOK(Lookahead) = XX  
 HOLD(Hold Dome) = XX  
 Returns: "OK" or "FAILED"

**PADDLE** Control Paddle buttons  
 Args: RIGHT = move right, LEFT = move left, any other= stop  
 Returns: "OK" or "FAILED"

**FOCUS** move to absolute focus value XXXXXXXX  
 Args: XXXXXXXX  
 Returns: "OK" or "FAILED"

**RELFOCUS** relative move focus value XXXXXXXX  
 Args: XXXXXXXX  
 Returns: "OK" or "FAILED"

**FOCZERO** Zero current focus position  
 Args: N/A  
 Returns: "OK" or "FAILED"

FOCSTOP focus paddle stop  
Args: N/A  
Returns: "OK" or "FAILED"

FOCUP focus paddle up  
Args: N/A  
Returns: "OK" or "FAILED"

FOCDN focus paddle down  
Args: N/A  
Returns: "OK" or "FAILED"

FOCSPEED Set focus speed  
Args: "FAST" sets to fast, all other strings set speed slow  
Returns: "OK" or "FAILED"

### Periodic Error Correction Request

PECSTAT Current PEC operation status  
Args: N/A  
Returns: [PEC\_Condition] [PEC\_Count] [PEC\_Index] [PEC\_Mode]

PECPRG Current PEC programming status  
Args: N/A  
Returns: [Percent\_Done] [PEC\_Correction]

### Command

PECFILE Attempt to create a PEC file.  
Args: ???  
Returns: ???

PEC Turn on PEC  
Args: "ON" = enable, any other string will disable  
Returns: "OK" or "FAILED"

### Servo Request

CON ??? >> SERVO STUFF... NOT FOR NORMAL USE  
Args: ???  
Returns: ???

SAMDATA ??? >> SERVO STUFF... NOT FOR NORMAL USE  
Args: ???  
Returns: ???

SAMDONE ??? >> SERVO STUFF... NOT FOR NORMAL USE  
Args: ???  
Returns: ???

```
SERVO  ??? >> SERVO STUFF...  NOT FOR NORMAL USE  
  Args: ???  
  Returns: ???
```

#### Command

```
WCON  axis, gd gp gi dmax vmax groot >> SERVO CONST...  DO NOT MODIFY  
  Args: ???  
  Returns: ???
```

```
SERVO  ??? >> AXIS SERVO SAMPLING...  DO NOT MODIFY  
  Args: ???  
  Returns: ???
```

```
GD  axis, value >> SERVO CONST...  DO NOT MODIFY  
  Args: ???  
  Returns: ???
```

```
GP  axis, value >> SERVO CONST...  DO NOT MODIFY  
  Args: ???  
  Returns: ???
```

```
GPI axis, value >> SERVO CONST...  DO NOT MODIFY  
  Args: ???  
  Returns: ???
```

```
DMAX  axis, value >> SERVO CONST...  DO NOT MODIFY  
  Args: ???  
  Returns: ???
```

```
VMAX  axis, value >> SERVO CONST...  DO NOT MODIFY  
  Args: ???  
  Returns: ???
```

```
PERMAX axis, value >> SERVO CONST...  DO NOT MODIFY  
  Args: ???  
  Returns: ???
```

```
SAMPLE axis, interval, total samples >> AXIS SERVO SAMPLING...  DO NOT  
MODIFY  
  Args: ???  
  Returns: ???
```

```
DUMPSAM axis >> AXIS SERVO SAMPLING...  DO NOT MODIFY  
  Args: ???  
  Returns: ???
```

```
SAMSTART ??? >> AXIS SERVO SAMPLING...  DO NOT MODIFY  
  Args: ???
```

Returns: ???

SAMABORT ???    >>    AXIS SERVO SAMPLING...    DO NOT MODIFY

Args: ???

Returns: ???

SYSSAVE ???

Args: ???

Returns: ???

YSKILL Kills TCS process after disabling stopping all telescope motion.

Args: N/A

Returns: OK or Failure

    SYSRESET Restarts TCS process after disbling the telescope                    Added  
by Scott 12/2012

    Telescope should be stowed before doing this.

    Args: [TIME] [DD/MM/YY] [HH:MM:SS]

    If no arguments are used the TCS simply restarts as if you had restarted the TCS computer. If for some reason the time is bad on the TCS computer you can add the TIME argument followed by the date and time in UT and TCS will use this and not the computer time for astrometry.

    Returns OK or Failure

    TLE            Gives TCS a new TLE for tracking Earth Satellites

    Args: Follows this format exactly:

[[[https://en.wikipedia.org/wiki/Two-line\\_element\\_set](https://en.wikipedia.org/wiki/Two-line_element_set)]]

    SATTRACK      Tracks the current satellite TLE with the telescope.

    Args: N/A

NEXTEVENT Gives you rise or set time in hours of coordinates set using the NEXTPOS command.

    Args N.A

    Returns: Rise/Set (0/1) state and time in decimal hours.

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