

TCS3 Network Communication

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1. Introduction

The network interface allow communication to the tcs3 over the IRTF network. This document describes these interfaces.

2. Primary Network Interface

The primary network interface for tcs3 is a Remote Procedure Call (RPC) server to the hostname 'tcs3_host', which is an alias to t1. Details on this interface can be provide by the IRTF software staff on request.

3. Aux socket interface

An auxiliary socket interface to the tcs3 is also available. This aux socket interface is a telnet like session that can support both human and computer session. Details on this interface can be provided by the IRTF software staff on request.

4. t3io

t3io is a command line program that implements the tcs3 Remote Procedure Call (RPC) interface. It is a C program and is installed on all IRTF computers. For visitor's instruments, the source code can be provide for porting to your instrument software. T3io is a text based program, TCS3 commands are give as argument and replys are printed on standard output. The t3io program can run from the command line, or called from other application. Rather than building the Remote Procedure Call (RPC) into you application, your application can call t3io (via a system call or fork).

An 'OK', followed by the reply is output for successful commands.
Otherwise, 'ERR' followed by an error code is printed.

```
usage: t3io [-v] [-h hostname] command
       -v = verbose flag
       -h = hostname
```

Example: Issuing the 'info tm' command to get time information from the tcs3.

```
> t3io info tm
OK 2006-08-02 00:19:55.792 2006-08-01 14:19:55.79 10:39:53.45
```

5. TCS3 Command Examples

Details on the TCS3 command are provide in document *1101 TCS3 Command Reference*. This section provide examples of commands that instruments could use to control or query data from the TCS3.

5.1 Info

The `tcs3 info` command is used to query position, time and other type of facility data. The `info` command's parameters will dictate the type of information returned.

For example, the 'info tm' will return UTC_data UTC_time LAST.

```
> t3io info tm
OK 2006-08-02 00:19:55.792 2006-08-01 14:19:55.79 10:39:53.45
```

Multiple type of information can be requested. This command probably returns everything you want to know:

```
> t3io info tm sp mp os op sm fo
OK 2006-08-02 00:44:44.760 2006-08-01 14:44:44.76 11:04:46.49 11:04:21.12 -00:00:17.6
0.0000 0.0000 2000.0 2000.0 fk5 11:04:21.12 -00:00:17.6 0.0 0.0 0.0 0.0 0 0.0 0.0 0 0.0
0.0 11:04:40.45 -00:01:57.3 00:00:06.04 1.063 19.859 180.074 -0.070 track -0.320 -
0.321 1
```

Let's break down the reply:

OK

The ok tell us the command reply is good

```
2006-08-02 00:44:44.760 2006-08-01 14:44:44.76 11:04:46.49
```

The TM returns Time data: UTC_data UTC_time Local_date Local_time LAST

```
11:04:21.12 -00:00:17.6 0.0000 0.0000 2000.0 2000.0 fk5
```

The sp provides Sky position parameters: RA Dec pm_ra pm_dec epoch equinox coordinate_system

```
11:04:21.12 -00:00:17.6
```

The MP returns the means position (J2000.0 FK5 current epoch): ra dec

```
0.0 0.0 0 0.0 0.0 0 0.0 0.0
```

The OS provides Offset information total_ra total_dec user.ra user.dec user.enable beam.ra beam.dec beam.enable scan.ra scan.dec

```
11:04:40.45 -00:01:57.3 00:00:06.04 1.063 19.859 180.074 -0.070
```

The OP provides Observed Position: obs_ra obs_dec obs_ha airmass zenith_dist azimuth parallactic_angle

```
track
```

The SM provides the servo mode

```
-0.320 -0.321 1
```

The FO provides Focus_desired_pos Focus_actual_pos Focus_enable(0 or 1).

5.2 Beam Switch

- | | |
|---------------------|---|
| T3io beam.init | - Use this command to setup for beam switch (make current position the base, zero and enable beamswitch). |
| T3io beam.set 10 20 | - Sets the absolute value for the B Beam position. |
| T3io beam.a | - Goto the A beam position. |

T3io beam.b - Goto the B beam position

5.3 User's Offset can be used in dithering or scanning macros.

T3io user.init - Use this command to initialize user offset
(make current position base, zero and enable offsets).
T3io user.set 10 20 - Sets the absolute displacement values.
T3io user.inc 1 -2 - Sets the relative displacement values. Increment offset by +1 -2
T3io user.on - enable user offsets.
T3io user.off - disable user offsets.

5.4. Other misc examples:

The *next* command allows a sky coordinations to be sent to the tcs3 system as possible slew targets. The TO can then slew to this position, Example of the next command:

```
> t3io next 12:22:42.0 20:08:56.5 -0.0012 -0.0170 2000.0 2000.0 FK5 SAO-82277
OK
```

5.5. Instrumentation macros

The IRTF instruments (spex, for example) allow tcs command to be embedded in to their macor files. Check the instarument documentation for an example of embedding tcs command in a macro. Typically, it would be something like:

```
Tcs Beam.A
```

When 'tcs' is the instrument command, and the remaining text is the tcs3 command.

Most macros can be support using on the following command:

Offset commands:

User.init - Initialize the user offset by make the current position 0,0
(without moving the telescope).
User.inc ra dec - Apply an increment to the RA and Dec offsets.
User.set ra dec - Set the RA and DEC offset to ra,dec.

Beam switch commands:

Beam.Set 0.0 0.0 - set the beam switch displacement.
Beam.A - Puts the telescope in the A beam.
Beam.B - Pust the telescope in the B beam.

6. Using the TCSD.V3 and Upgrading from TCS1 commands.

TCS1 used a program called tcsd to provide a network interface to the control system. TCS3 implement a similar daemon call tcsd.v3 running on the tcs3 computer ("tcs3_host"). tcsd.v3 to mimics the old network interface and translates a sub-set of tcs1 commands to the new tcs3 system. Older systems may not need to be converted to work with tcs3. This section documents the command tcsd.v3 supports, and can be used as a porting guide for tcs3.

If possible, please update you software to communication with tcs3 directly.

TCS3.V3 supported commands are listed below:

6.1 Beam Switch Commands

TCS1 command	TCS3 command with similar function
ABEAM	Beam.A
BBEAM	Beam.B
?BS	Info os
TW.BS	Beam.set
?TW.BS	Info os

6.2 Scan, Peak, and other offset related commands

TCS1 command	TCS3 command with similar function
C.PEAK	'1 ra dec -1 C.PEAK' = 'user.init' '1 ra dec 0 C.PEAK' = 'user.inc ra dec' '1 ra dec 1 C.PEAK' = 'user.set ra dec'
C.SCN	'1 ra dec -1 C.SCN' = 'user.init' '1 ra dec 0 C.SCN' = 'user.inc ra dec' '1 ra dec 1 C.SCN' = 'user.set ra dec'
?PEAK	Info os
?SCAN	Info os
?DISP	Info os

6.3 TCS Query commands

TCS1 command	TCS3 command with similar function
C.HST	Info tm
C.STIME	Info tm
TCS_INFO	Info mp op
TPD	Info mp op

6.4 Other commands

TCS1 command	TCS3 command with similar function
C.SLEW	Next