

Clock drift correction for HK timing system



Contents



MIDAS environment for correction

MIDAS env

Before

cggtts septentrio

Settings:

IP
Port
Username
Password
Remote path
Latest Date
Latest Time

Variables:

NSA0
MJD0
STT0 (HHMMSS)
PRN0
AZI0 (deg)
ELE0 (dea)
REF0 (ns)

SRS0 (ns/s)

Correction

Settings:

measurements to use)
SFCO (bool, SF correction?)
NPSF (# last GNSS measurements to use for SF correction)

Variables:

SLOP (ns/day) OFFS (ns) <u>ApplyCorr</u>

Settings:

Reysight_index
PosCorr (bool,
depends on the
sign of the counter
measurement)
Offset (between
counter and GNSS
measurements)

Variables:

CORR (s)
RESI (s)
MJDC (date when the correction was applied)

Keysight 1/2

Settings:

TimeMeasurement (bool) ExternalFrequency Channel1InputFreq Channel1resol

Variables:

COUN FREQ (Hz) TIME (s)

MIDAS env

After

cggtts septentrio

Settings:

IP
Port
Username
Password
Remote path
Latest Date
Latest Time

Variables:

NSA0
MJD0
STT0 (HHMMSS)
PRN0
AZI0 (deg)
ELE0 (dea)

REF0 (ns) SRS0 (ns/s) **Correction**

Settings:

MPTS (# last GNSS measurements to use)

Variables:

SLOP (ns/day) OFFS (ns) <u>ApplyCorr</u>

Settings:

Keysight_index
Offset (between
counter and GNSS
measurements)

Variables:

CORR (s)
RESI (s)
MJDC (date when the correction was applied)

Keysight 1/2

Settings:

TimeMeasurement (bool) ExternalFrequency Channel1InputFreq Channel1resol

Variables:

COUN FREQ (Hz) TIME (s)





Modifications in Correction:

- The old version is now called Correction_SF: this should only be used for testing of monitoring and correction of the SRS_FS725 frequency drift. It is very "dirty" and could be greatly improved!
- In the new version of Correction I removed everything related to correction of SF of the Rubidium clock. Better to use this version unless we decide to use a SRS_FS725 and to correct its frequency in real-time.

MIDAS env



Modifications in ApplyCorr:

- Removed the possibility to apply a negative correction (no more PosCorr boolean in the Settings)
- Added info at initialisation to remind user to branch the clock PPS on channel 1 of the counter

```
logger.info("Please make sure that the PPS of clock to test is on channel 1")
```

Added error message if the residuals are above 100ns

```
if np.abs(res)>1e-7:
    logger.error("Residuals are above 100 ns at "+str(res)+" s. Check setup or setting Offset.")
```

Conclusion



- Still some cleanup to do in the MIDAS Correction environment
- Remaining questions:
 - Do we fix or not the counter measurement settings (which signal on which channel, sign of the measurement)?
 - Do we keep the possibility of Rb SF correction (if yes, preferable to put it in another frontend but it cannot be tested right now)?