OSA GPS 4554 STAR 4+ ATDC

Specifications for <**XXXXXXXXXXXXXXX>**

Article Number : A015880

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Historic

Revision	Description of change	By	Date
-	First edition	VONI	18.06.2009
A	Update level of 10MHz sine wave to 0.5Vrms	MIAL	28.06.2009
B	- Add article number A015880 (page 1 & 3) - Update "Table of contents" (page 2) - Add OPEN SHORT current detection for antenna (page 4) - Adapt 10MHz output voltage level regarding 50 Ohms impedance change (page 5) -Harmonic value of 10MHz sinus output (page 5) - Change PPS & 10Mhz alignement value (page 5) - Add spurious specification for 10MHz sine output (page 5) - Add GPS_TIME; command description (page 12 and 13) - Add information about INV; command - Add TEMPERATURE; command description (page 15) - Add default parameters value (page 16)	VONI	15.11.2009
C	- Add Kantu and RoHs compliance (page 3) - Add MTBF value (page 3) - Add Max sensitivity value (page 4)	VONI	06.12.2009
D	- Correct KANKANTU in § 1.3 (page 2) - Change phase alignment value for PPS to 10MHz LVCMOS output (page 5) - Correct time delay between PPS and TOD sending (page 9) - Correct Article number and software number (page 14) - Add TOD_STATE command specification (page 16)	VONI	10.12.2009
E	- change TOD timing specification (page 9)	VONI	13.01.2011

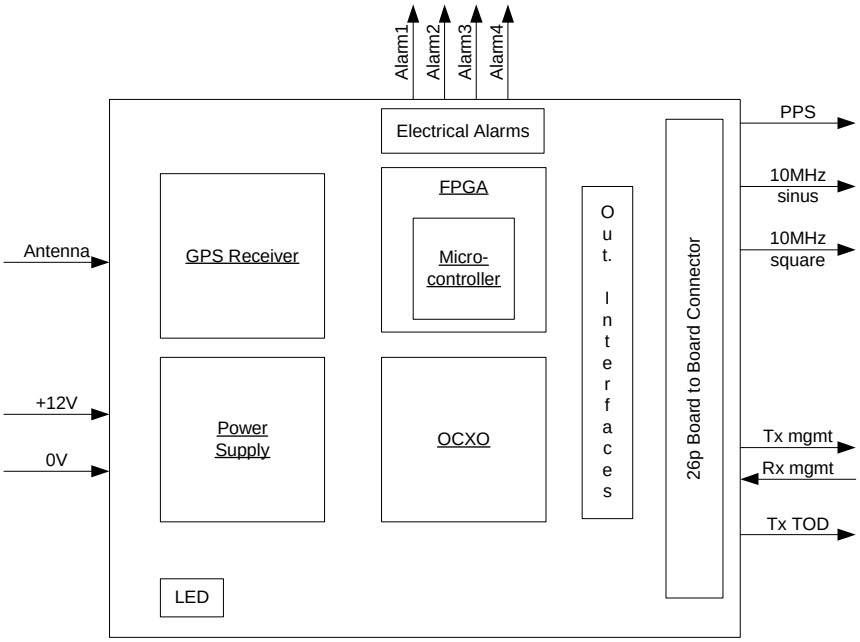
1 Overview

This document specifies the OSA STAR4+ GPS Clock with ATDC

1.1 Article number

This product is fully defined, including software specifications, by its article number: **A015880**

1.2 Block diagram



1.3 RoHs and KANKANTU compliance

The unit STAR 4+ Article Nr A015880 is compliant with NEC Document KANKANTU-04-006 ver. 3, dated July 2008. It is also compliant with RoHs European Directive 2002/95 (restriction of the use of certain hazardous substances in electrical and electronic equipment)

1.4 MTBF

The MTFB value for STAR 4+ Article number A015880 is: **180'000 hours**
This estimation has been performed according to the MIL 217-F2 standard.

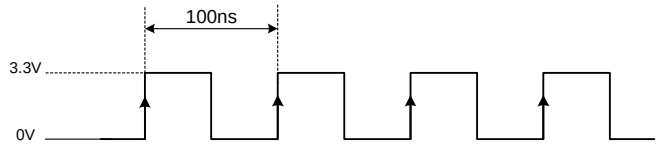
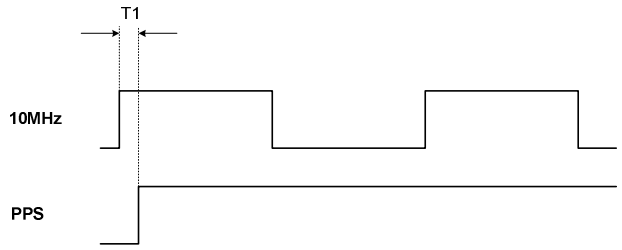
2 Inputs specifications

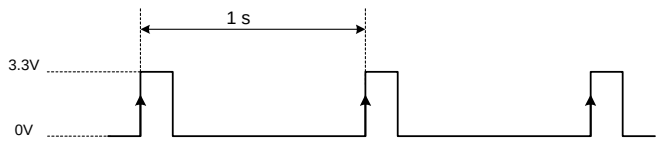
Antenna Input			
Connector	SMB, male, Right angle		
Frequency	1575.42 MHz		
Impedance	50 Ohms		
Sensitivity	Min : -144 dBm (cold start) -160 dBm (Fixed Position) Max : -70dBm		
Absolute maximum rating *1	+ 5dBm (Signal input power)		
Antenna open detection current	If < 4.8mA +/- 1mA	With Vant = 5V	
Antenna short detection current	If > 270mA +/- 15mA		
Preamplifier gain	Max 50 dB		
Preamplifier noise figure	Max 3 dB		
Power Input			
Connector	ERNI 063209		
Connections:	+Vcc: Pins: a12,a13, b1 for 12V 0V: Pins: a2, a6, a7, a8, b11		
Vcc	+12V +/-5%, Ripple and noise max: 150mV peak to peak		
Consumption	Warm-up: Max 12W Steady-state: Max 6W (At 25°C)		
Environmental			
Operating temperature range	-20° to +70° C		
Storage temperature	-40° to +85° C		
Humidity	5 to 95% non condensing.		

*1 Stressing the device beyond the “Absolute Maximum Ratings” may cause permanent damage

3 Outputs signals specifications

10MHz Sinus Frequency Output	
Number	1
Connectors	SMB, male, Right angle
Signal wave form	Sine wave
Amplitude	Min 0.35 Vrms (3.89 dBm)
Impedance	50 Ohms
Harmonics	-40dBc
Non-harmonics	≤ -70dBc
Spurious	≤ -90dBc in the frequency range up to 1MHz
Phase alignment with PPS	+/- 5ns at ambient temperature

10MHz Square Frequency Output	
Number	1
Connectors	On the board to board connector, pin b7
Signal wave form	Square
Amplitude	3.3Vpp (LVCMOS) (Amplitude is divided by two, when connected to a 50 Ohms load) *1
Signal shape	
Phase alignment with PPS	 0ns < T1 < 10ns at ambient temperature

PPS Outputs	
Number	1
Connectors	On the board to board connector, pin b9
Signal wave form	Square
Amplitude	3.3Vpp (LVCMOS) (Amplitude is divided by two, when connected to a 50 Ohms load) *1
Rising time	≤ 10ns (10% - 90%)
PPS Duration	200ms
Signal shape	

*1 **Absolute maximum ratings**
Loading PPS and 10MHz outputs with impedance lower than 30Ω may cause permanent damages to the device.

Output signal availability

Mode	10MHz sinus	10MHz square	PPS
INIT	Not available	Not available	Not available
WARM-UP	available	available	Not available
TRACK FAST	available	available	available
TRACKED	available	available	available
HOLDOVER	available	available	available

4 Alarms signals specifications

Alarm status Output	
Number	4
Connectors	ERNI 063209
Connections	Alarm 1: Pin b3 Alarm 2: Pin a3 Alarm 3: Pin b4 Alarm 4: Pin a4
Amplitude	3.3Vpp (ACMOS).
Output Current	IOH_{max} = -10mA max. IOL_{max} = 10mA max
Logical information	Logical “0” when alarm is information active (KO) Logical “1” when alarm is not active (OK)
Alarms signals: Truth table Note: It is not possible to show all alarms conditions with the electrical signals, as a binary code cannot represents all individuals conditions. To have a more detailed information, please use the management port and the appropriate command	

Alarm 4	Alarm 3	Alarm 2	Alarm 1	Alarm condition
1	1	1	1	System OK
1	1	1	0	Antenna failure
1	1	0	1	GPS Timing alarm
1	0	1	1	GPS OK, but Position averaging in progress
--	--	--	--	Reserved for future use
0	0	0	0	General system failure.

5 Operation mode :

5.1 Mode definition

- **Initialisation**
  After a power-up, the initialisation mode assures the configuration of the system. The typical time to perform the configuration of the system is up to 10 seconds.

- **Warm-up**
  In this mode, the system is waiting for the GPS initialisation (Satellites acquisition, tracking algorithms..) and for the OCXO stabilization.

- **Tracking Fast**
  After the warm-up phase, the OCXO is ready to be tracked, but with a short time constant to assure that the system is able to compensate the deviation of the phase during the retrace phase of the OCXO.

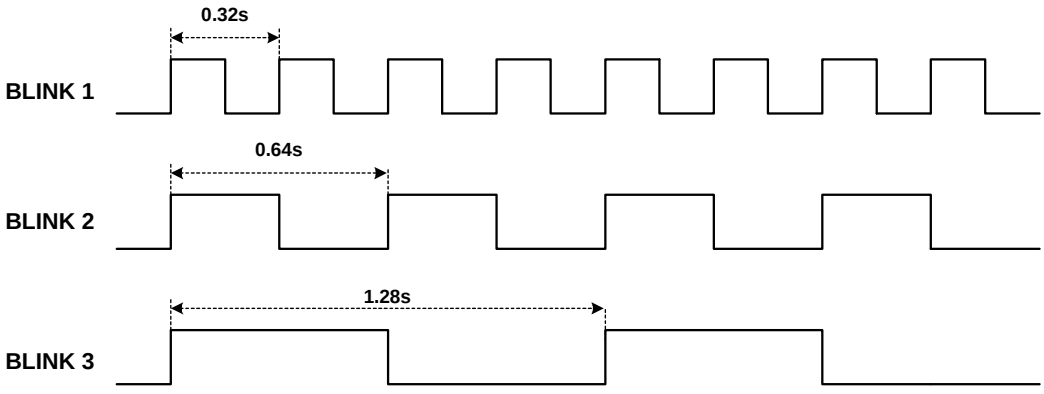
- **Normal Tracked**
  This is the normal mode of working. The system uses the time constant defined by the user

- **Holdover**
  If no input is available, the module enters in holdover mode. The tracking function is blocked and the OCXO delivers its own frequency for the outputs.

- **Squelch**
  After a while (See HBSQ value) of continuous holdover the outputs (PPS & 10MHz) are squelched.

5.2 LED's truth table

Mode	ALARM ANTENNA	ALARM PPS_GPS	LED GREEN	LED RED
INIT	X	X	BLINK 1	OFF
WARM-UP	1	1	BLINK 2	BLINK 2
	1	0	BLINK 3	BLINK 3
	0	1	BLINK 2	OFF
	0	0	BLINK 3	OFF
TRACK FAST	X	X	BLINK 3	OFF
TRACKED	X	X	ON	OFF
HOLDOVER & SQUELCH	1	X	OFF	BLINK 3
	0	X	OFF	ON



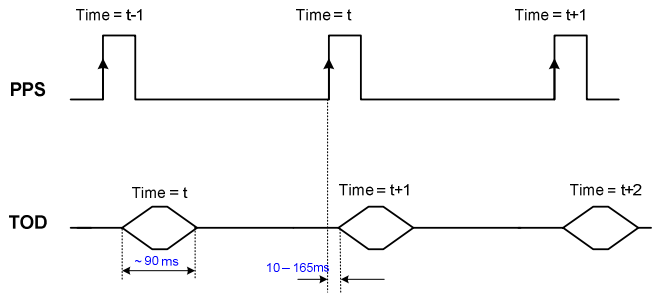
6 Management and TOD specifications

Management Port	
Number	1
Connectors	ERNI 063209
Connections	Rx (Input): Pin a5
	Tx (Output): Pin b5
Electrical levels	LVTTL (3.3V)
Configuration	Baud-rate : 9600 Number of bits : 8 Stop bits : 2 Parity : None Flow control : None Characters : Tiny or Capital letters
Types of commands	1) Set command 2) Answer to a Set command 3) Request command 4) Answer to a Request command Note 1: All commands are not “case sensitive”
Format of Set Command	Set Command: `CMD=par1,par2,…,parN;<cr><lf>` CMD is the name of the command par1 to parN are the parameters of the command.
Format of an Answer to a Set Command	An answer to a set command is: `ANS;<cr><lf>` ANS is the answer, which can have the following values: • OK • SYNTAX_ERROR • UNKNOWN_CMD • PARAM_ERROR Note 1: Please not that the DOWNLOAD command is particular and has no response Note 2: Please note that during download process, the 4500 is not able to receive any answer
Format of a Request Command	Request Command: `CMD;<cr><lf>` CMD is the name of the command.

Format of an Answer to a Request Command	An answer to a request command is:
	
	`ANS=val1,val2,…,valN;<cr><lf>`
	
	ANS is the name of the answer.
	val1 to valN are the values of the answer.
	
	Some answers have to send many information. In this case, the answer is given on several lines:
	`ANS=<cr><lf>`
	`val11,val12,…,val1N,<cr><lf>`
	`val21,val22,…,val2N,<cr><lf>`
	…
	`valM1,valM2,…,valMN;<cr><lf>`

Time of Day Port	
Number	1
Connector on TOP side	ERNI 063209
Connections	Tx_tod_0 (Output): Pin b6
Configuration (NMEA compatible)	Baud-rate : 4800 Number of bits : 8 Stop bits : 1 Parity : None Flow control : None
Types of commands	NMEA spontaneous

Format	The NMEA spontaneous TOD information begin with a "$", followed by the command's name.
	Then, the parameters, each separated with a ",".
	The command is terminated by a " * " followed by the Checksum
	Finally, the string is terminated by "CR and LF"
	Example, for TOD:
	
	`$GPZDA,104534,11,07,2001,+00,00*CS<cr><lf>`
	
	Note: During warm-up and almanacs satellites acquisition phase, the system is not able to send correct TOD information. In this case, the following information is sent:
	
	`TOD_NOT_VALID;<cr><lf>`
	
	Note: A correct TOD can only be provided when the system has received the offset information between GPS Time and UTC Time. This information is contained in GPS almanacs

Timing specification	

List of Alarms	
Definition	Alarms are sent as a response to the specific command "Alarm" (No spontaneous messages).
Available alarms	1) Initialisation and Warm-up Start of the system and OCXO heating phase. 2) Holdover System in holdover (No GPS reference or user selection) 3) Tracked fast System is using a temporary tracked fast mode, in order to stabilize the system faster, after entering in tracked mode. 4) OCXO failure Signal failure detected at the OCXO's output 5) Outputs squelched (After specified time in holdover) The outputs have been squelched by the system, because the OCXO is in holdover mode since a longer time that specified with the HBSQ command. 6) GPS timing alarm The GPS system is not able to provide time reference. 7) GPS Failure (No internal communication) 8) Antenna failure The consumption of the antenna is out of the limits. It means, generally, that the cable is not correctly connected, or that a shorted condition is affecting the cable. 9) Tracked initial The system is tracked normally, but not in fixed position mode. 10) Operating temperature out of limits The system as detected an operating temperature out of the limits (-20°C to 70°C)

List of Commands	
Commands	***Answers***
Request the alarms status: `ALARM;<cr><lf>`	Returns the active alarms: Example: `ALARM=1,5,9;<cr><lf>` If alarms 1,5,9 are active `ALARM=N;<cr><lf>` If no alarm is active Means that the alarms 1, 5 and 9 are active. The meaning of the values "1 to 10" is given in the chapter " List of Alarms"
Request the alarms mask: `ALARM_MASK;<cr><lf>`	Returns the alarms mask: Example: `ALARM_MASK=2,5,6;<cr><lf>` If masks 2,5,6 are set `ALARM_MASK=N;<cr><lf>` If no masks is set For each parameter listed (1 to 10, Refer to List of Alarms, for description), the corresponding alarm condition is masked, others are implicitly not masked

Set the alarms mask:
 	
Example:
`ALARM_MASK=2,5,6;<cr><lf>`
To set mask for alarm 2,5,6 and clear mask of all others
`ALARM_MASK=N;<cr><lf>`
To clear all alarm masks
 	
For each parameter listed (1 to 10, Refer to List of Alarms, for description), the corresponding alarm mask is set, other are cleared
	Returns:
	
	`OK;<cr><lf>`
	or
	`PARAM_ERROR;<cr><lf>`

Request the configuration:
 	
`CONF;<cr><lf>`
	Returns the configuration:
	
	`CONF=ut,rt,um,g,c;<cr><lf>`
	
	ut : User PLL time constant (0 ≤ ut ≤ 5000)
	rt : Real PLL time constant (0 ≤ rt ≤ 5000)
	um : User mode (A: Automatic, H: Holdover)
	g : UTC offset (shh:mm) s:+ or -; 0<= hh<= 12; 0<= mm <=59;
	c : PPS Correction (-999999 <= c <= +999999)

Request the GPS time, information about leap second and UTC-GPS time offset: `GPS_TIME;<CR><LF>`	Returns: `GPS_TIME=wwww,ssssss,dd.mm.yy,hh:mm:ss,ls,of;<CR><LF>` 1) GPS Time `wwww` 0000 to 3182 [week] This field counts up how many weeks have elapsed since the GPS system started operation at 1980/01/06 00:00:00 `ssssss` 000000 to 604799 [second] This field counts up how many seconds have elapsed in the current GPS week. The count is reset to “000000” every week. These fields are only available when module is in TRACKED or TRACKED FAST mode. Otherwise they will be filled with zeroes. 2) UTC Leap Second Adjustment Date/Time `dd.mm.yy hh:mm:ss` This field predicts when a leap second adjustment will take place. Unless a UTC parameter has been collected, this field will be filled with zeroes: 00.00.00,00:00:00 3) Leap Second `ls` "-1", "00" or "+1" [second] This field indicates the magnitude of a pending or previous leap second adjustment to UTC. The UTC Leap Second Adjustment Date/Time (field #2) establishes the context of the Leap Second value. When the date of an adjustment is in the future, the Leap Second value is the magnitude of a pending adjustment; when this date is in the past, the value applies to the previous adjustment. “00” is reported when the magnitude of a pending or previous adjustment is unknown. **Limitation of Leap Second Indication** The GPS receiver calculates the magnitude of an adjustment by subtracting the current offset from the pending offset. The Leap Second field, however, is updated only when these values differ. For example, “+1” will be reported prior to and following the addition of a leap second. It will not revert to “00”, and can only change to “-1” when a pending subtraction of a leap second is announced. Accordingly, a GPS receiver that received the announcement of a prior adjustment reports “+1” or “-1”. A GPS receiver placed in operation after this adjustment reports “00”, since current and pending time scale offsets are identical.

	4) UTC-GPS Time Offset `of` 00 to 99 [second] This field accumulates leap seconds since the GPS system started operation on January 6, 1980. Take note that this field will be “00” unless a UTC parameter has been collected.
Request the HBSQ configuration: `HBSQ;<cr><lf>` HBSQ is a functionality which squelches the output signals, after a configured delay in holdover mode.	Returns the HBSQ configuration `HBSQ=h,a;<cr><lf>` h: User configured value, in minutes (0 <= h <= 7200) a: Current value of the HBSQ counter, in minutes. If the system is not in holdover, "a" value is the same as "h" value. If the system is in holdover, "a" value is the remaining time, in minutes, before that the outputs will be squelched.

Set the HBSQ configuration:
 	
`HBSQ=h;<cr><lf>`
 	
1 <= h <= 7200, in minutes. Delay before to squelch the outputs, in holdover mode.
0 : disable the HBSQ function
	Returns:
	
	`OK;<cr><lf>`
	
	Or:
	
	`PARAM_ERROR;<cr><lf>`

Request information about visible satellites:
 	
`INFO_VIS_SAT;<cr><lf>`
	Returns information about visible satellites:
	
	`INFO_VIS_SAT=n,<cr><lf>`
	`1,i,a,b,s,h,<cr><lf>`
	`…,<cr><lf>`
	`12,i,a,b,s,h;<cr><lf>`
	
	n : Number of visible satellites
	
	i : Satellite Identifier
	
	a : Elevation angle (5 <= a <= 90)
	
	b : Bearing angle (0 <= b <= 359)
	
	s : Signal/Noise Ration (0 <= s <= 99) (dBHz)
	
	h : Health (0:Almanach not collected, 1:Unhealthy, 2: Healthy)

Request information about tracked satellites:
 	
`INFO_TRACK_SAT;<cr><lf>`
	Returns information about tracked satellites:
	
	`INFO_TRACK_SAT=n,<cr><lf>`
	`1,i,<cr><lf>`
	`…,<cr><lf>`
	`12,i;<cr><lf>`
	
	i: Satellite Identifier

Request information about GPS receiver position: `INFO_GPS_POS;<cr><lf>`	Returns information about GPS receiver position: `INFO_GPS=lat,lon,h,da,tm;<cr><lf>` Lat : Latitude (dd:mm:ffff:di) dd : Degree (00 <= dd <= 90) mm : Minute (00 <= mm <= 59) ffff : Fraction: (0000 <= ffff <= 9999) di : Direction (N or S) lon : Longitude (ddd:mm:ffff:di) dd : Degree (000 <= ddd <= 180 mm : Minute (00 <= mm <= 59) ffff : Fraction: (0000 <= ffff <= 9999) di : Direction: (E or W) h : Altitude (-999 <= h <= 17999) da : Date (dd.mm.yyyy) If date is invalid: 99.99.9999 tm: Time (hh:mm:ss) If time is invalid: 99:99:99
Request the inventory information: `INV;<cr><lf>`	Returns the inventory information: `INV=a,b,c,d,e,f,g,h,i;<cr><lf>` a: Name of the module (Max 12 char.) : **GPS STAR 4+** b: Article number (Max. 6 characters) : **015880** c: Serial Number (Max: 6 characters) d: Hardware version (Max. 2 characters) e: Firmware article number (6 characters): **015881** f: Firmware version (4 characters) g: Date of test (format : DD/MM/YYYY) h: Version of test system (Max. 4 characters) i : Oscillator's type (Max. 10 characters) : **8663-XS** j: FPGA version (4 characters)
Request the mask angle: `MASK_ANGLE;<cr><lf>`	Returns the mask angle: `MASK_ANGLE=m;<cr><lf>` m : mask angle (5..90°)

Set the mask angle:
 	
`MASK_ANGLE=m;<cr><lf>`
 	
m : mask angle (5..90°)
	Returns:
	
	`OK;<cr><lf>`
	Or:
	`PARAM_ERROR;<cr><lf>`

Set the user mode configuration:
-Automatic or Holdover
 	
`MODE=m;<cr><lf>`
 	
m = A => Automatic Mode
m = H => Holdover Mode.
	Returns:
	
	`OK;<cr><lf>`
	Or:
	`PARAM_ERROR;<cr><lf>`

Request the outputs state
 	
`OUTPUT_STATE;<cr><lf>`
	Returns the output state of the system:
	
	`OUTPUT_STATE=3,<cr><lf>`
	`1,10M_S,output_state,<cr><lf>`
	`2,1PPS,outpus_state,<cr><lf>`
	`3,10M_L,output_state;<cr><lf>`
	
	output_state : OK : output is OK
	AL : output is squelched or in alarm

Set the PPS compensation:
 	
-Negative value to compensate delay in the antenna cable.
 	
`PPS_CABLE_DELAY=n;<cr><lf>`
 	
n: PPS Correction
(-999999 <= c <= +999999 , in ns)
	Returns:
	
	`OK;<cr><lf>`
	Or:
	`PARAM_ERROR;<cr><lf>`

Request a Restart of the system:
 	
`RESTART(r);<cr><lf>`
 	
r = W: Ask for a Warm restart
(Restart with current parameters)
 	
r= C: Ask for a Cold restart
(Restart with factory parameters)
	Returns:
	
	`OK;<cr><lf>`
	Or:
	`PARAM_ERROR;<cr><lf>`

Request LED and GPS status `STATUS;<cr><lf>`	Returns LED and GPS status `STATUS=l,g,rm;<cr><lf>` l: LED's status: l = 0 => OFF l = 1 => Red l = 2 => Red, blinking l = 3 => Green l = 4 => Green, blinking l = 5 => Red-Green, alternate l = 6 => Orange l = 7 => Orange blinking g: GPS status g = A => GPS is in alarm g = O => GPS is OK rm: Real mode (I: Init, W: Warm-up, F: Fast, T: Tracked, H: Holdover, S: Squelched)

Set the PLL time constant
 	
`TAU=t;<cr><lf>`
 	
t= PLL time constant (10 ≤ t ≤ 5000)
	Returns:
	
	`OK;<cr><lf>`
	Or:
	`PARAM_ERROR;<cr><lf>`

Request the ambient temperature `TEMPERATURE;<cr><lf>`	Returns: `TEMPERATURE=SAA.AA;<cr><lf>` S : sign (+ or –) AA.AA : Temperature measured in °C

Request the TOD state : `TOD_STATE;<cr><lf>`	Returns the TOD state : `TOD_STATE=s;<cr><lf>` s : state (0 = disable, 1 = enable)

Set the TOD state :
 	
`TOD_STATE=s;<cr><lf>`
 	
s : state (0 = disable, 1 = enable)
	Returns:
	
	`OK;<cr><lf>`
	or
	`PARAM_ERROR;<cr><lf>`

Request the type of the system `TYPE;<cr><lf>`	Returns the type of the system: `TYPE=family,variant;<cr><lf>` For this product: family = 4554 variant = base

Set the Time Zone (UTC Offset)
 	
`UTC_OFFSET=shh:mm;<cr><lf>`
 	
s : Sign (+ or -)
hh : Hours (0≤ hh ≤ 12)
mm: Minutes (0 ≤ mm ≤ 59)
	Returns:
	
	`OK;<cr><lf>`
	Or:
	`PARAM_ERROR;<cr><lf>`

Request for ATDC function status `ATDC_STATUS;<cr><lf>`	Returns the ATDC state of the system `ATDC_STATUS=s,n;<cr><lf>` s : 0 : Aging compensation activated (ATDC READY) 1 : Calculation of the aging compensation factor is in progress (ATDC NOT READY) n : Time remaining (in seconds) before activation of aging compensation. Note : See chapter “Description ATDC function timing specification with ATDC function” to know how the ‘s’ flag is managed.
Request of Holdover performance STATUS `HOLD_PERF_STATUS;<cr><lf>`	Returns the Holdover performance STATUS flag accordingly to TIMING SPECIFICATION chapter `HOLD_PERF_STATUS=p;<cr><lf>` *p : 0 : performance holdover **not match** to specification (page 17)* *1 : performance holdover **match** to specification (page 17)*

6.1 Default parameters

When a COLD restart command is sent to the STAR module the factory default parameters are restored.
Default parameters values are as follow:

Parameter	**Default value**
TAU	200 s
TOD state	Enable
UTC Offset	00:00
PPS Cable delay	0 ns
HBSQ	Disabled
Mask angle	10°
Alarm mask	None
Working mode	Automatic

7 Description of the ATDC function

ATDC means “Aging and Temperature Drift Compensation”. Basically, this ATDC function is a software algorithm which is able to compensate during a HOLDOVER period, the frequency drift of the OCXO due to its intrinsic aging and the thermal variation. The thermal compensation factor is calibrated at factory during a specific industrial process and is available immediately after power on. The aging compensation factor is calculated “in the field” and is continuously updated during tracked period. The indication of the availability of this compensation factor is given through the ‘s’ parameter of the ATDC_STATUS command (see chapter 6 “management and TOD specification”)
After a power up the unit determine itself three kinds of “power-up” criteria and adapt the calculation period of the aging compensation factor accordingly. These three “power on criteria” are specified as follow

1) Cold power up

The unit as been switched off for a period > ~3 minutes then the OCXO is considered as cold and the aging compensation factor calculated previously can not be used anymore. In this case the system waits (for a period called Ts) the availability of the GPS signal and for a stable enough frequency (variation less than $1x10^{-10}$ / hour) before starting a new calculation. Once this calculation is started, a new value for the compensation factor is available after 24 hours.

In this case the ATDC READY flag will be available after : **Ts + 24hours**

2) Warm power up

The unit as been switched off for an approximate period between 30 seconds and 3 minutes. In this case the ATDC NOT READY flag is set for a period of 5 hours. After 5 hours the previous calculated compensation factor is used (if available) in case of HOLDOVER and a new calculation over 24 hours is started.

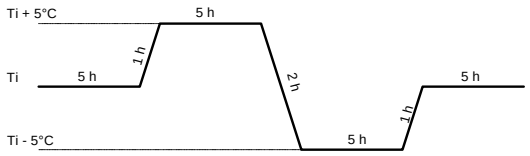
In this case the ATDC READY flag will be available after: **T_0 + 5hours**

3) Hot power up

The unit as been switched off for an approximate period less than 30 seconds. In this case the ATDC NOT READY flag is set for a period of 1 hour. After 1 hour the previous calculated compensation factor is used (if available) in case of HOLDOVER and a new calculation over 24 hours is started.

In this case the ATDC READY flag will be available after: **T_0 + 1 hour**

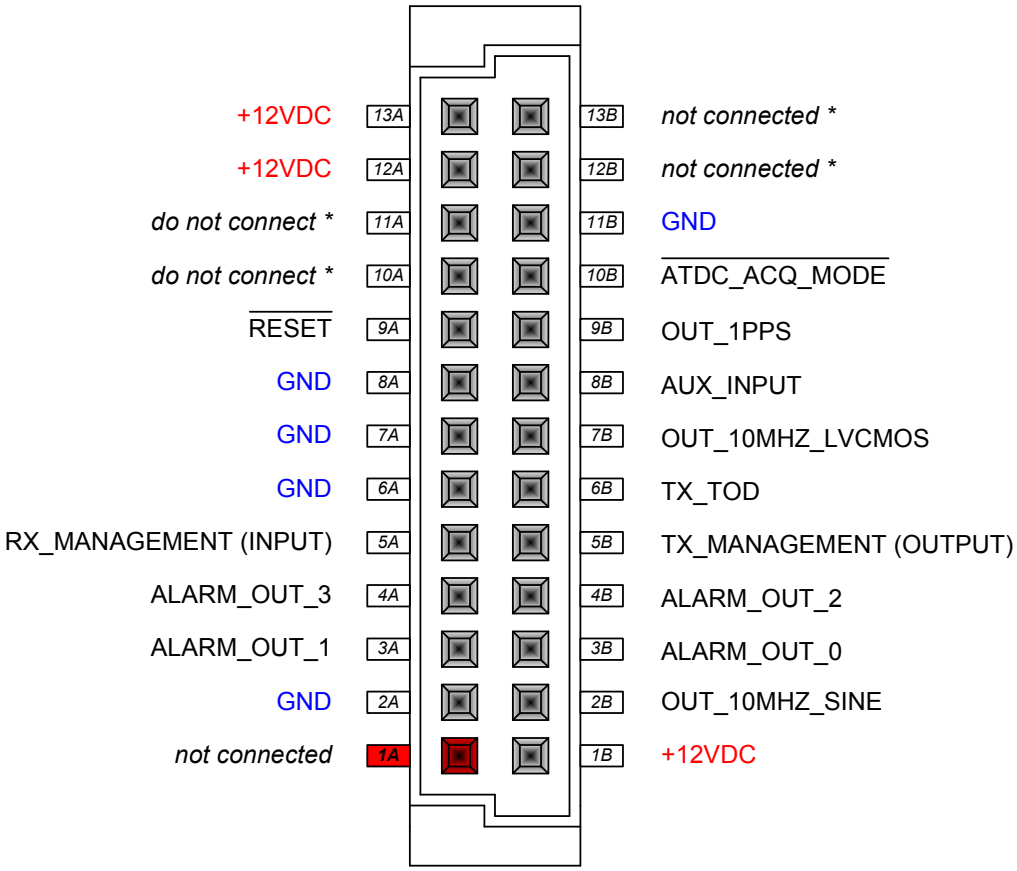
8 Timing specifications

PPS Stability	
Tracked mode, during position averaging	150ns max, peak to peak
Tracked mode, fixed position mode	100ns max, peak to peak.
10MHz Stability	
Tracked mode, fixed position mode	ADEV <= $1x10^{-12}$ @ 20.000s
Frequency stability in holdover mode, at constant temperature	Within 5 days holdover : 3×10^{-11} / Day After 5 days holdover :1×10^{-10} / Day
Holdover performance for 10MHz and PPS	
Phase drift in holdover mode, with temperature variation for PPS and 10Mhz **Test conditions** : ➔ 24 hours continuous tracking before starting the measure ➔ From any temperature between 0 - 60°C, with the following cycle *5h @ initial temperature (Ti)* *1h from Ti to Ti + 5°C* *5h @ Ti+5°C* *2h from Ti to Ti - 5°C* *5h @ Ti - 5°C* *1h from Ti -5°C to Ti* *5h @ initial temperature (Ti)*  	Phase variation : Max : 5uS over 24 hours Typical : 3uS over 24 hours Typical : after 2 days of continuous operation Guarantee : 3 days of continuous operation
Necessary continuous tracked period to reach specified HOLDOVER performance after a HOLDOVER period (consecutive HOLDOVER). A flag is available through the command HOLD_PERF_STATUS (see List of commands for more details) Prev. HOLDOVER duration / Necessary tracked time (Typical values) 0 - 1 hour — 4 hours 1 – 3 hours — 6 hours 3 – 12 hours — 12 hours 12 – 1 week — 24 hours < 1 week — 24 hours	

Fixed Position Mode	
Condition for transition to Fixed position mode	14.400 seconds (4 hours) after entering in tracked mode.
Condition for transition to Averaging position mode	Power-up.

9 Board to Board connector specification (connector on TOP side)

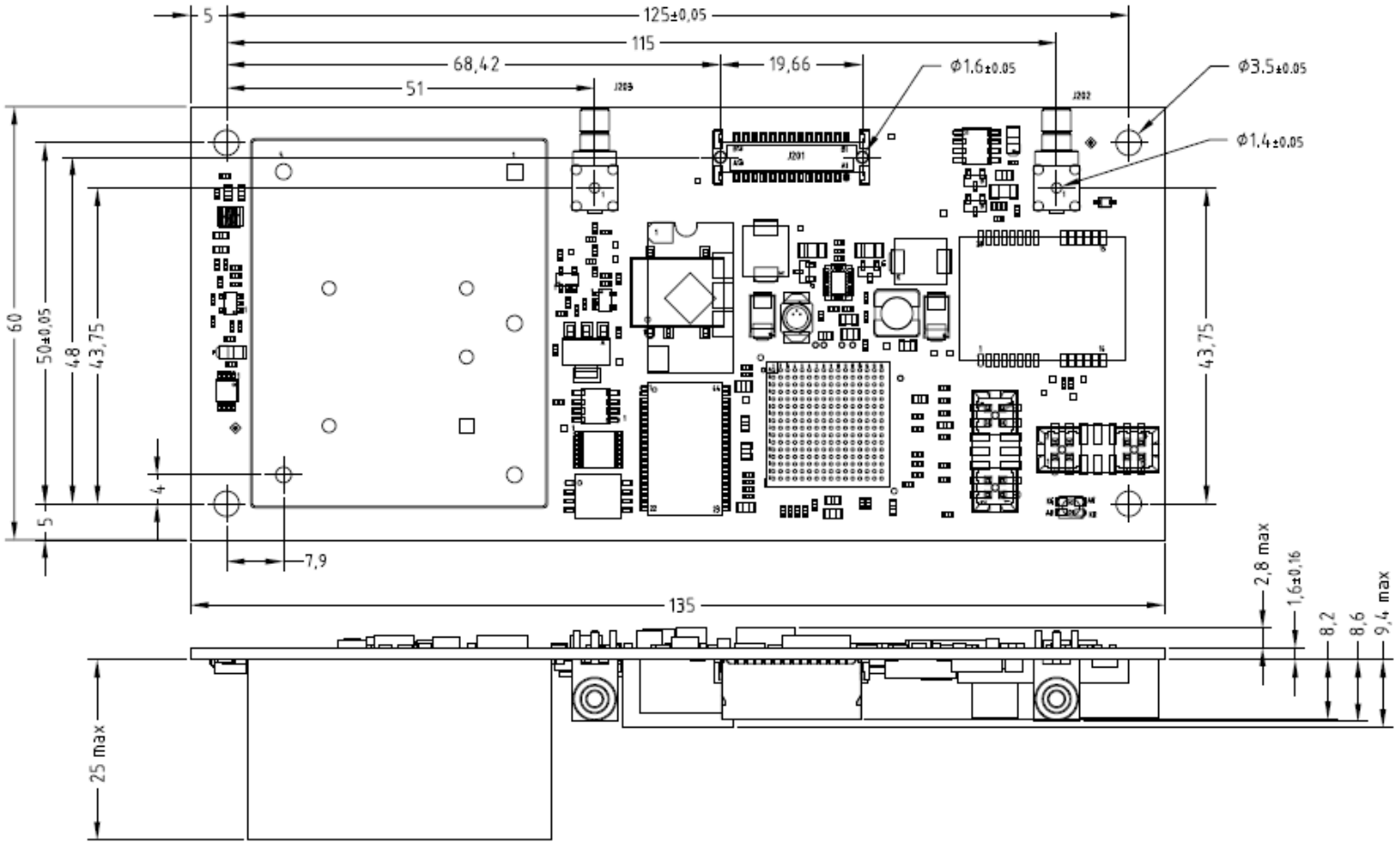
VIEW FROM CONNECTOR SIDE



(*) reserved for factory testing or other use
IT IS VERY IMPORTANT NOT TO CONNECT ANYTHING

ERNI Dual Row Vertical Male Connector
SMC-Q, 26-pole
Part# 063209

10 Mechanical dimensions, mounting and positioning



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