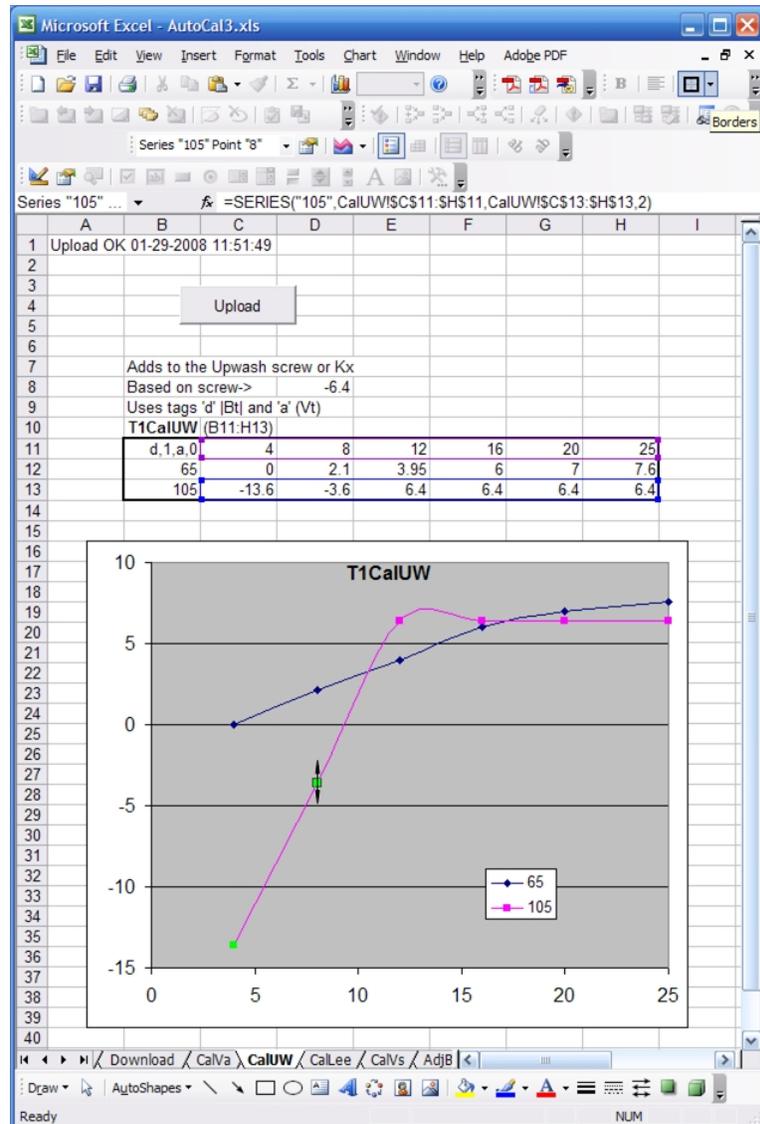


New T1 Autocal Interface (AutoCal3)

In response to requests for an easier way to maintain T1 autocal tables, a new API has been included in T1 code after 1/08. This API (Application Program Interface) includes functions for querying and setting table size, variable definition and cell contents.

This new interface eliminates the need to remove the compact flash card when changing autocal.

As a demonstration of this new API, an Excel spreadsheet has been created that allows up- and downloading autocal tables between the spreadsheet and the T1.



Because these tables live in Excel, real-time graphical editing is now possible. The figure shows the upwash table being modified in Excel. The upwash for 8 knots and 105 degrees true (currently set to -3.6) is being dragged to a new value.

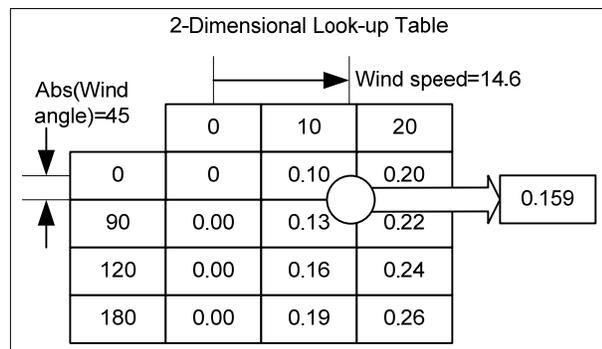
After modification, the Upload button is pressed, and the table is sent to the T1 for immediate use. The spreadsheet can also download tables from the T1 for inspection and confirmation.

How AutoCal Works

AutoCal allows automatic calibration adjustment in situations where standard calibrations are not flexible enough. One example is a boat with a centerboard or swing keel the position of which changes leeway. Another example is a boat where planing changes the boatspeed calibration.

In addition to the four calibration tables (Apparent Wind Speed, Upwash, Leeway and Boatspeed), two tables allow for adjustment to true wind angle and speed.

AutoCal tables are two-dimensional look-up tables. In the figure, the absolute value of wind angle (45°) and wind speed (14.6) and are interpolated between the table row (0 and 90) and column (10 and 20) values to find the current output value of 0.159.



Row/Col tags and 'abs_flag's

For maximum flexibility, the AutoCal mechanism does not assume anything. The user is free to specify any system variable as row and column inputs. The upper left cell of the AutoCal table specifies the input tags and whether or not to take the absolute value. In the first figure showing the CalUW table, the tags and flags are specified as "d,1,A,0" which means:

- Row input is tag 'd' (true wind angle).
- Row 'abs_flag' is 1, meaning 'take the absolute value'.
- Column input is tag 'A' (apparent wind speed).
- Column 'abs_flag' is 0, meaning 'don't take the absolute value'. Duh.

You can see the current value being emitted from your table on the T1 Status 1 output (tag ' '). Look for VA:<number or off> for CalVa etc. The Status 1 monikers are listed in the table info below.

AutoCal and Conventional Cals

The internal T1 AutoCals ride on top of their respective calibrations. In other words, the table is added to the respective calibration (screw-turn or K command), and both mechanisms remain active. When developing a T1 AutoCal table, it's a good idea to note the nominal calibration the table is based on.

External AutoCals (those running on a PC) do their thing by sending K commands, and therefore replace the calibration.

Spreadsheet issues

The demo spreadsheet uses embedded code to send your AutoCal table to the T1. In order to do this, the code needs to know where your table is. It does this by means of the **Range Name**. Each table area has a name associated with it, and that name defines the area where the table resides. In the first figure, the CalUW table is located on sheet 'CalUW' in cells B9 thru G17 and is named "T1CalVa". Before you upload your table, you should check that the range of your table coincides with the range name. Check Excel help on the subject "range name". For advanced users, there is the name droplist to the left of the formula bar.

Table numbers

#	Name	Stat1	Function
1	CalVa	VA:	Table values add to Cal Windspeed (or K5 command)
2	CalUW	UW:	Table values add to Cal Upwash (or K6 command)
3	CalLee	LE:	Table values add to Cal Leeway (or K3 command)
4	CalVs	VS:	Table values add to Cal Boatspeed (or K1 command)
5	AdjBt	BT:	<p>Table values add to true wind angle. +1° makes starboard tack wider and port tack narrower. There are two other functions that also affect true wind angle.</p> <ul style="list-style-type: none"> • QuikCal™ also known as Unlift/Unhead are cal commands K11 (upwind) and K12 (downwind). These narrow or widen true wind angle on both tacks. • Option 4 adds to true wind angle (like the table). It was originally there to undo wind shear (deprecated). <p>The sum of all adjustments to true wind angle (K11 + K12 + O4 + AdjBt) is displayed on tag 'e' (TWcorr).</p>
6	AdjVt	VT:	<p>Table values add to true wind speed. There is also a QuikCal™ for this adjustment (K13 upwind and K14 downwind), although it is not implemented on displays nor displayed.</p>

How to start using this new API

A zip file containing the required materials is available for download from the web (<http://www.ockam.com/docs/autocal3.zip>). The contents include this document, a new executable for the T1 and the demo Excel spreadsheet.

To use the demo spreadsheet, your T1 must be connected to your PC, and the OckamSoft 4 driver (<http://www.ockam.com/os4>) must be installed. Third party software can use the API directly with whatever communications method they now use.

New API commands

Because the API sends data as well as receives it, the commands include a response tag (the r_tag), specified by the user for data and acknowledgement. In the examples below, the period is being used. Responses always start with 'N' as a confirmation that the API is responding and not something else. When items are set, the response is 'NK' for okay. Error responses are 'NEn'.

Function	Query	Response
Get table dimension	ND<r_tag>,<table> ND.,1 queries for the dimensions of table 1 (CalVa). Response (to tag '.') is the current table dimensions.	N<rows>,<cols>
Set table dimension	ND<r_tag>,<table>,<rows>,<cols> ND.,1,4,5 set the dimensions of CalVa to 4 rows by 5 columns.	NK
Get row variable	NR<r_tag>,<table> NR.,1 queries for the row variable of CalVa.	N<tag>,<abs>
Set row variable	NR<r_tag>,<table>,<row_tag>,<abs_flag>	NK
Get/Set col variable	NC<r_tag>,<table>[,<col_tag>,<abs_flag>]	
Get/Set cell value	NV<r_tag>,<table>,<row>,<col>[,<value>] Row and column numbers range from 0 to 1 less than the respective table dimension.	
Save Autocal tables	NW.	NK

Error Codes

- NE1 Unknown command.
- NE2 No Autocal. The Autocal tables have not been allocated (system error).
- NE3 Bad parameter.
- NE4 Table has been deleted (set to 0 x 0 dimension).