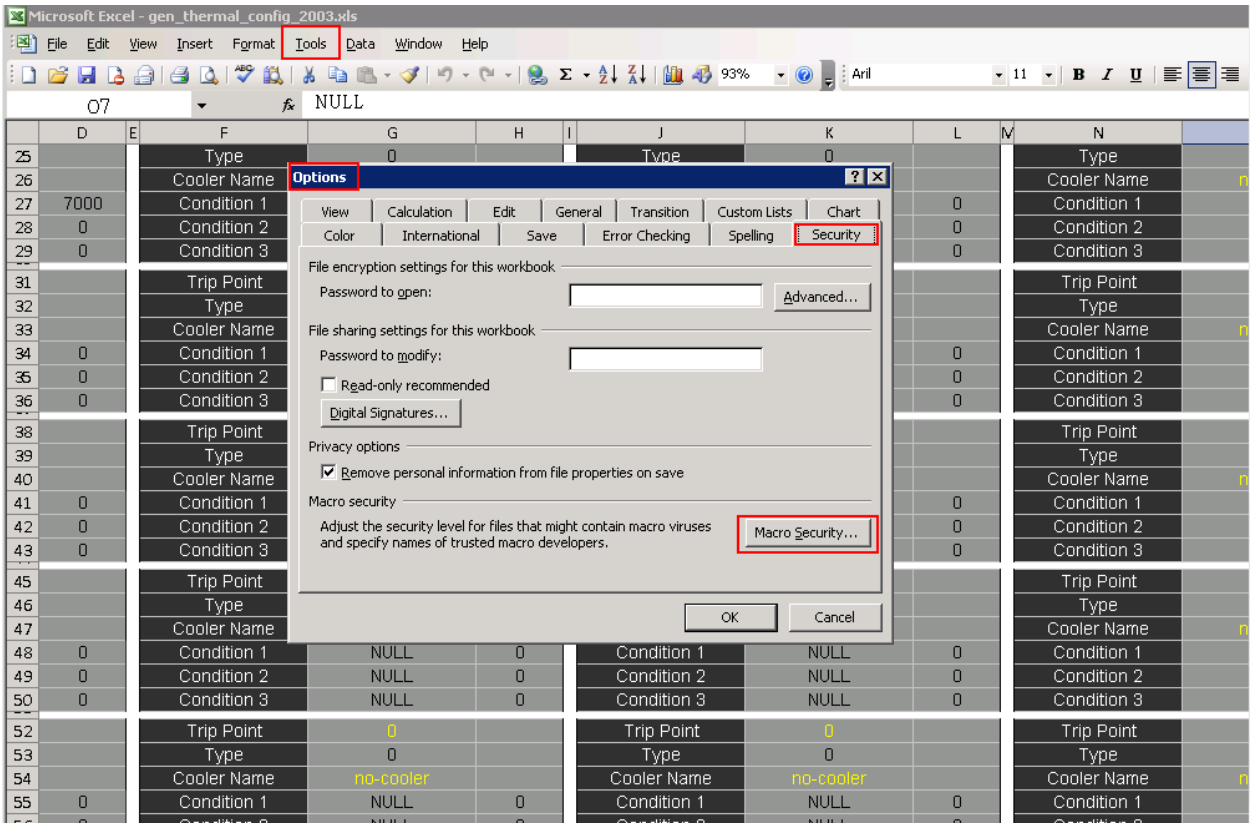
Thermal Config Tool User Guide

V1.7.1

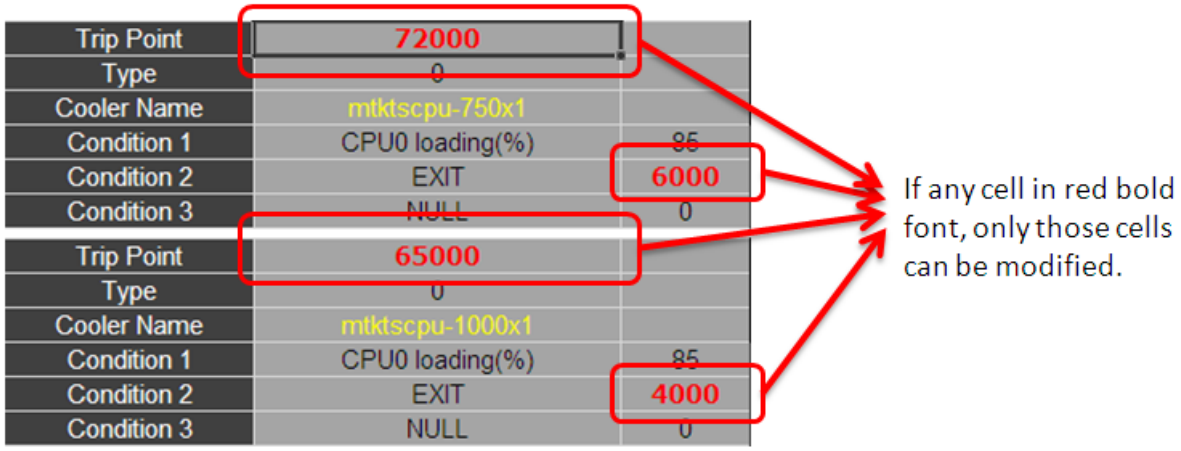
Outline:

1. Generate MTC Files

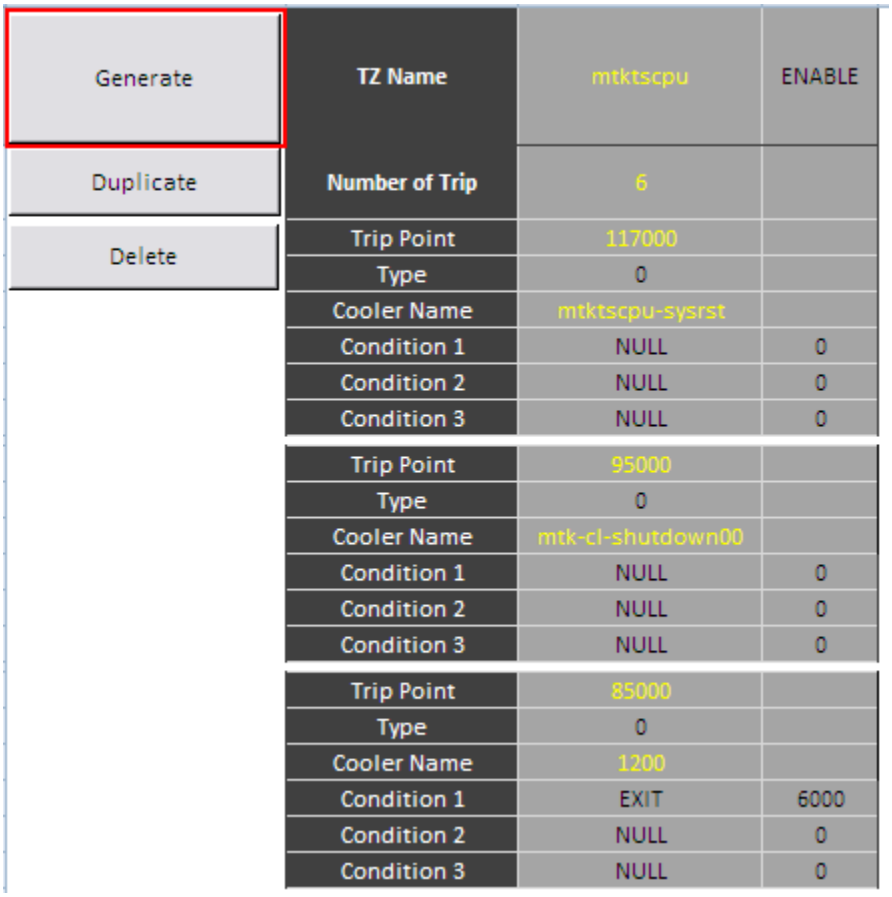
1. Open gen_thermal_config.xlsm if you are using MS Office 2007 and after. (**Open gen_thermal_config_2003.xls if you are using MS Office 2003.**)
   Choose "Yes" when you encounter macro security settings pop up dialog right after opening the file.
   Macro security related settings can be accessed from Tools → Options → Security → Macro Security. See the following screen shot.



2. Modify cells - **If some cells are using bold font type and red color, it means only those cells can be modified in the whole sheet. Limited modification is allowed in lite version of thermal config tool because MTK does not suggest thermal protection trips modified without thorough thermal tests. In below screen shot, only 72000, 6000, 65000, and 4000 can be modified.**



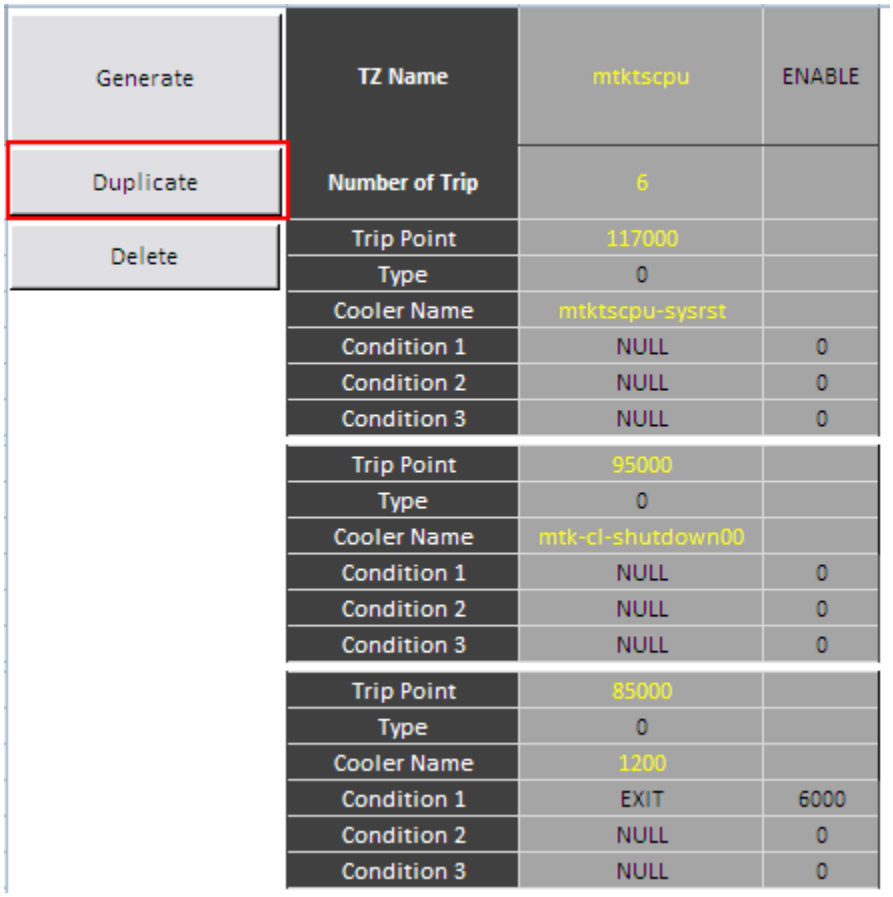
Press “Generate” button immediately generates a MTC file named by the sheet with a dot prefix under “.\mtc\ “ folder. In the following example, the sheet name is “default”. A MTC file named “.default.mtc” is generated. After generated successfully, a pop up notification shows “genConfig finished”. (The dot prefix is to make the MTC file a hidden one in linux file system).



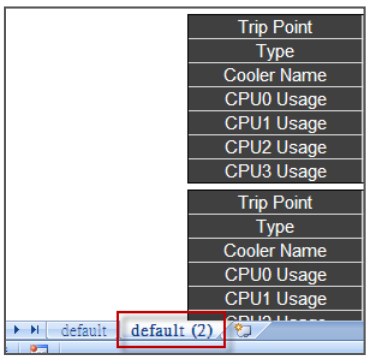
Note: Press “Generate” button automatically save current file. A Privacy Warning dialog will pop up, please just press “OK”.

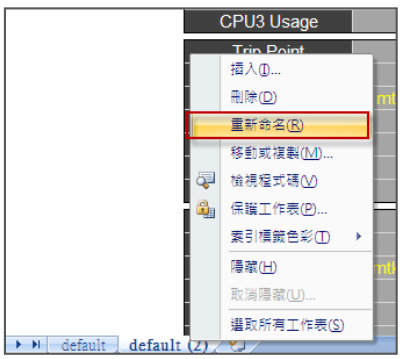
2. Add a New Sheet for a New Thermal Policy

1. Choose a current available sheet your modification can be based upon. Then press “Duplicate” button around upper left corner.



2. Rename the sheet.

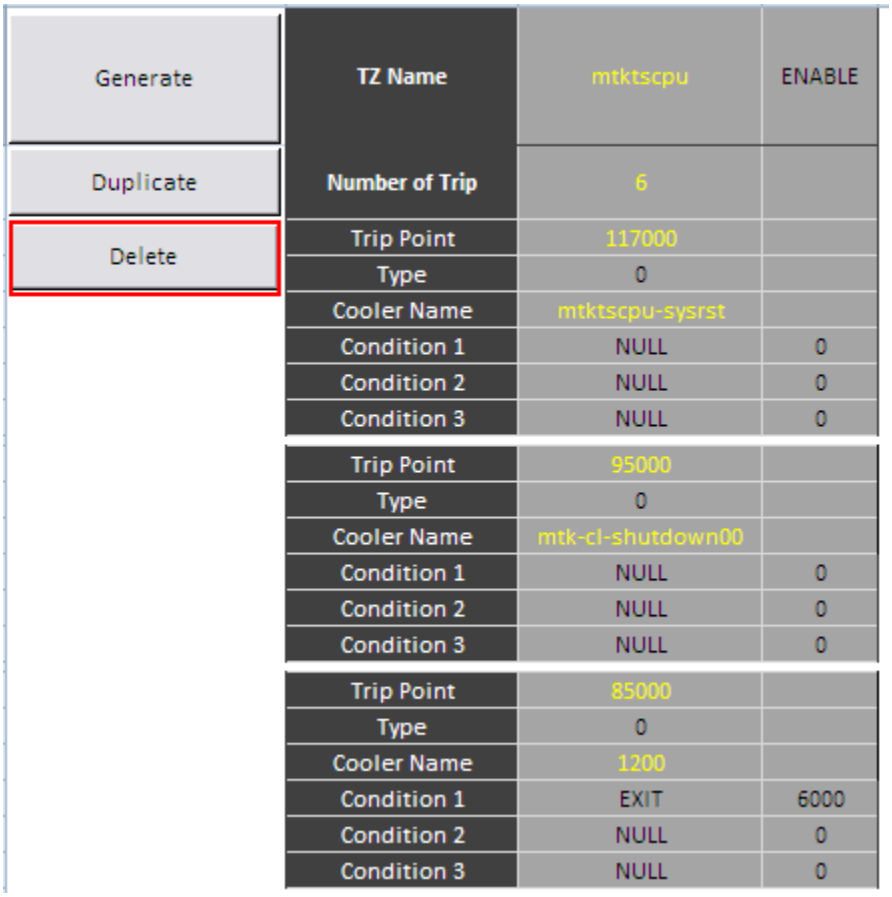




3. Then all other operations are the same. You can modify config at proper cells and generate MTC files.

3. Delete a Sheet

1. Press “Delete” button around upper left corner to delete current in focus sheet. This works the same way as directly delete a sheet using Excel way.



4. Details – If any cell is using red bold font type, then only those cells can be modified in the whole sheet.

Number of Trip: The number of trips which are used in a thermal zone. The max value is 10. This value must be correct for generating correct MTC files.

Trip Point: The trip temperature point. The unit is milli-degree C.

Type: Cooler Type, since all current available coolers are designed as Active Type. Any other value will result in undefined behaviors.

Cooler Name: It should be filled with the name of cooler that is intended to bind. Please fill in "no-cooler" if a trip is not required.

!!**Note: Selecting "no-cooler" will clear all settings in the trip!!!**

Condition 1: (The approach to set Condition2 and Condition3 is the same as Condition1. There are total three independent conditions can be used.)

Condition is used to cooperate with trip point. Except for EXIT condition, all other conditions must hold besides temperature exceeding trip point, and then bound cooler is activated. EXIT is a special condition, which is to test if temperature drops below trip point by specified point. If EXIT condition holds, then the bound cooler is deactivated. If EXIT is not set, bound cooler is immediately deactivated once temperature drops below trip point. Here explains all cases a condition can be:

a. **NULL**
   It means Condition1 is not set. Cell on the right side should be set to 0.
b. **CPU0 loading (%)**
   It means CPU total loading must bigger than a threshold to activate the cooler. CPU total loading is the sum of loadings on all CPU cores. Full loading of a single core is counted as

100%. In the case of MT6577 dual core AP, the max CPU total loading is 200%.

Ex. CPU0 loading (%) 85

➔ It means CPU total loading must bigger than 85% to activate the cooler.

c. **Wifi usage (Kb/s)**

It means WiFi TX throughput must exceeds specified threshold.

d. **EXIT** (If no EXIT condition exists, cooler is immediately turned off when temperature drops below trip point.)

It means cooler can only be turned off when temperature drops by specified milli-degree C from trip point.

Ex. EXIT 4000

It means the trip is left (cooler is turned off) when temperature drops 4000 milli-degree C more from trip point.

e. mtktscpu

The name of other thermal zone can be used as a condition. It means the temperature of specified thermal zone is taken into consideration.

Ex. mtktsbattery 50000

➔ It means battery temperature must also exceeds 50 degree C to activate the cooler. All of the rest adopt the same design.

f. mtktsabb
g. mtktspmic
h. mtktsbattery
i. mtktspa
j. mtktswmt

Polling Interval: It is the time interval between each temperature polling to the thermal zone. The unit is millisecond. Smallest value is 1000 for 1 second. Please be noted that, smaller the value, higher the system overhead. But it cannot be too wide such that it does not cover the quickest temperature raising slope. For example, if a thermal zone can raise up 1

degree C in 1s, setting polling interval to 10 may result in slow responses to thermal problems. If polling interval is set to **0**, it means this thermal zone will not be monitored. Temperature exceeding trip points does not activate bound coolers.

Moving Average: The moving average length. It reports the average of last specified sample points to the thermal system to represent the temperature of a thermal zone. It is meant to filter noise. The valid range is [1, 60]. 1 means no moving average is used, raw temperature sensing data is reported. The bigger the moving average length, it takes longer to reflect a temperature rising. For example, the real temperature may already exceed 60 degree C for 15 seconds, then temperature of thermal zone reports 60 degree C.

Polling Interval	3000	
Moving Average	10	

It means the thermal zone is checked every 3 seconds, and temperature value is the moving average of latest 10 sample points.

Next page shows an example of a thermal zone configuration.

Thermal Zone Device Name

TZ Name	mtktscpu	ENABLE
Number of Trip	6	
Trip Point	117000	
Type	0	
Cooler Name	mtktscpu-sysrst	
Condition 1	NULL	0
Condition 2	NULL	0
Condition 3	NULL	0
Trip Point	95000	
Type	0	
Cooler Name	mtk-cl-shutdown00	
Condition 1	NULL	0
Condition 2	NULL	0
Condition 3	NULL	0
Trip Point	85000	
Type	0	
Cooler Name	1200	
Condition 1	EXIT	6000
Condition 2	NULL	0
Condition 3	NULL	0

ENABLE: gen config for it
DISABLE: ignore it

1st trip settings

2nd trip settings

3rd trip settings

Last trip settings, which are empty

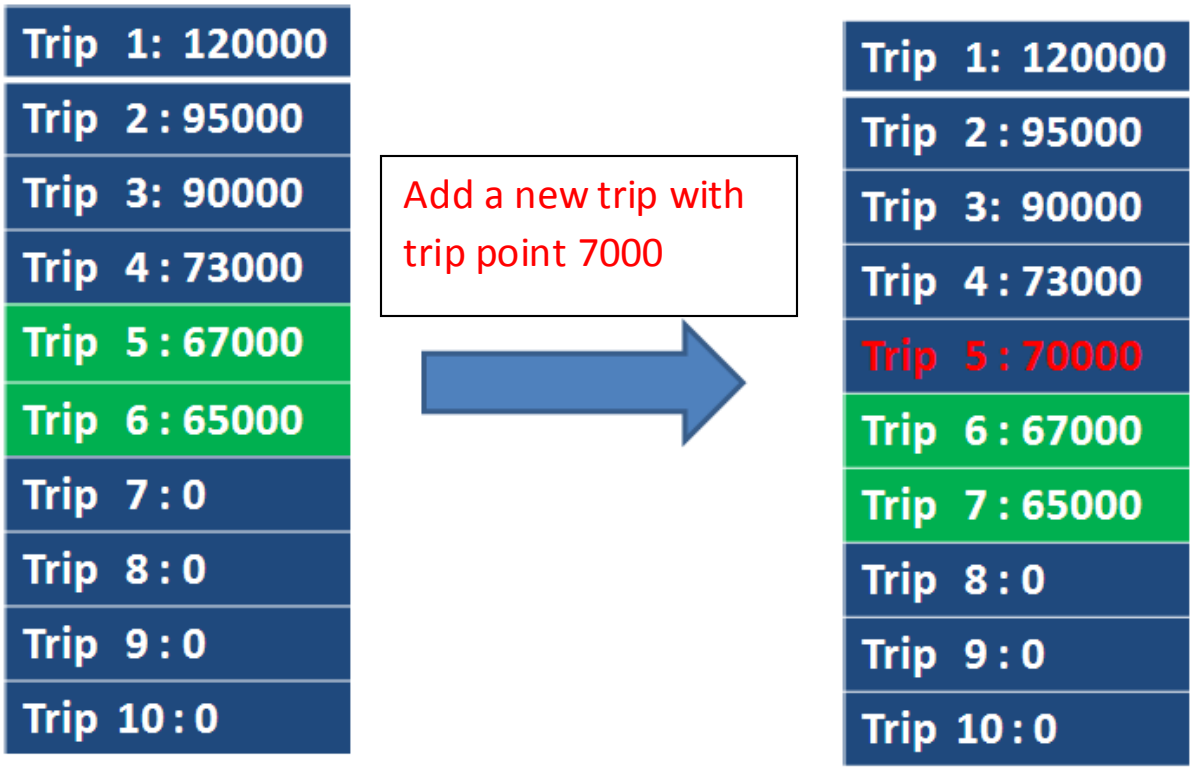
Trip Point	0	
Type	0	
Cooler Name	no-cooler	
Condition 1	NULL	0
Condition 2	NULL	0
Condition 3	NULL	0
Polling Interval	3000	
Moving Average	10	

5. Use Cases

RULE: All trips must be sorted by trip points in descending order. Empty trip blocks must be placed below all non-empty trip blocks!!!

Case 1. Add a New Trip

Step 1: Find a proper place to insert a new trip. (Follow above RULE)
Step 2: Insert the new trip if necessary. (to follow above RULE)
Step 3: Fill in trip point, cooler name, and conditions.



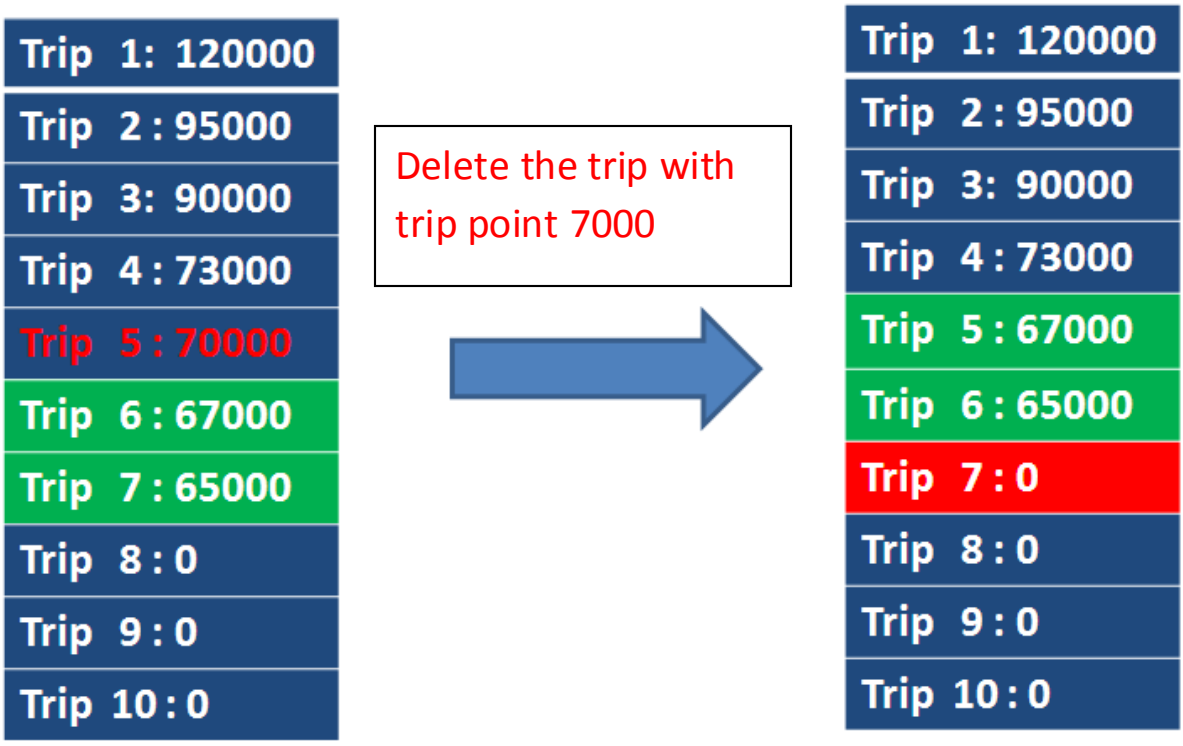
Green areas label those trips needed to be copied and pasted.

Example: Add a new trip of trip point 70000. It must be inserted between current Trip 4 and Trip 5. So the action is to cut Trip 5 and below and paste them downward by one block. Then compose the content of new Trip 5 with trip point 70000.

Case 2. Delete a Trip

Step 1: Locate the trip block to remove

Step 2: Remove it and adjust all the rest trip blocks to follow the RULE.



Green areas label those trips needed to be copied and pasted.

Red area labels the trip to be removed.

Example: Remove trip 5 directly. Copy Trip 6 and 7 and paste them in the place of trip 5. Fill in an empty trip block in the position of trip 7.

6. ADB Push Tools

1. Push all MTC files into a USB connected phone
   - Run push_all_mtc.bat under “mtc” folder can push all MTC files in the same folder to a USB-connected phone.
   - The phone must enable USB debugging function and ADB must work.
   - ADB installation and usage is out of scope.

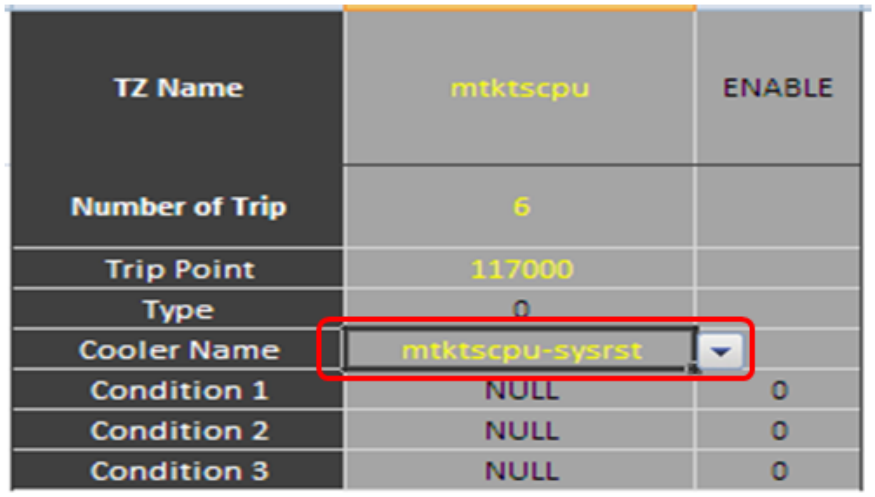
2. Push a single MTC file into a USB connected phone
   - After generating a MTC from one sheet. A batch file named by the sheet is also created besides MTC file in “mtc” folder. For example, pressing “Generate” in a sheet named “foo” will generate .foo.bat and .foo.mtc under “mtc” folder.
   - Execute it then MTC of the same name is pushed into the phone.
   - The phone must enable USB debugging function and ADB must work.

8. Decryptor

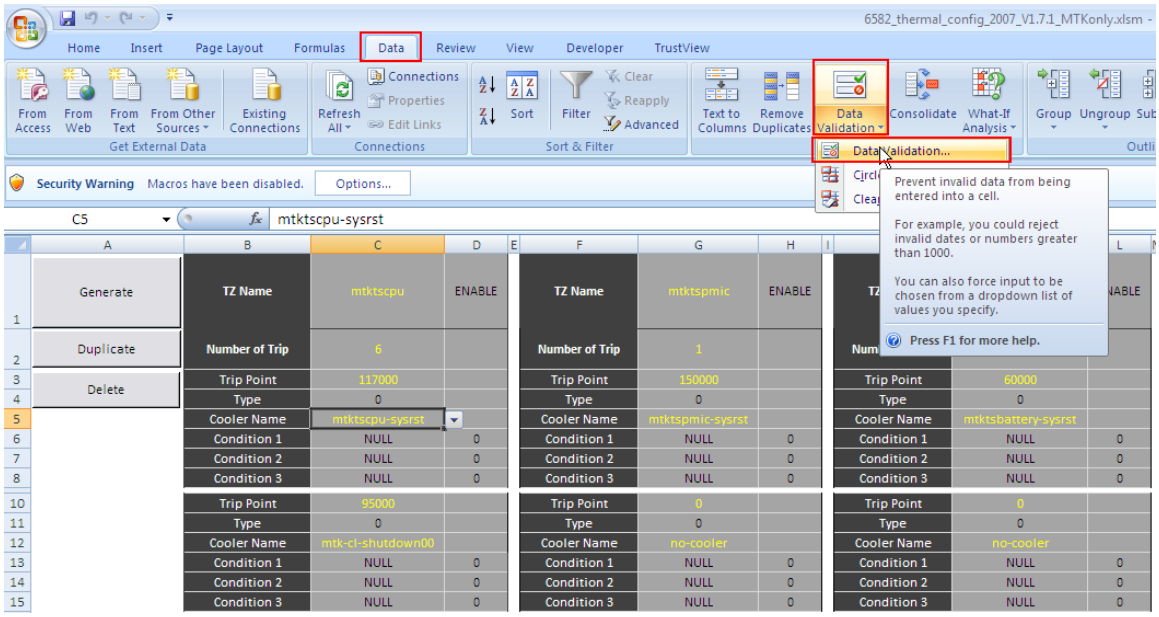
1. How to use:
   - Enter “decrypt” folder
   - Put the MTC files you like to examine in this folder. MTC files are all encrypted.
   - Execute decrypt_all_config.bat will decrypt all MTC files in this folder. The plain text files are all with .TXT extension.

9. Add a New Cooler in the Drag Down List

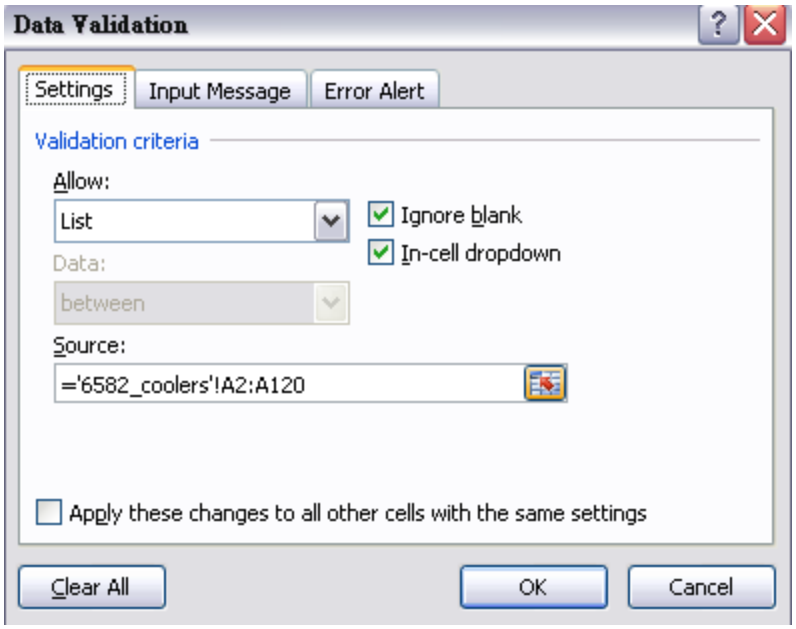
1. Select any cooler cell as below.



2. Click Data → Validation → Data Validation.

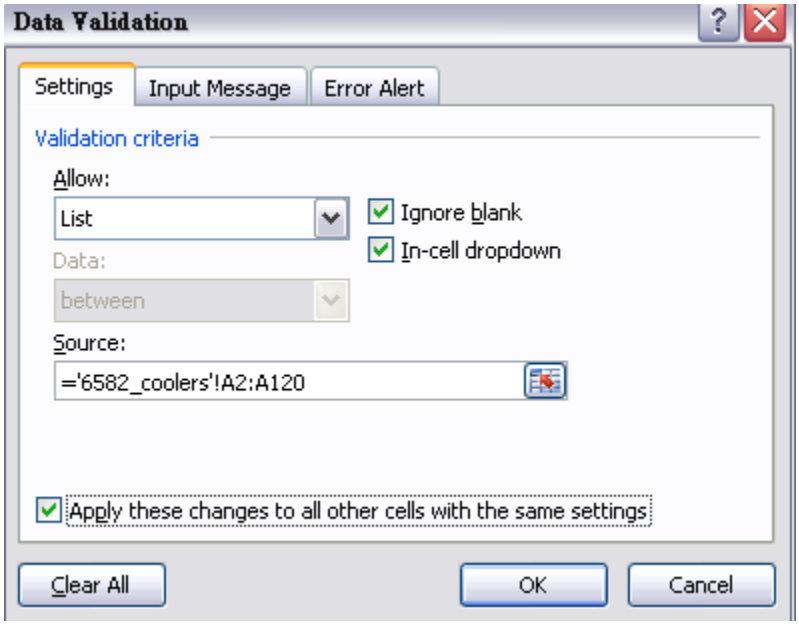


3. Select List. Here you can directly modify the list or modify the cells where it points to.



4. If coolers are directly in the list, just insert your new cooler name and separated with comma.

5. Check “Apply the settings to all cells”and press OK.



10. Set up for Multi-Step Moving Average

1. The format is **"temperature,M.A;" At most three settings are allowed. Leave it blank if not required.**

   Temperature: Unit is milli degree, when thermal zone real temperature exceeds it, the moving average length is immediately changed to new one.

   M.A: The new moving average length.

   This is designed to respond to temperature changing in different speed in different temperature region. A setting means once real temperature exceeds threshold, the new moving average length is applied.

2. Example of all three settings are used

   Moving avg. length is changed to 20 when real temperature exceeds 60 deg C.

   Moving avg. length is changed to 15 when real temperature exceeds 80 deg C.

   Moving avg. length is changed to 10 when real temperature exceeds 100 deg C.

   Below 60 deg C, moving avg. length is 30.

Polling Interval	1000	
Moving Average	30	
Multi-Step MA	60000,20;80000,15;100000,10;	

(Please do not insert space characters in this cell!)

11. Limitations

1. Each thermal zone can have only ten trips.

   When configuring a thermal zone, trips must be sorted by trip point in descending order. Empty trip blocks must be placed in the bottom.