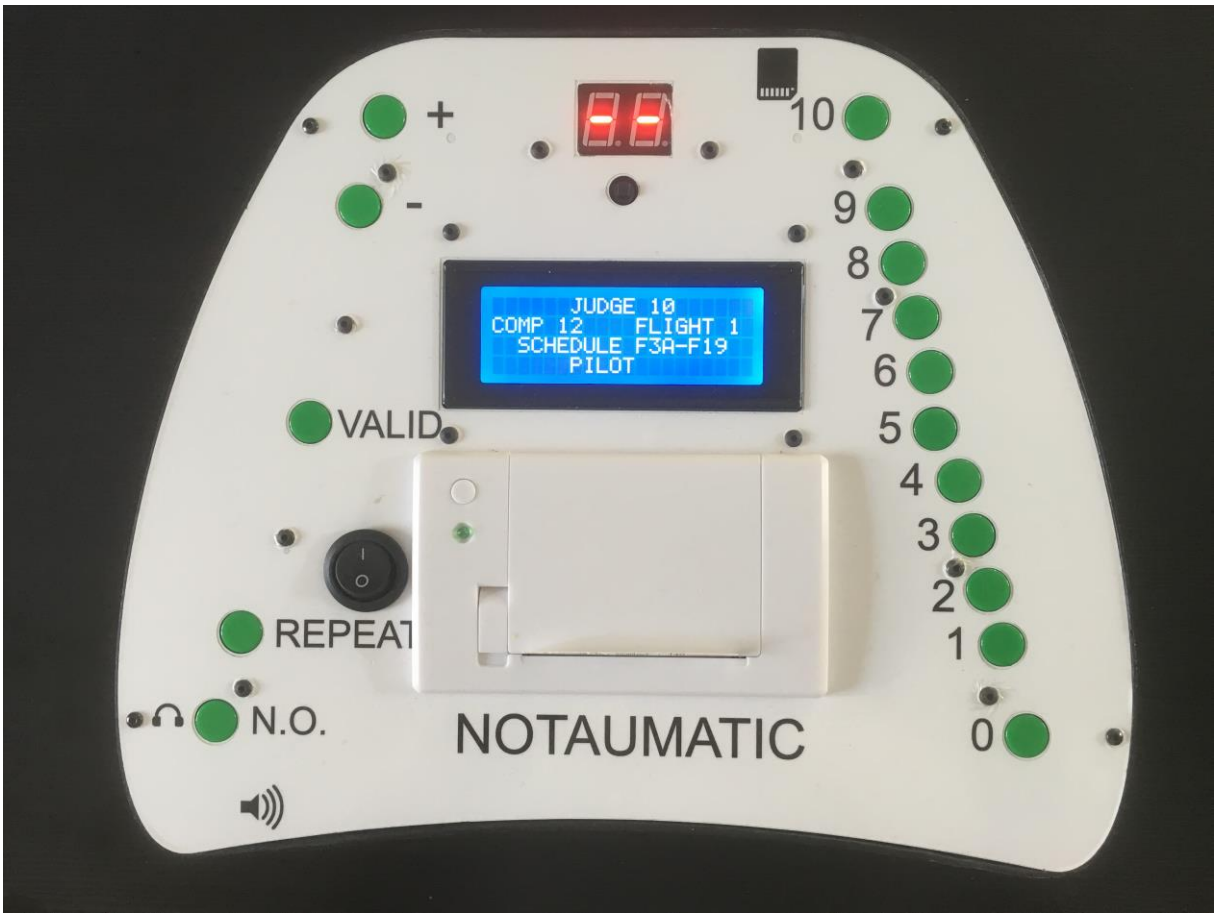
NOTAUMATIC



User manual

Rpc Informatique

Introduction

We thank you for choosing the Notaumatic for the management of your competitions.
To take advantage of all the features of this unit, please read these operating instructions very carefully.
Keep this manual handy for future reference

Version	Date	Rédacteur	Nature / Motif de la mise à jour
1.0	20/06/2016	Roland Poidevin	Version initiale
1.1	30/07/2017	Roland Poidevin	Displays updates
1.2	21/09/2017	Roland Poidevin	Displays updates
1.3	27/11/2017	Russell Edwards	Minor changes re English translation
1.4	31/08/2018	Roland Poidevin	Displays updates, new features.
1.5	12/11/2018	Roland Poidevin	New option 7 (IMAC)

Table of contents

Safety rules

Charging LiFe batteries.

The Notaumatic is equipped with LiFe batteries. LiFe batteries are renowned for their resistance to deep discharges and their low self-discharge rate. However, it is advisable to charge the batteries before each day. It is imperative to use a charger suitable for these batteries.

Prohibitions and precautions for use.

The Notaumatic is designed to use 2-cell (2S) LiFe batteries.
Do not short circuit the battery plugs.
Do not subject the batteries to heavy shocks.
Batteries can burn or destroy themselves in the event of an impact.
Protect the Notaumatic units against contact with fuel, oil, etc.
Do not dispose of batteries in a fire. Do not disassemble or recondition them.
Since LiFe batteries are recyclable, do not dispose of your batteries. Take them to a waste disposal center.

Technical description

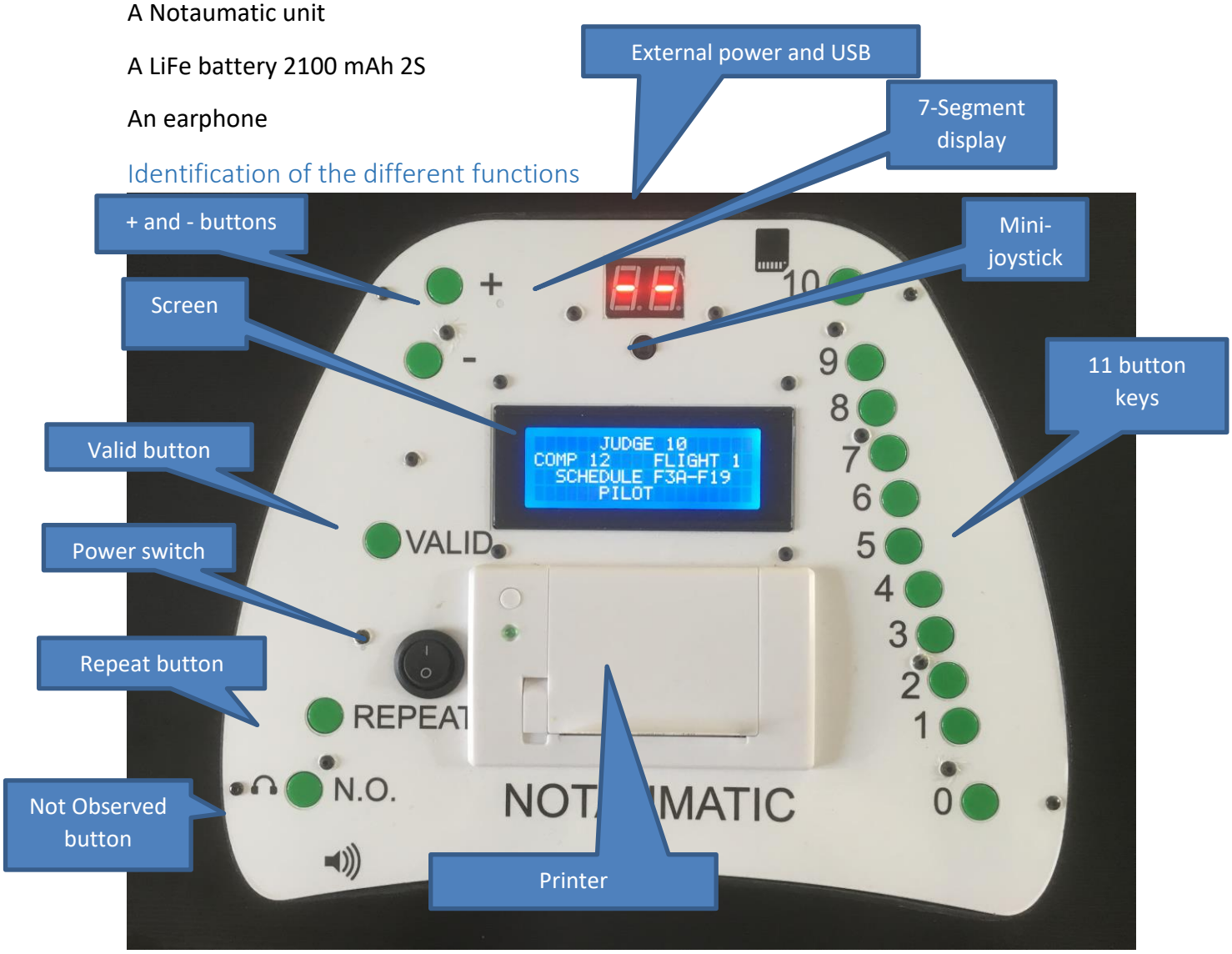
Package contents

A Notaumatic unit

A LiFe battery 2100 mAh 2S

An earphone

Identification of the different functions



Power switch	Switches the Notaumatic on or off. It is advisable to turn off the Notaumatic when not in use. Powering on is almost instantaneous.
Mini joystick	Navigates through the menus that are displayed on the screen. It may be operated in 5 directions: Up, Down, Right, Left and Center.
Screen	4 lines of 20 characters. It displays the parameters at the beginning of the flight, and information on manoeuvers and scores during the flight.

Printer	A score sheet will be printed at the end of the flight, after validation. This printer uses thermal paper.
11 button keys	Used to enter scores. May also be used for entry of pilot, judge and flight number.
<+> and <-> buttons	These keys allow you to enter scores by decreasing the score as the manoeuver is executed.
<Valid> button	Validates the score for each manoeuver.
<Repeat> button	Re-plays the audio description of the manoeuver.
<Not Observed> button	Where a manoeuver (or portion of the manoeuver) cannot be fully observed.
External power supply	This round plug allows an external power supply (2S LiFe or LiPo, 7 to 12 Volts). The positive pole is in the center, the negative pole is outside.
USB plug	For firmware updates.

Using the device

Problems and solutions.

The organization of a competition requires substantial logistics, in particular managing the volume of scores. A regional competition (20 pilots, 3 flights) represents over 3,000 scores. An FAI competition or a national championship, more than 15,000 scores. All these scores are "mimed" with the fingers by the judges, written by the scribes, and finally entered manually in a calculation program.

This organization requires the attentive presence of a scribe for each judge, and one or two people for data entry. The opportunities for errors are many: the scribe's understanding of the judge's mimicry, inattention of the scribe, incorrect filling the score sheets with the judge's number and that of the pilot, data entry errors, etc ...

Then there is the difficulty of finding 3, 5 or 10 competent scribes, plus additional expenses for these volunteers.

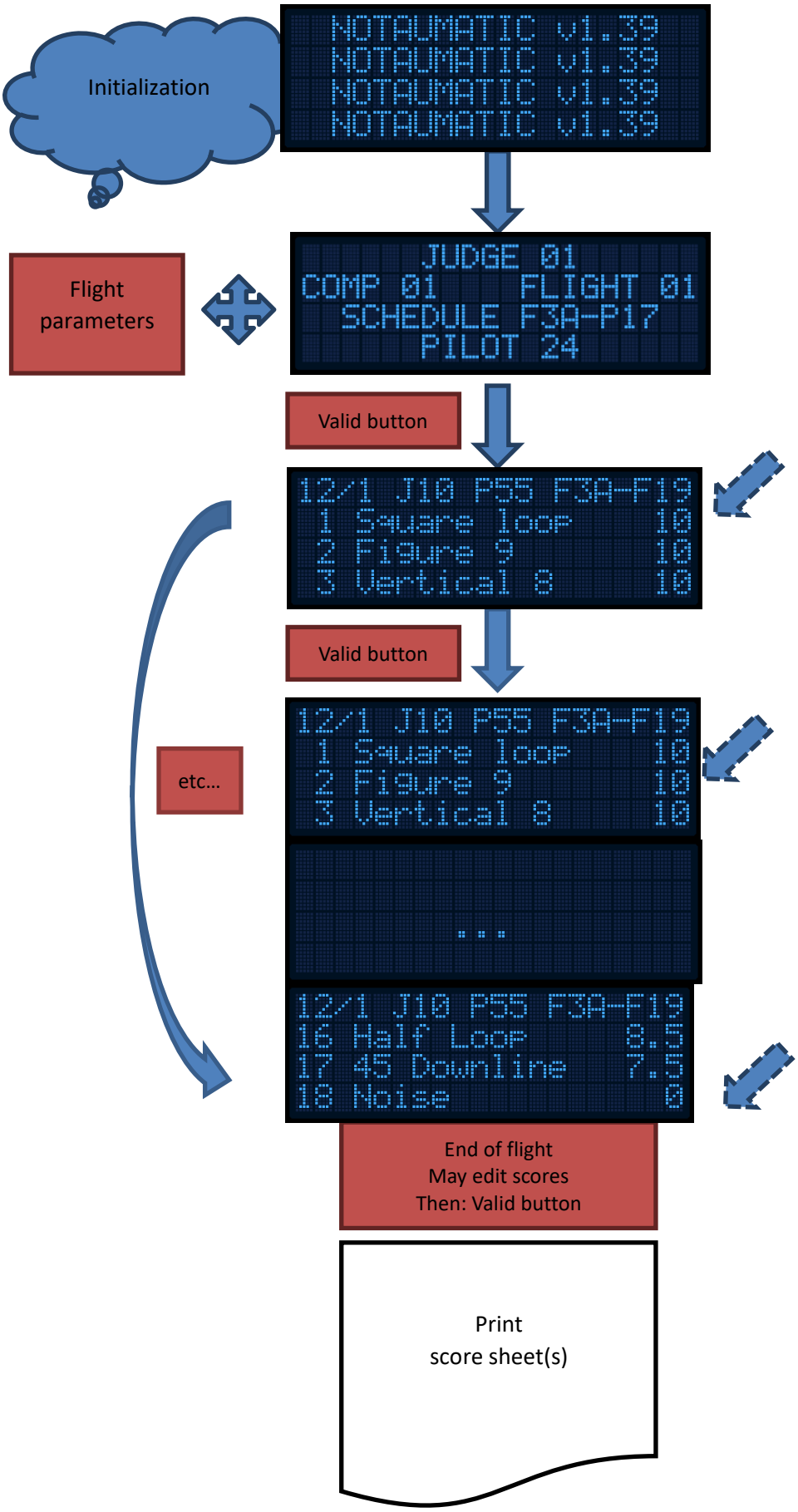
The vision of the Notaumatic system is therefore to automate the entire process from the recording of scores, through to the final competition results.

Another potential development is the display of scores in real time.

F3A, F3M, F3P, F2B, etc… judging

At the beginning of each flight, the scribe will note pilot's number and the judge's number on a score sheet provided by the organization. For each manoeuver (the manoeuver is possibly announced by the scribe), the judge deducts points for each observed fault. When the manoeuver is finished, the judge shows the scribe the score for the manoeuvre. The scribe writes this score on the score sheet next to the manoeuver. This procedure allows the judge to observe the entire flight, and not miss portions of the flight while writing on a score sheet themselves.
At the end of the flight, the score sheets are collected and entered into a calculation program. This "deduction processes" of scoring is theoretical and, in reality, the judge "nuances" the score by taking into account other criteria (smoothness, harmony, size of manoeuver, etc). Therefore some judges will simply apply a final score at the end of the manoeuver.

Functional overview


Initialization
NOTAUMATIC v1.39
NOTAUMATIC v1.39
NOTAUMATIC v1.39
NOTAUMATIC v1.39
Flight parameters
JUDGE 01
COMP 01 FLIGHT 01
SCHEDULE F3A-P17
PILOT 24
Valid button
12/1 J10 P55 F3A-F19
1 Square loop 10
2 Figure 9 10
3 Vertical 8 10
Valid button
etc...
12/1 J10 P55 F3A-F19
1 Square loop 10
2 Figure 9 10
3 Vertical 8 10
...
12/1 J10 P55 F3A-F19
16 Half Loop 8.5
17 45 Downline 7.5
18 Noise 0
End of flight
May edit scores
Then: Valid button
Print
score sheet(s)

Principles.

The Notaumatic unit is an autonomous device with which the judge can record scores without taking his eyes off the model. Audible feedback of scores and the upcoming manoeuvre are provided by an earphone plugged into the unit.

The judge may record scores in two different ways:

1) A <-> button that counts down from 10 for each error observed by the judge (and a <+> button to correct). The <Valid> key is used to complete the manoeuvre and move automatically to the next manoeuvre. The unit will then automatically provide an audio description of the next manoeuvre.
2) A numeric keypad with 11 buttons (0 to 10) which the judge can use to count deductions or directly select a score. Again, the <Valid> key completes the manoeuvre and moves automatically to the next.

   A <Not Observed> button is also available.

With the right equipment, the units all communicate with a centralized computer that collects all scores and calculates results.

The main advantages are therefore:

- Eliminate manual recording and entry of scores
- Real-time display of scores for each manoeuver/judge

A written record of each flight (ticket receipt style) is printed by the unit to be signed by the judge. This written record replaces the traditional flight sheet, so it is possible to mix judges equipped with a Notaumatic unit with judges not equipped.

At the end of the flight (before the flight sheet is printed), judges can review and modify their scores.

Additionally, scores are stored on the unit's SD card. This card can also be read by a computer to automatically upload scores into the calculation software.

Detailed Operations:

Key management:

- All keys have a software rebound (50 ms minimum), which safeguards keys against fal se contacts or interference.
- Long presses are managed and timed to a minimum of one second.
- Double clicks are not supported.

Preflight entry:

- The "cursor" is positioned by default on the "PILOT" line
- A short press of the <Up> or <Down> keys allow to move on to the previous/next param.
- A short press of the <Left> or <Right> keys decreases the value (if it is greater than 1) or increases it.
- The numeric keys (0 to 10) can be used to enter values.
- The values are repeated on the 7-segment displays with the following features:
  - If the flight number is less than 10, it is displayed "F2" (Flight 2).
  - If the judge's number is less than 10, it is displayed "J3" (Judge 3)
- For processes requiring a somewhat long processing time, the message No 2 ("Please wait... ") is displayed
- This screen may be completed by pressing the <Valid> key, or by a long press in the center of the joystick.
- These parameters are stored in the EEPROM (non volatile memory).
- At the beginning of the next flight, the pilot number is displayed as "-" and therefore requires data entry. However, if the "next driver" is entered in NotauScore, it will appear directly.
- If the pilot number corresponds to a note file present in the SD card, the following screen is displayed :

The three choices (1: return to the entry screen of the pilot number, 2: re-keying of the notes, 3: re-printing of the ticket) are accessible by the corresponding numerical keys.

During the flight:

- The first line contains the parameters (Competition/Flight, Judge, Pilot and schedule). Note: if the text is too long (in the case of 3 digits judge or pilot number), the first line is displayed by alternating the different data.
- The next three lines display the manoeuvres, with a blinking mark for the current manoeuvre.

- The description of the manoeuvre is displayed as per the xx.TXT file (see Creating a new schedule)
- The scores are initialized according to the option on the SD card (file xx.OPT). The values are as follows:

Value	Description
0	0 to 10 in integer values (default value). Same as no file.
1	0 to 10 in half points (VGM)
2	5, 0 or +5 (noise for VGM)
3	0 or 10 (take-off and landing)
4	-10 or 0 (noise for F3A)
5	0 to 10, starting at 0 (VGM sequence break)
6	0 to 10 in 1/10 point increments (F2B)
7	O or 1 (IMAC penalty)

- Additional details:

Value	Initial Value	Use of <-> and <+> keys		
		Value changes by	Minimum	Maximum
0	10	1	0	10
1	10	0.5	0	10
2	0	5	-5	+5
3	10	10	0	10
4	0	10	-10	0
5	0	1	0	10
6	10	.1	0	10
7	0	1	0	1

- The numeric keys (0 to 10) allow you to enter scores directly within the limits stated above. In the case of half-points, you must use the <-> and <+> keys to refine the score. In the case of 1/10 points, the two digits of the score must be entered. The limits described above are applied. The score is not validated until the <Valid> key is pressed.
- In all cases, the score is displayed on the 7-segment display.
- The <Valid> key (or a long-press on the center of the joystick) validates the score. If the current program has the "Rounded" option, the score is rounded up to the next whole number. The following manoeuver is then displayed.
- In the case of a ½-point notation, another press on the same numerical key between ½ point.
- The <Repeat> key repeats the audio cue for the current manoeuvre. A long press on the <Repeat> key switches between "long" and "short" audio description mode.

Editing Scores:

- If a score has been incorrectly entered, you can "scroll upwards" by pressing <up> on the joystick. The same input procedure (per above) then applies.
- The same procedure can be used at the end of the flight for all manoeuvres.

Volume Adjustments:

- A small knob is accessible under the case. A "software" setting is also possible:
- At initialization, the volume is maximum.
- A short press on the left joystick decreases the volume. A short press on the right joys tick increases it. The last sound is repeated for confirmation.

Validation of the flight:

- The display is not changed (the last three manoeuvres are displayed).
- It is possible to "scroll upwards" (<up> on the joystick) and to modify the scores of all manoeuvers in the flight.
- Validate the flight by pressing <Valid>.
- Print the ticket(s). The number of tickets is set in the file PARAM.TXT, line "NBFEUIL". A screen message allows additional copies.
- The scores are written to the SD card.
- Scores are sent by WiFi to the calculation software.
- The unit returns to the flight settings screen. The pilot number will display "-".

Displays during the flight:

20 x 4 Screen

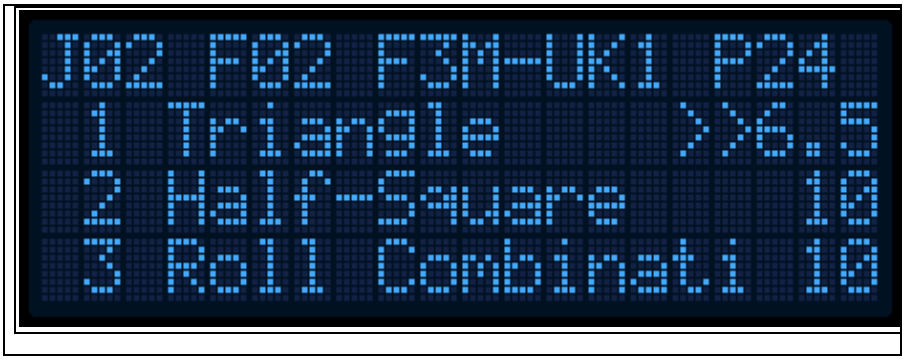
7-segment display

F3A

Whole number scoring

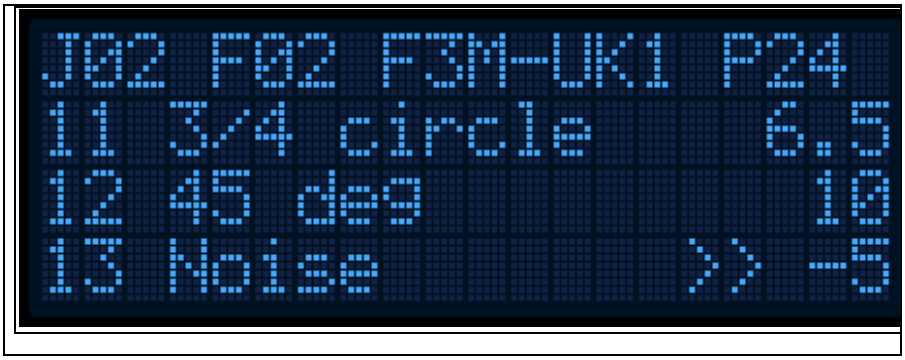
F3M

Half-point scoring.



Noise for F3M

Negative score



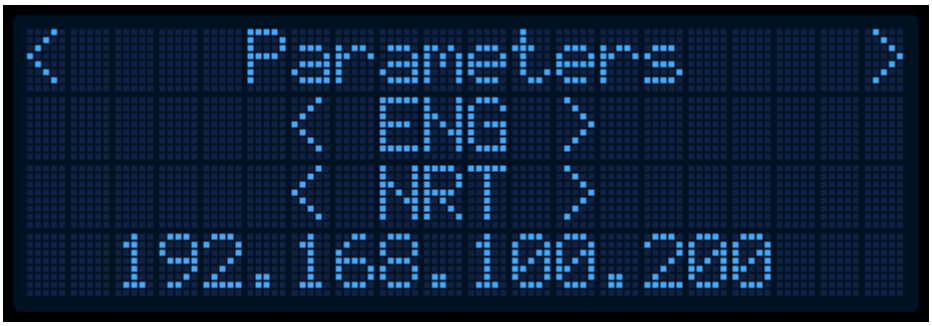
Menus

The parameter screens can be accessed by a long press on the left or right joystick. Further long presses on the left or right joystick cycles through the following screens:

- Parameters
- Managing files
- Tests
- Preflight display

Parameters

A long press on the left or right joystick displays the "Parameters" screen:



The language codes are read from the SD card (see: Data storage). The displayed language is currently selected (read from the PARAM.TXT file or selected manually).

Parameter “NRT” (Notes in Real Time) indicates that the marks entered by the judge will be transmitted as soon as he validates it. If “No NRT” is set, the marks will be transmitted only at the end of the flight.

The values can be changed using the joystick (short press right or left)

The last line indicates the IP adress of the server.

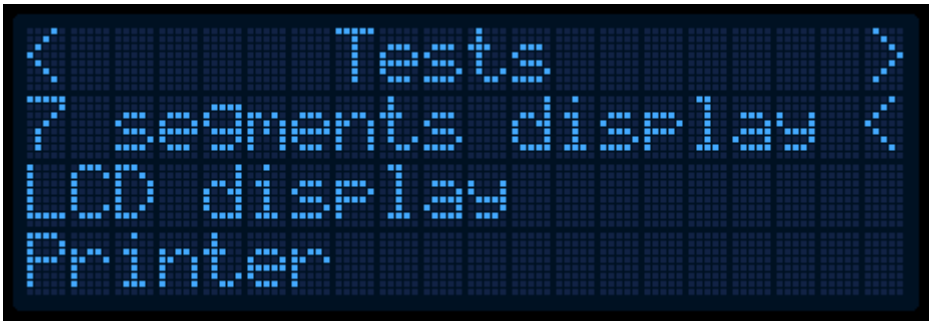
Managing files

A long press on the left or right joystick displays the "Managing files" screen:

The <1> option (pressing the "1" key) will erase all note files on the SD card.
The <2> option (pressing the "2" key) will retransmit all the note files on the card to WIFI. Only notes relating to an open flight will be taken into account by NotauScore.

Tests

Another long press on the joystick displays the "Tests" screen:



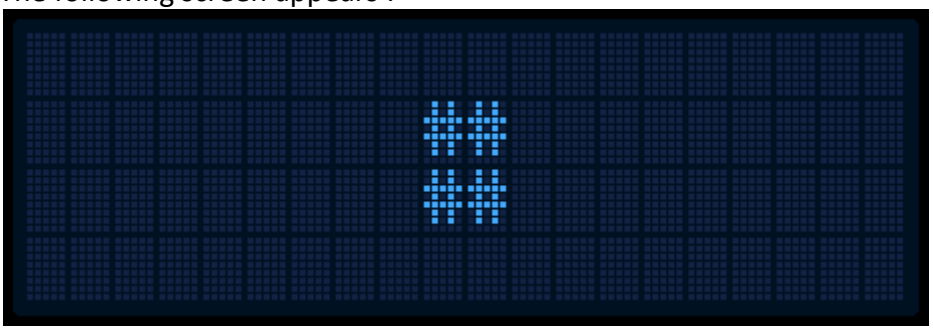
This screen is used to test the functionality of the connected equipment in the Notaumatic.

The arrow on the right indicates the selected test. This arrow is moved using the joystick's Up and Down keys.
The tests are started by the left button on the joystick.
A confirmation line is written to the printer.
Once the test is done, the main screen may be displayed by a long press to the middle of the joystick.

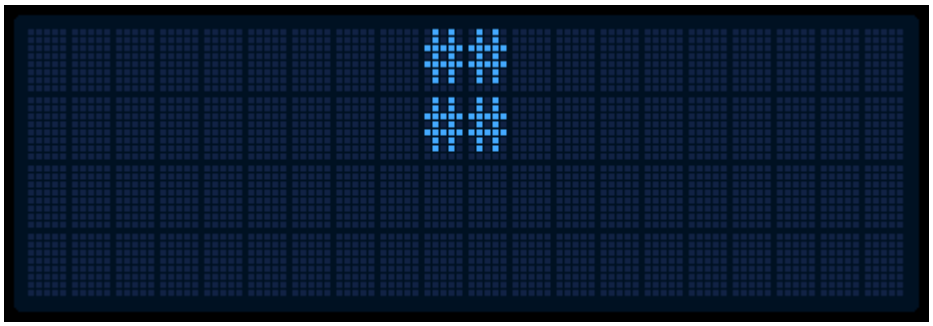
The tests are as follows:
- **7-segment display**. All the segments on the display are illuminated successively. The I2C addresses of the displays are displayed on the screen. A long press on the <Valid> button writes the values of these addresses to the Arduino EEPROM.
- **LCD display**. The screen is gradually filled with arrows. The display address is displayed on the screen. A long press on the <Valid> button writes the value of this address to the Arduino EEPROM.
- **Printer**. A test is integrated into the printer itself: Power on while pressing the small round button on the printer. The printer settings are printed.
From the Notaumatic, the test is as follows: The characters from code 32 to 255 are printed at the rate of 5 per line. A long press on the <Valid> button allows you to change the transmission speed to the printer (9600 -> 19200 or 19200 -> 9600)
- **Keyboard**. The following screen appears:

The display shows the result of pressing buttons on the Notaumatic unit. Numeric buttons cause duplicate display on the left and right displays as well as the corresponding sound.
For example, pressing <Valid> will cause the following display:

- **Joystick**. The following screen appears :



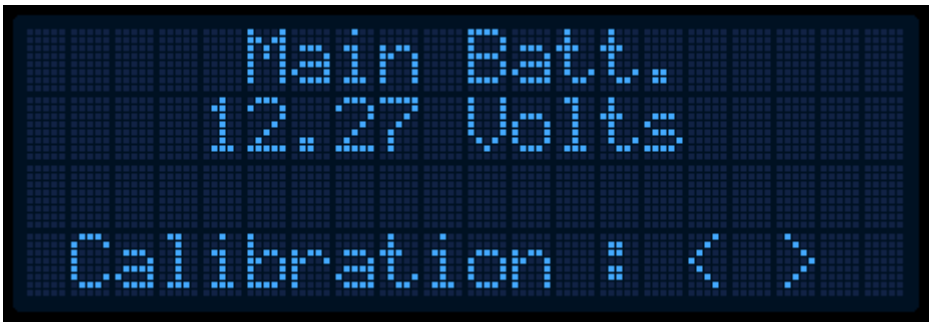
Pressing the joystick moves this symbol on the screen to the left, right, up or down. For example, up:



- **SD card**. The test scans all the files on the SD card and displays the total number :

- **Sound card**. The program plays sound "Bienvenue" (in French !).

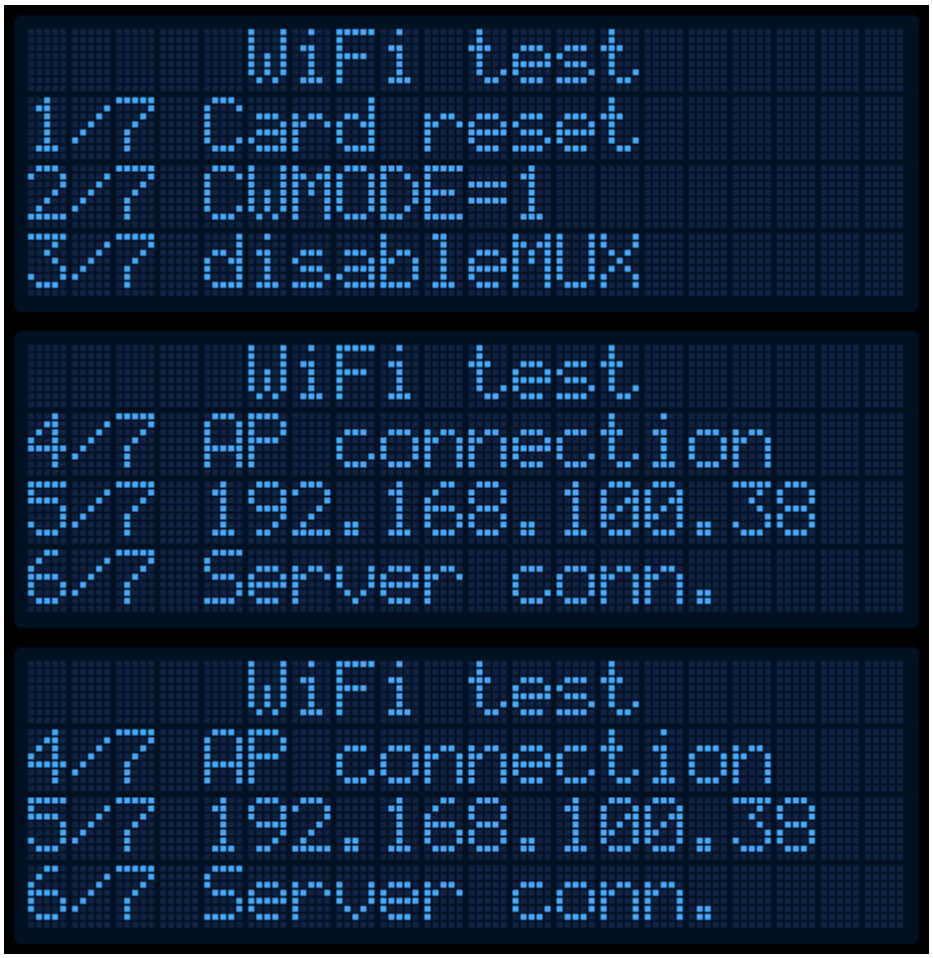
- **Main battery**. Displays the main battery voltage.



- The main battery voltage is displayed in hundredths of a volt. The display is refreshed ev ery second.
  This display is dependent on the tolerance of the resistors used for the measurement. It c an be modified (calibrated) using the joystick (right: +, left: -) to 1 / 100th of Volt.
- **WiFi**. This test will execute a set of procedures to test the ability of the device to send sc ores to the application server.
  The test process is displayed on the screen in a scrolling manner.
  The tests are:
  - Initialization of the on-board WiFi card
  - Switching WiFi to "station" mode
  - Switching the WiFi card to "single connection" mode
  - Connection to the WiFi access point
  - Display of the IP address delivered by the WiFi access point
  - Connecting to the application server
  - Connecting to the database and testing the sending of scores

  If all tests are OK, the unit is ready to transmit scores via WiFi

  The screen displays are as follows:

- 

-

Battery life

The Notaumatic has a normal battery life of 6 hours with 40 ticket print-outs.
An energy-saving function has been developed. After a certain period of inactivity (5 minutes), the screen is deactivated and the displays simply displays two points. Pressing any key will "wake up" the Notaumatic and turn on the display.

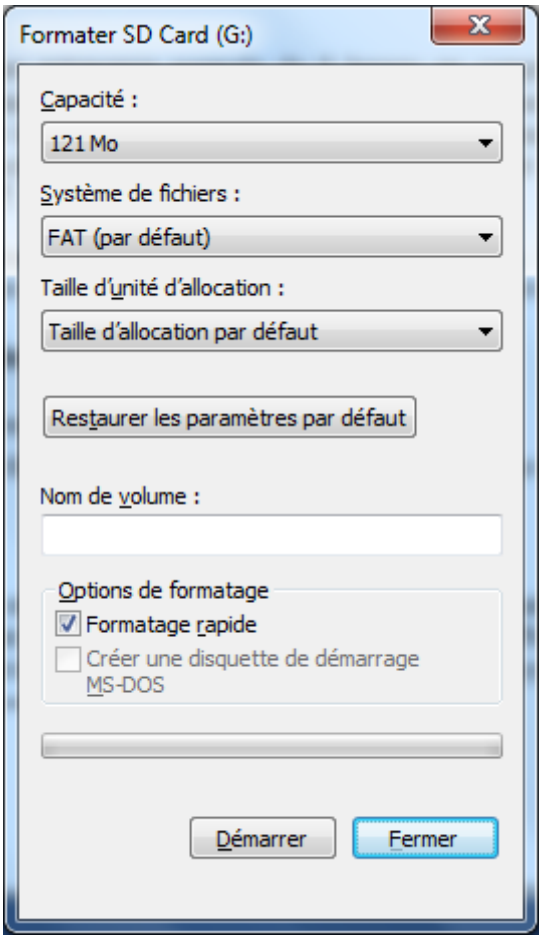
It is recommended that you switch off the Notaumatic units during breaks. The start-up is instantaneous, the program restarts at the beginning of the flight and the parameters are retained.

Date storage

In normal use, there is no need to change the data on the SD card. The information below is for information only

SD card formatting

The SD card must be FAT formatted with the default allocation size:



Software settings

Software settings are stored in a "PARAM.TXT" file located at the root of the SD card. The structure of the file is similar to that of an .ini file. The name "PARAM.TXT" is mandatory.

Each parameter is written in a specific line with the following syntax:
<Parameter Name> = <Value>
For example :
VOL=2
JUGE=3
...

Each line is separated by the characters <CR> <LF>, or 0D0A in hex (end of line for Windows and not Linux). However, the Linux line end (<CR> 0D) will be taken into account.
A line beginning with a ";" will be considered a comment line and thus ignored. **Note**: Comment lines will disappear from the file when rewritten by the Notaumatic.
The spaces at the beginning of the line, before and after the "=" sign and at the end of the line are ignored. Although it is preferable to avoid these spaces. Spaces included in the parameter name and those included in the value are taken into account:
^^^^ Aerobatics ^^^^^^^^^^^^=^NOT^DIFFICULT^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
Will be treated as follows:
Aerobatics = NOT^DIFFICULT (spaces are represented by <^>)

This file can be easily edited on a computer (PC, MAC or Linux) and copied onto the SD card to prepare the Notaumatic units for use.

Below is an example of a PARAM.TXT file:

```
LANGUE=1
PROGRAMME=3
JUGE=8
VOL=1
PILOTE=1
NBFEUIL=1
SSID=myBox
PW=myPassword
IPSERVER=80.93.93.213
;IPSERVER=192.168.1.12
URLSERVER=concours.test.ffam.asso.fr
;URLSERVER=192.168.1.12
NRT=1
```

The meaning of these parameters are:

LANGUAGE=1. Number of the language used for the manoeuvers. This parameter is managed by the Notaumatic in the "Preflight" screen
PROGRAM=3. Number of the schedule used. This parameter is managed by the Notaumatic in the "Preflight" screen
JUGE=8. Number of the judge. This parameter is managed by the Notaumatic in the "Preflight" screen
VOL=1. Flight number. This parameter is managed by the Notaumatic in the "Preflight" screen
PILOT=1. Pilot number. This parameter is managed by the Notaumatic in the "preflight" screen
NBFEUIL=1. Number of flight sheets (tickets) printed. It is always possible to print one or more sheets at the end of a flight.
SSID=MYBOX. The SSID (indicative) of the WiFi access point
PW=my_password. The WiFi access point password
IPSERVER=80.93.93.213. The IP address of the application server.
;IPSERVER=192.168.1.12. Comment line (see above for use of the ";" at the beginning of the line)
URLSERVER = concours.test.ffam.asso.fr. The URL of the application server

;URLSERVER = 192.168.1.12. Comment line
NRT=1. 1 = Scores are transmitted for each manoeuver, # 1 = Scores are transmitted only at the end of the flight.

Important note: The informations contained in the PARAM.TXT file are read at startup and then stored in the non-volatile memory (EEPROM) of the Notaumatic. The PARAM.TXT file is then renamed to PARAM.SAV and will not be processed at the next boot.

Note that you can force the replay of the PARAM.SAV by starting the Notaumatic with the "Repeat" key pressed until the setting screen appears.

Scores

Scores are stored in text files, in a directory named “N”.
The naming of these files is important. They are structured as follows:
CCFFJJJx.PPP. On the SD card, file names are limited to 8 characters.
CC = Competition number

FF = Flight number
JJJ = Judge's number

X = “T” if WIFI transmission is OK, else “K”
PPP = Pilot number
For example, « 1201123T.254 » will contain the scores for pilot 254, competition 12, flight 1, judge 123

Inside this file, each score will be stored on a separate line with the following syntax:
<Number of the manoeuver> <Tab> <Name of the manoeuver > <Tab> <Score>
For example :

01	Golf ball	8
02	Half square diamond	9
03	Double Immelmann	8

...
Each line is separated by the characters <CR> <LF>, or 0D0A in hex. (End of line type Windows and not Linux).
The different values are separated by the <Tab> character, ie 09 in hex.

This file can therefore be read easily by a computer (PC, MAC or Linux). It will have the structure of a file of type CSV and can therefore be read by a spreadsheet or a word processor.
These score files are stored at the root of the SD card.

Errors

In order to save memory and to offer a multi-lingual application, error descriptions are stored in the SD card in / # <Language> / ERRORS / (<Language> represents the language code, for example "FRA" or "ENG") eg: /#FRA/ERRORS/25.TXT.
Each error description is stored in a file "xx.TXT", where xx represents the error number. The description will be truncated to 40 characters to be displayed on two lines.

Vowel accents will be deleted from error descriptions.
The errors listed are as follows:

02 – Please wait…

03 – Pb file PARAM.TXT

08 – Nb of manoeuvers < 3

09 – Pb file notes

17 – Validation : <Valid>

Review : <->

18 – Other ticket : <+>

Return : <Valid>

21 - Err WIFI connection

22 – Flight number error

23 – Judge number error

24 – Pilot number error

25 - Erreur # manouevers

26 – Pilote already noted

27 – Wrong option code

28 - Pil. Not in phase

29 – Schedule error

Sounds

Sound files are stored in .WAV format. They are located in the / # <Language> / SOUNDS / directory (s). This allows you to store the sounds in all the languages used.

Directory tree

The names of the files on the SD cards are in standard 8.3 : name and extension in upper-case, 8 characters maximum for the name, 3 characters maximum for extension, separated by a full stop.

```
/
      PARAM.TXT
/N
      0101123T.254
```

0101123T.255

0101123T.256

0101123T.257

…

0101123T.280

/#FRA

/#FRA/SOUNDS/

LANGUE.TXT

LNG_FRA.WAV

LNG_ENG.WAV

LNG_GER.WAV

PROMO.WAV

NAT_A.WAV

NAT_B.WAV

P17.WAV

F17.WAV

JUGE_01.WAV

…

JUGE_10.WAV

DOSS _01.WAV

…

DOSS _99.WAV

VOL_1.WAV

VOL_2.WAV

VOL_3.WAV

VOL_4.WAV

VOL_5.WAV

VOL_6.WAV

0P5.WAV

…

/#FRA/ERRORS/

01.TXT

02.TXT

…

/#FRA/PGM/

/#FRA/PGM/PROMO

P.OPT (FACULTATIF)

01.TXT

01.WAV

01.OPT

02.TXT

02.WAV

…

/#FRA/PGM/NAT_A

01.TXT

01.WAV

02.WAV

02.TXT

…

/#FRA/PGM/NAT_B

01.TXT

01.WAV

02.TXT

02.WAV

…

/#FRA/PGM/P17

01.TXT

01.WAV

02.TXT

02.WAV

…

/#FRA/SOUNDS/

-10.WAV

-5.WAV

0.WAV

…

```
/#ENG
      /#ENG/ANNONCES/
            LANGUE.TXT
            LNG_FRA.WAV
            LNG_ENG.WAV
            LNG_GER.WAV
            PROMO.WAV
            NAT_A.WAV
            NAT_B.WAV
      /#ENG/PGM/
            /ENG/PGM/PROMO
            …
      …
```

Creating a new schedule

The website (notaumatic.f3a.fr) offers all available schedules and a tool for selecting all or some of them. However, it is possible to manually create new schedules. The procedure for creating a new schedule (eg from P17 to P19) is quite simple. This involves creating 2 or 3 files for each manoeuver using a PC. These files are named xx.TXT, xx.WAV and xx.OPT where xx corresponds to the number of the manoeuver. xx will need to be 01 to nn, without any "holes". Eg: Missing numbers are not allowed.

• xx.TXT should contain the description of the manoeuver, which should be brief. Only the first 17 characters will be displayed on the screen of the device, and only the first 27 characters will be printed on the "ticket". Any vowel accents will be deleted.

• xx.WAV should contain the sound file of the description of the manoeuver. This sound file can be created by any audio program. Eg: Audacity or Balabolka. It should have the following features: 22KHz, 16bit (on a 12bit DAC), mono. Length is not limited.

• xx.OPT contains the scoring option for this manoeuver. This file is optional. If absence, the manoeuver will be scored according to option 0 (below).

For other scoring options, the file may contain the following values:

Value	Description
0	Scoring 0 to 10 in integer values (default value). Same as no file
1	Scoring from 0 to 10 in half points (F3M)
2	Scoring -5, 0, +5 (previously used for noise in F3M)
3	Scoring 0 or 10 (take-off and landing F3A promotion)

4	Scoring -10 or 0 (noise for F3A)
5	Scoring from 0 to 10, starting at 0 (F3M sequence break)
6	Scoring from 0 to 10 by 1/10 of a point (F2B)
7	Scoring 0 or 1 (IMAC penalty)

The program folder may also contain a P.OPT file.
The file may contain the following values:
0 = No rounding
1 = Rounded up to the next integer
The absence of a file is equivalent to "0" - no rounding.

Last but not least, NotauScore now includes an automatic SD card generation (only with Windows)

Printing flight sheets

The printer allows 32 characters per line in the standard font.

MOTALNATIC v1.15
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F3A-P17

VOL	01
JUGE	02
PILOTE	01

01 Accroche-regard	1
02 1/2 boucle carree	2
03 Vol tranche alterne	3
04 Renversement avec 2	4
05 Humpty-bump	5
06 Comete	6
07 Boucle hexagonale	7
08 Deux demi-tonneaux e	8
09 Figure en S	9
10 3 tours de vrille	10
11 Montee a 45°,demi-to	9
12 Humpty-Bump inverse	8
13 Boucle triangulaire	7
14 1/2 carre diamant	6
15 Combinaison tonneaux	5
16 Demi-huit cubain	4
17 Boucle avec tonneau	3
18 Bruit	0

Signature du juge :

WiFi Transmission

A Raspberry microcomputer serves as both a server and a WiFi access point.
The scores are sent to the Raspberry at the end of each flight. The Raspberry compiles the results which are accessible via WiFi by any terminal (PC, Smartphone, etc ...).