

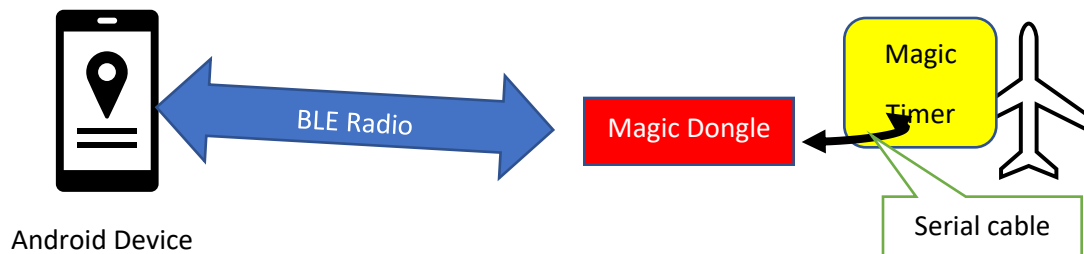
Super Magic 6 (version 0.090)

Introduction

Super Magic 6 is a program for setting Magic Timers. It replaces Super Magic 4 (Palm) and Super Magic 5 (Windows 10). It runs on an Android phone and/or tablet. It uses Bluetooth Low Energy (BLE) to communicate between the Android device and the timer. The BLE specification came in with Bluetooth 4.1; it is not the same as Bluetooth Classic. Virtually all new Android devices support it. There is an additional box (aka the Magic Dongle) to connect to existing Magic Timers and potentially small future Magic Timers that may not have BLE radio for reasons of size, cost, or weight. This has been tested on several Android tablets and phones running Android 4.4 and onwards.

Because using the Magic Dongle to work with existing Magic Timers is a little more involved with some extra steps this document has extra information especially on that.

How it works with current Magic Timers that do not have a BLE radio:



The Dongle is used on the ground to program the timer and is removed before flight. One Dongle will do all your timers. There is a BLE radio in the dongle so it can connect with Super Magic 6 on the Android. The Dongle has a 2.5mm socket and a male to male cable connects the Dongle to the timer.

Advance Version

There is an “Advance” version of the Magic Dongle and Super Magic 6 that has been given to some customers. The Advance version of Super Magic 6 does not have the final changes to the screen layouts and support for the RDT and Altimeter.

The Magic Dongle is not the production version.

The current version of the Dongle at the time of writing is version 0.90.

The intent with Super Magic 6 is not to render obsolete current Magic timers. This is done using the Magic Dongle. The Magic Dongle has been released ahead of the first Magic Timer than connects directly to Super Magic 6.

This version of the Magic Dongle can be powered either by an internal single cell LiPo battery or by plugging the dongle into a USB power source.

What Super Magic 6 does

As with previous version of Super Magic you can read and write flight programs to and from the timer. New programs can be created, and existing programs modified and renamed to suit new timers and requirements. Unlike Super Magic 4 the flight programs can be exported and imported to enable the sharing of flight programs.

The structure of Super Magic 6 is like Super Magic 4 in that there are separate screens for performing the major functions such as Servo setting, Timer Step setting, Start and Hook setting, etc. There are additional screens for configuring the BLE connection and for some new functions that we have used for some time on our own airplane but not yet provided to our timer users.

Some of the screens hold more information that can be easily displayed on the screen of some phones, but these screens can be scrolled vertically and horizontally to see any missing information.

This document

This document was written before the first production release of Super Magic 6, some of the screens shown are not in the final format or colors.. The document is intended primarily for people already familiar with Magic Timers and their operation. A more complete document will be produced later that includes both a description of the timer functionality and of Super Magic 6.

Androids versions and sizes

The program has been tested with phones and tablets from a 6 inch diagonal to a 9 inch. These were made by Redmi, Huawei, Lenovo, and Samsung with Android versions 4.4, 7, 8.1, 9 and 10. Because of the amount of information needed by some versions of Magic Timer we would not recommend anything smaller than a 6 inch, preferably a little bigger.

We know that there many companies that make Android devices with varying quality and idiosyncrasies. For our testing we chose Wi-Fi (not mobile phone) versions from well-known manufacturers and Super Magic 6 performed satisfactorily. None of these was very expensive. If you have question whether it will run on your Android, download the program and try it.

The Android BLE functionality requires both location and storage permissions; these are requested automatically by Super Magic 6. From Android 8 these were considered important from a security point of view and cannot be granted automatically. So, if your Android version falls in this category, after Super Magic 6 is installed you will need set these permissions. In many cases the first time Super Magic

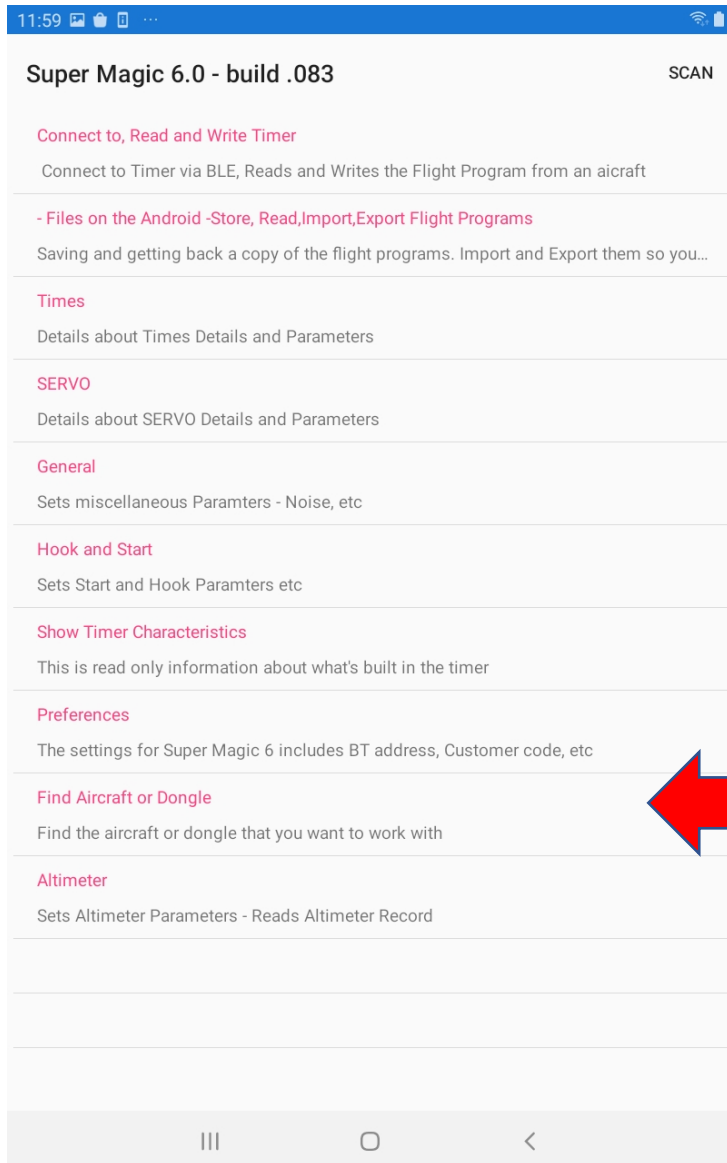
6 is used you will be prompted to permit file and location access. If not prompted, you will have to use Settings/ Apps to turn on these permissions. Some Android implementations may require the Dongle or Timer to be paired or additional Bluetooth rights granted.

First Steps with the Magic Dongle

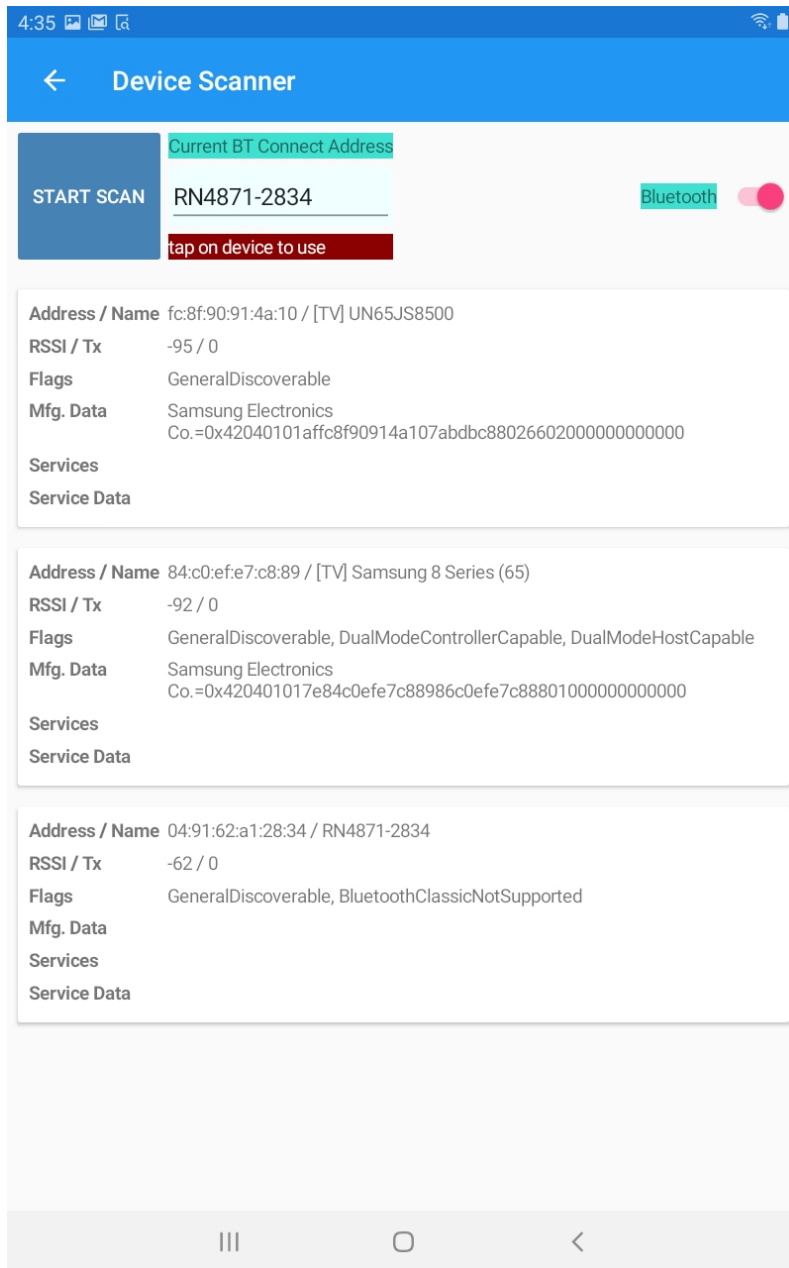
1. Load Super Magic 6 on your Android device. Initially this done by a process called “side loading”, this means you get an APK file from a like Magic Timers provide, download it onto you Android and tap it. It will then install it. You will get some warning message because it did not come from Google Play, if you wish to continue with this version of Super Magic 6 you must ignore these message.
2. Tap on the Super Magic Icon to start the program
3. When you use Super Magic 6 and the Magic Dongle for the first time, we recommend that you do it in your workshop and power the Dongle from a USB power connection. So, plug it into a USB power source
4. Plug the 2.5mm cable into both the Magic Dongle and a Magic Timer. Make sure the cable is plugged in the whole way
5. Turn on the Dongle with the power switch, on is in the direction away from the USB connector. LEDs will flash.
6. Turn on the Magic Timer.
7. Follow instructions below

Getting started

This is the first screen that comes up, it is referred to as the Main Menu. It shows the choices. What you need to do first is find the Dongle or airplane you want to work with.



Finding your Dongle or Aircraft



This screen looks for the BLE devices withing range. You tap on the START SCAN button and it will search.

For this scan to work your Timer or Dongle must be turned on.

The Bluetooth toggle on the right shows that Bluetooth isturned on on this Android device and is available to this program.

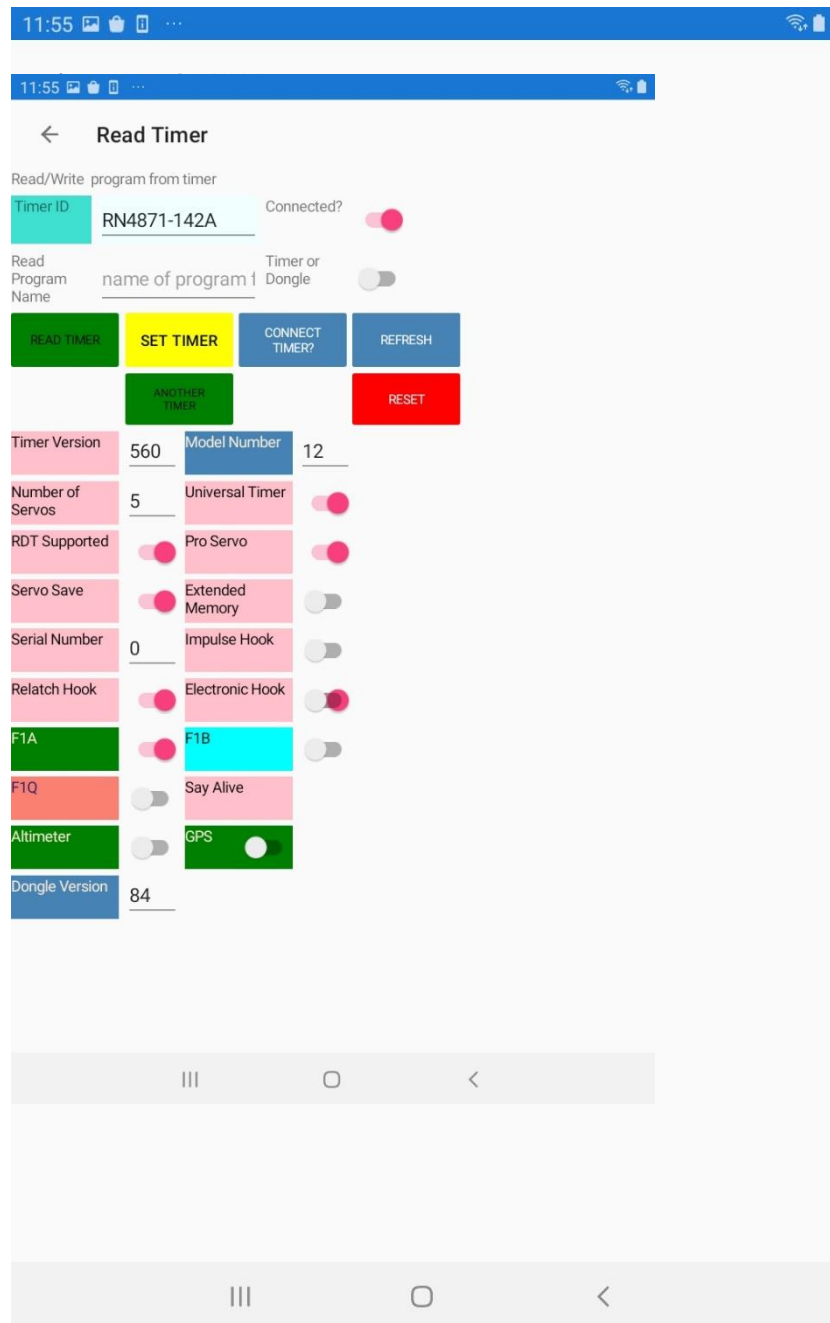
When you tap on START SCAN it will search and list devices. It only shows devices that have a name. When you look at this list you will see it found 3 devices, two TVs and one whose name started with RN. That latter one is the Dongle we are looking for. Tap on it to select it. You will see a slight change in color when you do this.

Sometimes if there are many Bluetooth devices in range it may take a second or even third scan to find it. With this version of Super Magic 6 all BLE devices start with RN.

Wait until the scan is finished then leave this screen by tapping the <- that is in the top left hand corner.

Making the connection

Now take the Top menu choice to connect to a Magic time This shows the Timer (or Dongle) ID in the



top right that we selected. At this point your timer or Dongle is turned on. If you are using a dongle make sure it is plugged into the timer and turn the timer on. At this point you will see the "traffic light" LED combo on the Dongle with RED, Yellow and Green turned on.

Then you tap on the **Connect Timer Button**. Super Magic 6 will then make a BLE connection to the Timer or Dongle and read the basic information from the timer. When it makes the BLE connection you will see the steady Blue light on the Timer or Dongle begin to flash. And in the case of the Dongle you will see/hear a noise and Timer LED flash when the program information is read.

That information is displayed on the bottom table on the screen. Besides basic information about the timer this screen also displays the Dongle version number. Reading all the information from the Timer. You will get a message on the screen indicating the success of the connection. You **MUST** connect before any other operation such as reading the

timer.

Once you are connected to the Timer you then tap on the READ TIMER button on the previous screen. This will read all the flight program from the timer.

The various sections of the timer info are available to you from the main menu choices. So go back to the main screen and select the part you want to see.

This screen shows the servo parameters. You then tap on the ones that you want to change and a keyboard will come up and you can make the change.

Config Servo Settings	Servo 1	Servo 2	Servo 3	Servo 4
Base Point	20	19	17	19
Mult	411	422	500	444
Speed	1	1	1	1
Reverse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Park	255	255	255	255
Label/use				

On some screens like this one some data validation/checks cannot be done until all the information is entered. On those screens there is a Finish button on the top of the screen. Tap on that and the complete screen will be validated. If there are errors you will get a message and an opportunity to fix any errors.

If the only change you needed to make was on this screen you would leave the screen, go back to the main menu, then select the Read/Write screen and select the Set Timer button to send the changed flight program back to the timer.

Changing the timer steps

The screenshot shows the 'Times' app interface. At the top, there's a blue header with a back arrow and the title 'Times'. Below it, a table shows the current step settings for 'Step 4':

Line	Minutes	Seconds	Hundreths	Action	Servo1	Servo2	Servo3	Servo4
Step 4	1	1	56	Jump	63	176	151	1

Below this is an orange bar with the text: "SELECT THE STEP TO CHANGE, DO ABOVE - THEN PRESS TO TAKE EFFECT".

The main part of the screen is titled "Timer Step Settings" and contains a table with the following data:

Step	Minutes	Seconds	Hundreths	Cumulative Time (s)	Action	Servo1	Servo2	Servo3	Servo4
Straight						230	91	20	0
Circle						200	115	200	0
Launch						190	150	205	0
Step 1	0	0	19	0	Jump	220	105	220	0
Step 2	0	0	35	0	Jump	180	115	200	0
Step 3	0	0	65	1	Jump	165	155	190	0
Step 4	1	1	56	62	Jump	63	176	151	1
Step 5	0	1	5	63	Jump	205	112	110	0

A red vertical bar highlights the 'Cumulative Time' column. At the bottom, a numeric keypad is visible with a 'Done' button.

One of the most important and complex changes is on the timer's steps. This screen shows all the steps and the times for the step, servo action and each servo position for that step. This screen has a lot of information and the screen can be scrolled both vertically and horizontally if the Android screen is too small to view all at once.

To change values, you select the step you can change in the bottom part of the screen. When you do that values will appear in the top part above the orange bar.

Then tap on the value or values to change. In this example the person is changing the value of the first servo position. This is a numeric value, so a numeric keyboard pops up. When that step is complete tap on the orange bar and the correct values will go into the bottom half of the display. Once finished the <- will take you back to the main menu. **Do not forget that the timer is not**

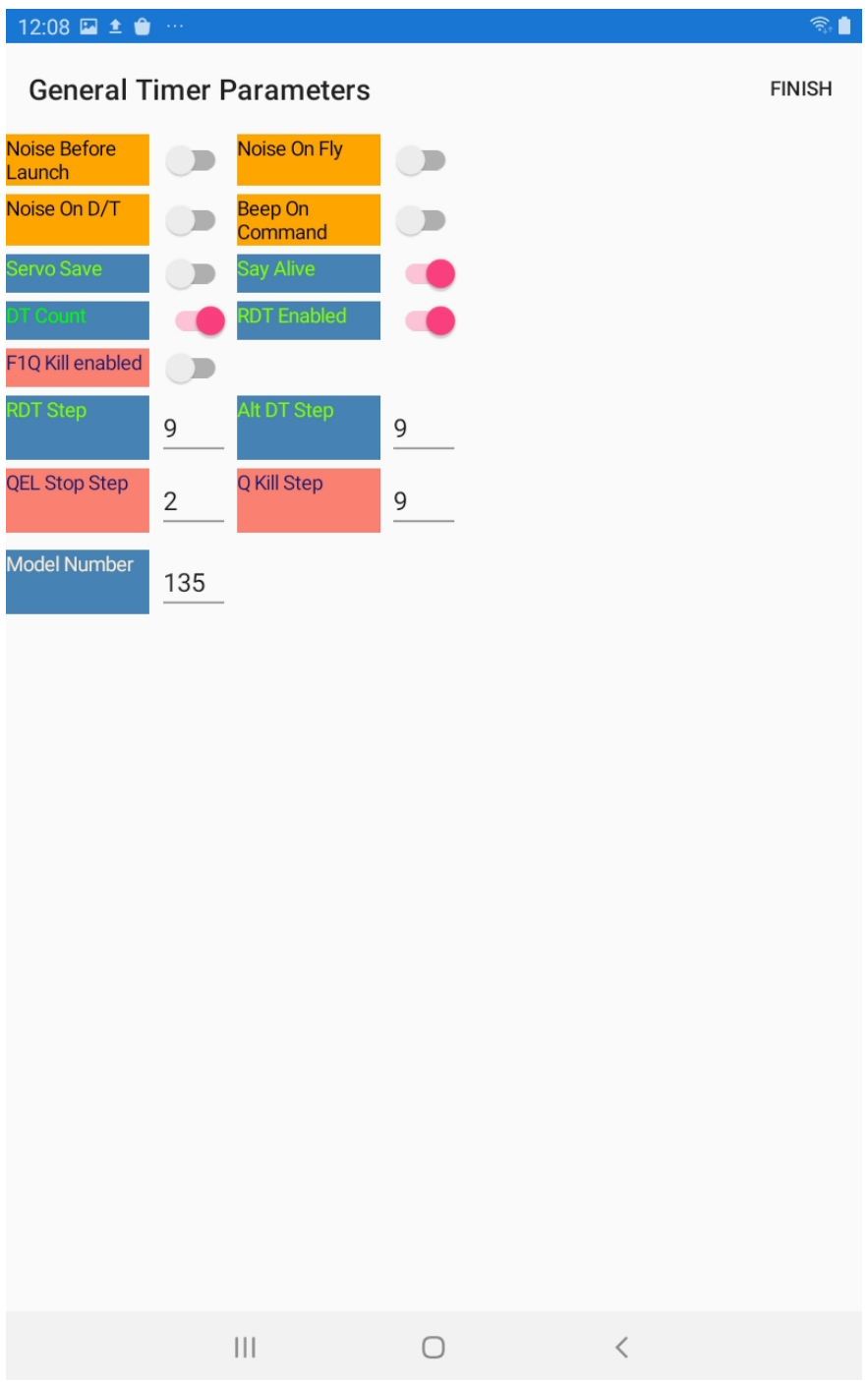
updated until you write your flight program back.

The numbers in the Red Column are the cumulative time in seconds.
Start and Hook Settings



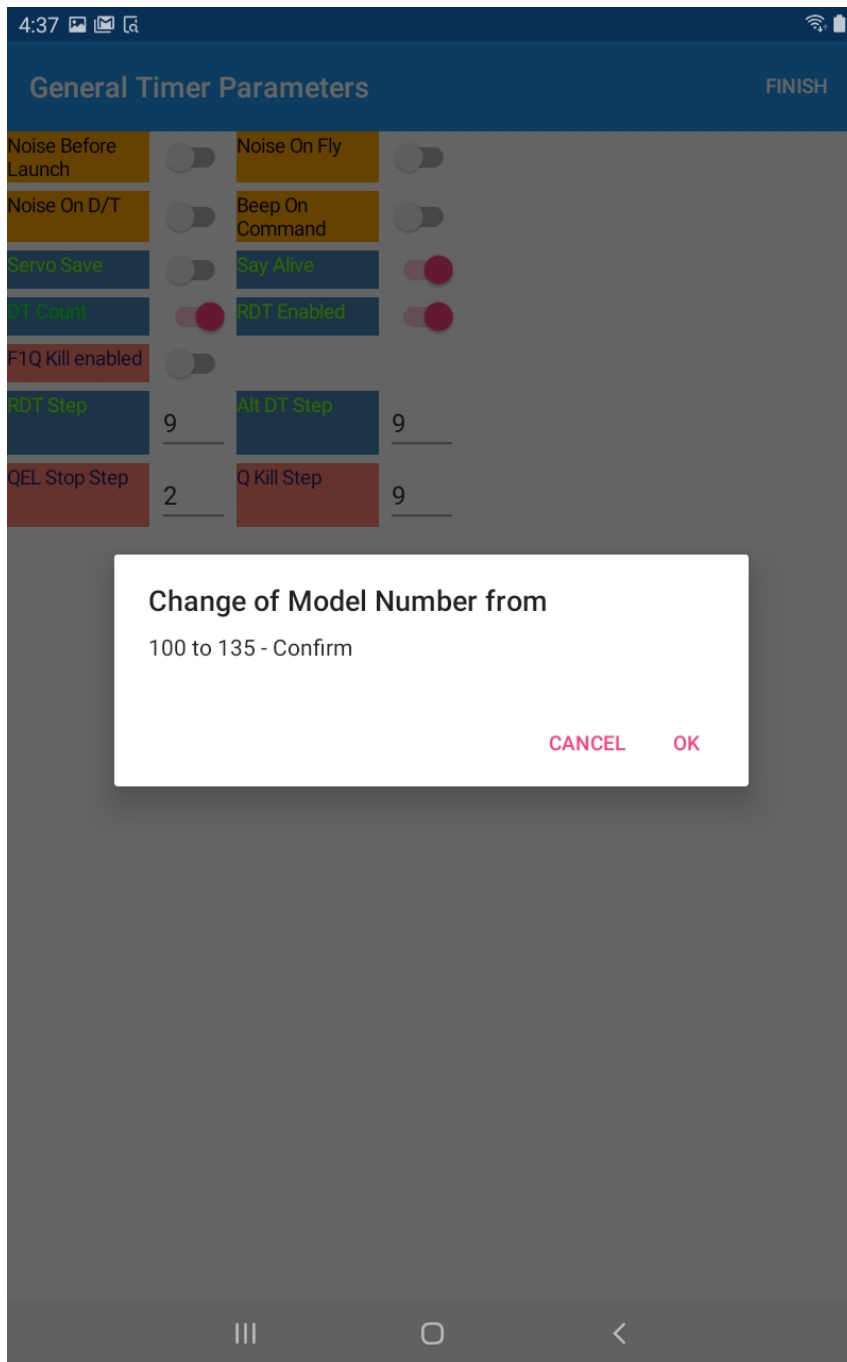
This screen is mainly concerned with the hook management features of F1A timers.

But it does include some F1Q and other general parameters.



General parameters

This screen contains noise, RDT, and other similar features.



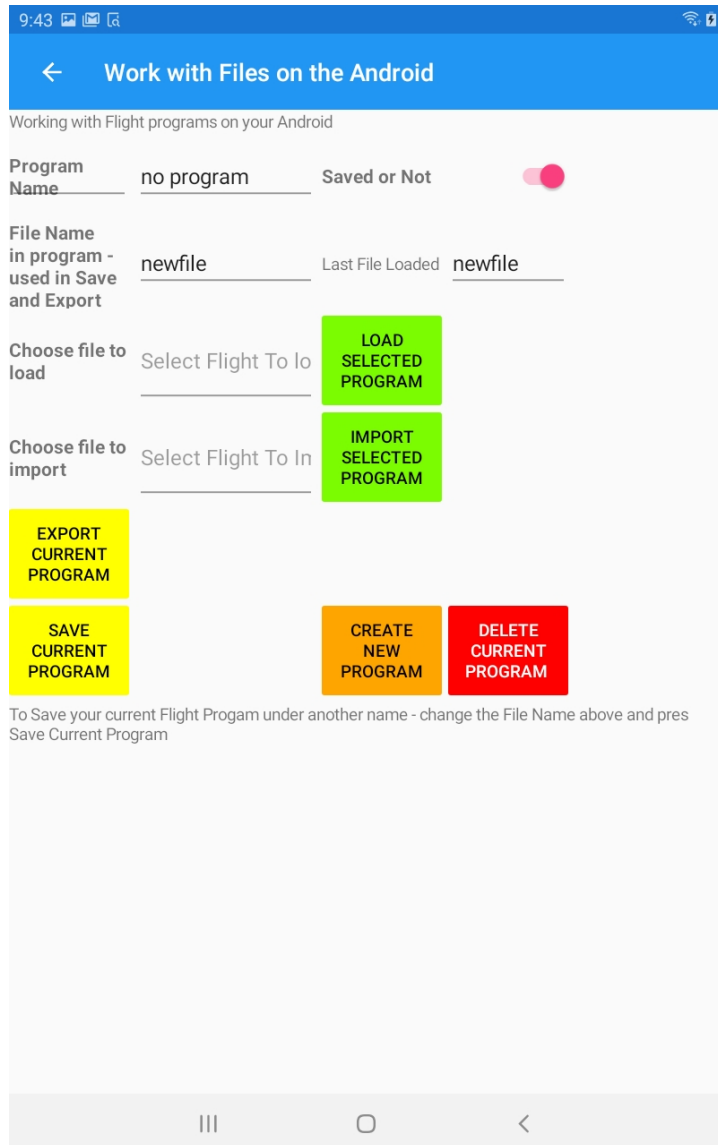
Actions requiring confirmation

Some parameter changes are considered potentially risky and, in that case, you will be asked to confirm the action.

Here is an example.

Working with saved Flight Programs

As with previous Super Magic programs your Flight programs can be saved with Super Magic 6. They are saved on a special part of the Android's storage associated with the App. But a new feature with Super Magic 6 is to import and export programs.



These programs are saved in a special "standard" file format call JSON.

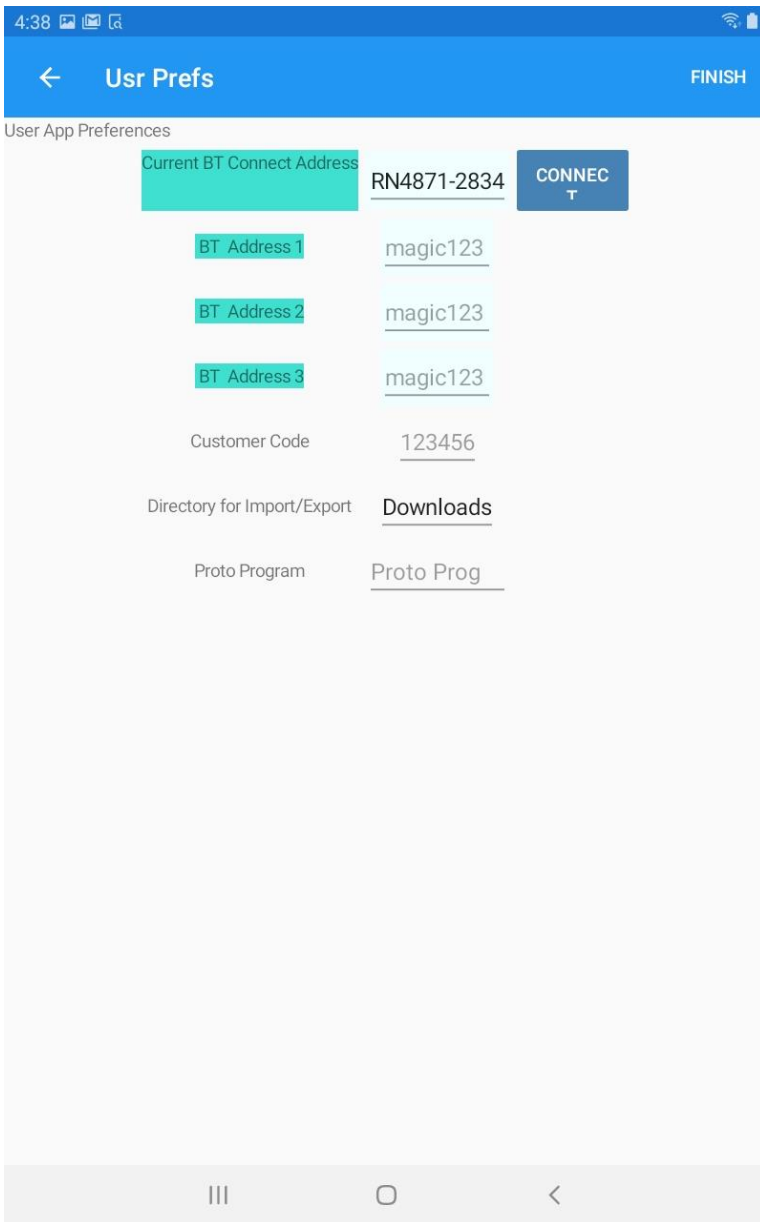
Pushing the yellow button Save Current Program will save the program you are working on

The Export Current Program will export it to the Download folder on the Android. The name of the file will be the file name shown on the screen, in this case newfile plus the JSON file type = newfile.json

If you want to save a copy of what you are working on you change the file name e.g. make newfile to LostHillsnewfile and press the save Current Program button.

To load a program, you have already stored on the Android you tap on the Select Flight ... and you will get a list of saved programs to select from.

Similarly, you chose a file to Import by tapping on the Select File ... and you will see a collection of JSON file that are your DOWNLOAD folder. Make sure the JSON file is really a Magic Timer flight program file before you try and load it.



User Preferences

Super Magic 6 maintains some user preferences; these will be explained at a later date. Do not use these.

Other Functions

You will notice that there is a screen for Altimeter. This is for configuring the Magic Timer Altimeter and RDT. We have been using this for quite some time, but it needed Super Magic 6 and some other small items to make it more readily available.

Version 0.90 - 24 August 2020

The Dongle

For working with existing timers there is the Magic Dongle. This is a little box. It has a BLE radio to communicate with Super Magic 6. It has a socket where you plug a serial cable to communicate with the timer.

The Dongle is powered by a single cell LiPo; this is needed for the BLE Radio. There is a microcontroller with custom firmware, a power switch, control button and a USB connector. The purpose of the USB connector is twofold; it can be used as power source and it permits the upgrading of the customer firmware by the customer. This lets you plug the Dongle into a PC and load the latest firmware from Magic Timer. The details of this process will be described later.

Also, in the Dongle is a blue LED; this shows the status of the BLE connection. If the LED is bright and steady on with very widely spaced blips it means it is ready but not connected. When it flashes it means that something has connected to it. If the LED is lit but not very bright it means that the BLE has power but is not ready or in Reset mode. This can happen at startup when the radio is being initialized or it can happen if power to the Dongle drops below a safe operating voltage of 3.1 volts.

The “Traffic Signal” signal LEDs – Red, Yellow and Green are other status indicators. At startup they will flash for a while and then all will be on together. This means the Dongle has started up and ready to talk with Super Magic 6. There are other status indications, again that will be documented later. But when Super Magic indicates a disconnect it will cycle through flashing all then go out. This means that the session is finished, and you can power off the Dongle. If you need to work with another airplane you should cycle the power.

You will notice that the time spent by the timer buzzing is shorter than when using the Palm Pilot to program; this is normal.

The connection between the Dongle and the timer can be tested off-line before the Dongle is connected to the Android via BLE. When the Dongle is powered up and the “traffic signal” 3 LEDs are all alight before it is connected to the Android, if you push the control button it will connect to the timer in 3 steps then disconnect. To go from each step, it is necessary to push the control button. This verifies that the cable part of the connection is good. Here are the steps

1. Set up, connect Timer to Dongle the cable, then turn Dongle and timer on.
2. Wait for traffic light = Red, Yellow and Green LED all on
3. Push control Button, Dongle will read timer and an LED will come on.
4. Push LED another 3 timers pausing between each for a second or two
5. At the end of a successful test you will have heard the buzzing from the timer start and stop and the Traffic light LED combo will be back. That is good.
6. If there is an issue note which LEDs were on at each step and if there was noise from the timer com communicate with Magic Timers Support.

Bootloader process for the Dongle

Explanatory Note

The Magic Dongle has a microcontroller with software in it. This software plays an important role in converting how information is stored on older Magic Timers and used by Super Magic 4 on a Palm Pilot to what is needed by Super Magic 6 on an Android. It is possible for the Magic Timer user to upgrade the software on the Magic Dongle in the field without having to send the Magic Dongle back to the Magic Timer factory. This upgrade is done by what is called the Bootloader process. This is done on a Windows PC using a USB connection to the Magic Dongle. Magic Timers will make available the new software when and if it is needed. This new software will be in a file of type .HEX. This note explains how you install this software on your Magic Dongle.

You will see some references to CCS. This refers to a company that provides some software tools that Magic Timers used to build the Magic Dongle. You do not need to know about it or buy it. We just mention this in case you wonder what it is.

First time

Create a folder in Documents called *superm*. [Make sure that your Documents folder is actually on your PC and not on OneDrive, i.e. “in the cloud”.]

Unzip setup_ccsbootloader.zip to *superm*.

Installing new .hex files

Copy the .hex file into *superm*.

Run **Windows PowerShell** (found in the Windows programs list). You will get a blue screen with a c: > prompt.

Do these three commands:

```
cd documents
```

```
cd superm
```

```
dir
```

You will see several files (the contents of *superm*) including ccsbootloader.exe and the .hex file you put there. [Don't close the Windows shell yet!]

Turn off Magic Dongle (if it is turned on) and unplug the battery (if there is one).

Plug Magic Dongle into a USB port.

Push down and hold the button (recessed into the case) on Magic Dongle; you may need a screwdriver to reach this.

Turn on Magic Dongle. It is important not to turn on the Magic Dongle before it is plugged in and to keep the button pressed while you are turning it on.

Release the button – the Magic Dongle will have green and red LEDs turned on.

Now you need to find out what COM PORT on the PC the Dongle is connected to:

- Use Device manager and expand > PORTS

Let us say you see it is USB Serial Device (COM12)

Go back to the blue Windows shell.

Type the command

```
.\ccsbootloader PORT=COM12 btdongle1-2.hex
```

Where btdongle1-2.hex is the file that was sent to you.

You will see a progress line go across the screen as the file is loaded. When it is loaded the Dongle will restart with the new firmware and red, yellow and green LEDs will be on. You may now a) turn off the power on the Magic Dongle and b) remove it from the PC, **in that order!**

Close Windows power shell.

Finished.

