Magic Timers Tech Note – 19-8
Impulse Hook Support

Support the M&K Impulse hook is now available on certain selected Magic Timers.

The Impulse hook is an advanced tow hook for F1A and F1H gliders. The concept originated with M&K in Moscow. This document is not a detailed description of the impulse hook nor is it a description of how to make one. It is assumed that the reader is familiar with the concept and has purchased a hook from M&K or one of their agents.

General principles of operation. The tow hook has a mechanical sensor that can detect an increase of tension and a particular kind or jerk or impulse on the tow line. This impulse happens when the sportsman is approaching launch point. When this happens the hook sends a signal to the timer. The timer responds to the signal by moving the servos that are attached to the timer to a special pre-launch position. This movement of the stabilizer is called OLA or Online Acceleration in M&K's documentation. The timer setting controls the position that the servo or servo move to. If the tension relaxes on the line, the state change is signaled to the timer by the hook and servos moved to the original position. The M&K impulse hook is built in such a way that until the OLA state is reached there is a mechanical interlock that stops it from unlatching. The interlock is controlled hook and in the original M&K there are many moving parts and quality machining that one would expect from M&K. If the hook came from someone else the user is advised to make sure that the hook is well made and works properly.

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Note that this is a different philosophy than the relatch hooks with a servo on the hook. The M&K impulse hook does not have a servo on the hook, but rather relies on the Impulse unlatch interlock keeping the hook closed until it is the right time to launch. It is important to note that this Interlock is a function of the tow hook and is not controlled at all by the timer. It is not for this document to discuss the philosophical differences between the different kinds of hook. The sportsman needs to select the one that suits his style of flying the best.

This feature can only be supported on the 3 servo Black Magic Timer and the 4/5 servo Black Magic Extended Universal Timer. On the 3 servo timers only 2 servos can be used. This feature is built in to the latest versions of these timer and can be enabled by the user. Note that it may not be available on earlier versions of these timers. These timers are available in both the standard and VR Versions.

This feature also requires a particular release level of the Super Magic program on the Palm Pilot 4.95 or later. The current at the time of this revision is 4.95 to set the needed parameters and select the options, so make sure that you have it before commencing.

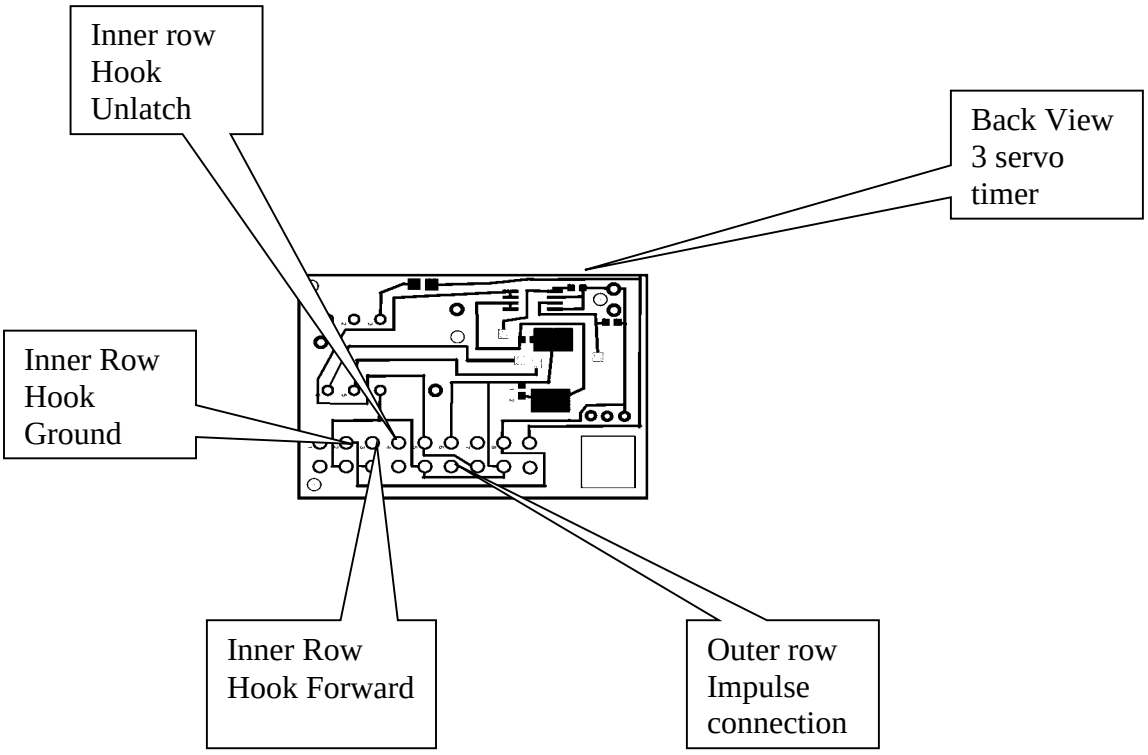
Read the program from the timer into Super Magic. Go to the Hook screen by tapping on the hook button. Here you will see the Impulse hook check box. Check this to enable the Impulse hook functions. There are also 4 servo positions that give the servo value of where the servo will move after the Impulse [OLA] has been detected. Hook Servo or Electronic hook must not be enabled.

It is important to note that the Magic Timer works slightly differently from the timer that the M&K supply. The Magic Timer

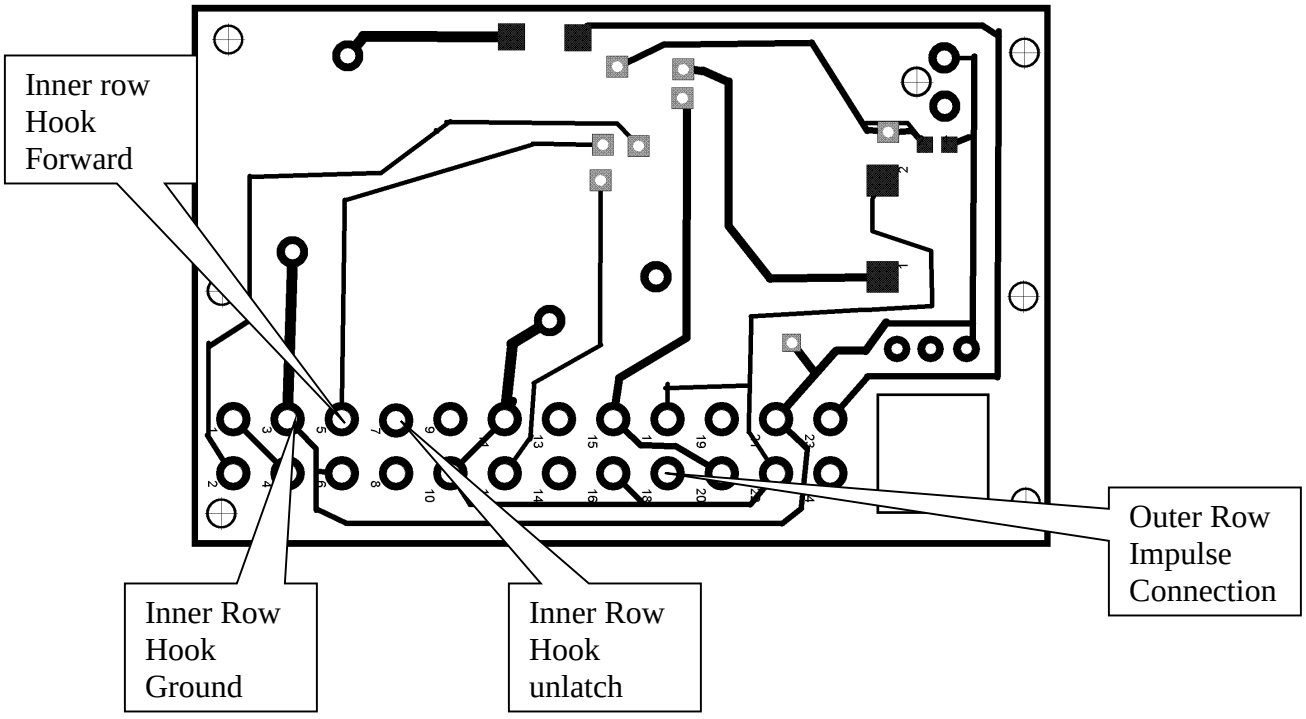
has a launch value for the servo that comes into play when the hook unlatches. So this value would “take over” from the OLA position when the hook unlatches so make sure that you take this into account.

There is another field called OLA-Delay. This is the delay in 1/10 of a seconds to return to the original servo settings should the OLA tension decrease and the servo need to return to the original position and re-engage the hook unlatch interlock. However seeing this condition may occur during an intended to be successful launch as well as an abandoned launch a small delay is needed to allow the line to come off the hook in the first case and the time to get into launch mode. Some individual tuning of the number will be needed.

You will see from the above description that the timer requires 3 connections to the timer, hook forward, hook unlatch and impulse input. There is a detailed pin out for the two timers but on the 3 servo Universal Timer the impulse is where the third servo signal output would be on that board. On the 4/5 servo board the impulse input is where the hook or fifth servo would be. The timer expects the switch to close when the impulse is to be signaled.



3 Servo VR Timer back shown



Latest version of 5 Servo Extended mode timer.

Summary of steps

1. Buy Magic Timer with Impulse hook support.
2. Buy M&K impulse hook.
3. Make sure that you have Super Magic 4.95 on your Palm Pilot.
4. Set up servos, timer, hook and battery on the bench.
5. Refer to the picture above where to connect the 3 wires from the Impulse hook.
6. Configure the servos and hook for non-impulse hook flight
7. Note for an M&K hook of any kind the Red Unlatch box must be checked on the Hook Screen.
8. Make sure the timer is working properly like a non-impulse hook – it should recognize hook forward and unlatch.
9. Now in the hook screen check the Impulse box.
10. Note the Hook Servo and E Tension must not be checked.
11. Put in a servo position for OLA Servo1, 2, 3 and 4 as you need it. Note that when the impulse hook signals to the timer that it got the impulse from the sportsman via the towline, the hook will be in the forward position. So if you are not sure what to put – use the hook forward [aka straight tow position]
12. Set the OLA delay number. See explanation above. If in doubt use a value of 2 [2 tenths of a second] as a starting point.
13. Test setup on the ground. By simulating the impulse you should see the servos move to the OLA position. For this reason at least one servo should have a different from straight tow hook value.
14. Fly model.
15. You can use the Magic Timers Accel Delay and Period with this hook. They come into play after to hook has opened. See Magic documentation.
16. Adjust OLA to obtain best result.
17. Win.

You can ask us if you have additional questions.

To e-mail Magic Timer write to magictimers@yahoo.com

"We count the seconds, the rest is up to you."