

Proposal of adding JST SM06B-SHLS-TF as alternative debug interface connector

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The problem

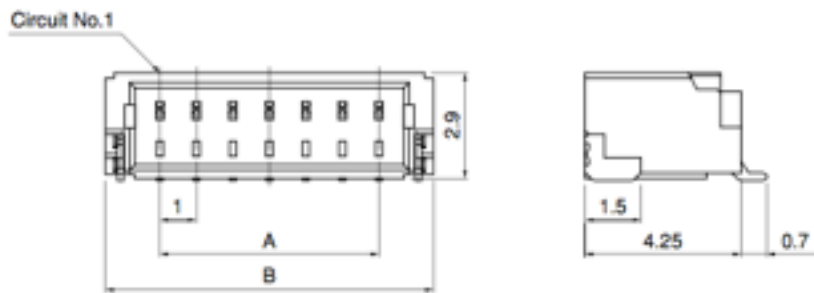
DroneCode connector standard has defined 'SM06B' as debug interface connector. This statement is ambiguity as 'SM06B' is just a mounting type which further contains several different series of connectors.

The SH series however, seems to be the original intention of existing standard. This connector is fine for many design cases but in mini or nano size flight controller, this connector is sub optimal in dimension. The height of this connector is 2.9mm, as in Fig.1.



Side entry type

Fig.1 The SH series connector



The proposal

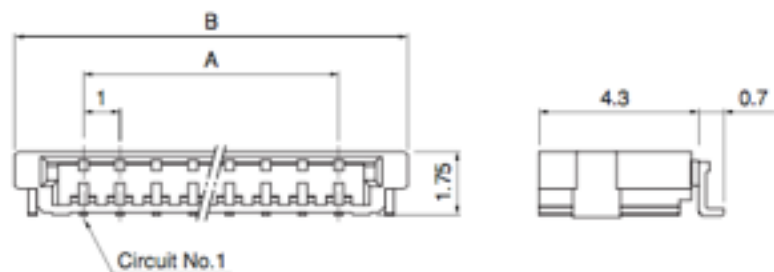
So the 1st part of this proposal is a more specific series/type name(s) should be used instead of the current one.

As the 2nd part of this proposal, The JST SHL series (SM06B-SHLS-TF for debug interface) is a recommended choice for its thin design and space saving feature, as in Fig. 2. This connector has a height of only 1.75mm, and can effectively help reducing the form factor for mini size flight controller.



Normal type

Fig.2 The SHL series connector



Design case MindRacer

One of the design goal of MindRacer is to have minimum form factor in order to fit into the smallest vehicle/racer, while still keeps as much connecting conveniency as possible. The form factor consideration not only includes size in length and width dimension, but also in height dimension as well.

The taller connectors (GH series) are all placed in the bottom side of the board, and the connectors on top side of the board are all signed with limitation on height thus the overall height of the controller can be lower and results in a thinner/smaller enclosure. If SH series is used then that makes it the tallest element(2.9mm) on top side which will force the designer to increase the height upper limit, as in Fig.3.

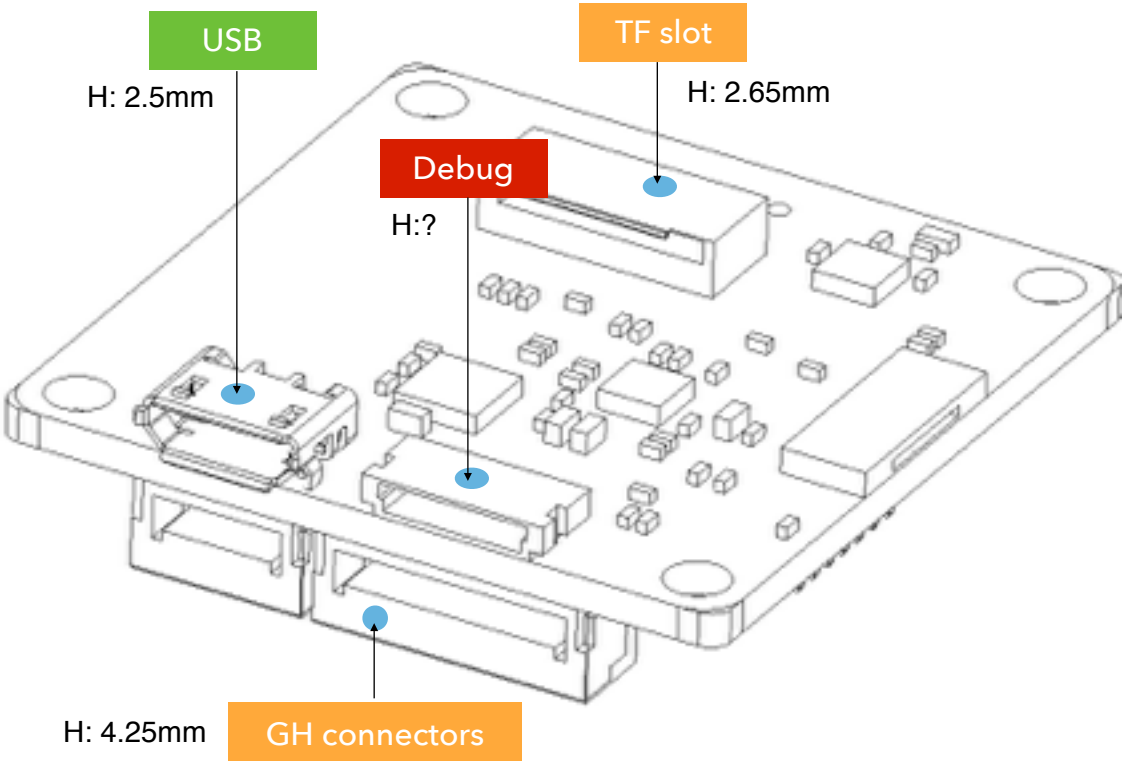


Fig.3 MindRacer top side

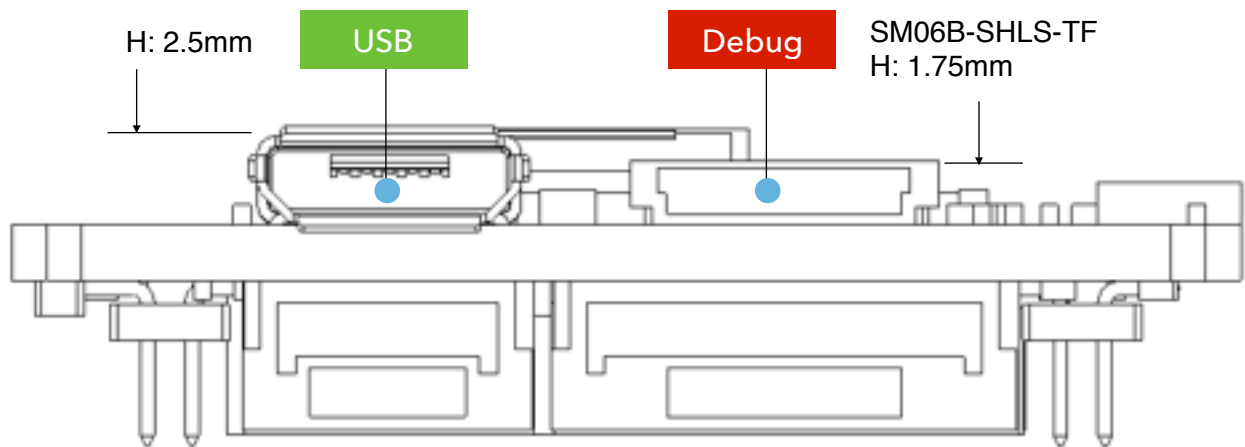


Fig.4 MindRacer board side view

Using SM06B-SHLS-TF instead can help designer to keep the top side height and reduce the overall height of the flight controller to around 8mm, as in Fig.4.

Conclusion

SM06B-SHLS-TF has almost the same PCB area occupation as SH series. The contact is tight and solid enough for debugging purpose. The insert and pull out force is more smooth and ease than SH connector. The price is also quite economic.

In all aspects SM06B-SHLS-TF is a superior choice over SH series thus I propose to add SM06B-SHLS-TF as alternative debug interface connector to DroneCode connector standard.

This proposal only has impact on physical form factor, not affecting pin map definition.