

HBZ5305 Receiver/ESC: Duet

1.HBZ5305 Receiver/ESC: Duet

1.1.1. Introduction

Horizon Hobby would like to announce a low-cost flight controller module which contains a 2.4GHz RF receiver, a gyroscope, motor output electronics, servos, and the control chips. The highly integrated module makes the possibilities of LVC telemetry. The module is specifically developed for all non-spektrum airplanes.

1.2.2. Features

- 1.2.1. Support 2.4GHz Zigbee network
- 1.2.2. 2.4Ghz supports 16 channels
- 1.2.3. Support on UART output.
- 1.2.4. Support three pwm outputs.
- 1.2.5. Support two main motors outputs.
- 1.2.6. Stabilization control with 6-axis gyro

1.3.3. General Specificaiton

1.3.1. Model Name

1.3.1.1.HBZ5305 Receiver/ESC: Duet

1.3.2. Product Description

1.3.2.1.HBZ5303 is a low-cost mian control modlue used in a wireless remote control fixed-wing model plane, which contains a 2.4GHz RF receiver module for flight control, a gyroscope, motor, servos, and the control chips. Its center frequency is 2405~2475MHz.

1.3.3. Dimension:

1.3.3.1.LxWxH: 34.5x27.5x8.9mm

1.3.4. 2.4 GHz Interface

1.3.4.1.SPI

1.3.5. Operating temperature

1.3.5.1.-10°C to 55°C

1.3.6. Storage temperature

1.3.6.1.-30°C to 85°C

1.3.7. VDD

1.3.7.1.DC:3.0V-4.2V

1.3.8. SW

1.3.8.1.V01

1.3.9. HW

1.3.9.1.V0

1.4.4. 2.4GHz RF Specification

1.4.1. RF Output Power

Modulation	Channel No.	Frequency (MHz)	Average Power (dBm)			Max EIRP Power (dBm)	Limit (dBm)	Result
			Normal	Extreme				
			25°C	-10°C	55°C			
GFSK	11	2405	6.51	7.51	6.15	9.62	20	Pass
	18	2440	6.59	7.71	6.21	9.82	20	Pass
	25	2475	6.51	7.68	6.03	9.79	20	Pass

Note: Max EIRP Power (dBm) = Max Average Power (dBm) + Antenna Gain (dBi).

1.4.2. Power Spectral Density

Modulation	Channel No.	Frequency (MHz)	EIRP Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
GFSK	11	2405	8.60	10	Pass
	18	2440	8.68	10	Pass
	25	2475	8.60	10	Pass

1.4.3. Occupied Channel Bandwidth

Modulation	Channel No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Frequency Range (MHz)	Result
GFSK	11	2405	0.89234	2404.554	Pass
	25	2475	0.87845	2475.439	Pass

1.4.4. Transmitter Unwanted Emissions in the Out-of-band Domain

Modulation	Channel No.	Frequency Range (MHz)	Worst Level (dBm/MHz)	Total Worst Level (dBm/MHz)	Limit (dBm/MHz)	Result
GFSK	11	2400 - 2*BW ~ 2400 - BW	-58.85	-56.74	-20	Pass
		2400 - BW ~ 2400	-61.50	-59.39	-10	Pass
	25	2483.5 ~ 2483.5 + BW	-61.04	-58.93	-10	Pass
		2483.5 + BW ~ 2483.5 + 2*BW	-61.21	-59.10	-20	Pass

Note: Total Worst Level (dBm/MHz) = Worst Level (dBm/MHz) + Antenna Gain (dBi).

1.4.5. Transmitter Unwanted Emissions in the Spurious Domain

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
11	219.6	-104.5	31.9	-72.6	-54.0	-18.6	Peak	Horizontal
	578.5	-103.1	35.0	-68.1	-54.0	-14.1	Peak	Horizontal
	96.9	-104.7	40.4	-64.3	-54.0	-10.3	Peak	Vertical
	656.1	-102.5	36.3	-66.2	-54.0	-12.2	Peak	Vertical
	4807.0	-69.1	15.2	-53.9	-30.0	-23.9	Peak	Horizontal
	10693.8	-74.7	29.6	-45.1	-30.0	-15.1	Peak	Horizontal
	4807.0	-70.3	15.5	-54.8	-30.0	-24.8	Peak	Vertical
11533.9	-76.4	31.3	-45.1	-30.0	-15.1	Peak	Vertical	
25	219.6	-104.3	31.9	-72.4	-54.0	-18.4	Peak	Horizontal
	560.1	-103.3	34.9	-68.4	-54.0	-14.4	Peak	Horizontal
	97.4	-105.0	40.6	-64.4	-54.0	-10.4	Peak	Vertical
	582.9	-103.3	35.6	-67.7	-54.0	-13.7	Peak	Vertical
	4948.0	-65.8	14.4	-51.4	-30.0	-21.4	Peak	Horizontal
	11099.1	-74.1	29.8	-44.3	-30.0	-14.3	Peak	Horizontal
	4948.0	-67.0	14.2	-52.8	-30.0	-22.8	Peak	Vertical
	11287.1	-76.0	30.4	-45.6	-30.0	-15.6	Peak	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB).
 Note 2: For emission up to 1GHz:
 Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) - Antenna Gain (dBi) - 2.15 (dB)
 For emission above 1GHz:
 Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) - Antenna Gain (dBi) - Pre_Amplifier Gain (dB)

1.4.6. Receiver Spurious Emissions

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
11	43.1	-105.6	32.5	-73.1	-57.0	-16.1	Peak	Horizontal
	820.1	-102.4	38.5	-63.9	-57.0	-6.9	Peak	Horizontal
	98.4	-104.6	40.2	-64.4	-57.0	-7.4	Peak	Vertical
	729.9	-104.0	37.4	-66.6	-57.0	-9.6	Peak	Vertical
	2404.1	-68.2	3.3	-64.9	-47.0	-17.9	Peak	Horizontal
	9742.0	-75.1	20.7	-54.4	-47.0	-7.4	Peak	Horizontal
	2151.5	-68.9	4.2	-64.7	-47.0	-17.7	Peak	Vertical
	9195.6	-75.8	20.7	-55.1	-47.0	-8.1	Peak	Vertical
25	55.7	-103.4	29.3	-74.1	-57.0	-17.1	Peak	Horizontal
	760.4	-102.4	37.7	-64.7	-57.0	-7.7	Peak	Horizontal
	96.9	-105.2	40.4	-64.8	-57.0	-7.8	Peak	Vertical
	835.6	-103.1	39.4	-63.7	-57.0	-6.7	Peak	Vertical
	1405.4	-68.6	2.6	-66.0	-47.0	-19.0	Peak	Horizontal
	7068.9	-75.6	17.4	-58.2	-47.0	-11.2	Peak	Horizontal
	1317.3	-67.5	3.3	-64.2	-47.0	-17.2	Peak	Vertical
	7662.3	-73.3	17.2	-56.1	-47.0	-9.1	Peak	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB).
 Note 2: For emission up to 1GHz:
 Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) - Antenna Gain (dBi) - 2.15 (dB)
 For emission above 1GHz:
 Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) - Antenna Gain (dBi) - Pre_Amplifier Gain (dB)

1.4.7. Receiver Blocking

Channel	Wanted Signal Mean Power from Companion Device (dBm)	Blocking Signal Frequency (MHz)	Blocking Signal Power (dBm)	Type of Blocking Signal	Test Result
11	-67.38	2300	-31.89	CW	Pass
		2380	-31.89		Pass
25	-67.45	2504	-31.89	CW	Pass
		2584	-31.89		Pass

Note 1: The wanted signal mean power from companion device = $\text{Min}(-139\text{dBm} + 10 \cdot \log_{10}(\text{OCBW}) + 10\text{dB}, -74\text{dBm} + 10\text{dB}) + \text{Antenna Gain}$, OCBW is in Hz.

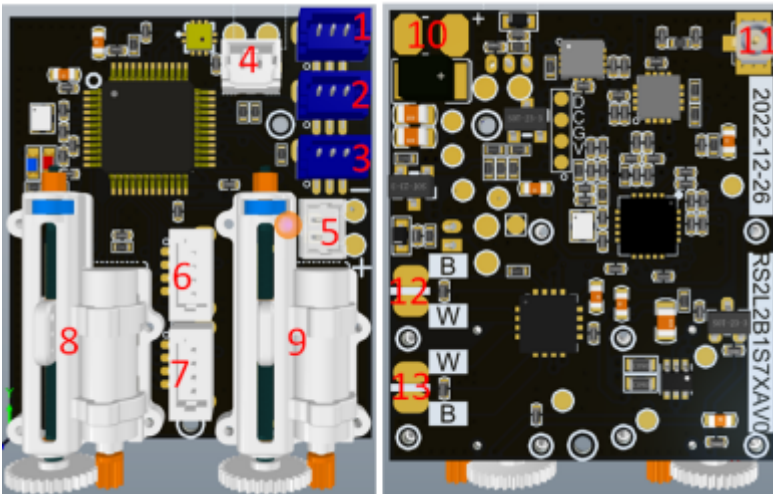
Note 2: The blocking signal power = $-34\text{dBm} + \text{Antenna Gain} = -34\text{dBm} + 2.11\text{dBi} = -31.89\text{dBm}$.

Note 3: Manufacturer claims this equipment does not support a PER or a FER test to be performed, so the performance criteria "no loss of the wireless transmission function needed for the intended use of the equipment" shall be used. When EUT is normally connected to AE, the indicator light of EUT is green, if EUT is disconnected from AE, the indicator light of EUT becomes blue. During the test, when the signal generator generates Blocking signals, the indicator light of EUT remains green, so the test result is Pass.

1.5.5. Pin Assignment

1.5.1. Pin Outline

1.5.1.1.



1.5.2. Pin Definition

1.5.2.1.1、2、3: Servo port

1.5.2.2.4、5: Motor port

1.5.2.3.6: OTA upgrade port

1.5.2.4.7: LED port

1.5.2.5.8、9: Onboard Servo

1.5.2.6.10: Power cable

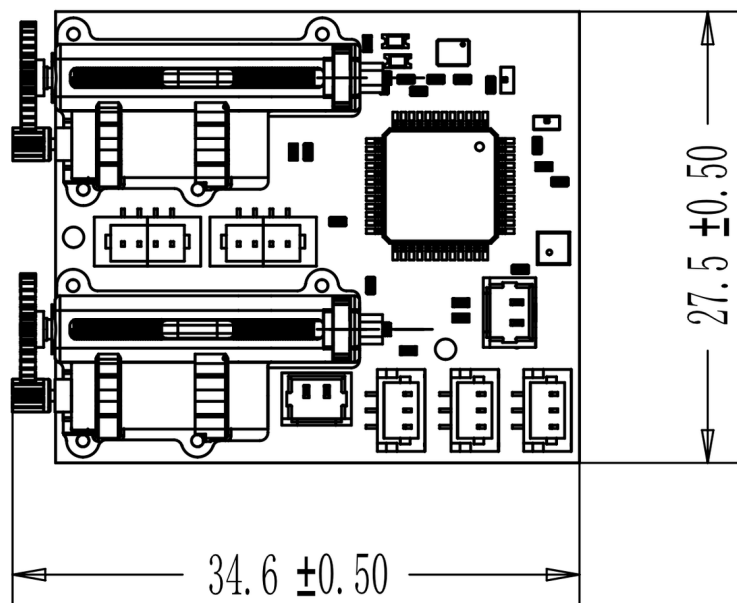
1.5.2.7.11: Antenna

1.5.2.8.12、13: Onboard servo cable

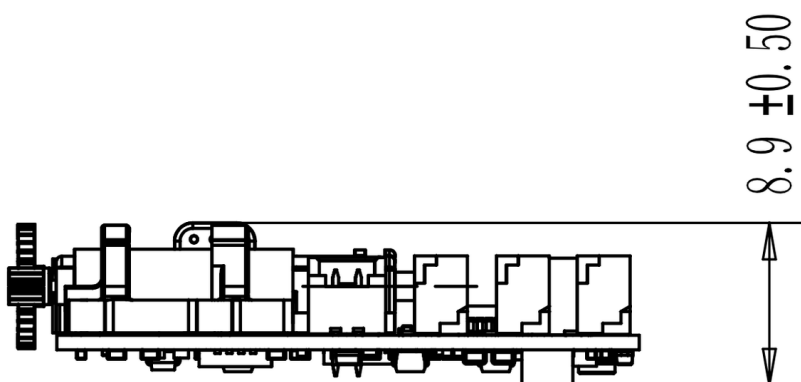
1.6.6. Dimensions

1.6.1. Physical Outline (Unit:mm)

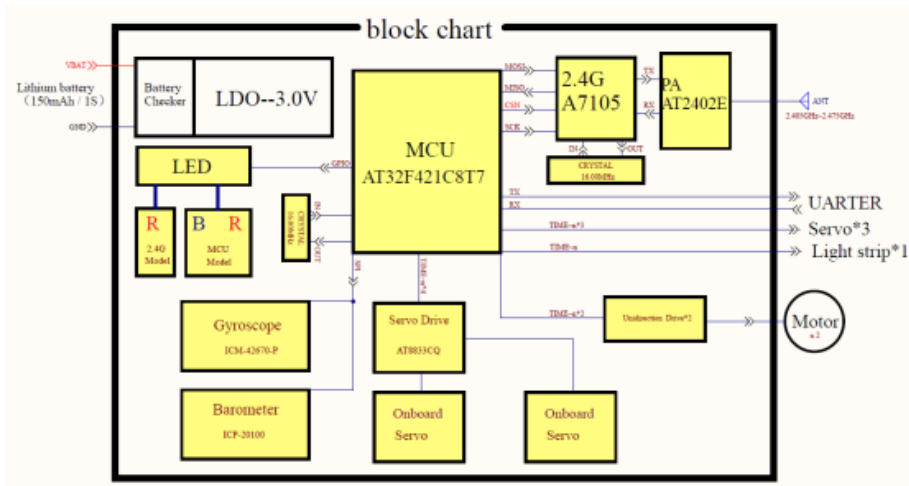
1.6.1.1.



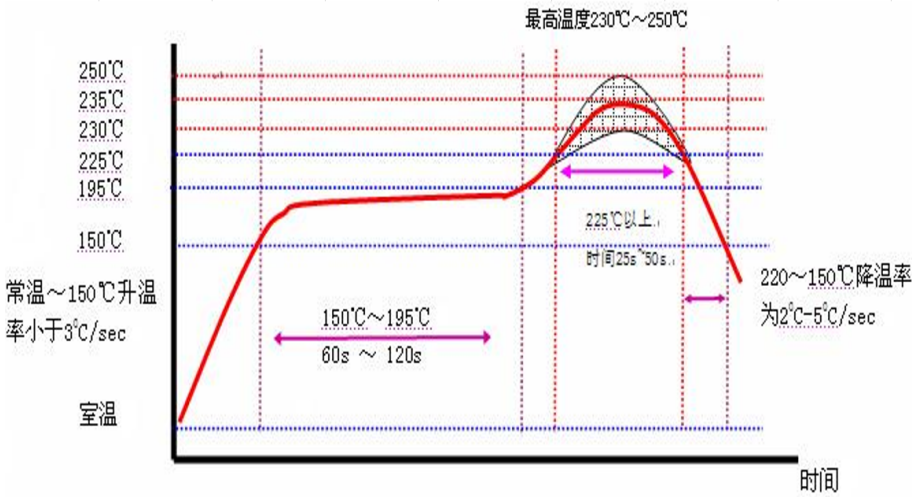
1.6.1.2.



1.7.7. Funtional Block Diagram



1.8.8. Recommended Reflow Profile



1.9. MPE Warning

1.9.1. FCC

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the part responsible for compliance could void the user's authority to operate this equipment.

This module has been tested and found to comply with Part 15C requirements for Modular Approval.

The module is tested for standalone mobile RF exposure use condition.

(1) The antenna must be installed such that 20 cm is maintained between the antenna and users,

(2) The transmitter module may not be co-located with any other transmitter or antenna.

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product

(including the transmitter) and obtaining a separate FCC authorization.

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. The antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.”.

The module is a limited modular, tested in a specific host (Model: HBZ05300; Brand: HobbyZone). If other hosts are used, the OEM integrator will be responsible for re-evaluating the end product.

The following antennas have been certified for use with this module.

Only antennas of the same type with equal or lower gain may also be used with this module.

Other types of antennas and/or higher gain antennas may require the additional authorization for operation.

Antenna Specification list below:

--Antenna Type: Monopole Antenna

--Frequency Bands (MHz): 2405 ~ 2475

--Antenna Gain (dBi): 2.11

When the module is installed in the host device, the FCC ID label must be visible through a window on the final device or it must be visible when an access panel, door or cover is easily re-moved. If not, a second label must be placed on the outside of the final device that contains the following text: “Contains FCC ID: BRWHBZ5303”. The FCC ID can be used only when all FCC compliance requirements are met.

This transmitter is tested in a standalone mobile RF exposure condition in the specific host. And any co-located or simultaneous transmission with other transmitter(s) may require a Class II permissive change re-evaluation or a new grant.

This module transmitter is only authorized for the specific rule parts listed on the grant. And the host product manufacturer/OEM is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. The modular doesn't comply with the requirements of Part 15 Subpart B. The host must comply with the requirements of Part 15 Subpart B.

1.9.2. ISED

This device complies with Industry Canada license-exempt RSSs. Operation is subject to the following two conditions:

1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. l'appareil ne doit pas produire de brouillage;
2. l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

The transmitter module may not be co-located with any other transmitter or antenna. The OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

- 1) Operation shall be limited to indoor use only; and
- 2) This device is limited to under control an indoor access point or an indoor

The module is tested for standalone mobile RF exposure use condition.

(1) The antenna must be installed such that 20 cm is maintained between the antenna and users,

(2) The transmitter module may not be co-located with any other transmitter or antenna.

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the ISED authorization is no longer considered valid and the IC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate ISED authorization.

The module is a limited modular, tested in a specific host (Model: HBZ05300; Brand: HobbyZone). If other hosts are used, the OEM integrator will be responsible for re-evaluating the end product.

Le module est testé pour les conditions d'utilisation de l'exposition aux radiofréquences

des téléphones mobiles autonomes.

(1) L'antenne doit être installée de manière à ce que 20 cm soient maintenus entre l'antenne et les utilisateurs,

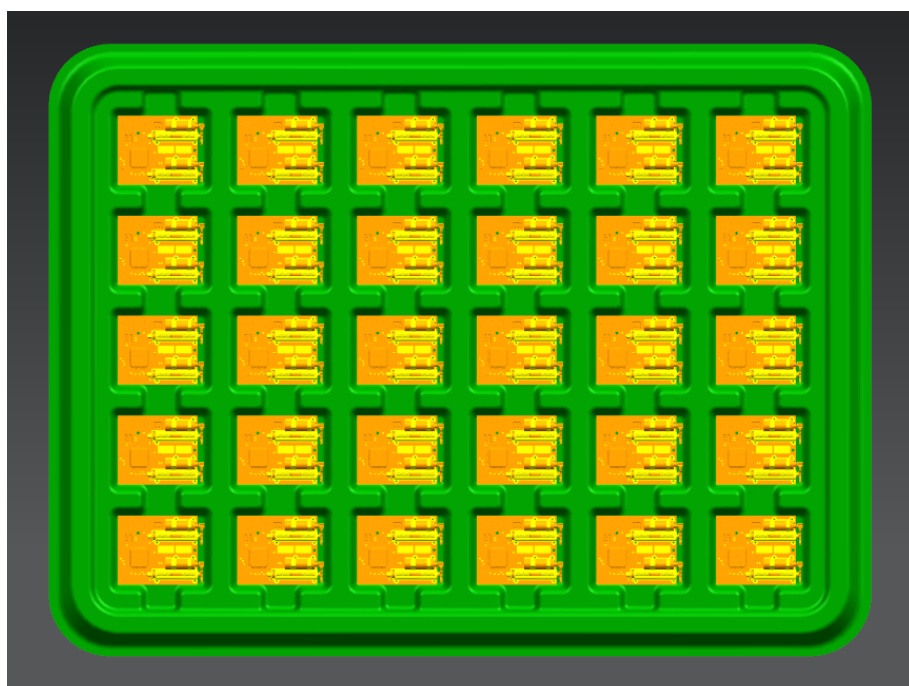
(2) Le module d'émission ne peut pas être installé en même temps qu'un autre émetteur ou qu'une autre antenne.

Si ces conditions ne peuvent pas être remplies (par exemple, certaines configurations d'ordinateurs portables ou la co-implantation avec un autre émetteur), l'autorisation ISED n'est plus considérée comme valide et l'IC ID ne peut pas être utilisé sur le produit final. Dans ce cas, l'intégrateur OEM devra réévaluer le produit final (y compris l'émetteur) et obtenir une autorisation ISED distincte.

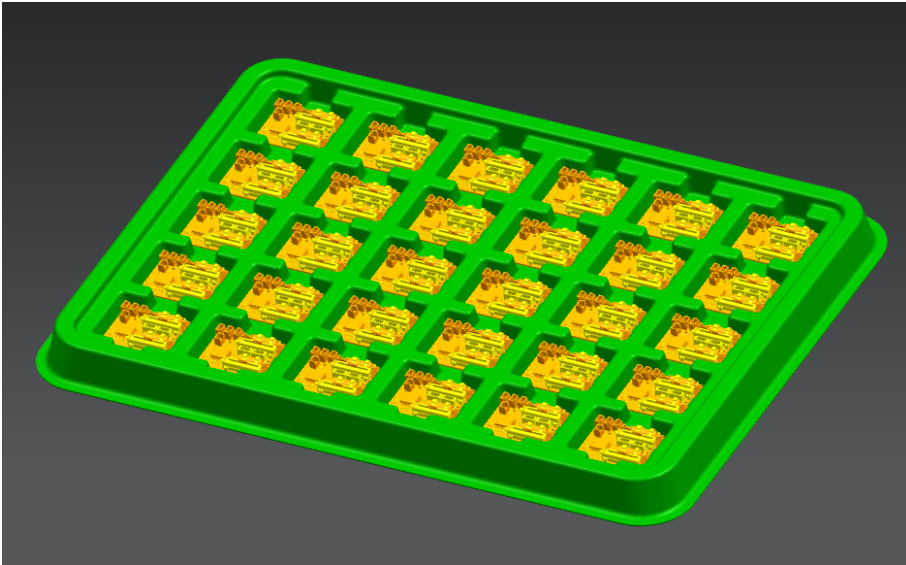
Le module est un module limité, testé dans un hôte spécifique (modèle : HBZ05300 ; marque : HobbyZone). Si d'autres hôtes sont utilisés, l'intégrateur OEM sera responsable de la réévaluation du produit final.

1.10.9. Package Informaion : 30pcs in one tray

1.10.1.



1.10.2.



1.10.3.

