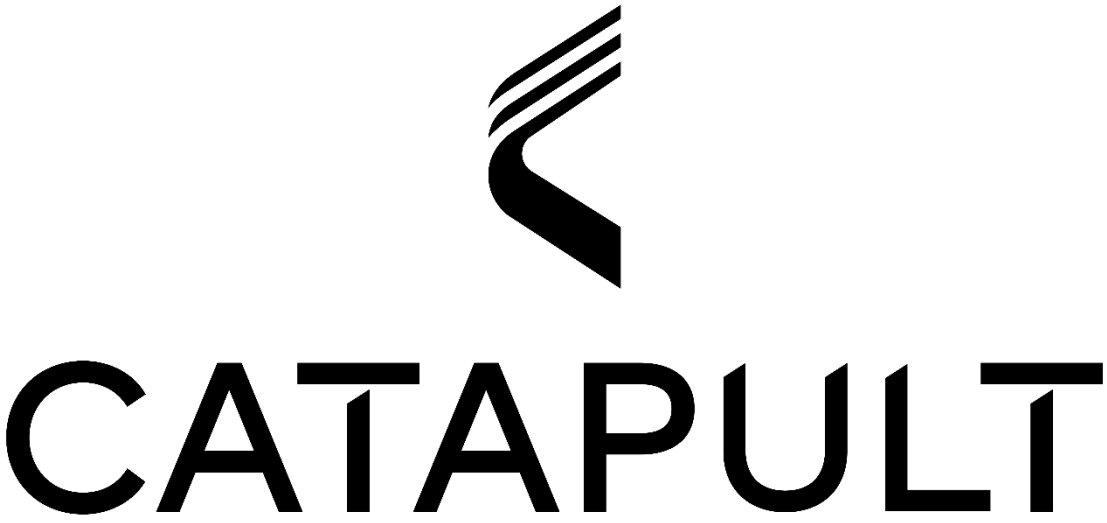
Catapult Smart Football
(2ADAL-B001)
User Manual



1. OUTLINE

Catapult's Ultrawideband (UWB) Clearsky technology can be used to track the Catapult Smart Football in real time and give coaches insights into the number of times the ball has been thrown, the distance it travels, the speed at which it travels and how fast it spins amongst many other metrics.

When removed from the Catapult Smart Ball Charger, the ball starts transmitting UWB frames and will periodically listen for transmissions received from Clearsky infrastructure. If it can detect that it is within line-of-sight of a Clearsky receiver, it will continue to transmit at a pre-configured rate. The Clearsky receivers then record timestamps of received ball transmissions and backhaul them to a location engine, which computes the position of the ball in real-time using pre-surveyed receiver positions.

When positioned on its charger, the ball will turn off its UWB sub-system and turn on its Bluetooth Low Energy (BLE) sub-system. When in this mode, the ball can be upgraded over-the-air (OTA) and its configuration can be polled and updated using BLE data transfer.

2. Catapult Smart Ball Charger

The Catapult Smart Ball Charger uses innovative power-at-distance charging technology to charge compatible balls using the 915 MHz Industrial, Scientific, and Medical (ISM) band.

The charger is powered by the provided USB-C to mains adapter and USB-C cable. Upon insertion, the LED will be coloured white to indicate that the charger is operational. When a Catapult Smart Football is placed on the charger, the LED will change colour to red to indicate that the ball is charging. Once the football is fully charged, the LED will change colour to green. No user interaction other than plugging the cable into the charger and placing the ball on the charger is required.

3. Catapult Smart Football

As explained in the previous section, The Catapult Smart Football can be charged using the Smart Ball Charger. When the football is placed on the charger, its firmware can be upgraded, and it can be placed in a deep-sleep state for shipping. Both can be initiated using Catapult's mobile app.

When the football is removed from the charger, its UWB transceiver will be activated, and it will commence transmitting small frames called "blinks". To verify that it is in range of a Catapult Clearsky system, the football will attempt to receive blinks from a Clearsky system. If it fails to receive any within ten seconds, then it will cease transmission and go into a standby state and then periodically attempt to receive Clearsky transmissions.

The football also has an accelerometer and gyroscope, which are sampled at 100 Hz, and the data transmitted in the UWB blinks. By monitoring the accelerometers, the football's firmware can detect if it is being moved; if not, it will go into a standby state where it will monitor for movement and then wake up and commence transmitting.

The football is used by college and professional football players to monitor their throwing, kicking, and receiving ability. Therefore, it is often held by players before they throw the ball and after they've caught it and no minimum distance between the football and a player is required.

Regulatory Notices

USA

Federal Communication Commission Interference Statement

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.

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

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.

FCC Radiation Exposure Statement
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment and must not be co-located or operating in conjunction with any other antenna or transmitter.
For body worn operation, this device has been tested and meets FCC RF exposure guidelines. When used with an accessory that contains metal may not ensure compliance with FCC RF exposure guidelines.

Canada

CAN ICES-3 (B)/NMB-3(B)

This device complies with Industry Canada's licence-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, et
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

IMPORTANT NOTE:

Radiation Exposure Statement

For body worn operation, this device has been tested and meets RF exposure guidelines when used with an accessory that contains no metal. Use of other accessories may not ensure compliance with RF exposure guidelines.

Déclaration d'exposition aux radiations RF:

Pour une utilisation sur le corps, cet appareil a été testé et respecte les directives sur l'exposition aux RF lorsqu'il est utilisé avec un accessoire sans métal. L'utilisation d'autres accessoires peut ne pas garantir la conformité aux directives d'exposition aux RF.