



Terrahawk

Model HT5200

Operations and Settings
090xxxxxa



HEADSIGHT.COM | 574.546.5022

Notices for Operation of Terrahawk in the US

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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 UNDESIRE OPERATION.

Warning: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

IMPORTANT NOTE: This device is considered a UWB imaging device and is subject to FCC Coordination requirements under the CFR Title 47 Chapter I, Sub chapter A, Part 15, Subpart F , Section 15.525. As such it is the responsibility of the users of these systems to submit the following information to the FCC prior to use of these systems. The users of UWB imaging devices shall supply operational areas to the FCC Office of Engineering and Technology, which shall coordinate this information with the Federal Government through the National Telecommunications and Information Administration. The information provided by the UWB operator shall include the name, address and other pertinent contact information of the user, the desired geographical area(s) of operation, and the FCC ID number and other nomenclature of the UWB device. If the imaging device is intended to be used for mobile applications, the geographical area(s) of operation may be the state(s) or county(ies) in which the equipment will be operated. The operator of an imaging system used for fixed operation shall supply a specific geographical location or the address at which the equipment will be operated. This material shall be submitted to Frequency Coordination Branch, OET, Federal Communications Commission, 445 12th Street, SW, Washington, D.C. 20554, Attn: UWB Coordination. The operator shall comply with any constraints on equipment usage resulting from this coordination.

Notes:

- The device is to be used for agricultural purposes, at a height of one meter above crop heights, but not to exceed 12 feet (3.7 meters) above the soil surface.
- Multiple Terrahawk transmitters intended to be mounted on a single piece of farming machinery (a combine harvester, ground tiller, fertilizer, etc.) in any installation shall be positioned for operation with a minimum separation distance of 1.5 m (~ 5 feet) between transmitters.
- The Terrahawk's emissions shall be aimed downward toward the ground so they can be attenuated by the presence of crops, and shall not be operated at a height of greater than 1 meter when there are no crops beneath the device.
- The Terrahawk shall only be installed on farming machinery (combine harvesters, ground tillers, fertilizers, etc.) and operated in fields that are located in rural or predominantly agricultural areas as generally defined by the United States Geological Survey National Land Cover Database (NLCD) classifications 81 (Pasture/Hay) and 82 (Cultivated Crops).
- Operation of this device shall be limited to parties eligible for licensing under the provisions of part 90 of the Commission's rules (e.g., persons regularly involved in activities such as the operation of farms, ranches, or similar land areas, for the quantity production of crops or plants; including soil plowing, soil conditioning, seeding, fertilizing, or harvesting for agricultural activities). No operation in city gardens or on trees is permitted.
- Terrahawk devices used in the US must be coordinated with the FCC prior to use. A coordination postcard was included in the front of this manual for your convenience.

Notices for Operation of Terrahawk in Canada

This device complies with Industry Canada licence-exempt RSS standard(s). 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.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

This equipment complies with the ICES RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator and any part of the human body.

Cet équipement est conforme aux limites d'exposition aux radiations ICES définies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé à une distance minimale de 20 cm entre le radiateur et une partie de votre corps.

Note: This Ground Penetrating Radar Device shall be operated only when directed at the ground within one meter of the surface under analysis.

Remarque: Ce dispositif de radar à pénétration au sol ne doit être utilisé que lorsqu'il est dirigé vers le sol à moins d'un mètre de la surface en analyse.

Note: This Ground Penetrating Radar Device shall only be operated for purposes associated with the agricultural industry.

Remarque: Cet appareil de radar à pénétration au sol ne doit être utilisé qu'à des fins associées à l'industrie agricole.

About Headsight

Headsight Contact Info

Headsight, Inc
Bremen, IN 46506
Phone: 574-546-5022
Fax: 574-546-5760
Email: info@headsight.com
Web: www.headsight.com

Technical Assistance

Phone: 574-220-5511

About this Manual

How to use this manual

For new installations, follow all applicable instructions in each of the numbered sections (1, 2, etc) in the order that they are presented in this manual. The information in the lettered appendices (A, B, etc) is for service or advanced settings which you will not need for most installations, but may want to reference in the future.



This icon designates information of which you should take note.



This icon designates an important instruction.

Disclaimers

Headsight®, Horizon®, Pinpoint®, Insight®, Foresight®, Feathersight®, Truesense™ and Truesight® are trademarks of Headsight, Inc. All other trademarks are property of their respective owners.

Suggestions

If you have any suggestions to improve this manual –please call 574-546-5022 or email info@headsight.com.



Portions of this product are protected by US Patents 6202395, 6833299, 7310931, 7647753 and other US and international patents, issued and pending.

Copyright Headsight, Inc. 2016

Table of Contents

About Headsight	iii
Headsight Contact Info	iii
Technical Assistance	iii
About this Manual	iii
How to use this manual	iii
Disclaimers	iii
Suggestions	iii
1. Theory of Operation	5
2. Sensor Power and Status	6
2.1. Powering the Terrahawk sensors	6
2.2. Sensor light Status	6
3. Setup	7
3.1. System Setup	7
3.2. Assigning Sensors	7
3.3. Range	8
3.4. Offset	9
3.5. OSD / ISD	10
3.5.1. Theory of Operation	10
3.5.2. Setting OSD and ISD	10
4. Operation	12

1. Theory of Operation

The Terrahawk ground penetrating radar sensor is designed to mount on the header of an agricultural harvester to measure the distance to the ground and/or crop. This data may be used for header control as well as logged for analysis. Sensors should be mounted in accordance with the installation manual for the specific header being used.



Terrahawk sensors are connected through a CAN bus on the header to a Horizon base controller mounted on the header near the single point connection. The user interface for the Horizon base controller is generally an OEM or aftermarket UT in the cab of the combine. This manual explains the operation and settings for the Terrahawk units through Horizon interface on the UT.

2. Sensor Power and Status

2.1. Powering the Terrahawk sensors

1. Terrahawk sensors are powered by connecting them to the Horizon header CAN network.
2. The Horizon CAN network is tied to key power so the sensors are emitting when the machine is keyed on.

2.2. Sensor light Status

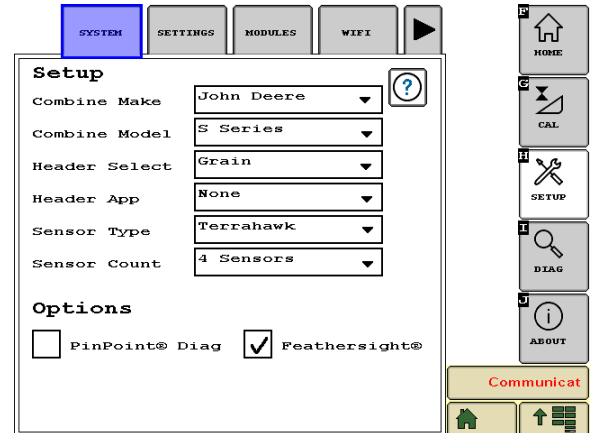
The LED near the connector of the sensor indicates its status.

1. Flashing green – active, emitting and receiving signal

3. Setup

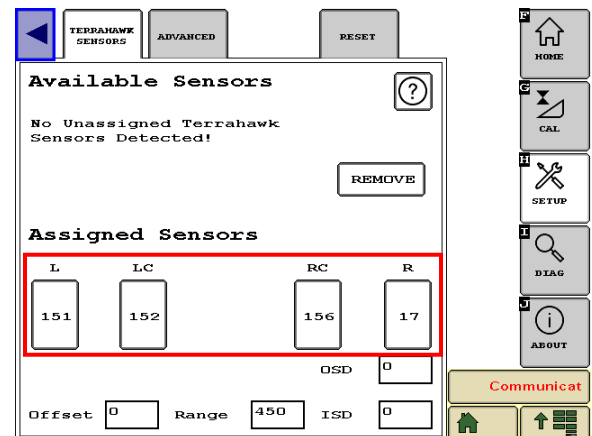
3.1. System Setup

1. On the UT interface in the cab, open the Horizon pool, and press the “Setup” softkey on the right.
2. Press the “System” tab along the top.
3. Input the information of your combine and header.
 - a. For Sensor type select “Terrahawk”
 - b. Check “Feathersight” if you have a platform head and plan to run near the ground



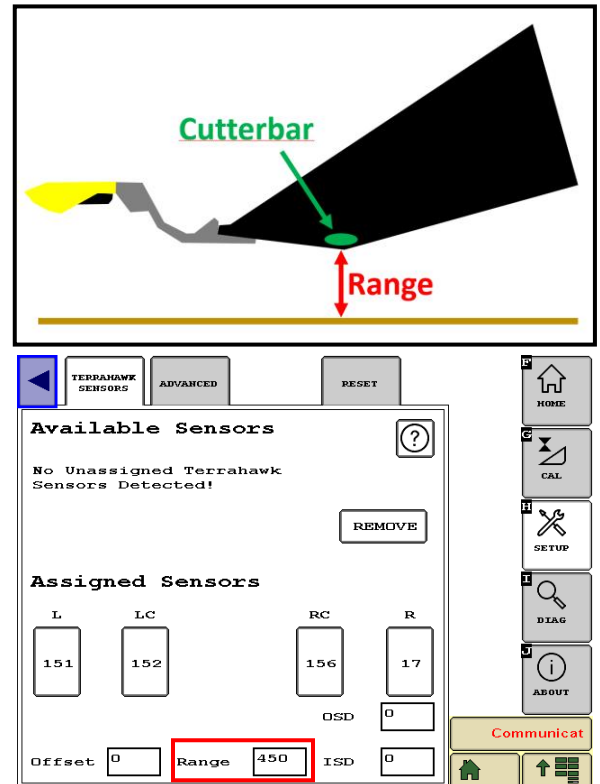
3.2. Assigning Sensors

1. On the UT interface in the cab, open the Horizon pool, and press the “Setup” softkey on the right.
2. Scroll over in the tabs along the top and press “Terrahawk Sensors”.
3. The sensor locations are displayed on the screen and the last 3 digits of each sensor serial number are display on the sensor icon. The location of these serial numbers must match the actual location of the sensors on the head.
4. Horizon has the ability to read the serial number of each Terrahawk sensor but cannot tell the location of the sensors on the head. During initial setup of the system, it will guess that the sensor with the lowest serial number is on the left and that each sensor position moving across the head to the right has a higher serial number.
5. If two serial numbers are in the wrong place, simply press the icons of the two incorrect sensors on the screen and the serial numbers will be swapped.



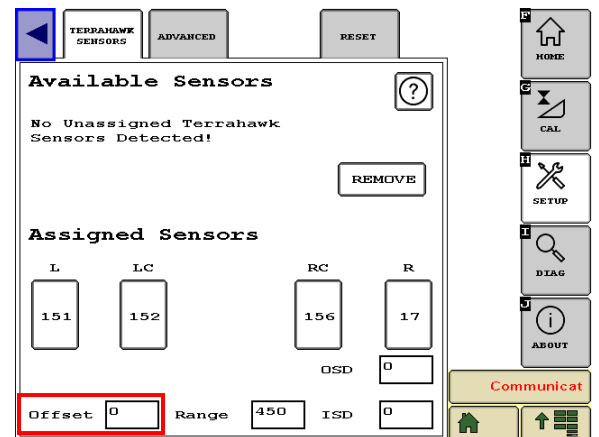
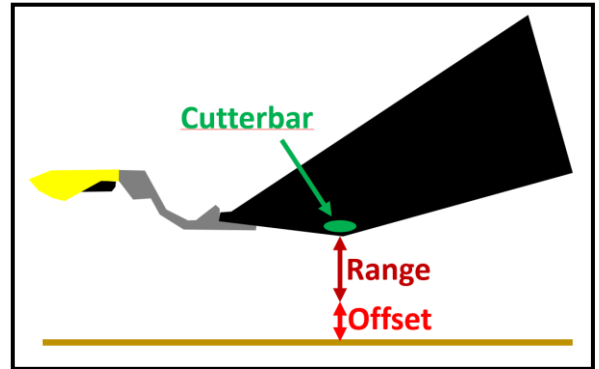
3.3. Range

1. On the UT interface in the cab, open the Horizon pool, and press the “Setup” softkey on the right.
2. Scroll over in the tabs along the top and press “Terrahawk Sensors”.
3. The range setting specifies the allowable range of operation (min to max cut height) in millimeters. 450mm (18 inches) often works well.
4. Increasing the “Range” value gives a larger allowable range of cut height but reduces the amount of sensitivity within the range.
5. Decreasing the “Range” value gives a smaller allowable range of cut height but increases the amount of sensitivity within the range.



3.4. Offset

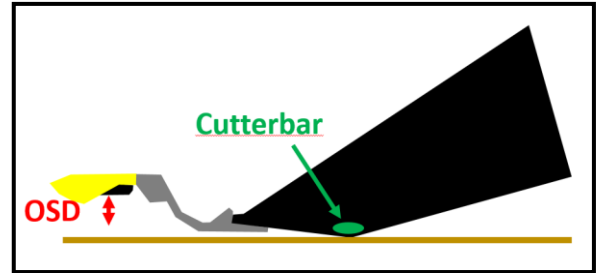
6. On the UT interface in the cab, open the Horizon pool, and press the “Setup” softkey on the right.
7. Scroll over in the tabs along the top and press “Terrahawk Sensors”.
1. After setting the range, an offset can be added if needed. The offset is input in millimeters and is used to shift the range up from the ground. This allows you to increase cut height without increasing the range (since increasing the range will decrease the sensitivity).
2. The default value for offset is 0 and if your desired cut height is within 18 inches of the ground, it is probably fine to leave it there.
3. By definition, the offset value is raising the bottom end of the operating range - so if you add an offset, you will no longer be able to cut at the ground.
4. The combine will perform the best if you use an offset value that allows you to cut in the center of the combines height range.
5. Since having an offset value means you cannot cut close to the ground the Feathersight option must be turned off (“Setup” softkey, “System” tab).



3.5. OSD / ISD

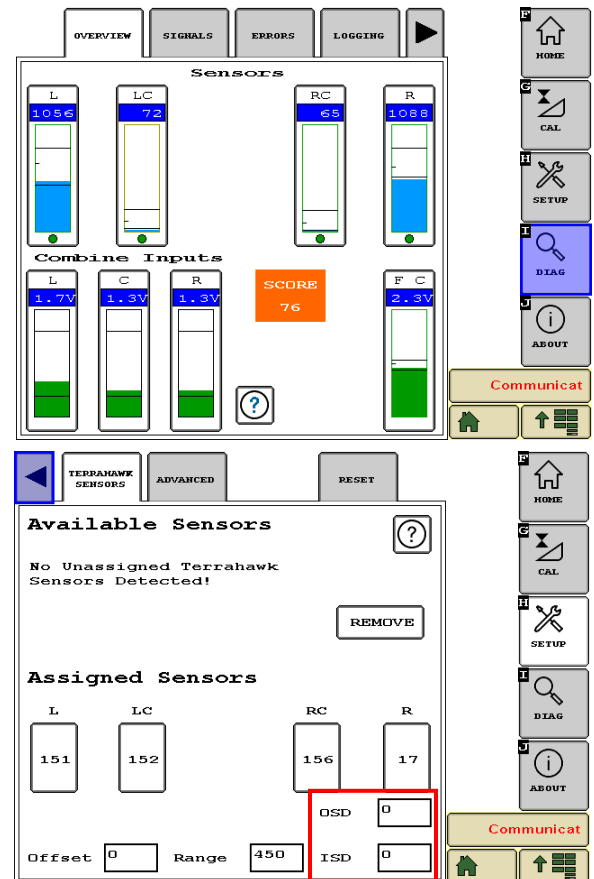
3.5.1. Theory of Operation

1. It is difficult for a Terrahawk sensor to see things that are very close to it. Sometimes the sensor will see something (or think it sees something) in its very near field vision. The sensor is most responsive to things that are close to it, so when this happens it tends to overreact and quickly raise the header out of the crop. OSD and ISD stand for “Outer Start Distance” and “Inner Start Distance” respectively. This is the start distance where the sensor will begin looking so if something comes closer to the sensor than this value, the sensor will ignore it. Properly setting OSD and ISD can significantly improve the stability of the header control. OSD and ISD should be set as large as possible without missing values (representing objects) that are critical.



3.5.2. Setting OSD and ISD

1. Set the header on the ground.
2. On the UT interface in the cab, open the Horizon pool, and press the “Diagnostic” softkey on the right.
3. Select the “Overview” tab along the top.
4. If all sensors are mounted under the head, the reading of each sensor should be approximately the same. In the screen shot shown, the outer sensors are raised terrace mounts out in front of the end dividers so the value of the outer sensors is much higher.
5. First set the ISD. Since the header is resting on the ground, the value of the inner sensors should theoretically never go below 65 if the ground is level. However, the purpose of the sensor is to read variance in the ground so a good setting might be 35. This is 30 mm less than the bottom of the range meaning that if the head is all the way on the ground and there is a 30mm variance in the ground from one radar reading to the next (a very short time) the radar should be



- able to see it.
6. Next set the OSD. The same principle applies, the lowest value in the example is 1056. Since these sensors are farther out in front of the combine, there could likely be more variance so a good value for OSD would probably be around 1000.

4. Operation

1. Be sure initial settings have been entered and Horizon has been calibrated.
2. Calibrate the Header to the combine per combine operator's manual.
3. Operate the Headsight Height control system the same as an OEM combine height control system.
4. Fine tune all combine speed and sensitivity adjustments for best performance.

STATEMENT OF LIMITED WARRANTY

For Headsight® Products

Headsight Inc. (Headsight) warrants its new products to be free from defects in material and workmanship for a period of twelve (12) consecutive months following the date of purchase by the retail purchaser.

Headsight Inc. (Headsight) warrants its new corn sensors assemblies for a period of thirty-six (36) months.

Headsight warrants genuine Headsight replacement parts and components to be free from defects in material and workmanship for a period of six (6) consecutive months following the date of purchase or the remainder of the original equipment warranty period, whichever is longer.

Headsight's obligation under these warranties shall be limited to repairing or replacing, free of charge to the original purchaser, any part that, in Headsight's judgment, shows evidence of such defect.

Limitations to Warranty

This warranty does not cover:

- Warranty claims directly resulting from improper installation of the product.
- Any product damaged by accident, abuse, misuse, or negligence after shipment from Headsight.
- Any unauthorized product alteration or modification.
- Any unauthorized repairs made with parts other than genuine Headsight parts.
- Any repairs performed by anyone other than Headsight or an authorized Headsight dealer unless specifically authorized by Headsight.

Warranty Procedure

- Troubleshooting should be done between farmer/dealer and Headsight through our technical assistance @ 574.220.5511.
- Labor reimbursement will occur only pre-arranged through Headsight technical assistance and be scheduled to a flat rate basis or reasonable time allowance in Headsight's judgment.
- There is no mileage reimbursement.
- Diagnostic time will not be reimbursed except in pre-arranged circumstances.
- Warranty claims should be on typical dealer service work order with a number and name to be attached for any future correspondence.
- All warranty work must be performed, and claims submitted, within sixty (60) days of the occurrence of the claim and within the warranty period.
- All parts removed during warranty repair should be held for a period of 60 days after the warranty claim has been submitted to Headsight.
- Headsight, Inc. reserves the right to either inspect the product at the original retail purchaser's location or require it to be returned to Headsight, Inc. for inspection.

Limitation of Liability

Headsight makes no express warranties other than those, which are specifically described herein. Any description of the goods sold hereunder, including any reference to buyer's specifications and any descriptions in circulars and other written material published by Headsight is for the sole purpose of identifying such goods and shall not create an express warranty that the goods shall conform to such description.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED. There are no implied warranties of merchantability or fitness of a particular purpose. This warranty states Headsight's entire and exclusive liability and buyer's exclusive remedy or any claim for damages in connection with the sale of furnishing of Headsight products, their design, suitability for use, installation or operation, or for any claimed defects herein. HEADSIGHT WILL IN NO EVENT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES WHATSOEVER, NO FOR ANY SUM IN EXCESS OF THE PRICE RECEIVED FOR THE GOODS FOR WHICH LIABILITY IS CLAIMED.

No representative of Headsight nor any dealer associated with Headsight has the authority to change the items of this warranty in any manner whatsoever, and no assistance to purchaser by Headsight in the repair or operation of any Headsight product shall constitute a waiver of the conditions of this warranty, nor shall such assistance extend or revive it.

Headsight reserves the right to make improvements in design or changes in specifications at any time, without incurring any obligation to owners of units previously sold. Warranty: 10/2006

This page is intentionally left blank.



P 574.546.5022 • **F** 574.546.5760
4845 3B Rd • Bremen, IN 46506
info@headsight.com
www.headsight.com