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BULLSEYE[®] 3⁺
Laser Receiver

Thank you for purchasing an Apache Technologies, Inc. product. Your BULLSEYE® 3+ receiver is a premium quality tool that has been designed and manufactured to provide years of precise and reliable performance. The system has been specifically designed for use in harsh construction environments.

This manual is an important part of your purchase as it will familiarize you with the unit and explain the numerous features that have been designed into it. Please read this manual thoroughly before using your BULLSEYE 3+ receiver.

Please contact your Apache dealer or the Apache factory should you have questions regarding specific applications or if you require additional information. Contact information is located on the back cover. Additional contacts are:

Website: www.apache-laser.com
Email: sales@apache-laser.com
service@apache-laser.com

Please record your product information below. This will assist you if there are any questions regarding warranty or service.

PRODUCT: _____

SERIAL NUMBER: _____

DATE OF PURCHASE: _____

PURCHASED FROM: _____

PHONE: _____

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BULLSEYE 3+ Laser Receiver

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BULLSEYE® 3+ Laser Receiver

System Description

The Apache BULLSEYE 3+ laser receiver is a rugged, multipurpose, easy-to-use electronic sensor that detects laser light generated by rotating laser transmitters. The receiver is designed to work with nearly all makes and models of rotating lasers and will detect both visible and invisible beams. When installed, the operator is given visual indication of the reference plane of laser light's position relative to the cutting edge of the machine. The receiver can be adapted to many different types of construction and agricultural machinery.

The BULLSEYE 3+ has several selectable settings. Deadband size (accuracy) has three settings to meet job site requirements. LED display brightness can be set to meet light conditions. Additional user preferences can be set and are detailed in this manual.

A super-bright LED display has green on-grade diodes and red high and low diodes for quick, easy to distinguish grade information. 5 channels of grade position information as well as high or low lost beam indication are displayed. Individual LED's also inform battery status and deadband selection.

A strong, durable upper and lower housing made with aluminum castings and a polycarbonate center section provides a sealed compartment for the electronics. The electronics are isolated from the rest of the unit by internal rubber shock-mounts, protecting the unit from shock and vibration damage. Clamps on each end securely grip 1.66" to 2.00" (42 mm to 50 mm) round tubing or 1.50" (38 mm) square tubing with rounded corners.

An accessory connector is provided for the optional RD14 remote display, machine power cable, or rechargeable battery charger. The connector may also be used to communicate with the Model CB24+ control box for automatic control. The center two inches (5 cm) of the receiving area contains proportional photocells which optimizes automatic control performance.

Controls and Displays

1. Aluminum cast upper and lower housing - strong and durable.

2. Polycarbonate center section - houses the electronics and four sets of photocells spaced at 90° to allow 360° reception.

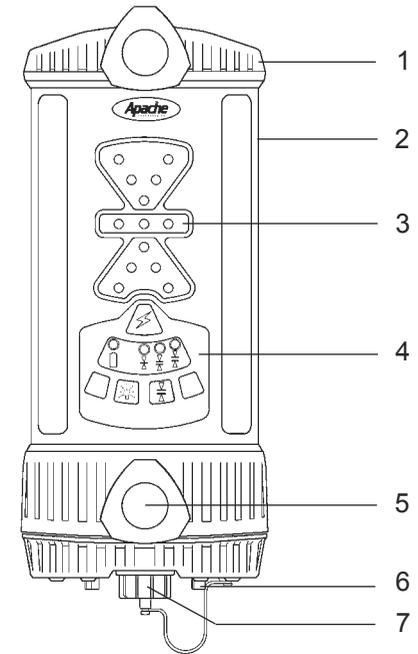
3. LED Display - highly visible using super-bright diodes display grade position. Green diodes display on-grade and red diodes display high and low.

4. Touch Panel - contains power, deadband, and LED brightness switches. Also displays low battery warning and deadband selection. Unmarked switches and switch combinations provide additional functions. Details can be found in the operation section beginning on page 6.

5. Mounting Knobs - attached to heavy-duty stainless steel clamps for quick mounting to pipe, square tubing, or magnetic mount.

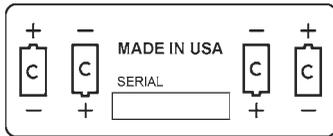
6. Access Screws - access to battery compartment for replacement of alkaline or rechargeable batteries.

7. Accessory Connector and Dust Cap - allows cable connection of optional remote display, machine power cable, or control box cable for automatic control. Connector is also used to charge rechargeable batteries.



Battery Installation / Charging

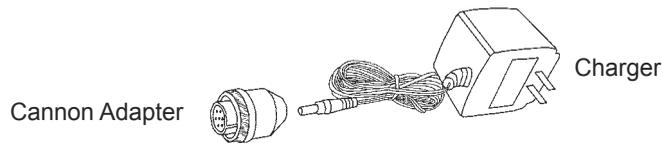
Alkaline Battery Installation: Remove the receiver from its carrying case. Hold the unit so the accessory connector is pointing upwards. Remove the dust cap from the accessory connector. Loosen the two thumb screws and remove the battery access cover. Install four "C" cell alkaline batteries as shown on the label diagram inside the battery compartment noting the (+) and (-) terminals.



Battery installation diagram /
Serial number label

Replace the battery access cover. Firmly tighten the two thumbscrews. Replace the accessory connector dust cap.

Nickel Metal Hydride Batteries: If the receiver is equipped with rechargeable batteries, they require an initial and subsequent charging time of approximately 3 hours. It may require 2 or 3 charging cycles to obtain maximum battery life. To charge, remove the dust cap from the accessory connector. Insert the cannon adapter into the accessory connector and tighten. Insert the charger into the cannon adapter. Plug the charger into a 110-volt outlet (US). European and Australian chargers allow plugging into appropriate outlets.



The batteries may also be recharged with a 12-volt auto cigarette lighter adapter. The charge status indicator located on the back of the housing will remain solid when the unit is charging. The indicator will blink when fully charged. When charged, unplug the charger from the outlet and remove the cannon adapter from the accessory connector.

Battery Installation / Charging

Built-in overcharging protection prevents damage if the unit is left on charge after being fully charged. There is also charge protection for attempting to charge alkaline batteries.

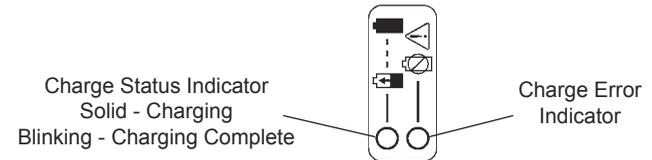


CAUTION: DO NOT ATTEMPT TO CHARGE ALKALINE OR OTHER DISPOSABLE BATTERIES.



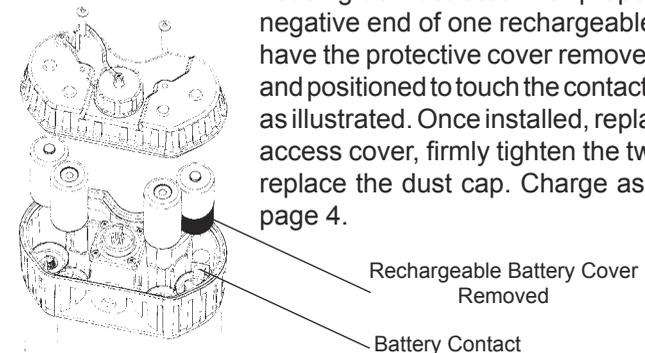
NOTE: DO NOT CHARGE NI-MH BATTERIES WHEN AMBIENT TEMPERATURE EXCEEDS 113° F (45° C).

The rechargeable battery package includes a charge error indicator. A solid light on the right LED indicates an error with the internal battery connection, the charging temperature, or possible dead battery cell. Contact your dealer service department if this light is displayed.



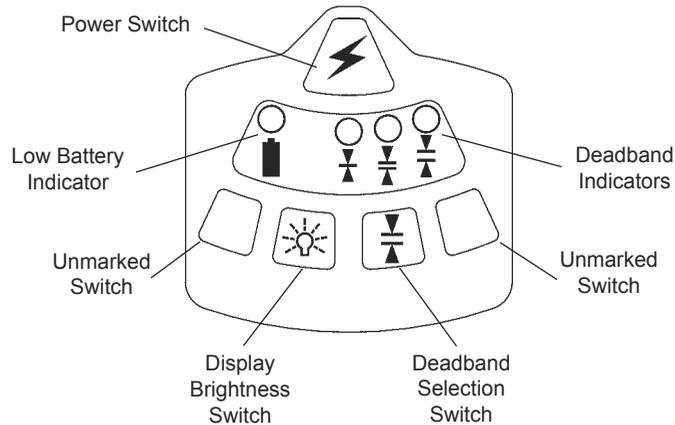
(Located on lower rear of polycarbonate housing)

Rechargeable Battery Replacement - Remove the battery access cover as previously described. A battery contact is located in the battery housing as illustrated. For proper operation, a negative end of one rechargeable battery must have the protective cover removed or "skinned" and positioned to touch the contact in the housing as illustrated. Once installed, replace the battery access cover, firmly tighten the two screws and replace the dust cap. Charge as instructed on page 4.



Operation

Touch Panel



To turn the BULLSEYE 3+ on, press the power switch on the touch panel and release. All the LED's will come on for a few seconds. Each LED grade display row will turn on then turn off from top to bottom. Then each status indicator will turn on and off. The current deadband status will momentarily display. If the receiver is out of the laser beam, the center green LED will flash to confirm power is on. If the receiver is in a laser beam, a corresponding LED grade display will be indicated.

To turn the receiver off, press the power switch for 2 seconds. All the LED's will light. Releasing the switch will turn the power off.

Default Settings. Initially, the receiver is set from the factory to the standard deadband and dim display. Additional functions are set to Out of Beam indication on, Laser Out of Level warning off, and Laser Beam Averaging on.

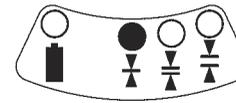
The following sections detail the operation of each these settings.

The receiver will subsequently power on with the same settings as when it was turned off.

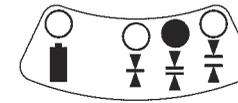
Operation



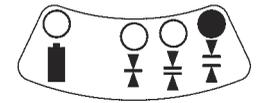
Deadband (Accuracy) Selection. The deadband, or on-grade accuracy, can be changed to meet various job conditions. To identify which mode is selected, press the deadband selection switch once. The current selection LED is activated. To change the deadband, press the deadband selection switch again when the deadband LED is activated. The deadband and corresponding LED will change with each press.



Fine
Deadband
~ 3/16"
(0.20"/5mm)



Standard
Deadband
~ 1/2"
(0.45"/12mm)



Wide
Deadband
1-1/4"
(1.25"/32mm)



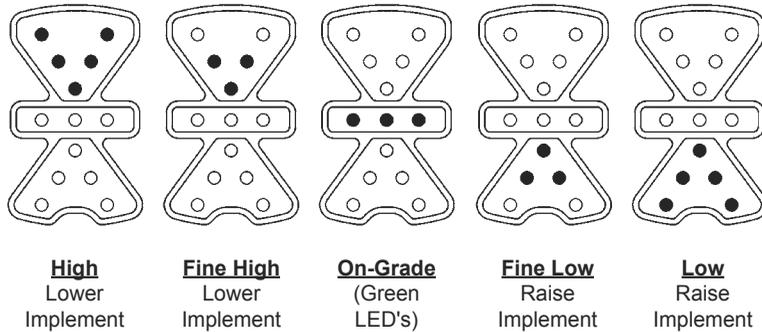
Brightness Selection. The brightness switch controls the LED display brightness. Bright and Dim are the selection options. Use Bright for daytime operation if necessary and Dim for lower light conditions. Display Dim will extend battery life by approximately 50%.

When the brightness switch is pressed and the receiver is out of the laser beam, the LED's will display a circle with the current setting. Press the brightness switch again while the LED's are activated to change the setting. The LED's will then display the new setting.

When the receiver is in the laser beam, simply press the brightness switch and the setting will change.

Operation

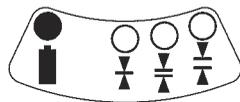
Grade Display. The LED grade display indicates when the machine's cutting edge needs adjusting or is on-grade. The display will indicate with directional arrows which way to move the cutting edge or bucket to achieve desired grade. Five distinct channels are displayed.



Low Battery Warning. The receiver has a low battery warning LED that is used when batteries are installed. During normal operation with good batteries, the LED is off. When the batteries become low, the LED will begin to flash as a warning. The unit will operate as normal, with approximately 90 minutes of battery life remaining.

When the batteries are too low for fully functional operating, the LED will be on continuously. Additionally, the four corner grade display LED's will flash. The unit will no longer receive laser signals and the batteries must be replaced (or recharged if using rechargeable batteries).

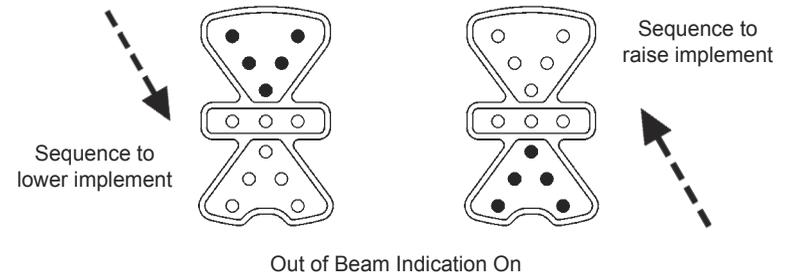
The warning does not operate when the receiver is connected to machine power via a power cable.



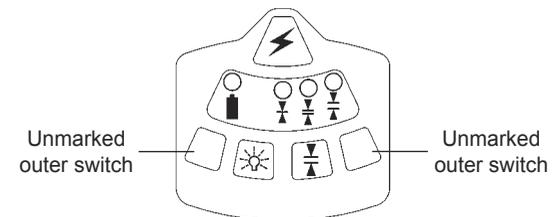
Low Battery Warning LED

Operation

Out of Beam Indication. The receiver has an Out Of Beam (OOB) indication that can be turned on or off. When it is on, the LED display will indicate if the receiver has moved beyond the vertical laser reception range. A sequence of LED's will indicate which direction to move the blade or cutting edge to pick up the laser beam. The sequence will indicate to move the edge down if it is raised above the beam or to move the edge up if it is lowered below the beam. The sequence will stop as soon as a laser signal is received. Otherwise it will shut off after two minutes.



The factory default setting is Out of Beam Indication on. To turn the indication off, press the 2 unmarked outer switches at the same time. The LED display will show a sequence inward toward on-grade when the indication is on. Pressing both switches again while the indication is activated will turn the indication off. The LED display will show a sequence outward from on-grade to confirm the indication is off. Pressing the switches again while the indication is activated will turn the indication back on.



Operation

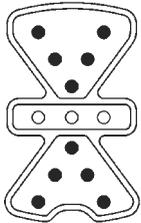


Out Of Level Warning. The Out of Level (OOL) Warning is used with certain lasers that have the ability to indicate they are out of level by changing their rotation speed.

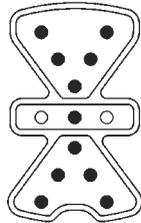
The factory default setting is Laser Out of Level Warning off.

To activate the laser OOL Warning, turn the receiver on. Press and hold the power switch and then press and release the brightness switch. A flashing "X" pattern indicates if the OOL Warning is activated. If the center green LED is not lit, the OOL Warning is off. Pressing the power / brightness switch combination again while the "X" pattern is activated will turn the warning on. The center green LED will come on to confirm the OOL Warning is on. Pressing the power / brightness switch combination again while the "X" pattern is activated will toggle between on and off.

When the warning is turned on and the laser drops to 300 RPM, a flashing "X" will appear on the display to let the machine operator know the laser is out of level.



Laser Out Of Level OFF



Laser Out Of Level ON

Operation



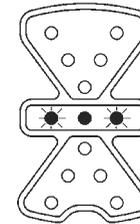
Laser Beam Averaging. The laser beam averaging function senses the laser strikes and applies the highest level of averaging appropriate for the laser rotation speed. This may stabilize the LED display

if the laser set-up is unstable due to windy conditions or long range applications.

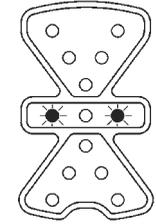
The factory default setting is Laser Beam Averaging on.

The receiver can be set for no averaging. In this mode the receiver processes and displays every single laser strike. To change between the two modes, turn the receiver on. Press and hold the power switch and then press and release the deadband switch. The outer on-grade LED's will flash confirming the averaging function is activated. Pressing the power / deadband switch combination again while the averaging function is activated will toggle between on and off.

When the center LED is on, averaging is on. When the center LED is off, averaging is off.



Averaging ON



Averaging OFF

Installation

Position the blade or bucket to the desired elevation (benchmark). If using on an excavator or backhoe, the dipperstick should be vertical and the bucket “curled” or extended to a position that can be easily duplicated each time a reading is taken. To check that the plane of laser light is intersecting the pipe where the receiver will be mounted, move the receiver up and down along the length of the mounting pipe. Ideally you should be able to move the receiver far enough in either direction to utilize the entire reception range - receiving all the grade displays and the lost beam indicators. If the full reception range is not being used, raise or lower the rotating laser until the full reception range is utilized.

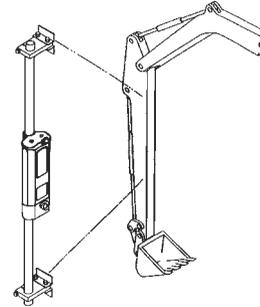
Turn both the top and bottom knobs counterclockwise until the mounting clamps in back open enough to fit around the mounting pipe and place the receiver on the pipe. Move the receiver up or down until the “On-Grade” symbol is displayed by the LED’s. Tighten both clamps firmly by hand. NOTE: Do not mount on painted poles if possible. Paint may accumulate on the clamps and deteriorate the clamps gripping capacity.

When mounted to a bulldozer, motorgrader, scraper or other grading machine, the operator can keep the blade at the proper elevation by manually controlling the blade so that the receiver stays within the “on-grade” zone. The LED display indicates in which direction the blade needs to be moved to return to “on-grade”.

When mounted to an excavator or backhoe, the receiver is a grade checker and allows the depth of cut to be monitored from the cab of the machine by the operator. This is done by putting the dipper stick in the vertical position and the bucket in the setup position and touching the bottom of the ditch.

To remove the receiver from the machine, loosen the two clamps. Store and transport the receiver in its carrying case.

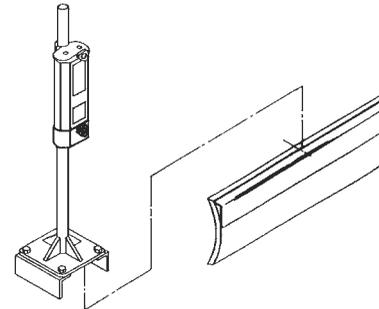
Installation



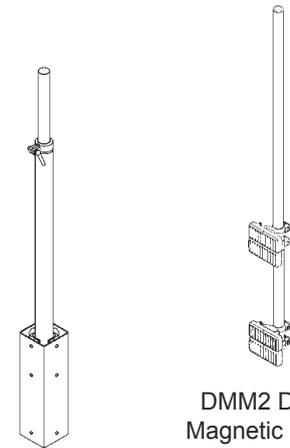
Typical Excavator /
Backhoe Installation



MM2 Magnetic Mount
for Excavator / Backhoe



Typical Dozer
Installation



STM1 Manual
Telescoping Mount

DMM2 Dozer
Magnetic Mount

Maintenance and Care

The user of this product is expected to follow all operating and safety instructions of this manual and of the machinery operator's manual. Perform periodic checks of the product's performance. The manufacturer or its representatives assume no responsibility for results of the use of this product including any direct, indirect, consequential damage, and loss of profits. Check your work frequently.

The BULLSEYE 3+ Laser Receiver was shipped in a protective carrying case. If the unit is transported from job to job inside its protective case and normal instrument precautions are followed, the unit will provide many years of service.

Do not wipe dust or dirt off the laser receiver with a dry cloth as scratching could occur, possibly damaging these surfaces. Use only a good quality glass cleaner with a soft cloth on all external components. If these surfaces have hardened concrete or other materials on them, take the system to your Authorized Service Center for cleaning.

If the system will not be used for a 30 day period or more, it is recommended to remove the alkaline batteries from the receiver.

Refer to your state or local requirements for the disposal of batteries. Be sure to dispose of all batteries properly.

Specifications

BULLSEYE 3+ Laser Receiver

Beam Reception Range	360 degrees
Operating Range	Up to 2000 ft. (610 m) -depending on laser
Vertical Reception Range	6.75 in. (171 mm)
Accuracy - "On-Grade" Width	Fine: 3/16" (0.20" / 5 mm) Standard: 1/2" (0.45" / 12 mm) Wide: 1 1/4" (1.25" / 32 mm)
5 Channel Display	Coarse Hi, Fine Hi, On-Grade, Fine Low, Coarse Low
Display Output	Bright, Dim
Automatic Control Capability	Yes, with CB24+ control box
Power Options	Alkaline - 4 x "C" Cell Rechargeable - 4 x "C" Ni-MH Power Cable - 10-30 VDC
Automatic Shut Off	75 minutes with no laser beam
Out of Beam Indication	On or Off; High and Low
Weight (With Batteries)	6 Lbs. (2.7 Kg.)
Dimensions (LxWxD)	13.50 x 5.58 x 5.88 in. (343 x 142 x 149 mm)
Mounting Pipe	1.66" to 2.00" O.D. round tube (42 mm to 50 mm) 1 1/2" square tube (38 mm)
Operating Temperature	-4° F to 140° F (-20° C to +60° C)
Battery Life - Continuous Display	75 Hours, Alkaline - Dim 45 Hours, Alkaline - Bright 50 Hours, Ni-MH - Dim 40 Hours, Ni-MH - Bright

Warranty

This Apache Technologies product is warranted to be free of defects in material and workmanship for a period of two years. This warranty period is twenty-four months from the date the product is delivered from the dealer to the purchaser or is put into service by a dealer as a demonstration unit or rental unit.

Please return the included warranty card as this will expedite any warranty service that may be required. Please retain your warranty information and proof of purchase. If a warranty card is not on file, proof of purchase must accompany your request for warranty repair.

Any evidence of abuse, misuse, alteration, accident or negligent use or an attempt to repair products by unauthorized personnel or with parts other than those provided by Apache Technologies automatically voids the warranty.

The user of the product is expected to follow all operating instructions, periodically checking the instrument and the work as it progresses.

Apache Technologies liability under this warranty is limited to repairing or replacing any product returned to an authorized service center for that purpose. The foregoing states the entire liability of Apache Technologies regarding the purchase and use of its product and they shall not be held responsible for any consequential loss or damage of any kind.

This warranty is in lieu of all other warranties, expressed or implied, and constitutes all of Apache Technologies liability with respect to merchandise sold by it.



CE Declaration of Conformity

We herewith declare, in exclusive responsibility, that the instruments

- **Bullseye 3+**
- **Bullseye 5+**
- **Bullseye 5MC**
- **Bullseye 6**

were developed, designed and manufactured to conform with the

- Council Directive 89/336/EEC (Electromagnetic Compatibility)

including their amendments up to the date mentioned below.

Equipment Type / Environment: Measurement, Control, and
Laboratory Equipment

The following harmonized standards were applied:

- EN61326: 1997 +A1: 1998 + A2: 2001
Electromagnetic compatibility (EMC)
Requirement for electrical equipment for measurement, control and laboratory use
- EN61000-3-2: 2000
Mains Harmonic Emissions
Single Phase < 16A / Phase
- EN61000-3-3: 1995 +A1: 2001
Mains Voltage Fluctuations and Flicker Emissions
Single Phase < 16A / Phase

We, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s).

Apache Technologies, Inc.
8261 State Route 235
Dayton, OH 45424 USA

Robert G. Conner
President

23 July 2004