MINERVA AJAX

PRODUCT HANDBOOK



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VERSION HISTORY
HB152-805-18
Issue 3
May 2026

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1. NOTES / CONFORMITY STATEMENTS

1.1 Important notes:

Warning: Replacement parts do not come with these systems; however, they are available once a fault has been confirmed. Please contact dBD Communications should a fault occur.

Warning: These units contain **Lithium-Ion Polymer batteries**. Anything that contains Lithium-Ion Batteries must comply with the IATA / ADR / IMDG Regulations while in transport. Under normal circumstances these are totally safe, however, should the headset casings become deformed in any way, further use should be avoided, and dBD Communications should be contacted immediately.

RF Radiation: This system uses a Class 1 Bluetooth device operating between 2.400 and 2.4835 GHz. Users should avoid getting the antenna closer than 20mm to their eyes as this could result in damage to the retina (low risk). If individuals are concerned, please contact dBD Communications.

Cables and connections: All cables and connections should be checked at regular intervals to ensure that they are in good condition and not damaged in any way. Damaged items should be replaced as soon as practically possible.

1.2 Conformity Statements:

RoHS - The devices comprising this system are RoHS compliant.



None of the parts that comprise this system should be disposed of in normal waste. For disposal instructions please refer to dBD Communications.

CE – The system is to be self-certified. A CE file containing all results of tests and investigations shall be held for viewing at dBD Communications.

Low Voltage Directive (LVD) – All parts of this system are either compliant or do not need to be considered.

EMC – Individual parts of this system are already EC and FCC compliant.

ESD – Individual parts of this system are already EC and FCC compliant.

2. PRODUCT OVERVIEW

2.1 Product Details

Communication in day-to-day operations can be complex, but one of the main features that we as humans have, is the ability to speak. Without speech and the ability to hear we are reduced to lip reading, facial expressions, and the complexity of body language such as gesturing. The Minerva Ajax product provides the added benefit of a microphone shield which further reduces the effect of background noise.

There are many industries where operatives need to wear noise suppressing head gear, but having then reduced the noise, the ability to converse or take instruction is severely reduced especially at a distance. Some systems use long audio extension leads that provide the user some freedom of movement but can become tangled or not give the complete freedom needed over the distance required.

The Bluetooth system is designed with Dynamic Noise Reduction built in; this further enhances the already passive noise reduction provided by the Ajax unit. Each Minerva Ajax System-headset and transceiver box have an in-built Bluetooth transceiver and the two units automatically pair and connect to each other providing a full duplex intercom facility. This has many advantages for the operators both in terms of personal comfort and safety, the operator stress and workload are reduced.

Each unit is provided with a small external antenna that ensures that a maximum range of up to 150 metres can be obtained between the units in open space. This will be tempered by their use in an obstructed area, but certainly they will provide good coverage up to a range of 150 metres around an aircraft. This is proven on the A380 with full wing walks being completed without compromised range or communication quality.

Other systems are available which offer more communication capability including functions to add additional users, range to the systems and different system packages to suit environmental needs.

Please contact sales@dbdcommunications.co.uk for further information.

Our YouTube training videos can be found via the following link:
https://youtu.be/8KXWC19O0WY?si=RvfpWM15yo_4Y5mV

2.2 Technical Details

Each headset and transceiver can produce a maximum of 100mW Radiated Power out of the Antenna

The Minerva Ajax system will work to a range of 150m in normal working conditions. The system operates depending on line of sight (due to this, large metal objects will restrict range capability).

The components are powered from a 3.7V DC Lithium-Ion battery source. The chargers supplied provide between 4.5V and 6.5V DC.

2.3 Temperature ranges

The headset and transceiver units will accommodate -30 to +75 degrees centigrade.

2.4 IP protection

The Ajax units are designed with weather protection in mind and protect from the elements that may cause damage to the product.

The headsets are rated to IP66.

They are all dependant on whether the headset is worn or not. If not worn IP rating reduces due to the inner ear cup section being exposed.

2.5 Weights

Each headset is no more than 0.45Kg

Each Ajax unit is no more than 0.75Kg

In their packed flight bag, the total weight is 1.7Kg

2.6 Class 1 Bluetooth device To FCC Part 15C

Operating Frequency Range (OFR)	**2402-2483.5MHz**
Channels	79
Channel Separation	1MHz
Channel Bandwidth (20dB)	1.391MHz
Conducted Power	15.94dBm (64.39mW)
Transmission Technique	FHSS
Modulation	GFSK, π/4 DQPSK, 8DPSK
Antenna Gain	2.14dBi

Note: User's do not need to change any channels on system, this is information for technical support only.

3. EQUIPMENT CHECK LIST

3.1 Equipment List

You will receive a Minerva Ajax and please refer to Minerva System handbook for details on what should be included.

a) One PNR headset fitted with Bluetooth transceiver



b) One Ajax mouth unit





c) One transceiver unit



d) Aircraft interface lead



e) Two screw on antennas



f) Mains charger fitted with multinational interface plate



g) Microphone connection cable



h) Bag strap



i) Your system will have a serial number on the inside of the headband

***DO NOT REMOVE THIS (Warranty Reasons)**



j) Orange lanyard



Your system will be packed in one of the pictured carrying options below:

A Flight Bag with Carabiner Clip



3.2 Accessories List

Additional hygiene options are available which include:

Mic covers	**MM-ELE**
Cloth ear covers	100% COTTON EAR COVERS
Gel ear cups	SL-GEL
Foam ear cups	SL-UR
Antenna	W-ANT
Mains (AC) Charger 2 Way	GA151-810-1
Primary Headset	Please contact sales@dbdcommunications.co.uk for part numbers as various options available.
Transcieiver	Please contact sales@dbdcommunications.co.uk for part numbers as various options available.

Flight Bag	DBD-PKG-FB

4. MINERVA AJAX SYSTEM DETAILS

The Minerva Ajax system is a set of two units; a headset which uses PNR (Passive Noise Reduction) to minimise external noise from the environment and a transceiver which connects to the aircraft to enable the Marshall to be untethered from the aircraft for up to 150m away from the connection point.











5. SYSTEM SET UP

To set up your system follow the instructions below:

a) Collect the units from the Flight Bag.

b) Within the bag there will be antennas located in the pocket.





c) Firstly, the antennas need to be fitted to the headset and transceiver. This is achieved by straightening the antenna at the knuckle, found close to the connector end.

d) Offer the antenna to the connector, making sure that the antenna is in line with the connector.

e) Gently push the connectors together to ensure that the connector engages, before screwing it on.

f) Tighten the antenna using the splined connector base and not the overall antenna body.



g) Bend the antenna at the knuckle, at a 90° angle and ensure that it sits vertical when the headset is worn.

h) This antenna can be supplied which is more robust but cannot be bent.

i) The over the head variants are to be worn as shown in the picture to the right. The hard headband with the model number displayed, sits over your head.



j) Remove the headset and refer to section 6 Operating Your Equipment for details on how to use the headsets and system.

k) As with the Antenna, the aircraft interface lead will be fitted to the transceiver on delivery.



l) To extract the unit from the bag it may be necessary to disconnect the interface lead should this be needed, the following instruction should be followed. The aircraft interface lead has a key to orientate the pins the black button should be in line with the key slot and when removing the lead this should be depressed. On re fitting the lead the black button should be in line with the key inside the connector on the transceiver.

m) The alternate end of interface lead is connected to the aircraft's intercom jack.

n) The Carabiner clip is the preferred method of attachment, as this secures the flight bag to the aircraft attaching eye.



o) The Sling is the preferred alternative when the Carabiner cannot be used due to space constraints. The sling can be utilised in many configurations to accommodate bag security to the aircraft.



p) The S-Clip is used to attach the transceiver to the aircraft using the interface lead. We advise that this is the last solution that is adopted due to exposure of the equipment and equipment security.





6. OPERATING YOUR EQUIPMENT

a) Turning on your headset:-



To turn on your headset and transceiver, push and hold the on/off button for approximately 2 seconds (NO LONGER), you will hear an initial warning tone (da-dah) and a green light. This will be followed by 1, 2 or 3 beeps (For further details on battery indication see **section 7 Charging Instructions**). Your system is now on.

b) **Check Headset and Transceiver are paired:-**



After turning your system on, you will hear warning tones from the headset (da-dah) indicating that they have paired, both units will then have green lights that flash alternatively between the two. If both lights stay solid green, then the units are not paired. (To pair system, see **section 8 Pairing Instructions**).

c) Volume Control:-



The volume control is allocated next to the on/off button. This allows the user to adjust the audio to a comfortable level.

d) Ready to Operate:-

The headset is now ready for use, and you will be able to freely communicate between the aircraft and Marshall.

e) Low Battery Warning:-

When the battery has less than 30 minutes left the headset with the low battery will provide an audible regular beep to indicate power is about to run out. If this is happening, then a charger must be applied. The system is designed to rapid charge so if in this condition when being charged for the first 30 minutes 2/3 of the battery will be charged back up again.

f) Turning off your System:-



To turn your headset and transceiver off, push and hold the on/off button for approximately 2 seconds and you will hear a warning tone (da-doo) indicating the system has been turned off.

7. CHARGING INSTRUCTIONS

DO NOT USE ANY OTHER CHARGING SYSTEM TO CHARGE YOUR HEADSETS, OTHER THAN THOSE PROVIDED BY dBD COMMUNICATIONS. USE OF OTHER CHARGERS CAN CAUSE DAMAGE TO PRODUCT AND WILL INVALIDATE WARRANTY – SEE SECTION 11 WARRANTY & SERVICING







To charge your system, the charger is to be plugged in to the socket on the headset and transceiver. This is located on the left ear dome at the bottom (side for transceiver). Both units **MUST BE SWITCHED OFF** when charging. You **MUST NOT SWITCH THE UNITS ON**, while charging. They will take approximately 3-4 hours to charge fully from a low battery.

When plugged in to charge, an orange light will illuminate, indicating that charging is taking place.

If no orange light appears on plug in, then the unit is already fully charged.

On initial power up, as explained in the operational instructions, you will hear 1, 2 or 3 beeps synced with orange lights on the headset. These beeps indicate your battery status. (Just flashes on transceiver module)

1 beep indicates – less than 30% battery power
2 beeps indicate- 30-80% battery power
3 beeps indicate-more than 80% battery power.

While the system has been charged before it is dispatched, it is recommended that they are topped up before being used for the first time.

They should also be charged after each use whether this is for a short or prolonged period.

On a single charge, each unit will operate for approximately 24 hours, however there are two main factors that affect this operational time.

Bluetooth operates using a minimal RF power output. This means that the drain on the battery will be less when the headsets have a clear line of site between them or at very short range. If the headsets are working at the extreme of their range or in an obstructed environment, the battery drain will be higher which will reduce the operational time between charges.

The headset has a volume control. If the volume is continuously set high, then the battery drain will be greater, again reducing the likely operational time.

Lithium Ion: Li-ion can be fast charged from 5°C to 45°C (41 to 113°F). Below 5°C, the charge current should be reduced, and no charging is permitted at freezing temperatures because of the reduced diffusion rates on the anode.

8. PAIRING INSTRUCTIONS

Before you begin:



a) Firstly, check that your headset and transceiver are fully charged (2 beeps or flashes = 30-80% charged is enough to carry out pairing process).
b) Switch both units off.
c) Make sure both headsets have antennas and that they are screwed down fully.



d) On each unit push and hold the on/off button for approximately 10 seconds.

*At approximately 10 seconds you should hear a triple beep or flash, these beeps will sync with a triple orange light. When this happens**, let go of the button.***
The two units will now search for each other.





One will go orange and stay a solid orange (Primary button)

The transceiver will beep and flash on and off with a green light occasionally. (Secondary button)

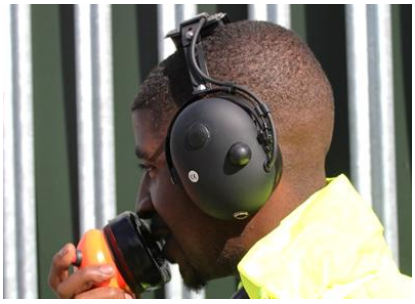
After a while you will hear a beep-boo (warning tone) sound from the headset, indicating that they have paired. Both units will then have green lights that flash alternatively.

Checking your system is paired:

a) The antenna needs to be bent at the knuckle at a 90-degree angle.



b) Put the headset on, making sure that the hard headband is adjusted to your head.



c) Plug the transceiver into the intercom jack on the aircraft, clipping the hi vis bag to the available clipping point. Press the Momentary mic button (red) or latch function if fitted (yellow) on the headset to engage the microphone. Keep this held and confirm that the pilot can communicate with you. On a latched system, the microphone will remain on unless pressed again to turn off for unwanted transmissions.







Your system is now ready to use.

9. STORING YOUR SYSTEM

9.1 Flight Bags

The flight bag has two compartments, and it is advisable to separate the equipment evenly into them as shown in the picture below.

If a unit and charger is placed in each side, there is ample room for the equipment.





10. FAULT FINDING

10.1 Headset will not turn on.

Check headset is charged by plugging into mains charger (if headset battery is completely flat; the orange light will illuminate).

10.2 Headset turns on but permanently green, solid light.

Check both headset and transceiver are turned on and are the right serial numbers (there should be an “A” Primary and “B” Secondary transceiver).

10.3 Headset turned on and paired (flashing green light) but no audio.

Check volume, does the microphone look serviceable?

10.4 Headset turned on and paired (flashing green light) but interference on audio (Crackling).

Check all antenna connections are fitted correctly on both headset and transceiver.

10.5 Lack of range

Check all antenna connections are fitted correctly on both units. Also, consider where you are trying to communicate. This system with large obstruction in front of it will reduce range as will all RF communication systems.

10.6 Low volume in headsets

Check volume control on headset.

10.7 When applicable, no back-to-back radio functions.

Check radio interface lead is correctly fitted. Confirm back-to-back radio is switched on and has adequate battery life.

If you cannot resolve the issue, please contact dBD Communications to discuss further.

11. SERVICING AND WARRANTY

Each system has a 1-year warranty from date of purchase. Extended warranty can be purchased on a year-by-year basis.

dBD Communications can offer an option of either a light or deep service. Depending on the option taken, this can extend the life of the equipment.

Please contact sales@dbdcommunications.co.uk for options available.

The following warranty conditions are in place and non-adherence to any of the below will invalidate your 1 year or subsequent warranties purchased.

a) Removal / defacing of equipment serial numbers.
b) Incorrect chargers used to charge any of the equipment or accessories.
c) Misuse of product (not in line with fair wear & tear).

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