



PlaneTRack^(tm) Type B

ADS-B Surveillance Receiver (19" insert)



s/n 110.045

Operating Manual

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1.1.1 About this manual

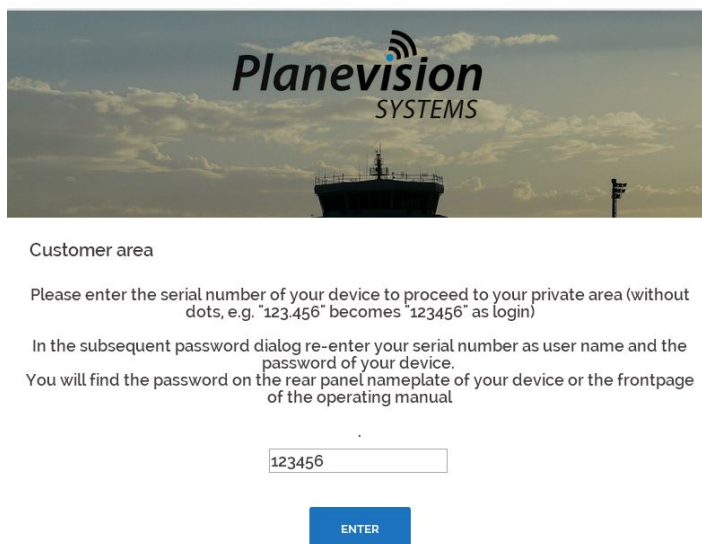
This manual is effective for the following PlaneTRack receiver types:

Type designation	General characteristics	Serial number ranges
Type BA	1 ADS-B receiver	110.145

Each PlaneTRack receiver configuration will be customized according to customer requirements. The configuration is valid for a specific serial number or range of serial numbers only (the "effectivity"). As such this documentation may be valid for the serial number(s) as indicated on the front page of Annex A of this documentation only. Optional equipment that may or may not be part of the customized configuration is marked with an asterisk (*) throughout this manual.

1.1.2 About documentation updates

This manual is subject to change without prior notice. For updates of this manual visit the manufacturer's website at <http://customers.plane.vision>.



Customer area

Please enter the serial number of your device to proceed to your private area (without dots, e.g. "123.456" becomes "123456" as login)

In the subsequent password dialog re-enter your serial number as user name and the password of your device.
You will find the password on the rear panel nameplate of your device or the frontpage of the operating manual

123456

ENTER

Please have the master device serial number and password at hand to access the web page.

The master device serial number and the password are available from

- The frontpage of Annex A of this manual
- The serial plate of each receiver on the rear panel

Your device may belong to a series of equal devices. Use the master device serial number and password for web access only.

Further details on usage of the web customer area can be found from Application Note AN-100 Access to Planevision Systems Internet Customer Area at <http://appnotes.planevision.systems>.

Further updates or useful additions to this manual may also be found on the same webpage <http://appnotes.planevision.systems>.

1.2 Purpose Disclaimer

Planevision Systems PlaneTRack ADS-B equipment is not intended and not certified for air traffic control, navigational purposes, other essential aircraft on-board services or other life critical services and in no case may be used for any other but sole information purposes.

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2. Safety Instructions

This product complies with international safety and design standards. Observe all safety procedures that appear throughout this manual and the safety symbols that are affixed to this product.

If circumstances impair the safe operation of this product, stop operation immediately and secure this product against further operation.

Avoid personal injury and product damage! Do not proceed beyond any symbol until you fully understand the indicated conditions!

	You may find this symbol <u>in this document</u>. This symbol indicates important operating or maintenance instructions.
	You <u>may</u> find this symbol <u>in this document</u>. This symbol indicates where a dangerous voltage may be present that constitutes a risk of electrical shock and a life hazard
	You <u>may</u> find this symbol <u>affixed to the product</u>. This symbol indicates a protective ground or frame ground terminal.

Please read this Operating Manual before starting to use the PlaneTRack ADS-B Receiver. Please read this entire manual. If this manual provides installation or operation instructions, give particular attention to all safety statements included in this manual.

To operate the PlaneTRack ADS-B Receiver follow the instructions in the Operating Manual and the Quick Start Guide section 3.

To service the receiver follow the instructions in Section 7.

All spare parts used on the PlaneTRack ADS-B Receiver must be approved by Planevision Systems GmbH.

Important Safety Instructions








Handling

- Cables damaged through crushing or cracking can be dangerous if used and must be replaced immediately.
- Always pull on the plug or the connector to disconnect a cable. Never pull on the cable itself.
- Do not walk on or place stress on cables or plugs
- Do not allow moisture to enter this product.
- Do not open the enclosure of this product unless otherwise specified or instructed.
- Do not push objects through openings in the enclosure of this product
- Do not connect the receiver to an unearthed (PROTECTIVE GROUND) socket.
- Do not operate the receiver in an unearthed configuration.

Service

- Both the ON/OFF switch(es) on the front AND rear panel must be switched to OFF and the mains cable(s) must be removed from the mains socket when carrying out maintenance work.
- Refer service only to qualified service personnel who are authorized by Planevision Systems.

3. Quick Start Guide

Action	Type B	
<p>Insert and mount the device mechanically safe and secure inside the 19" rack according to the mounting instructions provided by the rack operator. (For test purposes per Section 7.5 only the device may be operated as an unmounted desktop device) As instructed by the rack operator provide an ground/earth connection between the 19" rack and the device protective earth bolt on the rear panel (M8 bolt).</p>		
<p>Check PWR ON/OFF switch(es) on rear panel are switched OFF¹</p>	PWR	
<p>Check STBY (FP) switch on front panel is switched OFF</p>	STBY	
<p>Connect antenna cable(s) to <u>ADS-B ANT</u> connector - DANGER OF DEVICE DAMAGE: DO NOT CONNECT GPS ANT CABLE TO THIS CONNECTOR</p>	1 antenna	
<p>Connect antenna cables to <u>GPS ANT</u> connector - DANGER OF DEVICE DAMAGE: DO NOT CONNECT ADS-B ANT CABLE TO THIS CONNECTOR</p>	1 antenna	
<p>Connect ethernet cables to <u>NETWORK</u> connector</p>	1 network cable	
<p>Connect alarm cable (max. 24V/!A) to <u>ALARM</u> connector*</p>	*optional	
<p>Connect an approved and PE grounded mains cable to PWR IEC connector(s) on rear panel (NOTE: Receivers with DC power supply connect a DC power cable)</p>	1 cable	
<p>Switch PWR ON/OFF switch(es) on rear panel to ON¹</p>	PWR	
<p>Switch STBY (FP) switch on front panel to ON</p>	1 switch	
<p>Check green LED(s) on front panel are ON permanently</p>	PWR LED	
<p>After ca. 30² secs: check blue TFC LEDs blinking After ca. 40² secs: check blue TFC LEDs flickering at least every 5 sec (heartbeat) If ADS-B traffic is present: check blue TFC LEDs flickering faster than every 5 sec.</p>	TFC LED	

² <i>If no network connection is present this period may extend up to 3 minutes or more</i>		
--	--	--

¹Does not apply to ADS-B receivers with DC power supply

Power Cables and Connectors

Danger of Electrical Shock and Non-Conformal Operations



Due to the variety of international sockets, connectors and cable types please observe:

- This device is designated as VDE Class I (unisolated).
- To avoid a safety hazard the case of the device MUST be connected to Protective Earth at any time of operation.
- It is NOT PERMISSIBLE to operate the device with a mains power plug in an unearthed socket.
- The device is delivered with mains cables of
 - plug type IEC C13 on the device side and
 - plug Schuko type (CEE 7/7) on the mains side

These cables can be plugged into certain socket types that DO NOT ESTABLISH a Protective Earth connection, i.e. among others

- DS 60884-2-D1 (Type K), used in e.g. Bangladesh, Denmark, Greenland, Färöer Is., Guinea, Madagascar, Maldives, Senegal, St. Vincent
- BS 546/5A (Type D), used in e.g. India, Nigeria, Pakistan, South Africa
- various types in the Russian Federation and the CIS

It is NOT PERMISSIBLE to operate the device in such a configuration. Such configuration constitutes an unapproved use of the device with regard to section 1.4 . The user MUST PROVIDE a conformal configuration by means of adequate and approved power cables or adaptors.



Laite on liitettävä suojamaadoituskoskettimilla varustettuun pistorasiaan



Apparatet må tilkoples jordet stikkontakt



Apparaten skall anslutas till jordat uttag



Apparatets stikprop skal tilsluttes en stikkontakt med jord, som giver forbindelse til stikproppens jord.

NOTE: This section does not apply to PlaneTRack ADS-B receivers with DC power supply. Refer to Annex A for details on this configuration.

4. ADS-B Services description

Automatic Dependent Surveillance – Broadcast (ADS-B)

ADS-B transmits periodic information about altitude, airspeed, location and other parameters from an equipped aircraft to ground stations and to other equipped aircraft in the vicinity.

ADS-B is "automatic" in that it requires no pilot or external input. It is "dependent" in that it depends on data from the aircraft's navigation system.

ADS-B is an element of the US Next Generation Air Transportation System (NextGen), the Single European Sky ATM Research (SESAR) and several other regional programs.

ADS-B equipment is currently mandatory in several portions of the global airspace. The U.S.A. requires some aircraft to be equipped by 2020 and the equipment will be mandatory for some aircraft in Europe from 2017. Canada is already using ADS-B for Air Traffic Control in portions of its remote airspace.

Required ADS-B Airborne Equipment

The PlaneTRack ADS-B receiver can process and decode ADS-B messages only, if the aircraft is equipped with a suitable installation, i.e. an ADS-B transponder and other necessary equipment. Mode A/C only and Mode A/C/S only transponders are not suitable unless they have been upgraded to an ADS-B installation.

For an interim period the authorities allow to operate certain transponder/aircraft type combinations that do not comply with the full spectrum of formats as required under the regulations. Amongst other non compliant data these airplanes may respond with

- false or a lack of position data
- a lack of track, speed or vertical rate or other data

Planevision Systems GmbH is not responsible for these non compliances and the associated falsifications or omissions of data.

Scope of ADS-B Services received, processed and decoded

The PlaneTRack ADS-B receiver can receive, process and decode all relevant ADS-B formats as specified in RTCA DO-260/A/B and ICAO Doc 9871. These are the unified and standardized ADS-B services and formats in use by civil airplanes worldwide.

The receiver is not capable of receiving and decoding ADS-B messages of military formats DF19 and DF22, as these formats have not been disclosed to the public.

The receiver is not capable of receiving and decoding other somewhat regional or private types of transmissions that are sometimes referred to as ADS-B, too, e.g. UAT (978 MHz), УВД-М (740 MHz), Flarm (868 MHz).

The receiver is not capable of receiving ADS-C messages which are routed through VHF radio, satellite or HF links.

The receiver has limited capability of processing ADS-R messages from ADS-B ground repeaters in the U.S.A.

Mode-S Radar and TCAS System Responses

In certain airspaces air traffic control may interrogate aircraft by an Mode-S radar ground installation according to ICAO Annex 10 Chapter IV.

The PlaneTRack ADS-B receiver can receive, process and decode Mode-S aircraft response messages. It can also receive and decode some ACAS/TCAS aircraft emissions. The following limitations apply:

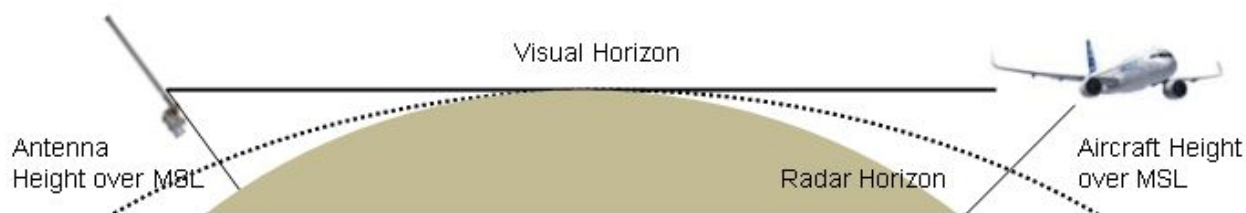
- Mode-S interrogations must be present from a ground radar head; or TCAS interrogations or squitter transmissions must be present
- no position data are available from any of these responses
- messages may be discarded inside the decoder because no positive identification of the responding source is possible

The receiver is not capable of receiving any Mode-S or TCAS uplink interrogation messages on 1030 MHz.

Range consideration of ADS-B downlink transmissions

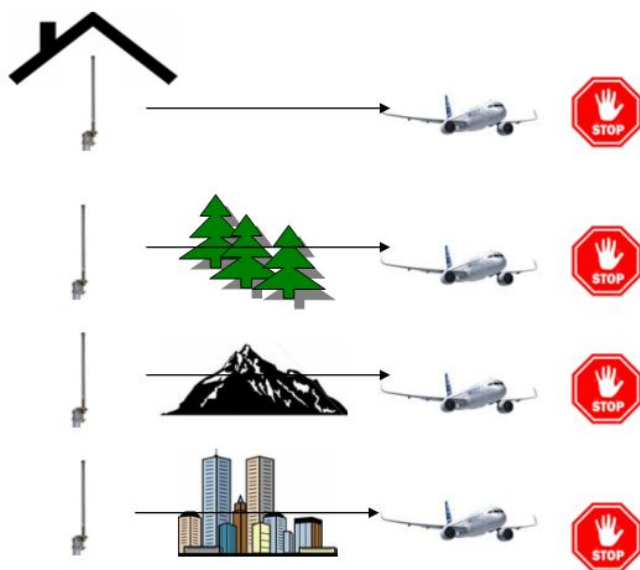
ADS-B links are transmitted in the UHF band of 1.09 GHz. The propagation range of these radio waves is almost line-of-sight, when there are no obstructions in the propagation path. Obstructions attenuate the signal significantly and will reduce the range of transmissions.

The actual radar horizon of an ADS-B ground station is slightly farther (about 15%) away than line-of-sight Visual Horizon. Since the pressure and content in water vapor of the atmosphere varies with height, the path used by the radio waves is **refracted** by the change in density. With a standard atmosphere, electromagnetic waves are generally bent or refracted downward. Furthermore, layers with inverse trend of temperature or humidity cause **atmospheric ducting** which bend further downward the beam or even trap radio waves so that they do not spread out vertically.



Aircraft Height over MSL (Antenna Height = MSL)	Visual Horizon	typical Radar Horizon
5,000 ft	75 NM	87 NM
10,000 ft	106 NM	123 NM
35,000 ft	200 NM	230 NM

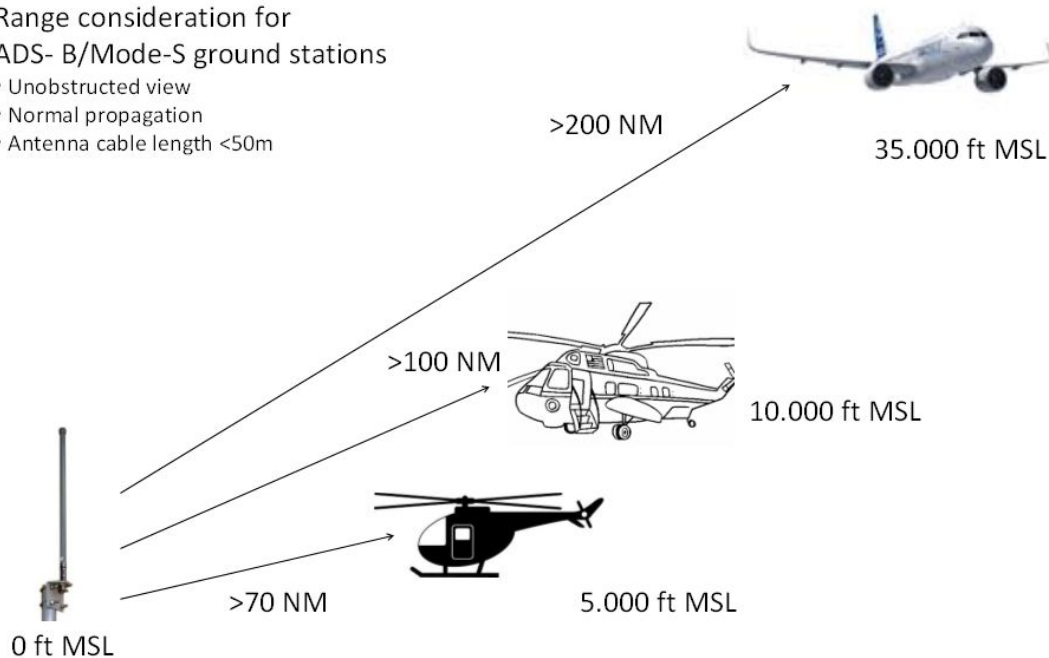
Obstructions attenuate the ADS-B signal significantly and will reduce the range of transmissions. Therefore please observe the **DON'T DOS OF ANTENNA PLACEMENT**:



In average with an optimal antenna placement and a suitable ADS-B 1090 MHz antenna the following range of transmissions can be expected:

Range consideration for
ADS- B/Mode-S ground stations

- Unobstructed view
- Normal propagation
- Antenna cable length <50m



Technical data of ADS-B downlink transmissions

Transmission frequency: 1090 MHz

Modulation: PPM, manchester coding

Bit rate: 1 MBit/s

Packet length: Preamble + 56 or 112 bit

References:

ICAO Annex 10 Part IV

RTCA DO-260/A/B

ICAO DOC 9871

5. System overview and description

The PlaneTRack ADS-B receivers Type B consist of an autonomous ADS-B receiver, processor and decoder that comes as one insert for 19" racks.

The receiver module receives 1090 MHz RF data and amplifies and digitizes them. From the continuous stream of noise and data the processor filters and assembles ADS-B data packets. The decoder module converts these packets into machine or human readable data and send them over two network interfaces to the user.

Several output data formats are available according to user requirements.

Built-in web servers provide a GUI with configuration parameters and a quick reference aircraft list and map that displays the position of received flights.

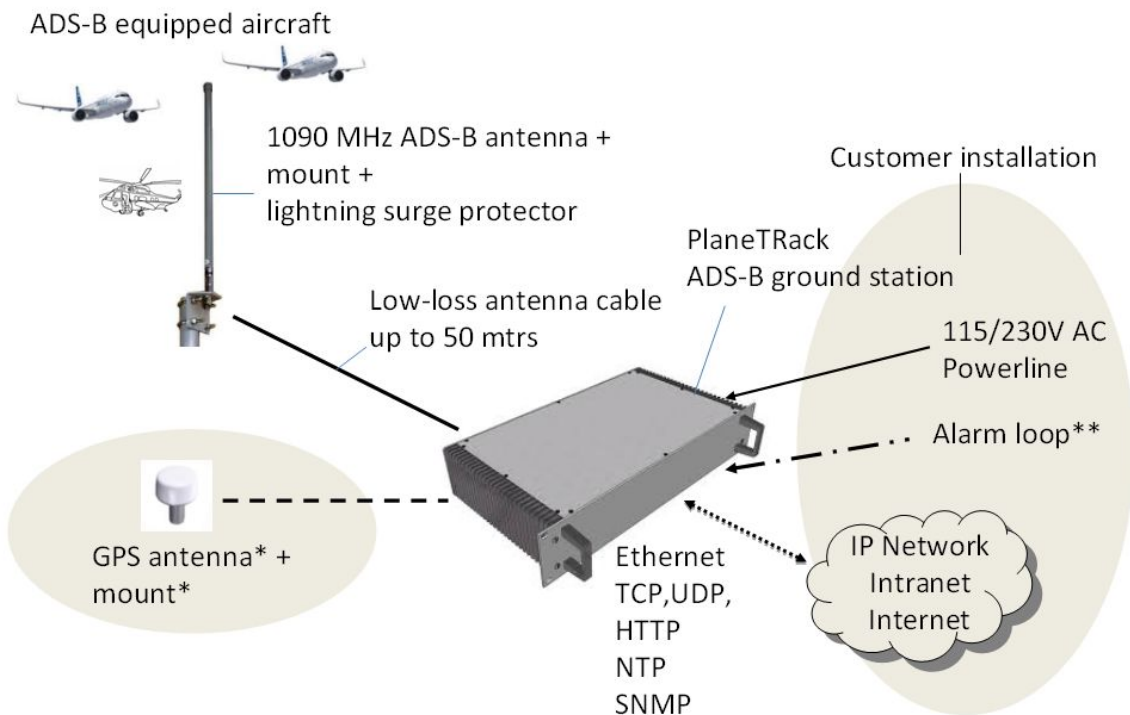
Basic device parameters can be interrogated from the device via SNMP v2c*.

Type B receivers have a single mains supply (PSU). As long as power is supplies a potential free alarm contact* remains closed. If the power line fails the alarm contact* will remain open.

The PlaneTRack B receiver assembly will be connected to an adequate ADS-B receiving antenna and one active GPS antenna by 50 Ohms N-connectors.

The PlaneTRack receiver assembly configuration will be customized according to customer requirements. The configuration is valid for a specific serial number of range of serial numbers only. The specific configuration that underlies this documentation is listed in ANNEX A.

5.1 Overview

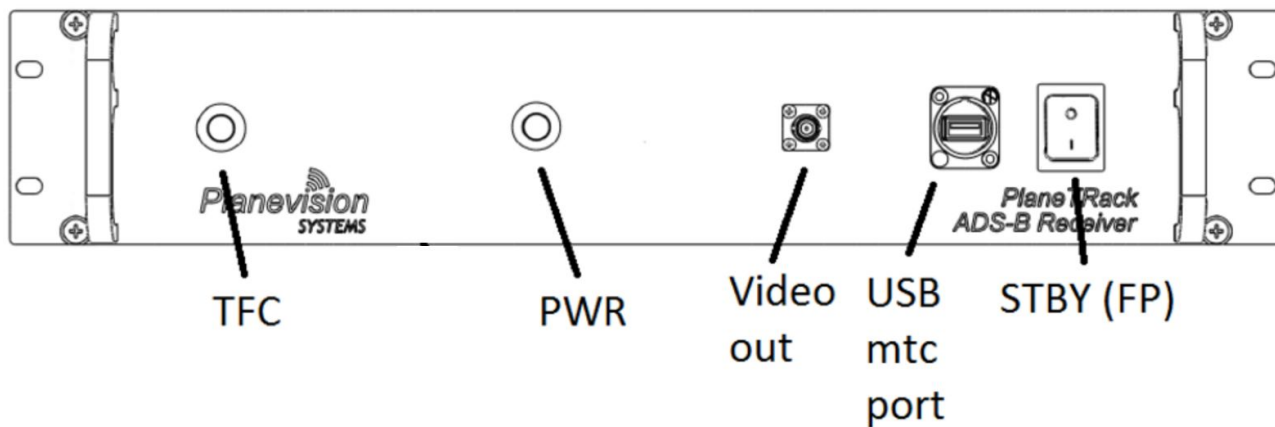


* MLAT option only

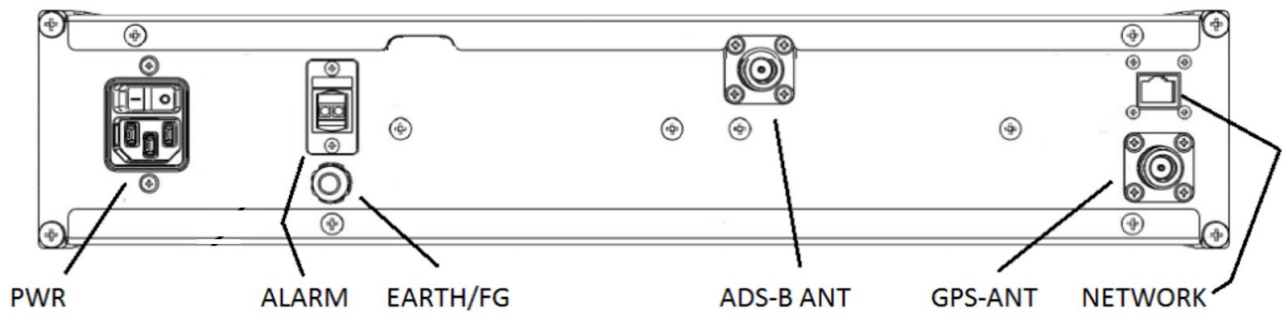
** Option only

5.2 Panel and Interior overview

5.2.1 Front panel



5.2.2 Rear panel



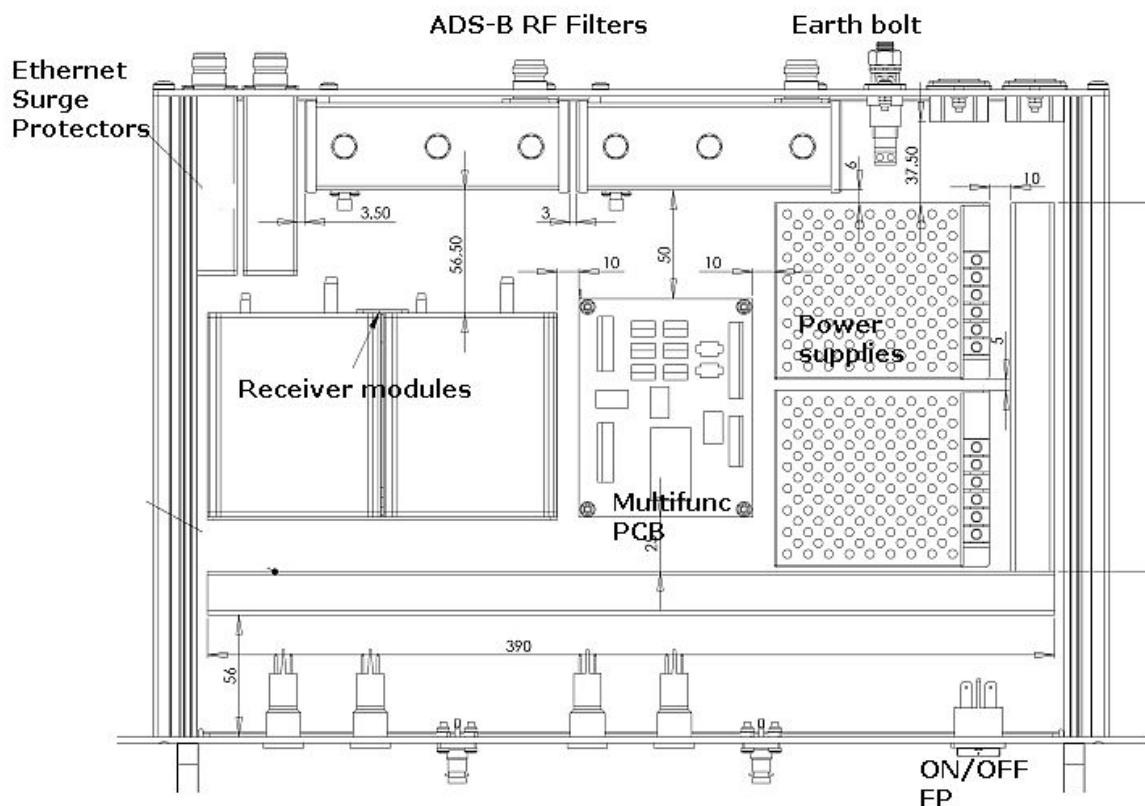
5.3 Functional interior overview

Please note: this device is maintenance free and does not contain any serviceable components.

**Open the device only when instructed and when qualified.
Refer to Section 7.4 for instructions.**



This drawing is not detailed, not to scale and for overview information purposes only.



Type B





1 Receiver Module only, 1 ADS-B RF filter
only, 1 Power supply only

5.4 Legend of panel user interfaces

FP = Front panel

RP = Rear panel

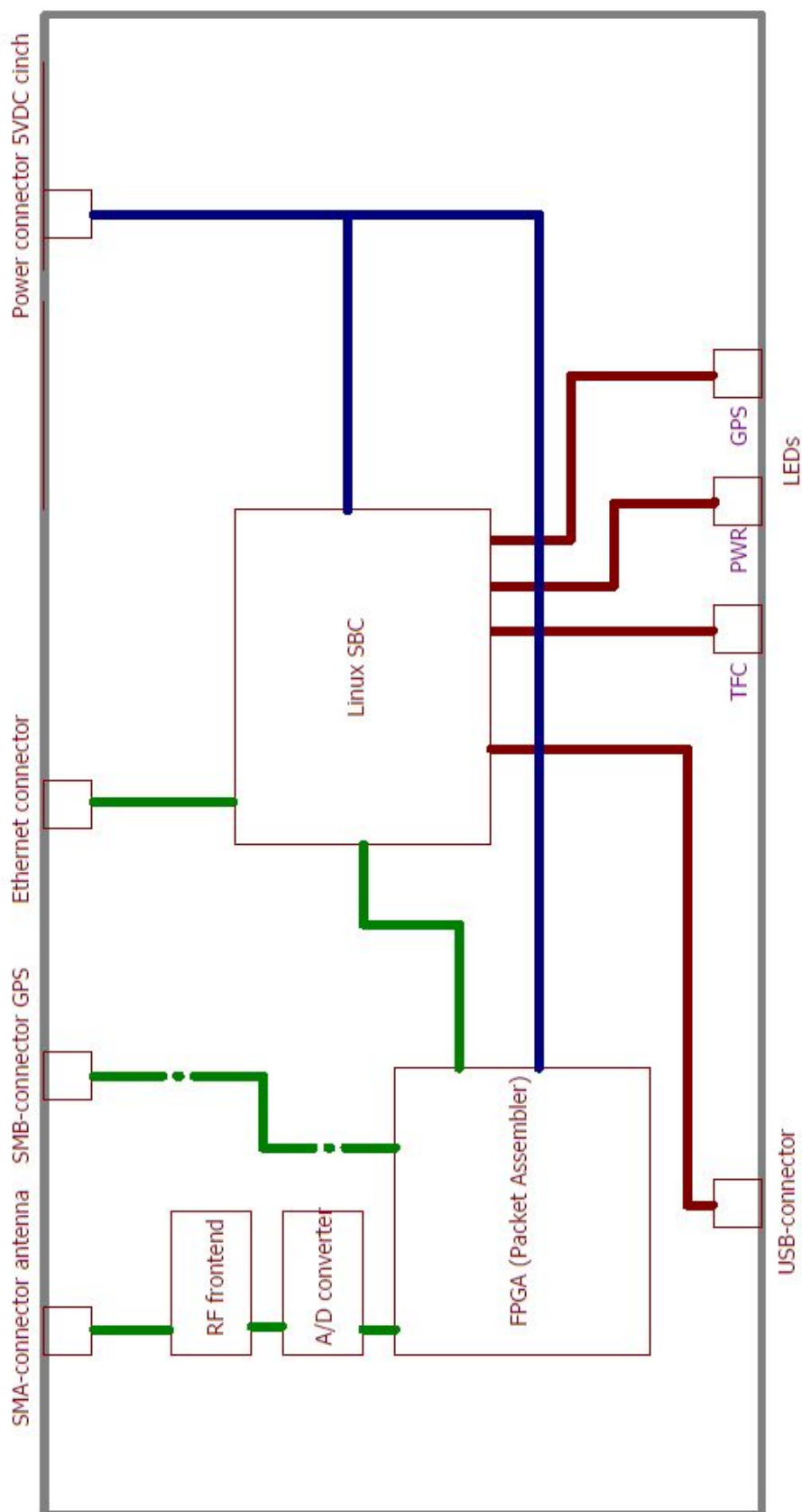
5.4.1 ADS-B Receiver Type B

Item	Panel	Description	
PWR LED	FP	Green when operating power is provided from PSU	
TFC LED	FP	Blue and blinking when receiver is booting (after ca. 30 ¹ sec) Blue and short flicker 1/sec when receiver I is operative (heartbeat) Blue and flickering when ADS-B data are received	
STBY FP	FP	Front panel STBY switch. This is a service switch only that does isolate mains from the PSUs. To isolate mains from the PSUs, switch OFF the PWR switch on the rear panel and disconnect the mains cable².	
VIDEO	FP	Please refer to <u>Application Note AN-105 "Usage of PlaneTRackVideo Output"</u> from http://appnotes.planevision.systems	
PWR	RP	Power connector and ON/OFF switch ² for PWR	
ALARM* (Optional)	RP	Potential-free contact for an alarm loop. DO NOT CONNECT DEVICES EXCEEDING POSTED MAX. LOAD 24V/1A.	
ADS-B ANT	RP	Antenna connector type N female. DO NOT MISCONNECT THE GPS ANTENNA CABLE TO THIS CONNECTOR. DANGER OF DEVICE DAMAGE.	
GPS ANT	RP	Antenna connector type N female. DO NOT MISCONNECT THE ADS-B ANTENNA CABLE TO THIS CONNECTOR. DANGER OF DEVICE DAMAGE.	
NETWORK	RP	Ethernet RJ-45 jack	
EARTH BOLT	RP	Connect receiver to earth with this bolt (M8)	

¹ may extend to 3 minutes and more, if no network connection is present

² not applicable to receivers with DC power supply

5.5.2 ADS-B processor module p/n 66006, 66008, 66009, 66018



Planevision Systems GmbH			
TITLE:	Radarcape pn 66006		
Document Number:	0-66006-01		
Date:	06.06.2015	16:34:33	Sheet: 1/1

Subject to change without notice

5.6 Technical and interface parameters

Power Supply (AC)		
Input voltage	110 ~ 230VAC	IEC60320 connector type C-14
Input frequency	47 ~ 63Hz	
Power Consumption (Type B, BDM)	typ. 230VAC / 15 W	
Power Consumption (Type RDM)	typ. 230VAC / 23 W	
Power Supply (12V DC - optional)		
Input voltage	9.2 ~ 18 V DC	
Power Consumption (Type B, BDM)	typ. 12VDC / 15W (1.25 A)	
Power Consumption (Type RDM)	typ. 12VDC / 23W (1.9 A)	
Power Supply (48V DC - optional)		
Input voltage	36 ~ 72 V DC	
Power Consumption (Type B, BDM)	typ. 48VDC / 15W (0.3 A)	
Power Consumption (Type RDM)	typ. 48VDC / 23W (0.48 A)	
RF receiver(s)/processor(s)		
Antenna input impedance	50 Ohms	N type connector (female)
Active antenna feed*	5V DC	*option only
Input filter passband attenuation	< 0.5 dB	
Input filter bandwidth	< 9 MHZ @ -3 dB	
Sensitivity at antenna port	better than -93 dBm	
Lightning protection	DC short inside filter	
Number of receivers	Type B, BDM: 1; Type RDM: 2	

Receiver center frequency	1090 MHz	
Data processor(s) and decoder(s)		
Hardware platform	Linux SBC Beaglebone Black Rev. C	
Processor	32-bit Cortex A8, Texas Instruments AM3358 Sitara	
CPU speed	1 GHz	
On board Flash memory	4 GB eMMC	
On board RAM	512 MB DDR3L	
Operating System	Linux Debian 8 Kernel 4.1 or similar	
Power up boot delay	ca. 30 secs ¹	If no network connection present: > 3 min
ADS-B message formats processed and decoded	DF17, DF18, DF19 ¹	DO-260/A/B, ICAO Doc 9871 (¹ DF19 not decoded)
Mode-S message formats processed and decoded	DF4, DF5, DF20, DF21	ICAO Annex 10 Part IV, ICAO Doc 9871
ACAS/TCAS message formats processed and decoded	DF0, DF16 ¹	ICAO Annex 10 Part IV, ICAO Doc 9871 (¹ DF16 altitude decoded only)
Decoder output formats	Raw data, ASTERIX Cat 021 V0.23*, Cat 023*, Cat 247*, ASCII CSV, ASCII JSON, KML, KMZ, customized	(*requires Software Option)
Decoder latency to output	< 10 ms	
Packet throughput	> 2.500 packets/sec	
GPS receiver(s)		
Antenna/power supply	Active antenna with 5VDC power	N type connector (female)
Network connections		
Ethernet type	Cat. 5e, 10/100BaseTX	RJ45 connector
Surge protection clamping voltage	7.5V / 70V	IEC 61643-21

Max. surge discharge current	10 kA (8/20 μ s)	
Peak pulse current	100 A (10/1000 μ s)	
Cable length	< 100 meters	
Data protocols	TCP/IP, UDP/IP, HTTP	
Configuration protocols	HTTP/HTML, SSH	
IP address	Fixed or DHCP	
Alarm contact		
Contact type	Potential free	2 screw clamps
max. switchable power	24W / 24VA	
max. switchable voltage	24V / 1A	
SNMP interfaces		
Device base object id	1.3.6.1.4.1.45919.1.120.1	
Specification	V2c	
Dimensions		
Type of enclosure	19" rack insert, 2 U	EIA 310-D, IEC 60297, DIN 41494
Front panel width	480.0 mm	
Front panel height	88.3 mm	
Enclosure width	ca. 444.8 mm	
Enclosure height	ca. 88 mm	
Enclosure length	ca. 300 mm	without handles
Gross Weight (Type BDM)	ca. 5.0 kgs receiver only; ca. 7.1 kgs all components	

5.7 Environmental specification

Ambient temperature	0° to +40°C (-20° to +80°C*)	32°F to 104°F (0° to +170° F*)
Relative humidity	<= 80%	
Cooling	natural convection, no fan	
Enclosure ingress classification	IP52	




6. Device and output format configuration

6.1 Network configuration

6.1.1 SSH connection

The device can be accessed through a console/terminal via SSH protocol and port 22. Access through this port and associated protocols as SFTP allow complete modification of the receiver software.

Be aware that warranty may expire when unapproved software modifications are made.

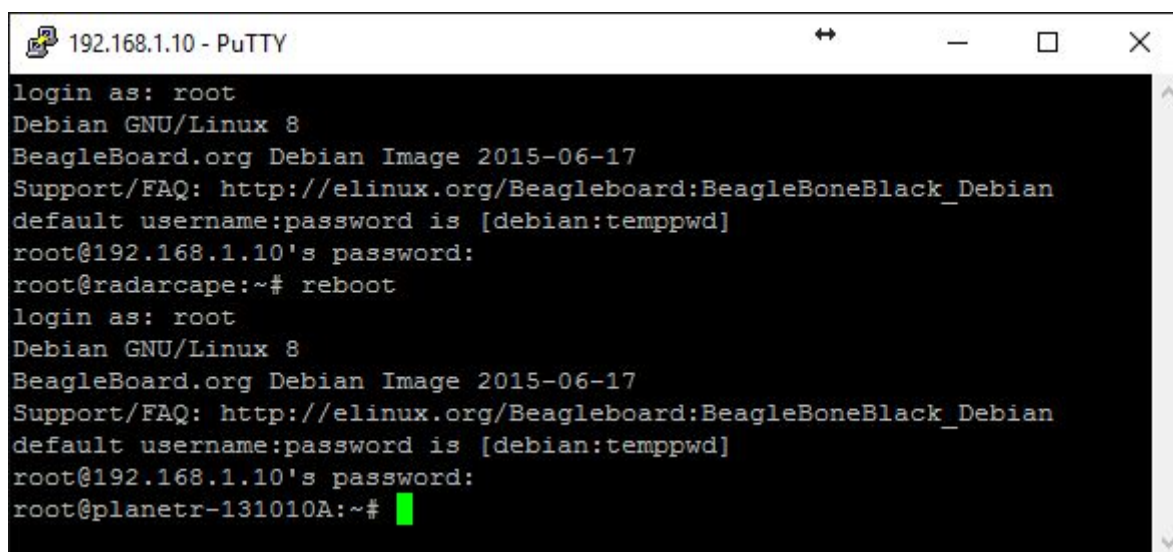
It is strongly recommended to change the SSH password upon the first operation to inhibit unauthorized access.	
Do not provide SSH access to unauthorized and/or unqualified personnel. Danger of damage of device.	
Secure SSH password in a safe place. SSH access is permanently disabled if password is lost.	

Open a console program (as PuTTY) and link to the device at port 22.

A login and a password prompt will appear.

For login enter username: **root**

For password enter: see ANNEX A



```

192.168.1.10 - PuTTY
login as: root
Debian GNU/Linux 8
BeagleBoard.org Debian Image 2015-06-17
Support/FAQ: http://elinux.org/Beagleboard:BeagleBoneBlack_Debian
default username:password is [debian:temppwd]
root@192.168.1.10's password:
root@radarcape:~# reboot
login as: root
Debian GNU/Linux 8
BeagleBoard.org Debian Image 2015-06-17
Support/FAQ: http://elinux.org/Beagleboard:BeagleBoneBlack_Debian
default username:password is [debian:temppwd]
root@192.168.1.10's password:
root@planettr-131010A:~#
  
```

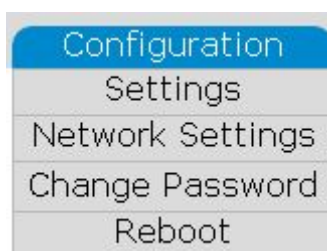
To change the SSH password enter the command "**passwd**" and follow the on-screen instructions.

6.1.2 Network configuration

This setting requires advanced knowledge of network configuration parametering. In case of a misconfiguration access to the device may be permanently lost.



The network configuration can be set from the GUI.



Select the **CONFIGURATION | NETWORK SETTINGS** menu.

Enter new network parameters carefully and check for typos as "." instead of " ", "o" instead of "0" or a network mask of 255.255.255.255. DO NOT LEAVE IP, NETMASK OR GATEWAY FIELDS BLANK.

All these entries will make the device non-accessible via the network.

In case of a false entry the device will not establish a fallback connection IP. In this case the device will be non-accessible via the network.



It is not recommended to change the hostname.

Network Settings

Hostname	<input type="text" value="planetrack123456"/>
IP Address Assignment	<input type="radio"/> DHCP <input checked="" type="radio"/> static
Below parameters are only valid if using a static IP assignment	
Static IP Address	<input type="text" value="192.168.1.11"/>
Netmask	<input type="text" value="255.255.255.0"/>
Default Gateway	<input type="text" value="192.168.1.1"/>
<input type="button" value="Save Changes"/> Cancel	

After pressing **SAVE CHANGES** a check screen appears:

Setting Network Parameters

Hostname set to planetrack123456

Setting eth0 network preferences:

```
iface eth0 inet static
address 192.168.1.11
netmask 255.255.255.0
gateway 192.168.1.1
```

It is strongly recommended to make a screenshot from the check page and store it in a secure place.

After determination that the settings are correct, initiate a reboot from the **CONFIGURATION | REBOOT** entry.

Rebooting after a network parameter change can take up to 3 minutes and more.

6.1.3.1 DHCP configuration via Linux console

This setting requires advanced knowledge of access to and editing of files on Linux OS. In case of a misconfiguration access to the device may be permanently lost.



The DHCP configuration is configured in file `/etc/network/interfaces`.

To establish a DHCP configuration the following lines must be present (this is the default ex-factory configuration):

```
auto eth0
iface eth0 inet dhcp
```

Enter the above lines carefully and check for typos.

No other auto/iface entry with reference to the eth0 interface may be present in the file, i.e. `iface eth0 inet static` entries or another `iface eth0 inet dhcp` entry must not be present.

Reboot the device after changing and saving these values to file.

6.1.3.2 Fixed IP address and mask via Linux console

This setting requires advanced knowledge of access to and editing of files on Linux OS. In case of a misconfiguration access to the device may be permanently lost.



The Fixed IP address and mask are configured in file `/etc/network/interfaces`.

Set the required values with the following lines:

```
auto eth0
iface eth0 inet static
#sample of device IP address
address 10.10.10.45
#sample of network mask
netmask 255.255.255.0
#sample of gateway IP address
gateway 10.10.10.1
```

Enter new network parameters carefully and check for typos as "," instead of ".", "o" instead of "0" or a network mask of 255.255.255.255. All these entries will make the device non-accessible via the network.

No other auto/iface entry with reference to the eth0 interface may be present in the file, i.e. `iface eth0 inet dhcp` must not be present.

Reboot the device after changing and saving these values to file.

6.1.4 Alternate/emergency access and recovery

An alternate/emergency means of access to the Linux console via USB is described in Application Note AN-106, which is available on request from the manufacturer.

This type of access can be used, if the device must be recovered when it has become inaccessible via network.

6.2 SNMP configuration* (optional)

6.2.1 Overview

The device implements an optional long running SNMP daemon that supports SNMP Version 2c*.

6.2.2 Public MIBs

There are a high number of default MIBs available from the device. These can be found on the web customer area in folder `/snmp/public`.

From the SNMPv2-MIB and DISMAN-EVENT-MIB the following items are customized and available:

sysDescr	1.3.6.1.2.1.1.1	Type of receiver
sysObjectID	1.3.6.1.2.1.1.2	Basic object ID
sysUpTimeInstance	1.3.6.1.2.1.1.3	Uptime of SNMP client
sysContact	1.3.6.1.2.1.1.4	Manufacturer contact
sysName	1.3.6.1.2.1.1.5	Type of receiver
sysLocation	1.3.6.1.2.1.1.6	Type of receiver
sysServices	1.3.6.1.2.1.1.7	72

6.2.3 Vendor MIB "PLANEVISION-MIB"

A vendor MIB PLANEVISION-MIB is configured with the following data under

```
iso.org.dod.internet.private.enterprises.  
Planevision.PlaneTRack.TypeBDMSeries120
```

sDevType	1.3.6.1.4.1.45919.1.120.1	Type of device	string
sMacAddress	1.3.6.1.4.1.45919.1.120.2	MAC address of device	string
sLatitude	1.3.6.1.4.1.45919.1.120.3	WGS-84 latitude of receiver	string
sLongitude	1.3.6.1.4.1.45919.1.120.4	WGS-84 longitude of receiver	string
sSerialNo	1.3.6.1.4.1.45919.1.120.5	Serial no of device	string

sPWRAStat ¹	1.3.6.1.4.1.45919.1.120.6	PWR A status ("UNKNOWN","DOWN", "UP")	string
sPWRBStat ¹	1.3.6.1.4.1.45919.1.120.7	PWR B status ("UNKNOWN","DOWN", "UP")	string
sAltitudeMSL	1.3.6.1.4.1.45919.1.120.8	GPS altitude MSL of receiver (m)	string
sOSVersion	1.3.6.1.4.1.45919.1.120.9	OS version of the receiver	string
sRCDVersion	1.3.6.1.4.1.45919.1.120.10	RCD version of the receiver	String
sDBpresent	1.3.6.1.4.1.45919.1.120.11	Support databases present on the receiver.	string
sSelectedTimeSource	1.3.6.1.4.1.45919.1.120.12	Timesource from which ADS-B timestamps are derived (GPS CPU)	string
sPacketCount	1.3.6.1.4.1.45919.1.120.13	ADS-B/Mode-S packets received during the last 60 secs period	string

¹ Ignore result on Type B receivers as there is only one power supply present. If the power supply fails the receiver and the SNMP function will not be available due to lack of power and SNMP GET will time out.

6.2.4 Community ID

By means of the SSH console navigate to `/etc/snmp/snmpd.conf` and open the file with an editor.

Change the default value "public" to a community id as you wish:

```
#####
#
#
# ACCESS CONTROL
#
rocommunity public
```

In the same file search for:

```
# send SNMPv2c traps
trap2sink 192.168.1.250 public
```

Again, change the default value "public" to a community id as you wish:

Save the file.

Navigate to `/usr/local/bin/planetrack.cfg` and open the file with an editor.

Change the default value "public" to a community id as you wish:

```
community="public"
```

Save the file.

Reboot the receiver

6.2.5 SNMP Traps

The following SNMP traps are configured in PLANEVISION-MIB under

```
iso.org.dod.internet.private.enterprises.  
Planevision.PlaneTRack.TypeBDMSeries120.tsTraps
```

tsRestart	1.3.6.1.4.1.45919.1.120.99.1	Restart of ADS-B receiver
tsPWRAfail ¹	1.3.6.1.4.1.45919.1.120.99.2	Power supply A failed
tsPWRArestore ¹	1.3.6.1.4.1.45919.1.120.99.3	Power supply A restored ²
tsPWRBfail ¹	1.3.6.1.4.1.45919.1.120.99.4	Power supply B failed
tsPWRBrestore ¹	1.3.6.1.4.1.45919.1.120.99.5	Power supply B restored ²

¹ Not available on Type B receivers

² will only be sent if the other PWR supply remains available

The host destination (default 192.168.1.250) of the Planevision SNMP trap service is stored in variable `trap2sink` in files:

Navigate to `/etc/snmp/snmpd.conf` and open the file with an editor.

Change the default value "192.168.1.250" to a target IP as you wish:

```
# send SNMPv2c traps  
trap2sink    192.168.1.250 public
```

Save the file.

Navigate to `/usr/local/bin/planetrack.cfg` and open the file with an editor.

Change the default value "192.168.1.250" to a target IP as you wish:

```
trap2sink="192.168.1.250"
```

Save the file.

Reboot the receiver

6.2.6 Default Traps

Please note that the following default traps are executed by the system anyway:

System restart	1.3.6.1.6.3.1.1.5.1	SNMPv2-MIB::coldStart
System shutdown	1.3.6.1.4.1.8072.4.0.2	NET-SNMP-AGENT-MIB:: nsNotifyShutdown REMARK: this trap will work only when the SNMP agent is orderly shutdown by a termination or reboot command. It will not work when the unit is switched off by the last power switch.

A SNMP manager software is available for configuration by means of a web browser. Please refer to AN-109 at <http://appnotes.planevision.systems>.

6.3 Data interfaces and formats

The PlaneTRack ADS-Receiver provides a variety of output formats to its users. All formats can be used concurrently and mixed and are only limited by excessive processor load.

However, it is recommended to limit the use of streaming raw data formats (ports 100xx, 30003) to the necessary and prefer predecoded and formatted formats especially over long distance WAN lines.

All formats are summarized in Table 6-1 which can be found in your customer web area or at <http://appnotes.planevision.systems>

6.3.1 Aircraft List

Table accessible via web browser. The table can be sorted by any column, ascending or descending. It refreshes itself after a configurable time (GUI :: Configuration | Range and Time Settings)

Aircraft List

Time ▲▼	ICAO ▲▼	Flight ▲▼	Lon	Lat	Src	Ground ▲▼	Alt ▲▼	VRate ▲▼	Speed ▲▼	True Track ▲▼	Cat ▲▼	Orig ▲▼	Dest ▲▼	Oper ▲▼	Type ▲▼	Reg ▲▼	Squawk ▲▼	Country ▲▼	Dist(km) ▲▼	Trust ▲▼	Track Size
07:51:50.634405500	3D1BBC	DEITG	0.00000	0.00000	A	A	0	0	0	0								Germ	0.0	62	0
07:51:48.949634296	3D1EC4	DEJXC	0.00000	0.00000	A	A	2700	0	0	0	A2						7000	Germ	0.0	435	0
07:51:51.067977625	3D4920	PTO3E	0.00000	0.00000	A	A	3700	0	0	0	A1						7757	Germ	0.0	1711	0
07:51:50.121362234	3D1B45	DEIOR	0.00000	0.00000	A	A	3800	0	0	0	A1						7746	Germ	0.0	29	0
07:51:51.356938125	4B1698	SWR105V	9.81299	53.54539	A	A	4050	2880	256	232	A0			SWR	A321	HB-IOM	1101	Swit	12.6	752	27
07:51:51.577038968	3D349A	DESEC	0.00000	0.00000	A	A	8000	0	0	0							5012	Germ	0.0	507	0
07:51:51.429013265	3944E5	AFR041J	9.92222	53.83553	A	A	9050	-576	274	93	A0			AFR	A319	F-GRHF	7554	Fran	19.5	6766	60
07:51:51.590946343	45AB43	SAS646	10.17940	53.82249	A	A	11275	832	197	44	A0			SAS	AT76	OY-JZC	7264	Denm	16.7	3511	60
07:51:51.491430468	3C720A	BER7420	11.99425	52.93959	A	A	18775	1664	401	326	A0			BER	A332	D-ALPJ	1360	Germ	75.1	518	24
07:51:51.535492859	4B1784	SWR96P	12.16877	51.89550	A	A	20025	1152	380	201	A0			SWR	RJ1H	HB-IXO	1110	Swit	122.9	368	17
07:51:11.687226953	484F80	KLM27G	0.00000	0.00000	A	A	21275	0	0	0				KLC	E190	PH-EZX	1000	Neth	0.0	220	0
07:51:48.788985125	4010EE	EZY98MJ	10.47563	55.14676	A	A	23725	-2304	401	65	A0			EZY	A319	G-EZBZ	0576	U.K.	96.8	11765	60
07:51:49.161759453	501DD1	CTN480	0.00000	0.00000	A	A	24000	0	0	0				CTN	DH8D	9A-CQF	7635	Croa	0.0	2272	0
07:51:51.606523687	502C97	BTI92E	0.00000	0.00000	A	A	24000	0	0	0				BTI	DH8D	YL-BBU	1000	Latv	0.0	10202	0
07:51:51.521578921	47878E	NAX21Z	13.27375	53.14143	A	A	25225	1600	433	2	A0			NAX	B738	LN-NIA	7271	Norw	114.0	511	12

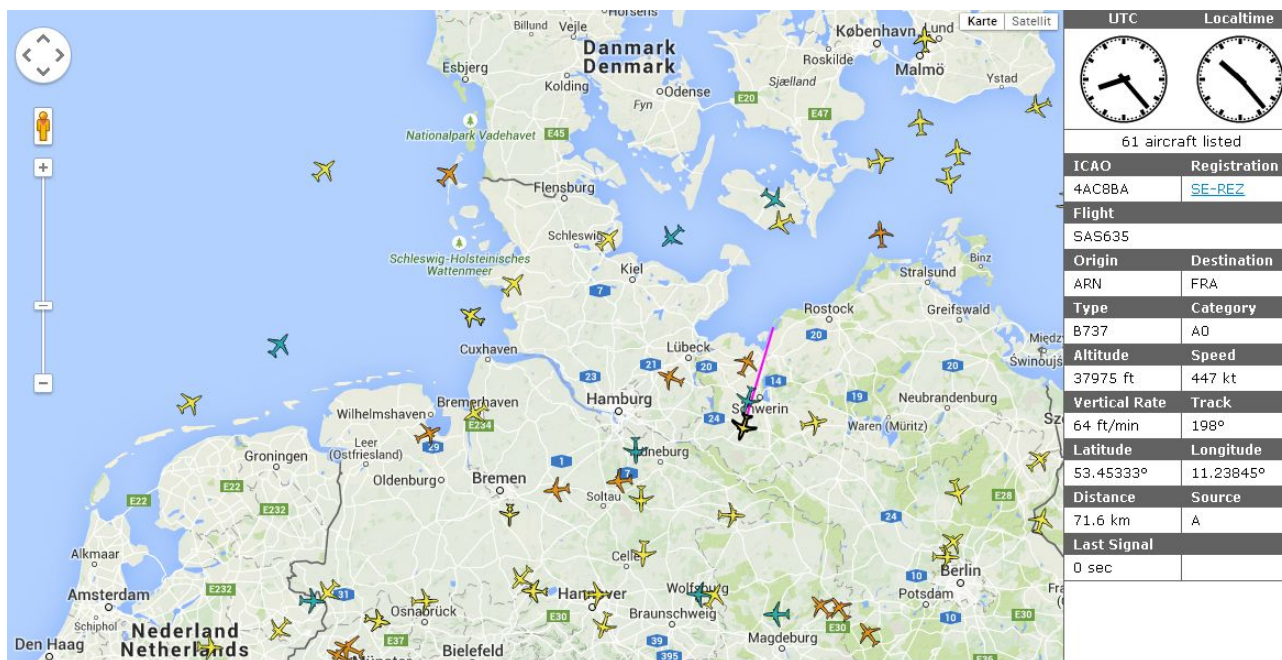
Legend

Name	Description	Notes
Time (hh:mm:ss:ns)	Time of last message received from the aircraft	
ICAO	24 bit ICAO hex ID unique identification of aircraft	
Flight	Flight Call Sign as it is transmitted from the aircraft	
Lon	Longitude (WGS-84)	
Lat	Latitude (WGS-84)	
Src	Source of Lat/Lon: A=ADS-B M=MLAT	

GndAir	Aircraft is on ground (G) or airborne (A)	
Alt	Altitude (feet) at 1013 mb standard atmosphere	
VRate	Vertical rate in feet/min	
Speed	Ground Speed in knots	
Track	Course in degrees true	
Cat	Aircraft category	
Orig	Origin of flight	provided by public domain database, perform GUI :: Configuration Software Maintenance -> Update flight routes database
Destin	Destination of flight	provided by public domain database, perform GUI :: Configuration Software Maintenance -> Update flight routes database
Oper	Flight operator	provided by public domain database, perform GUI :: Configuration Software Maintenance -> Update basestation database
Type	Aircraft Type	provided by public domain database, perform GUI :: Configuration Software Maintenance -> Update basestation database
Reg	Registration of aircraft	provided by public domain database, perform GUI :: Configuration Software Maintenance -> Update basestation database
Squawk	Mode A SSR code	
Country	Country that the aircraft is registered for, indicated through the upper bits in the ICAO hex id	
Distance	Distance to the observer if its Lat, Lon is either entered manually in GUI :: Configuration Settings Location or determined by GPS* (MLAT option)	
Trust	Number of highly trustable DF-11 or DF-17/18 messages per aircraft.	
Track Size	Length of the track in 2D display in 5 sec sequence track points	

6.3.2 Live 2D Map Output

A web browser and an internet connection are required in order to display 2D maps. This display is ideal for testing purposes and quick surveillance.



Legend of Target Color: Yellow - Level flight, Brown - descending, Cyan - climbing

6.3.3 Port 30003 data (CSV)

Port 30003 is a decoded interface in comma separated format. As the encoding of Mode-S and ADS-B messages is not trivial, this is the easiest way how second level software can access flight data. However, as this is a streaming format it replicates every ADS-B and Mode-S message at the device's output. Therefore this format is not recommended to be used in WAN operations with slow or loaded data lines.

Output sample:

```
STA,,5,179,400AE7,10103,2008/11/28,14:58:51.153,2008/11/28,14:58:51.153,RM
MSG,4,5,211,4CA2D6,10057,2008/11/28,14:53:49.986,2008/11/28,14:58:51.153,,,408.3,146.4,,,
64,,,,,
MSG,8,5,211,4CA2D6,10057,2008/11/28,14:53:50.391,2008/11/28,14:58:51.153,,,,,,,,,,,,,0
MSG,4,5,211,4CA2D6,10057,2008/11/28,14:53:50.391,2008/11/28,14:58:51.153,,,408.3,146.4,,,
64,,,,,
MSG,3,5,211,4CA2D6,10057,2008/11/28,14:53:50.594,2008/11/28,14:58:51.153,,,37000,,,51.4573
5,-1.02826,,,0,0,0,0
```

Legend

Token	Type	Description
-------	------	-------------

ID	NEW ID MESSAGE	Generated when an aircraft being tracked sets or changes its callsign.
AIR	NEW AIRCRAFT MESSAGE	Generated when the device picks up a signal for an aircraft that it isn't currently tracking.
STA	STATUS CHANGE MESSAGE	Generated when an aircraft's status changes according to the timeout values set in the GUI :: Configuration menu.
MSG	TRANSMISSION MESSAGE	Generated by the aircraft. There are eight different MSG types.

Token	Type	Source	Description
MSG,1	ES Identification and Category	DF17 BDS 0,8	
MSG,2	ES Surface Position Message	DF17 BDS 0,6	
MSG,3	ES Airborne Position Message	DF17 BDS 0,5	
MSG,4	ES Airborne Velocity Message	DF17 BDS 0,9	
MSG,5	Surveillance Alt Message	DF4, DF20	Triggered by ground radar. Not CRC secured. MSG,5 will only be output if the aircraft has previously sent a MSG,1, 2, 3, 4 or 8 signal.
MSG,6	Surveillance ID Message	DF5, DF21	Triggered by ground radar. Not CRC secured. MSG,6 will only be output if the aircraft has previously sent a MSG,1, 2, 3, 4 or 8 signal.
MSG,7	Air To Air Message	DF0, DF16	Triggered from TCAS.
MSG,8	All Call Reply	DF11	Broadcast but triggered by ground radar

Further details about this format can be found at <http://appnotes.planevision.systems> Application Note AN-116/6.

6.3.4 "deltadb.txt" CSV file

Similar to Port 30003 the deltadb.txt file can deliver pre-decoded and comma delimited data for ease of further processing. It is serviced by the internal web server, so requests will be responded by a list of changes of the aircraft list which have either occurred since the last request or a time that can be provided as caller parameter.

Output sample:

```
1435478409,3F7B3C,GA642,25725,445,73,52.393,10.9649,-1088,5026
```

Legend of data fields:

UNIX Time, ICAO aircraft id, Callsign, Altitude, Ground Speed (kts), Track (degrees true), Latitude (WGS-84), Longitude (WGS-84), Vertical rate (ft/min), SSR code (squawk)

6.3.5 JSON file (aircraftlist.json)

The JSON output format can be used to facilitate interfacing with second level software. It provides a table of fully decoded data that can be interrogated at any time and concurrently from several clients.

Output sample:

```
[{"uti":1435477011,"dat":"2015-07-26 07:36:51.657189000",
"tim":"07:36:51.657189000","hex":"47A7BC","fli":"","lat":"55.76912","lon":"13.3558
8","gda":"A","src":"A","alt":34850,"spd":497,"trk":153,"cat":"","org":"","dst":"","
"opr":"NAX","typ":"B738","reg":"LN-NGJ","dis":"173.5","cou":"Norw","squ":"4522","t
ru":19,"tsa":1,"tsm":0,"vrt":832,"lla":0},
{ ... },
{ ... }]
```

Legend

Token	Description	Remark
uti	Linux timestamp of last message (contains date)	"uti":1435477011
dat	ESRI formatted timestamp of last message	"dat":"2015-07-26 07:36:51.657189000"
tim	Time of last message (contains nanoseconds)	"tim":"07:36:51.657189000"
hex	ICAO Aircraft Hex ID	
fli	Flight Identification/Call Sign	
lat	Latitude (WGS-84)	in decimal degrees
lon	Longitude (WGS-84)	in decimal degrees
gda	Ground/Air status	A=Air G=GND
src	Source of position*	A=ADS/B M=MLAT (*MLAT option only)
alt	Altitude (Flight level)	in ft 1013 hPa Standard Atmosphere
spd	Ground Speed	in kts
trk	True track	in degrees
cat	Category (A0-C7)	
org	Origin	Requires flight routes database being loaded
des	Destination	Requires flight routes database being loaded
opr	Operator	Requires base station database being loaded
typ	Type	Requires base station database being loaded
reg	Registration	Requires base station database being loaded
squ	Squawk	SSR Mode A code
cou	Country	

dis	Distance	from station position
tru	Trust Level	
VRT	Vertical Rate	in ft/min
mch	MACH*	in MACH x 100 optional
ias	IAS*	in kts optional
tas	TAS*	in kts optional
rol	Roll angle*	in degrees/sec optional
tra	Turn rate*	in degrees/sec optional
sfl	Sel FL *	in ft Flight Level optional
qnh	QNH*	in hPa optional
shd	Sel Heading*	in degrees magnetic optional
hgt	Height difference*	between FL and GPS ellipsoid optional
mop	MOPS*	Transponder standard optional
flg	Alert, SPI, Emerg.,IC*	Transponder flags optional
tcs	TCAS alert*	TCAS alert optional
nic	NIC + NACV*	Transponder precision data optional
apm	autopilot mode*	optional
rec	record number	internal
lla	LatLon_Age	Age of ADS-B last position packet in sec
lpa	LastPacket_Age*	Age of last ADS-B or Mode-S packet in sec optional
tsa	Track Size ADS-B	internal
tsm	Track Size MLAT	internal

6.4 Raw data formats

Raw data formats are streamed from the built-in TCP server of the device to a TCP client. These undecoded data require a processing/decoding software at the remote end of the connection. Be aware that in high traffic environments there can be significant data rates of these links, exceeding 1 MBit/s.

6.4.1 TCP port 10002

Raw data as it is received by the ADS-B receiver from the packet assembler. It includes all errors, broken frames etc.. DF-11,DF-17 and DF-18 are CRC pre-checked if selected so in the configuration menu.

6.4.2 TCP port 10003

Mode-S and ADS-B raw data, but all frame types in Mode-S/ADS-B have passed CRC checking. This is the recommended port if you want to route full data through a slow speed network connection, thus eliminating bandwidth requirements for erroneous data or broken frames.

6.4.3 TCP port 10004

DF-11, DF-17 and DF-18 only, all frame types CRC pre-checked. This is recommended in case of interest of aircraft positions only, but no Mode-S or TCAS data are contained (DF-0,4,5,16,20,21).

6.4.4 TCP port 10005*

Mode-S frames only. This is a special port for streaming multilateration clients.

6.4.5 Transmission formats

There are three raw data transmission formats available that can be selected from the GUI :: Configuration menu

AVR format (ASCII)

Samples:

```
*02E99619FACDAE;
```

```
*8D3C5EE69901BD9540078D37335F;
```

Legend

ASCII representation of 56-bit or 112-bit raw data packets without timestamp

AVR format (ASCII) with Option MLAT*

Samples:

```
@016CE3671C7423FFE7AB7BFCAB;
```

```
@016CE3671AA8A800199A8BB80030A8000628F400;
```

Legend

ASCII representation of 48-bit MLAT timestamp and 56-bit or 112-bit raw data packets

Binary format (14 or 21 bytes, without escaped characters)

0x1a,0x32 : 6 byte MLAT timestamp, 1 byte signal level, 7 byte Mode-S short frame

0x1a,0x33: 6 byte MLAT timestamp, 1 byte signal level, 14 byte Mode-S/ADS-B long frame

0x1a,0x1a : true 0x1a (escaped)

6.4.6 Asterix CAT021, CAT023, CAT247

See separate Application Note AN-101 "PlaneTRackdata output of Eurocontrol Asterix formats" at <http://appnotes.planevision.systems>

6.4.7 Extended Mode-S, ACAS and DO-260/A/B output formats (Restful API)

See separate Application Note AN-103 "ADS-B, ModeS and ACAS flight data analysis with "ExtFlightData" function" at <http://appnotes.planevision.systems>

Planevision PlaneTRack Data Formats and Protocols

Ed. February 2016

Common name	Protocol	Port	Decoded	Sample	Comment	Links to documents
Event driven data output						
1 Raw data	TCP/IP	10002	no	0x1a,0x31 : 6 byte MLAT, 1 byte signal level, 2 byte Mode-AC 0x1a,0x32 : 6 byte MLAT, 1 byte signal level, 7 byte Mode-S short frame 0x1a,0x33 : 6 byte MLAT, 1 byte signal level, 14 byte Mode-S long frame 0x1a,0x34 : 6 byte MLAT	This is a CRC-checked mirror of the data as it comes from the FPGA, DF-11, DF-17 and DF-18. Includes Mode-A/C data with respect to the configuration setting.	Manual
2 Verified Raw Data	TCP/IP + UDP/IP	10003	no	0x1a,0x31 : 6 byte MLAT, 1 byte signal level, 2 byte Mode-AC 0x1a,0x32 : 6 byte MLAT, 1 byte signal level, 7 byte Mode-S short frame 0x1a,0x33 : 6 byte MLAT, 1 byte signal level, 14 byte Mode-S long frame 0x1a,0x34 : 6 byte MLAT	Binary formatted raw data with all Mode-S data formats CRC-prechecked (eliminates transmission of the erroneous frames, reduces load on the network). All data from the FPGA is disassembled into messages and verified if correct. Includes Mode A/C data.	Manual
3 ADS-B Raw Data	TCP/IP + UDP/IP	10004	no	0x1a,0x32 : 6 byte MLAT, 1 byte signal level, 7 byte Mode-S short frame 0x1a,0x33 : 6 byte MLAT, 1 byte signal level, 14 byte Mode-S long frame 0x1a,0x34 : 6 byte MLAT	Binary formatted raw data, pre-checked DF-11, DF-17 and DF-18 only: minimum load for the transmission path but contains most information. No Mode-A/C data.	Manual
4 Non ADS-B Raw Data	TCP/IP + UDP/IP	10005	no	0x1a,0x32 : 6 byte MLAT, 1 byte signal level, 7 byte Mode-S short frame 0x1a,0x33 : 6 byte MLAT, 1 byte signal level, 14 byte Mode-S long frame 0x1a,0x34 : 6 byte MLAT	Binary formatted raw data, only raw data frames of those aircraft where the location (latitude and longitude) is unknown. Used for special MLAT purposes. No Mode-A/C data.	Manual
5 Verified Mode-S Raw Data	TCP/IP + UDP/IP	10006	no	0x1a,0x32 : 6 byte MLAT, 1 byte signal level, 7 byte Mode-S short frame 0x1a,0x33 : 6 byte MLAT, 1 byte signal level, 14 byte Mode-S long frame 0x1a,0x34 : 6 byte MLAT	Binary formatted raw data with all Mode-S data formats CRC-prechecked (eliminates transmission of the erroneous frames, reduces load on the network). All data from the FPGA is disassembled into messages and verified if correct. No Mode A/C data.	Manual
6 Port 30003 format (Pseudo NMEA)	TCP/IP + UDP/IP	30003	yes	SEL,496,2286,4C4E5,27215,2010/02/19,18:06:07.710,2010/02/19,18:06:07.710,RVR1427 ID,496,7162,405637,27928,2010/02/19,18:06:07.115,2010/02/19,18:06:07.115,EZY691A AIR,496,5906,400F01,27931,2010/02/19,18:06:07.128,2010/02/19,18:06:07.128 STA,5,179,400AE7,10103,2008/11/28,14:58:51.153,2008/11/28,14:58:51.153,RW CLK,496,-1,-1,2010/02/19,18:19:036,2010/02/19,18:19:036 MSG,1,145,256,7404F2,11267,2008/11/28,23:48:18.611,2008/11/28,23:53:19.161,RJAL118 *****	ASCII output format for different types of packets received. No Mode A/C data.	Format definition
7 Asterix CAT 021 (V0.23) + CAT 023 + CAT 247	UDP/IP		yes	binary, according to Eurocontrol Specification	available as an option	Eurocontrol CAT021 V0.23 Application Note
8 Asterix CAT 021 (V1.8) + CAT 023 + CAT 247	UDP/IP		yes	binary, according to Eurocontrol Specification	available as an option	Eurocontrol CAT021 V1.8
9 Asterix CAT 021 (V2.4) + CAT 023 + CAT 247	UDP/IP		yes	binary, according to Eurocontrol Specification	available as an option	Eurocontrol CAT021 V2.4
State driven data output						
10 HTML Aircraft Table (caller: http://radarcape.com/aircraftlist.html)	HTTP (HTML)	80	yes	Live demo see link last column	A list of received aircraft can be fetched via a built-in Web server. This list can be sorted ascending and descending in each column by simply clicking on the arrows. Distances are automatically calculated from aircraft positions and home coordinates.	Manual Live Demo

Table 6-1

PlaneTRack data formats and protocols (two pages)

Due to size and embedded links please refer to document "PlaneTRack data formats and protocols" in your web customer area or at <http://appnotes.planevision.systems>.

6.5 Graphical User Interface (GUI)

The GUI is a convenient way to access the device configuration menus and display traffic status of the device.

The GUI can be reached on port 80 of the device IP, e.g. <http://10.10.10.45>

Security settings may inhibit access to certain pages without a username and password.

Please see below how to set these.

Throughout this document referrals to the GUI are marked by the token "GUI::" followed by the relevant menu and menu items.



GUI :: Aircraft Data | Aircraft List

see Section 6.3.1

GUI :: Aircraft Data | Live 2D Output

see Section 6.3.2

GUI :: Aircraft Data | Live 3D Output

Generates a live kml file to be used with Google Earth for test purposes.

Access to the following GUI items may be locked by a user name and password. Please refer to Annex A. Locking takes place in the GUI :: Configuration | Settings menu

GUI :: Status | GPS Status

Status report of the GPS receiver and error/status log

Sample:

Status

```
Date: 21.05.2015
Time: 17:50:14 [UTC]
Latitude: 52.5446
Longitude: 11.4669
Altitude: 123.9091
Temperature: 25.4271 deg C
Fix Mode: auto
Fix Dimension: OD clock fix
Self Survey: complete
Survey Progress: 100%
Rcvr Mode: Over determined clock
GPS Status: doing fixes
Dynamics Code: unknown (0xff)
HardwareId: Resolution SMTx
```

Firmware version: 2.2 Build 0
 SwBuildDate: 17.01.2013
 Software Version: 2.2 build 17.01.2013
 Product Name: Resolution SMTx
 Antenna open: connected
 Antenna short: operating
 Tracking Sats: true
 Position stored: true
 Position questionable: false
 AMU mask: 0
 PDOP mask: -1
 PDOP switch: -1
 Almanach: complete
 PPS not generated: false
 Number of SVs in Fix: 3

PRN	Chan	Az	Elev	Sig	Acquire	Ephe m	Age	Old	Bad	DataColl.
26	6	181.0	17.0	23.0	acquired	inv.	0	-	-	in progress
30	9	328.0	11.0	36.0	acquired	inv.	-1	-	-	in progress
18	2	88.0	53.0	33.0	acquired	inv.	0	-	-	in progress

Supervision results: (28.06.2015 17:49:44)
 Time reference: UTC
 PPS reference: UTC
 PPS pulse: on
 PPS polarity: positive
 PPS output option: always on

GUI :: Status | Port Connection Status

Status report and connection history of the data ports

Sample:

Port Connection Status
 Port 10002 (unchecked true raw data)
 Port 10003 (all data formats, including Mode-AC, CRC checked)
 Port 10004 (DF11/DF17 CRC checked)
 11.06.16 13:34:23(G) Port 10004: established #1 from 127.0.0.1:37578
 Port 10005 (non ADS-B frames, CRC checked)
 Port 10006 (all data formats, no Mode-AC, CRC checked)
 Port 30003

GUI :: Status | System Information

Information about the system setup

Sample:

```
=====
System Information
=====
```

System Type and Configuration

```
-----
```

```
Version: 160603.09.57
Build: Jun  3 2016 10:10:46
FPGA Version: meaADSB_ep3_146_TimestampFix.rbf
Beaglebone: TI AM335x BeagleBone Black
Distribution: Debian
Linux Version: Linux version 4.1.4-ti-r9 (root@b1-omap5-uevm-2gb) (gcc version 4.9.2
(Debian 4.9.2-10) ) #1 SMP PREEMPT Tue Aug 11 00:31:44 UTC 2015
```

Time

```
----
```

```
Uptime of Linux System: 0027d 22h 46m 36s
Uptime of ADS-B Daemon: 0014d 17h 51m 47s
Selected Time Source: GPS
GPS Time: 2016-06-12T07:25:48Z
System Time: 2016-06-12T07:25:47Z
```

Client Information

```
-----
```

```
Client Address: 46.52.2.19
User Agent: Mozilla/5.0 (Windows NT 6.0) AppleWebKit/537.36 (KHTML, like Gecko)
Chrome/49.0.2623.112 Safari/537.36
```

Network

```
-----
```

```
Hostname: planetrack123456
MAC Address: b8:d5:14:3c:1b:e6
DHCP/Static IP: dhcp

IPv4 Address(es): 192.168.2.115 (255.255.255.0)
IPv4 Default Gateway: 192.168.2.1
```

Location

```
-----
```

```
Latitude: 49.86631 deg North
Longitude: 8.62531 deg East
Altitude: 144m HAE
```


GUI :: Configuration | Settings

Do not provide GUI access to unauthorized and/or unqualified personnel. Danger of damage of device.



Location of device

This setting is required for tracking of ground traffic only.

Setting is not required for airborne traffic.

If valid GPS data are present these fields will be automatically filled.

Latitude Longitude Altitude m
Decimal values, southern latitude and western longitude as negative values. Will become overwritten after GPS fix.

Configuration of Range Rings on 2D map

Range Rings on 2D Map ☒ disabled ☐ enabled

If enabled, range rings are displayed at 60, 120, 180, and 240 NM from your receiver's location.

Data output settings

Raw data transmissions via UDP can be enabled/disabled here and the target IP/port can be configured.

For Asterix* transmissions via UDP also the SAC/SIC values can be entered and the transmission interval of the Position State Vector Report.

Port 10003 UDP Server Settings
 Enable Port 10003 UDP Output ☒ disabled ☐ enabled
 Servers where to send Port 10003 data :10003

Port 10004 UDP Server Settings
 Enable Port 10004 UDP Output ☒ disabled ☐ enabled
 Servers where to send Port 10004 data :10004

Port 10005 UDP Server Settings
 Enable Port 10006 UDP Output ☒ disabled ☐ enabled
 Servers where to send Port 10005 data :10005

Port 10006 UDP Server Settings
 Enable Port 10006 UDP Output ☒ disabled ☐ enabled
 Servers where to send Port 10006 data :10006

Port 30003 UDP Server Settings
 Enable Port 30003 UDP Output ☒ disabled ☐ enabled
 Servers where to send Port 30003 data :30003

Asterix CAT021 V0.23/CAT023/CAT-247 Server Settings
 SAC (hex)
 SIC (hex)
 Enable Transmission ☒ disabled ☐ enabled
 Position State Vector Report (ED-129) 5
 Transmission Interval [sec]
 Destination server(s) IP (:Port) :9000
 Separate multiple entries by a comma

Configuration of Live 2D Map

Aircraft distance unit	<input checked="" type="radio"/> km	<input type="radio"/> nm
Omit aircraft after [min]	<input checked="" type="radio"/> 1	<input type="radio"/> 5 <input type="radio"/> 10 <input type="radio"/> 30 <input type="radio"/> 60 <input type="radio"/> 120 <input type="radio"/> 300
Delete aircraft after [min]	<input checked="" type="radio"/> 1	<input type="radio"/> 5 <input type="radio"/> 10 <input type="radio"/> 30 <input type="radio"/> 60 <input type="radio"/> 120 <input type="radio"/> 300
KML output refresh time [s]	<input type="radio"/> 10 <input checked="" type="radio"/> 15 <input type="radio"/> 30 <input type="radio"/> 60 <input type="radio"/> 120 <input type="radio"/> 300 <input type="radio"/> 600	<input type="radio"/> auto refresh off
KML output track length [s]	<input type="radio"/> 5 <input type="radio"/> 10 <input checked="" type="radio"/> 30 <input type="radio"/> 60 <input type="radio"/> 120 <input type="radio"/> 300	<input type="radio"/> all database elements
GPS status refresh time [s]	<input type="radio"/> 1 <input checked="" type="radio"/> 5 <input type="radio"/> 10 <input type="radio"/> 30 <input type="radio"/> 300	<input type="radio"/> auto refresh off

Feature key entry*

Feature keys can be entered here to enable optional firmware functionality.

Feature Keys	
Feature Keys	<input type="text" value="123456789012345612456987"/>
Separate several keys with a comma	

Configuration of Security settings

Webpage Access Control Level	<input type="text" value="Strict"/>
<i>Public:</i> Almost all webpages accessible without login. <i>Strict:</i> Login required for all webpages except aircraftlist and 2D map. <i>Very Strict:</i> Login required for all webpages.	

GUI :: Configuration | Network Settings


See section 6.1.2

GUI :: Configuration | Save & Restore Configuration

Use this menu to make a backup or restore the GUI configuration. This command does not provide a backup of the device's configuration. Such backup can be performed from the SSH command line with the command `./root/backup.sh`. A backup folder will be created in the /root folder and can be copied externally. The ex-factory backup folder is also available in the customer web area.

GUI :: Configuration | Change Password

The initial device GUI password is posted in ANNEX A.

Secure GUI password in a safe place. Change of configuration is permanently disabled, if password is lost.	
---	---

Enter old password	<input type="text"/>
Enter new password	<input type="text"/>
Repeat new password	<input type="text"/>
<input type="button" value="Change"/> Cancel	

GUI :: Configuration | Reboot

Restarts the device.

6.6 Antenna configuration

The antenna configuration is specific to the customization of the device. For details see ANNEX B.

7. Maintenance and Repair Instructions

The PlaneTRack 19" ADS-B receiver device does not require any maintenance.


The PlaneTrack 19" ADS-B receiver device does not contain any field repairable or serviceable components.


For module exchange or repair it is strongly recommended to return the device to the manufacturer.

For any field module exchange request a manufacturer approval before proceeding.

Be aware that unapproved opening of the device and/or module exchange may affect the warranty state of the device.

7.1 Troubleshooting or module exchange instructions

<p>Troubleshooting or module exchange must be exercised by qualified and authorized personnel only.</p> <p>Contact the manufacturer for service authorization.</p>	
--	---

<p>In exceptional cases and only when instructed by the manufacturer the device may be opened for troubleshooting.</p> <p>Carefully follow disconnecting, unmounting and opening instructions as provided by the manufacturer and in Section 7.4.</p> <p>If you have any questions contact the manufacturer first.</p>	
---	---

7.2 Quick initial troubleshooting guide

Failure	Check action	Category
PWR LED off (only)	Toggle ON/OFF (FP) switch for 30 secs. Check mains cable connected and power line operative, rear panel ON/OFF switch ON	#1.1
PWR LED off (only)	Toggle ON/OFF (FP) switch for 30 secs. Check mains cable connected and power line operative, rear panel ON/OFF switch(es) ON	#1.1
Alarm contact opened (optional)	Toggle ON/OFF (FP) switch for 30 secs. Check all PWR LED(s) are GREEN	#4.1
Network access to user GUI not possible, but PWR	Toggle ON/OFF (FP) switch for 30 secs. Allow receiver >30 sec to restart.	#5.1

LED(s) are GREEN	Check network connection cable. Check network parameters.	
Network access via SSH not possible, but all PWR LED(s) are GREEN	Toggle ON/OFF (FP) switch for 30 secs. Allow receiver >30 sec to restart. Check network connection cable. Check network parameters.	#5.1
TFC LED not blinking after 30 secs on startup, but all PWR LED(s) are GREEN	Check for network connection. Allow more than 3 minutes to start receiver without network connection. Toggle ON/OFF (FP) switch for 30 secs. Allow receiver >30 sec to restart.	#7.1
TFC LED not flickering for traffic, but all PWR LED(s) are GREEN	Toggle ON/OFF (FP) switch for 30 secs. Allow receiver >30 sec to restart. Check GUI for traffic present in list or on map	#8.1
Range degraded on output and GUI map, but TFC LED flickering	Check ADS-B antenna and surge protector state, cable and connection	#8.1
Flight data timestamp not correct in data output	Check GPS antenna, cable and connection	#9.1
System time not correct	Time cannot be obtained from NTP server.	#9.2

8. Declaration of Conformity



Declaration of Conformity (DoC)

We, Planevision Systems GmbH
 Grellkamp 6b
 22113 Oststeinbek, Germany

declare under our sole responsibility that the product:

Type of equipment: ADS-B Receiver

Brand name: Planevision Systems

Model name: PlaneTRack Type B / BDM / RDM

to which this declaration relates, is in compliance with all the applicable essential
requirements and other provisions of the European Council Directives:

1999/5/EC	Radio & Telecommunications Terminal Equipment Directive (R&TTE)
2011/65/EC	Restrictions of Hazardous Substances (RoHS)
2006/95/EC	Low voltage directive

Product compliance has been demonstrated on the basis of:

EN 301 489-1 V1.9.2
EN 301 489-15 V1.2.1
IEC 61000-3-2,3
IEC 61000-4-2,3,4,5,6,8,11
EN 55022 Ed. 6.0
EN 60950-1

The technical documentation file is kept available at:

Planevision Systems GmbH, Grellkamp 6b, 22113 Oststeinbek

Issued on: 17.07.2015

Signed by the manufacturer:

(Company name) Planevision Systems

(Signature)

(Printed name) Dr.-Ing. Gunther Kruse

(Title) Managing Director

9. Contact information

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Record of Revisions

1.4	2016-12-29	Revised panels
1.4C	2017-02-28	Added safety remark to /etc/network/interfaces config
1.5	2018-11-09	Revised several paragraphs