AIR Traffic Displays

Installation Manual

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Important

Please read this manual carefully before installing the device.

Observe limitations and safety instructions.

This manual is an essential portion of the device and must be kept in a safe place.

Articles Covered

This manual covers the following articles:

- ATD-11 "AIR Traffic Display 11"
- ATD-57 "AIR Traffic Display 57"
- ATD-80 "AIR Traffic Display 80"

Revision History

Rev.	Date	Status	Author	Changes	Approved
0.1	2016/02/24	Draft	M. Förderer	initial Draft	–
0.9	2016/06/08	Draft	M. Förderer	Release Candidate	–
1.0	2016/07/05	Release	M. Förderer	First Release	Tobias Fetzer
1.5	2017/04/21	Release	M. Förderer	Added infos regarding bootloader update	Tobias Fetzer
2.0	2017/05/22	Release	H. Hoeth	Document restructuring	Hendrik Hoeth
2.1	2017/06/23	Release	M. Förderer	Added details in within the scope of FLARM compatibility certification	–
2.2	2018/03/13	Release	M. Förderer	Updated manual according to software version 1.8	Marc Förderer
3.0	2019/05/09	Release	M. Förderer	Updated manual according to software version 21, added ATD-11 and hardwares	Marc Förderer
3.1	2021/07/08	Release	H. Hoeth	Added missing picture for light sensor check	Hendrik Hoeth
3.2	2021/10/11	Release	M. Förderer	Added details reagarding environmental data for ATD-57	–
3.2	2021/10/11	Release	M. Förderer	Added details reagarding environmental data for ATD-57	–
5.0	2024/01/30	Release	M. Förderer	Major Changes and New Functions of Software Version 50 introduced	–
5.1	2024/03/11	Release	M. Förderer	Information regarding Software version 51	–

Product Support

If you have questions, our product support team will be happy to help you. Contact us via support@air-avionics.com or by phone. Please find details about our hotlines and availability online at *https://www.air-avionics.com*

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1.1   Introduction

This manual is intended to provide mechanical and electrical information for use in the planning and design of an installation of the Air Traffic Displays (ATD-11, ATD-57, and ATD-80) into an aircraft. This manual is not a substitute for an approved airframe-specific maintenance manual, installation design drawing, or complete installation data package. Attempting to install equipment by reference to this manual alone and without first planning or designing an installation specific to your aircraft may compromise your safety and is not recommended. The content of this manual assumes use by competent and qualified avionics engineering personnel and/or avionics installation specialists using standard aviation maintenance practices in accordance with relevant accepted practices. This manual is not intended for use by individuals who do not possess the competencies and abilities set forth above. Refer to section "Limitations", for additional information and other considerations.

> All screen shots used in this document are current at the time of publication. Screen shots are intended to provide visual reference only. All information depicted in screen shots, including software file names, versions, and part numbers, is subject to change and may not be up to date.

1.2   Equipment Description

Model	Part number	Description
AIR Traffic Display 11	ATD-11	Cockpit Display of Traffic information (CDTI) in a flexibly mountable package
AIR Traffic Display 57	ATD-57	Cockpit Display of Traffic information (CDTI) for 57mm standard panel cutouts
AIR Traffic Display 57	ATD-80	Cockpit Display of Traffic information (CDTI) for 80mm standard panel cutouts

ATD are cockpit displays. Multiple ATD can be used in a single aircraft. The small outline and multifunctional software of the devices allow for better system integration in space constrained environments. The pilot-centered user interface aims at reducing crew workload, increasing crew efficiency and improving flight safety.
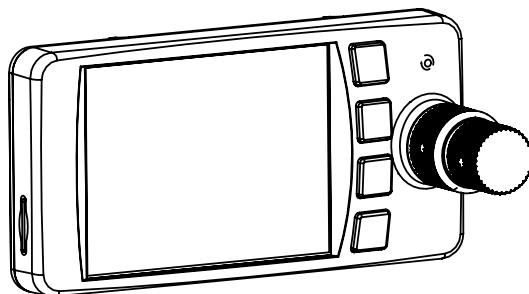
Figure 1.1.: View of AIR Traffic Display 11
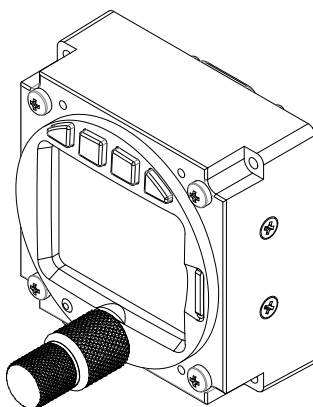
Figure 1.2.: View of AIR Traffic Display 57
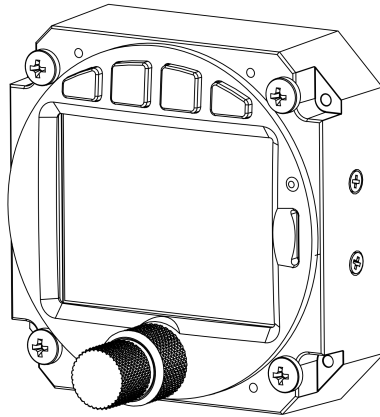
Figure 1.3.: View of AIR Traffic Display 80

1.3   System Capabilities

AIR Traffic Display (ATD-11, ATD-57, or ATD-80) is a small and affordable Cockpit Display of Traffic Information (CDTI) that is displaying traffic and warning messages generated by connected traffic systems or traffic receivers.

Comprehensive position and danger-level information on dangerous traffic are given. Additionally, detailed target data is optionally displayed. ATD features a sunlight readable TFT display with a 2 inch (ATD-57) or 2.7 inch (ATD-11, ATD-80) screen diameter. It features field updateable software and is capable of using traffic databases (e.g. FLARMNet) from a mass storage device (microSD card). ATD emits aural alerts through an integrated alert sounder.

1.4   Traffic System Compatibility

ATD is compatible to many traffic systems. The following list shows traffic systems ATD has been tested with. Many other traffic systems may be compatible as well. ATD is certified as "FLARM compatible" in the category "Standalone Display".

> Not all traffic systems provide for the same functionality. ATD is only capable of displaying data it receives from connected traffic systems.

Make	Device / Productline	Protocol	Data Setup
AIR Avionics	AT-1	AT-1	AIR Traffic Protocol via RS232 (normally data port 2)
AIR Avionics	TRX	TRX	FLARM compatible Traffic Display extended, 19,200 Bd or higher, GPS Data, non-directional targets with empty BRG field
FLARM Technology	PowerFLARM	FLARM	GPS and Traffic Data, Protocol Version 7, 19,200Bd or higher, 57,600 Bd recommeded
FLARM Technology	Classic FLARM	FLARM	GPS and Traffic Data, Protocol Version 7, 19,200 Bd or higher
LXNAV / LXNAVIGATION	All LX FLARM products	FLARM	GPS and Traffic Data, 19,200 Bd
EDIATEC	ECW-100	FLARM	GPS and Traffic Data, Protocol Version 7, 19,200 Bd or higher
ZAON Flight Systems	XRX	TIS	GARMIN TIS Output

While many factors have to be carefully taken into account, it is recommended to always use an RS-232 data rate of at least 38,400Bd for interfacing ATD-57 to a traffic system. Higher data rates come with the benefit of higher bandwidth and therefore the capability to transfer more information per time.

1.5   Technical Specifications

Please find dimensional drawings in the appendix A

1.5.1   Characteristics of the ATD-11

Parameter	Data	Unit
Mechanical		
Dimensions	100.5x50.5x54.44	mm
Mass	0.135	kg
Electrical		
Voltage (nom.)	13.8	V DC
Voltage (operational)	9 to 32	V DC
Low voltage shutdown	8	V DC
Current (nom.)	0.08	A

1.5.2 Characteristics of the ATD-57

Parameter	Data	Unit
Mechanical		
Dimensions	61.5x61.5x26.3	mm
Mounting	Panel cut out, 57	mm
Mass	0.143	kg
Depth behind panel without connectors	27	mm
Depth in front of panel	29	mm
Electrical		
Voltage (nom.)	13.8	V DC
Voltage (operational)	9 to 32	V DC
Low voltage shutdown	8	V DC
Current (nom.)	0.07	A
Optical		
Brightness	0.2 – 1350	cd/m^2
Viewing Angle	45	°
LCD Viewing Area	40.5 x 32.2	mm
LCD Viewing Envelope	45 / 45 / 45 / 45	°

1.5.3 Characteristics of the ATD-80

Parameter	Data	Unit
Mechanical		
Dimensions	83x83x53.01	mm
Mounting	Panel cut out, 80	mm
Mass	0.190	kg
Depth behind panel without connectors	24.25	mm
Depth in front of panel	29	mm
Electrical		
Voltage (nom.)	13.8	V DC
Voltage (operational)	9 to 32	V DC
Low voltage shutdown	8	V DC
Current (nom.)	0.08	A

1.5.4 Housing and Human Machine Interface

ATD has an all-metal housing with anti-reflective blackout finish on all parts visible to the flight crew.

ATD is controlled by two concentric rotary knobs (not illuminated) and four softkey pushbuttons (illuminated).

Information is displayed on a backlit TFT color display. The display is sunlight readable and features a dimmable backlight.
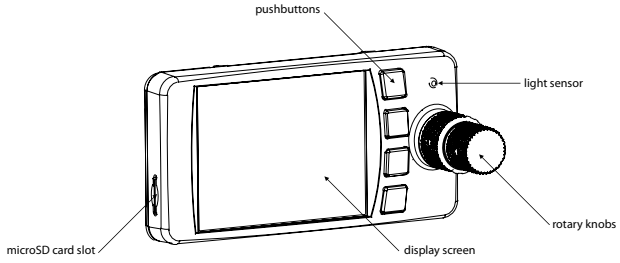
Figure 1.4.: Housing and human-machine-interface overview ATD-11
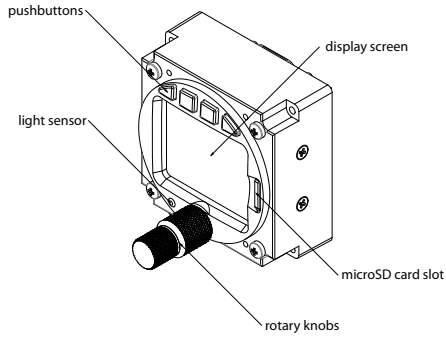
Figure 1.5.: Housing and human-machine-interface overview ATD-57
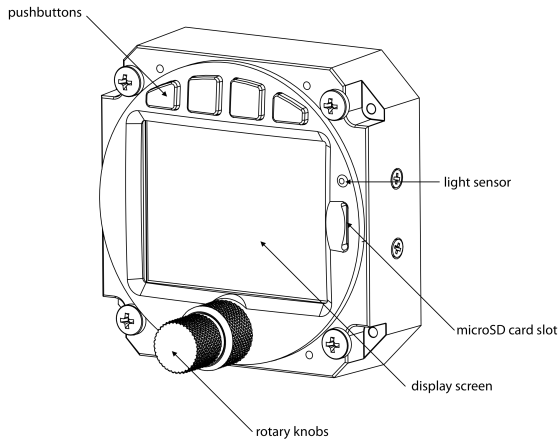
Figure 1.6.: Housing and human-machine-interface overview ATD-80

1.6 Environmental Specifications

1.6.1 General Environmental Data for all AIR Traffic Display Variants

Characteristics	Specifications	Unit
Low Ground Survival Temperature	-55	°C
Low Operating Temperature	-20	°C
High Ground Survival Temperature	+85	°C
High Short Time Operating Temperature	+70	°C
High Operating Temperature	+55	°C
Temperature Variation	5	K / minute
Humidity	0 – 98	%
Max. Operational Altitude	50,000	ft
Operational Shock	6	g
Crash Safety Shock	20	g
Vibration	DO-160D U F/F1	
Vibration	DO-160D S M	

1.6.2 Detailed Environmental Data for ATD-57

Environmental tests are performed in accordance with RTCA DO-160D Chg. 3

Description	Section	Category	Conditions
Temperature / Altitude D1	4.0	D1	
Low Ground Survival Temperature	4.5.1	D1	-55°C
Low Operating Temperature	4.5.1	D1	-20°C
High Ground Survival Temperature	4.5.2	D1	+85°C
High short Time Operating Temperature	4.5.2	D1	+70°C
High Operating Temperature	4.5.3	D1	+55°C
In Flight Loss of Cooling	4.5.4	Z	No auxiliary cooling required
Altitude	4.6.1	D1	50,000 ft (alticoder / altimeter limited to 40,000ft)
Temperature Variation	5.0	B	5°C / minute
Humidity	6.0	A	
Shock	7.0	B	6 G operational, 20 G crash safety
Vibration	8.0	U	Vibration curve F/F1
		S	Vibration curve M

Description	Section	Category	Conditions
Explosion Proofness	9.0	X	not tested
Water Proofness	10.0	X	not tested
Fluids Susceptibilities	11.0	X	not tested
Sand and Dust	12.0	X	not tested
Fungus Resistance	13.0	X	not tested
Salt Spray	14.0	X	not tested
Magnetic Effect	15.0	Z	Less than 0.3m
Power Input (DC)	16.0	B	
Voltage Spike Conducted	17.0	B	
Audio Frequency Conducted Susceptibility	18.0	B	
Induced Signal Susceptibility	19.0	A	
Radio Frequency Susceptibility	20.0	S	Radiated Susceptibility
		T	Conducted Susceptibility
Emission of RF	21.0	B	
Lightning Induced Transient Susceptibility	22.0	A2XXX	
Lightning Direct Effects	23.0	X	not tested
Icing	24.0	X	not tested
Electrostatic Discharge (ESD)	25.0	A	
Fire, Flammability*	26.0	C	Acc. to RTC DO-160G

> * Flammability Test in accordance with RTCA DO-160G instead of FAR 25.853/1359 and appendix F hereto, as this is a more recent standard. DO-160D Chg. 3 does not address any aspects for fire, flammability tests.

> Cat X: Not tested

1.7   Regulatory Compliance

1.7.1   ETSO Functions

ATD does not provide any ETSO functions.

1.7.2   Deviations

Not applicable.

1.7.3   Non-ETSO Functions

1. Cockpit Display of Traffic Information

2. Cockpit display of traffic-, obstacle-, and general warnings from connected systems.

3. Configuration of connected FLARM compatible systems.

1.7.4   Limitations

The Flight crew is ultimately responsible for traffic avoidance.

This unit shall not be used as the primary means of traffic avoidance and shall be used for situational awareness only on a no-hazard no-credit basis.

1.7.5   Installation

It is the responsibility of those installing this article either on or within a specific type or class of aircraft to determine that the aircraft installation conditions are within required standards. The article may be installed only if performed under applicable airworthiness requirements. Installation must follow acceptable practices.

1.8   Liability

IN NO EVENT WILL AIR AVIONICS BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, WHETHER RESULTING FROM THE USE, MISUSE OR INABILITY TO USE THE PRODUCT OR FROM DEFECTS IN THE PRODUCT.

1.9   Unpacking and Inspecting Equipment

Before installation into an aircraft, the equipment should be visually inspected for shipping damages and completeness. If the unit is damaged, notify the carrier. Do not return the unit to AIR Avionics before the carrier has authorized a claim.

The following parts are normally included with delivery of an ATD:

1.9.1   Air Traffic Display 11 (ATD-11)

Part	*Part number*	*Description*
1 x ATD-11 main unit	ATD-11	ATD-11 main unit
4 x screws	–	M2.5 x 4mm screws
1 x connection cable	B394	Standard ATD to RJ45 connection cable
1 x documentation	–	ATD documentation package

1.9.2   Air Traffic Display 57 (ATD-57)

Part	*Part number*	*Description*
1 x ATD-57 main unit	ATD-57	ATD-57 main unit
4 x panel screws	–	DIN7985 M3 x 8mm panel screws
1 x connection cable	B394	Standard ATD to RJ45 connection cable
1 x documentation	–	ATD documentation package

1.9.3   Air Traffic Display 80 (ATD-80)

Part	Part number	Description
1 x ATD-80 main unit	ATD-80	ATD-57 main unit
4 x panel screws	–	DIN7985 M4 x 8mm panel screws
1 x connection cable	B394	Standard ATD to RJ45 connection cable
1 x documentation	–	ATD documentation package

Should there be missing parts or spare parts required, please contact AIR Avionics or visit *https://www.air-store.eu*

1.10   Installation Materials

1.10.1   Tools required but not supplied

Standard Tools

Tool	Specification	Description
Phillips screwdriver	PH 00	Screwdriver for supplied phillips screws M2.5 (ATD-11)
Phillips screwdriver	PH 0	Screwdriver for supplied phillips screws M3 (ATD-57)
Phillips screwdriver	PH 1	Screwdriver for supplied phillips screws M4 (ATD-80)

Special Tools

If not using the supplied standard cable and manufacturing an individual wiring harness, using crimp contacts for all connectors is recommended. The table below identifies crimp tools required to ensure consistent, reliable crimp contact connections for the rear D-SUB connectors.

Hand Crimping Tool	Positioner	Insertion Extraction Tool
M22520/2-01	M22520-2-06	M81969/14-01

Supplied part numbers are military part numbers. Please contact AIR Avionics support or visit *https://www.air-store.eu* for procurement.

1.10.2   Parts required but not supplied

ATD is intended for use with standard aviation accessories. The following items are required for custom wiring harnesses and not supplied.

- Wire (MIL-W-22759/16 or equivalent)
- Shielded wire (MIL-C-27500 or equivalent)
- D-SUB 15HD FEMALE connector, crimp type preferred, and crimp inserts

- D-SUB 15HD connector backshell, metalized or full-metal type preferred, quicklock type preferred
- Push/Pull (manually resettable) circuit breakers
- Tie wraps or lacing cord

1.10.3 Optional Standard Kit Accessories

A wide range of accessories is available. Please visit *https://www.air-store.eu* for details.

2 | System Interconnects and Interfaces
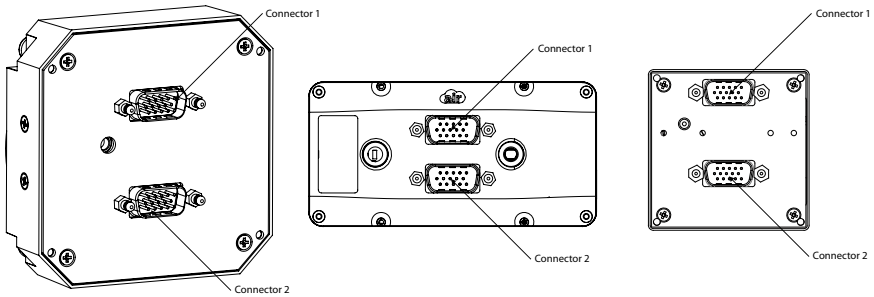
Figure 2.1.: System interconnects overview for ATD-80, ATD-11, and ATD-57. View from the back.

Both connectors are D-SUB 15 high density male types. Small pin numbers are molded into the connectors for easier pin identification. Pin numbers of mating (female) connectors are identical, therefore mating pins have identical numbers.
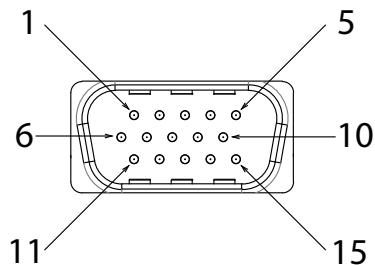
Figure 2.2.: Connector Pin Map

2.1   Pin Function List

2.1.1 Connector 1

Pin Name	Pin number	I/O
Aircraft Power (VIN)	1.1	In
RS-232 Port 1 receive data (RXD1)	1.2	In
RS-232 Port 1 transmit data (TXD1)	1.3	Out
Enable (EN)	1.4	Out
Aircraft Ground (GND)	1.5	-
Aircraft Power (VIN)	1.6	In
Data Bus Low Signal (CANLO)	1.7	In/Out
Data Bus High Signal (CANHI)	1.8	In/Out
Discrete Output 1 (OUT1)	1.9	Out
Discrete Output 2 (OUT2)	1.10	Out
Voltage Sensor Input 1 (USENS1)	1.11	In
Data Bus Termination 120R (CANTERM)	1.12	In
Discrete Input 1 ($\overline{IN1}$)	1.13	In
Aircraft Ground (GND)	1.14	In
Buzzer Output 1 (BZZOUT1)	1.15	Out

2.1.2 Connector 2

Pin Name	Pin number	I/O
Aircraft Power (VIN)	2.1	In
RS-232 Port 2 receive data (RXD2)	2.2	In
RS-232 Port 2 transmit data (TXD2)	2.3	Out
Enable (EN)	2.4	Out
Aircraft Ground (GND)	2.5	-
Aircraft Power (VIN)	2.6	In
Data Bus Low Signal (CANLO)	2.7	In/Out
Data Bus High Signal (CANHI)	2.8	In/Out
Discrete Output 3 (OUT3)	2.9	Out
Discrete Output 4 (OUT4)	2.10	Out
Voltage Sensor Input 2 (USENS2)	2.11	In
Data Bus Termination 120R (CANTERM)	2.12	In
Discrete Input 2 ($\overline{IN2}$)	2.13	In
Aircraft Ground (GND)	2.14	In
Buzzer Output 2 (BZZOUT2)	2.15	Out

2.2 Data Interfaces

2.2.1 Serial Data Interface

ATD is capable of interfacing with other aviation instruments by sending and/or receiving serial data on its serial ports.

Pin Name	Pin number	I/O
RS-232 Port 1 data out (TXD1)	1.3	Out
RS-232 Port 1 data in (RXD1)	1.2	In
RS-232 Port 2 data out (TXD2)	2.3	Out
RS-232 Port 2 data in (RXD2)	2.2	In

The serial outputs conform to RS-232C (EIA Standard) with a positive and negative output voltage of at least 5V when driving a standard RS-232 load.

The serial data interface (RS-232) consists of one or two data transfer wires and a ground connection. As shown in the example below, there shall always be a direct ground connection between all RS-232 clients.

It is not sufficient that power supply ground in both devices is connected to aircraft ground, an additional direct ground connection is mandatory.

The use of a twisted pair shielded cable, for example MIL-C-27500-22TG 2T14[1], is highly recommended. With this cable both data wires and the GND reference can be connected using a single cable.
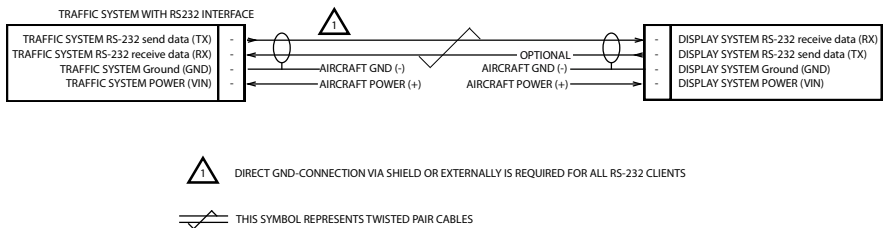
Figure 2.3.: Generic RS-232 wiring recommendation between "Traffic System" and "Traffic Display"

The table below contains maximum recommended cable lengths using shielded data cables for an RS-232 data interface. Exceeding these cable lengths may reduce signal integrity and therefore the reliability of the data interface.

Data Rate	Recommended Cable Length (meter)	Comment
4800 Bd	30	Standard NMEA 0183 data rate
9600 Bd	15	–
19,200 Bd	7.6	–
38,400 Bd	3.7	–
57,600 Bd	2.6	–

[1] for procurement, please visit *https://www.air-store.eu*

Serial Input Protocol

ATD accepts "extended NMEA" GPS and traffic data as well as GARMIN TIS traffic data. For a detailed description of supported datasets, please contact AIR Avionics customer support.

ATD accepts different data rates. ATD-57 automatically adjusts to the current data rate present on its serial inputs, if one of the following:

- 4800 baud
- 9600 baud
- 19,200 baud
- 28,800 baud
- 38,400 baud
- 57,600 baud

2.3 Power and Lighting Functions

This section covers the power input requirements and lighting bus input.

2.3.1 Power Supply

Power inputs on connector 1 and connector 2 provide power. All pins of one connector should be connected. If required, pins on both connectors may be connected.

Connector 1 and connector 2 power pins are internally decoupled. Therefore different supply voltages on the two connectors are acceptable, e.g. if a backup battery is connected to one of the two connectors.

Pin Name	Pin number	I/O
Aircraft Power	1.1/1.6 or 2.1/2.6	In
Aircraft Ground	1.5 or 2.5	–

Connection of input power to incorrect pins can cause damage to the unit that will require return to the factory for repair. Ensure that the power supply is connected to the correct pins and does not short to any adjacent pins prior to applying power to the unit.

2.3.2 Lighting Bus

Pin Name	Pin number	I/O
Lighting Bus	1.11 or 2.11	In

Connection of the lighting bus to incorrect pins can cause damage to the unit that will require return to the factory for repair. Ensure that the lighting bus is connected to the correct pins and does not short to any adjacent pins prior to applying power to the unit, including the lighting bus.

In aircraft certified for VFR night operations, the lighting bus interface is mandatory.

2.4   Discrete Inputs

A "NO WARNINGS SWITCH" or a "NORTH UP SWITCH" or both can be connected to either one of the two active-low discrete inputs.

Active-low discrete inputs are considered active if either the voltage to ground is below 2V or the resistance to ground is below 375 Ohm. These inputs are considered inactive if the voltage to ground is 9–32VDC.

Pin Name	Pin number	I/O
Switch Input	1.13 or 2.13	In

3.1 General Handling Recommendations

3.1.1 ESD Handling Recommendations

To avoid damage to the ATD, take precautions to prevent Electrostatic Discharge (ESD) when handling the unit, connectors, and associated wiring. ESD damage can be prevented by touching an object that is of the same electrical potential as the unit before handling the unit itself.

3.2 Workmanship

Installation of avionics equipment into an aircraft is a complex task that requires expert skills and know-how. While some installation practices may lead to quicker results, only practices that provide for excellent durability and reliability are acceptable. As many avionics systems have a life cycle of several decades, a durable and reliable installation in compliance to strict workmanship standards is of utmost importance.

3.2.1 Workmanship

"Workmanship is defined as the control of design features, materials and assembly processes to achieve the desired durability and reliability for subassembly interconnections, specifically those in printed wiring assemblies and cable harnesses, and the use of inspection techniques and criteria to assure interconnect quality. Workmanship promotes standardized designs and fabrication practices to enhance assembly durability and reliability and restricts the use of designs and manufacturing processes known to reduce those qualities."[1]

3.2.2 Standards

> Always follow acceptable avionics installation practices. Installation must always follow regulatory requirements.

Many military or civil standards for avionics installations are acceptable.

NASA Workmanship Standards

As an addition to regulatory requirements we recommend installation in accordance to NASA WORKMANSHIP STANDARDS. These standards provide for an excellent overview and in-detail knowledge on acceptable practices including explanations and a pictorial

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[1]Source: *https://nepp.nasa.gov/workmanship*

reference. NASA WORKMANSHIP STANDARDS are publicly available on this website: *https://nepp.nasa.gov/workmanship*

Pictorial Reference

On *https://workmanship.nasa.gov* a pictorial reference "intended to provide insight to certified operators, inspectors and instructors who visually assess the compliance of flight hardware to locally applicable requirements"[2] is available.

3.3   Cabling and Wiring Considerations

3.3.1   General Wiring Considerations

Wiring should be installed in accordance with applicable regulations.

- It should not be possible for a cable harness to be exposed to wire chafing.
- Route the wiring bundle as appropriate. Avoid sharp bends.
- Secure all wires in order to minimize vibration damage.
- Preferably shielded wire is to be used.
- Use 22 or 24 AWG wire for all connections unless otherwise specified.
- The cable harness should not be located near flight control cables and controls, high voltage lines or fuel lines.
- The cable harness should be located in a protected area of the aircraft.
- Do not route cable near high voltage sources.

For dual ATD installations, care should be taken to ensure separation between wires of redundant systems to reduce the possibility of failure due to a single event.

For the D-SUB connectors, crimp terminals and mating receptacles are recommended because these are more reliable than soldered connections, and are easier to assemble in-situ in an aircraft, where soldering is impractical. They also allow individual wires to be removed and replaced in a receptacle without replacing the whole connector.

For power supply, manually resettable circuit breakers are strongly recommended. These circuit breakers allow for individual devices to be switched off without compromising other systems on the same power bus.

3.4   Mounting Considerations

Be sure that any aircraft controls and emergency features do not interfere with ATD

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[2]Source *https://workmanship.nasa.gov*

The unit shall always be mounted within view and reach of the flight crew. The unit location should minimize flight crew head movement when transitioning between looking outside of the cockpit and viewing/operating the ATD. The location should be suchthat the ATD is not blocked by the glare shield on top, or by the throttles, control yoke, etc. on the bottom. Try not to mount ATD in a location that is exposed to sunlight focussed by the canopy.

ATD-57 and ATD-80 are designed to be mounted in the aircraft instrument panel. ATD-11 is designed to be installed externally on a mount or in the aircraft instrument panel.

3.5   Air Circulation and Cooling

ATD-57 does not require external cooling. However lower operating temperatures extend equipment life. Reducing the operating temperature increases the mean time between failures (MTBF).

Units tightly installed heat each other through radiation, convection, and sometimes by direct conduction. Even a single unit operates at a much higher temperature in still air than in moving air. Fans or some other means of moving the air around electronic equipment are usually a worthwhile investment.

3.6   Compass Safe Distance

After reconfiguring the avionics in the cockpit panel, if ATD-57 is mounted less than 30 cm from the compass, recalibrate the compass and make the necessary changes for noting correction data.

4 | Installation Procedures

We recommend installing the ATD according to the following process:

1. Equipment mounting
2. Switch installation (optional)
3. Wiring harness and interconnect installation
4. Post installation configuration, checkout, and documentation

4.1   Equipment Mounting

1. Decide where and how the equipment shall be mounted.
2. If the equipment shall be mounted in the instrument panel, use the dimensions shown in appendix A to prepare the mounting holes. For ATD-57 and ATD-80 standard templates for 57mm/80mm panel cutouts can be used. For ATD-11 a special panel cutout can be prepared. If the equipment shall be installed using a mount (ATD-11), please follow the installation specifications of the mount.
3. Install the unit. Secure all screws.

Using other screws than those supplied may cause damage to the device

4.2   Switch Installation (optional)

Two toggle switches may be optionally installed and connected to the two discrete inputs. A toggle switch either suppresses all alarms, or changes the traffic-display orientation to "north up" if the switch source is exercised.

Make sure that the switch is labeled in a way that misinterpretations are not possible:

- The switch can be labeled with the words "TRAFFIC WARNINGS:" and the switch positions with "NO ALARMS" and "NORMAL".
- The switch can be labeled with the words "TRAFFIC DISPLAY NORTH UP:" and the switch positions with "NORMAL" and "ON".

The following process should be used for switch installation:

1. Install the switch in an appropriate position.
2. Label the switch according to requirements mentioned above.

4.3   Interconnect Installation

In appendix C, wiring diagrams for most common installation cases are given.

Install all electrical connectors and ensure that they are appropriately secured. We recommend using "Quicklock" D-Sub backshells (standard configuration).

4.4   Post Installation Configuration, Checkout, and Documentation

This is a summary of the steps required for checkout, configuration, and installation documentation:

- Perform the installation checks. Instructions can be found in chapter 5.
- Configure the unit for the specific installation. Work though every configuration item according to instructions in chapter 6.
- Perform ground checks. Instructions can be found in chapter 7.
- Update the aircraft documentation. Instructions can be found in chapter 8.

5 | Post Installation Checkout

This chapter contains instructions for checking out an ATD installation. Checks shall ensure the system is properly installed and functioning correctly.

5.1 Wiring Checks

Verify that all cables are properly secured. Check the movement of aircraft controls to verify there is no interference between the cabling and controls. Ensure that all wiring is installed as described.

Prior to powering up ATD, the wiring harness must be checked for proper connections to the aircraft systems and other avionics equipment. Point to point continuity must be checked to expose any faults such as shorting to ground.

After accomplishing a continuity check, perform power and ground checks to verify proper power and GND levels are present. Any faults or discrepancies should be corrected at this time.

Any faults or discrepancies must be corrected before proceeding.

Make sure shielding is installed where appropriate.

ATD may be connected after completion of the continuity and power checks. All connections must be made before the unit is powered up.

5.2 Connector Engagement Checks

Prior to powering up ATD, a connector engagement check should be performed.

1. Optically inspect all interconnects.
2. Check if all connectors are locked properly, verify by gently pulling on the connectors.

6.1 Configuration Operations

6.1.1 Configuration Menu

The ATD-57 is configured in the configuration menu. To enter the configuration menu, push the (inner knob pushbutton) for at least 2 seconds (long push). The menu contains several configuration options and informations about ATD-57 and connected systems.

Please find a menu diagram in appendix B

6.1.2 Configuration Reset to Defaults

In order to reset the system configuration to factory defaults, please perform the following steps:

1. Disconnect the device from power.
2. Press and hold (softkey 3) and (softkey 4) while connecting the device to power. Keep holding the softkeys until the device has booted.
3. All settings are now reset to the factory defaults.

All settings will be reset. This process can not be undone. After factory defaults have been applied the device is no longer in an airworthy configuration state. All configuration operations have to be conducted again.

6.2 Device Configuration

In the configuration menu, *DEVICE* contains specific configuration parameters and information about the ATD-57 device itself.

6.2.1 Sounder Volume

ATD-57 features an integrated alert sounder (buzzer) for warning annunciation. The alert sounder volume can be adjusted to meet individual installation requirements. The default for this value is 3.

To change the alert sounder volume, please carry out the following steps:

1. Open the menu with a long push on the (inner knob pushbutton).
2. Use the (inner knob) to navigate to *DEVICE → SOUNDER VOLUME*

---

3. Use the [inner knob] to select a desired volume.

4. Push the [inner knob pushbutton] to execute your selection.

5. Push the [ESC softkey] to leave the menu.

6.2.2   Info

The INFO menu contains information about the devices software and hardware versions as well as installed databases.

6.2.3   Status

The STATUS menu contains information about the current status of the device, the supply voltage and the state of the switch inputs.

6.2.4   Illumination Override

The ILUM OVERRIDE menu allows the flight crew to quickly override all illumination settings and to dim the display manually. This is required, for example, when the ambient lighting sensor fails during a flight and the display thus becomes unreadable.

6.2.5   Installation

In this section of the DEVICE menu, parameters that are set once during the devices installation can be found.

HMI Illumination Brightness Control

Human machine interface illumination brightness (screen and buttons) can be controlled using independent methods, only one brightness control method can be used at a time.

- Manual brightness control - Brightness at a set value (user adjustable).

- Automatic brightness control - Automatic adjustment using the ambient light sensor

- Brightness control over aircraft lighting bus - using one of the lighting bus inputs

> For aircraft operating at night, the aircraft lighting bus input must be used.

The value for manual, minimum, and maximum illumination levels can be configured individually. Aircraft lighting bus source and minimum/maximum voltage values can as well be configured.

> Please note that some changes like minimum and maximum illumination level require a system restart before they take effect.

Manual Brightness Control

To change the HMI illumination mode to manual brightness control, please carry out the following steps:

1. Open the menu with a long push on the [inner knob pushbutton].

2. Use the [inner knob] to navigate to *DEVICE → INSTALLATION → ILLUMINATION →
MODE*.

3. Use the [inner knob] to select *MANUAL*.

4. Push the [inner knob pushbutton] to execute your selection.

5. Push the [ESC softkey] to leave the menu.

Now the brightness level as configured in *MANUAL INTENSITY* is used.

Automatic Brightness Control

To change the HMI illumination mode to automatic brightness control, please carry out the
following steps:

1. Open the menu with a long push on the [inner knob pushbutton].

2. Use the [inner knob] to navigate to *DEVICE → INSTALLATION → ILLUMINATION →
MODE*.

3. Use the [inner knob] to select *AUTO*.

4. Push the [inner knob pushbutton] to execute your selection.

5. Push the [ESC softkey] to leave the menu.

Now the brightness level is adjusted using the ambient light sensor in the front bezel of
the device. Restrictions to minimum and maximum brightness levels are configured in
MINIMUM and *MAXIMUM*.

Brightness Control over Aircraft Lighting Bus

In order to use the aircraft lighting bus, the following configuration actions have to be
taken:

1. change HMI illumination mode

2. configure the input pin used

3. configure input voltage levels

To change the HMI illumination mode to aircraft lighting bus, please carry out the following
steps:

1. Open the menu with a long push on the [inner knob pushbutton].

2. Use the [inner knob] to navigate to *DEVICE → INSTALLATION → ILLUMINATION →
MODE*.

3. Use the [inner knob] to select *LIGHTINGBUS*.

4. Push the [inner knob pushbutton] to execute your selection.

5. Push the [ESC softkey] to leave the menu.

To configure the correct input pin for the lighting bus, please carry out the following steps:

1. Open the menu with a long push on the [inner knob pushbutton].

2. Use the (inner knob) to navigate to *DEVICE → INSTALLATION → ILLUMINATION →*
   LIGHTING BUS → LIGHT. BUS SRC.

3. Use the (inner knob) to select *select the pin, the aircraft lighting bus is connected to*
   (USENS1 or USENS2).

4. Push the (inner knob pushbutton) to execute your selection.

5. Push the (ESC softkey) to leave the menu.

Now the brightness level is adjusted using the confirgured lighting bus input pin. To
configure desired voltage levels for minimum and maximum brightness, please carry out
the following steps:

1. Open the menu with a long push on the (inner knob pushbutton).

2. Use the (inner knob) to navigate to *DEVICE → INSTALLATION → ILLUMINATION →*
   LIGHTING BUS → LIGHT. BUS MIN.

3. set the aircraft lighting bus to the minimum level using the lighting bus control in
   your aircraft.

4. Push the (inner knob pushbutton) to execute your selection.

5. Use the (inner knob) to navigate to *DEVICE → INSTALLATION → ILLUMINATION →*
   LIGHTING BUS → LIGHT. BUS MAX.

6. set the aircraft lighting bus to the maximum level using the lighting bus control in
   your aircraft.

7. Push the (inner knob pushbutton) to execute your selection.

8. Push the (ESC softkey) to leave the menu.

Power On Mode

"Power On Mode" is typically active (set to ON) in order to always automatically switch
ATD-57 on if sufficient supply power is present. By setting the Power On Mode to OFF
ATD-57 ignores supply power and is switched on by pushing (softkey 1).

As mentioned above, the default setting for this parameter is *ON*. To change Power On
Mode configuration, please carry out the following steps:

1. Open the menu with a long push on the (inner knob pushbutton).

2. Use the (inner knob) to navigate to *DEVICE → INSTALLATION → POWER ON MODE*.

3. Push the (inner knob pushbutton) to toggle between ON and OFF.

4. Push the (ESC softkey) to leave the menu.

Data Ports

ATD-57 can receive traffic data from various data sources. The data source can be connected
to either one of the two independent RS-232 data ports of the ATD.

To change the data port configuration, please carry out the following steps:

1. Open the menu with a long push on the (inner knob pushbutton).

2. Use the [inner knob] to navigate to *DEVICE → INSTALLATION → DATA PORTS → PORT 1* or *DEVICE → INSTALLATION → DATA PORTS → PORT 2*.

3. Use the [inner knob] to select a source: *AT-1*, *FLARM*, *PowerFLARM*, *GARMIN TIS*, *GDL90* or *NOT CONNECTED*.

4. Push the [inner knob pushbutton] to execute your selection.

5. Push the [ESC softkey] to leave the menu.

A correct configuration of this parameter is required for the ATD to communicate with its data source. If not configured correctly, the screen "waiting for traffic receiver" will appear and not go away.

Switches

Two toggle switches may be optionally installed and connected to the two discrete inputs. A toggle switch either suppresses all alarms, or changes traffic-display orientation to "north up" if the switch source is exercised.

The *NO WARNINGS* and *ORIENTATION* functions can be individually mapped to input 1 (on the upper connector) and input 2 (on the lower connector).

To change the switch configuration, please carry out the following steps:

1. Open the menu with a long push on the [inner knob pushbutton].

2. Use the [inner knob] to navigate to *DEVICE → INSTALLATION → SWITCHES → NO WARNINGS* or *DEVICE → SWITCHES → ORIENTATION*.

3. Use the [inner knob] to select a source: *IN1* (input on upper connector), *IN2* (input on lower connector), or *NOT CONNECTED*.

4. Push the [inner knob pushbutton] to execute your selection.

5. Push the [ESC softkey] to leave the menu.

6.3   Traffic View Configuration

In the configuration menu, *TRAFFIC VIEW* holds data display and user interface parameters.

6.3.1   Quick Select

In *CONFIGURATION MENU → VIEW → QUICK SELECT* the quick selection target list can be managed. For details about using this feature, please consult the Pilot's Manual.

6.3.2   Installation

In this section of the TRAFFIC VIEW menu, parameters that are set once during the devices installation can be found.

Units

Units for distance, altitude and vertical speed are configurable:

- Distance: kilometers, nautical miles, or statute miles.
- Altitude: meters or feet.
- Vertical rate: meters per second, feet per minute, or knots.

To change the units configuration, please carry out the following steps:

1. Open the menu with a long push on the (inner knob pushbutton).
2. Use the (inner knob) to navigate to *TRAFFIC VIEW → INSTALLATION → UNITS →
   DISTANCE*, *ALTITUDE*, or *VERT RATE*.
3. Use the (inner knob) to select the desired unit.
4. Push the (inner knob pushbutton) to execute your selection.
5. Push the (ESC softkey) to leave the menu.

Own Ship Symbol

The aircraft symbol (own ship) can be configured to either resemble a motorplane, helicopter or a glider.

> Aircraft Symbol settings do not have effect on aircraft type settings in the connected traffic system.

Figure 6.1.: own ship aircraft symbols for motorplane (left) and glider (right)

To change the own ship symbol, please carry out the following steps:

1. Open the menu with a long push on the (inner knob pushbutton).
2. Use the (inner knob) to navigate to *TRAFFIC VIEW → INSTALLATION → OWN-SHIP*.
3. Use the (inner knob) to select the desired symbol.
4. Push the (inner knob pushbutton) to execute your selection.
5. Push the (ESC softkey) to leave the menu.

Nav Boxes

In this menu, the Nav Boxes can be activated. Additional information about the selected target is shown on the right hand side of the radar view in the nav boxes.
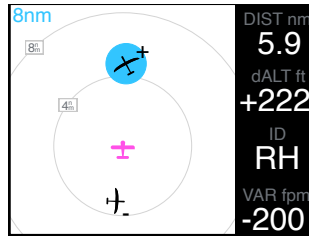
Figure 6.2.: Navboxes active (on the right side of the screen)

To change "Nav Box" settings, please carry out the following steps:

1. Open the menu with a long push on the [inner knob pushbutton].
2. Use the [inner knob] to navigate to *TRAFFIC VIEW → INSTALLATION → Nav Boxes*.
3. Push the [inner knob pushbutton] to toggle between ON and OFF.
4. Push the [ESC softkey] to leave the menu.

The content of the four Nav Boxes can be configured individually in the same menu.

Background Style

Main display colors can be selected to be black on white (default) or white on black. White on black is recommended for night flying.
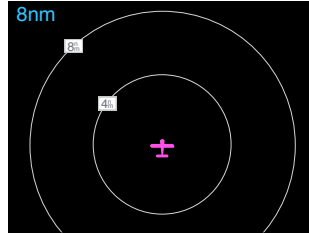
Figure 6.3.: Black Background

To activate the black background, please carry out the following steps:

1. Open the menu with a long push on the [inner knob pushbutton].
2. Use the [inner knob] to navigate to *TRAFFIC VIEW → INSTALLATION → BACKGROUND*.
3. Push the [inner knob pushbutton] to toggle between WHITE and BLACK.
4. Push the [ESC softkey] to leave the menu.

Head-On Alarm

If the head-on traffic warning screen is deactivated all traffic warnings, also those from head-on traffic are displayed using the normal traffic warning screen.

To change Head-On Alarm settings, please carry out the following steps:

1. Open the menu with a long push on the [inner knob pushbutton].
2. Use the [inner knob] to navigate to *VIEW → INSTALLATION → HEAD-ON ALARM*.
3. Push the [inner knob pushbutton] to toggle between ON and OFF.
4. Push the [ESC softkey] to leave the menu.

6.4 Traffic System Configuration

In the configuration menu, *PORT 1 DEVICE* and *PORT 2 DEVICE* hold configuration parameters for the connected traffic system on the upper (PORT 1) and lower (Port 2) data connector of the ATD.

- *INFO* contains information about the connected traffic system.
- *STATUS* contains status informations of the connected traffic system.
- *SETTINGS* allows for configuration of the connected traffic system.

Configuration and information display are only possible in specific installation cases and with some traffic systems. A bidirectional data connection is required. If the specific parameter can not be read or configured, the value "–" appears.

Please consult the documentation of the connected traffic system for available setup parameters and their recommended values.

7.1 Interface Checkout

7.1.1 Serial Interface

The serial data interface of the unit can be checked with a pragmatic function test.

1. Connect ATD and another compatible avionics system via a serial data port.
2. Verify correct operation.

7.2 Controls

This check verifies that all controls operate correctly.

1. Manipulate all pilot controls (buttons 1, 2, 3, and 4 , the concentric rotary knob , and the inner knob pushbutton). Please consult the ATD Pilot's Manual for details on pilot controls.
2. Check if manipulation results in control input on the display.

Depending on the unit's configuration and software status not all controls may be active all the time.

7.3 Lighting

7.3.1 Lighting Bus

The display and bezel key backlight on ATD can track an external lighting bus input and use it to vary the display and bezel key illumination levels accordingly.

Connection of the aircraft lighting bus to the incorrect input pins can cause damage. Always start this test with the lighting bus at the lowest setting, and slowly increase the brightness. If it is noticed that the lighting level on the display does not increase as the lighting bus input is increased in brightness, verify that the wiring is correct before proceeding.

This check verifies that the interface is connected correctly.

1. Ensure the lighting bus is set to its minimum setting.
2. Slowly vary the lighting bus level that is connected to ATD. Verify that the display brightness tracks the lighting bus setting. Continue to maximum brightness and verify proper operation.

7.3.2 Light Sensor

The light sensor can sense ambient lighting conditions and adjust illumination of display and bezel keys accordingly.

This check verifies that the sensor is working correctly.
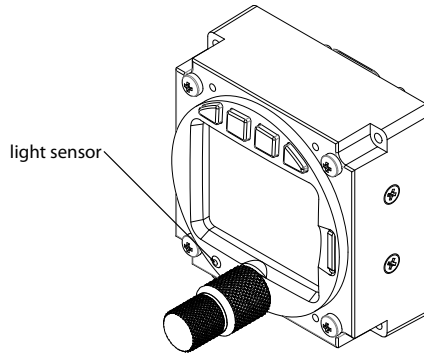
light sensor

Figure 7.1.: Light sensor on the front bezel

1. Ensure that ILLUMINATION is set to AUTO.
2. Cover the light sensor with your finger and see if display and bezel illumination changes within a time of some seconds.

7.4 Alert Sounder

This check verifies that the integrated alert sounder is working.

1. Set alert sounder volume. Test beeps shall be put out according to the volume settings.

7.5 Discrete Inputs

1. For each of the switches that are connected, exercise the switch source.
2. Verify that the function controlled by the switch operates as intended.
3. If the switch is exercised and does not cause the ATD to operate as intended, verify the wiring between the ATD and the switch.

7.6 Interference Checks

1. Verify that the ATD has no negative influence on other aircraft systems.

2. Especially check if any special noise is audible in the aircrafts COM systems by disabling the COM squelch function and carefully listening to COM background noise while controlling ATD and switching ATD on and off.

7.7   Version / Revision

Verify that the currently installed software version/revision is approved and suitable for your device, aircraft, and configuration. Verify compatibility to all connected systems by cross-checking compatibility lists of all involved systems.

Software and hardware identification and version information can be reviewed directly on the display in *CONFIGURATION MENU → DEVICE → INFO*.

8 | Configuration and Checkout Documentation

8.1   Configuration Documentation

It is mandatory for each configuration that the configuration is logged in a document that is to be added to the aircraft records.

A configuration log form is provided in appendix F

8.2   Checkout Documentation

It is mandatory for each installation that the checkout is logged in a document that is to be added to the aircraft records.

A checkout log form is provided in appendix E

Maintenance | 9

ATD can be checked "on-condition" if allowed by regulations and the aircraft manufacturer. For checkout if applicable, use aircraft manufacturer approved checkout procedures.

9.1 Software and Database Loading

Software upgrades and databases are loaded using the integrated microSD card slot and a microSD memory card.

While the software is actually loaded onto the device, the database remains on the microSD card. Therefore database information is only accessible if the microSD card is installed.

> If the microSD card is not installed, not all functions will be available.

> Never remove the microSD card while the device is in operation. If the microSD card is removed from the device during runtime, the device's software may stop working. In this case a system restart would be required.

9.1.1 microSD Card Slot

A microSD card slot is located on the right side of the unit's front panel. A microSD memory card can be inserted and removed from the device.
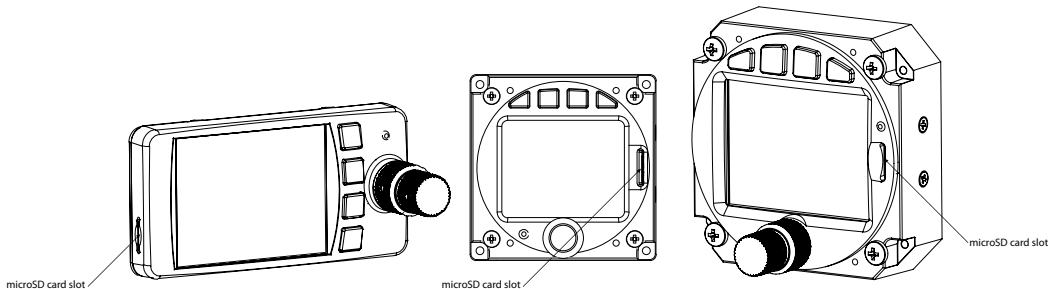
Figure 9.1.: microSD Card Slot

To insert a microSD card, insert the card into the slot, print facing to the display, little nose facing upwards for ATD-57 and ATD-80 or downwards for ATD-11 wiht controls on the right. Gently push the card until it clicks in.

Inserting the microSD card in the wrong orientation may damage the slot.
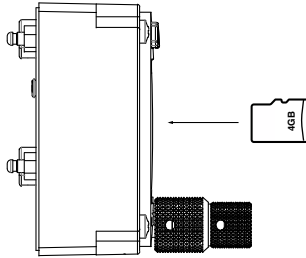
Figure 9.2.: microSD card in correct orientation for ATD-57 and ATD-80
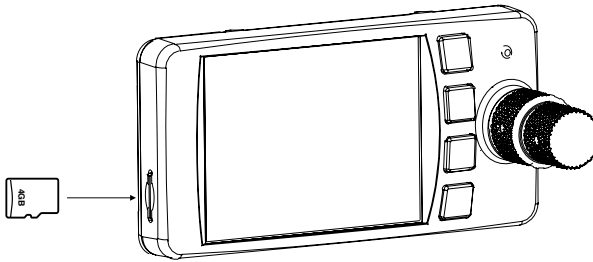
Figure 9.3.: microSD card in correct orientation for ATD-11

To remove an inserted microSD card, use your fingernail to gently push on the card until a click is audible. The card will be released following the click. Use your fingernail to remove the card.

Be careful. Application of too much force may damage the slot.

ATD is compatible to all FAT or FAT32 formatted microSD cards. It has been successfully tested with microSD cards with a storage size of 2 to 64 gigabytes.

9.1.2   Loading Software to ATD

In order to perform a software update, please carry out the following steps:

1. Load a valid ATD firmware file (A file with ending .air) onto a microSD card (into the card's root folder).

2. Insert the microSD card into the unit.

3. Power the unit on. An update message will appear.

4. Once the update process has been completed, verify the correct software version and function by repeating all configuration, checkout, and documentation steps described in chapter 6, chapter 7, and chapter 8.

5. Update required documentation.

9.1.3   Special Update Instructions from Version 1.3 to 1.5

The update to version 1.5 requires a two step process including an update of the ATD "bootloader". A bootloader is the piece of software that handles the update process on the device.

> A stable power supply is required for bootloader updates. Never disconnect power during the process. This might damage the device beyond repair.

1. Ensure software version 1.3 is installed. Update any earlier versions to 1.3.

2. Load bootloader update file (AD57BL_VER_1_7.abl) onto an empty microSD card.

3. Insert the microSD card into the unit.

4. Power the unit on. In the *CONFIGURATION MENU*, please navigate to *DEVICE → INFO → HW AND BL → UPDATE BOOTLOADER*.

5. Turn the ⌞inner knob⌟ to start the update process.

6. Once the update process has been completed, perform software update to version 1.5 or later normally (as described above).

> Please make sure that alwas only one update file is present on the microSD card at a time. Multiple files on the microSD card will cause the device to not update properly.

9.1.4   Special Update Instructions from Version 1.5 or 1.7 to 1.8 or later

The update to version 1.8 requires a two step process including an update of the ATD "bootloader". A bootloader is the piece of software that handles the update process on the device.

> A stable power supply is required for bootloader updates. Never disconnect power during the process. This might damage the device beyond repair.

1. Ensure software version 1.7 is installed. Update any earlier versions to 1.7.

2. Load bootloader update file (AD57BL_VER_2_6.abl) onto an empty microSD card.

3. Insert the microSD card into the unit.

4. Power the unit on. In the *CONFIGURATION MENU*, please navigate to *DEVICE → INFO → HW AND BL → UPDATE BOOTLOADER*.

5. Turn the ⌞inner knob⌟ to start the update process.

6. Once the update process has been completed, perform software update to version 1.8 or later normally (as described above).

Please make sure that alwas only one update file is present on the microSD card at a time. Multiple files on the microSD card will cause the device to not update properly.

9.2 Cleaning

ATD has a display that is coated with a special anti-reflective coating that is very sensitive to waxes and abrasive cleaners. It is very important to clean the display using a clean, lint-free cloth and an eyeglass lens cleaner that is specified as safe for anti-reflective coatings.
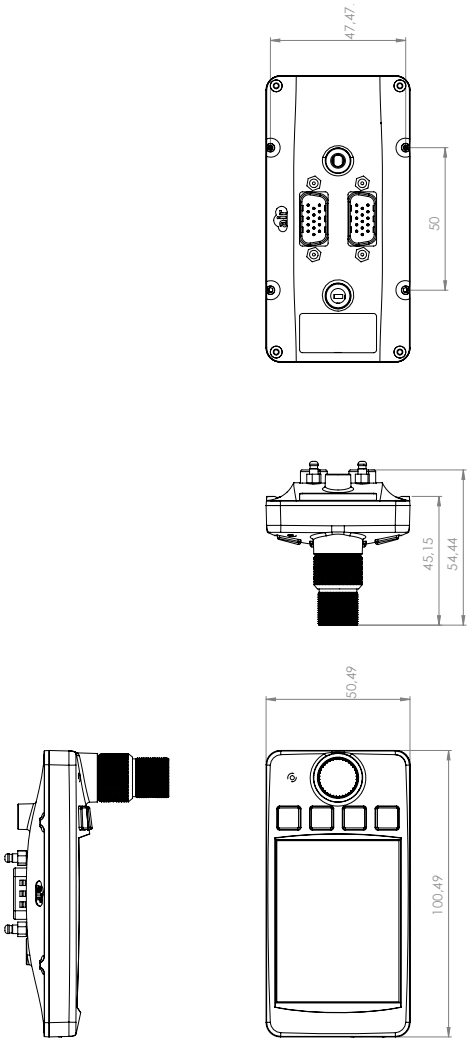
Figure A.1.: Dimensional drawing ATD-11, all dimensions in millimeters
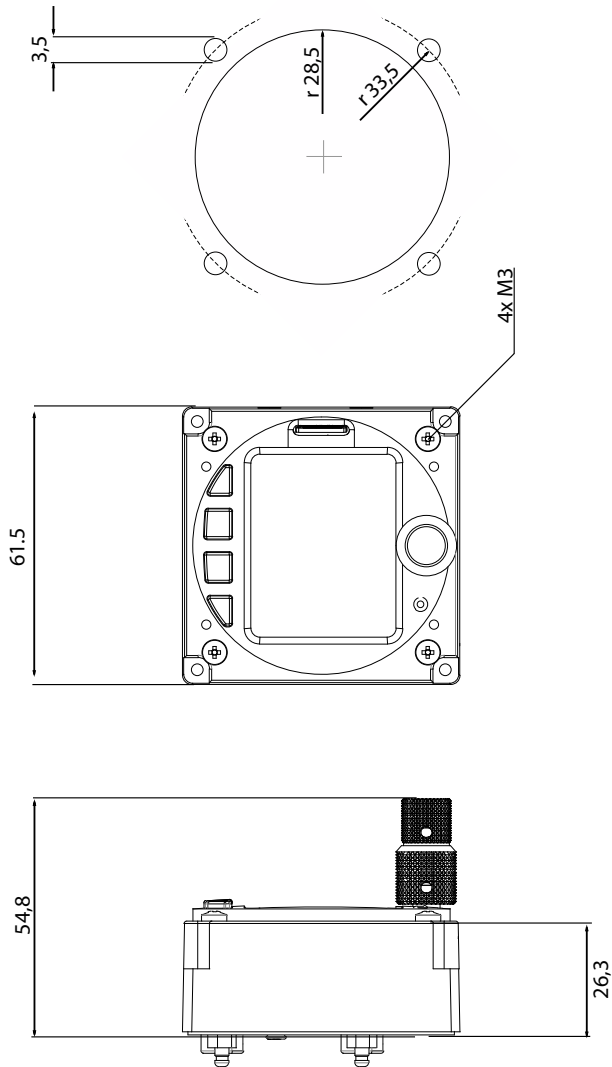
Figure A.2.: Dimensional drawing ATD-57, all dimensions in millimeters

Figure A.3.: Dimensional drawing ATD-80, all dimensions in millimeters

B | Configuration Menu Diagram

For better readability, the menu diagram is split into multiple separate parts on different pages of this manual.

```
DEVICE ─┬─ SOUNDER VOL-    ── Alert sounder vol-
        │   UME               ume configuration
        │                     page: Values from
        │                     0 (quiet) to 5 (full
        │                     loud). Default: 3
        │
        ├─ INFO ─┬─ PID: Product iden-
        │        │   tification
        │        │
        │        ├─ VID: Vendor iden-
        │        │   tification/manufac-
        │        │   turer
        │        │
        │        ├─ VER: Software ver-
        │        │   sion
        │        │
        │        ├─ BUILD: Software
        │        │   build identification
        │        │
        │        ├─ SERIAL: Device
        │        │   serial number
        │        │
        │        ├─ DATABASES ── FLARMNET:
        │        │                Database version
        │        │                or N/A
        │        │
        │        └─ MAINTENANCE ─┬─ BUILD: Build iden-
        │                        │   tification
        │                        │
        │                        ├─ BLVER: Bootloader
        │                        │   version
        │                        │
        │                        ├─ P/N: Hardware
        │                        │   Partnumber
        │                        │
        │                        └─ UPDATE BOOT-
        │                            LOADER: Install
        │                            new bootloader
        │                            from microSD card
        │
        ├─ STATUS ─┬─ SUPPLY VOLT: Sup-
        │          │   ply Voltage Level
        │          │
        │          └─ SWITCHES ─┬─ NO WARNINGS:
        │                        │   No Warnings
        │                        │   switch stater
        │                        │
        │                        └─ NORTH UP: North-
        │                            Up switch state
        │
        └─ ILLUMINTION   ── Overrides illumina-
            OVERRIDE        tion settings once
                            for as long as the
                            unit is switched
                            on
```

DEVICE — INSTALLATION

ILLUMINATION

- MODE. Parameters MANUAL, AUTO, or LIGHTINGBUS. Default: MANUAL
- MANUAL INTENSITY → Illumination intensity configuration page for manual mode: Values from 0 (dark) to 100 (full bright). Default: 80
- MINIMUM → Global minimum allowed illumination intensity: Values from 0 (dark) to 100 (full bright). Default: 1
- MAXIMUM → Global maximum allowed illumination intensity: Values from 0 (dark) to 100 (full bright). Default: 100

LIGHTING BUS

- LIGHTING BUS SRC → LIGHTING BUS source selection page. Values: NOT CONNECTED, USENS1, or USENS2. Default: NOT CONNECTED
- LIGHTING BUS MIN → LIGHTING BUS voltage for minimum illumination intensity: Values from 0V to 100V. Default 0
- LIGHTING BUS MAX → LIGHTING BUS voltage for maximum illumination intensity: Values from 0V to 100V. Default: 12.00V

POWER ON MODE: Values ON or OFF. Default: ON

DATA-PORTS

- PORT 1 → Configures, which kind of traffic unit is connected to port 1: NOT CONNECTED, AT1, FLARM, , Power-FLARM, GARMIN TIS, GDL 90 Default: NOT CONNECTED
- PORT 2 → Configures, which kind of traffic unit is connected to port 1: NOT CONNECTED, AT1, FLARM, , Power-FLARM, GARMIN TIS, GDL 90 Default: NOT CONNECTED

SWITCHES

- NO WARNINGS selection page. Values: NOT CONNECTED, IN1, or IN2. Default: NOT CONNECTED
- NORTH UP selection page. Values: NOT CONNECTED, IN1, or IN2. Default: NOT CONNECTED

SIMULATOR → Enables a simulator mode

OP Mode → Special Mode for Development Purposes

TRAFFIC VIEW

- QUICK SELECT
  - POSITION IDENTI-FIER 1
  - POSITION IDENTI-FIER 2
  - POSITION IDENTI-FIER 3
  - POSITION IDENTI-FIER 4

- INSTALLATION
  - UNITS
    - DISTANCE
      - KM: Kilometers (default)
      - NM: Nautical Miles
      - SM: Statute Miles
      - M: Meters
      - ft: Feet
    - ALTITUDE
      - M: Meters (default)
      - FT: Feet
    - VERT RATE
      - MPS: Meters per Second (default)
      - FPM: Feet per Minute
      - KN: Knots
  - OWN SHIP
    - SYMBOL
      - GLIDER SYMB
      - MOTORPLANE SYMB (default)
      - HELICOPTER SYMB
    - POSITION
      - Position of the onw ship symbol on the radar view
  - NAVBOXES
    - SHOW NAVBOXES: Values ON or OFF. Default: OFF
    - NAVBOX 1: Selects the content of the highest Navbox
    - NAVBOX 2: Selects the content of second navbox
    - NAVBOX 3: Selects the content of the third navbox
    - NAVBOX 4: Selects the content of the lowest navbox
  - BACKGROUND: Selects the background color. Values BLACK, WHITE or AUTO. Default: BLACK
  - HEAD-ON ALARM: Enable head-on alarm display style. Values ON or OFF. Default: OFF

PORT 1 DEVICE: Device specific information and parameters for the traffic system connected to Port 1

PORT 2 DEVICE: Device specific information and parameters for the traffic system connected to Port 2

Cabling Examples | C

C.1 Standard ATD to RJ-45 cable

The supplied standard cable, partnumber B394, is suitable for most standard installations with FLARM compatible traffic systems.
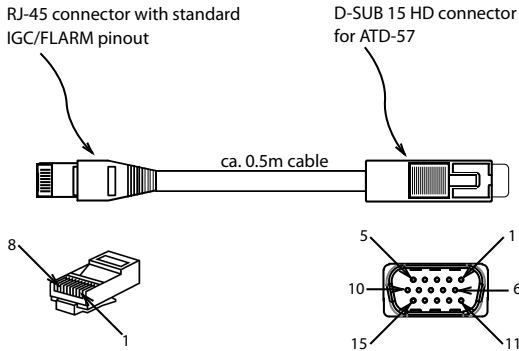

Figure C.1.: Standard D-SUB 15HD to RJ-45 cable including pin-numbers

Pin Name	Pin number RJ-45	Pin number D-SUB 15HD
Aircraft Ground (GND)	1	14
Aircraft Ground (GND)	2	5
RS-232 ATD Transmit Data (TXD)	3	3
RS-232 ATD Receive Data (RXD)	4	2
–	5	not connected
–	6	not connected
Aircraft Power (VIN)	7	1
Aircraft Power (VIN)	8	6
Databus Termination	not connected	7 bridged to 12

Pin numbering of RJ-45 connector conforms to EIA standard. Other standards (for example IGC) show reverse numbering for identical pinouts.
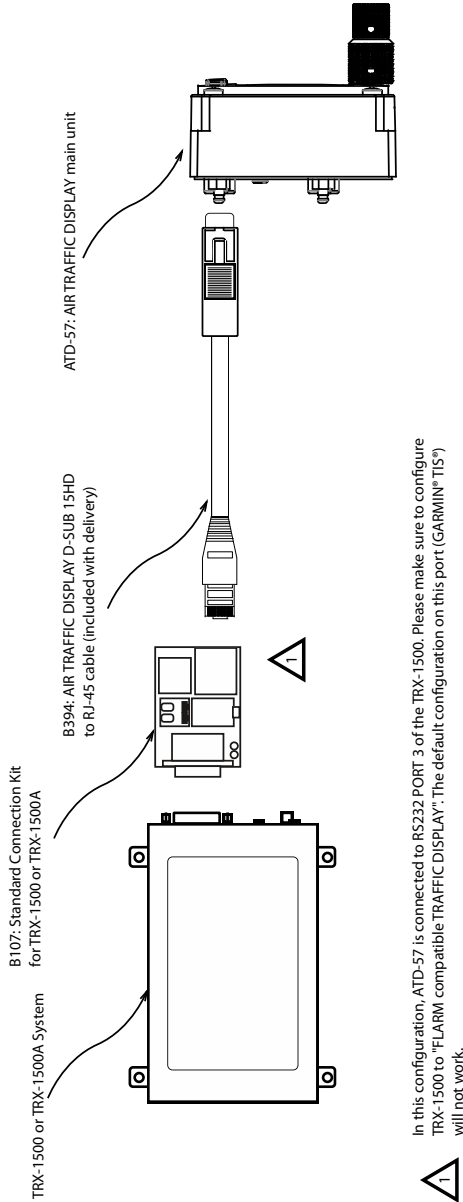
C.2   AIR Avionics TRX Systems

ATD-57: AIR TRAFFIC DISPLAY main unit

B394: AIR TRAFFIC DISPLAY D-SUB 15HD to RJ-45 cable (included with delivery)

B107: Standard Connection Kit for TRX-1500 or TRX-1500A

TRX-1500 or TRX-1500A System

In this configuration, ATD-57 is connected to RS232 PORT 3 of the TRX-1500. Please make sure to configure TRX-1500 to "FLARM compatible TRAFFIC DISPLAY". The default configuration on this port (GARMIN® TIS®) will not work.

Figure C.2.: Connection to TRX-1500

ATD-57: AIR TRAFFIC DISPLAY main unit

B394: AIR TRAFFIC DISPLAY D-SUB 15HD
to RJ-45 cable (included with delivery)

TRX-2000 System

1 In this configuration, ATD-57 is connected to RS232 PORT 2 of the TRX-2000. Alternatively it can be connected to PORT 3. If so, please make sure to configure TRX-2000 PORT 3 to "FLARM compatible TRAFFIC DISPLAY". The default configuration on this port (GARMIN® TIS®) will not work.

Figure C.3.: Connection to TRX-2000

C.3   PowerFLARM Systems

ATD-57: AIR TRAFFIC DISPLAY main unit

B394: AIR TRAFFIC DISPLAY D-SUB 15HD to RJ-45 cable (included with delivery)

PowerFLARM® CORE or PowerFLARM® CORE PURE

ATD-57 is connected to the RJ-45 Jack (PORT 1) of the PowerFLARM® CORE. Use the factory default configuration on PORT 1.

1
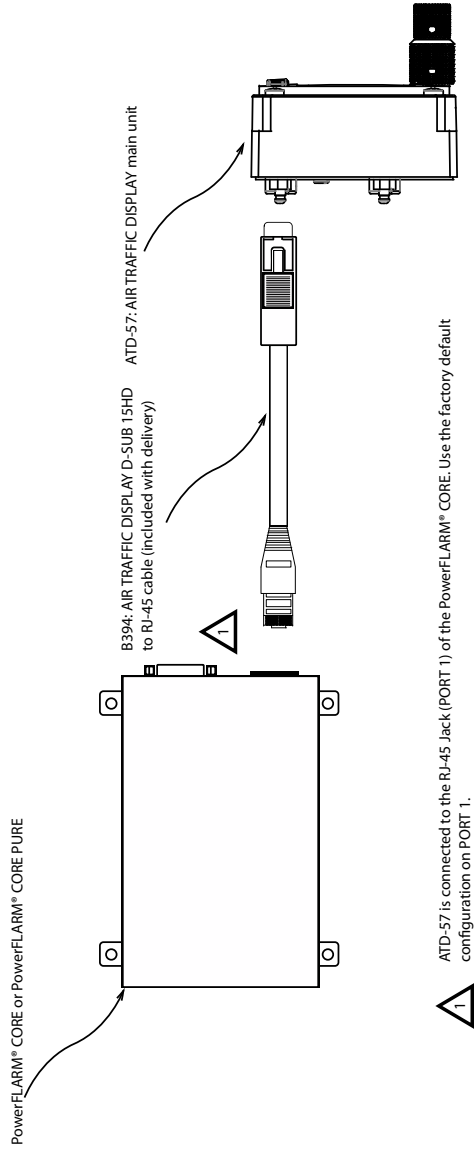
Figure C.4.: Connection to PowerFLARM CORE

ATD-57: AIR TRAFFIC DISPLAY main unit

B394: AIR TRAFFIC DISPLAY D-SUB 15HD to RJ-45 cable (included with delivery)

1 ATD-57 is connected to the RJ-45 Jack of the PowerFLARM® PORTABLE. Use the factory default configuration.

2 If running on batteries, PowerFLARM® PORTABLE is not capable of powering ATD-57. Make sure PowerFLARM® PORTABLE is powered externally, e.g. with a cigarette-lighter cable.

PowerFLARM® PORTABLE or PowerFLARM® PORTABLE PURE

Figure C.5.: Connection to PowerFLARM PORTABLE

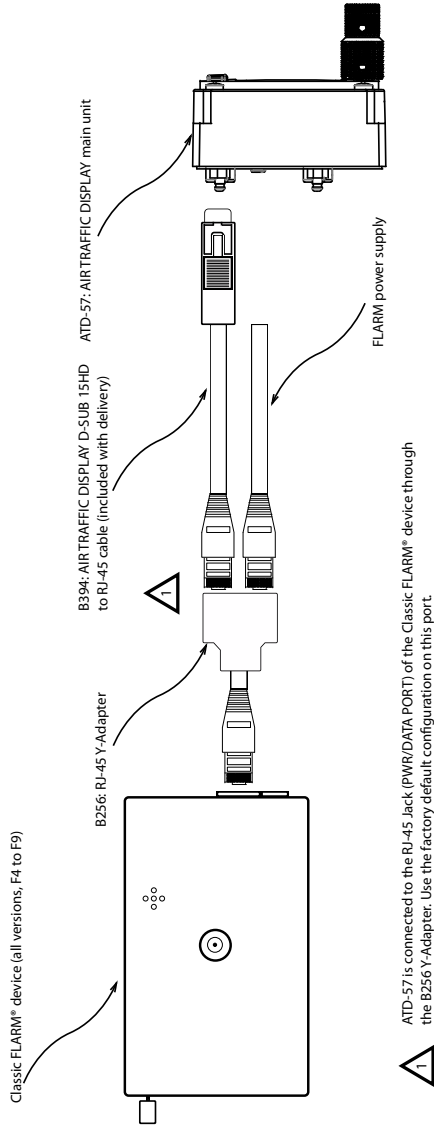## C.4 Legacy FLARM Systems

Figure C.6.: Connection to classic FLARM device
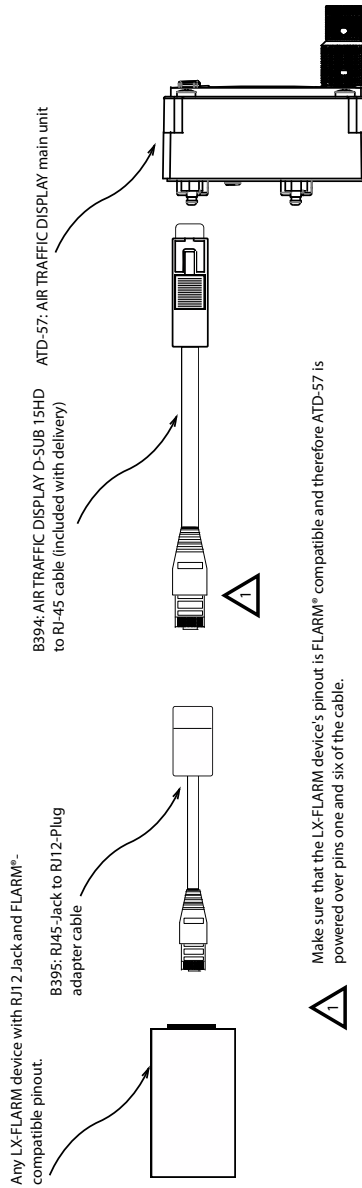
C.5   LX FLARM devices

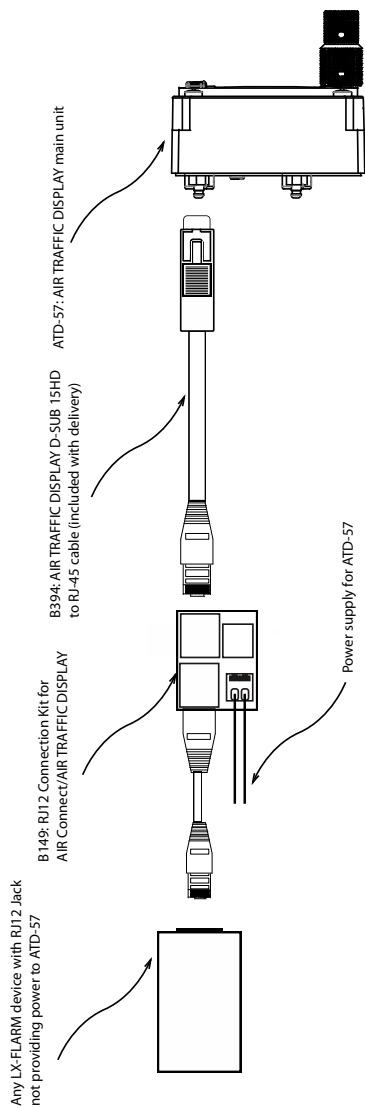Figure C.7.: LX-FLARM installation with power supplied through pins of RJ12 jack.

Figure C.8.: LX-FLARM installation with no power supplied through pins of RJ12 jack (additional accessories required).
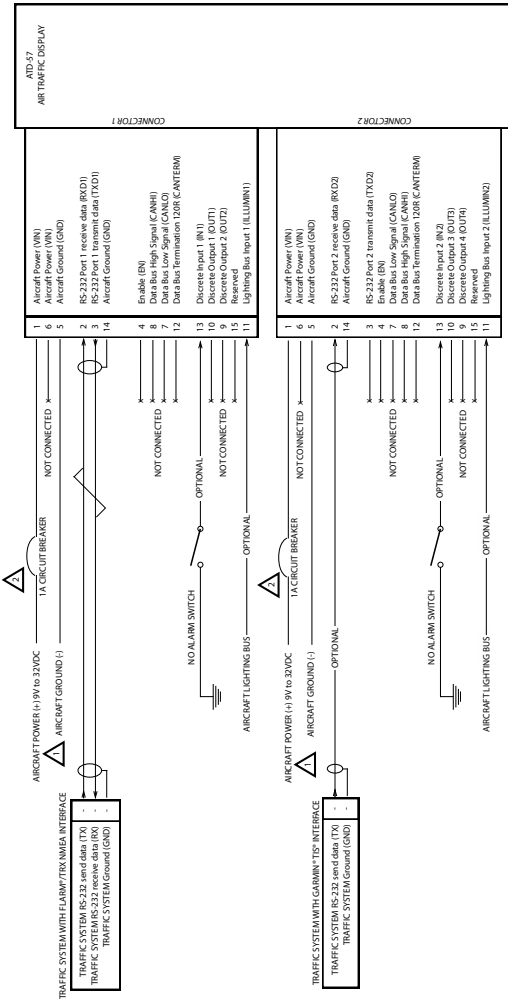
D.1 Generic Wiring Diagram

Figure D.1.: Generic wiring diagram

E | Checkout Log

E.1   Installation

1. ☐ The installation has been performed in accordance with the instructions shown in this manual.
2. ☐ Wiring checks have been performed.
3. ☐ Connector engagement checks have been performed.

E.2   Ground Checks

1. ☐ Serial interface check has been performed.
2. ☐ Lighting and controls have been checked.
3. ☐ Discrete inputs have been checked.
4. ☐ Interference checks have been performed.
5. ☐ Version check has been performed.

E.3   Device Configuration

1. ☐ The device has been configured according to requirements for this specific installation.

E.4   Documentation

1. ☐ Aircraft documentation updated.
2. ☐ All documentation, including this log and the configuration log has been documented and stored.

I hereby confirm the above mentioned steps have been completed and that no issues, problems or failures have been found.

Name, date, signature _____

Configuration Log F

F.1   Device

F.1.1   Device Infos

- PID: Product identification: _____
- VID: Vendor identification/manufacturer: _____
- VER: Software version: _____
- BUILD: Software build identification: _____
- SERIAL: Device serial number: _____

F.1.2   Sounder Volume

- Sounder Volume: _____

F.1.3   Illumination

- MODE: ☐ MANUAL / ☐ AUTO / ☐ LIGHTING BUS
- Manual INTENSITY: _____
- Minimum INTENSITY: _____
- Maximum INTENSITY: _____
- If LIGHTING BUS selected, LIGHTING BUS source: _____
- If LIGHTING BUS selected, LIGHTING BUS minimum: _____
- If LIGHTING BUS selected, LIGHTING BUS maximum: _____

F.1.4   Power On Mode

- POWER ON MODE: ☐ ON / ☐ OFF

F.1.5   Data Ports

- PORT 1: ☐ Not Connected / ☐ AT1 / ☐ FLARM / ☐ PowerFLARM / ☐ GARMIN TIS / ☐ GDL 90
- PORT 2: ☐ Not Connected / ☐ AT1 / ☐ FLARM / ☐ PowerFLARM / ☐ GARMIN TIS / ☐ GDL 90

F.1.6   Switches

- NO WARNINGS: ☐ Input 1 / ☐ Input 2 / ☐ Not Connected

- NORTH UP: ☐ Input 1 / ☐ Input 2 / ☐ Not Connected

F.2   View

F.2.1   Units

- Distance units: ☐ Kilometers / ☐ Nautical Miles / ☐ Statute Miles / ☐ Feet / ☐ Meters
- Altitude units: ☐ Meters / ☐ Feet
- Vertical rate units: ☐ Meters per second / ☐ Feet per minute / ☐ Knots

F.2.2   Other view options

- BACKGROUND: ☐ BLACK / ☐ WHITE / ☐ AUTO
- OWN-SHIP SYMBOL: ☐ MOTORPLANE / ☐ GLIDER / ☐ HELICOPTER
- NAVBOXES: ☐ ON / ☐ OFF
- HEAD-ON ALARM: ☐ ON / ☐ OFF

F.3   Traffic System

Please note configuration data in the specific configuration log form of the connected traffic system.

Name, date, signature _____

Changelog | G

G.1 ATD Software Version 51

G.1.1 Changes Since Software Version 50

Bugfix in FlarmNet Database Function
An error in the FLARMNet database function has been fixed. This update is only required if you use the optional database functionality.

G.2 ATD Software Version 50

G.2.1 Changes Since Software Version 25

Graphical User Interface
Reworked the user interface to better align with some of the concepts of RTCA DO-317B Section 2.3.

Target Selection
We have adopted a unified logic for target selection. The target selection selects the targets ordered by distance and is restricted to the visible range.

When no targets are received and the knob is turned, the last selected target is deselected.

Mode Without Navboxes
Target selection is now also possible in the mode without navboxes. The most relevant information is shwon directly on the radar screen. If the selection did not change anymore within the last 30 seconds, the nearest target is selected automatically.

Vertical Zoom
A vertical zoom function was added: The user can select the vertical range for the targets, which are shown on the radar screen. The vertical range can be changed by push-turning the inner rotary knob.

Support For PFLAM Messages
Added support for the FLARM PFLAM message format. This messages provide information about registration, callsign, aircraft type, and other details of received targets. The received information is displayed instead of the ID.

ATD-11 On/Off Function
The function of the On/Off button was fixed.

G.3 ATD Software Version 25

G.3.1 Changes Since Software Version 24

- Support for housing component version 1 on ATD-11.

G.4   ATD Software Version 24

G.4.1   Changes Since Software Version 23

- Support for display component version 1 on ATD-57.

G.5 ATD Software Version 23

G.5.1 Changes Since Software Version 22

- Add support for baseboard and front plane versions 3.
- Fixed buggy display of bootloader version in menu.

G.6 ATD Software Version 22

G.6.1 Changes Since Software Version 21

- Add support for GDL-90 compatible devices as traffic datasource.
- Add setting to select the vertical position of the own ship symbol on the screen.
- Add setting to select the content of the navboxes.
- Add navbox types for targets absolute altitude, groundspeed, bearing, closurerate and distancerate.
- Add speed unit setting.
- Add speed unit value 'ft/min'.
- Add setting to configure the operation mode for special operation purposes.
- Fixed switch on/off function for ATD-11.
- Replaced usage of red color by amber.
- Add support for backplane version 2.

G.7   ATD Software Version 21

G.7.1   Changes Since Software Version 20

- Add support for ATD80 and ATD11 hardware.

- Use obstacle symbol to visualize static objects flarms.

- Add helicopter symbol to list of own aircraft symbols.

- Add setting to enable the display simulator mode to devices installation-menu.

- Add additional distance units (meters and feet) for horizontal distances. These distance units are used for distances less than 10000 m/ft only. For greater distances, the units km (if selected unit is m) and nm (if selected unit is ft) are used.

- Fixed a serial port driver problem, which could lead to 'WAITING FOR TRAFFIC RECEIVER' warning screens.

- Fixed a memory problem, when receiving PAAVQ sentences, which could lead to crashes during AT-1 updates.

G.8   ATD Software Version 20

G.8.1   Changes Since Software Version 1.9

- Add settings to select specific devices for each of the two dataports (AT-1, Flarm, PowerFlarm, Garmin TIS) to devices installation-menu.

- Implement connected device dependent submenus for info, status and configuration of
connected devices.

- Implement support for AT-1 status and error messages.

- Implement support for AT-1 error and alarm acknowledge functionality.