

# Hardware Documentation

*Powersupply  
ADP-NT24V3  
for HW Revision 1.00*

**preliminary**

Version 001  
(2024-03-11)



**Elektronik  
Systeme**

© F&S Elektronik Systeme GmbH

Untere Waldplätze 23

D-70569 Stuttgart

Phone: +49(0)711-123722-0

Fax: +49(0)711-123722-99

# About This Document

This document describes how to use the adapter board [ADP-NT24V3](#), with mechanical and electrical information. The latest version of this document can be found at: <http://www.fs-net.de>.

## ESD Requirements



All F&S hardware products are electrostatic sensitive devices. All products are handled and packaged according to ESD guidelines. Please do not handle or store ESD-sensitive material in ESD-unsafe environments. Negligent handling will harm the product and warranty claims become void.

## History

Date	V	Platform	A,M,R	Chapter	Description	Au
18.03.24	001	All		-	Initial Version	SM

V       Version  
A, M, R   Added, Modified, Removed  
Au       Author

# Table of Contents

<b>About This Document</b>	<b>2</b>
<b>ESD Requirements</b>	<b>2</b>
<b>History</b>	<b>2</b>
<b>Table of Contents</b>	<b>3</b>
<b>1 Mechanical Characteristics</b>	<b>4</b>
<b>2 Connectors</b>	<b>5</b>
<b>3 Electrical Characteristics</b>	<b>5</b>
<b>4 Detailed Description</b>	<b>6</b>
4.1 General.....	6
4.2 Power Input .....	6
4.3 RTC Supply VBAT .....	6
4.4 Backlight Supply & Control Bypass .....	6
4.5 LED Indicator.....	6
<b>5 ESD and EMI Implementation</b>	<b>7</b>
<b>6 Second source rules</b>	<b>7</b>
<b>7 Storage conditions</b>	<b>7</b>
<b>8 ROHS and REACH statement</b>	<b>7</b>
<b>9 Packaging</b>	<b>7</b>
<b>10 Matrix Code Sticker</b>	<b>7</b>
<b>11 Appendix</b>	<b>8</b>
Important Notice .....	8
Warranty Terms.....	9
<b>12 Content</b>	<b>10</b>

# 1 Mechanical Characteristics

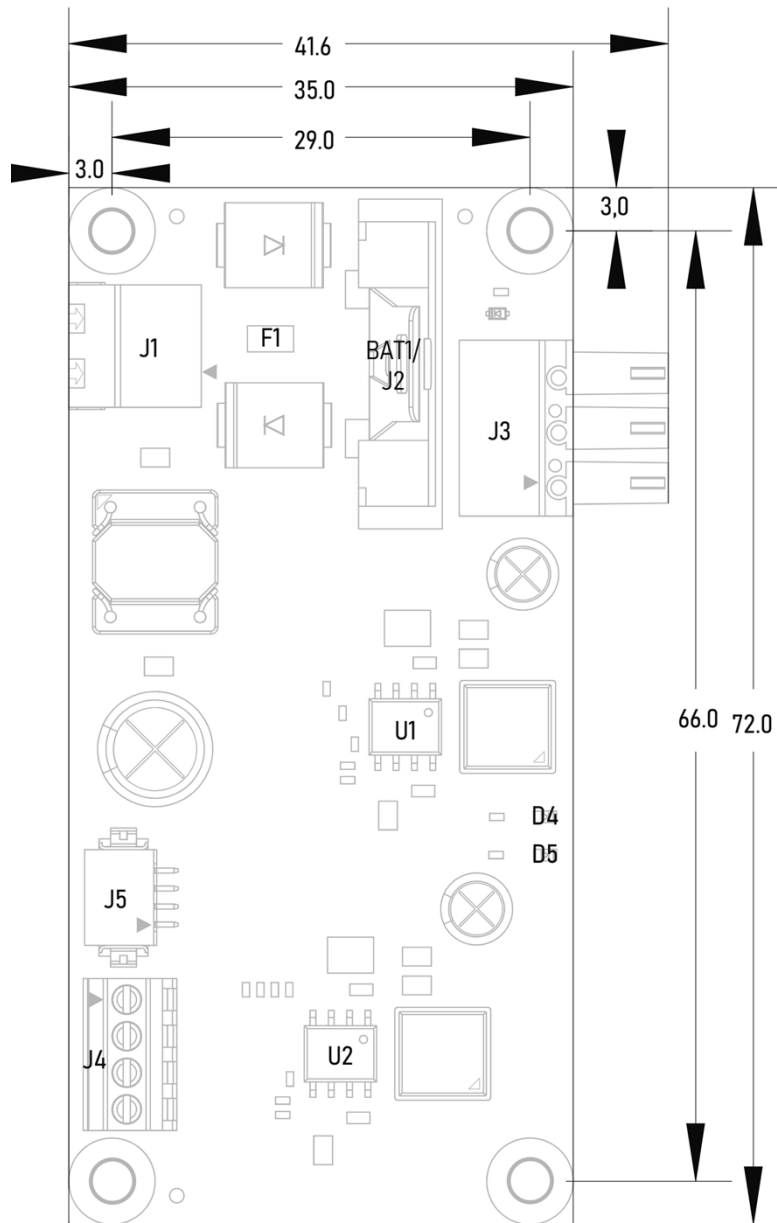


Figure 1: Top side, all dimensions in mm; Pin1 marked with an triangle

Dimensions	Description
PCB Thickness	1.60mm ± 0.16mm
Max. part height on top side	18.40mm ± 0.20mm (25mm with Battery Cell)
Weight	≈24.00g (excl. Battery cell)
Mounting holes diameter	3.20mm

Table 1: Mechanical Dimensions

## 2 Connectors

Ref.	Description	Connector Type	Pin Layout
J1	Input – Power	Würth WR-TBL Series 322 2-pins	1) POWER 2) GND
BAT1	Input – VBAT	MPD BS-05 (for CR2032 battery)	-
J2	Input – VBAT (optional)	1x2 Pin Header RM: 2.54mm	1) VBAT 2) GND
J3	Output – Module	Würth WR-TBL Series 3093 3-pins	1) GND 2) POWER 3) VBAT
J4	Output – Backlight	Würth WR-TBL Series 2109 4-pins AWG 30 to18	1) BL_CONTROL 2) BACKLIGHT_ON 3) POWER 4) GND
J5	Input – Backlight Control	Hirose DP13 4-pins	1) NC 2) BACKLIGHT_ON 3) BL_CONTROL 4) GND

Table 2: Connector List and Pin Layouts

## 3 Electrical Characteristics

Parameter	Description	Min.	Typ.	Max.	Unit
V <sub>IN</sub>	Power supply input voltage	7.50	24.00	36.00	V
P <sub>IN</sub>	Power consumption under maximum load conditions	-	-	36	W
V <sub>BAT</sub>	RTC supply voltage	2.20	3.00	3.45	V
V <sub>OUT_J3</sub>	Module supply voltage output	4.75	5.00	5.25	V
V <sub>OUT_J4</sub>	Backlight supply voltage output	4.75	5.00 <sup>1</sup>	5.25	V
I <sub>OUT_J3</sub>	Load current	-	-	3.00 <sup>2</sup>	A
I <sub>OUT_J4</sub>	Load current	-	-	3.00 <sup>2</sup>	A
T	Working temperature	-25		+85	°C

<sup>1</sup>: Changeable, if needed for other backlight voltages. Please contact F&S Support for further information

<sup>2</sup>: Maximum 3A for continuous load current, 3.60A for short-time peaks

Table 3: Recommended Operation Conditions

## 4 Detailed Description

### 4.1 General

The adapter can supply a suitable F&S module and a display backlight out of one source. For simple integration, the adapter can be connected directly (see Fig. 2). A battery socket for a Real Time Clock (RTC), is provided additionally.

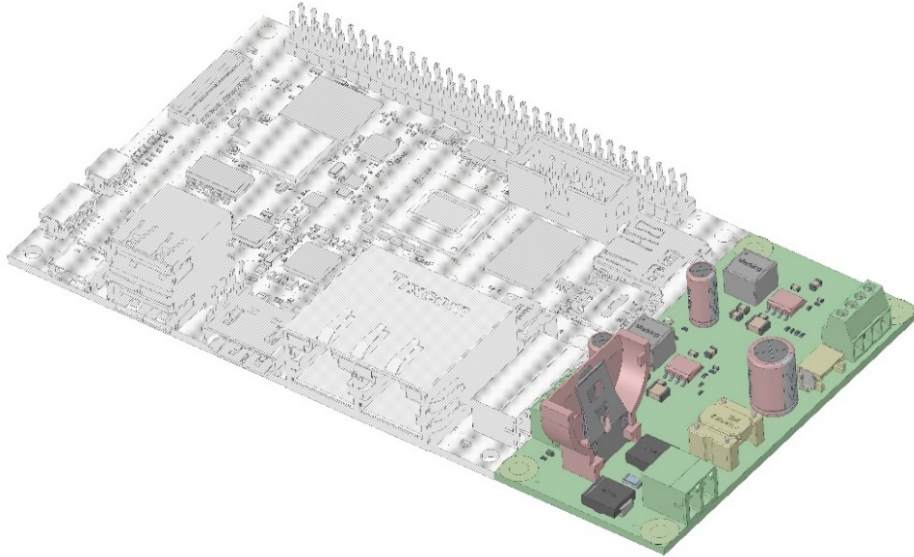


Figure 2: ADP-NT24V3 (highlighted) mounted on a armStone™ MX8MP (shaded)

### 4.2 Power Input

The power input is protected against polarity reversal, overvoltage and overcurrent. If triggered, replace F1 with a 5A slow type fuse (size 1206). A matching connector can be purchased at F&S (Article No.: B.MBU.1R2PS.4).

### 4.3 RTC Supply VBAT

For the RTC supply, a CR2032 battery can be attached into the socket BAT1. A pin header (J2) can be assembled instead of the battery socket.

### 4.4 Backlight Supply & Control Bypass

The adapter delivers the supply voltage for display backlights at connector J4. Additionally, two backlight control signals can be bypassed from connector J5 to connector J4 (see Table 2).

### 4.5 LED Indicator

Ref	Description
D4	Module voltage available
D5	Backlight voltage available

Table 4: LED Indicator

## 5 ESD and EMI Implementation

On the ADP-NT24V3 adapter board there is an ESD protection diode for 24V input connector. The other connectors do not have any protection. The inputs and outputs of the power circuits were widely filtered in order to reduce the EMI. We highly recommend using the adapter board with wires as short as possible.

## 6 Second source rules

F&S qualifies their second sources for parts autonomously, as long as this does not touch the technical characteristics of the product. This is necessary to guarantee delivery times and product life. A setup of release samples with released second sources is not possible.

F&S does not use broker components without the consent of the customer.

## 7 Storage conditions

Maximum storage on room temperature with non-condensing humidity: 6 months

Maximum storage on controlled conditions 25 ±5 °C, max. 60% humidity: 1 2 months

For longer storage, we recommend vacuum dry packs.

## 8 ROHS and REACH statement

All F&S designs are created from lead-free components and are completely ROHS compliant. The products we supply do not contain any substance on the latest candidate list published by the European Chemicals Agency according to Article 59(1,10) of Regulation (EC) 1907/2006 (REACH) in a concentration above 0.1 mass %.

Consequently, the obligations in No. 1 and 2 paragraphs in Annex are not relevant here.

Please understand that F&S is not performing any chemical analysis on its products to testify REACH compliance and is therefore not able to fill out any detailed inquiry forms.

## 9 Packaging

All F&S ESD-sensitive products will shipping either in trays or in bags.

## 10 Matrix Code Sticker

All F&S hardware will ship with a matrix code sticker including the serial number. Enter your serial number here <https://www.fs-net.de/en/support/serial-number-info-and-rma/> to get information on shipping date and type of board.



Figure 2: Matrix Code Sticker

# 11 Appendix

## Important Notice

The information in this publication has been carefully checked and is believed to be entirely accurate at the time of publication. F&S Elektronik Systeme ("F&S") assumes no responsibility, however, for possible errors or omissions, or for any consequences resulting from the use of the information contained in this documentation.

F&S reserves the right to make changes in its products or product specifications or product documentation with the intent to improve function or design at any time and without notice and is not required to update this documentation to reflect such changes.

F&S makes no warranty or guarantee regarding the suitability of its products for any particular purpose, nor does F&S assume any liability arising out of the documentation or use of any product and specifically disclaims any and all liability, including without limitation any consequential or incidental damages.

Specific testing of all parameters of each device is not necessarily performed unless required by law or regulation.

Products are not designed, intended, or authorized for use as components in systems intended for applications intended to support or sustain life, or for any other application in which the failure of the product from F&S could create a situation where personal injury or death may occur. Should the Buyer purchase or use a F&S product for any such unintended or unauthorized application, the Buyer shall indemnify and hold F&S and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, expenses, and reasonable attorney fees arising out of, either directly or indirectly, any claim of personal injury or death that may be associated with such unintended or unauthorized use, even if such claim alleges that F&S was negligent regarding the design or manufacture of said product.

Specifications are subject to change without notice.



# Warranty Terms

## Hardware Warranties

F&S guarantees hardware products against defects in workmanship and material for a period of one (1) year from the date of shipment. Your sole remedy and F&S's sole liability shall be for F&S, at its sole discretion, to either repair or replace the defective hardware product at no charge or to refund the purchase price. Shipment costs in both directions are the responsibility of the customer. This warranty is void if the hardware product has been altered or damaged by accident, misuse or abuse.

## Software Warranties

Software is provided "AS IS". F&S makes no warranties, either express or implied, with regard to the software object code or software source code either or with respect to any third party materials or intellectual property obtained from third parties. F&S makes no warranty that the software is useable or fit for any particular purpose. This warranty replaces all other warranties written or unwritten. F&S expressly disclaims any such warranties. In no case shall F&S be liable for any consequential damages.

## Disclaimer of Warranty

THIS WARRANTY IS MADE IN PLACE OF ANY OTHER WARRANTY, WHETHER EXPRESSED, OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A SPECIFIC PURPOSE, NON-INFRINGEMENT OR THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION, EXCEPT THE WARRANTY EXPRESSLY STATED HEREIN. THE REMEDIES SET FORTH HEREIN SHALL BE THE SOLE AND EXCLUSIVE REMEDIES OF ANY PURCHASER WITH RESPECT TO ANY DEFECTIVE PRODUCT.

## Limitation on Liability

UNDER NO CIRCUMSTANCES SHALL F&S BE LIABLE FOR ANY LOSS, DAMAGE OR EXPENSE SUFFERED OR INCURRED WITH RESPECT TO ANY DEFECTIVE PRODUCT. IN NO EVENT SHALL F&S BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES THAT YOU MAY SUFFER DIRECTLY OR INDIRECTLY FROM USE OF ANY PRODUCT. BY ORDERING THE PRODUCT, THE CUSTOMER APPROVES THAT THE F&S PRODUCT, HARDWARE AND SOFTWARE, WAS THOROUGHLY TESTED AND HAS MET THE CUSTOMER'S REQUIREMENTS AND SPECIFICATIONS



# 12 Content

Table 1: Mechanical Dimensions.....	4
Table 2: Connector List and Pin Layouts.....	5
Table 3: Recommended Operation Conditions.....	5
Table 4: LED Indicator .....	6
Figure 1: Top side, all dimensions in mm; Pin1 marked with an triangle.....	4
Figure 2: ADP-NT24V3 (highlighted) mounted on a armStone™MX8MP (shaded).....	6