

NEXCOM International Co., Ltd.

Mobile Computing Solutions

Fanless Railway Computer

nROK 500

User Manual

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Preface

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Acknowledgements

nROK 500 is a trademark of NEXCOM International Co., Ltd. All other product names mentioned herein are registered trademarks of their respective owners.

Regulatory Compliance Statements

This section provides the FCC compliance statement for Class A devices and describes how to keep the system CE compliant.

Declaration of Conformity

FCC

This equipment has been tested and verified to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area (domestic environment) is likely to cause harmful interference, in which case the user will be required to correct the interference (take adequate measures) at their own expense.

CE

The product(s) described in this manual complies with all applicable European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

RoHS Compliance

NEXCOM RoHS Environmental Policy and Status Update



NEXCOM is a global citizen for building the digital infrastructure. We are committed to providing green products and services, which are compliant with European Union RoHS (Restriction on Use of Hazardous Substance in Electronic Equipment) directive 2011/65/EU, to be your trusted green partner and to protect our environment.

RoHS restricts the use of Lead (Pb) < 0.1% or 1,000ppm, Mercury (Hg) < 0.1% or 1,000ppm, Cadmium (Cd) < 0.01% or 100ppm, Hexavalent Chromium (Cr6+) < 0.1% or 1,000ppm, Polybrominated biphenyls (PBB) < 0.1% or 1,000ppm, and Polybrominated diphenyl Ethers (PBDE) < 0.1% or 1,000ppm.

In order to meet the RoHS compliant directives, NEXCOM has established an engineering and manufacturing task force in to implement the introduction of green products. The task force will ensure that we follow the standard NEXCOM development procedure and that all the new RoHS components and new manufacturing processes maintain the highest industry quality levels for which NEXCOM are renowned.

The model selection criteria will be based on market demand. Vendors and suppliers will ensure that all designed components will be RoHS compliant.

How to recognize NEXCOM RoHS Products?

For existing products where there are non-RoHS and RoHS versions, the suffix "(LF)" will be added to the compliant product name.

All new product models launched after January 2013 will be RoHS compliant. They will use the usual NEXCOM naming convention.

Warranty and RMA

NEXCOM Warranty Period

NEXCOM manufactures products that are new or equivalent to new in accordance with industry standard. NEXCOM warrants that products will be free from defect in material and workmanship for 2 years, beginning on the date of invoice by NEXCOM. HCP series products (Blade Server) which are manufactured by NEXCOM are covered by a three year warranty period.

NEXCOM Return Merchandise Authorization (RMA)

- ✘ Customers shall enclose the “NEXCOM RMA Service Form” with the returned packages.
- ✘ Customers must collect all the information about the problems encountered and note anything abnormal or, print out any on-screen messages, and describe the problems on the “NEXCOM RMA Service Form” for the RMA number apply process.
- ✘ Customers can send back the faulty products with or without accessories (manuals, cable, etc.) and any components from the card, such as CPU and RAM. If the components were suspected as part of the problems, please note clearly which components are included. Otherwise, NEXCOM is not responsible for the devices/parts.
- ✘ Customers are responsible for the safe packaging of defective products, making sure it is durable enough to be resistant against further damage and deterioration during transportation. In case of damages occurred during transportation, the repair is treated as “Out of Warranty.”
- ✘ Any products returned by NEXCOM to other locations besides the customers’ site will bear an extra charge and will be billed to the customer.

Repair Service Charges for Out-of-Warranty Products

NEXCOM will charge for out-of-warranty products in two categories, one is basic diagnostic fee and another is component (product) fee.

System Level

- ✘ Component fee: NEXCOM will only charge for main components such as SMD chip, BGA chip, etc. Passive components will be repaired for free, ex: resistor, capacitor.
- ✘ Items will be replaced with NEXCOM products if the original one cannot be repaired. Ex: motherboard, power supply, etc.
- ✘ Replace with 3rd party products if needed.
- ✘ If RMA goods can not be repaired, NEXCOM will return it to the customer without any charge.

Board Level

- ✘ Component fee: NEXCOM will only charge for main components, such as SMD chip, BGA chip, etc. Passive components will be repaired for free, ex: resistors, capacitors.

If RMA goods can not be repaired, NEXCOM will return it to the customer without any charge.

Warnings

Read and adhere to all warnings, cautions, and notices in this guide and the documentation supplied with the chassis, power supply, and accessory modules. If the instructions for the chassis and power supply are inconsistent with these instructions or the instructions for accessory modules, contact the supplier to find out how you can ensure that your computer meets safety and regulatory requirements.

Cautions

Electrostatic discharge (ESD) can damage system components. Do the described procedures only at an ESD workstation. If no such station is available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the computer chassis.

Safety Information

Before installing and using the device, note the following precautions:

- ✘ Read all instructions carefully.
- ✘ Do not place the unit on an unstable surface, cart, or stand.
- ✘ Follow all warnings and cautions in this manual.

- When replacing parts, ensure that your service technician uses parts specified by the manufacturer.
- Avoid using the system near water, in direct sunlight, or near a heating device.
- The load of the system unit does not solely rely for support from the rackmounts located on the sides. Firm support from the bottom is highly necessary in order to provide balance stability.

The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Installation Recommendations

Ensure you have a stable, clean working environment. Dust and dirt can get into components and cause a malfunction. Use containers to keep small components separated.

Adequate lighting and proper tools can prevent you from accidentally damaging the internal components. Most of the procedures that follow require only a few simple tools, including the following:

- A Philips screwdriver
- A flat-tipped screwdriver
- A grounding strap
- An anti-static pad

Using your fingers can disconnect most of the connections. It is recommended that you do not use needlenose pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.

Safety Precautions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a stable surface during installation. Dropping it or letting it fall may cause damage.
7. Do not leave this equipment in either an unconditioned environment or in a above 40°C storage temperature as this may damage the equipment.
8. The openings on the enclosure are for air convection to protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
9. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
10. Place the power cord in a way so that people will not step on it. Do not place anything on top of the power cord. Use a power cord that has been approved for use with the product and that it matches the voltage and current marked on the product's electrical range label. The voltage and current rating of the cord must be greater than the voltage and current rating marked on the product.
11. All cautions and warnings on the equipment should be noted.
12. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
13. Never pour any liquid into an opening. This may cause fire or electrical shock.
14. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
15. If one of the following situations arises, get the equipment checked by service personnel:
 - a. The power cord or plug is damaged.
 - b. Liquid has penetrated into the equipment.
 - c. The equipment has been exposed to moisture.
 - d. The equipment does not work well, or you cannot get it to work according to the user's manual.
 - e. The equipment has been dropped and damaged.
 - f. The equipment has obvious signs of breakage.
16. Do not place heavy objects on the equipment.
17. The unit uses a three-wire ground cable which is equipped with a third pin to ground the unit and prevent electric shock. Do not defeat the purpose of this pin. If your outlet does not support this kind of plug, contact your electrician to replace your obsolete outlet.
18. **CAUTION:** DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER. DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
19. The computer is provided with CD drives that comply with the appropriate safety standards including IEC 60825.

Technical Support and Assistance

1. For the most updated information of NEXCOM products, visit NEXCOM's website at www.nexcom.com.
2. For technical issues that require contacting our technical support team or sales representative, please have the following information ready before calling:
 - Product name and serial number
 - Detailed information of the peripheral devices
 - Detailed information of the installed software (operating system, version, application software, etc.)
 - A complete description of the problem
 - The exact wordings of the error messages

Warning!

1. Handling the unit: carry the unit with both hands and handle it with care.
2. Maintenance: to keep the unit clean, use only approved cleaning products or clean with a dry cloth.
3. CompactFlash: Turn off the unit's power before inserting or removing a CompactFlash storage card.

Conventions Used in this Manual



Warning: Information about certain situations, which if not observed, can cause personal injury. This will prevent injury to yourself when performing a task.



Caution: Information to avoid damaging components or losing data.



Note: Provides additional information to complete a task easily.

Battery - Safety Measures

Caution

- Risk of explosion if battery is replaced by an incorrect type.
- Dispose of used batteries according to the instructions.

Safety Warning



This equipment is intended for installation in a Restricted Access Location only.

Resetting the Date and Time



Note: Remember to reset the date and time upon receiving the product. You can set them in the AMI BIOS. Refer to chapter 4 for more information.

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Package Contents

Before continuing, verify that the package that you received is complete. Your package should have all the items listed in the following table.

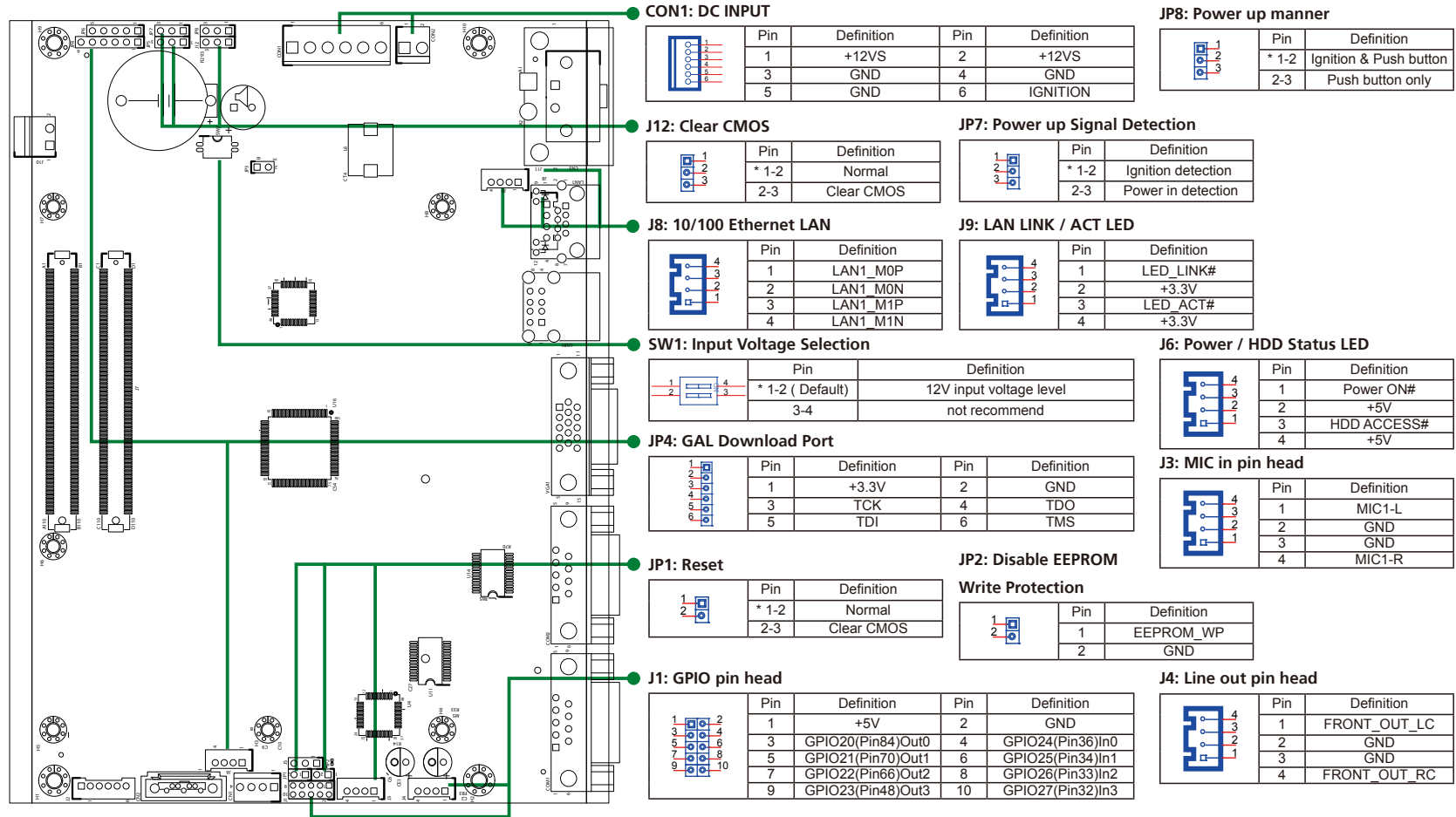
| Item | P/N | Name | Specification | Qty |
|------|---------------|------------------------|-------------------------------------|-----|
| 1 | 50311F0110X00 | FLAT HEAD SCREW | F3x5 NI NYLOK | 4 |
| 2 | 60233SAM17X00 | GSM/UMTS/HSDPA ANTENNA | ETEK:EEN-501 53.5(H)x16.8(W)mm | 1 |
| 3 | 602DCD0375X00 | CD DRIVER | | 1 |
| 4 | 60233PW237X00 | POWER CABLE | 3W3 FEMALE TO CABLE 18 AWG L=1000mm | 1 |

Ordering Information

The following provides ordering information.

- **nROK 500 (P/N: 10A00050000X0)**
 - Intel® Atom™ D525 1.8GHz Fanless Railway Computer with 2G memory pre-installed and Isolated 24VDC Input

Chapter 1: Quick Reference Guide



CON1: DC INPUT

| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1 | +12VS | 2 | +12VS |
| 3 | GND | 4 | GND |
| 5 | GND | 6 | IGNITION |

JP8: Power up manner

| Pin | Definition |
|-------|------------------------|
| * 1-2 | Ignition & Push button |
| 2-3 | Push button only |

J12: Clear CMOS

| Pin | Definition |
|-------|------------|
| * 1-2 | Normal |
| 2-3 | Clear CMOS |

JP7: Power up Signal Detection

| Pin | Definition |
|-------|--------------------|
| * 1-2 | Ignition detection |
| 2-3 | Power in detection |

J8: 10/100 Ethernet LAN

| Pin | Definition |
|-----|------------|
| 1 | LAN1_M0P |
| 2 | LAN1_M0N |
| 3 | LAN1_M1P |
| 4 | LAN1_M1N |

JP9: LAN LINK / ACT LED

| Pin | Definition |
|-----|------------|
| 1 | LED_LINK# |
| 2 | +3.3V |
| 3 | LED_ACT# |
| 4 | +3.3V |

SW1: Input Voltage Selection

| Pin | Definition |
|-----------------|-------------------------|
| * 1-2 (Default) | 12V input voltage level |
| 3-4 | not recommend |

J6: Power / HDD Status LED

| Pin | Definition |
|-----|-------------|
| 1 | Power ON# |
| 2 | +5V |
| 3 | HDD ACCESS# |
| 4 | +5V |

JP4: GAL Download Port

| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1 | +3.3V | 2 | GND |
| 3 | TCK | 4 | TDO |
| 5 | TDI | 6 | TMS |

J3: MIC in pin head

| Pin | Definition |
|-----|------------|
| 1 | MIC1-L |
| 2 | GND |
| 3 | GND |
| 4 | MIC1-R |

JP1: Reset

| Pin | Definition |
|-------|------------|
| * 1-2 | Normal |
| 2-3 | Clear CMOS |

JP2: Disable EEPROM

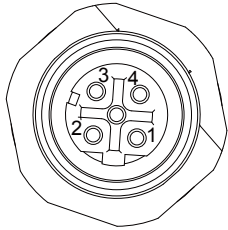
| Pin | Definition |
|-------------------------|------------|
| Write Protection | |
| 1 | EEPROM_WP |
| 2 | GND |

J1: GPIO pin head

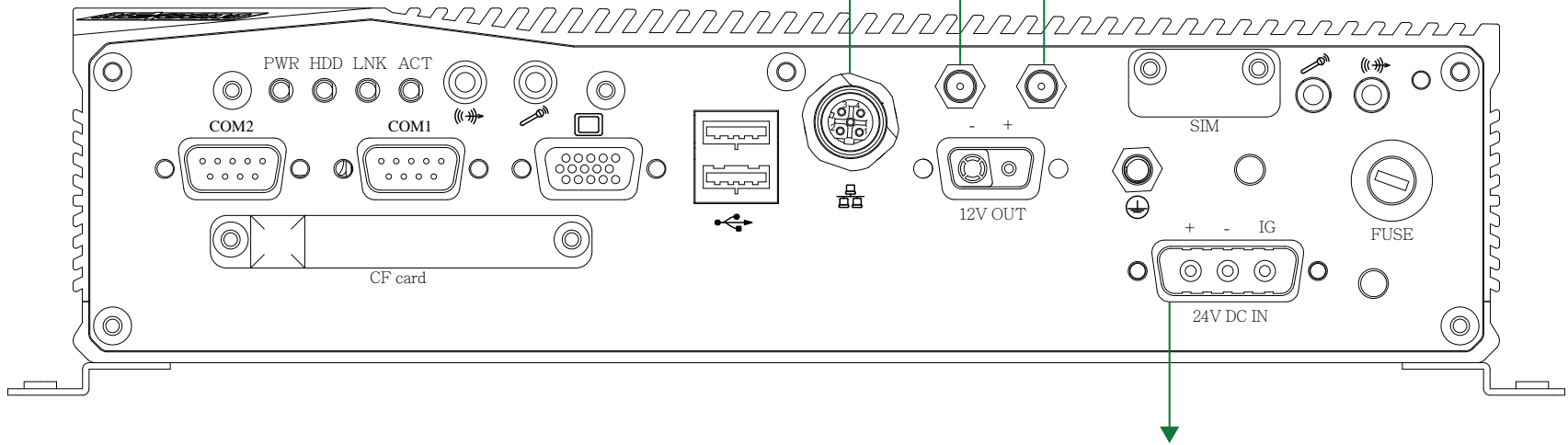
| Pin | Definition | Pin | Definition |
|-----|-------------------|-----|------------------|
| 1 | +5V | 2 | GND |
| 3 | GPIO20(Pin84)Out0 | 4 | GPIO24(Pin36)In0 |
| 5 | GPIO21(Pin70)Out1 | 6 | GPIO25(Pin34)In1 |
| 7 | GPIO22(Pin66)Out2 | 8 | GPIO26(Pin33)In2 |
| 9 | GPIO23(Pin48)Out3 | 10 | GPIO27(Pin32)In3 |

J4: Line out pin head

| Pin | Definition |
|-----|--------------|
| 1 | FRONT_OUT_LC |
| 2 | GND |
| 3 | GND |
| 4 | FRONT_OUT_RC |



| Pin No | Wire Color | Pin Out (10/100 LAN) |
|--------|------------|----------------------|
| 1 | Yellow | Tx+ |
| 2 | White | Rx+ |
| 3 | Orange | Tx- |
| 4 | Blue | Rx- |



DC Input: 24V DC output (range:16.8V~30V)

Pin-out:

A1: + input (24V nominal)

A2: - GND

A3: Ignition Signal Input (24V,nominal;0~10.5V=off,test=on)

Chapter 2: Product Introduction

Overview



Front View



Rear View

Key Features

- Built-in Intel® Atom™ D525 Dual Core 1.8GHz processor
- Fanless and rugged design
- 1x M12 LAN port
- 1x external CF socket and one external SIM card holder
- DC power input with 500V isolated protection
- Support ignition signal for delay-time control
- Support WoL & PXE function
- Certified by EN50155

nROK 500 fanless computer with EN50155 certified is specially designed for transportation computing solution especially in railway related applications.

Based on Intel® Atom™ D525 processor, nROK 500 is designed with isolated DC input protection to ensure stable operation in harsh environments.

Adopting lock concept, all connectors, for example M12 Ethernet connector, on nROK 500 are designed against vibration. Equipped with a SIM card holder, CF socket and mini-PCIe socket for optional 3G wireless module, nROK 500 allows data to be transmitted over network and stored in a convenient SSD (Solid-State Drive) or CF card for better vibration and shock protection. EN50155 certified nROK 500 is a reliable accredited solution for railway applications.

Hardware Specifications

CPU

- Intel® Atom™ D525 Dual Core 1.8GHz

Main Chipset

- Intel® ICH-8M

Memory

- 2GB DDR2 667MHz SODIMM (up to 2GB)

Storage

- CF Card socket: External accessible type, screwed with CF card cover
- 1x 2.5" SSD drive bay

Expansion

- 1x Mini-PCIe socket (for 3.5G module option)

I/O Interface-Front

- 1x VGA Output
 - DB15 x 1, support analog monitor with pixel resolution up to 2048 x 1536@75 Hz
- 2x RS-232 COM Port
 - DB9 x 2, support 115.2 Kbps baud rate
- 2x USB Port
 - 2x USB 2.0 ports, 500mA per port, covered with plastic cover to against the dust
- 1x Mic-in & 1 x Speaker-out
 - Audio controller: High definition audio controller, Realtek: ALC888-GR
 - 1x Speaker-out, Dia. 3.5mm phone jack, covered with plastic cover to against the dust

- 1x Mic-in, Dia. 3.5mm phone jack, covered with plastic cover to against the dust
- 1x 10/ 100 M12 LAN Port
 - LAN Controller: Intel® WG82574L LAN controller x 1
 - Support wake on LAN and boot from LAN function
- Wireless communication
 - 1x External accessible SIM card socket
 - 1x Mic-in for wireless communication use
 - 1x Speaker-out for wireless communication use
 - 2x Antenna holes (for 3G/ 3.5G mobile wireless module)
- LEDs
 - 1x LED for power status
 - 1x LED for HDD status
 - 1x LED for 10/ 100 LAN link
 - 1x LED for 10/ 100 LAN active
- DC Input
 - Nominal Voltage: 24V (Range: 16.8V ~ 30V)
 - Ignition signal input (24V, nominal; 0~10.5V = off, rest = on)
 - 500V Isolated design on DC Input
 - 1x External fuse

Operating System

- Windows Embedded Standard 2009
- Windows Embedded Standard 7

System Dimension

- 264mm (W) x 142mm (D) x 65.5mm (H)

Environment

- Operating temperature
- Ambient with air: -25°C to 55°C (EN50155 Class T1)
- Storage temperature: -40°C to 80°C
- Damp heat test: 95% at 55 °C, compliance with EN50155
- Relative humidity: 0% to 90% (non-condensing)
- Vibration (Random): Compliance with EN61373 Category 1, Class B
- Shock: Compliance with EN61373 Category 1, Class B

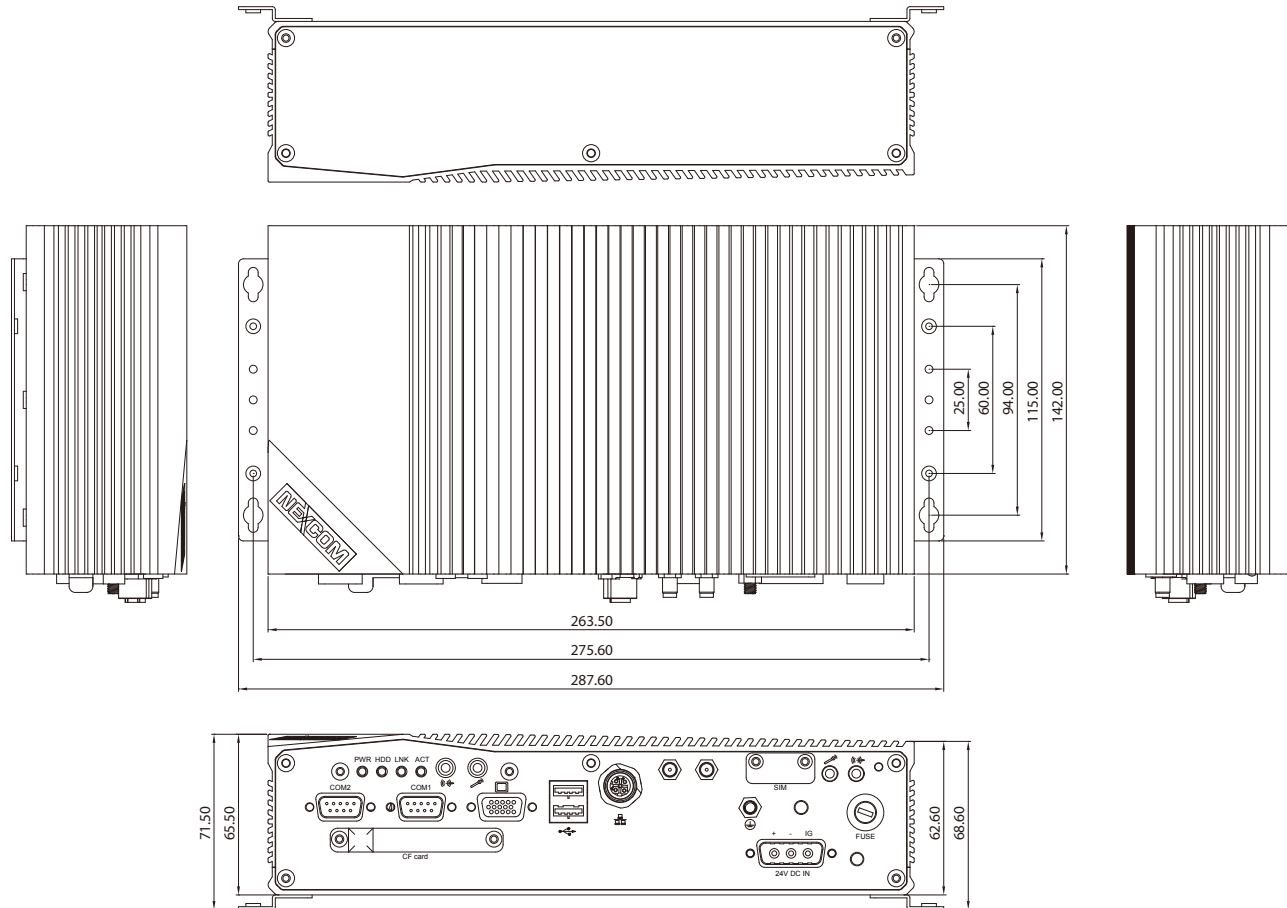
Ingress Protection

- IP52

Certifications

- CE
- EN50155

nROK 500



Chapter 3: Jumpers and Connectors

This chapter describes how to set the jumpers on the motherboard.

Before You Begin

- Ensure you have a stable, clean working environment. Dust and dirt can get into components and cause a malfunction. Use containers to keep small components separated.
- Adequate lighting and proper tools can prevent you from accidentally damaging the internal components. Most of the procedures that follow require only a few simple tools, including the following:
 - A Philips screwdriver
 - A flat-tipped screwdriver
 - A set of jewelers Screwdrivers
 - A grounding strap
 - An anti-static pad
- Using your fingers can disconnect most of the connections. It is recommended that you do not use needle-nosed pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.
- Before working on internal components, make sure that the power is off. Ground yourself before touching any internal components, by touching a metal object. Static electricity can damage many of the electronic components. Humid environment tend to have less static electricity than dry environments. A grounding strap is warranted whenever danger of static electricity exists.

Precautions

Computer components and electronic circuit boards can be damaged by discharges of static electricity. Working on the computers that are still connected to a power supply can be extremely dangerous.

Follow the guidelines below to avoid damage to your computer or yourself:

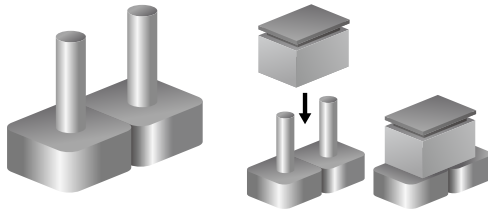
- Always disconnect the unit from the power outlet whenever you are working inside the case.
- If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal chassis of the unit case, or the bare metal body of any other grounded appliance.
- Hold electronic circuit boards by the edges only. Do not touch the components on the board unless it is necessary to do so. Don't flex or stress the circuit board.
- Leave all components inside the static-proof packaging that they shipped with until they are ready for installation.
- Use correct screws and do not over tighten screws.

Jumper

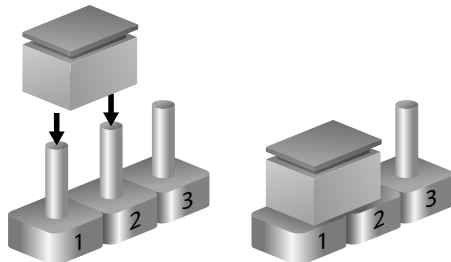
A jumper is the simplest kind of electric switch. It consists of two metal pins and a cap. When setting the jumpers, ensure that the jumper caps are placed on the correct pins. When the jumper cap is placed on both pins, the jumper is **short**. If you remove the jumper cap, or place the jumper cap on just one pin, the jumper is **open**.

Refer to the illustrations below for examples of what the 2-pin and 3-pin jumpers look like when they are short (on) and open (off).

Two-Pin Jumpers: Open (Left) and Short (Right)

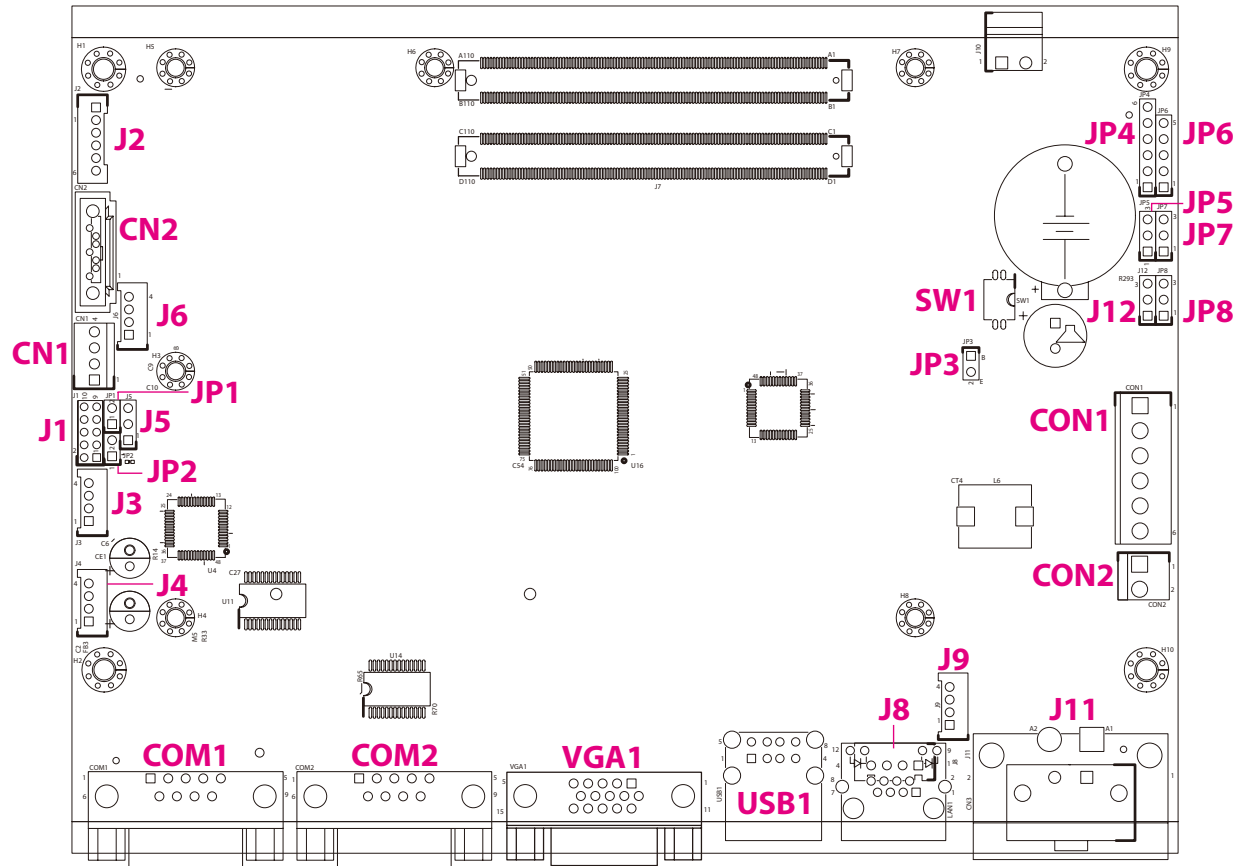


Three-Pin Jumpers: Pins 1 and 2 Are Short



Locations of the Jumpers and Connectors

The figure below is the main board which is the board used in the nROK 500 system. It shows the locations of the jumpers and connectors.



Connectors

LAN Connector (J8)

A. Connector size: 1 X 4 = 4 Pin, 2.5mm, 180°, JST Connector

B. Connector location:



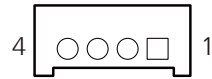
Connector pin definition

| Pin | Definition |
|-----|------------|
| 1 | LAN1_M0P |
| 2 | LAN1_MON |
| 3 | LAN1_M1P |
| 4 | LAN1_M1N |

LAN LINK / ACT LED (J9)

A. Connector size: 1 X 4 = 4 Pin, 2.0mm, 180°, JST Connector

B. Connector location:

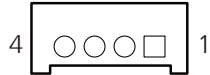


Connector pin definition

| Pin | Definition |
|-----|------------|
| 1 | LED_LINK# |
| 2 | +3.3V |
| 3 | LED_ACT# |
| 4 | +3.3V |

Power / HDD Access LED (J6)

- A. Connector size: 1 X 4 = 4 Pin, 2.0mm, 180°, JST Connector
 B. Connector location:

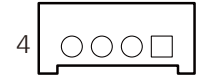


Connector pin definition

| Pin | Definition |
|-----|-------------|
| 1 | Power ON# |
| 2 | +5V |
| 3 | HDD ACCESS# |
| 4 | +5V |

Mic-in Pin Header (J3)

- A. Connector size: 1 X 4 = 4 Pin, 2.0mm, 180°, JST Connector
 B. Connector location:



Connector pin definition

| Pin | Definition |
|-----|------------|
| 1 | MIC 1-L |
| 2 | GND |
| 3 | GND |
| 4 | MIC 1-R |

Line-out Pin Header (J4)

- A. Connector size: 1 X 4 = 4 Pin, 2.0mm, 180°, JST Connector
 B. Connector location:



Connector pin definition

| Pin | Definition |
|-----|--------------|
| 1 | FRONT_OUT_LC |
| 2 | GND |
| 3 | GND |
| 4 | FRONT_OUT_RC |

DC Input Connector (CON1)

- A. Connector size: 1 X 6 = 6 Pin, 3.96mm, 180°, Power Connector
 B. Connector location:

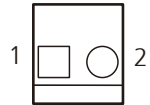


Connector pin definition

| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1 | +12VS | 2 | +12VS |
| 3 | GND | 4 | GND |
| 5 | GND | 6 | IGNITION |

VGA Power Input Connector (CON2)

- A. Connector size: 1 X 2 = 2 Pin, 3.96mm, 180°, Power Connector
 B. Connector location



Connector pin definition

| Pin | Definition |
|-----|------------|
| 1 | +12VSD |
| 2 | GND |

USB 2/3 Connector (J2)

- A. Connector size: 1 X 6 = 6 Pin, 2.0mm, 180°, JST Connector
 B. Connector location

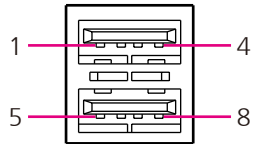


Connector pin definition

| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1 | +5V | 2 | Data 2N |
| 3 | Data 2P | 4 | Data 3N |
| 5 | Data 3P | 6 | GND |

REAR USB connector (USB1)

- A. Connector size: double layer standard USB, edge connector
 B. Connector location



Connector pin definition

| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1 | +5V | 5 | +5V |
| 2 | Data 0N | 6 | Data 1N |
| 3 | Data 0P | 7 | Data 1P |
| 4 | GND | 8 | GND |

SATA Power Connector (CN1)

- A. Connector size: 1 X 4 = 4 Pin, 2.54mm, 180°, JST Connector
 B. Connector location

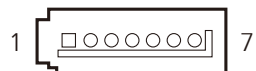


Connector pin definition

| Pin | Definition |
|-----|------------|
| 1 | +12V |
| 2 | GND |
| 3 | GND |
| 4 | +5V |

SATA Connector (CN2)

- A. Connector size: 1 X 7 = 7Pin, 1.27mm, 180°, standard SATA connector
 B. Connector location

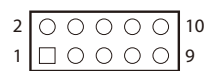


Connector pin definition

| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1 | GND | 2 | TXP0 |
| 3 | TXN0 | 4 | GND |
| 5 | RXN0 | 6 | RXP0 |
| 7 | GND | | |

GPIO Pin Header (J1)

- A. Connector size: 2 X 5 = 10 Pin, 2.0mm, 180°, pinhead
 B. Connector location



Connector pin definition

| Pin | Definition | Pin | Definition |
|-----|-------------------|-----|------------------|
| 1 | +5V | 2 | GND |
| 3 | GPIO20(Pin84)Out0 | 4 | GPIO24(Pin36)In0 |
| 5 | GPIO21(Pin70)Out1 | 6 | GPIO25(Pin34)In1 |
| 7 | GPIO22(Pin66)Out2 | 8 | GPIO26(Pin33)In2 |
| 9 | GPIO23(Pin48)Out3 | 10 | GPIO27(Pin32)In3 |

Clear CMOS Pin Header (J12)

- A. Connector size: 1 X 3 = 3 Pin, 2.54mm, 180°, pinhead
 B. Connector location



Connector pin definition

| Pin | Setting |
|-----|------------|
| 1-2 | Normal |
| 2-3 | Clear CMOS |

1-2 On: default

SMBus Pin Header (J5)

- A. Connector size: 1 X 3 = 3 Pin, 2.54mm, 180°, pinhead
 B. Connector location



Connector pin definition

| Pin | Definition |
|-----|------------|
| 1 | I2C CLK |
| 2 | I2C DATA |
| 3 | GND |

System RESET Pin Header (JP1)

- A. Connector size: 1 X 2 = 2 Pin, 2.54mm, 180°, pinhead
- B. Connector location



Connector pin definition

| Pin | Definition |
|-----|------------|
| 1 | RSET |
| 2 | GND |

Disable EEPROM Write Protection (JP2)

- A. Connector size: 1 X 2 = 2 Pin, 2.54mm, 180°, pinhead
- B. Connector location



Connector pin definition

| Pin | Definition |
|-----|------------|
| 1 | EEPROM_WP |
| 2 | GND |

Thermal Sensor (Reserved Function) (JP3)

- A. Connector size: 1 X 2 = 2 Pin, 2.54mm, 180°, pinhead
- B. Connector location



Connector pin definition

| Pin | Definition |
|-----|------------|
| 1 | Sensor |
| 2 | GND |

Power Up Signal Detection Pin Header (JP7) (Reserved Feature)

- A. Connector size: 1 X 3 = 3 Pin, 2.54mm, 180°, pinhead
- B. Connector location



Connector pin definition

| Pin | Setting |
|-----|--------------------|
| 1-2 | Ignition detection |
| 2-3 | Power in detection |

1-2 On: default

Power Up Manner Pin Header (JP8) (Reserved Feature)

- A. Connector size: 1 X 3 = 3 Pin, 2.54mm, 180°, pinhead
- B. Connector location



Connector pin definition

| Pin | Setting |
|-----|------------------------|
| 1-2 | Ignition & Push button |
| 2-3 | Push button only |

1-2 On: default

MCU Debugging Pin Header (JP5)

- A. Connector size: 1 X 3 = 3 Pin, 2.54mm, 180°, pinhead
- B. Connector location



Connector pin definition

| Pin | Definition |
|-----|------------|
| 1 | TX0 |
| 2 | RX0 |
| 3 | GND |

MCU Download Port (JP6)

- A. Connector size: 1 X 5 = 5 Pin, 2.54mm, 180°, pinhead
- B. Connector location

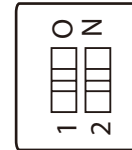


Connector pin definition

| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1 | +3.3ALW | 2 | C2D |
| 3 | MRST | 4 | C2CK |
| 5 | GND | | |

Input Voltage Selection (SW1)

- A. Connector size: 1 X 2 = 2 Pin DIP Switch
- B. Connector location



Connector pin definition

| Pin | Definition |
|-----|---|
| 1-2 | 12V input voltage level |
| 2 | Wide range 8~60V voltage input (reserved feature) |

1-2 On: default

GAL Download Port (JP4)

A. Connector size: 1 X 6 = 6 Pin, 2.54mm, 180°, pinhead

B. Connector location



Connector pin definition

| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1 | +3.3V | 2 | GND |
| 3 | TCK | 4 | TDO |
| 5 | TDI | 6 | TMS |

CF Connector (IDE1)

A. Connector size: Standard TYPE 2 connector with ejection

B. Connector location



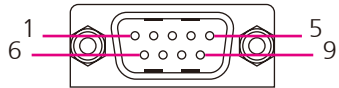
Connector pin definition

| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1 | GND | 26 | CF_CD1# |
| 2 | SDD3A | 27 | SDD11A |
| 3 | SDD4A | 28 | SDD12A |
| 4 | SDD5A | 29 | SDD13A |
| 5 | SDD6A | 30 | SDD14A |
| 6 | SDD7A | 31 | SDD15A |
| 7 | SDCS#1 | 32 | SDCS#3 |
| 8 | GND | 33 | NC |
| 9 | GND | 34 | SDIOR# |
| 10 | GND | 35 | SDIOW# |
| 11 | GND | 36 | VCC |
| 12 | GND | 37 | HDIRQ14 |
| 13 | VCC | 38 | VCC |
| 14 | GND | 39 | CF_SEL# |
| 15 | GND | 40 | NC |

| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 11 | GND | 36 | VCC |
| 12 | GND | 37 | HDIRQ14 |
| 13 | VCC | 38 | VCC |
| 14 | GND | 39 | CF_SEL# |
| 15 | GND | 40 | NC |
| 16 | GND | 41 | IDERST# |
| 17 | GND | 42 | SIORDY |
| 18 | SDA2A | 43 | SDREQ |
| 19 | SDA1A | 44 | SDDACK# |
| 20 | SDA0A | 45 | IDEACTP# |
| 21 | SDD0A | 46 | DIAG# |
| 22 | SDD1A | 47 | SDD8A |
| 23 | SDD2A | 48 | SDD9A |
| 24 | NC | 49 | SDD10A |
| 25 | CF_CD2# | 50 | GND |

COM Port Connector (COM1 / COM2)

- A. Connector size: Standard COM DB9, 90°
B. Connector location



Connector pin definition (COM1)

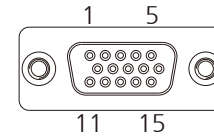
| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1 | DCD2 | 6 | DSR#2 |
| 2 | RX2 | 7 | RTS#2 |
| 3 | TX2 | 8 | CTS#2 |
| 4 | DTR#2 | 9 | RI#2 |
| 5 | GND | | |

Connector pin definition (COM2)

| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1 | DCD1 | 6 | DSR#1 |
| 2 | RX1 | 7 | RTS#1 |
| 3 | TX1 | 8 | CTS#1 |
| 4 | DTR#1 | 9 | RI#1 |
| 5 | GND | | |

VGA connector (VGA1)

- A. Connector size: Standard VGA connector DB 15, 90°
B. Connector location

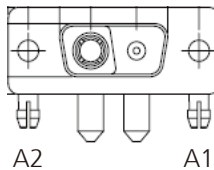


Connector pin definition (COM1)

| Pin | Definition | Pin | Definition |
|-----|------------|-----|--------------|
| 1 | RED_VGA | 9 | VGA_VCC |
| 2 | GREEN_VGA | 10 | GND |
| 3 | BLUE_VGA | 11 | NC |
| 4 | NC | 12 | VGA_DDC_DATA |
| 5 | GND | 13 | G_HSYNC |
| 6 | GND | 14 | G_VSYNC |
| 7 | GND | 15 | VGA_DDC_CLK |
| 8 | GND | | |

Monitor Power Connector (J11)

- A. Connector size: FCI Power connector , 90°
- B. Connector location

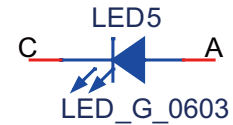


Connector pin definition (COM1)

| Pin | Definition |
|-----|------------|
| A1 | +12V |
| A2 | GND |

LED Status

LED5: COMEXPRESS TYPE2 ID identification



LED 1~4 / 6~9 : BIOS POST Display (Port 80)
 LED 1~4 : High Byte
 LED 6~9 : Low Byte

Appendix A: GPIO Programming Guide

Digital I/O (Digital Input/Output) pins are provided for custom system design. This appendix provides definitions and its default setting for the Digital I/O pins in the nROK 500. The pin definition is shown in the following table:

| Pin | Definition | Pin | Definition |
|-----|-------------------|-----|------------------|
| 1 | +5V | 2 | GND |
| 3 | GPIO20(Pin84)Out0 | 4 | GPIO24(Pin36)In0 |
| 5 | GPIO21(Pin70)Out1 | 6 | GPIO25(Pin34)In1 |
| 7 | GPIO22(Pin66)Out2 | 8 | GPIO26(Pin33)In2 |
| 9 | GPIO23(Pin48)Out3 | 10 | GPIO27(Pin32)In3 |

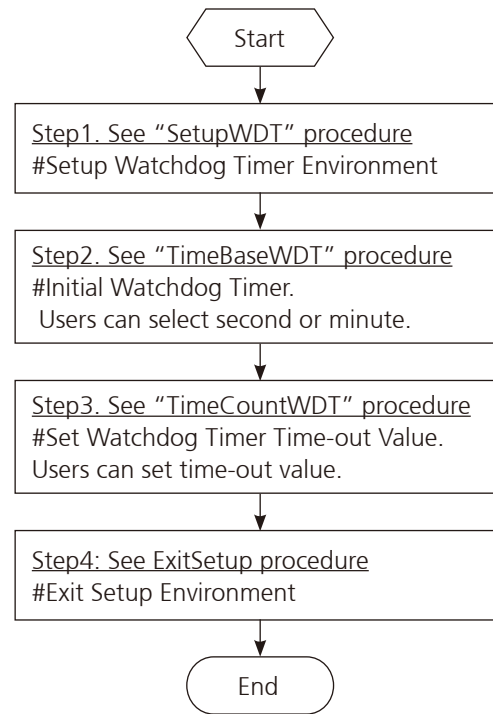
IO base address : 800h

Bit0 : GPO20
 Bit1 : GPO21
 Bit2 : GPO22
 Bit3 : GPO23
 Bit4 : GPI 24
 Bit5 : GPI 25
 Bit6 : GPI 26
 Bit7 : GPI 27

1. Read/Write GPIO data by I/O port 801h

Appendix B: Watchdog Timer

nROK 500 Watch Dog Function Configuration Sequence Description:




```

=====
SetupWDT      PROC
    mov     dx, 2eh
    mov     al, 087h
    out     dx, al
    nop
    nop
    mov     al, 01h
    out     dx, al
    nop
    nop
    mov     al, 55h
    out     dx, al
    nop
    nop
    out     dx, al          ;Write operations to special address
port (2E) for entering MB PnP Mode.

    mov     al, 07h
    out     2eh, al
    mov     al, 08h ;Select logical device for Watch Dog.
    out     2fh, al
    ret
SetupWDT      ENDP

```

```

=====
TimeBaseWDT   PROC
    mov     al, 72h
    out     2eh, al
    mov     al, 40h ;Set WDT reset upon KBRST#
    or      al, 00h ;Here!! set 00h for second, set 80h for minute

```

```

    out     2fh, al
    ret
TimeBaseWDT   ENDP

```

```

=====
TimeCountWDT  PROC
    mov     al, 73h ;WDT Time-out register.
    out     2eh, al
    mov     al, 03h ;Here!! Set count 3.
    out     2fh, al
    ret
TimeCountWDT  ENDP

```

```

=====
ExitSetup     PROC
    mov     dx, 2eh
    mov     al, 0AAh
    out     dx, al
ExitSetup     ENDP

```

```

c:\>debug [enter]
-o 2e 87 ;Enter the Extended Function Mode
-o 2e 01
-o 2e 55
-o 2e 55
-o 2e 07 ;Logical Device Number Reg
-o 2f 07 ;LDN=7
-o 2e 72 ;Watch dog configuration
-o 2f XX ;minute mode (-o 2f 00 second mode)
-o 2e 73 ;LSB for Watch dog tme out value

```

- o 2f YY
- o 2e 74 ;MSB for Watch dog tme out value
- o 2f ZZ

XX: DO : Second mode with KRST (Bit 6)
50 : minute mode with KRST (Bit 6)

ex:

10 second timeout:

xx=D0

yy=0a

zz=00