ModBerry 500

Introduction

About this document

This manual applies to Modberry series industrial computers equipped with Linux operating system. The device can be optionally equipped with a GPRS/3G modem and thousands of additional packages from Debian repositories for ARM.

About the device

Modberry is a series of industrial computers which you can easily adapt to your needs by choosing from the available options.

Basic information

- Based on Raspberry Pi Compute Module
- 700 MHz ARM11 Broadcom processor
- 512 MB RAM and 4GB NAND Flash
- 6 Digital Outputs
- 6 Digital Inputs
- 4 Analog Inputs
- 1x CAN
- 1x OneWire
- 1x Ethernet port
- 1x USB port
- 1x HDMI port

Functionalities overview

Control and monitoring system controller

- serial port converter
- MODBUS Master/Slave/Gateway
- datalogger, SQL server
- SNM/MAIL/FTP/WWW server

Fulfills requirements for scattered system devices

- low power consumption
- fanless casing
- DIN bus installation
- Watchdog, RealTime Clock

Rich array of functions and network resources

- Ethernet and modem GPRS/3G
- GPRS/3G router, NAT
- services VPN protocols, SSH, PPP and many others
- safety – firewall, SSL

Expanded Developer's Platform

- integrated Linux system
- enormous base of software packages, thanks to Debian base
- rich set of programming tools
- supports C, C++, JAVA languages

Device architecture

The heart of the computer is an efficient and energy-saving RISC type ARM11 processor, which, combined with large memory resources and the Linux system, gives unlimited possibilites.

Interfaces and hardware resources

Modberry is a universal controller built with the needs of the automatic, telemetric, and integrated system markets in mind. The input/output interfaces available to the device and enabling exchange of information are shown here.

Communication interfaces:

- Analog Inputs
- Digital Inputs/Outputs
- Ethernet
- GPRS/3G
- One-Wire
- Modbus
- CAN bus
- Wi-Fi(*)

(*) Available at client's request or with an external dongle

Communication protocols and services:

- FTP
- NAT
- SSH
- DNS/DynDNS
- iptables
- Apache
- PHP
- OpenVPN
- NFS
- E-mail

Integrated functionality

Modberry can operate in various modes depending on its configuration. Selected functions can be activated this way, depending on the needs to be met.

Modberry computer operating modes:

- Network 3G router
- Internet server: www/ftp/mail
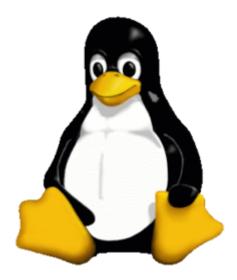- Data register, SQL server

About the Modberry system

Every IT specialist knows what the Linux system offers for servers. However, more and more often, thanks to the increasing power of energy-saving processors, this system becomes the ideal platform for embedded systems and all types of controllers.

The Linux system is distinguished by:

- a world standard, stability, and unlimited platform development possibilities
- a huge program and tool base available free of charge, including source code
- access to a complete base of knowledge, documentation, and guides at various levels of advancement, as well as hundreds of thousands of specialists all over the world

System architecture

Linux Operating System

Linux was originally developed as a free operating system for Intel x86-based personal computers. It has since been ported to more computer hardware platforms than any other operating system. It is a leading operating system on servers and other big iron systems such as mainframe computers and supercomputers: as of June 2013, more than 95% of the world's 500 fastest supercomputers run some variant of Linux, including all the 44 fastest. Linux also runs on embedded systems (devices where the operating system is typically built into the firmware and highly tailored to the system) such as our company's Modberry and NPE 9xxx/X1000/X500 series.

The development of Linux is one of the most prominent examples of free and open source software collaboration: the underlying source code may be used, modified, and distributed — commercially or non-commercially — by anyone under licenses such as the GNU General Public License.

Modberry uses the Linux Debian-based system, which means it has access to an enormous software packages base. Some of them are already pre-compiled and supplied on the client's demand with the device, others may be installed by a simple command.

Used Linux distribution

Modberry is based on highly-acclaimed Raspbian distribution used traditionally on Raspberry Pi board. Raspbian uses 3.12 Linux kernel and is maintained by Raspberry Foundation, which assures frequent updates.

Available packages

Basic information	
Kernel	Linux Kernel 3.12.x
Protocol pile	ARP, PPP, IPv4, ICMP, TCP, UDP, DHCP, FTP, SNMP, HTTP, NFS, SMTP, Telnet
File system	ext2, ext3, ext4, FAT
Shell	Bash

Technical specification

SYSTEM

CPU	700 MHz ARM1176JZF-S core (ARM11 family, ARMv6 instruction set) @ 700 MHz
RAM	512MB SDRAM
Flash memory	4GB NAND FLASH
Operating system	Linux Raspbian 3.12.x
Real Time Clock	RTC, 240 byte SRAM, Watch Dog Timer

ETHERNET INTERFACE

Ethernet ports	1x Ethernet 10/100 Mbps (RJ45 connector)

USB PORTS

USB PORT	1x USB 2.0 (host)

INPUTS/OUTPUTS

Digital inputs	6x DI
Digital outputs	6x DO
Analog inputs	4x AI 0…20 mA (0…7V) (18bit resolution), Max Peak Power: 600W
1-Wire	1x 1-Wire
Serials	2x RS-232 interface (1 for terminal output) 2x RS-485

POWER SUPPLY

12 ~ 30 V DC, 1000 mA

MECHANICAL PARAMETERS

Dimensions	130mm x 140mm x 66mm
Casing	Plastic or Aluminium, DIN bus installation

OPERATING AND STORAGE CONDITIONS

Temperature -25 ~ 80°C, humidity 5 ~ 95% RH (no condensation)*

AVAILABLE EXPANSION CARDS

3G/GPRS Modem
Wi-Fi

CONNECTORS AND PHYSICAL INTERFACES

1x RJ45 (Ethernet)
1x HDMI
2x type A USB 2.0 (one inside the case)
2x expansion card slot (MiniPCI connection)

*some of the expansion cards can limit operating temperature range

Main components

iMod

The iMod platform is an industry grade innovative firmware for monitoring and control. It gives ready to use functionalities of NPE hardware like: Telemetry Module, Protocol Gateway, Data Logger, Notification Module

iModCloud

iModCloud is a set of ready-to-use internet services (including mobile/desktop web access) for remote control, monitoring and data collection, processing and data aggregation.

For more information about iModCloud please refer to the link: iModCloud .

3G/GPRS

Ability to establish and maintain GPRS/EDGE/3G/LTE connection with hardware control of the modem. Connection working is independentely of SMS service.

1-Wire

1-Wire Server - Service for accessing the one-wire bus sensors and other modules.

Wi-Fi

Ability to establish and maintain Wi-Fi connection b/g/n standards. Hotplug available for dongle Wi-Fi cards.

Proprietary TECHBASE software

This category consists of two applications:

- SearchNPE allows to look up your Modberry device on a PC in network,
- Software Manager (softmgr) allows to easily upgrade your TECHBASE-specific firmware and application packages with only one command.