

USB / Ethernet / GPRS Gateway

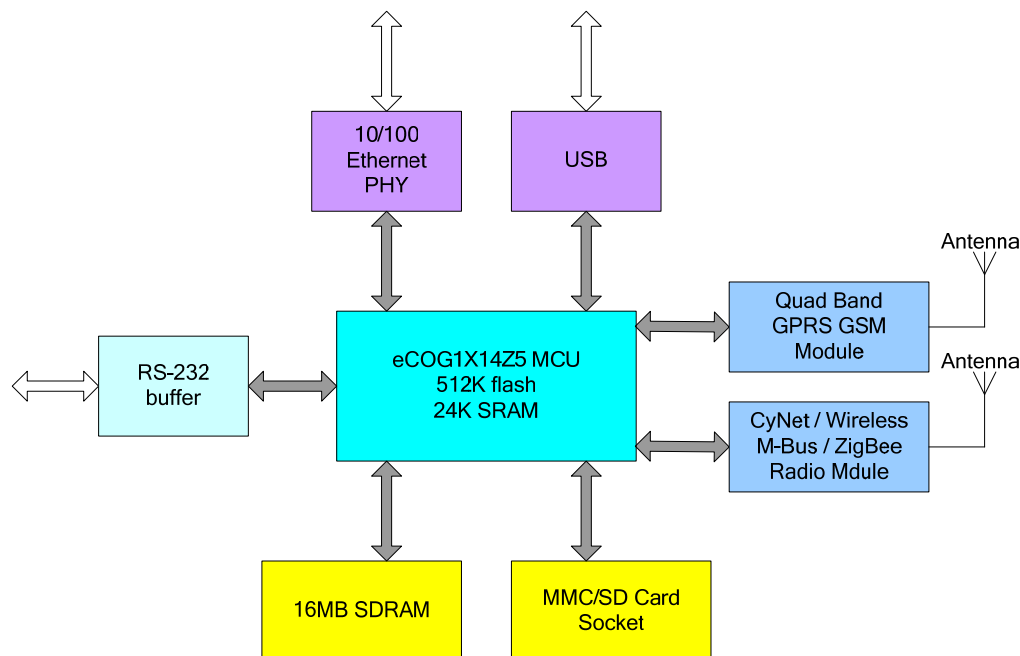
The Cyan USB / Ethernet / GPRS Gateway is a compact unit offering access to a range of Cyan Radio Modules through an Ethernet, USB or GPRS connection.

The main processor board includes a Cyan eCOG1X14Z5 microcontroller with on-chip Ethernet and USB peripherals. Cyan's microcontrollers are fully supported by our free integrated development environment, CyanIDE, which includes a sophisticated device configuration tool and an unrestricted ANSI C compiler.

Key features include:

- ◆ eCOG1X14Z5 72MHz MCU with 512Kbytes flash
- ◆ 10/100 Ethernet PHY with RJ45 twisted-pair connection
- ◆ USB interface supporting up to 12Mb/s data rate
- ◆ 16Mbytes SDRAM
- ◆ SD/MMC card socket
- ◆ SIM card holder.
- ◆ Daughter board socket for Cyan Cy-Net 3, Wireless M-Bus and ZigBee modules
- ◆ Quad Band GSM/GPRS Module (850.900/1800/1900MHz).
- ◆ GPRS multi-slot class 10/8
- ◆ Compliant to GSM phase 2/2+ Class 4 (2W @850/900MHz) Class 1 (1W @1800/1900MHz).
- ◆ Operating temperature range: 0°C to +70°C
- ◆ Cyan Driver Framework including support for Cy-Net3, Wireless M-Bus and ZigBee modules
- ◆ USB library support
- ◆ FAT file system support
- ◆ Open source TCP/IP stack
- ◆ Power Supply: 5V 2A.

Block diagram



Hardware Description

Microcontroller

The module uses a Cyan eCOG1X14Z5 microcontroller as the processor. This device has a CPU core that operates at an internal clock frequency of up to 72 MHz, 512Kbytes of flash memory and 24Kbytes of SRAM. It also has a wide range of peripheral functions, including the Ethernet and USB interfaces used here.

Software development is performed using the CyanIDE environment. It includes a full C compiler (gcc), source level debugger (gdb), Eclipse based IDE, and supports a direct debug connection to the target processor through a dedicated serial interface (eICE).

Memory

In addition to the memory within the eCOG1X MCU device, the module includes an additional 16 Mbytes of on-board SDRAM and a standard card socket for an SD or MMC memory card. The SDRAM is connected directly to the eCOG1X external memory interface bus. Software support for the SD card includes both a low level device driver and a library that implements an industry standard FAT file system.

USB

The eCOG1X MCU includes a USB peripheral with an on-chip PHY, supporting low speed (1.5 Mb/s) and full speed (12 Mb/s) operation. Several standard USB peripheral functions are supported with a comprehensive software library. Example projects for a range of applications are included with CyanIDE as standard.

The gateway board has a B-type USB connector, suitable for USB peripheral applications.

10/100 Mb/s Ethernet

The eCOG1X includes an on-chip 10/100 Ethernet MAC. An external Micrel KSZ8041 device provides a twisted-pair PHY, connected via a standard RJ45 connector.

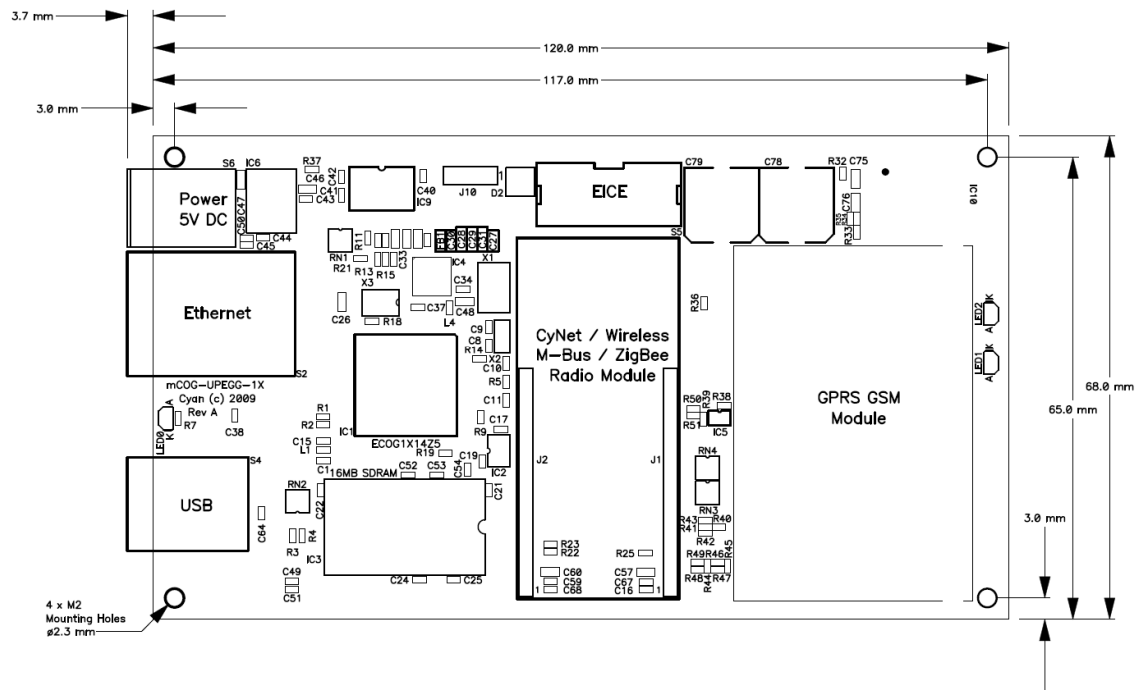
GPRS GSM Module

The GPRS GSM Module provides a standard communications channel connection between the Gateway Board and the GSM network. This can then be used to set up either a Circuit Switched Data (CSD) connection to another modem, or an IP call (using the GPRS functionality).

Other Information

- Power supply 5V +/-10% @ 2A via d.c. jack.
- Operating temperature range: 0°C to +70°C
- Board size: 120 mm x 68 mm

Outline Drawing and Dimensions



Application Software

A comprehensive set of application and support software is provided with the gateway and the CyanIDE development environment.

Serial to GPRS TCP/IP pass thru cable-replacement example

The serial to TCP/IP example included with CyanIDE demonstrates how the board can be used as a cable replacement solution. The board establishes and maintains a connection to a server on the Internet via a GPRS link. Once connected, the board relays data in both directions between the remote server and serial ports. With the use of the example server software provided, this can enable two boards with dynamically allocated private IP addresses to communicate with each other over the GSM network.

Cyan Driver Framework (CYDF)

The CYDF Cyan Driver Framework is a set of device drivers and APIs that supports a wide range of peripheral functions, including the serial port connection to the Cy-Net3 module.

USB Library and Plug-Ins

CyanIDE includes an extensive USB support library for the eCOG1X. It includes a number of software “plugins” that can be added to applications to support common USB peripheral functions.

The USB support library offers the following features:

- Configuration and setup is done within CyanIDE.
- USB host, peripheral and On-The-Go operation.
- Low speed and full speed transfers.
- Event driven messaging model, with event queue.
- Low level access to USB core hardware, if required.
- Integration with eCOG1X DMA peripheral for memory transfers.
- Plugins for common USB applications, requiring only minor custom configuration.
- Low memory usage.

FAT File System

The FAT file system library provides a number of disk, file and directory manipulation routines for FAT16 and FAT32 disk formats. These disk formats are the most commonly used formats for solid-state memory cards that are used with digital cameras, MP3 players and other portable devices.

The library only requires simple block read and write access routines, allowing it to be used on top of lower level disk access routines; for example direct access to SD flash memory cards.

The FAT library offers the following features:

- FAT16 and FAT32 support
- Read and write accesses
- Supports multiple partitions on a disk
- Supports nested subdirectories
- C-library style routines
(`fopen()`, `fread()`, `fwrite()`, `fclose()`, `ftell()`, `fseek()`)
- Fast file block read and write routines
- File and directory delete
- Multiple open files at the same time
- Low level disk access routines
- Quick and full format
- Create and delete partitions
- Low RAM requirement (less than 1KB)
- Low program memory requirement

Ethernet TCP/IP Stack

The software provided with the gateway includes source code and project templates based on the open-source uIP TCP/IP network stack.

The uIP package provides an implementation of the TCP/IP protocol stack for embedded microcontrollers, without sacrificing interoperability or RFC standards compliance. It provides the necessary protocols for Internet communication, with very small code and data memory requirements. Cyan's port of uIP includes a number of application examples using a range of standard protocols and services. Additional services, protocols and application layer components may be available in future.

uIP is developed by Adam Dunkels at the Swedish Institute of Computer Science. For more information about uIP, please visit the uIP web site at <http://www.sics.se/~adam/uip/>. The uIP reference manual is available at <http://www.sics.se/~adam/download/uip-1.0-refman.pdf>

Ordering Information

Type	Part Number	Description
Gateway	mCOG-UPEG Note that this is an incomplete part number.	Board with Ethernet + GPRS + USB (peripheral connector)
RF Node Module	mCOG-RF-1X-M1-4/8/9	RF-Solved Cy-Net3 Node Module 433/868/915MHz
Development kit	DEVKIT1X-USB/ETHERNET	USB/Ethernet Development Kit

Notes

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This product is not designed or intended to be used for on-line control of aircraft, aircraft navigation or communications systems or in air traffic control applications or in the design, construction, operation or maintenance of any nuclear facility, or for any medical use related to life support equipment or systems intended to be surgically implanted into the body or any other life-critical application, whose failure to perform per documented instructions, can be reasonably expected to cause loss of life or significant injury. Cyan specifically disclaims any express or implied warranty of fitness for any or all of such uses.

Declaration of RoHS Compliance

Cyan Technology Ltd hereby declares that the USB / Ethernet / Cy-Net3 Gateway module is in full compliance with the European Directive 2002/95/EC, The Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS).

This declaration is made based on data provided by our material suppliers, and independent analysis of all homogenous materials used in the manufacture of the product.

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