ComSysDes

COMMUNICATION SYSTEMS DESIGN LLC

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## Semicustom Subsystems Series   GUI Development System GDS-01

The "Semicustom Subsystems" design concept allows the System Designer to concentrate in developing the core aspects of his/her technology. "Farming out" the non-core aspects of the design allows a higher degree of parallelism in the product development process. Marketing can also benefit by being able to have detail definition of the "Semicustom Subsystems" portion of the product specs very early in the product development process.

Product Description

The GUI Development System GDS-01 consists of a set of hardware and firmware elements that allow developing Graphical User Interfaces using its small high resolution color display with touch panel input. The system is based on the Amulet Technologies color graphics chip together with CSD's proprietary hardware and firmware monitor.

The development of sophisticated Graphical User Interfaces was considered up until now a complex endeavor, reachable only for larger organizations and with considerable effort. Two concurrently developed technologies makes this effort much more fruitful and easier to reach nowadays. The first one is the advent of Amulet Technologies color graphics chips and its GraphicsOS. The Amulet chip achieves this goal with its ability to interpret html code directly, in addition to the more traditional method of graphic primitives. Writing a sophisticated GUI that can include check boxes, radio button, photo or graphic pictures, custom pushbuttons, sliders, oscilloscope-like windows, scribble canvas, etc. is now reduced to an effort equivalent to writing simple web pages in html code.

The second technological breakthrough comes from a specially adapted firmware monitor from CSD. To start with, this monitor includes the standard operations like "peek", "poke", "memory fill", "memory copy", etc. (on RAM, flash or EEPROM memory or I/O) plus I2C or SPI handling, script based sequences, etc. This particular version of CSD monitor embeds the Amulet protocol on it creating a virtual dual-port memory in the adjunct application processor, in this case an Atmel ATMEGA128 or AT90CAN128. The Amulet GraphicOS therefore can seamlessly interact with this virtual dual port memory in the other processor. By simply writing from one side or the other results in the interaction between the graphic processes and whatever processes run in the adjunct micro controller. Thus, a write operation on the adjunct processor side results in the variable showing in the display, in the form and shape determined by the corresponding html code (linear gauge, flipping pages, string chain, waveform picture, etc., etc.) Similarly the actions from pushbuttons, sliders, virtual keypads, etc. in the touch panel automatically result in write operations to the virtual dual port memory, which is then handled by the application processor.
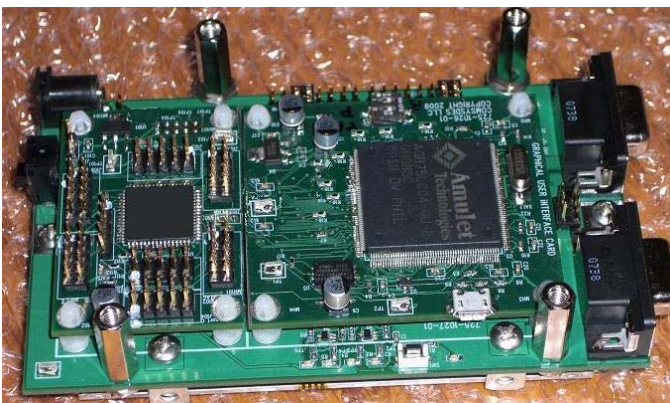
Rear View
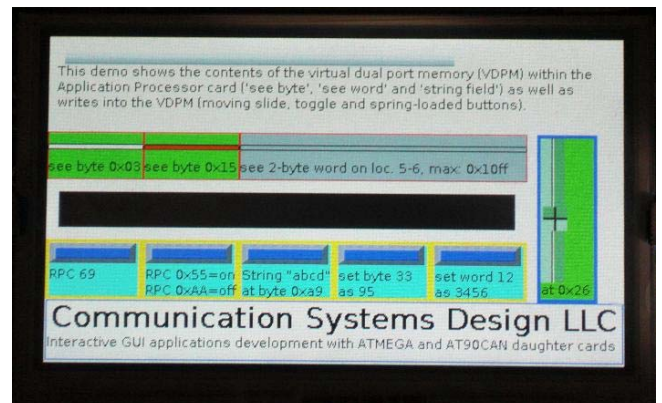
Front View

Regardless of the choice of processor used in the final application it is possible to design and test 100% of the Graphical User Interface using the resources of the development system. Of course, if the final product happened to use a compatible Atmel processor it is possible to develop also that portion of the design on it.

Product Features

- Display mother card with 4.3" color display, 480x272 resolution and touch panel.
- GUI daughter card with Amulet Technologies color chip controller, 64MB flash and 64Mb SDRAM
- Amulet chip re-programmable via USB or 115KBd serial port
- Application processor daughter card with ATMEGA128 (optional AT90CAN128 version); re-programmable via JTAG connector (ATMEGA128 also via SPI).
- CSD's ATMEGA or AT90CAN firmware monitor with embedded Amulet protocol
- Two configurable serial RS23 ports (one is typically used by the monitor).
- Most Application Processor I/O resources (port bits from ports A…E, 2-wire I/F, SPI, Analog-to-digital converter channels, spare USART's, CAN controller, etc.) are available to user.
- On board DC voltage regulator that accepts unregulated 5V DC power input.
- Current consumption is about 315mA with LG color display at max. brightness, all LED's 'on'.
- Master pushbutton reset switch
- Monitor accepts regular text-based scripts from any terminal emulator via serial port.

Support of Other Display Types

Nothing in the system precludes connection to other display types with different sizes or features. Although a 480x272 color display is used in this product, the GUI daughter card maximum resolution is 1024x1024. The user can modify the basic elements to support other types of display, including OLED's, monochrome, TFT with compact fluorescent backlight, etc. Please contact CSD for a wide variety of assistance services for a seamless development process.

Target Applications

Target markets are, among others:
- Home Alarm Systems
- Electrical and mechanical Test Equipment
- Industrial Controls
- Fixed and Portable Medical Equipment
- Storage Area Network equipment
- Home appliances (washer, ovens, etc.)
- Office equipment (printers, faxes, etc.)
- Gas pumps, vending machines
- Cash registers (including signature capture)
- Automatic Teller Machines
- Ticket dispensers
- Environmental building controls
- Etc., etc.

Summary of Monitor Functions

- (**) Peek RAM [location, length]
- Peek flash [location, length]
- Peek EEROM [location, length]
- (**) Poke RAM [location, data
- Poke EEROM [location, data]
- Select I2C compatible port bits for SCL [SCL port, port bit#; SDA port, port bit#]
- I2C type read [device, location, length]
- I2C type write [device, location, data]
- SPI type read/write [data]
- (**) Copy flash to RAM [source, dest, length]
- Copy flash to EEROM [source, dest, length]
- Copy RAM to EEROM [source, dest, length]
- (**) Copy RAM to RAM [source, dest, length]
- (**) Copy EEROM to RAM [source, dest, length]
- Copy EEROM to EEROM [source, dest, length]
- (**) Fill RAM [location, length, data]
- Fill EEROM [location, length, data]
- (*) Set 11-bit CAN address [message object, address]
- (*) Set 29-bit CAN address [message object, address]
- (*) Reset CAN controller
- (*) Set CAN timing parameters [param1, param2, param3]
- (*) Send CAN message [message object, byte1, byte2,…byteN]
- Toggle Amulet code debugging on/off

NOTES:
(*) Apply only to the AT90CAN daughter card version

(**) All references to RAM include the virtual dual port memory

Contacts

For additional information on this product visit our website http://www.comsysdes.com/amulet.htm, send email to info@comsysdes.com, or call at 510-792-1760. For other design services please see http://www.comsysdes.com