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COMMUNICATION SYSTEMS DESIGN LLC

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## Semicustom Subsystems Series

## GUI (Graphical User Interface) Unit

The "Semicustom Subsystems" design concept allows the System Designer to concentrate in developing the core aspects of his/her technology. "Farming out" non-core aspects of the design allows a higher degree of parallelism in the product development. 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 & Target Applications**

It consists of a graphic display and touch panel unit running on an Amulet Technologies controller. A customer specific printed circuit board is designed to hold all the hardware and software components for a complete graphical user interface. The graphics development is performed in a sub-set of HTML language that can include the use of applets. This approach to GUI development results not only in a faster development cycle but also much easier code maintenance. The HTML graphics can be developed using standard tools and can be thoroughly tested for "look-and-feel" in either on the screen of a regular PC or on a special development system using the same display as the target product. Due to the high quality and low cost color displays currently available in the market, almost any conceivable product with a human interface can benefit from this technology. 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
- Etc., etc.

### **Typical Cost**

The development cost as well as the unit cost depends largely on specific display (size, resolution, color or monochrome, etc.). Communication Systems Design LLC ("CSD") can just assist you with the development services or can also provide with the finished production units tailored to your specific needs, in small, medium or large quantities as

needed. The typical cost of customization for a standard 4.3" TFT color display in WQVGA format (480x272) with bright white LED backlight and embedded touch panel is usually between \$8K and \$18K. The unit cost for the above described GUI will depend on the quantity ordered, typically ranging from \$90 in 1000 units to around \$300 for 50 units. Should your application fit in one of our already designed standard PCB's the development cost would be only for the graphics design, if applicable.

### **Standard & Customized GUI's**

If a standard GUI board does not satisfy the needs for a specific application the design can be tailored to meet customer specifications.

There are two possible paths for the development. If the customer needs fit into any of the existing designs the only customization needed is the graphic design. This can be done by the customer (or customer appointed graphic artist) or we can assist with this task. Each user interface is different (number and type of HTML pages) and this task needs to be quoted in each case.

The second possibility is a to design a combination of display and input device (touch panel, external buttons, etc.) that satisfies any special requirement. The graphics design task is still the same but a new printed circuit board and/or mechanical arrangement might be needed. Due to the semi-custom nature of this product these designs can be ready for testing in approximately one month, depending on the complexity. Notice that the vast majority of the graphics design details can be performed concurrently with the hardware design.

### **Power Consumption**

The standard version is powered from 5V DC. The typical power consumption (excluding display itself) is 300mW. Other semi-standard power options are 12V DC and 3.3V DC, depending on the specific display and special features.

**Volume Production**

The production can be handled as per the customer’s choice, for example:

- CSD can build and deliver tested units, ready to incorporate into customer product.
- The customer can handle the whole production process by purchasing the manufacturing rights and full documentation for this product.
- CSD can take partial responsibility for the production by working with the customer’s contract manufacturer.
- CSD can act as the customer’s agent, providing its technical expertise to coordinate with the different vendors involved.

The designs are optimized for small, medium or large volume production and the tasks involved depend largely on this parameter. For larger volumes, additional optimizations are advisable in order to adapt to the machinery and practices of the chosen manufacturing facilities.

**Agency Approvals**

Since the GUI is semi-custom and part of a larger product there is no specific agency approval for it. Depending on the application and specific configuration, the design may need the approval for NEBS, UL, TUV, CSA, FCC or other agency

regulations. The agency approval process for the final product can be handled by CSD or directly by the customer.

**Stand Alone Standard GUI Units**



The picture above shows a standard GUI board connected to a 4.3” display with embedded touch panel. This particular board can be used as a general purpose development board with multiple types of displays and takes approximately 1.2W from 5VDC, including the display itself and the serial and USB interfaces (typical applications require only one of these interfaces).

**Standard & Customizable Features**

Feature	Standard	Optional
User input	Resistive touch panel	Capacitive touch panel or external push-buttons
Backlight (display dependent)	White LED’s	CCFL (Cold Cathode Fluorescent tube)
Resolution	WQVGA	VGA
Screen aspect ratio	16:9	4:3
Color	18 or 24 color bits	Low cost monochrome
Host interface	Serial, 115Kb/d	USB
Power	5VDC	12VDC; 3.3VDC (others possible)
Miscellaneous options	N.A.	Buzzer, voice/music speaker, external I/O ports, signature or image capture, etc., etc.

**Contacts**

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

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