On-Board I/O Functions

Digital Inputs (8)
Digital Outputs (8)
Analog Inputs (6)
Serial Ports (3)
Printer Port (1)

6" 1/4 VGA RGB Color Graphic LCD Display With Touch Screen

Microsoft Windows CE
Version 3.0

User CPU I/O Bus For Adding Custom Interfaces

Easy Mechanical Design-In

AMD Elan-SC400 100 Mhz (486) Embedded Single Board Computer

On-Board Power Supply Accepts 6 to 12 Vdc

PCMCIA Card Slot Accepts Ethernet, Modem, Or ATA FLASH

CE-SBC-SC400

New from R.L.C., the *CE-SBC-SC400* 32-Bit Embedded Single Board Computer features a complete *Windows CE* system that can easily run your applications written in *Microsoft Embedded Visual C++,* or *Visual Basic*. Key hardware features include an AMD ELAN SC400 486 compatible CPU/Controller, RAM and FLASH Memory, Solid State Disk, Real Time Clock, Serial Ports (3), Parallel Printer Port, LCD Color Graphics LCD, Touch Screen, PCMCIA Card Interface, Digital Parallel TTL I/O (16), Analog Inputs (6), and much more. The *CE-SBC-SC400* comes complete with a 1/4 VGA color graphics LCD display with touch screen. Software development using Microsoft embedded visual tools include remote debug and drag & drop features between your software development computer and the *CE-SBC-SC400*. Both Ethernet and serial port software development is supported.

Hardware Features

* 32-Bit ELAN SC400 (486) Embedded CPU
* 100 MHz Clock Speed
* 12 Meg-bytes On-Board FLASH Standard
* 16 Mega-bytes On-Board RAM Standard
* LCD Color Graphics Display (6", 1/4 VGA)
* Touch Screen Standard
* PCMCIA Card Interface
* Serial COM Ports (3)
* Printer Port (1)
* Analog Inputs (6)
* Digital Parallel TTL I/O (16)
* Real Time Clock And Timers (3)
* User I/O Expansion Bus
* On-Board Power Supply

Software Features

* *Windows CE* (3.0 Standard)
* *Visual Basic* Supported
* *Visual C++* Supported
* *Remote Debug* Supported
* On-Board FLASH Programming
* Demo Programs Provided Free

R L C

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1-888-RLC-TECH
http://www.RLC.com**

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R.L.C. Enterprises, Inc.

2985 Theatre Drive, Paso Robles, CA 93446 Phone (805) 239-9737 FAX (805) 239-9736

CE-SBC-SC400

Top View

6" 1/4 VGA (320x240)
Color RGB Graphics LCD Display
With Touch Screen Standard
Software Controlled Contrast & Back Light

Side View

Low Profile Easy To Mount
Mechanical Design

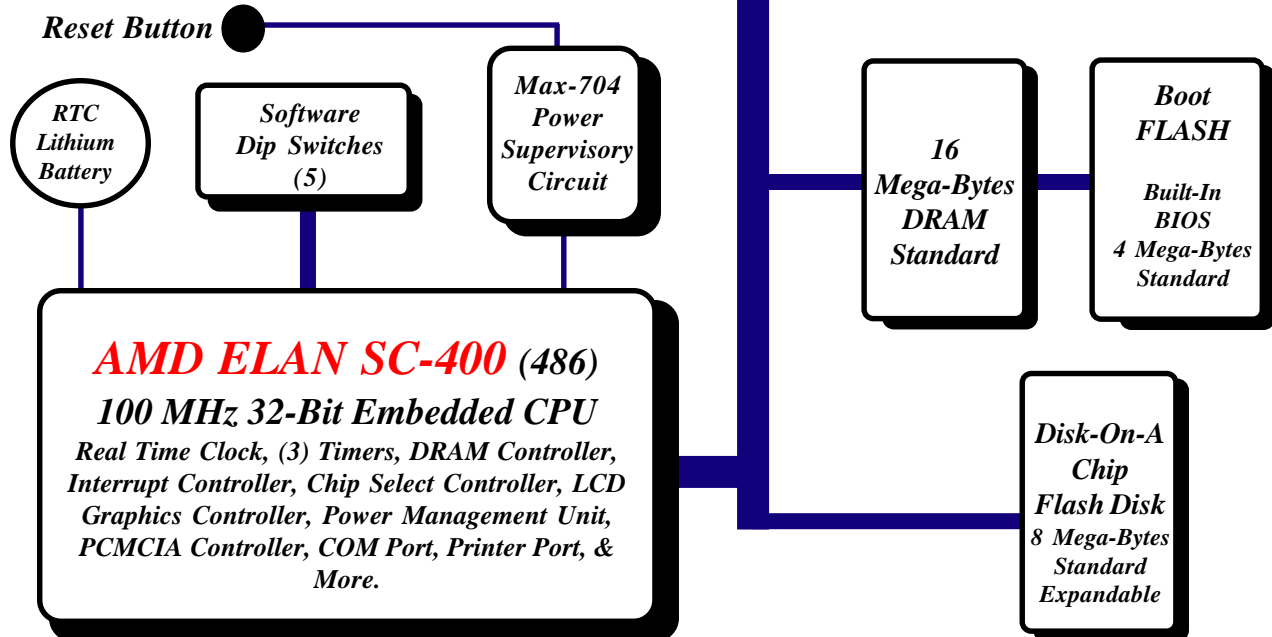*PCMCIA Card Socket Adapter*
Snaps Directly To Back
Of Main CPU Board

Bottom View

Easy Connection To On-Board
User I/O Expansion Functions

On-Board I/O & Expansion Connectors

Serial Port (COM-1) RS-232	Serial Port (COM-2) 232/422/485	Serial Port (COM-3) RS-232	Printer Port (LPT-1)	A to D 8-Ch. 12-Bit	TTL I/O 8 Input 8 Output	Color LCD Graphics Display & Touch	PCMCIA Controller Interface	User I/O Bus Expansion

Reset Button

RTC Lithium Battery

Software Dip Switches (5)

Max-704 Power Supervisory Circuit

16 Mega-Bytes DRAM Standard

Boot FLASH
Built-In BIOS
4 Mega-Bytes Standard

AMD ELAN SC-400 *(486)*

100 MHz 32-Bit Embedded CPU

Real Time Clock, (3) Timers, DRAM Controller, Interrupt Controller, Chip Select Controller, LCD Graphics Controller, Power Management Unit, PCMCIA Controller, COM Port, Printer Port, & More.

Disk-On-A Chip Flash Disk
8 Mega-Bytes Standard Expandable

CE-SBC-SC400 Hardware Description

AMD ELAN-SC400 CPU

The **CE-SBC-SC400** features the AMD ELAN SC400 microcontroller/CPU which combines a 100 Mhz 32-bit, low-voltage 486 CPU with a complete set of PC/AT compatible peripherals, along with the power management features required for low power and battery operation. Fully integrated compatible peripherals include an LCD character/graphics controller, PCMCIA controller interface, two 8259A compatible programmable interrupt controllers (PICs), DRAM controller, two 8237A compatible DMA controllers, 8254 compatible timer, 16550 UART, real-time clock (RTC), and an enhanced parallel printer port. The ELAN SC400 microcontroller/CPU is targeted specifically for embedded systems. All software written for the x86 architecture family is compatible with the ELAN SC400 microcontroller/CPU.

On-Board Memory

The **CE-SBC-SC400** provides 16 Mega-bytes of DRAM and 12 Mega-bytes of on-board FLASH memory as standard. Additional FLASH memory may also be added using ATA FLASH memory cards via the PCMCIA card interface. A BIOS with built-in loader and FLASH programmer is contained in a protected region of the on-board BOOT FLASH memory. The BIOS allows new versions of the operating system to be down-loaded and programmed directly into the BOOT FLASH memory without the use of external EPROM programmers. Full program transfers into FLASH DISK memory space using standard drag & drop and your Windows Explorer is supported.

Serial Ports (3)

The **CE-SBC-SC400** provides three (3) standard serial ports (COM-1, COM-2, COM-3). Each of the three serial ports provide RS-232 receivers and drivers for Tx, Rx, RTS, and CTS RS-232 signals. Standard DB-9 connectors are provided. The COM-2 port also provides RS-422/485 drivers for interfacing to Network I/O modules and other similar devices that use this type interface. This RS-422/485 network interface is provided on an RJ-11 style connector.

Color Display & Touch Screen

The **CE-SBC-SC400** features a built-in color LCD graphics display with integrated resistive touch screen. The display is mounted directly to the main CPU board and features 1/4 VGA resolution, 320 x 240 RGB color 4 bits per pixel. Display and touch screen drivers have been custom integrated into the Windows CE operating system. The display features a wide viewing angle with CCFL back light. Power for the LCD display is generated on-board. Software controls allow for contrast adjustment and applications to turn off the CCFL back light to conserve power.

Standard I/O Interfaces

The **CE-SBC-SC400** provides (3) serial ports, (1) standard parallel printer port, (8) Digital TTL outputs, (8) Digital TTL inputs, and (6) channels of 12-Bit A to D conversion. These standard I/O features are made available on standard connectors on the back side of the main CPU board. Software drivers and demonstration programs are provided for each of these I/O functions.

PCMCIA Socket Adapter

The PCMCIA card host adapter interface conforms to PCMCIA Standard Release 2.1. The interface provides support for one external PCMCIA card socket. The PCMCIA socket adapter mounts directly on the back side of the main CPU board. Standard size or compact PCMCIA cards are accepted.

User I/O Expansion BUS

The **CE-SBC-SC400** provides an interface connector to provide the engineer with access to the CPU address lines, data lines, chip selects, interrupts, and control signals. You can use this interface to add your own custom I/O designs. Software drivers are provided.
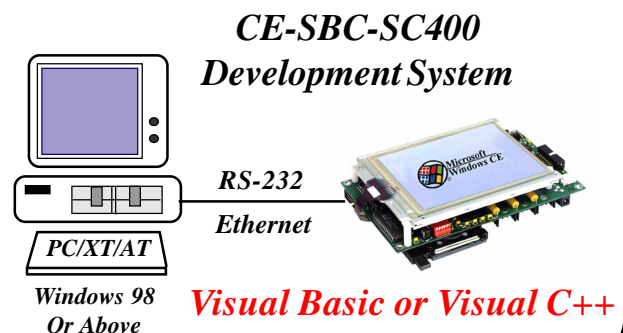
More Features

Additional standard functions and features include a battery backed Real Time Clock, software dip switch, precision reset circuit, on-board regulated power supply, two 8259 compatible interrupt controllers, 8254 timers and more.
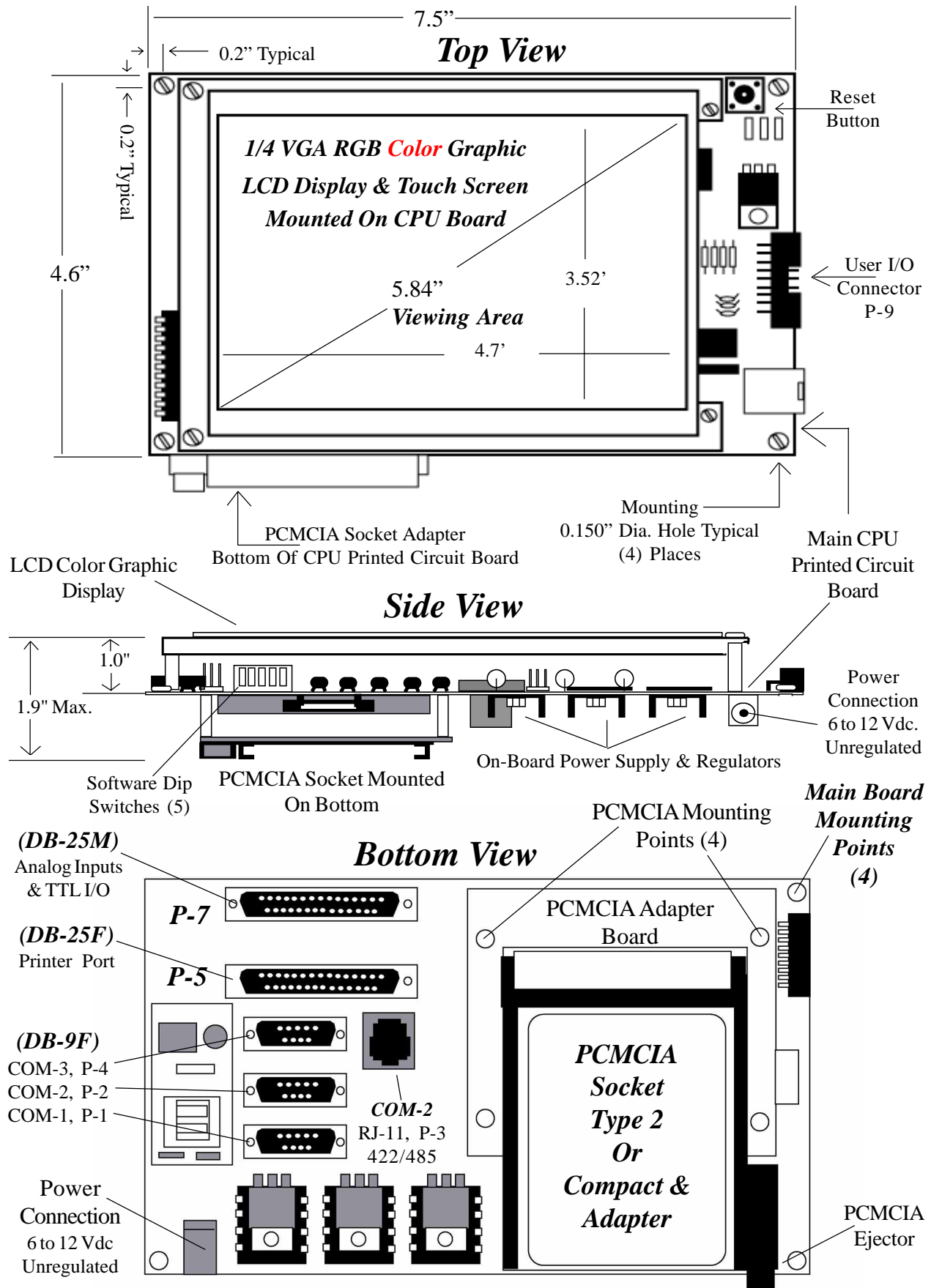
Software Development

Windows CE is a low-cost, compact real time embedded operating system from Microsoft designed for sophisticated 32-bit embedded computer solutions. Windows CE features a compact operating system which has been custom tailored and ported to the CE-SBC-SC400 Embedded Single Board Computer. Many of the interfaces provided by the CE-SBC-SC400 have been integrated into the operating system. You can write your application programs using Microsoft embedded Visual Basic or Visual C++ and debug your application using the full featured remote debugger. You can add custom drivers and DLLs as required for your specific hardware application.

Microsoft embedded Visual Basic or Visual C++ is used for software application development. R.L.C. will provide the Windows CE operating system custom tailored and pre-installed in the CE-SBC-SC400 along with everything needed to start developing your custom software applications. Remote application development and debug is supported using the serial COM-1 port or a PCMCIA card Ethernet connection. Full remote debug, and program transfers into FLASH DISK memory using standard drag & drop and your Windows Explorer are supported.

CE-SBC-SC400 Development System

RS-232

Ethernet

PC/XT/AT

Windows 98 Or Above

Visual Basic or Visual C++

CE-SBC-SC400 Mechanical Specifications

Top View

7.5"

0.2" Typical

0.2" Typical

4.6"

Reset Button

1/4 VGA RGB Color Graphic LCD Display & Touch Screen Mounted On CPU Board

5.84"
Viewing Area
4.7'

3.52'

User I/O Connector P-9

PCMCIA Socket Adapter Bottom Of CPU Printed Circuit Board

Mounting 0.150" Dia. Hole Typical (4) Places

Main CPU Printed Circuit Board

Side View

LCD Color Graphic Display

1.0"

1.9" Max.

Power Connection 6 to 12 Vdc. Unregulated

On-Board Power Supply & Regulators

Main Board Mounting Points (4)

Software Dip Switches (5)

PCMCIA Socket Mounted On Bottom

Bottom View

PCMCIA Mounting Points (4)

(DB-25M) Analog Inputs & TTL I/O

P-7

(DB-25F) Printer Port

P-5

PCMCIA Adapter Board

(DB-9F)

COM-3, P-4
COM-2, P-2
COM-1, P-1

COM-2 RJ-11, P-3 422/485

PCMCIA Socket Type 2 Or Compact & Adapter

Power Connection 6 to 12 Vdc Unregulated

PCMCIA Ejector

Development System (*CE-DEV-SC400*)

R.L.C. offers a development system (CE-DEV-SC400) which provides the necessary hardware and software needed to develop software applications using Microsoft Visual Embedded Tools. The development system is shipped pre-assembled and complete with Windows CE version 3.0 pre-install and ready to run. Demonstration programs are also pre-installed ready to run and are also provided on a separate CD with source/project files included for your own use. The development system provides all hardware required to set up an environment for software development using Microsoft Embedded Visual C++ or Visual Basic. The development system comes with serial port cables, power supply, PCMCIA adapter socket, and the RLC-CD with recovery files, documentation, and demo programs with source code. You must provide your own development computer . R.L.C. will provide everything needed including the Visual Basic and Visual C++ embedded tools. These tools are also available from Microsoft for FREE. Follow the links at our web site (www. rlc.com) to get your tools.

I/O And User Interfaces

Serial Ports (3):

All three serial ports COM-1, COM-2, and COM-3 provide PC compatible (Rx, Tx, RTC, CTS) RS-232 signals. DB-9F locking connectors are provided on the back of the main CPU board. Standard PC serial cables may be used for direct connection to the serial ports. A nul-modem is not required.

RS-422/485 Network Port:

The COM-2 serial port may be used for either RS-232/422 or 485 serial communication. Connection to the RS-422/485 feature is provided by an RJ-11 connector on the back side of the main CPU board. Standard phone style network cables may be used to connect to this feature. This feature may be used to control Network I/O modules from R.L.C. or for other custom applications.
Signals available at connector P-3 (RJ-11)

Parallel Printer Port:

A locking DB-25F connector is provided on the back of the main CPU board for connection to the enhanced parallel printer port. A standard printer cable may be used for connection. Signals available at connector P-5 (DB-25F)

PCMCIA Interface:

Signals are provided to implement one PCMCIA interface to support Ethernet, Modem or ATA FLASH memory cards. Software drivers are included in the Windows CE operating system. The PCMCIA socket mounts directly on the back of the main CPU board

Parallel TTL I/O:

Eight (8) digital TTL input pins
Eight (8) Digital TTL output pins
Signals available at connector P-7 (DB-25M)

Analog Inputs:

Six channels of A to D conversion, 12 Bit resolution.
Signals available at connector P-7 (DB-25M)

User I/O BUS Interface:

(8) Data Lines, (3) Address Lines , (2) Interrupt Lines,
(1) Chip Select, I/O Read, I/O Write
RESET, *RESET, 5Vdc, Gnd.
Signals available at connector P-9, (20 pin ribbon)

Display And Touch Screen Specifications

Graphics RGB Color LCD Display:

1/4 VGA resolution, 320 x 240 RGB STN color
Brightness = (180 cd/sq-m)
Viewing angle = approx. +50/-50 Degrees
CCFL back light with off/on control to conserve power
Software controlled contrast adjustment
LCD power provided by CPU main board

Touch Screen:

Extremely durable glass-like resistive touch screen. 12-Bit A to D converter used to provide high resolution and accuracy. Can be easily calibrated for use with finger, glove, or stylus. Calibration routines are built into the operating system and can be easily intergrated into your application.

General Specifications

Power Requirements:

Unregulated 6 to 12 Vdc
6 to 9 volts recomended, Cooling may be required if higher
330 ma @ 33Mhz, Idol with CCFL back light off
750 ma @ 33Mhz, Idol with CCFL back light on
1200 ma @ 100Mhz, back light on

Environmental:

-10 to +55 C with air flow and no condensation.

CPU Clock Speed:

AMD ELAN SC400 running at 100 Mhz, automatic power management built into CPU.

Special Or Custom Orders :

R.L.C. will, on special request, re-design the *CE-SBC-SC400* to include the I/O functions and interfaces required by your specific application. Size and shape may also be changed to your specifications. Special orders will require minimum quantity purchases and/or NRE charges. Please see our web site for more details.