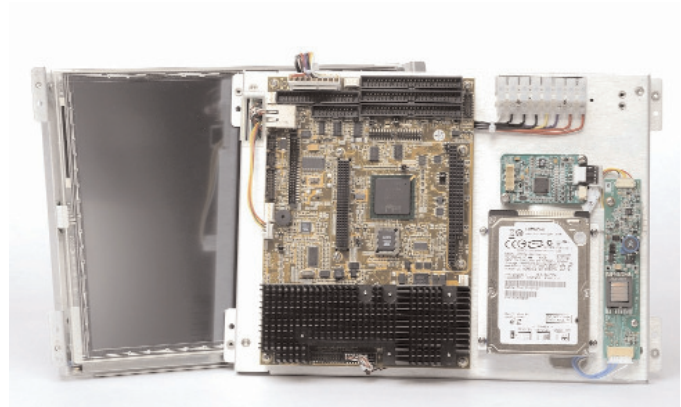


### FEATURES

- Compact 12.1" AM TFT Flat Panel Display
  - 1024 x 768 resolution
  - Two long-life, CCFL replaceable backlights
  - Contrast ratio is 550:1
  - Anti-reflective coating
  - Wide viewing angles
  - Extended temperature operation
- 15-in and 6.5-in screen sizes are also available
- Includes PC-compatible x86 single board computer
  - Fanless 1GHz Via C3, 1GHz Intel ZC Dothan, or 1.8GHz Pentium® M
  - 10/100 ENET and wireless support
  - 4 COM ports; 2 with RS-232/422/485 and 2 with only RS-232 interface, also provides 4 USB ports
  - 48-DIO, LPT, keyboard, mouse, and AC97 audio
  - 2 x IDE and CFlash socket
  - PC/104 expansion connectors
- Supports Linux, Windows® XP embedded and other x86-compatible operating systems
- Quick-response resistive touchscreen included
- Thin profile, small size of complete assembled unit
- Rugged and reliable aluminum construction
- Unpluggable terminal strip for power supply input
- Easy to mount, open-frame design
- Gasket material supplied to user for better fit into the user's application enclosure
- Memory, CompactFlash, 802.11 miniPCI cards, and cable sets available
- Optional 2.5-in hard drive for large storage requirements
- Free technical and configuration support
- Long-term product support
- Operating temperature: -20°C to +70°C
- Requires +5V and +12V
- RoHS compliant

WinSystems' Panel PC (PPC2) is a compact, open frame display subsystem that includes a 12.1-inch flat panel display, PC-compatible Single Board Computer (SBC) with Ethernet and touch screen integrated into an open-frame enclosure less than 3 inches thick. The combination of embedded PC functionality with industrial-grade construction makes the unit ideal for medical, transportation, kiosks, industrial automation and control applications with tight system integration and minimal space requirements.

The Panel PC is also perfect for networked applications since it is shipped with a wired Ethernet connection plus expansion is available for 802.11 wireless Ethernet on the EBC-855-G SBC.



The Panel PC supports operating systems such as Linux and Windows® XP embedded, plus real time kernels compatible with the x86 architecture.

### FUNCTIONAL CAPABILITY

**What is an Open-Frame Panel PC?** - A Panel PC consists of a color TFT flat panel, Pentium-class single board computer (SBC), and touch screen mounted in an open aluminum frame. The open frame chassis (without a front bezel) permits flexible mounting of the system for OEMs and integrators with content-rich applications. Its small size and wide operating temperature of the PPC2 makes it suitable for industrial and medical environments.

The unit is user-configurable to accommodate specific application design requirements. The PC/104 and PC/104-Plus connector allows industrial-grade expansion cards to be added for features such as GPS, cellular modems, analog and digital I/O, relays, etc.

Just like a standard desktop PC, a Panel PC provides a man-machine interface. A touch panel is included but a keyboard and mouse can be used for input as well. This is determined by the user's application and its operating environment.

---

**Flat Panel Display** - An Optrex high-luminance, wide-viewing angle, color TFT provides the foundation of the Panel PC. It has a 12.1-inch diagonal XGA screen which contains 1024 x 768 pixels that can display 262,144 colors. Optrex's TFT also supports -20°C to +70°C operation, which is currently the most extensive operational temperature range offered in the flat panel industry.

This flat panel display is ideal for factory automation use because of its high luminance of 320 cd/m<sup>2</sup> (nits). It uses two long-life (50K hours minimum) CCFL lamps as edge lights which are replaceable by the user. The display supports a viewing angle of ±65° horizontal and -75° to +45° vertical. This wide viewing angle permits easy panel placement with maximum operator viewing flexibility. Also, its contrast ratio is 550:1 thus ensuring color fidelity and superior gray scaling.

WinSystems also offers both a 15-inch and 6.5-inch open frame Panel PC. Support for other size panels are forecast for the future. Contact a WinSystems' factory application engineer with your specific needs.

**Single Board Computer (SBC)** - WinSystems offers two different PC-compatible single board computers to serve as the computing and display engine for the Panel PC.

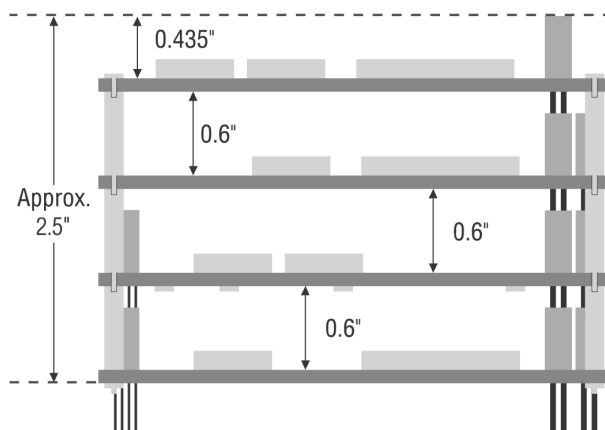
WinSystems' currently offers the EBC-855-G with either an Intel 1GHz ZC Dothan or 1.8 GHz Pentium® M for even higher performance. The EBC-855 has up to 1GB of RAM and offers a full set of I/O interfaces including a 10/100BaseT Ethernet port (with remote boot and WOL capability), VGA and dual channel LVDS flat panel video, a miniPCI connector that supports an optional 802.11 wireless networking module, four USB 2.0 ports, four serial COM ports, AC97 audio (5.1 codec), LPT and a PS/2 port for keyboard and mouse. Also onboard is a software programmable, 48-line digital I/O controller that provides input, output or output with readback for each I/O line. The board has PC/104 and PC/104-Plus connectors for support of additional off-the-shelf or user-designed specialty I/O modules. A full data sheet is available at <http://sbc.winsystems.com/products/sbcs/ebc855.html>.

WinSystems also offers a Via-based 1GHz EBC-H-C3Plus SBC as its PC-compatible host computer for the Panel PC. <http://sbc.winsystems.com/products/ebc-c3plus.cfm>. The board is configured with a 1GHz MMX-compatible CPU with up to 512MB of PC133 SDRAM plus a CompactFlash socket. Two 10/100 Ethernet controllers, USB, LVDS/CRT video, four serial COM channels, 48 digital I/O lines, AC97 audio, and the standard AT peripheral feature set are on board. It supports expansion with the

PC/104 or PC/104-Plus connectors or with four USB ports. The EBC-H-C3PLUS does not require a fan and will operate over an industrial temperature range that makes it ideal for rugged applications requiring an embedded PC.

The EBC-H-C3Plus and EBC-855-G are similar in features and I/O mix. The key differences are the processor's manufacturer and system clock speeds, number of USB 2.0 ports, and single vs. dual 100 Mbps Ethernet support. Both SBCs are based on PC/AT architecture which supports standard operating systems, real-time executives, utilities, and drivers such as Linux, Windows® XP embedded, QNX, and VxWorks.

**PC/104 Expansion Capability** - Both SBCs support a PC/104 and PC/104-Plus interface connector so that a designer can add off-the-shelf or user-designed, application specific PC/104 modules. PC/104 modules are self-stacking and plug together in a "piggy back" configuration to serve as a mezzanine expansion bus. PC/104-Plus is the PCI bus for the I/O functions requiring higher data transfer speeds.



PC/104-Plus Module Stack

PC/104 modules are very compact, measuring only 3.6 x 3.8 inches (90 mm x 96 mm), and are offered by WinSystems and a number of third party companies worldwide. Module functions include serial I/O, ZigBee, Cellular modems, digital I/O, GPS, and analog I/O among other functions.

More PC/104 information including white papers, products, and specifications are on our web site at <http://pc104.winsystems.com/products/pc104/index.html>

---

**Hard Disk Drive** - One of the factory configuration options is a 2.5-inch rotational hard disk drive that is mounted directly to the PPC2 chassis. It is a 20GB or larger unit which is typically needed if the system is running Windows XP or if large amounts of data storage are required.

**CompactFlash** - WinSystems offers industrial-grade CompactFlash cards that provide operational, high capacity, solid state disk (SSD) storage from -40° to +85°C for harsh embedded applications. The sustained data transfer rate is very fast, plus an on-card wear leveling algorithm extends the number of write cycles to the part.

These RoHS-compliant, bootable devices will fit into any computer, SBC, instrument, or camera with a CompactFlash socket. [www.industrialcompactflash.com](http://www.industrialcompactflash.com)



WinSystems' Industrial-grade CompactFlash

**Touchscreen** - The Panel PC features a quick-response, resistive touchscreen, manufactured by Elo Touchsystems for keyboardless operation. Their touchscreen has been operationally tested to over 35 million touches in one location, making them ideal for heavy-usage environments. It is durable since it is coated with an enhanced, scratch-resistant hardcoat.

A touchscreen is the simplest, most direct way for a person to interact with a computer. Touchscreens eliminate the keyboard and mouse, which may be cumbersome to use in certain application areas. Also there may be no space available for keyboard or mouse. Plus touchscreens are rugged enough to stand up to harsh environments where keyboards and mice often get damaged.

Resistive touchscreens allow all kinds of touch input devices to activate the screen, including fingers, fingernails, styluses, and gloved hands all the while maintaining an exceptional tactile feel.

Resistive touchscreens are used in more applications than any other touch technology including hand-held computers, PDAs, industrial equipment, point-of-sale equipment, medical equipment, office automation equipment and consumer electronics.

The Elo panel is an accurate, linear glass design which makes it inherently stable. Elo's patented AccuTouch® five-wire resistive touchscreens have unmatched accuracy, staying linear without relying on lookup tables and curve fitting corrections. The initial setup should last the life of the product, because only a two-point video alignment is required to normalize the touchscreen and video coordinate systems.

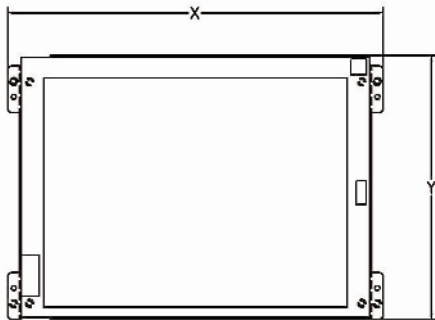
**Chassis** - The chassis plate is made of heavy duty aluminum alloy. It is designed to hold both the flat panel in place and to prevent any twisting or excessive stress on the glass surface. Aluminum was chosen because it provides excellent shielding from light, RFI/EMI, or infrared radiation. It has a high strength-to-weight ratio making it rugged and durable. Aluminum will not rust like steel and is corrosion resistant. Aluminum is non-combustible, non-magnetic, non-sparking, non-toxic and recyclable. It is also thermally conductive to dissipate component heat.

Both the single board computer and flat panel display are mounted directly to the same plate. The rigid plate serves as a base to hold the SBC, I/O connector plate, power terminal strip, backlight controller, and touchscreen controller. It is designed to rigidly hold the LCD yet not twist or stress the panel or cables.

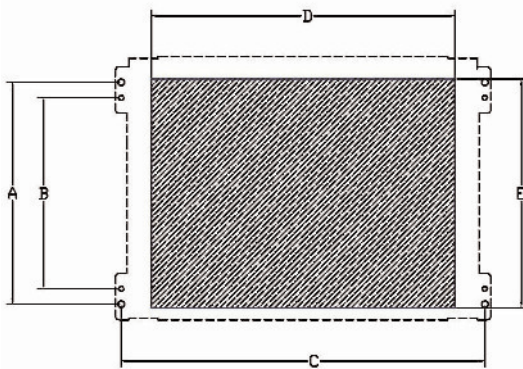
This assembly design is slim with a depth of less than 3 inches. Contact WinSystems' application engineering department if you need a different size or feature set.

**Mounting** - The Panel PC is designed to be rear mounted to a panel or placed in an instrument as a system component. Four through holes plus four captured #4-40 press fit nuts are in the chassis for mounting flexibility. The cut out dimensions for the panel display area is approximately 8.8 x 7.38 inches. A 0.031-inch pre-cut gasket kit is included with each panel for use in mounting it to the designer's final assembly.

WinSystems can provide electronic CAD drawings to help you begin your design.



Overall dimensions:  
 X = 12.1"    Y = 8.5"



**Mounting Holes:**

- A = 7.164", #4-40 Threaded Hole, 4 Places
- B = 6.164", 0.156" Dia. Hole, 4 Places
- C = 11.729"

**Cutout Dimensions:**

- D = 9.803"    E = 7.381"

**Mounting Outline for the PPC2**

**Power** - Power is accessed via an 8-pin pluggable terminal block located on the back of the Panel PC. The wiring harness from the power supply is attached to the mating male plug which permits convenient and solid attachment of the unit to the power source without the worry of disconnection. All wire retention screws are located in their towers that cannot fall out during transportation, installation and use. Wire protectors are available to protect small gauge stranded wire from screw damage. WinSystems ships both the terminal strip and plug with each unit.

Most applications require only +5 volts and +12 volts. A negative 12 volt input is provided, but is usually used by PC/104 and PC/104-Plus expansion boards.

**Power Supply** - If an external supply is needed, WinSystems offers the PS-80W-2-PPC2. It is an 80-Watt universal switcher that will accept input voltages from 85 VAC to 264 VAC (50/60Hz). It provides output voltages of +5 volts @ 12A, +12 volts @ 3A, and -12 volts @ 1A. The supply is housed in a black anodized aluminum case. <http://www.winsystems.com/products/misc/ps80.html>.



**WinSystems' External Power Supply**

**SOFTWARE, TOOLS & SUPPORT**

**Operating Systems** - Each selected single board computer is x86 software compatible and will run the latest versions of Windows and Linux. The SBC will support other operating systems such as QNX and real-time executives that require a "PC-AT" hardware environment. The Panel PC does not ship with an operating system installed in its standard configuration from the factory.

**RoHS** - The panel, SBC, touchscreen, enclosure and fasteners from WinSystems are RoHS compliant.

**Source** - WinSystems' Panel PCs are designed, manufactured, and assembled in the United States.

**Standard Ordering Configurations** - WinSystems has standard versions with different size of panels, SBCs and with/without a rotational disk drive. The 15-inch and 6.5-inch Panel PCs have their own separate data sheets.

---

**Technical Support and Custom Configurations** - WinSystems offers free support to speed your initial design cycle into production. Our engineers are dedicated to answering your questions. If you do not see a product or feature listed in this data sheet that you require, please contact us. We may have a product in development, know of another source, or perhaps can modify existing product to serve your needs.

## **SPECIFICATIONS**

---

### **Display**

Viewable Image Size: 12.1" diagonal  
Display Type: Active Matrix color LCD TFT  
Pixel Format: 1024 x 768 (maximum)  
Dot Size: 0.240 mm (H) x 0.240 mm (V)  
Colors: 262,144, 6 bit digital via LVDS  
Brightness (without touchscreen): 320 cd/m<sup>2</sup> (nits)  
Contrast Ratio: 550:1  
Horizontal Viewing Angle: ±65°  
Vertical Viewing Angle: +75°/-45°  
Surface Coating: Anti-glare hard coating  
Backlight: Two cold cathode fluorescent  
Touchscreen: Analog resistive

### **EBC-855-G Plus Single Board Computer**

EBC-855 CPU Clock: 1GHz w/Intel Celeron ZCD or 1.8GHz with Intel Pentium® M  
Memory: Expandable up to 1GB  
Solid State Disk: Up to 16GB CFlash  
Ethernet: One 10/100 Mbps/second port  
USB: Four ports, Ver. 2.2 compliant  
Serial Interface: Four serial COM channels, all with RS-232 levels; two with RS-422/485 (COM 1 and 2)  
802.11: User installed miniPCI card  
Audio: AC97 with MIC, six speakers and Line In  
LPT Interface: Bidirectional LPT  
Parallel Interface: 48 I/O lines, TTL compatible  
EIDE Interface: Supports up to four drives  
Keyboard: Standard PS/2 or USB interface  
Mouse: Standard 5-pin or USB interface  
PC/104 Interface: 16-bit, non-stackthrough  
PC/104-Plus Interface: 32-bit PCI, non-stackthrough

### **EBC-H-C3Plus Single Board Computer**

CPU Clock Speed: 1GHz  
Memory: Expandable up to 512MB  
Solid State Disk: Up to 16GB CFlash  
Ethernet: Two, 10/100 Ethernet  
Serial Interface: Four serial COM channels all with RS-232 levels and two with RS-422/485 (COM 1 & 2)  
LPT Interface: Bidirectional with ECP/EPP  
Parallel Interface: 48 I/O lines, TTL compatible  
EIDE Interface: Supports up to four drives  
Floppy Disk Interface: Supports two 1.44M drives  
Audio: AC97 compatible  
PC/104 Interface: 16-bit connector  
PC/104-Plus Interface: 120-pin, 32-bit connector  
USB: Two ports, Ver. 1.0 compliant

### **Environmental**

Operating Temperature: -20°C to +70°C  
Non-condensing relative humidity: 5% to 95%

## **ORDERING INFORMATION**

---

PPC2-G-12-0-312-1G 12.1-in. Panel PC with 1GHz C3 SBC and resistive touchscreen  
PPC2-G-12-1-312-1G 12.1-in. Panel PC with 1GHz C3 SBC, touchscreen and 40GB hard disk  
PPC2-G-12-0-327-1G 12.1-in. Panel PC with 1GHz ZC Dothan SBC and touchscreen  
PPC2-G-12-1-327-1G 12.1-in. Panel PC with 1GHz ZC Dothan SBC, touchscreen, and 40GB hard disk  
PPC2-G-12-0-327-1.8G 12.1-in. Panel PC with 1.8GHz Pentium®M SBC and touchscreen  
PPC2-G-12-1-327-1.8G 12.1-in. Panel PC with 1.8GHz Pentium®M SBC, touchscreen, and 40GB hard disk

### **Software Developers Kit**

DV-S-312-L20 Software developers kit for Linux (2.6 kernel) including SDK4  
DV-S-312-XP-SP2007 Software developers kit for Windows XPe including SDK4  
DV-S-327-L20 Linux (2.6 kernel) Developer Kit, includes software, hardware, enclosure, and cables  
DV-S-327-XP-SP2007 Windows XPe Developer Kit, includes software, hardware, enclosure, and cables

---

---

### System Memory for EBC-855-G

|                    |                          |
|--------------------|--------------------------|
| SODIMM200-G-27-128 | 128Mbyte RoHS compliant  |
| SODIMM200-G-27-256 | 256Mbyte RoHS compliant  |
| SODIMM200-G-27-512 | 512Mbyte RoHS compliant  |
| SODIMM200-G-27-1G  | 1028Mbyte RoHS compliant |

### System Memory for EBC-H-C3Plus

|                    |                      |
|--------------------|----------------------|
| DIMM168-G-133-64M  | 64Mbyte RoHS device  |
| DIMM168-G-133-128M | 128Mbyte RoHS device |
| DIMM168-G-133-256M | 256Mbyte RoHS device |
| DIMM168-G-133-512M | 512Mbyte RoHS device |

### -40°C to +85°C Industrial CompactFlash Memory

|                  |                     |
|------------------|---------------------|
| CFLASH-G-128M-I  | 128MB CFlash - RoHS |
| CFLASH-G-256M-I  | 256MB CFlash - RoHS |
| CFLASH-G-512M-I  | 512MB CFlash - RoHS |
| CFLASH-G-1024M-I | 1GB CFlash - RoHS   |
| CFLASH-G-2048M-I | 2GB CFlash - RoHS   |
| CFLASH-G-4096M-I | 4GB CFlash - RoHS   |
| CFLASH-G-8192M-I | 8GB CFlash - RoHS   |

### PPC2 Cable Set for the EBC-H-C3Plus

|                    |  |
|--------------------|--|
| CBL-SET-PPC2-312-G | Set includes:  |
| CBL-173-G-1-1.0C   | 20-pin ribbon to two, 9-pin male D (COM3 and COM4) adapter cable |
| CBL-225-G-1-0.333B | PS/2 mouse adapter cable   |
| CBL-249-G-1-0.645B | USB adapter cable (four cables)                                  |

### PPC2 Cable Set and battery for the EBC-855-G

|                    |  |
|--------------------|--|
| CBL-SET-PPC2-327-G | Set includes:  |
| CBL-173-G-1-1.0C   | 20-pin ribbon to two, 9-pin male D (COM3 and COM4) adapter cable |
| CBL-225-G-1-0.333B | PS/2 mouse adapter cable   |
| CBL-275-G-2-0.50D  | Dual USB to 8-pin, 2 mm cable (two cables)                       |
| BAT-LTC-E-36-16-1  | Battery  |

### Wireless Development Kit for EBC-855-G

|                    |  |
|--------------------|--|
| KIT-SBC-WIRELESS-1 | Kit includes a wireless module, antenna, and cable |
|--------------------|--|

### Power Supply

|               |  |
|---------------|--|
| PS-80W-2-PPC2 | 80 Watt switching power supply enclosure, and cables |
|---------------|--|

WinSystems reserves the right to make changes to products and/or documentation without further notification.

Product names of other companies may be trademarks of their respective companies.

