

**TS-ENC720**  
**Enclosure Manual**



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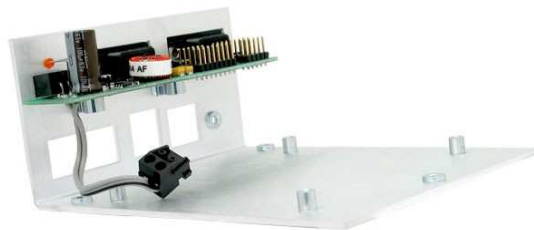
## 1 OVERVIEW

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**TS-ENC720** metal enclosure is made to house the TS-7200 family of Single Board Computers as well as the TS-7800 and up to two PC/104 peripheral boards. The internal power regulator efficiently converts unregulated 8-30 VDC input into regulated +5 VDC for the TS-7200 family and 8-38 VDC input for the TS-7800 to +5VDC as required by the SBC.

The TS-ENC720 Rugged Enclosure provides extra functions, including power conversion and DB9 breakouts of the internal COM ports or additional I/O. Additional features include:

- ✓ Supports TS-7200 family and TS-7800
- ✓ Power converter: 8-30VDC to 5VDC
- ✓ 8-38VDC to 5VDC for the TS-7800
- ✓ Surge suppression on power input
- ✓ Sturdy metal design reduces noise
- ✓ COM ports adapted to 9 pin Sub-D
- ✓ Dimensions 2-1/2x4-3/8x5-3/8 inch
- ✓ Power good LED visible
- ✓ Ethernet Status LEDs visible
- ✓ Extra DB9: COM3 or 8 DIO or 8 A/D



## 2 GETTING STARTED

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### 2.1 Handling the Board Safely

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Before performing any set up or placement procedures, take precautions outlines in this section.

- ✓ Be sure to take appropriate Electrostatic Discharge (ESD) precautions.
- ✓ Disconnect the power cable at the rear panel of the enclosure before moving, cabling, or performing any set up procedures.



#### **Warning**

Inappropriate handling may cause damage to the board inside

### 2.2 Setup and Installation Instructions

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Follow these guidelines for safety and maximum product performance:

- ✓ Observe local health and safety requirements and guidelines for manual material handling.
- ✓ Set the enclosure on a level surface with adequate ventilation.
- ✓ Ensure the rubber feet are used for protection and stability on level surfaces.
- ✓ Wall-mount the unit if placement on a level surface is not available, or desired.

### 2.3 Setup Tools

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Depending on placement and cabling of the enclosure, you may need the following tools:

- ✓ Small flat-blade screwdriver
- ✓ Small Phillips screwdriver

### 2.4 Setup Procedures

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After locating, setting up, grounding, and cabling the enclosure:

- ✓ Apply power to the unit (refer to some other section)
- ✓ Monitor COM1 using a terminal emulator to verify that the enclosure is operating properly

### 2.5 Disconnecting AC Power

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- ✓ Unplug the cord from the power source
- ✓ Disconnect the power cord from the rear panel of the enclosure

## 3 COMPONENTS

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### 3.1 TS-782

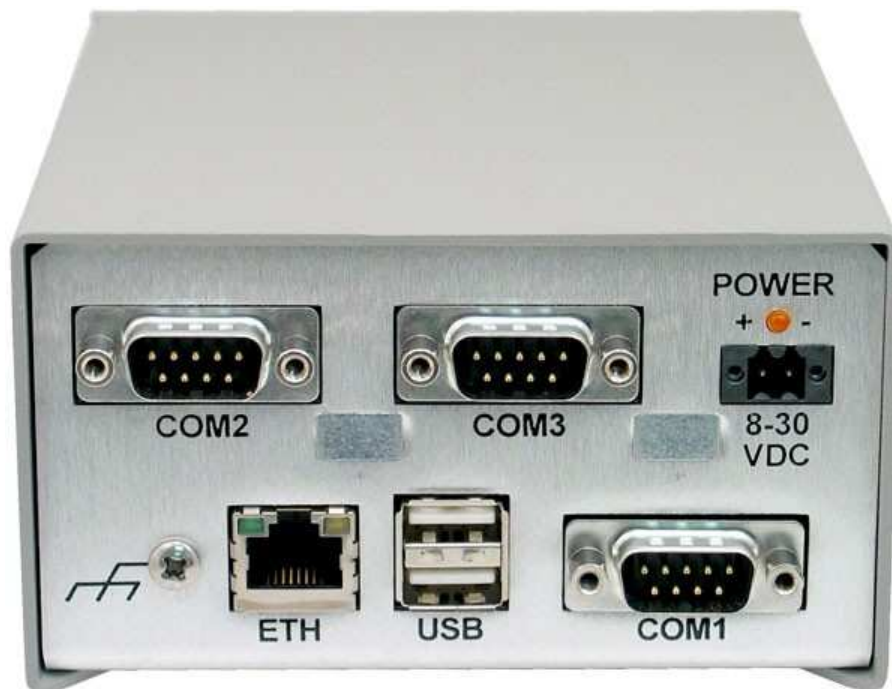
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The TS-782 is the board inserted in to the TS-ENC720 that provides the internal SBC with 2 DB-9 ports and 5VDC power regulation.

### 3.2 Front and Rear Panels

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The TS-ENC720 front panel is shown on the first page of this manual.



The rear panel of the TS-ENC720 enclosure (shown above) has all of the input/output connectors, including one COM port, two DB9 ports which can be used for an additional COM port, 8 channel A/D, or 8 DIO pins, one ethernet port, two USB ports, two pin power connector, as well as a power indicator LED.

### 3.3 Standard Headers and Connectors

#### COM1: Console RS-232 Serial Port

The COM1 RS-232 port uses a standard DB-9 male connector on the TS-ENC720.

**Table: COM1 DB9 Pinouts**

DB9 Pin	Signal	Description
1	DCD	Data Carrier Detect
2	RXD	Receive Data
3	TXD	Transmit Data
4	DTR	Data Terminal Ready
5	GND	Ground
6	DSR	Data Set Ready
7	RTS	Request to Send
8	CTS	Clear to Send
9	-	-



#### Note

The COM1 port on the TS-ENC720 is the default port used for system console. The RC-DB9 cable must be connected to COM1 in order to have a Linux console via any terminal emulator.

#### USB

The USB Connector on the TS-ENC720 provide two USB interfaces for the user. These are directly connected to the EP9302 processor, which integrates an USB dual-port Open Host Controller Interface (Open HCI), providing full-speed serial communications ports at a baud rate of 12 Mbits/sec. Up to 127 USB devices (printer, mouse, camera, keyboard, etc.) and USB hubs can be connected to the USB host in the USB “tiered-star” topology.

#### ETH0

The ethernet connector ETH0 makes use of a standard RJ-45 socket. This can be used to connect a standard 10/100 Ethernet cable into the enclosed SBC.

#### COM2 and COM3

Two standard DB-9 connectors are brought out for additional COM ports, DIO, or A/D conversion. The DB-9 headers are connected straight to the enclosed SBC. COM2 header is designed to connect to the A/D (MAX197 on TS-7200/TS-7250) header on the enclosed SBC and COM3 is designed for the DIO1 (or XDIO/DIO2 on the TS-7260) header of the enclosed SBC. Both COM2 and COM3 are set up to connect to COM headers on the enclosed SBC.



#### Warning

Connecting both RS-232 signals and DIO or A/D to the same COM port may cause irreversible damage to the SBC

# GETTING STARTED WITH TS-ENC720

## RUGGED METAL ENCLOSURE

Table: DB-9 Pin-out for DIO, A/D, and COM

DB-9 Pin	COM3 (DIO)	COM2 (TS-7200 & TS-7250 MAX197 A/D)	COM2/COM3 (TS-7250 & TS-7800 10 pin On-board A/D)	COM2/COM3 (RS-232)
1	DIO_0	Ch0	Ch0	DCD
2	DIO_1	Ch1	GND	RXD
3	DIO_2	Ch2	Ch1	TXD
4	DIO_3	Ch3	GND	DTR
5	GND	GND	Ch2	GND
6	DIO_4	Ch4	GND	DSR
7	DIO_5	Ch5	Ch3	RTS
8	DIO_6	Ch6	GND	CTS
9	DIO_7	Ch7	Ch4	--



### Notes

Other configurations are possible, but they may require non-standard cabling

### 3.4 TS-782 Routing/Connectors

The TS-782 board creates an interface between the TS-72XX/TS-7800 and external connections (The two DB-9 ports and incoming power connections).

#### TS-782 Internal Headers

Both of the DB-9 connectors on the TS-782 have a 16-pin and a 10-pin male header. These allow for connection to the SBCs COM port, DIO, or A/D converter. Technologic Systems provides: one 10-pin and one 16-pin cable (and an additional 10-pin and 16-pin cable with the A/D option) for TS-7200/TS-7250; two 10-pin cables for the TS-7260/TS-7800.

#### TS-782 Internal Power Cable

The internal power cable of the TS-782 must be connected to the power input of the enclosed SBC in order to provide regulated 5VDC power supply to the SBC.



### Warning

The indicated polarity must be used when connecting this cable

## 4 PRODUCT SPECIFICATIONS

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### 4.1 Dimensions

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The TS-ENC720 enclosure dimensions are **2.5" x 4.375" x 5.375"**

### 4.2 Cabling

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The enclosure includes the following cables for use with the TS-72XX/TS-7800 SBCs:

- ✓ All internal ribbon cables to make connections between the various 10-pin headers

### 4.3 Environmental

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To ensure optimum product operation you must maintain the operational environmental specifications listed in the table below.

**Table: Environmental Specification for TS-ENC720**

Environmental Specification	Standard Temp Products	Extended Temp Products
<b>Ambient Temperature</b>	-20° to +70° C The internal temperature must not exceed +70° C.	-40° to +85° C Extended temperature range is also standard lower CPU clock speeds.  <b>Note:</b> At high temperature operations, CPU clock speed should be set to <=166MHz  <b>Note:</b> Refer to your product manual, or contact Technologic Systems if the environmental temperature of the location is in doubt.
<b>Relative Humidity</b>	0 to 90% relative humidity. Not to exceed 90% non-condensing.	Not to exceed 90% non-condensing.

### 5 FURTHER REFERENCES

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- ✓ **Getting Started with TS-Linux**  
(<http://www.embeddedarm.com/documentation/software/arm-tslinux-ts72xx.pdf>)
- ✓ **Linux for TS-ARM User's Guide**  
(<http://www.embeddedarm.com/documentation/software/arm-linux-ts72xx.pdf>)
- ✓ **TS-7300 Data Sheet** (<http://www.embeddedarm.com/documentation/ts-7300-datasheet.pdf>)
- ✓ **TS-7300 schematic**  
(<http://www.embeddedarm.com/documentation/ts-7300-schematic.pdf>)
- ✓ **TS-7300 mechanical drawing**  
(<http://www.embeddedarm.com/documentation/ts-7300-mechanical.pdf>)
- ✓ **TS-7300's download section**  
(<http://www.embeddedarm.com/epc/ts7300-spec-d.htm>)
- ✓ **EP9301 User's Guide**  
([http://www.embeddedarm.com/documentation/third-party/ts-7000\\_ep9301-ug.pdf](http://www.embeddedarm.com/documentation/third-party/ts-7000_ep9301-ug.pdf))
- ✓ **EP9301 Data Sheet**  
([http://www.embeddedarm.com/documentation/third-party/ts-7000\\_ep9302-ds.pdf](http://www.embeddedarm.com/documentation/third-party/ts-7000_ep9302-ds.pdf))
- ✓ **TS-7000 Yahoo Users' Group** (<http://groups.yahoo.com/group/TS-7000/>)

### APPENDIX A: DOCUMENT HISTORY

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<i>Date of Issue/Revision</i>	<i>Revision Number</i>	<i>Comments</i>
July 11, 2008	1.0	Initial Release
July 15, 2008	1.1	Format changes
June 1, 2009	1.2	Updated mailing address

### APPENDIX B: ENCLOSURE VIEWS

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TS-ENC720 shown with optional TS-7200 SBC, TS-CAN1 peripheral board; included cables and TS-782 peripheral board



**APPENDIX C: CONTACT TECHNOLOGIC SYSTEMS**

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Call us Monday-Friday, **from 9 am to 5 pm**, Arizona-USA time; or email us at any time.

Our engineers answer tech support calls and are more than happy to talk to you about your needs and help you find the best solution for your project.