Tough Panel Plus

Table of contents

Warnings

Programmable control devices such as the Tough Panel Plus are not fail-safe devices and as such must not be used for stand-alone protection in any application. Unless proper safeguards are used, unwanted start-ups could result in equipment damage or personal injury. The operator must be made aware of this hazard and appropriate precautions must be taken.

In addition, consideration must be given to the use of an emergency stop function that is independent of the Tough Panel Plus.

The diagrams and examples in this user manual are included for illustrative purposes only. The manufacturer cannot assume responsibility or liability for actual use based on the diagrams and examples.

Trademarks

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EU Information

The Tough Panel Plus is manufactured in compliance with European Union (EU) Directives and carries the CE mark. They been tested under CE Test Standard #EN55011, and is submitted for UL Certification.

Products with CE marks perform their required functions safely and adhere to relevant standards as specified by EU directives provided they are used according to their intended purpose and that the instructions in this manual are adhered to. The protection provided by the equipment may be impaired if this equipment is not used in accordance with this manual. Only replacement parts supplied by AVG Automation or its agents should be used.

Technical Support

Consult PLC Editor Programming Software Help. You may also find answers to your questions in the operator interface section of our website @ uticor.net. If you still need assistance, please call our technical support at 1-563-359-7501 or FAX us at 1-563-359-9094.

SELV Circuits

All electrical circuits connected to the communications port receptacle are rated as Safety Extra Low Voltage (SELV).

Preventative and Maintenance Cleaning

No special preventative measurement is required.

Product Overview

Thank You for using Uticor's new pre-configured HMI. The new 15" Tough Panel Plus functions as a drop-in replacement. In addition, the Tough Panel Plus provides several enhancements over its predecessors including additional communication ports, higher resolution, a standard MicroSD slot and more. This manual presents information on the installation, communication and specifications of the Tough Panel Plus. It also covers the troubleshooting and maintenance of an existing setup and provides understanding on how to program the panel.

Specifications

INPUT POWER

Voltage: 24 VDC nominal (12-28VDC operating range)
Max. Power Consumption: 20 Watts for 15" unit

MECHANICAL

Mounting: DIN Clip
Enclosure: NEMA 4, 4x (indoor)
External Dimensions: 16.75" [425.45mm] x 13.00" [330.20mm] x 4.66" [118.47mm]

ENVIRONMENTAL

Operating Temperature: 0°C to 55°C
Storage Temperature: -25°C to 65°C
Humidity: 10-95% RH, Non-Condensing
Atmospheric Conditions: Non-corrosive gases
Vibration: 5 to 55Hz, 2g for 2 hours in X, Y, and Z axis
Shock: 10g for under 12ms in the X, Y, and Z axis
Electrical Noise: NEMA ICS 2-230 Showering arc, ANSI C37.90a SWC; Level C Chattering Relay Test

HMI DISPLAY

Backlight: White LED
Brightness/Life: 400 nits/75,000 hrs
Touch Screen: 4/5-Wire Analog Resistive
Pixel Resolution: 1024 x 768
Display View Area: 12.02" x 9.01" (305.28 x 228.96mm)

COMMUNICATIONS

Communication Ports:
    1 RS-232 port (9 pin D-Sub)
    1 RS-232/RS-422/RS-485 (15-pin D-Sub)
    4 USB ports with USB 2.0
    Ethernet port with 1 GB speed
    Micro SD slot

Installation

Mounting Information

15" Unit: inches [millimeters]
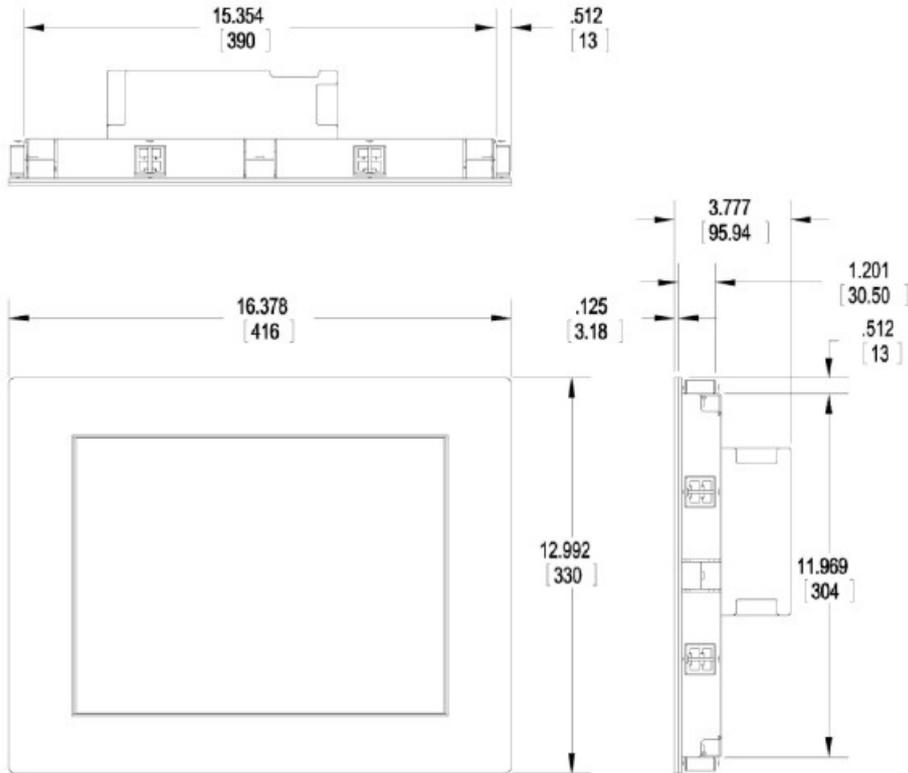
Cutout Dimensions

PANEL CUTOUT SIZE

Note: Allow for 1-inch clearance between rear of panel and enclosure.

Mounting Instructions

The Tough Panel Plus is DIN mounted. All the necessary mounting hardware is provided with the unit. The 15" unit will require use of 8 DIN Clips which are provided with the unit. Once the cutout is properly sized for the Tough Panel Plus unit, follow the steps below to secure the unit to the enclosure.

1. With the flanges on the DIN Clip pointed away from the enclosure surface, insert the flanges into both holes on the side of the Tough Panel Plus mounting plate.

2. Tighten the screw against the enclosure surface. **Note:** Tighten DIN Clips to a maximum of 1.5 inchpounds to provide a proper seal.
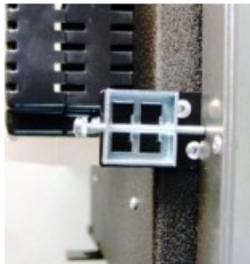
3. Tighten nut to secure screw against enclosure. Repeat this process with the remaining DIN Clips.

Powering the Unit

Connect the power input wires into the HMI's power terminals. Supply 24VDC nominal (12-28VDC) power to the system. If the unit does not power up correctly, remove power from the system and check all the wiring. In addition, see the Indicator Light section below for troubleshooting.
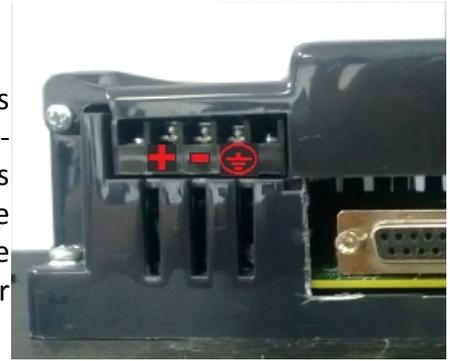
Indicator Light Status

Indicator Light	LED Behavior	Status Description
COM1 Activity	Blinking Red	Panel transmitting through RS232 port
COM1 Activity	Green	Panel receiving through RS232 port
COM2 Activity	Blinking Red	Panel transmitting through RS422/485/ RS232 connection
COM2 Activity	Green	Panel receiving through RS422/485/ RS232 connection

Communication
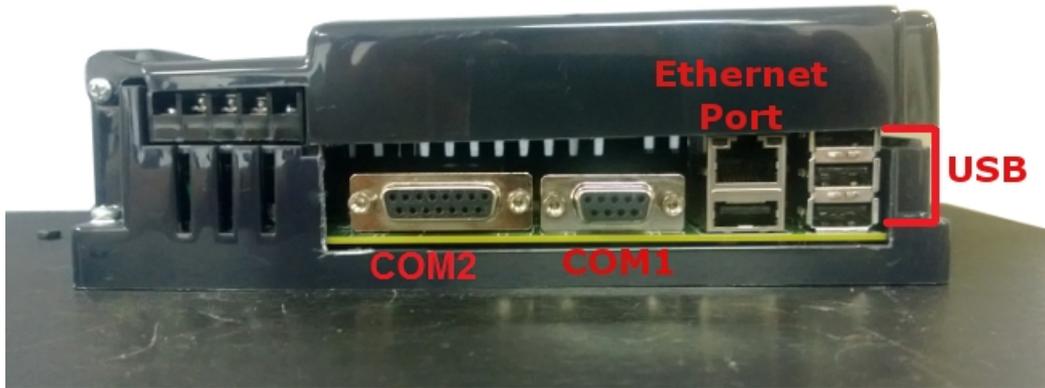
COM2 Port
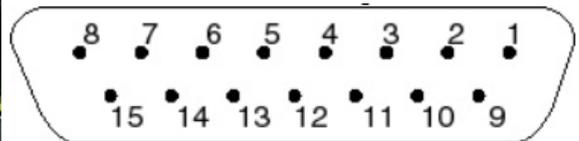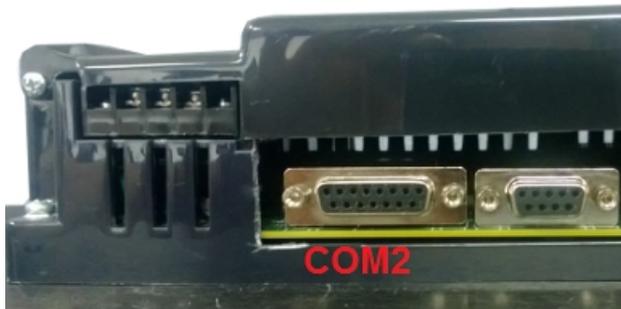
This is the RS-232C, RS-422A or RS-485A female 15-pin D-Sub Connector to connect to other PLCs. Most PLCs connect to the 15-pin D-Sub with a cable specific to the PLC type.

Pin Number	Connection
1	Chassis GND
2	PLC TXD (RS-232C)
3	PLC RXD (RS-232C)
4	+5V (100Ω)
5	Logic GND
6	LE
7	PLC CTS (RS-232C)
8	PLC RTS (RS-232C)
9	RXD+ (RS-422A)
10	RXD- (RS-422A)
11	TXD+ (RS-422A)
12	TXD- (RS-422A)
13	Terminating Resistor (connect to pin 9)
14	NC
15	NC

COM1 Port
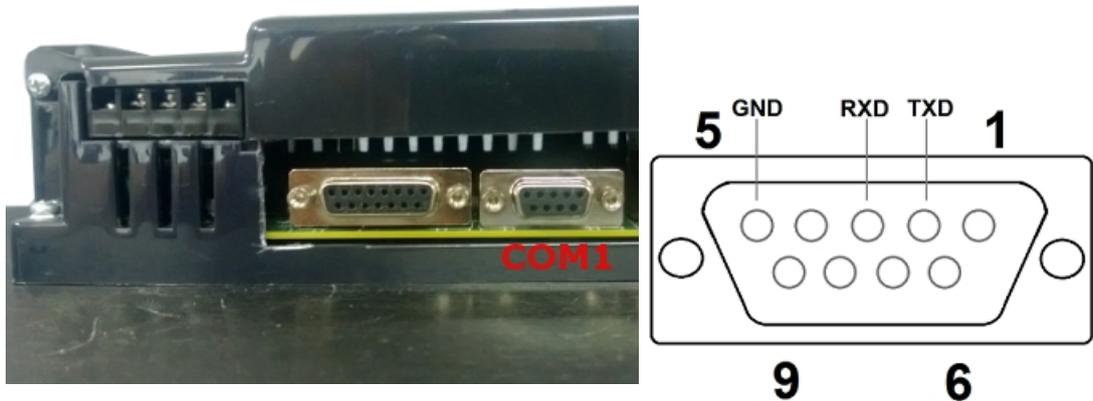
The Tough Panel Plus has a built-in serial port (COM1 PORT) located on the 9-pin D-Sub connector. COM1 PORT is an RS-232 port which requires an appropriate RS-232C cable **(P/N: UT-CPG1)** for programming the unit through a PC. It serves as the default programming port on the Tough Panel Plus. Since COM1 has fixed communication parameters, you can always connect the programming software to the PLC through the port without needing to make different configuration changes.

CAUTION! Keep the signal reference GND wire well protected from external noise by using shielded cable.
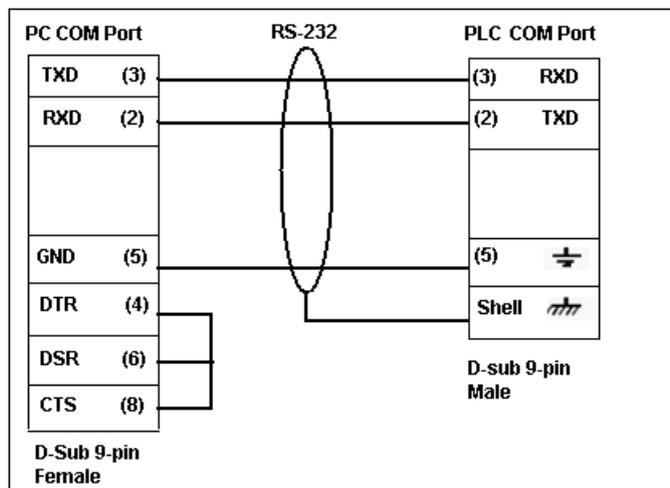
Ethernet Port
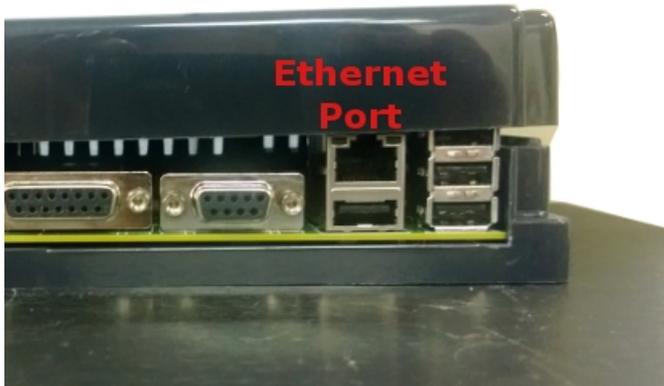
There is an Ethernet port available on the Tough Panel Plus. This port enables users to add/update programming through an Ethernet connection. It allows for both PC and PLC simultaneous communications. It can also be used for Internet access and email alerts.

The following is a list of current drivers supported by the Tough Panel Plus HMIs. We are always updating PLC compatibility, if you don't see your type PLC in this table, visit our web site at uticor.net or call technical support at 1-563-359-7501.

PLC Manufacturer	Serial Drivers	Ethernet Drivers
AVG/EZAutomation	EZPLC	Uticor Ethernet TCP/IP
Allen Bradley	DH485/AIC/AIC+ DF1 Half Duplex DF1 Full Duplex	Ethernet/IP DF1 over Ethernet
KOYO (AutomationDirect)	Modbus (Koyo addressing) Modbus RTU Direct NET ADC K-Sequence Do More Serial	Modbus TCP/IP ECOM Ethernet Do More Ethernet
Modicon	Modbus RTU Modbus Uni-Telway	Modbus TCP/IP
Omron	Host link adapter	
GE		GE SRTP
Siemens		Siemens ISO Ethernet

Ethernet Port

USB Ports

Tough Panel Plus HMIs come equipped with four USB ports. Currently the USB ports for the Tough Panel Plus are only used for USB Flash drives (data collection or program upload), and only one drive can be used at a time.

   Note: Only the one storage device (Micro SD or USB) may be used as a storage device at a given time.

Micro SD slot
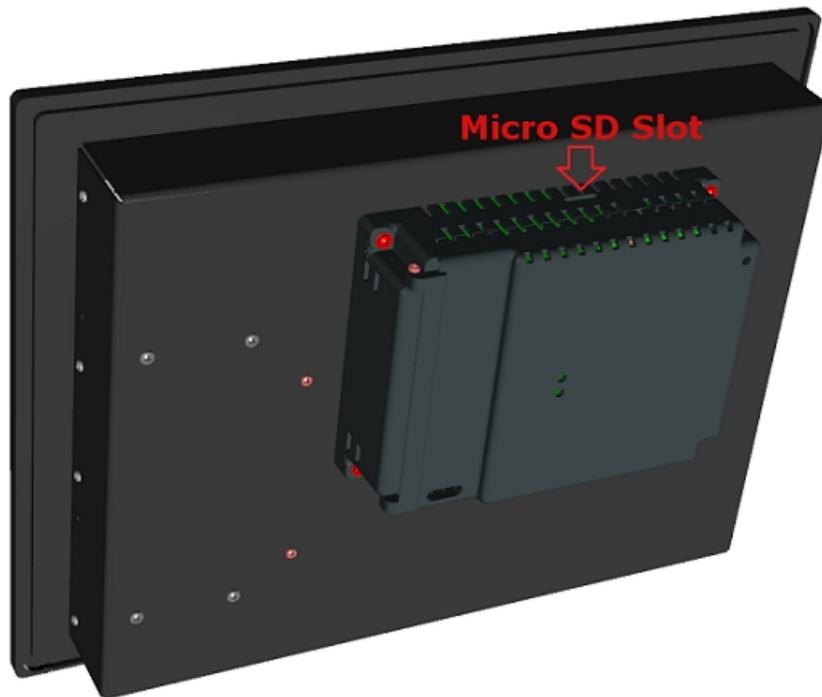
A Micro SD slot is available to allow for additional storage or data transfer. Simply insert a Micro SD into the slot and it will load automatically. When finished, push down on the Micro SD card to eject it from the unit.

Network Option Cards

Depending on model purchased, network option cards are available for additional connectivity. Compatible network option boards include DataHighway Plus, Modbus Plus, Devicenet, Profibus, and CC-Link.

Programming the Panel

Create a Project

This section outlines the basics of creating a project using the uWIN software. Further programming information for the Tough Panel Plus is located in the Software Manual.

Launch your Programming Software and select how you would like the program to link to the Windows HMI unit. For this scenario, you can select 'Edit Program OFF-LINE.' This will enable you to create a program without having the Windows HMI unit connected.

   NOTE: uWIN software must be version 2.2 or later to communicate with the Tough Panel Plus.
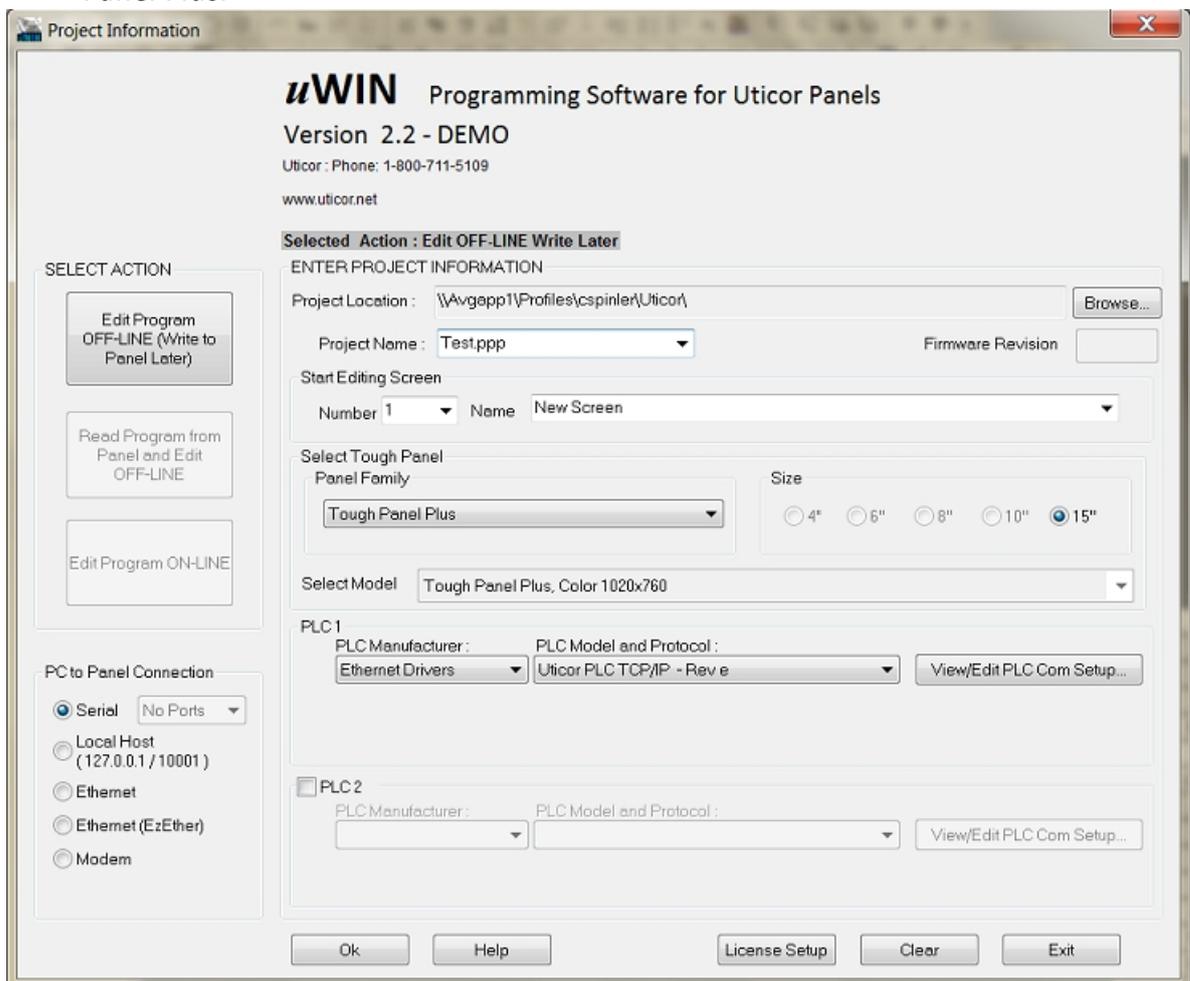
1. Enter a project name (e.g. Test). Click OK.
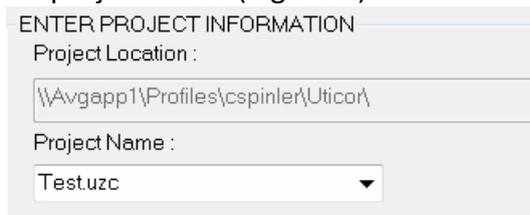
2. Under Panel Family, select Tough Panel Plus. The size field will automatically populate as 15".
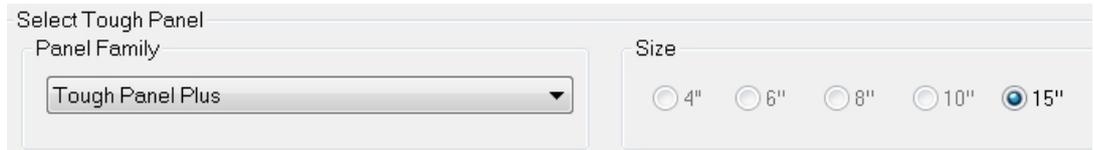
3. Next, select the PLC Manufacturer and protocol you would like to use with the unit. (Example shown below.)
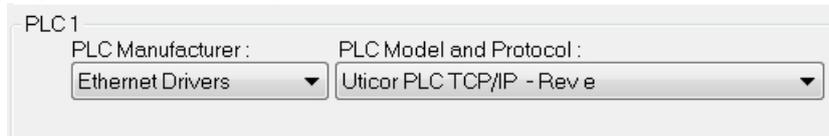
4. Click OK to launch the editing software program. The Main Project Window will then appear. The steps below outline how to create a sample panel program.

Create a Panel Program: Click on "Panel" and "Scr 1" to create the Panel display screen as explained in the sample below.

1. In the Main Menu, click on **Objects** > **Buttons** > **Buttons**. The screen below will appear. Enter **START** for Tag Name. Click OK.
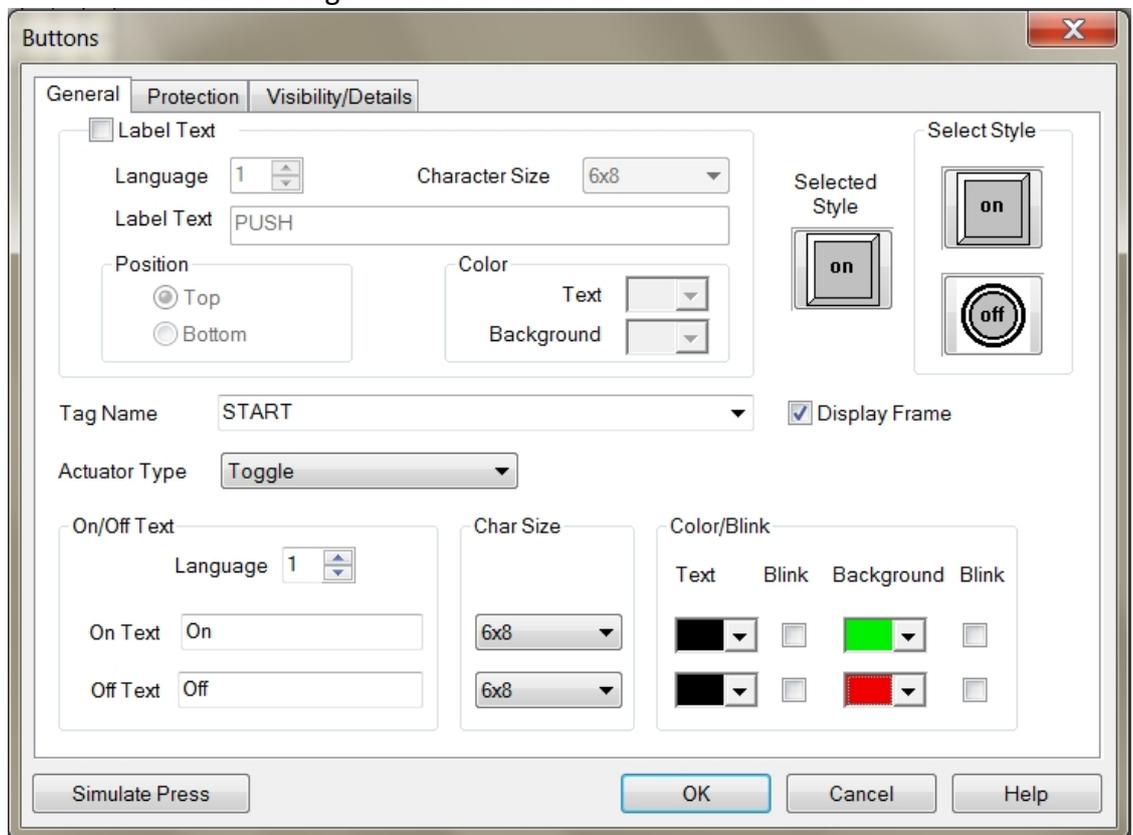
2. A dialog box might appear requesting the memory location. Enter "S1" in the field to the right of "Address String." The Data Type should be marked as DISCRETE. Click OK.
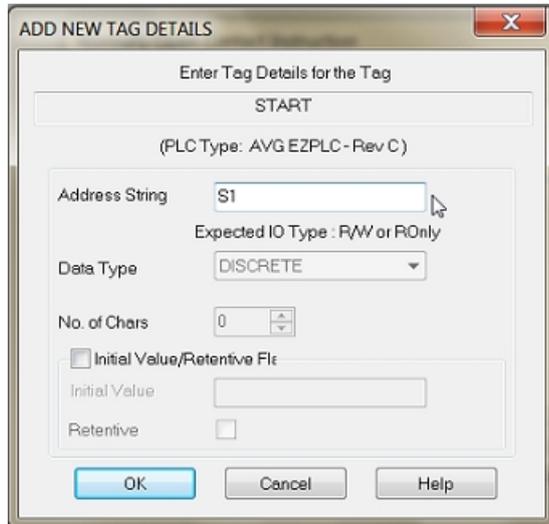
3. Click anywhere on the screen to place the Button object. Double click the icon to open its object dialog box if you need to adjust the object's appearance or attributes. Clicking "Simulates Press" will allow you to toggle between On and Off states.
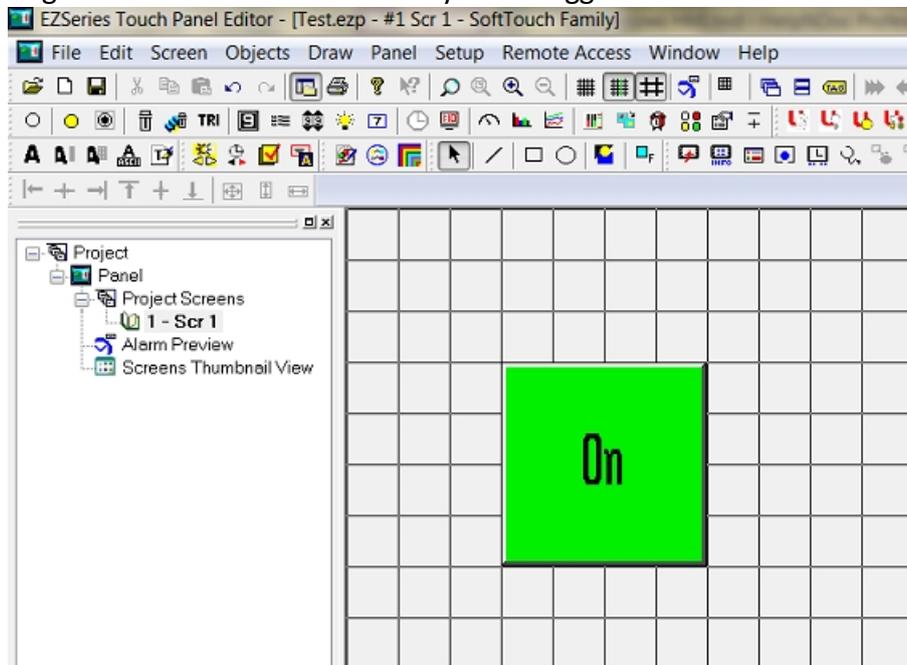
4. Similarly, you can create an Indicator Light Object by selecting **Objects** > **Data Display** > **Indicator Light**. Enter **Lamp** for Tag Name. Click OK. Place the object on the panel. Your screen should look like the picture below.

On

Lamp

On
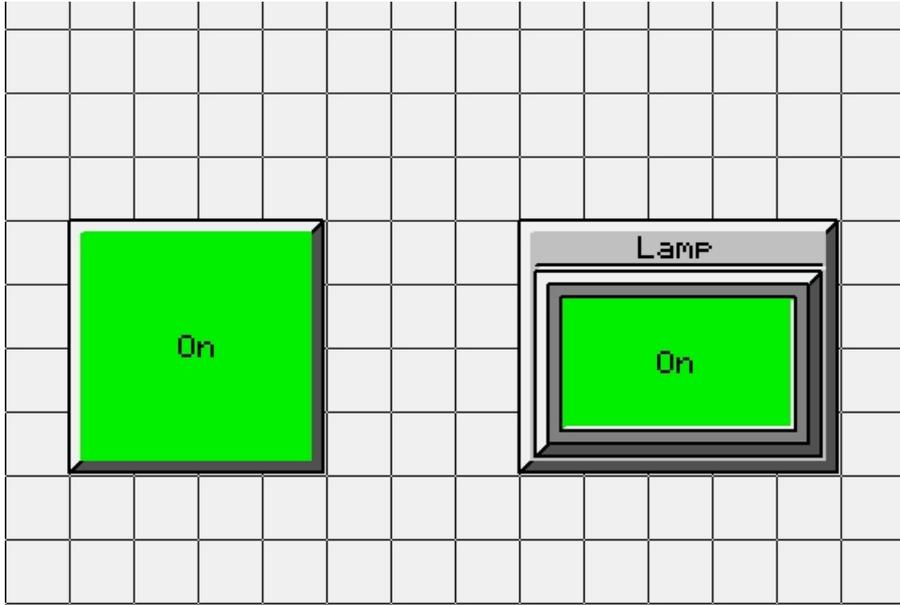
Transfer a Project

After a project is complete, the next step is to transfer the project to the Tough Panel Plus unit. When editing projects online, programming information is automatically sent to the unit once the project is saved. When editing in an off-line mode, the project information will need to be transferred. To transfer the project follow the steps outlined below:

From the Project drop down menu, select **File** > **Transfer to Panel**. A dialog box similar to the one below will appear.

If transferring serially:
1. Verify the RS-232C cable **(P/N: UT-CPG1)** is connected between the unit and the PC. In the absence of an RS-232 port on the PC, a USB to RS-232 converter may be used to connect the programming cable to the PC.
    Note: The recommended USB to Serial converters are ATEN-UC-232A or Belkin-F5U409.
2. Select *Serial (COM1)* as method of transfer under PC to Panel Connection. And then click *Start*.

If transferring via Ethernet:
1. Select Ethernet as PC to Panel Connection.
    Note: Click the *Specify IP/Port* button in order to make adjustments to the IP Address or Port.
2. Then click *Start*.

When finished, a Transfer Completed message will be displayed. Click OK to continue and the project is now transferred.

Maintenance and Troubleshooting

Hardware Maintenance

Routine maintenance checks should be performed on the unit to avoid any risk of hardware problems. The Tough Panel Plusis designed to be a very rugged controller so that just a few checks periodically will help keep it up and running.

The key points to be checked include:
- · Ambient operating conditions
- · Wiring and connections

Maintaining the Ambient Operating Conditions

Keeping the Tough Panel Plus unit's environment within specified operating conditions is the best method to minimize the maintenance.

1. Always ensure that ambient temperature inside the cabinet is within Tough Panel Plus unit's temperature ratings.

2. If any other equipment inside or outside of the cabinet is producing heat, employ cooling methods like a blower fan to reduce 'hot spots' around theTough Panel Plus.

3. Periodically inspect and clean if there are any air filters on the cabinet. Ensure that the unit is free from dust, humidity and corrosive gases.

Changing the Battery

The unit comes with a built in Lithium battery with a 5 year life expectancy. The steps below outline the process to change the battery inside the unit. Since only the information saved to the registers/discretes available on a power cycle will remain intact, please save pertinent information before attempting to change the battery. Then remove power from the unit.

1. Open the back cover to access the battery.

2. The battery is located in the upper-left hand corner as shown in the figure below. Remove the old battery and replace with a new 1/2 AA, 3.6 V Lithium Battery (Part Number: **UT-B**).

3. Close rear cover and ensure that the door latches.
4. Reconnect power source. Connect to PC and run the Programming Software to transfer back the user program to the Tough Panel Plus.

The Real Time Clock (RTC) will need reset after the battery has been replaced. All information saved to the registers/discretes available on a power cycle will remain intact. Data not saved to registers/discretes available during a power cycle will be lost.

Troubleshooting

If you encounter difficulties while using our Tough Panel Plus device, please consult the table below. Additional assistance is also available within the **uWIN Software Help**. Alternatively, you may also find answers to your questions in the operator interface section of our website @ uticor.net.

Problem		Possible Cause	Suggested Action
Operation	CPU Status LED is off	Disconnected or faulty power source	Check and repair power source.
			Check the wiring for loose contacts and secure them if found.
			Ensure that proper polarity is observed.
		Input power level is outside of unit's power rating specifications	Ensure that the power being presented to the PLC terminal is within the specified range.
	CPU LED is blinking red and green	Bad or corrupted program	Check the logic program
			Pay special attention to Program Control Instructions and make sure there is a Next or Return statement at the end of Jump and Subroutine Instructions
	CPU LED is red	Electrical Noise	Power cycle the PLC once to see if an intermittent high frequency noise has caused the failure.
			Follow instructions to avoid electrical noise.
			Consider installing an Isolation Transformer if you think the noise is making its way through the Power source.
			Check to ensure that RS232 signal GND is not connected to Earth ground and the shield is

			connected to Earth ground on both sides.
			If problem persists, call AVG Automation for assistance.
Communication	No communication with unit	Disconnected or loose cable	Check the wiring for loose contacts and secure them if found.
			Ensure you are using a correct communication cable.
	No communication with the PC (RS232 Port error)	Wrong/broken cable	Ensure the correct communication cable is being used (PGMCBL).
		Wrong communication port settings	Check and correct the COM port attributes.
			Open the PLC Editor and click on the configuration button
		Wrong COM port assignment on the computer	Check if correct Serial Port (COM1) of the computer has been selected.

Still Need Help?

Technical Support

Most of the frequently encountered problems regarding the Tough Panel Plus unit's operation are answered in the sections above. However, if you still need answers to your questions, please call our technical support at 1-563-359-7501.

Warranty Repairs

If your Tough Panel Plus is under warranty, contact us at 1-563-359-7501.

Out of Warranty Services

If your Tough Panel Plus is out of warranty, contact Uticor at 1-563-359-7501 for an evaluation of repair costs. You can then decide whether it is more economical to proceed with the repairs or to upgrade your system with a new unit.