

Crestron **ST-1700C**
1-Way Wireless RF Touchpanel

Operations Guide



CRESTRON

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1-Way Wireless RF Touchpanel: ST-1700C

Introduction

The ST-1700C 1-Way Wireless RF SmarTouch™ Touchpanel (the touchpanel) gives users customized command of their control environment. Available in both a domestic and an international version (STI-1700C), the lightweight, hand-held touchpanel, with long-life NiMH battery and RF wireless communication with a range of up to 300 feet, allows complete freedom of movement, indoors or out. Customized graphic icons and 10 programmable “quick” pushbuttons let users easily control any function.

Included with the ST-1700C are a Crestron High Performance Rechargeable Battery Pack (ST-BTPN) and a Docking Station (ST-DSN) that docks the touchpanel and/or recharges the ST-BTPN. An external power pack (PW-1215 for domestic use or PWI-1215 for international use) is also provided to power the touchpanel. Refer to the latest revisions of the documentation supplied with these items for descriptions and details.

The following table provides a functional summary of the ST-1700C.

- 5.7" (14.78 cm) Active Color Matrix Display
- 320x240 Screen Resolution
- 63MIPs ColdFire Processor Running ISYS Generation Firmware
- 16 Bit Non-Palette Graphics
- 64,000-color ISYS engine
- 4 MB of Flash (3MB Reserved For User Display Lists)
- 8 MB of SDRAM (Synchronous Dynamic RAM) for Panel Firmware
- Power Up on Last Page
- Display On From Hardkey Disabled
- Built-in 10 "quick" Pushbuttons
 - Engraveable*
 - Operate Without Waking Display
- Long-Life NiMH Battery
 - Fast Charging
 - No Battery Memory
- Compatible with Existing CNRFGWA RF Gateway
- 1-Way RF Communication, Range up to 300 Feet

*Supplied with standard legends. Customizable Engraving Button Kit sold separately. See Appendix on page 32 for details.

Specifications

Specifications for the ST-1700C are given in the following table.

ST-1700C 1-Way Wireless RF Touchpanel Specifications

SPECIFICATION	DETAILS
Power Options <i>ST-BTPN (or equivalent)</i>	Rechargeable NiMH battery pack (included) (4100 mAh capacity after full charge. Operating time depends on usage.)
<i>AC: Domestic External Adapter</i>	12VDC, 1.5A, 120VAC Input (included) (P/N PW-1215 or equivalent)
<i>AC: International External Adapter</i>	12VDC, 1.5A, 230VAC Input (included with international version touchpanel) (P/N PWI-1215 or equivalent)
ST-DSN	Docking Station/charger with external power pack (included)
Default NET ID	3
Default RF ID	10
Default Timeouts	10 minute for standby 30 minutes for power down
Signal Join Maximums	999 digital
Control System Update Files ^{2, 3, 4} 2-Series Control System Update GEN/CN-TVAV Update File CNMSX-AV/Pro Update File CNRACKX/-DP Update File ST-CP Update File	Version C2-2004.CUZ or later Version 5.10.13V.UPZ or later Version 5.10.11X.UPZ or later Version 5.10.11W.UPZ or later Version 4.02.02S.UPZ or later
Acceptable File Extensions ⁶ .vtz .csf	<i>projectname.vtz</i> (compiled file) ST1700C.vx.xxx.x.csf (panel firmware)
RF Specifications	1-Way Wireless RF Touchpanel, 433.92 MHz, Range up to 300 feet ⁵
Memory	4 MByte flash memory (3 Mbytes available for user programming) 8 MByte SDRAM for firmware storage EEPROM for NV storage of last page and join #s
Touchscreen Dimensions	Height: 3.700 in (9.017 cm) Width: 4.700 in (11.938 cm)
Touchscreen Resolution	320 x 240 pixels, 64K color ISYS engine
Touchscreen LCD	STN color, dot matrix type
Touchscreen Illumination	Backlit fluorescent
Touchscreen Composition	Resistive Membrane
Operating Temperature	50° to 113°F (10° to 45°C)
Humidity	10% to 90% RH (non-condensing)
Overall Dimensions	Width: 8.75 in (22.23 cm) Height: 3.62 in (9.19 cm) Depth: 5.43 in (13.79 cm)
Weight (without battery pack)	1.85 lb (0.84 kg)

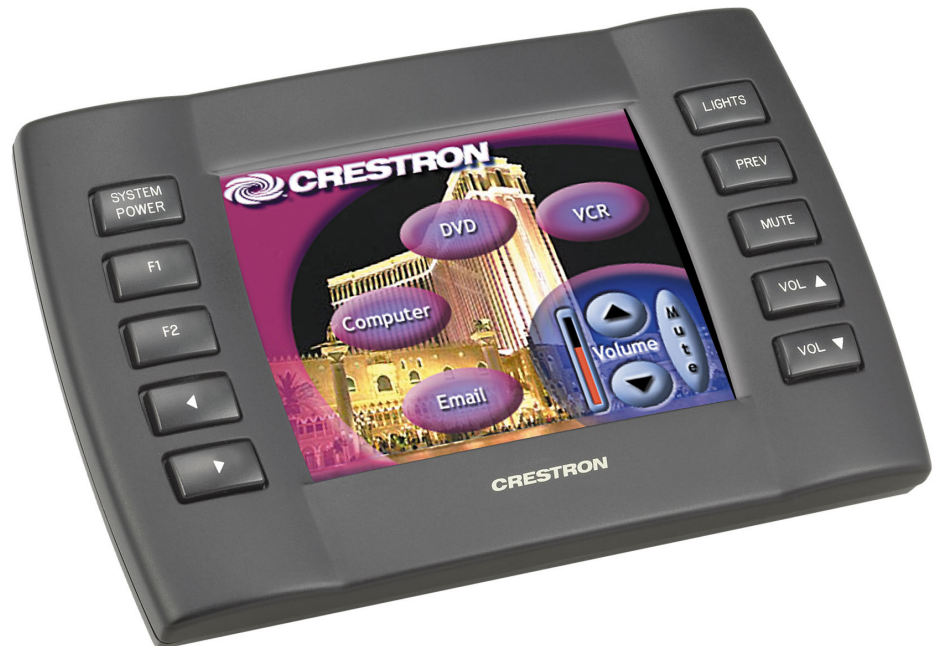
- Battery life is 180 minutes continuous usage with background lighting at full brightness. Actual operating time depends on usage and settings for background brightness and timeouts.
- The latest versions can be obtained from the Downloads | Software Updates section of the Crestron website (www.crestron.com). Refer to NOTE after last footnote.
- Crestron 2-Series control systems include the AV2, PAC2, PRO2, and RACK2.
- CNX update files are required for either CNMSX-AV/Pro or CNRACKX/-DP. Filenames for CNX update files have a UPZ extension and ST-CP files are in one EXE or zipped UPZ file. To avoid program problems, make certain you are using the update file with the correct suffix letter (e.g., S, V, W, X).

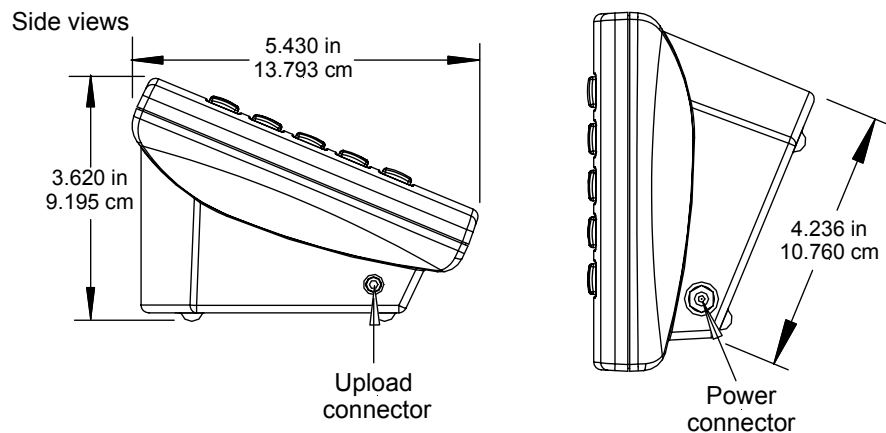
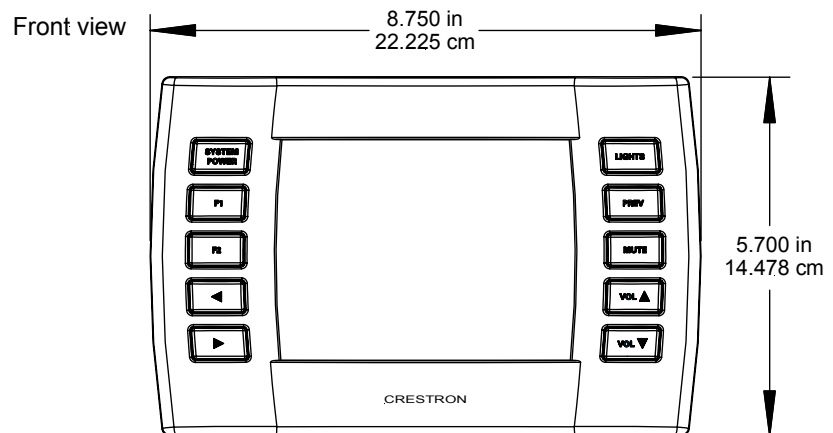
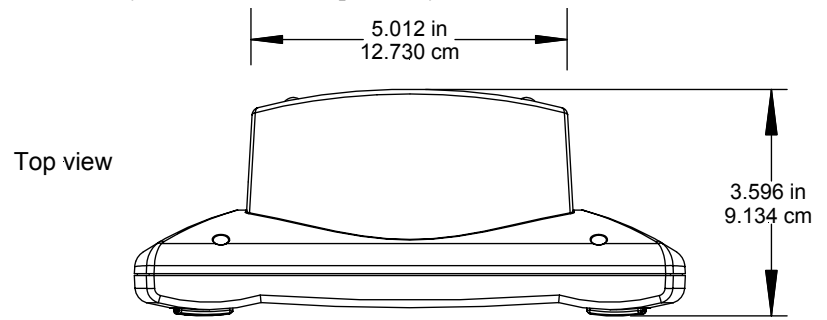
5. Requires Crestron CNRFGWA 1-Way RF Receiver, or ST-CP SmarTouch Control Processor.
6. Extension requires a prefix specific to the touchpanel type. In DETAILS, *projectname* represents the assigned project name, and vx.xxx.x represents a version number.

NOTE: Crestron software and any files on the website are for Authorized Crestron dealers only. New users may be required to register to obtain access to certain areas of the site (including the FTP site).

Physical Description

The touchpanel has a 5.7-inch (14.48 cm) active matrix color display panel with 320 x 240 resolution and 16-bit non-palette graphics. The electronic hardware is housed in a high impact, black molded plastic enclosure, shown below. Connectors to power the unit and upload touchscreen projects are located on the sides of the unit.



ST-1700C 1-Way Wireless RF Touchpanel Physical Views

The battery compartment, located on the underside of the unit, holds one Crestron ST-BTPN, rechargeable power pack. There are also four rubber feet on the underside of the unit for stability and to prevent slippage.

WARNING: To avoid shock hazard and possible damage to the unit, do not use touchpanel in rain or expose it to unnecessary moisture.

Industry Compliance

As of the date of manufacture, this unit has been tested and found to comply with specifications for CE marking and standards per EMC and Radio Communications Compliance Labeling (N11785).



NOTE: This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. The equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
 - Increase the separation between the equipment and receiver.
 - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
 - Consult the dealer or an experienced radio/TV technician for help.
-

Setup

Applying Power

The touchpanel can be powered via an external AC power pack, while resting in the ST-DSN, or via the ST-BTPN. Each of these supplied items has its own Operations Guide which details proper usage. Refer to the table below for the required document number.

NOTE: The battery can be charged only if the touchpanel is in the docking station. The touchpanel will function when powered by the external power pack, but this configuration will not charge the battery.

ST-1700C Power Source Options

POWER SOURCE OPTION	MODEL	DOCUMENT NUMBER *
Battery Pack	ST-BTPN	6088
Docking Station	ST-DSN	6095
Domestic External Power Pack or	PW-1215	5762
International External Power Pack	PWI-1215	5763

* The latest revision may have a revision letter after the document number (i.e., 6088A).

Identity Codes

The ST-1700C touchpanel uses two distinct types of identity codes: Cresnet identity (NET ID), and RF ID. These codes are assigned to the touchpanel from the Interface Submenu when the unit is configured. Refer to “Setup Menu” on page 7. For the touchpanel to be identified within the Cresnet system, these assignments must match assignments made in the SIMPL™ Windows® program.

NET ID

Every equipment and user interface within the Cresnet system requires a unique NET ID. The NET ID is a two-digit hexadecimal number that can range from 03 to FE. The NET ID of the unit must match the NET ID specified in the SIMPL Windows program. The NET ID is used when the touchpanel is wired directly to the control system during uploading a VisionTools™ Pro-e (VT Pro-e) project or upgrading the touchpanel firmware.

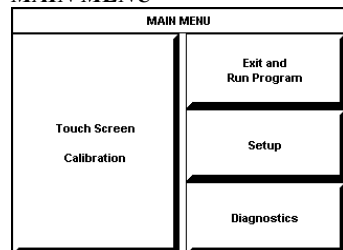
RF ID

Every ST-1700C touchpanel communicating with a Cresnet control system via a CNRFGWA requires a unique RF ID to secure RF communications. There are 15 useable codes for multiple touchpanel(s) ranging from 01 to 0F (hexadecimal number). The RF ID of the unit must match the RF ID specified in the SIMPL Windows program.

NOTE: Do not set the RF ID to “00”; it is not supported in SIMPL Windows.

Configuring the Touchpanel

MAIN MENU



This menu can also be obtained via digital reserved join number, 17242.

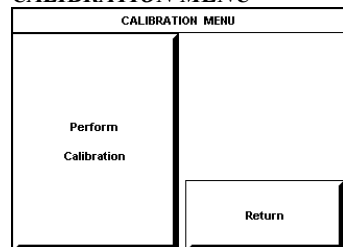
To configure the unit, it may be necessary to access a series of setup screens prior to viewing run-time screens that are loaded into the touchpanel for normal operation. The MAIN MENU for configuring the touchpanel appears when a finger is held to the touchscreen for about 5 seconds from the powered down state.

Upon entering SETUP MODE, the MAIN MENU, shown to the left, displays four buttons: **Touch Screen Calibration**, **Exit and Run Program**, **Setup**, and **Diagnostics**.

The **Exit and Run Program** button verifies that all of the setup information has been saved to EEPROM and displays the main page that has been programmed into your system. The remaining buttons on the MAIN MENU open other menus, which are discussed in subsequent paragraphs.

Calibration Menu

CALIBRATION MENU



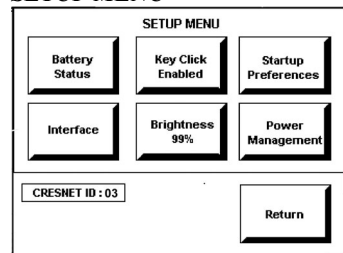
Calibration of the touchscreen is required if the active touch area of a button does not coincide with the button's image. Select the **Touch Screen Calibration** button to display the CALIBRATION MENU, shown to the left. The CALIBRATION MENU offers the choice to initiate calibration with the **Perform Calibration** button or return to the previous screen with the **Return** button. Choose an option by touching the correct button.

If you proceed to calibrate the touchpanel, the screen displays the message "Touch Upper Left" centered on the panel with a cross hair in the upper left corner. Touch the cross hair in the corner of the screen to initiate calibration. Another message, "Touch Upper right", appears with a cross hair in the correct corner. Touch the corner of the screen. A final message, "Touch Lower Left", appears with a cross hair in the correct corner. Touch the corner of the screen to conclude calibration and return to the MAIN MENU.

NOTE: When touching the screen during calibration, be as accurate as possible. Use the tip of a capped pen or the eraser end of a pencil.

Setup Menu

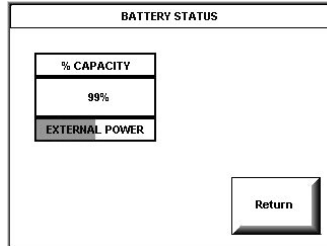
SETUP MENU



To obtain the SETUP MENU, shown to the left, press the **Setup** button from the MAIN MENU. The SETUP MENU offers a series of buttons, which open additional menus and displays that are detailed in subsequent paragraphs. After setup parameters have been set, select the **Return** button to return to the MAIN MENU.

NOTE: For convenience, the current CRESNET ID setting is displayed in the lower left corner.

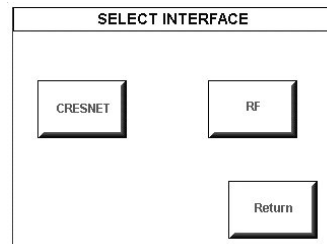
NOTE: All touchpanel settings are automatically saved in non-volatile memory.

BATTERY STATUS**Battery Status**

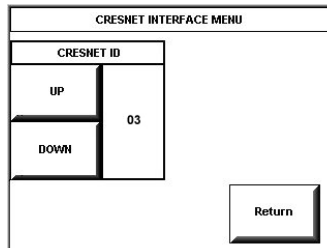
To access the BATTERY STATUS screen, shown to the left, press the **Battery Status** button on the SETUP MENU.

This screen indicates the amount of charge (or life) remaining in the battery as a percentage of full capacity, if the battery is installed. An analog bar is provided below the percentage amount as a quick visual reference to the approximate level of charge remaining. The EXTERNAL POWER label appears if external power is applied either through the docking station or via the optional power pack. Note that battery recharging takes place only through the docking station. Touch the **Return** button to display the SETUP MENU.

NOTE: When the touchpanel is in the docking station to recharge the battery, the % CAPACITY display is not an accurate indicator of battery charge level. The display will indicate a full charge (100%) before charging is actually complete. The docking station indicates that charging is complete by illuminating the RDY indicator.

SELECT INTERFACE**Select Interface**

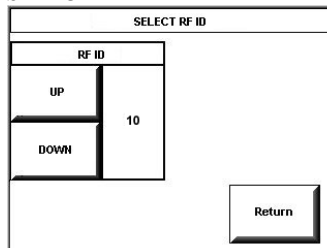
The touchpanel communicates with a control system to activate commands or to display feedback from components within the system. The communication interface must be correctly specified or communication will not occur. To set communication parameters, first select the **Interface** button on the SETUP MENU to display the SELECT INTERFACE screen, shown to the left. Then, select either the **CRESNET** or the **RF** button to display the CRESNET INTERFACE MENU or the SELECT RF ID screen, respectively. Use these screens to set the Cresnet network identity (NET ID) and the RF ID numbers.

CRESNET INTERFACE MENU

CRESNET ID is a two-digit hexadecimal number that can range from 03 to FE, used only during screen uploads to the touchpanel or upgrading the touchpanel firmware. NET ID for the ST-1700C is factory set to 03.

The **UP** and **DOWN** buttons increase and decrease the CRESNET ID by one digit (i.e., 03, 04, 05, . . . FE).

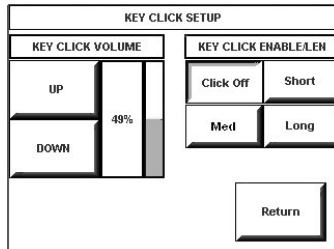
Select the **Return** button to return to the SELECT INTERFACE screen.

SELECT RF ID

RF ID, the radio frequency identity number, is necessary to secure RF communications such that controls can be activated from the touchpanel. The RF ID consists of a two-digit hexadecimal number. The touchpanel can be set to one of fifteen numbers; "10" is shown as an example in the illustration and happens to be the default.

The **UP** and **DOWN** buttons increase and decrease the RF ID most significant digit by one, respectively (i.e., 10, 20, 30, . . . , F0).

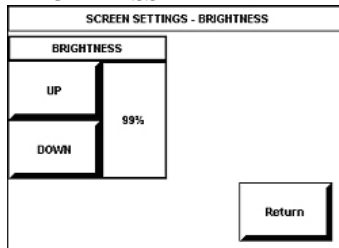
After the Cresnet ID and RF ID settings have been verified, touch the **Return** button to save the settings and display the SELECT INTERFACE screen.

KEY CLICK SETUP SCREEN**Key Click Setup**

From the SETUP MENU, press the **Key Click Enabled** button to open the KEY CLICK SETUP screen. (If the function is currently disabled, the button legend is “**Key Click Disabled.**”) To enable an audible tone (beep) when the touchpanel buttons are pressed, select among the **Short**, **Med**, or **Long** KEY CLICK ENABLE/LEN buttons to set the duration of the tone. The touchpanel responds with a corresponding signal. To disable the feature, select **Click Off**.

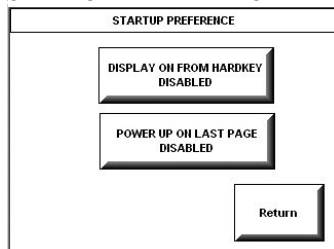
Use the KEY CLICK VOLUME **UP** and **DOWN** buttons to increase and decrease the volume of the signal. The display to the right of the buttons shows the relative volume from 0% to 100%, both as a numeric value and, for a quick visual reference, as an analog bar.

Select the **Return** button to return to the SETUP MENU.

SCREEN SETTINGS - BRIGHTNESS**Brightness**

From the SETUP MENU, press the **Brightness** button to open the SCREEN SETTINGS – BRIGHTNESS screen. The **UP** and **DOWN** buttons increase and decrease screen brightness, respectively. The display to the right of the buttons shows the relative brightness from 0% to 100%.

Select the **Return** button to return to the SETUP MENU.

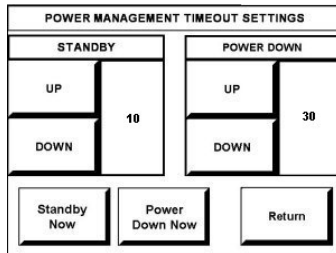
STARTUP PREFERENCE**Startup Preference**

The Startup Preference option allows (when the touchpanel is off or in standby) the display to come on or stay off when a “quick” pushbutton is pressed. From the SETUP MENU, press the **Startup Preferences** button to open the STARTUP PREFERENCE screen.

When pressed, the **DISPLAY ON FROM HARDKEY** button toggles between ENABLED and DISABLED. With ENABLED selected, the display comes on when one of the “quick” pushbuttons is pressed. With DISABLED selected, the display stays off when a “quick” pushbutton is pressed (if touchpanel was off, it goes to standby). The default is DISABLED.

The **POWER UP ON LAST PAGE** button also toggles between ENABLED and DISABLED. Enabling this option causes the unit to “remember” the last page and which “joins” were active when the unit was last powered down, and return to that state when next powered on. If the option is disabled, the unit will always go to the first page of the project and all “joins” are cleared.

Select the **Return** button to return to the SETUP MENU.

POWER MANAGEMENT TIMEOUT SETTINGS**Power Management Timeout Settings**

The Power Management feature is intended to conserve energy and to extend the service life of the battery. From the STARTUP screen, press the **Power Management** button to display the POWER MANAGEMENT TIMEOUT SETTINGS Screen. Use the STANDBY and POWER DOWN UP and DOWN buttons to set the respective timeouts from 0 through 120 minutes, where 0 disables the timeout. The time settings are in single-minute increments from 0 to ten minutes, and in 10-minute increments from 10 minutes through 120 minutes.

Use the **Standby Now** and **Power Down Now** buttons to immediately enter the respective mode.

STANDBY timeout turns the display and backlight off when the touchpanel is inactive for the specified time. When the touchpanel is reactivated, the last screen to be displayed reappears. The specified time is displayed in minutes. The default STANDBY timeout is 10 minutes.

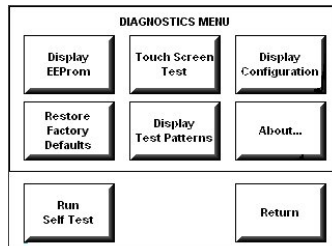
POWER DOWN timeout turns off all power when the touchpanel is inactive for the specified time. When the touchpanel is activated, either the first page of the project appears or the last screen to be displayed reappears, depending on the setting of the Power Up On Last Page option on the Startup Preference screen. The specified time is displayed in minutes. The default POWER DOWN timeout is 30 minutes.

NOTE: Power Down Timeout should be set low to maximize battery life. However, Power Down Timeout should be set greater than Standby Timeout. Otherwise, the Standby Timeout is meaningless.

NOTE: When the panel is powered down, it will take about 1.5 seconds to power up and respond to a button press. There is no such delay from Standby mode

NOTE: If the external AC power pack is attached to the touchpanel and plugged into an active AC receptacle, or if the touchpanel is resting in the docking station (ST-DSN) and plugged into an active AC receptacle, the panel does not power down when the power down timeout is achieved. Recall that the purpose of this timeout is to maximize battery life. Standby timeout still functions.

Press **Return** to save the settings and return to the SETUP MENU.

Diagnostics Menu**DIAGNOSTICS MENU**

The **Diagnostics** button from the MAIN MENU should only be used under supervision from a Crestron customer service representative during telephone support. Many options available from the DIAGNOSTICS MENU, shown to the left, are numeric in nature and their interpretation is beyond the scope of this manual.

Uploading and Upgrading

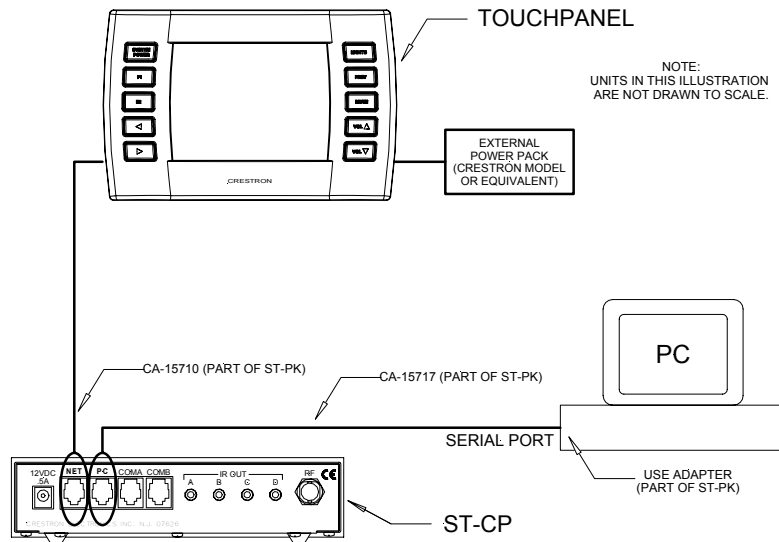
VT Pro-e is a Windows[®] compatible software package for creating Crestron touchpanel screen designs. Refer to “Programming with VisionTools™ Pro-e” on page 22 for additional details. To upload a VT Pro-e project (.vtz file) or upgrade the firmware (.csf file) of the ST-1700C, a local PC that contains the Crestron Viewport (available via VT Pro-e) is required. Refer to the following sections.

Hookup and Preparation

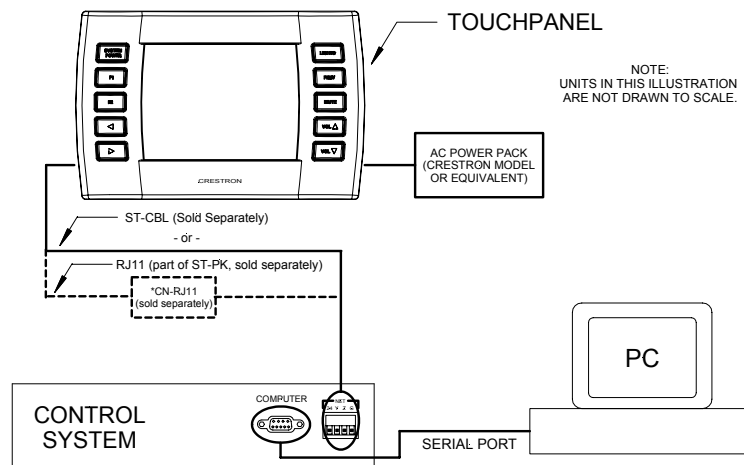
To prepare the ST-1700C for uploading or upgrading, refer to the figures below for typical connection diagrams. Complete the steps provided on pages 12 and 13 to ensure proper connection to the system.

NOTE: The cable components in the first figure are part of the SmartTouch Programming Kit (ST-PK). If available, use these components.

Typical Connection Diagram when Uploading a Project from the ST-CP



Typical Connection Diagram when Uploading a Project from the PRO2 or equivalent

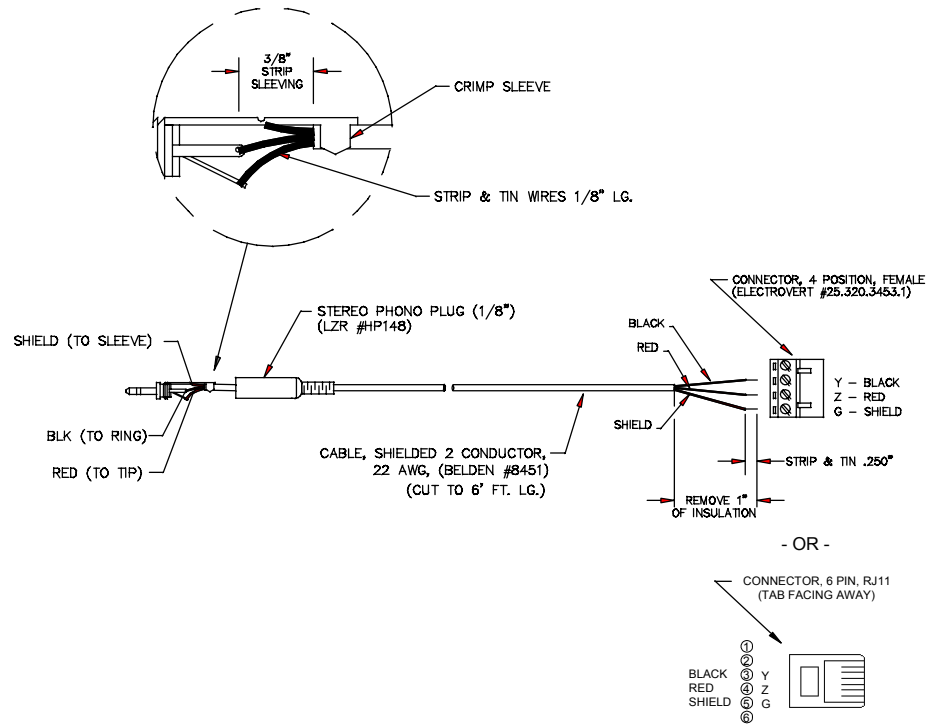


NOTE: If the control system in use has a 4-pin network connector rather than a modular (RJ11-type) NET connector, use a ST-CBL (sold separately).

NOTE: To make a cable for either configuration, refer to the “Programming Cable Specifications” diagram after these notes.

NOTE: The RJ11 (part of ST-PK) and ST-CBL cables can also be found as part numbers CNSP-585 and CNSP-586, respectively, in the Crestron cable database. The database can be downloaded from the Downloads | Software Updates | Cables section of the Crestron website (www.crestron.com).

Programming Cable Specifications

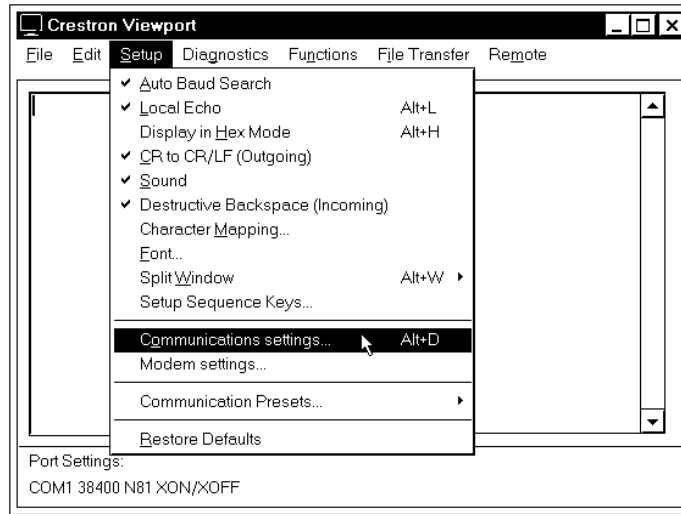


1. Before making any connections to the touchpanel, verify that control system is properly connected to the PC (using ST-PK cable 15717 and adapter) and powered on.
2. Attach the stereo connector end of the ST-PK cable 15710, to the touchpanel.
3. Attach the RJ11 connector end of the ST-PK cable 15710, to the connector labeled NET on the control system.
4. Attach the appropriate external power pack or equivalent to touchpanel and plug into outlet. At the PC, make sure that no programs accessing the COM port of the PC are running.
5. Start VT Pro-e.
6. From the e menu bar, select **Tools | Viewport** to open the Crestron Viewport.

NOTE: SIMPL Windows may open with a splash screen and may display the “What do you want to do?” window. If so, close the window and continue.

7. Refer to the figure below. From the Viewport menu, select **Setup | Communications settings** (alternatively, depress **Alt+D**) to open the “Port Settings” window.

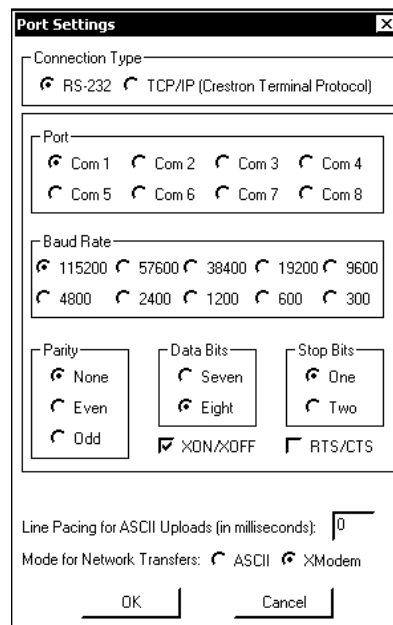
Accessing the “Port Settings” Window



8. Select the **RS-232** connection type. Verify the available COM is selected. Verify that the baud rate is set to **115200** (2-series default), the parity is **None**, the data bits is **Eight**, and the stop bits is **One**. Click the **OK** button to save the settings and close the window.

NOTE: You may need to select a lower baud rate for larger files (38,400 is recommended). Make sure **Xmodem** is selected from *Mode for Network Transfers*.

“Port Settings” Window



9. Proceed to “Uploading a VT Pro-e Project” on the next page or “Firmware Upgrade” that begins on page 15 as appropriate.

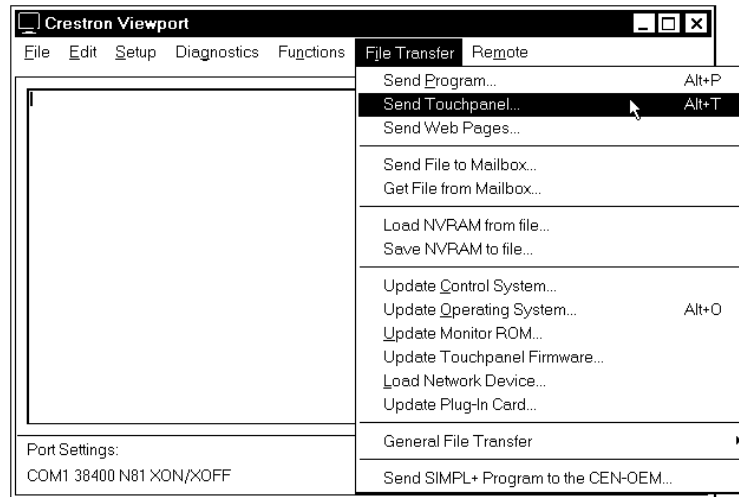
A compiled VT Pro-e file has the extension .vtz.

Uploading a VT Pro-e Project

VT Pro-e is a Windows compatible software package for creating Crestron touchpanel screen designs. Refer to “Programming with VisionTools™ Pro-e” on page 22 for additional details. To upload a VT Pro-e project to the ST-1700C, complete the following steps.

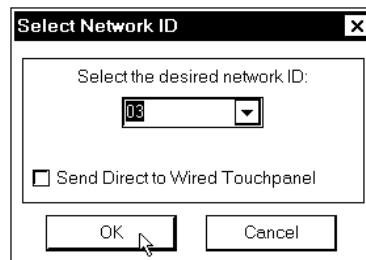
1. Make sure that “Hookup and Preparation” that begins on page 11 has been performed.
2. As shown below, select **File Transfer | Send Touchpanel** (alternatively, depress **Alt+T**) from the Viewport menu.

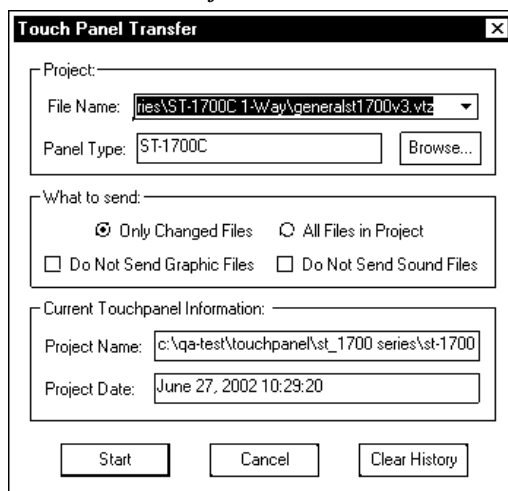
Select Send Touchpanel



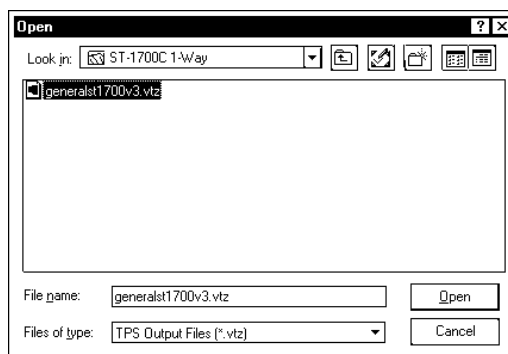
3. As shown below, select the NET ID of the ST-1700C and then click **OK**. The “Touch Panel Transfer” window appears (refer to graphic on next page).

“Select Network ID” Window



“Touch Panel Transfer” Window

4. Click Browse. The “Open” window appears as shown below.
5. Select the VT Pro-e (vtz) file and click **Open**. The transfer will complete automatically.

Select VTZ File

6. Disconnect the programming cable and the external power pack from the touchpanel.
7. Close the Viewport, exit VT Pro-e, and disconnect the programming cable from the PC and the control system.

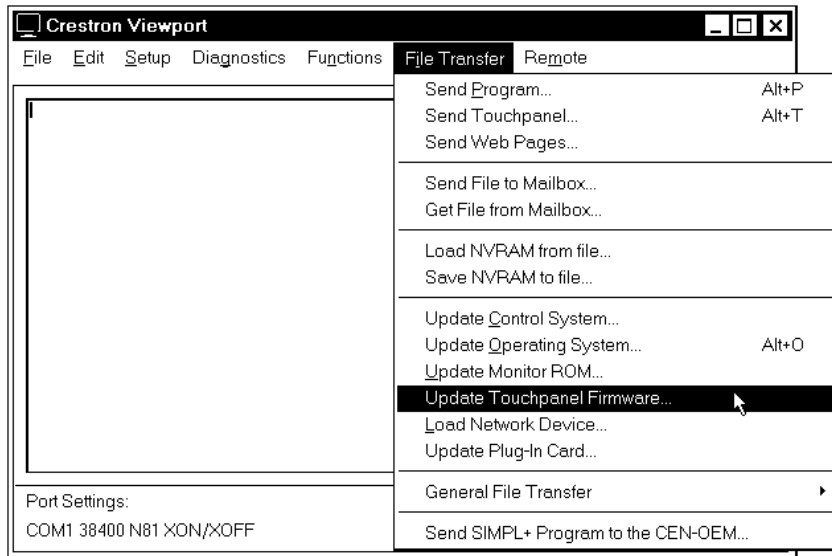
Firmware Upgrade

A firmware upgrade file has the extension .csf.

Firmware upgrade files are obtained from the Downloads | Software Update | Touchpanels section of Crestron’s website (www.crestron.com). To upgrade the ST-1700C firmware, complete the following steps.

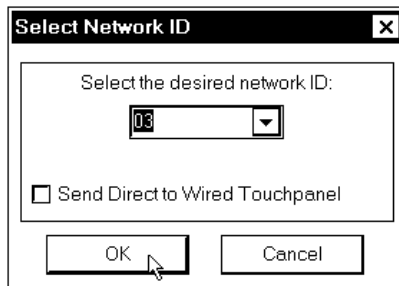
1. Make sure that “Hookup and Preparation” that begins on page 11 has been performed.
2. As shown on the next page, select **File Transfer | Update Touchpanel Firmware** from the Viewport menu.

Select Update Touchpanel Firmware



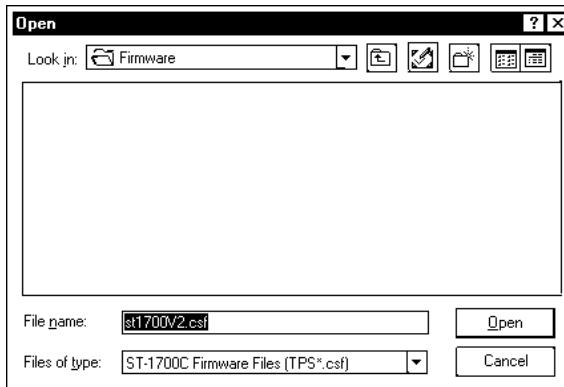
3. As shown below, select the NET ID of the ST-1700C and then click **OK**.

“Select Network ID” Window



4. As shown below, select the firmware (CSF) file and click **Open**. The transfer will complete automatically.

Select CSF File



5. Disconnect the programming cable and the external power pack from the touchpanel.

General Use and Safety

WARNING: To avoid shock hazard and possible damage to the unit, do not use touchpanel in rain or expose it to unnecessary moisture.

Recommended Touchpanel Cleaning

Keep the surface of the touchscreen free of dirt, dust, or other materials that could degrade optical properties. Long-term contact with abrasive materials can scratch the surface that may detrimentally affect image quality.

For best cleaning results, use a clean, damp, non-abrasive cloth with any commercially available non-ammonia glass cleaner. Surrounding plastic enclosure may not provide a complete watertight seal. Therefore, apply cleaning solution to the cloth rather than the surface of the touchscreen. Wipe touchscreen clean and avoid ingress of moisture beneath panels.

Programming

Have a comment about Crestron software?

Direct software related suggestions and/or complaints to Crestron via email (software@crestron.com).

Do not forward any queries to this address. Instead refer to "Further Inquiries" on page 31 for assistance.

The easiest method of programming, but does not offer as much flexibility as SIMPL Windows.

The touchpanel provides wireless RF user interface in either a Cresnet control system or a SmarTouch control system.

You can create a program that allows you to set up the ST-1700C to operate a Crestron control system using the Crestron programming tools Crestron Application Builder™ (AppBuilder) and SIMPL Windows. These tools are intended for users with different levels of programming knowledge. The flexibility of each tool is proportional to the degree of programming expertise (i.e., the more flexible, the more a programmer needs to know and account for). Of course, one can initiate programming using the easiest method (Crestron AppBuilder) and use advanced techniques that are available from SIMPL Windows to customize the job.

VT Pro-e is a Windows compatible software package for creating Crestron touchpanel screen designs. Refer to "Programming with VisionTools™ Pro-e" on page 22 for additional details regarding VT Pro-e.

The following are recommended software version requirements for the PC:

- SIMPL Windows version 2.02.11 or later. Requires SIMPL+ Cross Compiler version 1.1.
- Crestron Database version 15.7.5 or later.
- Application Builder version 1.1.6 or later. Requires SIMPL Windows.
- VisionTools Pro-e version 2.4.1.6 or later. Used for graphical touchscreen design.

Programming with the Crestron AppBuilder

The Crestron AppBuilder offers automatic programming for such residential and commercial applications as audio distribution, home theater, video conferencing, and lighting. The interface of this tool guides you through a few basic steps for designating rooms and specifying the control system, touchpanels, devices, and functionality. The Crestron AppBuilder then programs the system, including all touchpanel projects and control system logic.

The Crestron AppBuilder is fully integrated with Crestron's suite of software development tools, including SIMPL Windows, VT Pro-e, Crestron Database, User IR Database, and User Modules Directory. The Crestron AppBuilder accesses these tools behind the scenes, enabling you to easily create robust systems.

Programming with SIMPL™ Windows®

NOTE: The following assumes that the reader has knowledge of SIMPL Windows. If not, refer to the extensive help information provided with the software.

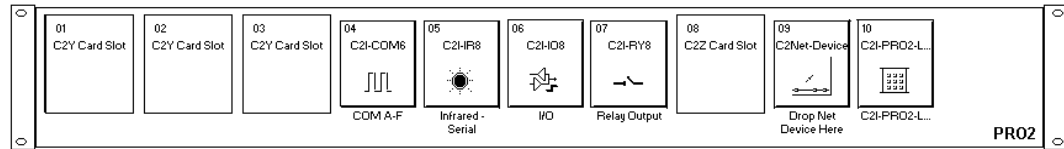
NOTE: In the following description, the PRO2 control system is used.

SIMPL Windows is Crestron's software for programming Crestron control systems. It provides a well-designed graphical environment with a number of workspaces (i.e., windows) in which a programmer can select, configure, program, test, and monitor a Crestron control system. SIMPL Windows offers drag and drop functionality in a familiar Windows® environment.

This section describes a sample SIMPL Windows program that includes a touchpanel.

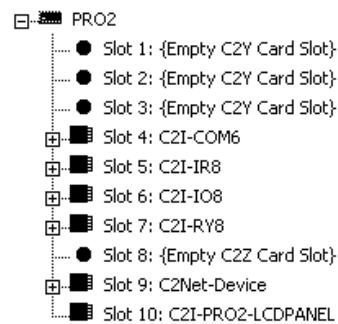
Configuration Manager is where programmers “build” a Crestron control system by selecting hardware from the *Device Library*. In Configuration Manager, drag the PRO2 from the Control Systems folder of the *Device Library* and drop it in the upper pane of the *System Views*. The PRO2 with its associated communication ports is displayed in the *System Views* upper pane.

PRO2 System View



The *System Views* lower pane displays the PRO2 system tree. This tree can be expanded to display and configure the communications ports.

Expanded PRO2 System Tree



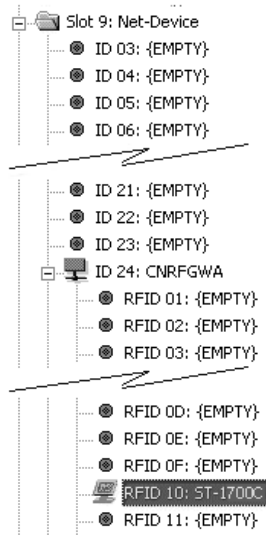
C2Net-Device Slot in Configuration Manager

To incorporate a wireless RF touchpanel into the system, a gateway device is required. The C2Net-Device Slot can accept a gateway such as the CNRFGWA. Once a gateway is configured in a C2Net-Device Slot, the slot allows Cresnet communication between the touchpanel and the control system.

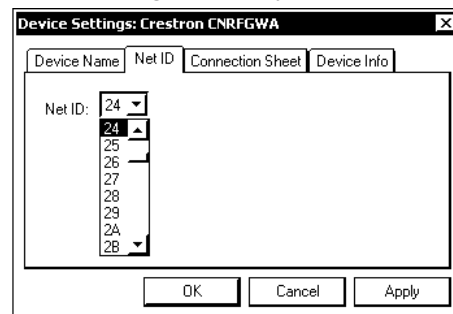
In Configuration Manager, drag the CNRFGWA gateway from the Wireless Receivers (RF) folder of the *Device Library*. The *System Views* upper pane displays the CNRFGWA device icon below the PRO2 graphic.

NOTE: An ST-CP control processor is automatically configured with a CNRFGWA in its STCP-Net Device Slot 3, with a fixed NET ID of 2, when the ST-CP is dragged into the upper pane of *System Views*.

Drag the ST-1700C from the Touchpanels (Wireless | Wireless one way) folder of the *Device Library* and drop it on the CNRFGWA symbol in *System Views*. The PRO2 system tree displays the CNRFGWA gateway in Slot 9, with a default NET ID of 24. The CNRFGWA displays the touchpanel at the touchpanel’s default RF ID location, “10,” as shown in the following illustration.

C2Net Device, Slot 9

Double-click the CNRFGWA icon in the upper pane to open the “Device Settings” window. This window displays CNRFGWA device information. Select the Net ID tab to change the gateway Net ID, as shown in the following figure.

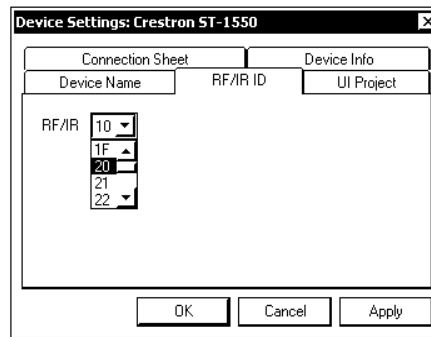
“Device Settings” Window for the CNRFGWA

NOTE: Recall that if the CNRFGWA is part of an ST-CP configuration, its NET ID is fixed at 02 and cannot be changed.

Similarly, expand the system tree in the lower pane and double-click the ST-1700C icon to open the “Device Settings” window for the touchpanel. Select the RF/IR ID tab to change the touchpanel RF ID, as shown in the following figure. For more information on setting the RF/IR ID, see “Select Interface” on page 8.

NOTE: The hardware and software settings of the RF ID must match. Although the device setting window in SIMPL Windows allows choices through the range of two-digit Hexadecimal numbers from 01 through FE, the RF ID setting for the hardware is limited to numbers in increments of the most significant digit (i.e., 00, 10, 20). Since 00 is not a valid selection in SIMPL Windows, the RF ID number is limited to the fifteen numbers 10, 20, 30, 40, . . . F0.

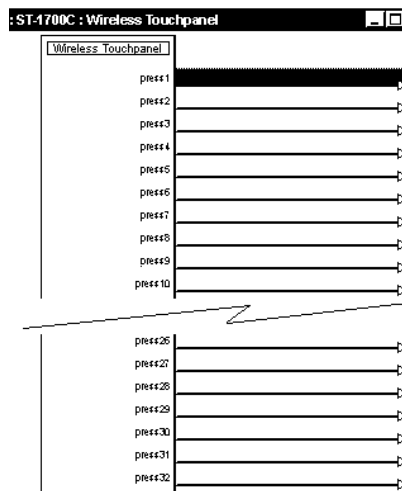
Touchpanel “Device Settings” Window



ST-1700C Symbol in Programming Manager

Programming Manager is where programmers “program” a Crestron control system by assigning signals to symbols. The following diagram shows the ST-1700C symbol in the SIMPL Windows’ Programming Manager.

Detail View of the ST-1700C in SIMPL Windows’ Programming Manager



NOTE: Join numbers are expandable to 999.

The table below lists and gives functional descriptions for the touchpanel outputs.

Symbol Output Signal Descriptions

OUTPUT	DESCRIPTION
press 1 through press 32*	Notifies control system of button press (1 – 32*). High/1 = button is being pressed Low/0 = button is not being pressed

**Expandable to 999*

Programming with VisionTools™ Pro-e

Control screen variations incorporating two- and three-dimensional graphics and text are possible and can be created with VT Pro-e, a design and programming Windows-based software program. A set of pages, which make up a project, can be designed for each application. Each touchpanel can be organized with the ideal, color-oriented control environment with custom control graphics: icons, two and three-dimensional buttons, and floor plans. The project is uploaded to the touchpanel's flash PROM. The touchpanel uses the project until another is uploaded from the PC. The PC may be disconnected from the control processor except when uploading a project.

For additional software information, refer to the help file provided with the software. The latest version of VT Pro-e can be obtained from the Downloads | Software Updates section of the Crestron website (www.crestron.com).

Virtual Feedback

Programming a one-way RF touchpanel such as the ST-1700C requires consideration of "feedback." Since the panels are one-way only, and there is no *true* feedback, you must create "virtual feedback" so that buttons respond appropriately when pressed and the user perceives no real difference between a one-way panel and a two-way panel. The Application Builder takes care of all of this for you, as did its predecessor, the SmarTouch Pro Editor. However, if you are programming your panels with SIMPL Windows and VT Pro-e, you must follow the procedure described below to add logic both to the touchpanel for button feedback and to the control system program to properly process the signals, and to make sure that the state of the buttons on the panel and in the control system remain in sync.

Button press feedback produces a change in appearance from the inactive state to the active state, or vice versa, as defined in the program.

- Momentary feedback, from inactive to active and back to inactive, has a short duration, lasting only as long as the button is pressed.
- Toggle feedback produces a change of state each time the button is pressed.
- With Interlock feedback, only one button in an assigned interlock group can be active at a time. Pressing an inactive button changes its state to active, and forces the other buttons in the group to inactive. (To clear all buttons in the interlock group requires that an extra button be added whose sole purpose is to force all the others to the inactive state.)
- Duration feedback is assigned to a button that is to be activated and remain active for a specified period of time, and then return to the inactive state.

In the following paragraphs, each feedback type will be discussed in detail as applicable.

VT Pro-e Procedures

Buttons requiring feedback need to have the feedback type assigned as if it were a property of the object. Button feedback logic is classified as momentary, toggle, interlock, or duration. Logic is added to the buttons on the panel (after join numbers and other properties have been assigned), by right-clicking the button in VT Pro-e and selecting **Feedback**, which displays the "Feedback" window.

“Feedback” Window

The screenshot shows a window titled "Feedback" with a close button (X) in the top right corner. The window contains the following elements:

- Text: "Join:20"
- Section: "Button Action" with a sub-label "Select a join number to add it to the Sequence Group." and an empty text input field below it.
- Controls: "Joins:" dropdown menu set to "None", "Add Step" button, and "Delete Step" button.
- Control: "Feedback Type:" dropdown menu set to "Momentary".
- Control: "Duration:" text input field followed by "Seconds".
- Control: "Interlock Group:" dropdown menu.
- Control: "Close" button at the bottom center.

NOTE: When the Feedback window is open, you can click on any of the buttons on the page and view their various feedback properties.

Interlock

An interlock consists of a number of assigned buttons grouped together so that button selection is mutually exclusive within the group. This is an important feature when you wish to guarantee that button selection can only be made when all the other buttons of the group are or will be forced inactive. For example, three sources (CD, VCR, tape deck) are controlled and designed within an interlock. This ensures that if CD is chosen, all other sources are inactive.

To create the interlock group, right-click on one of the buttons to be in the group, and select Feedback to display the “Feedback” window. Select *Interlock* as the feedback type. The window changes to show any existing interlock group(s), and includes a **Groups** button.

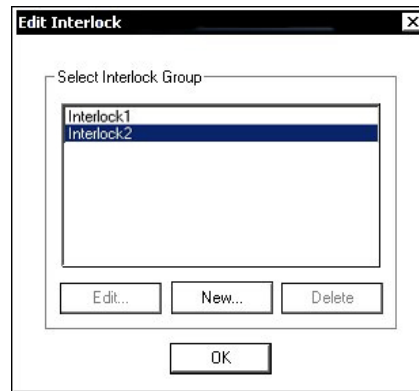
“Feedback” Window

The screenshot shows a window titled "Feedback" with a close button (X) in the top right corner. The window contains the following elements:

- Text: "Join:13"
- Section: "Button Action" with a sub-label "Select a join number to add it to the Sequence Group." and an empty text input field below it.
- Controls: "Joins:" dropdown menu set to "None", "Add Step" button, and "Delete Step" button.
- Control: "Feedback Type:" dropdown menu set to "Interlock".
- Control: "Duration:" text input field followed by "Seconds".
- Control: "Interlock Group:" dropdown menu and a "Groups..." button to its right.
- Control: "Close" button at the bottom center.

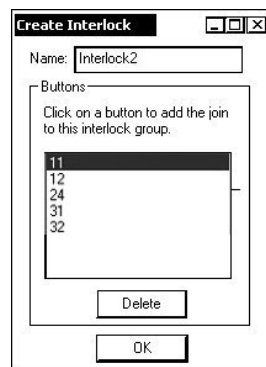
Use the drop down *Interlock Group*: field to select an existing group, or click on **Groups** to open the “Edit Interlock” window, which allows you to edit the existing groups or create a new group.

“Edit Interlock” Window



Select **New** to create a new interlock group. Select **Edit** if you wish to modify an existing group. In either case, the “Create Interlock” window appears.

“Create Interlock” Window



For new interlock groups, move the cursor over each button to be added and left-click to select it. (Notice that the cursor assumes the pointing hand shape when it is over the page.) If a button is inadvertently placed in the “Buttons:” field, highlight the button and select **Delete** to remove it from the group. Select **OK** to confirm and save the interlock group.

To edit an existing interlock group, select the group in the “Edit Interlock” window and click **Edit** to open the “Create Interlock” window. Add or delete buttons as needed.

Duration

A button defined with duration feedback will remain active for a fixed time period as defined in the *Duration* field. The purpose of a duration feedback is to simulate a function in the SIMPL Windows program that must remain active for a certain amount of time, such as closing drapes or lowering a screen.

Right-click on the desired button, and select **Feedback**. In the “Feedback” window, select **Duration** as the feedback type, and enter the desired duration in seconds.

Sequence Groups

A sequence group consists of a number of assigned buttons that are activated as a group as a result of a single button press. When the first button is activated, the other

buttons are activated either sequentially, when one or more of the buttons is defined as having duration feedback, or simultaneously if no durations are included in the group. This is an important feature when one wishes to guarantee that a single selection can activate a number of functions. For example, one can unify the following functions: draw shades closed, dim lights, and start projector. This ensures that when this sequence group is activated, all functions of the collective unit are activated together.

Starting from an open page, select (or create) the button that is to activate the group, right click and select **Feedback**. In the “Feedback” window, select **Duration** as the feedback type, and enter the desired Duration in seconds. In the *Button Action* area *Joins* field, scroll to the desired button joins and click the **Add Step** button. As each one is added, “Simulate Button xx” appears in the *Sequence Group* list. When all the desired joins have been added, click **Close** to accept the entries and close the “Feedback” window. (Refer to the following figure.)

“Feedback” Window

VT Pro-e always generates the proper virtual feedback logic and appends it to the compiled VT Pro-e file for upload to the panel. However, you must add similar logic to the control system via SIMPL Windows.

SIMPL Windows Procedures

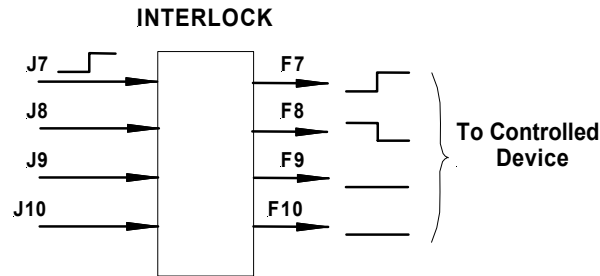
Momentary Feedback

Momentary feedback is when the button feedback state is active as long as the button is pressed and inactive when it is not being pressed. Momentary feedback does not require anything special in the SIMPL Windows program. You simply connect the signal from the appropriate touchpanel join number to the logic in the program (to the feedback of the same digital press).

Interlock Feedback

Interlock feedback is when the feedback of only one button in a group may be active at any one time. Pressing a button causes its feedback to go high and the feedback of all other buttons to become inactive, or low, as shown in the figure following this paragraph. In this example, join numbers 7 – 10 are in an interlock group; join 7 is pressed, causing join 8, initially high, to go low and join 7 to go hi. The one-way touchpanels transmit **only** the newly pressed button to the control system. The programmer must add a SIMPL Windows INTERLOCK symbol and connect all of the touchpanel output's join numbers in that interlock group as inputs to the INTERLOCK

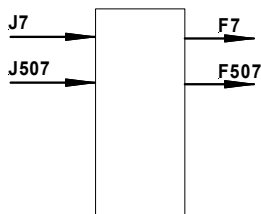
symbol. All of the outputs are then used to drive the appropriate logic. Note that the output of the interlock corresponding to the pressed button remains high even after the button is released, until the next button is pressed.



Toggle Feedback

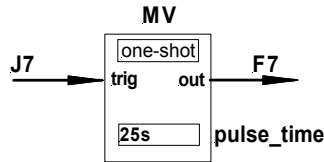
Toggle feedback is when the feedback of a button alternates between active and inactive each time the button is pressed. As in the interlock, the toggle feedback remains high even after the button is released, until the button is pressed again. Because there is no way to communicate the state of the toggle button between the panel and the control system by using that single button, Crestron models a toggle on a one-way panel as a two-button interlock group. The button shown on the panel is the first button. The second button (invisible, Crestron-created, not user-created) is the original button's join number + 500, e.g. 1 and 501, 101 and 601, etc. Since there are only 999 join numbers allowed by Crestron's RF protocol, a toggle button may only have a join number of 499 or below. Be aware that you must not use the toggle join numbers + 500 for other purposes. Crestron recommends that you keep toggle buttons in one numeric range (such as 100-150) and then make sure you don't use anything in the corresponding +500 range (600-750). When the user first presses and releases the toggle button, the panel transmits the join number press and release. The next time the user presses and releases the toggle button, the panel transmits the join number + 500 press and release, and then continues to alternate between them. By this method, Crestron knows that the user is explicitly turning the toggle on or explicitly turning it off, so that the state on the control system and the state on the touchpanel will match. The programmer must place an INTERLOCK symbol in the SIMPL Windows program and connect the join number and the join number + 500 to it. The feedback corresponding to the original join number should be used to drive the logic corresponding to the toggle being turned on, and the feedback corresponding to the join number offset by 500 is used to drive the logic corresponding to the toggle being turned off. See the following figure.

INTERLOCK Performing TOGGLE Function



Duration Feedback

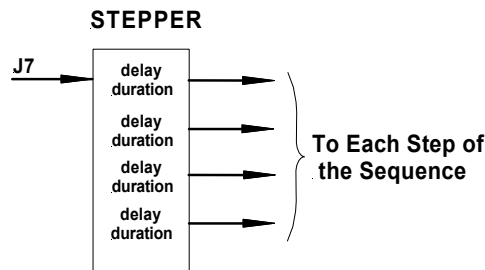
A button defined with duration feedback will remain active for a fixed period of time as programmed in the *Duration* field. Active duration is defined by selecting **Duration** as the feedback type, and entering a number of seconds in the *Duration* field. The programmer should add an MV (one-shot) symbol to the SIMPL Windows program, with the appropriate time parameter, as shown in the following figure.



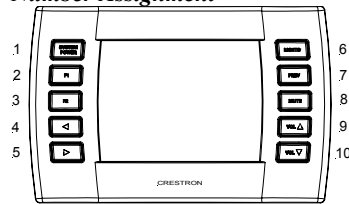
Sequence Groups

In addition to button feedback, programmers can specify that a single button perform a sequence of operations. The sequence can press other buttons and these buttons may have durations to introduce delays. The virtual feedback generated by VT Pro-e to the one-way panel will approximate as closely as possible the SIMPL Windows program of multi button press feedback generated from a single button press sequence, but the only information that is actually transmitted to the control system is the join number of the button that specifies the sequence. On the touchpanel, if timing is specified in the sequence, the button that specifies the sequence will appear active for the whole sequence; the other buttons in the sequence will go active in the order and for the duration specified in the sequence; if no timing is specified, the other buttons will go active simultaneously.

The programmer must duplicate the actual logic, including all button presses, functions and durations, on the control system. Normally, the programmer uses a STEPPER symbol in SIMPL Windows, with the input driven by the join number that initiates the sequence. As shown in the following figure, each output of the STEPPER drives the logic for the next step in the sequence with the appropriate duration and delay as the corresponding parameters.



Pushbutton Layout and Join Number Assignment



“Quick” Pushbuttons

The touchpanel includes ten “quick” pushbuttons, five on each side of the LCD screen. These buttons are used to access any frequently used commands. Each button has a permanently fixed digital join number. The sequence of digital join numbers is (top to bottom) 1 through 5 on the left side and 6 through 10 on the right side. The default feedback definition for these joins is “momentary.”

NOTE: A user may not want the LCD screen to come on after a pushbutton is pressed when the unit is off. The Startup Preference option allows the user to select whether the panel’s display comes on or stays off after a pushbutton is pressed. For more information, refer to “Startup Preference” on page 9 for details.

NOTE: Assuming that the touchpanel is powered down, pressing a “quick” pushbutton once “wakes up” the touchpanel but no command is sent. A second button press sends the command. However, if the touchpanel is actually in standby mode, the panel is “awake” and the initial button press sends the command.

NOTE: If you wish to change the feedback definition for one of these buttons, create another button on a page, assign the digital join, and set the definition as desired (e.g., toggle, interlock, etc.). Use SIMPL Windows to assign the join numbers to specific functions (e.g., power, volume). The buttons can be used to accomplish screen changes (page flips) by assigning the join numbers to the desired pages using Page Properties in VT Pro-e. Refer also to “Virtual Feedback” on Page 22.

NOTE: In versions of VT Pro-e prior to 2.5, if you wish to use “quick” pushbuttons 1-10, you must make a new page and draw buttons with join numbers 1-10.

Reserved Join Numbers

A reserved join number is a feature of the software that enables a designer to create a button that completes a predetermined function (e.g., calls up the Preferences Menu, adjusts brightness, etc.). The table after this paragraph provides a list of reserved join numbers available within SIMPL Windows software.

Digital Reserved Join Numbers for ST-1700C Touchpanel

JOIN NUMBER	FUNCTION	VALUE
17200	Power	Off
17216	Brightness	Up
17217	Brightness	Down
17218	Brightness	High
17219	Brightness	Medium (Default)
17220	Brightness	Low
17230	Standby	N/A
17231	Standby Timeout	Up
17232	Standby Timeout	Down
17233	Power Timeout	Up
17234	Power Timeout	Down
17242	Setup	N/A
17302	Keyclick	On
17303	Keyclick	Off
17304	Keyclick Volume	Up
17305	Keyclick Volume	Down
17322	Keyclick Short	Short (Default)
17323	Keyclick Medium	Medium
17324	Keyclick Long	Long

Analog Reserved Join Numbers for ST-1700C Touchpanel

JOIN NUMBER	FUNCTION	VALUE
17201	Brightness*	1-100%
17202	Power Off Timeout*	0-120 minutes
17203	Standby Timeout*	0-120 minutes
17300	Keyclick Volume*	1-100%
17507	Battery Level	0-100%

*Default values for these functions are: Brightness – 50%; Power Off Timeout – 30 minutes; Standby Timeout – 10 minutes; Keyclick Volume – 50%

Problem Solving

Troubleshooting

The table below and on the next page provides corrective action for possible trouble situations. If further assistance is required, please contact a Crestron customer service representative.

ST-1700C Troubleshooting

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Project can not be uploaded to touchpanel:		
1. Screen is black.	Touchpanel is powered down.	Verify that the panel has power supplied to it, either battery or power pack.
2. Checking communications error.	Incorrect COM port specified.	Verify upload preferences is set to the COM port being used to communicate to the control system. Verify upload preferences specifies RACK (not the PANEL) as target of the upload.
3. Checking panel type error.	Incorrect NET ID setting.	Verify that panel NET ID matches the NET ID specified during upload. Refer to "Interface" in this Operations Guide.
	Problem with cable between control system and touchpanel.	Check the cable for errors or poor connections.
Wrong screens appear on touchpanel.	Screens were not uploaded.	Upload screens as described in the help files found in VT Pro-e.
Touchpanel does not function.	No power to the touchpanel.	Confirm that battery pack is installed or external adapter is connected.
	Touchpanel is incorrectly calibrated.	1. Enter "calibration mode" through the Setup Mode: a. Remove power (battery pack or adapter). b. Reapply power while holding finger to the touchscreen for approximately 5 seconds. c. When finger is lifted from screen, the MAIN MENU screen appears. d. Select Touch Screen Calibration to display the CALIBRATION MENU; select Perform Calibration to enter "calibration mode." 2. If you cannot manually enter calibration mode, use the Viewport Function Put Touchpanel into Calibrate Mode to force the panel to display the screen.

SmarTouch Touchpanel Troubleshooting (continued)

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Touchpanel does not function and RF LED on PRO2 illuminates, but COM or IR LEDs do not illuminate.	Touchpanel RF ID is not set to match the RF ID assigned in the system program.	Verify that RF IDs match. Refer to "Interface" in this Operations Guide and RF ID parameters assigned in the program.
Touchpanel display is dark or too light.	Screen brightness is improperly set.	Hold a finger to the touchscreen for more than 3 seconds as power is applied. The display sets the brightness to a safe value.
Touchpanel exhibits slow operation.	Compressed graphics take time to decompress.	If there are no memory problems, decompressed graphics decrease the drawing time of panel pages.
Pressing "quick" pushbutton yields incorrect or no	Unit out of range. Incorrect SIMPL Windows program	Bring unit in range. Upload correct SIMPL Windows program.

Further Inquiries

If after reviewing this Operations Guide you cannot locate specific information or have questions, please take advantage of Crestron's award winning customer service team by calling:

- In the US and Canada, call Crestron's corporate headquarters at 1-888-CRESTRON [1-888-273-7876] or 1-201-767-3400.
- In Europe, call Crestron International at +32-15-50-99-50.
- In Asia, call Crestron Asia at +852-2341-2016.
- In Latin America, call Crestron Latin America at +5255-5093-2160.
- In Australia and New Zealand, call Crestron Pacific at +613-9480-2999.

Firmware Upgrades

To take advantage of all the ST-1700C features, it is important that the unit contains the latest firmware available. Therefore, please check our website (http://www.crestron.com/downloads/software_updates.asp) for the latest version of firmware. Not every product has a firmware upgrade, but as Crestron improves functions, adds new features, and extends the capabilities of our products, firmware upgrades are posted. For questions regarding upgrade procedures, contact Crestron customer service.

Future Updates

As Crestron improves functions, adds new features, and extends the capabilities of the ST-1700C, additional information and programming examples may be made available as manual updates. These updates are solely electronic and serve as intermediary supplements prior to the release of a complete technical documentation revision.

Check the Crestron website (www.crestron.com) periodically for manual update availability and its subjective value. Updates are available from the Downloads | Product Manuals section and are identified as an "Addendum" in the Download column.

Appendix: Engraveable Pushbutton Installation

Custom-engraved pushbuttons can be obtained by ordering the Customizable Engraving Button Kit 1700C-BTBN. You can submit the engraving layout in two ways:

- Engraving Sheet, Doc. 6069.
- Engraving Software package, Version 1.1.1.6, available from the Downloads | Software Updates section of the Crestron website (www.crestron.com).

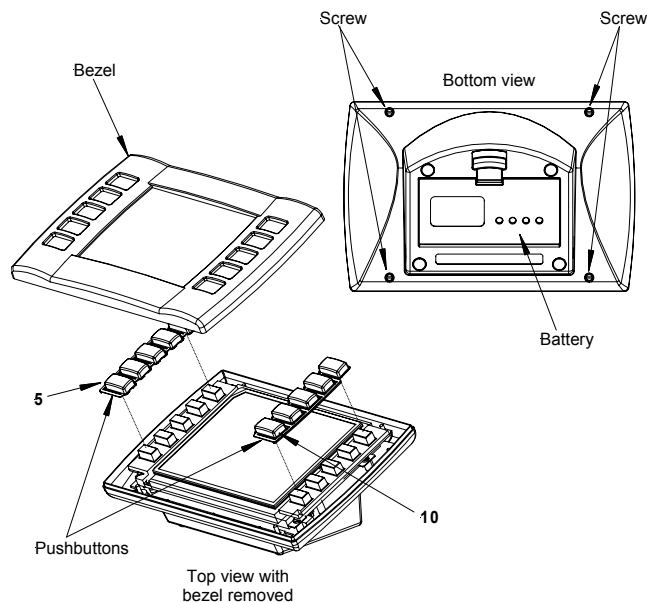
Perform the following to install engraveable pushbuttons on the ST-1700C. A #1 Phillips screwdriver is required. Refer to the illustration below.

1. Remove the battery, and place the touchpanel face down on a clean work surface.
2. Remove the four screws securing the front bezel to the base, and return the unit to its normal position (use care to prevent the bezel from dropping and becoming damaged).
3. Lift the bezel from the touchpanel, and remove the pushbuttons being replaced. Note that the pushbutton sets fit snugly.
4. Put the new pushbuttons in place (see following Note), press firmly to ensure they are seated, and place the bezel back in position.

NOTE: The rear of the pushbuttons are marked TOP 1- TOP 5 and TOP 6 – TOP 10 to ensure correct position and orientation when installed. Do not remove the plastic frame connecting the buttons together.

5. Hold the bezel in place and turn the unit over on its face.
6. Reinstall the four screws to secure the bezel to the base. Tighten the screws, being careful not to strip the threads.
7. Reinstall the battery and verify that the pushbuttons function properly.

Engraveable Pushbutton Installation Diagram



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