SP3-TCM+

Transport Control Module

Multi-Unit Media Control Device

Important Safety Instructions

1) Read these instructions.
2) Keep these instructions.
3) Heed all warnings.
4) Follow all instructions.
5) Do not use this apparatus near water.
6) Clean only with dry cloth.
7) Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8) Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9) Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
10) Only use attachments/accessories specified by the manufacturer.
11) Unplug this apparatus during lightning storms or when unused for long periods of time.
12) Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

FCC Compliance

This equipment generates radio frequency energy and if not installed in accordance with the manufacturer's instructions may cause radio interference.

This equipment complies with part 15, Subpart J of the FCC rules for a Class A computing device. This equipment also complies with the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications. These above rules are designed to provide reasonable protection against such interference when operating the equipment in a commercial environment. If operation of this equipment in a residential area causes radio frequency interference, the user and not SP Controls, Inc., will be responsible.
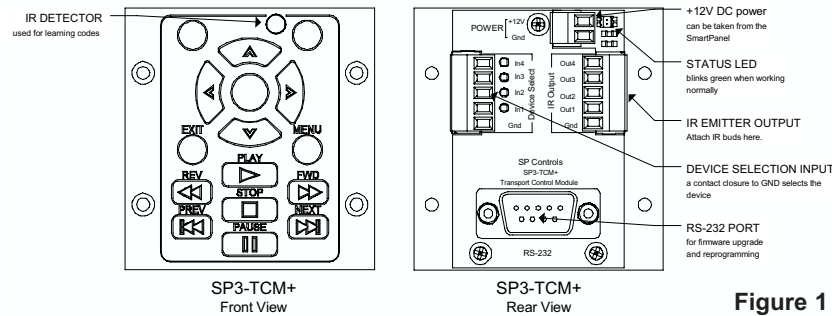
Changes or modifications made to this equipment not expressly approved by SP Controls, Inc., could void the user's authority to operate the equipment.

SP Controls, Inc. assumes no responsibility for any errors that appear in this document. Information in this document is subject to change without notice.

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used for learning codes

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Gnd

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Out3
Out2
Out1
Gnd

Device Select

IR Output

SP Controls
SP3-TCM+
Transport Control Module

RS-232

SP3-TCM+
Rear View

+12V DC power
can be taken from the
SmartPanel

STATUS LED
blinks green when working
normally

IR EMITTER OUTPUT
Attach IR buds here.

DEVICE SELECTION INPUT
a contact closure to GND selects the
device

RS-232 PORT
for firmware upgrade
and reprogramming

Figure 1

The SP3-TCM+ Transport Control Module is a hardware peripheral extending the SmartPanel™ control system. It provides standard and extended (e.g., menu) control for VCRs, DVD players, CD players, TV tuners, et cetera. It is capable of learning IR codes from a variety of different devices or from another TCM+ (cloning).

In addition to standard transport control (play, pause, stop, fast forward, rewind), the module provides buttons that can be programmed to provide access to menus and other advanced controls. Programmed keys are backlit; keys that are not programmed are dark.

The TCM+ can control up to **five unique devices**. The TCM+ accepts contact closure control from a SmartPanel on its *Device Selection* port to switch between device channels. One control device can be associated with each of the four SmartPanel inputs, and an additional device (*Device 0*) is selected when the SmartPanel is off. The TCM+ drives up to four IR outputs via its *IR Output* port. IR outputs can be jumpered if the same physical device is configured for more than one device channel.

2 IR emitters ship with the SP3-TCM+; additional emitters can be ordered as needed (part no. *SP2-IR*). Power is typically drawn from a SmartPanel (page 4). A 12VDC wall-wart power supply is not required, but can be ordered separately from SP Controls if desired (part no. *SP2-PS*).

DVD/VCR Combo Units: Many DVD/VCR combo units are best programmed as two TCM+ devices: one for the VCR and one for the DVD player. In this case, two SmartPanel inputs are required. This is required for DVD/VCR combo units with separate video outputs for the DVD and VCR. A user-defined *AUX* button can be programmed on the TCM+ to switch between VCR mode and DVD mode. For some combo units, the TCM+ can automatically switch modes. See *Entrance Codes* on page 12 below for more information.

Part II. Requirements

In order to configure and operate the SP3-TCM+ you will need the following:

1. The **SP3-TCM+** and **IR squirt(s)** (**required** - 2 squirts supplied).

2. **12VDC** power supply (**required**) - typically drawn from a SmartPanel. See page 4 for more information.

Note: A separate power supply can be ordered for the TCM+ if necessary (part no. *SP2-PS*).

3. A short **multi-conductor cable** to connect SmartPanel source selection relays (captive screw) to the *Device Selection* port (captive screw) on the TCM+ (**required** for installations that will control **more than one device**, including VCR/DVD combo units that are treated as two devices). For wiring instructions, see page 6.

4.The **devices to be controlled** (**recommended)** - wire the IR emitters to the devices to be controlled during programming to allow testing.

Part III. Installation

1. The TCM+ is the correct form factor to replace two Auxiliary Patch Modules in a Large Chassis SmartPanel (SP2-CHAS). It also fits in a modular rack-mount kit (SP2-RACKSM-MOD) or SmartBox+ optional modular front plate (SLB-SBOX+MINIFACE-BL/WH).


**SP3-TCM+ mounted in a
Large Chassis SmartPanel (SP2-CHAS)**

Part III. Installation

2.**Power** the TCM+ using the SmartPanel's 12VDC power supply.

Figure 2

SmartPanel

To TCM+

To 12VDC

Figure 3

SmartPanel

To 12VDC
On TCM+

To Gnd
On TCM+
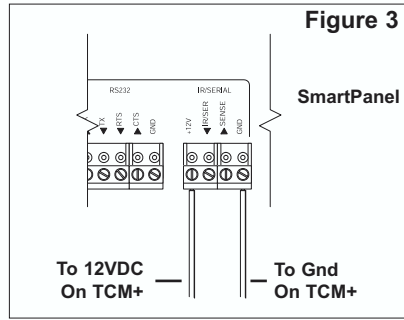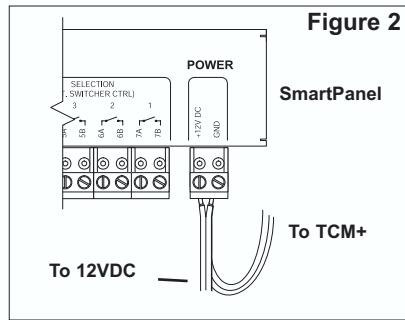
Power can be drawn from the back
of the SmartPanel by wiring from
the power connector (figure 2) or
from the IR control port (figure 3).

Power on TCM+

POWER [+12V / Gnd]

In4   Out4
In3   Out3
In2   Out2

Figure 4
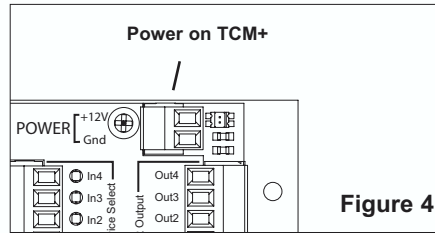
Note: Power polarity must be correct. If the TCM+ does not power on, try
reversing the polarity of the power supply. A properly powered TCM+ will run
through a brief power-on self-test when power is first applied (flashing all key-
pad backlight LEDs), and will begin flashing its status LED green on the back
of TCM+.

3. **Wire IR emitters** to the TCM+ captive screw connector labeled
IR OUTPUT. White wires must land on *Out*, black wires land on *Gnd*.

See the next two sections for more information.

4. The IR codes that are learned by this device are stored in nonvolatile mem-
ory. The device can remain unpowered for any length of time without losing
codes.

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Part IV. Wiring the TCM+ to Control a Single Device

Leave the *Device Selection* port unwired (open) and connect an IR Emitter to *IR Output 1* and *Gnd* (figure 5). Because no device selection pin is shorted to ground, the TCM+ will default to *Device 0*. In this case the TCM+ will output IR on pin 1.

When extending the IR emitter to the control device, *be sure to maintain correct polarity*. The white stripe on the IR emitter indicates SIGNAL (hot), the unstriped wire must be wired to GROUND.

Affix the bud of the IR emitter to the IR window of the device to be controlled. Some devices are very sensitive to placement of the emitter bud, so *be sure the bud is positioned directly over the IR window* of your device.

Continue to *Part VI* below, and program your single device.

Note: Many *DVD/VCR combo units* should be treated as multiple devices.
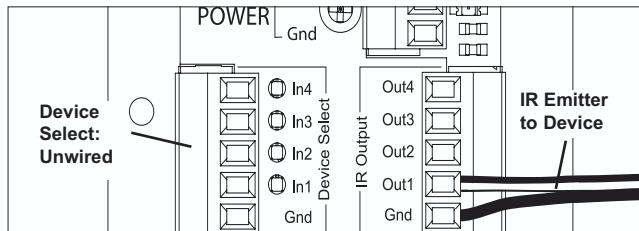

Figure 5: TCM+ Wired to Control One Device

Part V. Wiring the TCM+ to Control Multiple Devices

1. **Overview**: Switching inputs on the TCM+ is accomplished through relay control. The *Device Selection* port accepts **maintained closure relay control**. At any time, one and only one device selection pin on the input port should be shorted to ground. Each input switches the TCM+ to the corresponding *IR Output* and device channel.

For example, when *In2* is shorted to *Gnd*, the TCM+ switches to programmed *Device 2*, and IR signal will be sent from *IR Output* pin *Out2*. When no *Device Selection* pin is shorted to ground (e.g., the SmartPanel is off), the TCM+ switches to *Device 0*. *Device 0* and *Device 1* share *IR Output* pin *Out1*.

Part V. Wiring the TCM+ to Control Multiple Devices

2. **Wiring**: Wire a cable between the TCM+ *Device Select* port and the SmartPanel's *Relays Selection* port. Common ground should be jumpered at the SmartPanel side for all devices.
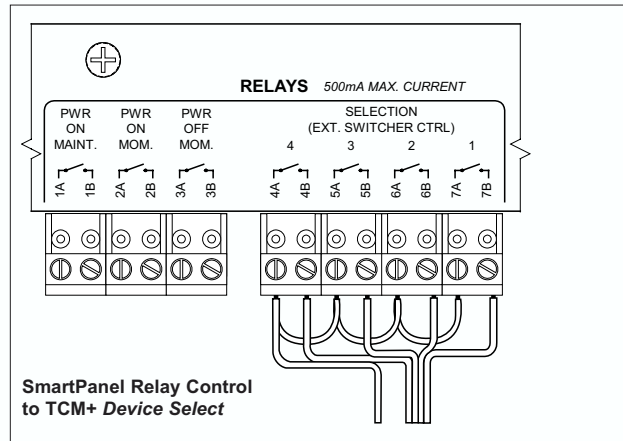

Figure 6: Wiring SmartPanel Relays to TCM+

3. **SmartPanel Configuration**: When controlling multiple devices, the SmartPanel *Selection Relays* must be configured for *Maintained Closure*. Use the SP Controls Configuration Utility to configure the SmartPanel as described in the *SmartPanel Installation and Configuration Guide*.

Relay configuration should be as follows:

1. Navigate to the *CONFIGURE RELAYS* tab in the Configuration Utility
2. Set relays to *SIMPLE CONTROLS*
3. Both the *MOMENTARY* and *BINARY SELECTION* checkboxes should be UNCHECKED.
4. Download settings to the SmartPanel.

Older versions of the SmartPanel and Configuration Utility always show *Simple Controls*.

When the SmartPanel is correctly configured and the two devices are correctly wired, the TCM+ will **automatically switch between each of four devices** when the SmartPanel is on. When the SmartPanel is *OFF*, the TCM+ will switch to *Device 0* (which is often unprogrammed).

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Part V. Wiring the TCM+ to Control Multiple Devices

4. **Switching**: Verify that the TCM+ is correctly switching between devices when the SmartPanel source selection is changed.

When powered, the TCM+ has LEDs that show what device is currently selected at the *Device Selection* port (figure 7). These LEDs are only visible by examining the back of the TCM+. There is no indication on the front side of the unit.
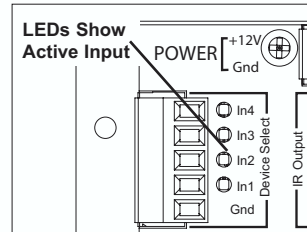

Figure 7

As each input is selected at the Panel, the corresponding green LED should light at the *Device Selection* port at the back of the TCM+.

5. **Wiring IR Emitters**: Wire IR Emitters from the TCM+ *IR Output* port to each device that will be controlled.

When extending the IR emitter to the control device, *be sure to maintain correct polarity*. The white stripe on the IR emitter indicates SIGNAL (hot), the unstriped wire must be wired to GROUND.
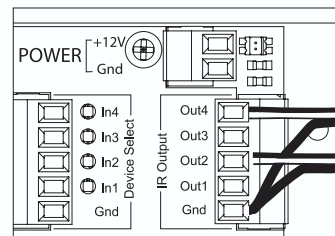
Figure 8
2 IR Emitters Wired to
Control Devices 2 and 4

Affix the bud of the IR emitter to the IR window of the device to be controlled. Some devices are very sensitive to placement of the emitter bud, so *be sure the bud is positioned directly over the IR window* of your device.

SP Controls supplies dual-blink IR emitters which visibly glow when IR is being emitted. The active TCM+ IR output pin corresponds to the device selected at the *Device Selection* port. For example, when *In2* is shorted to *Gnd*, *Out2* will be active. *Device 2* should likewise correspond to *Input 2* on the SmartPanel. All emitters share a single ground.

Note: DVD/VCR combo units that receive control as two devices can be controlled via a single IR emitter. Jumper the appropriate output pins to a single IR emitter SIGNAL wire.

Part VI. Learning IR Codes with the TCM+

Note: When the TCM+ is in IR learning mode, it is susceptible to interference from ambient light sources such as bright sunlight or strong compact fluorescent lights. If you cannot see the button backlights illuminate, then the room may be too bright for programming. You may need to shield the IR window on the TCM+ from bright light sources while learning.

While we have tested this product with many manufacturers' remote controls, there may be remotes that are not learnable by this device. In particular, you may not achieve optimum results with remotes made by *Philips* or their OEM partners, including *Magnavox* and *Koss*. If you experience difficulties learning an IR remote, please contact SP Controls, Inc.

To learn a remote control:

1. **POWER THE TCM+**: Make sure that the unit is powered and the status light is blinking green. See page 4 for more information.

2. **SELECT THE DEVICE (BANK) THAT YOU WISH TO LEARN**: Switch to the appropriate input that you want to learn. If the SmartPanel relays are connected to the TCM+, power on the Panel and select the Panel input corresponding to the device you wish to learn. If the TCM+ is not wired to the SmartPanel relays, you can switch the TCM+ by shorting the appropriate input positions on the TCM+ with a wire or needle-nose pliers.

3. **ENTER LEARNING MODE**: To enter learning mode press and hold *ADJUST UP* and *ADJUST DOWN* simultaneously on the TCM+ (figure 9). After a few seconds, the keypad will flash in a spiral pattern and the status LED will blink green and amber. This indicates the TCM+ is in learning mode.

NOTE: There is no need to press the buttons hard. Excessive force should not be used.

Press and hold
ADJUST UP and
ADJUST DOWN
to enter Learning
Mode

Figure 9
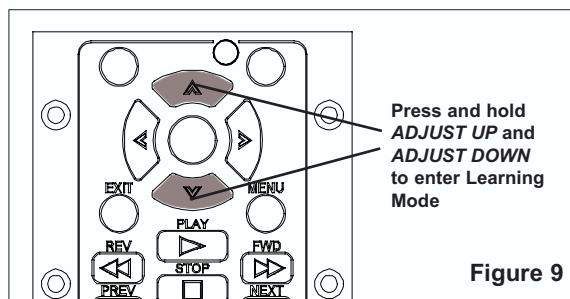
Part VI. Learning IR Codes with the TCM+

If the status LED begins flashing red, the current device was pre-programmed and must be erased entirely before individual keys may be learned.

You can switch between devices while in Learning Mode, programming each in turn, without having to re-enter Learning Mode.

4. Learning mode will eventually **time out** after a minute of inactivity, so you need to have the remote control that you are going to learn handy.

5. **TEST REMOTE AND IDENTIFY SWEET SPOT**: Before trying to learn any keys, position your remote control about ½" from the IR learning eye (upper right of TCM+ front, indicated in the figure 10).

IR Learning Window
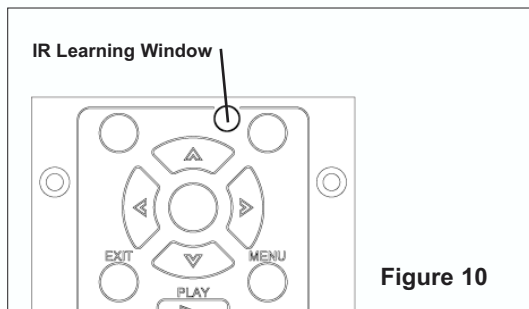
Figure 10

When you press a key on the remote, you should see the status LED on the back of the TCM+ flash red. Notice that as you move the remote closer and farther away from the eye, or as you move "off axis" (away from perpendicular to the eye) the brightness of the red flashes may fall off and become intermittent. Identify a position that seems to consistently yield clear, bright flashing of the red status LED. This is the "sweet spot" most likely to provide the clean signal that the TCM+ needs to learn.

If you do NOT see a red light blinking, your remote may need new batteries.

Note: Some remotes have several emitting LEDs, which may not be located in the center of the remote.

6. **ARM A KEY AND LEARN A CODE**: Press TCM+ the button that you wish to learn. It will start blinking slowly to show that is it is ARMED for learning. Arming will eventually time out if no IR code is received. You can select a different key for learning at any time, including keys that are already learned.

Part VI. Learning IR Codes with the TCM+

Note: If no key will arm for learning, verify that you are still in Learning Mode.

Hold the remote control in the sweet spot you identified in step 5. Press and hold the button on the remote for approximately one second. You should see the red status LED on the back of the TCM+ flicker, indicating that the code is being received.

If the TCM+ "sees" the code you are trying to learn, it will immediately provide feedback on whether it thinks it learned the code correctly.

If a code is incorrectly learned, the TCM+ keypad LEDs will flash a quick "X" and the key will immediately be re-armed to try again.

If a code is successfully received and learned, the TCM+ keypad LEDs will flash a quick, circular "O" with its adjustment keys, and the key that was just learned will begin to blink rapidly, indicating that the key is in VERIFICATION MODE.

7. **VERIFY LEARNED KEYS**: Immediately after learning, each key will blink quickly to indicate that it is ready for verification. Press the key and verify that it was learned correctly. Both the red status LED **and the IR emitter for the current device** will emit the code as it was learned.

Note: Because the device's IR emitter will emit the code during this step, it is very useful to have it wired to the device to be controlled. You can then test that the learned code will correctly control the device being learned. The device's IR emitter will not blink during learning, only during verification. Most remotes have a "press and hold" repeat behavior; you can test this behavior in step 5. For remotes that do implement a "press and hold repeat," verify that the code only squirts for a moment if the key is pressed briefly, but continues to regularly emit if the key is press-and-held.

Signs of an improperly learned code are inability to press-and-hold for infinite repeat, very quick codes that are not visible on the red status LED, and codes that seem to pulse irregularly or go up and down in brightness as they are emitted. Most keys on a single remote will produce signals that look the same to the human eye. If during learning one key blinks in a visibly different pattern on the Status LED, it may need to be learned again.

To re-learn a key that did not seem to learn correctly, simply press any other key on the keypad, then press the target again to rearm it.

8. **REPEAT FOR EACH BUTTON**: While you are still in learning mode, continue programming each button. Unused buttons should be left unprogrammed (e.g., if you are trying to control a CD player, the menu up/down/left/right buttons will probably not be programmed). Unprogrammed buttons will not illuminate when the device is selected.

9. **TO ERASE A KEY**: Press and hold any learned key for several seconds to erase it. It will start blinking to show that it is PRIMED TO BE ERASED. After a few seconds the key will begin to blink QUIICKLY to CONFIRM ERASURE. After a few seconds it will go dark and be erased. If you release the key at any time while it's blinking, the erase process is cancelled.

10. **TO ERASE AN ENTIRE DEVICE**: Device Erase erases all codes for *one learned remote* (one programmed device), not all the codes in the TCM+.

Press and hold the combination *ENTER* and *STOP* (figure 11) to prime the TCM+ for DEVICE ERASE. The whole keypad will begin blinking slowly to indicate that it is going to be erased. Blinking will gradually quicken to CONFIRM DEVICE ERASE. After a few seconds all keys will go dark, indicating it has been erased.

Press and hold *ENTER* and *STOP* to Erase Device

Figure 11

If either of the two keys (*ENTER* or *STOP*) is released while the keypad is blinking, the Device Erase operation will be cancelled.

Once a device has been erased there is no way to un-erase it.

Part VI. Learning IR Codes with the TCM+

11. **LEARNING ENTRANCE CODES** (optional): You can program the TCM+ to send a specific code EVERY TIME A DEVICE IS SELECTED. This may be useful if you are using a VCR/DVD combination player and have configured them as two separate devices at the SmartPanel.

For example, when you switch the Panel and TCM+ to the VCR input the TCM+ can be configured to automatically send an Entrance Code to switch to the VCR/DVD Combo Unit to VCR mode. This is only possible if the combo unit remote control has separate commands for VCR mode and DVD mode; many combo units are *toggling* and therefore will not support this feature.

If the remote control toggles between VCR and DVD mode, one of the user-defined *AUX* buttons should be programmed as the VCR/DVD toggle switch.

To ARM a device Entrance Code, press and hold the *ENTER* button and the *AUX 1* button (figure 12) for several seconds simultaneously.

Press ENTER and AUX 1 to learn ENTRY CODE

Figure 12

They will begin to flash together to indicate that the Entrance Code is now armed for learning. Learn the code as you would any other. When the code has been learned, the two buttons *ENTER* and *AUX 1* will begin flashing quickly to indicate that the Entry Code can now be VERIFIED.
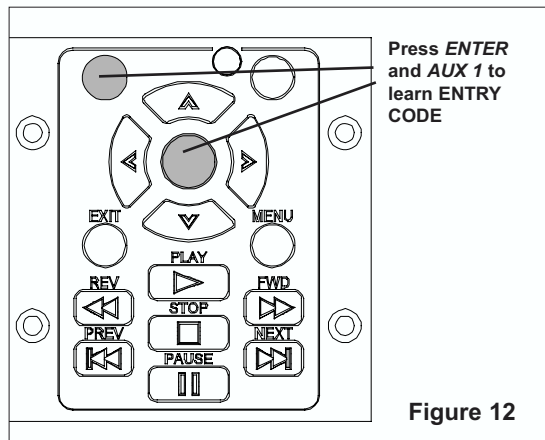
Press either the *ENTER* or the *AUX 1* button to test and verify that the Entrance Code is learned correctly. If the device to be controlled is actually wired with the appropriate IR output, it will be controlled during testing.

Note: Because there is no button associated with "device entry," the TCM+ automatically sends the Entrance Code three times.

Erase Entrance Codes by pressing and holding the Entrance Code key combination for several seconds. The two keys will blink more and more quickly to indicate code erasure exactly as with other keys.

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Part VI. Learning IR Codes with the TCM+

12. **LEARNING MOUSEPAD COMMANDS** (optional) : It is possible to learn codes from a remote's "mouse" controls (typically circular pads). These are identifiable as providing a RANGE of motion, rather than including separate buttons for up, down, et cetera.

To learn mousepad keys, first arm the button you wish to program as usual. Then point the remote control directly AWAY from the TCM+ (or cover the end of the remote control with a piece of paper or your hand). Press and hold the mousepad button you wish to program. **Hold the key in exactly the same position.** While still pressing the button, quickly uncover the end of the remote control and position it in front of the IR detector on the TCM+.

It is possible to successfully learn mousepad keys this way, including the ability to repeat them. These keypads do not produce a consistent code - instead, they encode the precise intermediate positions of the control in a constantly changing flow. The extra handling explained above is necessary for the TCM+ to correctly duplicate this complex code schema.

13. **TO EXIT LEARNING MODE**: Repeat the keypress sequence used to enter Learning Mode - press and hold *ADJUST UP* and *ADJUST DOWN* simultaneously (see figure 9, page 8 above). After a few seconds the keypad will show a quick animation, and the TCM+ will reenter normal operation. The status LED should return to green flashing.

Learning mode will also time out after several seconds if the device is inactive.

14. **FINAL TEST OF LEARNED CODES**: It is important to test the TCM+ codes after programming. Place the IR emitter bud on the device that you are controlling directly over the IR detector on that device. Press the button that you wish to test. You should see the IR emitter blink. If not, check your wiring.

If it blinks and you still cannot control the device, MAKE ABSOLUTELY SURE that the IR emitter is located in the right place. If it still does not work, test other programmed buttons. If some work, but others do not, try re-programming the buttons that do not work. Make sure that you press the button on the remote that you are learning for at least 1 second.

If you have gone through all of these steps and still cannot control the device, it may have an IR format that cannot be learned. Note that this is *extremely rare* and it is much more like that the emitter is miswired, the bud is improperly placed, et cetera.

Please contact SP Controls if you believe you have a device that cannot be controlled.

Part VII. Cloning
## (Programming Multiple Units With the Same Codes)

Cloning copies the entire configuration from one TCM+ to another - all codes for all devices, including pre-programmed codes are copied. Any TCM+ can easily clone another, which is very useful If you are installing multiple units with the same configuration.

To clone one TCM+ to another:

Start with one TCM+ that has been programmed with IR codes and one that will become the clone.

Note: The unit that will become the clone does not need to be erased or un-programmed; any existing information will be overwritten.

1. Apply power to both units.

2. Connect the two TCM+ units with a **male-male null-modem cable** (all 9 pins must be wired). If you have a conventional female-female null-modem cable, attach gender changers to both sides of the cable.

3. **ON THE UNIT THAT WILL BECOME THE CLONE**: Press and hold the *ADJUST LEFT* and *ADJUST RIGHT* (figure 13). After a moment, the keypad will show a quick animation to indicate that it has entered cloning mode.

TCM+ to be Programmed: Press and hold *ADJUST LEFT* and *ADJUST RIGHT* to enter *CLONING MODE*

Figure 13

14
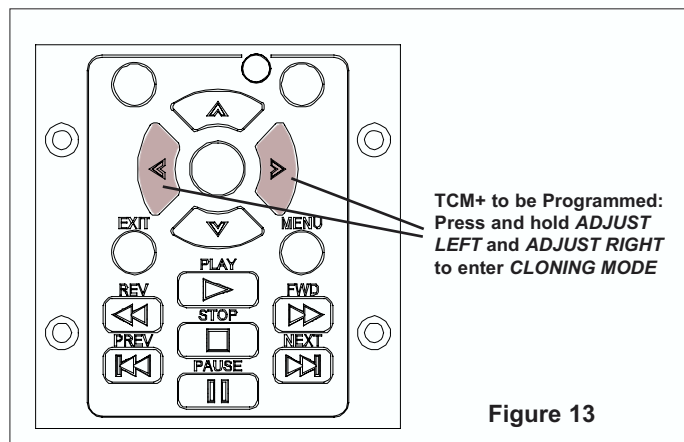
4. The TCM+ that is BECOMING THE CLONE will begin retrieving data from the other unit, which will appear normal. While the TCM+ is retrieving data, it indicates progress both by showing a circulate animation. Five keys on the clone will gradually illuminate one by one, indicating progress as the five devices are successively copied.

CLONING takes approximately 75 seconds.

DO NOT interrupt the cloning process until it is complete. DO NOT attempt to use the unit being cloned. Interruption or disruption of the cloning process may leave the unit that is becoming a clone in an indeterminate state. If this happens, you may have to use *Device Erase Only Mode* (see *Section XI* below).

5. When the unit is finished cloning, it will reset and you will see all the buttons flicker in rapid succession. It is now fully programmed, and IDENTICAL to the source unit.

6. You can repeat this process as needed until all units are programmed.

7. Once a device is successfully cloned, it can act as a DONER to other units as well. There is no need to clone all devices from a single original.

Part VIII. Legends

A sheet of self-adhering legends is provided with the TCM+ to label auxiliary buttons as appropriate for the installation and devices controlled.

Tweezers may be helpful to affix the legends.

Part IX. TCM+ Operation

1. For installations using the TCM+ to control multiple devices, switching SmartPanel inputs automatically switches the TCM+ to control the appropriate device.

2. When the TCM+ has a programmed device selected, buttons with active functions are backlit (figure 14).
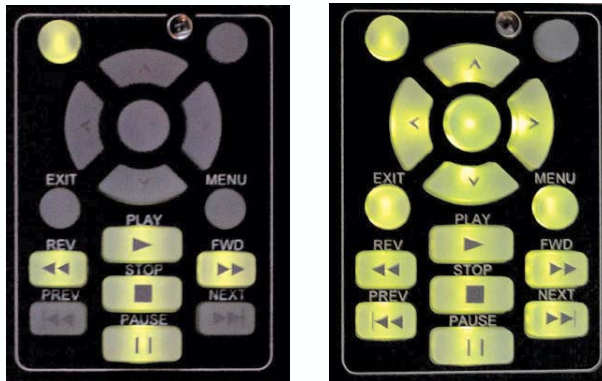
Figure 14 VCR, DVD Player inputs selected on a TCM+

3. Buttons go dark to acknowledge user keypresses. Keys that support press-and-hold repeat sends will stay dark while pressed.

4. Press-and-hold features function with the TCM+ just as they do with device remote controls. For example, if a VCR supports fast-forward scrubbing when FWD is pressed and held while the VCR is playing, the FWD key will also scrub from the TCM+.

5. Not all active buttons will produce a change on the device being controlled at all times. For example, DVD players may disable the menu function at certain times. This is entirely dependent on the device being controlled.

6. The LEDs on the TCM+ *Device Select* port on the back of the unit indicate the currently selected device.

7. The status LED on the back of the TCM+ will flicker RED when IR is being emitted on any output.

Part X. Troubleshooting

The TCM+ doesn't appear to power on.

The TCM+ should run through a brief power-on self-test in which all the lights rapidly flicker on in succession. If you do not see the self-test, verify that power polarity is correct (see page 4).

If the currently selected input is not programmed, none of the buttons on the front will illuminate. Check that the Status LED on the back is blinking green.

I cannot switch devices - the TCM+ always seems to have the same device selected.

Check whether the *Device Select* port LEDs indicates a change of device selection. If not, control wiring between the TCM+ and SmartPanel selection relays may be incorrect, or the SmartPanel relays may not be correctly configured (see page 6).

If the TCM+ is properly switching between devices, one or more device may not be programmed properly, and may require reprogramming.

The TCM+ does not seem to be putting out IR.

The TCM+ status LED will flicker red when an IR code is being emitted. Verify that the button you are pressing is causing the LED to flicker. If not, it may not be programmed.

Verify that IR emitter polarity is correct. The white striped wire should land on the appropriate *OUT* pin; black should land on GND (see pages 5 and 7).

The *IR Output* pin that is active corresponds to the currently selected device. Verify the currently selected device with the *Device Selection* port LEDs.

Make sure that you have an IR emitter wired to the correct pin of the IR Output port. For example, if Device 2 is selected (*In2* is shorted to *GND*), the TCM+ will send IR from the *Out2* pin. If the *Device Selection* port is not being used (e.g., the TCM+ controls only one device), the TCM+ will default to *Device 0* and the emitter should be wired to pin *Out1*.

Buttons that are not illuminated have no function programmed for them, and hence will not emit IR.

Be sure that the IR emitter bud is carefully placed directly over the IR receiver window on the device you are controlling. Some devices are extremely sensitive to placement.

Part X. Troubleshooting

The TCM+ is not correctly learning a code or remote.

Be sure that you carefully and completely follow the procedure described in *Part VI* on pages 8 and following.

TCM+ IR learning is susceptible to interference from ambient light sources such as bright sunlight or strong compact fluorescent lights. You may need to shield the IR window on the TCM+ from bright light sources while learning.

Codes from remote control *mousepads* require special handling; see *Part VI, Section 12* on page 13.

The TCM+ may have difficulty learning remote controls if the batteries in the remote control are low. If you still have difficulty, try replacing the remote control batteries.

If the red status LED is constantly blinking while in Learning Mode, the currently selected TCM+ device was pre-programmed and the entire device must be erased before keys can be learned. See page 11 for instructions.

The IR is working, but the device is not being controlled.

MAKE ABSOLUTELY SURE that the IR emitter is located in the right place on the device that you are controlling. Some devices are extremely sensitive to placement of the emitter bud.

If it still does not work, test other programmed buttons. If some work, but others do not, try re-programming the buttons that do not work.

Make sure that during the learning process you press the button on the remote for at least 1 second.

If you still cannot control the device, it may have an IR format that cannot be learned. Contact SP at this point. We may ask you to send the remote to us for further analysis. Note that this is *extremely rare* and it is much more like that the emitter is miswired, the bud is improperly placed, et cetera.

If you are still having problems, contact SP Controls technical support at help@spcontrols.com or at (877) 367-8444.

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Part XI. Special Device Modes

SPECIAL MODE: DEVICE-ERASE ONLY MODE

In the unlikely event that the TCM+ non-volatile memory becomes corrupted (possible but unlikely if a cloning process is interrupted) and will not allow conventional Device Erase and programming, it is equipped with a special "back door" mode that will allow it to be returned to service.

To enter "Device Erase Mode", press and hold STOP and ENTER while applying power. The TCM+ will start up with it status LEDs blinking AMBER (both red and green, simultaneously).

This service mode allows only one operation, Device Erase, which functions just as it normally would. To erase a device, **you must enter Learning Mode as usual** (see page 8), switch to each device to be erased, and erase them individually using the combination key press STOP and ENTER (see page 11).

To return the TCM+ to normal operation, remove and re-apply power.

Note: In this mode, no keypad LEDs will ever light up, regardless of the actual configuration of each device.

SPECIAL MODE: FIRMWARE DOWNLOAD ONLY MODE

The TCM+ can be placed in a special service mode to support in-field firmware upgrades. Normally, it should not be necessary to use this mode, as the Configuration Utility will automatically place the TCM+ in firmware upgrade mode. However this mode is provided as a "back door" in case of emergency.

To enter "Firmware Download Only Mode," press-and-hold *ADJUST UP* and *ADJUST DOWN* while applying power. The TCM+ will start up with it status LEDs blinking AMBER and RED quickly; the keypad will display an "X".

This service mode allows only one operation, Firmware Download, which must be initiated by the SP Controls Product Configuration Utility. To exit this mode and reset without firmware download, remove and re-apply power, or press the PLAY button, which will cause a reset.

Technical Specifications

Power	8-13 VDC, 220 mA
Dimensions	2.6"(h) x 2.4" (w) x 1.4" (d) 65mm (h) x 62mm (w) x 35mm (d)
Weight	2.5 oz
Connectors	female DB9 RS-232 (configuration port) (1) 2-pole captive screw (power) (1) 5-pole captive screw (relay switching control) (1) 5-pole captive screw (IR Emitter Output)
Temperature/humidity	Storage -40° to +158°F (-40° to +70°C) / 10% to 90%, non-condensing Operating +32° to +122°F (0° to +50°C) / 10% to 90%, non-condensing

LED Color	TCM+ State
Blinking Green	Normal Operation
Blinking Amber/Green	Learning Mode
Blinking Amber	Learning Mode, current device pre-programmed or Device Erase Only Mode (see *Part XI*)
Fast Blinking Amber/Red, Keypad Shows X	Firmware Download Only Mode (see *Part XI*)
Flickering Red	Either emitting or receiving an IR code
Solid Amber	Manufacturer's Test Mode

WARRANTY

SP Controls warrants all SP3-TCM+ products and accessories against defects in materials and workmanship for a period of three years from the date of purchase.

Although SP Controls thoroughly tested and reviewed this documentation, there is no warranty, express or implied, with respect to quality, merchantability, or fitness for a particular purpose. Therefore, the SP3-TCM+ and accessories are provided "as-is" and the purchaser assumes the entire risk as to quality and performance.

There are no obligations or liabilities on the part of the SP Controls Corporation for consequential damages arising out of or in conjunction with the use or performance of these products or other indirect damages with respect to loss of profit, revenue, or cost of removal and/or replacement. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that vary from state to state. SP Controls' maximum liability shall not exceed the price paid by the user.

All implied warranties, including warranties for merchantability and/or fitness, are limited in duration to three (3) years from the date of purchase. Proof of purchase must be provided with any claim.

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