

Frequently Asked Questions for TFT Remote Controlled Monitors.

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1. What was the primary “spark” that started the fire under TFT to make remote control monitors when there are several brands already on the market?
 - a. The spark was the concept of a new way to design a waterway. Never before has a monitor been made with the design of the Monsoon. It has the lowest friction loss by far of any monitor made anywhere in the world. 16 PSI at 2000 GPM

2. What were the primary design criteria used by TFT for the electronics?
 - a. Reliability
 - b. Resistance to the elements found on a fire truck
 - c. State-of-the-Art microprocessor technology such that units would be software-updatable for user needs
 - d. Simple to install, minimal wiring
 - e. Easy to troubleshoot
 - f. Modular in nature
 - g. Rich feature set

3. What is it about the design of the electronics that makes it so easy to install?
 - a. The short answer is RS485. The long answer is that each of the various components of the TFT system are connected by a communications system that utilizes a standard industrial protocol called RS485. This method allows multiple control points to be connected to the monitor by attaching them in any sequence to a pair of wires that are routed around the vehicle. This protocol is highly noise immune and very, very reliable.
 - b. The units are also capable of being used on 12 or 24 volts with no changes whatsoever to the electronics.

4. What is it about the design of the electronics that makes the monitors easy maintain when things are not working as expected?
 - a. The primary problem with monitors is either in the motors on the individual axis’ or in the control boards that activate them. Each of the motors is identical and each of the motor control boards are identical. When a motor board is plugged into its slot certain of the contacts in the mating plug are connected by the circuit board. These connections automatically teach the board what axis it has been installed in and the parameters and software reconfigures itself for that particular axis. What this means as a practical matter is that if a particular axis is not working the cover can be taken off the unit and any two of the three motor control boards swapped. If the problem stays on the same axis the motor itself is defective, if the problem moves the drive board is defective. The fact that

all the boards are the same means that only one board has to be stocked if spares are desired.

5. The TFT system is all microprocessor based, is there a battery used to hold the memory?
 - a. NO! The types of chips that are used to hold the program are called EEPROMS or erasable programmable read only memory. Once programmed they hold that program indefinitely, no batteries are required.
 - b. The program steps for Oscillate and Stow are also stored in this type of memory so that the program is not lost when power is removed.

6. The motors in the TFT system are advertised as having encoders on them, what does that achieve as an end result for the end user?
 - a. Each motor of the TFT system (except the fog stream motor) has on the end of its shaft a device that generates multiple pulses for each rotation of the motor. What this means is that by counting these pulses the microprocessor in the motor controller always knows where the monitor is in terms of position. This accomplishes several things.
 - i. One thing that it accomplishes is that the limit switches normally required to keep the monitor from hitting its end stops are not needed.
 - ii. A second benefit is that no matter what pressure is on the monitor, nor how cold or warm it may be, nor how worn it may be (or unmaintained) the motor controller can vary the amount of power to the motors such that the SPEED of the motors is always CONSTANT.
 - iii. The use of pulse feedback means that the motor can go very slow when it first starts up so that fine adjustments are possible. After a time delay the motor can then speed up for fast transit.
 - iv. Position control is ESSENTIAL for the effective use of an oscillate function. Other competitive products use timing for this function. If timing is used then the speed of the monitor over time due to cold, pressure, warm up, etc., will affect the length of the movement causing the position to be lost quickly. The TFT monitors, once programmed to oscillate, will operate for an unlimited amount of time without losing the pattern
 - v. Position control is also essential to a reliable stow function. The TFT monitor, during its stow function, moves to known end stops and re-zeros itself. It then moves from these known points thru a user-programmable pattern to the stowed position. Other models of monitor use time and if the monitor is moving slowly due to low voltage or being cold soaked it may give the signal that it is stowed when in fact it has not moved all the way to its end position.

7. What happens if a position/pulse encoder fails?

- a. In this case the monitor operates at a fixed speed (current). The OSC and the STOW functions will cease to operate until the problem is corrected.
 - b. When moving the failed axis, the OSC & STOW leds will blink rapidly.
8. TFT has a position display, how does that work and how many can be used on one monitor?
 - a. As many as NEEDED can be attached. Each display has to query the monitor to obtain its current position. If too many displays are added the display will start to lag the actual monitor position.
9. I want to store my oscillate program so that it is not lost when the power is removed from the system, can I do that?
 - a. Yes, there is a single switch that can be flipped in the primary monitor control case that will force the unit to maintain the oscillate program indefinitely. DIP switch #4 on the communications board that is on the monitor needs to be set to ON to cause the program to not be lost at power cycle.
10. How many control points can I use for one monitor?
 - a. The number of control points is unlimited. Any number of devices can be attached to the two wires (blue and white) that constitute the control bus for the monitor.
11. If I have more than one station which one is the master control point?
 - a. With the configuration that is set at the factory, the answer is that none of the control points are the master. Whichever button is pushed last will be the one that the monitor responds to. This is acceptable for most installations
12. I want to make one station the master station so that it cannot be overridden, how do I do that?
 - a. All that is required is to set DIP switch #1 on the communications board to ON. This switch is located on the communications board in the device that you want to be master. Refer to the manual for a picture of where this switch is located. Note: The monitor control station cannot be made a master station.
13. . How are the electronics configured for 12 versus 24 volt?
 - a. No configuration is required. The speed that the unit moves is based on the pulses from the encoders. As long as the voltage is above 8 volts the unit will function properly.
14. I just want a wireless remote and the monitor, can I do that without buying other items?
 - a. Not currently. Currently we are using a radio package from another manufacturer and it has to be interfaced to our unit with a Y4E-RP or

Y4E-COMM control box. In the very near future we will release a radio that is built right into the monitor control box, when this is done all that will be needed from a wiring standpoint will be to get 12 volts to the monitor. (Due for release 1st quarter 2006)

15. I see buttons marked AUX 1 and AUX 2, they don't seem to do anything, what are they for?
 - a. There are two electronic "switches" in the motor control box that can be used to open and close valves, turn on flood-lights, or for other needs of the end users by using the YE-REMAUX dual relay box.

16. I want to control the module from a CANBUS I/O module, is this possible?
 - a. Yes! For this purpose TFT makes the Y4E-COMM control module. It allows for discrete inputs for each of the control functions. With a simple jumper change the TFT input module can be configured to accept either a plus 12 volt signal as a signal to move or it can be an input that is held to chassis ground.

17. I have a monitor that is being controlled by discrete outputs from a CANBUS module. Is there a way that I can send a STOW command to the monitor?
 - a. YES! In fact there are two ways. If an extra output is available it can be attached to the terminal block at the point marked stow on the COMM board. Connecting this input to 12 volts (or ground depending which way the jumper is set) will cause the unit to stow.
 - b. If there are no spare outputs available. Then the controller can be "tricked" into going into stow by setting the outputs for STREAM, FOG, and RIGHT to be all turned on at once. The Monitor will accept that as a STOW command and initiate the stow sequence.

18. Space on my control panel is very limited. There is not room for the full size TFT control panel, there is enough space for toggle switches. Can the monitor be controlled with toggle switches that are not supplied by TFT?
 - a. Yes, this can be wired the same as the inputs from a CANBUS module would be wired. The communication interface module that is needed from TFT is a model Y4E-COMM box.

19. On the Tornado monitor, nozzles are used that go into flush after they are in fog. This could potentially quickly drain the tank of a small brush truck if the operator did not realize that the nozzle was in flush, has TFT addressed this issue?
 - a. Yes! The motor controller communicates with any of the Smart Shaper ER nozzles to determine what type of nozzle it is. The nozzle can be configured with or without flush just by changing the DIP switches. If configured with flush, the motor will stop just before entering flush. If the operator releases the fog button and then presses it again the nozzle will continue to move into flush.

20. What happens if someone accidentally presses the STOW button while water is flowing?
- The pressing of any button on the control panel during a STOW cycle will cancel the STOW function instantly.
21. What will stop the unit when it is in Oscillate mode?
- Pressing any button EXCEPT the fog stream buttons will cause the unit to stop doing its automatic program. If the fog or stream button is pressed the unit will stop moving until the desired new stream pattern is achieved and then when the fog or stream button is released the unit will continue with the oscillate pattern.
22. The blue and white wires are the communications wires. Are they in parallel or series? Is the signal boosted by going thru a control module?
- Terminal blocks are provided in every control unit for the connection of two sets of blue and white wires. This is for convenience only and to assure that each wire has its own connection point. In fact all the blue wires from all the control points could be twisted together and all the white wires twisted together and the unit would function normally. They appear to be attached to the circuit board only because the terminal block is mounted to the circuit board.
23. The display module only has enough lights to display 180 degrees of rotation. What happens if it is attached to a monitor that has more than 180 degrees of rotation?
- The primary purpose for this display module was in bumper turret applications where the monitor cannot always be seen by the operator. These applications typically only have 180 degrees of "swing" and therefore the display only has 180 degrees of lights. If the display is attached to a monitor with 360 degrees of travel that 360 degrees will be equally divided over the available lights.
24. Why does the fog stream position not display on the remote display unit?
- Only the horizontal and vertical axis has have position encoders such that the monitor can communicate its current position. The nozzle does not have position feedback capability.
25. The display unit has a high speed, low speed switch, can this be used with a Monsoon or a Hurricane to allow two speeds?
- Yes! The display unit can be used to cut the speed of either monitor in half from what it normally functions at. In addition the display is fully compatible with both monitors for displaying their position.
26. What happens when the monitor runs into an obstruction, it seems to slow down?

- a. It seems to slow down because in fact that is what it did. The monitor learns its limit of travel by “running into” the ends stops the first time it travels from one end of stroke to the other. When an obstruction is hit the unit temporarily sets this point as the new end stop and slows down looking for the encoder pulses to stop meaning that a physical end stop has been reached. Each time the monitor comes near an end stop it slows down such as to not hit the stop at full speed (This saves wear and tear on all the drive train components), it then creeps at this slow speed until the encoder pulses stop. When the pulses stop this becomes the new monitor end stop. The advantage of this system is that when customers change end stops there is no reprogramming required. The electronics “learn” the new range of motion and the stops are then reset. This eliminates the need for external limit switches, which have wires that break and other problems that can occur from physical damage.
27. The stow and oscillate lights are flashing in an alternating fashion and nothing is moving. What is possibly wrong?
- a. More than likely the cause of this is that either the blue or the white communications wire is not connected properly. The controller is trying to talk to the monitor and is not getting a response back from the monitor. If these lights flash when moving one of the axis', it means the motor has a bad encoder. This will cancel OSC and STOW mode
28. I want to go into the program mode to store a new Stow position and it will not go into stow program mode, why?
- a. Going into program mode will ONLY occur if the button is held within the first 1 minute of the unit being powered up. With this lockout feature of the program mode it is not nearly as likely that someone will accidentally enter the stow program mode. To get into program mode, intentionally power the unit down and then back up. Within 30 seconds of power up hold the stow button for 10 seconds and it will enter program mode.
29. I need to know when the unit has reached its Stowed position. Is that possible?
- a. Yes, the communication interface boards have an “At Stow” relay that you can connect to an indicator.