360 Systems®
BROADCAST

TSS-2470

BROADCAST TIME DELAY

Operations Manual

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Software Version 5.21.xxx

Model TSS-2470 Broadcast Time Delay
Model TSS-2470 II Variable Time Delay
Model TSS-1080p Variable Time Delay
Model TSS-2470 DualZone Variable Time Delay

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Safety Notices

Safety Terms and Symbols

The following warning symbols are used in this manual

	English	ATTENTION: refer to owner's manual for important information.
	Français	ATTENTION: veuillez vous référer au mode d'emploi pour une information importante.
	Italiano	ATTENZIONE: fate riferimento al manuale per informazioni importanti.
	Español	ATENTCION: favor de referir al manual de operacion por informacion importante.

	English	WARNING: electrical shock hazard.
	Français	AVERTISSEMENT: danger de choc électrique.
	Italiano	AVVERTIMENTO: pericolo di shock elettrico.
	Español	ADVERTENSIA: peligro de choque electrico.

General Safety Caution

Heed the following important cautions regarding the TSS-2470 Time Delay in order to avoid personal injury or equipment damage.

Only qualified personnel should perform installation and service. Refer to appropriate sections of this product manual for instruction. Contact 360 Systems Customer Support for further explanation, or to clarify any uncertainty.

Disconnect both power cords before removing the cover.

Personal Injury Precautions

To avoid electric shock, do not operate this product with cover removed.

To avoid risk of fire, replace the power cord only with same type and rating as specified. Replace damaged power cords immediately.

This product is grounded through the grounding conductor of the power cord. To avoid electric shock, do not remove or modify the contacts on the plug.

Prevent the power cord from being walked on, pinched, or abraded.

To reduce the risk of fire or electric shock, do not expose this unit to rain or moisture.

Remove jewelry, such as rings, watches, or necklaces before servicing this equipment.

Product Damage Precautions

The TSS-2470 Time Delay contains hard disk drives and other fragile electronic and mechanical devices. While this product is very reliable, it is still vulnerable to shock. Handle it with care, and exercise caution not to drop or bump the recorder as damage to internal components may result. Turn off power before moving the Time Delay.

Do not obstruct air vents. Maintain an ambient temperature below 30°C (86°F).

Clean only with a soft cloth dampened with water. Do not spray cleaners or solvents directly on the product.

⚠ **WARNING:**

> Do not ingest the battery, Chemical Burn Hazard
>
> This product contains a coin/button cell battery. If the coin/button cell battery is swallowed, it can cause severe internal burns in just 2 hours and can lead to death.
>
> Keep new and used batteries away from children.
>
> If the battery compartment does not close securely, stop using the product and keep it away from children. If you think batteries might have been swallowed or placed inside any part of the body, seek immediate medical attention.

⚠ **CAUTION:**

> Replace battery only with the same, or equivalent, battery type. Follow all local laws regarding the disposal of BR and CR Lithium batteries. Batteries should be fully discharged prior to disposal.

⚠ **CAUTION:**

> Never shutdown the Time Delay by removing the power cords. Doing so may cause errors in the hard disk array. Should this happen, the array can be reinitialized without any data loss; however, the process may take several hours. Shutdown the system only by momentarily pressing the front panel reset button, or through the On-Screen user interface.

Product Registration

Important: As the owner of new capital equipment, you will want to take advantage of product information, enhancements, upgrades, or notifications issued by 360 Systems. Please register your product so 360 Systems can remain in contact with you. To register your product,

visit or call our
Customer Service Department at 818-991-0360.

Product Improvements and Upgrades

360 Systems reserves the right to make changes and/or improvements to
its products without incurring any obligation to incorporate such
changes or improvements in units previously sold. Certain features
mentioned in this document may not be present in all models. Time
Delays are not offered for sale in all countries.

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TSS-2470 Time Delay

Introduction

There are four versions of the 360 Systems Time Delay. The TSS-2470 Time Delay is the standard for set-and-forget time delay applications such as time zone shifting. The TSS-2470II Variable Time Delay adds the ability to change the delay time without the loss of any previously recorded material. The DualZone Variable Time Delay adds a second independent playback channel. Finally, the TSS-1080p Variable Time Delay offers all of the same features as the TSS-2470II but with the added enhancement of supporting high quality 1080p output. All four systems offer high-quality program delay for television broadcast, satellite delivery, and other applications requiring a user-settable delay time for video, audio, and ancillary data. Applications for the delay include:

- Compensation for time zone differences, where a program is received at a different time than when it needs to air.

- Program origination delays, where content is time-shifted prior to transmission or distribution.

- "+1" channels that allow cable casters to offer multiple feeds of the same program content to maximize channel exposure with limited additional cost. Viewers can choose to see a variety of different shows in their chosen viewing time, or see an immediate repeat of a show that interested them simply by changing the channel.

- The TSS-2470 Time Delay can be used in a disaster recovery system where a 24 hour delay provides a guarantee of airing appropriate content for the time of day.

- The TSS-2470II Variable Time Delay server can be used as a mountain minute delay server or in other application where the delay may need to be reset without loss of the recorded material.

- The TSS-1080p Variable Time Delay server is used in situations such as live gaming events and other rebroadcast applications where high quality video output is of the utmost importance.

- The TSS-2470 DualZone Time Delay has the same features as the TSS-2470II Variable Time Delay, with the addition of a second independent playback channel. This allows serving two time zones, or reviewing material before or after its normal delay time. It can also allow for cueing up a different delay time before a programming transition (effected by an external switcher or router).

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The TSS-2470 Time Delay server can be thought of as a black box that records video, audio, and specific ancillary data information; it then delays the playback of the program by a user-selectable time period. Whatever goes in comes out later.

The TSS-2470 Time Delay server will operate as a set-and-forget box with no user intervention. On restarting after a power failure, it will again start delaying the input according to the most recent user settings.   The TSS-2470II can be set to an initial delay and then changed on-the-fly to any point within the recorded time. The delay time is user-programmable from 30 seconds to 24 hours. The programmed delay interval is frame-accurate over an indefinite time period; if several Time Delays are fed identical input signals, they will remain in sync indefinitely.

The TSS-2470 is user-configurable as an SD or HD delay server with no additional hardware or software.   It employs high quality, HD video encoding at 100 Mb/s or SD encoding at 30 Mb/s which is ideal for this application, providing superior final image quality when used in conjunction with other codec processes such as MPEG or H.264 for satellite transmission and cable distribution.

  16 embedded audio channels are provided.

Vertical Interval Ancillary (VANC) data is reproduced in HD. The payload capacity is set by default to 4K per frame or field and is adjustable. SD reproduces all 512 lines to support line 21 closed captions and other signals.

TSS-2470 Time Delay Features

- Functions in a stand-alone configuration with no external machine controls, and requires no third-party software.
- Operates unattended for long periods of time. No operator intervention or file maintenance required for continuous operation.
- All settings are non-volatile, allowing unattended restart on power-up. The unit automatically reconfigures itself for the last-specified delay time, and re-enters the record/playback cycle.
- System configuration is accomplished through a GUI interface using a local keyboard, mouse and VGA monitor.
- Allows user to specify a frame-accurate delay time, such that multiple units will play back in frame-accurate sync when fed identical input video.
- RAID-5 drive array protects stored data against a single drive failure.
- 1 HD-SDI/SD-SDI program input.
- 1 E-E monitor output, 1 delayed program output. HD-SDI/SD-SDI connectors provided.
- Records video in 10-bit, at 100 Mb/s for visually lossless picture quality.
- Records 8 stereo pairs of embedded audio. (4 in SD).
- Synchronizes to video input, or to an external reference.
- Upon loss of input video, records black and uses internal reference until input is restored.
- Outputs black and audio silence during the recording interval preceding the desired program output delay.
- Captures and plays VANC data.
- Front panel status LEDs: network, system, power.
- 1 rack-unit (1¾") height. Redundant, forced-air cooling.

TSS-2470 II, TSS-2470 DualZone & TSS-1080p Variable Time Delay Additional Features

- Same feature set as the TSS-2470 Time Delay but with the added benefit of being able to reset the delay time without a restart.
- Four "quick set" delay time buttons for setting or resetting a delay time plus an additional delay reset button to return quickly to the original delay setting.
- Transport controls over the delay feed such as Pause, Jog, FF, REW, Locate and Play are available throughout the maximum recorded delay time.

Installation

Unpacking

Your TSS-2470 Time Delay has been carefully inspected and calibrated before shipment to allow immediate operation upon installation. Check all items for signs of visible damage which may have occurred during shipment. If any item is damaged, contact the carrier to file a claim.

Keep the packing materials in the event that the unit must be shipped. If the original packaging is not available, make sure that the following criteria are met:

- Packaging must be able to withstand the product weight.
- Product must be held firmly within the package.
- There must be at least two inches (50mm) of space between the product and outer container.
- The corners of the product must be protected.

Package Contents

Confirm that all items on the packing list have been received. Contact 360 Systems if any item is missing.

- ✓ Model TSS-2470 Time Delay.
- ✓ Keyboard.
- ✓ 2-Button Wheel Mouse.
- ✓ HDBNC to BNC adapter cables.
- ✓ Software backup on USB memory stick.
- ✓ PDF Operations Manual.
- ✓ Power cord.

The TSS-2470 Time Delay is not shipped with a video monitor. Select a VESA-compliant CRT or LCD monitor capable of a refresh rate of at least 75 Hz. **Note that the TSS-2470 Time Delay may not start correctly if an unsuitable monitor is connected.**

If you own more than one TSS-2470 Time Delay, it may be appropriate to use a single keyboard, monitor, and mouse with a KVM switch to select between units. Not all KVM switching systems are compatible. The KVM switch must supply an active signal to the TSS-2470 Time Delay at all times, even when switched away from it. When first powering up the TSS-2470 Time Delay, use only the supplied keyboard and mouse directly connected. Before installation is completed, thoroughly test the KVM switch system that will be used. Be especially careful about this when using extender cables.

Rack Mounting

Cables attached to the rear of the TSS-2470 Time Delay should be supported by proper cable management. Do not support substantial cable weight from the TSS-2470 Time Delay's Mini BNC connectors as this may damage the video board.

Install the provided rack rails into the rack first then remove the front panel to expose the rack screw slots. Fasten the TSS-2470 Time Delay into the rack. Replace the front panel.

System Cooling

When many pieces of equipment are mounted in an equipment rack, a considerable amount of heat may be produced, which must be removed efficiently. Further, a lower operating temperature will make equipment operate more reliably, and it will last longer. In the extreme case, excessive temperatures cause rapid equipment failure, and damage which can be difficult to repair.

Heat in an equipment rack should be removed by forced air. This is often accomplished by blowers installed in the top of the rack, venting into the room. An alternative is to draw hot air from the top of the rack into an air-conditioning return duct, and not vent it into the equipment room; cold air should be ducted into the bottom of the rack.

The optimum air temperature for cooling electronic equipment is 25° C (72° F). When many pieces of equipment are contributing to the heat load, a substantial air-flow will be needed, and the inlet temperature may need to be lower.

Check These Points

- Are all ventilation holes in the TSS-2470 Time Delay free of obstruction?
- Can blowers or HVAC system adequately remove heat from the equipment rack?
- Have you measured the <u>actual temperature</u> inside the rack? Do this near the top.
- Verify that the HVAC system is <u>not</u> on a timer that can shut off on weekends or   holidays.
- What procedures are in place to protect the equipment when the HVAC system fails?

Power Conditioning

It is good practice to operate an on-air TSS-2470 Time Delay from an Uninterruptible Power Source, or UPS. All utility power systems experience occasional transient events, including brownouts and

dropouts, which are capable of taking the TSS-2470 Time Delay off the air. It is the station operator's job to plan for and overcome such contingencies.

UPS units suitable for smoothing short-term power line problems come in two varieties:

Change-over UPS Design

This design senses drop-outs and low line voltage, and switches its output to an internal inverter operating from a battery. This UPS is low in cost, and is most often used in non-critical applications such as desk-top computers. A disadvantage is that it may create its own power transients when switching between utility power and its inverter supply. For this reason **360 Systems does not recommend this type for use with broadcast servers.**

Continuous Conversion UPS Design

The UPS design recommended by 360 Systems for use with the broadcast servers is the continuous conversion design which continuously converts utility power to DC, stores it in a battery, then produces isolated AC power from an inverter. It never switches, and is immune to input transients, brownouts, and blackouts. Models are available with batteries of almost any size, making the continuous-conversion UPS suitable for transient suppression or long-term operating power in the absence of utility power.

Recommended UPS Models

There are several manufacturers of continuous conversion UPS systems that are suitable for use with 360 Systems' video products. APC and Eaton/Powerware Corporation are two of the most common.

UPS's are available in several different configurations to accommodate various current load and power failure support times.

The minimum requirement for maximum current load for a single TSS-2470 Time Delay is 2 amps.

Operating Environment

A TSS-2470 Time Delay is a critical element in broadcast operations. Its installation should safeguard it from every external event that can interfere with it doing the task expected of it. 360 Systems' engineers have experience with thousands of installations, and have become aware of a number of environmental factors that can adversely affect performance. Two of these have already been discussed: power conditioning and inadequate cooling. Two others, less obvious, should also be considered:

RF Interference by Cell Phones

Many people are not aware that cell phones can attain a very substantial power output, even when no conversation is taking place. You may have experienced the effect of a cell phone interfering with a common desk phone placed nearby. Carrying a cell phone into a machine room where it is in close proximity to broadcast equipment and its associated wiring is unwise. They are able to interfere with serial control commands, video synchronization, and in some cases can crash the CPU in equipment.

Some major broadcasters prohibit the carrying of cell phones into certain machine areas. 360 Systems believes that the risk of undesired equipment behavior from their RF fields is very real.

Static Discharge

Static electricity discharge is accepted by most people as an inevitable consequence of living in a dry area. It is, rather, a result of floor coverings that may enhance appearances, but are inappropriate for use around critical pieces of broadcast equipment. Static discharge can do two adverse things:

- Discharge into a connector can—and will—destroy internal circuitry of equipment. The result will always be difficult to diagnose and repair.

- Discharge to equipment frames or wiring can crash a CPU and take the station off the air. The event may seem random or unrelated to static, but it is clearly a catastrophic event—and one that can repeat indefinitely as humidity varies.

Several steps can be taken to protect equipment from static discharge:

- Do not install critical broadcast equipment in a room with carpeting.

- Connect equipment racks directly to an earth ground with a heavy copper conductor.

- Do not operate equipment with a lifted safety ground (green frame ground).

- Install a humidifier, if necessary, to reduce the likelihood of static discharge.

About TSS-2470 Time Delay Software

The TSS-2470 Time Delay is shipped with its application programs and operating system installed.

The first time that it is started, it must be connected to a keyboard, monitor and mouse in order to enter the operational parameters. It is recommended that these always be available, however once set up the delay process will start automatically when the system powers up and the input signals are present.

If for any reason it becomes necessary to reinstall any software, refer to the *Software / Firmware updates* chapter for instructions.

Front Panel Features

Front Panel

The front panel is held on by two roller clips, one on each end of the panel. To remove the front panel, grasp the left or right end of the panel and pull straight out. The front panel is reinstalled by reversing this process.

Power Button

The Power button is located directly behind the front panel on the right side.   To turn the system on, press and release the power button. A sequence of start-up screens will appear, ending with the graphical user interface.

When the TSS-2470 Time Delay is running, pressing the Power button momentarily will cause the system to begin an orderly shutdown. This can also be initiated from the GUI by selecting
START > SHUTDOWN > SHUTDOWN. In most cases the power will shut off automatically, however if the front panel lights begin to blink, the file system has been properly closed and it is safe to force the power off by holding the front panel button in for 4 seconds.

In the event that the system has stopped responding to commands and will not shutdown, hold the button in for 4 seconds to force a power down.


CAUTION:

LOSS OF DATA CAN OCCUR IF THE POWER IS TURNED OFF WITHOUT A SHUTDOWN.

USE THE FOUR SECOND SHUTDOWN ONLY IF THE SYSTEM IS NOT RESPONDING OR THE SHUTDOWN PROCESS DOES NOT TURN THE POWER OFF AUTOMATICALLY.

Indicators

Three blue LED Status Indicators appear on the front panel. These indicators are illuminated continuously or in some cases are dark when inactive or not connected. The NIC indicator will flash on and off if a network cable is attached indicating network activity. Error conditions are indicated by flashing of the SYS indicator. See the table *Front Panel Indicators* on page 44 for diagnostic meanings.

Rear Panel Drawing
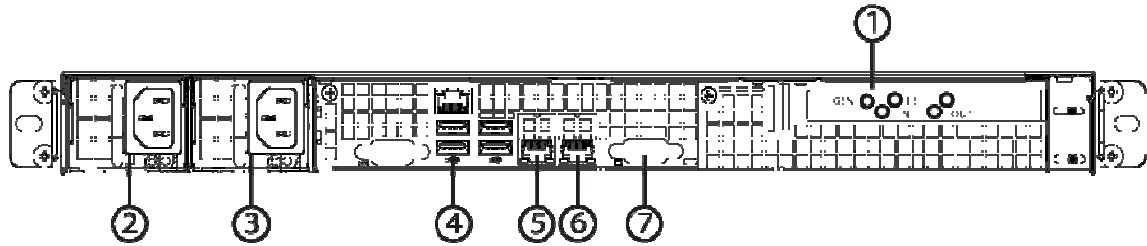
1. SDI Video I/O
2. Power Supply Module 1
3. Power Supply Module 2
4. USB ports for Keyboard / Mouse
5. Gigabit Ethernet port 1
6. Gigabit Ethernet port 2
7. VGA Video monitor output

Rear Panel Connectors

The TSS-2470 Time Delay provides one video input with up to 16 Embedded audio channels, one delayed video output with audio, and a second monitoring output which reflects input video and audio (E-E).

| REAR PANEL DESIGNATION	CONNECTOR TYPE	FUNCTION
IN	HDBNC	HD-SDI/SD-SDI Video Program Input
OUT OUT 2 (DualZone Only)	HDBNC HDBNC	Main HD-SDI/SD-SDI Video Program Out Secondary Channel Video Program Out
GEN	HDBNC	Black Burst / Tri level reference input
USB	USB	Keyboard / Mouse / Program updates
NET 1	RJ-45	Gigabit Ethernet (for diagnostic use)
Other Motherboard I/O	various	future use

Operations

The Graphical User Interface

The TSS-2470 Time Delay uses a Graphical User Interface (GUI) to control most functions. A keyboard and mouse are included, and the user needs to supply an SVGA compliant monitor.

The GUI is divided into two sections: Run/Stop control, and Time Delay Set. Controls and displays for each section are described below.

In addition, the Menu Bar provides two dialogs, accessed through **Edit>Configure**, and **Help>About**.
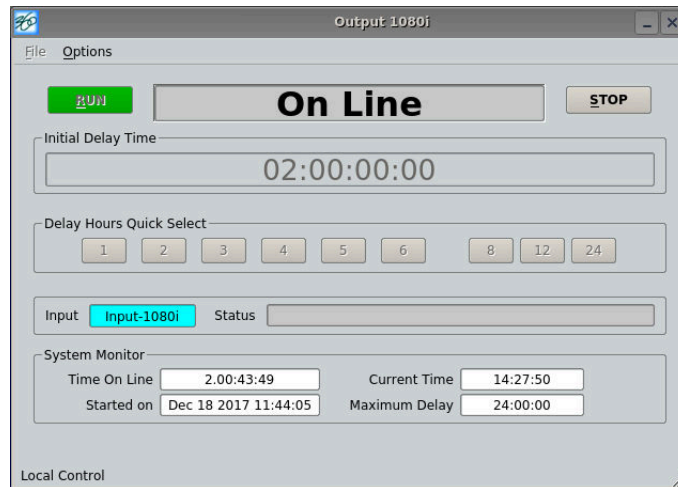
Model TSS-2470 Time Delay
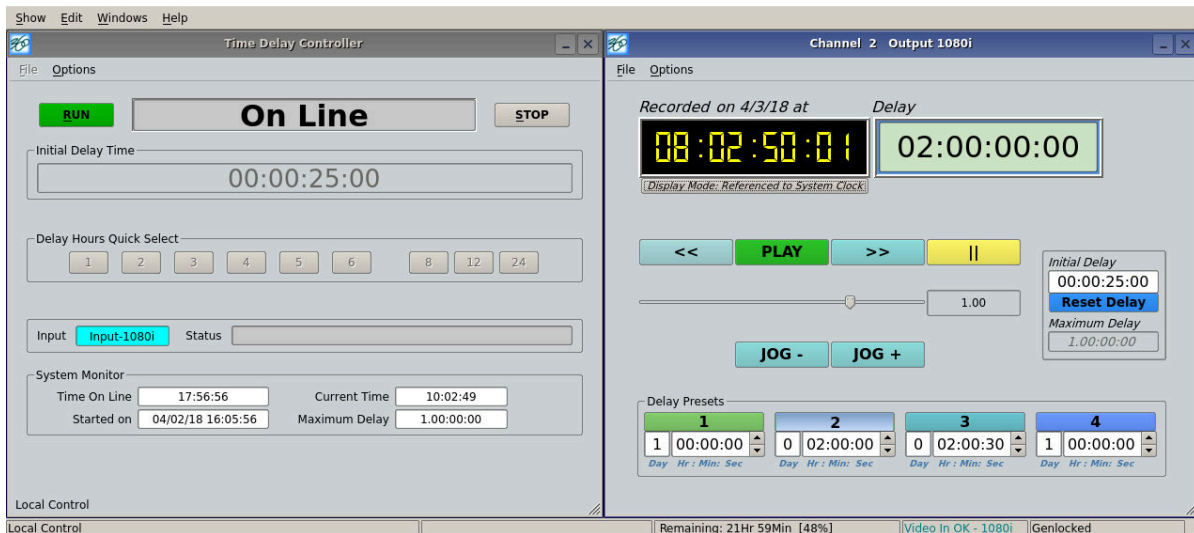
Models TSS-2470II & TSS-1080p Variable Time Delay
Graphical User Interface

Basic TSS-2470 Run/Stop Control

Run

The **RUN** button initiates or restarts the TSS-2470 Time Delay process. Press **RUN** to begin a new delay cycle and start the Time-to-Air countdown. When the countdown reaches zero, it changes to ON LINE, and the delayed video begins playing from the main Program Output.

Upon power up the TSS-2470 Time Delay will automatically enter Run mode and start the delay process if a valid input is detected, or if Frame Synchronizer is selected a valid reference signal is detected.

Stop

The **STOP** button stops playout and clears stored program content from memory. Note that the Time Delay value can only be changed when the machine is in the **STOP** mode.

Time to Air

Initially, the Time to Air display shows the selected Time Delay Setting. Once **RUN** is pressed and the recording process sets up and commences, Time to Air is a countdown value, displaying the time remaining before delayed program material reaches the output. It is an approximate display value; it is not directly locked to the video timing.

Time Delay Setting

Delay time is entered and displayed in the **DELAY TIME** window in HH:MM:SS:FF format. (Hours:Minutes:Seconds:Frames) The desired time is entered from the keyboard from left-to-right.

Delay times may also be entered as whole units of seconds, minutes, hours, by appending a suffix, (s, m, or h) to the value entered into the text box, such as "120m" or "30s." "1d' will set a 24 hour delay.

Delay Hours Quick Select

Nine preset buttons provide a rapid way to set a delay time to an even number of hours from 1 to 24. With the machine stopped, clicking on one of these buttons will immediately load that time value, expressed in hours. An appropriate number of zeros will also be entered for MM:SS:FF. The presets are not active while the machine is running. (Not available on DualZone model.)

### DualZone Time Delay Setting

In the DualZone Time Delay the Quick Select buttons are replaced by the Secondary Channel Delay Time setting. It operates the same as the **DELAY TIME** Setting detailed above.
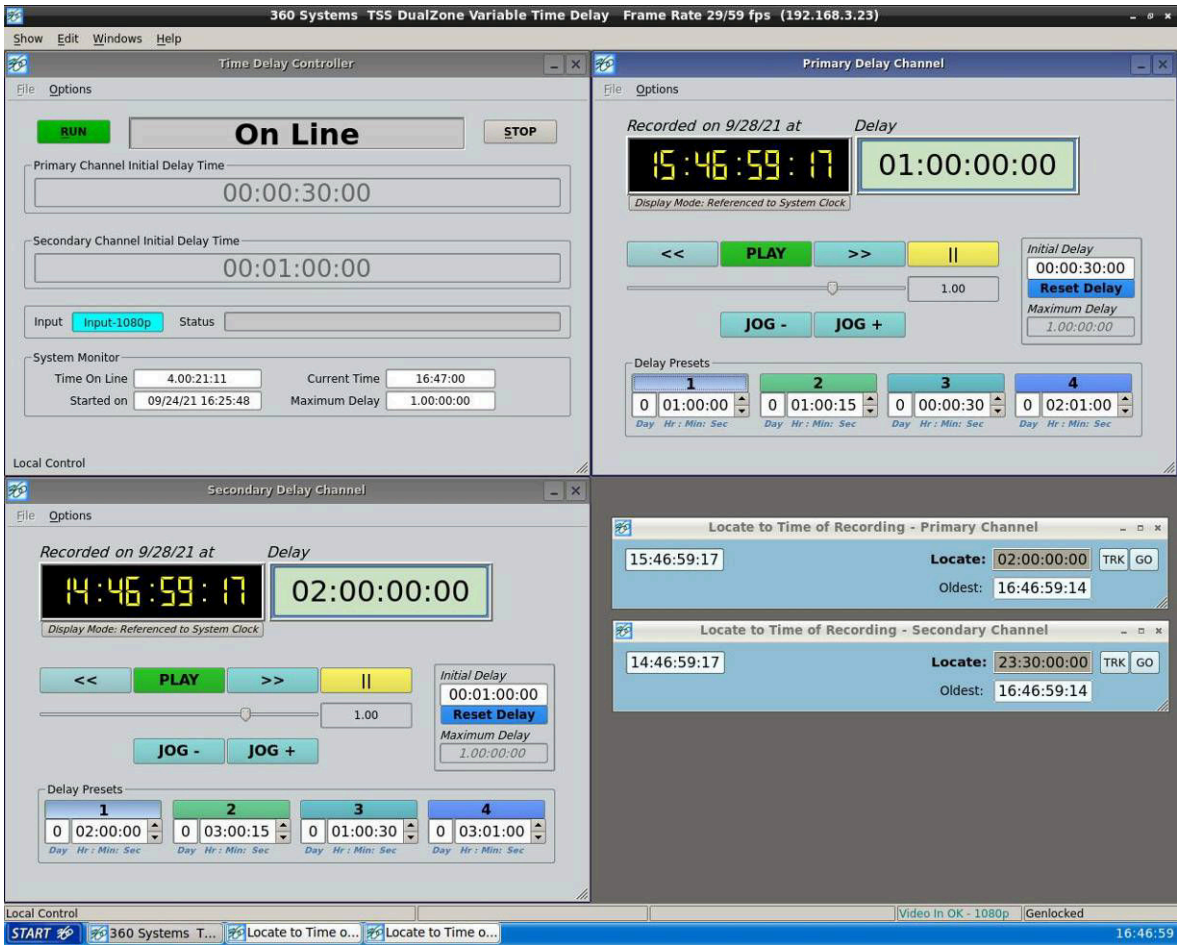
Model TSS-2470 DualZone Variable Time Delay
Graphical User Interface

TSS-2470 II Variable Delay Control Functions

The TSS-2470 II has the same main control window for setting up the initial delay time. Once the initial delay is established, the functions in the output channel window will become available.
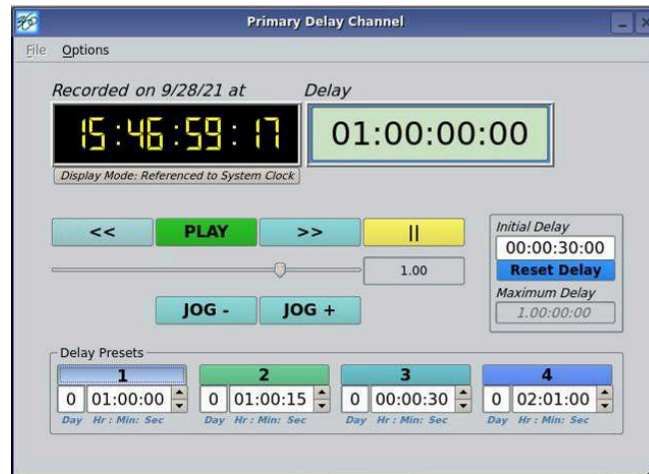
Model TSS-2470 Variable Time Delay
Output Channel Window

Playback Time
The Playback Time Window displays the Time of Day that the current output frame was recorded.

Delay
The Delay window shows the amount of delay time there is between the input signal and the output signal.

<< (Rewind)
The << button starts to reverse from current delay setting, effectively increasing the delay time.

>> (Fast Forward)
The >> button starts to fast forward from the current delay setting, effectively decreasing the delay time.

Play
The **Play** button causes the video to play from the current delay setting.

Pause (||)
The **Pause** button causes the video to go to still on the frame pause is pressed.

Variplay slider
The variplay sliders allow finer control of the fast forward and rewind functions to allow the user to more accurately adjust the delay time.

Jog – and Jog +

The **Jog -** button reverses the Playback Time one frame at a time. The **Jog +** button advances the Playback Time one frame at a time.

Delay Presets

The four numbered **Delay Presets** buttons are available for quickly setting or resetting the delay time. The time setting for each button is configurable at any time. Once a delay time is established on a delay preset, clicking the numbered button immediately reconfigures and starts the delay for the established time.

Display Mode

The Display Mode button located just under the "Recorded At" readout display, allows the user to switch the "Recorded At" time between time code generated by the system clock or generated by the recorded video.

Go To

The **Go To** operation is accessed from the channel's **Options** menu. It opens the **Locate to Time of Recording** dialog. The location time can be entered in the **Locate** field, pressing the **Go** button stops playback and locates the playback position at the requested time. The transport then remains paused.

Go To (Locate) dialog

The **Trk** button turns on Track Current Position mode, this syncs the **Locate** field time with the current playback position continuously. Current playback position is shown in the time field at left.

The **Oldest** field displays the time of the oldest (earliest) part of the recording that is still remaining in the Time Delay's record file. Initially this will indicate the original start time. Once the maximum record time has been achieved, this will start counting up to show the time of the oldest available recorded material.

If the Time Delay is configured to have a maximum delay time greater than 1 day, there is also a **Days Ago** drop down menu. This allows selecting a location time in a day earlier than today. The menu becomes active once a full day has been recorded. As more days are recorded they will appear in the drop down menu listed by day and date.

Go To (Locate) dialog in a multi-day delay system

Note that the Locate feature is dependent on the Time Delay's System Time remaining constant. This requires that the date and time be set before the delay process is started, and that the time is not changed by Daylight Savings Time operations. Use a time zone that is relative to GMT, not a local time. The Date Time dialog explains how to set up GMT referenced time zones, or see the section on setting the Date and Time on page 31. It is also recommended that NTP automatic time update be used. *continued…*

There are two or three possibilities for setting the time zone depending on the nature and location of operations. Generally, it is typical to set the Time Delay's system time to reflect the time zone of the originating feed. This means that the Recorded On time indication will reflect the time of day that the program aired originally. On playback, assuming that the delay time is equal to the difference in time zones, the playback time will match local time.

Setting the System Time to the time zone of the target market of the delayed feed will mean that the Recorded On Time will reflect the local time in the target market. The playback time will reflect the time of day in the local time that the material was recorded. Normally this is not recommended. It is not possible to set this independently in the two channels of a DualZone Time Delay.

The third possibility is also not necessarily useful and should be avoided if possible. If the Time Delay is located in a different time zone than the originating feed *or* the target market, it could potentially be set to the local time of the facility where it is located. Although it may be tempting to make it consistent with other equipment in the building, it can be confusing for operators to have to "convert" the time they are seeing as the playback position.
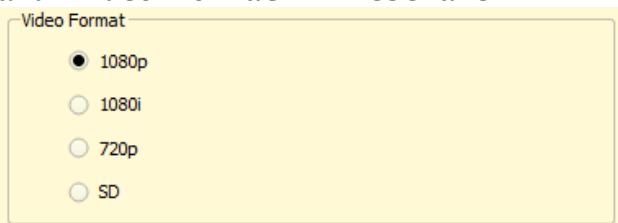
Edit Configure Timing Dialog
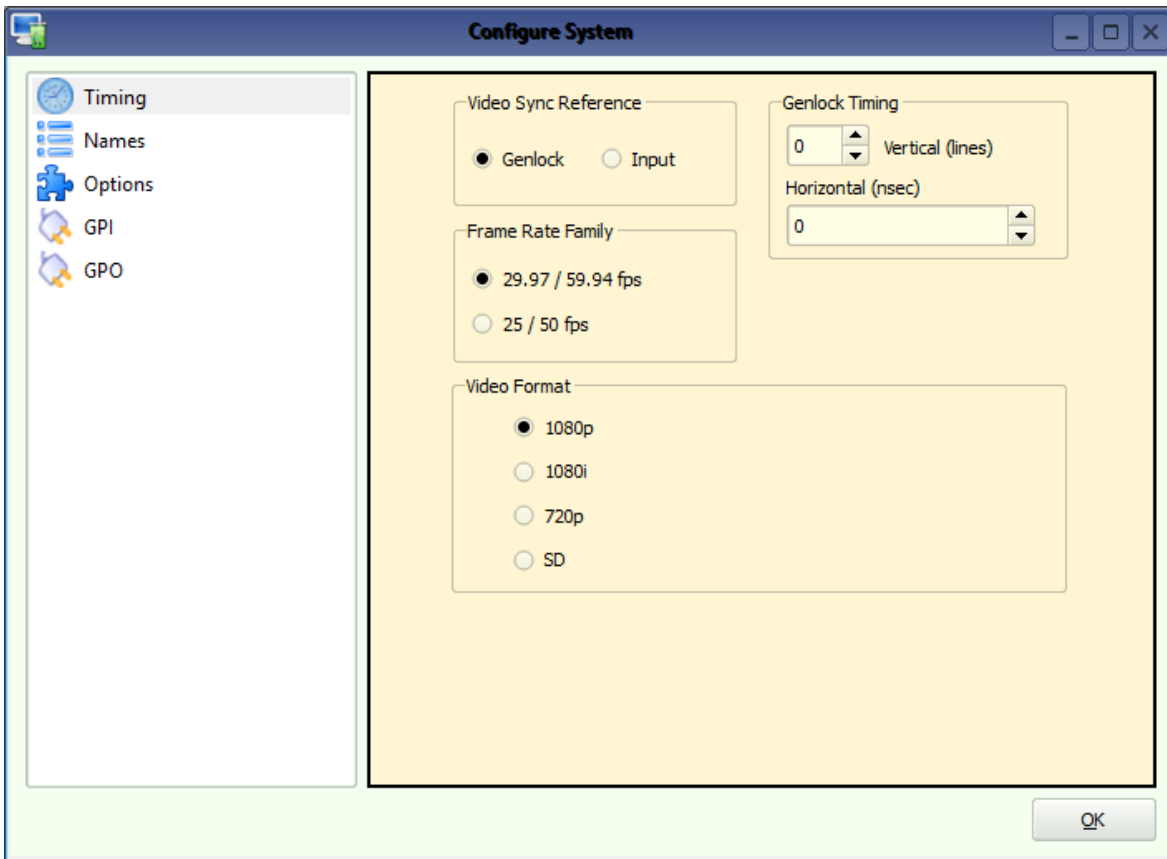
Configure Timing Dialog

(Note: 1080p output only available on the TSS-1080p model)

Video Output Format

Four radio buttons select the Video Mode, which includes the frame rate and video format. These are:

This setting can only be changed when the TSS-2470 Time Delay is stopped. When it is changed, the unit will display a warning and then automatically perform a quick restart to initialize in the newly selected mode.

Frame Rate Family

The system frame rate is set globally for input and output at either 29.97/59.94 or 25/50 fps using the radio button selection.

Frame Rate Family
● 29.97 / 59.94 fps
○ 25 / 50 fps
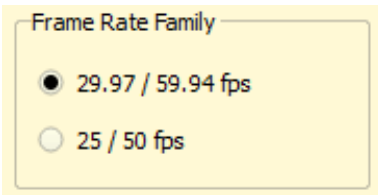
Genlock Timing

This controls the timing relationship of the output to the reference, which is the input video or the genlock reference as set by the Frame Synchronizer checkbox.

Genlock Timing
0 ▲▼ Vertical (lines)
Horizontal (nsec)
0 ▲▼

Note that these timing adjustments apply only to the Delay output, not the Monitor output. The monitor outputs are designed for confidence monitoring only, and are not timed.
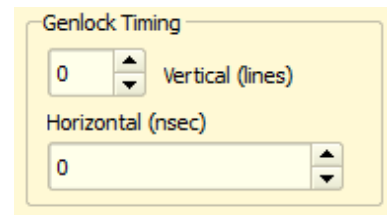
In most applications these adjustments are not necessary. They are only used in environments where the output must be adjusted to match other timed equipment, for example when using a switcher or video mixer that requires precise timing alignment.

Both adjustments are made by using numeric entry from the keyboard or the Up and Down Arrow buttons next to the parameter's numeric display.

The Output Timing values are the only parameters that are adjustable while the TSS-2470 Time Delay is in RUN to allow timing while in operation. Adjustments take effect immediately without using Apply or OK, allowing the effects to be seen easily. The picture will blink while the change takes effect.

Vertical (Lines)

Adjusts the output line timing, in relation to the reference, by an amount equal to one complete line. The adjustment range is -4 to +30 lines.

Horizontal (nsec)

Adjusts the output line timing, in relation to the reference, by an amount equal to one half pixel. The adjustment range is ±100,000.

The Up/Down Arrow buttons increment in steps of 10 nsec.

Video Sync Reference

This sets the timing of the output reference to either the Genlock input or the Input signal. Genlock is used in systems where the

| Video Sync Reference |
| --- |
| ● Genlock ○ Input |
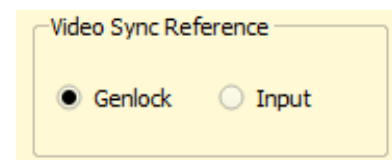
output of the Time Delay is contributing to a timed system such as a video switcher.

There must be a valid Black/burst or Tri-level sync signal present on the genlock input before the delay recording process will start. If the signal is lost after that, the time delay will run from its internal generator until the reference signal returns. The internal sync generator is also referenced to the genlock and tries to maintain its rate when it is lost, so there will be little disturbance of the signal if the interruption is brief.

Assigning Names to the Server and Transport Channels

The server can be assigned a name that will be displayed along the top of the Main GUI Window. Each individual server channel can also be given a name.

To assign a name to the server or transport channels, click **EDIT>CONFIGURE>NAMES** from the main menu pulldown. Use the keyboard to type in a name for any of the selections. Names can be up to 31 characters in length. Spaces, digits and other non-alphanumeric characters may be used. Click **APPLY** to accept the name. The names will appear in their appropriate windows immediately.
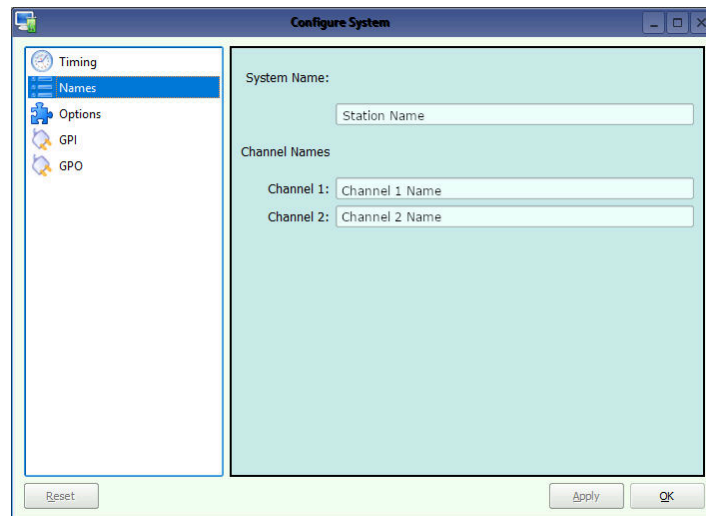
Configure Names Screen

Configure Network

Network parameters are set in the Configure Network dialog. Network communication for the TSS-2470 Time Delay is designed primarily to support access to error logs and factory diagnostics. It can also support automatic time updates using the NTP protocol. **The system time is used only in the diagnostic system message logs; it does not affect the operation of the TSS-2470 Time Delay in any way.** Therefore, it is not mandatory to connect the system to a network if you are not taking advantage of these features.

Use only the NET1 connection on the rear panel to connect to the network. Make no connection to NET2.
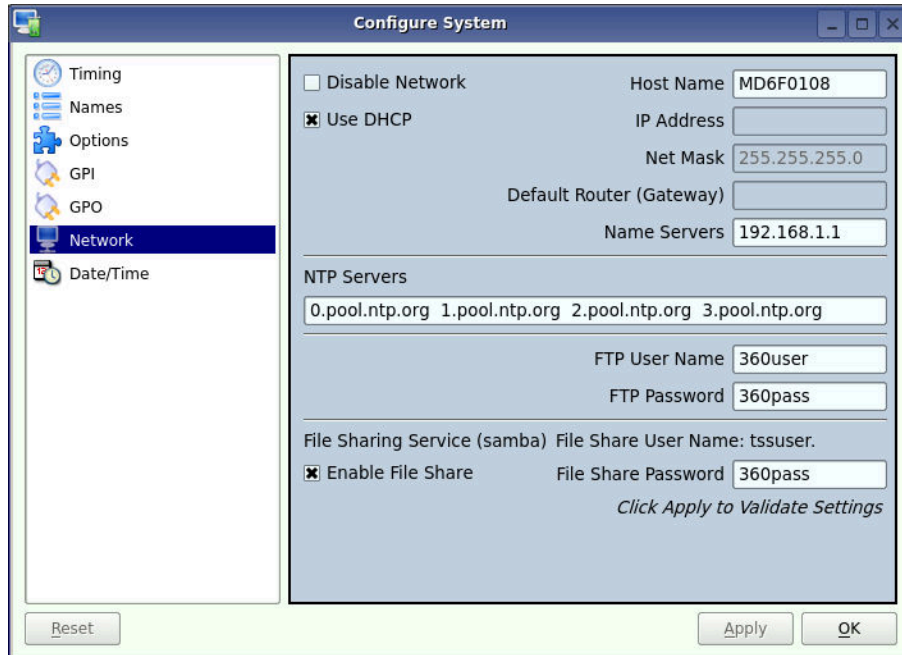
Configure Network dialog

Use the Configure Network dialog to configure network communication settings.

From the Main Menu selection bar at the top of the screen, select **Edit>Configure**, then in the window on the left select Network.

Each TSS-2470 Time Delay is shipped with a unique default network Host Name and IP Address. Update these configurations to suit your specific network environment. Factory defaults for networking are:

- Disable Network is checked
- Use DHCP is unchecked

Disable Network Checkbox: This selection turns the network off or on. The default is Disable.

Host Name: (Any name will suffice, but since this name appears on each line of the TSS-2470 Time Delay's diagnostic logs, it is a good idea to keep this short.) The name should also be unique from other devices on the network.

If **"Use DHCP"** if not checked, then enter a fixed IP address compatible with your local subnet. For example,
            IP Address: 192.168.1.20

```
Net Mask:         255.255.255.0
Default Router:      192.168.1.1
```

Do not use these examples unless you know that they are appropriate, as addressing errors can cause problems for the entire network. If you are in doubt consult with your IT specialist.

The **Name Servers** and **NTP Servers** fields provide the information needed to reach the public time servers. **Note that NTP and the System Time in no way affects the accuracy of the Time Delay.**

The **NTP Servers** field contains a list of time servers, either by numeric IP address, or by site name (URL). Entries are separated by spaces.

The nonprofit Internet Systems Consortium, Inc. (ISC) maintains sites that automatically return lists of public time servers to an NTP client such as the server. Hence, the **NTP Servers** field is initially filled in with the URL's for these sites (0.pool.ntp.org, for example). Of course, this list with the addresses of specific time servers you may want to use can be overwritten. However, any attempt to clear the **NTP Servers** field will reset it to the default list.

Note: When URLs (non-numeric site address such as pool.ntp.org) are used in the **NTP Servers** field, the IP address of at least one DNS (Domain Name server) in the **Name Servers** field must be provided. Typically, this address is supplied by your Internet Service Provider.

These name servers translate URL names into numeric IP addresses needed to access the sites in question.

When using a GPS-based time server which is connected directly to a local area network, enter its numeric IP address (such as 192.168.1.60) into the **NTP Servers** field, leaving the **Name Servers** field blank.

Also, if the numeric IP addresses of the public or corporate time servers on the Internet is known, these addresses can be entered, separated by spaces, in the **NTP Servers** field, leaving the **Name Servers** field blank, since there would be no URLs to be resolved.

Note: Not all time servers allow unlimited public access. Refer to www.ntp.org for more information.

Click the **APPLY** button to save your changes.

FTP User and Password

In order to obtain log files from the server for use when troubleshooting technical issues, you may FTP to the server from a remote computer. Setting the user name and password adds a layer of security so that accidental or unauthorized access to the server is not permitted.

File Share Service User and Password

The second method of obtaining log files from the server is to access the server from a file share via a remote computer. To enable the file share on the server, check the **Enable File Share** box and set a password. The user name is locked to *tssuser*. Setting the user name and password adds a layer of security so that accidental or unauthorized access to the server is not permitted.

Once established, the server's file share becomes accessible from a networked PC by either browsing the local network or mapping the share as a drive. When mapping the share to a drive the following convention should be utilized.

Use *<host name>**TSS_Video_Files* for the folder to map, where *<host name>* is the host name or IP address of the server.

Saving Network Configuration

Click on OK or APPLY to accept new entries. To abandon unsaved changes and return to the current setting, click the red close box at the upper right of the dialog window.

Some changes may not take full effect until the TSS-2470 Time Delay is restarted. It is recommended that a full restart be performed after enabling DHCP.

Date and Time

From the Main Menu selection bar at the top of the screen, select Configure>Options, then select **Date/Time** in the window at left.

The date and time in the TSS-2470 Time Delay's system clock can be set by entering values in the Time Set window. To enable the NTP service, check the Automatic Updates box. A valid entry for at least one NTP server must be made in the Network setup dialog, and the network must be configured and connected. See the next section for information on NTP.

The date and time should only be set when the TSS-2470 Time Delay is in STOP mode.
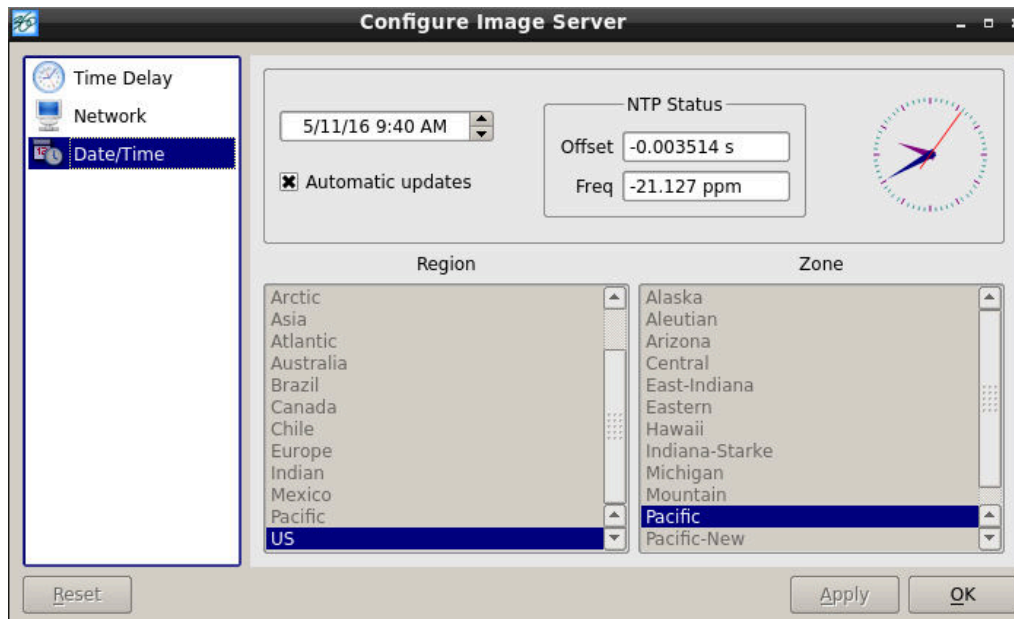
Date and Time dialog

Time Zone **Region** and **Zone** can be selected only when **Automatic updates** is unchecked. Once set, **Automatic updates** can be re-enabled and will follow the selected time zone.

NOTE: It is strongly recommended that time zones that follow Daylight Savings Time not be used. This is especially true for Variable Time Delay models. The Locate function depends on a stable relationship between the system clock and the original recording start time. In **Region**, select the Etc region, and select one of the GMT referenced zones that reflects the standard time of the time zone of operation. (In the non-variable model Date and Time are used only for display in the GUI and internal error-logging, the system time has no effect on the operation of the video delay.)

Network Time Protocol

Automatic Date/Time Updates

The TSS-2470 Time Delay's clock can be set automatically from a network time server that is referenced to Coordinated Universal Time (UTC).

This is accomplished using the Network Time Protocol (NTP). A time server could be an in-house computer that is equipped with a GPS receiver, or a radio receiver locked to signals from the NIST radio station WWV. Alternatively, public time servers may be used which are accessible through an Internet connection.

Connecting to the Network

To obtain automatic date/time updates from the public time servers on the Internet, you will need to provide the server with Internet access. Generally, servers would be connected on a secure high-speed local area network, with any Internet connection going through a router with an integrated firewall. The Network Time Protocol uses TCP/IP port number 123, so be sure the firewall is configured to allow access to this port.

Configuring NTP

The TSS-2470 Time Delay GUI is used to set the time zone and to enter the networking parameters.

Selecting the Time Zone

Starting at the main menu bar, Click **Edit->Configure->Date-Time screen**. When "Automatic Updates" is not checked, the Region and Zone lists are enabled. Select your region and then the zone within that region. There may be more than one way to your zone; America/New York, for example, is the same as US/Eastern. Click the **APPLY** button to activate the settings.

> After changing the time zone a Full Restart must be performed before changes become effective.

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GPIO Configuration

12 GPI's and 12 GPO's are available though the optional CXP-5 module that attaches to the TimeDelay II via a USB connection.   The GPI signaling allows basic control of the transport functions which GPO signaling can be enabled for certain system alerts.   The full list of available options is listed below. GPIO settings can be found in the main menu under Edit > Configure and then GPI or GPO.

GPI

For each of the 12 GPI's, the following functions may be selected:
- Pause
- Play
- Reset Delay
- DelayPreset1
- DelayPreset2
- DelayPreset3
- DelayPreset4

GPO

For each of the 12 GPO's, the following functions may be selected for notification:
- Idle
- Paused
- Stopped
- Playing
- Recording
- Video Card Fault
- RAID Fault
- No genlock
- No Video Input
- Fan Fault
- System Fault
- Any Fault

Technical Specifications

Video

Time delay	Adjustable, 30 sec to >24 hrs. (HD)
Time set format	HH:MM:SS:FF (True number of frames per hour)
Video reference	Synchronizes to video input.
Accuracy	Frame accurate.
Inputs	1 HD-SDI/SD-SDI, 75Ω HDBNC connector
Outputs	1 delayed output, 1 E-E monitor. Each available as both HD-SDI/SD-SDI 75Ω HDBNC
Video standards	1080i, 720p, or SD (NTSC or PAL) selectable
Field (frame) rates	50 Hz (25 interlaced) or 59.94 Hz (29.97 interlaced) selectable
Compression format	

Audio

Embedded Audio	16 channels Groups 1-4 per SMPTE 299M
Audio coding	48k sample rate, 24-bit word, Linear PCM

Ancillary Data

Payload size	Selectable from 0 (no ancillary data saved) to 4 MB per field.
Closed Captions	Records and plays CC data from VANC per EIA-708B in HD, and will reproduce whatever method is used on the input signal as it relates to true 708 data or 608 data in 708 format. Records and plays Line 21 in picture in SD.

Network Communications

Network port	Gigabit Ethernet
Transfer protocol	FTP
Data available	System log

Disk Storage

Drives	(4) Serial ATA in RAID-5 array
Drive access	Accessible/replaceable from front panel

Miscellaneous

Operating system	Linux®
Front panel indicators	LED: Power-on, Network Connectivity, System alarm
Miscellaneous ports	USB, SVGA display, Ethernet
Cooling	Forced air
Power	100 to 240 volts universal, 50/60 Hz, 165 watts

Mechanical	3½" x 19" x 18" (89 x 483 x 457 mm) H-W-D
Mounting	Rack mount (1U)
Weight	27 lb. (10.6 Kg) net
Country of origin	U.S.A.

Connector Pin Designations

HDBNC Connectors

The following note applies to all video and genlock connectors:

A HDBNC connector used as an output has a 75-ohm source impedance.

A HDBNC connector used as an input has a fixed 75-ohm termination.

System Board Ports

Standard computer I/O ports on the TSS-2470 Time Delay include video monitor, keyboard, mouse, (USB) and two Gigabit Ethernet ports.

SVGA Port

A VESA-compliant VGA or SVGA computer monitor should be connected to the 15-pin video port. The TSS-2470 Time Delay is pre-configured to an SVGA screen resolution of 1024 x 768 and 64,000 colors. The refresh rate will auto-negotiate with the attached monitor to achieve the best appearance. This resolution is best viewed on 17-inch or larger monitors. 360 Systems does not provide monitors for the TSS-2470 Time Delay.
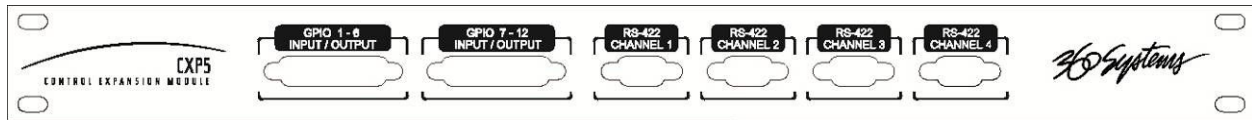
Use only VESA compliant monitors with a maximum refresh rate of at least 75 Hz.

Unused Ports

An unused RS-232 serial port may be present on the unit. This is not active and no connection should be made to it.

CXP-5 Module

The CXP-5 module provides twelve GPIO inputs for control of machine functions, which appear on two 25-pin **GPIO** connectors. These "General Purpose Inputs" can be connected to switch contacts or to an open-collector transistor output. The CXP-5 also provides twelve GPIO Outputs which may be used to confirm that a command has been received, to trigger operations on external equipment, or provide warning indications for system errors. The function of these open-collector outputs is programmable; they may be used to operate an LED, or they can drive a suitable logic input.

> **Note:** The 9 pin serial connectors are not active when used with the Time Delay product.

These inputs are optically isolated from the server circuitry; individual floating returns are provided. +5 volts may be sourced from pins 18 or 26, or provided from an external source. Current limiting devices are provided within the server.
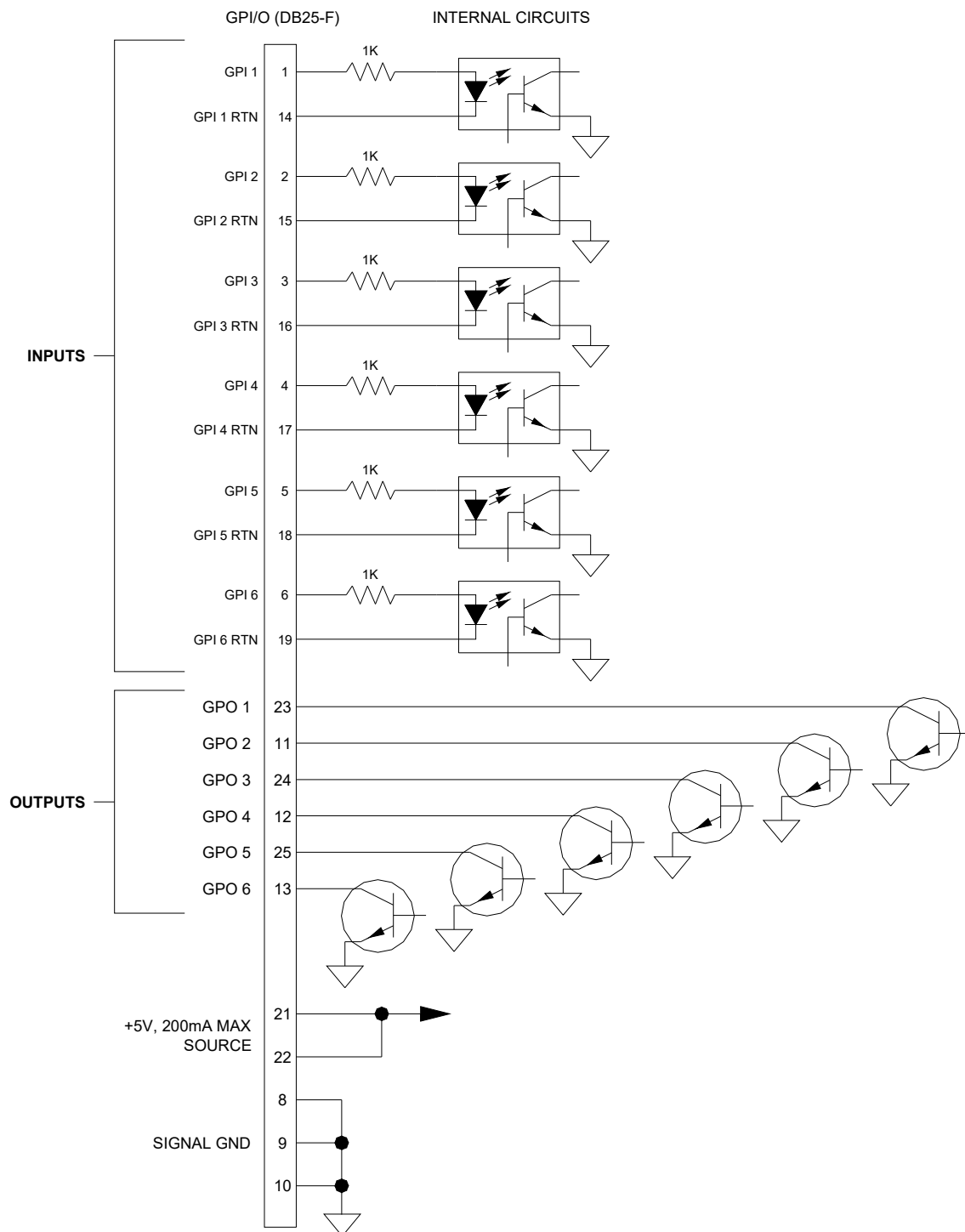
Refer to the connector pin-out table and partial schematic, following. Inputs and outputs 1-6 are on connector 1, 7-12 are on connector 2, shown in parentheses. The schematic applies to both connectors as well.

GPIO Connector Pinout

Numbers in parentheses indicate numbering of signals on GPIO Connector 2

Pin	Signal	Pin	Signal
1	GPI 1 (7)	14	GPI 1 (7) RTN
2	GPI 2 (8)	15	GPI 2 (8) RTN
3	GPI 3 (9)	16	GPI 3 (9) RTN
4	GPI 4 (10)	17	GPI 4 (10) RTN
5	GPI 5 (11)	18	GPI 5 (11) RTN
6	GPI 6 (12)	19	GPI 6 (12) RTN
7	N/C	20	N/C
8, 9, 10	GND	21, 22	+5V SOURCE (200MA MAX)
11	GPO 2 (8)	23	GPO 1 (7)
12	GPO 4 (10)	24	GPO 3 (9)
13	GPO 6 (12)	25	GPO 5 (11)

Warning: Incorrect wiring of GPIO connector may damage its interface circuitry.

![360 Systems logo]

Mechanical Drawings

20 inches
(508 mm)

1.75 inches
(44 mm)

19.00 inches
(483 mm)
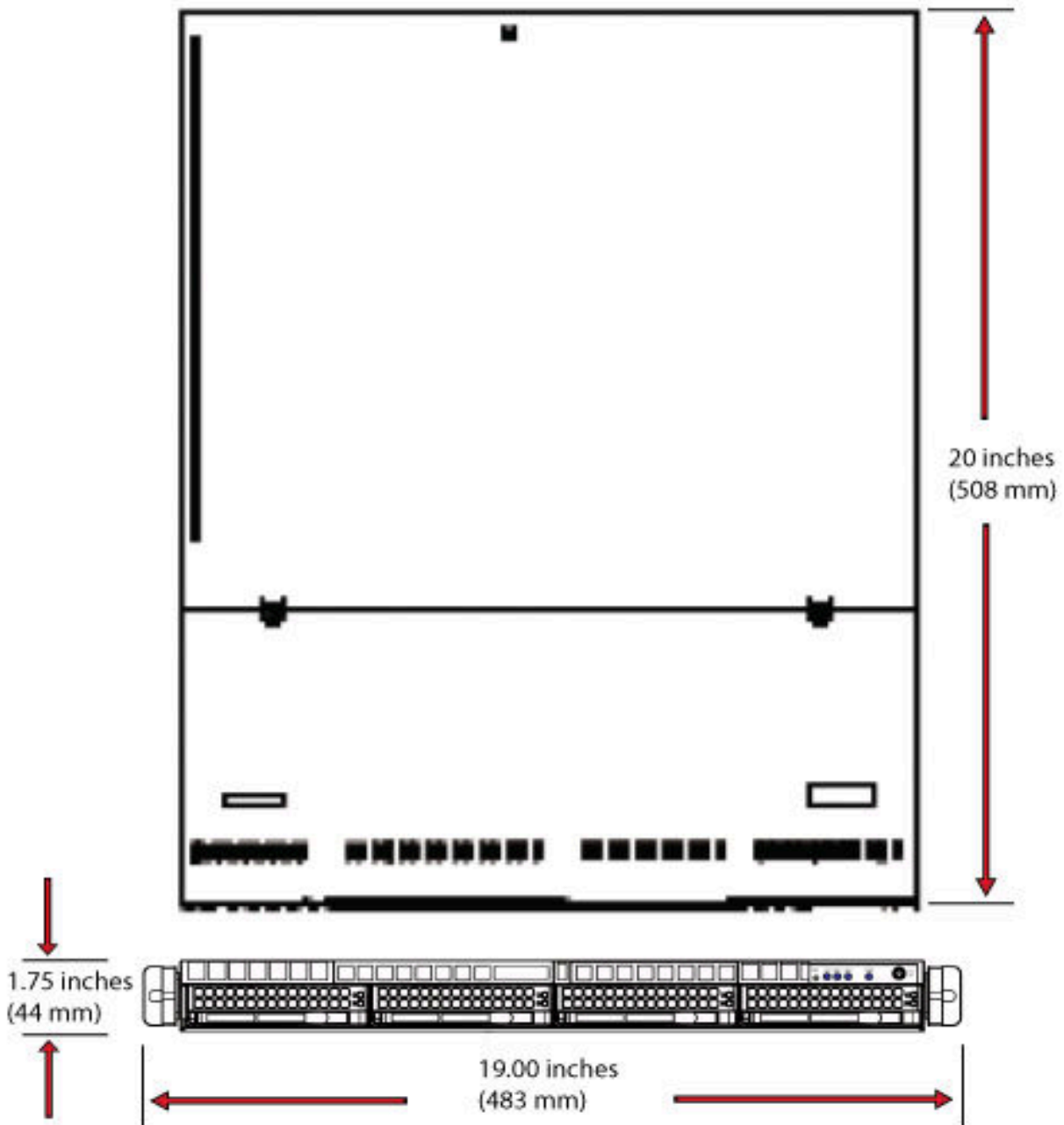
Dimensional Drawing
TSS-2470 and TSS-2470II models
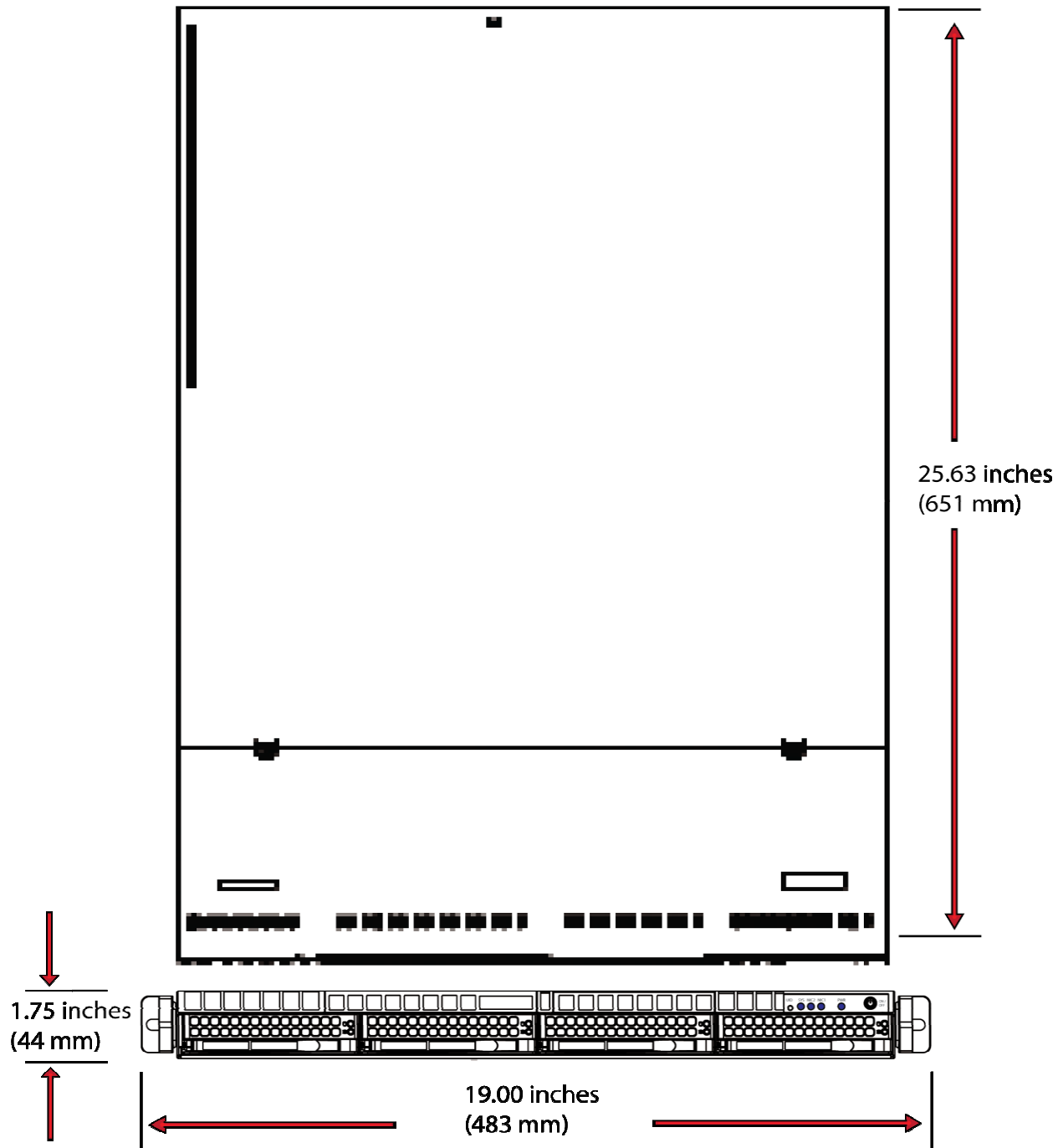
Dimensional Drawing
TSS-1080p model

25.63 inches
(651 mm)

1.75 inches
(44 mm)

19.00 inches
(483 mm)

Software Updates from USB Memory

Software updates for the TSS-2470 Time Delay may be issued from time to time. The operating system and application programs can be updated by the user from a USB Flash Drive distributed by 360 Systems.

The software version that is installed on the TSS-2470 may be determined by looking in the GUI **Help>About** dialog. In the top line there will be a number such as 1.08.561-211H. The software version is the first set of numbers before the "-", for example the current version at this writing is 1.08.561. The numbers after the "-" are the firmware version, currently 211. The final letter refers to the motherboard used, currently "H".

To install a software update, follow these instructions. Please read them completely before beginning.

1. Discontinue all record, play, network transfer or system-level operations.

2. With power applied, insert a 360 Systems USB Flash Drive into one of the USB sockets.

3. Press the front panel power switch briefly to shutdown the TSS-2470 Time Delay.

4. Wait 5 seconds, and then press the front panel power switch again to boot from the USB Flash Drive.

5. The Installer menu provides a choice to Update the TSS-2470 Time Delay operating system, begin a new complete install, or cancel the install.

   Choose Update to install or reinstall only the Software, without reformatting the RAID or losing your configuration data.

   Choose NEW to partition and reformat the drive array, and install the new operating system. You will have to re-enter your configuration information once the installation is complete.

   The message, "Please wait while server is being installed" will appear with an activity indicator. When installation is complete, the server will automatically reboot from its hard disk array, and will display a copyright notice while starting up.

6. **IMPORTANT!** Remove the USB Flash Drive. Never leave it plugged into the server.

Maintenance

Fault Diagnostics

Front Panel Indicators

The five LED indicators on the front panel are used to diagnose fault
conditions. The meaning of each indicator is noted in the following
table. During normal operation all five indicators will be on.

POWER	FLASHING indicates that there is a fault in the system power supply.	Shut down the TSS-2470 Time Delay and contact 360 Systems Customer Support for further hardware diagnosis.
SYSTEM	FLASHING indicates that the CPU fan is running slow, or stopped; or that the CPU temperature or voltage is not within manufacturer's specification.	Shut down the TSS-2470 Time Delay and contact 360 Systems Customer Support for further hardware diagnosis.

Other Error Indicators

The bottom line of the GUI will announce error conditions, in some
cases giving further detail on the nature of a fault. For example,
when the System light is flashing, the GUI may indicate a temperature
error or a power supply voltage that is out of tolerance.

| ⚠	Repairs should be performed only by qualified electronics technicians.

Gigabit Ethernet Indicators

The Gigabit Ethernet port NET1 has the following indicator LEDs:

Label	Indication	Meaning
ACT/LNK (Left)	Green on	The port is connected to a valid link partner
	Green flashing	Data activity
	Off	No link
10=OFF 100=YELLOW 1000=GREEN (Right)	Off	10 Mbps
	Yellow flashing	100 Mbps
	Green	1000 Mbps

NET 2 is not active. Make no connection to this port.

Access to Components
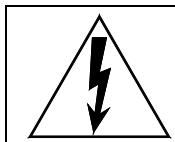
	Be certain to shut down the TSS-2470 Time Delay, turn off the rear panel power switch and disconnect the power cord before opening the unit for service.

The following sections provide instruction on disassembly and re-assembly for maintenance.

The front panel is removed to allow access to the hard drives.

The top cover is removed to service an I/O card or fans.

Removing the Front Panel

The front panel is easily removed for access to the four disk drives, or for removing the server from an equipment rack. Simply grasp the panel with both hands and pull on one side. The panel will snap off.

To re-install the front panel, simply grasp the panel with both hands and push on one side, then the other. The panel will snap on.

NOTE: The TSS-2470 Time Delay is vulnerable to accidental system reset while removing or re-installing the front panel. It is recommended that the front panel be removed or attached only while the system is OFF.

Removing the Top Cover

Using a No. 2 Philips head screwdriver, unscrew the two 6-32 Philips head screws attaching the top cover to the chassis. Push down on the two silver buttons on the top panel and slide the cover back to remove.

General Handling Precautions

ESD Precautions

⚠	**Observe electrostatic discharge (ESD) precautions to avoid damaging static-sensitive components when handling any PC card or disk drive.**

- When the case of your server is open and its internal parts are exposed, do not touch any internal part without first grounding yourself to the chassis.
- Always wear a ground strap or work on an ESD-protective mat.
- DO NOT remove components from protective packaging until you are properly grounded.
- Handle printed circuit boards by their edges or by the metal bracket.
- Don't touch any pin, contact, lead or component on the printed circuit boards.
- Keep disk drives in their anti-static package until installed in the server.

Mechanical Concerns

- Be careful when installing I/O cards into your system. Excessive force can damage the PC boards, cables, hard drives or the motherboard.
- Be sure each board is aligned with its slot in the mating connector before installing. Use care to not flex any PC boards.
- Interface cable connectors must be mated carefully. Use care to not bend any of the pins. The connectors provided are keyed to prevent upside-down insertion.
- Interface cables are fragile and must not be pinched. Ensure that their dress does not restrict airflow from fans or heat sinks within the enclosure.
- Prior to installation, keep disk drives stored in a foam-lined protective carton to protect them from physical damage.

Installing/Removing I/O Cards

Follow the preceding instructions to remove the top cover. The I/O cards are accessible from the top of the chassis.

Video I/O Card

Remove the two screws on each side of the top panel and remove the top cover.

Remove the on screw on the right rear side next to the video card that holds the retaining clip in place for securing the PCI cards.

Slide the card out of the riser card to remove.

Reverse the procedure to install a card. After all the screws are reinstalled, check that the riser card, RAID card, and video card are all seated properly in their PCI connectors.

Accessing the Main System Board

There are no user-configurable options on the main system board. If you suspect that the system board is not operating properly, consult with 360 Systems before proceeding. DO NOT undertake any repairs on it.

Managing the RAID Disk Array

The RAID Disk Array is for the most part, self maintaining. Any errors that occur are generally automatically assessed and the proper steps are taken by the system to correct the errors. A BIOS level configuration utility is included on the system but is only used in conjunction with the initial setup of the drives.

A single drive fault should not cause data loss; but remember: <u>the drive array is degraded and no longer has storage redundancy</u>. Hence, another disk failure (or removal of the wrong disk) may cause a complete loss of data and system failure. After a drive failure it is strongly recommended that at the earliest time diagnostics be performed, and the server be taken off line while the RAID array is rebuilt.

Error Notification and Repair

The TSS-2470 Time Delay will notify users in the event of a fault by an indicator in the GUI status bar, on the bottom of the screen and highlighted in yellow as shown below. A drive fault can be triggered by a variety of conditions. The first step in response to an error warning is to wait 10 minutes and see if the status indicator changes. In most cases the system will detect the error and initiate a rebuild process. The GUI will display an updated message indicating the percent of the drive rebuild.

GUI Drive Fault Indication

Status messages you may see on the status line:
- **Initializing**, indicated by "Initializing"
- **Degraded**, indicated by "Degraded"
- **Resyncing**, indicated by "Resyncing x%"
- **Recovering**, indicated by "Recovering x%"
- **Drive Removed**, indicated by "Drive 'n' removed" where 'n' corresponds the drive number of a drive that has either failed or been physically removed. Drives are numbered 0 through 3, 0 is the leftmost drive when viewing from the front of the unit.

"Recovering" or "Resyncing" is the process by which the array controller creates the data parity information or corrects data parity errors that may have occurred because of power loss, incorrect shutdown or some other data error.

The term "degraded" refers to the state of the Array data, not necessarily the hardware or disk drives themselves. It indicates that the parity information that protects the data is not up to date.

Parity errors may occur if the TSS-2470 Time Delay loses power, or is improperly shut off. No data will be lost, but the parity re-initialization process may take several hours. NEVER directly unplug the power cords from the unit without first properly shutting down the system. Shut down the system only by <u>momentarily</u> pressing the front panel **Power** button or selecting **Start > Shutdown > Shutdown** from the graphic user interface.

Note that in some cases the power may not automatically shut off after a Shutdown is executed. If the system does not turn itself off within three minutes, force the power off by holding the **Power** switch in until the unit turns off.

Drive Replacement

If the array continues to indicate a failed drive, replace the drive. Although the drives are hot swappable and can be replaced while the system is running, it is recommended that if possible the unit be taken offline and powered off prior to conducting any maintenance or repairs.

If the drive is hot swapped, the system should recognize within no more than 5 minutes that a new drive has been installed, and start to rebuild the array.

If the rebuild process does not start automatically, it may be necessary to cycle power. If this does not result in the rebuild starting automatically, contact 360 Systems support.

When powering up with a newly replaced drive, the RAID boot up screen should indicate that the drive is present. Once the system has powered

up the rebuild operation should start and be indicated in the status
line. The system can be used immediately, but if possible allow the
RAID to finish rebuilding before putting the system back in service. If
the Recording process starts automatically, simply click the Stop button
in the GUI.

A hard disk array ideally should be repaired using the same drive model
and capacity as other drives in the array. Because specific drive
models become unavailable as time goes on, 360 Systems recommends that
maintenance spares be purchased at the same time as the server. It is
possible to use a larger drive than the original; in this case the drive
will be partitioned to match the size of the original.

When ordering spare drives, note carefully which model TSS-2470 Time
Delay you have as the drives may vary depending on the model.

The server hard disk drives have been factory tested and configured in
a RAID 5 array. Each drive is numbered (0-3) and must be attached to
the correctly numbered data cable. Drive bays are also numbered.

Please read *Removing the Front Panel* on page 45 for instructions on
accessing the hard drive bays.

Replacing a Hard Drive

Each hard drive bay is numbered 0 through 3, as are the drives. If for any reason one or more drives have been removed, they must be reinstalled in a bay whose number matches the drive. Installation in the wrong location will damage data stored on all drives.

Although the drives are hot swappable and can be replaced while the system is running, it is recommended that if possible the unit be taken offline and powered off prior to conducting any maintenance or repairs.

1. Turn system power OFF with the front panel button. After it has shut down, turn off the AC power switch and unplug the AC power cords.

2. Remove the front panel as described on page 45.

3. Release the lever on the front of the drive and pull the drive out of the chassis.

4. Replace the drive and fasten the holding plate in place.

5. Replace the front panel.

6. Replace the AC power cords and turn on the rear panel AC switch.

7. Turn the system ON using the front panel button and check the RAID array status.

8. Check for correct operation of the TSS-2470 Time Delay.

NOTE: All drives in the RAID array must be "RAID Enabled" or "RAID Edition" drives. Any replacement must have an actual capacity equal to or larger than the drives that existed when the array was originally created.

Drives that are advertised as being a particular size vary in actual size. Before attempting to rebuild an array, check that the size of the drive reported when it is installed is at least equal to or larger than the existing drives in the array. The size is reported in the bootup screen for the RAID system during power up.

Notices

Product Improvements and Upgrades

360 Systems reserves the right to make changes and/or improvements to its products without incurring any obligation to incorporate such changes or improvements in units previously sold. Certain features mentioned in this document may not be present in all models. The TSS-2470 Time Delay is not offered for sale in all countries.

Repair Policy

A product being returned under warranty shall be sent to 360 Systems, freight prepaid, in the original or equivalent packaging. Call 360 Systems for a return authorization number *before* returning a product.

Use the following address for shipping and correspondence.   360 Systems' offices are open Monday through Friday, from 8:30 AM to 5:00 PM, Pacific Time.

360 Systems	Telephone	(818) 991-0360
Customer Service Dept.	Fax	(818) 991-1360
3281 Grande Vista Drive,	E-mail	support@360systems.com
Newbury Park, CA 91320	Website	www.360systems.com

End User License Agreement
For 360 Systems® TSS-2470 Time Delay Software

IMPORTANT

THIS IS A LEGAL AGREEMENT BETWEEN YOU ("YOU") AND 360 SYSTEMS®
("COMPANY"). COMPANY IS WILLING TO LICENSE THE TSS-2470 TIME DELAY
SOFTWARE TO YOU ONLY UPON THE CONDITION THAT YOU ACCEPT ALL OF THE
TERMS CONTAINED IN THIS SOFTWARE LICENSE AGREEMENT ("AGREEMENT").
PLEASE READ THE TERMS CAREFULLY BEFORE OPENING THIS PACKAGE, OR IF
DOWNLOADED, BEFORE INSTALLING THE SOFTWARE, AS OPENING THE PACKAGE, OR
IN THE CASE OF DOWNLOADED SOFTWARE, INSTALLING IT, WILL INDICATE YOUR
ASSENT TO THEM. IF YOU DO NOT AGREE TO THE LICENSE TERMS, THEN
COMPANY IS UNWILLING TO LICENSE THE SOFTWARE TO YOU, IN WHICH EVENT
YOU MAY RETURN THE UNOPENED SOFTWARE PACKAGE TO THE PLACE FROM WHICH
IT WAS ACQUIRED WITHIN 14 DAYS OF THE DATE OF PURCHASE AND YOUR MONEY
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