



TSD08

Cockpit Display



Sainsel

Equipment Overview

The TSD08 /TSD08N Multifunction Cockpit Display is a rugged self-contained unit including the necessary hardware and software to be an X Terminal and a Multifunction Display, connectable by standard Ethernet to other systems and through dedicated video connections to different video sources on board, allowing the pilot to have a real time picture of the tactical situation.

Cockpit Display TSD08 working as X-Terminal can provide a picture of the tactical situation which can interactively be modified by the operator. It can alternatively be used to display a RGB copied video generated by other external system.

The equipment has been designed to be used in the cockpit of a military plane. It can be used on two different light operation environments, DAY or NIGHT in which mode its Night Vision System Compatibility function is activated.

Operation Modes

The equipment provides two operation modes that the operator can select in the hard key GRAPHIC/RBG.

Working as an X Terminal (graphic), it allows displaying any information received by Ethernet according to the standard X-Windows from any X-Client. The operator can locally superimpose a TV video window with two different sizes on the screen, 1/4, or full screen.

In this optional mode, using the touch screen and the external keyboard that additionally can be connected; the operator can work on the picture.

This mode allows displaying the cartography at the same time than the tactic situation.

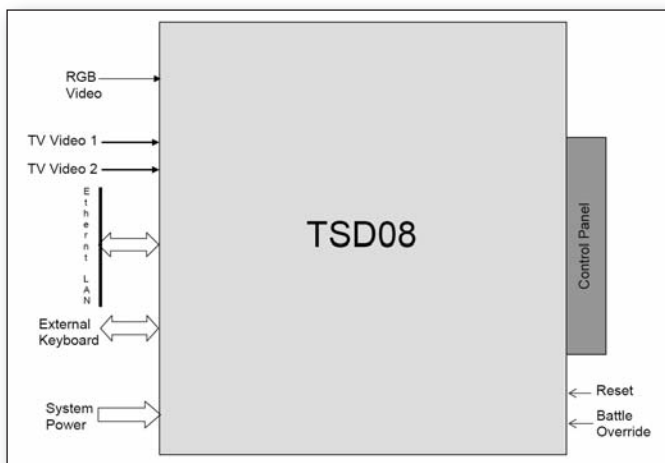
Working in RGB mode, it displays an image which is externally generated and it can not be locally modified.

Both modes can be used in NIGHT/DAY mode, which can be selected through the DAY/NIGHT key.

The activation of the NIGHT mode can be remotely done through an NVG external signal, when it is activated, it inhibits DAY/NIGHT key.

In the NIGHT mode the equipment displays the information whit a low brightness level, and with a limited spectre with no infrared components which fall down into NVS image intensifications tubes.

Interfaces



The TSD08/TSD08N provides the following external signal/data interfaces:

- Power: DC 28V (main) and DC 28V for heaters (auxiliary)
- Discrete Signals
- Ethernet 10/100 Base T in accordance to IEE 802.3.
- External Keyboard and Mouse: PS/2

- TV Composite Video input (two separated PAL or NTSC inputs)
- RGB Video input

Physical Configuration

The design has the following features:

- Flat panel display with touchscreen mounted in a custom designed enclosure.
- Enclosure designed to be operable under rain.
- Front Panel including protected and illuminated hardware keys to control de equipment.
- External Connectors Panel, whit special allocation of the output connectors to save space required for installation.
- Special keyboard and mouse connector for maintenance purpose.

Control panel

The TSD08/TSD08N provides a Control Panel with the following hardware protected keys and indicators:

- Brightness control.
- Activate/Deactivate Menu control key,
- DAY/NIGHT mode selection key
- Graphic/RGB mode selection key.
- Video source selection key (TV1/TV2/OFF)
- Size of the Video Window selection key.
- Position of the Video Window selection key.
- Power ON indicator
- Fault indicator
- Temperature out the range indicator

Display Characteristics

The main characteristics of the Display surface are the followings:

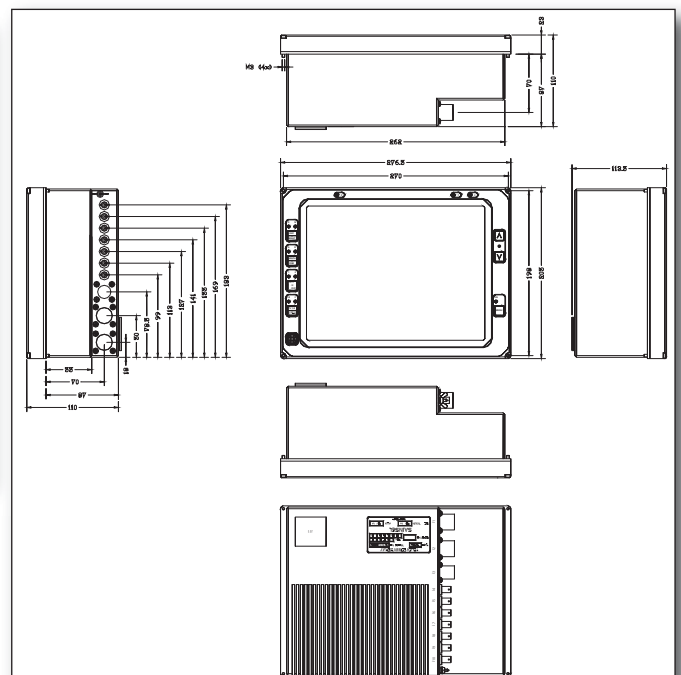
- LCD Active Matrix
- 10.4" diagonal
- Aspect Ratio: 4:3
- Resolution 1024 x 768 pixels
- Color Temperature .Equal or greater than 5000 °K over the viewing cone.
- Contrast Ratio in dark environment = 500: 1
- Dimming ratio: min. 3.000:1
- Refresh rate: 58.14 up to 62.11 Hz
- Horizontal frequency: 37.468 kHz typ

Touchscreen

The display surface incorporates a touchscreen. The characteristics are the followings:

- Technology: Resistive
- Resolution: 3400 points horizontal and 2900 points vertical
- Response Time: 200 coordinates/sec (5msec/coordinate)
- Minimum Activation Force: Between 57 gr. and 113 gr.
- Life Expectancy: 2,000,000 touches minimum

Dimensions



ENVIRONMENTAL CHARACTERISTICS

The equipment meets the environmental qualification requirements defined herein. Qualification test methods shall use the MIL-STD-810E and RTCA/DO-160D for guidance.

| <i>DO-160D Section</i> | <i>Description</i> | <i>Applicable Category Standard Equipment bays</i> |
|------------------------|------------------------------------|--|
| 4 | Temperature/Altitude | Category A1 (Note 1) |
| 5 | Temperature Variation | Category A (Note 2) |
| 6 | Humidity | Category A (Note 3) |
| 7 | Operational Shock and Crash Safety | Operational Shock and Crash Safety |
| 8 | Vibrations | Curve M for non shock-mounted equipments |
| 9 | Explosion Proofness | Environment III = Category X (Note 4) |
| 12 | Sand and Dust | Category X (Note 5) |
| 13 | Fungus Resistance | Category X (Note 6) |

ELECTROMAGNETIC RADIATION CHARACTERISTICS

The equipment complies to LRU level with the portions and tailoring of MIL-STD-461E defined below.

Conducted Emissions

CE101 Conducted Emissions, Power Leads, 30Hz to 10kHz. (Levels of figure CE101-4).
 CE102 Conducted Emissions, Power Leads, 10kHz to 10MHz (Levels of figure CE102-1).

Conducted Susceptibility

CS101 Conducted Susceptibility, Power leads, 30Hz to 150kHz. (Levels of figure CS101-1).
 CS114 Conducted Susceptibility, Bulk Cable Injection, 10kHz to 200MHz. (Levels of figure CS114-1 curve 3).

Radiated Emissions

RE101 Radiated Emissions, Magnetic Field, 30Hz to 100kHz. (Levels of figure RE101-1).
 RE102 Radiated Emissions. Electric Fields, 10kHz to 18GHz (Levels of figure RE102-3 for Internal Equipment).

Radiated Susceptibility

RS103 Radiated Susceptibility, Electric Field, 2MHz to 40GHz (Levels for Air Force Internal Equipment).

ELECTRICAL CHARACTERISTICS

The equipment meets the electrical qualification requirements defined in the following tables:

Normal Operating Conditions

| | | |
|-------------------------------|----------|-------------------------------|
| Nominal Voltage | 28V | MIL-STD-704A and MIL-STD-704C |
| Maximum Voltage | 29V | MIL-STD-704C |
| Minimum Voltage | 22V | MIL-STD-704C |
| Ripple | 2Vp | MIL-STD-704A |
| Ripple Frequency Spectrum | Figure 7 | MIL-STD-704A |
| Voltage Transient | Figure 8 | MIL-STD-704A |
| Momentary Power Interruptions | 50ms | MIL-STD-704A and MIL-STD-704C |
| Distortion | 2Vp | MIL-STD-704A |

Abnormal Operating Conditions

| | | |
|----------------------|----------|--------------|
| Overvoltage | Figure 8 | MIL-STD-704A |
| Undervoltage | Figure 8 | MIL-STD-704A |
| Steady State Voltage | 20-31.5V | MIL-STD-704C |

Emergency Operating Conditions

| | | |
|---------|--------|--------------|
| Voltage | 16-30V | MIL-STD-704C |
|---------|--------|--------------|

Engine Starting

| | | |
|---------|--------|--------------|
| Voltage | 16-30V | MIL-STD-704C |
|---------|--------|--------------|

Weight

The total TSD08 /TSD08N weight is 3,5 Kg. approx.

NIGHT VISION GOGGLE COMPATIBILITY (NVGC)

The TSD08/TSD08N is NVG compatible to GEN III, Type I, Class B standard as defined by MIL-STD-3009.

Compliance with MIL-STD-3009 include NVIS radiance (NR), chromaticity, luminance and contrast requirements.

Display and bezel indicators, legends and markings are compatible with GEN III, Type I, Class B NVGs as defined by MILSTD-3009.

Chromaticity of legends and markings on buttons and bezel surface are NVISGREEN A as defined in MIL-STD-3009.



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