

Tracker 4See™

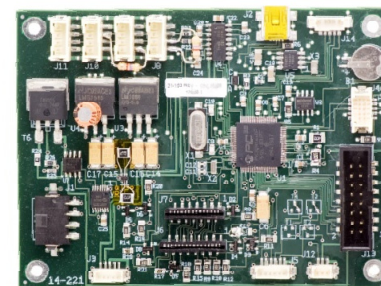
*A Suite of Hardware and Software Products
that Allow for Remote Diagnostics and
Maintenance of LCD Monitors*

Tracker 4See™ Key Features

❖ General Digital-Designed Proprietary Tracker 4See™ Hardware/Software

◇ View Hardware Status

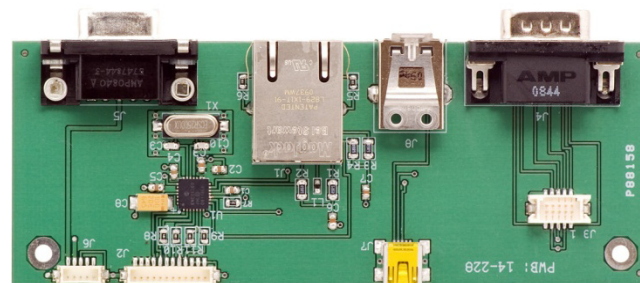
- *Monitor hardware performance in real time*
 - View current fan speed, inverter current, power supply output voltage, DC-DC voltage, backlight brightness and various temperatures (inverter current and voltages require optional Power Management PCB)
 - View video controller settings and input video modes of operation



Tracker 4See™ Main PCB

◇ Command and Control Video Features

- *Allows pass-through RS-232 commands to the video controller, locally or remotely*
 - Status, query commands
 - Calibration commands
 - Image commands
 - Control commands
 - PIP commands
- *Upgrade/refresh video controller firmware (custom or standard) in the field*



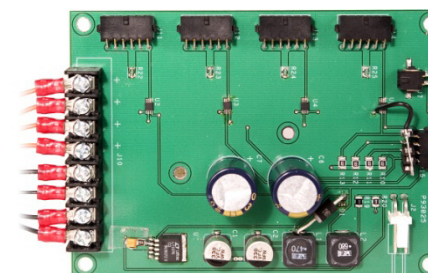
Network/Connector PCB

Tracker 4See™ Key Features

❖ General Digital-Designed Proprietary Tracker 4See™ Hardware/Software

◇ **Manages/Controls Administrative Features**

- *Perform initial calibration using a GD-trained expert*
- *Set temperature limits for “fan speed vs. temperature” (e.g., 25% @ 25° C, 50% @ 30° C, etc.)*
- *Defines operating parameters for automatic over-temperature soft failure algorithm (e.g., 90% brightness @ 50° C, 80% brightness @ 52° C, etc.)*
- *Set other trim table values*
- *Administration of service/failure alert e-mails*
 - *Define personnel to be notified in the event of monitor failures*
- *Calibrate and optimize video controller performance*
- *Troubleshoot and diagnose failures*
- *Train field operatives remotely*

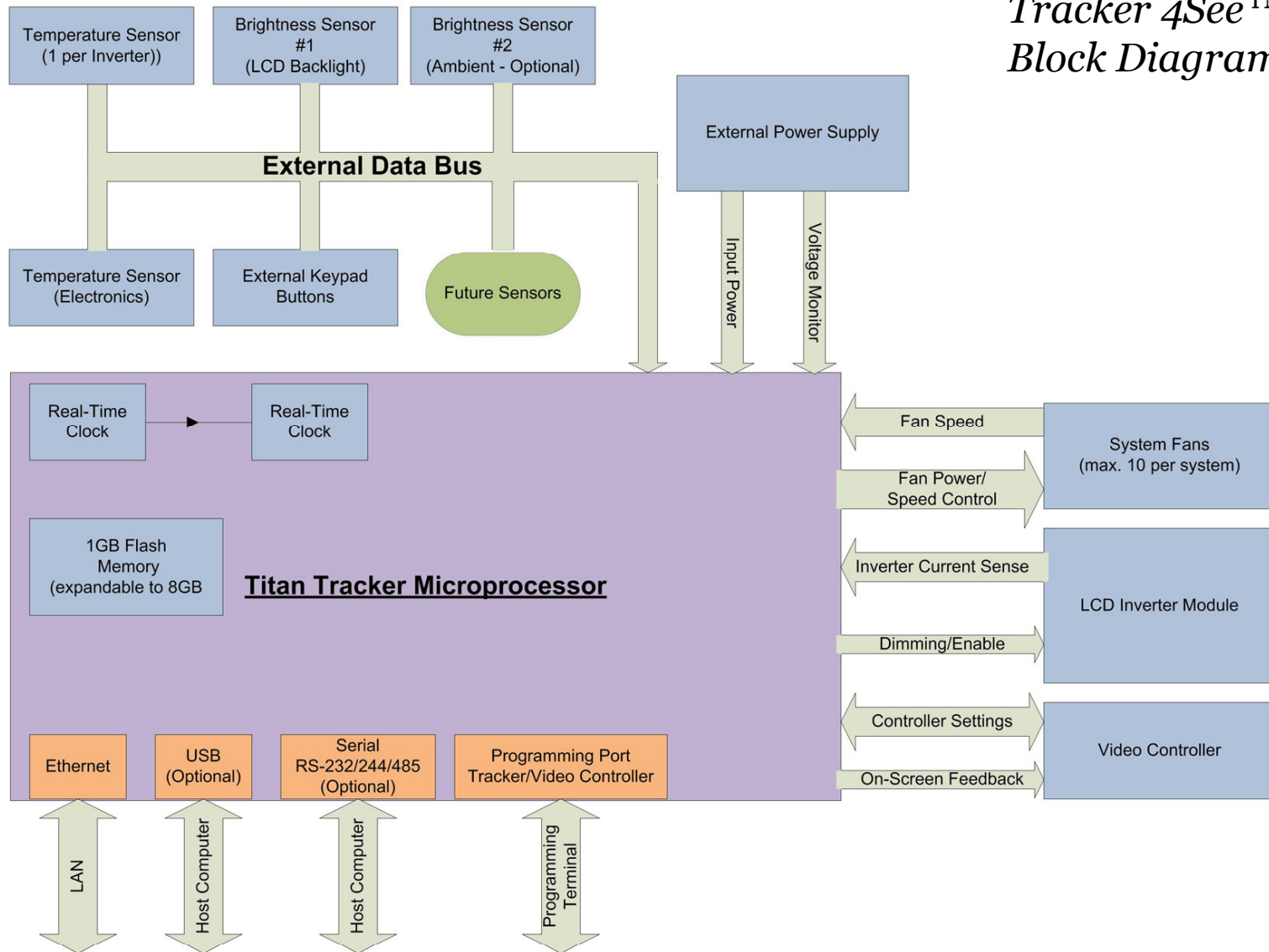


Power Management PCB (Optional)

◇ **Records Failure & Performance History**

- *Provides technicians with complete log of performance and failure history*

Tracker 4See™ Block Diagram



Tracker 4See™ Interface – Environmental Data

TRACKER BOARD ENVIRONMENTAL DATA



Environmental Data Trim Data Video Data Event Log

Serial Number Prototype1

General

| | | | |
|--------------------|----------|------------------|--------------|
| Video Control Bios | V0.29.00 | Mac Address | 0004A3000201 |
| Runtime Hours | 798.50 | Tracker Firmware | 1.0.0 |

Temperature

| | | | |
|-----------------------------|----------|----------------------------|----------|
| Temp #1 (Top Left Inverter) | 29.50° C | Temp #2 (Bottom Left Inv.) | 29.06° C |
| Temp #3 (Misc. Electronics) | 28.31° C | Temp #4 (Top Right Inv.) | 27.31° C |
| Temp #5 (Bottom Right Inv.) | 30.19° C | | |

Brightness

| | | | |
|--------------------|----------|------------------------|----------------------|
| Current Brightness | 1553 Lux | B/L Brightness Command | 511 Volts (0 to 3.3) |
| Ambient Brightness | 447 Lux | Backlight (On/Off) | 1 |

SUBMIT


Fans

| | | | |
|----------------------|----------------|-----------------------|-----------|
| Fan #1 (Top Left) | 10710 RPM | Fan #2 | 10830 RPM |
| Fan #3 | 10800 RPM | Fan #4 (Top Right) | 10740 RPM |
| Fan #5 (Bottom Left) | 0 RPM | Fan #6 | 10980 RPM |
| Fan #7 | 11220 RPM | Fan #8 (Bottom Right) | 10950 RPM |
| Fan Command | 405 (0 to 511) | | |

Inverters/Power Supply

| | | | |
|----------------------------|-------------|-----------------------------|-------------|
| Current (Inv. Top Left) | 2.58 Amps | Current (Inv. Top Right) | 3.08 Amps |
| Current (Inv. Bottom Left) | 2.81 Amps | Current (Inv. Bottom Right) | 3.18 Amps |
| Power Supply Output | 23.89 Volts | DC-DC Output | 12.02 Volts |

Tracker 4See™ Interface – Trim Data: Thermal

TRACKER BOARD TRIM DATA 

Environmental Data Trim Data Video Data Event Log

Fans Brightness **Thermal** Current / Voltage Memory Clock

Serial Number: **Prototype1**


THERMAL

Temperature Trims

| | | | |
|-------------------------------|--|-------------------------------|-----------------------------------|
| Install Flags | <input type="text" value="0, 1, 2, 3, 4"/> | | |
| Sensor #1 Offset | <input type="text" value="0"/> | Sensor #2 Offset | <input type="text" value="0"/> |
| Sensor #3 Offset | <input type="text" value="0"/> | Sensor #4 Offset | <input type="text" value="0"/> |
| Sensor #5 Offset | <input type="text" value="0"/> | Sensor #6 Offset | <input type="text" value="0"/> |
| Sensor #7 Offset | <input type="text" value="0"/> | Sensor #8 Offset | <input type="text" value="0"/> |
| Thermal Fan Range, Low | <input type="text" value="240"/> | Thermal Fan Range, High | <input type="text" value="640"/> |
| Thermal Fan Range, Deadband | <input type="text" value="40"/> | | |
| Thermal Fault Range, Low | <input type="text" value="-40"/> | Thermal Fault Range, High | <input type="text" value="1280"/> |
| Thermal Fault Range, Shutdown | <input type="text" value="1400"/> | Thermal Fault Range, Deadband | <input type="text" value="40"/> |

Password:

Tracker 4See™ Interface – Video Data: Utilities 1

TRACKER BOARD VIDEO SETTINGS 

Environmental Data Trim Data Video Data Event Log

Picture Source Utilities 1 Utilities 2

Serial Number Prototype1

UTILITIES 1

SETUP

| | |
|----------------------------|---------------------------------------|
| Auto Picture Setup | <input type="checkbox"/> |
| Auto Color Gain | <input type="checkbox"/> |
| Wide Screen Mode Detection | 0 |
| Manual Clock | 2578 |
| Manual Phase | 42 |
| Auto Source Seek | <input type="button" value="Adjust"/> |
| De-Interlacing Mode | Unused |
| Auto Power | 1 |
| Video Standard | 0 |
| Gamma | 0 1.0~2.6 & User-defined |
| Color Temperature | <input type="button" value="Adjust"/> |

OSD

| | | |
|-------------------------|-----|------------------------------|
| OSD Position Horizontal | 128 | 0~255 |
| OSD Position Vertical | 128 | 0~255 |
| OSD Timeout | 60 | 5~60 seconds, 0 = Continuous |
| OSD Screen Marker | | |
| Screen Marker | 0 | |
| Center Marker | 0 | |
| Safe Area Marker | 0 | 64%~98% |
| Aspect Marker | 0 | |
| Transparency | 0 | 0~95% [4 steps] |
| OSD Language | 0 | English, Chinese |
| OSD Transparency | 0 | 5%~60% |

Tracker 4See™ Board Hardware/Software

Tracker Board Features and Benefits

| FEATURES | BENEFITS |
|--|--|
| Monitor and diagnose the health of the monitor and its internal electronic subassemblies via the Internet. | <p>Allows a customer appointed administrator or General Digital (GD) technician to establish a direct communication with the monitors over a LAN connection for the express purpose of monitoring the health of the monitors, and/or troubleshooting/diagnosing in-the-field malfunctions.</p> <p>Remote operators are able to query operational status of the major electronics (fans, video controller, backlights, inverters, power supplies), verify and configure calibration settings, and issue control commands.</p> <p>Enables GD the ability to provide worldwide service anywhere our monitors are installed, provided Internet service and Internet security access is provided.</p> <p>Allows GD to cost effectively engage and deploy a network of independent third party service providers globally to implement field replacement of defective electronics based on remote diagnosis by trained GD personnel.</p> <p>Prevents unnecessary downtime of the monitors; i.e., returning to a GD Service Depot.</p> <p>Saves customer extraordinary expense of shipping large and heavy monitors back and forth to Connecticut for diagnosis and repair.</p> <p>Additional time and shipment savings by avoiding customs inspections/delays and shipping charges for international shipments.</p> <p>Minimize damage due to shipment and handling.</p> |

Tracker 4See™ Board Hardware/Software

Tracker Board Features and Benefits

| FEATURES | BENEFITS |
|---|--|
| Monitors temperature from 5 temperature sensors located strategically throughout the monitor. | Temperature data is used by microprocessor to control fan speed and/or backlight brightness (indirectly reduces power consumption and heat dissipation) to prevent critical failures due to over-temperature conditions. |
| Monitors the speed (RPMs) of each of the 8 cooling fans. | Technician can identify if any of the fans have failed permanently, or intermittently. Individual fan failures are reported in real time to facilitate pro-active repair that, in turn, prevents critical hardware failures and unscheduled downtime. |
| Controls the speed of the cooling fans in response to the temperature conditions reported by the temperature sensors. | Fan speed is optimized to provide proper level of cooling while maintaining minimal audible noise. |
| Monitors the brightness provided by an optical sensor located on the LCD backlight. | Allows technician to determine if the backlights are functional. Also allows determination of amount of brightness decay that has resulted from usage. |
| Monitors the current from each of the LCD's 3 inverters. | Provides an indication of a faulty inverter. Specifically identifies the offending inverter so that it can be replaced by third party service personnel. |
| Monitors the output voltage from the integrated power supply. | Provides indication of power supply failure or "dirty" AC power. |
| Record individual failures and failure history in non-volatile memory. | Provides technicians with a complete log of the monitor's performance and failure history. |

Tracker 4See™ Board Hardware/Software

Tracker Board Features and Benefits

| FEATURES | BENEFITS |
|---|---|
| <p>Provides remote service technician or administrator with the ability to issue status/query, calibration and control commands to the integrated video controller. Nearly all of the video controller commands that can be issued locally can also be issued remotely:</p> | <p>Allows the administrator or service technician to perform the following functions:</p> |
| <ul style="list-style-type: none"> Status/Query Commands Runtime hours Video mode Resolution inquiry Sync frequency inquiry Color settings Calibration settings Image settings Source settings BIOS version | <p>Monitor the health of the monitor and its individual electro-mechanical subassemblies.</p> |
| <ul style="list-style-type: none"> Calibration Commands Auto calibrate Load default values Frequency Phase Scaling mode OSD (position, transparency, language, timeout) | <p>Properly calibrate and optimize the performance of the monitor.</p> |

Tracker Board Hardware/Software

Tracker Board Features and Benefits

| FEATURES | BENEFITS |
|--|--|
| Provides remote service technician or administrator with the ability to issue status/query, calibration and control commands to the integrated video controller. Nearly all of the video controller commands that can be issued locally can also be issued remotely (continued): | Allows the administrator or service technician to perform the following functions: |
| Image Commands Red, green and blue levels Gamma level Color temperature Saturation, hue, sharpness Zoom level and position | Optimize the performance of the monitors. |
| Control Commands Power on/off Backlight on/off Backlight brightness control Volume control Scaling mode Input main Auto source seek Source layout | Troubleshoot and diagnose failures while the monitor is still deployed in the field. |
| PIP Commands Brightness, contrast, position, window size, source select, swap, transparency, auto off | Train field operatives remotely. |

Tracker Board Hardware/Software

Tracker Board Features and Benefits

| FEATURES | BENEFITS |
|--|---|
| Text over graphics | Provides local failure reporting on the display using the text-over-graphics feature. Remote technicians can also communicate with local operators via the text-over-graphics interface to provide instructions or status. |
| Upgrade video controller in the field. | Standard or custom firmware upgrades can be uploaded in the field without requiring the monitor be returned to a Service Depot. |
| Future/Optional Capabilities Automatic failure alerts via email to administrators and/or GD service personnel upon failure generation Support for serial interface Support for USB interface Support for IR remote operation Support for RF remote operation Automatic over-temperature shutdown | Increased flexibility, convenience and control. |

What Does Tracker 4See™ Offer?

- ❖ **Reduced Cost of Ownership**
 - ◇ **Remotely monitor health via the Internet**
 - *Detect performance anomalies and address them before they lead to critical failures*
 - *Offer 24/7 GD monitoring service (fee based)*
 - ◇ **Remotely diagnose failures via the Internet**
 - *Replacement of defective components in the field*
 - GD identifies defective components and sends replacement parts and “pro-process” procedures directly to local third party technicians
 - *Minimize operational downtime by reducing the need to return defective monitors to a GD service depot*
 - ◇ **Training via the Internet (fee based)**



Why Buy from General Digital?

- ❖ Mature QC Department and Acceptance Testing
 - ◇ Extensive Burn-in Testing for a Minimum of 72 Hours
 - ◇ Documented Procedures and Acceptance Criteria



| QC INSPECTION PROCEDURE | |
|--|----------------|
| Document Number: 999-0330-014 | Page 1 of 5 |
| Document Name: Acceptance Test Procedure for Optically Bonded 12.1-inch LCD, Part Number 91-121-11-039 | |
| Revision: A | Author: BD |
| | Date: 10-26-09 |

Purpose: This document outlines the procedure for visual and electrical inspection of the referenced DRS 12.1-inch LCD with bonded touch screen.

Scope: This procedure shall be followed when performing the final inspection of the referenced DRS 12.1-inch display with bonded touch screen.

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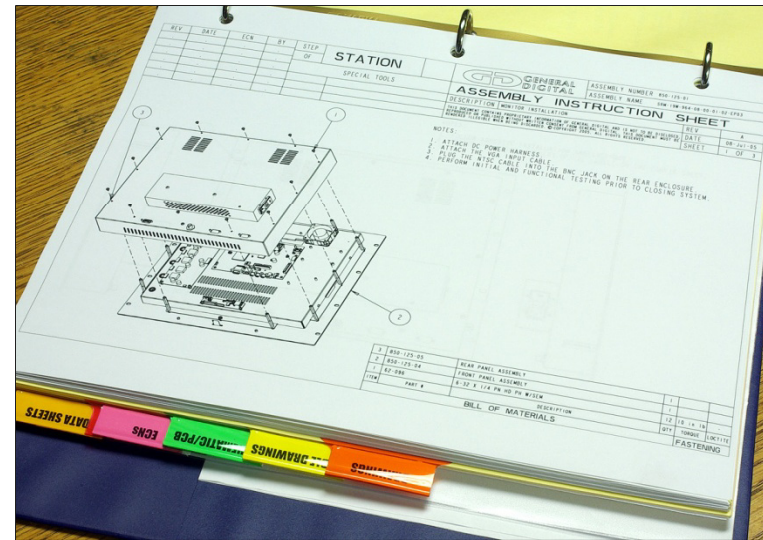
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“Blue Book” Library



Pro-Process Drawing

Why Buy from General Digital?

❖ First-Class Production Facility

- ❖ **30,000 sq. ft. (Expandable to 125,000 sq. ft.)**
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- ❖ **Laminar Flow Benches**

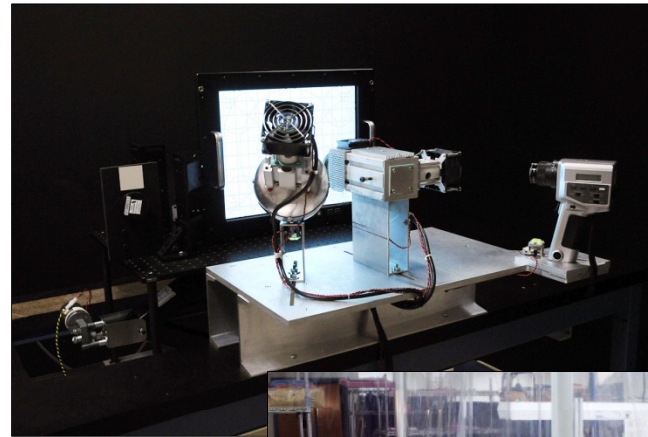


Why Buy from General Digital?

❖ Mature Engineering Company with Extensive Capital Resources

- ◇ **Ovens**
- ◇ **Colorimeters**
- ◇ **Power Meters**
- ◇ **EMI Antenna and Related Equipment**
- ◇ **Spectrometer**
- ◇ **Reflectometer**
- ◇ **Class 10 Clean Booth**
- ◇ **Class 100 Laminar Flow Benches**
- ◇ **High Speed Lamination Equipment**

Reflectometer



*High-Speed Laminator
in Class 10 Clean Room*

Why Buy from General Digital?

❖ Mature Engineering Company with Extensive Capital Resources

- ◇ **Temperature / Humidity Chamber**
- ◇ **Vacuum Chambers**
- ◇ **Hipot Testers**
- ◇ **Data Loggers**
- ◇ **Thermal Sensors**
- ◇ **Current Probes**
- ◇ **Oscilloscopes**
- ◇ **Photometers**



Vacuum Chamber



Temperature/Humidity Chamber



Data Logger