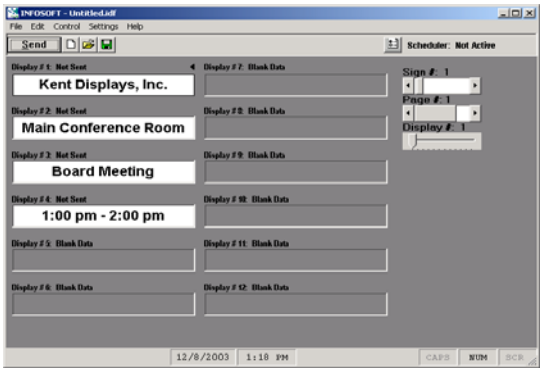
INFOSIGN® Cholesteric Display Modules and Controller

Display Module

Controller

INFOSOFT Windows® Based Software



Demonstration Kit

Product Description

INFOSIGN® display modules are for general purpose graphic and character display applications.
All Kent Displays Cholesteric Liquid Crystal Display (ChLCD) products take advantage of the technology's unique "No Power" attribute without compromising superior optical performance even in direct sunlight.
INFOSIGN® display modules require an external controller.

The INFOSIGN® controller is designed for use with single and multiple display module configurations. The controller can be mounted directly behind a display module or at a separate location using a 24-conductor ribbon cable assembly. A single controller can control up to 12 INFOSIGN® display modules.
An INFOSIGN® assembly and interconnect diagram is provided on page 7 of this document.

The INFOSOFT software, a Windows® based graphical user interface for data entry and control of the INFOSIGN®, permits text entry in any resident font including all Windows® supported language fonts. The ability to download bitmaps from a PC to the INFOSIGN® is also supported.
INFOSOFT includes a scheduler, which allows a sequence of images and/or text to be programmed to appear on the INFOSIGN® modules at specified times.
Developers with application specific INFOSIGN® control requirements should refer to Kent Displays Standard Serial Protocol document (#25016).

The INFOSIGN® demonstration kit contains everything required to quickly evaluate the unique "No Power" attribute of this technology, its superior optical performance, and all the features and capabilities of the INFOSIGN® display system. Each INFOSIGN® demonstration kit includes: an INFOSIGN® display module (part # 01531301xxx), controller (part # 01011402), PC to controller serial communication cable (part # 01006703), AA cell holder assembly with batteries (part # 01016801), 7.5 VDC Power Supply (part # 03916), and software CD (part # 03930) with INFOSOFT software & related documents.

*Min. 400MHz Pentium® II Windows® 95 PC required

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Product Features

Display Module:

- 240 Columns × 30 Rows
- 20 Dots Per Inch
- Approximate Size 13.5×2.2×0.4 Inches (L×H×W)
- Low Profile Modular Design
- Available in Four Color Combinations
- Superior Brightness
- Excellent Optical Properties
- Viewing Cone Comparable to Paper
- Full or Partial Screen Update Capability
- "No Power" Required to Maintain Images

Controller:

- Host PC Controls from 1 to 32 Controllers
- Each Controller Controls from 1 to 12 INFOSIGN® Display Modules
- Multiple Communication Options
  - RS–232 Interface to a Single Controller
  - RS–485 Interface to Multiple Controllers **[ref. Application Note 25068]**
  - Wireless (RF) Interface Option to Multiple Controllers **[ref. Data Sheet 25042]**
- Individual Display Module Image Control
- Automatic Sleep Mode
- LED Indicators to Support Operation & Control
- Graphic Image Capability
- Built-In Test Mode
- Power Supply Options
  - Batteries
  - AC/DC Adapter

INFOSOFT Software

- Windows® based Text Editor
- Graphic Image Download Capability
- Message Scheduler with 1 Minute Resolution
- Control Up To 32 Sign Arrays From a Single PC

Typical Applications

- **Airport Destination/Arrival Signage**
- **Lobby Signage**
- **Point of Sale Signage**
- **Remote / Battery Powered Signage**
- **Door Signage**
- **General Purpose Indoor or Outdoor Signage**

Ordering Information:

Display Modules	
Part #	**Description**
01531301166	Module, INFOSIGN® Yellow/Black
01531301167	Module, INFOSIGN® White/Blue
01531301168	Module, INFOSIGN® Yellow-Green/Black
01531301169	Module, INFOSIGN® Green/Black

Controllers*	
Part #	**Description**
01011401	Controller, RS-232 Interface
01011402	Controller, RS-232/Board-to-Board Header
01011403	Controller, RS-485 Interface
01011404	Controller, RS-485/Board-to-Board Header

Demonstration Kits	
Part #	**Description**
09001901166	Demo Kit, INFOSIGN® Yellow/Black
09001901167	Demo Kit, INFOSIGN® White/Blue
09001901168	Demo Kit, INFOSIGN® Yellow-Green/Black
09001901169	Demo Kit, INFOSIGN® Green/Black

Related Items	
Part #	**Description**
01006703	Cable, Communication 108"
03916	Power Supply, Regulated 7.5 VDC
03930	Software CD
010243xx**	Cable Assembly, Ribbon
015424	Converter Kit, RS-232 to RS-485
01016801	Assembly, AA Cell Holder with Batteries

*All INFOSIGN® Controllers require a serial communication cable, software CD, and regulated DC power supply.

**Replace xx with 01 - 12 corresponding to the number of display modules required by the application.
Example: 01024306 is the cable assembly part number for a 6 (six) display module configuration.
Ribbon cable assembly must not exceed 40" in length regardless of the number of display modules in the sign.

Contact Kent Displays at sales@kentdisplays.com for complete sign assemblies, framing options, custom configurations, pricing, and additional information.

Display Module and Controller

General Specifications	
Parameter	**Description**
Display Type	Cholesteric Reflective LCD
Format	240 columns × 30 rows
Resolution	20 dots per inch, or 0.05" (1.27 mm) between pixel center-lines
Image Area	12 in. × 1.5 in. (305 mm × 38 mm)
Display Module Weight	7.6 oz (215 grams)
Controller Weight	1.2 oz (34 grams)
Operating Temperature Range	0 °C to +60 °C (custom operating temperatures available)
Storage Temperature Range	-40 °C to +100 °C
Full Image Update Rate	0.5 sec (@ 23 °C, refer to graph on page 5 for more details)
Possible Sign Address Selections	32 addresses
Maximum Number of Display Modules/ Controller	12
Sleep Mode Activated After	20 sec

Power Requirements	
Parameter	**Description**
Power Source[1]	3.5 VDC – 8.0 VDC (6.0 VDC recommended at battery termination – CN7, and 7.5 VDC is recommended at Alternate AC derived power termination – J2)
Average "Wake-up" mode power consumption when updating a display module	210 mW (from CN7 Header with Battery = 6.0 VDC) (Measured Average Current = 35 mA)
Average "Idle" mode power consumption	36 mW (from CN7 Header, with Battery = 6.0 VDC) (Measured Average Current = 5.94 mA)
"Sleep Mode" power consumption display module & controller	< 40 µW (from CN7 Header with Battery = 6.0 VDC) (Measured Average Current = 6 µA)
Typical INFOSIGN® battery life[2]	6000 updates achieved with a 6 module RS-232 INFOSIGN® configuration
Recommended mating battery power plug (CN7)	Standard 2mm pitched 3 conductor plug, Hirose P/N DF3-3S-2C w/ DFS-2428SC crimped contacts, or equivalent
Power supply header on controller (J2)	2 Pin, 1.3 mm Diameter, + Center, CUI Stack PJ-014D-SMT-1

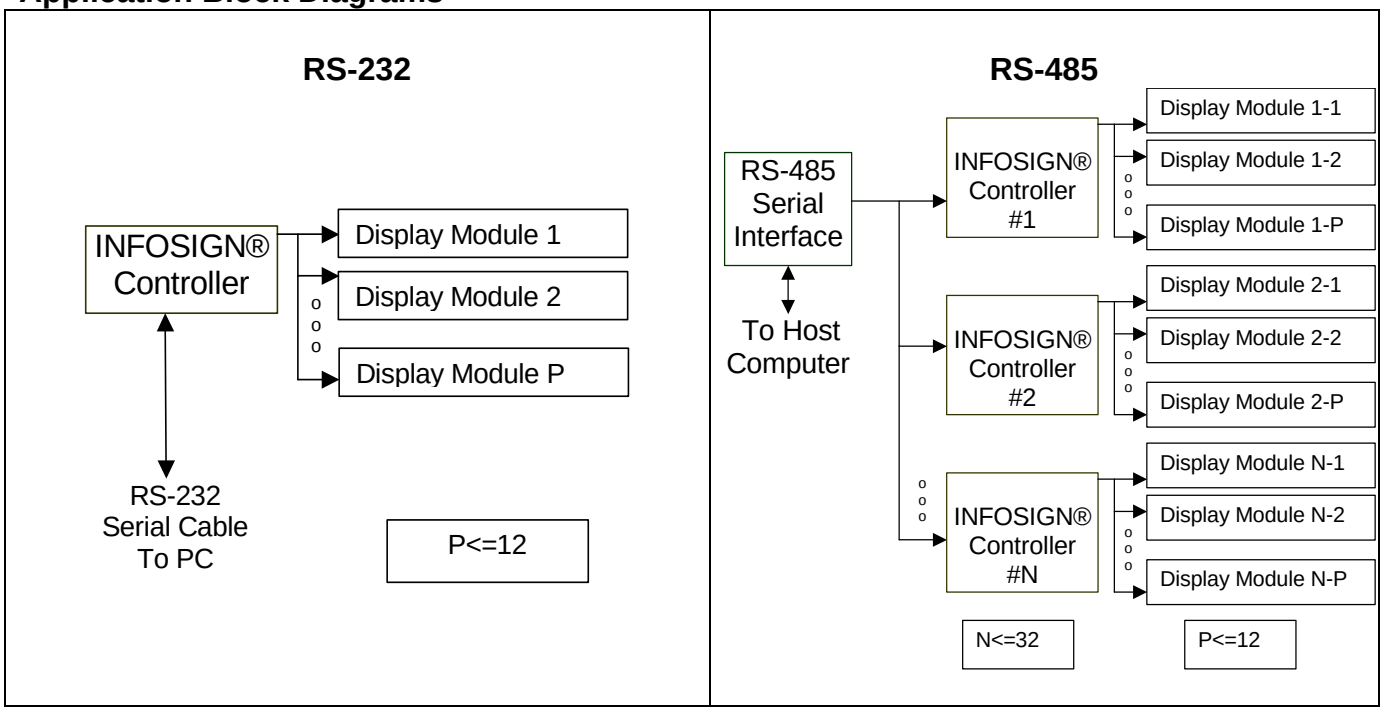
Communication Interface Information	
Parameter	**Description**
Serial communication format	RS-232: Asynchronous, full duplex, 8 data bits, 1 stop bit, no parity. RS-485: Asynchronous, half duplex, 8 data bits, 1 stop bit, no parity.
Baud rate	19.2 kbps
Protocol format	Kent Displays character/graphics serial protocol.(Refer to 25016 for details).
Mating communication plug	2mm pitched 4-conductor plug, Hirose P/N DF3-4S-2C w/ DFS-2428SC crimped contacts, or equivalent.

*Specifications are subject to change without prior notice.

[1] When using both battery power and an AC derived power source, the applied DC voltage to terminal J2 must exceed the DC voltage applied at CN7 (battery power), or the battery source at CN7 will discharge.

[2] Test setup consisted of a 6 module INFOSIGN® powered by four (4) 2800 mA-hour AA alkaline batteries. Display refresh occurred once every 5 minutes.

Application Block Diagrams



Controller

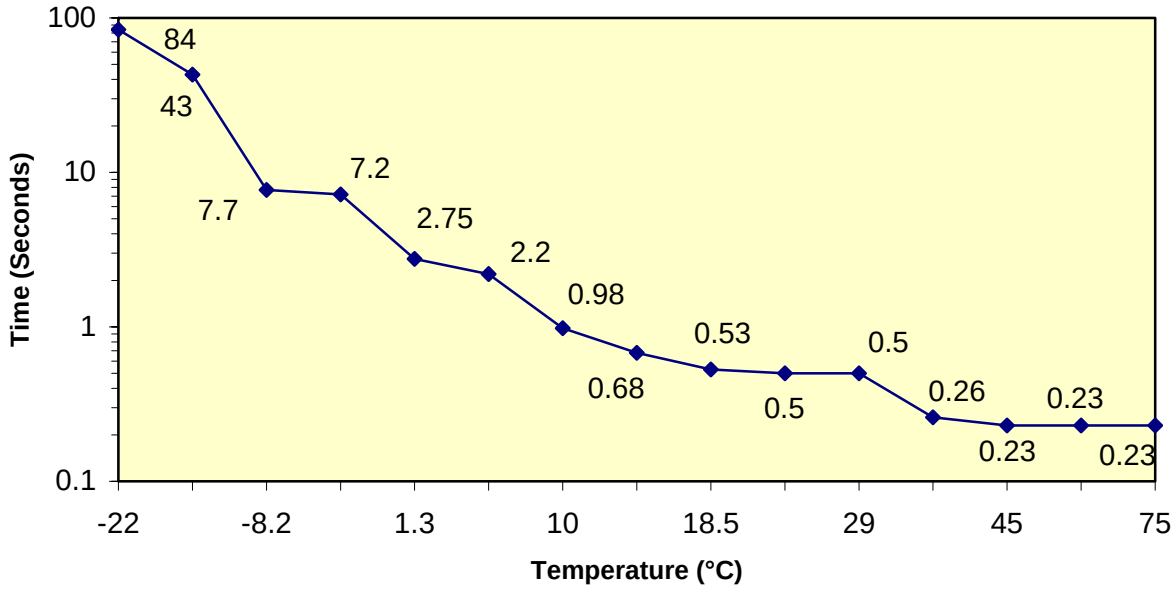
Battery Header: CN7		
Pin #	**Symbol**	**Description**
1	- Power (Return)	Negative power termination.
2	+ Power	Positive power termination. (Not over-voltage protected. Do not exceed 10 VDC.)
3	+ Power	Positive power termination. (Not over-voltage protected. Do not exceed 10 VDC.)

Power Supply Header: J2		
Pin #	**Symbol**	**Description**
1 Center	+ Power	Positive power termination. (Not over-voltage protected. Do not exceed 8.0 VDC.)
2 Outside	- Power (Return)	Negative power termination.

Communication Header Interface: CN2		
Pin #	**Symbol**	**Description**
1	RX_DATA	Module receive- data input termination (RS-232). Positive data communication termination point (RS-485).
2	Ground	Ground termination point (RS-232 use only).
3	Ground	Ground termination point (RS-232 use only).
4	TX_DATA	Module transmit- data output termination (RS-232). Negative data communication termination point (RS-485).

Local On-Board Control Descriptions	
Symbol	**Description**
SW1, “RESET”	Controller reset button.
SW3, “TEST”	Controller diagnostic input button.
D6, “LED”	Diagnostic LED
SW2, “ADDRESS”	Module address DIP switch (6 position).
SW4, “WAKE-UP”	Local wake button.

Image Update Information



The chart above illustrates measured full screen update interval with respect to temperature for the INFOSIGN® display module. The update interval is approximately 0.5 seconds at room temperature.

FRONT COVER MATERIAL SELECTION:

The following front cover requirements are necessary to insure image quality during the life of the INFOSIGN® display module:

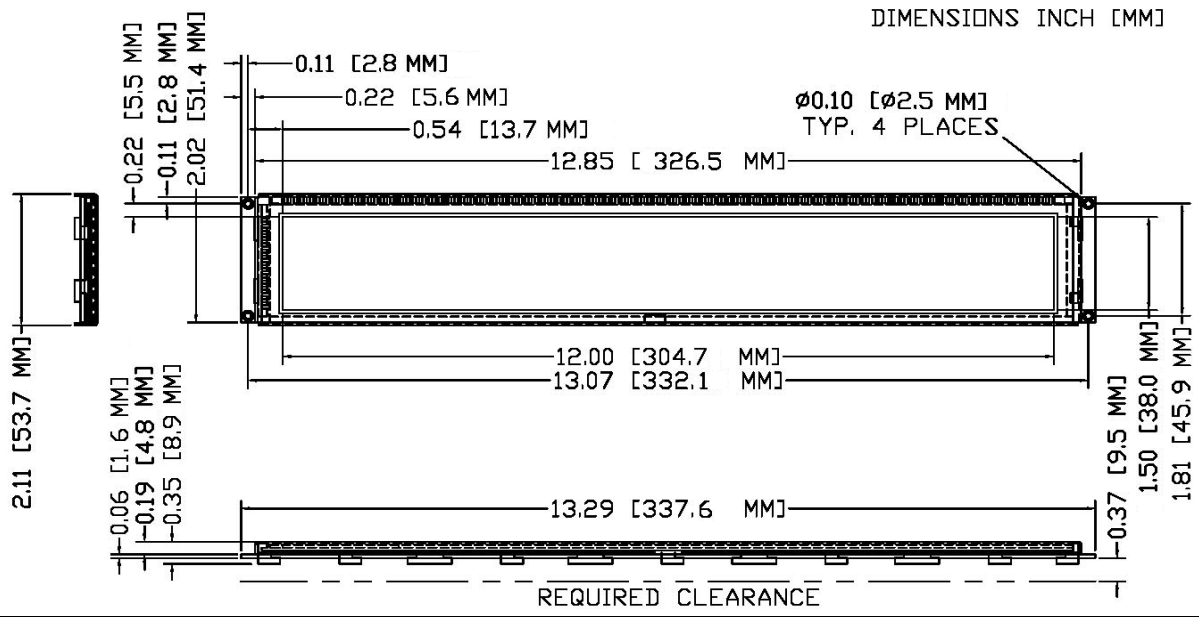
1. Cholesteric Liquid Crystal materials require protection from UV light. A UV blocking material with a minimum 98% cutoff at 380nm and lower spectral components is required.

2. The finished product design should incorporate a transparent cover such as acrylic, polycarbonate, etc., to protect the viewing area of the display. Place the protective cover as close to the display module(s) as possible. The protective cover should be of sufficient thickness to resist flexing, or if flexed should not touch the surface of the display(s). Acrylite® OP-3-P-99 matte finish and Acrylite® OP-3 material without matte finish are examples of a recommended protective cover material.

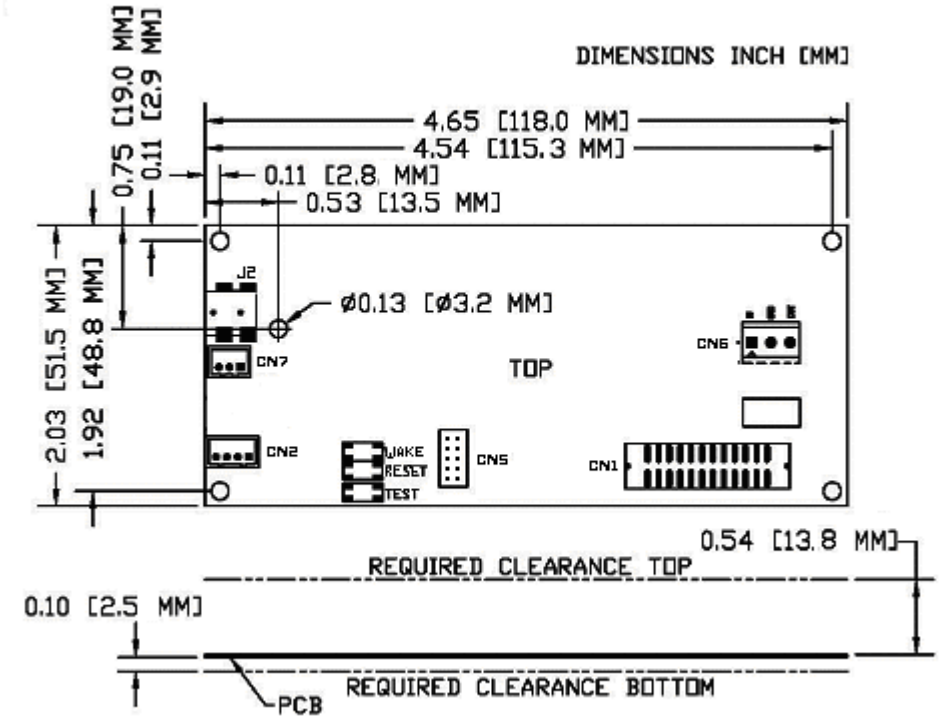
Adding an anti-glare and/or anti-reflective surface film or finish to the viewing side of the protective cover may improve the optical performance in certain display applications and lighting conditions.

Mechanical Dimensions:

Display Module



Controller



INFOSIGN® Module Assembly Instructions:

Assembly instructions apply to single and multiple INFOSIGN® Display Module configurations in customer-supplied framing.

Install the INFOSIGN® display modules (shown below) into an appropriate frame by securing the display modules via the four mounting holes located in the corners or by capturing the edges of each display module in the frame. Use caution as damage may occur if excessive pressure is applied to any or all of the INFOSIGN® display modules. The connectors CN1 & CN2 are aligned along the left side as viewed from the rear of the assembly.

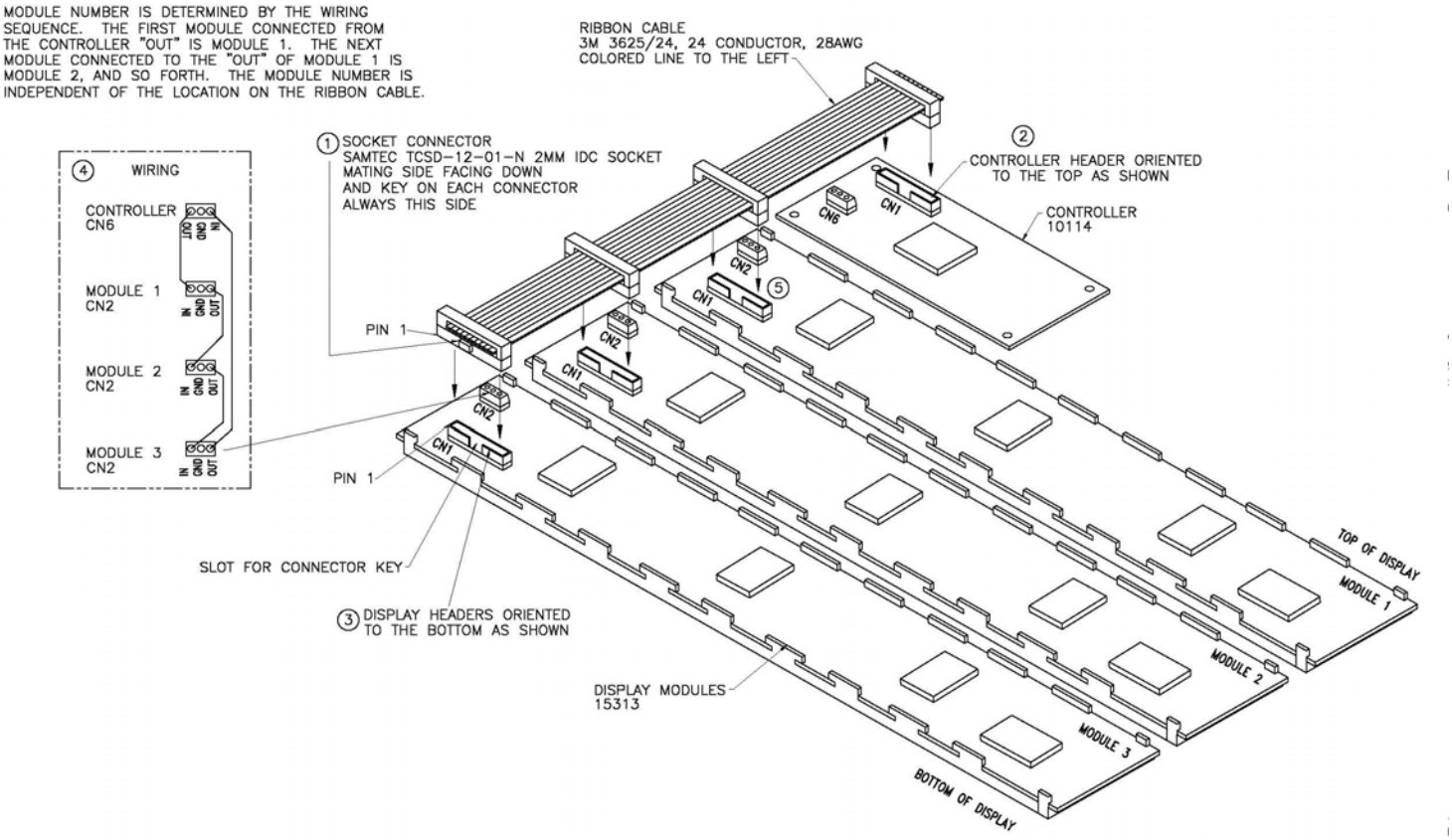
The Controller can be mounted above the top most INFOSIGN® display module (as shown), or directly behind a display module via the four corner mounting holes provided. A 24-conductor ribbon cable connects CN1 on the Controller to CN1 on each of the display modules. Custom cable assemblies are available. From 1 to 12 INFOSIGN® display modules can be connected to a single Controller.

DC power is supplied to the Controller via either connector J2 (DC power supply) or connector CN7 (battery power). If both power sources are present, the DC power supply output voltage to J2 must be greater than the battery voltage applied to CN7 or the batteries will discharge. A 7.5 Volt DC regulated power supply, (Kent Displays P/N 03916) is recommended.

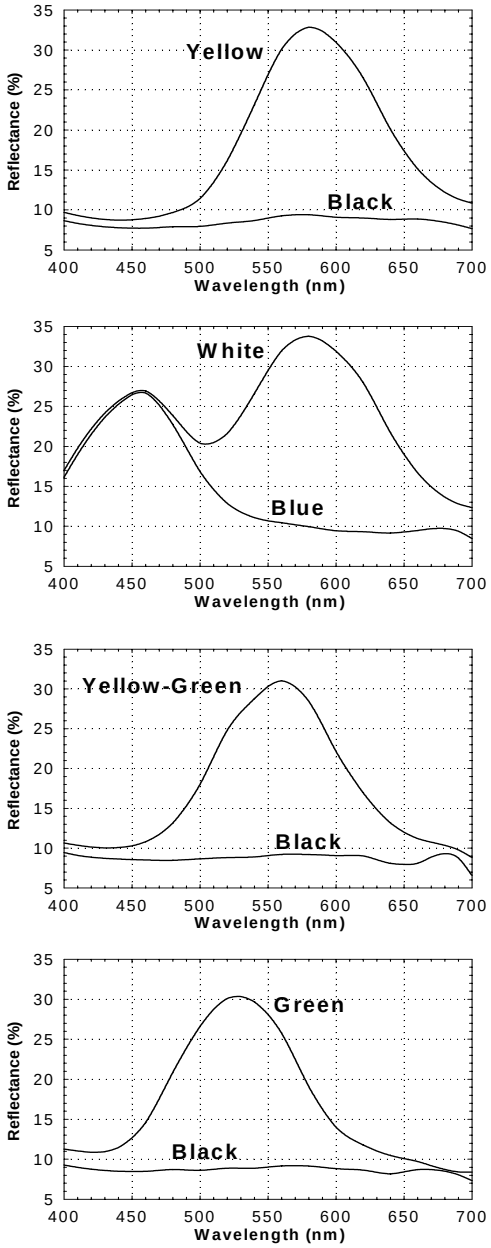
Connect RS-232 or RS-485 communication cabling (requires controller P/N 1011401 or 1011403 respectively) to CN2 (not shown) on the Controller.

Wiring from CN6 on the Controller to the CN2 connectors on each INFOSIGN® display module (see wiring diagram 4 below):

1. Connect the CN6-OUT terminal on the Controller to the CN2-IN terminal of display module #1, (Note: module #1 can be any display in the sign).
2. Connect CN2-OUT terminal of display module #1 to CN2-IN terminal of display module #2.
3. Connect CN2-OUT terminal of display module #2 to CN2-IN terminal of display module #3.
4. Continue this process until the connection is made to the CN2-IN terminal of the LAST display module.
5. Connect CN2-OUT terminal of the LAST display module to CN6-IN terminal of the Controller.



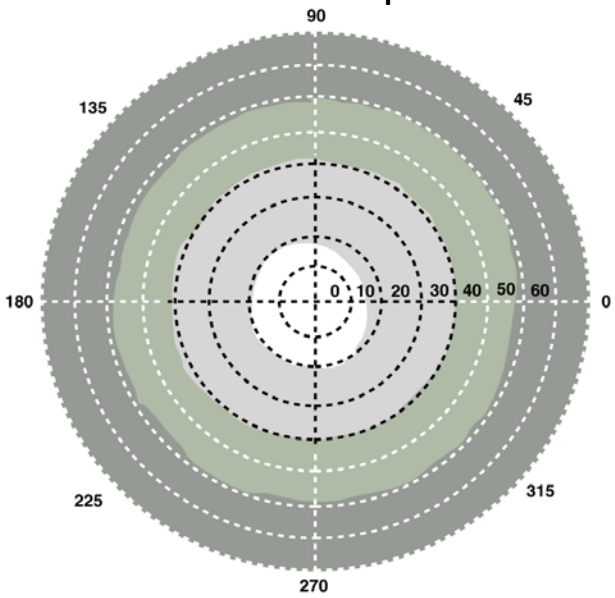
Optical Characteristics for Standard Color Configurations



The above reflectance curves are from a single pixel. Actual reflectance will vary depending on display resolution, aperture ratio, and other factors.

The graphs to the left outline the spectral reflectance characteristics for a given display pixel when switched to either of the two possible stable states: reflective planar or transparent focal conic. The top line in each chart outlines the reflective characteristic of the planar state. The bottom line outlines the reflective characteristic of the transparent focal conic state. Graphs for the 4 standard color combinations are illustrated.

Contrast Ratio Polar Representation



As illustrated in the polar graph above, all Kent Displays ChLCD products have a 360-degree viewing cone. When measured normal to the plane of the display, the monochromatic contrast ratio is as high as 25:1 with a peak reflectivity approaching 35% of the incident light. The contrast ratio reduces as the viewing angle approaches the plane of the display but is still excellent at 11:1. Since no polarizers are used, display contrast reduces uniformly in all azimuthal directions when the viewing angle is increased.