Grayhill

INTUITIVE HUMAN INTERFACE SOLUTIONS

Versatile CAN-Based Display

The Series 3D50 5-inch Touchscreen Display for off-highway vehicles.

- Intuitive touch technology to select objects and swipe through screens.
- Responsive PCAP touchscreen recognizes bare and gloved fingers, even when the display surface is wet.
- Easy application creation and integration with VUI Builder (J1939), Qt, or optional CODESYS (J1939, CANopen, and many more).
- Up to 2 Video inputs, up to 2 CAN-bus inputs.
- Powerful processor with 3 second boot time (VUI Builder).
- Scratch resistant/anti-glare cover glass is optically bonded to LCD display for superior mechanical and visual performance.
- Bright, backlit display provides high contrast text and full color graphics for excellent sunlight readability.
- Convenient flush mounting provides modern look and feel, to seamlessly blend with vehicle cab design.
- Armrest, A-post, and dashboard mounting.
- Rugged design for extreme environments.
- Functions as an engine monitor or input device.





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Versatile Display. Many Features.

Flexible.
Series 3D50 is available with or without a projected capacitance touch screen. This advanced touchscreen works even when **wet** or when the user is **wearing gloves**.

Adaptable.
Designed for integration into off-highway vehicles. It functions in 12V/24V operation, boots in 3 seconds (VUI Builder) and is sealed against the ingress of liquids and dust.

Bright.
This 5.0-inch backlit WVGA LCD (800x480) is very bright (700 nits) providing good daylight readability. It has software controlled LED backlighting and 16 bit color.

Rugged.
The protective cover lens is scratch resistant glass, not plastic. Optical bonding of the cover glass improves impact resistance.

Adjustable.
There are many system interface options:
- Up to two CAN-bus ports
- Up to two NTSC/PAL camera input ports
- Up to four digital inputs
- Up to four digital outputs
- One USB 2.0 port
- Touchscreen

Powerful.
The powerful embedded computer can monitor and display many events and camera images simultaneously:
- 800MHz
- 512MB RAM
- 4GB storage
- USB 2.0



Readable.
Optically bonding the display, touch sensor and cover glass reduces reflections. An anti-glare coating further improves readability in bright sunlight.

Useful.
Ideal for agriculture and construction vehicle applications, including virtual gauges, diagnostic menus, engine monitor, operator input, fault indicators and service reminders.

Easy to Program.
PC-based configuration tools makes application development fast and easy. Drag and drop graphics (supported by Qt and CODESYS), bitmaps, text with the click of a mouse.

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Versatile Display. All the Specifications.

Display: 5" color transmissive TFT LCD
Resolution: WVGA, 800 x 480 pixels, 16 bit color
Aspect ratio: 16:9
Orientation: Landscape or Portrait
Backlighting: LED, 700 cd/m² or nits
Microprocessor: Freescale™ i.mx6, 800 MHz
Flash Memory: 4GB eMMc
RAM: 512 MB DDR3

USB: 2.0 host
Real Time Clock: Internal non-rechargeable battery backup
CAN: (2) CAN 2.0 B
RS232: full duplex
Video Input: 2 NTSC / PAL
Inputs: (4) 0-32 VDC discrete digital;; 10Hz LPF
Outputs: (4) digital 200 mA switched high side

POWER SPECIFICATIONS

Operating Voltage	8VDC to 32VDC
Power Consumption	5 Watts (typical) with full back light
Standby Current	<1ma

ENVIRONMENTAL SPECIFICATIONS

Operating temperature	ANSI/ASAE EP455 5.1.1	-30˚C to +65˚C
Storage Temperature	ANSI/ASAE EP455 5.1.2	-40˚C to +85˚C
Thermal Shock	ANSI/ASAE EP455 5.1.3	-40˚C to 65˚C at a rate of 4˚C/min (1 hour at extremes)
Altitude (Barometric Pressure)	ANSI/ASAE EP455 5.2	101.3kPa to 18.6kPa
Sand and Dust	SAE J1455	
Solar Radiation	ISO 4892-2	Method B
Wash Down	ANSI/ASAE EP455 5.6	Level 2
Humidity	ANSI/ASAE EP455 5.13	96% humidity at 35˚C for 240 hours
Salt Fog	ANSI/ASAE EP455 5.9	5% aqueous solution of NaCl @ 35˚C and a pH between 6.5 and 7.2 for 48 hours
Chemical resistance	ISO 16750-5 EP 455 5.8.2	
Ingress Protection	IP67 front and rear	with mating connector installed

ELECTRICAL PERFORMANCE SPECIFICATIONS

Maximum load	ANSI/ASAE EP455 5.1.1	T(min)= -40C; T(max) = +65C
Jump start voltage	EP455 5.10.2	36V for 5 minutes; -36V for 5 minutes
Short circuit protection	EP455 5.10.4	36V
Reverse polarity protection	EP455 5.10.3	-36V
Starting profile	ISO 16750-2:2006-08-01	Code C for 12V, Code E for 24V
Battery-less operation	ANSI/ASAE EP455 5.11.3	Level 1
Load dump	ISO 7637-2:2004 Test Pulse 5a	Level 4
Switching spikes	ISO 7637-2:2004	Level 4
Alternator field decay	ANSI/ASAE EP455 5.11.2	

MECHANICAL PERFORMANCE

Vibration, Random	ANSI/ASAE EP455 5.15.1	2h each axis 50Hz to 2000Hz
Vibration, Sinusoidal	ANSI/ASAE EP455 5.15.2	A logarithmic sweep from 10Hz to 2000Hz to 10Hz over a period of 20 minutes for 4 hours in each axis
Shock	ANSI/ASAE EP455 5.14	11ms half sine pulse of 490 m/s2 in 3 axis
Drop	ANSI/ASAE EP455 5.14.2 Level 1	400 mm onto a hardwood benchtop on all practical edges.

CE COMPLIANCE

EMC	EN 13309:2010	ESA

ELECTROMAGNETIC COMPATIBILITY SPECIFICATIONS

ESD	ANSI/ASAE EP455 5.12	Level 1 (Handling), level 2 (Powered)
Radiated Immunity	EP455 5.16	Level 1
Conducted emissions	CISPR25	Level 3
Radiated emissions	ISO14982	

SOFTWARE DEVELOPMENT TOOLS

VUI Builder	Grayhill's proprietary application for PC	Ideal for engineers that wish to quickly create common vehicle functions without coding
Qt	Cross platform development app from Digia Plc	Ideal for software developers familiar with coding for human interface applications
CODESYS	Hardware-independent automation software from 3S-Smart Software Solutions GmbH	Ideal for software developers familiar with coding for human interface applications

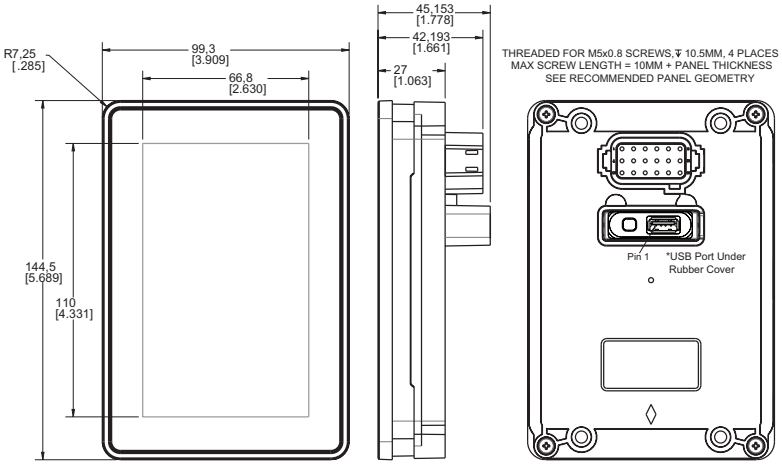
Easily create custom graphic icons, text boxes and active gauge elements that can monitor CAN-bus parameters such as J1939.

- Applications can be developed in Grayhill's proprietary VUI Builder, Qt, or CODESYS - the most trusted cross platform development environments.
- A development kit is offered to provide the hardware and software required to set up a programmer's workstation for the use with the chosen development environment.

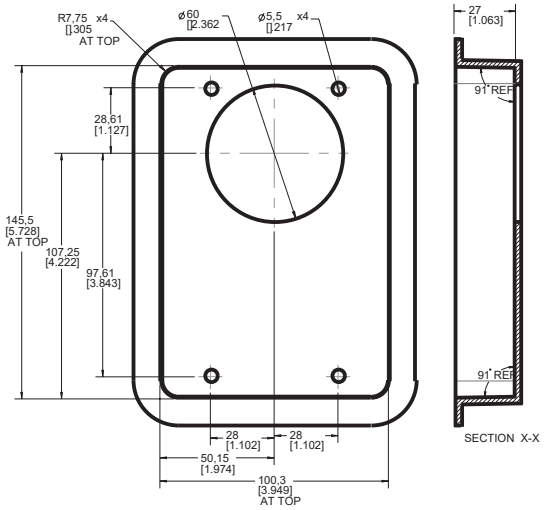


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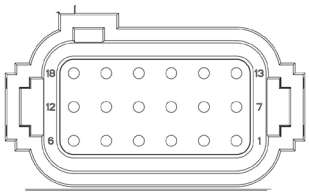
DIMENSIONS in mm [inch]



Recommended Mounting Cut Out



REAR CONNECTOR A & B



Mating Connector:
DEUTSCH DT16-18SA-K004

Pin	Function	Pin	Function	Pin	Function	Pin	Function	Pin	Function	Pin	Function
1	VIN Positive	2	VIN Return	3	VIN Switched	4	Digital In	5	Digital Out	6	Digital I/O
7	Didital I/O	8	Didital I/O	9	VIDEO1+	10	VIDEO1-	11	VIDEO2+	12	VIDEO2-
13	CAN1 HI	14	CAN1 LO	15	CAN2 HI	16	CAN2 LO	17	RS232Tx	18	RS232Rx

VERSATILE DISPLAY. ORDER INFORMATION.

	RS232	USB 2.0	CAN1	CAN2	VIDEO1	VIDEO2	RTC	Touch	DIG IN	DIG OUT	DIG I/O	VUI Builder	QT 4.8.6	CODESYS	Linux
3D50XX-200	X	X	X						0	0	0	X	X		4.1.15
3D50VX-200	X	X	X	X	X	X	X		1	1	3	X	X		4.1.15
3D50VT-200	X	X	X	X	X	X	X	X	1	1	3	X	X		4.1.15
3D50DEV-200	Development Kit with 3D50VT-200 display														
3D50XX-200-C	X	X	X						0	0	0	X	X	X	4.1.15
3D50VX-200-C	X	X	X	X	X	X	X		1	1	3	X	X	X	4.1.15
3D50VT-200-C	X	X	X	X	X	X	X	X	1	1	3	X	X	X	4.1.15
3D50DEV-200-C	Development Kit with 3D50VT-200-C display														

Your Experts in Cab Controls

Grayhill specializes in the design, development and production of human interface controls, including:

- Cab user interface design
- Customized control panels
- CAN-bus interface devices

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