3D70 7-INCH TOUCHSCREEN DISPLAY

Versatile CAN-based 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 3 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, 1000-nit display is backlit, and 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.

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

VERSATILE DISPLAY. MANY FEATURES.

Flexible.
Series 3D70 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 12 V/24 V operation, boots in 3 seconds (VUI Builder) and is sealed against the ingress of liquids and dust.

Bright.
This 7.0-inch backlit WVGA LCD (800×480) is very bright (1000 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 three NTSC/PAL camera input ports
- Up to two analog inputs
- Up to four digital inputs
- Up to four digital outputs
- One USB 2.0 port
- Ethernet
- Audio Line Out
- Touchscreen

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

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

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

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.

VERSATILE DISPLAY. ALL THE SPECIFICATIONS.

Power Specifications

Operating Voltage	8 VDC to 32 VDC
Power Consumption	7 Watts (typical)
Standby Current	<1 ma

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 hr at extremes)
Altitude (Barometric Pressure)	ANSI/ASAE EP455 5.2	101.3 kPa to 18.6 kPa
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 hrs
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)= -40 °C; T(max) = +65 °C
Jump Start Voltage	EP455 5.10.2	36 V for 5 minutes; -36 V for 5 minutes
Short Circuit Protection	EP455 5.10.4	36 V
Reverse Polarity Protection	EP455 5.10.3	-36 V
Starting Profile	ISO 16750-2:2006-08-01	Code C for 12 V, Code E for 24 V
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	

Display: 7" color transmissive TFT LCD

Resolution: WVGA, 800×480 pixels, 16 bit color

Aspect Ratio: 16:9

Orientation: Landscape or Portrait

Backlighting: LED, 1000 cd/m² or nits

Microprocessor: Freescale™ i.mx6, 800 MHz

Flash Memory: 4GB

RAM: 512 MB DDR3

USB: 2.0 host

Real Time Clock: Internal non-rechargeable battery backup

CAN: (2) CAN 2.0 B

RS232: 115K Baud

Video Input: 3 NTSC/PAL

Inputs: (4) 0-32 VDC discrete digital; freq meas. to 20 KHz, pulse width meas. down to 50uS

Outputs: (4) digital 200 mA switched high side

Analog: (2) 0-5 V, 0-10 V, 4-20 mA, 0-5000 Ohm

Mechanical Performance

Vibration, Random	ANSI/ASAE EP455 5.15.1	2 rs each axis 50 Hz to 2000 Hz
Vibration, Sinusoidal	ANSI/ASAE EP455 5.15.2	A logarithmic sweep from 10 Hz to 2000 Hz to 10 Hz over a period of 20 mins for 4 hrs in each axis
Shock	ANSI/ASAE EP455 5.14	11 ms 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

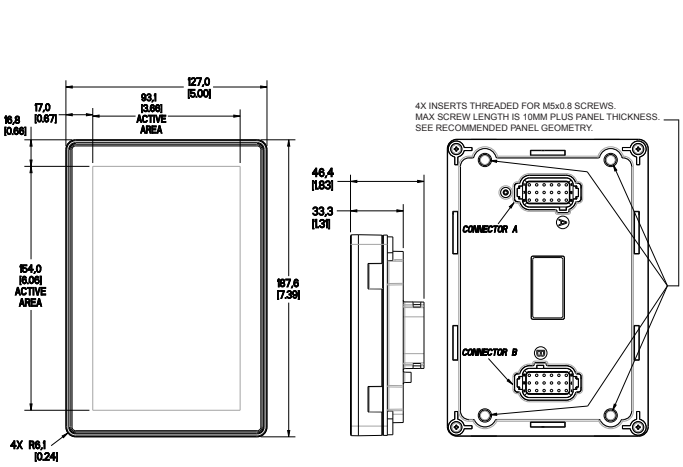
VUI Builder	Grayhill's proprietary application for PC	Ideal for engineers that wish to quickly create common vehicle functions without coding
Qt	Cross platform development app from Digia Plc	Ideal for software developers familiar with coding for human interface applications
CODESYS	Hardware-independent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

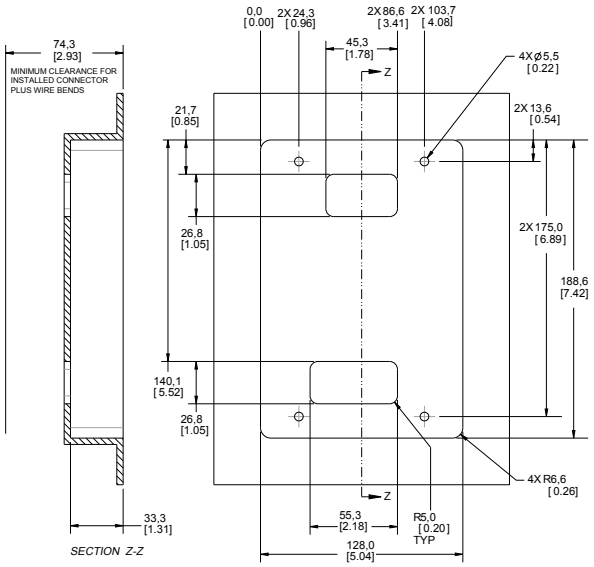
- Applications can be developed in Grayhill's proprietary VUI Builder, Qt, or CODESYS — the most trusted cross platform development environments.
- A development kit is offered to provide the hardware and software required to set up a programmer's workstation for the use with the chosen development environment.

Specifications are subject to change.

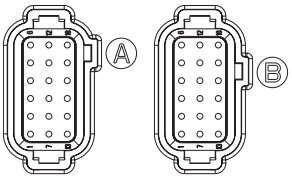
DIMENSIONS in millimeters [and inches]



RECOMMENDED MOUNTING CUT OUT



REAR CONNECTOR A & B



Mating Connector:
CON. A:
DEUTSCH DT16-18SA-K004

CON. B:
DEUTSCH DT16-18SB-K004

CONNECTOR A

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

CONNECTOR B

Pin	Function	Pin	Function	Pin	Function	Pin	Function	Pin	Function	Pin	Function
1	AUDIO OUT	**2**	AUDIO RET	**3**	Analog IN 1	**4**	Analog IN 2	**5**	VIDEO3 -	**6**	VIDEO3+
7	Analog RET	**8**	Digital IN 2	**9**	Digital IN 3	**10**	Digital IN 4	**11**	Digital OUT 1	**12**	Digital OUT 2
13	Digital OUT 3	**14**	Digital OUT 4	**15**	ETH TPO+	**16**	ETH TPO-	**17**	ETH TPI+	**18**	ETH TPI-

VERSATILE DISPLAY. ORDER INFORMATION.

	RS232	USB 2.0	CAN1	CAN2	VIDEO1	VIDEO2	VIDEO3	RTC	Touch	Ethernet	Buzzer	Audio Out	DIG IN	DIG OUT	Analog IN	VUI Builder	QT 4.8.6	CODESYS	Linux
3D70XX-200	X	X	X										0	0	0	X	X		4.1.15
3D70VX-200	X	X	X	X	X	X	X	X		X	X	X	4	4	2	X	X		4.1.15
3D70VT-200	X	X	X	X	X	X	X	X	X	X	X	X	4	4	2	X	X		4.1.15
3D70DEV-200	Development Kit with 3D70VT-200 display																		
3D70XX-200-C	X	X	X										0	0	0	X	X	X	4.1.15
3D70VX-200-C	X	X	X	X	X	X	X	X		X	X	X	4	4	2	X	X	X	4.1.15
3D70VT-200-C	X	X	X	X	X	X	X	X	X	X	X	X	4	4	2	X	X	X	4.1.15
3D70DEV-200-C	Development Kit with 3D70VT-200-C display																		