



CURTIS

A **KOHLER** COMPANY



## Digital Instrumentation

# enGage® NX VII Model 3750





## Digital Instrumentation

The Curtis enGage® NX VII (NX7) is a 7 inch, 1000 nit, touch screen display that utilizes a high-performance i.MX 8M+ processor, memory, and peripherals to enable innovative features such as digital video, machine learning, advanced graphical animations, and wireless connectivity. The NX7 is customizable in a multitude of ways, allowing OEMs to realize unique brand identity quickly. The display is equipped with CAN-FD, the latest CANbus technology, which provides faster data rates and increased reliability than CAN 2.0. Optional Bluetooth and WiFi enable communication to a mobile application or fleet telematics portal. Optional RFID enables vehicle security and operator identification through an RFID tag or mobile phone.

The NX7 represents the most advanced level of the unified enGage NX product portfolio. All enGage NX products share a common user experience as well as a set of companion tools such as the mobile application and data server making it easy to move between product platforms within the portfolio.

### FEATURES

- ▶ 7 in. 1024 x 600 pixel, wide-format, touch screen LCD.
- ▶ Bright, 1000 nit, optically bonded, display enables clear visualization in direct sunlight.
- ▶ Enables visualization of machine information and a unique brand identity through a fully customizable user interface.
- ▶ A light sensor automatically adjusts screen brightness to ambient light conditions.
- ▶ Two CAN FD ports, with J1939 and CANopen support, provide 5 Mbps data speeds, superior EMC and reliability, and backwards compatibility to CAN 2.0.
- ▶ Gigabit Ethernet allows for digital video feeds, fast application updates and machine communication.
- ▶ Support for both digital and analog video, with auto-detected analog PAL and NTSC, allows OEMs flexibility in video solutions.
- ▶ Optional WiFi and Bluetooth connectivity communicate machine data to the Curtis mobile application or third-party applications.
- ▶ Optional RFID/NFC enables easy operator identification using compatible ISO 14443A RFID tags or supported mobile phone application.
- ▶ Optional CAN isolation allows for CAN operation when using different voltages and ground planes.
- ▶ Four independently configurable inputs, three fixed switch inputs and two configurable outputs allow for a range of connected IO devices.
- ▶ Mount the display using either panel or RAM mounting.
- ▶ Operates in demanding conditions with an operational temperature range of -40° to +70°C and IP67 front and rear ingress protection.
- ▶ CE, UKCA and ROHS3 compliance and UL recognition ensure compatibility with global regulatory safety.\*

*\*Pending*



## Digital Instrumentation

### SPECIFICATIONS

#### Electrical

##### Voltage Ranges:

Nominal	Min.	Max.
12–48V	9V	60V

##### Operating Currents:

Voltage	Typical (A)	Max (A)
B+ (9V)	0.8	1.5
B+ (12V)	0.6	1.0
B+ (24V)	0.3	0.5
B+ (36V)	0.2	0.4
B+ (48V)	0.2	0.3
B+ (60V)	0.2	0.3

##### CAN Baud Rate:

100 Kbps to 5 Mbps

#### Inputs

##### Switch Input Characteristics:

Parameter	Min.	Max.	Units
Input Range	0	60	Volts
Active-High Threshold	8.0	–	Volts
Active-Low Threshold	–	1.0	Volts
Input Impedance	741 k	819 k	Ohms

##### Keyswitch Input:

The keyswitch input meets the same input specifications as the switch inputs. This input is active only when switched to B+.

##### Sender Inputs:

Input 1 and 2 can be programmed for either a resistive or voltage based sender, or a frequency or switch input. Input 3 and 4 can be either a resistive or voltage based sender or a switch input.

##### Analog Input Characteristics:

Parameter	Min.	Max.	Units
Voltage Input Range	0	60	VDC
Voltage Measurement Range	0	10	VDC
Voltage Resolution	–	10	mV
Voltage Measurement Error	–	+/- (1% + 40 mV)	
Resistance Measurement Range	0	10k	Ohms
Resistance Resolution (0 – 1200 Ω)	0.2	5	Ohms
Resistance Resolution (1.2k – 10k Ω)	5	35	Ohms
Resistance Measurement Error	–	+/- (3% + 2Ω)	
Input Impedance	43.2k	60.6k	Ohms

##### Frequency Input Specifications:

Parameter	Min.	Max.	Units
Active High Threshold1*	1.38	–	VDC
Active Low Threshold1*	–	1.04	VDC
Active High Threshold2*	3.27	–	VDC
Active Low Threshold2*	–	2.96	VDC
Frequency	1	10k	Hz
Duty Cycle	10	90	%
Resolution	1	–	µsec
Accuracy	1	–	%

\* Note that threshold levels have two options that can be configurable.

#### Outputs

##### MOSFET Output Specifications:

Parameter	Min.	Max.	Conditions
Continuous Current	0	2A	
Off Voltage	–	60V	
On Voltage (rev. pol. protected)	1.0	2.0V	I = 2A DC



## Digital Instrumentation

### SPECIFICATIONS continued

#### Environmental

##### Operating Temperature:

–40° to +70°C

##### Storage Temperature:

–40° to +85°C

##### Humidity:

###### Soak

Designed to meet EN 60068-2-78

###### Cyclic

Designed to meet EN 60068-2-30

##### Ingress Protection:

Designed to meet EN 60529 IP67

##### Shock:

Designed to meet EN 60068-2-30

#### Regulatory Approvals

**UL:** UL recognition to UL 583.

**CE:** The product complies with the requirements of the EMC Standards and RoHS directive 2015/863/EU (RoHS 3).

**RoHS:** RoHS directive 2015/863/EU (RoHS 3).

#### Vibration:

**General:** Designed to meet EN 60068-2-6

**Random:** Designed to meet EN 60068-2-64

**Resonance:** Designed to meet EN 60068-2-6

#### EMC

##### Emissions:

Designed to meet ISO 13766-1:2018, ESA Test

##### Immunity:

**ESD:** Designed to meet EN 12895: 2015+A1:2019: Test level IV

**Radiated:** Designed to meet ISO 13766-1:2018

**Conducted:** Designed to meet ISO 13766-1:2018, ESA Test

**Frequency Magnetic Field:** Designed to meet EN 12895:2015+A1:2019

#### EMC:

- ▶ Radiated Emissions: EN 12895:2015+A1:2019
- ▶ Radiated Immunity: EN 12895:2015+A1:2019
- ▶ Frequency Magnetic Field Immunity: EN 12895:2015+A1:2019
- ▶ ESD: EN 12895:2015+A1:2019

#### MODEL CHART

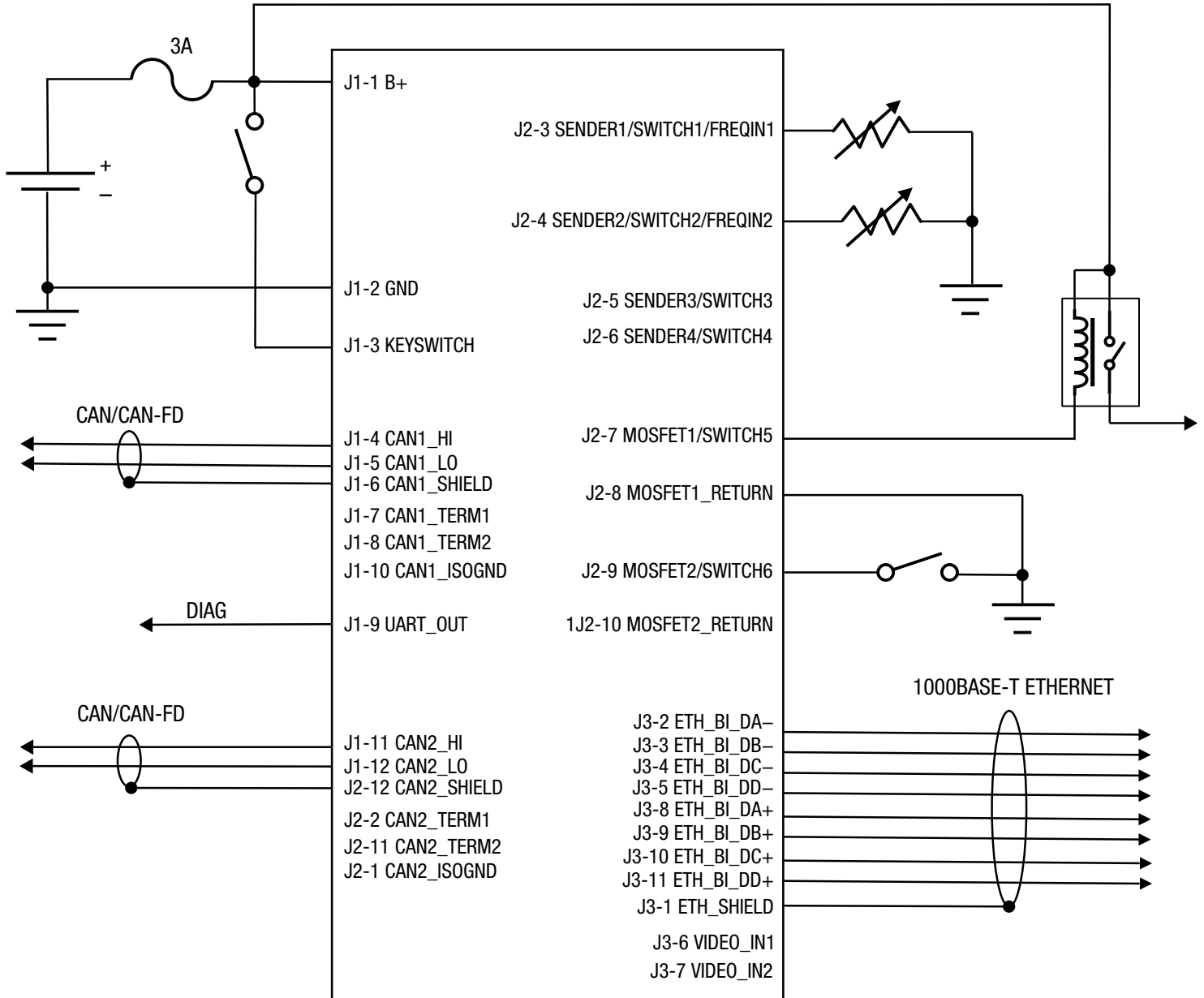
Model	Curtis PN	Description
3750–T0T-001	17778700-001	NX7 with Digital Video and Touch Screen
3750–TVIN4T-002	17778700-002	NX7 with Analog and Digital Video, Isolated CAN, RFID, Bluetooth 5, WIFI 4 Single Band and Touch

Please discuss custom model inquiries with a Curtis sales member.



## Digital Instrumentation

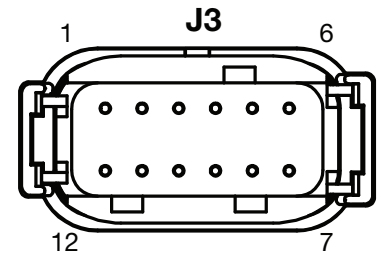
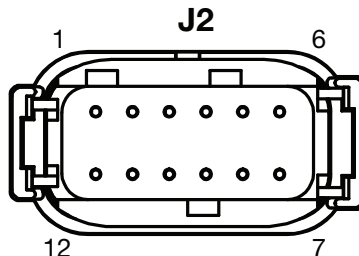
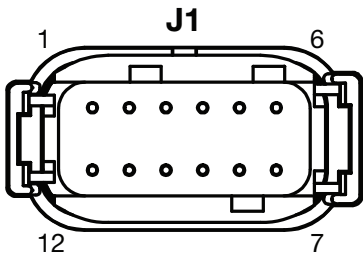
### TYPICAL WIRING DIAGRAM





## Digital Instrumentation

### CONNECTOR



The signals are assigned as shown in the table below.

Pin No.	Signal Description
J1-1	Battery Voltage (B+)
J1-2	Battery Common (B-)
J1-3	Keyswitch
J1-4	CAN1 High
J1-5	CAN1 Low
J1-6	CAN1 Shield
J1-7	CAN1_Term1
J1-8	CAN1_Term2
J1-9	UART RX
J1-10	CAN1 Common
J1-11	CAN2 High
J1-12	CAN2 Low

Pin No.	Signal Description
J2-1	CAN2 Common
J2-2	CAN2_Term1
J2-3	Sender 1
J2-4	Sender 2
J2-5	Sender 3
J2-6	Sender 4
J2-7	MOSFET 1 Output
J2-8	MOSFET 1 Common
J2-9	MOSFET 2 Output
J2-10	MOSFET 2 Common
J2-11	CAN2_Term2
J2-12	CAN2 Shield

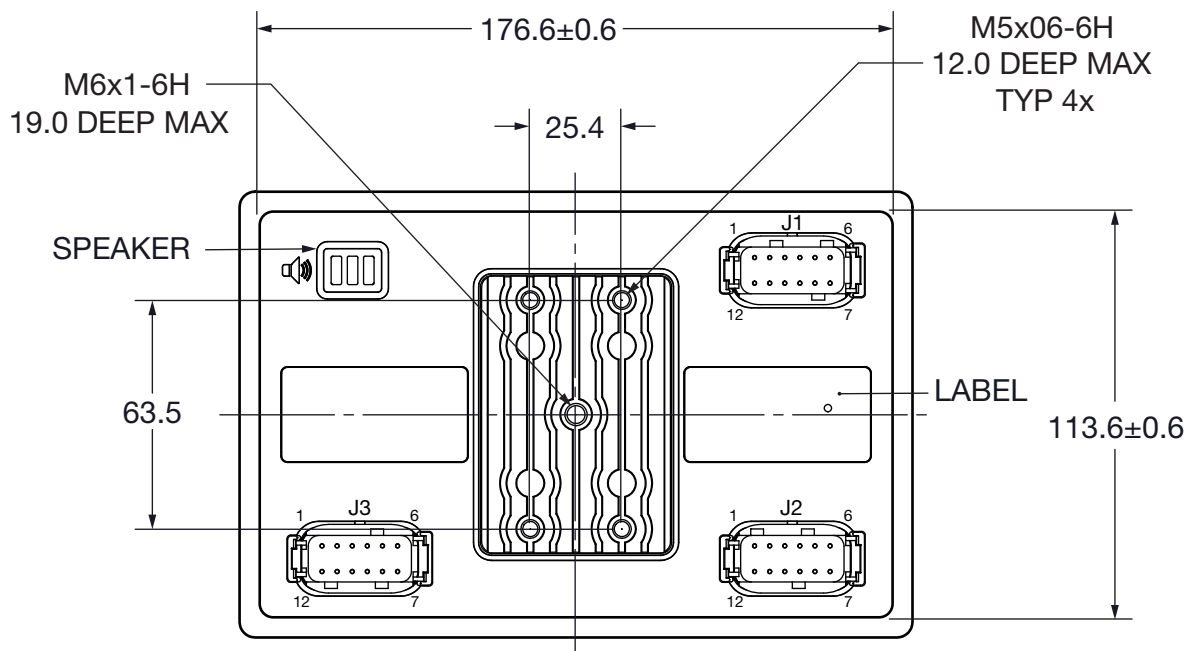
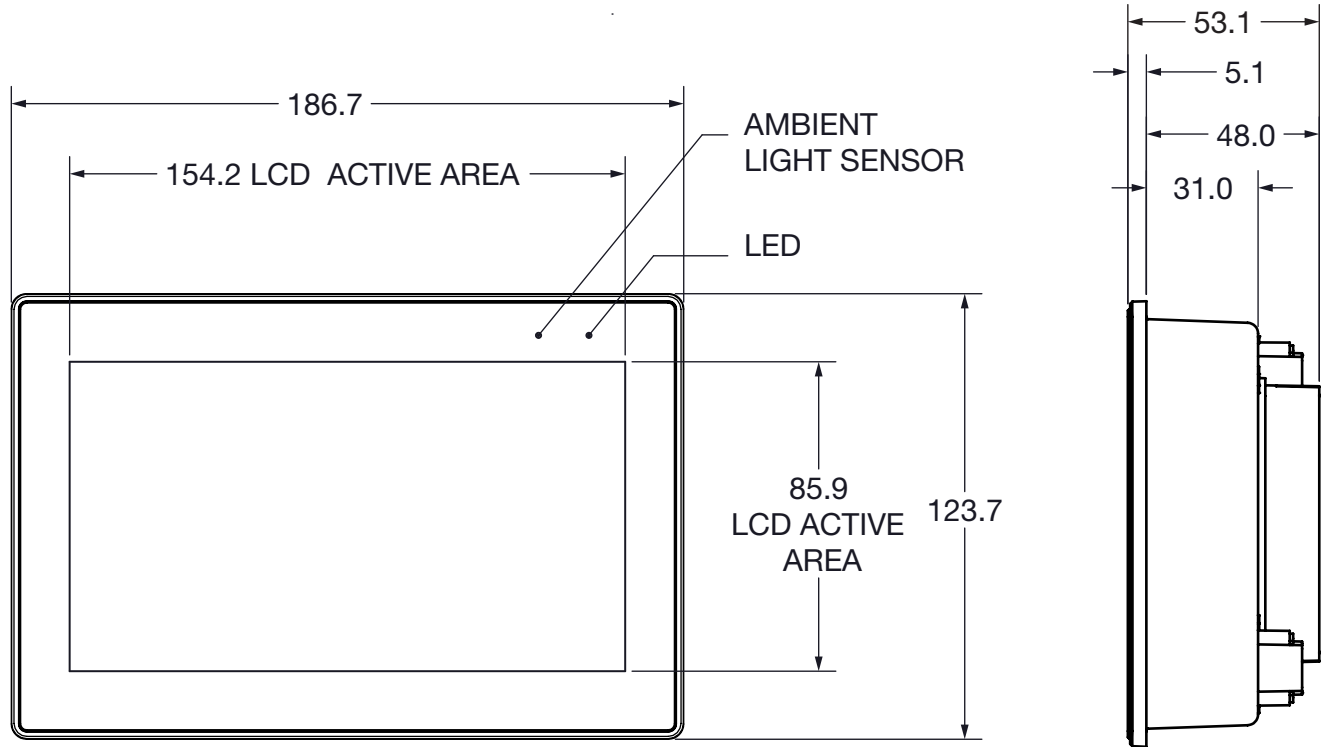
Pin No.	Signal Description
J3-1	ETH Shield
J3-2	ETH BI_DA-
J3-3	ETH BI_DB-
J3-4	ETH BI_DC-
J3-5	ETH BI_DD-
J3-6	Video Input 1 Signal
J3-7	Video Input 2 Signal
J3-8	ETH BI_DA+
J3-9	ETH BI_DB+
J3-10	ETH BI_DC+
J3-11	ETH BI_DD+
J3-12	-





## Digital Instrumentation

### DIMENSIONS mm

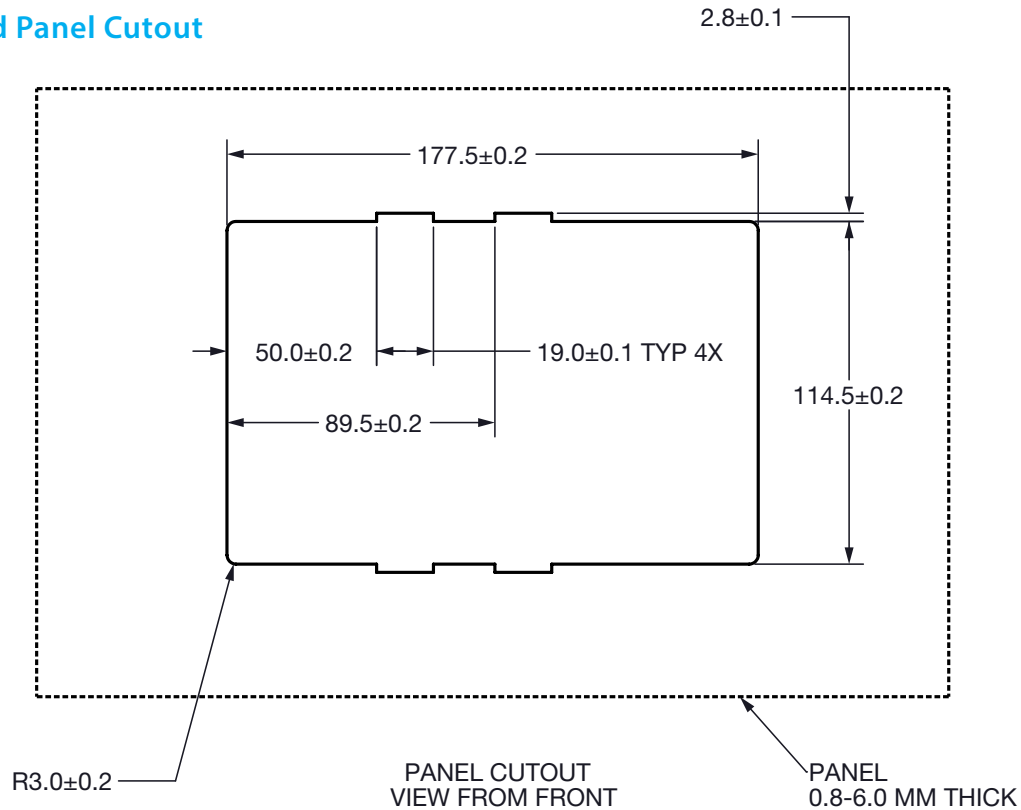




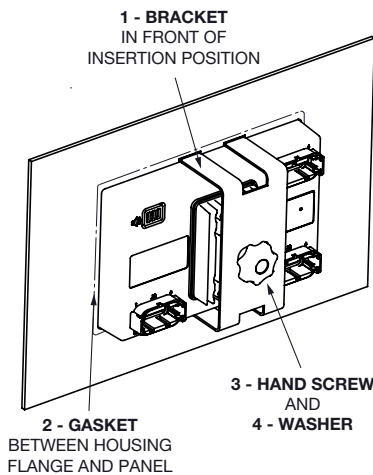
## Digital Instrumentation

### DIMENSIONS

#### Recommended Panel Cutout

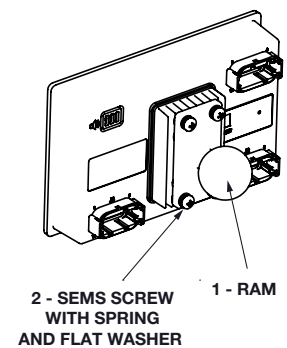
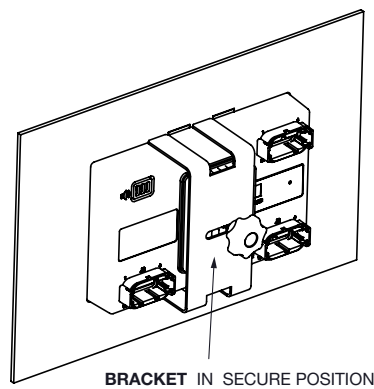


### Mounting Options



Panel Mounting

No.	Curtis Part Number	Description
1	17778364	Bracket
2	17778363	Gasket
3	12515-HS-01	Hand Screw, M6x20
4	12077WB-0005-M6	Bellville Washer, M6



RAM Mounting

No.	Curtis Part Number	Description
1	17778362	RAM 202U-153
2	12057MP-9001-M5-16	SEM Screws with Spring and Flat Washer, M5x16





## Digital Instrumentation

### CUSTOMIZATION OPTIONS

The Curtis NX7 is designed to allow OEMs to easily customize the user interface, features, and theme to realize a unique brand identity. The NX7 may be customized in two ways:

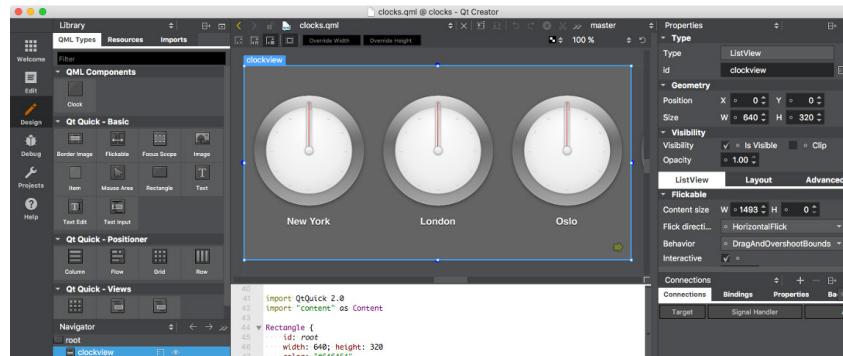
1. **Qt Design Studio** - Enables full graphics and simple logic customization using Qt QML and a WYSIWYG (what you see is what you get) type editor. This option is best suited for graphics designers and simple customizations to the Curtis generic application.
2. **Qt Creator** - Enables full graphics and logic customization using a powerful code tool chain and editor. This option is best suited for software engineers with familiarity with C++.

### Generic Application Features include:

- ▶ User management and login
- ▶ Speed Input
- ▶ Wheel Position Input
- ▶ Battery State of Charge
- ▶ Analog or Digital Video Input and Display
- ▶ Fault Notification and Management
- ▶ Machine Maintenance Management
- ▶ Hour Meter and Odometer Management
- ▶ Warning Lights
- ▶ Forward/Neutral/Reverse Indication
- ▶ Optional Wireless connection (WiFi/Bluetooth)
- ▶ Display Brightness Management
- ▶ Language/Units Management
- ▶ Date/Time Management

### Qt Based Customization

- ▶ Qt, a cross platform software development tool, offers OEMs fast development times, modern, high-quality GUIs, and responsive animations.
- ▶ Through Qt, OEMs have full control over the user interface and logic of their application.
- ▶ Utilization of the Qt commercial license ensures that OEMs will never need to publish their source code or violate open-source license requirements.
- ▶ Qt enables 3D graphics and advanced animations allowing OEMs to realize modern applications.
- ▶ Qt comes packaged with a multitude of useful libraries allowing OEMs to quickly implement common features and functions.
- ▶ Qt enables advanced debugging and PC simulation, making it easy to resolve application issues.
- ▶ The OEM may interface with NX7 hardware through Curtis provided libraries and APIs. The libraries are fully tested to ensure reliability of core features.



**WARRANTY** Two year limited warranty from time of delivery.