VeeCAN Displays:
Raptor's HMI Hardware and Software Capabilities

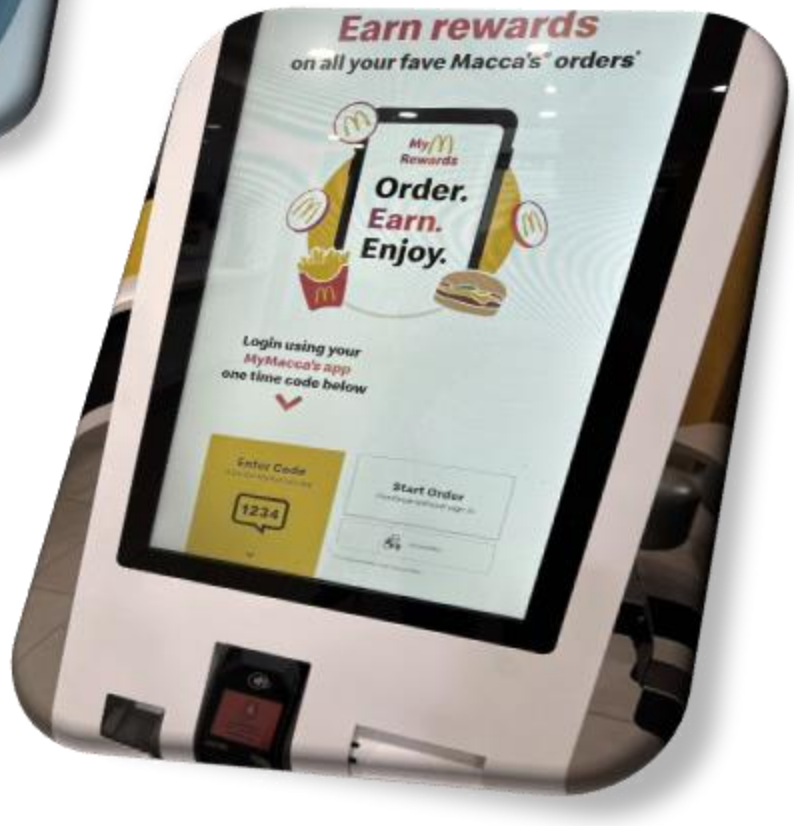
new eagle

RAPTOR™
INNOVATION
SUMMIT 2024

By: George Reeves

What are HMIs?

Everyday HMIs



Human

Machine

Interface

Related Terminology

HMI

UI

UX

GUI

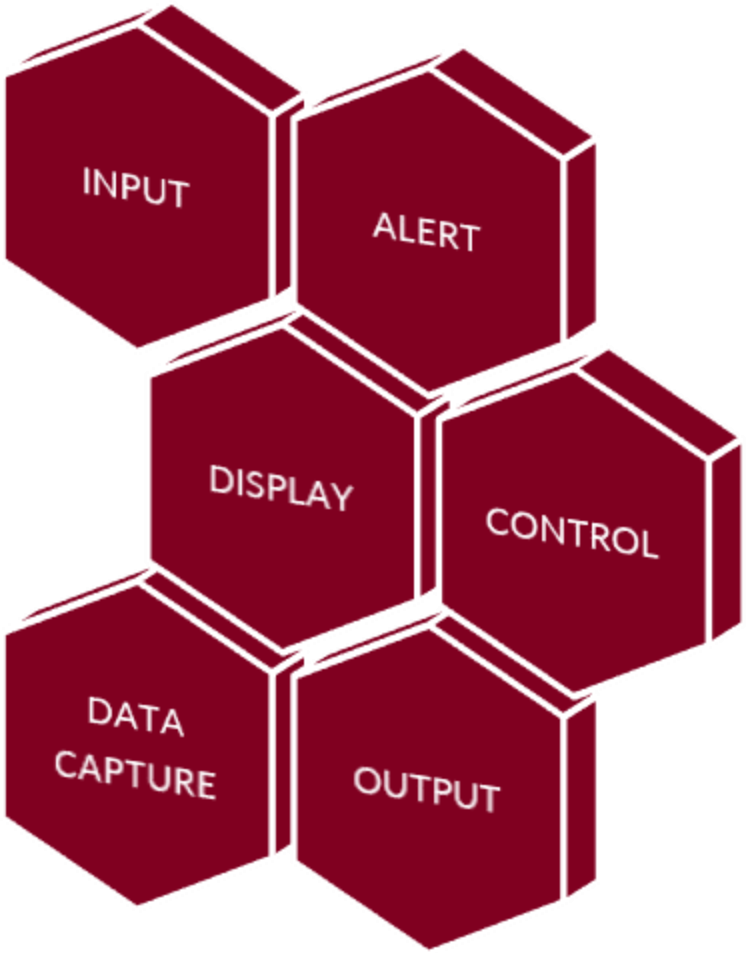
CUI

HID

HUD

What can HMIs do?

- Display information to user
  - Vehicle Speed
  - Order number
- Ability to input data
  - Trip counter
  - Order selection
- Execute actions or events
  - Alert notification
  - Print receipt



HMIs Across Industries

Choosing the right HMI

Generic HMIs come in all shapes, sizes, and IP ratings!

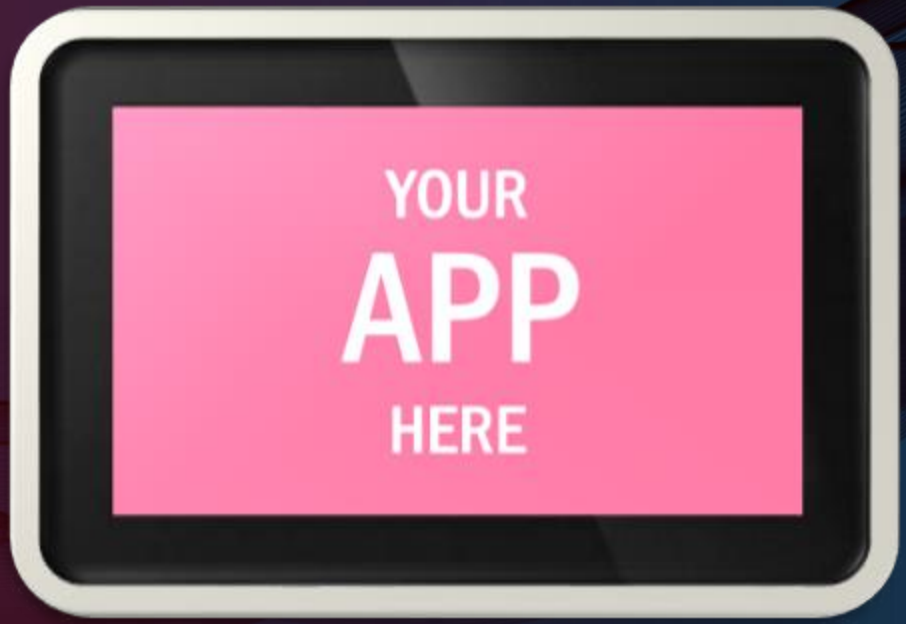
- System connectivity
- Operator interactions
- Ability to customize
- Mounting location
- Data collection

Raptor Displays

Raptor Enabled HMIs

Raptor-Dev allows users to deploy custom HMI applications

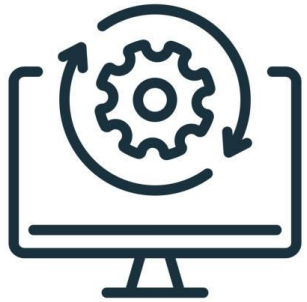
- CAN and Serial communication interfaces
- Capacitive and resistive touchscreens
- Matlab/Simulink custom coding interface via Raptor
- Marine rated with mounting options
- CAN and custom data capture available

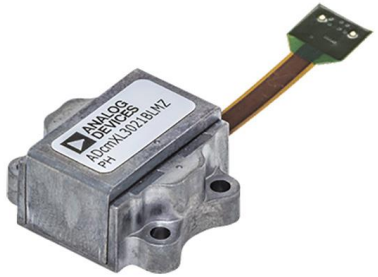


Live Display Showcase

Raptor Displays: Hardware

Raptor Display Hardware





Raptor Display Hardware

new eagle TAKE CONTROL	VeeCAN 800	VeeCAN 700	VeeCAN 500	VeeCAN 320	VeeCAN 320 J1708	VeeCAN 320 LITE	VeeCAN 320 Low Profile	VeeCAN 320 Low Profile - LITE	VeeCAN 300R	VeeCAN 128	KAntrak 1700
Image of Display											
Screen Size	7"	7"	5"	3.5"	3.5"	3.5"	3.5"	3.5"	3" Round	2.3"	2.3"
Resolution	**800x480**	**800x480**	**800x480**	**320x240**	**320x240**	**320x240**	**320x240**	**320x240**	**432x432**	**128x64**	**128x64**
Color	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-
Touchscreen	✓	✓	✓	-	-	-	-	-	✓	-	-
Raptor Programmable	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
Data Logger	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
C Programmable (with purchase of SDK)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
J1939 Generic Engine Monitoring (GEM)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Analog Inputs	14	1	1	7	7	-	7	-	7	-	1
Digital Inputs	-	**1**	-	-	-	-	-	-	**4**	-	-
Frequency Inputs	1	-	1	1	1	-	1	-	1	-	-
Digital Outputs	**8**	**1**	**1**	**4**	**4**	-	**4**	-	**3**	-	**1**
CAN 2.0B Ports	2	2	2	2	2	1	2	1	1	1	1
USB 2.0 Ports	**2**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	-
J1708 Ports	-	-	-	-	1	-	-	-	-	-	-
RS-232 Ports	**1**	**1**	**1**	**1**	-	**1**	**1**	**1**	-	**1**	-
RS-485 Ports	-	-	-	-	-	-	-	-	1	-	-
Brightness	**700 NIT**	**800 NIT**	**1000 NIT**	**700 NIT**	**700 NIT**	**700 NIT**	**700 NIT**	**700 NIT**	**850 NIT**	**700 NIT**	-
Operating Temp (°C)	-30 to 80	20 to 70	-20 to 70	-40 to 70	-40 to 70	-40 to 70	-40 to 70	-40 to 70	-20 to 70	-30 to 80	-30 to 70
Built-in Heater	-	-	-	-	-	-	-	-	-	-	-
IP Rating	Front 66 / Back 67	IP67	IP67	Front 66 / Back 67	Front 66 / Back 67	Front 66 / Back 67	Front 66 / Back 67	Front 66 / Back 67	IP67	Front 66 / Back 67	67

Raptor Display Hardware - Datasheets

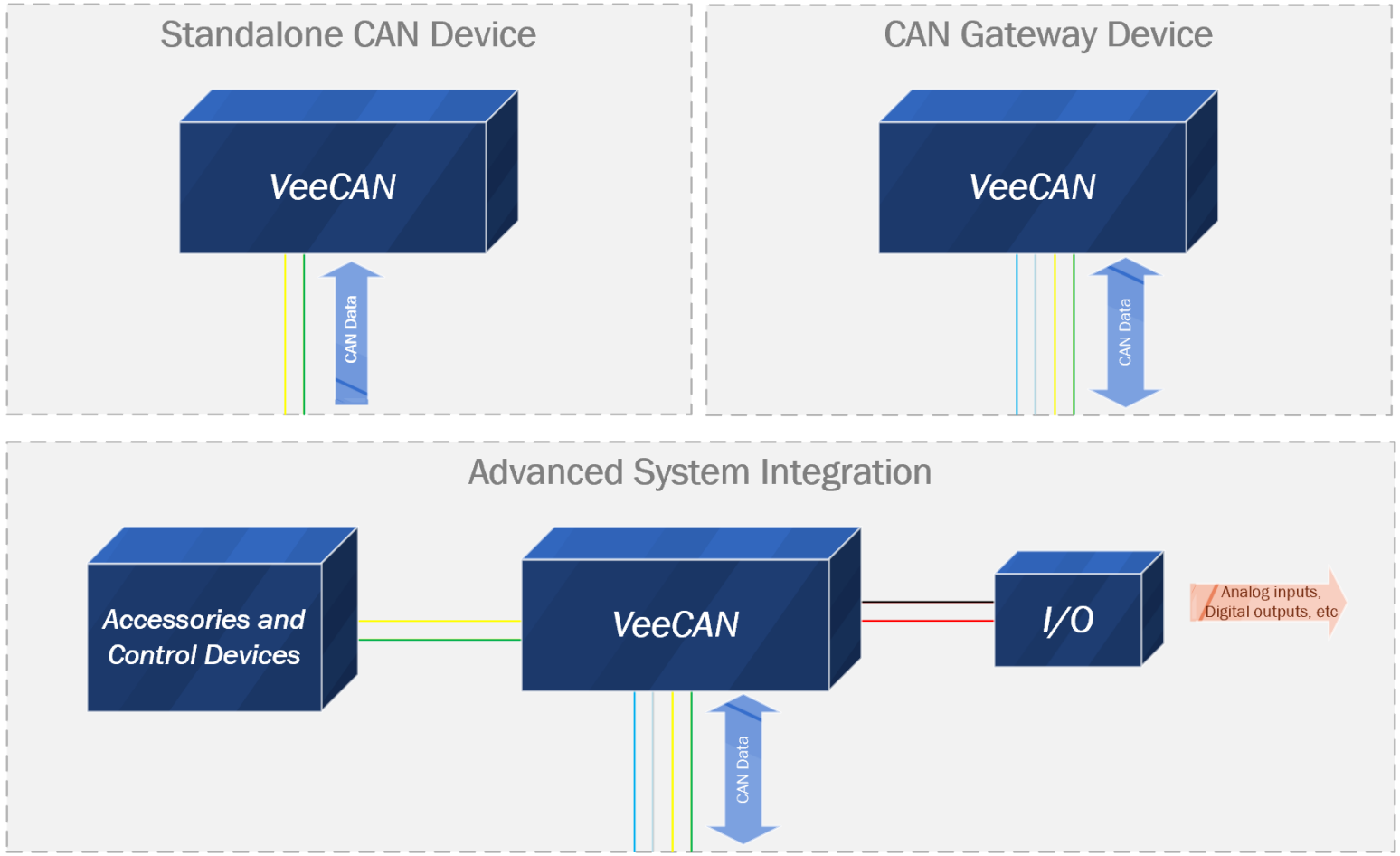
- Full hardware specifications
- Module pinout and connector information
- Communication, memory, and MCU specifications

WIKI.NEWEAGLE.NET

- **3" LCD Round Color Display**
  - PCAP LCD 2.93" Round
  - Full Sunlight Readable
- **Programming**
  - MATLAB Simulink with Raptor 2020b_1.0+
  - IO support in Raptor 2022a_1.0+
- **Processor**
  - ST M32 F4
  - 180 MHz
- **Memory**
  - 8 MB App Flash
  - 4 KB EEPROM
  - 256 MB SDRAM
- **12 Inputs**
  - 7 Analog Inputs
  - 4 Digital Input
  - 1 Frequency Input
- **1 Output**
  - 1 Digital Output
- **10-32 V Operating Voltage**
- **Communication**
  - 1 CAN 2.0B
  - 1 RS-485
  - 1 USB 2.0
- **Environmental**
  - 20°C to 70°C Operating Temp
  - IP67 Rating
- **Compiler**
  - arm-atollic-eabi_6.3.1 (Included with Raptor-Dev)
- **Weight**
  - 0.58lb (263g)

- **7" LCD Color Display**
  - 800(H) x 480(V) WVGA
  - Full Sunlight Readable
- **Programming**
  - MATLAB Simulink with Raptor 2020a_2.0 or newer
- **Processor**
  - Freescale i.MX 6
  - 1 GHz
- **Memory**
  - 256 MB App Flash
  - 256 MB SDRAM
- **2 Inputs**
  - 1 Analog Inputs
  - 1 Digital Input
- **1 Output**
  - 1 Relay Output
- **8-32 V Operating Voltage**
- **Communication**
  - 2 CAN 2.0B
  - 1 RS-232
  - 1 USB 2.0
  - 1 Ethernet Available
- **Environmental**
  - -30°C to 80°C Operating Temp
  - IP67 Rating
- **Compiler**
  - Arm_linux-gnueabihf_5.4.0 (Included with Raptor-Dev)
- **Weight**
  - 1.07lb (485g)

Raptor Display Concepts



Standard VeeCAN Features

- USB flash drive data capture
  - Raw CAN data
  - Internal software data
- Common Communication Interfaces
  - CAN 2.0
  - RS-232 (RS-485 available)
- User Input
  - Touchscreen or tactile button
  - Custom input functions
  - Expandable with I/O modules

Raptor Display Project Integration

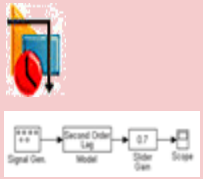
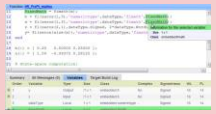
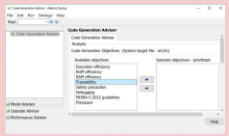
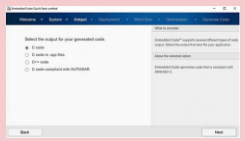
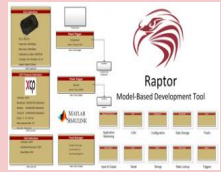
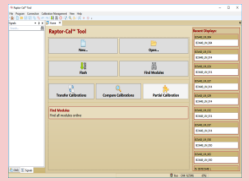
Raptor Displays

CONCEPT | DESIGN | VALIDATE | PPAP | PRODUCTION | FLEET MANAGEMENT | SERVICE

- RAPTOR-DEV: Rapid Prototyping/Controls, Display Development
- RAPTOR-CAL: Calibration
- RAPTOR-CAN: Data Loggers (PC/Embedded)
- RAPTOR-TEST: Automated Testing/Regression
- RAPTOR-FLASH: End of Line
- RAPTOR TELEMATICS: Engineering Data Collection; Fleet Management Interface
- RAPTOR-SERVICE: Service Interface

Raptor Displays: Software

Display Building Environment

MATLAB	SIMULINK	MATLAB Coder	Simulink Coder	Embedded Coder	Raptor-Dev Software	Raptor tools
						
▪ Analysis, design, optimization ▪ Offline data processing	▪ Block diagram-based modeling ▪ Offline simulation	▪ Generate ANSI C/C++ code from MATLAB code	▪ C-code generation from the block diagram	▪ Optimizes the code generated by MATLAB Coder and Simulink Coder for production use	▪ Implementation Software ▪ Provides TLC ▪ .NET Framework Req	▪ Raptor-Cal ▪ Raptor - Service ▪ Raptor-Test ▪ Raptor-CAN

Software Components

*** Complier for the microprocessor/VeeCAN is required**
https://support.neweagle.net/support/solutions/articles/8000074117-raptor-controller-compilers

- Integrates all steps for developing a closed-loop control system
- Utilizes automatic code generation
- Direct access to the Raptor system

Display Building Environment

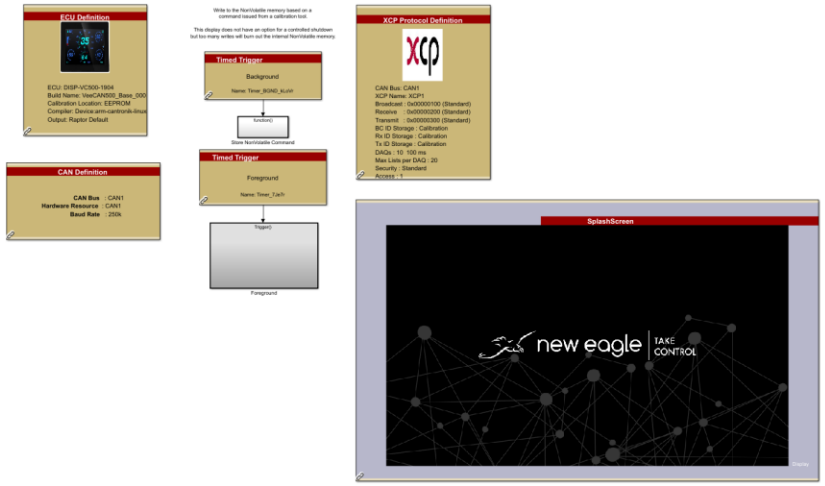
Raptor-Dev

- Develop control software with MATLAB Simulink for Production Hardware
- Wide variety of rugged control modules and display hardware
- Single step ready to program code directly from Simulink development enviorment
- Easy integration of I/O, communication, and diagnostic libraries
- CAN based interface for calibration
- Additional application libraries available

Raptor-Dev Display Library

Useful templates are built into the Raptor-Dev environment

- Designed to be ready for use immediately
- Base software templates provided for all Raptor VeeCAN units
- No additional libraries required

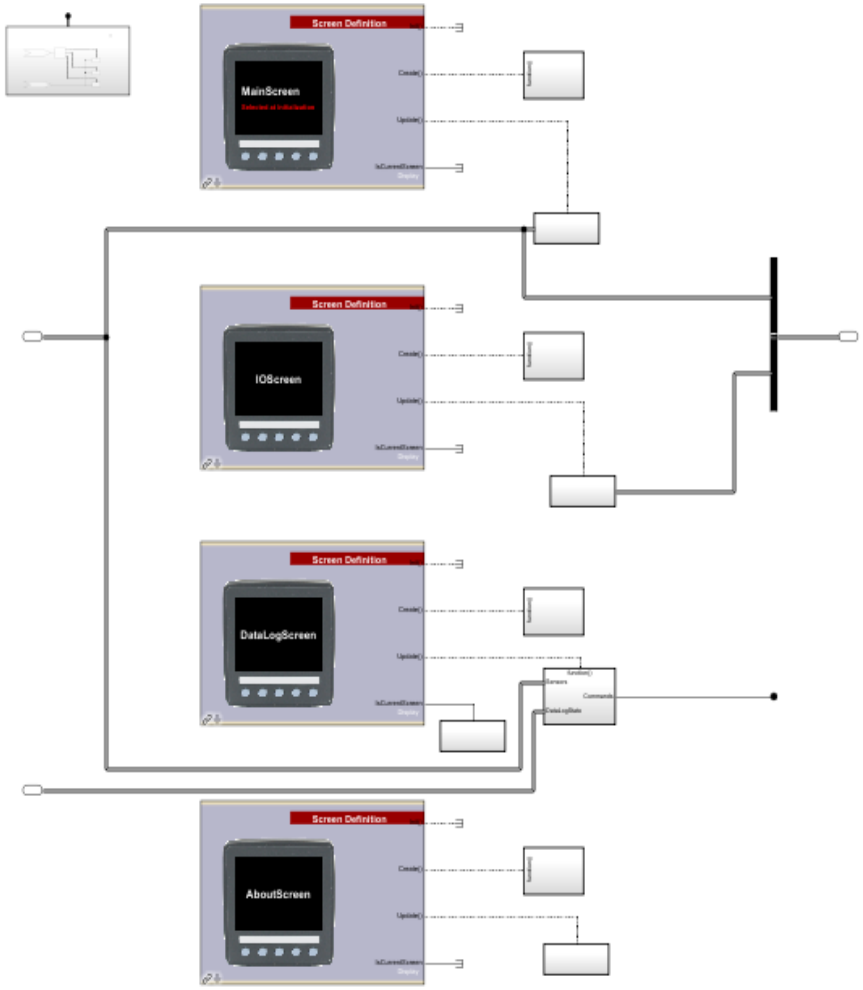



```
>> raptor_create_project('VeeCAN500_Base')
  1) DISP-VC128-1901
  2) DISP-VC320L-1402
  3) DISP-VC320-1204
  4) DISP-VC800-1402
  5) DISP-VC500-1904
  6) DISP-VC700-2003
  7) DISP-VC300R-2004
  8) GCM-5634M-070-1559
  9) GCM-5634M-070-1562
 10) ECM-1793-196-1503
 11) GCM-1793-196-1503
 12) GCM-5605B-048-1906
 13) GCM-5605B-048-2104
 14) RCM-5743R-080-2005
 15) RCM-5743R-080-2106
 16) RCM-5743R-080-2203
 17) UAS-5743R-047-2102
 18) UAS-5743R-047-2107
 19) EOL-58NN-176-2204
 20) RCM-58NN-112-2103
 21) RCM-58NN-112-2202
 22) HCM-5604-36-1303
 23) HCM-5604-36-1702
Please Select the Target by the Index (1-23): 5
*** Creating project folder
*** Creating support files
*** Creating model
A copy of the original file "VeeCAN500_Base.slx"
```

Raptor-Dev Display Library Continued

Templates contain a wide variety of software examples

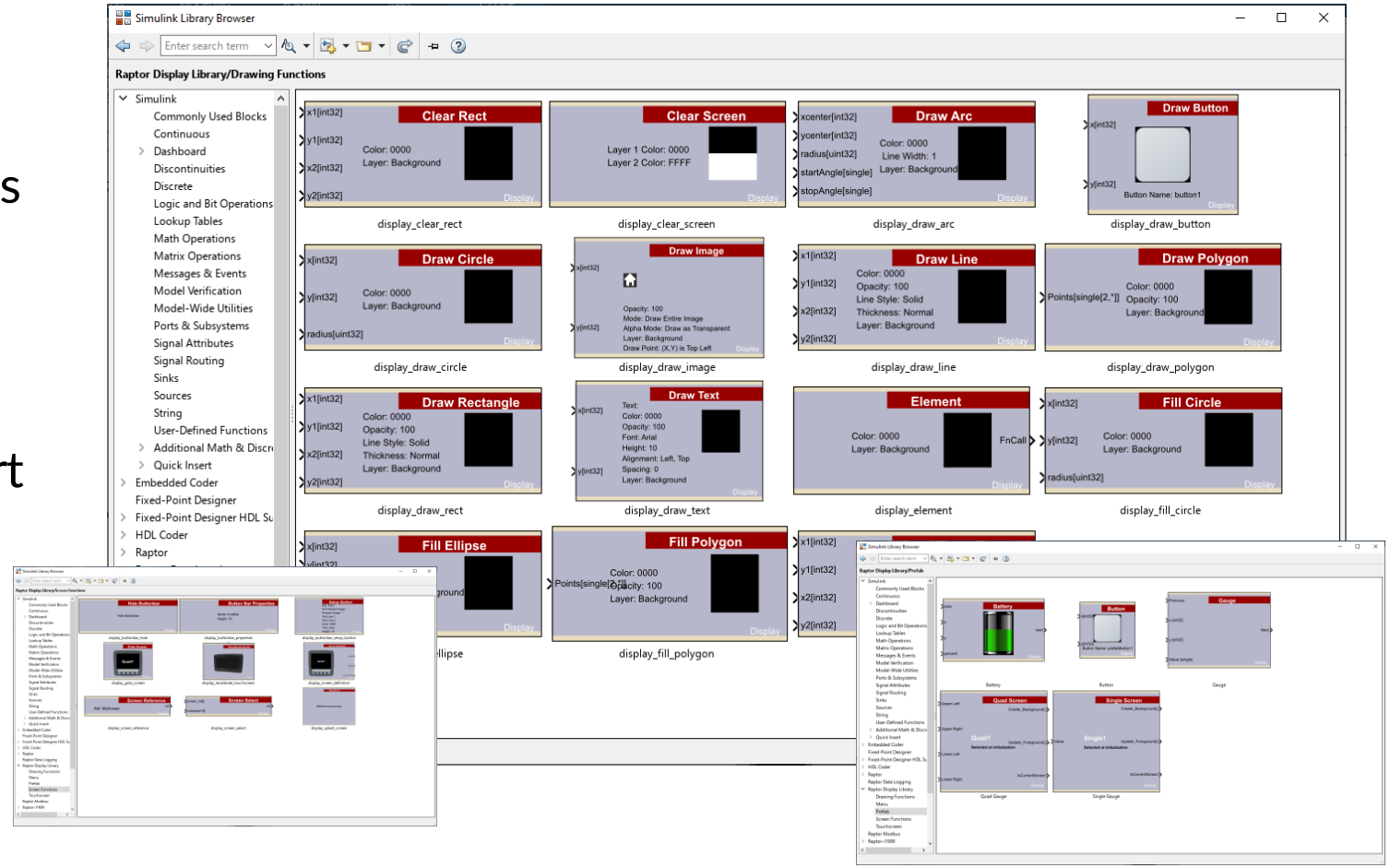
- Multi-screen application
- Touch gesture/button control
- USB datalogging
- Sample images
- Live gauges
- Dynamic text generation
- Example J1939 implementation
- Buildable PC simulator



Raptor-Dev Display Library Continued

Library contains all basic drawing and display functions

- Drawing functions
- Menu system
- Prefab – premade gauge systems
- Screen functions
- Touchscreen
- USB Logging
- Base Raptor-Dev Library Support
- Controls Foundation & J1939 Support



Raptor-Dev Display PC Simulator

Streamlines Raptor Display development process

- Real time debugging
- Supports Kvaser CAN tools and devices
- Supports virtual button inputs/gestures
- Great for iterative visual updates
- Use as standalone device

Display vs PC Simulator Functional Comparison

CAN Communication

Button & Gesture Inputs

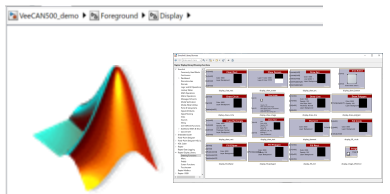
Control Software Functions

Display/Drawing Software

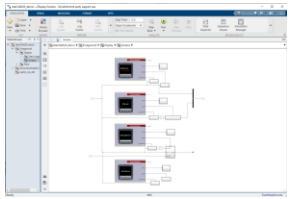
Physical I/O Hardware only

Audio Hardware only

Raptor-Dev Display Development Workflow

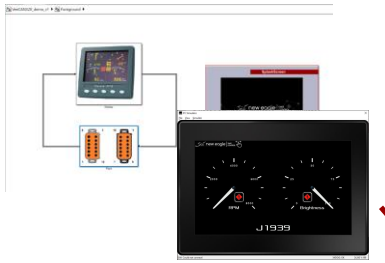


Create a preliminary VeeCAN model design

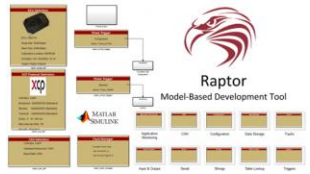


Add/Modify Screens & Functionality

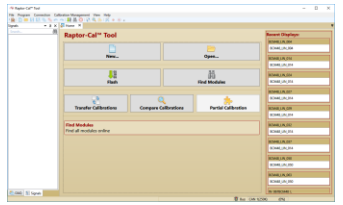
Graphics/Image design



Build and evaluate with virtual simulator

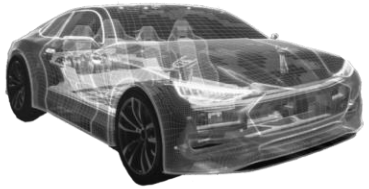


Implement I/O and/or CAN Re-build

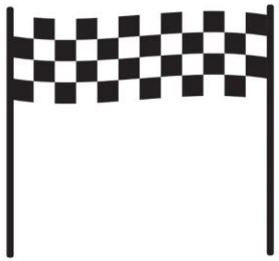


Use Raptor- Cal to Flash VeeCAN

Test in Vehicle/Test bench



New idea?



Finished

Additional Features & Tools

Display Datalogging

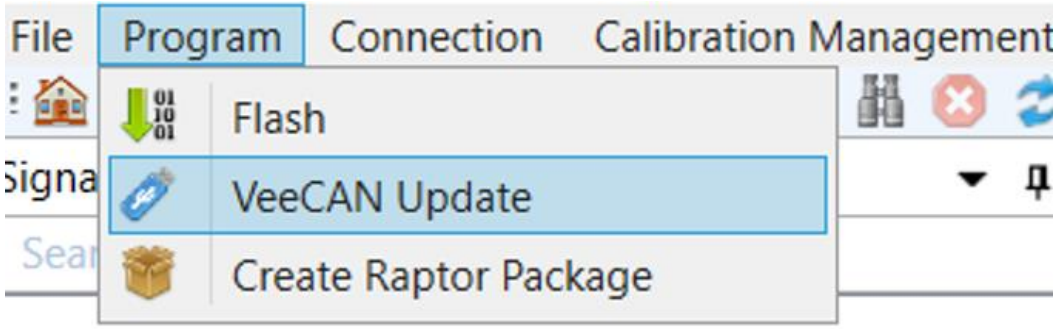
Data capture is a universally useful tool

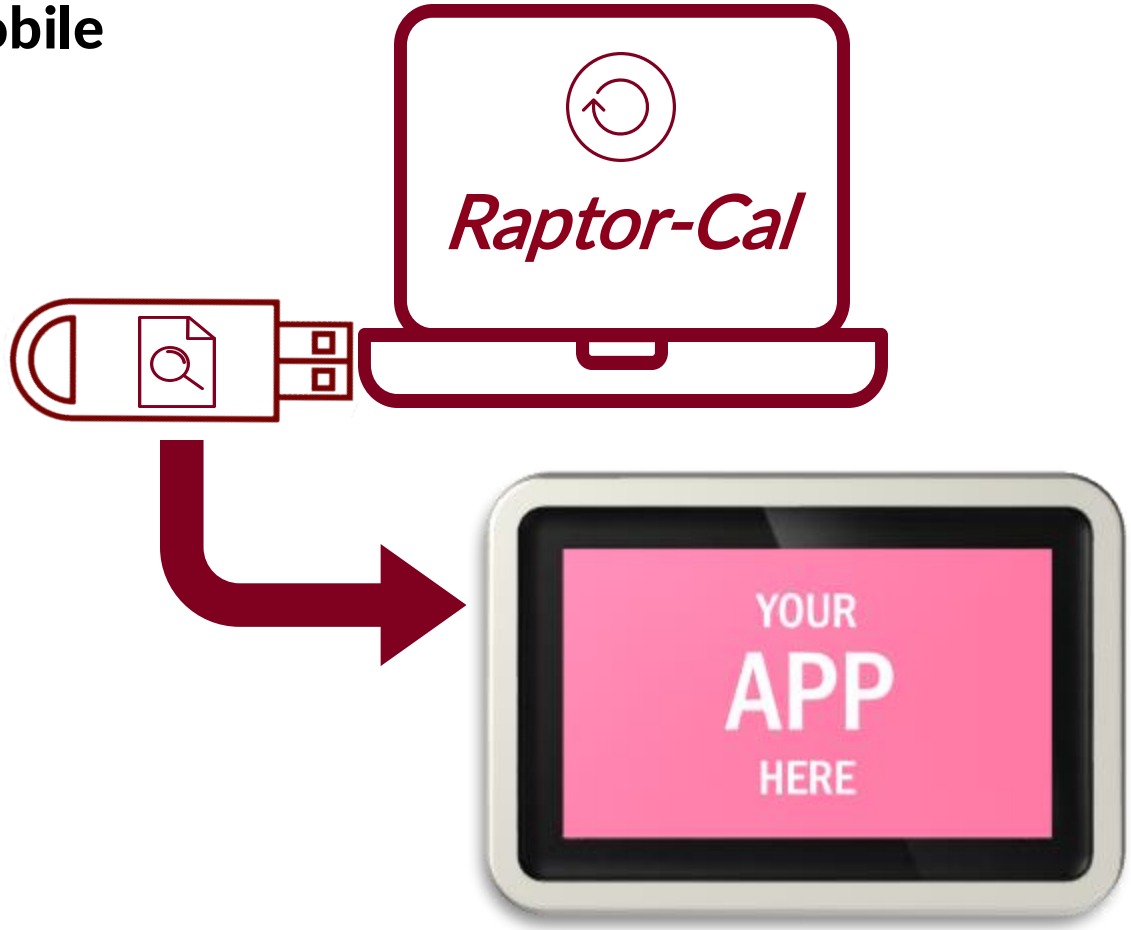
- Raw CAN logging to USB
- Internal software signal logging
- Custom logging software features:
  - Event capture
  - DBC phrasing
  - CSV formatting
- RS232 & Multiple CAN channel support
- Display logging variables on screen

USB Software Reflash

Leave your laptop at the desk, we're going mobile

- USB based reflash
- Raptor-Cal & Raptor-Service built in display packager
- Increase field deployment options



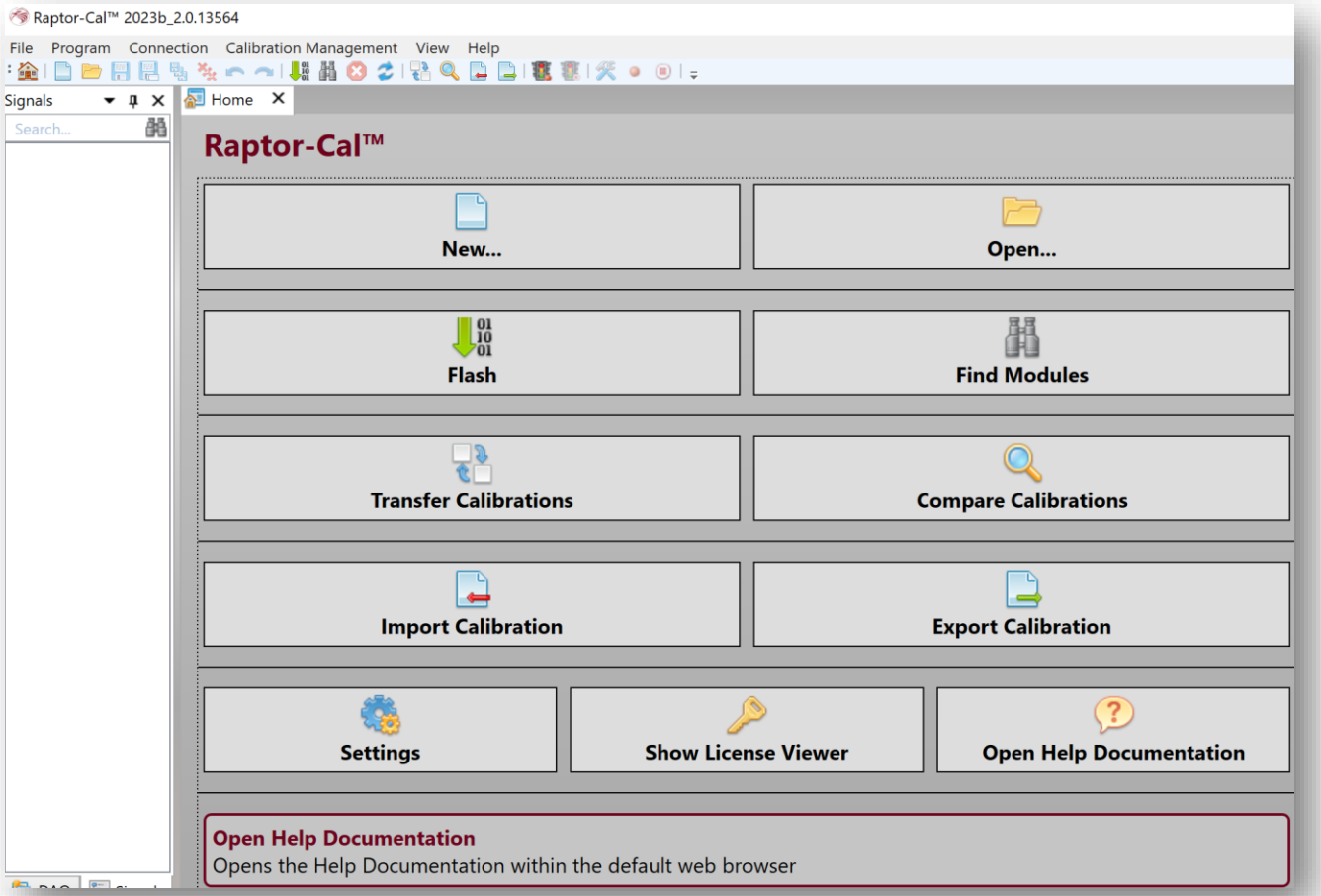


Raptor Service & Calibration Tools

Raptor-Cal and Raptor-Service

- Real time access to display software and memory
- View system and diagnostic variables
- Execute custom programmed software routines
- Aids in debug process

Note: Raptor-Cal's calibration management tools are for non-display Raptor units only*



*Calibration and RAM variables are managed in software, definable by the user

Pop Quiz!

Visit The Store!

Browse our Selection of VeeCAN Displays

new eagle

RAPTOR™ INNOVATION SUMMIT 2024