



CURTIS



Accessories

# Windows PC Software Suite for the Design, Configuration and Diagnostics of CAN Control Systems

## Curtis Integrated Toolkit V1.5

The screenshot displays the Curtis Integrated Toolkit V1.5 software interface. The main window, titled "Curtis Integrated Toolkit - OrderPicker", features a menu bar (Project, Communication, Device, Tools, Help) and a toolbar. Below the toolbar, there is a diagram of a vehicle chassis with components labeled: OrderPicker, 1351 - System Master, Traction, Pump, and Steering. On the right side, there is a vertical toolbar with icons for TACT, Programmer, Menu Editor, and Package and Flash. The bottom status bar shows "AN-USB AUTO", "Bus Load: 0.00%", and "Access Level: OEM - Factory".

Overlaid on the main window are several other software windows:

- System - Menu Editor:** Shows a "Factory Menu" tree structure with various system parameters.
- System - Package and Flash:** A window for managing software packages and flashing.
- System - Programmer:** A window for programming the device.
- System Monitor:** A window displaying a real-time graph of "VCL\_Throttle" (percent) over time. The graph shows a signal fluctuating between approximately 0% and 100%. A vertical dashed line is positioned at 42.520 seconds, with a data point showing 99% throttle. The status bar at the bottom of this window indicates "Status: Stopped. Data Interval (ms): 8.000".
- Project File Viewing:** A window displaying a list of project parameters and their values:
 

99 %
Max_Speed_SpdM
970 rpm
Motor_RPM
291 rpm
Steer_Reduced_Max
970
1222_Steer_Angle (c
-12957
Joystick_Y_Map_Ou
32234
Par_1222_Steer_Dec
-1820
Par_1222_Steer_Ang
-16384



# Curtis Integrated Toolkit – CIT V1.5

Windows PC Software Suite for the Design, Configuration and Diagnostics of CAN Control Systems



The Curtis Integrated Toolkit (CIT) is a powerful, fully integrated suite of development and diagnostic tools for use on control systems utilizing Curtis CAN-based products. CIT allows system design engineers to fully develop, configure, optimise and debug vehicle/equipment control systems that utilise Curtis CAN-based motor controllers, system controllers and I/O modules.

CIT provides a 'whole system' viewpoint, allowing communication with all compatible CAN devices present on the CANbus, thus enabling live information from multiple CAN devices to be viewed at the same time. Conversely, CIT can also target any one individual device on the CANbus.

Primarily intended for use by OEM design and development engineers, CIT is also available in reduced-feature editions that provide a sub-set of the available functionality. Restricted permission levels are also available, making CIT suitable for use by equipment dealers and maintenance engineers as a service tool.

## FEATURES

The full-feature CIT-V edition provides the following applications that run in a shared environment:

- ▶ **Launchpad**  
Launchpad is the primary application that runs when the Curtis Integrated Toolkit is started. Launchpad is responsible for managing CIT projects, and for sharing project information and communications resources between the other CIT applications.
- ▶ **Programmer**  
Similar to the Curtis 1314 PC programming tool, Programmer provides access to the CAN device's adjustable parameters, fault status, internal settings, and monitor variables. It allows users to set up and monitor each device present on the CANbus individually or the entire vehicle/system at once.
- ▶ **Dashboard**  
Programmer also provides a dashboard view where users can create custom panels of 'gauges' to provide a visual representation of parameter values, and provide customized views to access specific variables and objects within the device or system.
- ▶ **Pack & Flash**  
The Pack and Flash tool creates application packages from the various files in each CIT project and allows users to download (flash) the resulting software package into the targeted CAN device. Pack and Flash is also used to 'read' the software versions already installed in the connected CAN devices, so users can select which devices are to be updated.
- ▶ **TACT**  
CIT integrates an improved version of the Curtis TACT (Test, Analysis and Calibration Tool). This is a powerful virtual oscilloscope, collecting time-based plots of system parameter values for debugging, event capture and system diagnostic analysis. Parameters from multiple CAN devices can be traced simultaneously, and it features fully configurable Chart, Trace, Trigger, Cursor and Warning functions.
- ▶ **VCL Studio**  
The VCL Studio application is a full-featured code editor and compiler for Curtis Instruments' Vehicle Control Language (VCL). It provides an environment to add, remove, and edit VCL code in a project. It contains all the expected features of a code editor, including syntax highlighting, search and replace functions, column-mode editing, multiple-file project management, bookmarking, new file templates, and code compilation with error reporting to the file and line. With this tool, users can update, debug, and compile VCL code which can later be packaged and flashed to the connected CAN device.
- ▶ **Menu Editor**  
The Menu Editor application allows system designers to create and modify customized menus and sub-menus as required to correctly organize parameters, VCL parameters and monitor variables for their application when viewed by the CIT programmer or other Curtis programming tools. Menus can be structured for individual devices on the CANbus, or they can be created for the entire vehicle at the system level. Read and write access levels can be set on parameters and menu items, allowing the system designer to control what information is presented to or hidden from other users viewing the system with programming tools at lower access levels.

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## FEATURES cont'd

### ▶ CANbus Connectivity

To connect the PC to the CANbus system, a USB>CAN interface dongle is required. CIT is compatible with USB>CAN interface dongles from PEAK, Kvaser, Sontheim and others. Please contact your local Curtis Sales office for further information.

### ▶ Web Connectivity and Automatic Updates

Once installed, CIT can operate fully without a web connection. However, CIT features an automatic update utility, where users are prompted to update to newer versions (if available) when they launch CIT while connected to the internet.

## SYSTEM REQUIREMENTS

The minimum requirements for correct installation/operation are:

- ▶ Microsoft Windows 10 X64 (in-service versions).
- ▶ 64 bit processor.
- ▶ 4GB minimum available memory, 8GB recommended.
- ▶ USB 2.0 port.
- ▶ Internet connection for initial installation and licence key authentication.

## TYPICAL PROGRAMMING SCREENS

The screenshot shows the 'System - Programmer' window with the 'Brake Input' configuration screen. The main configuration table is as follows:

Name	Device Value	Project Value	Min Value	Max Value
Brake Input				
Mapped Brake				
Brake Command				
Brake Pedal Enable	⊖ ⊕	Off	Off	On
Brake Min Input	⊖ ⊕	15 %	0 %	100 %
Brake Max Input	⊖ ⊕	85 %	0 %	100 %
Brake Map Shape	⊖ ⊕	50 %	0 %	100 %
Brake Offset	⊖ ⊕	0 %	0 %	100 %
Brake Filter	⊖ ⊕	10.0 Hz	0.5 Hz	125.0 Hz
VCL Brake Enable	⊖ ⊕	Off	Off	On

Help Text:

Voltage at pot2 wiper (pin 17).  
Brake\_Pot\_Percent CAN = 0x33D3:00, Node ID = 0x27

Programmer

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## TYPICAL PROGRAMMING SCREENS cont'd

System - Menu Editor

Home File Edit Help

Factory Menu

- Supervision Input Check
- Motor Characterization Error
- BMS Cutback
- Hardware Compatibility
- PWM Driver Count
- Phase PWM Mismatch
- Differential Steering
- Invalid CAN Port
- VCL Watchdog
- System Monitor
- Control Mode Select
- Speed Mode Express
- Speed Mode
- Speed Controller
- Response
  - Full Accel Rate HS
  - Full Accel Rate LS
  - Low Accel Rate
  - Neutral Decel Rate HS

OEM - Factory

Traction (Node 0x27)

Menu Item

Display Text: \_\_\_\_\_

Language: English

Text: Traction (Node 0x27)

Address A Single Bit (enable BitSelect)

Branch Type

Normal Branch

Context-Sensitive

LAL Read

Field - Basic

Enable without secure node

Help Text

Output

13:28:36.1581 Loaded menu 'Factory Menu' from project.

Menu Editor

Traction - TACT

Home File Tools Help

Max\_Speed\_SpdM: 4340 ms/div 494 rpm/div

Project File: steering\_speed\_reductio...

Joystick\_Y\_Map\_Ou: 32439

VCL\_Throttle: 99 %

Max\_Speed\_SpdM: 1600 rpr

Steer\_Reduced\_Max: 1600

1222\_Steer\_Angle (t): -4432

Par\_1222\_Steer\_Des: -1820

Par\_1222\_Steer\_Ang: -16384

Temp\_Joystick\_Y\_D: 880

Status: Stopped. Data Interval (ms): 8,000

TACT

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## TYPICAL PROGRAMMING SCREENS cont'd

The screenshot shows the Traction Programmer software interface. The main window displays a dashboard with three gauges: BDI (63%), Steering Angle Command, and Joystick Throttle Command Output. A 'Gauge View Configuration' dialog is open, showing settings for a gauge including Label, Count, Pointer, FillColor, Section, EndFillColor, StartFillColor, Tick Mark, MajorTickMarkCount, and MinorTickMarkCount.

Gauge Dashboard

```
131 Fault_Pointer = 0
132
133 Program_Flags = 0
134
135
136 Setup_Delay(DLY1, 500) ;Set up 500 ms delay for hydraulic inhibit function
137
138 Setup_Delay(DLY2,3000) ;Set up delay to allow Spyglass (model 840 display) to power on and be ready to display
139
140 Enable_Timer(TMR1) ;Start Total KSI Hourmeter
141
142 ;=====
143 ; Main Program Loop
144 ; The continuously running portion of the program should be placed here
145 ; It is important to structure the main loop such that there is no
146 ; possibility for the program to get stuck in a loop that will prevent
147 ; important vehicle functions from occurring regularly. Be particularly
148 ; careful with while loops. Use of signal chains and automated functions
149 ; as described in the VCL documentation can greatly reduce the complexity
150 ; of the main loop.
151 ;=====
152
153 ;mainloop
154
155 call Process_Hourmeters
156 call Process_Hydraulic
157
158 if (DLY3_Output = 0) ;setup delay to limit 840 information transfer to every 500ms
159 {
160 call Process_Spyglass
161 Setup_Delay(DLY3,500)
162 }
163
164
165 ;check for reverse throttle request and Reverse direction before using reverse max speed
166 if((Mapped_Throttle < 0)&(Motor_RPM <= 0)&(Mode_Switch = Off))
167 {
168 Max_Speed_SpdMX = Par_M1_Reverse_Max_Speed ;Multi-Mode
169 }
170 else if((Mapped_Throttle < 0)&(Motor_RPM <= 0)&(Mode_Switch = On))
171 {
172 Max_Speed_SpdMX = Par_M2_Reverse_Max_Speed ;Multi-Mode
173 }
174 else if(Mode_Switch = On)
```

VCL Editor

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## TYPICAL PROGRAMMING SCREENS cont'd

File Type	Package	Project Version	Flash	Device Version	Update Status	Restore Defaults	Bus Status
All Devices			▶▶				
1351 - System Master (Node 0x26) Primary OS		2.30.17.0	▶▶		Offline	⏏	Not Connected
1351 - System Master (Node 0x26) Factory A...	📦	0.0	▶▶		Offline		
1351 - System Master (Node 0x26) Secondar...		2.23.6.0	▶▶		Offline		
1351 - System Master (Node 0x26) Secondar...	📦	2.2.1.0.1	▶▶		Offline		
Traction (Node 0x27) Primary OS		2.3.0.0	▶▶		Offline	⏏	Not Connected
Traction (Node 0x27) Factory Application Pa...	📦	0.0	▶▶		Offline		
Pump (Node 0x28) Primary OS		2.3.0.0	▶▶		Offline	⏏	Not Connected
Pump (Node 0x28) Factory Application Pack...	📦	0.0	▶▶		Offline		
Steering (Node 0x29) Primary OS		2.1.0.9	▶▶		Offline	⏏	Not Connected
Steering (Node 0x29) Factory Application Pa...	📦	0.0	▶▶		Offline		

Pack & Flash

## CIT EDITIONS

There are three editions of CIT available:

Tools Included	CIT-P	CIT-D	CIT-V
Launchpad	X	X	X
Programmer	X	X	X
Dashboard	X	X	X
Pack & Flash	X	X	X
TACT		X	X
VCL Studio			X
Menu Editor			X

## MODEL CHART & ACCESS LEVELS

Each edition of CIT is available at the access levels shown below. Lower access levels have progressively restricted permissions than higher access level versions. Note that the required access level for each system parameter can be set using the Menu Editor tool for each CIT project file.

Part Number	Edition	Model No.	Access Level	Suitable For
393681001	CIT-P Programming Edition	CIT-P-1001	Field – Basic	Basic user
393682101		CIT-P-2101	Field – Intermediate	Service Technician
393683201		CIT-P-3201	Field – Advanced	Service Engineer
393684301		CIT-P-4301	OEM – Dealer	OEM Dealer
393693201	CIT-D Diagnostics Edition	CIT-D-3201	Field – Advanced	Service Engineer
393694301		CIT-D-4301	OEM – Dealer	OEM Dealer
393714401	CIT-V Full Edition	CIT-V-4401	OEM – Factory	OEM Factory Development Engineer



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