Li-ion Diagnostics Tool User Manual

Rev D

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1. OVERVIEW

Li-Ion Diagnostics Tool (CCDT) is a handheld diagnostics tool for trouble shooting Club Car's Li-ion Vehicles

With CCDT you can perform
- Software updates for all the ECUs
- Read various faults and diagnostics trouble codes
- Perform Diagnostics and trouble shooting
- Real time data monitoring
- Configuring and Saving vehicle settings
- Finalize VCMs

CCDT Components
1. Dongle
2. Diagnostics Cable - connects the Dongle with the Diagnostics port.
3. CCDT-APP- Android App (supported in Android versions 5.0 and above)

1.1. DIAGNOSTICS TOOL COMPONENTS

1.1.1. Dongle
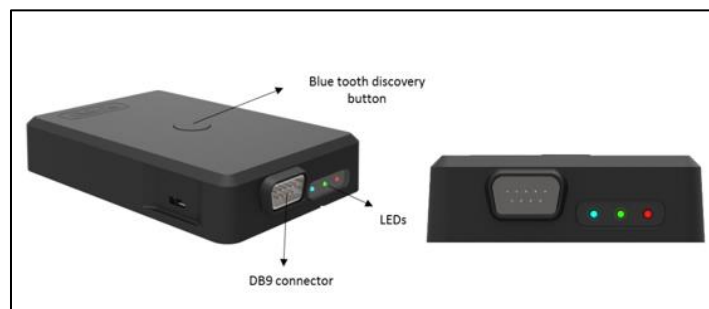
Figure 1   Dongle

1.1.2. Diagnostics Cable
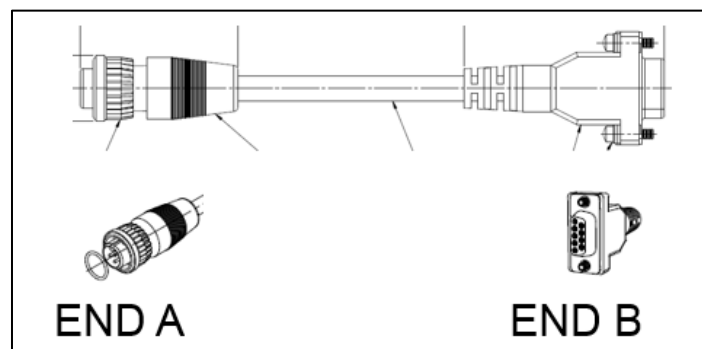
Figure 2   Diagnostics Cable

END A is connected to diagnostics receptacle of the vehicle
END B is connected to the Dongle

1.2. APP INSTALLATION

CCDT APP is available in the Google Play store.
Search for Club Car diagnostics tool or CCDT in the play store.
CCDT APP will request permissions to install (based on the Android settings).
 All Android versions above 5.0 supports CCDT APP

1.3. CCDT-APP ICON

Figure 3   CCDT-APP Icon

1.4. CONNECT THE CCDT TO THE VEHICLE

1. Connect the diagnostics Cable to the dongle
2. Remove the dust cap on the diagnostics receptacle
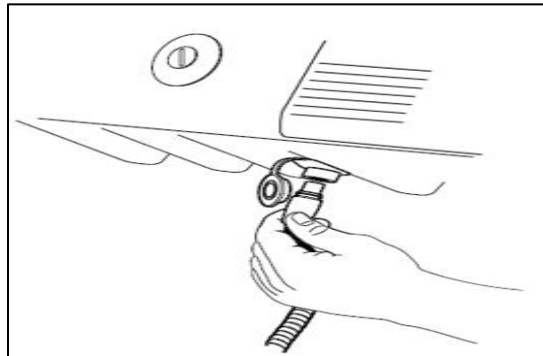
Figure 4   Diagnostics Receptacle

3. Align the diagnostic cable connector with the diagnostic receptacle
4. Connect the Diagnostics cable to the diagnostics receptacle

Note: - Diagnostics tool is powered by the Car diagnostics port
Dongle contains 3 LED for status indication.

LED COLOR	Description
Blue (Flash on and off)	Ready to pair with CCDT App
Blue (Constant)	Paired with CCDT App
Green (Constant)	Powered by vehicle
Red (Flash on and off)	Connected vehicle

Table 1 LED Indications

1.5. CONNECT THE CCDT TOOL TO MOBILE DEVICE

1. Connect the Dongle to the vehicle.
2. Open the CCDT-APP on the mobile device. The app will automatically scan for CCDT dongles.
3. If the screen shows SCANNING COMPLETED and the CCDT dongles are not in the list:
     3.a. Tap SCANNING COMPLETED to scan for devices again.
     3.b. Make sure that the Blue LED is flashing on the CCDT.
4. Tap on the desired CCDT.
5. Confirm the connection

CCDT dongles will be listed based on the serial number (dongle Id). Serial number will be listed in the label at the bottom.
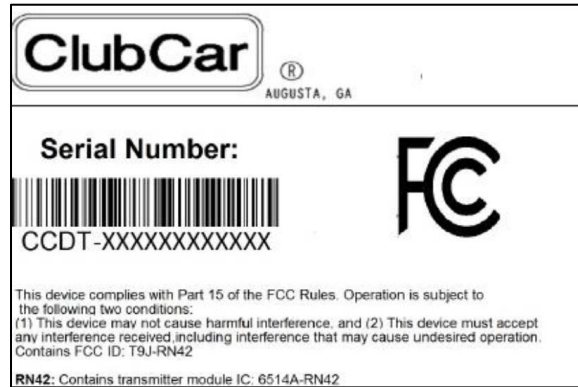
Figure 5   CCDT Dongle Label

Example serial number - serial number is "CCDT-XXXXXXXXXXXX"; where in "XXXXXXXXXXXX" will be a unique number.

1.6. CCDT BLUETOOTH DISCOVERY BUTTON

The Bluetooth discovery button is located on the top of the dongle.
If the dongle is not in the Bluetooth pairing list, push the Bluetooth discovery button.
NOTE: This will put the dongle is discovery mode or restart the scanning process.

1.7. CCDT LED

LED COLOR	Description
Blue (Flash on and off)	Ready to pair with CCDT App
Blue (Constant)	Paired with CCDT App
Green (Constant)	Powered by vehicle
Red (Flash on and off)	Connected vehicle

Table 2 LED

2. CCDT APP SCREENS

2.1. SPLASH SCREENS

The splash screen will display when the app is opened.
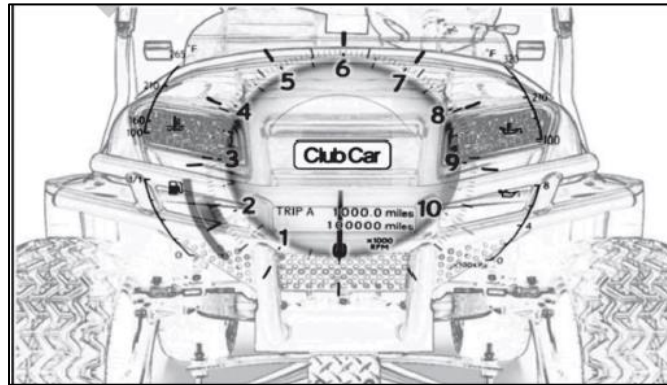The splash screen will transition to the connection screen automatically or on a swipe action.

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Figure 6   Splash Screen

Screen transitions to Connection screen automatically or on swipe action.

2.2. CONNECTION SCREEN

When the connection screen opens, the CCDT-APP will start scanning for all CCDT devices. A list of devices will be displayed. Select the correct device to connect.
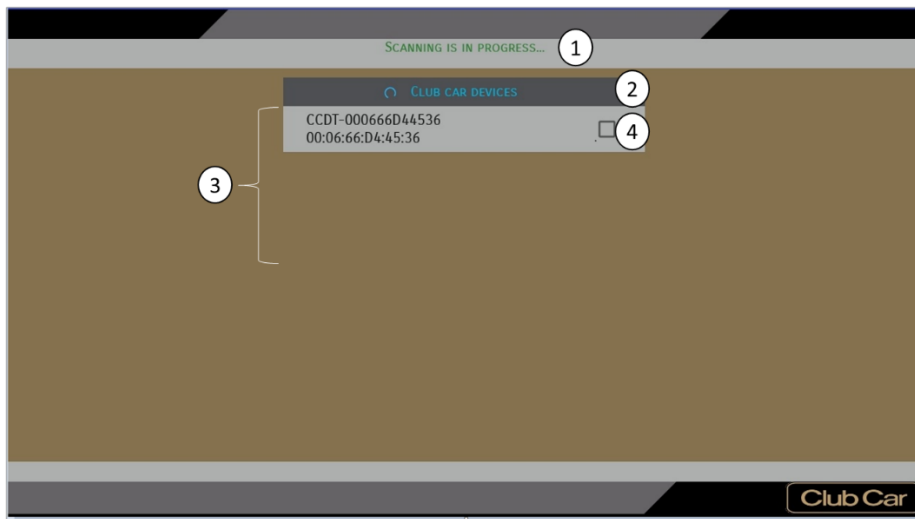

.

Figure 7   Connection Screen

Callout Number	Description
1	Scanning Status
2	Button to restart Scanning
3	All available diagnostics devices within Range will be listed here
4	Selection of the desired diagnostics device

If the desired dongle is in the list of available devices, click on the tick box listed against it ("4").

If the device is not in the available list, tap on "2" to restart the scanning.

NOTE: If the device is not in the list, if device is not listed after repeated scanning push the button on top of the dongle to put it in discovery mode.

While the device is being connected, a pairing confirmation prompt will display. To pair with the diagnostic tool, tap OK
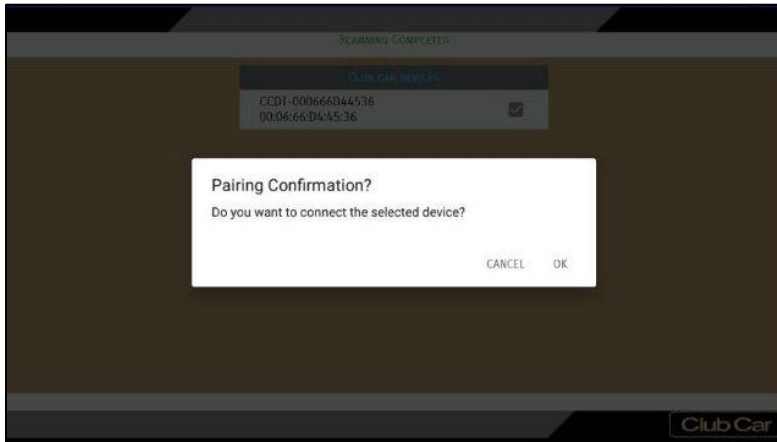
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Figure 8   Pairing Confirmation Screen

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2.3. HOME SCREEN

On successful connection, CCDT-APP Home screen will display. Tap the desired screen icon.
Top left corner will display the connected dongle name.

Figure 9   Home Screen

2.4. SCREEN LAYOUT

Figure 10   Screen Layout

Callout Number	Description
1	CCDT Dongle ID
2	Menu option for Dongle software and CCDT app version
3	Quick navigation pane
4	High-lighting to indicate currently displayed Tab

Quick navigation pane supports quick navigation to any desired page without navigating to home screen

2.5. CAR SYSTEM SCREEN

Car system screen provides a system level overview of the vehicle .CAR SYSTEM has 5 tabs
- CAR DETAILS - Vehicle functional data
- ABOUT - Vehicle identification data and all the ECU identification data
- CONFIGURATION - Current configuration of vehicle
- USAGE - Vehicle usage details
- FACTORY CONFIG - Factory configuration of vehicle

Figure 11   Car System Screens

2.6. BMS SCREEN

BMS screen displays battery management system (BMS) data. BMS data has 3 TABS
- BATERY DETAILS - BMS functional data
- ABOUT - Battery and cell monitoring system version information
- USAGE - BMS usage details

Figure 12   BMS Screen

2.7. VCM SCREEN

The VCM screen displays the vehicle control module (VCM) data. The VCM screen has four tabs:
- VCM - VCM functional data
- ABOUT - VCM hardware, Software Versions and identification data
- SIGNALS INPUT - status of input signals to VCM

- SIGNALS OUTPUT - status of output signals from VCM

Figure 13   VCM Screen

2.8. MCU SCREEN

MCU displays MCU (Motor Control Unit) data. The VCM screen has three tabs
- MCU - MCU functional data
- ABOUT - Provides MCU hardware, software versions and identification data
- USAGE - MCU usage history related details

Figure 14   MCU Screen

2.9. CUSTOM VIEW SCREEN

Custom view screen allows the user to customize the list of parameters to be monitored.

Figure 15   Custom View Screen

Callout Number	Description
1	Search option
2	Matching list of parameters
3	Arrow button (Add parameter)
4	X button (remove parameter)

There is a search function in the top left corner of the screen.

To add a parameter:
1. TAP the search option
2. Enter the parameter name or any part of parameter name. CCDT APP will list out all the matching parameters.
3. Select the desired parameter and drag the parameter to the middle
4. Tap the arrow button.

To remove a parameter:
1. Select the parameter
2. Tap the X button.

2.10.   SETTINGS SCREEN

The settings screen has four tabs:
- CCDT SETTINGS - APP internal settings
- HIGH SPEED ENABLE - Enable high speed for the vehicle
- CAR TIME - Vehicle internal clock Settings.
- Finalize Setting- To Set Vehicle serial number & Finalize the configuration

2.10.1.CCDT APP Settings
2.10.1.1.TIME ZONE SETTING

Vehicle maintains the internal clock based on UTC time zone. Time zone settings is to set the Time zone for the CCDT APP- for converting vehicle time to local time zone of the vehicle
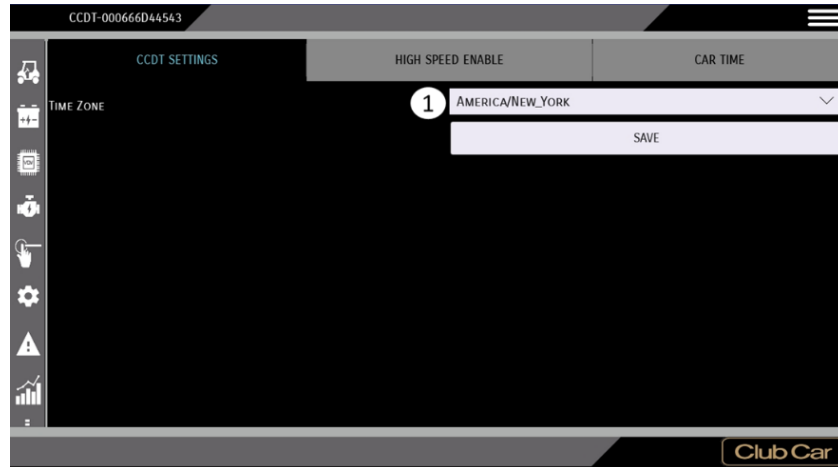
Figure 16   Time Zone Setting Screen

To Set the Time Zone
1. Tap on the "Time zone" list. ("1" in figure 16)
2. Select the Time zone from the drop down list.
3. Tap on save button to store the time zone.

2.10.2.High Speed Enable
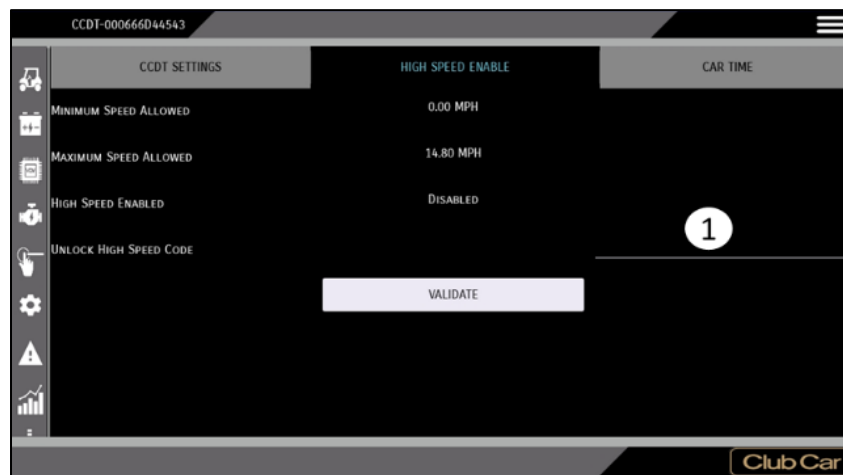To set the enable high speed option in the vehicle

Figure 17   High Speed Code Enable Screen

To Enable the High Speed option
1. Tap on Unlock High speed code entry ("1" in figure 16)
2. Enter the high speed code.

3. Tap Validate button.

2.10.3.Vehicle Time Settings

To configure the vehicle time. Vehicle maintains the time internally and time should be changed only after a battery pack replacement.

Before setting the vehicle time, CCDT app time zone should be configured.

Figure 18   Vehicle Time Setting Screen

Callout Number	Description
1	Current Vehicle Time
2	Vehicle Time edit box (pops out on tapping 2)
3	DATE & TIME window
4	Save button

To configure vehicle time option
1. Tap on Vehicle Time edit box
2. Set date and time in DATE & TIME Window.
3. Tap on set button on Time and Date edit window
4. Tap Save button.

2.10.4.Finalize Settings

Finalization is the final step in the "first time" configuration of VCM. Finalization should be performed in factory (making of Car) or in the field (replacement VCM).

It is only a one time step and NOT required for any subsequent modification to car parameters.

This section describes steps for the field replacements of VCMs.

Figure 19 Finalize Setting Screen

Callout Number	Description
1	Vehicle Serial Number user entry
2	"Finalize" button

Finalizing is the last step .Before Finalizing, user has to
1. Update the VCM to latest software version (or recommended version) [Software Update Screen]
2. Configure the vehicle to the factory ordered /desired configuration [Vehicle Settings Update / Write Screen]
3. Navigate to the Finalize setting page.
4. Enter Vehicle serial number
5. Tap on the "Finalize" button
6. Follow the prompts by the APP

Vehicle Serial Number is listed in the decal below passenger side cup holder.
Finalizing is one time activity. It is not required for any subsequent modification to car parameters.

Vehicle Serial Number cannot be changed after finalization. It is recommended to confirm the Vehicle Serial Number with decal listing before finalizing

When updating a new VCM, CCDT app will displays "no diagnostics" pop up, but user can navigate to SW update screen and select the relevant SW. SW update page will not display SW versions in the vehicle (call out number #3 in Figure 21).

2.11.   FAULTS SCREEN

Fault Listing is divided into 4 Tabs

Fault List Tabs	Details
ACTIVE FAULT	List of all faults that are currently active
LIST ALL	List of all faults that has occurred in the life time of the vehicle
LIST RESET	List of all faults that has occurred since last fault data Reset

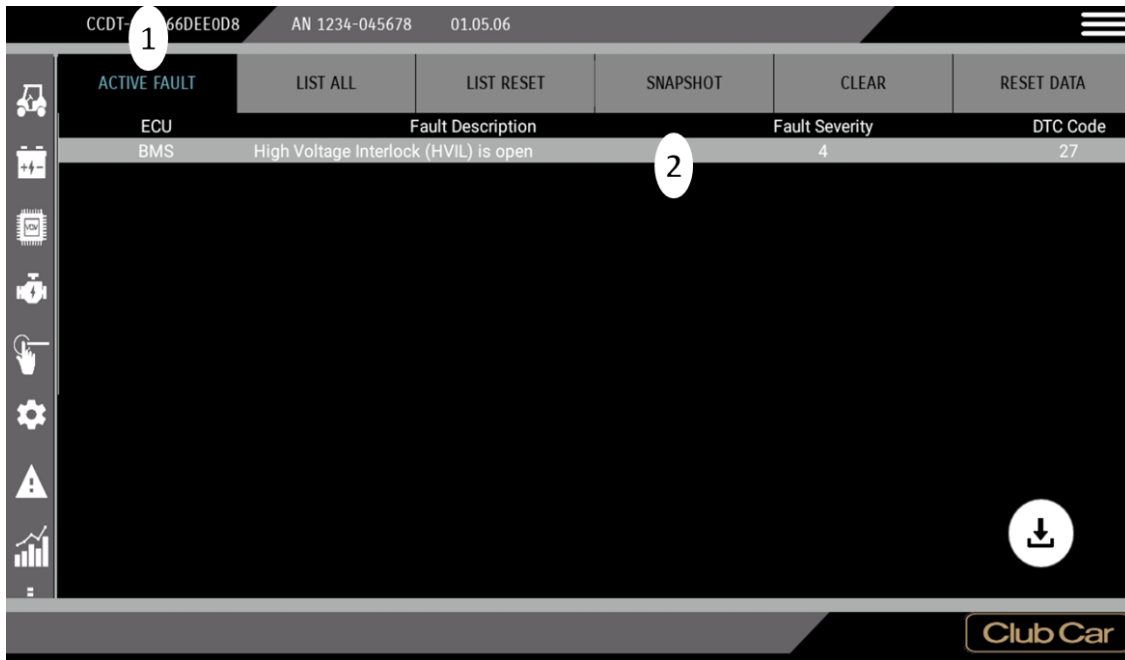| SNAPSHOT	List of Snap shots or Fault logs

2.11.1.ACTIVE FAULT

Lists all the currently active faults

Figure 20   Active Fault

Callout Number	Description
1	ACTIVE FAULT list
2	ACTIVE FAULT LIST ENTRY

From	Navigation
Any other page / screen	Default tab on clicking FAULT page
Any other Tab on FAULT Page	Tap on "ACTIVE FAULT" tab [call out number 1]

Navigation Details

Screen refresh rate is 250ms.

Each List entry contains

Entry	Description
ECU	ECU where fault originated or detected
Fault description	Fault description
Severity	Severity level of fault
DTC Code	DTC (Diagnostic trouble code of the fault)

To get the Fault History details of any fault in the list, tap anywhere on the fault's list entry
Refer section Fault History Data for detail.

2.11.2.LIST ALL

Lists all faults that has occurred in the life time of the vehicle

Figure 21   List All

Callout Number	Description
1	LIST ALL list
2	LIST ALL list entry

From	Navigation
From Other Pagers	Step 1 :Navigate to FAULT page Step 2 :Tap on LIST ALL tab (call out 1)
From any other Tab on FAULT Page	Tap on LIST ALL tab (call out 1)

Navigation Details

Tab has no auto update to reflect any parameter changes in the car when LIST ALL tab is active. User has to navigate to ACTIVE FAULT Tab and navigate back to LIST ALL tab.

Entry in Red color indicates an active fault

List update takes 1 - 2 seconds and "Please wait" message will be displayed during data retrieval and screen update.

Each List entry contains -

Entry	Description
ECU	ECU where fault originated or detected
Fault Description	Fault description
Count Since Reset	Fault occurrence count after last Fault data reset
Count Total	Fault occurrence count in car life time after last Fault data reset
Severity	Severity level of fault

DTC Code	DTC (Diagnostic trouble code of the fault)

To get the Fault history details of any fault in the list, tap anywhere on the fault's list entry
Refer section Fault History Data for details.

2.11.3.LIST RESET

Lists contains all faults that have occurred after last "fault Data Reset" [RESET DATA].

Figure 22   List Reset

Callout Number	Description
1	LIST RESET list
2	LIST RESET list entry

From	Navigation
From Other Pagers	Step 1 :Navigate to FAULT page Step 2 :Tap on LIST-RESET tab (call out 1)
From any other Tab on FAULT Page	Tap on LIST RESET tab (call out 1)

Navigation Details

Tab has no auto update to reflect any parameter changes in the car when this LIST RESET tab is active. User
has to navigate to ACTIVE FAULT Tab and navigate back to LIST RESET tab
Entry in Red color indicates an active fault
List entry update will take 1 - 2 seconds and "Please wait" message will be displayed during data retrieval and
screen update

Each List entry contains

Entry	Description
ECU	ECU where fault originated or detected

Fault Description	Fault description
Count Since Reset	Fault occurrence count after last Fault data reset
Count Total	Fault occurrence count in car life time after last Fault data reset
Severity	Severity level of fault
DTC Code	DTC (Diagnostic trouble code of the fault)

To get the Fault history details of any fault in the list, tap anywhere on the fault's entry in the list
Refer section Fault History Data for details.

2.11.4.SNAPSHOT

On every Fault detection, Li-ion Car stores a set of car's operational data and status .This data reflects the car status or operation at the time of fault They are called snap shots.LI-ion car supports maximum of 16 snap shots (first in first out format). SNAPSHOT tab lists the 16 snap shots and their logged time.
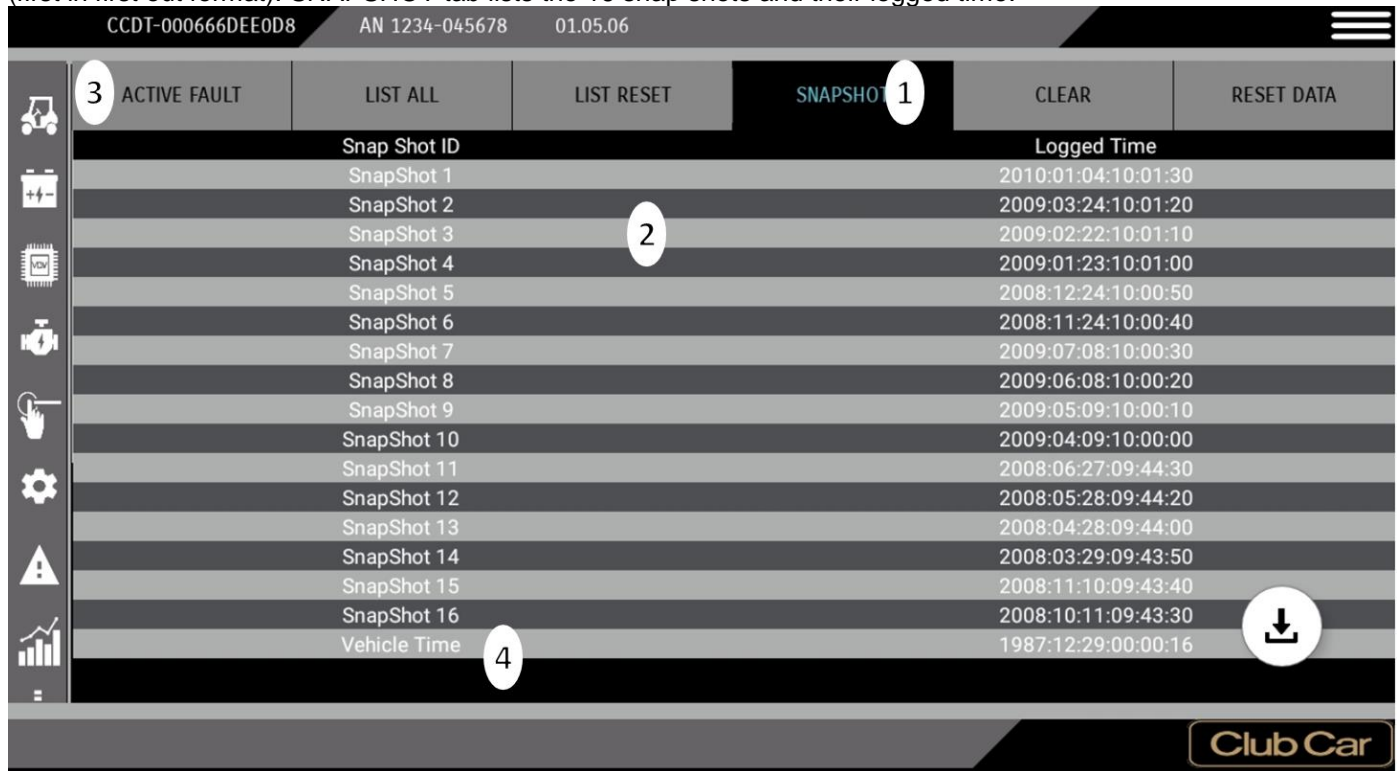

Figure 23   Snapshot

Callout Number	Description
1	SNAP SHOT list
2	SNAP SHOT list entry
3	ACTIVE FAULT tab
4	Current Vehicle Time

From	Navigation
From Other Pagers	Step 1 :Navigate to FAULT page Step 2 :Tap on SNAPSHOT tab (call out 1)
From any other Tab on FAULT Page	Tap on SNAPSHOT tab (call out 1)

Navigation Details

Tab has no auto update to reflect any parameter changes in the car when this SNAP SHOT is active. User has to navigate to ACTIVE FAULT Tab and navigate back to SNAP SHOT tab

List entry update will take 1 - 2 seconds and "Please wait" message will be displayed during data retrieval and screen update
To get the data in any SNAPSHOT in the list, tap anywhere on the SNAPSHOT's entry in the list.
Refer section for details.

2.11.5. FAULT HISTORY DETAILS
On Tapping on any entry in the ACTIVE FAULT, LIST ALL, LIST RESET list, CCDT APP will display the history information of that fault
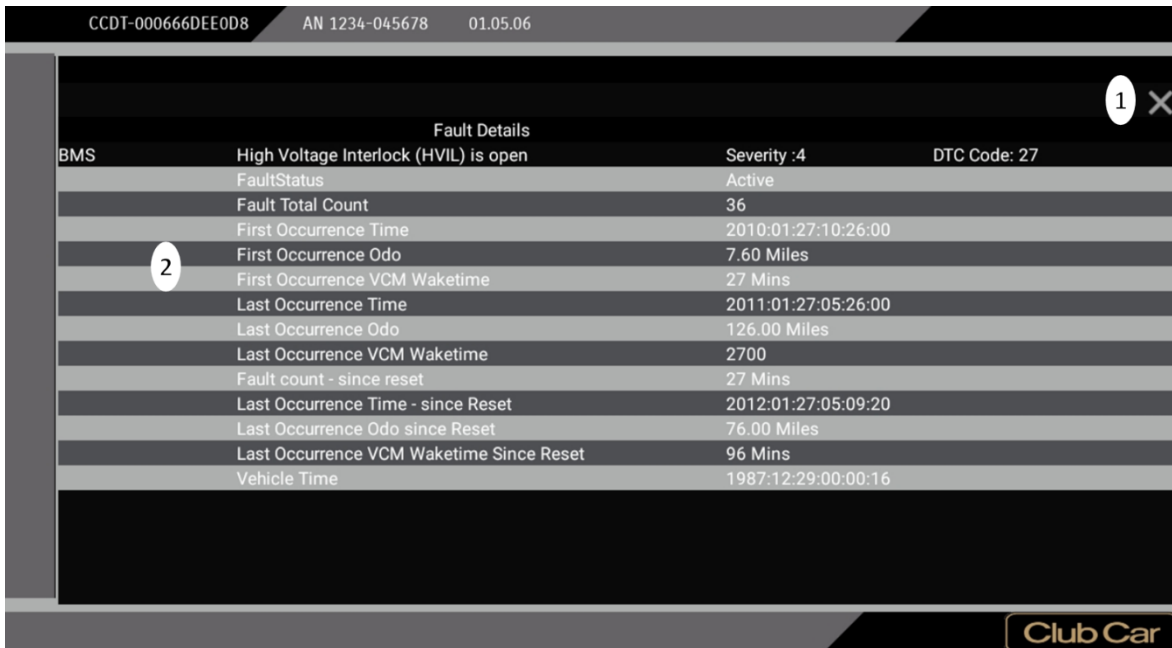

Figure 24   Fault History Details

Callout Number	Description
1	To close the Fault Details
2	Fault History Data details

From	Navigation
Any tab on FAULT Page	On Tapping on the entry in the ACTIVE FAULT, LIST ALL, LIST RESET list

Navigation Details

Tab has no auto update to reflect any parameter changes in the car when this FAULT HISTORY DETAILS is active. User has to navigate to close the page and tap on the fault entry again.

2.11.5.1. FAULT HISTORY DATA

Each fault's history data contains the following

	Entry	Description
	ECU	ECU where fault originated or detected
	Fault Description	Fault description

	Severity	Severity level of fault
	DTC Code	DTC (Diagnostic Trouble Code of the fault)
	Fault Status	Current Status of the fault
	Fault Count	Count of fault occurrences in life time. Count increments every time a fault is detected
First instance of Fault occurrence (Car life Time)	First Occurrence Time stamp	Time stamp at first occurrence of fault
	First Occurrence Odo	Odometer Value at first occurrence of fault
	First Occurrence VCM Wake time	VCM wake time at first occurrence of the fault
Last instance of Fault occurrence (Car life Time)	Last Occurrence Time stamp	Time stamp at last occurrence of fault
	Last Occurrence Odo	Odometer Value at last occurrence of fault
	Last Occurrence VCM Wake time	VCM wake time at last occurrence of fault
Last occurrence after the fault Data Reset	Fault Count Since Reset	Count of fault occurrence since last fault data reset. Count increments every time a fault is detected
	Last Occurrence Time Stamp Since Reset	Time stamp at last occurrence after last fault data reset
	Last Occurrence Odo Since Reset	Odometer Value at last occurrence after last fault data reset
	Last Occurrence VCM Wake time Since Reset	VCM wake time at last occurrence after last fault data reset

Table 3 Fault History Details

All the Time stamps are in YYYY:MM:DD:HH:MiMi:SS format [Y–year, M-Month-Day, H-Hour in 24 hour format, MI-Minutes, S: Seconds) .Time stamps are based on UTC time zone.

2.11.6. SNAPSHOT DETAILS

On every Fault detection, Li-ion Car stores a set of car's operational data and status .This data will reflect the car status or operation at the time of fault They are called snap shots
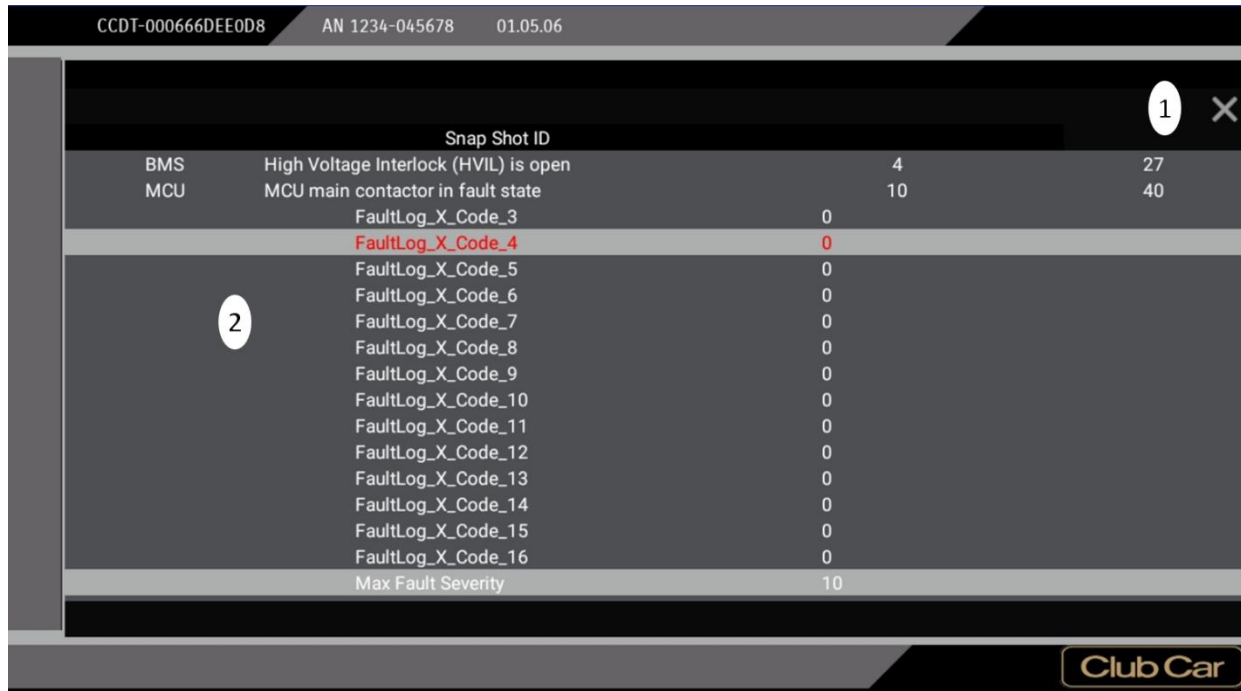
Figure 25   Snapshot Details

Callout Number	Description
1	To close the SNAPSHOT Details
2	SNAPSHOT Data details
	List can be scrolled up or down to access the remaining data

From	Navigation
Any Tab on FAULT Page	On Tapping on the entry in the SNAPSHOT list

Navigation details

Figure 26 Excerpts for the rest of Snapshot Details

2.11.6.1.SNAP SHOT DATA

Each fault's history data contains the following

Entry	Description
FAULT DTC CODE 1 to 16	List of 16 DTC's Active at the time of Snap Shot Log Diag APP will decode the DTC and provide additional information like ECU , Fault Text, Severity and DTC Code
MaxSeverity	Fault severity level-Maximum (active)
VCM SW Version	
Odometer	Odo Reading
Snapshot Time Stamp	Time stamp
Mode Commands	
Mode Active State	
Mode Weld Check State	
Charge Status Word	
Battery Status Word	
MCU Status Word	
Vehicle Speed	
Motor RPM	Motor Rpm (RPM)
VCM APP	APP%
Voltage Pack Internal	Pack internal Voltage (V)
Voltage Pack Middle	Pack Middle Voltage (V)
Voltage Pack Output	Pack output Voltage (V)
Voltage MCU Logic	MCU Logic Voltage (V)
Voltage MCU Power	MCU Voltage (V)
Voltage Cell Max	Cell Maximum Voltage (V)
Voltage Cell Min	Cell Minimum Voltage (V)
Voltage VCM 12V	VCM Voltage (V)
Current Battery	Battery Current (A)
Current MCU Battery	MCU Current (A)
Temperature BatteryMax	Battery Max Temperature in ^{0}C
Temperature BatteryMin	Battery Min Temperature in ^{0}C
Temperature Motor	Motor Temperature in ^{0}C
Temperature MCU	MCU Temperature ^{0}C
SOC Battery	Batter SOC (%)
SOC User	User SOC (%)
Key Switch	
FNR	FNR Switch Status
Tow Switch	
VCM run time	
MCU run time	

Table 4 Snapshot Details

All the Time stamps are in YYYY:MM:DD:HH:MiMi:SS format [Y–year, M-Month-Day, H-Hour in 24 hour format, MI-Minutes, S: Seconds) .Time stamps are based on UTC time zone.

2.11.7.Buttons - CLEAR FAULT, RESET DATA & FAULT DATA DOWNLOAD

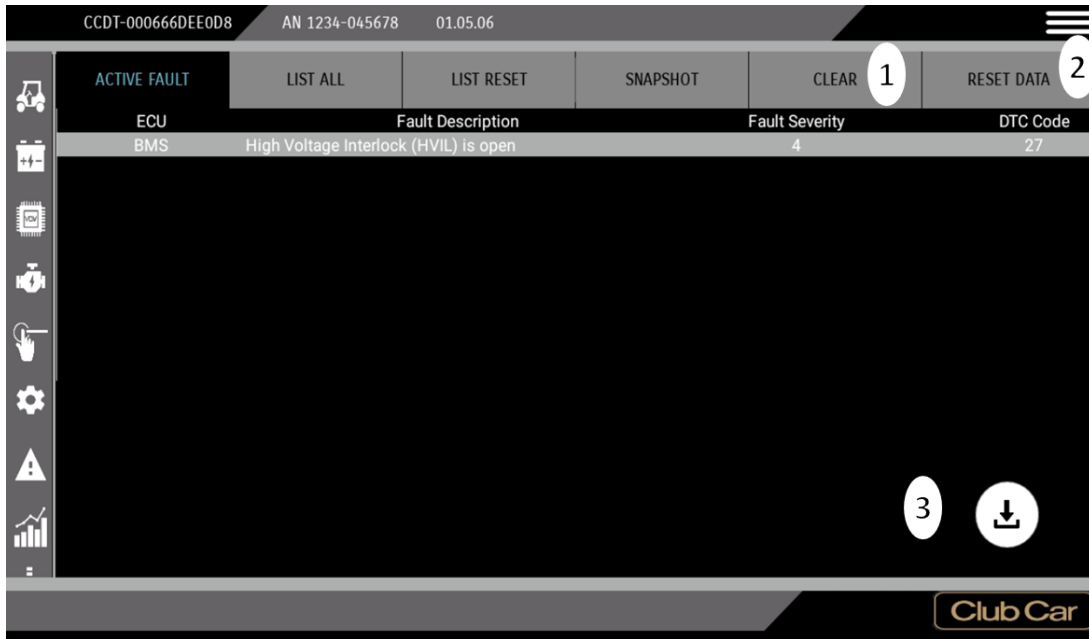Fault Screen provides 3 buttons – "CLEAR" and "RESET DATA" and FAULT DATA DOWNLOAD.

Figure 27 Buttons- Clear, Reset Data & Data Download

Callout Number	Description
1	CLEAR Fault
2	RESET DATA
3	Fault Data Download Icon

They are accessible from any tabs in the fault screen

2.11.7.1.CLEAR FAULT

Tap CLEAR FAULT to clear the faults that require technician reset.

2.11.7.2.RESET DATA

Tap RESET DATA to clear the following data from fault history details for all the faults

Entry	Description
Last Occurrence Time Stamp Since Reset	Time stamp at last occurrence after last fault data reset
Last Occurrence Odo Since Reset	Odometer Value at last occurrence after last fault data reset
Last Occurrence VCM Wake time Since Reset	VCM wake time at last occurrence after last fault data reset

2.11.7.3.FAULT DATA DOWNLOAD

On Tapping the FAULT DATA DOWNLOAD button (callout number 3 Figure 27), CCDT APP will download the complete fault related data (complete fault history data and the snap shot details to the user's Android device.

Downloaded data will be stored as JSON file.
File name *<<Car serial number>>_<<Date>> _<<Time>>.JSON* , where Time is YYYYMMDD format and time in HHMM format

File will be stored under \\Download\Log\FaultData folder in the user device. For now the decoding of the data is not in the scope of this document. The JSON file should be sent to the Engineering team for further analysis.

2.12. GRAPHS SCREEN
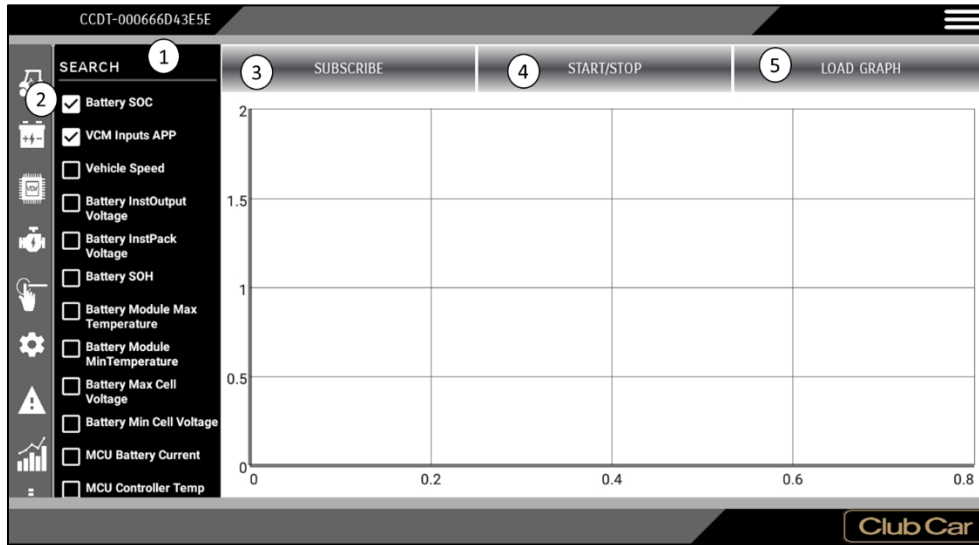
Figure 28   Graph Screen

Callout Number	Description
1	Search option
2	Available list of parameters
3	Subscribe Button
4	START/STOP button to start & Stop Logging data
5	Replay Graph from the logged data

Graph screen provides a search option (1) .Steps to use search option
1. TAP on Search (1)
2. Enter the full or partial text for search
3. Available list of parameter matching the search criteria will be listed (2).

Steps to for graph
1. Parameter selection - click on desired parameters from the list.
2. Tap on subscribe button

2.13. SOFTWARE UPDATE SCREEN

The software update screen lets the user update any software in the vehicle CAN bus or diagnostic Tool

Figure 29 Software Update Screen

Callout Number	Description
1	"GET UPGRADE FILE" button - Lists out the available files for software update
2	List of available files (on tapping Get UPGRADE FILE)
3	Software versions in the vehicle
4	"UPGRADE" to initiate upgrade

Steps for upgrade

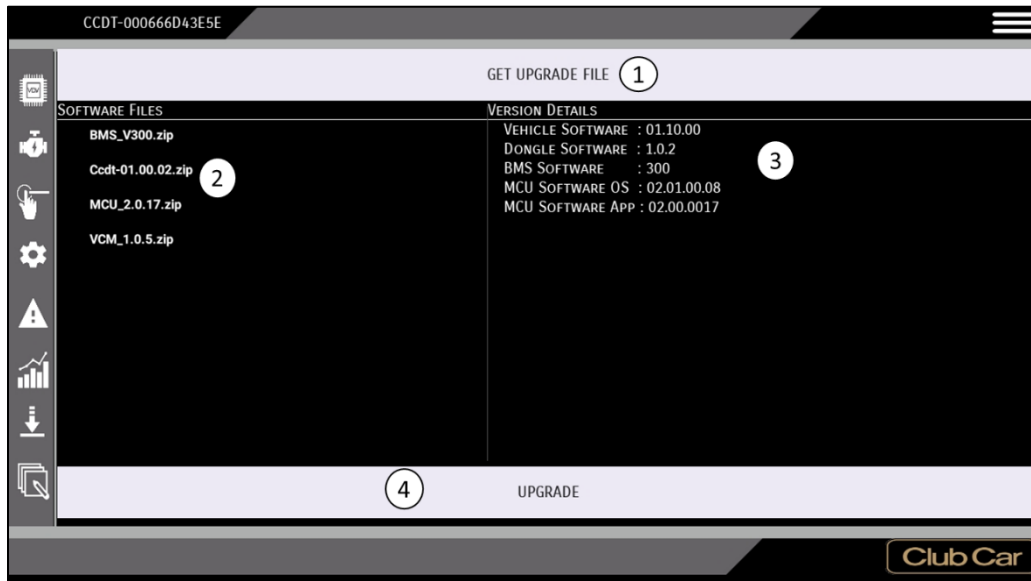1. TAP the "GET UPRADE FILE" button
2. TAP on the desired software
3. TAP on upgrade to initiate the upgrade.

CCDT supports software update of VCM, BMS, MCU and Dongle. Each software file will have the ECU name as prefix (e.g.:- BMS- , VCM- etc.)
Software Update is handled in 3 steps internally by the tool

1. CCDT app Sends SW file information to dongle
2. CCDT app sends SW file to the dongle
3. Dongle validates SW file and transfer the Image to target ECU.

Dongle can store up to 2 software files internally. If the requested software file is available in dongle, Software Update process bypasses step 2.

CCDT is capable of updating the software in blank ECUs. Blank ECUs are
1. ECUs that are not programmed (e.g.: a new VCM)
2. ECUs with corrupted software (e.g. previous SW update failure rendering ECU inoperable).

Programming in a blank VCM
When updating a blank VCM, CCDT app will display "no diagnostics" pop up, but user can navigate to SW update screen and select the relevant SW. When connected with a blank VCM, SW update page will not display any SW versions in the vehicle (call out number #3 in Figure 21).
Fully functional CAN network is mandatory for updating blank VCM.

Programming blank ECUs other than VCM:
Follow the standard steps for SW update.
Following are mandatory for ECU update-
1. Fully Functional VCM.
2. Functioning CAN network

2.13.1.SW Update Status

During upgrade CCDT APP shows the Update status with following pop-up messages

#	Status Messages	Description
1	DOWNLOAD HEADER	Software file information transfer in progress
2	DOWNLOAD IMAGE STARTED	SW file Transfer to Dongle
3	PACKETS UPGRADING	Software file transfer (to Dongle) Progress
4	PACKET TRANSFER COMPLETED WAIT FOR COMPLETION STATUS	Dongle is updating the Target ECU
5	SOFTWARE UPGRADE WAS SUCCESSFUL	Successful SW update
6	UPGRADE TERMINATED	Failed SW update

Cancelling a Software Update
Download can be cancelled only during Step 1 and Step 2 .Download cannot be cancelled during transfer of image to target ECU.
TAP "CANCEL" button on upgrade status message for cancellation. CCDT APP will require confirmation to terminate the image transfer

2.14.   VEHICLE SETTINGS UPDATE / WRITE SCREEN

Vehicle configuration /write screen will
1. Display the Current Configuration of the car
2. Modify the vehicle Configuration
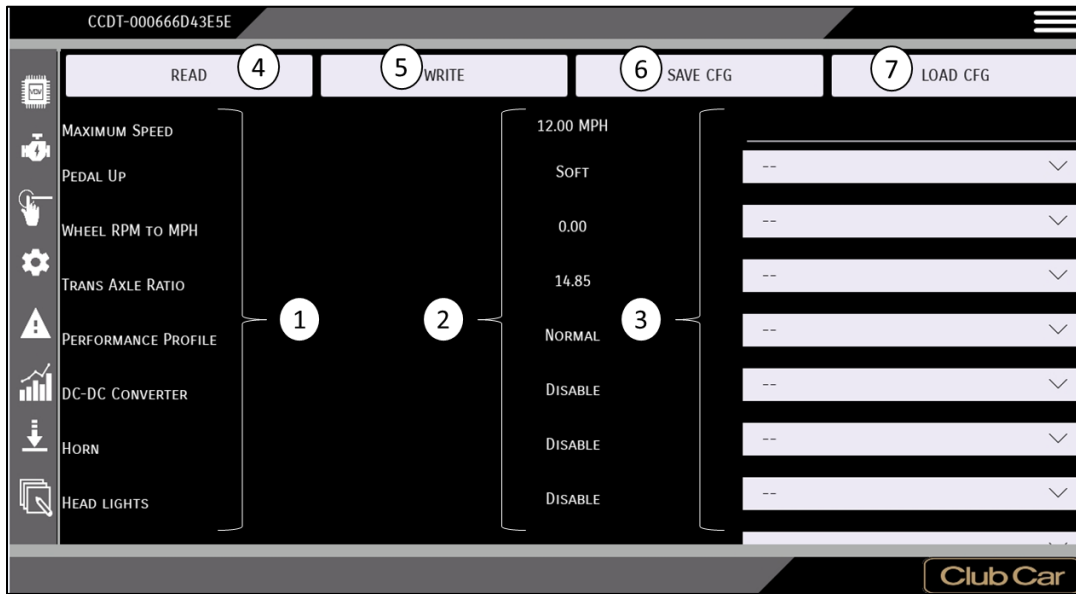3. Clone the vehicle Configuration

Figure 30   Vehicle Configuration Edit / Update Screen

Callout Number	Description
1	Parameter names
2	Parameter values read from the vehicle
3	"User Edit" fields
4	To read the current configuration from the vehicle
5	To write the "User Edits" to the vehicle
6	To store the last "read" configuration to the APP (Clone configuration)
7	To Load the saved configuration to the user edit fields

To Change the Car configuration
1. Tap the "READ" button(4) to load the configuration from the vehicle
2. Make changes in the user edit field of the parameters
3. Tap the "WRITE" Button to load the settings to the vehicle

Vehicle Configuration Cloning
Feature is used to clone the settings from a one vehicle (Source vehicle) to multiple (target) vehicles.

To store the settings for cloning
1. Read settings from the source vehicle using "READ" button.
2. Save the settings in CCDT app by Tapping "SAVE CFG" (6) button

To update or clone the saved settings
1. Connect to the Target vehicle
2. Load the settings by tapping "LOAD CFG button (7).
3. Stored settings will be loaded in "User Edit" fields
4. Tap the "WRITE" Button to load the settings to the vehicle

#	Configuration Parameter	Description	Available option
1	Maximum Speed	Vehicle maximum speed	
2	PEDAL UP	Go Pedal sensitivity settings	SOFT / NORMAL / FIRM

3	WHEEL RPM TO MPH***	Tire size	19.65 / 18.60 / 18.20 / 16.08 / 15.19
4	TRANS AXLE RATIO		14.85
5	PERFORMANCE PROFILE	Performance profile	ECONOMY / NORMAL /SPORT
6	DC-DC CONVERTER	Enable or disable DC-DC converter	ENABLE / DISABLE
7	HORN*	Enable or disable Horn	ENABLE / DISABLE
8	HEAD LIGHTS *	Enable or disable Head Lights	ENABLE / DISABLE
9	TURN SIGNAL*	Enable or disable Turn signals	ENABLE / DISABLE
10	HAZARD SIGNALS*	Enable or disable Hazard signals	ENABLE / DISABLE
11	BRAKE LIGHT*	Enable or disable Brake light	ENABLE / DISABLE
12	LOGO LIGHT*	Enable or disable Logo Light	ENABLE / DISABLE
13	DRL*	DRL light settings	DISBALE / GOLF / CONSUMER
14	BODY BUILDER RELAY	Enable or disable Body Builder Relay	
15	VISAGE CONTROL	Enable or disable VDU	ENABLE / DISABLE
16	START OF CHARGE BEEP COUNT	Number of beeps to indicate start of charge	0 / 1 / 2 / 3
17	OFF PEAK CHARGING MODE	Off Peak charging mode	DISABLE / VDU / VCM
18	OFF PEAK CHARGE START TIME**	Off Peak charging start time	Time in 24- hour format
19	Car Time Zone	Time zone selection to enable DST settings for Off Peak charging	List of Time Zones
20	OFF PEAK CHARGE END TIME**	Off Peak charging end time	Time in 24- hour format
21	SOC Display	SOC display in the GDU	"No SOC display in Key On" / "10% Increments"
22	Timeout: Key In Run	Time out value for Key in Run position	5 min / 10 min /15 min / 20 min /25 min / 30 min
23	Timeout: Key In Acc	Time out value for Key in Run position	15 min / 30 min / 45 min / 1:00 h / 1:15 h / 1:30 h / 1:45 h / 2:00 h
24	Timeout: Key off lighting	Time duration for lights active after Key off	15s / 30s / 45s / 1:00 min / 1:15 min / 1:30 min / 1:45 min / 2:00 min

Table 5 Vehicle Settings

*DC-DC converter should be enabled
**off peak charging mode should be VCM for off peak charging start time and end time
*** Refer Table 4 for Tire size v/s Wheel RPM to MPH mapping

Tire Size	Wheel PM to MPH mapping
18x8.5-8	19.65
215/40-12	18.20
205/55-10	18.20
205/50-10	18.60
22x10-10	16.08
23x10-12	15.19
23x10-14	15.19

Table 6 Tire Sizes

#	Configuration Parameter	Steps	Available option
1	Maximum Speed	Tap the user edit field Enter the required maximum speed	

#	Configuration Parameter	Steps	Available option
2	PEDAL UP		SOFT NORMAL FIRM
3	WHEEL RPM TO MPH		19.65 18.60 18.20 16.08 15.19
4	TRANS AXLE RATIO		14.85
5	PERFORMANCE PROFILE		ECONOMY NORMAL SPORT
6	DC-DC CONVERTER		ENABLE DISABLE
7	HORN	1. Tap the user edit field 2. Tap the required option from the menu	ENABLE DISABLE
8	HEAD LIGHTS		ENABLE DISABLE
9	TURN SIGNAL		ENABLE DISABLE
10	HAZARD SIGNALS		ENABLE DISABLE
11	BRAKE LIGHT		ENABLE DISABLE
12	LOGO LIGHT		ENABLE DISABLE
13	DRL		DISABLE GOLF CONSUMER
14	BODY BUILDER RELAY		ENABLE DISABLE
15	VISAGE CONTROL		ENABLE DISABLE
16	START OF CHARGE BEEP COUNT		0 1 2 3
17	OFF PEAK CHARGING MODE		DISABLE VDU VCM
18	Car Time Zone		List of Time Zones
19	OFF PEAK CHARGE START TIME	1. Tap the user edit field 2. Select the time	Time in 24- hour format
20	OFF PEAK CHARGE END TIME		Time in 24- hour format
	SOC Display	1. Tap the user edit field 2. Tap the required option from the menu	"No SOC display in Key On" / "10% Increments"
21	Timeout: Key In Run		5 min / 10 min /15 min / 20 min /25 min / 30 min

#	Configuration Parameter	Steps	Available option
22	Timeout: Key In Acc		15 min / 30 min / 45 min / 1:00 h / 1:15 h / 1:30 h / 1:45 h / 2:00 h
	Timeout: Key off lighting		15s / 30s / 45s / 1:00 min / 1:15 min / 1:30 min / 1:45 min / 2:00 min

Table 7 Vehicle Settings Options

Note: - Please ensure that when making changes to vehicle settings, the setting are supported by vehicle configuration, otherwise correct vehicle operation may be effected.

3. SW COMPATIBILITY DONGLE & APP

CCDT consists of 2 software components
1. CCDT APP running in an Android platform
2. Software running in the dongle.

After pairing, CCDT APP will perform compatibility check with Dongle SW. If they are not compatible, APP will throw a warning pop up - "*CCDT APP requires Dongle SW upgrade to vX.Y.Z. Please update the Dongle SW from UPGRADE screen* "

Where in X.Y.Z is the required dongle SW .This version will be available in the Software Update Screen and User can update dongle software from the software update screen.

4. SETTING UP A REPLACEMENT VCM

Steps to configure a new VCM CCDT

Prerequisite: - user should have the latest or recommend version of Diag Tools.
CAN should be fully functional
VCM and diagnostics tool should be powered.

Step #	Step	Reference Section
1	Connect the new VCM to the Car	
2	Connect the CCDT tool	
3	Navigate to the Software Update Screen	2.13 Software Update Screen
4	Select and update the VCM to latest software version (or recommended version)	2.13 Software Update Screen
5	After SW update is completed, navigate to Vehicle Settings Update / Write Screen, Configure the vehicle to factory ordered /desired configuration	2.1.4 Vehicle Settings Update / Write Screen
6	Navigate to Finalize Settings screen [Under setting tab]	2.10.4 Finalize Settings
7	Input car serial number	2.10.4 Finalize Settings
8	Tap on Finalize button	2.10.4 Finalize Settings

When connected to a new VCM, Diagnostics tool will display "no diagnostics" pop-up. This is normal as VCM has no functional SW. User will be able to update the VCM SW.

5. TROUBLESHOOTING

#	Problem	Indication	Possible causes and remedial steps
#1	Dongle not	1. Green LED is off.	1. Diagnostics cable not connected

			2. No Bluetooth connectivity (Blue Led Off).	2. Blown Diag Fuse (5A) in Power Distribution module 3. Vehicle not powering Up
#2	No Bluetooth Connectivity		1. Dongle not listed in Connectivity Screen 2. During operation, App transitions to connectivity screen	1. Dongle not powered or lost power- power the dongle (Refer #1) 2. Out of range – move closer to Dongle 3. Press the BT button on the Dongle to put dongle in discovery mode and Restart the APP 4. Restart or switch off the Blue tooth connectivity in the Android Device
#3	CCDT-APP unable to pair with the dongle automatically		CCDT-APP / Tablet / Mobile APP Prompts to enter Bluetooth Passkey	Enter Bluetooth Passkey / PIN. Blue tooth Passkey / PIN – 1210.

Table 8 Troubleshooting

6. DEFINITIONS AND ACRONYMS

Term	Definition
BT	Bluetooth
SW	Software
CCDT-APP	Club Car Diagnostics Tool's App (User interface part of the tool) executed in Android based TABLET or Phone (Android Version 5.0 or above)
APK	Android Package - Android installation file format name
APP	Application Package running in Android (in this case)
Play store	Digital distribution service run by Google - official App store for android platform Apps
CAN	Controller Area Network - a common Communication network used in automotive and other domains
ECU	Electronic Control Unit - VCM ,BMS, MCU
VCM	Vehicle Control Module - Main controlling ECU in the Car network
MCU	Motor Controller Unit
BMS	Battery Management System - ECU for Battery management
UTC	Coordinated Universal Coordinated Time

Table 9 Terms and Acronyms

7. APPENDIX

7.1. ANDORID DEVICES TESTED FOR CCDT-APP

Device	Device Type	Android Version
Lenovo Tab3 7	Tablet PC	Android 5.1 Lollipop
Lenovo TAB 4	Tablet PC	Android 7.1.1 Nougat
RCA Voyager III –RCT697W43	Tablet PC	Android 7.1.2 Nougat
Samsung Galaxy Tab A (2017)	Tablet PC	Android 7.1.1 Nougat
Asus Zenfone Max pro M1	Cell Phone	Android 8.1 Oreo
Google Pixel 3	Cell Phone	Android 9.0 Pie
Motorola X4	Cell Phone	Android 9.0 Pie
Samsung Galaxy S7	Cell phone	Android 6.0.1 Marshmallow
Samsung Galaxy S8	Cell Phone	Android 8.0 Oreo
Xioami Redmi Note 3	Cell Phone	Android 5.1 Lollipop [MIUI 9.5]
OnePlus 5	Cell Phone	Android 9.0 Pie [Oxygen Os 9.0.4]

Table 10 Android Devices Tested

FCC information
This device complies with Part 15 of the FCC Rules Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial environment. This equipment generates, uses and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in residential area is likely to cause harmful interference in which case the user will be required to correct the interference at own expense

CAN ICES-3(B) /NMB-3(B)

This device complies with Industry Canada license exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.
Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le
fonctionnement.