Evaluates: MAX20342

General Description

The MAX20342 evaluation kit (EV kit) is a fully assembled and tested PCB that evaluates the MAX20342 USB Type-C[®] charger detector with integrated overvoltage protection. The EV kit features a Pmod[™] connector, allowing the USB2PMB2 adapter board to provide I²C interface.

The EV kit features an on-board LDO to generate a supply voltage from the USB +5V. The on-board LDO output is configurable for 4.2V, 3.3V, or 2.3V to power the IC.

The EV kit software controls the USB2PMB2 adapter board over the USB, which generates I²C commands. The EV kit ships with jumpers installed and supply voltages set to typical operating values.

Ordering Information appears at end of data sheet.

Features

- USB-Powered Operation
- USB Type-C Receptable Connector
- Proven High-Speed USB PCB Layout
- Pmod I²C Interface
- Flexible Configuration
- On-Board Regulator and USB Connectors for Device Multiplexing
- Windows[®] 8/10-Compatible GUI Software
- Fully Assembled and Tested

Evaluation Kit Contents

- MAX20342 EV Kit
- USB2PMB2 Adapter Board
- Two USB A to Micro-B Cables
- USB Type-C Cable



USB Type- $C^{(R)}$ is a registered trademark of USB Implementers Forum. Windows is a registered trademark and registered service mark of Microsoft Corporation. Pmod is a trademark of Digilent Inc.



MAX20342 EV Kit Files

FILE	DESCRIPTION
MAX20342EVKit.exe	PC GUI Program

Quick Start

Required Equipment

Note: In the following sections, software-related items are identified by **bold** text. Text in **bold** refers to items directly from the install of EV kit software. Text which is **bold and underlined** refers to items from the Windows operating system.

- MAX20342 EV Kit
- USB2PMB2 Adapter Board
- Two USB A to Micro-B Cables
- USB Type-C Cable
- Windows PC with USB Ports

Procedure

The EV kit is fully assembled and tested. Follow the steps below to verify board operation. **Caution: Do not turn on the power supply until all connections are completed.**

- Visit <u>https://www.maximintegrated.com</u> to download the latest version of the EV kit software, <u>MAX20342EVKitSetupVxxx.ZIP</u> located on the MAX20342 EV kit web page. Download the EV kit software to a temporary folder and unzip the ZIP file.
- Install the EV kit software on your computer by running the <u>MAX20342EVKitSetupVxxx.EXE</u> program inside the temporary folder.
- 3) Verify that all jumpers are in their default positions, as shown in Table 1.
- 4) Connect the USB2PMB2 adapter board to J1 Pmod connector on the EV Kit.
- 5) Connect a USB A-to-micro-B cable between the PC and the X1 port on the USB2PMB2. USB driver should be installed automatically.
- 6) Connect the USB A-to-micro-B cable between the PC and the USB1 port on the EV kit.
- 7) Start the MAX20342 EV Kit tool. The EV kit software main window appears, as shown in Figure 1.
- 8) If connection is successfully established, the status bar the bottom displays **Connected**.
- 9) The EV kit is now ready for additional evaluations.



Figure 1. The Status of the GUI Shows Connected Ready for Further Evaluation

Evaluates: MAX20342

Detailed Description of Software

Software Startup

Upon starting the program, the EV kit software automatically searches for the USB interface circuit and then for the IC device addresses. The EV kit enters the normal operating mode when the connection is established and addresses are found. If the USB connection is not detected, the status bar displays **Not Connected**. If the USB connection is detected, but the MAX20342 is not found, the status bar displays **MAX20342 Not Found**.

The **Read All** button reads all the registers visible on the current tab page. All statuses are polled continuously. The polling feature can be disabled in the **Options** section of the menu bar by selecting **Disable Polling**.

ToolStrip Menu Bar

The Toolstrip menu bar (Figure 2) is located at the top of the GUI window. This bar comprises **File**, **Device**, **Options**, and **Help** menus whose functions are detailed in the following sections.

File Menu

The **File** Menu contains the option to exit out of the GUI program.

Device Menu

The **Device** menu provides the ability to connect or disconnect the EV kit to the GUI. If a board is disconnected while the GUI is open, the GUI displays **Not Connected** in the lower right corner. If the device is then plugged back in, the bottom right corner of the GUI displays **Connected**. The **I2C Read/Write** in the **Device** menu allows the user to read from or write to a selected register with a specified slave address.

Options Menu

The **Options** menu provides additional setting to access more features offered by the GUI. Read the registers manually instead of getting automatically frequent register updates from the IC by using the **Disable polling** option.

Help Menu

The **Help** menu contains the **About** option, which displays the GUI splash screen, indicating which GUI version is being used.

Tab Controls

The MAX20342 EV kit software GUI provides a convenient way to test the features of the MAX20342. Each tab contains controls relevant to various blocks of the device. Changing these interactive controls triggers a write operation to the MAX20342 to update the register contents.

🕲 USB Type-C Charger Detector (MAX20342) EV Kit Tool		×
File Device Options Help		

Figure 2. The ToolStrip Menu Items

General Tab

The **General** tab (Figure 3) provides all important information and options to set up the MAX20342 general configurations. The **Device Information and Status** panel provides detection of VBAT and VBUS. **USB Switch Control** and **VB Switch Control** can be found in the middle and right panels. Configuring low power modes can be accomplished through settings in the **Low Power Mode** panel.



Figure 3. General Tab

Type-C Tab

The **Type-C** tab (Figure 4) configures the USB Type-C detection and displays detection status. Several Type-C modes control can be configured through the T**ype-C Detection Configuration** panel. The user can also select options for VCONN configuration and other settings in this tab.

Seneral Type-C BC1.2 Moisture SBU Resis	tance Register Map	
Type-C Detection Status	General Configuration	VCONN Configuration Read All
No Connection CC Pin State: No Determination Allowed VBUS Current: Not in Sink Mode	Attached.SNK Lock Lock Constrained SNK Lock Constrained SNK Lock Lock Constrained SNK if CC < VRA_RD	VCONN Output: VCONN Disabled VCONN Overcurrent: No Overcurrent VCONN Short Circuit: No Short Detected
Type-C Detection Configuration	Advertised Current 0.5A	VCONN Overcurrent Protection
Enable Type-C Detection Enable Detection of: Sink Mode	TryWait.SRC Debounce Time • 120ms • 15ms	VCONN Current Limit Reserved Swap VCONN Roles Swap
 Source Mode Audio Accessory Mode Debug Accessory Sink Mode Debug Accessory Source Mode 	DRP Phase 35% Force ErrorRecovery Force Lock ESM in ErrorRecovery State	
Sink Reset Reset	Low Power Current Normal •	
Source Reset Reset	Rp Control Normal +	
Denable Try.SNK	Disable CC Resistor Ladder	

Figure 4. Type-C Tab

Evaluates: MAX20342

BC1.2 Tab

The **BC1.2** tab (Figure 5) hosts the settings for BC1.2 charger detection. View charger detection results and status according to charger type and proprietary charger. The **BC1.2 Charger Detection Configuration** panel provides an **Enable Charger Detection** button to enable or disable the charger detection, and **Manual Charger Detection** button to force a charger detection manually. The **Data Contact Detection** panel provides the DCD timeout status and options to select wait time for DCD.

Beneral Type-C BC1.2 Moisture SBU Resistance Register Map BC1.2 Charger Detection Status Read All Nothing Attached Proprietary Charger: Unknown Read Proprietary Charger: Unknown Charger Detection Run Status: No charger detection runnning. Charger Detection Abort Status: Type-C Detection FSM is gating BC1.2 Charger Detection FSM. Charger Detection can be run manually. BC1.2 Charger Detection Configuration Data Contact Detection Charger Detection of: Nanual Charger Nikon Charger 3A Dedicated Charging Port	file De	vice Opt	ions H	elp				
BC12 Charger Detection Status Nothing Attached Proprietary Charger: Unknown Charger Detection Run Status: No charger detection runnning. Charger Detection Abort Status: Type-C Detetction FSM is gating BC1.2 Charger Detection FSM. Charger Detection can be run manually. BC12 Charger Detection Configuration Data Contact Detection Manual Charger Detection of: Nikon Charger 3A Dedicated Charging Port	Seneral	Type-C	BC1.2	Moisture	SBU Resistance	Register Map		
Nothing Attached Proprietary Charger: Unknown Charger Detection Run Status: No charger detection runnning. Charger Detection Abort Status: Type-C Detectcion FSM is gating BC1.2 Charger Detection FSM. Charger Detection can be run manually. BC1.2 Charger Detection Configuration Data Contact Detection Manual Charger Detection Enable Detection of: Nikon Charger 3A Dedicated Charging Port	BC1.2	Charger	Detectio	on Status				Read All
BC1.2 Charger Detection Configuration Data Contact Detection Manual Charger Detection Run Enable Detection of: 0.000ms Nikon Charger 0.3A Dedicated Charging Port	No Pro Ch Ch	thing Att oprietary (arger Det arger Det	ached Charger: ection F	: Unknown Run Status Ibort Status	: No charger deter s: Type-C Detetcti	tion runnning. on FSM is gating BC	1.2 Charger Detection FSM. Charger Detection can be ru	in manually.
 Enable Charger Detection Manual Charger Detection Enable Detection of: Nikon Charger 3A Dedicated Charging Port Data Contact Detection Timeout Status: No Timeout Data Contact Detection Wait Time Ø 2000ms Ø 800ms 	BC1.2	Charger	Detectio	on Configu	ration		Data Contact Detection	
	Ma En	Enable nual Chai able Dete Nikon Chi 3A Dedica	Charge rger Det ction of: arger ated Cha	er Detection ection arging Port		Run	Data Contact Detection Timeout Status: No Time Data Contact Detection Wait Time 2000ms 800ms	out

Figure 5. BC1.2 Tab

Moisture Tab

The **Moisture** Tab (Figure 6) provides settings for a moisture detection configuration. The moisture detection function can be automatically configured (by toggling on **Enable Automatic Configuration**) or manually configured (by toggling off **Enable Automatic Configuration**). It also supports manual triggering (by clicking the **Run** button next to **Manual Moisture Detection**) or 10-second periodic triggering (by toggling on **Enable Periodic Measurements**). The moisture detection function is run only when the MAX20342 is not in shutdown mode, and V_B or a CC connection has not been detected. Refer to *Moisture Detection* section in the the MAX20342 IC data sheet, for details about these configurations.

The moisture detection threshold (R_{MOIST}) can be set by two parameters: selecting the voltage value in **Moisture Detection Voltage Threshold** drop-down menu and selecting pullup current in **Moisture Detection Max Pull-up Current**. Based on these selections, the program GUI updates and displays R_{MOIST} . Refer to Table 5 of the MAX20342 IC data sheet for the conditions of moisture detected. In manual configuration (by toggling off **Enable Automatic Configuration**), select the pullup and pulldown pins through the **Non-Automatic Moisture Detection Pull-up and Pull-down Settings** panel. If more than one pullup or pulldown pins are selected, the ADC results show the equivalent resistance connected in parallel.

The **ADC Results and Interrupts** panel outputs the average ADC voltage results and the final pullup current. The program GUI calculates the resistance based on obtained voltage and current results. Interrupts, self-cleared after read, are set according to Figure 3 and Figure 6 of the MAX20342 IC data sheet.

Burst measurement happens when it is in automatic configuration (**Enable Automatic Configuration** toggled on) and moisture is detected. Each pin, CC1, CC2, SBU1, and SBU2 is individually pulled up while other pins are grounded. The resistance results measured from each pin are updated in the **Moisture Detection Burst Measurement Results** panel.

General Type-C BC12 Moisture SBU Resistance Register Map Moisture Detection Configuration ADC Results and Interrupts Read	C12 Moisture SBU Resistance Register Map A Configuration ADC Results and Interrupts Read All eriodic Measurements ADC Voltage Average: 0.659V Final Pull-up Current: 128uA re Detection Run Measured Resistance: 0.659V / 128uA = 5.147kΩ reto Voltage Threshold 0.600V • Read Resistance: 0.659V / 128uA = 5.147kΩ reto Voltage Threshold 0.600V • Read Resistance: 0.659V / 128uA = 5.147kΩ reto Voltage Threshold 0.600V • Read Resistance Measurement Interrupts Resistance Threshold = 0.600V / 32uA = 18.750kΩ Read Resistance Result: Open = 0 Abort = 0 Ground = 0 Moisture Detection Pull-up and Pull-down Settings: CC1 Moisture Detection Result: Open = 1 Abort = 0 Ground = 0 Pull-up Enable CC2 Pull-down CC2 Resistance Result: 1.500V / 2uA = 750.0kΩ SBU1 Moisture Detection Result: Open = 1 Abort = 0 Ground = 0 Pull-up Enable D- Pull-down SBU1 Resistance Result: 1.500V / 2uA = 750.0kΩ SBU2 Moisture Detection Result: Open = 1 Abort = 0 Ground = 0 Pull-up Enable VBUS Pull-down SBU2 Moisture Detection Result: Open = 1 Abort = 0 Ground = 0 Pull-up Enable D- Pull-down SBU2 Moisture Detection Result: Open = 1 Abort = 0 Ground = 0 Pull-up Enable	File De	vice Opti	ons Hel	p			
Moisture Detection Configuration ADC Results and Interrupts Read Enable Periodic Measurements Enable Automatic Configuration Manual Moisture Detection Run ADC Voltage Average: 0.659V Final Pull-up Current: 128uA Measured Resistance: 0.659V / 128uA = 5.147kΩ Interrupts: Moisture = 0 Finite = 0 Open = 0 Ground = 0 Abort = Read Measured Resistance: 0.659V / 128uA = 5.147kΩ Interrupts: Moisture = 0 Finite = 0 Open = 0 Ground = 0 Abort = Read Moisture Detection Max Pull-up Current Programmed Resistance Threshold = 0.600V / 32uA = 18.750kΩ Non-Automatic Moisture Detection Pull-up and Pull-down Settings: Enable CC1 Pull-up Enable CC2 Pull-up Enable CC2 Pull-up Enable CC2 Pull-up Enable CC2 Pull-up Enable SBU1 Pull-up Enable SBU1 Pull-up Enable SBU1 Pull-up Enable SBU1 Pull-down ADC Results and Interrupts	ADC Results and Interrupts Read All ADC Results and Interrupts ADC Results and Interrupts ADC Voltage Average: 0.659V Final Pull-up Current: 128uA Measured Resistance: 0.659V / 128uA = 5.147kΩ Interrupts: Moisture = 0 Finite = 0 Open = 0 Ground = 0 Abort = 0 reion Voltage Threshold 0.600V • tion Nax Pull-up Current 32uA • Resistance Threshold = 0.600V / 32uA = 18.750kΩ Moisture Detection Burst Measurement Results Moisture Detection Pull-up and Pull-down CC1 Moisture Detection Result: Open = 0 Abort = 0 Ground = 0 Last CC1 Resistance Result: 1.6059V / 128uA = 5.147kΩ CC2 Moisture Detection Result: Open = 1 Abort = 0 Ground = 0 Last CC2 Resistance Result: 1.500V / 2uA = 750.0kΩ SBU1 Moisture Detection Result: Open = 1 Abort = 0 Ground = 0 Last SBU1 Pull-up Enable D+ Pull-down SBU1 Moisture Detection Result: 1.500V / 2uA = 750.0kΩ SBU1 Moisture Detection Result: Open = 1 Abort = 0 Ground = 0 Last SBU2 Resistance Result: 1.500V / 2uA = 750.0kΩ SBU2 Moisture Detection Result: Open = 1 Abort = 0 Ground = 0 Last SBU2 Resistance Result: 1.500V / 2uA = 750.0kΩ	ieneral	Type-C	BC1.2	Moisture	SBU Resistance	Register Map	
Enable Periodic Measurements ADC Voltage Average: 0.659V Manual Moisture Detection Run Moisture Detection Voltage Threshold 0.600V Moisture Detection Noltage Threshold 0.600V Moisture Detection Nax Pull-up Current 32uA Programmed Resistance Threshold = 0.600V / 32uA = 18.750kΩ Moisture Detection Result: Open = 0 Abort = 0 Ground = Non-Automatic Moisture Detection Pull-up and Pull-down Enable CC1 Pull-up Enable CC1 Pull-up Enable CS2 Pull-up Enable CC2 Pull-up Enable SBU1 Pull-down Enable SBU1 Pull-up Enable SBU1 Pull-down C22 Resistance Result: 0.659V / 2uA = 750.0kΩ	eriodic Measurements utomatic Configuration re Detection Resistance Configuration re Detection Resistance Threshold 0.600V Stion Max Pull-up Current 32uA Resistance Threshold 0.600V Moisture Detection Pull-up Current 32uA Moisture Detection Pull-up and Pull-down Settings: Pull-up Enable CC1 Pull-down Pull-up Enable CC2 Pull-down Pull-up Enable SBU1 Pull-down Pull-up Enable SBU2 Pull-down Pull-up Enable D- Pull-down SBU1 Moisture Detection Result: 1.500V / 2uA = 750.0kΩ SBU1 Moisture Detection Result: 1.500V / 2uA = 750.0kΩ SBU2 Moisture Detection Result: 1.500V / 2uA = 750.0kΩ	Moistu	re Detect	ion Confi	iguration			ADC Results and Interrupts Read All
Moisture Detection Voltage Threshold 0.600V • Moisture Detection Max Pull-up Current 32uA • Programmed Resistance Threshold = 0.600V / 32uA = 18.750kΩ • Moisture Detection Burst Measurement Results Non-Automatic Moisture Detection Pull-up and Pull-down Enable CC1 Pull-up Enable CC1 Pull-up Enable CC2 Pull-up Enable CC2 Pull-up Enable CC2 Pull-up Enable SBU1 Pull-up Enable SBU1 Pull-down Enable SBU1 Pull-up Enable SBU1 Pull-down Enable SBU1 Pull-up Enable SBU1 Pull-down	Action Voitage Threshold 0.600V Stion Max Pull-up Current 32uA Resistance Threshold = 0.600V / 32uA = 18.750kΩ Moisture Detection Pull-up and Pull-down Settings: Pull-up Enable CC1 Pull-down Pull-up Enable CC2 Pull-down 11 Pull-up Enable SBU1 Pull-down Pull-up Enable SBU2 Pull-down Pull-up Enable D+ Pull-down Pull-up Enable D- Pull-down SBU1 Moisture Detection Result: 0.659V / 128uA = 5.147kΩ CC2 Moisture Detection Result: 0.659V / 128uA = 5.147kΩ CC2 Moisture Detection Result: 0.659V / 128uA = 5.147kΩ CC2 Moisture Detection Result: 0.659V / 128uA = 5.147kΩ CC2 Moisture Detection Result: 0.60V / 2uA = 750.0kΩ SBU1 Moisture Detection Result: 0.60V / 2uA = 750.0kΩ SBU1 Moisture Detection Result: 1.500V / 2uA = 750.0kΩ SBU2 Moisture Detection Result: 0.60N / 2uA = 750.0kΩ SBU2 Moisture Detection Result: 0.60N / 2uA = 750.0kΩ	Ma	Enable Enable	Periodic Automati ture Dete	Measurer ic Configu ection	nents ration	Run	ADC Voltage Average: 0.659V Final Pull-up Current: 128uA Measured Resistance: 0.659V / 128uA = 5.147kΩ Interrupts: Moisture = 0 Finite = 0 Open = 0 Ground = 0 Abort = 0 Read Resistance Measurement Interrupts Read
Non-Automatic Moisture Detection Pull-up and Pull-down Settings: CC1 Moisture Detection Result: Open = 0 Abort = 0 Ground = Last CC1 Resistance Result: 0.659V / 128uA = 5.147kΩ Enable CC1 Pull-up Enable CC1 Pull-down Enable CC2 Pull-up Enable CC2 Pull-down Enable SBU1 Pull-up Enable SBU1 Pull-down CC2 Moisture Detection Result: Open = 1 Abort = 0 Ground = Last CC2 Resistance Result: 1.500V / 2uA = 750.0kΩ	CC1 Moisture Detection Result: Open = 0 Abort = 0 Ground = 0Moisture Detection Pull-up and Pull-downLast CC1 Resistance Result: $0.659V / 128uA = 5.147k\Omega$ Pull-upEnable CC1 Pull-downPull-upEnable CC2 Pull-down11 Pull-upEnable SBU1 Pull-down12 Pull-upEnable SBU2 Pull-downPull-upEnable D+ Pull-downPull-upEnable D- Pull-downPull-upEnable D- Pull-downPull-upEnable D- Pull-downPull-upEnable D- Pull-downPull-upEnable D- Pull-downPull-upEnable D- Pull-downPull-upEnable VBUS Pull-downPull-up<	Mo	isture Det	ection M d Resista	ax Pull-up ance Thre	Current shold = 0.600V/3	32uA + 2uA = 18.750kΩ	Moisture Detection Burst Measurement Results
Enable SB02 Pull-up Enable SB02 Pull-down SB01 Moisture Detection Result: Open = 1 Abort = 0 Ground = Enable D+ Pull-up Enable D+ Pull-down Last SB01 Resistance Result: 1.500V / 2uA = 750.0kΩ SB02 Moisture Detection Result: Open = 1 Abort = 0 Ground = Last SB02 Moisture Detection Result: 0.500V / 2uA = 750.0kΩ SB02 Moisture Detection Result: 1.500V / 2uA = 750.0kΩ SB02 Moisture Detection Result: 0.500V / 2uA = 750.0kΩ		No	n-Automa Enable C(Enable C(Enable SI Enable SI Enable D- Enable D-	tic Moistr C1 Pull-u C2 Pull-u BU1 Pull- BU2 Pull- Pull-up Pull-up	ure Detect p E up E up E up E E E E	tion Pull-up and P Enable CC1 Pull- Enable CC2 Pull- Enable SBU1 Pull Enable SBU2 Pull Enable D+ Pull-do Enable D- Pull-do Enable VBUS Pull	ull-down Settings: lown down down down wn wn vn down	CC1 Moisture Detection Result: Open = 0 Abort = 0 Ground = 0 Last CC1 Resistance Result: $0.659V / 128uA = 5.147k\Omega$ CC2 Moisture Detection Result: Open = 1 Abort = 0 Ground = 0 Last CC2 Resistance Result: $1.500V / 2uA = 750.0k\Omega$ SBU1 Moisture Detection Result: Open = 1 Abort = 0 Ground = 0 Last SBU1 Resistance Result: $1.500V / 2uA = 750.0k\Omega$ SBU2 Moisture Detection Result: Open = 1 Abort = 0 Ground = 0 Last SBU2 Resistance Result: $1.500V / 2uA = 750.0k\Omega$ SBU2 Moisture Detection Result: Open = 1 Abort = 0 Ground = 0 Last SBU2 Resistance Result: $1.500V / 2uA = 750.0k\Omega$

Figure 6. Moisture Tab

Evaluates: MAX20342

SBU Resistance Tab

The **SBU Resistance** tab (Figure 7) provides settings for debug accessory resistance detection. The detection can be triggered manually (by clicking the **Run** button next to **Manual SBU1/SBU2 Detection**), continuously (by toggling on **Enable Continuous SBU1/SBU2 Resistor Measurement**), or one-shot (by toggling on **Enable One-shot SBU1/SBU2 Resistor Measurement**). One detection consists of measuring the resistances on SBU1/SBU2 to ground in sequence, reporting the results, and asserting the corresponding interrupts. Refer to the *Debug Accessory Modes* section in the MAX20342 IC data sheet for details about these configurations.

The MAX20342 can automatically detect up to five accessory modes based on the measured resistance between

SBU1 (or SBU2) and ground. These five resistance thresholds are selected by the corresponding drop-down option from **Choose an Accessory to Configure** block. Configure the minimum and maximum voltage thresholds as well as pullup current for each accessory mode. With these parameters set, a resistance range for each accessory mode is defined and displayed on the GUI. Refer to Table 7 and Table 8 of the MAX20342 IC data sheet for the allowed ranges of debug accessory detection.

The SBU1/SBU2 resistance results are shown in the **SBU Accessory Detection Measurement Results** panel. The program GUI calculates the resistance based on obtained voltage and current results.

General Type-C BC12 Moisture SBU Resistance Register Map SBU Accessory Detection Configuration ADC Results and Interrupts Read All Image: SBU Accessory Detection Configuration ADC Results and Interrupts Read All Image: SBU Accessory Detection Configuration ADC Results and Interrupts Read All Image: SBU1/SBU2 Resistor Measurement ADC Voltage Average Overall Result: 1.500V Final Pull-up Current Overall Result: 1.500V / 2uA = 750 0kΩ Interrupts: SBU Accessory 1 Configure: Accessory 1 Adcessory 1 Image: SBU1/SBU2 Detection Image: Accessory 1 Accessory 1 Image: SBU Accessory 1 Valid Voltage Maximum Threshold 0.900V * Accessory Detection Result: Open = 0 Abort = 0 Accessory 1 Valid Voltage Maximum Threshold 1.024V * Accessory Detection Result: Open = 0 Abort = 0 Ground = 0 Last SBU1 Accessory Voltage Result: 0.000V Last SBU1 Accessory Voltage Result: 0.000V Last SBU1 Accessory Final Pull-up Current Result: 2uA Accessory 1 Valid Resistance Range = 28.125kΩ - 31.985kΩ SBU2 Accessory Detection Result: 0.000V / 2uA = 0Ω SBU2 Accessory Voltage Result: 0.000V / 2uA = 0Ω SBU2 Accessory Voltage Result: 0.000V Last SBU1 Accessory Voltage Result: 0.000V / 2uA = 0Ω SBU2 Accessory Voltage Result: 0.000V	File Device Options Help		
SBU Accessory Detection Configuration ADC Results and Interrupts Read All	General Type-C BC1.2 Moisture SBU Resistance	Register Map	
C Enable Continuous SBU1/SBU2 Resistor MeasurementManual SBU1/SBU2 DetectionManual SBU1/SBU2 DetectionRunEnable Abort Result Priority in Overall ResultChoose an Accessory to Configure:Accessory 1 Valid Voltage Minimum Threshold0.900V *Accessory 1 Valid Voltage Maximum Threshold1.024V *Accessory 1 SBU1/SBU2 Max Pull-up Current32uA *Accessory 1 Valid Resistance Range = 28.125kΩ - 31.985kΩSBU1 Accessory Voltage Result: 0.000V / Last SBU1 Resistance Result: 0.000V / 2uA = 00SBU2 Accessory Detection Result: 0.000V / 2uA = 00SBU2 Accessory Voltage Result: 0.000V / 2uA = 00	SBU Accessory Detection Configuration		ADC Results and Interrupts Read All
Accessory 1 Valid Voltage Minimum Threshold 0.900V • Accessory 1 Valid Voltage Maximum Threshold 1.024V • Accessory 1 SBU1/SBU2 Max Pull-up Current 32uA • Accessory 1 Valid Resistance Range = 28.125kΩ - 31.985kΩ SBU Accessory Detection Measurement Results SBU1 Accessory Voltage Result: 0.000V Last SBU1 Accessory Voltage Result: 0.000V Last SBU1 Accessory Final Pull-up Current Result: 2uA Last SBU1 Accessory Detection Result: 0.000V / 2uA = 0Ω SBU2 Accessory Detection Result: 0.000V SBU2 Accessory Voltage Result: 0.000V	 Enable Continuous SBU1/SBU2 Resistor Me Enable One-shot SBU1/SBU2 Resistor Me Manual SBU1/SBU2 Detection Enable Abort Result Priority in Overall Result Choose an Accessory to Configure: Acc 	leasurement asurement Run ult essory 1 •	ADC Voltage Average Overall Result: 1.500V Final Pull-up Current Overall Result: 2uA Measured Resistance Overall Result: 1.500V / 2uA = 750.0kΩ Interrupts: SBU = 0 Finite = 0 Open = 0 Ground = 0 Abort = 0 Valid Accessory Interrupts: No Accessory Detected Read Resistance Measurement Interrupts Read
Accessory 1 Valid Voltage Maximum Threshold 1.024V Accessory 1 SBU1/SBU2 Max Pull-up Current 32uA Accessory 1 Valid Resistance Range = 28.125kΩ - 31.985kΩ SBU1 Accessory Voltage Result: 0.000V Last SBU1 Accessory Final Pull-up Current Result: 2uA Last SBU1 Accessory Final Pull-up Current Result: 2uA Last SBU1 Resistance Result: 0.000V / 2uA = 0Ω SBU2 Accessory Detection Result: Open = 0 Abort = 0 Ground = 0 Last SBU2 Accessory Voltage Result: 0.000V Last SBU2 Accessory Voltage Result: 0.000V	Accessory 1 Valid Voltage Minimum Threshold	0.900V ×	SBU Accessory Detection Measurement Results
Last SBU2 Accessory Final Pull-up Current Result: 2uA Last SBU2 Resistance Result:0.000V / 2uA = 0Ω	Accessory 1 Valid Voltage Maximum Threshold Accessory 1 SBU1/SBU2 Max Pull-up Current Accessory 1 Valid Resistance Range = 28.125k	1.024V • 32uA • Ω - 31.985kΩ	$SBU1 \ Accessory \ Detection \ Result: \ Open = 0 \ Abort = 0 \ Ground = 0 \\ Last \ SBU1 \ Accessory \ Voltage \ Result: 0.000V \\ Last \ SBU1 \ Accessory \ Final \ Pull-up \ Current \ Result: \ 2uA \\ Last \ SBU1 \ Resistance \ Result: 0.000V / \ 2uA = 0\Omega \\ SBU2 \ Accessory \ Detection \ Result: \ Open = 0 \ Abort = 0 \ Ground = 0 \\ Last \ SBU2 \ Accessory \ Voltage \ Result: 0.000V \\ Last \ SBU2 \ Accessory \ Voltage \ Result: \ 0.000V \\ Last \ SBU2 \ Accessory \ Final \ Pull-up \ Current \ Result: \ 2uA \\ Last \ SBU2 \ Accessory \ Final \ Pull-up \ Current \ Result: \ 2uA \\ Last \ SBU2 \ Accessory \ Final \ Pull-up \ Current \ Result: \ 2uA \\ Last \ SBU2 \ Resistance \ Result: \ 0.000V / \ 2uA = 0\Omega \\ \ Accessory \ Final \ Pull-up \ Current \ Result: \ 2uA \\ Last \ SBU2 \ Resistance \ Result: \ 0.000V / \ 2uA = 0\Omega \\ \ Accessory \ Final \ Pull-up \ Current \ Result: \ 2uA \\ Last \ SBU2 \ Resistance \ Result: \ 0.000V / \ 2uA = 0\Omega \\ \ Accessory \ Final \ Pull-up \ Current \ Result: \ 2uA \\ Last \ SBU2 \ Resistance \ Result: \ 0.000V / \ 2uA = 0\Omega \\ \ Accessory \ Final \ Result: \ 0.000V / \ 2uA = 0\Omega \\ \ Accessory \ Final \ Result: \ 0.000V / \ 2uA = 0\Omega \\ \ Accessory \ Final \ Result: \ 0.000V / \ 2uA = 0\Omega \\ \ Accessory \ Final \ Result: \ 0.000V / \ 2uA = 0\Omega \\ \ Accessory \ Final \ Result: \ 0.000V / \ 2uA = 0\Omega \\ \ Accessory \ Final \ Result: \ 0.00V / \ 2uA = 0 \\ \ Accessory \ Final \ Result: \ 0.00V / \ 2uA = 0 \\ \ Accessory \ Final \ Result: \ 0.00V / \ 2uA = 0 \\ \ Accessory \ Final \ Result: \ Result: \ 0.00V / \ 2uA = 0 \\ \ Accessory \ Final \ Result: \ Re$

Figure 7. SBU Resistance Tab

Evaluates: MAX20342

Register Map Tab

The **Register Map** tab (Figure 8) provides all names and values of MAX20342 registers. Click **Read All** at the top right corner to perform a burst read of all registers.

The left table shows the register to be read from or written to. The right table contains descriptions for each register field of the selected 8-bit register. All bits, along with their field names, are displayed at the bottom of the page.

To set a bit, click the bit label. **Bold** text represents logic 1 and regular text represents logic 0. To configure the changes to the device, click the **Write** button at the bottom right.

Detailed Description of Hardware

The MAX20342 EV kit evaluates the MAX20342 USB Type-C charger detector with integrated overvoltage protection that communicates over the I²C interface. The EV kit demonstrates the IC features such as BC1.2 charger detection, USB Type-C detection, overvoltage protection, USB switch control, moisture detection, and SBU accessory detection. The EV kit uses the IC in a 24-bump (2.62mm x 2.02mm) wafer-level package (WLP) on a proven, four-layer PCB design. The EV kit operates from the USB +5V DC, and therefore, does not require an external power supply. Alternatively, the EV kit can be powered with an external power supply through EXT_5V of JU1 or EXT_VBAT of JU2.

ile Device	Options H	lelp								
eneral Typ	e-C BC1.2	Moisture	SBU Resistance	Re	gister Map					
Register N	Мар								Rea	d All
Register Address		Register	Value	^	Field	Name		Description		
0x00	RE	VISION ID	0x01		Bit [7:0]	Revision_id	Information abo	out the hardware re	evision.	
0x01	CC	MMON_INT	Г 0x00	1.00						
0x02		CC_INT	0x00	1						
0x03		BC_INT	0x00							
0x04		OVP_INT	0x00							
0x05	F	RES_INT1	0x00							
0x06	F	RES_INT2	0x00							
0x07	COM	MON_STAT	US 0x00							
0x08	CC	_STATUS1	0x00							
0x09	CC	_STATUS2	2 0x00							
0x0A	B	C_STATUS	0x00							
0x0B	OV	P_STATUS	0x00							
0x0C	COM	MON_MAS	SK 0x00							
0x0D	C	C_MASK	0x00	~						
7		6	5		4	3	2	1	0	
Revision	n_id[7]	Revision_id[6	Revision_id	[5]	Revision_id	[4] Revision_id[3]	Revision_id[2]	Revision_id[1]	Revisio	n_id[0]
Note: Click	text to set	or clear bit a	and "Write" to con	nmit t	o device. Bol	d text is logic 1. Regula	ar text is logic 0.		Read	Write
			1				213			C

Figure 8. Register Map Tab

Table 1. Jumper Table (JU1-JU24)

JUMPER	SHUNT POSITION	DESCRIPTION					
	1-2*	Connect VB of U1 to VBUS of USB4. U1 powered from the USB Type-C port.					
JU1	2-3 Connect VB of U1 to the external 5V applied at EXT_5V test point. 1-2* Connect VBAT of U1 to INT_VBAT of U2. U1 powered from USB1 and restricted from USB1 and restrited from USB1 and restricted from						
	1-2*	Connect VBAT of U1 to INT_VBAT of U2. U1 powered from USB1 and regulator U2.					
JUZ	2-3 Connect VBAT of U1 to the external VBAT applied at EXT_VBAT test point. a 1.2*						
JU3	1-2*	Pullup SCL of U1 to VIO 3.3V.					
JU4	1-2*	Pullup SDA of U1 to VIO 3.3V.					
JU5	1-2*	Pullup INT of U1 to VIO 3.3V.					
JU6	1-2*	Pullup CE of U1 to VIO 3.3V.					
JU7	1-2*	Connect VB of U1 to the LED indicator D3.					
JU8	1-2*	Connect VB of U1 to the LED indicator D3. Connect VBAT of U1 to the LED indicator D4.					
JU9	1-2*	Connect OUT of U1 to the LED indicator D5.					
	1-2	Select 2.3V for INT_VBAT to supply BAT of U1.					
JU10	1-3	Select 3.3V for INT_VBAT to supply BAT of U1.					
	1-4*	Select 4.2V for INT_VBAT to supply BAT of U1.					
JU11	1-2*	Pullup DB of U1 to VIO 3.3V.					
11.14.0	1-2	Connect VBUS of USB4 (USB Type-C port) to VBUS2 of USB2 and USB3.					
JU12	Open	Disconnect VBUS of USB4 (USB Type-C port) to VBUS2 of USB2 and USB3.					
11.14.4	1-2	Connect VIO to the 3.3V output of regulator U3.					
5014	2-3*	Connect VIO to 3.3V_EXT of J1.					
11.115	1-2*	Connect VBUS2 of USB2 and USB3 to OUT of U1.					
3015	2-3	Connect VBUS2 of USB2 and USB3 to 5V supply from USB1.					
	1-2	Connect SBU1 of U1 to pulldown resistor R18 7.5k Ω .					
	3-4	Connect SBU1 of U1 to pulldown resistor R19 $24k\Omega$.					
	5-6*	Connect SBU1 of U1 to pulldown resistor R28 $30k\Omega$.					
JU16	7-8	Connect SBU1 of U1 to pulldown resistor R40 80.6kΩ.					
	9-10	Connect SBU1 of U1 to pulldown resistor R20 100k Ω .					
	11-12	Connect SBU1 of U1 to pulldown resistor R29 150kΩ.					
	13-14	Connect SBU1 of U1 to pulldown resistor R21 330kΩ.					
	1-2	Connect SBU2 of U1 to pulldown resistor R22 7.5k Ω .					
-	3-4	Connect SBU2 of U1 to pulldown resistor R23 24kΩ.					
	5-6	Connect SBU2 of U1 to pulldown resistor R30 30kΩ.					
JU17	7-8*	Connect SBU2 of U1 to pulldown resistor R41 80.6kΩ.					
	9-10	Connect SBU2 of U1 to pulldown resistor R24 100kΩ.					
	11-12	Connect SBU2 of U1 to pulldown resistor R31 150kΩ.					
	13-14	Connect SBU2 of U1 to pulldown resistor R25 330kΩ.					

JUMPER	SHUNT POSITION	DESCRIPTION
	1-2	Connect VBUS of U1 to the potentiometer selection of JU19.
	3-4	Connect SBU1 of U1 to the potentiometer selection of JU19.
	5-6	Connect SBU2 of U1 to the potentiometer selection of JU19.
11.14.0	7-8	Connect CC1 of U1 to the potentiometer selection of JU19.
JU 18	9-10	Connect CC2 of U1 to the potentiometer selection of JU19.
	11-12	Connect CDP of U1 to the potentiometer selection of JU19.
	13-14	Connect CDN of U1 to the potentiometer selection of JU19.
	15-16	Connect GND to the potentiometer selection of JU19.
	1-2*	Select potentiometer R1 50k Ω between JU19 and JU20.
JU19	3-4	Select potentiometer R26 300k Ω between JU19 and JU20.
	5-6	Select potentiometer R27 1M Ω between JU19 and JU20.
	1-2	Connect VBUS of U1 to the potentiometer selection of JU19.
	3-4	Connect SBU1 of U1 to the potentiometer selection of JU19.
	5-6	Connect SBU2 of U1 to the potentiometer selection of JU19.
11.120	7-8	Connect CC1 of U1 to the potentiometer selection of JU19.
JU20	9-10	Connect CC2 of U1 to the potentiometer selection of JU19.
	11-12	Connect CDP of U1 to the potentiometer selection of JU19.
	13-14	Connect CDN of U1 to the potentiometer selection of JU19.
	15-16	Connect GND to the potentiometer selection of JU19.
	1-2	Connect CC1 of U1 to resistor R34 56.2k Ω .
JU21	3-4	Connect CC1 of U1 to resistor R35 5.1k Ω .
	5-6	Connect CC1 of U1 to resistor R36 $1k\Omega$.
	1-2	Pullup resistor R34 56.2k Ω to VBUS (R _P).
JU22	3-4	Pullup resistor R35 5.1k Ω to GND (R _D).
	4-6	Pullup resistor R36 1k Ω to GND (R _A).
	1-2	Connect CC2 of U1 to resistor R37 56.2k Ω .
JU23	3-4	Connect CC2 of U1 to resistor R38 5.1k Ω .
	5-6	Connect CC2 of U1 to resistor R39 $1k\Omega$.
	1-2	Pullup resistor R37 56.2k Ω to VBUS (R _P).
JU24	3-4	Pullup resistor R38 5.1k Ω to GND (R _D).
	4-6	Pullup resistor R39 1k Ω to GND (R _A).

Table 1. Jumper Table (JU1-JU24) (continued)

*Default position

Supply Voltage Selection

This section covers the procedure to select supply voltage to power the MAX20342 either from V_B or BAT.

Supply Voltage from BAT

To select the supply voltage from BAT, configure the default jumper connections from <u>Table 1</u>, then connect the USB A-to-micro-B cable between the PC and the USB1 port on the EV kit. The LED D4 illuminates, indicating the voltage of BAT. The GUI program shows the battery voltage status in the **General** tab (see Figure 9).



Figure 9. Status of Battery Voltage Detection

Supply Voltage from VB

To select the supply voltage from V_B , configure default jumper connections from <u>Table 1</u>, then disconnect the USB A-tomicro-B cable between the PC and the USB1 port on the EV kit. Connect USB Type-C cable between the PC and the USB4 port on the EV kit. The LED D3 illuminates, indicating the voltage of V_B . The GUI program shows the VBUS voltage status in the **General** tab (see Figure 10).



Figure 10. Status of VBUS Voltage Detection

Supply Voltages Present on Both BAT and VB

With both valid supply voltages present on the BAT and V_B pins, the MAX20342 features an internal supply voltage selector that can be set through the VCCINTOnBAT bit of register 0x15. By default, the MAX20342 is powered from the higher valid voltages between BAT and V_B . However, it is possible to switch the valid supply voltage to BAT by writing 1 to the VCCINTOnBAT bit or toggle the button in the GUI program (see Figure 11).

Time C. DOI 0. Mainture. CDU Desistance.	DesisterMan	
eneral Type-C BC1.2 Moisture SBO Resistance	Register Map	
Device Information and Status	General Configuration	General Configuration Read All
Revision ID = 0x01 Fault Status: No Fault State Thermal Fault Not Active No Battery Overvoltage No Battery Undervoltage VBUS Detected VBUS Detected VBUS Within Valid Range VBUS Switch Closed	USB Switch Control All Switches Open USB Switches in UT/UR Position USB Switches TD+/TD- Position Follow Automatic HW Setting Enable Interrupts Force CE Output CE Output Forced Value	VB Overvoltage Switch Control Force Switch Open Switch Closed When VBUS Detected Switch Controlled by Logic Switch Closed VB Pulldown Duration Enable VB Discharge Pull-down Enable Active Discharge
Low Power Mode	Low Force DB Output	 Enable Shutdown Mode USB Valid Autoconfig
Low Power Mode Not Active	DB Output Forced Value High Impedance	Debug Accessory Mode Autoconfig Enable USB Switch Charge Pump
Low Power Mode Enable Enable Low Power UFP Mode Enable Low Power DRP Mode	Low	Force VCCINT Switch-Over on BAT

Figure 11. Internal Supply Voltage Switchover

Evaluates: MAX20342

Moisture Detection

This section covers the procedure to perform moisture detection with the MAX20342.

Hardware setting

- 1) Follow the default jumper settings from Table 1.
- Connect pin 3-4 of JU21 and pin 3-4 of JU22. Such configuration connects a 5.1kΩ resistor to pin CC1.
- 3) Do not connect any jumpers of JU23 and JU24. Such configuration leaves pin CC2 open.
- 4) Power the MAX20342 through USB1 (through BAT).
- 5) Do not connect a USB Type-C cable to the USB4 port, or supply any voltage to V_B.

GUI Program

Interpreting moisture detection results is detailed in the following procedure and Figure 12.

- Open the MAX20342 EV kit GUI program. The status bar should display **Connected**. Navigate to the **Moisture** tab.
- 2) Toggle on, if necessary, both Enable Periodic Measurements and Enable Automatic Configuration, which are on by default. For Enable Automatic Configuration, the MAX20342 is configured to measure the resistance between CC1 (alternatively CC2) and all other USB Type-C pins which are grounded. Regarding periodic measurements, the MAX20342 updates the measured resistance every 10 seconds. In this case, the pattern repeats such that resistance measurement on CC1 is displayed, and 10 seconds later, CC2 resistance measurement is shown. Refer the MAX20342 IC data sheet for more information.
- 3) By default, the Moisture Detection Voltage Threshold is set to 0.600V, and the Moisture Detection Max Pull-up Current is 32µA. These two parameters are used to compute the moisture resistance threshold (R_{MOIST}), approximately 18.750kΩ. If the resistance result from either CC1 or CC2 is less than R_{MOIST}, in this case 18.750kΩ, moisture is detected.

eral Type-C BC1.2 Moisture SBU Resistance Register Map	
oisture Detection Configuration	ADC Results and Interrupts Read All
 Enable Periodic Measurements Enable Automatic Configuration Manual Moisture Detection 	ADC Voltage Average: 0.659V Final Pull-up Current: 128uA Measured Resistance: 0.659V / 128uA = 5.147kΩ Interrupts: Moisture = 1 Finite = 0 Open = 0 Ground = 0 Abort = 0
Moisture Detection Voltage Threshold 0.600V Moisture Detection Max Pull-up Current 32uA Programmed Resistance Threshold = 0.600V / 32uA = 18.750kΩ 3	Read Resistance Measurement Interrupts Read Moisture Detection Burst Measurement Results Control of the control of
Non-Automatic Moisture Detection Pull-up and Pull-down Settings: Enable CC1 Pull-up Enable CC1 Pull-down Enable CC2 Pull-up Enable CC2 Pull-down Enable SBU1 Pull-up Enable SBU1 Pull-down Enable SBU2 Pull-up Enable SBU2 Pull-down Enable D+ Pull-up Enable D+ Pull-down Enable D- Pull-up Enable D- Pull-down Enable D- Pull-up Enable D- Pull-down Enable D- Pull-up Enable D- Pull-down	 CC1 Moisture Detection Result: Open = 0 Abort = 0 Ground = 0 Last CC1 Resistance Result: 0.659V / 128uA = 5.147kΩ CC2 Moisture Detection Result: Open = 1 Abort = 0 Ground = 0 Last CC2 Resistance Result: 1.500V / 2uA = 750.0kΩ SBU1 Moisture Detection Result: Open = 0 Abort = 0 Ground = 0 Last SBU1 Resistance Result: 0.959V / 32uA = 29.963kΩ SBU2 Moisture Detection Result: Open = 0 Abort = 0 Ground = 0 Last SBU2 Resistance Result: 0.647V / 8uA = 80.882kΩ

Figure 12. Moisture Detection Shows Resistance Measurement Results of CC1

- 4) The ADC Results and Interrupts panel shows resistance result for pin CC1. The Measured Resistance shows 5.147k Ω , which is close to the actual resistance value connected to CC1. Since the computed resistance result is less than R_{MOIST} 18.750k Ω , moisture is detected. Click the Read button next to Read Resistance Measurement Interrupts to display the corresponding interrupt (i.e., Moisture = 1).
- Burst measurements happen after moisture is detected on CC1 (refer to Figure 2 in the MAX20342 IC data sheet). Results are shown in the **Moisture Detection Burst Measurement Results** panel. CC1 resistance is **5.147k** Ω (discussed above). CC2 resistance is **750.0k** Ω , with interrupt **Open = 1**,

since CC2 is left open. SBU1 resistance is $29.963k\Omega$ due to a default jumper connection at pin 5-6 of JU16. SBU2 resistance is $80.882k\Omega$ due to a default jumper connection at pin 7-8 of JU17.

- 5) After 10 seconds, the ADC shows the resistance measurement of pin CC2 (see Figure 13). As CC2 is left open, the **Measure Resistance** displays the highest ADC value equivalent to **750.0k** Ω .
- The ADC Results and Interrupts panel is updated every 10 seconds. The resistance measurement results of CC1 and CC2 are shown alternatively in Figure 12 and Figure 13.

neral Type-C BC1.2 Moisture SBU Resistance Register Map	
Moisture Detection Configuration	ADC Results and Interrupts Read All
Enable Periodic Measurements Enable Automatic Configuration Manual Moisture Detection	ADC Voltage Average: 1.500V Final Pull-up Current: 2uA Measured Resistance: 1.500V / 2uA = 750.0kΩ Interrupts: Moisture = 0 Finite = 0 Open = 0 Ground = 0 Abort = 0
Moisture Detection Voltage Threshold 0.600V Moisture Detection Max Pull-up Current 32uA Programmed Resistance Threshold = 0.600V / 32uA = 18.750kO	Read Resistance Measurement Interrupts Read Moisture Detection Burst Measurement Results Image: Content of the second
Non-Automatic Moisture Detection Pull-up and Pull-down Settings: Enable CC1 Pull-up Enable CC2 Pull-up Enable SBU1 Pull-up Enable SBU1 Pull-up Enable SBU2 Pull-up Enable D+ Pull-up Enable D- Pull-up	 CC1 Moisture Detection Result: Open = 0 Abort = 0 Ground = 0 Last CC1 Resistance Result: 0.659V / 128uA = 5.147kΩ CC2 Moisture Detection Result: Open = 1 Abort = 0 Ground = 0 Last CC2 Resistance Result: 1.500V / 2uA = 750.0kΩ SBU1 Moisture Detection Result: Open = 0 Abort = 0 Ground = 0 Last SBU1 Resistance Result: 0.959V / 32uA = 29.963kΩ SBU2 Moisture Detection Result: Open = 0 Abort = 0 Ground = 0 Last SBU2 Resistance Result: 0.647V / 8uA = 80.882kΩ

Figure 13. Moisture Detection Shows Resistance Measurement Results of CC2

Evaluates: MAX20342

SBU Resistance Detection

This section covers the procedure to perform SBU resistance detection with the MAX20342.

Hardware Setting

- 1) Follow the default jumper settings from Table 1.
- 2) Connect a USB Type-C cable to the USB4 port. The MAX20342 is now powered through V_B.

GUI Program

Interpreting moisture detection results is detailed in the following procedure and $\underline{Figure 14}$.

- Open the MAX20342 EV Kit GUI Program. The status bar displays Connected. Navigate to the SBU Resistance tab.
- By default, the Continuous SBU1/SBU2 Resistor Measurement is toggled on. Click the Run button next to Manual SBU1/SBU2 Detection.

- 3) This panel is used to customize the accessory resistance ranges. By default, **Accessory 1** resistance range is set between $28.125k\Omega$ and $31.985k\Omega$.
- 4) Since there are resistors connected to both pins SBU1 ($30k\Omega$) and SBU2 ($80.6k\Omega$), the **ADC Results and Interrupts** panel shows the overall SBU Detection Overall Result (refer to Table 6 of the MAX20342 IC data sheet). Click the **Read** button next to **Read Resistance Measurement Interrupts** to show corresponding interrupts (i.e., **SBU = 1** and **Abort = 1**).
- 5) The **SBU** Accessory Detection Measurement Results panel shows measured resistance results from the SBU1 and SBU2 pins. SBU1 resistance shows 29.963k Ω , which is close to 30k Ω . SBU2 resistance shows 80.882k Ω , which is close to 80.6k Ω .

BU Accessory Detection Configuration	ADC Results and Interrupts Read All
Enable Continuous SBU1/SBU2 Resistor Measurement Enable One-shot SBU1/SBU2 Resistor Measurement Manual SBU1/SBU2 Detection Run	ADC Voltage Average Overall Result: $0.000V$ Final Pull-up Current Overall Result: $2uA$ Measured Resistance Overall Result: $0.000V / 2uA = 0\Omega$ Interrupts: SBU = 1 Finite = 0 Open = 0 Ground = 0 Abort = 1
Enable Abort Result Priority in Overall Result Choose an Accessory to Configure: Accessory 1	Read Resistance Measurement Interrupts Read
Accessory 1 Valid Voltage Minimum Threshold 0.900V 🔹	SBU Accessory Detection Measurement Results
Accessory 1 Valid Voltage Maximum Threshold 1.024V Accessory 1 SBU1/SBU2 Max Pull-up Current 32uA	SBU1 Accessory Detection Result: Open = 0 Abort = 0 Ground = 0 Last SBU1 Accessory Voltage Result: 0.959V
Accessory 1 Valid Resistance Range = $28.125k\Omega - 31.985k\Omega$	Last SBU1 Resistance Result:0.959V / 32uA = 29.963kΩ
3	SBU2 Accessory Detection Result: Open = 0 Abort = 0 Ground = 0 Last SBU2 Accessory Voltage Result: 0.647V
	Last SBU2 Accessory Final Pull-up Current Result: 8uA Last SBU2 Resistance Result:0.647V / 8uA = 80.882kΩ

Figure 14. SBU Resistance Results on Both SBU1 and SBU2 Pins

Temporarily remove SBU2 resistance by removing jumper connection of JU17. The **SBU Resistance** tab shows only the measured resistance from SBU1 (see Figure 15).

- 6) Click the **Run** button next to **Manual SBU1/SBU2 Detection** to update the ADC result.
- 7) Click the **Read** button next to **Read Resistance Measurement Interrupts** to show corresponding interrupts (i.e. **SBU = 1**). The **Measured Resistance** shows **29.963k** Ω , close to the actual resistance value on SBU1. Accessory 1 is detected as the measured resistance falls into the Accessory 1 range.
- 8) The SBU Accessory Detection Measurement Results panel shows measured resistance results from SBU1 and SBU2 pins. SBU1 resistance shows 29.963k Ω , which is close to 30k Ω . SBU2 resistance shows 750.0k Ω (interrupt Open = 1), with SBU2 open.

Temporarily remove SBU1 resistance by removing jumper connection of JU16. The **SBU Resistance** tab shows only the measured resistance from SBU2 (see Figure 16), with Accessory 2 resistance detected.

ral Type-C BC1.2 Moisture SBU Resistance F	Register Map	
U Accessory Detection Configuration		ADC Results and Interrupts Read All
Enable Continuous SBU1/SBU2 Resistor Measurement Enable One-shot SBU1/SBU2 Resistor Measurement Manual SBU1/SBU2 Detection Enable Abort Result Priority in Overall Result	surement urement 6 Run	ADC Voltage Average Overall Result: 0.959V Final Pull-up Current Overall Result: 32uA Measured Resistance Overall Result: 0.959V / 32uA = 29.963kΩ Interrupts: SBU = 1 Finite = 0 Open = 0 Ground = 0 Abort = 0 Valid Accessory Interrupts: Accessory 1 Detected
Choose an Accessory to Configure: Access Accessory 1 Valid Voltage Minimum Threshold	ory 1 • 0.900V •	SBU Accessory Detection Measurement Results
Accessory 1 Valid Voltage Maximum Threshold Accessory 1 SBU1/SBU2 Max Pull-up Current	1.024V • 32uA •	SBU1 Accessory Detection Result: Open = 0 Abort = 0 Ground = 0 Last SBU1 Accessory Voltage Result: 0.959V
Accessory 1 Valid Resistance Range = 28.125kΩ -	31.985kΩ	Last SBU1 Accessory Final Pull-up Current Result: 32uA Last SBU1 Resistance Result:0.959V / 32uA = 29.963kΩ
		SBU2 Accessory Detection Result: Open = 1 Abort = 0 Ground = 0 Last SBU2 Accessory Voltage Result: 1.500V Last SBU2 Accessory Final Pull-up Current Result: 2uA
		Last SBU2 Resistance Result:1.500V / 2uA = 750.0kΩ

Figure 15. SBU Resistance Result with Resistor Connected to Only SBU1.

Evaluates: MAX20342

eral Type-C BC1.2 Moisture SBU Resistance Register Map	
BU Accessory Detection Configuration	ADC Results and Interrupts Read All
 Enable Continuous SBU1/SBU2 Resistor Measurement Enable One-shot SBU1/SBU2 Resistor Measurement Manual SBU1/SBU2 Detection Run Enable Abort Result Priority in Overall Result Choose an Accessory to Configure: Accessory 2 • 	ADC Voltage Average Overall Result: 0.647V Final Pull-up Current Overall Result: 8uA Measured Resistance Overall Result: 0.647V / 8uA = 80.882kΩ Interrupts: SBU = 1 Finite = 0 Open = 0 Ground = 0 Abort = 0 Valid Accessory Interrupts: Accessory 2 Detected Read Resistance Measurement Interrupts Read
Accessory 2 Valid Voltage Minimum Threshold 0.600V -	SBU Accessory Detection Measurement Results
Accessory 2 Valid Voltage Maximum Threshold 0.682V • Accessory 2 SBU1/SBU2 Max Pull-up Current 8uA • Accessory 2 Valid Resistance Range = 75.000kΩ - 85.294kΩ	SBU1 Accessory Detection Result: Open = 1 Abort = 0 Ground = 0 Last SBU1 Accessory Voltage Result: 1.500V Last SBU1 Accessory Final Pull-up Current Result: $2uA$ Last SBU1 Resistance Result: $1.500V / 2uA = 750.0k\Omega$ SBU2 Accessory Detection Result: Open = 0 Abort = 0 Ground = 0 Last SBU2 Accessory Voltage Result: $0.647V$ Last SBU2 Accessory Final Pull-up Current Result: $8uA$ Last SBU2 Resistance Result: $0.647V / 8uA = 80.882k\Omega$

Figure 16. SBU Resistance Result with Resistor Connected to Only SBU2

Ordering Information

PART	ТҮРЕ
MAX20342EVKIT#	EV Kit

#Denotes RoHS compliance.

Evaluates: MAX20342

MAX20342 EV Kit Bill of Materials

ITEM	QTY	REF DES	MAXINV	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION	
1	6	+5V, EXT_5V, EXT_VBAT, OUT, VB, VBAT	02-TPMINI5000-00	5000	KEYSTONE	N/A	TEST POINT; PIN DIA = 0.1IN; TOTAL LENGTH = 0.3IN; BOARD HOLE = 0.04IN; RED; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS=0.062IN; NOT FOR COLD TEST	
2	6	C1, C4-C7, C9	20-0001U-04	GRM21BR71H105KA12; CL21B105KBFNNN; C2012X7R1H105K085AC; UMK212B7105KG	MURATA; SAMSUNG ELECTRONICS; TDK	1µF	CAPACITOR; SMT (0805); CERAMIC CHIP; 1µF; 50V; TOL=10%; TG =-55°C TO +125°C; TC = X7R	
3	5	C2, C14-C17	20-004U7-72	GRM31CR71H475KA12; GRJ31CR71H475KE11; GXM31CR71H475KA10	MURATA;MURATA; MURATA	4.7µF	CAPACITOR; SMT (1206); CERAMIC CHIP; 4.7 µF; 50V; TOL = 10%; MODEL=; TG = -55° C TO +125°C; TC = X7R	
4	4	C3, C11-C13	20-000U1-91	C0603C104K5RAC; C1608X7R1H104K; ECJ-TVB1H104K; GM188R7H1H04KA93 CGJ3E2X7R1H104K080AA; C1608X7R1H104K080AA; CL10B104K58NINN; CL10B104K58NINN; 06035C104KAT2A	KEMET;TDK; PANASONIC:MURATA; TDK;TDK;SAMSUNG; SAMSUNG;AVX	0.1µF	CAPACITOR; SMT (6603); CERAMIC CHIP; 0.1µF; 50V; TOL=10%; TG = .55°C TO +125°C; TC = X7R; NOTE; NOT RECOMMENDED FOR NEW DESIGN USE 20-000U1-01	
5	2	C8, C10	EC111000002734	CL21B106KPQNNN; LMK212AB7106KG; C0805X106K8RACAUTO; GRM21BR71A106KA73	SAMSUNG;TAIYO YUDEN; KEMET;MURATA	10µF	CAP; SMT (0805); 10µF; 10%; 10V; X7R; CERAMIC CHIP	
6	2	CD+, CD-	02-TPMINI5117-00	5117	KEYSTONE	N/A	TEST POINT; PIN DIA = 0.1IN; TOTAL LENGTH = 0.3IN; BOARD HOLE = 0.04IN; BLUE; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS = 0.062IN; NOT FOR COLD TEST	
7	5	CE, DBB, INT, SCL, SDA	02-TPMINI5002-00	5002	KEYSTONE	N/A	TEST POINT; PIN DIA = 0.1 IN; TOTAL LENGTH = 0.3 IN; BOARD HOLE = 0.04 IN; WHITE; PHOSPHOR BRONZE WIRE SILVER; NOT FOR COLD TEST	
8	3	D1, D2, D6	30-LSL29KG1J21Z-00	LS L29K-G1J2-1-Z	OSRAM	LS L29K-G1J2-1-Z	DIODE; LED; SMART; RED; SMT (0603); PIV = 1.8V; IF = 0.02A; -40°C TO +100°C	
9	3	D3-D5	30-5988070107F-00	598-8070-107F	DIALIGHT	598-8070-107F	DIODE; LED; STANDARD; GREEN; SMT (0603); PIV=3.2V; IF=0.02A	
10	1	D7	30-CMPZ5242B-00	CMPZ5242B	CENTRAL SEMICONDUCTOR	12V	DIODE; ZNR; SMT (SOT-23); VZ = 12V; IZ = 0.02A	
11	1	J1	01-TSW10608SDRA12P-17	TSW-106-08-S-D-RA	SAMTEC	TSW-106-08-S-D-RA	CONNECTOR; THROUGH HOLE; DOUBLE ROW; RIGHT ANGLE; 12PINS; THIS PART IS DEDICATED FOR PMOD PERIPHERAL BOARD	
12	4	JU1, JU2, JU14, JU15	01-PEC03SAAN3P-21	PEC03SAAN	SULLINS	PEC03SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 3PINS	
13	9	JU3-JU9, JU11, JU12	01-PEC02SAAN2P-21	PEC02SAAN	SULLINS	PEC02SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 2PINS	
14	1	JU10	01-TSW10407LS4P-17	TSW-104-07-L-S	SAMTEC	TSW-104-07-L-S	EVKIT PART-CONNECTOR; MALE; THROUGH HOLE; TSW SERIES; SINGLE ROW; STRAIGHT; 4PINS	
15	2	JU16, JU17	01-PEC07DAAN14P-21	PEC07DAAN	SULLINS ELECTRONICS CORP.	PEC07DAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 14PINS	
16	2	JU18, JU20	01-PEC08DAAN16P-21	PEC08DAAN	SULLINS ELECTRONICS CORP.	PEC08DAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 16PINS; -65°C TO +125°C	
17	1	JU19	01-PEC03DAAN6P-21	PEC03DAAN	SULLINS ELECTRONICS CORP.	PEC03DAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT THROUGH; 6PINS; -65°C TO +125°C	
18	4	JU21-JU24	01-PBC03DAAN6P-21	PBC03DAAN	SULLINS ELECTRONICS CORP.	PBC03DAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 6PINS; -65°C TO +125°C	
19	1	R1	80-0050K-33	3266W-1-503LF	BOURNS	50K	RESISTOR; THROUGH-HOLE-RADIAL LEAD; SQUARE TRIMMING POTENTIOMETER; 12 TURNS; 50KΩ; 10%; 100PPM; ; TADJ; MOLDER CERAMIC OVER METAL FILM	
20	5	R2-R5, R17	80-002K2-53	CRCW06032K20JN; ERJ-3GEYJ222	VISHAY DALE; PANASONIC	2.2K	RESISTOR; 0603; 2.2KΩ; 5%; 200PPM; 0.10W; THICK FILM	
21	4	R6-R8, R15	80-0001K-77	RR0816P-102-B-T5; PCF0603R-1K0B	SUSUMU CO LTD; TT ELECTRONICS	1К	RESISTOR; 0603; 1KΩ; 0.1%; 25PPM; 0.063W; METAL FILM	
22	2	R9, R10	80-0100K-53	ERJ-3GEYJ104; CRCW0603100KJN	PANASONIC;VISHAY	100K	RESISTOR; 0603; 100KΩ; 5%; 200PPM; 0.10W; THICK FILM	
23	1	R11	80-0102K-24	CRCW0603102KFK	VISHAY DALE	102K	RESISTOR; 0603; 102KΩ; 1%; 100PPM; 0.10W; THICK FILM	
24	1	R12	80-043K2-24	CRCW060343K2FK; ERJ-3EKF4322	VISHAY DALE; PANASONIC	43.2K	RESISTOR; 0603; 43.2KQ; 1%; 100PPM; 0.10W; THICK FILM	
25	1	R13	80-061K9-24	CRCW060361K9FK	VISHAY DALE	61.9K	RESISTOR; 0603; 61.9KΩ; 1%; 100PPM; 0.10W; THICK FILM	
26	1	R14	80-0124K-24	CRCW0603124KFK	VISHAY DALE	124K	RESISTOR; 0603; 124KΩ; 1%; 100PPM; 0.10W; THICK FILM	
27	1	R16	80-0000R-27A	RC1608J000CS; CR0603-J/-000ELF; RC0603JR-070RL	SAMSUNG ELECTRONICS; BOURNS;YAGEO PH	0	RESISTOR; 0603; 0 Ω ; 5%; JUMPER; 0.10W; THICK FILM	
28	2	R18, R22	80-007K5-24	ERJ-3EKF7501; CRCW06037K50FK	PANASONIC; VISHAY	7.5K	RESISTOR; 0603; 7.5KΩ; 1%; 100PPM; 0.10W; THICK FILM	

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MAX20342 EV Kit Bill of Materials (continued)

ITEM	QTY	REF DES	MAXINV	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION	
29	2	R19, R23	80-0024K-24	ERJ-3EKF2402	PANASONIC	24K	RESISTOR; 0603; 24KΩ; 1%; 100PPM; 0.10W; THICK FILM	
30	2	R20, R24	80-0100K-24	CRCW0603100KFK; RC0603FR-07100KL; RC0603FR-13100KL; ERJ-3EKF1003; AC0603FR-07100KL	VISHAY DALE;YAGEO; YAGEO;PANASONIC	100K	RESISTOR; 0603; 100K; 1%; 100PPM; 0.10W; THICK FILM	
31	2	R21, R25	80-0330K-24	CRCW0603330KFK	VISHAY DALE	330K	RESISTOR, 0603, 330KΩ, 1%, 100PPM, 0.10W, THICK FILM	
32	1	R26	80-0300K-H4	3362P-1-304LF	BOURNS	300K	RESISTOR; THROUGH-HOLE-RADIAL LEAD; 300KΩ; 10%; 100PPM; 0.5W; SQUARE TRIMMING POTENTIOMETER	
33	1	R27	80-0001M-86	3214W-1-105E	BOURNS	1M	RESISTOR; SMT J-LEAD; TRIMMING POTENTIOMETER; 5 TURNS; 1MΩ; 10%; 100PPM; 0.25W; TADJ	
34	2	R28, R30	80-0030K-24	CRCW060330K0FK	VISHAY DALE	30K	RESISTOR; 0603; 30KΩ; 1%; 100PPM; 0.10W; THICK FILM	
35	2	R29, R31	80-0150K-24	CRCW0603150KFK	VISHAY DALE	150K	RESISTOR, 0603, 150KΩ,1%, 100PPM, 0.10W, THICK FILM	
36	2	R32, R33	80-0000R-BA38	CRCW04020000Z0EDHP; RCS04020000Z0	VISHAY DRALORIC; VISHAY DALE	0	RESISTOR; 0402; 0 $\Omega;$ 0%; JUMPER; 0.2W; THICK FILM	
37	2	R34, R37	80-056K2-24	CRCW060356K2FK; ERJ-3EKF5622	VISHAY;PANASONIC	56.2K	RESISTOR; 0603; 56.2KΩ; 1%; 100PPM; 0.10W; METAL FILM	
38	2	R35, R38	80-005K1-24	ERJ-3EKF5101	PANASONIC	5.1K	RESISTOR; 0603; 5.1KΩ; 1%; 100PPM; 0.10W; THICK FILM	
39	2	R36, R39	80-0001K-24A	CR0603-FX-1001ELF	BOURNS	1K	RESISTOR; 0603; 1KΩ; 1%; 100PPM; 0.10W; THICK FILM	
40	2	R40, R41	80-080K6-24	CRCW060380K6FK; ERJ-3EKF8062; RC0603FR-0780K6L	VISHAY;PANASONIC; YAGEO	80.6K	RESISTOR; 0603; 80.6KΩ; 1%; 100PPM; 0.10W; METAL FILM	
41	4	SPACER1-SPACER4	02-SOM35016H-00	9032	KEYSTONE	9032	MACHINE FABRICATED; ROUND-THRU HOLE SPACER; NO THREAD; M3.5; 5/8IN; NYLON	
42	15	SU1-SU15	02-JMPFS1100B-00	S1100-B;SX1100-B; STC02SYAN	KYCON;KYCON; SULLINS ELECTRONICS CORP.	SX1100-B	TEST POINT; JUMPER; STR; TOTAL LENGTH = 0.24IN; BLACK; INSULATION=PBT;PHOSPHOR BRONZE CONTACT = GOLD PLATED	
43	2	TD+, TD-	02-TPMINI5116-00	5116	KEYSTONE	N/A	TEST POINT; PIN DIA = 0.11N; TOTAL LENGTH = 0.31N; BOARD HOLE = 0.04IN; GREEN; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS=0.062IN; NOT FOR COLD TEST	
44	2	TP1, TP2	02-TPMINI5001-00	5001	KEYSTONE	N/A	TEST POINT; PIN DIA = 0.11N; TOTAL LENGTH = 0.31N; BOARD HOLE = 0.04IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS = 0.062IN; NOT FOR COLD TEST	
45	2	TP3, TP4	02-TPMINI5011-00	5011	KEYSTONE	N/A	TEST POINT; PIN DIA = 0.125IN; TOTAL LENGTH = 0.445IN; BOARD HOLE = 0.063IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS=0.062IN; NOT FOR COLD TEST	
46	1	U1	00-SAMPLE-01	MAX20342	MAXIM	MAX20342	EVKIT PART - IC; MAX20342; WLP24; PACKAGE OUTLINE: 21-100430; PACKAGE CODE: W242A2+1	
47	1	U2	10-MAX8880EUT-U	MAX8880EUT+	MAXIM	MAX8880EUT+	IC; VREG; ULTRA-LOW-IQ LOW-DROPOUT LINEAR REGULATOR WITH POK; SOT23-6	
48	1	U3	10-MAX8511EXK33-X	MAX8511EXK33+	MAXIM	MAX8511EXK33+	IC; VREG; ULTRA-LOW-NOISE, HIGH PSRR, LOW-DROPOUT, LINEAR REGULATOR; SC70-5	
49	2	UR, UT	02-TPMINI5118-00	5118	KEYSTONE	N/A	TEST POINT; PIN DIA = 0.1IN; TOTAL LENGTH = 0.3IN; BOARD HOLE = 0.04IN; GREY; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS=0.062IN; NOT FOR COLD TEST	
50	1	USB1	01-101181920001LF5P-26	10118192-0001LF	FCI CONNECT	10118192-0001LF	CONNECTOR; FEMALE; SMT; MICRO USB B TYPE RECEPTACLE; RIGHT ANGLE; 5PINS	
51	2	USB2, USB3	01-6764339114P-26	67643-3911	MOLEX	67643-3911	CONNECTOR; FEMALE; THROUGH HOLE; USB A-TYPE CONNECTOR; RIGHT ANGLE; 4PINS	
52	1	USB4	01-DX07S024XJ124P-26	DX07S024XJ1	JAE ELECTRONIC INDUSTRY	DX07S024XJ1	CONNECTOR; FEMALE; USB TYPE-C RECEPTACLE; THROUGH HOLE; DX07 SERIES; RIGHT ANGLE; 24PINS	
53	1	PCB	EPCB	MAX	MAXIM	PCB	PCB:MAX	
TOTAL	137							

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MAX20342 EV Kit Schematic Diagrams





MAX20342 EV Kit Schematic Diagrams (continued)

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MAX20342 EV Kit PCB Layout Diagrams

MAX20342 EV Kit PCB Layout—Silkscreen Top

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MAX20342 EV Kit PCB Layout—Top Layer

Evaluates: MAX20342



MAX20342 EV Kit PCB Layout—Layer GND

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MAX20342 EV Kit PCB Layout—Layer 3_PWR



MAX20342 EV Kit PCB Layout—Bottom Layer



MAX20342 EV Kit PCB Layout—Silkscreen Bottom

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Revision History

REVISION	REVISION	DESCRIPTION	PAGES
NUMBER	DATE		CHANGED
0	7/20	Initial release	—

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