

SPECIAL EDITION

TROUBLESHOOTING AND IDENTIFYING USB TYPES WITH TECHLINE RECOMMENDATIONS

This information should be used as a guide to help identify cables found in a customer vehicle when troubleshooting connectivity concerns regarding projection apps (Apple CarPlay or Android Auto). The pictures below cover the USB type A end of the cord (not the phone side male plug). The different colors of the USB plastic insert determine the level of power and data transfer the cable is capable of. This does not determine the **quality** of the cable in use. A genuine cable from the manufacturer of the device is always recommended. Typically, “the cable that came with the device when it was new in the box” is the recommended cable to be using and testing with. This is because there is no standard for the quality or quantity of copper inside the cable.

Before beginning this troubleshooting, if the cable being used is dirty, frayed, kinked, or generally in poor condition, the first diagnostic step after duplication of the concern should be a switch to an OEM cable. The cable should **not** be wrapped or tied around the shifter. This is a safety hazard and induces movement into the system. A recommended retailer strategy is to have a known good Apple cable and USB 3.0 or higher cable kept by a shop foreman or manager to be used solely in diagnostic comparison.

The first two levels of USB cables are USB 1.0 and USB 2.0. Techline has determined that the colors are interchangeable depending on the manufacturer of the cable, but USB 2.0 is typically white. A cable that uses a black insert USB 1.0 should only be used for low power charging, they are not recommended for projection apps (Apple CarPlay or Android Auto).



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What color are the USB Type A inserts being used on the vehicle?



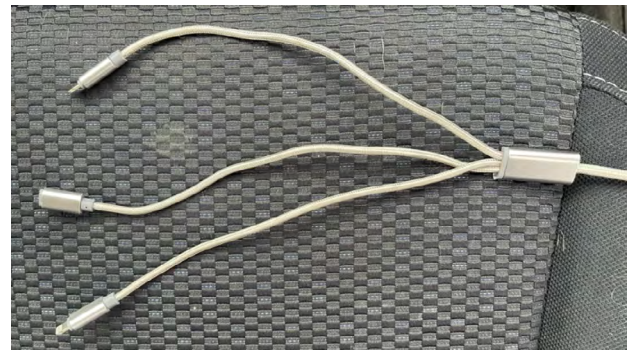
USB 1.0	USB 2.0	USB 3.0	USB 3.1	USB Fast Charge
1.5-12Mbps	480Mbps	Up to 5Gbps	5-10Gbps	10gbps
Recommend only for charging purposes	Apple products and most standard cables	Used for high end products and projection apps	Micro USB and newer devices May be teal in color	Typically found on fast charger devices

- A. Android, Apple, and Techline all recommend a cable no longer than 3ft (1m).
- B. Not all cables can be mixed and matched for Android operating systems. For example, a Google Pixel cable should **only** be used with a Pixel series phone. A Samsung cable should **only** be used with a Samsung series phone. The cables are tailored to the phone and the desired output. Consider interviewing the customer to determine the source of the cable and what they have available to continue testing.
- C. Apple recommends a USB 2.0 cable, all USB A-type Genuine Apple cables are USB 2.0 currently. Additional Apple cable recommendations can be found in the September 2021 TechTIP.

- D. Techline does not recommend any adapters for USB A to USB C.



- E. Techline, Android and Apple do not recommend any cable with multiple tails, typically labeled “3 in 1” charging cords. These should not be used in projection apps and may not charge the phone if the total draw exceeds the rating on the USB hub.



At this time most Subaru model have the maximum power output labeled on the USB port. TSB [15-226-18](#) can be referenced on certain models.



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When troubleshooting a lag in loading (the amount of time the phone takes to detect the radio and enable projection) the first step is to inspect the cable being used. Referencing the chart above, notice the rated speed difference between each level of USB cable. Trying to use a low-speed cable on a modern phone will cause performance concerns and possible complete disconnection from the head unit. This could result in multiple concerns, including but not limited to black screen, loss of connectivity, or loss of function. Techline has observed this on all Infotainment platforms across all Subaru models. A key detail that may indicate a cable issue is the head unit reverting to the home screen rather than a full reboot back to the Starlink screen or vehicle information and basic functions of the Infotainment system continue to work but all projection entertainment has stopped (FM, AM, menu selection operation still function). Techline recommends any Android based phone produced after 2019 use at least a USB 3.0, some high-performance phone models will require a USB 3.2 cable (light blue/teal) to work correctly.

Retailers may be presented with numerous projection app behavioral concerns, for example a music streaming app not progressing through the songs properly, a lag in performance which may result in a disconnection and projection app restart or general overall slowness until there is no response from the head unit. Customers may report a screen display concern the longer they operate the vehicle, for example while on a long road trip. **Technicians should focus first on the cable being used to connect as well as the phone app being used rather than assuming the head unit is at fault.**

Failure to Launch CarPlay or Android Auto Diagnostic Procedure

Use these procedures to troubleshoot projection app launching concerns. This flow chart should be used in conjunction with [TSB 15-220-18](#) for phone settings and compliance settings.

Example 1

Customer states that Apple CarPlay will not launch.

First step, clear all the open apps from any phone that is going to be used for testing.

Does the Technician iPhone detect and launch Apple CarPlay on the customer's cable?

YES - Inspect the customer's phone, the concern is not with the vehicle.

NO - Proceed to cable inspection.

Does the customer's phone launch Apple CarPlay with the retailer's OEM Apple cable?

YES - Test the Technician iPhone on the same vehicle, if both phones operate as designed, use this document to inspect the cable and replace as needed.

NO - The customer's iPhone and Technician iPhone do not launch Apple CarPlay with an OEM cable. Proceed to supplemental USB hub testing.
As an alternative, test the customer's phone and cable in a like vehicle with the same brand and level Infotainment system.

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Example 2

Customer states Android Auto does not launch via USB cable.

First step, clear all the open apps from any phone that is going to be used for testing.

Does the Technician's Android phone connect to Android Auto using the customer's cable?

YES - Inspect the customer's phone for OS and app software updates. Test the customer's phone and cable in a like vehicle with the same brand and level Infotainment system..

NO - Proceed to cable inspection.

Does the customer's phone connect to Android Auto using the recommended USB 3.0 or higher cable?

YES - Use this document to troubleshoot the customer cable and replace as needed.

NO - Proceed to the next step.

Does the technicians Android phone connect to the infotainment system using the same USB cable?

YES - Stop, retest the customer's phone and cable in a like vehicle with the same brand and level Infotainment system.

NO - Proceed to supplemental USB troubleshooting.

Troubleshooting Intermittent Loss of Connection - Tethered

The first step is to inspect the cable and the position that the phone is stowed in. **Reminder, this test should be done with the customer's phone and cable (a technician should consider collecting photos of the customers setup).** Techline finds most connection concerns to be at one of these two places if there is no obvious physical damage to the cable.

The first inspection is the connection into the phone.

While inspecting the phone connection, here are some points of interest to keep in mind.

- A. Is the connection loose?
- B. Can it be wiggled and manipulated to create an instant loss of connection?
- C. Where is the phone typically stowed when travelling in the vehicle?
- D. Does an OEM cable have better fitment into the phone?
- E. Does a USB-IF certified or USB 3.0 (or higher) improve the performance of the projection app?

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- F. Does an OEM Apple cable improve the performance of the projection app?
 - Does an MFI certified cable or OEM cable change the behavior over the long-term use? (a couple of hours, days, or weeks).
- G. Is there any foreign material preventing a good connection?

The second inspection is the USB cable connection to the vehicle.

- A. Are there obstructions at the plug?
- B. Visually inspect the plug and determine if anything can be changed about the position or situation?
- C. Is anything else plugged into the USB or aux port? Remove them and retest.
 - Inspect the back seat USB ports, and third row if applicable
- D. Does a factory cable (OEM cable) have better fitment at the USB port?
- E. Has the USB supplemental testing been performed? Continue to the next step.

Reminder, testing the Infotainment system and then making a diagnostic change to retest the setup and/or system again is an essential step of troubleshooting. This step should not be overlooked when trying to determine the source of the concern. Remember to make one change to the setup and retest thoroughly before reverting or making additional changes.

Note: Bluetooth connections to a third device (Apple watch, Air Pods, NFC devices, for example) may affect operation and should be turned off or out of range during diagnostics. Technicians should reference the [August 2021 TechTIP](#) for additional information.

Supplemental Troubleshooting for the USB Hub

How should a technician determine if the USB port is functioning correctly without disassembling the vehicle? There are multiple ways of testing that can help determine if the USB port should be considered for replacement.

Strategy 1

Install the newest Infotainment software file (found in Forms/Downloads or from the SSM laptop) onto a recently formatted, correctly sized USB drive. Plug the USB drive into the USB hub and follow the normal steps for performing a head unit software update. Does the Infotainment system acknowledge an update is ready to proceed? If the answer is yes, the USB port is powered and connected to the Infotainment system correctly. This would indicate the diagnostics should focus on the phone cable, phone hardware, phone application being used or a head unit software concern that should be reported using [TSB 15-304-22](#). A Technician could seek authorization to perform a software update and verify that the data can be transferred and utilized, further proving the USB hub is working.

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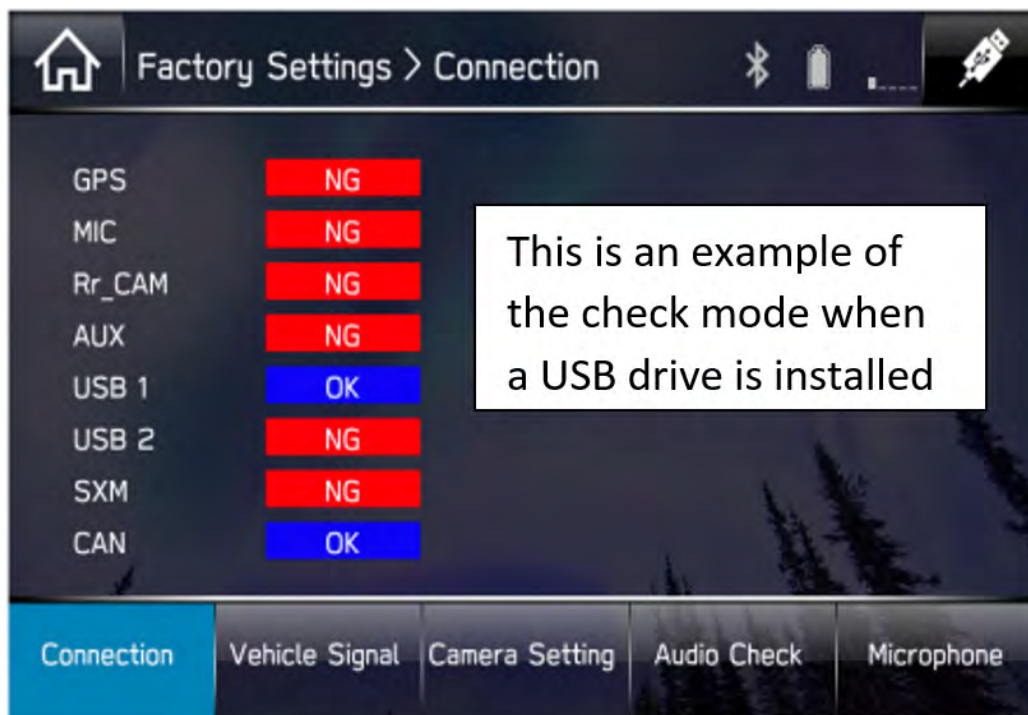
Strategy 2

With the ignition in the “On” position, enter Dealership mode (6 button push) or Factory mode (2 button push). Navigate to the “Connection” screen.

On Gen 3 Harman equipped vehicles “USB 2” is used for the Telematics system (if the vehicle is equipped). “USB 2” should be ignored for this test on Harman vehicles only. Both ports in the USB hub will shift “USB 1” from “NG” to “OK”.

On Gen 4 Denso CP 1.0/CP 1.5 equipped vehicles, “USB 1” and “USB 2” are the respective USB ports in the USB hub.

- View the list of possible connections, they may take a minute to populate.
- Observe “USB 1/2” at the start of this test, it should say “**NG**”. Plug the USB drive into the USB hub, it should change to “**OK**”.
- Remove the USB drive.
- On Denso CP 1.0/1.5 vehicles it is necessary to back out of the “**Connection**” screen and go back to it for the “USB” status to shift from “**OK**” back to “**NG**”.
- Move the USB drive to the other USB hub port.
- “USB 1/2” should say “**OK**” with the device plugged in again.
- This is an acknowledgement of the device being plugged in and connecting. **It is not recommended to perform this test with a cellular phone or similar device.**



If “USB 1” in the “**Connection**” menu always shows “**NG**” during the test, switch to a different USB drive and test again. If this makes no change to the “**OK**” or “**NG**” status the next step should be a visual inspection of the back of the head unit for a missing or damaged connector. Techline often finds a craftsmanship error and the USB hub connector is trapped near the floor pan area. If no missing or damaged connector are found, use STIS to refer to the “Body Electrical > Wiring system > Audio System” to verify power and ground at the USB hub connector. Images of the Infotainment connector layout can also be found in STIS, Diagnostics > Infotainment > Control Module I/O Signal. Generally, there should be no empty plugs on the back of the head unit.

Strategy 3

A Technician or retailer can obtain a USB tester from a third-party source. This device has a small display port that will track the available output voltage of the USB port. Does the USB hub have the correct available 5 volts displayed by the USB testing device? If yes, the hub has power and ground to it. Install the newest Infotainment software file (found in Forms/Downloads or from the SSM laptop) onto a recently formatted, correctly sized USB drive. Plug the USB drive into the USB hub and follow the normal steps for performing a head unit software update. Does the Infotainment system acknowledge an update is ready to proceed? If yes, the connection concern is not typically a vehicle side concern, and the diagnostics should circle back to the customer phone and cable connection. Some of these USB test devices can be switched to a pass-through mode where they will display the amount of current draw when the customer cable and phone are connected. If the amperage draw quickly tapers down to near zero, switch to an OEM or known good USB cable previously mentioned for testing purposes. Does the condition remain the same? If so, switch to a similar vehicle and compare or switch to another cellular device. A damaged cable will typically cycle the power down as the phone detects the concern with the cable.

Below is an example of a USB tester in use. The photo on the left indicates a normally operating connection. The photo on the right shows a phone plugged in with the tester set to pass thru mode, showing the charging Amps and Watts.

