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OFFLINE CABLE DETECTION METHOD

HP INC

Offline Cable Detection Method

Abstract: A printer's cable detect information can be read through an external interface, even when the printer itself is not powered on.

This disclosure relates to the field of printers.

A technique is disclosed that can read cable detect/presence detect information for diagnostic and manufacturing purposes through an external interface, even when the printer is not powered

Cables and modules can become disconnected over the lifetime of a product due to, for example. vibration. A key problem is vibration during shipment. A service technician is often dispatched to fix issues like this. However, sometimes it is difficult to visually distinguish between an incorrectly seated (i.e. disconnected) cable and a real hardware failure, so occasionally the service technician may make the wrong call and replace the component in question, even though it has not failed.

According to the present disclosure, and as understood with reference to the Figure, the cable detect information is instantaneously accessible through the Smart Device Services (SDS) USB service connector 5 of the printer 10. The cable detect status can be updated in real-time to determine the problem (i.e. the cable which is disconnected), and then checked after service to verify that it has been properly fixed. This technique works even when the printer 10 is not powered or not plugged in, as the detection circuitry 20 is powered through the external service device (tablet, smartphone, laptop, etc.) 30 which is plugged into the service port 5. Thus the cable detect information is available without requiring the printer 10 to fully boot up, and as such can therefore save valuable diagnostic and troubleshooting time

The disclosed technique uses the SDS microcontroller (aka "DTM", the SDS Diagnostic and Telemetry Module) 40, which is a completely standalone sub-system and therefore does not rely on any other system hardware or firmware to be operational. It can be powered either from the printer 10 itself or through its USB service port 5.

Several shift registers 50 are used to interface the cable detect signal with the main system ASIC 60 and DTM 40. This allows a simple 3 or 4 wire interface to carry up to 64 cable detect signals. DTM 40 can read the data from the shift registers 50 in parallel to the ASIC 60 in real-time.

If the printer 10 is not powered and a service technician plugs their tablet 30 into the USB service port, DTM 40 is powered up and then also turns on power from the external power source 30 to the shift register 50 in order to read the status of each cable detect signal.

This can be done in real-time as often as desired and works both when the printer 10 is powered and unpowered. The shift registers 50 are isolated from the ASIC 60 when the printer 10 is not powered on, in order to avoid back-biasing the unpowered part of the printer 10 (mainly the ASIC 60) when only a sub-circuit is turned on through external power 30.

The disclosed technique advantageously provides true real-time feedback regardless of the printer's power and functional state. Often the functional state is affected by a disconnected cable, and in this situation this technique advantageously provides an easy way to get the cable detect information to the service technician quickly and reliably using the SDS USB service port.

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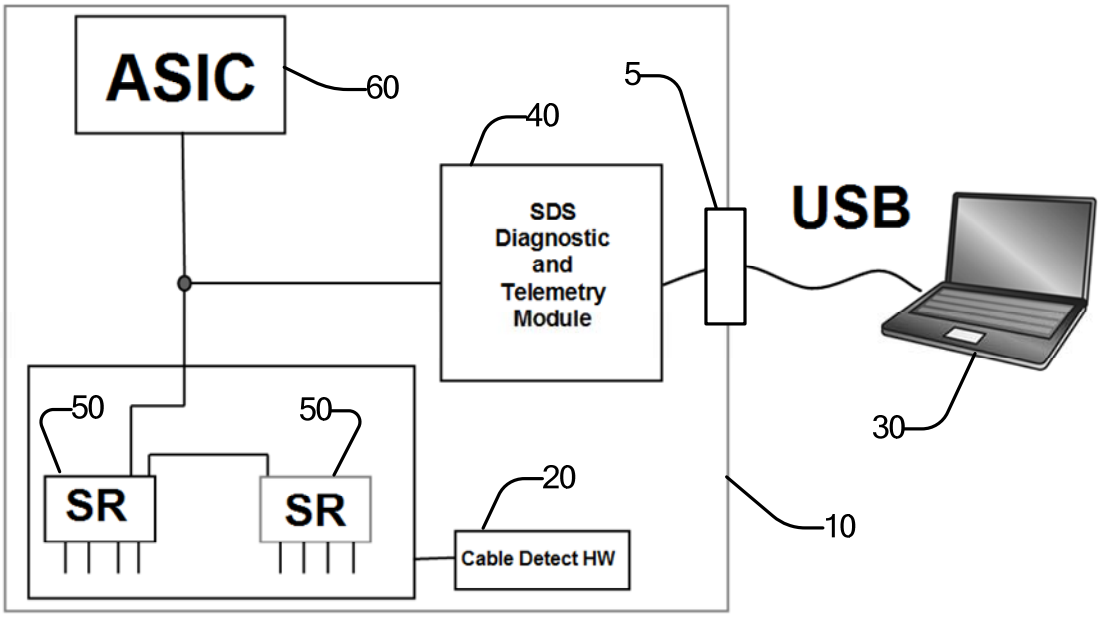
ASIC
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SDS
Diagnostic
and
Telemetry
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50
50
SR
SR
20
Cable Detect HW
10
30