

ICC WITH HIPRO-H12 SCANNER

**Input Hopper Tray Error Message
(ICC Software v. 5.10, Scanner Firmware 1.0.1019)
Certification Testing**

ROOT CAUSE ANALYSIS

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Introduction

ImageCast® Central software with a HiPro H12 scanner were provided to California Secretary of State office for certification testing in January 2019. As of February 2020, the Scanner was fully functional during 5.10 and Imprinter Certification

During 5.10A certification effort in June 2020, the scanner was powered on for testing. Upon initialization scanner displayed error messages codes 911 and 912. These error messages were determined to be related to the Input Hopper Tray motor control unit.

Dominion technician was sent on site and it was determined that the issue was intermittent. The technician replaced some parts in the process of trying to fix the fault. At the end it was decided to replace the scanner with a new one in order to save time and the failed scanner was sent to Dominion facility for further investigation.

It was determined that the error message is caused by one of the interconnection cables between motor control board and main control unit. Further investigation of cable revealed an intermittent connection in the RJ45 connector of the cable.

Problem

It was observed that during initialization, the HiPro H12 scanner would intermittently display error message codes 911 and 912. In some situations, the scanner functioned for some time before displaying the error messages.

Investigation

The devices that were tested in this investigation were configured as follows:

- HiPro-H12 (S/N: 0040K26)
 - FW v1.0.1019
- ImageCast® Central
 - SW v. 5.10A

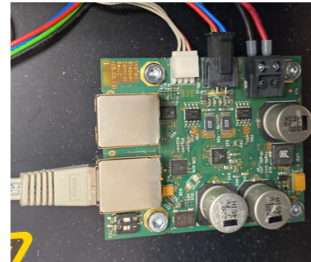
Dominion engineering team was able to replicate this Input Hopper Tray error messages on the same HiPro Scanner using test scan scenarios. Multiple techniques were then applied to determine the root cause.

The Input Hopper consists of Left Input Tray and Right Input Trays. Each one is controlled by a Stepper Control PCB (Left and Right) accordingly. All these PCBs communicate with the main PCB (Motion Board) through an additional Stepper Control PCBs. These PCBs communicate with each other through RJ45 Patch cables.

To identify the source of the Error Message accurately, each original Stepper Control PCB was replaced with known good Stepper Control PCB, test scans were performed and the error message 911 and 912 still appeared. Next, all three Stepper Control PCBs with known good ones and replaced, yet, the error

message still appeared after some amount of scanning.

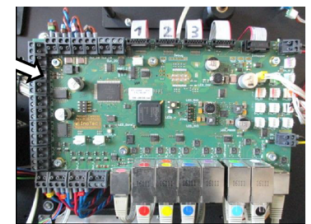
Stepper Control PCB Left



Stepper Control PCB Right



Stepper Control PCB Main



Motion Control PCB

As a next step the Motion Control Board, which is the main controller of the Input Hopper Tray, was replaced. All three original Stepper Control PCBs were installed back on the Scanner to make sure all original parameters are the same except the Motion Board. The error message showed up after ten minutes of volume scan testing.

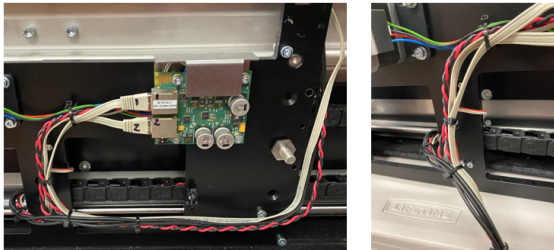
The investigations above proved that all boards are fully functional. The root cause of the error message is now narrowed down to the communication cables. However, replacement cables could not reach in time for certification due to shipping difficulty. Therefore, Dominion decided to replace the HiPro-H12 (S/N: 0040K26) with a fully functional HiPro-H12 (S/N: 0030K26).



The failing HiPro-H12 (S/N: 0040K26) was then transferred to Dominion facility for further investigation.

InterScan's and Dominion technician confirmed that the harness cable which connects the Stepper Control PCB to the Motion Control PCB had an intermittent connection inside the connector.

After replacing the harness cable on the HiPro-H12, the error message could not be replicated. 5000 scans were conducted using 11" and 14" ballots.



Harness Cable-Stepper Control PCB to Motion Control PCB

Solution

To overcome the issue of the Input Hopper Tray's error message, the damaged harness cable was replaced with a new one to correct the communication between the Motion Control PCB and the Stepper Control PCB.