
DOMINION VOTING SYSTEMS
DEMOCRACY SUITE, VERSION 4.0
PHYSICAL CONFIGURATION AUDIT

WYLE LABORATORIES, INC.

Huntsville, AL

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WHVS07.13

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1.0 INTRODUCTION

1.1 Scope

A Physical Configuration Audit (PCA) of the Dominion Voting Systems Democracy Suite, Version 4.0, was performed by Wyle Laboratories qualified personnel as part of the certification test campaign. The PCA consisted of inspecting: The Democracy Suite EMS software, the ImageCast eVolution (ICE), the ImageCast Precinct (ICP), the ImageCast Central Count (ICC), and all accessories, equipment and documentation used with the system. All initial hardware and software versions, of the ICE, ICP, and ICC were identified during the baseline PCA. Throughout the testing process, updates of the PCA will be performed to reflect any hardware and software changes. This document represents the initial hardware and software configurations of the Dominion Voting Systems Democracy Suite, Version 4.0.

1.2 References

The list below includes all documents cited in the PCA.

- EAC 2005 VVSG
- WoP 25 Physical Configuration Audit

1.3 Terms and Abbreviations

This subsection defines all terms and abbreviations applicable to the development of this PCA Review.

- ADA – Americans with Disabilities Act
- AS – EMS Audio Studio
- ATI – Audio Tactile Interface
- COTS – Commercial Off the Shelf
- DRE – Direct Record Electronic
- ECO – Engineering Change Order
- EED- EMS Election Event Designer
- EMS – Election Management System
- EUT – Equipment Under Test
- LAN – Local Area Network
- LCD – Liquid Crystal Display
- NAS – Network Attached Storage
- PCA – Physical Configuration Audit
- RAID – Redundant Array of Independent Drives
- RTR – EMS Results Tally & Reporting

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- SUT – System Under Test
 - TDP – Technical Data Package
 - UPS – Uninterruptible Power Supply
 - WoP – Wyle Operating Procedure

1.4 Hardware Overview

The Dominion Voting Systems Democracy Suite 4.0 System is a paper-based optical scan voting system. The Democracy Suite 4.0 System consists of four major components: the Election Management System (EMS), ImageCast Evolution (ICE) precinct scanner with optional ballot marking capabilities, ICP precinct scanner with audio ballot and DRE capabilities, and ImageCast Central (ICC) central count scanner.

1.0 INTRODUCTION (continued)

1.5 Democracy Suite 4.0 Election Management System Software Overview

The Democracy Suite EMS software suite consists of seven applications which fulfill all election management needs. The EMS platform can be deployed using two configurations: Express and Standard. A Witness Build was performed on all source code reviewed by Wyle, which makes up the Democracy Suite 4.0 voting system. SHA1 hash values were obtained from all software built by Wyle. At the completion of the Certification Process, all software versions will be released as version 4.0

The following descriptions of each EMS software component and the two EMS deployment configurations are as taken from the Dominion Voting Systems technical documentation.

The Dominion Voting Systems Democracy Suite EMS consists of seven components running as either a front-end/client application or as a back-end/server application. Below is a list and brief description of each:

- Democracy Suite EMS Election Event Designer client application - integrates election definition functionality and represents a main pre-voting phase end-user application.
- Democracy Suite EMS Results Tally and Reporting client application - integrates election results acquisition, validation, tabulation, reporting and publishing capabilities and represents a main post-voting phase end-user application.
- Democracy Suite EMS Audio Studio client application - represents an end-user helper application used to record audio files for a given election project. As such, it is utilized during the pre-voting phase of the election cycle.
- Democracy Suite EMS Data Center Manager client application - represents a system level configuration application used in EMS back-end data center configuration.

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- Democracy Suite EMS Application Server server application - represents a server side application responsible for executing long running processes, such as rendering ballots, generating audio files and election files, etc.
 - Democracy Suite EMS Network Attached Storage (NAS) Server server application - represents a server side file repository for election project file based artifacts, such as ballots, audio files, reports, log files, election files, etc.
 - Democracy Suite EMS Database Server server application - represents a server side RDBMS repository of the election project database which holds all the election project data, including pre-voting and post-voting data.

The EMS platform can be deployed in two physical hardware configurations:

- EMS Express hardware configuration - all EMS software components are installed on a single physical PC or laptop.
- EMS Standard hardware configuration - the EMS server components are installed on a single physical server, in addition to the UPS and LAN network switch devices, while the EMS client components are installed on one or more physical PCs or laptops. All system components are interconnected in a client-server local LAN environment.

1.0 INTRODUCTION (continued)

1.6 Democracy Suite EMS Software Overview

The Democracy Suite EMS software is supported on the Windows platform. The software consists of seven components: Election Event Designer, Results Tally and Reporting, Audio Studio, Datacenter Manager, Application Server, Network Attached Storage Server, and Database Server. In addition, the Democracy Suite supports two precinct tabulators (ICE and ICP) which run software that is treated as firmware. The Democracy Suite has an independent workstation running proprietary software. The ICC application provides the central tabulation function for the system. A Witness Build was performed on the ICE and ICP operating systems to ensure that specific options and applications required by the hardware were included in the operating system. The operating systems were loaded onto each ICE and ICP respectively. The ICE and ICP firmware were each built during a Witness Build, using source code reviewed by Wyle. Using the EMS application built by Wyle and included in the suite of tools, the ICE and ICP firmware was loaded onto each machine. During the performance of the Trusted Builds, all software versions will be set to 4.0.

1.7 Democracy Suite Software Overview

The Dominion Voting Systems Democracy Suite 4.0 System is a paper-based optical scan voting system. The Democracy Suite 4.0 System consists of four major components: the Election Management System (EMS), ImageCast Evolution (ICE) precinct scanner

with optional ballot marking capabilities, ICP precinct scanner with audio ballot and DRE capabilities, and ImageCast Central (ICC) central count scanner.

1.8 Technical Data Package Overview

As part of the Physical Configuration Audit of the Democracy Suite EMS System, a review of the Technical Data Package (TDP) submitted by Dominion Voting Systems was performed to ensure that all documentation required by a user to install, validate, operate, and maintain the system was present.

2.0 HARDWARE

2.1 Hardware Components

The following is a list of all hardware components in testing, and the quantity of each:

- 7x ImageCast Precinct
- 5x ImageCast Evolution
- 2x ImageCast Central Count
- 5x ImageCast Precinct Ballot Boxes
- 3x ImageCast Evolution Ballot Boxes
- 11x Headphones
- 5x Sip-n-Puff

2.2 Equipment

This subsection categorizes the equipment the manufacturer has submitted for testing. Each test element is included in the list of the equipment required for testing of that element, including system hardware, general purpose data processing and communications equipment, and any required test instrumentation.

Table 2-1 below, lists all of the major components of the ICE voting system. Each ImageCast eVolution (Equipment Under Test) EUT will be comprised of an ICE unit and ballot box.

Table 2-1 ImageCast eVolution Equipment

Equipment	Manufacturer	Model	Serial Number
ICE	Dominion	ImageCast PCOS 400A	ICE2P1005
ICE	Dominion	ImageCast PCOS 400A	ICE2P1006
ICE	Dominion	ImageCast PCOS 400A	ICE2P1007
ICE	Dominion	ImageCast PCOS 400A	ICE2P1008
ICE	Dominion	ImageCast PCOS 400A	ICE2P1013
ICE Ballot Box	Dominion	BOX-400A	BOX-57381-007

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ICE Ballot Box	Dominion	BOX-400A	BOX-57381-008
ICE Ballot Box	Dominion	BOX-400A	BOX-57381-15

Each ImageCast Precinct EUT will be comprised of one ICP unit and a ballot box. Each component and its details are listed in the table below.

Table 2-2 ImageCast Precinct Equipment

Equipment	Manufacturer	Model	Serial Number
ICP	Dominion	ImageCast Precinct Tabulator PCOS 320A	WLDAFBH0001
ICP	Dominion	ImageCast Precinct Tabulator PCOS 320A	WLDAFBH0002
ICP	Dominion	ImageCast Precinct Tabulator PCOS 320A	WLDAFBH0004
ICP	Dominion	ImageCast Precinct Tabulator PCOS 320A	WLDAFBH0005
ICP	Dominion	ImageCast Precinct Tabulator PCOS 320A	WLDAFBH0018
ICP	Dominion	ImageCast Precinct Tabulator PCOS 320A	WLDAFBH0019
ICP	Dominion	ImageCast Precinct Tabulator PCOS 320A	WLDAFBH0023
ICP Ballot Box	Dominion	BOX-310A	BOX-57381-011
ICP Ballot Box	Dominion	BOX-310A	BOX-57381-012
ICP Ballot Box	Dominion	BOX-310A	BOX-57381-013
ICP Ballot Box	Dominion	BOX-310A	BOX-57381-014
ICP Ballot Box	Dominion	BOX-310A (Plastic)	BOX-57381-015

The ImageCast Central Count consists of a COTS scanner paired with a COTS workstation PC used for ballot image and election rules processing and transfer of results to the EMS Datacenter.

Table 2-3 ImageCast Central Count Hardware

Equipment	Make	Model	Serial Number
ImageCast Central High-Speed Scanner	Canon	DR-X10C	ED300874
ImageCast Central High-Speed Scanner	Canon	DR-X10C	ED300880
ImageCast Central Workstation PC	Dell	Inspiron One 2305	564C3P1
ImageCast Central Workstation PC	Dell	Inspiron One 2305	563F3P1

2.0 HARDWARE (continued)

2.4 Voting Support Materials

The ICP and ICE voting systems make use of many of the same peripherals and accessories. Both the ICP and ICE units make use of the ATI handset. The table below lists the headphones, sip & puff devices, and other accessories required to perform voting using the Democracy Suite voting system.

Table 2-4 ImageCast Precinct and ImageCast eVolution Accessories

Equipment	Manufacturer	Quantity	Serial Number(s)
Footswitch Pair	Enabling Devices	4	RP-57381-001 thru 004
AirVoter Sip & Puff	Origin Instruments	5	AV-57381-001 thru 005
Disposable Mouthpieces	(Sip & Puff) p/n AC-310	30	AC-310-01
ATI Handsets	Dominion	5	ATI-57381-001 thru 005
Black Ballot Privacy Sleeves	Dominion	2	N/A
White Ballot Privacy Sleeves	Dominion	4	N/A
Black Privacy Labels (set of 2 pieces)	Dominion	4	N/A
White Privacy Labels	Dominion	4	N/A
Headphone	Cyber Acoustics	11	ACM 01-11
Headphone	Sony	1	MDR-G45LP-01
Combination Lock	MASTER Lock	1	646T
Keyed Lock	MASTER Lock	2	121Q
Security Keys	Maxim	20	N/A
Memory Flash Cards	SanDisk	100	N/A
Ballots	Dominion	8000	N/A
Dominion Cleaning Kit	Dominion	2	N/A
Permanent Markers	p/n SHARPIE1 BK	10	N/A
Thermal Printer Rolls	ICP/ICE Paper Rolls	120	N/A
Election Tamper Evident Seals (Silver)	Dominion	20	N/A
Tamper Evident Tie Wrap	Dominion	50	N/A

The support equipment listed below was provided by Dominion Voting Systems to support the EAC VVSG 2005 Test Campaign.

Table 2-5 Election Management System Support Equipment

Test Material	Make	Model	Quantity	Serial Number
iButton (SHA-1) with USB Reader/Writer	Maxim	USB R/W: DS9490R iButton: DS1963S	3	4D0273, 4C9CF5, 514DFD
iButton (SHA-1)	Maxim	DS1963S	2	4CE4C9, 4D064A
LCD Monitor	Dell	1909W	4	07E-4EUS, 07F-071S, 07F-06US, 07F-074S
LCD Monitor	Dell	N445N	2	2U6C, 2TWC
Audio Adapter	Soundwave	USB Soundwave 7.1 Audio Adapter	2	SW-57381-001, SW-57381-002
PCI Software	Soundwave	Soundwave 7.1 PCI Software	2	N/A
USB Software	Soundwave	USB Soundwave 7.1 Software	1	N/A
Networking Switch	D-Link	D-Link DES-1105 5- Port Switch	1	DRL728A001397
Compact Flash Reader	SanDisk	USB	5	0171618, 0201833, 0171631, 0171625, 0073688
Networking Switch	D-Link	DGS-2208 8-Port switch	1	F36J69C004824
eSATA PCI Card (Installed into Servers and PC)	SIIG, Inc.	eSATA II PCIe Pro Card	1	N/A
Card Reader	GGI Gear	Compact Flash Card Reader	1	CFRW-57381 -003

Table 2-6 Election Management System Hardware

Equipment	Manufacturer / Model	Hardware Specifications	Service Tag	COTS / Non-COTS
PC 1	Dell Precision T1500	Processor: Intel Core i7-860 2.8Ghz, Memory: 4x 1GB 1333Mhz DDR3, Hard Drive Capacity: 500 GB	61VNNM1	COTS
PC 2	Dell Precision T1500	Processor: Intel Core i7-860 2.8Ghz, Memory: 4x 1GB 1333Mhz DDR3, Hard Drive Capacity: 500 GB	61TPNM1	COTS
PC 3	Dell Precision T1500	Processor: Intel Core i7-860 2.8Ghz, Memory: 4x 1GB 1333Mhz DDR3, Hard Drive Capacity:	61YMNM1	COTS

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		500 GB		
PC 4	Dell Precision T1500	Processor: Intel Core i7-860 2.8Ghz, Memory: 4x 1GB 1333Mhz DDR3, Hard Drive Capacity: 500 GB	61TNNM1	COTS
PC5	Dell Inspiron One 2305	Processor: AMD Athlon II X2 240e 2.8 GHz, Memory: 8GB Dual Channel 1333MHz DDR3, Hard Drive Capacity: 1 TB	564C3P1	COTS
Server 1	Dell PowerEdge R610	Processor: Intel Xeon E5620 2.4Ghz, Memory: 8x 2GB 1333Mhz DDR3, Hard Drive Capacity: 2x500GB	5M9NNM1	COTS
Server 2	Dell PowerEdge R610	Processor: Intel Xeon E5620 2.4Ghz, Memory: 8x 2GB 1333Mhz DDR3, Hard Drive Capacity: 2x500GB	5M8PNM1	COTS
Server 3	Dell PowerEdge R610	Processor: Intel Xeon E5620 2.4Ghz, Memory: 8x 2GB 1333Mhz DDR3, Hard Drive Capacity: 2x500GB	5M8QNM1	COTS
Storage 1	Rocstor Guardian 4RM Raid System	Disk space: 2TB (Striped + Mirrored), Processor: 400 MHz storage I/O, Hot bus interface: eSATA, Drive bus interface: SATA II	ROC732621 047/SB0901 0154	COTS
Storage 2	Rocstor Guardian 4RM Raid System	Disk space: 2TB (Striped + Mirrored), Processor: 400 MHz storage I/O, Hot bus interface: eSATA, Drive bus interface: SATA II	ROC732621 045/SB0901 0157	COTS
Storage 3	Rocstor Guardian 4RM Raid System	Disk space: 2TB (Striped + Mirrored), Processor: 400 MHz storage I/O, Hot bus interface: eSATA, Drive bus interface: SATA II	ROC732621 046/SB0901 0161	COTS
Storage 4	Rocstor Commander 2UE Portable Hard Drive	Hard Drive Capacity: 500 GB	5VJ6RXKM	COTS
Storage 5	Rocstor Commander 2UE Portable	Hard Drive Capacity: 500 GB	5VJ48VFJ	COTS

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	Hard Drive		
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Table 2-7 Dell Service Tag Information (Desktop PC)

Service Tags: 61VNNM1, 61TPNM1, 61YMNM1, 61TNNM1		
System Type: Precision T1500		
Ship Date: 8/24/2010		
Dell IBU: Americas		
Quantity	Part #	Part Description
1	MVHJP	ASSEMBLY..., CHASSIS..., PWA INTEGRATED..., POWER FACTOR CORRECTION..., T1500, H57
0	T845M	INSTRUCTION..., TRIGGER..., SVC TAG
0	01323	INFORMATION..., NO ITEM
1	7CJHP	Card, Graphics, MV2650, ULGA9B
1	C158J	KIT..., DOCUMENTATION..., SERI/WSI, ENGLAND/ENGLISH..., DAO/BCC
1	HVYPG	DISPLAY..., FLAT PANEL DISPLAY..., 1909WB, MEXICO/MEXICAN..., ENGLISH/PORTUGUESE/GREEK...
1	33NRX	Assembly, Heatsink, 95W, 430/T1500
2	P382H	Dual In-Line Memory Module, 4G 1333, 512X64, 8, 240, 2RX8
1	M372H	KEYBOARD..., 104, UNITED STATES..., QUIETKEY..., PRIMAX ELECTRONICS LTD...
0	702EX	INFORMATION..., PREPARATION MATERIAL..., DEVIATION..., PRECISION WORKSTATION..., INCREASE..., #1
1	23NVR	Adapter, Connector, Video, Dongle, DP2DVI, Slide, V3
1	KMH7P	Assembly, Dvd+/-Rw, 16X, Half Height, BARE, Hitachi Lg Data Storage
1	XN967	KIT..., MOUSE..., UNIVERSAL SERIAL BUS..., 2BTN, OPTICAL..., PRIMAX ELECTRONICS LTD...
1	Y1PC7	TECHNICAL SHEET..., SETUP..., T1500, ENGLAND/ENGLISH...
1	RT4X4	Hard Drive, 500GB, S2, 7.2K, Western Digital, XL500
1	TF02D	Processor, I7-860, 2.8, 8MB, Lynnfield, 95W, B1
1	5120P	Cord, Power, 125V, 6Feet, SJT..., Unshielded

Table 2-8 Dell Service Tag Information (Server)

Service Tags: 5M9NNM1, 5M8PNM1, 5M8QNM1		
System Type: PowerEdge R610		
Ship Date: 8/24/2010		
Dell IBU: Americas		
Quantity	Part #	Part Description
1	T845M	INSTRUCTION..., TRIGGER..., SVC TAG
1	YPDP1	ASSEMBLY..., CHASSIS..., 2.5HD, 1U, PER610
1	F0XJ6	Assembly, Printed Wiring Assy, Planar, Maser, R610, Wistron, V2

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3	5PPFJ	Assembly, Carrier, Mounting, Blank, Hard Drive, 2.5, V2
1	60HT4	Processor, E5620, 2.4/5.86, 12M, Xeon Westmere Efficient Performance, B1
0	2260R	PREPARATION MATERIAL..., DEV, SRV, INCRS #1
1	R465D	GUIDE..., GETTING STARTED..., PER610, DAO/BCC
1	DJ331	Keyboard, 104, Universal Serial Bus, United States, Entry Liteon, Black
2	J38MN	Power Supply, 502W, Redundant, ASTEC, V3
1	Y849R	PLACEMAT..., SETUP..., POWEREDGE..., 2, WEST...
1	XN967	KIT..., MOUSE..., UNIVERSAL SERIAL BUS..., 2BTN, OPTICAL..., PRIMAX ELECTRONICS LTD...
1	4V7F1	Assembly, Dvd+/-Rw, Serial Ata, 12.7, Plds, E
0	5R203	INFORMATION..., FLYER, DOCUMENTATION...
1	J894K	GUIDE..., PRODUCT..., INFORMATION..., SERI, DAO/BCC
1	YK838	Printed Wiring Assy Controller, Serial Attached Scsi, SAS6/IR, Integrated
1	0R215	Cord, Power, 15A, 125V, 10, 5-15/C13
1	60HT4	Processor, E5620, 2.4/5.86, 12M, Xeon Westmere Efficient Performance, B1
0	01323	INFORMATION..., NO ITEM
1	9WXTH	DISPLAY..., FLAT PANEL DISPLAY..., 17, E170SB, BLACK..., MEXICO/MEXICAN...
1	JM257	Assembly, Cable, Serial Attached Scsi, Internal, Double Speed HYBRID
2	G176J	Assembly, Carrier, Hard Drive SAS-SATAU, 2.5, V2
8	J160C	Dual In-line Memory Module, 2G 1333, 2RX8X72, 8, 240, UBE
1	RF5PF	Assembly, Cable, Serial Attached Scsi, 4X, 3G, R610
1	TY293	Assembly, Bezel, 1U, Poweredge
1	P071K	GUIDE..., PRODUCT..., INFORMATION..., WSI, PE/PV
2	R734K	Hard Drive, 500G, NL6, 7.2K, 2.5, Seagate Dragonfly
2	TR995	Assembly, Heatsink, Central Processor Unit, PER610

Table 2-9 Dell Service Tag Information (Desktop PC for ICC)

Service Tags: 564C3P1, 563F3P1		
System Type: Inspiron One 2305		
Ship Date: 6/1/2011		
Dell IBU: Americas		
Quantity	Part #	Part Description
0	01323	INFORMATION..., NO ITEM
1	DKX7Y	Assembly, Bezel, Liquid Crystal Display, Front, Touch, Quanta, C3PO
1	5KMFT	KIT..., DOCUMENTATION..., ENGLAND/ENGLISH..., INSPIRON..., ONE, 23, D/B
1	760VX	ASSEMBLY..., LIQUID CRYSTAL DISPLAY..., SMSN, CONVERTER..., TOUCH..., QT, C3PO

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1	K5Y6D	Card, Wireless, Half Mini-Card, DW1501, 4313
1	PN0PC	ASSEMBLY..., ANTENNA..., WIRELESS..., ALL IN ONE..., C3PO
1	DD1FR	ASSEMBLY..., CHASSIS..., PWA INTEGRATED..., 2305
2	1N7HK	Dual In-Line Memory Module, 2G, 1333, 128X64, 8, 240, 1RX8
1	897TK	Hard Drive, 1TB, S2, 7.2K, Western Digital, XL500
1	M815C	Kit, Mouse/keyboard Combo Wireless, AMF, Abnt2
1	JU012	ADAPTER..., ALTERNATING CURRENT..., 130W, DELTA - AC ADAPT..., 3P, WORLD WIDE..., M09
1	3291K	KIT..., SOFTWARE..., CYBERLINK..., TOUCHCAM, 1.1, W#2
1	347RD	Processor, Athlon 64X2 For Desktops, 240E, 2.8, 512X2, 2C, C3
1	K260C	CORD..., Power, 125V, 2.5A, 1M, C5 United States
1	FKGR3	Dvd+/-Rw, 8X, Serial Ata, BARE, Toshiba Samsung Storage Technology

In order to perform the software Witness and Trusted Builds, one Personal Computer has been provided as a build machine. The build machine is described in the table below:

Table 2-10 Build Machine Description

Equipment	Manufacturer	Version/Model	Serial Number	COTS/ Non-COTS
Build 1	Super Micro PC w/4 Hard Drives	PC w/4 Hard Drives	BM-57381-001	COTS

3.0 MATERIALS REQUIRED FOR TESTING

The materials required for certification testing of the Democracy Suite 4.0 voting system include software, hardware, test materials, and deliverable materials to enable the test campaign to occur will be delivered by Dominion Voting Systems to Wyle.

3.1 Software

The tables below list the software the manufacturer must submit for testing. This section lists all software required for operation and testing of the voting system being certified. This includes software used for testing telecommunications, security, and system integration; as well as supporting software required for the test environment including compilers, assemblers, and database managers, etc. Both COTS and non-COTS software components are listed in this section.

Table 3-1 Democracy Suite 4.0 EMS Software Platform Component Descriptions

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Software Required For Testing	Software Version	Filename
Democracy Suite EMS EED Client Application	4.6	setup.exe: EED_FED_CERT.Setup.msi EED_FED_CERT.Setup_64b.msi
Democracy Suite EMS RTR Client Application	4.6	setup.exe: RTR_FED_CERT.Setup.msi RTR_FED_CERT.Setup_x64.Setup.msi
Democracy Suite EMS Application Server	4.6	setup.exe: EMSAplicationServer_FED_CERT.Setup.msi EMSAplicationServer_FED_CERT.Setup_x64.Setup.msi
Democracy Suite EMS File System Service	4.6	Setup.exe: DVS.Utilities.FileSystemServiceSetup.msi
Democracy Suite EMS Audio Studio Client Application	4.6	setup.exe: EMSAS2010_Setup.msi
Democracy Suite EMS Data Center Manager	4.6	DemocracySuiteEMS_DCM.exe
.NET Framework 3.5 Library	4.0	dotNetFx40_Full_x86_x64.exe
NetAdvantage for .NET 2008 Vol. 1 CLR 2.0	2008 Vol.1 CLR 2.0	NetAdvantage_WinForms_20081_CLR20_Product.exe (for details see document Components_3rdParty_1.0.xlsx)

Table 3-2 Democracy Suite 4.0 ImageCast Precinct Software Component Descriptions

Software Required For Testing	Software Version	Filename
Election Firmware	4.6.4-US	cf2xx.sig
Firmware Updater	4.6.4-US	firmUp.enc
Firmware Extractor	4.6.4-US	FirmwareExtract.enc
Kernel (uLinux)	4.6.4-US	Image.bin.gz
Boot Loader (COLILO)	20040221	colilo.bin

Table 3-3 Democracy Suite 4.0 ImageCast Evolution Software Component Descriptions

Software Required For Testing	Software Version	Filename
VotingMachine	4.6	VotingMachine-4.6.tar.bz2

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libAudio	0.3.7	libAudio-0.3.7.tar.bz2
libGenIO	0.3.24	libGenIO-0.3.24.tar.bz2
libScanner	0.2.31	libScanner-0.2.31.tar.bz2
libCrypto	0.3.11	libCrypto-0.3.11.tar.bz2
libPower	0.3.2	libPower-0.3.2.tar.bz2
Atmega RTC & Logger	1.0.7	logger-1.0.7.tar.bz2
Atmega Power	1.0.10	power-1.0.10.tar.bz2

Table 3-4 Democracy Suite 4.0 ImageCast Central Software Component Descriptions

Software Required For Testing	Software Version	Filename
ImageCast Central Application	4.0.tbd	ImageCast Central.exe
Image-Analysis DLL	4.0.tbd	ImgProc.dll

Table 3-5 Democracy Suite 4.0 EMS Software Platform Third Party Software Component Descriptions

Software Required For Testing	Software Version	Filename
NetAdvantage for .NET Windows Forms 2008 Subscription	2008 Vol.1 CLR 2.0	NetAdvantage_WinForms_20081_CLR20_Product.exe
TxText Control .NET Version 14	16.0	tx_1600_dotnetserver_sp1.zip
Cepstral Text-to-Speech Desktop Voices	5.1.0	Cepstral_Allison_windows_5.1.0.msi + 3 more voices

Table 3-6 Democracy Suite 4.0 EMS Client Application Software Component Descriptions

Software Required For Testing	Software Version	Filename
Microsoft Windows 7 x64	6.1	Microsoft DVD provided
Windows Server 2008 R2 x64	6.1	Microsoft DVD provided
Microsoft SQL Server 2008 R2 x64 or Microsoft SQL Server 2008 Express R2 x64	10.0	Microsoft DVD provided

Microsoft .NET Framework 4.0	4.0	dotNetFx40_Full_x86_x64.exe
Microsoft Visual J# Redistributable 2.0 x64	2.0 x64	vjredist64.exe
Adobe Acrobat Reader 9.3 or higher	9.0	AdbeRdr930_en_US.exe
Dallas 1-Wire Device Driver version 4.0.3b x64	4.0	install_1_wire_drivers_x64_v403beta.msi
Cepstral Text-to-Speech Desktop Voices	5.1.0	Cepstral_Allison_windows_5.1.0.msi + 3 more voices
Java Runtime Environment 6.0	6.0	jre-6u18-windows-x64.exe
Microsoft IIS 7.5	7.5	Microsoft DVD provided

Table 3-7 Democracy Suite 4.0 EMS Software Platform Unmodified COTS Components Descriptions

Software Required For Testing	Software Version	Filename
TX Text Control Library for .NET	16.0	tx_1600_dotnetserver_sp1.zip (for details see document Components_3rdParty_1.0.xlsx)
OneWire API for .NET	4.0.2.0	OneWireAPI.NET.dll (for details see document Components_3rdParty_1.0.xlsx)
SOX – audio converter application	14.3.1	sox.exe (for details see document Components_3rdParty_1.0.xlsx)
Log4net	1.2.10	log4net.dll, log4net.xml (for details see document Components_3rdParty_1.0.xlsx)
NLog – log library	1.0.0.505	NLog.dll (for details see document Components_3rdParty_1.0.xlsx)
Cepstral Text-to-Speech	5.1.0	Cepstral_Allison_windows_5.1.0.msi + 3 more voices (for details see document Components_3rdParty_1.0.xlsx)
iTextSharp – pdf generation library	4.0.3	iTextsharp.dll (for details see document Components_3rdParty_1.0.xlsx)
openssl.exe, libeay32.dll, ssleay32.dll	1.2	openssl.exe, libeay32.dll, ssleay32.dll (for details see document Components_3rdParty_1.0.xlsx)
SQLite	1.0.65.0	System.Data.SQLite.DLL 32-bit and 64-bit (for details see document Components_3rdParty_1.0.xlsx)

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		Components_3rdParty_1.0.xlsx)
Lame	3.98	System.Data.SQLite.DLL 32-bit and 64-bit (for details see document Components_3rdParty_1.0.xlsx)
Speex	1.0.4	speexdec.exe and speexenc.exe (for details see document Components_3rdParty_1.0.xlsx)
Ghostscript	8.71	gsdll32.dll – both 32-bit and 64-bit (for details see document Components_3rdParty_1.0.xlsx)
PdfToImage.dll	1.2	PdfToImage.dll (for details see document Components_3rdParty_1.0.xlsx)
Tamir.SharpSSH.dll, DiffieHellman.dll, Org.Mentalis.Security.d ll – Cryptography	SharpSSH package 1.1.1.13	Tamir.SharpSSH.dll, Diffie.Hellman.dll, Org.Mentalis.Security.dll (for details see document Components_3rdParty_1.0.xlsx)

Table 3-8 Democracy Suite 4.0 ImageCast Precinct Unmodified COTS Software Component Descriptions

Software Required For Testing	Software Version	Filename
PNG Reference Library	1.2.24	libpng-1.2.24.tar.gz
OpenSSL	1.1.2	Openssl-fips-1.1.2.tar.gz
Zlib	1.2.3	Zlib-1.2.3.tar.gz

Table 3-9 Democracy Suite 4.0 ImageCast Evolution Unmodified COTS Software Component Descriptions

Software Required For Testing	Software Version	Filename
libogg	1.2.2	libogg-1.2.2.tar.gz
libspeex	1.2rc1	speex-1.2rc1.tar.gz
libSoundTouch	1.5.0	soundtouch-1.5.0.tar.gz
Freetype	2.4.4	freetype-2.4.4.tar.bz2
libPNG	1.5.2	libpng-1.5.2.tar.gz
zlib	1.2.5	zlib-1.2.5.tar.bz2
Qt Everywhere	4.7.3	qt-everywhere-opensource-src-4.7.3.tar.gz
fontconfig	2.8.0	fontconfig-2.8.0.tar.gz
log4cxx	0.10.0	apache-log4cxx-0.10.0.tar.gz
apr	1.4.4	apr-1.4.4.tar.bz2
apr-util	1.3.11	apr-util-1.3.11.tar.bz2

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sqlite	3.7.6.2	sqlite-autoconf-3070602.tar.gz
libusb	1.0.8	libusb-1.0.8.tar.bz2
libusb-compat	0.1.3	libusb-compat-0.1.3.tar.bz2
glibc	2.13	glibc-2.13.tar.bz2
busybox	1.18.4	busybox-1.18.4.tar.bz2
dropbear	0.53.1	dropbear-0.53.1.tar.bz2
i2c-tools	3.0.3	i2c-tools-3.0.3.tar.bz2
e2fsprogs	1.41.14	e2fsprogs-1.41.14.tar.gz
expat	2.0.1	expat-2.0.1.tar.gz
libjpeg	8c	jpegsrc.v8c.tar.gz
libtiff	3.9.5	tiff-3.9.5.tar.gz
tzcode	2011g	tzcode2011g.tar.gz
tzdata	2011g	tzdata2011g.tar.gz
sysfsutils	2.1.0	sysfsutils-2.1.0.tar.gz
openssl-fips	1.2.3	openssl-fips-1.2.3.tar.gz
usb-modeswitch	1.1.7	usb-modeswitch-1.1.7.tar.bz2
usb-modeswitch-data	2011-02-27	usb-modeswitch-data-20110227.tar.bz2

Table 3-10 Democracy Suite 4.0 - ImageCast Central Build Environment Software Build Components (Unmodified COTS)

Software Required For Building ICC application	Software Version	Filename
Windows 7	Home Premium	OEM installed, or full CD from Microsoft
Visual Studio	2005	Full CD from Microsoft

Table 3-11 Democracy Suite 4.0 - ImageCast Central Build Environment Setup Software Utilities (Unmodified COTS)

Software Required For Build Environment Setup	Software Version	Filename
7-Zip	9.20	7z920.exe
Active Perl 64-bit	5.12.4.1205	ActivePerl-5.12.4.1205-MSWin32-x64-294981.msi
Active Perl 32-bit	5.12.4.1205	ActivePerl-5.12.4.1205-MSWin32-x86-294981.msi
Nasm	2.09.07	nasm-2.09.07-win32.zip

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**Table 3-12 Democracy Suite 4.0 - ImageCast Central
Software Build
Library Source Code (Unmodified COTS)**

Software Required For Build Environment Setup	Software Version	Filename
OpenSSL	Fips 1.2.3	openssl-fips-1.2.3.tar.gz

**Table 3-13 Democracy Suite 4.0 - ImageCast Central
Runtime Software Components (Unmodified COTS)**

Software Required For Testing ICC application	Software Version	Filename
Imgcomp.dll	2.11	apiman.zip
1 Wire driver 64-bit	4.03	install_1_wire_drivers_x64_v403.msi
1 Wire driver 32-bit	4.03	install_1_wire_drivers_x86_v403.msi
Kofax VRS	4.50	Full CD from Kofax
Canon Scanner driver	1.8	X10DRIT_V18.exe
VCredist	4/10/2006	vcredist_x86.exe

Table 3-14 Democracy Suite 4.0 ImageCast Precinct Modified COTS Software Component Descriptions

Software Required For Testing	Software Version	Filename
uClinux	20070130	uClinux-dist-20070130.tar.gz
COLILO Boot Loader	20040221	Colilo20040221.tar.gz

Table 3-15 Democracy Suite 4.0 ImageCast Evolution Modified COTS Software Component Descriptions

Software Required For Testing	Software Version	Filename
Kernel	2.6.30	linux-2.6.30.9.tar.bz2
U-BOOT	1.3.4	u-boot-1.3.4.tar.bz2

Table 3-16 Democracy Suite 4.0 EMS Software Build Environment Component Descriptions

Software Required For Testing	Software Version	Filename
Microsoft Windows Server 2008 R2 x64	6.1	Microsoft DVD provided
.NET Framework	4.0	dotNetFx40_Full_x86_x64.exe
Microsoft Visual J# 2.0 Redistributable	2.0 x64	vjredist64.exe
Microsoft Visual Studio 2010	10.0	Microsoft DVD provided (Microsoft patch KB2286556 VS10-KB2286556-x86.exe has to be installed)
Microsoft Visual Studio 2010 Service Pack 1	10.0.30319 SP1	VS2010SP1dvd1.iso
Cruise Control	1.5	CruiseControl.NET-1.5.7256.1-Setup
Nant	0.90	nant-0.90-bin.zip
Csunit	2.1.1	csUnit.2.1.1.BETA.setup
7-Zip	9.20 x64	7z920-x64.msi
NetAdvantage Infragistics	2008 Vol.1 CLR 2.0	NetAdvantage_WinForms_20081_CLR20_Product.exe
Tx Text Control 16.0.NET	16.0	tx_1600_dotnetserver_sp1.zip
Adobe Acrobat Reader 9.3 or higher	9.3	AdbeRdr930_en_US.exe
ImgBurn 2.5 or higher	2.5.1.0	SetupImgBurn_2.5.0.0.exe

Table 3-17 Democracy Suite 4.0 ImageCast Precinct Election Firmware Compiler Descriptions

Software Required For Testing	Software Version	Filename
g++ (GNU C++ compiler)	gcc3.4.0-20040603	m68k-uclinux-tools-c++-gcc3.4.0-20040603.sh

Table 3-18 Democracy Suite 4.0 ImageCast Evolution Election Firmware Compiler Descriptions

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Software Required For Testing	Software Version	Filename
g++ (GNU C++ compiler)	gcc-4.5.55-eglibc-2.11.55	freescale-powerpc-linux-gnu-2010.09-55.i686.rpm

Table 3-19 Democracy Suite 4.0 ImageCast Precinct Firmware Build Environment Component Descriptions

Software Required For Testing	Software Version	Filename
Ubuntu 10.04 LTS – Long-term support	10.04	ubuntu-10.04.2-desktop-amd64.iso
Toolchain Installation Script	N/A	Toolchain.sh
m68k uClinux tools base gcc	3.4.0-20040603	m68k-uclinux-tools-base-gcc3.4.0-20040603.sh
m68k uClinux tools c++ gcc	3.4.0-20040603	m68k-uclinux-tools-c++-gcc3.4.0-20040603.sh
m68k uClinux tools gdb	20040603	m68k-uclinux-tools-gdb-20040603.sh
OpenSSL	1.1.2	Openssl-fips-1.1.2.tar.gz

Table 3-20 Democracy Suite 4.0 ImageCast Evolution Firmware Build Environment Component Descriptions

Software Required For Testing	Software Version	Filename
Ubuntu	10.04 LTS	ubuntu-10.04.2-desktop-i386.iso
LTIB	10.1.1a-sv	ltib-10-1-1a-sv.tar.gz
g++ (GNU C++ compiler)	gcc-4.5.55-eglibc-2.11.55	freescale-powerpc-linux-gnu-2010.09-55.i686.rpm

4.0 TECHNICAL DATA PACKAGE (TDP)

4.1 Initial Review

The initial review of the Democracy Suite 4.0 Technical Data Package yielded a number of inconsistencies in the documentation. The documents submitted to Wyle contained several procedural errors as well as spelling errors. Throughout the TDP review process,

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Wyle will continue to inform the manufacturers of noted discrepancies. The TDP will be reviewed for consistency, clarity, and to ensure applicable revisions are incorporated as needed.

4.2 Required Documents for PCA

The following documents are required during the performance of the Physical Configuration Audit to ensure that the manufacturer's TDP provides sufficient instruction for a user to install, validate, operate, and maintain the voting system. Documentation regarding the manufacturer's Configuration Management Plan and Software and Design Specifications was used during the Source Code review to ensure that the software conformed to the manufacturer's specifications. The following table lists the documents utilized during the Physical Configuration audit:

Table 4-1 Democracy Suite 4.0 TDP Documents

Democracy Suite 4.0 TDP Documents	System	Version	Date	Document Number
<i>Documents describing overall system performance:</i>				
System Configuration Overview	All	1.2.0::225	3/22/12	2.02
System Security Specification	All	1.1.0::293	3/22/12	2.06
Configuration Management Process	All	1.2.0::148	3/22/12	2.11
Quality Assurance Program	All	1.2.0::74	3/22/12	2.12
System Test and Verification	All	1.1.0::96	3/22/12	2.07
System Test and Verification Suites	All	1.2.0::3	3/22/12	2.07
Personnel Training and Deployment Requirements	All	1.1.0::42	3/22/12	2.10
<i>Documents describing functionality, hardware, software design, maintenance, and operation:</i>				
EMS Functional Description	EMS	1.1.0::209	3/22/12	2.03
ICE Functional Description	ICE	1.2.0::58	3/22/12	2.03
ICP Functional Description	ICP	1.1.0::100	3/22/12	2.03
ICC Functional Description	ICC	1.1.0::48	3/22/12	2.03
ICE Tabulator System Hardware Specification	ICE	1.2.0::254	3/22/12	2.04
ICP Tabulator System Hardware Specification	ICP	1.1.0::67	3/22/12	2.04
ICE System Hardware Characteristics	ICE	1.2.0::77	3/22/12	2.04
ICP System Hardware Characteristics	ICP	1.1.0::40	3/22/12	2.04
EMS Software and Design Specification	EMS	1.0.0::186	3/22/12	2.05
ICE Software and Design Specification	ICE	1.0.0::70	3/22/12	2.05

4.0 TECHNICAL DATA PACKAGE (TDP) (continued)

ICP Software and Design Specification	ICP	1.1.0::93	3/22/12	2.05
ICC Software and Design Specification	ICC	1.0.0::25	3/22/12	2.05
ICP System Operation Procedures	ICP	1.1.0::147	3/22/12	2.08
EMS System Operation Procedures	EMS	1.2.0::387	3/22/12	2.08
ICE System Operation Procedures	ICE	1.0.0::79	3/22/12	2.08
ICC System Operation Procedures	ICC	1.1.0::67	3/22/12	2.08
ICP System Maintenance Manual	ICP	1.1.0::58	3/22/12	2.09
ICE System Maintenance Manual	ICE	1.1.0::109	3/22/12	2.09
EMS System Maintenance Manual	EMS	1.0.0::45	3/22/12	2.09
Election Event Designer Users Guide	EMS	1.3.3	3/22/12	N/A
Results Tally and Reporting Users Guide	EMS	1.2.7	3/22/12	N/A
Audio Studio Users Guide	EMS	1.2.3	3/22/12	N/A
ImageCast Precinct Approved Parts List	ICP	V3	3/22/12	N/A
ImageCast Precinct Configuration Files	ICP	1.0.0::18	3/22/12	N/A
ImageCast Precinct Election Definition Files	ICP	2.5.1	3/22/12	N/A
ImageCast Precinct Firmware Build and Install Document	ICP	1.0.0::19	3/22/12	N/A
ImageCast Precinct Firmware Update	ICP	1.0.0::8	3/22/12	N/A
ImageCast Precinct Technical Guide	ICP	1.0.0::8	3/22/12	N/A
Engineering Product Development Processes	ICP	P0.2	3/22/12	N/A
Dominion Voting C C++ Coding Standard	All	1.0.0::7	3/22/12	N/A
Dominion Voting Usability Study	ICP	1.0.0::20	3/22/12	N/A
Dominion Voting Usability Study	ICE	1.0.0::35	3/22/12	N/A

5.0 OPERATING SYSTEM BASELINE

Wyle reviewed the Dominion SCAP Checklist for completeness, clarity and consistency.

6.0 CONCLUSION

All Hardware and Software undergoing the Certification Process has been inspected. Photographs were taken of hardware components and are included in Appendix A of this document. Serial numbers of all hardware have been recorded as have version numbers for all software. Hardware and software changes that occur throughout the certification process will be recorded and tracked until testing is concluded, at which time a revised PCA report will be issued if necessary.

APPENDIX A

PHOTOGRAPHS

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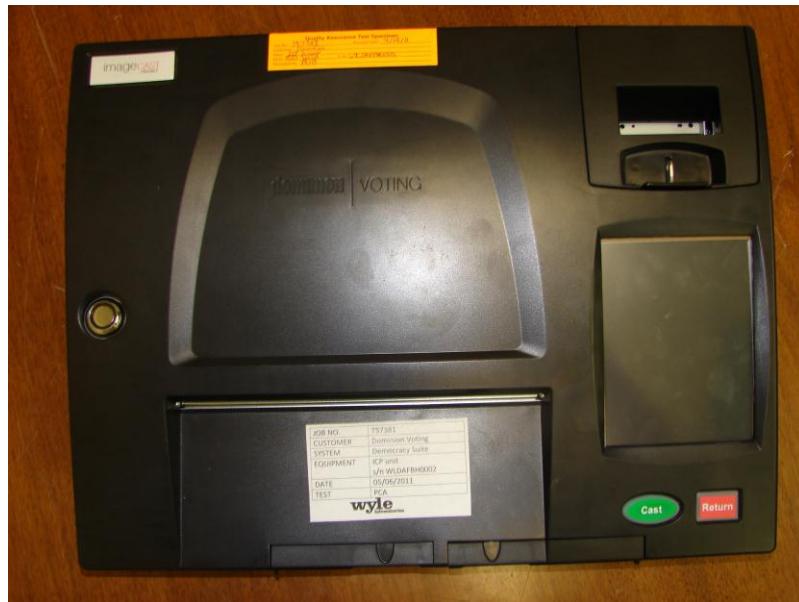
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EUT 2 ICP (WLDAFBH0002)



EUT 3 ICP (WLDAFBH0004)

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EUT 4 ICP (WLDAFBH0005)



EUT 5 ICP (WLDAFBH0018)

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EUT 7 ICP (WLDAFBH0023)

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EUT 8 ICE (ICE2P1005)

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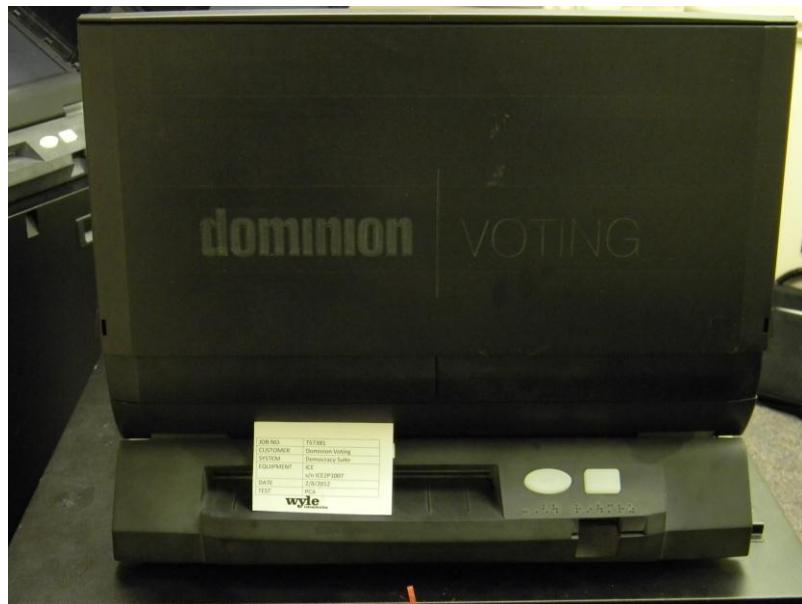
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EUT 9 ICE (ICE2P1006)



EUT 10 ICE (ICE2P1007)

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EUT 11 ICE (ICE2P1008)



EUT 12 ICE (ICE2P1013)

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EUT 13 ICC (ED300874)



EUT 14 ICC (ED300880)

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ICP Ballot Box back view

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ICP Ballot Box emergency door open

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ICP Ballot Box front view

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ICP Ballot Box inside main bin

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ICP Ballot Box side view

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ICE Ballot Box side view

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ICE Ballot Box front view

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EMS(monitor, keyboard, and mouse)

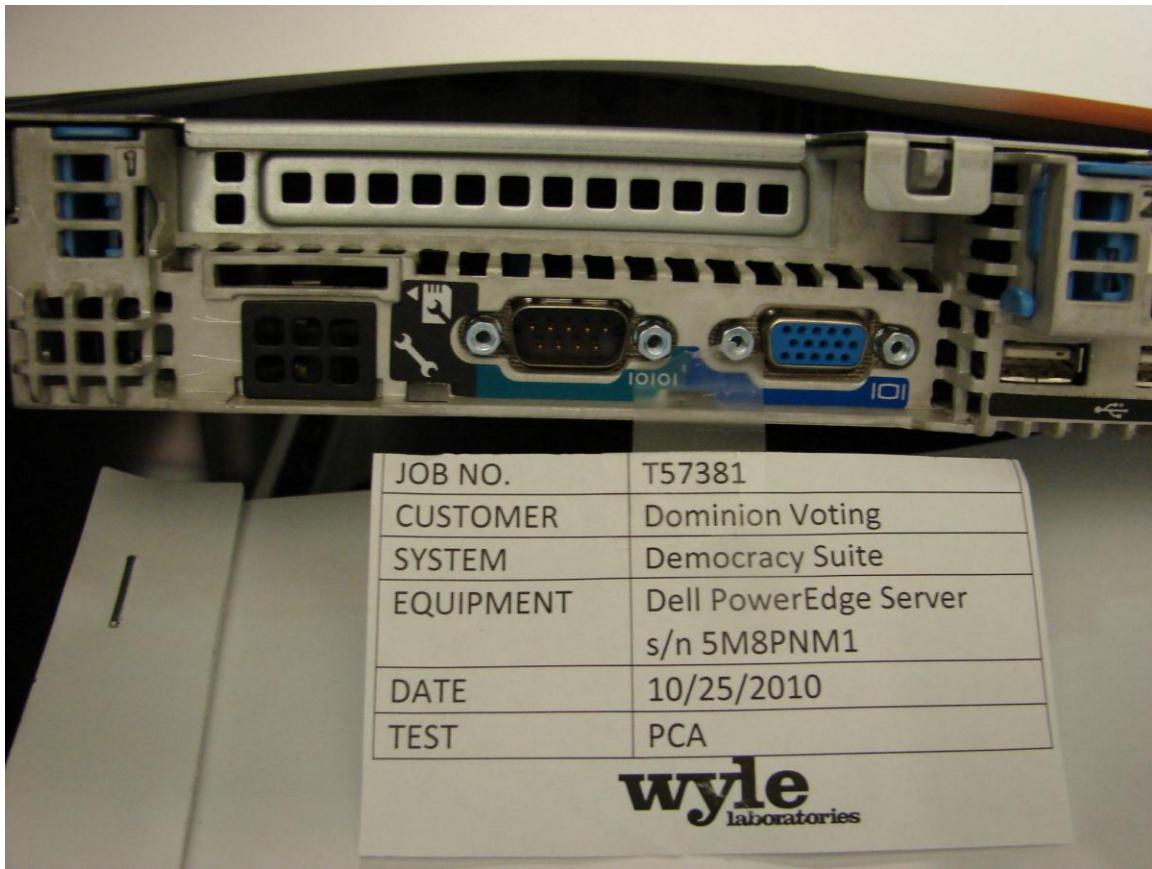
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Dell PowerEdge Server

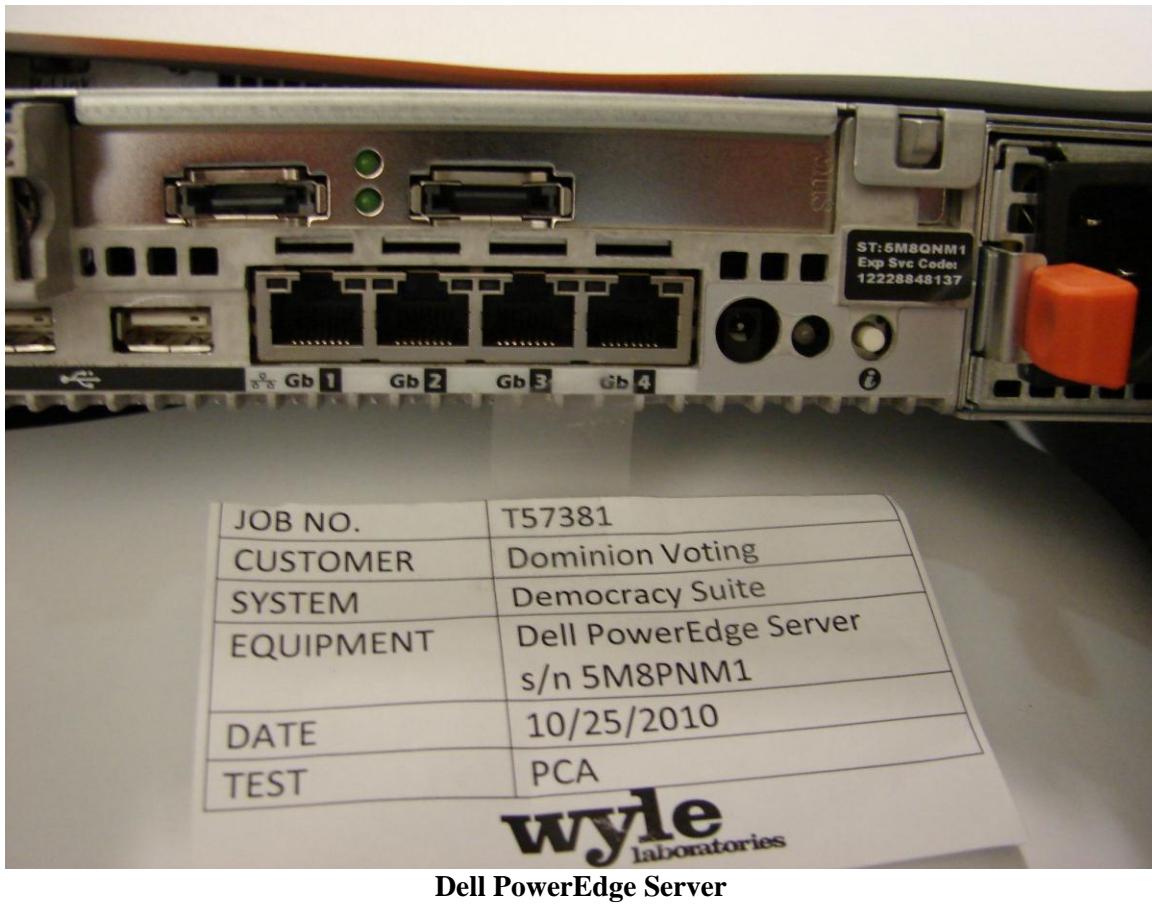
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Dell PowerEdge Server

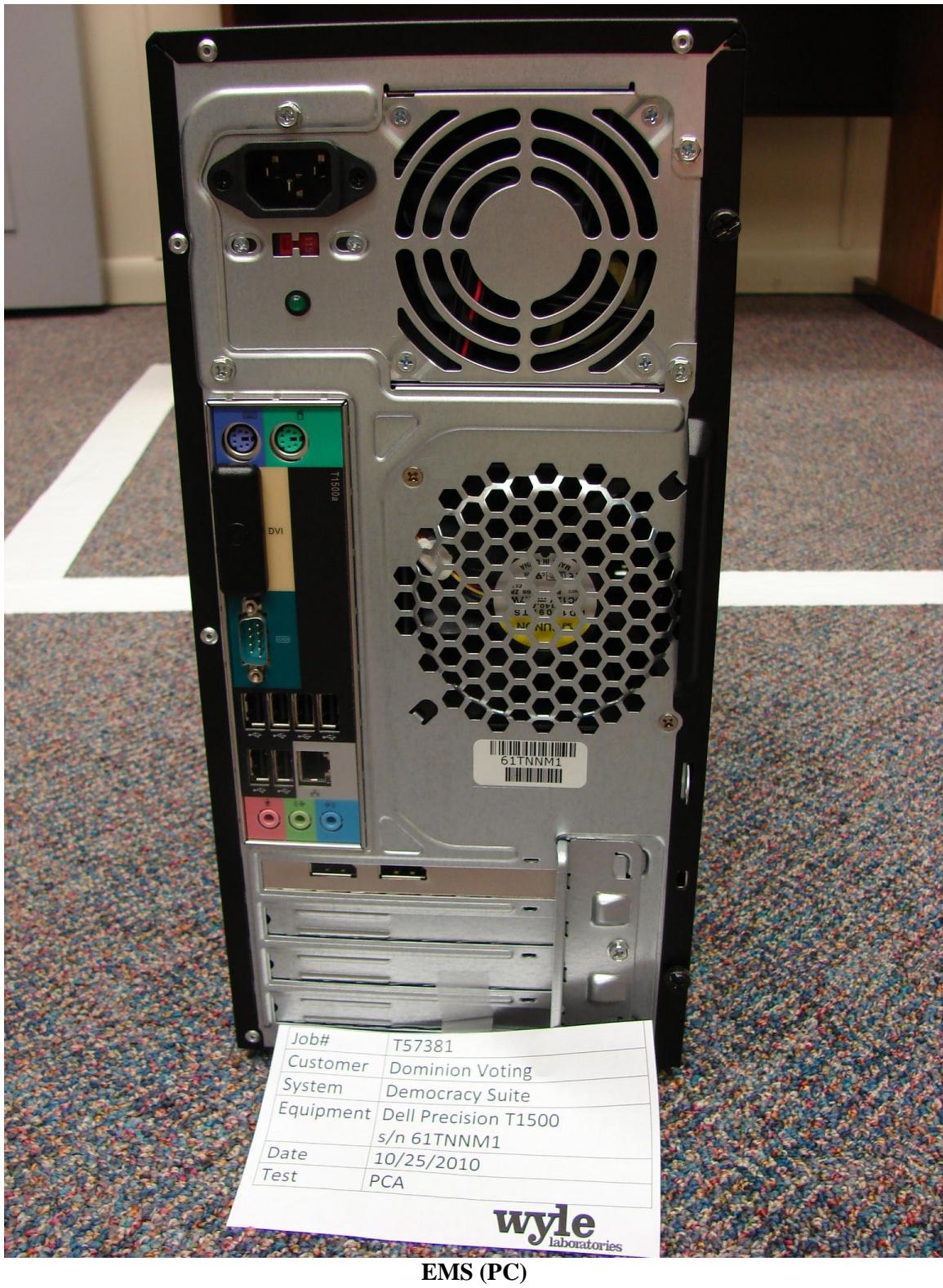
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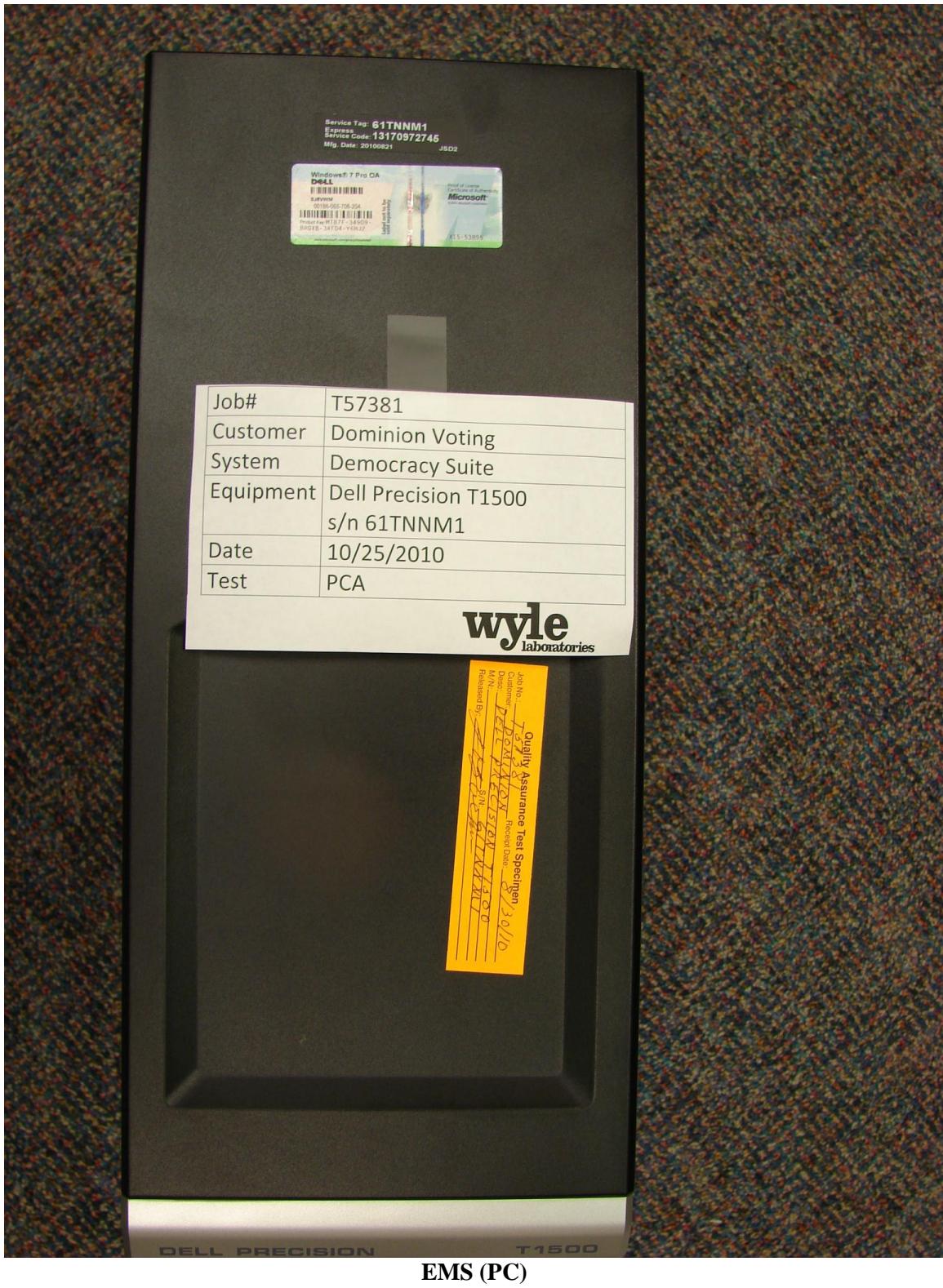


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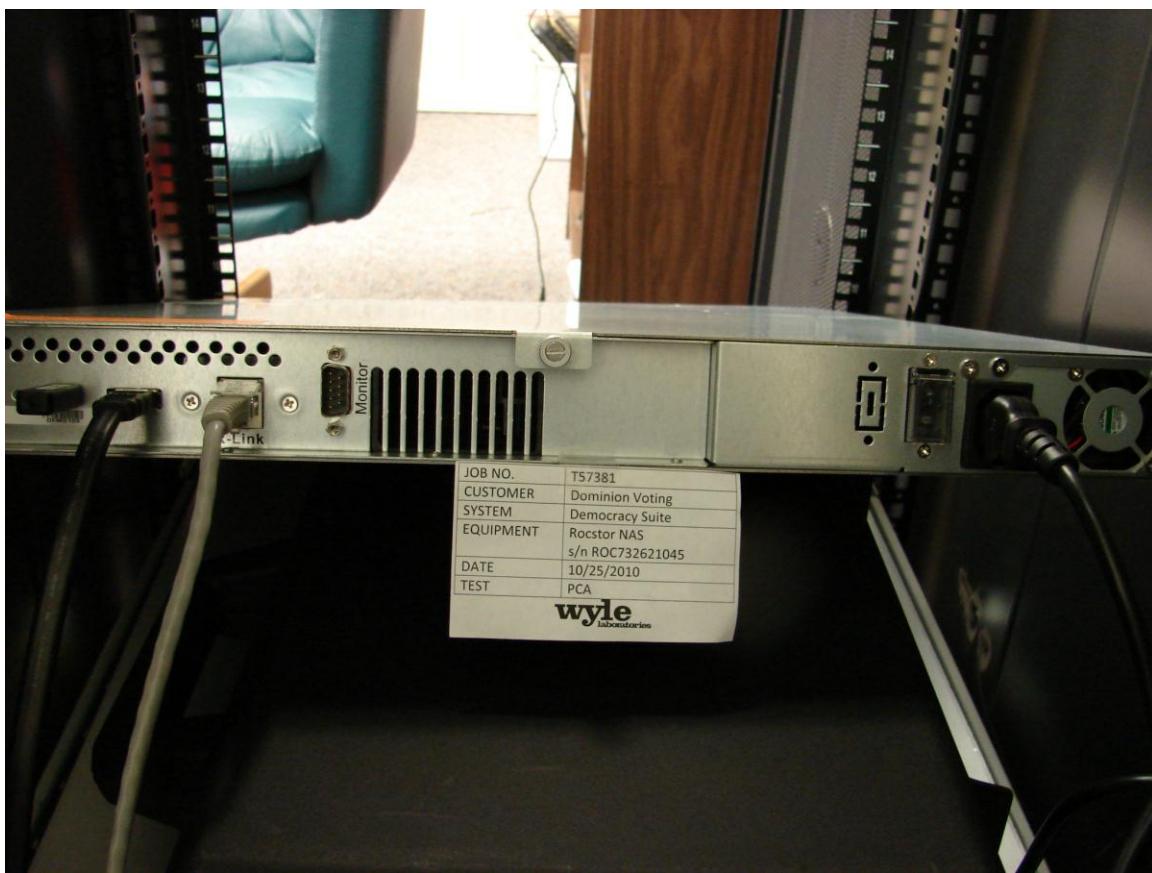
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Rocstor NAS

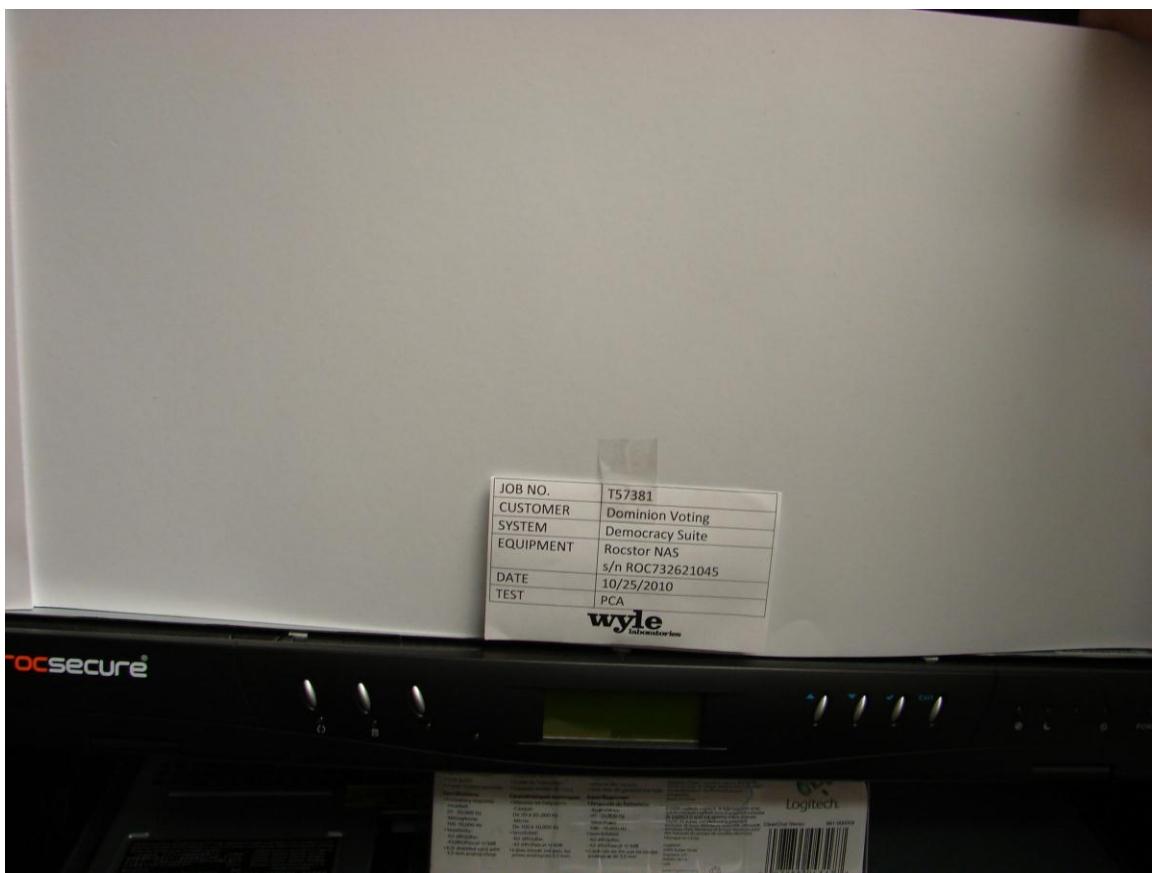
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Rocstor NAS

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JOB NO.	T57381
CUSTOMER	Dominion Voting
SYSTEM	Democracy Suite
EQUIPMENT	Rocstor NAS s/n ROC732621047
DATE	10/25/2010
TEST	PCA

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AirVoter Sip and Puff Gloves and Mouthpiece Kit

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ATI Handset

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Black Ballot Privacy Sleeve

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Sandisk CF reader/writer

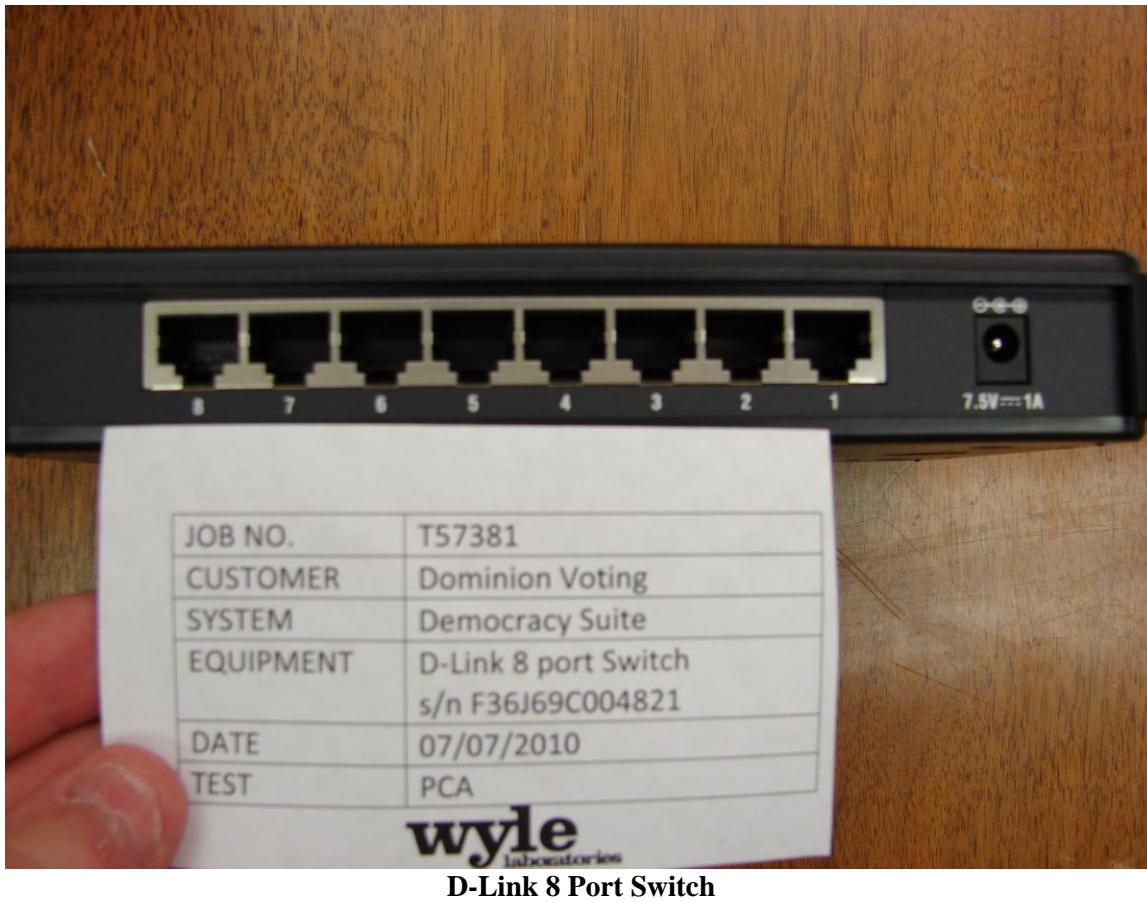
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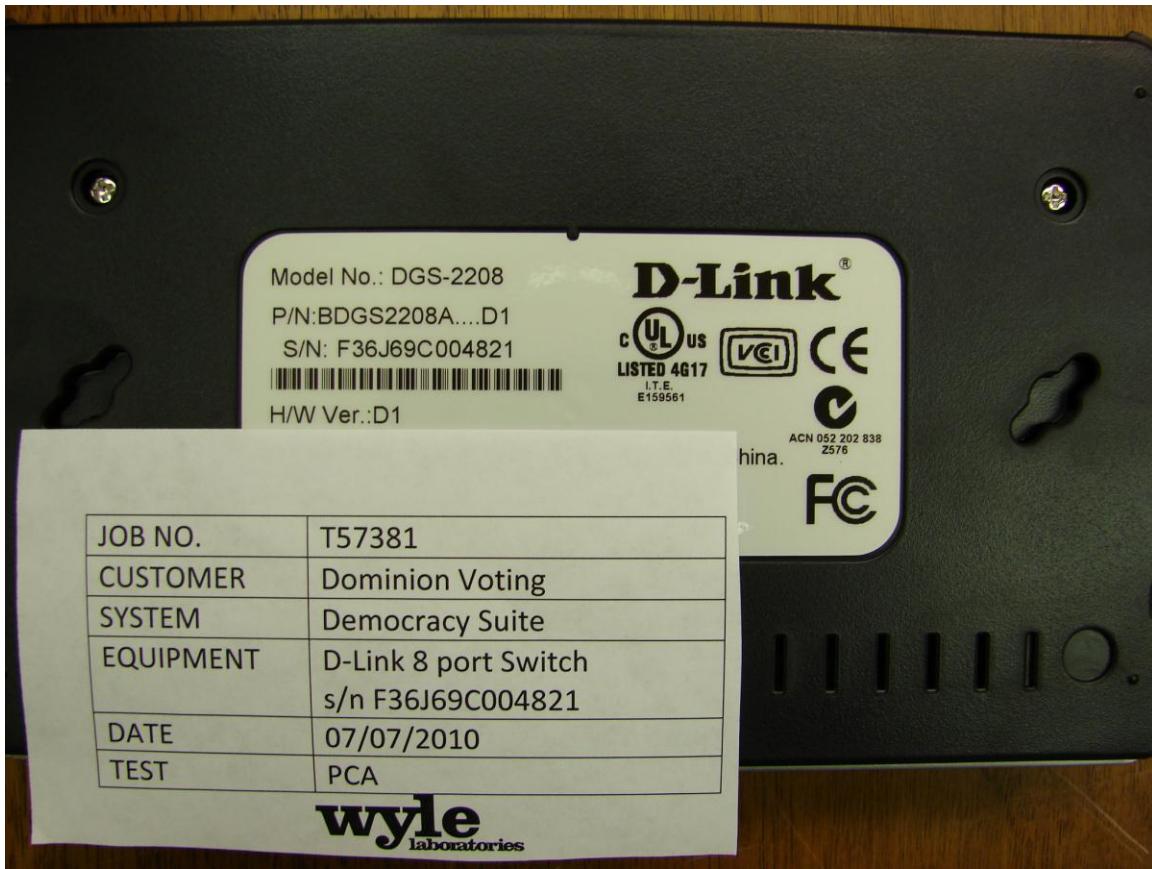
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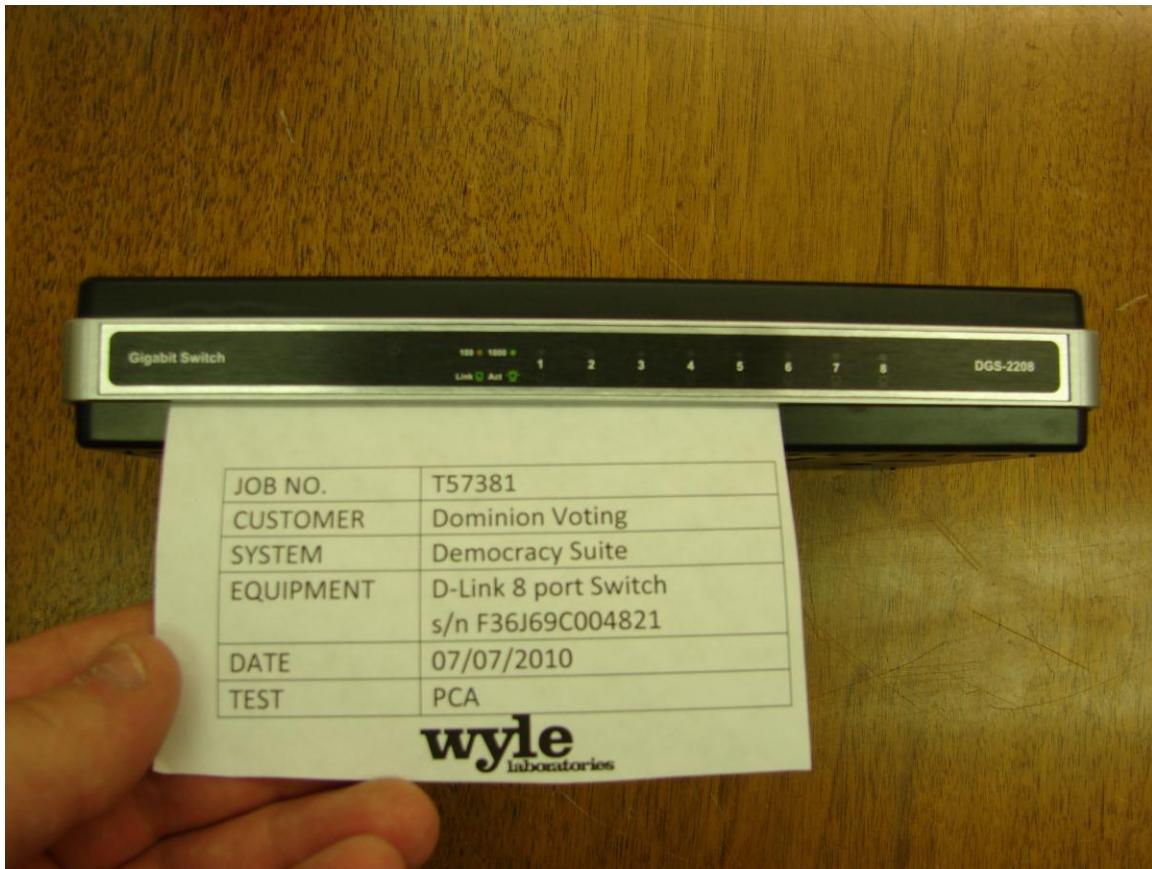
D-Link 8 Port Switch

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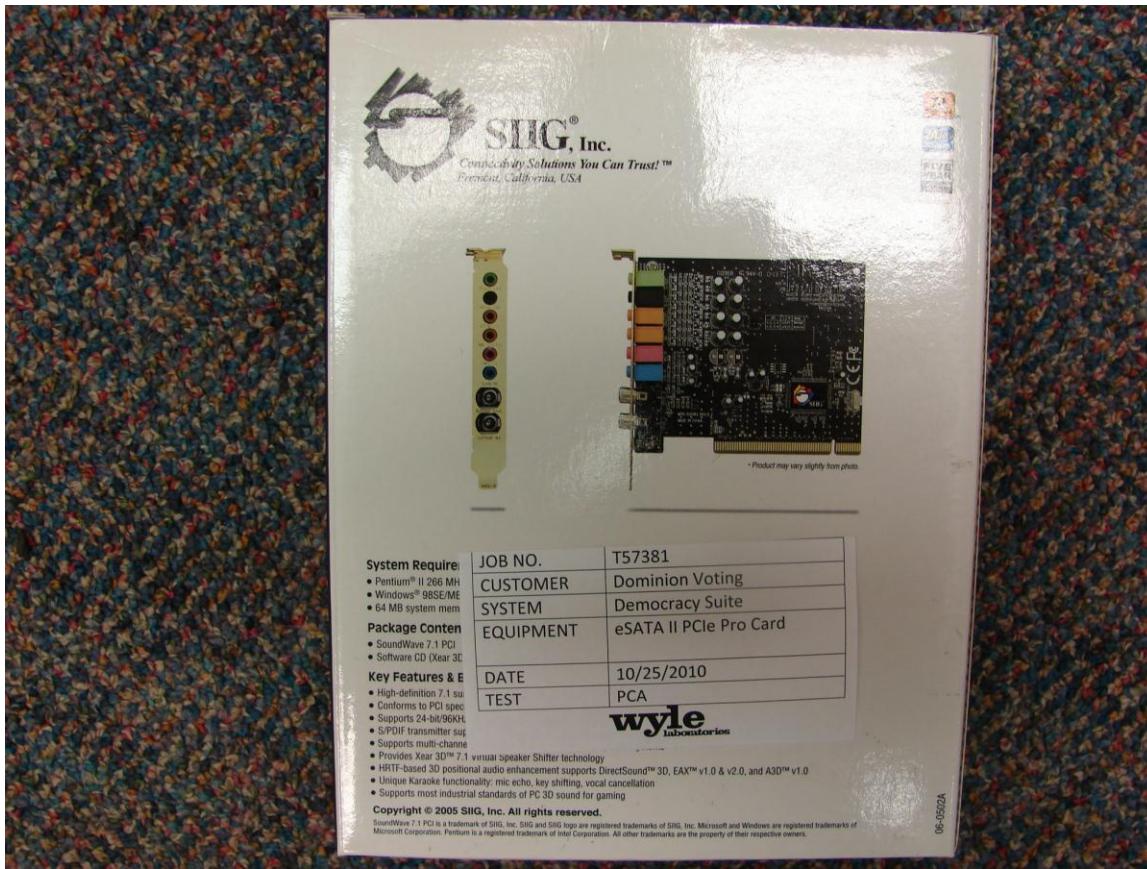
D-Link 8 Port Switch

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Huntsville, AL

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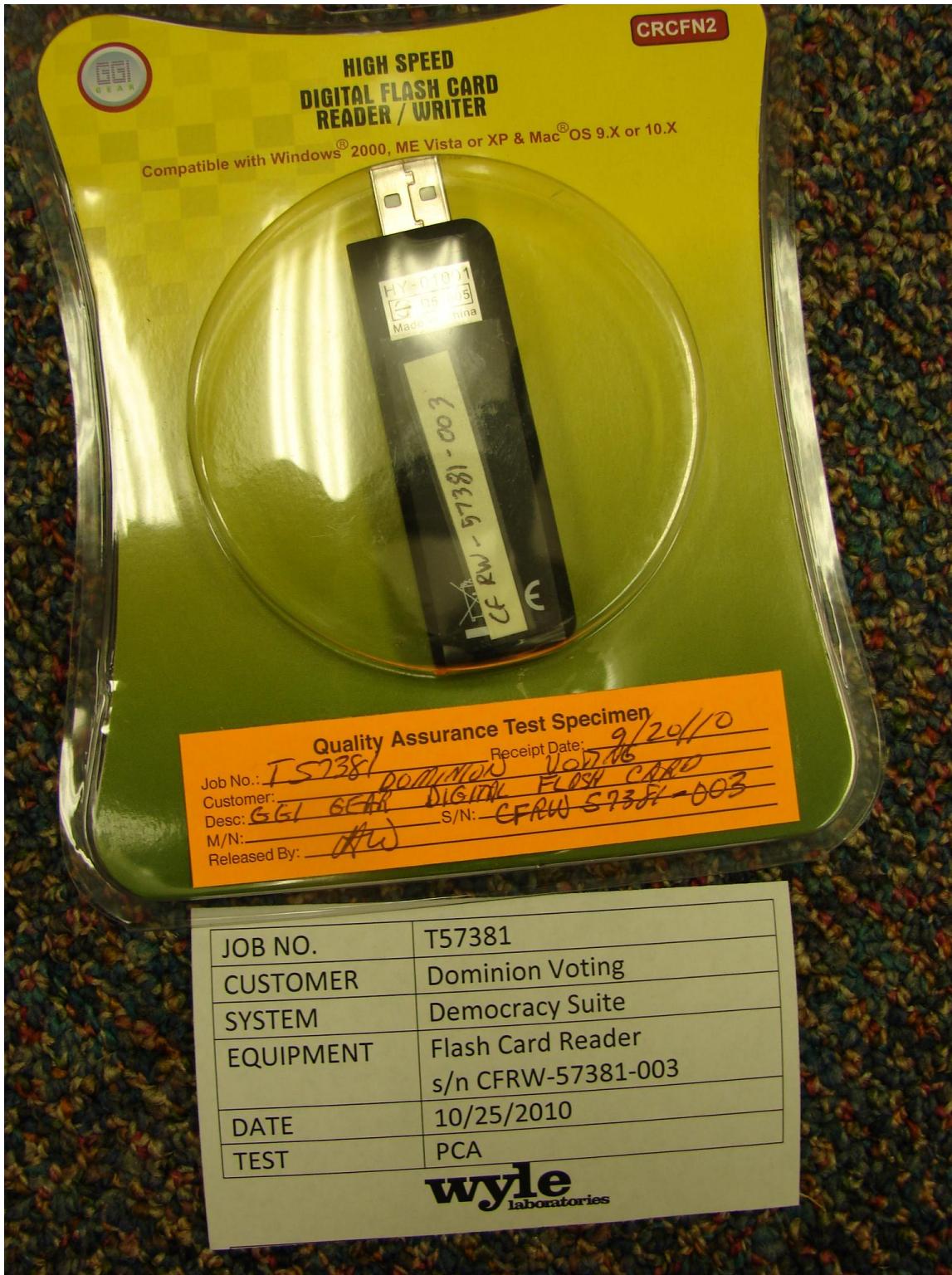
eSATA II PCI Pro Card

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Flash Card Reader

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Enabling Devices Footswitch

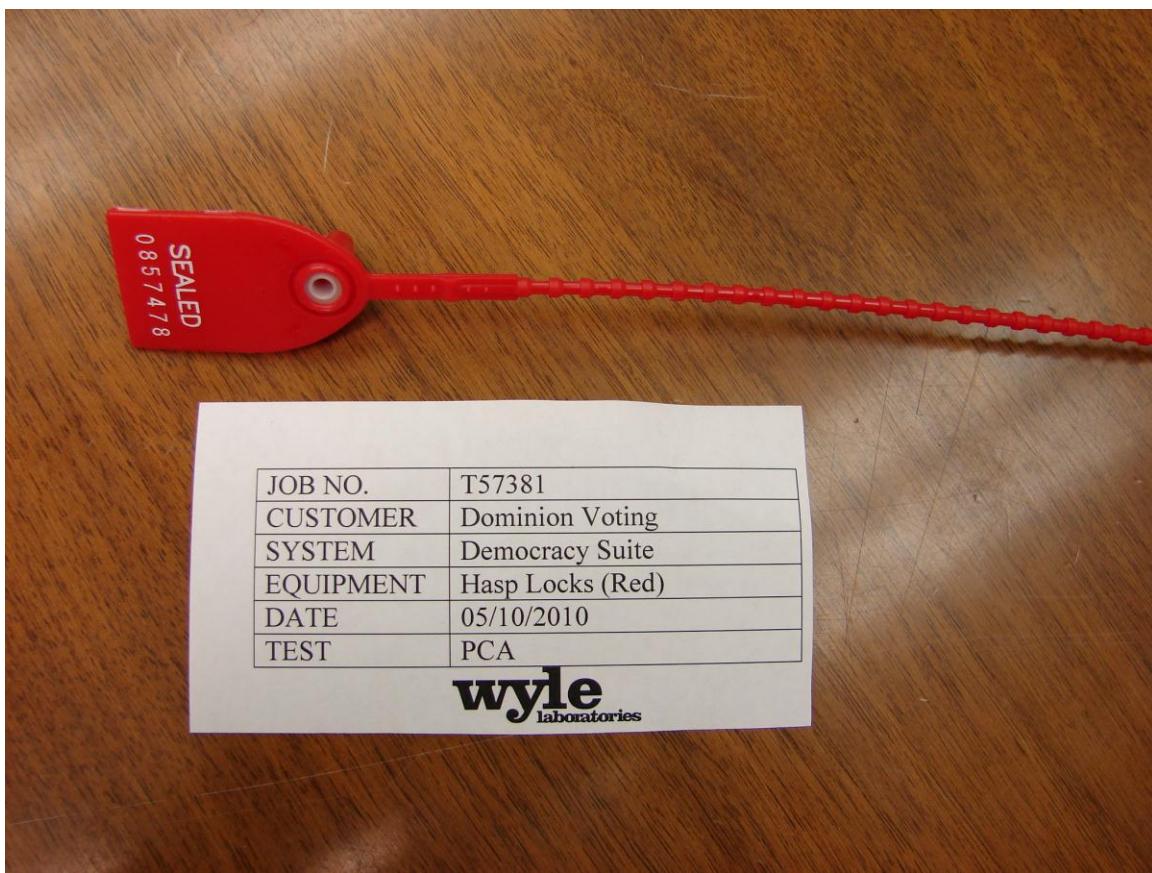
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Red Hasp Lock

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JOB NO.	T57381
CUSTOMER	Dominion Voting
SYSTEM	Democracy Suite
EQUIPMENT	I Button (admin) s/n 4CE4C9
DATE	07/07/2010
TEST	PCA

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Security iButton

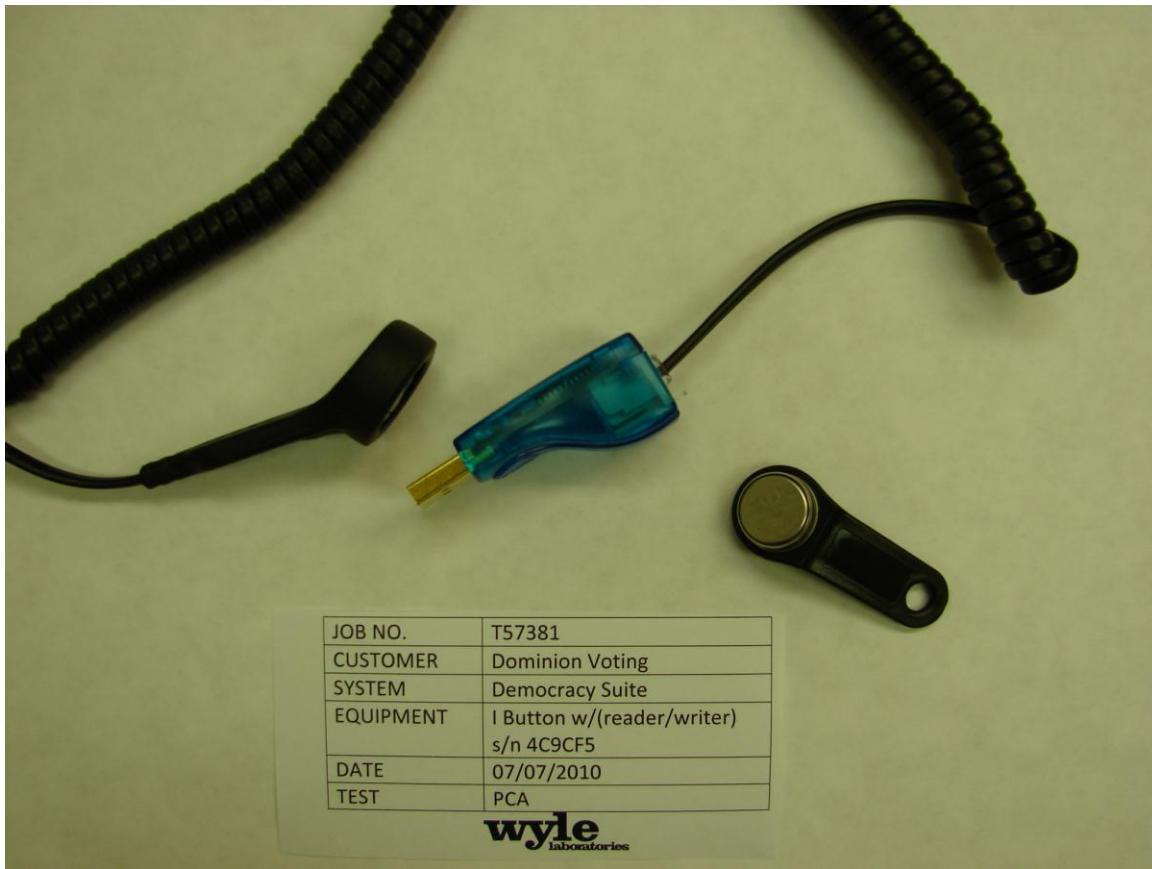
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iButton with reader/writer

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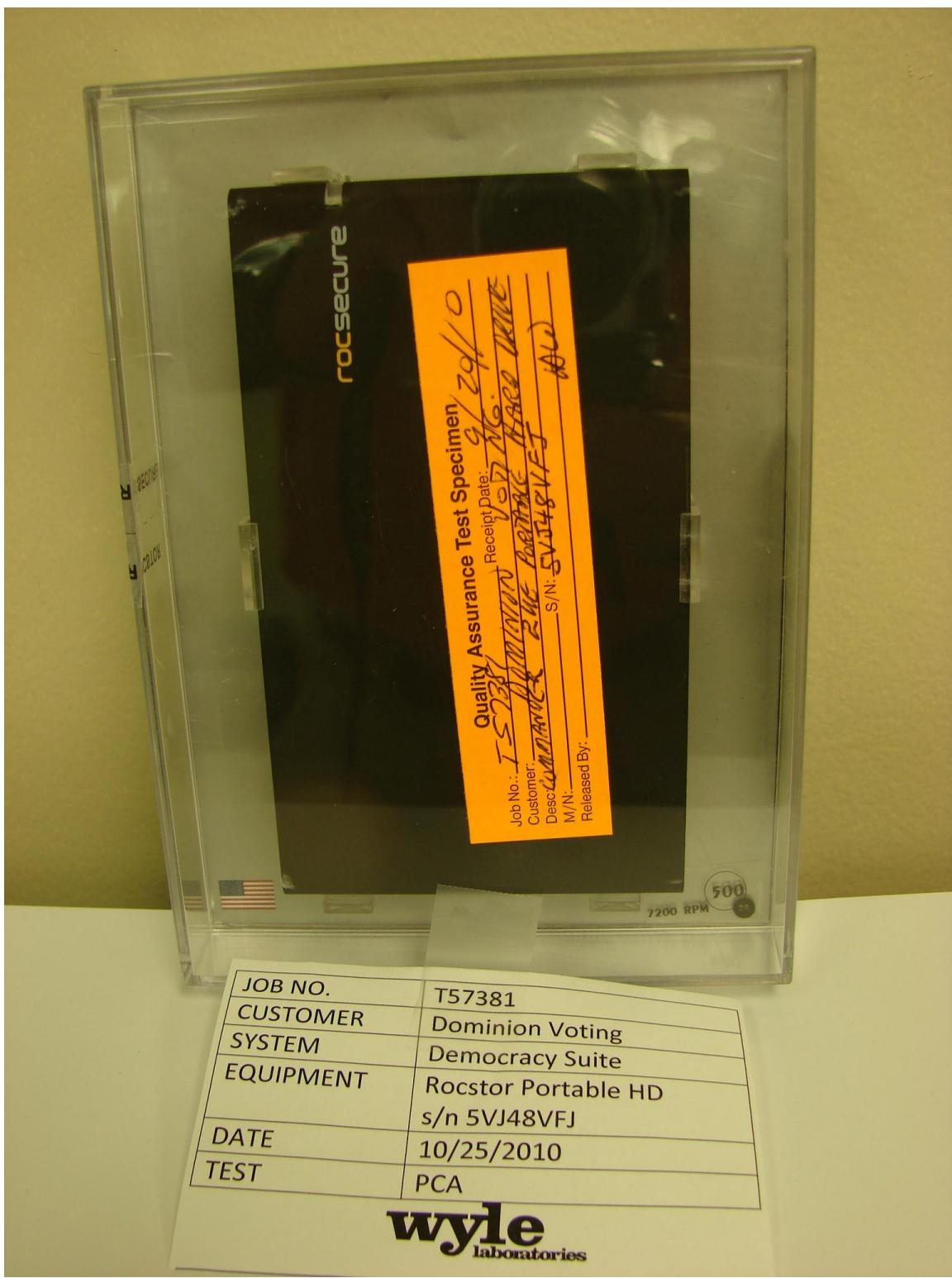
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Rocstor Portable HD

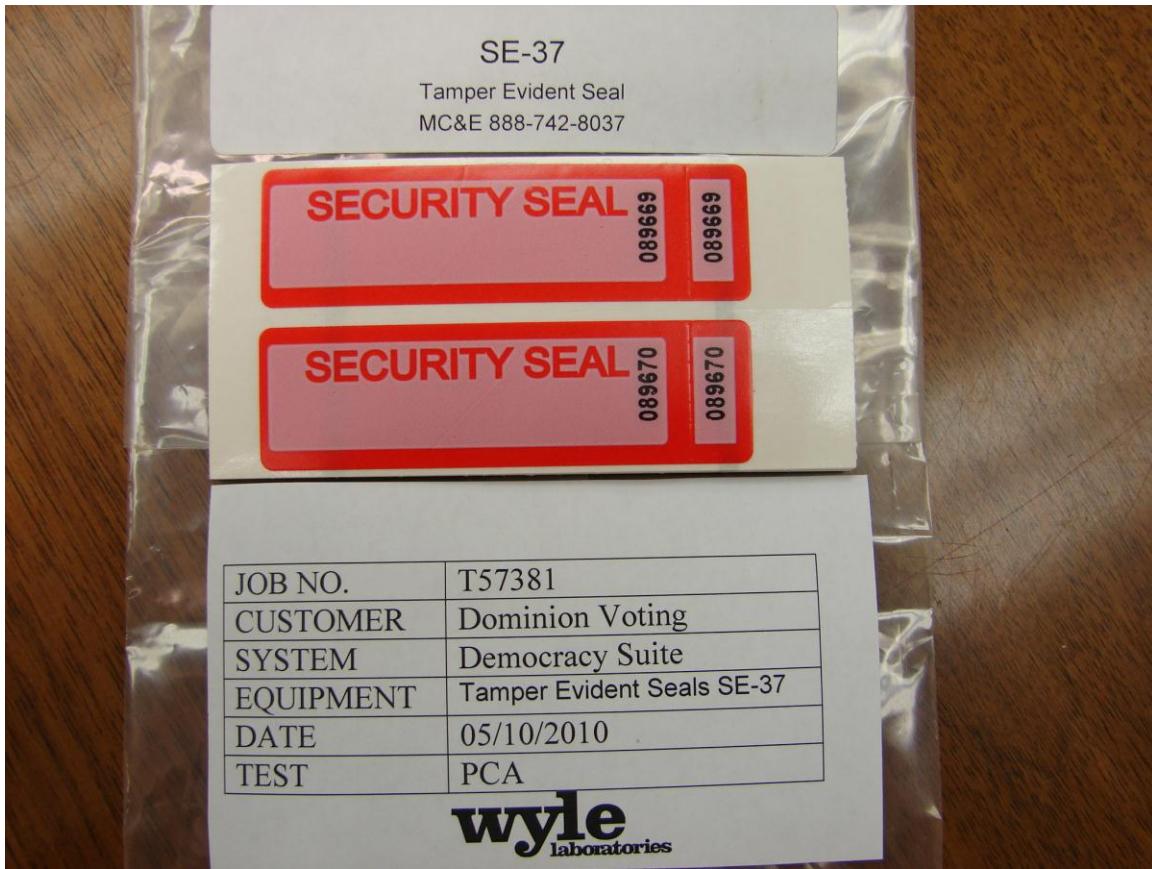
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Red Tamper Evident Seal

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USB Soundwave Audio Adapter

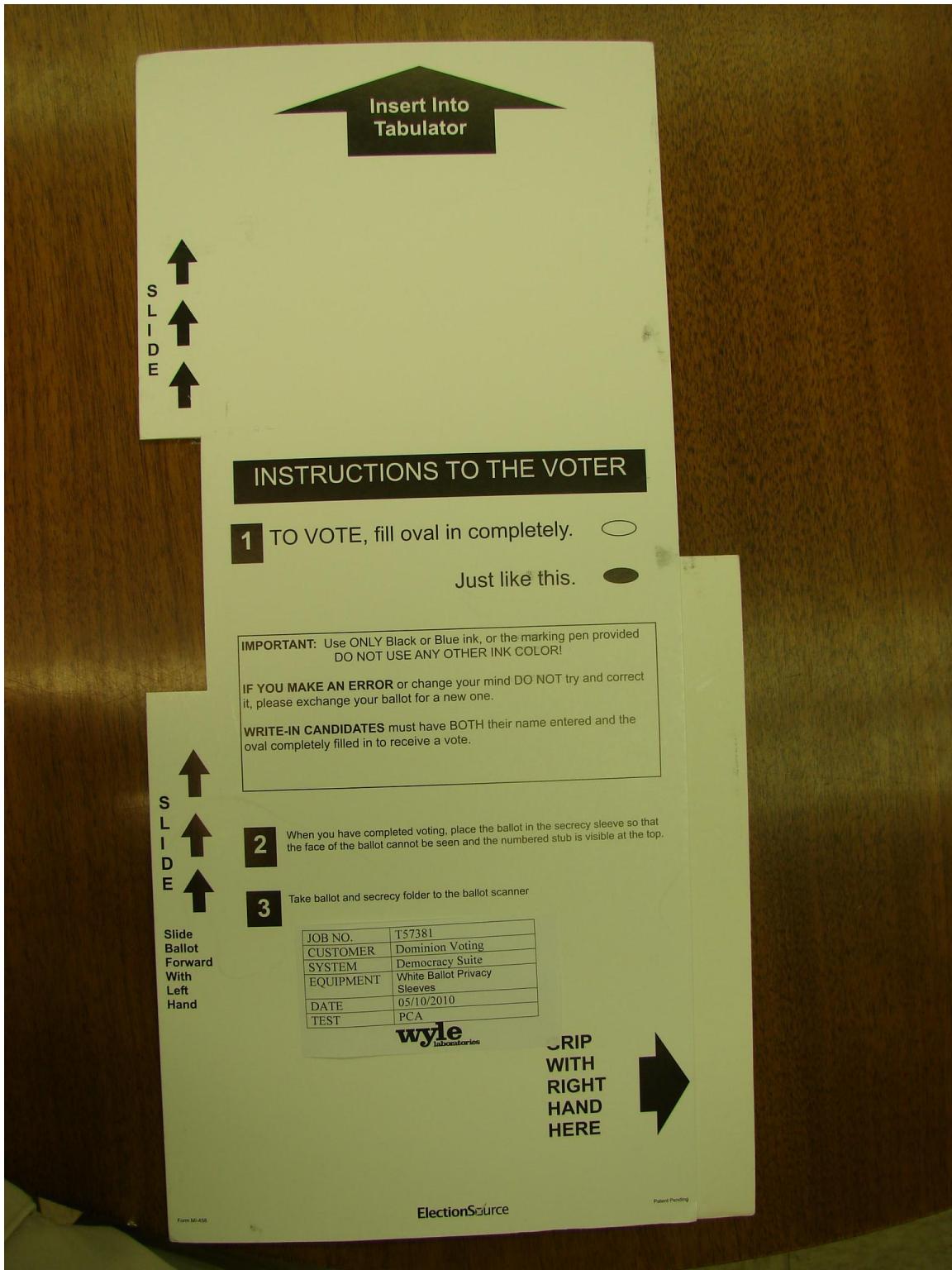
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White Privacy Ballot Sleeve
White Privacy Ballot Sleeve

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White Privacy Ballot Sleeve

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Job#	T57381
Customer	Dominion Voting
System	Democracy Suite
Equipment	Combination Security Lock S/N – 646T
Date	01/29/2012
Test	PCA

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laboratories



Combination Security Lock

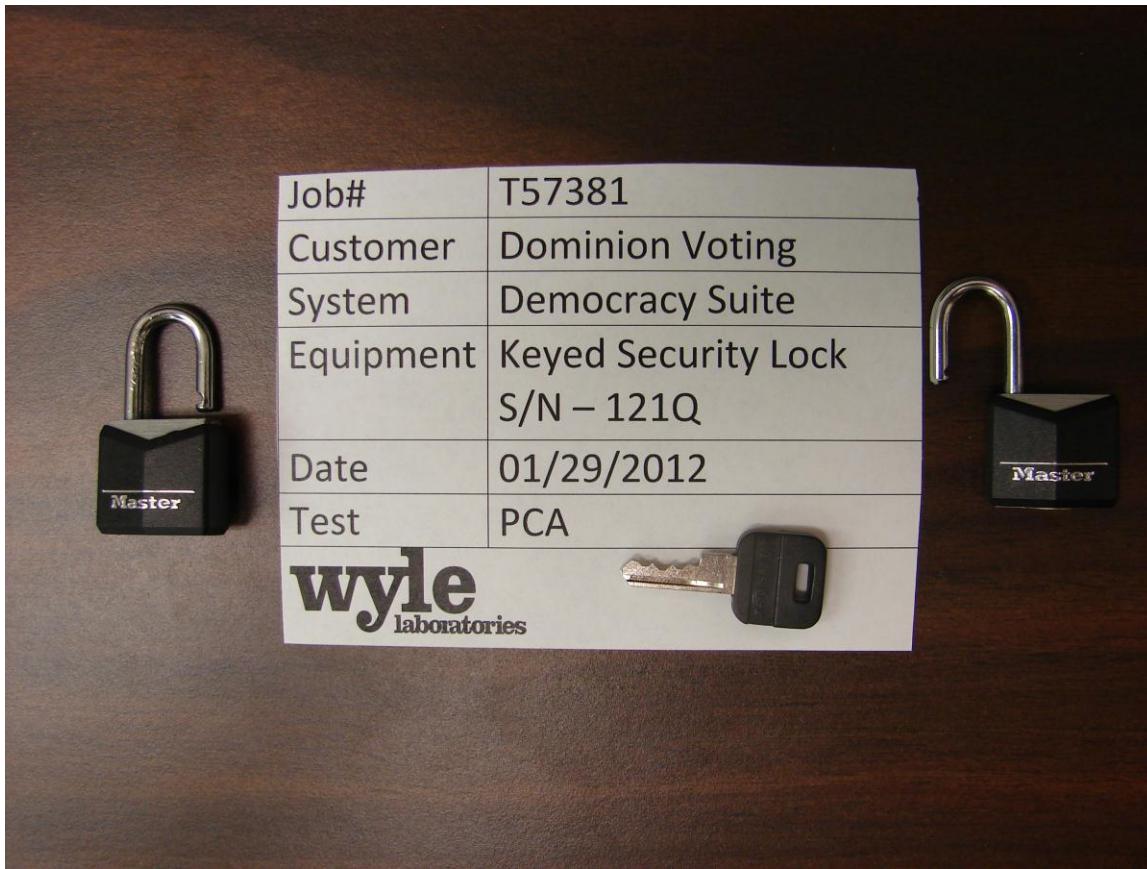
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Keyed Security Locks

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Silver Tamper Evident Security Seals

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Machine Keys

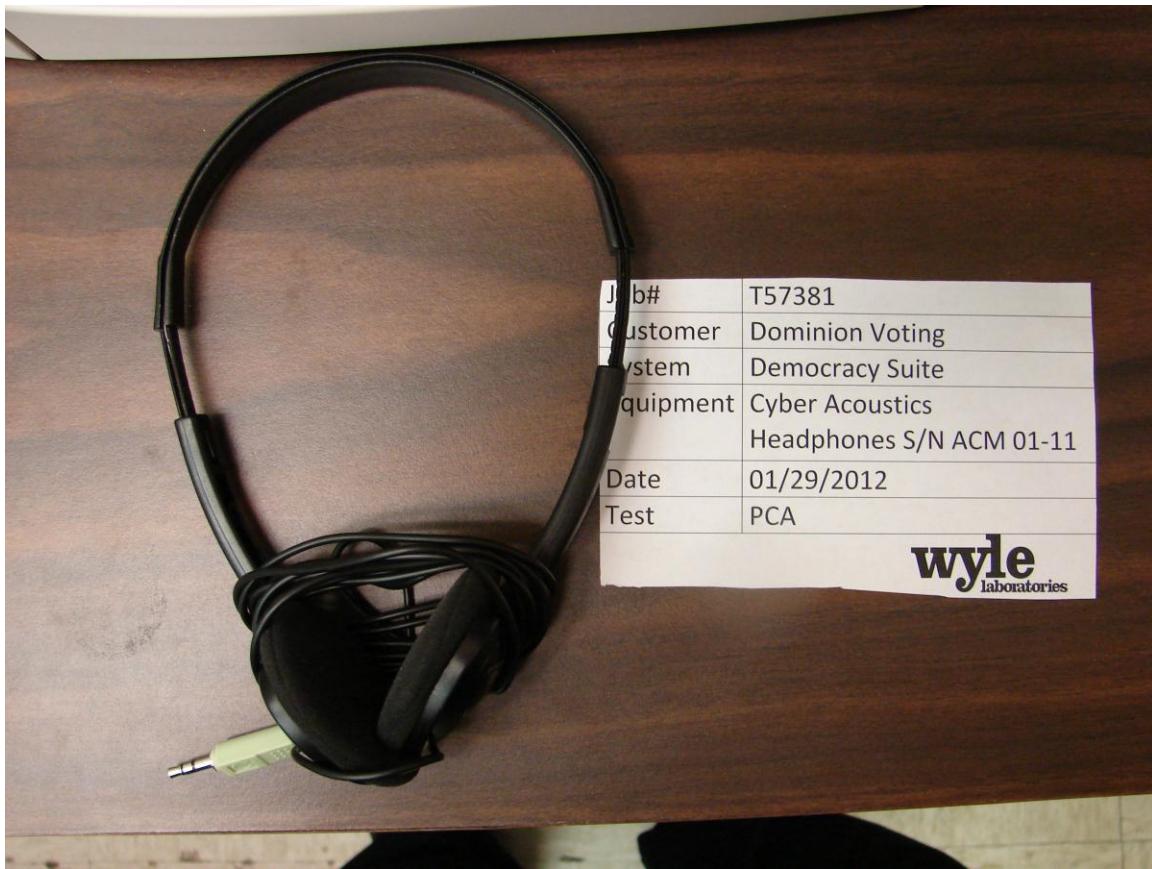
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Job#	T57381
Customer	Dominion Voting
System	Democracy Suite
Equipment	Cyber Acoustics Headphones S/N ACM 01-11
Date	01/29/2012
Test	PCA

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Headphones (Cyber Acoustic)

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Compact Flash Cards

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ICE Printer Paper Rolls

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ICP Printer Paper Rolls

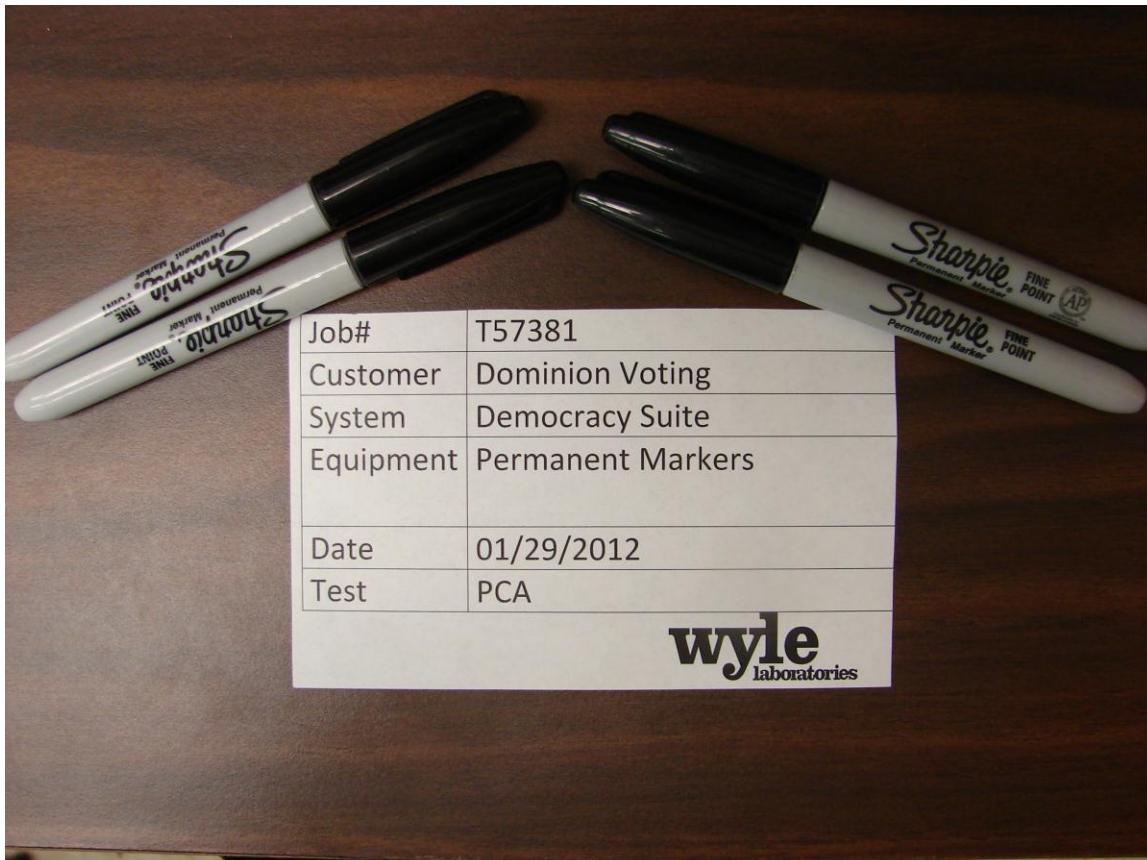
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Dominion Specified Marking Device (Black Sharpie)

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ICC All in One Workstation (563F3P1)

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ICC All in One Workstation (564C3P1)

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ICP Plastic Ballot Box side view

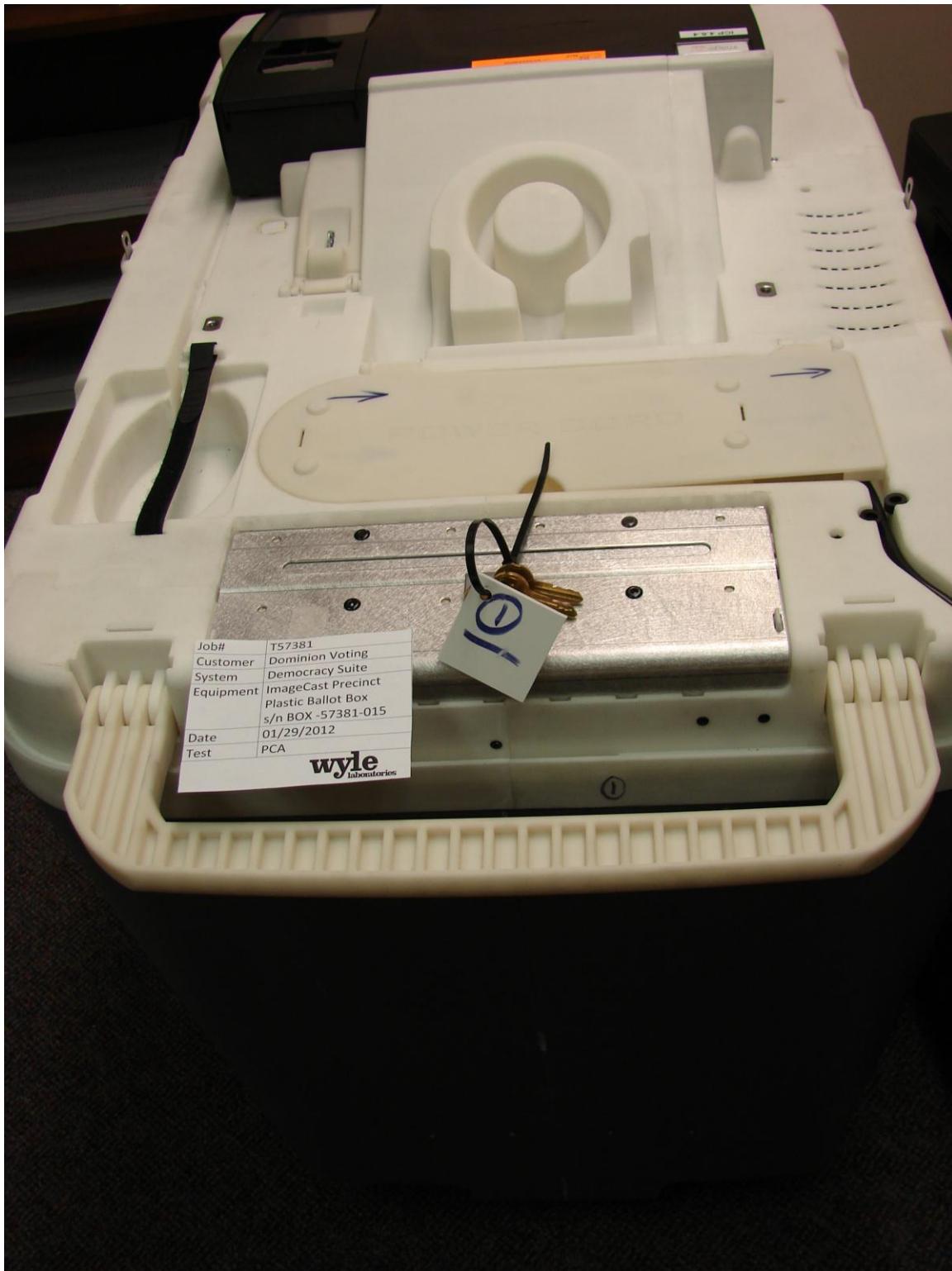
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ICP Plastic Ballot Box top back view

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ICP Plastic Ballot Box front view

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ICP Plastic Ballot Box overview

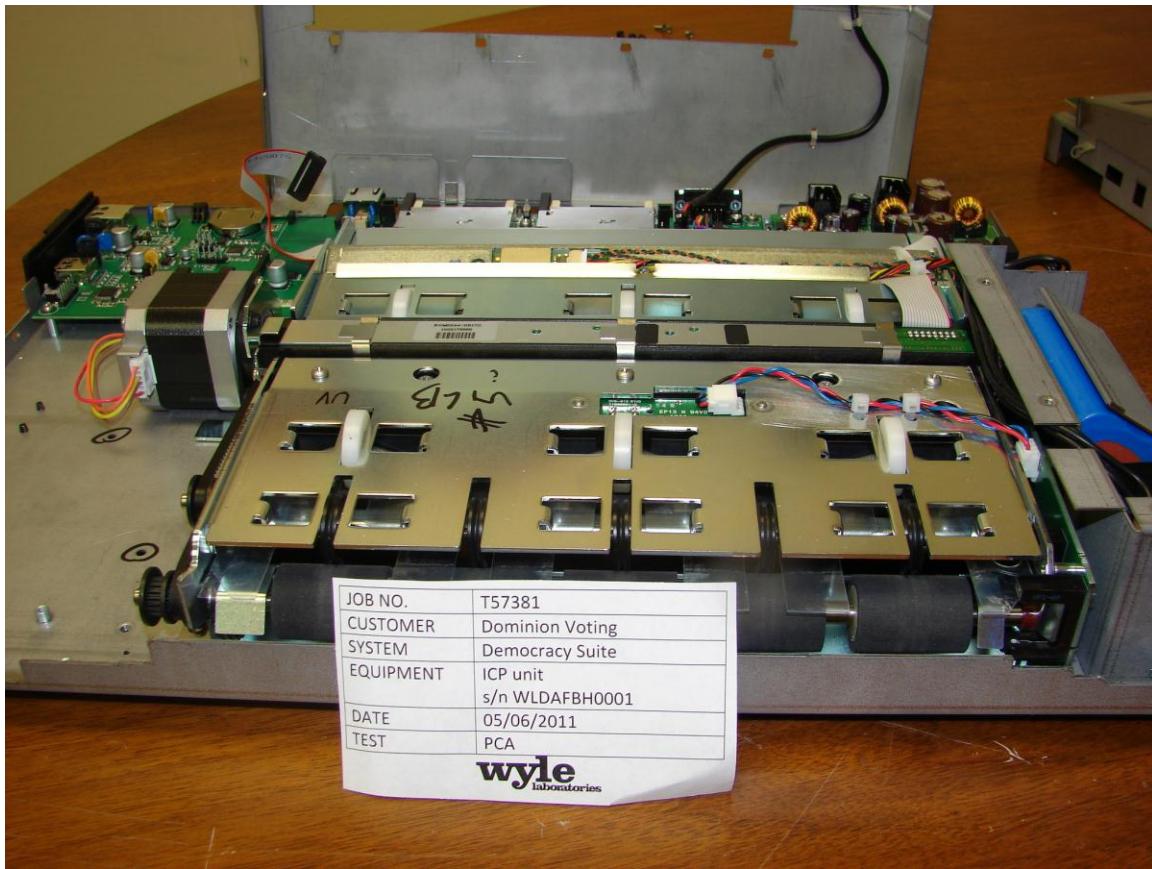
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ICP back view

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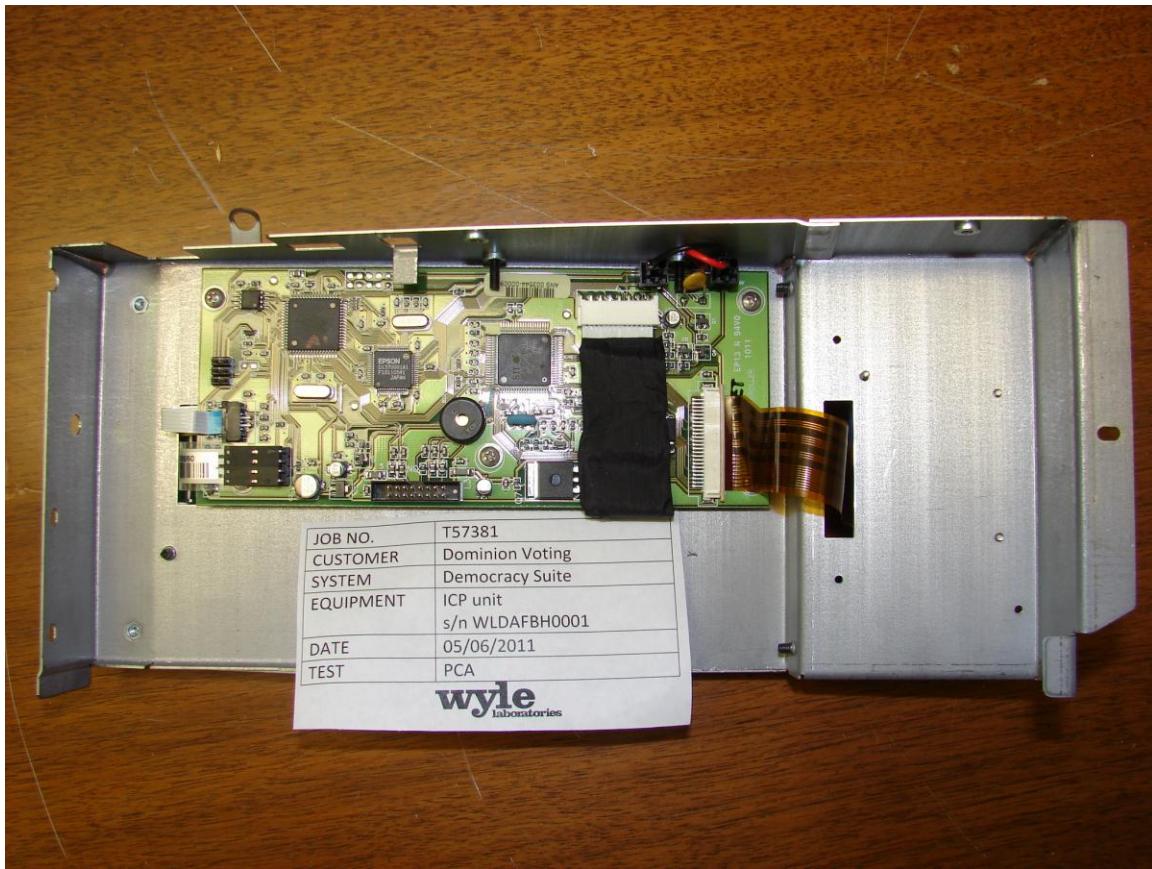
ICP bottom view

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ICP LCD bottom view

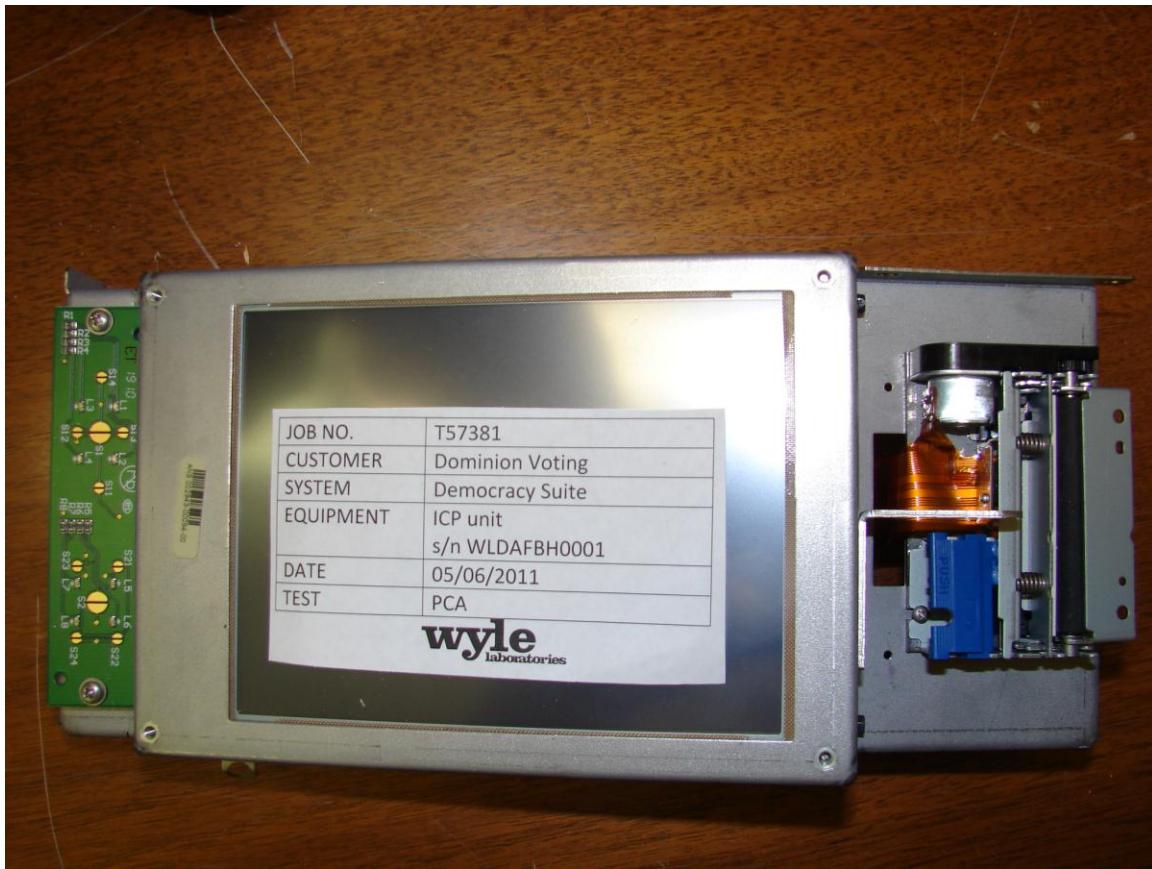
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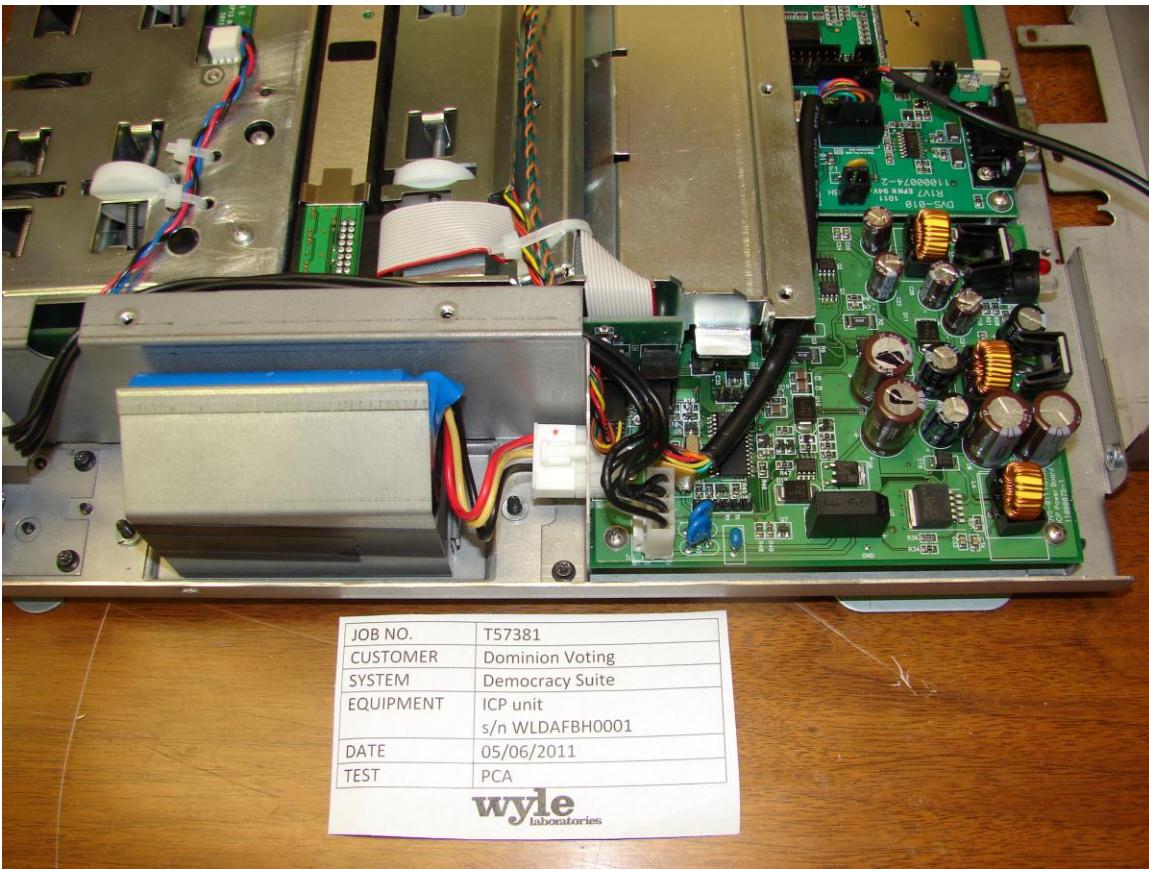
ICP LCD

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ICP Motherboard 1

JOB NO.	T57381
CUSTOMER	Dominion Voting
SYSTEM	Democracy Suite
EQUIPMENT	ICP unit s/n WLDAFBH0001
DATE	05/06/2011
TEST	PCA

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ICP Motherboard 2

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ICP Motherboard 3

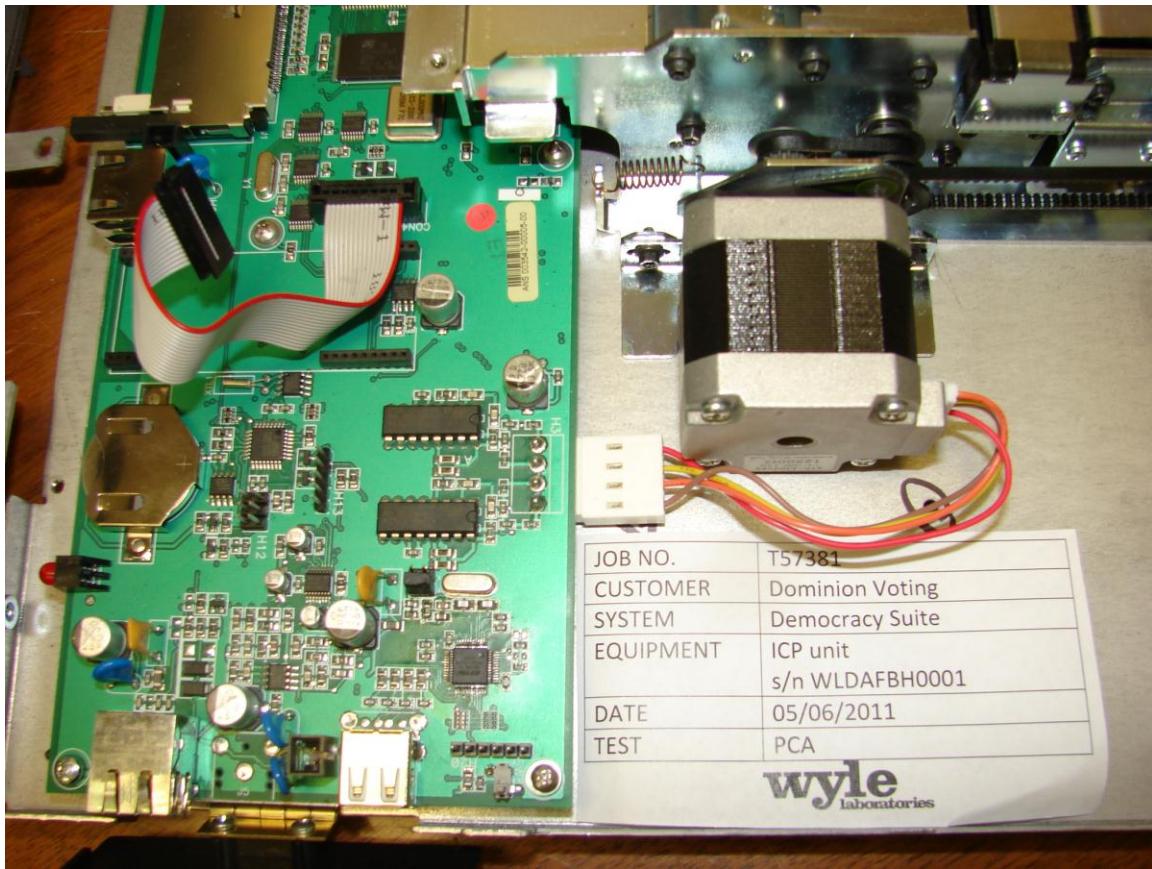
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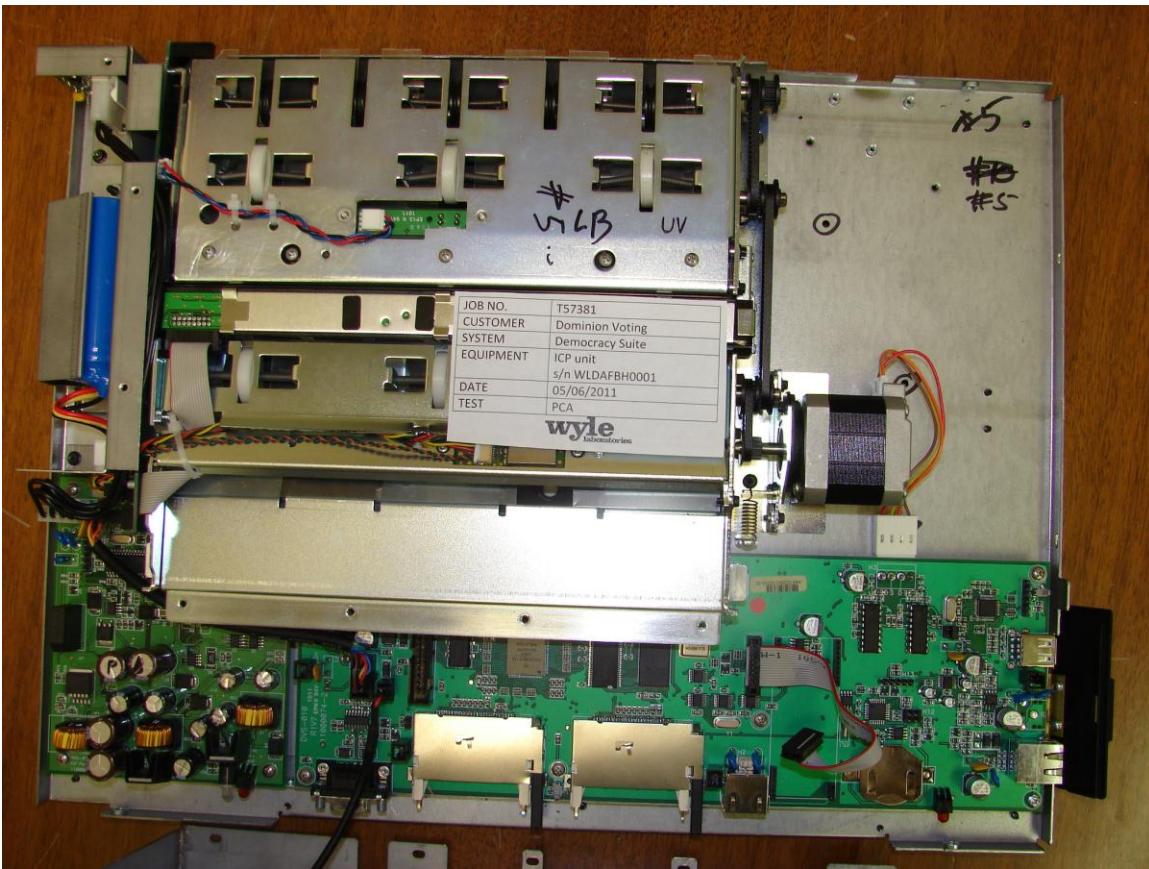
ICP Printer Controller

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ICP top view

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ICP top view closed with cover off

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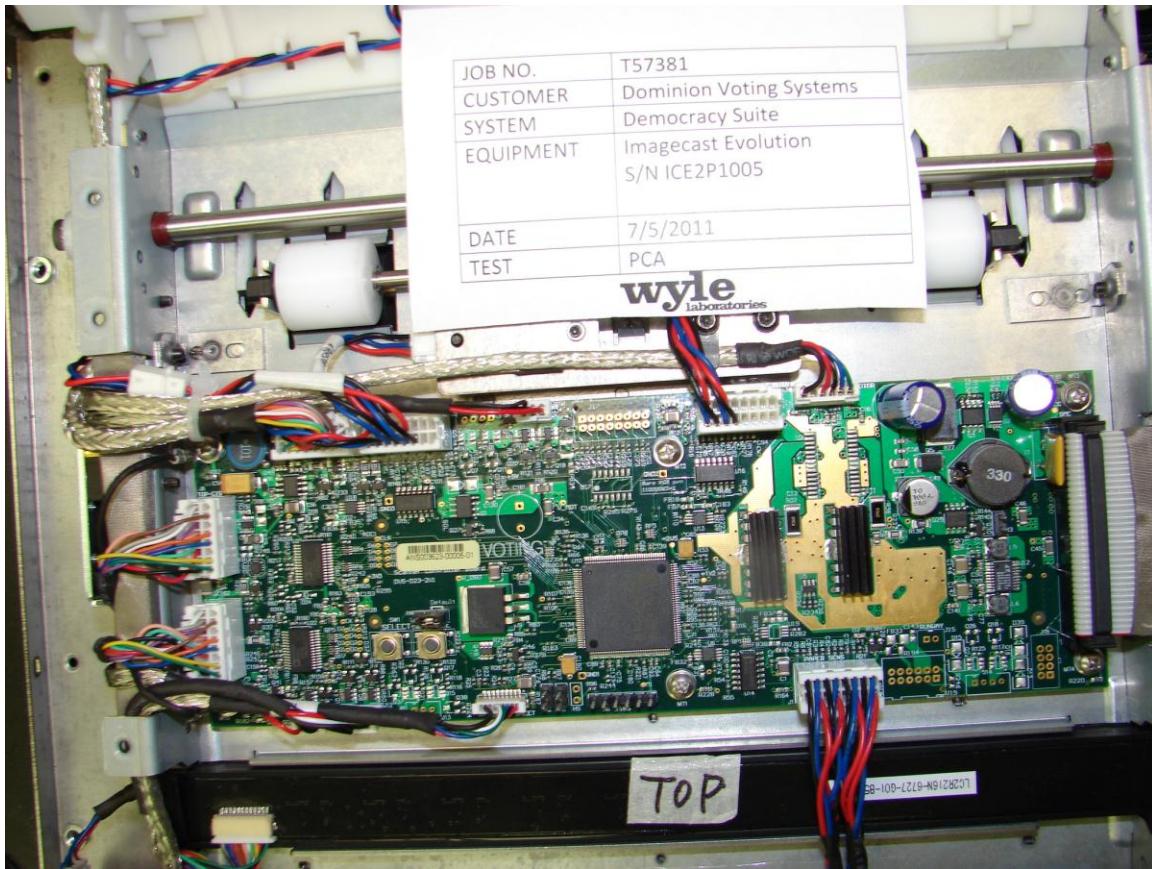
ICE internal shielding

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ICE Motherboard

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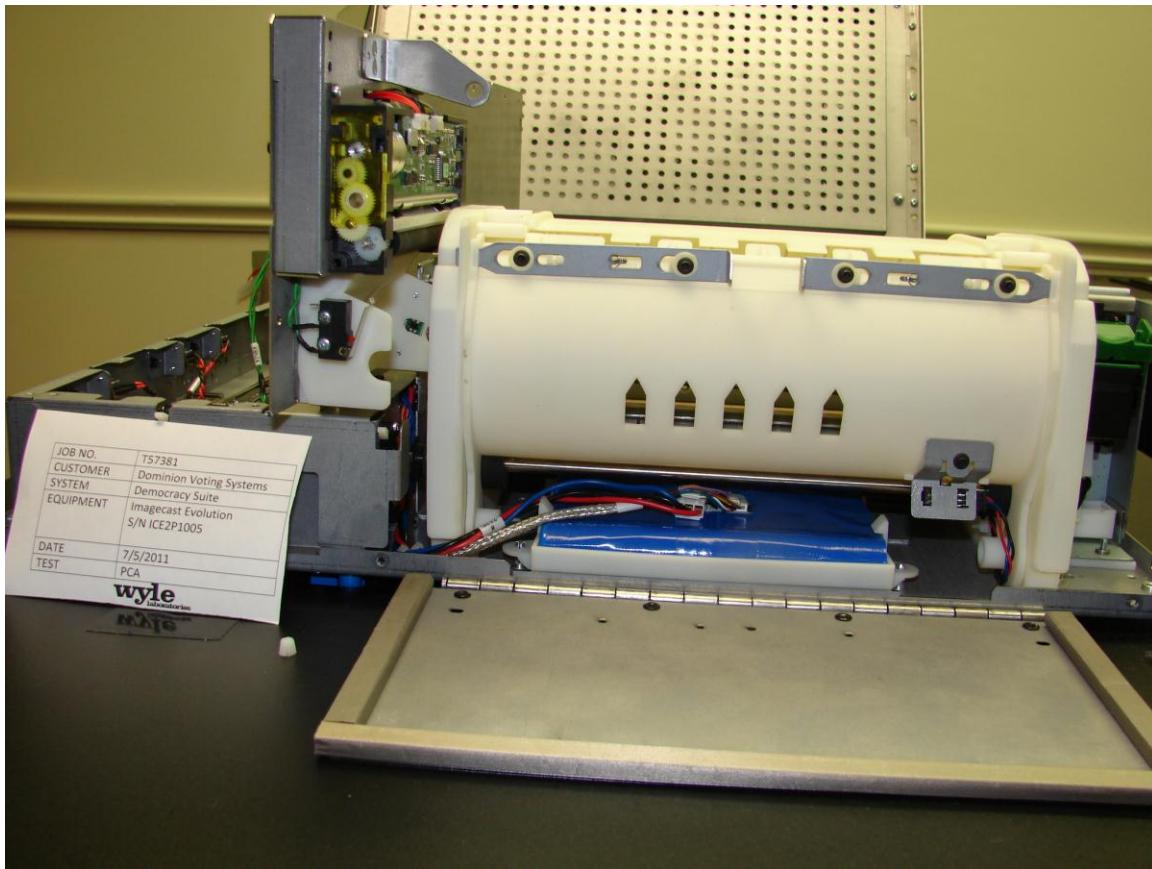
ICE right side view

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JOB NO.	T57381
CUSTOMER	Dominion Voting Systems
SYSTEM	Democracy Suite
EQUIPMENT	Imagecast Evolution S/N ICE2P1005
DATE	7/5/2011
TEST	PCA

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laboratories
MALE

ICE back view

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ICE left side view with cover removed

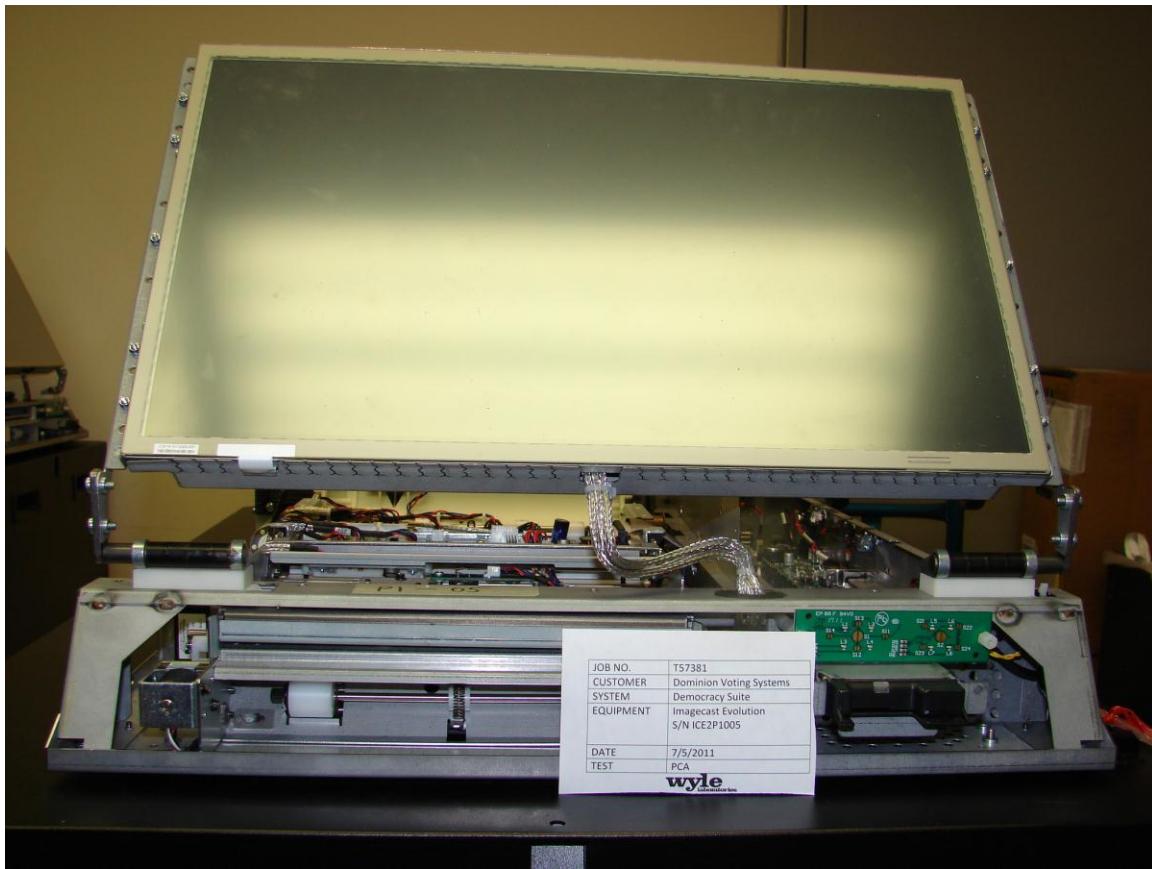
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ICE front view

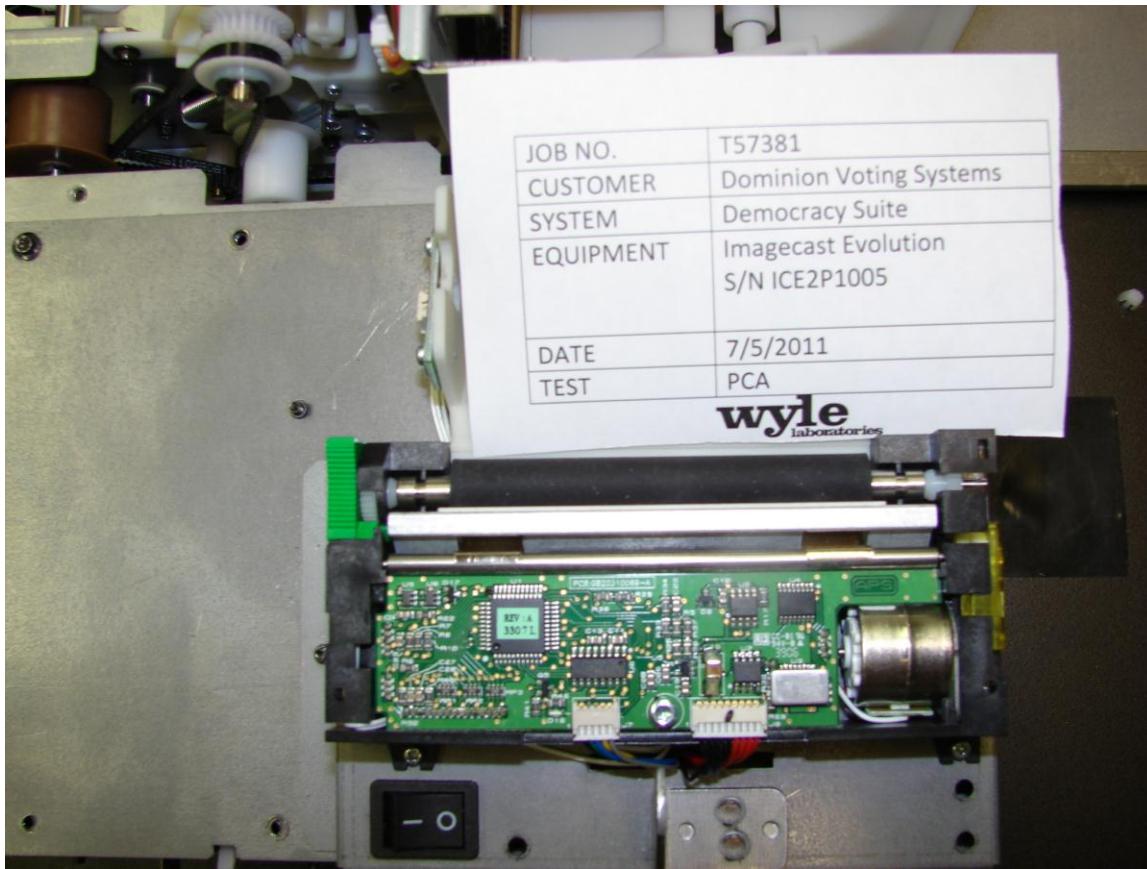
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ICE Printer with cover removed

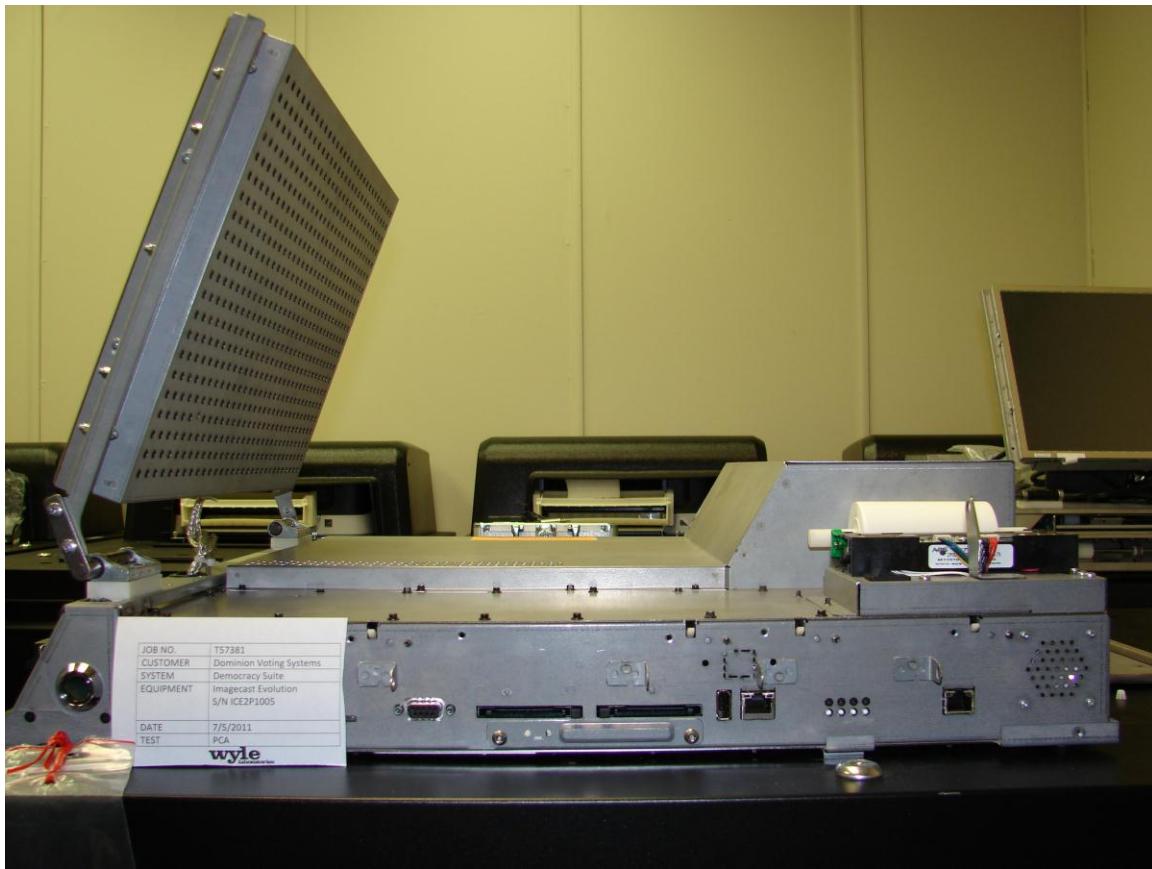
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ICE right side view

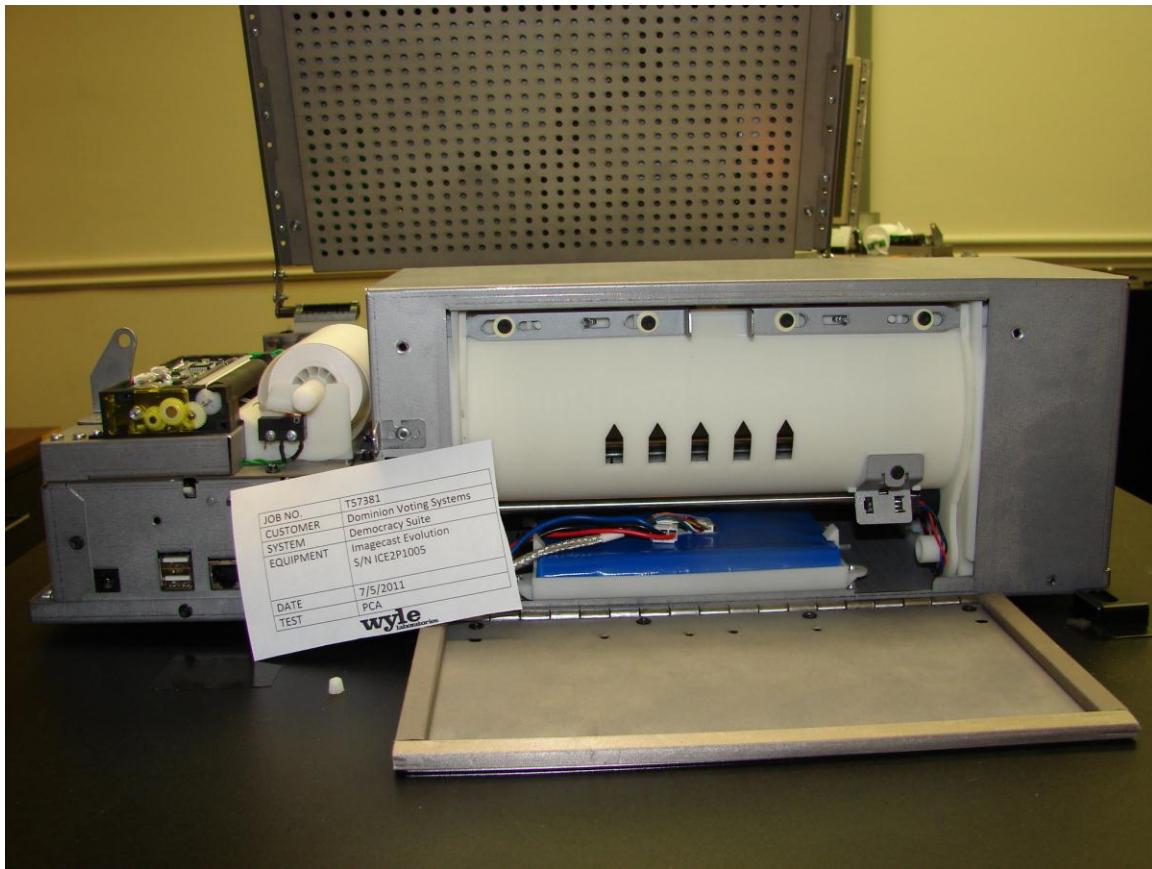
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ICE back view in casing

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ICE top view casing on

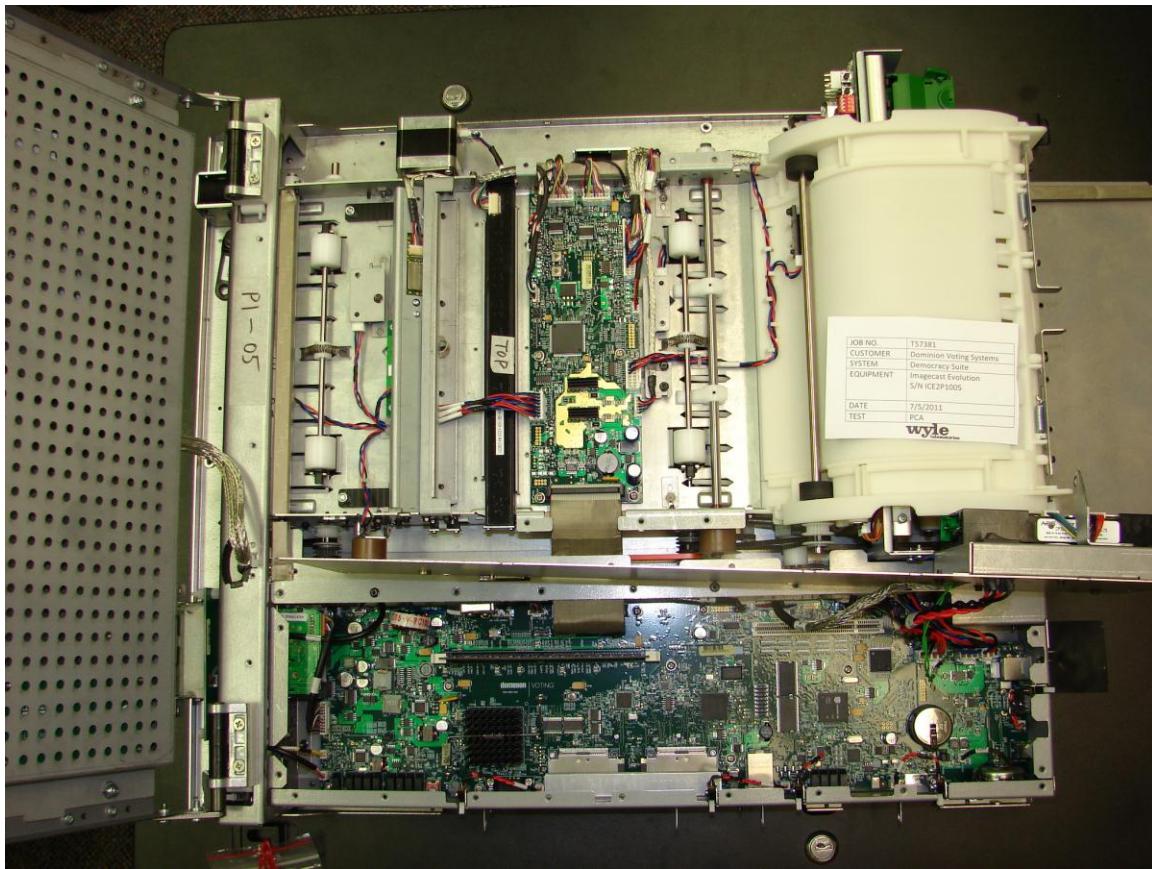
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ICE top view casing off

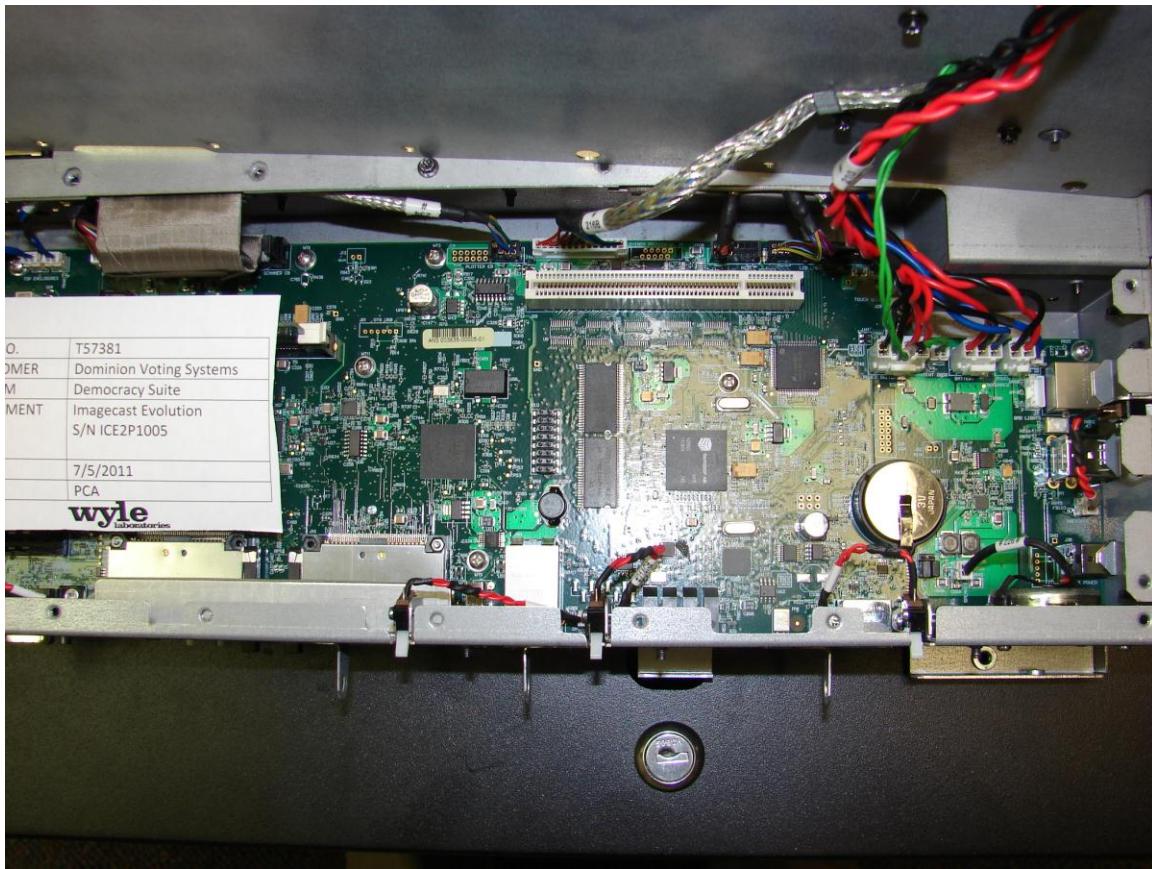
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ICE internal board view

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ICC top opened

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ICC closed up

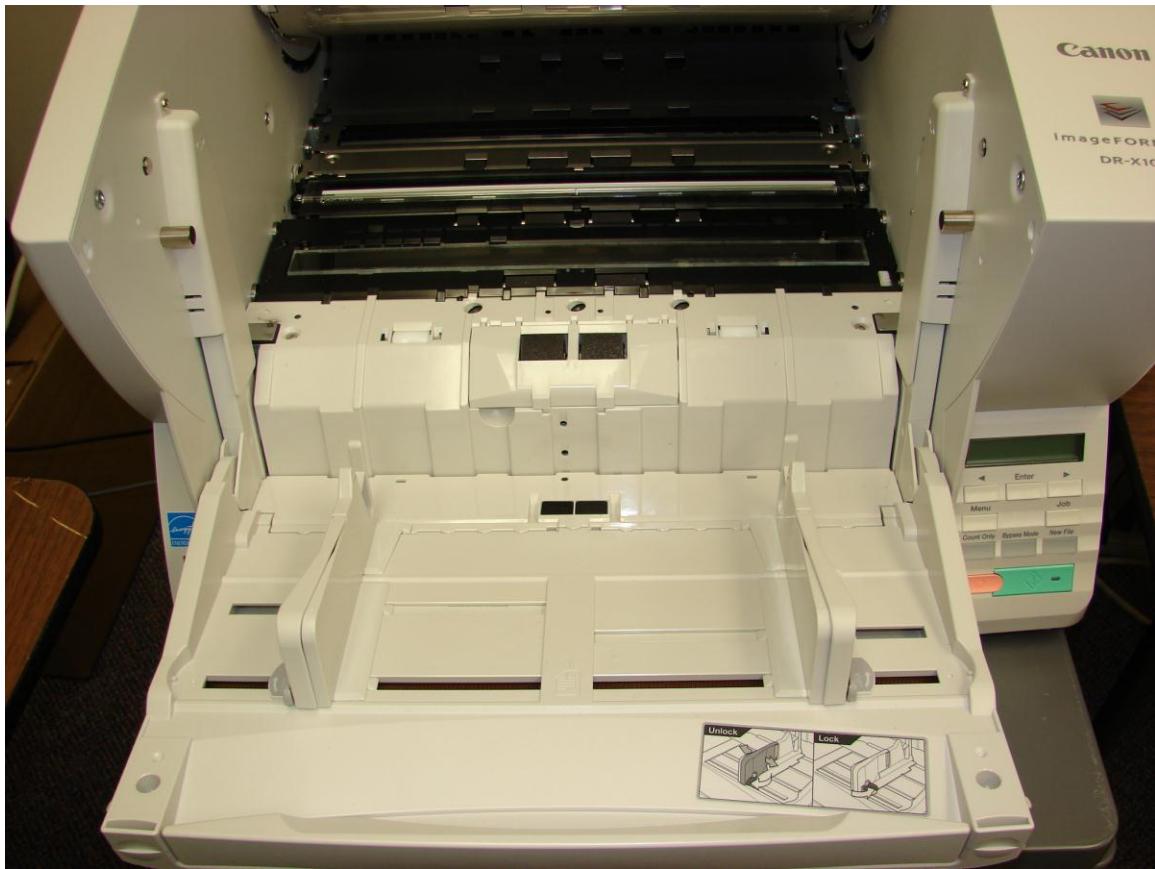
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ICC top opened and transport down

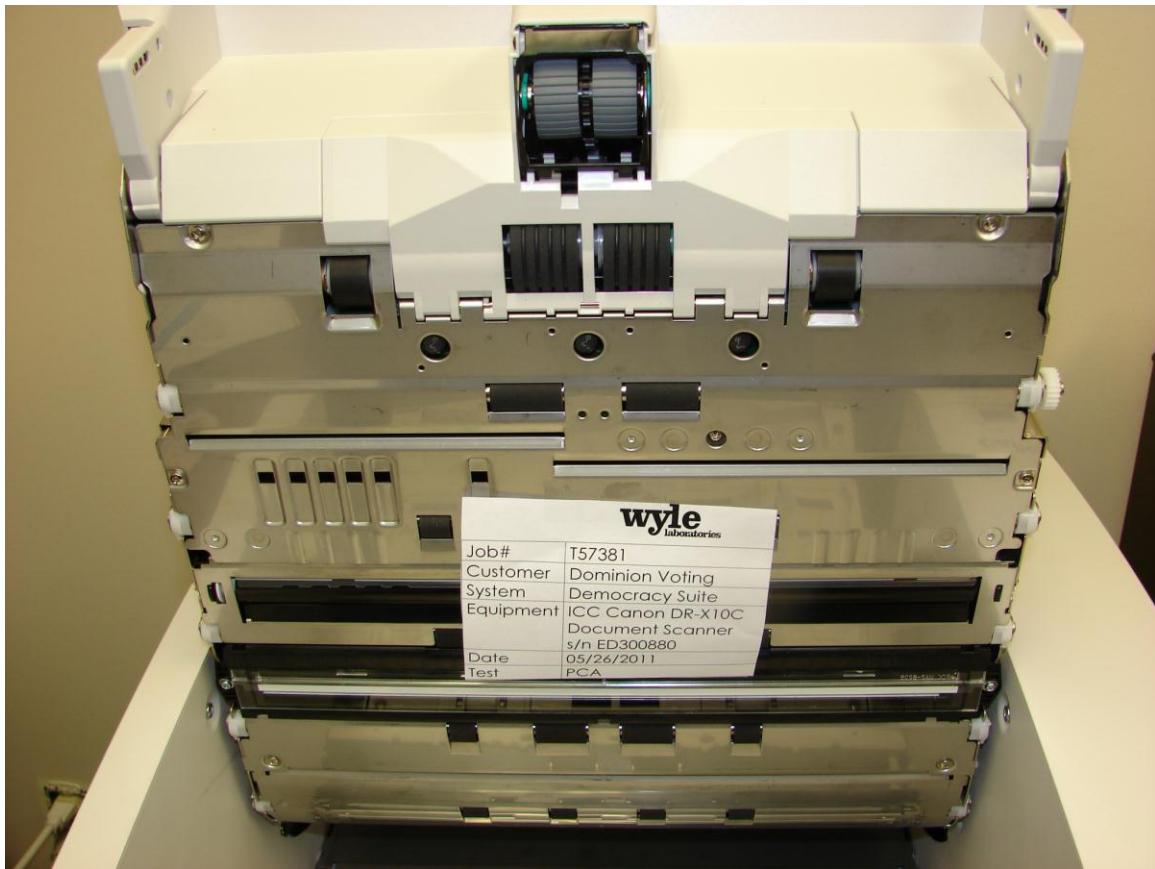
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ICC transport rollers

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ICC side view

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ICC back view

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