

**Note:** This is a recent report that has been altered to maintain anonymity of the parties involved. The result of my investigation and findings resulted in a client savings of several million dollars.

# **A-Board Insurance Claim Analysis**

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## Background

1. I was retained in May 2014 by Attorney Charles John of the Dallas, Texas Samson John Law Firm to provide analysis of a Panterra Insurance Claim filed by A-Board, Inc. and their subsidiary All Electrical, Inc., both of which are located in Dallas, Texas. A-Board, Inc. produces electronic printed circuit boards (PCBs) and reportedly sells individual electronic components, subassemblies and systems to customers. All Electrical sells individual electronic components, subassemblies and systems to customers, as well. A-Board, Inc. and/or All Electrical, Inc may be referred to as “A-Board” throughout this report. The basis for the claim is an alleged theft that took place on 7 January 2014 where selected items were stolen from the A-Board warehouse. The amount of the A-Board claim is approximately \$4,000,000 (\$4M) and coincides with the maximum inventory coverage A-Board has with Panterra Insurance. A-Board values the total pre-theft warehouse inventory at approximately \$42,000,000 (\$42M). My instructions from both Everett Caldwell at Panterra and Attorney John were to be proactive in looking at all possible avenues to substantiate and validate the A-Board claim.
2. The purpose of this report and my review of the matter are to identify or estimate what was actually stolen from A-Board along with the value of items that may have been removed during the theft. To that end, I visited A-Board for a facility tour and meeting on May 16, 2014 and a 5 day physical warehouse inventory starting on May 25, 2014.

3. Until January 2011, I was Director of Engineering on the Department of the Air Force Space Based Infrared Systems (SBIRS) satellite surveillance program, and I have approximately 35 years of experience in the manufacture, use, and design of electronic and electrical devices used in commercial, military, and space systems. I have managed several PCB production facilities and I am very familiar with required electronics handling, storage, and packaging and how those practices affect component and system reliability. I have also been employed by several electronic component manufacturers and I am an experienced Computer Forensics Examiner. I have a Bachelor's degree in Electrical Engineering and a Master of Science in Engineering Management. I am also a State Registered Professional Electrical Engineer. My general resume is attached as Exhibit 1.

## **Preface**

4. The value and reliability of electronic devices and assemblies is highly dependent on their age, proper storage, handling, and packaging. Exposure to electrostatic discharge (ESD), moisture, dust, dirt, and physical damage degrades electronics by imparting immediate loss of functionality or latent defects that can result in future functional failures. Use of these degraded electronics causes failures of higher level assemblies and end products. The latter incurs costly repair, warranty replacement, and intermittent problems that impact a producer's bottom line and reputation.

5. The international electronics industry ESD Association states in their 2013 ESD Fundamentals publication:

*“Despite a great deal of effort during the past thirty years, ESD still affects production yields, manufacturing cost, product quality, product reliability, and profitability. The cost of damaged devices themselves ranges from only a few cents for a simple diode to thousands of dollars for complex integrated circuits. When associated costs of repair and rework, shipping, labor, and overhead are included, clearly the opportunities exist for significant improvements. Nearly all of the thousands of companies involved in electronics manufacturing today pay attention to the basic, industry accepted elements of static control.”*

The entire ESD Association paper is attached as Exhibit 4. I have also attached, as Exhibit 5, an Intel Corporation paper on ESD and Electrical Overstress (EOS). Intel is a member of the ESD Association as are virtually all significant electronics industry producers throughout the world.

6. Exposure to moisture and other contaminants can also impact reliability by causing degradation to external assembly materials and component internals, particularly in non-hermetic packages.
7. I am unaware of any electronic components or assemblies that improve with age, and most degrade over time due to corrosion, moisture intrusion, and other factors.
8. The lifecycle of electronic components is quite short. Newer, faster, more complex components with higher function density and enhanced

production methods evolve continually, rendering older components obsolete. There is also an increasing tendency to replace rather than repair end products, limiting the number of replacement components purchased. Unfortunately, newer higher density components are typically more susceptible to ESD damage due to their reduced geometries. Those familiar with continuing cell phone advances may relate to this commentary.

9. Many electronic devices are imprinted with a date code. A date code such as 8807 typically signifies a manufacture date of week 7 in the year 1988. Electronics with indeterminate age are of unknown reliability and would typically be scrapped.
10. Consideration of handling, packaging, storage practices, and age were significant factors in determining the value of the A-Board inventory.

### **May 16, 2014 A-Board Meeting**

11. To gain a better understanding of the A-Board claim and operation, I attended a May 16, 2014 meeting at their Dallas, TX facility. Meeting attendees were:

- Harold Hone, A-Board President
- Charles John, Panterra Attorney
- Everett Caldwell, Panterra Adjuster
- Joan Sands, A-Board Employee
- Robert Abend, Panterra Consultant
- Mark Clark, Product Consignor

12. Mr. Hone stated that A-Board had been producing PCBs for eighteen years.

13. During our meeting, Mr. Hone stated that no physical warehouse inventory had been conducted for years prior to the theft, and that the theft was evident based on empty warehouse shelves in a number of different locations, but primarily on upper shelves. The loss was then subjectively based on there being at least \$4M in value removed by the thieves, which was scaled as an estimate from the \$42M total inventory value. Mr. Hone had previously estimated that as much as \$20M could have been stolen from the warehouse but he initially estimated that figure to be \$5M and later concurred with Mr. John's suggestion that he did not know what was stolen or its value.

14. Photo 1 on the following page shows a portion of the warehouse as currently depicted on the All Electrical web-site:



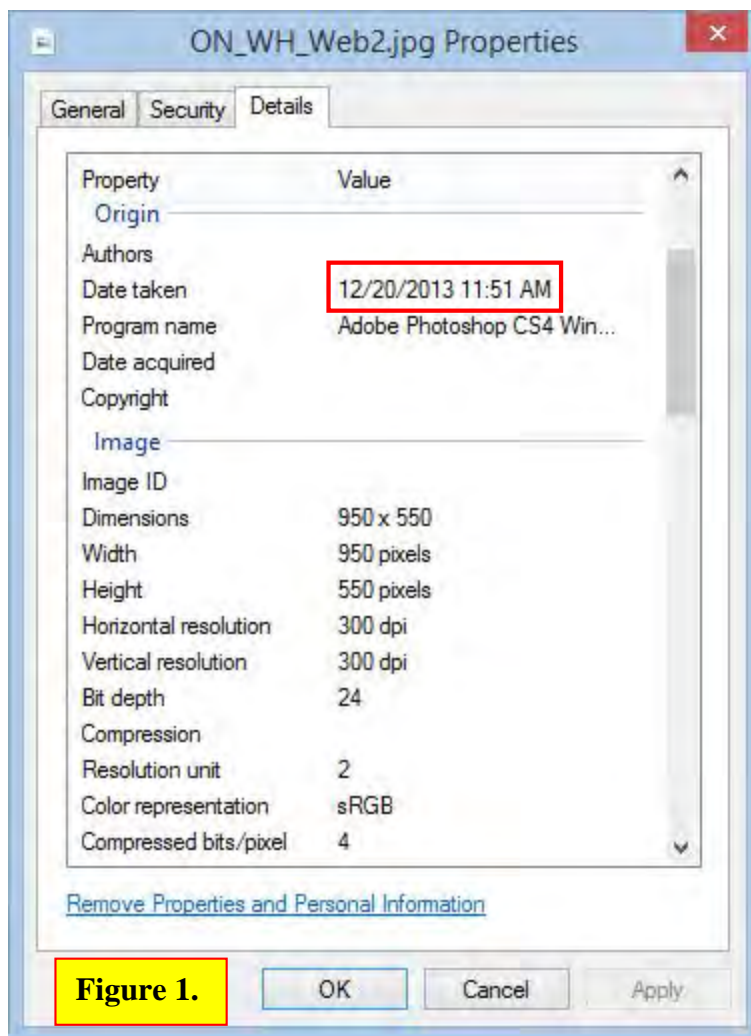
**Photo 1.**



**Photo 1A.**



Photo 1 metadata shows that it was taken before the theft on December 20, 2013 at 11:51 AM. It is then notable that there are empty shelves at various pre-theft inventory locations, and the criteria delineating empty shelves prior to the theft from those allegedly created by the theft have not been identified by A-Board. The Photo 1 empty shelves are primarily in the upper rack areas in a similar manner to the post-theft photos I took on May 16th. While Mr. Hone stated that the upper shelves were safer and where high-value product was stored, the lower shelf population preference could be to minimize the need for equipment such as ladders, and was observed to be consistent throughout the warehouse. The metadata for Photo 1 is shown below in Figure 1.



15. Photo 1A, above, is an excerpt of a post-theft picture I took during our May 16<sup>th</sup> A-Board meeting. Photo 1A was taken from a different perspective than Photo 1, but it can be seen by comparing Photo 1A to the red rectangle in Photo 1 that the inventory, location, type, shape, and orientation of shelved goods are the same, as is the empty shelf. While this is a small section of the warehouse, it is immediately adjacent to the reported theft point of entry and appears to have been untouched during the theft.
16. A May 1, 2014 Royce & King (R&K) report (shown in Exhibit 2) states that they were unable to obtain warehouse inventory shelf locations from Mr. Hone and the 43,000 item pre-theft inventory spreadsheet provided by A-Board does not include shelf locations. The complete pre-theft inventory spreadsheet provided by A-Board is hundreds of pages and not included in this report. It can be provided in electronic form upon request.
17. The R&K report also documents Mr. Hone's statement that up to \$20M in parts may have been stolen.
18. As can be seen in Photo 2 on Page 11, taken during my May 16<sup>th</sup> visit, all warehouse shelves have unique sequential identifiers as do most bins on the shelves:



As previously stated, A-Board and All Electrical sell items to customers from their warehouse. That process includes the following steps:

- a. A customer order is received
- b. An A-Board employee reviews the inventory database for quantity available and inventory location
- c. An A-Board employee uses the inventory location to find the item(s) in the warehouse and removes them for delivery to the customer
- d. The inventory database is debited for the item(s) sold and shipped

Selling from a 43,000 item warehouse without an inventory database containing item shelf locations would be virtually impossible.

19. During my May 16<sup>th</sup> visit, I asked Mr. Hone what the shelf labels (shown in Photo 2) were for. He confirmed that they were to identify item

locations, and stated that all items are identified by location in his inventory database/spreadsheet. Several hours later, he said that some items are identified by location in his database, and some are not.

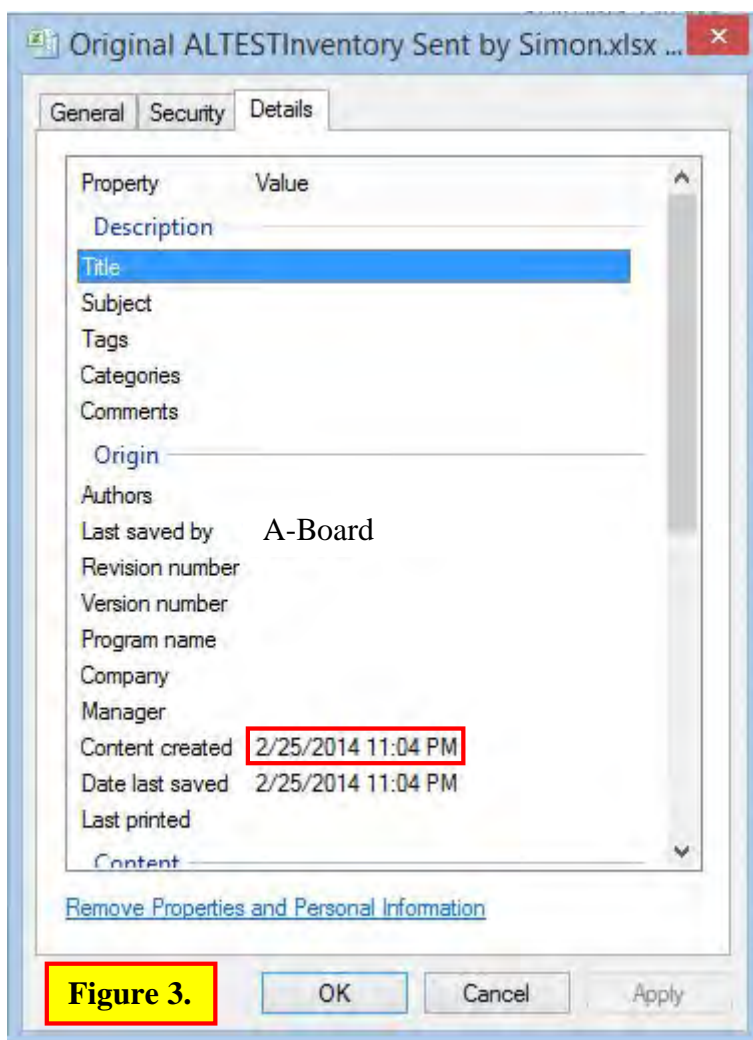
20. Mr. Hone stated that much of the warehouse inventory ( $\approx 90\%$ ) was on consignment and belonged to entities other than A-Board. As such, he had Mr. Mark Clark attend the meeting as a consignor of A-Board warehouse inventory. Mr. Clark said he had approximately \$1.7M in A-Board resident product. Mr. Hone stated that he had approximately twenty consignors. The pre-theft inventory spreadsheet, provided by A-Board, shows four warehouses numbered as 2, 3, 9, and 11 in Column F. I asked Mr. Hone where the four different warehouses were located and he said there was only one warehouse and he initially stated the warehouse numbers did not mean anything. When pressed, he said that each warehouse represented a consignor. I then asked Mr. Hone if he only had consignors 2, 3, 9, and 11 (four) or the twenty previously stated. He had no answer for that question.

21. An excerpt of the pre-theft inventory is shown in Figure 2. below:

A	B	C	D	E	F	G	H	I	J	K	L
1	Item	Part Number	Description	Manufacture	Lead Time	Warehouse	Qty	Unit Price	Extent Price		
2	1	8520112	CONN TERM FEMALE 18-20AWG TIN	Molex Inc	STOCK	2	1200	0	0		
3	2	10011034	5.08MM KK CRP TERM HSG 3CKT	MOLEX	STOCK	2	900	0.2	180		
4	3	10081021	5.08MM KK HDR VT RPIN VRA 2CKT	MOLEX	STOCK	2	65	0.83	53.95		
5	4	00201-0037	(ON BOARDS)	XPEED	STOCK	2	14	0	0		
6	5	22035025	CONN HEADER 2POS 2.5MM VERT TIN T/i	MOLEX	STOCK	2	265	2.38	630.7		
7	6	22035045	CONN HEADER 4POS 2.5MM VERT TIN T/i	Molex Inc	STOCK	2	21	1.26	26.46		
8	7	22122034	CONN HEADER 3POS .100 R/A GOLD	MOLEX	STOCK	2	0	3.4	0		
9	8	31.7601	FUSEHOLDER FOR SUB-MINI LINK PCB	Schurter Inc	STOCK	2	700	0.99	693		
10	9	34.6014	FUSE 1A 250V FAST 4.3MM PCB	Schurter Inc	STOCK	2	0	2.2	0		
11	10	52918099	SOLDERING PENCIL 80W 24V	WELLER	STOCK	2	6	33	198		
12	11	008-00792-5	CONN D-SUB 25POS Female SOLDER CUF TRW ELECTRONIC COM	STOCK	2	36	8.91	320.76			
13	12	9674022	3.96mm (.156") Pitch SPOXä,c and KKÄ®	MOLEX	STOCK	2	0	0.25	0		
14	13	010005-REV.A	FAB 010005-REV.A	CMS	STOCK	2	45	0	0		
15	14	01020071H	CLIP FUSE 1/4" EAR PC MOUNT	Littelfuse Inc	STOCK	2	500	0.1	50		
16	15	01110501H	CLIP FUSE 2AG/5MM BRASS PC MOU	Littelfuse Inc.	STOCK	2	691	0.13	89.83		

**Figure 2.**

22. Mr. Hone told us several times during our meeting that A-Board had generated the “Pre-Theft” inventory approximately one week prior to the reported January 7, 2014 break-in and theft. In reviewing the metadata for the EXCEL spreadsheet he provided, it appears that an “A-Board User” generated the purported Pre-Theft Inventory on February 25, 2014 at 11:04 PM, weeks after the reported theft. Figure 3 below shows the pre-theft Inventory file metadata:



23. I asked Mr. Hone why 20,015 items listed in Warehouse 9 all had a quantity of three since it does not seem possible for that many items in an

active inventory to have the exact same quantity. Mr. Hone did not have an explanation for that phenomenon. Warehouse 9 represents approximately half the A-Board warehouse inventory value. An excerpt of Warehouse 9 pre-theft inventory is shown in Figure 4 below:

	A	B	C	D	E	F	G	H	I
1	Item	Part Number	Description	Manufacture	Lead Tim	Warehou	Qty	Unit Pri	Extent
21468	21467	10	ACER ANDROID 10"TABLET	ACER Tablet	9_LT	9	3		0
21469	21468	120GM5SSD1	CT120M500SSD1;M500 120G 7MM	CRUCIAL SSD	9_LT	9	3	122.1	366.3
21470	21469	120GM5SSD3	CRUCIAL M500 MSATA 120G	CRUCIAL SSD	9_LT	9	3	126.5	379.5
21471	21470	120GOPEN	120G TLC SATA3 OPEN BOX	SAMSUNG SDD	9_LT	9	3		0
21472	21471	150MBWLESN	.	IMICRO	9_LT	9	3		0
21473	21472	150WLENADP	.	IMICRO	9_LT	9	3		0
21474	21473	1S-KT7M12F	1U CHASSIS KIT	Tyan barebone	9_LT	9	3	698.5	2095.5
21475	21474	1S-KT7M24F	CHASSIS KIT 2U, (24) 2.5" HOT-	Tyan barebone	9_LT	9	3	1056	3168
21476	21475	1U-CHASSIS	SM/CSE-111T-360CB/BLACK	SUPERMICRO	9_LT	9	3	268.4	805.2
21477	21476	200GSAS	SDLB6HS-200G-00	SANDISK SSD	9_LT	9	3	1650	4950
21478	21477	240GM5SSD1	CT240M500SSD1;M500 240G 7MM	CRUCIAL SSD	9_LT	9	3	204.6	613.8
21479	21478	240GM5SSD3	CRUCIAL M500 MSATA 240G	CRUCIAL SSD	9_LT	9	3	214.5	643.5
21480	21479	24B1STA-BK	ASUS 24X SATA DVDRW BLK BULK	ASUS DVD-RW	9_LT	9	3	21.725	65.175
21481	21480	24B3ST-R	ASUS 24X SATA DVDRW RETAIL	ASUS DVD-RW	9_LT	9	3	27.225	81.675
21482	21481	250GOPEN	OPEN BOX	SAMSUNG SDD	9_LT	9	3	220	660
21483	21482	28AWGCX403	3 METER 28AWG CX4 CABLE	CONTROLLER CARD	9_LT	9	3		0
21484	21483	28AWGCX403	3 METER 28AWG CX4 CABLE	OTHER	9_LT	9	3		0
21485	21484	28AWGCX405	5 METER 28AWG CX4 CABLE	CONTROLLER CARD	9_LT	9	3		0
21486	21485	28AWGCX405	5 METER 28AWG CX4 CABLE	OTHER	9_LT	9	3		0
21487	21486	290426-101	290426-010MCX4 10M CABLE	CONTROLLER CARD	9_LT	9	3		0
21488	21487	290426-101	290426-010MCX4 10M CABLE	OTHER	9_LT	9	3		0
21489	21488	2U-CHSSIS	2U	SUPERMICRO (contin	9_LT	9	3		0
21490	21489	3.0E-8001M	PENTIUM 4 3.0G 800MHZ 478PIN	INTEL PENTIUM 4 OEM	9_LT	9	3	31.9	95.7
21491	21490	3.5ESATA	3.5"SATA TO ESATA+USB2.0	IMICRO HARD DRIVE	9_LT	9	3		0
21492	21491	3.5ESATA	3.5"SATA TO ESATA+USB2.0	IMICRO HARD DRIVE	9_LT	9	3		0
21493	21492	300MBWLESN	.	IMICRO	9_LT	9	3		0
21494	21493	300WLENADP	.	IMICRO	9_LT	9	3		0

Figure 4.

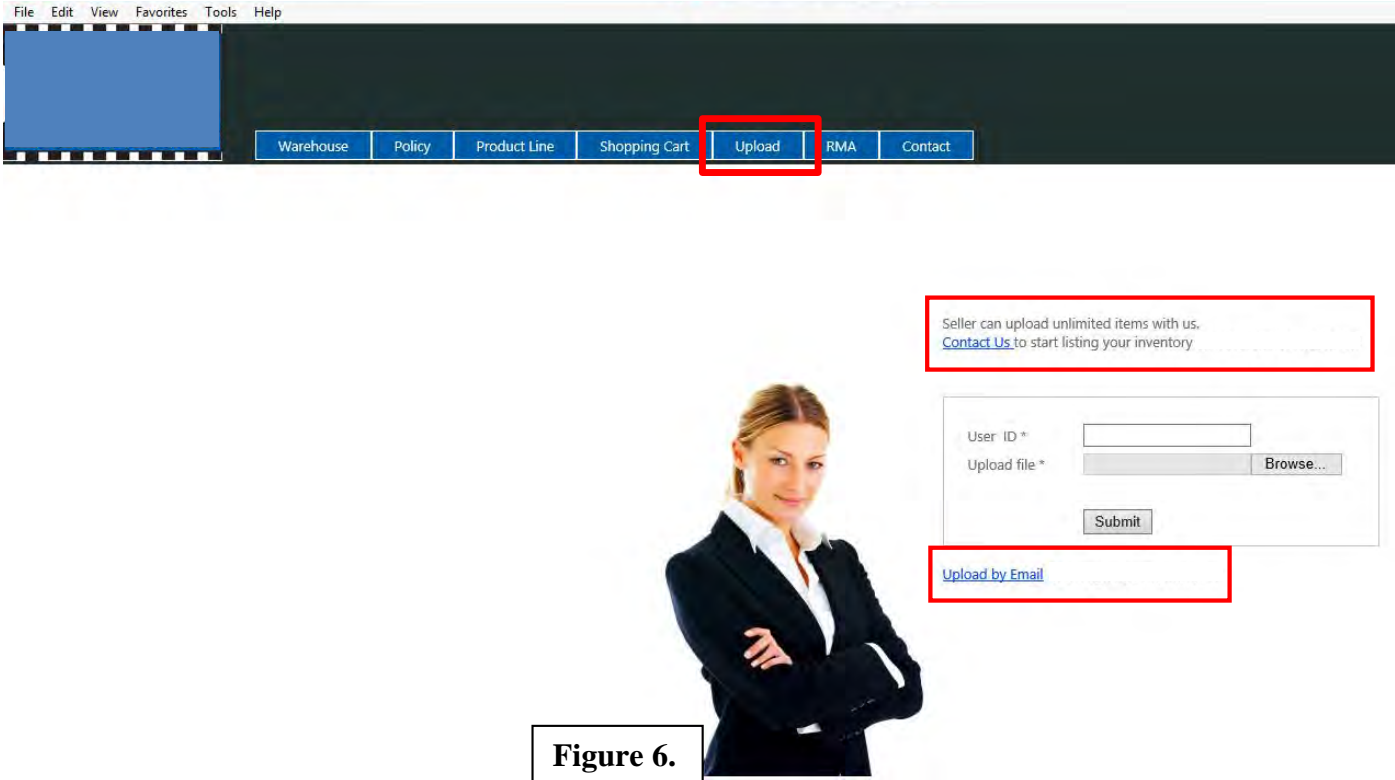
24. I asked Mr. Hone what the “9\_LT”, under the lead time column, meant for Warehouse 9. He said it had no meaning even after I expressed surprise that the 9\_LT code had been developed for no reason. I suggested that 9\_LT might be an acronym for “Warehouse **9** **L**ead **T**ime”, and Mr. Hone said that was not the case. In Figure 2, as an example, the term “Stock” under the lead time column means that an item is resident in warehouse inventory and the lead time is essentially zero, sans packing and shipping. Another lead time term could be “2 Weeks” or a specific date indicating when an item would be available to a customer from the date of their

order. If Warehouse 9 inventories were in stock at the A-Board warehouse, as claimed, it is not clear why the lead time was not “Stock” as is shown for some items in Warehouse 2. All Warehouse 9 items have the 9\_LT lead time and, again, Warehouse 9 represents approximately half the total A-Board inventory value, or roughly \$20M. The pre-theft inventory also lists quite a number of Warehouse 2 items with lead time dates well beyond the January 7, 2014 theft date. The latter could indicate those items were not in A-Board inventory during the theft and therefore not “pre-theft” inventory as claimed. Figure 5 below shows a “pre-theft” inventory excerpt with lead times beyond the January 7, 2014 date of theft.

	A	B	C	D	E	F	G	H	I
1	Item	Part Number	Description	Manufacture	Lead Time	Warehou Qty	Unit Price	Extent Pric	
786	785	105-0852-001	CONN JACK TEST VERTICAL RED T/H	Johnson Components Inc.	3/7/2014	2	300	1.25	375
788	787	105-0854-001	CONN JACK TEST VERTICAL GREEN T/H	Johnson Components Inc.	2/25/2014	2	837	1.25	1046.25
789	788	105-0856-001	CONN JACK TEST VERTICAL ORANGE T/H	Johnson Components Inc.	2/25/2014	2	1000	1.25	1250
792	791	105-0860-001	CONN JACK TEST VERTICAL BLUE T/H	Johnson Components Inc.	2/25/2014	2	756	1.25	945
1436	1435	1792760	CONN TERM BLOCK PLUG 3POS 5.08MM	PHOENIX CONTRACT	2/17/2014	2	20	3.72	74.4
1885	1884	2-30-2731	TRANSFORMER FLYBACK VELOCITY T/H	MCI	3/3/2014	2	95	21.34	2027.3
1886	1885	2-30-2732	TRANSFORMER FLYBACK DENSITY T/H	MCI	3/3/2014	2	90	21.03	1892.7
1887	1886	2-30-2733	INDUCTOR TOROID PWR SUPPLY PFII (green) T	MCI	3/3/2014	2	200	4.82	964
2046	2045	25LC1024-1/SM	IC EEPROM 1MBIT 20MHZ 8SOIC	MICROCHIP TECHNOLOGY	2/25/2014	2	6	5.88	35.28
3703	3702	7403-09FR-54	HEAT-PAD TO-220 .009" SP400	Bergquist	2/17/2014	2	20000	0.2	4000
5099	5098	AMC16021	Display 2 line 16 Lateral connection Lateral	AV DISPLAY	2/28/2014	2	100	15	1500
8765	8764	ECS-3525-250-B-TR	OSC 25.00 MHZ 2.5V SMD	ECS Inc	2/25/2014	2	5	5.99	29.95
9840	9839	G5V-2-DC24	RELAY DPDT 2A 24V 1152 OHM COIL	Omron Electronics Inc-ECB E	2/10/2014	2	0	2.18	0
12432	12431	M34C107K030BZSS	CAP TANT 100UF 30V 10% 0803	VISHAY	2/25/2014	2	4	186.9	747.6
12879	12878	MBR130LSFT1G	DIODE SCHOTTKY 1A 30V SOD-123FL	ON SEMICONDUCTOR	2/25/2014	2	397	0.47	186.59
13200	13199	MC78M15CT	IC REG VLT POS 500MA 15V TO220AB	ON SEMICONDUCTOR	2/26/2014	2	1000	0.48	480
13561	13560	MHS233RA	SWITCH SLIDE 3POS 0.177"BLCK T/H	TE Connectivity	2/21/2014	2	200	2	400
14717	14716	HR961160C	CONN Surface Mount, R/A 1PORT 10/100B-TX	HAN RUN	2/14/2014	2	3200	3.23	10336
18059	18058	ST5R007BRB	CURRENT LIMITER INRUSH 5 OHM 7A	US SENSOR	3/28/2014	2	153	1.476	225.828
20221	20220	MIC5281-3.3YMM	IC REG LDO 3.3V 25MA 8MSOP	MICREL INC	2/25/2014	2	1000	2.16	2160
20583	20582	MCP1640DT-1/CHY	IC REG BST SYNC ADJ 0.1A SOT23-6	MICROCHIP	2/25/2014	2	3050	1.5	4575
42111	42110	BTS4175SGAXUMA1	IC SWITCH PWR HISIDE DSO-8	INFINEON TECHNOLOGIES	3/4/2014	2	7500	1.2645	9483.75
42200	42199	BLM15AG100SN1D	FERRITE CHIP 10 OHM 1000MA 0402	MURATA	2/25/2014	2	50	0.124	6.2
42201	42200	ERJ-1GEF1400C	RES 140 OHM 1/20W 1% 0201 SMD	PANASONIC	2/25/2014	2	100	0.056	5.6
42202	42201	ERJ-1GEF1500C	RES 150 OHM 1/20W 1% 0201 SMD	PANASONIC	2/25/2014	2	100	0.056	5.6
42203	42202	ICE40LP1K-QN84	IC FPGA 67 I/O 84QFN	LATTICE SEMICONDUCTOR	2/25/2014	2	4	7.66	30.64
42206	42205	M25P10-AVMP6TG	IC FLASH 1MBIT 50MHZ 8VDFQFPN	MICRON TECHNOLOGY	2/25/2014	2	6	1.24	7.44
42207	42206	TPS62120DCNR	IC REG BUCK SYNC ADJ SOT23-8	TEXAS INSTRUMENTS	2/25/2014	2	7	3.62	25.34
42208	42207	TPS3808G12DBVR	IC VOLT SUPERVISOR 1.2V SOT23-6	TEXAS INSTRUMENTS	2/25/2014	2	6	3.52	21.12
42209	42208	NB6L115MNG	IC CLK BUFFER 1:2 2GHZ 16QFN	ON SEMICONDUCTOR	2/25/2014	2	5	15.76	78.8
42372	42371	63801-7200	CRMP PRESS TM3000 120V TO 10AWG	MOLEX	3/5/2014	2	1	3700	3700
42374	42373	MAX6629MUT	IC TEMP SENSOR DIG SOT23-6	MAXIM INTEGRATED	2/14/2014	2	1000	2.78	2780
42378	42377	LTC6241HVHS8PBF	IC OPAMP GP 18MHZ RRO 8SO	LINEAR TECHNOLOGY	2/14/2014	2	14	7	98
42379	42378	06032U5R6BAT2A	CAP CER 5.6PF 200V NP0 0603	AVX CORPORATION	2/14/2014	2	3990	0.124	494.76
42428	42427	TLE7259-2GE	TRANSCIEVER LIN AUTO PG-DSO-8	Infineon Technologies	3/5/2014	2	7500	1.04	7800
42434	42433	74HC2GU04GW,125	IC INVERT DL UNBUFF 6TSSOP	NXP SEMICONDUCTORS	2/17/2014	2	2980	0.258	768.84
42459	42458	B32592C6104J008	CAP FILM 0.1UF 400VDC RADIAL	EPICOS INC	2/18/2014	2	950	0.556	528.2
42472	42471	MCC56-081O1B	MOD THYRISTOR DUAL 800V TO-240AA	IXYS	2/11/2014	2	40	68.61	2744.4
42482	42481	FFB44E0476K--	CAP FILM 47UF 100VDC RADIAL	AVX CORPORATION	5/22/2014	2	100	18.98	1898
42489	42488	CU24025-UW1J	MODULE VF DISPLAY 24X2 5MM CHAR	NORITAKE	2/15/2014	2	309	97.66	30176.94

Figure 5.

25. The All Electrical web-site provides consignors an online method to upload their inventory database or to email their inventory list to All Electrical so that items can be posted for sale and remain at the consignor's inventory location. That type of inventory would, of course, not have been at A-Board during the reported theft. Figure 6 below shows the consignor "Upload Tab" inventory entry page on the All Electrical web-site:



**Figure 6.**



When asked about the All Electrical upload web-page, Mr. Hone insisted that All Electrical/A-Board does not allow consignors to upload electronic inventory lists to the web-site. He also stated that all consignor inventories physically reside in the A-Board warehouse.

26. As stated earlier, Mr. Mark Clark (an A-Board consignor/seller) attended our 16 May meeting. He indicated that he had consignment goods worth roughly \$1.7M in the A-Board warehouse. Mr. Clark went on to explain that he had obtained his inventory from companies such as Electrax that had gone bankrupt. Mr. Charles John (Panterra Attorney) asked Mr. Hone to provide a list of the goods Mr. Clark had in the A-Board warehouse inventory. Mr. Hone left our meeting room and returned with a two page list valued at approximately \$2.3M as is shown in Exhibit 3 of this report. That represented a \$600,000 increase from what Mr. Clark thought he had. Mr. John took note of an A-Board product on the list and asked Mr. Hone why an A-Board product was listed as Mr. Clark's inventory. Mr. Hone was unable to explain that anomaly.

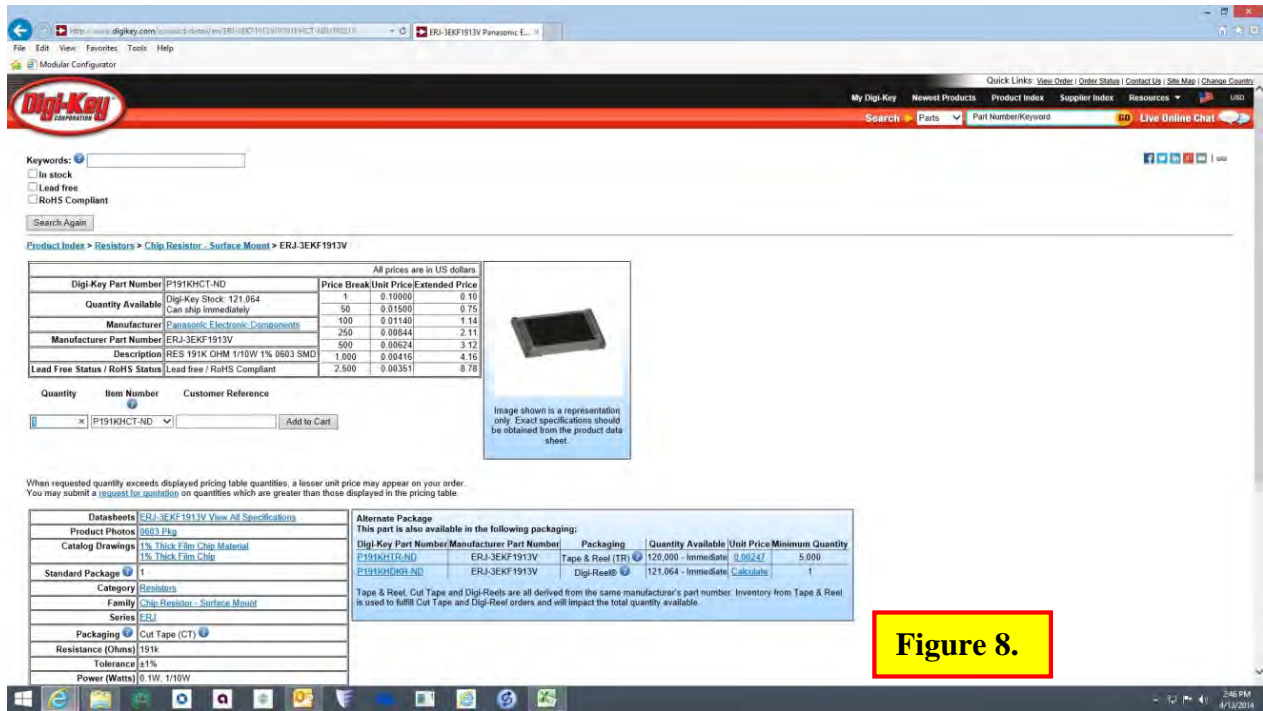
27. Mr. John then asked Mr. Hone if we could go to the A-Board warehouse and physically locate Mr. Clark's product. We moved to the warehouse and, after spending 15 or 20 minutes, Mr. Hone was unable to locate any of Mr. Clark's products on the list he had provided. His inability to find the product supports my hypothesis in Paragraph 20, of this report that an inventory database including warehouse locations is crucial to warehouse operation.

28. In my process of reviewing the pre-theft inventory, I sorted the top valued items as is shown below in Figure 7:

	A	B	C	D	E	F	G	H	I	J	K
1											
2	Item	Part Number	Description	Manufacture	Lead Time	Warehouse	Qty	Unit Price	Extent Price		
3	339	0603YC104KAT2A	CAP CERM .1UF 10% 16V X7R 0603	AVX CORP CORP		2 OE	10004800	0.04	400192.00		
4	38407	SY-6165F15	SM/ SYS-6016GT-TF-SF105	Supermicro barebone	9_LT	9 OE=5		3	83902.5		251707.50
5	2096	269425-001	PCB ASSY, FET POWWER DAR 4.2 K REV E( 100% CALIBRATION BY PROBE SPECIALIST)	ELECTROGLAS	STOCK	2 OE=1		105	2200		231000.00
6	2064	264564-001	PCB ASSY, PENU MDL3 MATERIAL HANDER ( NO CALIBRATION)	ELECTROGLAS	STOCK	2 OE=1000		1000	223		223000.00
7	14162	MWT2405-12	DC-DCCONVERTERS	IPD		2 OE=1000		1000	187.5		187500.00
8	36140	SAM-8207N2	82" SAMSUNG LCD BLK	SAMSUNG LCD MONITOR	9_LT	9 OE=5		3	62011.4		186034.20
9	34309	NEC-X551T9	55" 2X3 VIDEO WALL LED	NEC LCD MONITOR	9_LT	9 OE=5		3	60709		182127.00
10	6961	CL10C510JBNC	CAP CER 51 PF NPO 5% 0603	SAMSUNG	STOCK	2 OE=4000		4000	45		180000.00
11	4421	923345-01-C	JUMPER WIRE 0.1" LONG PKG OF 200	3M	STOCK	2 OE=10000		10000	16.53		165300.00
12	36139	SAM-820DN2	82" SAMSUNG LCD BLK	SAMSUNG LCD MONITOR	9_LT	9 OE=10		3	49608.9		148826.70 Two Values
13	42000	5650F5	LED GREEN T1 QUAD RIGHT ANG PCB	Visual Communications	STOCK	2 OE=1500	1500	94	141000.00		\$0.94 @ Digikey
14	2382	310-13-136-41-001000	CONN SOCKET STRIP 36POS GOLD	Mill-Max Manufacturing Corp.	STOCK	2 OE=70000	70000	2	140000.00		
15	34183	NEC-8205	82" NEC 2000:1 DVI HDMI BNC	NEC LCD MONITOR	9_LT	9 OE=5		3	45098.9		135296.70
16	34305	NEC-X463T9	NEC FOUR X463UN BUNDLED	NEC LCD MONITOR	9_LT	9 OE=10		3	44592.9		133778.30 5 @1/2 value
17	18571	TLC27L4BID	IC PREC QUAD OP AMP 14-SOIC (TUBE)	Texas Instruments	STOCK	2 OE=98670	98670	1.29	127284.30		
18	40302	TS-B75FN8X	4U, FT77A, C602	Tyan barebone	9_LT	9 OE=5		3	40647.2		121941.60
19	9242	ERJ-3EKF1913V	RES 191K OHM 1/10W 1% 0603 SMD	PANASONIC	STOCK	2 OE=4900	4900	23.16	113484.00		\$0.10 @ Digikey
20	19017	TX25A-L-4.5V	RELAY LATCH 2A 4.5VDC 100MW SMD	Panasonic Electric Works / NAIS	STOCK	2 OE=35000	35000	2.99	104650.00		
21	1992	252260-001	PCB ASSY, INKER SENSOR 100% CALIBRATION BY PROBE SPECIALIST	ELECTROGLAS	STOCK	2 OE=174	174	600	104400.00		
22	2033	258936-001	PBC ASSY TESTER I/F COND II( 258936-001 ) NO CALIBRATION	ELECTROGLAS	STOCK	2 OE=50	50	2000	100000.00		
23	40300	TS-B75FN6X	4U, FT77A, C602	Tyan barebone	9_LT	9 OE=5		3	31807.6		95422.80
24	40301	TS-B75FN8M	4U, FT77A, C602	Tyan barebone	9_LT	9 OE=30197		3	30107		90321.00
25	34310	NEC-X551TM	55" 2X2 VIDEO WALL LED	NEC LCD MONITOR	9_LT	9 OE=5		3	29393.1		88179.30
26	13049	MC68HC11K1CFU4	IC 8-BIT HC11 CISC ROMLess 5V 80-Pin PQFP (Quote: \$3.50)	FREESCALE	STOCK	2 OE=1975	1980	24.98	49460.4		
27								Total	3700906.20		

Figure 7.

29. When I asked Mr. Hone for a copy of the All Electrical web-site inventory database or spreadsheet, he stated that it was the same as the pre-theft inventory he had already provided. I showed him the differences in the pre-theft inventory and the All Electrical inventory shown in Figure 7 and he agreed to provide the All Electrical inventory, but has not done so as of this writing. As an example, Line 8 in Figure 7 shows 3 each 82" Samsung monitors in the pre-theft inventory and the All Electrical inventory shows 5 each. When I initially mentioned the 82" monitor Unit Price of \$62,011.40 Mr. Hone stated they were only worth \$600 or \$700 each. Additionally, I found some valuations to be orders of magnitude above market price such as the highlighted 191K surface mount resistor that A-Board had valued at \$23.16 each. As is shown in Figure 8 below, I found that component available at DigiKey, a major electronic component distributor in small quantities, for \$0.10 each:



**Figure 8.**

I also found several items that had reasonable market pricing, but none that were underpriced with finite value. There were a number of pre-theft inventory items inexplicably listed at zero value.

30. When we toured the warehouse, I asked Mr. Hone to show us the listed 82” Samsung LCD monitors. He told us they had been stolen during the break-in and pointed out the specific shelf locations where they had been. I looked up the shipping dimensions for a similar Samsung 82” monitor and found them to be 24” Deep X 59” High X 83” Wide with a weight of 340 pounds. With shelf dimensions at the specified locations that are 45” Wide x 9.25” High x 30” Deep on an aisle width of 29.5”, it does not seem to have been possible for the monitors to be stored on those shelves. I found more than 50,000 items in the pre-theft inventory with the designation “LCD Monitor”. LCD monitor is typically the description for

an LCD flat panel display. That many displays would have taken more empty shelf, floor space and volume than is currently available in the entire A-Board warehouse. Removal of that many large items would have also been challenging for what the Dallas Police Department called a white pickup truck used for the theft. Photo 3 below shows the 82” monitor shelves and their dimensions:



31. Photo 4 below shows a collection of empty containers piled on the floor in the front of the warehouse. Mr. Hone explained that the pile of containers was left by the thieves as they dumped components into larger bins to steal them. It is notable that the thieves took time to put the goods in larger bins and that they took the time to stack and nest some similar containers. Mr. Hone emphasized that the warehouse was on “lockdown” and that it was exactly how the thieves left it. He also stated that no empty containers were kept in the Photo 4 area prior to the theft. Later in the day Mr. Hone explained that since he had not conducted a post-theft physical



inventory, the only way he knew items were missing was when customers tried to place orders and his people were unable to find the components in the warehouse to fill the order. That seems to be inconsistent with keeping the warehouse on “lockdown”. During our May 2014 inventory, R&K personnel related that there was significant A-Board traffic in the warehouse during their March 2014 visits.

32. To augment Photo 1A, I photographed the shelves equivalent to the All Electrical web-site warehouse photo from a similar perspective during our A-Board physical inventory. That is shown in Photo 5 below:



33. If Photo 5 is compared to Photo 1, it can be seen that the post-theft inventory has not changed significantly and the empty shelves prior to the theft in Photo 1 remain empty in Photo 5 after the theft and populated shelves remain populated with what appear to be the same goods. Again, these warehouse racks are immediately adjacent to the reported point of entry used by the thieves. It also currently contains a new Asus LCD monitor. For ease of comparison, Photos 1 (right) and 5 (left) are shown side by side on the next page.



**May 25<sup>th</sup> 2014 Post-Theft Photo**

**December 20<sup>th</sup> 2013 Pre-Theft**

The mirror image set of shelves on the right side of Photo 1 were an Adobe Photoshop manipulation and do not exist in the warehouse. The double door at the rear of the photo was also largely obscured in Photoshop, and there may have been other minor touchups.

### **May 25<sup>th</sup> – May 30<sup>th</sup> 2014 A-Board Warehouse Physical Inventory**

34. In addition to myself, the following R&K personnel supported the inventory:

- Sam Brandis
- Karla Brandis
- Peter Brandis
- Bob Brandis
- Garfield Prentiss
- Brice Borden

35. We scheduled five days for the inventory based, in part, on Mr. Hone stating at our May 16<sup>th</sup> meeting that he had a database showing inventory locations for items. At the beginning of the inventory, I asked Mr. Hone to provide the item location data and he said he had no such database or spreadsheet.

36. The A-Board inventory is ESD sensitive, but Mr. Hone had stated several times at our May 16<sup>th</sup> meeting that ESD precautionary measures were unnecessary and not employed by A-Board personnel. As such, we requested Mr. Hone's permission to conduct the inventory process without ESD precautionary measures. He gave us written permission to do so.



37. General inventory observations:

- a. As he stated at our May 16<sup>th</sup> meeting, Mr. Hone does not employ ESD dissipative tiles on the warehouse floor. The electronics industry uses ESD dissipative cardboard bins and other types of dissipative containers to store electronics. Most of the A-Board electronics storage bins were plain non-ESD rated cardboard. As exemplified in Photo 6 below, opened packaging had been resealed with standard office “Scotch Tape”.



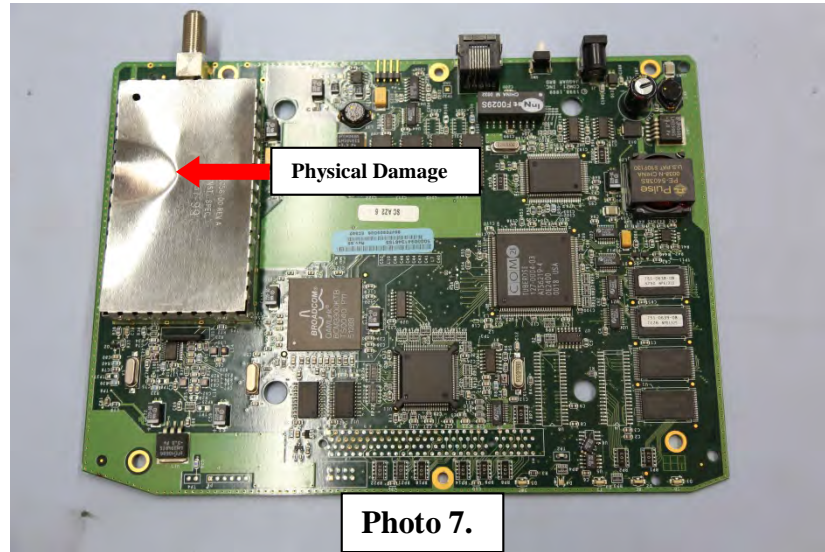
In their “Primer on Electrostatic Discharge” the Teledyne Corporation states:

*“Never use ordinary plastic adhesive tape near an ESD sensitive device or to close an anti-ESD bag. The act of pulling a piece of standard plastic adhesive tape, such as Scotch<sup>®</sup> tape, from its roll will generate a static charge of several thousand or even tens of thousands of volts on the tape itself and an associated field effect that can discharge through or be induced upon items up to a foot away.”*

From my own experience, I have found the use of Scotch Tape to be very destructive.

- b. Many components have no identifiable date codes, so their age cannot be determined.
- c. Almost all assemblies and components were unpackaged or in opened packaging, and the majority were partially used and less than the original contained quantity.
- d. The microelectronics inventory was in opened packaging with older date codes typically in the 1980’s and 1990’s. The majority of those components were non-hermetic plastic packages
- e. A number of items in inventory were not listed on the A-Board pre-theft inventory.
- f. Many bins have no part numbers listed along with a variety of unlabeled contents and are therefore not traceable to the pre-theft inventory.

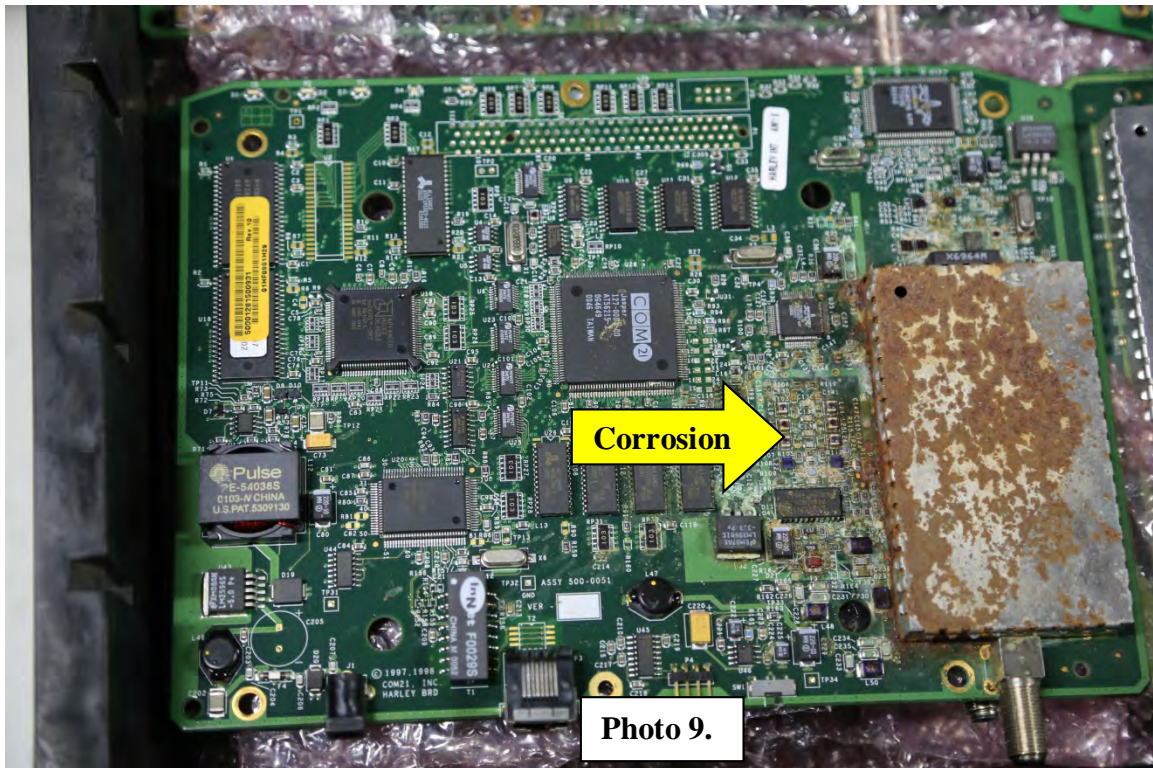
- g. Most printed circuit boards were unpackaged and piled on top of each other resulting in physical damage as is shown in Photo 7 below:



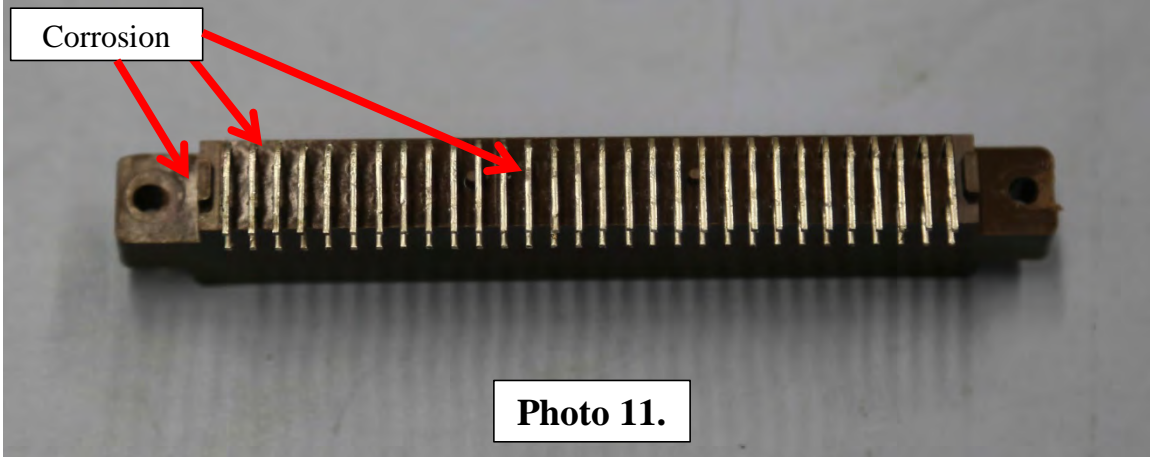
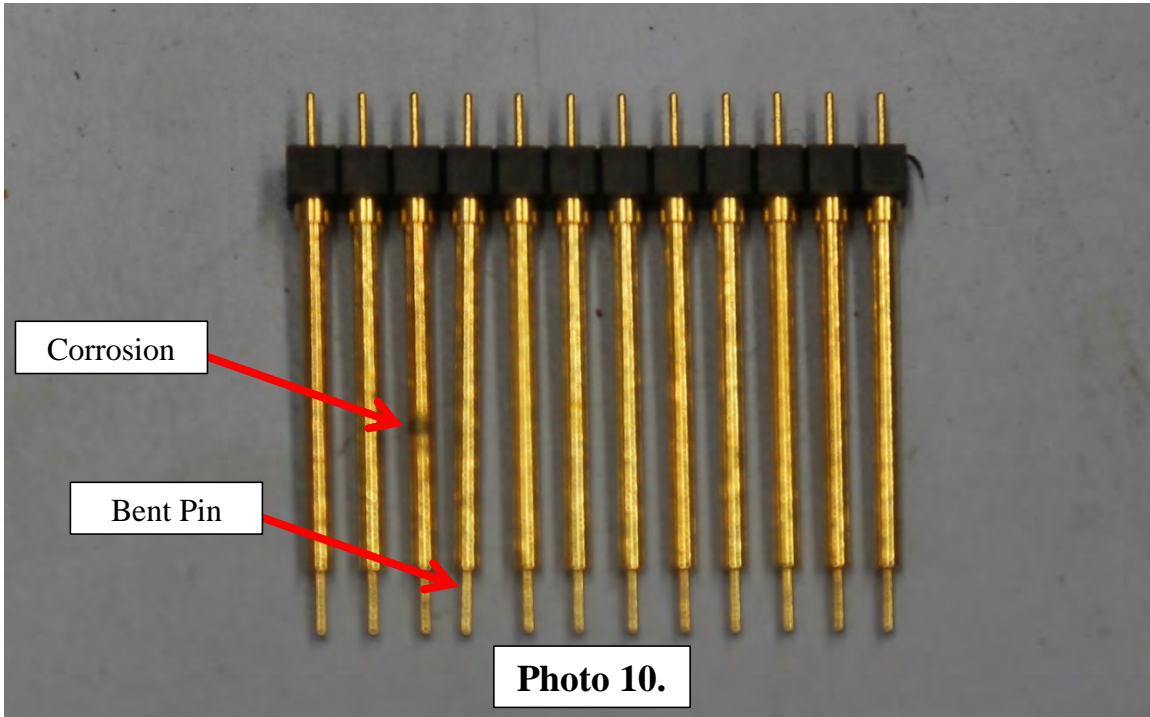
- h. R&K personnel complained about large spiders, some of which were in bins with electronics. I also took a picture of a large lizard on the warehouse floor adjacent to a rack of shelves containing electronics as shown below in Photo 8:



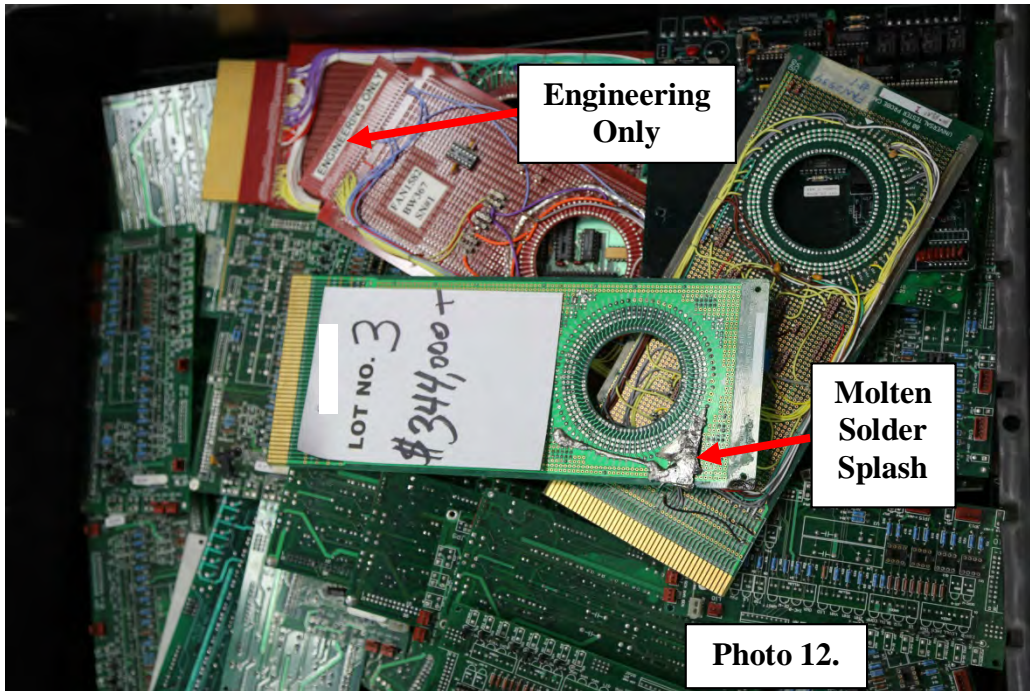
- i. Another example of PCB damage that could be related to animal infestation or other contaminants is shown in Photo 9 below:



- j. Most racks of shelving had some empty upper shelves similar to those evident in pre-theft Photo 1.
- k. The shelves along the warehouse back wall (Rack 31) containing connectors and sockets were fully populated possibly indicating no component theft in that area. The Warehouse Layout diagram is shown on Page 33 of this report. Most connectors were beyond a seven year age and some had evidence of degradation as is shown in Photo 10 and 11 below.



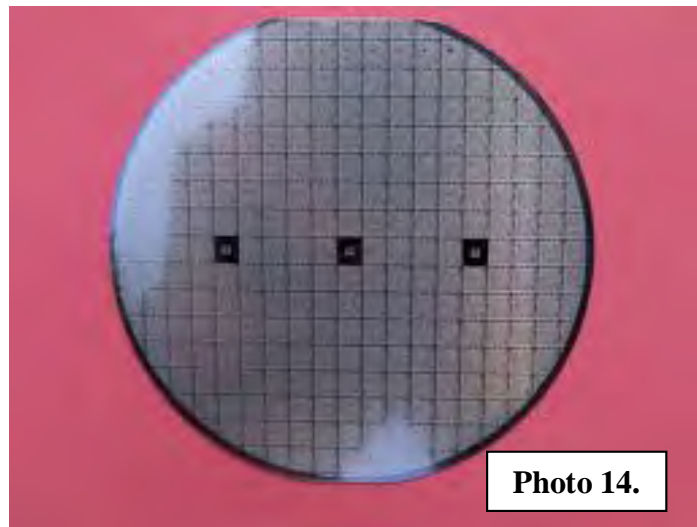
38. During their March 2014 visits, R&K had valued selected A-Board warehouse items. During the inventory, Sam Brandis showed me some of the items he had established the values on. An example of PCBs in a bin is shown below in Photos 12 and 13:



39. As can be seen from the R&K label, the bin of PCBs was valued at over \$344,000.00. Sam Brandis explained that the valuation was largely based on what Mr. Hone told him with regard to value.

40. The PCBs with circular cutouts are “probe cards” used to test semiconductor devices in wafer form. As can be seen, they are hand wired and likely for very specific devices and types of tests. The “Engineering Only” designation indicates the probe cards are for engineering analysis of some type and are likely not for resale as a commercial product. After tiny needle-like probes are attached to the probe cards, they can be used for testing replicated individual semiconductors with specific geometry on a wafer. A semiconductor wafer example is shown in Photo 14 below:

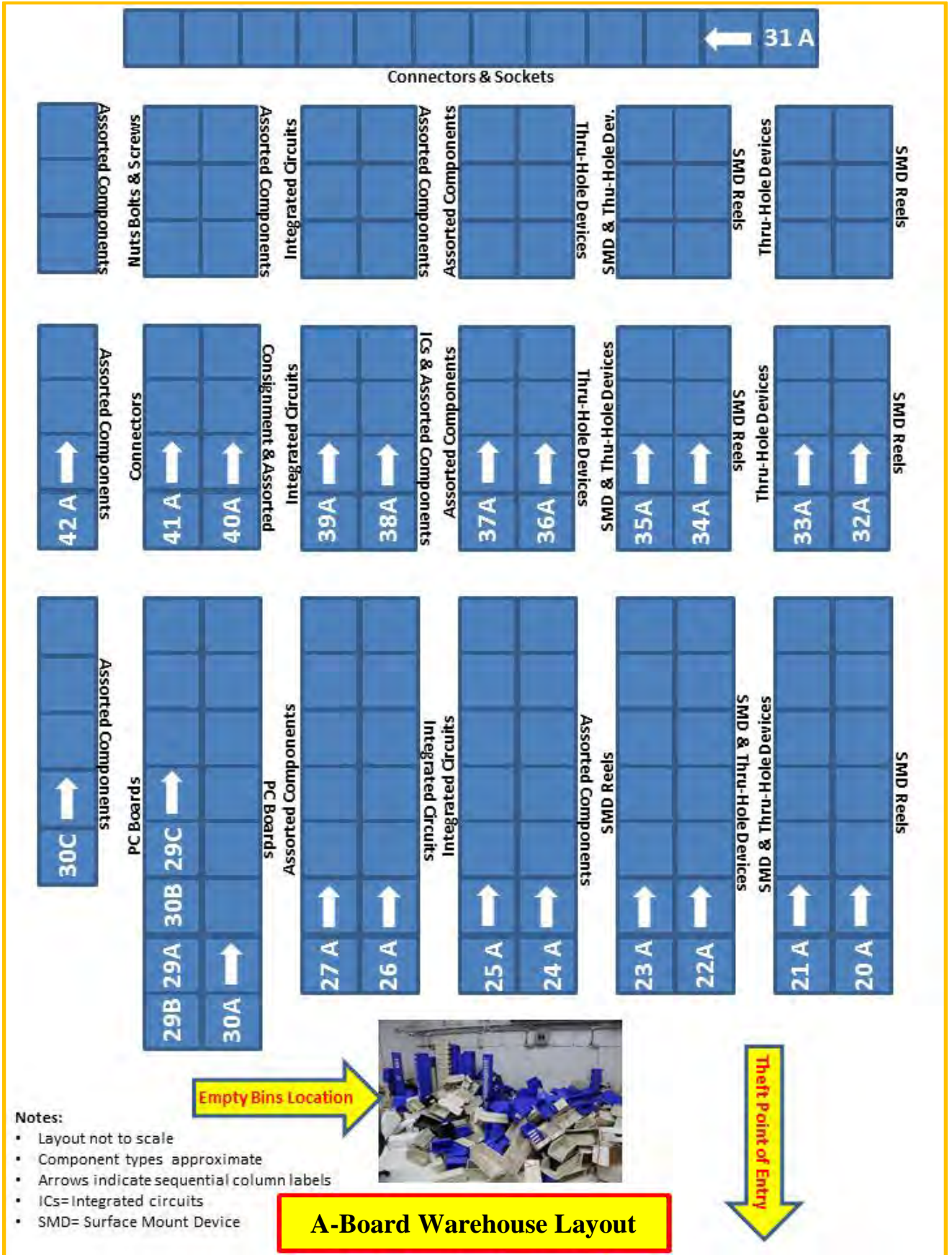
41.



41. In comparing the bin of PCBs shown in Photos 12 and 13 to industry standard requirements outlined in the Preface of this report, I found the following:

- a. The boards are stacked on top of each other without packaging
- b. There are essentially no ESD measures employed
- c. The boards are not protected from moisture by a moisture barrier bag or desiccant
- d. There are no date codes on the boards I examined, so the age of the boards cannot be discerned.
- e. A label on the bin indicates it contains 41 part types, “SY-625WTRB” through SY627AXR3”. On the pre-theft inventory those appear to be Supermicro Barebone Servers. The probe cards described above are not listed in the SY-625WTRB through SY627AXR3 sequence of part numbers, and I saw nothing that looked like a bare bones server. Sam and Karla Brandis told me with certainty that Mr. Hone had told them several times that the bin labels containing a part number, a dash, and then a second part number, as discussed above, indicated the applicable sequence of product on the pre-theft inventory spreadsheet. I asked Mr. Hone to confirm that during the inventory and he said sometimes that is the case and sometimes it is not.
- f. There were other containers valued at six figures of the same type and condition.





42. Mr. Hone had previously stated that no empty bins had been at the Photo 3 location until the thieves put them there during the robbery. During the inventory, I noticed the bin shown in Photo 15 below:



**Photo 15.**

43. Joan Sands was assigned as our support point of contact during the inventory by Mr. Hone. Since I could not find aisle 60, in the warehouse, I asked Ms. Sands where aisle 60 was located at A-Board. She left, came back and said Mr. Hone stated "it was just a number on a box and did not mean anything". Since Mr. Hone had stated that no electronics inventory was stolen from anywhere but the warehouse and aisle 60 appears to be a location external to the warehouse, it is unlikely the thieves placed that bin in the Photo 3 area.

44. The May 25<sup>th</sup> Inventory methods employed were as follows:

- a. Zero value items were sampled for date codes. As an example, the shelves in rack 20 contained unpackaged reels that had been partially used. They were visibly dirty, had been handled without

ESD precautionary measures, were unpackaged and exposed to moisture, and the vast majority of date codes were in the 1990s or early 2000s. Based on the above, I deemed the value of these components to be zero. In this case we recorded the date codes on a sample of ten reels per column of shelves. We skipped those reels with no date codes to achieve ten recordings

- b. In some cases such as the connector and socket inventory on the back wall, bins were counted in each column. The age of most connectors could not be determined, but Photos 10 and 11 above are likely indicative of age
- c. I supervised inventory methods used on each type of product and some areas were inventoried by an actual component count where deemed appropriate.

45. Many of the surface mount device (SMD) reels had date codes as old as 1983, were completely unpackaged, dirty, and frequently had components on the tape dangling off the shelf. More than half the reels had no date code at all, and many original labels had been obscured and covered by All Electrical labels. Photo 16, 17, and 18 below exemplify some of those findings:

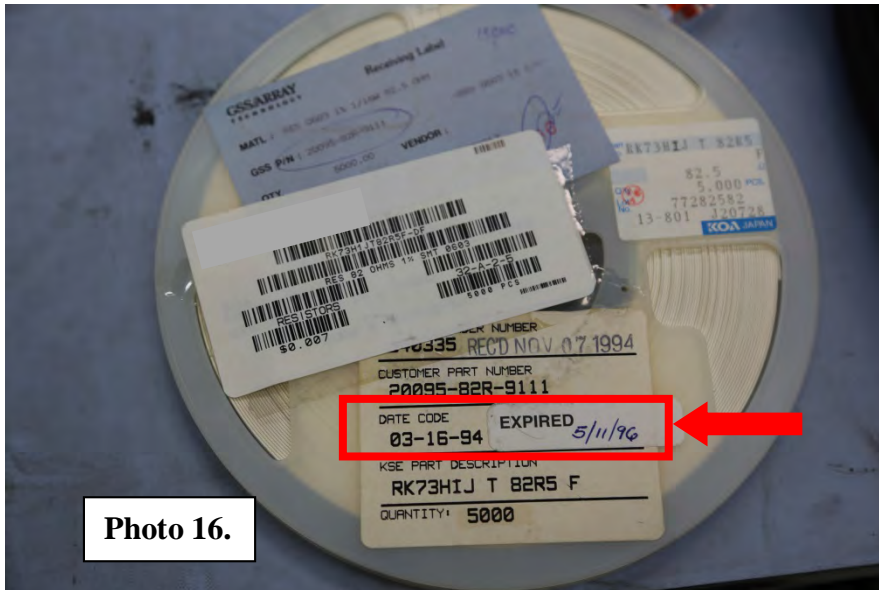


Photo 16.

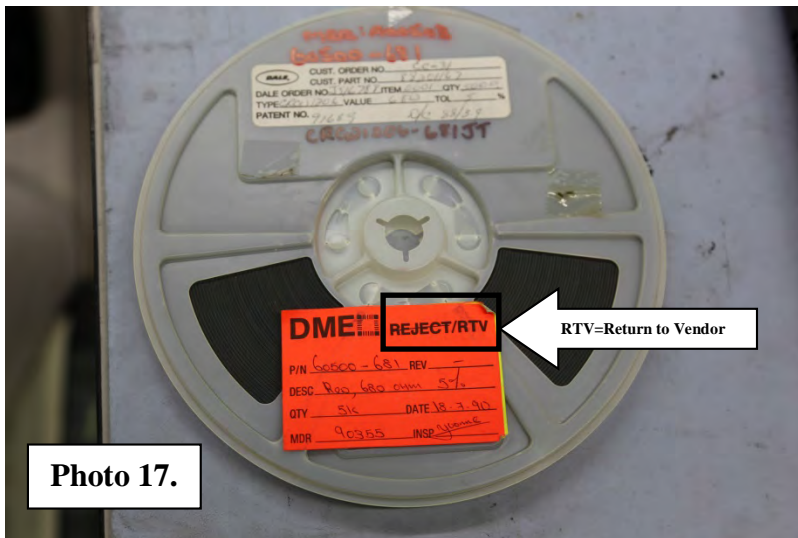


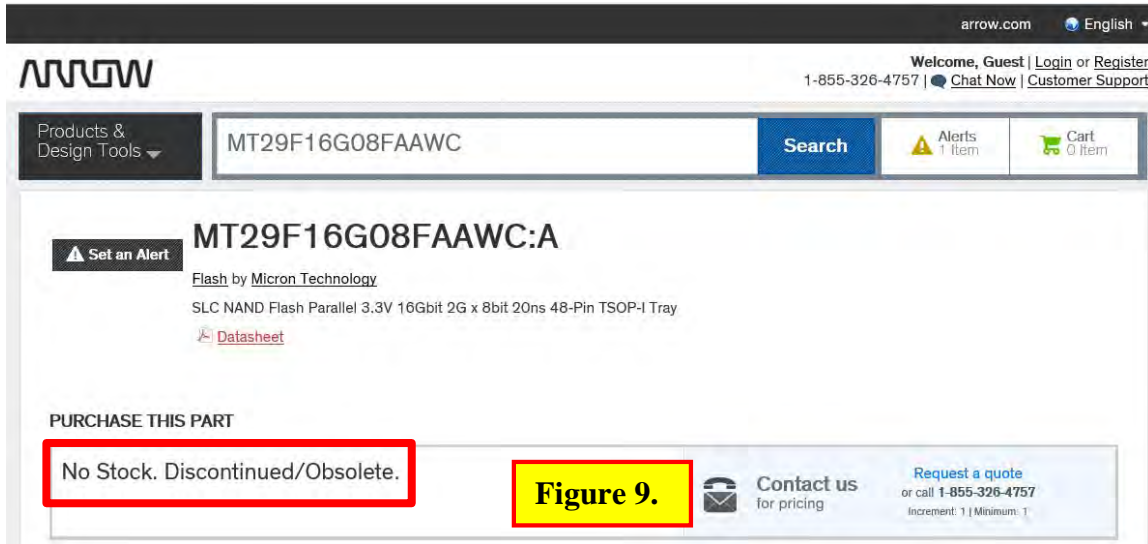
Photo 17.



Photo 18.

46. On May 30<sup>th</sup>, the last day of the inventory, I asked Mr. Hone to show me the labeling system used at A-Board to identify shelf and position locations within the warehouse. In the morning he told me he would have to find his IT person. Around lunch time, I stopped by his office and he showed me the label printer. When I asked to see it in operation, he told me he would have to find his IT person since it was not hooked up. I came back to his office toward mid-afternoon and he had left the A-Board facility. It is likely the label printing system is part of the inventory database.
47. The detailed record of our physical inventory is a spreadsheet that is hundreds of pages long and can be supplied electronically upon request.
48. By Friday May 30<sup>th</sup>, I had found very little value in the A-Board inventory. Per my instructions from Panterra Insurance, I wanted to be sure I had done everything possible to credit the insured with the maximum possible inventory value. As a result, myself and the R&K team conducted two passes through the warehouse to identify properly packaged goods with reasonable age. For most items, I relaxed my criteria to a seven year age limit. I also counted some items with recent date codes that were not hermetically sealed. Those searches yielded a total value of \$416,883.
49. As one example of credited value, we had found properly packaged flash memory devices, with a date code of 2007, that had Mark Clark labeled as the consignor. In performing a search, I found the device listed as

obsolete at Arrow Electronics, a major US electronics distributor. Their web-site excerpt is shown in Figure 9 below:



I also received quotes from other sources, one such quote for \$4.00 is shown in Figure 10 below and the lowest was \$1.66 each. The A-Board claimed unit price was \$18.00 each, and I still gave A-Board their claimed \$54,000 value credit for that inventory. There is a very unlikely possibility that a customer might want this device for the A-Board price if they could not find it elsewhere. As described in the Preface of this report, the life cycle of electronic components is very short, and flash memory, in particular, evolves at a very rapid pace.

Hi ,

It's our pleasure to got your RFQ.

The Following is our best quotation, please check:

---

PartNo.	Description	Qty	Mfg	DC	Price
MT29F16G08FAAWC	100 MICRON	2013			\$4.00/pcs

Our company is one of leading Electronics components distributor. We sale IC(Integrated Circuit), Modules, Capacitor, Connectors etc.

Any other goods do you need?

---

You can send RFQ to me if you looking for these produce.

We sell Only Original New item. If you have any inquiry, please feel free to sent any time.

Yours Sincerely

Brenda  
HongDa Electronics Co.,Ltd

**Figure 10.**

## Conclusions

50. Mr. Hone said that he has been in business for 18 years. Since the vast majority of warehouse electronic components are opened in partially used packages, they are likely overages from PC Boards produced over the 18 years. The date code ranges are also somewhat consistent with that time period. The printed circuit boards, exemplified in Photo 12 are also, in part, likely to be production overages.

51. Inventory such as that shown in Photo 12 is scrap material whose value is not more than can be obtained via metal recovery. The latter is miniscule relative to the intended product sale price, or the \$344,000 valuation.

52. A-Board applies considerable effort to maintain unique shelf location labels throughout their warehouse. They print shelf location labels and even delineate position within a shelf for the majority of bins in the warehouse and they have invested in a location labeling system and printer to facilitate the above. As previously stated, it would be a virtual impossibility to routinely sell product from their warehouse without a location database coupled to product type and quantities. That leaves two possibilities:

- a. A-Board does not sell product from their warehouse
- b. Mr. Hone is unwilling to share the location database

An inventory/location database would have made it much easier to conduct our inventory and to establish a deterministic loss value.

53. From a business perspective, it is unusual that Mr. Hone has made little or no attempt to establish his loss. He claims that 90% of the inventory belongs to consignors, yet he states that he has not notified any of them of their loss. Along similar lines, it would seem important to understand loss of product availability in order to continue selling items from the warehouse to customers.

54. Mr. Hone believes that ESD precautionary measures are unnecessary. That position is diametrically opposed to electronics industry standards as well as my personal experience.



55. Mr. Hone's statement that he stores the most valuable products on upper shelves in the warehouse was not born out during our inventory. Upper shelf inventories were, for the most part, similar to those on lower shelves, except that upper shelf products were probably accessed less frequently. It is logical that lower shelves would be easier to access without a ladder and therefore preferable, resulting in the likelihood that upper shelves would tend to be more empty.
56. Since even one 82" LCD monitor listed in Warehouse 9 could not possibly fit on the shelves Mr. Hone identified as their pre-theft location, and the whole warehouse could not contain the thousands of LCD monitors and other equipment specified in the pre-theft inventory provided to Panterra Insurance, the pre-theft inventory is quite inaccurate. In fact, the "pre-theft" inventory, based on its metadata appears to have been generated approximately 2.5 weeks after the January 7, 2014 theft.
57. The fact that the number of monitors and other equipment on the pre-theft inventory would not physically fit in the warehouse, coupled with the All Electrical web-site consignor "Upload" page and the lead times shown in Figure 5, point to a very significant portion of pre-theft inventory items not having been resident at A-Board during the reported theft.
58. The pre-theft All Electrical warehouse web-site photo taken on December 20<sup>th</sup> 2013 appears to have the same inventory in the same locations, and the same empty shelves as the photo of the same shelves I took on May 25<sup>th</sup> 2014. It then seems that nothing was stolen from that area of the warehouse at all, and it was directly adjacent to where the reported thieves

entered the warehouse. It also contains what appears to be a new ASUS computer monitor.

59. In some cases, older components or assemblies can demand high prices due to lack of availability for older equipment. I did not identify warehouse inventory in that category.
60. Based on our inventory and resultant valuation, the total current warehouse product is worth approximately \$418,000. That spreadsheet tally is shown in Exhibit 6.
61. Because of my involvement in the claim analysis, I became privy to product handling and other issues that typical customers might not be aware of. That could allow higher valuation than I allocated, but I am assuming A-Board accurately represents their goods to customers.
62. As has been described in this report, there are many inconsistencies and inaccuracies in data provided by the insured. Nevertheless, if I assume a warehouse theft actually took place, which is certainly not a given, and estimate the volume of empty bins that may have resulted from the theft, the loss value would be roughly 15% of the pre-theft inventory. The value of the pre-theft inventory could have been as high as \$500,000 resulting in a loss valuation estimate of \$75, 000.

## Summary

63. The process of establishing the value of the A-Board loss should have been a fairly straightforward process that might not have required the services of a technical expert. If an accurate pre-theft inventory had been provided by the insured along with warehouse shelf locations and reasonably accurate valuations, a timely pre-theft minus post-theft subtraction could have yielded an accurate estimate of the loss. The insured also promised but never provided the All Electrical online database and individual consignor spreadsheets that would have also been helpful. Mislabeled bins, lack of part traceability to the pre-theft inventory and frequent self-contradictions by the insured further exacerbated the process. Despite the above encumbrances, I believe the Panterra Insurance team applied considerable effort and took the time to do a fairly accurate and best possible assessment of the loss. If additional objective data can be obtained, I will be pleased to conduct further review and augment or modify any of my conclusions, where appropriate.

Respectfully submitted,

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ROBERT J. ABEND, PE