

**PE03-044**

**FORD**

**5/13/2005**

**APPENDIX I**

**BOOK 25 OF 28**

**PART 4 OF 4**





























TEST NO.	TEST NAME	TEST DATE	TEST TIME	TEST DURATION	TEST STATUS	TEST LOCATION	TEST OPERATOR	TEST EQUIPMENT	TEST RESULTS	TEST COMMENTS	TEST DATE	TEST TIME	TEST DURATION	TEST STATUS	TEST LOCATION	TEST OPERATOR	TEST EQUIPMENT	TEST RESULTS	TEST COMMENTS
1001	TEST NAME	10/10/80	10:00	1.0	PASS	LA	LA	TEST NAME	TEST RESULTS	TEST COMMENTS	10/10/80	10:00	1.0	PASS	LA	LA	TEST NAME	TEST RESULTS	TEST COMMENTS
1002	TEST NAME	10/10/80	10:05	1.0	PASS	LA	LA	TEST NAME	TEST RESULTS	TEST COMMENTS	10/10/80	10:05	1.0	PASS	LA	LA	TEST NAME	TEST RESULTS	TEST COMMENTS
1003	TEST NAME	10/10/80	10:10	1.0	PASS	LA	LA	TEST NAME	TEST RESULTS	TEST COMMENTS	10/10/80	10:10	1.0	PASS	LA	LA	TEST NAME	TEST RESULTS	TEST COMMENTS
1004	TEST NAME	10/10/80	10:15	1.0	PASS	LA	LA	TEST NAME	TEST RESULTS	TEST COMMENTS	10/10/80	10:15	1.0	PASS	LA	LA	TEST NAME	TEST RESULTS	TEST COMMENTS
1005	TEST NAME	10/10/80	10:20	1.0	PASS	LA	LA	TEST NAME	TEST RESULTS	TEST COMMENTS	10/10/80	10:20	1.0	PASS	LA	LA	TEST NAME	TEST RESULTS	TEST COMMENTS
1006	TEST NAME	10/10/80	10:25	1.0	PASS	LA	LA	TEST NAME	TEST RESULTS	TEST COMMENTS	10/10/80	10:25	1.0	PASS	LA	LA	TEST NAME	TEST RESULTS	TEST COMMENTS
1007	TEST NAME	10/10/80	10:30	1.0	PASS	LA	LA	TEST NAME	TEST RESULTS	TEST COMMENTS	10/10/80	10:30	1.0	PASS	LA	LA	TEST NAME	TEST RESULTS	TEST COMMENTS
1008	TEST NAME	10/10/80	10:35	1.0	PASS	LA	LA	TEST NAME	TEST RESULTS	TEST COMMENTS	10/10/80	10:35	1.0	PASS	LA	LA	TEST NAME	TEST RESULTS	TEST COMMENTS
1009	TEST NAME	10/10/80	10:40	1.0	PASS	LA	LA	TEST NAME	TEST RESULTS	TEST COMMENTS	10/10/80	10:40	1.0	PASS	LA	LA	TEST NAME	TEST RESULTS	TEST COMMENTS
1010	TEST NAME	10/10/80	10:45	1.0	PASS	LA	LA	TEST NAME	TEST RESULTS	TEST COMMENTS	10/10/80	10:45	1.0	PASS	LA	LA	TEST NAME	TEST RESULTS	TEST COMMENTS







Ball/Beam Balance System Design Template

Document Name	Ball/Beam Balance SRS
Doc Number	100-000000
Author	AS, MJD

Doc Title	Ball/Beam Balance SRS
Doc Number	100-000000
Doc Version	1.0
Doc Date	10/10/00

Doc Status	Final SRS
Doc Number	100-000000
Doc Version	1.0
Doc Date	10/10/00

Electrical Hardware Requirements Matrix

Req ID	Req Description	Category	Priority	Source	Notes
1	Power supply	Power	High	Internal	
2	Control system	Control	High	External	
3	Ball/Beam assembly	Mechanical	High	External	
4	Camera	Imaging	High	External	
5	Light source	Imaging	High	External	
6	Encoder	Positioning	High	External	
7	Motor	Actuation	High	External	
8	Temperature sensor	Monitoring	Medium	External	
9	Pressure sensor	Monitoring	Medium	External	
10	Humidity sensor	Monitoring	Medium	External	
11	Vibration sensor	Monitoring	Medium	External	
12	Acoustic sensor	Monitoring	Medium	External	
13	Gas sensor	Monitoring	Medium	External	
14	Proximity sensor	Monitoring	Medium	External	
15	Force sensor	Monitoring	Medium	External	
16	Displacement sensor	Monitoring	Medium	External	
17	Angle sensor	Monitoring	Medium	External	
18	Speed sensor	Monitoring	Medium	External	
19	Acceleration sensor	Monitoring	Medium	External	
20	Position sensor	Monitoring	Medium	External	

Req ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Req Status	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open

Note: All active options and variants are for MFR/BA, operational and include both open and reserved states.

Physical Interface Requirements Matrix

Req ID	Req Description	Category	Priority	Source	Notes
1	Power supply	Power	High	Internal	
2	Control system	Control	High	External	
3	Ball/Beam assembly	Mechanical	High	External	
4	Camera	Imaging	High	External	
5	Light source	Imaging	High	External	
6	Encoder	Positioning	High	External	
7	Motor	Actuation	High	External	
8	Temperature sensor	Monitoring	Medium	External	
9	Pressure sensor	Monitoring	Medium	External	
10	Humidity sensor	Monitoring	Medium	External	
11	Vibration sensor	Monitoring	Medium	External	
12	Acoustic sensor	Monitoring	Medium	External	
13	Gas sensor	Monitoring	Medium	External	
14	Proximity sensor	Monitoring	Medium	External	
15	Force sensor	Monitoring	Medium	External	
16	Displacement sensor	Monitoring	Medium	External	
17	Angle sensor	Monitoring	Medium	External	
18	Speed sensor	Monitoring	Medium	External	
19	Acceleration sensor	Monitoring	Medium	External	
20	Position sensor	Monitoring	Medium	External	

Compressor Run-Out - Near Limiting from the Face of the Compressor on Spring Mount

**AP2 & AP3 BUILDS**

Alpha Ballbot/Compressor are located in compressor build 100-000000-001.  
Beta Ballbot/Compressor are located in compressor build 100-000000-002.

**SEE ATTACHMENT**

Note: All active options and variants are for MFR/BA, operational and include both open and reserved states.

100-000-7087

**Electrical / Electronic Systems Design Transmittal**

Customer Name:	Pal & Eng'g. Inc.
Part Number:	2000-0000-00
Revision:	1.0

Customer Part:	AP2
Customer:	
Part:	AP2
Rev:	1.0

Date:	10/10/00
Time:	10:00 AM
By:	John Doe

**Electrical Hardware Requirements Matrix**

Component Number / Part Number	Board Name	Function Class	Operating Voltage (V)		Operating Current (A) at Voltage (V)					Max. Power (W)			Design Resistance (Ohms)			Operating Voltage or Amplitude (V)			Frequency (Hz)	Weight (lb)	Thermal Protection	Description																																																																																		
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max					Min	Max																																																																																
1	AP2-001	Power	2.7	3.3	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	10.0

Operating Voltage (V)	2.7	3.3
Operating Current (A)	0.1	0.2

Note: All reported voltage and currents are for NORMAL operation and must include both active and non-active states.

100 Specifications, Vol 1, Sec 2

**Physical Interface Requirements Matrix**

Connector Part Number	Pin	Signal Name	Pin Name	Function Part Number
AP2-001	1	Signal 1	Pin 1	AP2-001
	2	Signal 2	Pin 2	AP2-001
	3	Signal 3	Pin 3	AP2-001
	4	Signal 4	Pin 4	AP2-001

Connector Pin-Out - View Looking into the Plug of the Connector on Connector

**AP2 & AP3 BUILDS**

Note: Electrical Characteristics are identical to connector part 2000-0000-00. Safety Connector is identical to 001, Rev 001 2000-0000-00.

Designer: Don Blazquez  
Circuit Design Team/LLC

PENG-004-7000

Electrical / Electronic Systems Design Transmittal

Customer Name:	Aut & Sport Auto - And
Part Number:	8011-000000
Quantity:	01100

Customer Name:	Don Blumstein
Company:	DLI INC
Address:	21-000
City/State/Zip:	01100

Date:	01/10/00
Time:	10:00
By:	7/1/00

1	1	1
2	1	1
3	1	1
4	1	1
5	1	1
6	1	1
7	1	1
8	1	1
9	1	1
10	1	1
11	1	1
12	1	1
13	1	1
14	1	1
15	1	1
16	1	1
17	1	1
18	1	1
19	1	1
20	1	1

SEE ATTACHMENT

Note: Customer Part Number is the Part Number for the Customer on Your Computer System Software Panel.

1003-044-7000

Electrical / Electronic Systems Design Transmittal

Customer Name	U.S. AIR FORCE
Customer Address	3000 RANDOLPH DRIVE
Customer City	MEMPHIS, TN

Product Name	AP-100
Product Description	AP-100
Product Part Number	AP-100
Product Revision	1.0

Order Number	10000000000000000000
Order Date	10/10/00
Order Status	ORDERED
Order Type	STANDARD

Electrical Hardware Requirements Matrix

Req. No.	Req. Description	Item No.	Qty.	Unit	Notes	Material	Remarks
1	...	...	...	...	...	...	...
2	...	...	...	...	...	...	...
3	...	...	...	...	...	...	...
4	...	...	...	...	...	...	...
5	...	...	...	...	...	...	...
6	...	...	...	...	...	...	...
7	...	...	...	...	...	...	...
8	...	...	...	...	...	...	...
9	...	...	...	...	...	...	...
10	...	...	...	...	...	...	...
11	...	...	...	...	...	...	...
12	...	...	...	...	...	...	...
13	...	...	...	...	...	...	...
14	...	...	...	...	...	...	...
15	...	...	...	...	...	...	...
16	...	...	...	...	...	...	...
17	...	...	...	...	...	...	...
18	...	...	...	...	...	...	...
19	...	...	...	...	...	...	...
20	...	...	...	...	...	...	...
21	...	...	...	...	...	...	...
22	...	...	...	...	...	...	...
23	...	...	...	...	...	...	...
24	...	...	...	...	...	...	...
25	...	...	...	...	...	...	...
26	...	...	...	...	...	...	...
27	...	...	...	...	...	...	...
28	...	...	...	...	...	...	...
29	...	...	...	...	...	...	...
30	...	...	...	...	...	...	...
31	...	...	...	...	...	...	...
32	...	...	...	...	...	...	...
33	...	...	...	...	...	...	...
34	...	...	...	...	...	...	...
35	...	...	...	...	...	...	...
36	...	...	...	...	...	...	...
37	...	...	...	...	...	...	...
38	...	...	...	...	...	...	...
39	...	...	...	...	...	...	...
40	...	...	...	...	...	...	...
41	...	...	...	...	...	...	...
42	...	...	...	...	...	...	...
43	...	...	...	...	...	...	...
44	...	...	...	...	...	...	...
45	...	...	...	...	...	...	...
46	...	...	...	...	...	...	...
47	...	...	...	...	...	...	...
48	...	...	...	...	...	...	...
49	...	...	...	...	...	...	...
50	...	...	...	...	...	...	...

Customer Name	U.S. AIR FORCE
Customer Address	3000 RANDOLPH DRIVE
Customer City	MEMPHIS, TN

Notes: 1. All quantities are in units unless otherwise specified. 2. All dimensions are in inches unless otherwise specified.

Physical Interface Requirements Matrix

Req. No.	Req. Description	Item No.	Qty.	Unit	Notes	Material	Remarks
1	...	...	...	...	...	...	...
2	...	...	...	...	...	...	...
3	...	...	...	...	...	...	...
4	...	...	...	...	...	...	...
5	...	...	...	...	...	...	...
6	...	...	...	...	...	...	...
7	...	...	...	...	...	...	...
8	...	...	...	...	...	...	...
9	...	...	...	...	...	...	...
10	...	...	...	...	...	...	...
11	...	...	...	...	...	...	...
12	...	...	...	...	...	...	...
13	...	...	...	...	...	...	...
14	...	...	...	...	...	...	...
15	...	...	...	...	...	...	...
16	...	...	...	...	...	...	...
17	...	...	...	...	...	...	...
18	...	...	...	...	...	...	...
19	...	...	...	...	...	...	...
20	...	...	...	...	...	...	...
21	...	...	...	...	...	...	...
22	...	...	...	...	...	...	...
23	...	...	...	...	...	...	...
24	...	...	...	...	...	...	...
25	...	...	...	...	...	...	...
26	...	...	...	...	...	...	...
27	...	...	...	...	...	...	...
28	...	...	...	...	...	...	...
29	...	...	...	...	...	...	...
30	...	...	...	...	...	...	...
31	...	...	...	...	...	...	...
32	...	...	...	...	...	...	...
33	...	...	...	...	...	...	...
34	...	...	...	...	...	...	...
35	...	...	...	...	...	...	...
36	...	...	...	...	...	...	...
37	...	...	...	...	...	...	...
38	...	...	...	...	...	...	...
39	...	...	...	...	...	...	...
40	...	...	...	...	...	...	...
41	...	...	...	...	...	...	...
42	...	...	...	...	...	...	...
43	...	...	...	...	...	...	...
44	...	...	...	...	...	...	...
45	...	...	...	...	...	...	...
46	...	...	...	...	...	...	...
47	...	...	...	...	...	...	...
48	...	...	...	...	...	...	...
49	...	...	...	...	...	...	...
50	...	...	...	...	...	...	...

Customer Part No. - Must be entered in the Part of the Component on Data printed

**AP1 BUILDS ONLY**

**SEE ATTACHMENT**

Note: Quantity and Range is in the Standard or the Component on the Standard (Other otherwise noted).

PERG-044 75822

Contract Number	DAAG01-97-1-0001 (S/N 0001)
Contract Title	DEFENSE ELECTRONIC SYSTEMS DESIGN TECHNICAL
Contract Office	WPAFB

Task Order Number	0001
Task Order Title	DEFENSE ELECTRONIC SYSTEMS DESIGN TECHNICAL
Task Order Office	WPAFB

Product Name	DEFENSE ELECTRONIC SYSTEMS DESIGN TECHNICAL
Product Office	WPAFB
Product Office	WPAFB

**Electrical Hardware Requirements Matrix**

Req ID	Req Description	Priority	Category	Subcategory	Phase	Start	End	Status	Notes
1	Power Supply	High	Power	Supply	Design	1997-01-01	1997-03-31	Complete	
2	Control System	Medium	Control	System	Design	1997-01-01	1997-03-31	Complete	
3	Signal Processor	Medium	Signal	Processor	Design	1997-01-01	1997-03-31	Complete	
4	Display Unit	Medium	Display	Unit	Design	1997-01-01	1997-03-31	Complete	
5	Keyboard	Medium	Input	Device	Design	1997-01-01	1997-03-31	Complete	
6	Mouse	Medium	Input	Device	Design	1997-01-01	1997-03-31	Complete	
7	Printer	Medium	Output	Device	Design	1997-01-01	1997-03-31	Complete	
8	Scanner	Medium	Input	Device	Design	1997-01-01	1997-03-31	Complete	
9	Modem	Medium	Communication	Device	Design	1997-01-01	1997-03-31	Complete	
10	Network Card	Medium	Communication	Device	Design	1997-01-01	1997-03-31	Complete	
11	Sound Card	Medium	Audio	Device	Design	1997-01-01	1997-03-31	Complete	
12	Video Card	Medium	Video	Device	Design	1997-01-01	1997-03-31	Complete	
13	Hard Drive	Medium	Storage	Device	Design	1997-01-01	1997-03-31	Complete	
14	RAM	Medium	Memory	Device	Design	1997-01-01	1997-03-31	Complete	
15	Processor	High	Processing	Unit	Design	1997-01-01	1997-03-31	Complete	
16	Motherboard	High	System	Board	Design	1997-01-01	1997-03-31	Complete	
17	Power Supply	High	Power	Supply	Design	1997-01-01	1997-03-31	Complete	
18	Control System	Medium	Control	System	Design	1997-01-01	1997-03-31	Complete	
19	Signal Processor	Medium	Signal	Processor	Design	1997-01-01	1997-03-31	Complete	
20	Display Unit	Medium	Display	Unit	Design	1997-01-01	1997-03-31	Complete	
21	Keyboard	Medium	Input	Device	Design	1997-01-01	1997-03-31	Complete	
22	Mouse	Medium	Input	Device	Design	1997-01-01	1997-03-31	Complete	
23	Printer	Medium	Output	Device	Design	1997-01-01	1997-03-31	Complete	
24	Scanner	Medium	Input	Device	Design	1997-01-01	1997-03-31	Complete	
25	Modem	Medium	Communication	Device	Design	1997-01-01	1997-03-31	Complete	
26	Network Card	Medium	Communication	Device	Design	1997-01-01	1997-03-31	Complete	
27	Sound Card	Medium	Audio	Device	Design	1997-01-01	1997-03-31	Complete	
28	Video Card	Medium	Video	Device	Design	1997-01-01	1997-03-31	Complete	
29	Hard Drive	Medium	Storage	Device	Design	1997-01-01	1997-03-31	Complete	
30	RAM	Medium	Memory	Device	Design	1997-01-01	1997-03-31	Complete	
31	Processor	High	Processing	Unit	Design	1997-01-01	1997-03-31	Complete	
32	Motherboard	High	System	Board	Design	1997-01-01	1997-03-31	Complete	

Contract Number	DAAG01-97-1-0001
Task Order Number	0001

Note: All reported voltages and currents are for NORMAL operation and may include both peak and average values.

**Physical Interface Requirements Matrix**

Req ID	Req Description	Priority	Category	Subcategory	Phase	Start	End	Status	Notes
1	Power Supply	High	Power	Supply	Design	1997-01-01	1997-03-31	Complete	
2	Control System	Medium	Control	System	Design	1997-01-01	1997-03-31	Complete	
3	Signal Processor	Medium	Signal	Processor	Design	1997-01-01	1997-03-31	Complete	
4	Display Unit	Medium	Display	Unit	Design	1997-01-01	1997-03-31	Complete	
5	Keyboard	Medium	Input	Device	Design	1997-01-01	1997-03-31	Complete	
6	Mouse	Medium	Input	Device	Design	1997-01-01	1997-03-31	Complete	
7	Printer	Medium	Output	Device	Design	1997-01-01	1997-03-31	Complete	
8	Scanner	Medium	Input	Device	Design	1997-01-01	1997-03-31	Complete	
9	Modem	Medium	Communication	Device	Design	1997-01-01	1997-03-31	Complete	
10	Network Card	Medium	Communication	Device	Design	1997-01-01	1997-03-31	Complete	
11	Sound Card	Medium	Audio	Device	Design	1997-01-01	1997-03-31	Complete	
12	Video Card	Medium	Video	Device	Design	1997-01-01	1997-03-31	Complete	
13	Hard Drive	Medium	Storage	Device	Design	1997-01-01	1997-03-31	Complete	
14	RAM	Medium	Memory	Device	Design	1997-01-01	1997-03-31	Complete	
15	Processor	High	Processing	Unit	Design	1997-01-01	1997-03-31	Complete	
16	Motherboard	High	System	Board	Design	1997-01-01	1997-03-31	Complete	

Attention: Please View Looking into the View of the Connector as Compared to

**APS BUILDS ONLY**

**SEE ATTACHMENT**

Note: Attention: For updates to the Matrix, refer to the Matrix on the Network/Status Matrix Page.

FIG 3-644 7893

**Device Transmittal**

FOR ALL FORD NAVISTAR BUILDS - AP3  
 FUSED & ADJUSTABLE ACCELERATOR CONTROLS

Control Number:

Vehicle Code:  Model Year:  Vehicle Line:

Device Name:

Subsystem Name:

Ford Device Engineer:

Phone Number:

Signature:

Location/Cube:

Issue Date:

Revised Date:

PSMS Systems Engineer:

Phone Number:

Device Part Number:

Device Supplier:

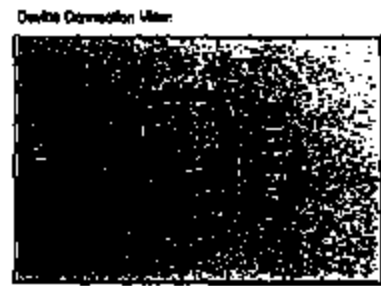
WHM Base Number:

Veh Location Code:

Device Connector P/N:

Device Connector Supp:

Device Orientation Type:



Ford Connector P/N:

Rel. Core App Part No.:

Connector Supplier:

Connector Description:

Ford Spec P/N:

Date Connector meet held:

ESB Requirements? Yes  No

\* If connector does not have a Ford Part Number, a Connector Part must be submitted

Cavity	Circuit Function	W/D	Wire Color	Wire Size	Voltage					Terminal Observations			Comp Term	Circuit Number	Terminal Part Number	Term. Supp. Term. Code	Wire Size	Wire Color	Low Energy Cont?
					V	I	R	Imp	Imp	Wtch	Yield	Plan							
A	Unsup																		
B	Unsup																		
C	PPB1 - Pedal push output 1		white	20AWG	5mA	10mA	variable	2.2		1.80V-2.20V-0.02	N/A		Tr & Au						
D	PPB2 - Pedal push output 2		orange	20AWG	5mA	10mA	variable	2.2		1.80V-2.20V-0.02	N/A		Tr & Au						
E	PPB3 - Pedal push output 3		green	20AWG	5mA	10mA	variable	2.2		1.80V-2.20V-0.02	N/A		Tr & Au						
F	Unsup																		
G	BRND		black	20AWG	5mA	10mA	0	<	40V	1.80V-2.20V-0.02	N/A		Tr & Au						
H	VREF		red	20AWG	5mA	10mA	4.8	5.0	5.2	1.80V-2.20V-0.02	N/A		Tr & Au						
J	BRND		black	20AWG	5mA	10mA	0	<	40V	1.80V-2.20V-0.02	N/A		Tr & Au						
K	VREF		red	20AWG	5mA	10mA	4.8	5.0	5.2	1.80V-2.20V-0.02	N/A		Tr & Au						

Ford System Engineer:

Phone Number:

Signature:

Location/Cube:

Ford WHM Engineer:

Phone Number:

Signature:

Location/Cube:

Ford Core Eng Engineer:

Phone Number:

Signature:

Location/Cube:

Ford Term Engineer:

Phone Number:

Signature:

Location/Cube:

Ford Conn App Engineer:

Phone Number:

Signature:

Location/Cube:

Comments:

FORD-014 7894





**Device Transmittal**

FOR ALL BDL MOUNTAIN BUILDS - AFS  
FIXED & ADJUSTABLE ACCELERATOR CONTROLS

Control Number:

Issue Date:

Revised Date:

FRWG Systems Engineer:

Phone number:

Vehicle Code:  Model Year:  Vehicle Line:

Device Name:

Subsystem Name:

Ford Device Engineer:

Phone Number:

Signature:

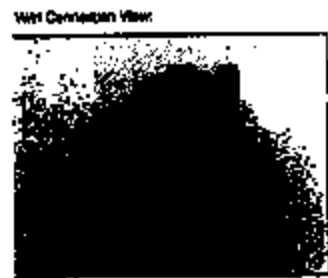
Location Code:

Device Part Number:  Device Connector PIN:

Device Supplier:  Device Connector Supp:

WH Base Number:  Device Connector Type:

Vehicle Location Code:



Ford Connector PIN:  Ref. Conn App Form No:

Connector Supplier:  Connector Description:

Ford Special Pkg:  Does Connector meet basic SCS Requirements? Yes  No

*If connector does not meet SCS, Part Numbering & Connector Application, Name must be submitted*

Circuit	Circuit Function	U/I	Device Time	Wiring Diagram	Device Dimensions					Terminal Dimensions			Cable Term Part Code	Circuit Number	Wiring Harness Connection		Wiring Spec	Wire Spec	Low EMI/RFI Cert
					Min	Max	Min	Max	Min	Max	Min	Max			Terminal Part Number	Term Supt Term Desc			
A	Unpld																		
B	Unpld																		
C	PPR1 - Pedal pos'n output 1				5mA	10mA	100mA	5.2		1.00±.02	2.00±.02	N/A	Th & Au						
D	PPR2 - Pedal pos'n output 2				5mA	10mA	100mA	5.2		1.00±.02	2.00±.02	N/A	Th & Au						
E	PPR3 - Pedal pos'n output 3				5mA	10mA	100mA	5.2		1.00±.02	2.00±.02	N/A	Th & Au						
F	Unpld																		
G	GRND				20mA	10mA	0	<	40V	1.00±.02	2.00±.02	N/A	Th & Au						
H	VREF				5mA	10mA	4.8	5.2	5.2	1.00±.02	2.00±.02	N/A	Th & Au						
J	GRND				5mA	10mA	0	<	80V	1.00±.02	2.00±.02	N/A	Th & Au						
K	VREF				5mA	10mA	4.5	5.0	5.0	1.00±.02	2.00±.02	N/A	Th & Au						

Ford System Engineer:  Ford Wiring Engineer:  Ford Conn Des Engineer:  Ford Term Engineer:  Ford Conn App Engineer:

Phone number:  Phone number:  Phone number:  Phone number:  Phone number:

Signature:  Signature:  Signature:  Signature:  Signature:

Location Code:  Location Code:  Location Code:  Location Code:  Location Code:

Comments:

PE03-044 7896



**Device Transmittal**

FOR ALL FORD NASTAR BUILDS - APE  
FORD ACCELERATOR CONTROLS

Control Number:

Vehicle Code:  Model Year:  Vehicle Line:

Device Name:

Subsystem Name:

Ford Device Engineer:  Dan Searles  
Phone Number:  84-6122  
Signature:   
Location/Club:  FOC 2B-240

Issue Date:   
Revised Date:   
FORD Systems Engineer:  Thomas Price  
Phone number:  (864) 421-5490

Device Part Number:  Device Connector P/N:

Device Supplier:  Device Connector Supplier:

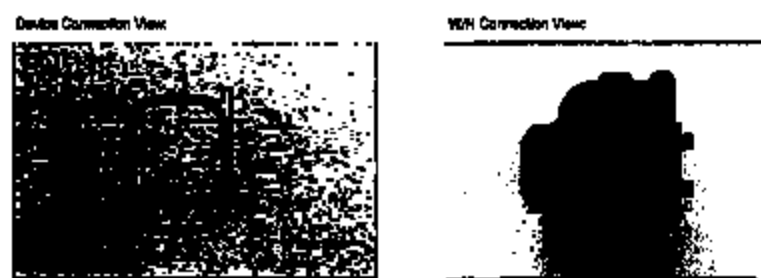
WH Base Number:  Device Connection Type:

Veh Location Code:

Port Connector P/N:  Part. Class App Form No.:

Connector Supplier:  Connector Description:

Feed Spool P/N:  Does Connector meet basic  
GD8 Requirements? Yes  No



\* Connector does not have a Part Part Number, a Connector Application Form must be submitted

Circuit	CIRCUIT Function	NO	Min/Max Time	Min/Max Res.	Device Connection						Wire Harness Connection						Low Energy Cir?		
					Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max			
A	APPS - APPS pedal position (1)				2mA	10mA	4.8	5.0	5.2			1.8V-2.0V	1.8	2.0	2.2				
B	Unlabeled				2mA	10mA	4.8	5.0	5.2			1.8V-2.0V	1.8	2.0	2.2				
D	APPS - APPS pedal position (2)				2mA	10mA	4.8	5.0	5.2			1.8V-2.0V	1.8	2.0	2.2				
E	APPS - APPS pedal position (3)				2mA	10mA	4.8	5.0	5.2			1.8V-2.0V	1.8	2.0	2.2				
F	APPS - APPS pedal position (4)				2mA	10mA	4.8	5.0	5.2			1.8V-2.0V	1.8	2.0	2.2				
G	APPS - APPS pedal position (5)				2mA	10mA	4.8	5.0	5.2			1.8V-2.0V	1.8	2.0	2.2				
H	APPS - APPS pedal position (6)				2mA	10mA	4.8	5.0	5.2			1.8V-2.0V	1.8	2.0	2.2				
J	APPS - APPS pedal position (7)				2mA	10mA	4.8	5.0	5.2			1.8V-2.0V	1.8	2.0	2.2				
K	APPS - APPS pedal position (8)				2mA	10mA	4.8	5.0	5.2			1.8V-2.0V	1.8	2.0	2.2				

Ford System Engineer:  Phone number:  Signature:  Location/Club:

Ford Wiring Engineer:  Phone number:  Signature:  Location/Club:

Ford Conn Des Engineer:  Phone number:  Signature:  Location/Club:

Ford Test Engineer:  Phone number:  Signature:  Location/Club:

Ford Conn App Engineer:  Phone number:  Signature:  Location/Club:

Comments:

FORD-944 7791

**Electrical / Electronic System Design Transcript**

Component Name	PLA 8000-100-100
Part Number	8000-100-100
Manufacturer	8000-100-100

Operating Point	100% Power
Power	100 W
Efficiency	80%
Temperature	25°C

Weight	100 g
Volume	100 cm <sup>3</sup>
Lead Time	100 weeks
Cost	100 \$

**Electrical Hardware Requirements Matrix**

Component Number / Part Number	Signal Name	Operating Voltage (V)	Operating Current (A) @ Voltage (V)					Power Dissipation (mW)			Data Retention (Hours)			Operating Duration / Lifetime Time (Year)			Propaganda (dB)	Weight (g)	Volume (cm <sup>3</sup> )	Lead Time (Weeks)	Cost (\$)
			Min	Max	Average	Peak	Steady State	Min	Max	Average	Min	Max	Average	Min	Max	Average					
1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
7	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
8	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
9	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

Operating Voltage (V)	100
Operating Current (A)	100
Power Dissipation (mW)	100
Operating Duration (Year)	100

Notes: All reported voltages and currents are for NORMAL operation and must include both active and standby states.

P200-044 7752







# Problem Statement

- 2002/2003 MY 7.3L Teleflex Adjustable Two Track Accelerator Pedal Field Failures

[ 120 R/1000 @ 6MIS YTD ] C

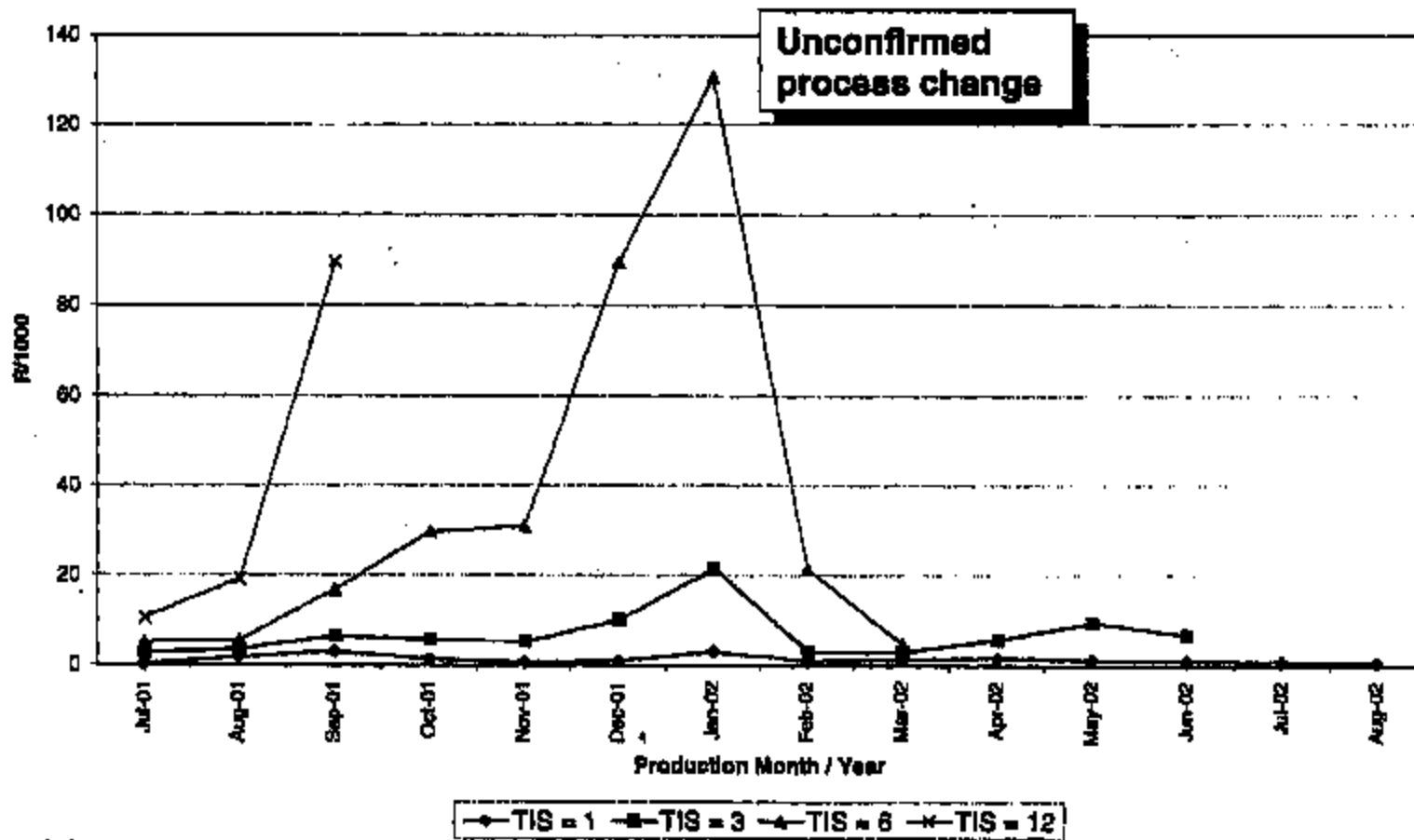


# Warranty-Stack Chart

TELEFLEX PEDAL

2002 - 2003 MY 7.3L DSL Super Duty F-Series / Excursion - 9F836 - Stack Chart

Part Num Full (osusa) [typed] = [2C3Z,9F836,%]



PE88-944 8225

10/3/2003

## **Root Cause** **(FRL Lab Results)**

- “Migration of lubricant from the switch track to the pot track which is designed to operate dry. Lubricant on pot track acts as an adhesive collecting wear debris. This wear debris erodes the contact fingers during normal operation resulting in loss of pedal function due irregular signal output.”

## PV Test Part Teardown



- Normal wear

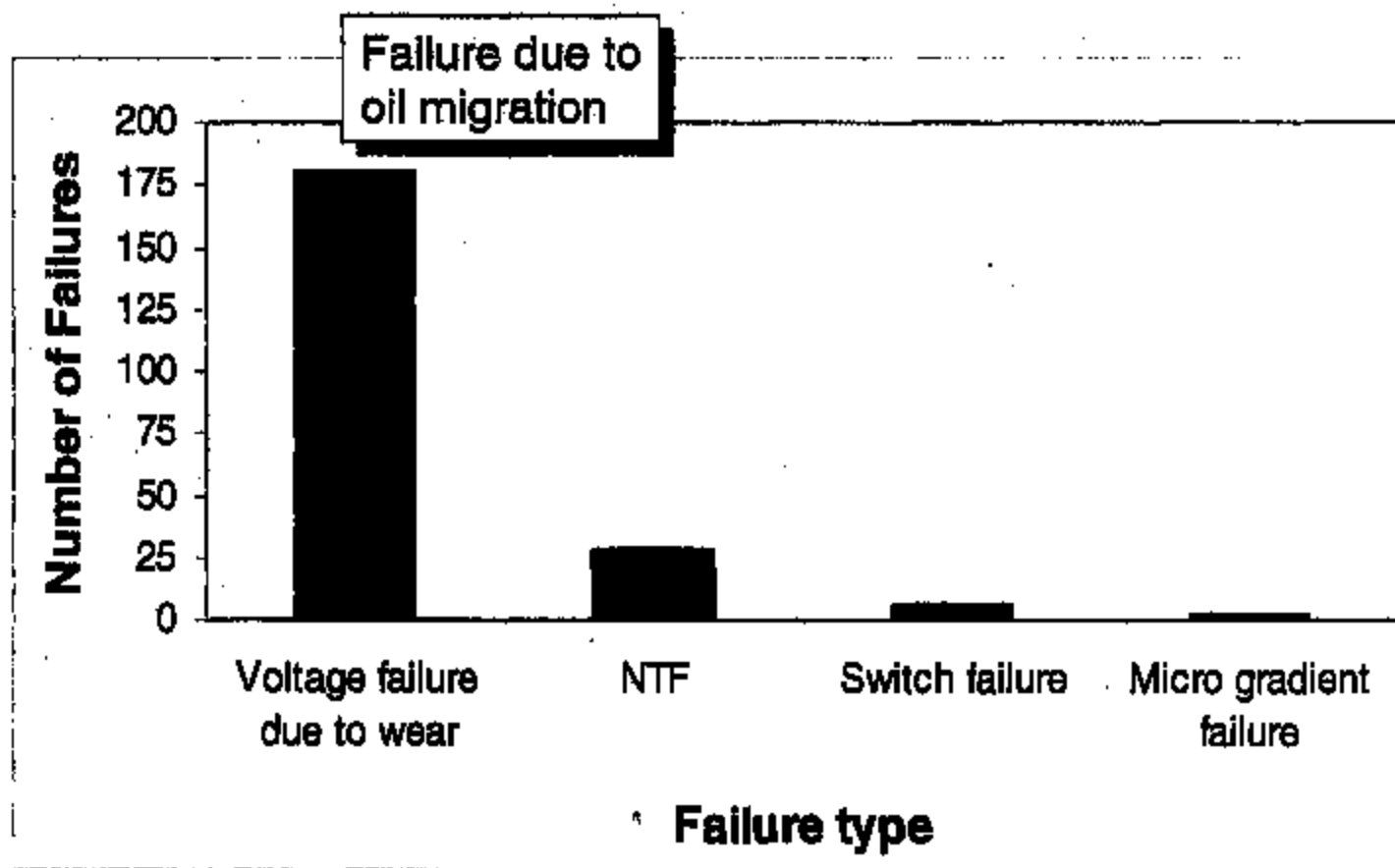


- Abrasive slurry caused by lube contamination on pot track



- Contact point on fingers worn away from abrasive slurry

# Warranty Return Parts





## Duplication of Failure/Oil Migration Testing

- Original sensor with 706D Lube
- Lube migration with 6 hours of heat



- Heat aging test with Phenolic Barrier  
- 59 hours of vibration at 85°C
- 706 Lube migration with Phenolic Barrier



- 8511 Lube with Phenolic Barrier.  
Lube does not migrate with heat or vibration

## **Permanent Corrective Actions**

- Add a phenolic resin to the ceramic circuit board between the switch tracks and pot tracks to minimize lubricant migration (10/17/02, C11415042).
- Changed to a non migrating lubricant (11/18/02, A11427723).
- Utilize an applicator (week of 12/16/02, C11427798) to apply a metered amount of switch track lube.

## Verification

- Completed 2 million cycles of KLT with c/o lube and phenolic resin barrier, no electrical or physical issues. Lube did not migrate across phenolic resin. Currently at 3.5 of 4 million cycles of extended life.
- Completed 2 million cycles of KLT with new lube, no migration. Extend KLT to to failure.
- Nye (lubricant supplier) completed bench testing to verify new lube does not migrate, heat and vibration were utilized during this testing

## Lessons Learned

- Root cause was due to oil migration and factors such as time and vibration were not accounted for in the KLT. Quantity of lubricant also played a key role in time to failure.
- Original DV/PV parts including Key Life and vehicle durability were not torn down after completion of testing which would have revealed the wear issue.
- Don't rely on Tier #1 Suppliers to incorporate "Black Box" Technology.



# Three Track Process Actions

- Eliminate lube intolerant sensor applications in SDS
- Deep Dive Tier #2 Suppliers
- Updated ES to include part teardown requirement after testing.
- Incorporate automated lube applicator. Control plan specifies metered quantity.
- RDM Process Incorporated

# **Three Track Product Actions / Validation**

- Successfully completed DV/PV in 2003 ¼ P131/U137, teardown and visual inspection has been completed. Teleflex has 1.3 million three track pedals in production. Three Track technology successfully tested to 14 million cycles
- Develop ES spec to add vibration as a variable during KLT. U152 and P221 PV testing will include serial vibration testing.
- Run KLT to failure. Establish Weibull Plot
- Develop objective metric for wiper wear.

# Golden Sensor Plan for Pedal Sensors

Letter sent requesting reps for Transition K/O Meeting	11/25/02
Design Review w/Clusters on 7.3L & 6.0L Diesel, LS, & P221 Pedals	12/03/02
Transition K/O Meeting scheduled for mid December <ul style="list-style-type: none"><li>• Sensor Strategy (Technology, Sourcing, Future Actions)</li><li>• Centralized Pedal Sensor D&amp;R</li></ul>	12/02
Strategy defined and organization established	3/31/03

**From:** Mitchell, Vicky (V.B.)  
**Sent:** Monday, September 22, 2003 4:44 PM  
**To:** West, Gregory (G.S.)  
**Cc:** Conroy, Jerry (J.R.); Lipoosky, Lawrence (L.J.)  
**Subject:** RE: Data analysis

Greg,  
As discussed, attached is a pie chart and summary, categorizing the failures for the 7.3L 2001-2003 MY SD/Excursion -1C3Z 9F836- Pedal Claims. Please review for discussion tomorrow (Tues., 23 sep 2003) and I'll address any questions or concerns you may have.



7.3L P131-U137  
9F836- Clatrs...

Regards;

*Vicky Mitchell*

Powertrain Quality Responsible Team

Quality is Job #1! It is our responsibility, our job Security and our future!

EMAIL: VMITCHEL@FORD.COM

PDC 2F-B37, Phone/FAX: (313) 32-27071

Text Pager: (313) 851-0283

-----Original Message-----

**From:** West, Gregory (G.S.)  
**Sent:** Friday, September 19, 2003 8:13 AM  
**To:** Mitchell, Vicky (V.B.)  
**Subject:** RE: Data analysis

Thanks, that sounds great. I'm at a supplier all day Monday so I'll review it with you Tuesday.

-----Original Message-----

**From:** Mitchell, Vicky (V.B.)  
**Sent:** Thursday, September 18, 2003 4:59 PM  
**To:** West, Gregory (G.S.)  
**Cc:** Conroy, Jerry (J.R.)  
**Subject:** RE: Data analysis

Greg,

I'm out of the office on vacation tomorrow (Friday, 9-19-03) but will work on having your data result by COB Monday, 9-22-03.

Regards;

*Vicky Mitchell*

Powertrain Quality Responsible Team

Quality is Job #1! It is our responsibility, our job Security and our future!

EMAIL: VMITCHEL@FORD.COM

PDC 2F-B37, Phone/FAX: (313) 32-27071

Text Pager: (313) 851-0283

-----Original Message-----

**From:** West, Gregory (G.S.)  
**Sent:** Thursday, September 18, 2003 3:01 PM  
**To:** Mitchell, Vicky (V.B.)  
**Cc:** Conroy, Jerry (J.R.)  
**Subject:** Data analysis

Vicky, per our earlier conversation could you please pull AWS data for the 2001.25 thru 2003.25, 7.3L, SD/Excursion, fixed pedal (1C34-9F836-BB).

There are over 10,000 claims against this pedal and Larry is being interviewed by NHTSA next Wednesday to understand the high failure rate.

Many of the failures are due to pedal pads (foot pads) falling off, probably nearly half but that needs to be quantified. The remaining claims need to be separated into:

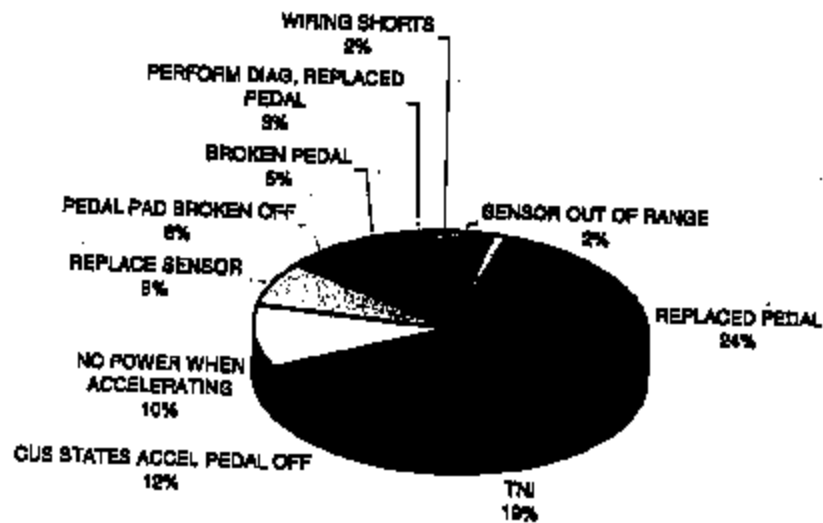
- 1) failures due to overload such as "went to idle on hard acceleration"
- 2) failures due to voltage out of range
- 3) failures due to vehicle wiring shorts which are possible between 8/1/01 and 12/1/01.
- 4) Unable to identify

Thanks in advance for your help.

MDL YR	(AI)
VEH LINE CD	(AI)
ENG CD	T/DS
PART NUM CAUS BASE	9F838

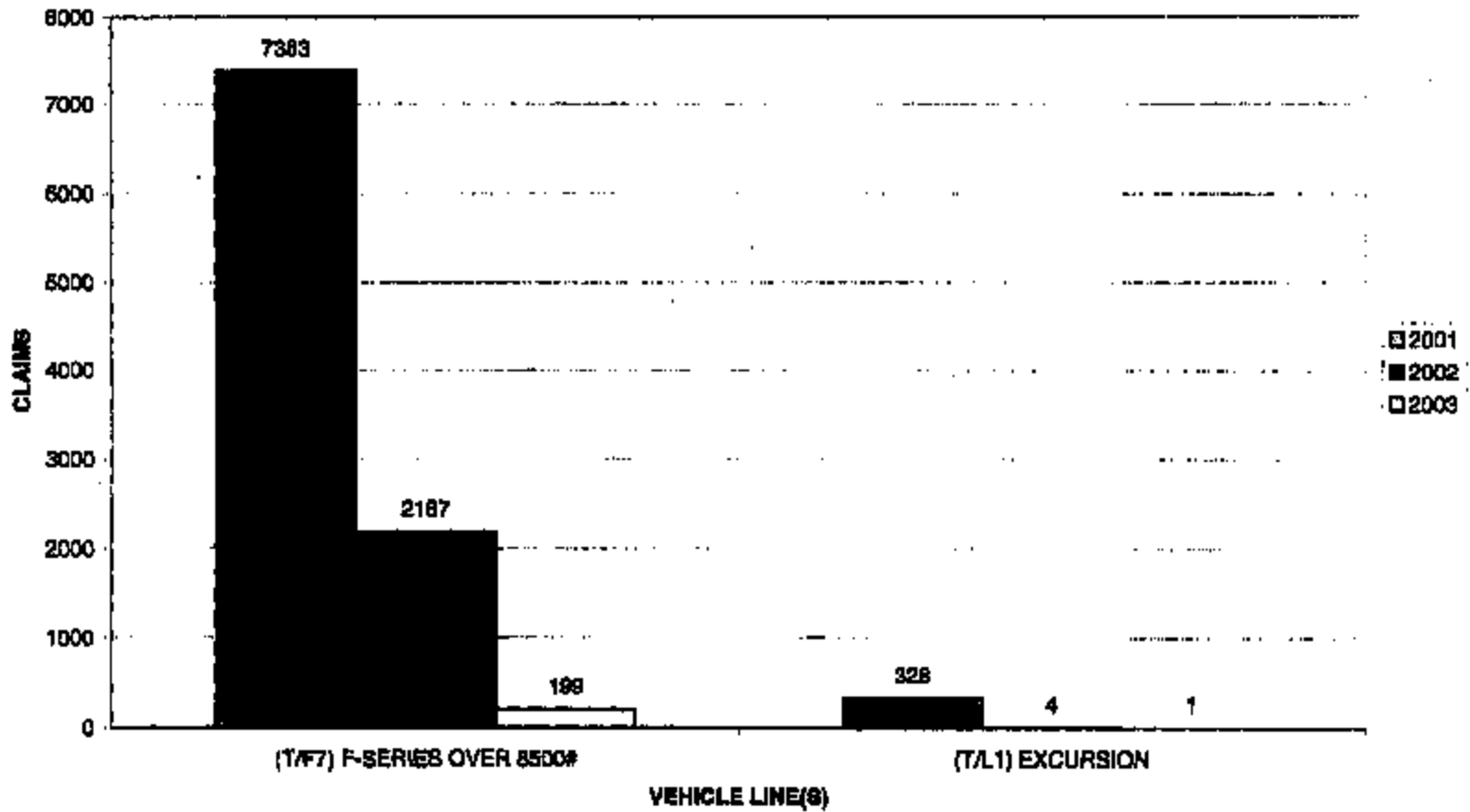
Count of FAILURE	Total
FAILURE	
T/M	1958
CUS STATES ACCEL PEDAL OFF	1271
NO POWER WHEN ACCELERATING	1058
REPLACE SENSOR	782
PEDAL PAD BROKEN OFF	670
BROKEN PEDAL	488
PERFORM DIAG, REPLACED PEDAL	284
WIRING SHORTS	184
SENSOR OUT OF RANGE	161
CUS STATES NO ACCEL	128
OPEN CIRCUIT	121
REPLACED DEFECTIVE PEDAL	117
IDLE ON ACCELERATION	88
VOLTAGE OUT OF RANGE	80
PEDAL STICKING	58
NO / LOSS SIGNAL	24
SENSOR FAILED	13
REPLACED FUEL PEDAL	5
THROTTLE POSITION NOT RESPOND	5
IDLE ON ACCELERATION / WIRING SHORT	2
IDLE ON ACCELERATION / PEDAL STICKING	1
NO PEDAL RESPONSE	1
REPLACED ACCEL PEDAL	1
REPLACED FAILED PEDAL	1
REPLACED SPECIAL ORDER PEDAL	1
VOLTAGE OUT OF RANGE / IDLE ON ACCELERATION	1
VOLTAGE OUT OF RANGE / IDLE ON ACCELERATION / IDLE ON ACCELERATION	1
VOLTAGE OUT OF RANGE / WIRING SHORTS	1
WIRING SHORTS / PEDAL STICKING	1
WIRING SHORTS / VOLTAGE OUT OF RANGE	1
GAS PEDAL INOP	93
NO THROTTLE RESPONSE	6
FAULTY PEDAL	143
LOOSE PEDAL / REPLACED	1
PIN LOOSE	61
PEDAL LOOSE	127
REPLACED PEDAL	2412
Grand Total	10246

**7.3L 2001-2003 MY Super Duty F-Series / Excursion  
-1C3Z 9F836- Pedal Clima**



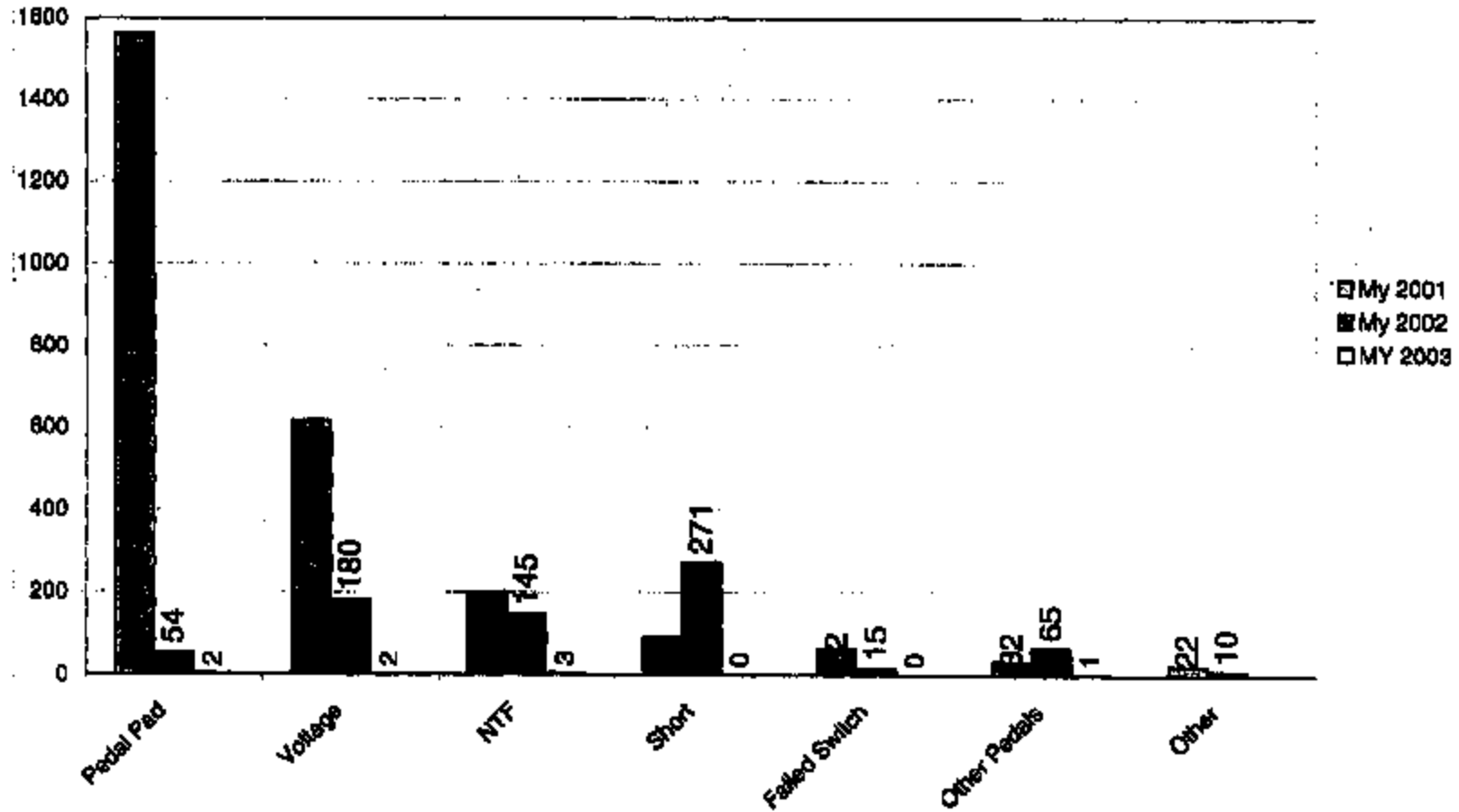
- TN
- CUS STATES ACCEL PEDAL OFF
- NO POWER WHEN ACCELERATING
- REPLACE SENSOR
- PEDAL PAD BROKEN OFF
- BROKEN PEDAL
- PERFORM DIAG, REPLACED PEDAL
- WIRING SHORTS
- SENSOR OUT OF RANGE
- CUS STATES NO ACCEL
- OPEN CIRCUIT
- REPLACED DEFECTIVE PEDAL
- IDLE ON ACCELERATION
- VOLTAGE OUT OF RANGE
- PEDAL STICKING
- NO / LOSS SIGNAL
- SENSOR FAILED
- REPLACED FUEL PEDAL
- THROTTLE POSITION NOT RESPOND
- IDLE ON ACCELERATION / WIRING SHORT
- IDLE ON ACCELERATION / PEDAL STICKING

2001 - 2002 MY F-Series Over 8500# / Excursion -1C3Z 8F836- Pedal  
 Cut Off Date=31 Jul 2003 Load Date=19 Aug 2003





## Warranty Returns by Model Year 8/01/03 (1C)



From: Love, Keith (K.A.)  
Sent: Wednesday, September 24, 2003 2:57 PM  
To: Yon, Scott  
Cc: Souchock, Peter (P.D.); Navi, Ray (R.A.); Tokarsky, Michael (M.); Liposky, Lawrence (L.J.)  
Subject: RE: VOQ VINs

Scott, I have researched the requested 2002MY F Super Duty/Excursion VINs and report the following:

VIN	MY	Series	Engine	Pedal
1FMSU43F22E	2002	Excursion	7.3L Diesel	Adjustable
1FMSU43F22E	2002	Excursion	7.3L Diesel	Adjustable
1FTNM20F02E	2002	F250 4x2 Crew Cab	7.3L Diesel	Adjustable
1FTNM21F72E	2002	F250 4x4 Crew Cab	7.3L Diesel	Adjustable
1FTSM31F32E	2002	F350 4x4 Crew Cab	7.3L Diesel	Adjustable

All these vehicles do indeed have adjustable pedals. Per our previous discussion, I added a "U" in the 5th position of the first VIN to create a valid number ("M" in the 3rd position requires "U" in the 5th).

Should have an answer to your other q's shortly.

-----Original Message-----

From: Yon, Scott [mailto:Scott.Yon@nhtsa.dot.gov]  
Sent: Wednesday, September 24, 2003 11:59 AM  
To: Love, Keith (K.A.)  
Subject: RE: VOQ VINs

The VOQ only has 16 digits for the VIN field entry (I copied the data off our database electronically) but it shows the vehicle model as a 2002 Excursion, so I agree that the VIN should be as you guessed.

Thanks,  
Scott

-----Original Message-----

From: Love, Keith (K.A.) [mailto:klove@ford.com]  
Sent: Wednesday, September 24, 2003 11:19 AM  
To: Yon, Scott  
Subject: RE: VOQ VINs

Reviewing your VINs now. The first one is shy of a digit. I believe it should be as follows: 1FMSU43F22E [redacted] (I added a U to the 5th position and found an Excursion). Please verify that this is correct.

-----Original Message-----

From: Yon, Scott [mailto:Scott.Yon@nhtsa.dot.gov]  
Sent: Wednesday, September 24, 2003 10:40 AM  
To: Keith Love (E-mail)  
Subject: VOQ VINs

Keith,

Thanks for your help on this. There are only 5 VINs because two of the complaints reference the same vehicle which suffered two failures. The attached SS has the numbers.

Two other questions came up after we hung-up. Can you let me know if you can get answers

to these? No hurry on number 2.

- 1) Was there a version of the 6.0L engine built with second generation (single track) ETC or was it only built with the third generation (triple track) system?
- 2) Is there a design intent throttle force that Ford uses on ETC based systems to get customer acceptable throttle feedback?

Can you advise your phone number? My details are below, feel free to contact me anytime.

Regards,  
Scott

Scott Yen  
U. S. Department of Transportation  
National Highway Traffic Safety Administration  
Office of Defects Investigations  
Rm 5326  
400 7th Street SW  
Washington, DC 20590  
202-366-6761  
Fax-202-366-1767

<<IE03048\_VOQ\_VINS.xls>>

From: Love, Keith (K.A.)  
Sent: Wednesday, September 24, 2003 10:58 AM  
To: Liposky, Lawrence (L.J.)  
Cc: Souchock, Peter (P.D.)  
Subject: FW: VOQ VINs



IE03048\_VOQ\_VINs  
.xls

Note Scott's additional questions. We already talked about number one so I believe the answer is no 2nd gen on the 6.0L. How about the 2nd question?

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400 7th Street SW  
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202-366-6763  
Fax-202-366-1767

<<IE03048\_VOQ\_VINs.xls>>

1FM643F2E	
1FM5L43F2Z	
1FTNW20F02	
1FTNW21F7Z	
1FTSW31F3Z	

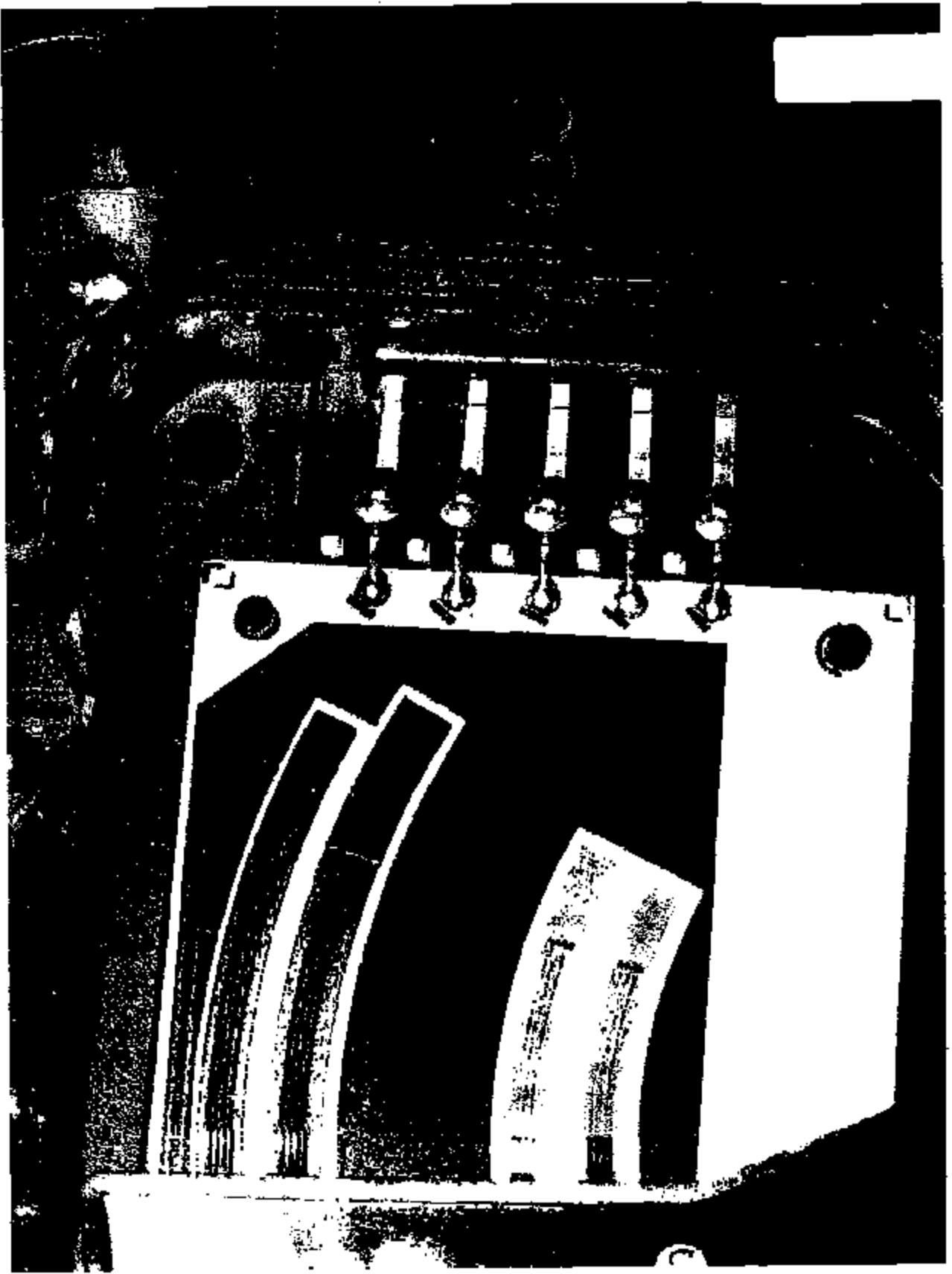
---

**From:** Zulqarnain Khan [zulqarn1@tfscauto.com]  
**Sent:** Tuesday, September 17, 2002 3:39 PM  
**To:** guest2@ford.com; flposky@ford.com; kzolan@tfscauto.com; gbranff@tfscauto.com  
**Subject:** Phenolic resin after 1M cycles

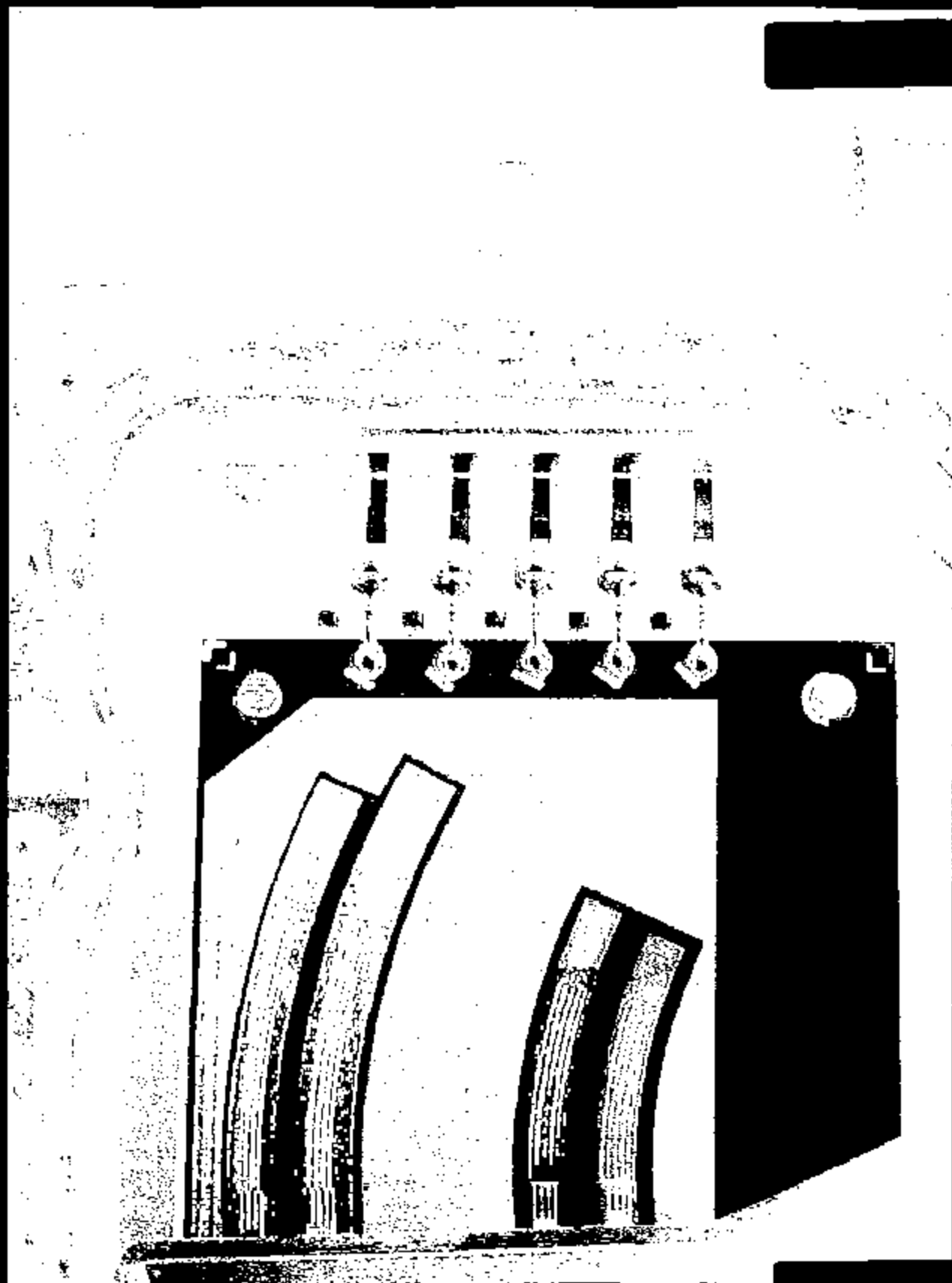
        
1IM-1.JPG 1IM-5a.JPG 1IM-5b.JPG 1IM-6.JPG 1IM-2.JPG 1IM-3.JPG 1IM-4.JPG

Attached are the images of U137 phenolic parts after 1M cycles.

Regards,  
Khan



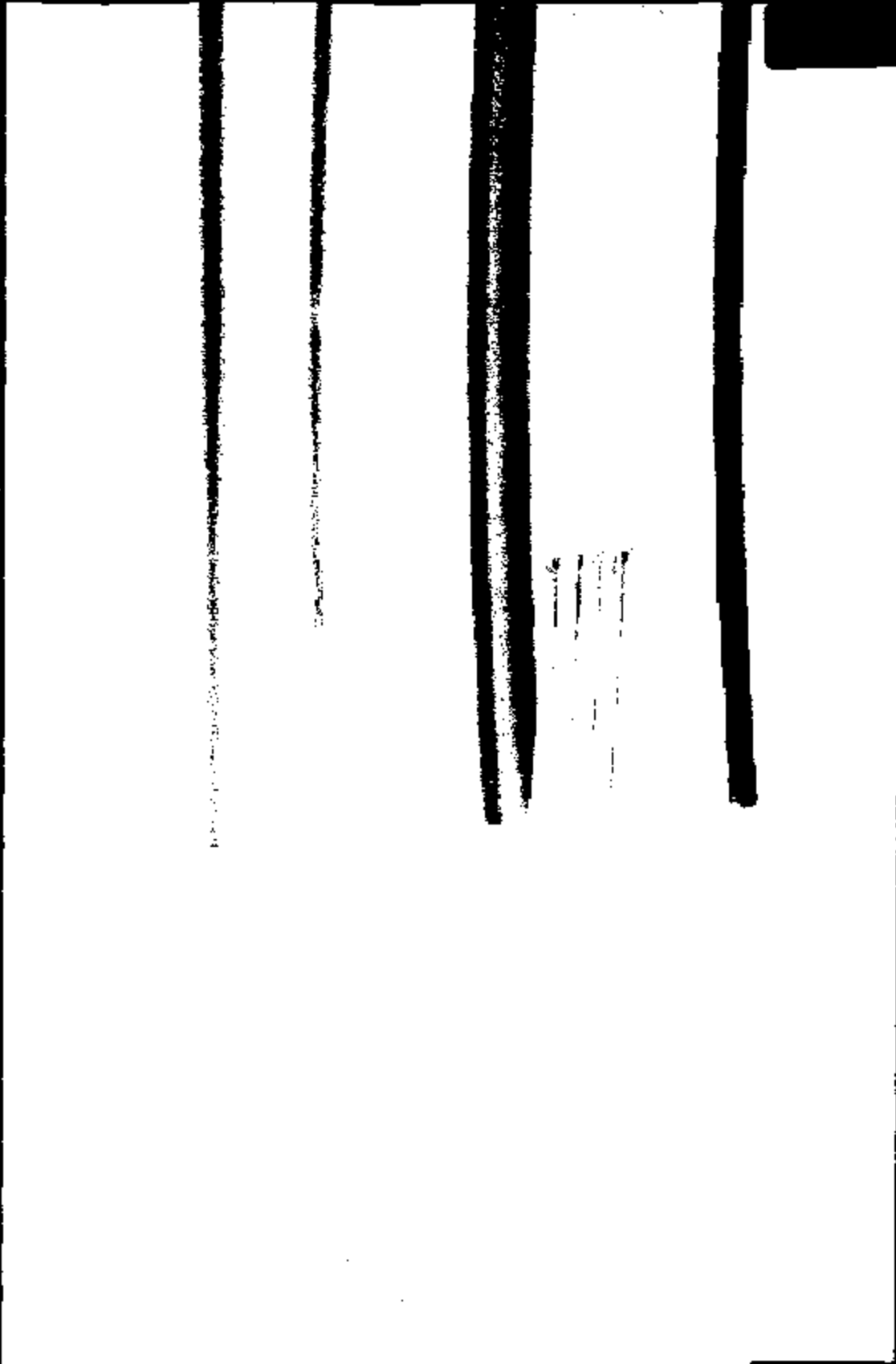
PE83-844 8828

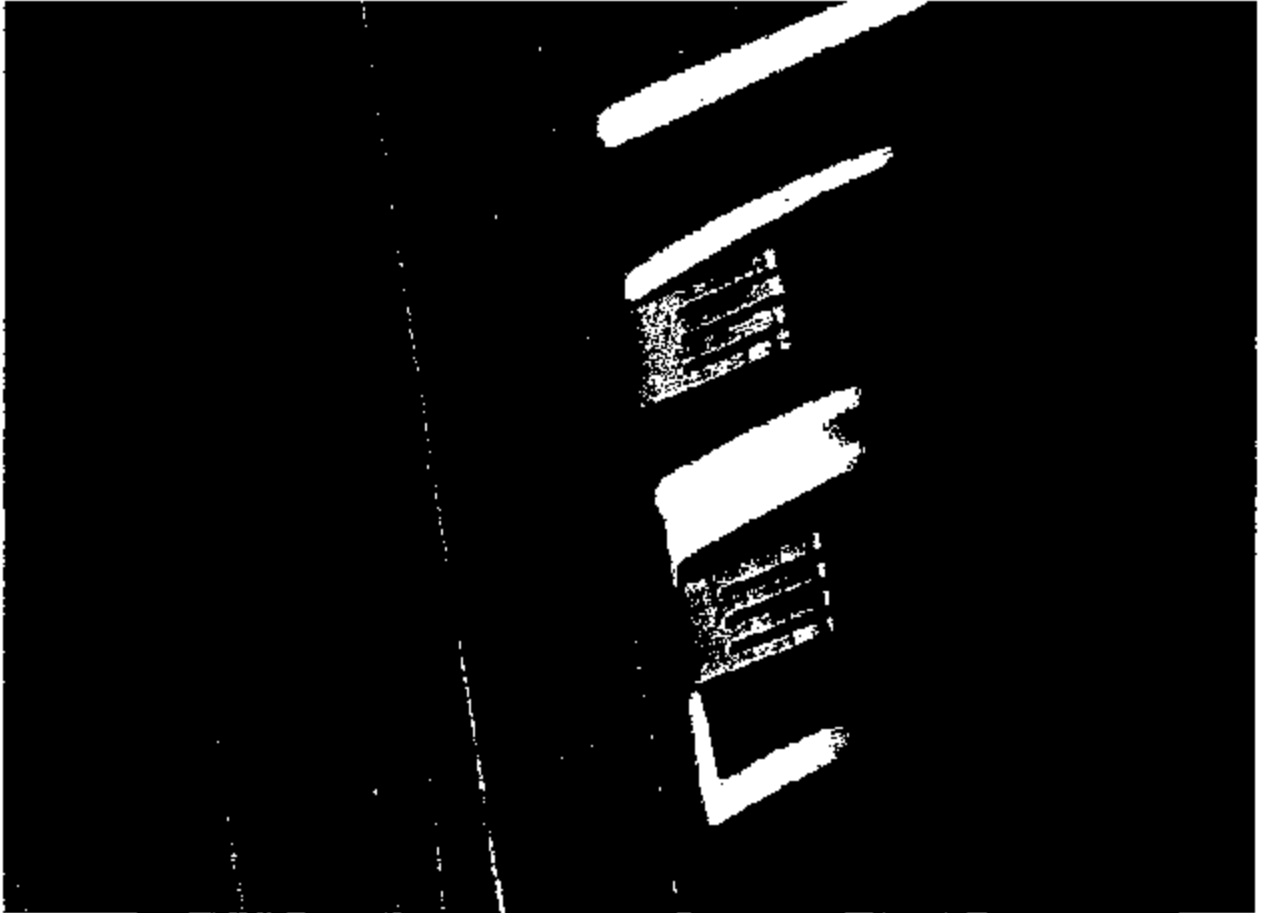


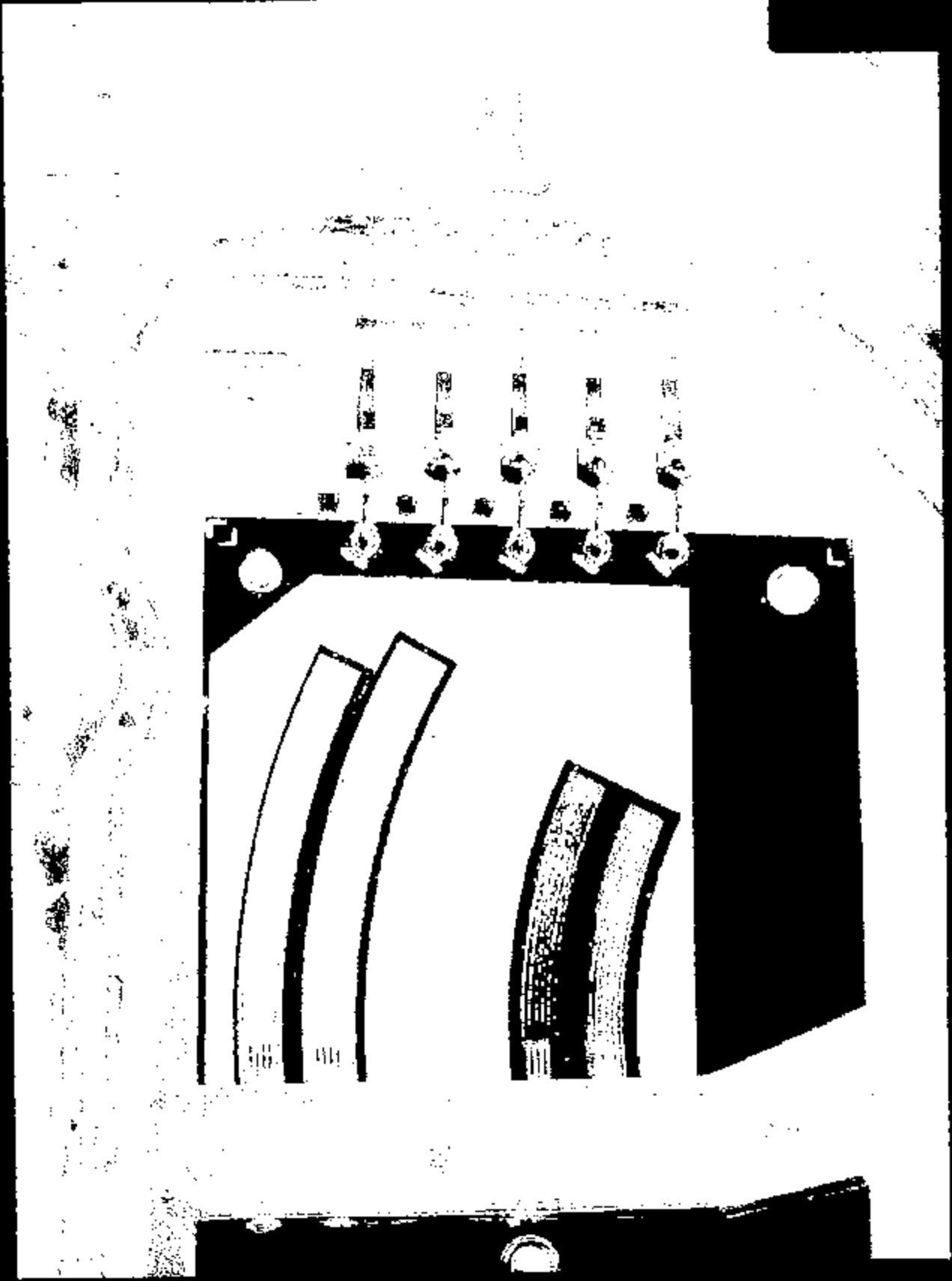
FEB3-844 8521

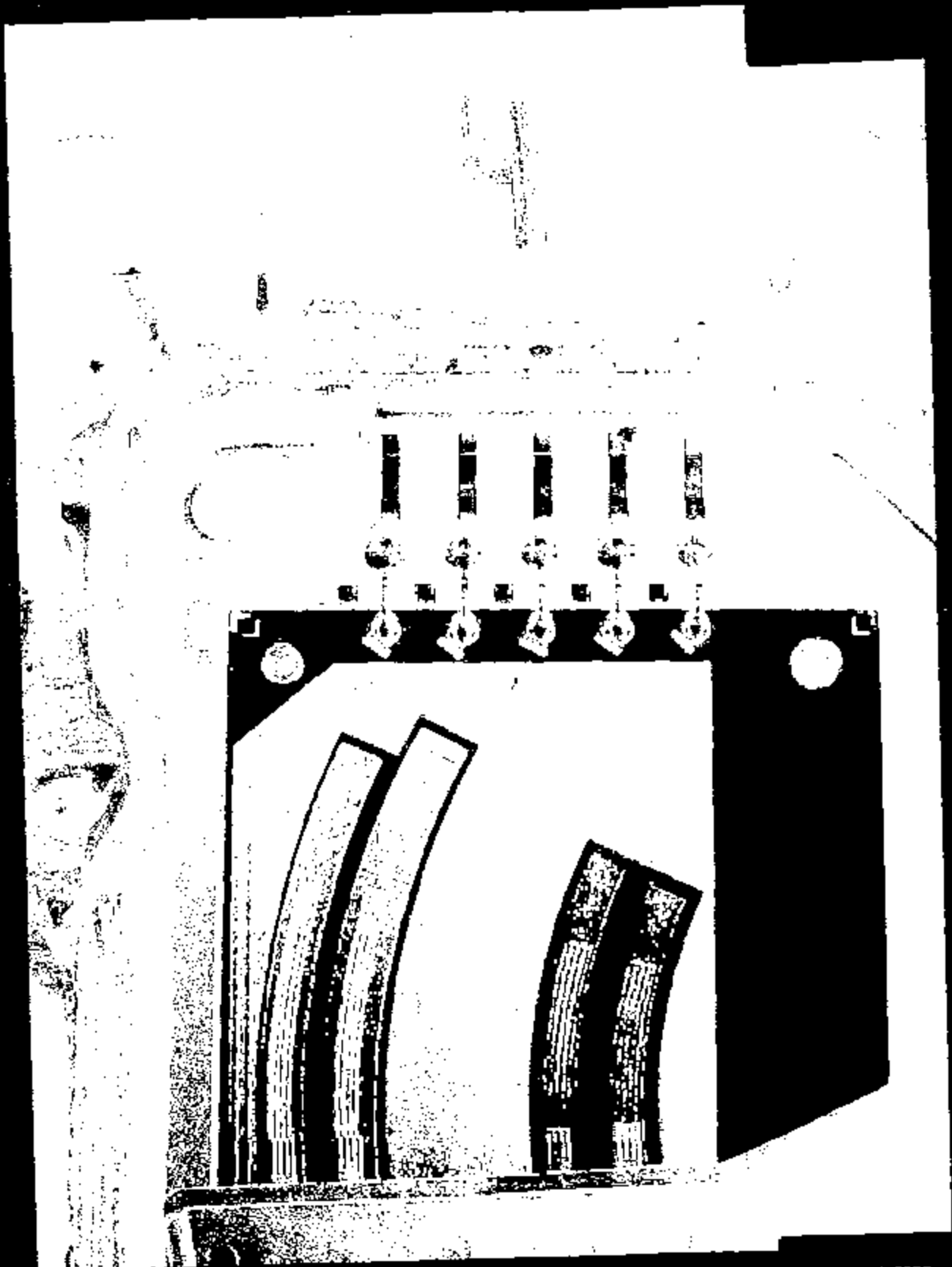












FE83-844 8826

**From:** Love, Keith (K.A.)  
**Sent:** Wednesday, September 24, 2003 10:58 AM  
**To:** Liposky, Lawrence (L.J.)  
**Cc:** Sotchock, Peter (P.D.)  
**Subject:** FW: VOQ VINs

  
IE03048\_VOQ\_VINs

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**Subject:** VOQ VINs

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Scott

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Washington, DC 20590  
202-366-6761  
Fax-202-366-1767

<<IE03048\_VOQ\_VINs.xls>>

1FMS43F22E	
1FMSU43F22E	
1FTNW20F02E	
1FTNW21F72E	
1FTSW31F32E	

---

**From:** Greg Braniff [gbraniff@tfxauto.com]  
**Sent:** Monday, September 09, 2002 12:12 PM  
**To:** ztkan1@tfxauto.com; Greg West; Larry Lipoaky; kzolan@tfxauto.com; Joe Vitale  
**Subject:** Phonolic Parts after 401K cycles



461-1.jpg



461-2.jpg



461-3.jpg



461-4.jpg



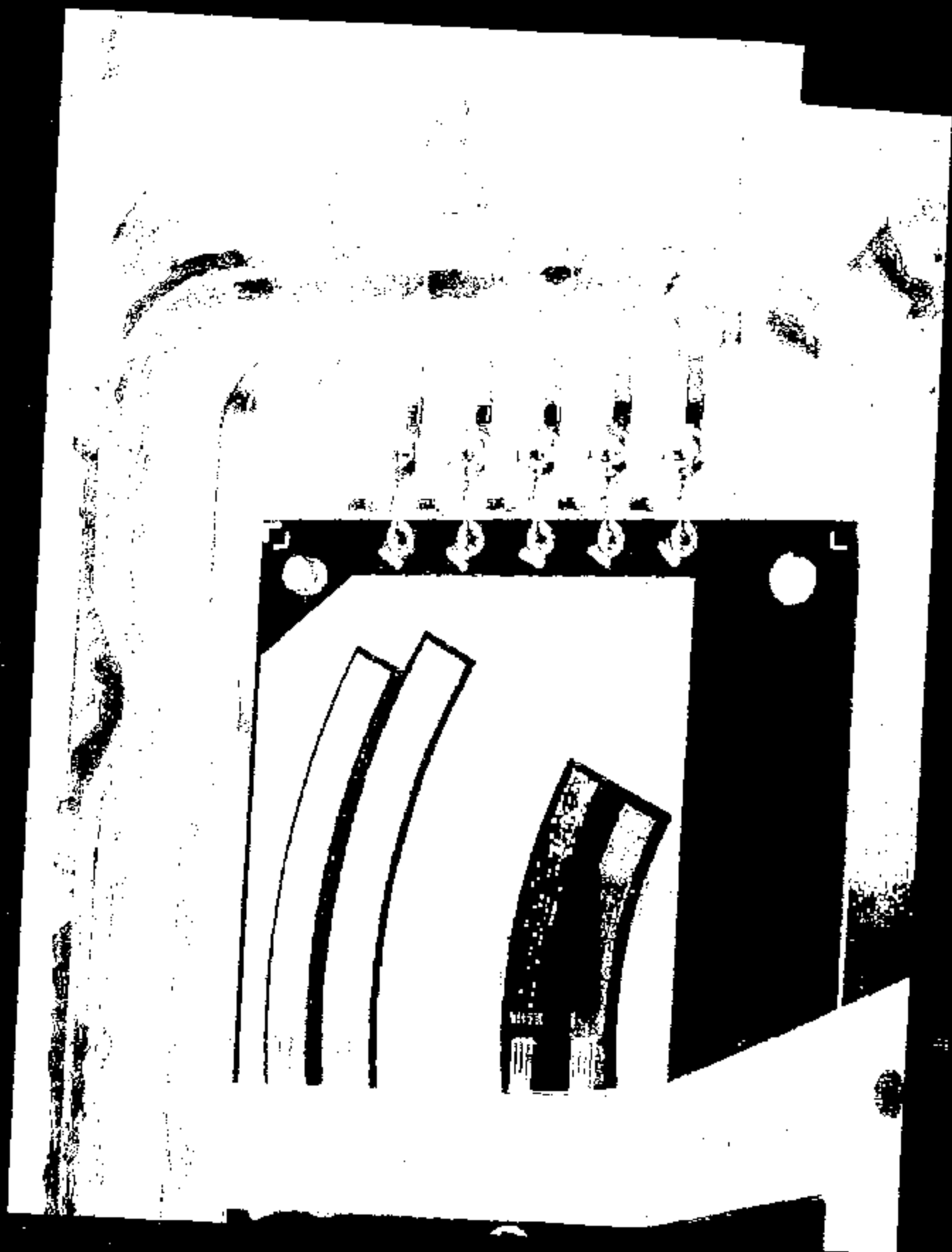
461-5.jpg

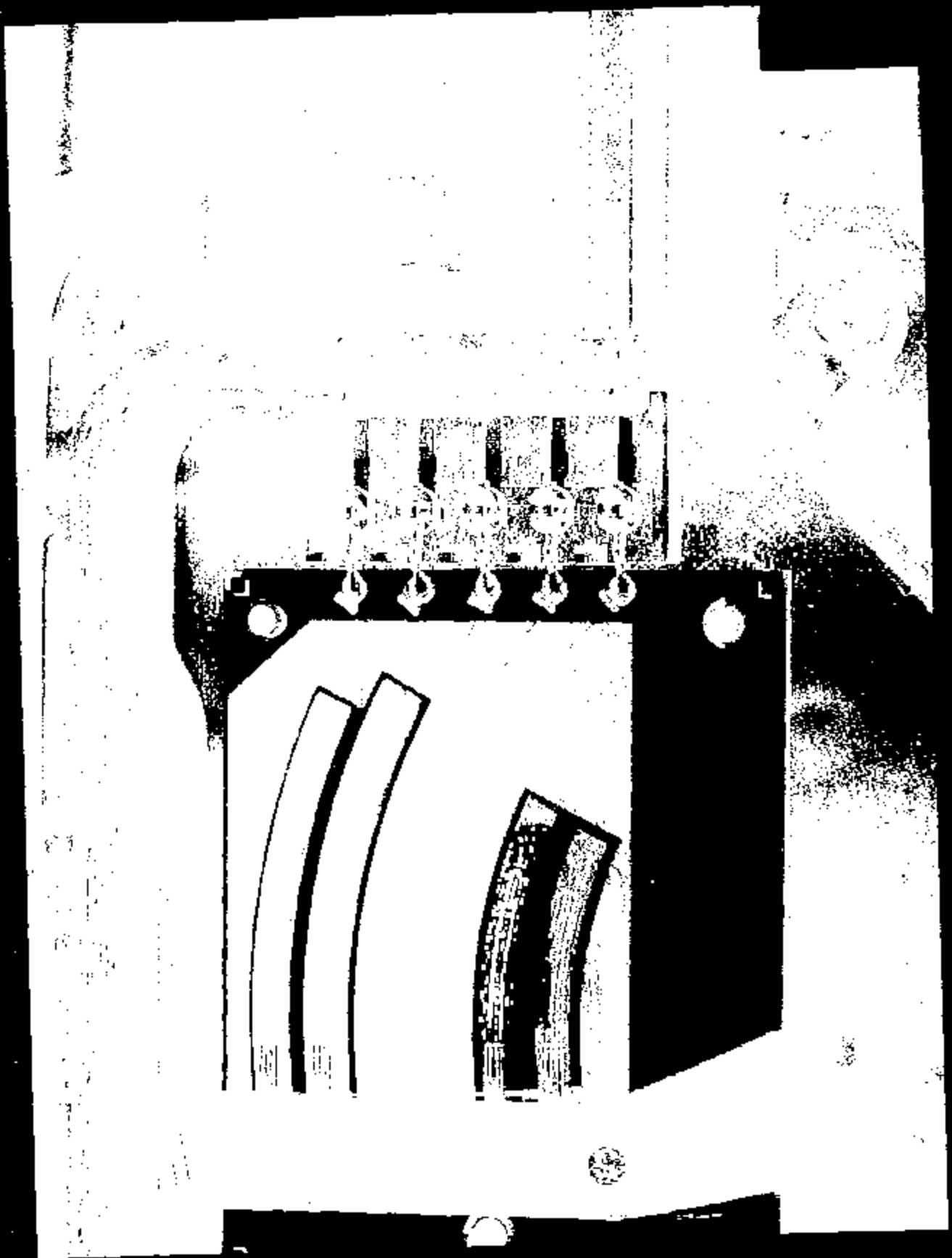


461-6.jpg

Greg Braniff  
Telsflex Automotive  
Ph 248-616-3107  
Call 248-840-1840  
gbraniff@tfxauto.com







PER3-044 8837

