

March 9, 1967

Report No. : CR-3.1

FINAL REPORT
PEGASUS DETECTOR SYSTEM
EVALUATION TOOL

Submitted To:

National Aeronautics & Space Administration
George C. Marshall Space Flight Center
Huntsville, Alabama 35812

Submitted By:

NEOTEC CORPORATION
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Rockville, Maryland 20850

PREFACE

Neotec Corporation is pleased to submit this final report, thereby completing the contractual requirements of Contract NAS 8-20647 with the George C. Marshall Space Flight Center, Huntsville, Alabama.

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1.0 INTRODUCTION

Three Pegasus spacecraft launched over a period of time from February 16 to July 30, 1965 have proven to be highly reliable meteoroid penetration monitors. Engineering data received from these systems has extended knowledge of meteoroid penetration rates to material thicknesses ten times greater than obtained from any previous flight data.

Detailed analysis of the information received from the Pegasus spacecraft has revealed certain infrequent anomalies in the data which take the form of multiple panel identifications for one registered "hit". Speculation as to the cause of this anomalous behavior ranges from complete penetration of both "back-to-back" detector panels to transient type malfunctions within certain portions of the on-board electronics. If the cause of these multiple panel identifications should indeed prove to be "back-to-back" penetrations, then valuable data relative to the meteoroid hazard of "thick-skinned" spacecraft would be obtained.

To aid in such a determination, Neotec, under contract to NASA (MSFC), designed and fabricated a test tool to simulate critical portions of the Pegasus Detector Electronics. This tool has been fabricated to exhibit as closely as possible the characteristics of the systems presently in orbit.

In addition to the actual Pegasus Detector System Evaluation Tool, Neotec calibrated and repaired two "plasma simulators" and also constructed suitable cables and a display device to enable operation of the Pegasus Earth Aspect System.

2.0 SYSTEM DESCRIPTION

DETECTOR SYSTEM - The Pegasus Detector System consists of large area capacitive meteoroid penetration detectors. Meteoroid penetration causes a transient short circuit to develop, resulting in capacitor discharge and thereby providing an electrical signal for subsequent processing.

The components of the test tool developed to simulate this system are shown in the block diagram of Figure 2.1. All the system elements except the simulated wing panels and the units designated Cards 1 through 3 are actual flight-type hardware. The total array of packages was contained within a rectangular "desk-sized" enclosure configured for ease of operation and suitable for public display.

In operation, each "panel" of each wing (+Y or -Y) is connected to three of seven current recharge amplifiers (CRA) and to one of three "hit" lines. Thus, both wings require a total of six indication lines and fourteen current recharge amplifiers. The indicator lines contain information as to which of three panel "thicknesses" (1.5 mil, 8 mil or 16 mil) was penetrated. To provide a form of redundancy in the spacecraft system, this information from each wing was maintained separately, requiring six indicators.

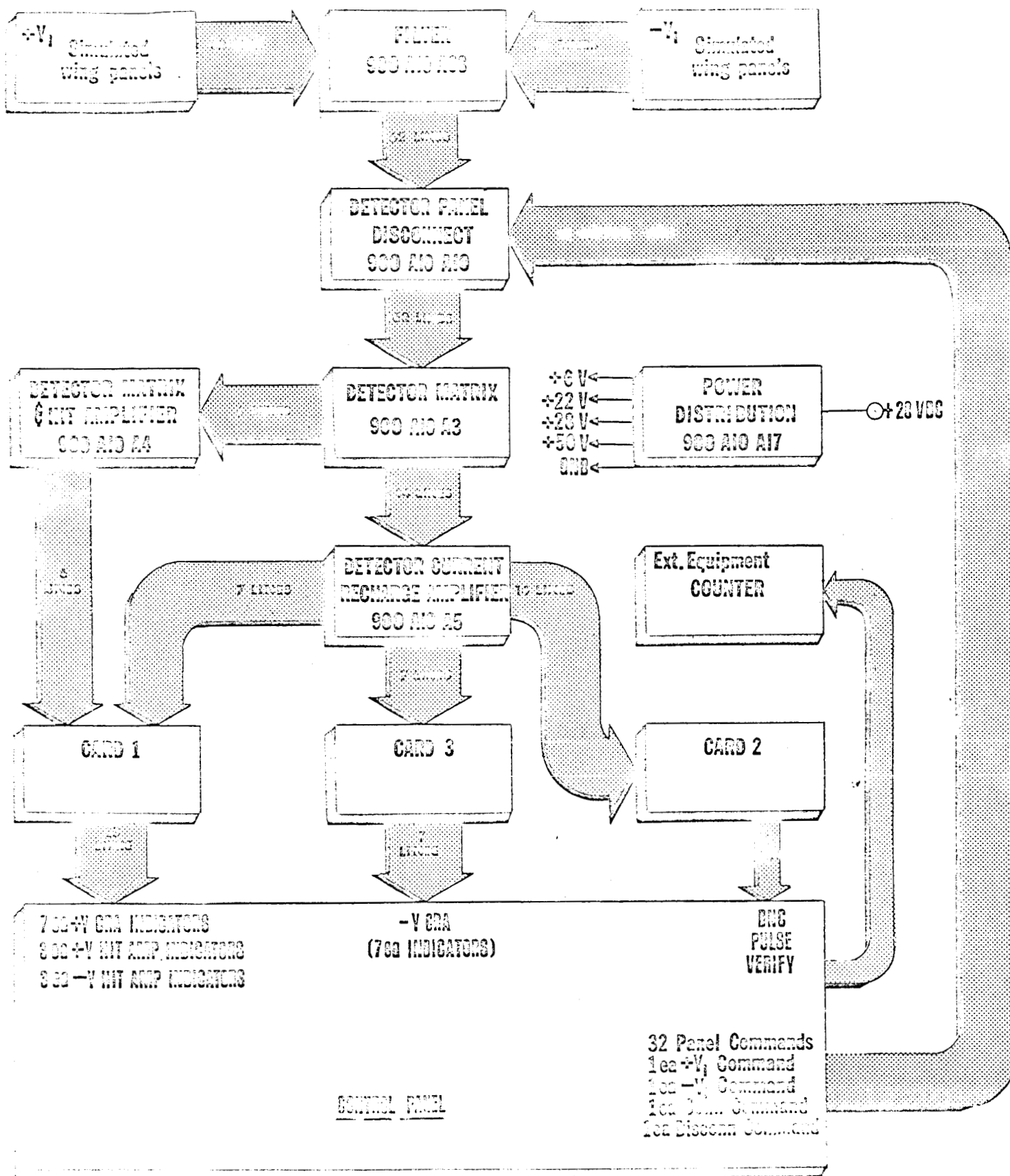


Figure 2.1 Block Diagram, Pegasus Detector Subsystem Evaluation Tool

Information identifying the actual panel struck is provided by the current recharge amplifiers. Since each panel is connected to three of the seven amplifiers, a seven bit code always containing three "ones" provides panel identification.

When a panel on either wing is shorted, the signal proceeds from the panel through the noise rejection filter, the Detector Panel Disconnect relays, and to the detector matrix. There the signal proceeds in parallel to the hit amplifier and to three of the seven CRA's. The pulse from the hit amplifier identifying wing and panel thickness is amplified in "Card 1" and closes a relay activating an indicator light. The outputs from the three affected CRA's are similarly amplified in "Card 3", and provide panel identification.

In addition, an indication of the time required to recharge the panel is provided by "Card 2". This "pulse verify" information is in the form of a series of clock pulses at 2048 pps. Knowledge of the capacitor recharge time is used as an aid in discriminating against spurious hit indications which could be caused, for example, by system noise and line transients. The clock pulses are accumulated by the counter indicated in Figure 1.

The Detector Panel Disconnect accepts 36 simulated commands provided by front panel switches to enable the insertion or removal from the circuit of any "wing panel" as is done in the actual spacecraft.

The proper sequence of events and the detailed method of test tool operation is contained in Section 3.0 of this report.

EARTH ASPECT SENSOR - As an input to attitude determination calculations, the position of the Earth vector within the satellite coordinate system was determined from the output of several IR earth sensors. Each sensor was designed to determine the presence of the Earth in a 2° field of view.

The complete Earth Aspect Sensor system consisted of a special power supply unit and six sensor heads, each with two opposite fields of view.

As part of the Neotec effort, an Earth Aspect Sensor system evaluation tool was configured as shown in Figure 2.2. With the exception of the 22 and 24 volt power supplies and the sensor test box, all units are flight type hardware.

Figure 2.3 contains the details of the sensor test box fabricated by Neotec. This unit accepts the 0 to 6 volt "Earth signal" to drive an indicator lamp to designate which of the twelve fields of view has been triggered.

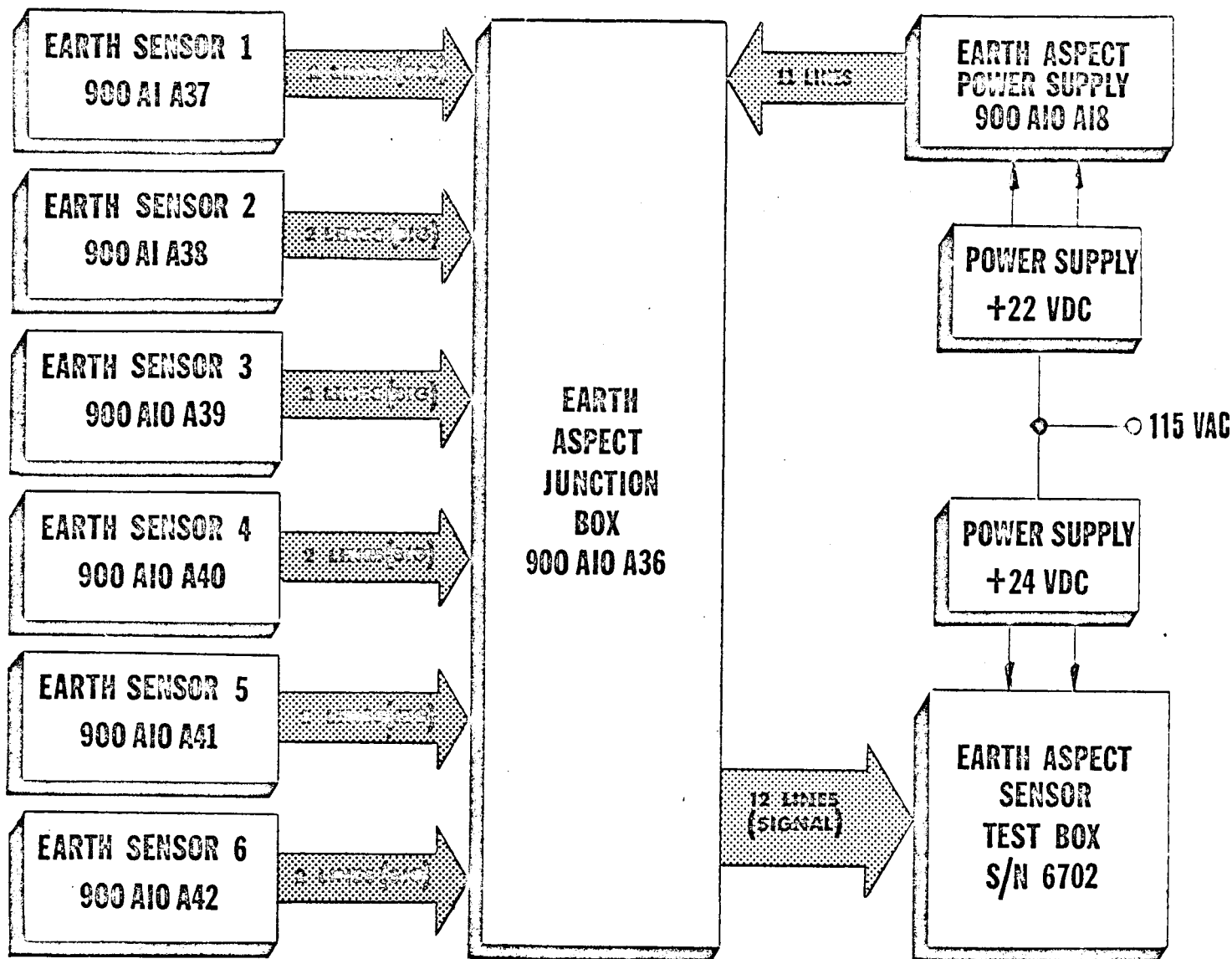


Figure 2.2 Block Diagram, Earth Sensor System Evaluation Tool

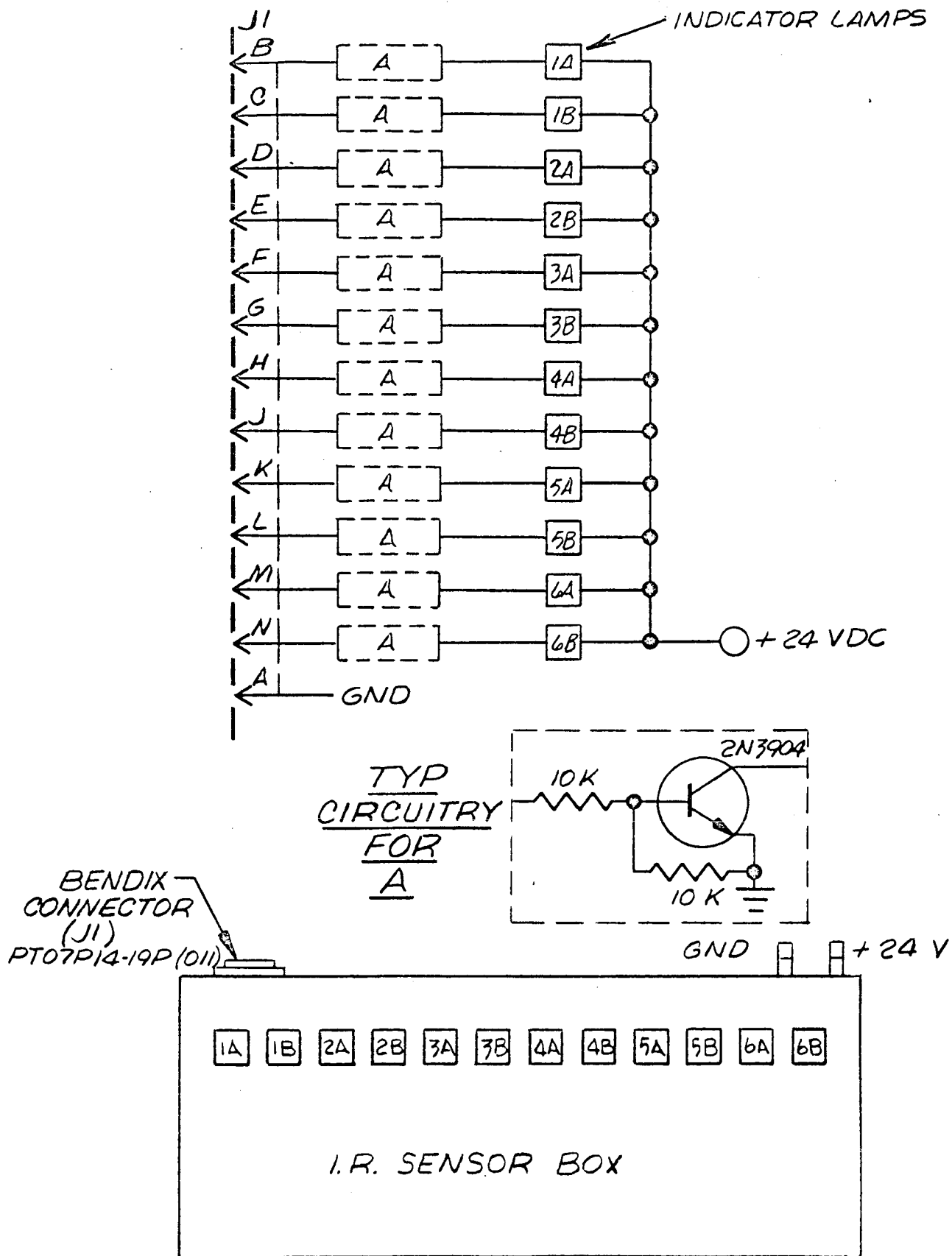


Figure 2.3 Schematic Diagram, Earth Sensor System Output Monitor

3.0 OPERATING INSTRUCTIONS

3.0 OPERATING INSTRUCTIONS

The unit is uncomplicated in operation, and the following brief operating procedure will suffice to familiarize the user with the proper sequence of events.

3.1 AC Power Requirements

117 VAC $\pm$ 10%

Single Phase

58-62 cps

3.2 Actuate "Power On" Switch

Verify proper power supply voltage setting by use of the front panel

28 and 28 VDC test points. (Reference Schematic Diagram of Figure 3.1.)

3.3 Actuate System "Reset"

All "CRA" and "Hit Amp" indicators should be extinguished.

3.4 Actuate "Wing Select"

Selection of, for example, "+Y" will cause the "+Y" indicator to light and the "-Y" indicator to go out.

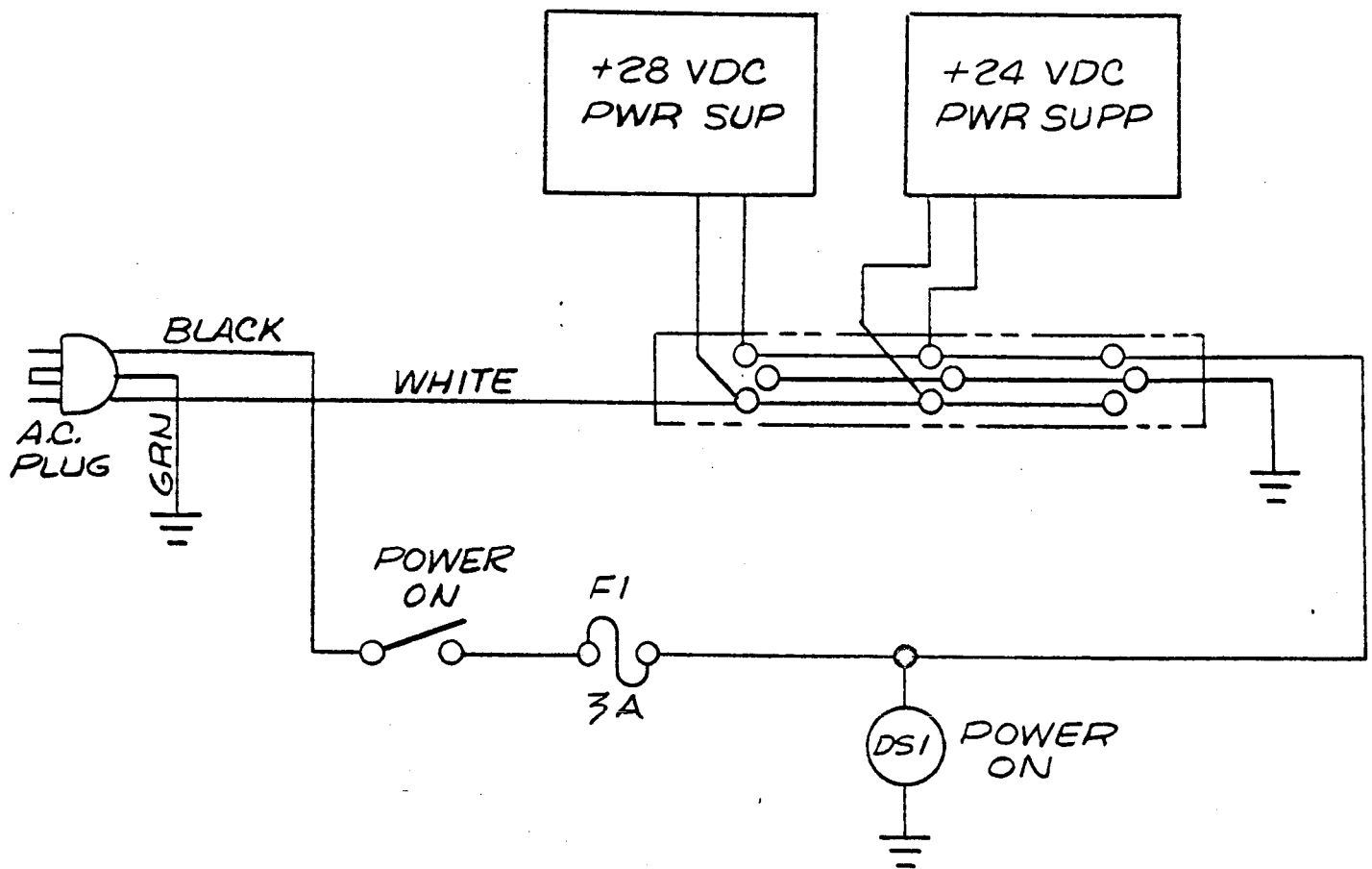


Figure 3.1 Schematic Diagram, Test Tool Power Distribution

3.5 Panel Connect/Disconnect

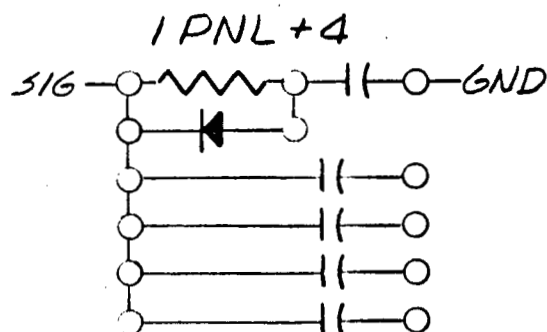
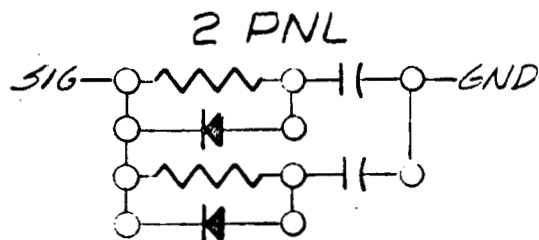
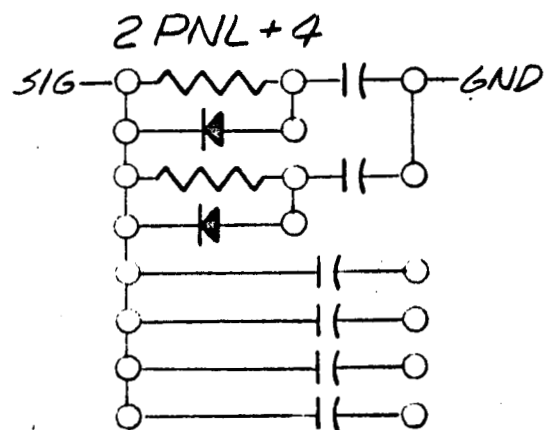
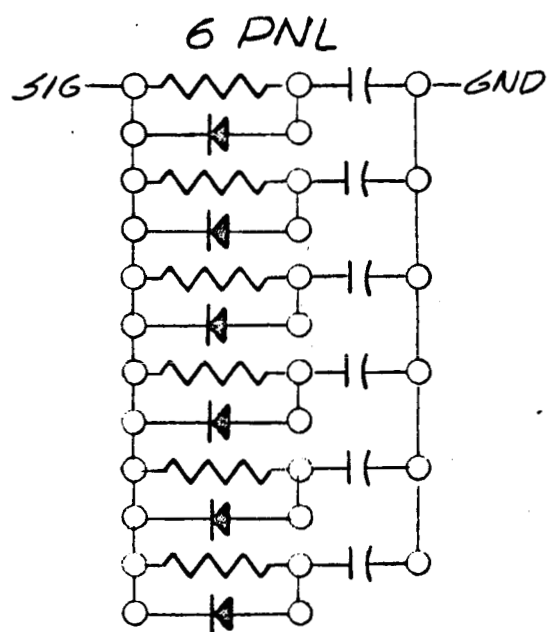
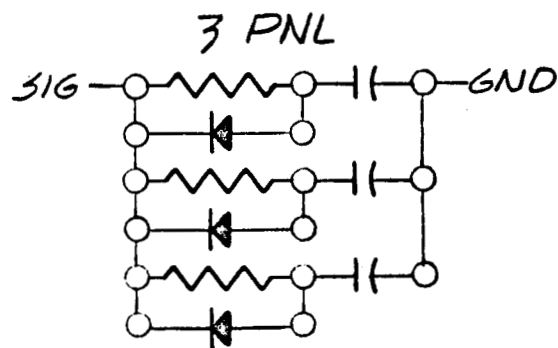
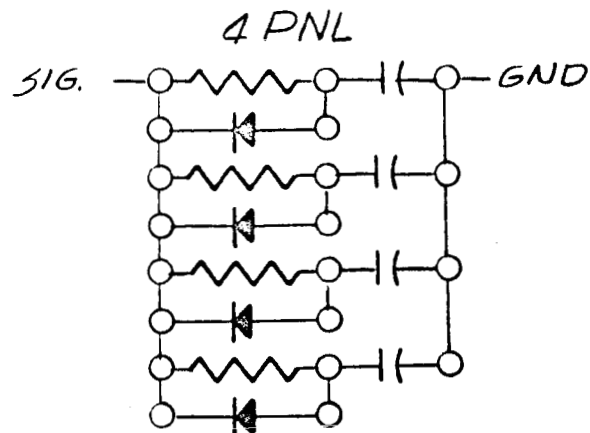
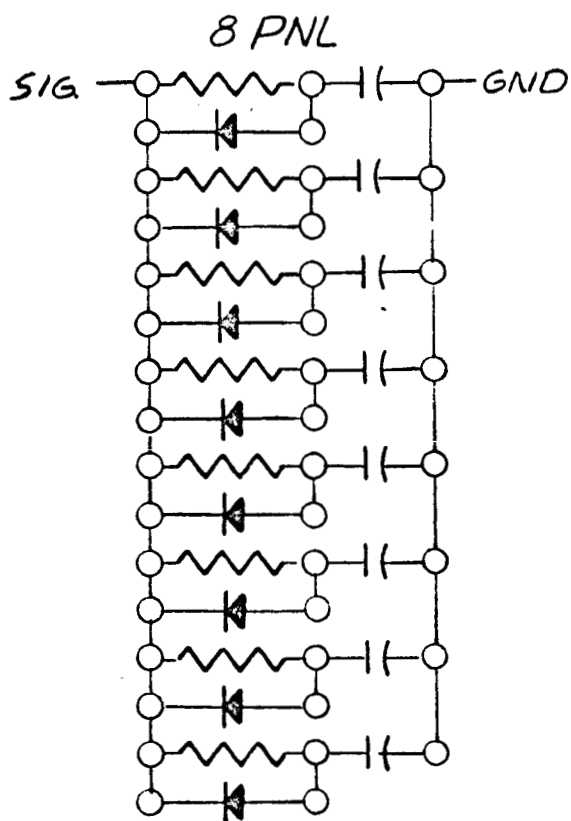
Any arrangement of panels may be connected into the system with the aid of the "Panel Connect/Disconnect" switch. This is accomplished by a two step process. First, the "Connect/Disconnect" switch is placed in mode for the intended operation. Then the panel callout switch is actuated (either upward or downward), completing the panel connect or disconnect operation.

3.6 Detector Panel Actuation

Once the desired arrangement of connected panels has been achieved, stimulation of the system can be caused by forcing a capacitor discharge of any connected series of panels. Figure 3.2 shows the manner in which the panels are configured. The number of parallel capacitor circuits for each panel is representative of the number of parallel Pegasus detectors.

The forced discharge can be accomplished in three ways:

- Direct Shorting - Could cause spurious (multiple) readings due to the inherent "bounce" associated with this method but is sufficient for quick check.
- Use of the Plasma Simulator - A preferred method since depth of discharge, recovery time, and repetition rate may be controlled.
- Panel Connection - Connection of a previously disconnected panel by means of the Connect/Disconnect switches already mentioned (reference Paragraph 3.5) will cause an indication.



ALL RESISTORS = 1 meg
ALL CAPACITORS = 1 μ f
ALL DIODES = IN645

Figure 3.2 Schematic Diagram, Simulated Detector Panels

The indicator lights are held "on" until reset by means of relays contained on Cards 1 and 3 (shown schematically in Figures 3.3 and 3.4). The arrangement of lights follows the sequence of CRA's (1-7) and hit indicators (1.5, 8, 16). However, the indicator lights can be converted directly into panel number (XXX) by use of the following code grouping:

<u>CRA Number</u>	<u>Digit</u>	<u>Binary Weight</u>
1	Third	1
2	Third	2
3	Third	4
4	Second	1
5	Second	2
6	Second	4
7	First	1

For operator convenience, this data has been tabulated and appears in Figure 3.5.

3.7 Pulse Verify

The pulse verify circuit (Figure 3.6) supplies pulses at a 2048 pps rate to an external counter to provide an indication of capacitor recharge time. The output characteristics are as follows:

Signal Level: 6 volts (AC coupled)
Source Impedance: 4.7K

3.8 Special Sensor Inputs

On the +Y wing only, sensor numbers 124 and 013 have been provided with switches (Figure 3.7) to accommodate external stimulation such as the Plasma Simulator.

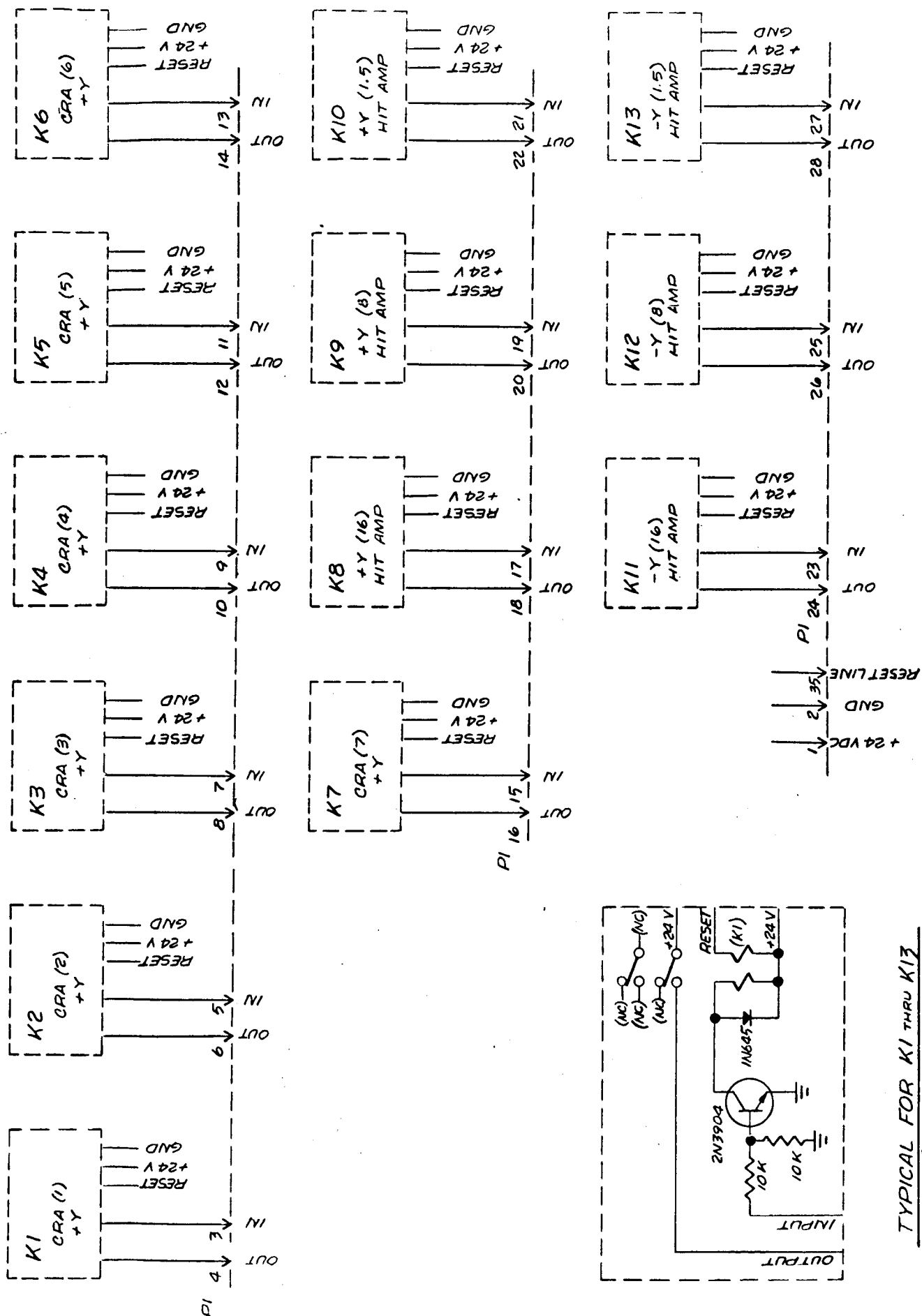
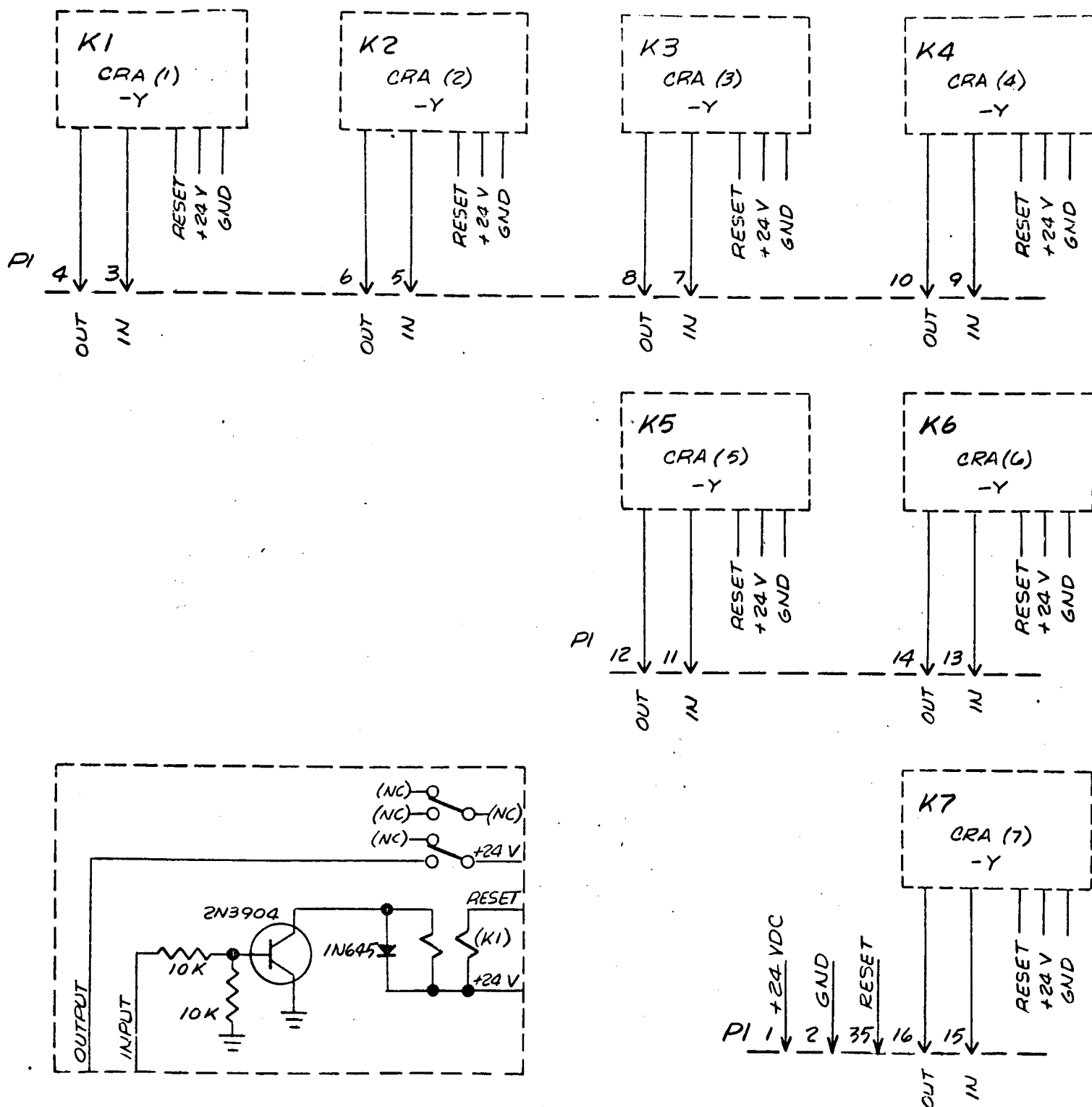


Figure 3.3 Schematic Diagram, +Y1 Wing CRA & Hit Amplifier Driver

TYPICAL FOR K1 THRU K13
CARD C-1



TYPICAL FOR K1 THRU K7
CARD C-3

Figure 3.4 Schematic Diagram, -Y1 Wing CRA Indicator Driver

(1)

(1)

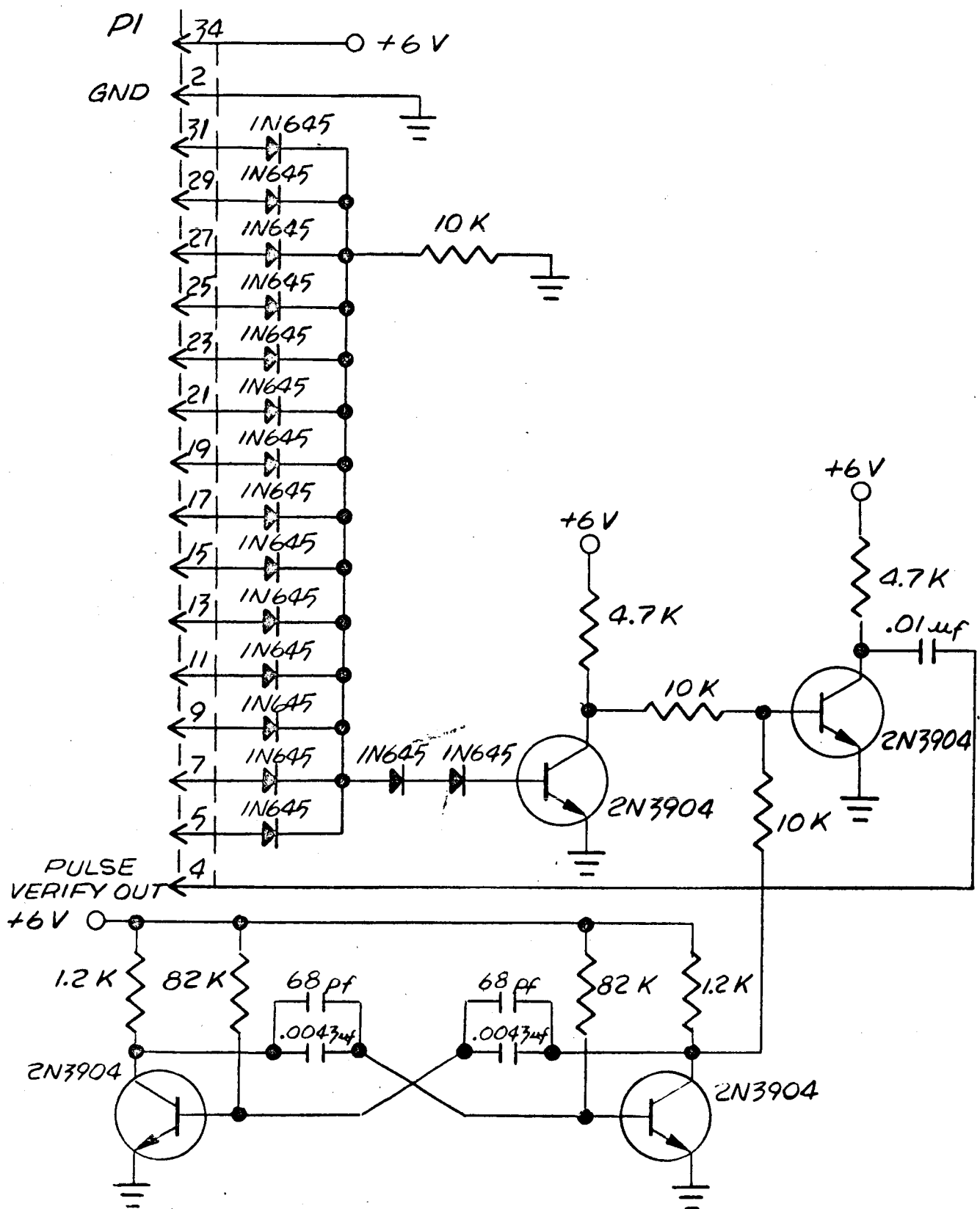
(2)

PANEL IDENT	HIT AMPLIFIER "THICKNESS"			CURRENT RECHARGE AMPLIFIERS						
	1.5	8	16	1	2	3	4	5	6	7
007	*			*	*	*				
013						NOT USED				
015			*	*		*	*			
016			*		*	*	*			
023			*	*	*			*		
025			*	*		*		*		
026			*		*	*		*		
031			*	*			*	*		
032			*		*		*	*		
034			*			*	*	*		
043			*	*	*				*	
045			*	*		*			*	
046			*		*	*			*	
051			*	*			*		*	
052			*		*		*		*	
054			*			*	*		*	
061		*				NOT USED				
103	*			*	*					*
105	*			*		*				*
106	*				*	*				*
111		*		*			*			*
112		*			*		*			*
114			*			*	*			*
121			*	*				*		*
122			*		*			*		*
124			*			*		*		*
130			*				*	*		*
141			*	*					*	*
142			*		*				*	*
144			*			*			*	*
150			*				*		*	*
160			*					*	*	*

* Lighted Indicators

(1) On +Y only, no CRA readout
zero bias radiation test panel(2) On +Y only, no CRA readout
zero bias radiation test
panel (8 mil thickness)

Figure 3.5 Indicator Chart



CARD 2

Figure 3.6 Schematic Diagram, Clock Generator & Pulse Verify "OR" Gate

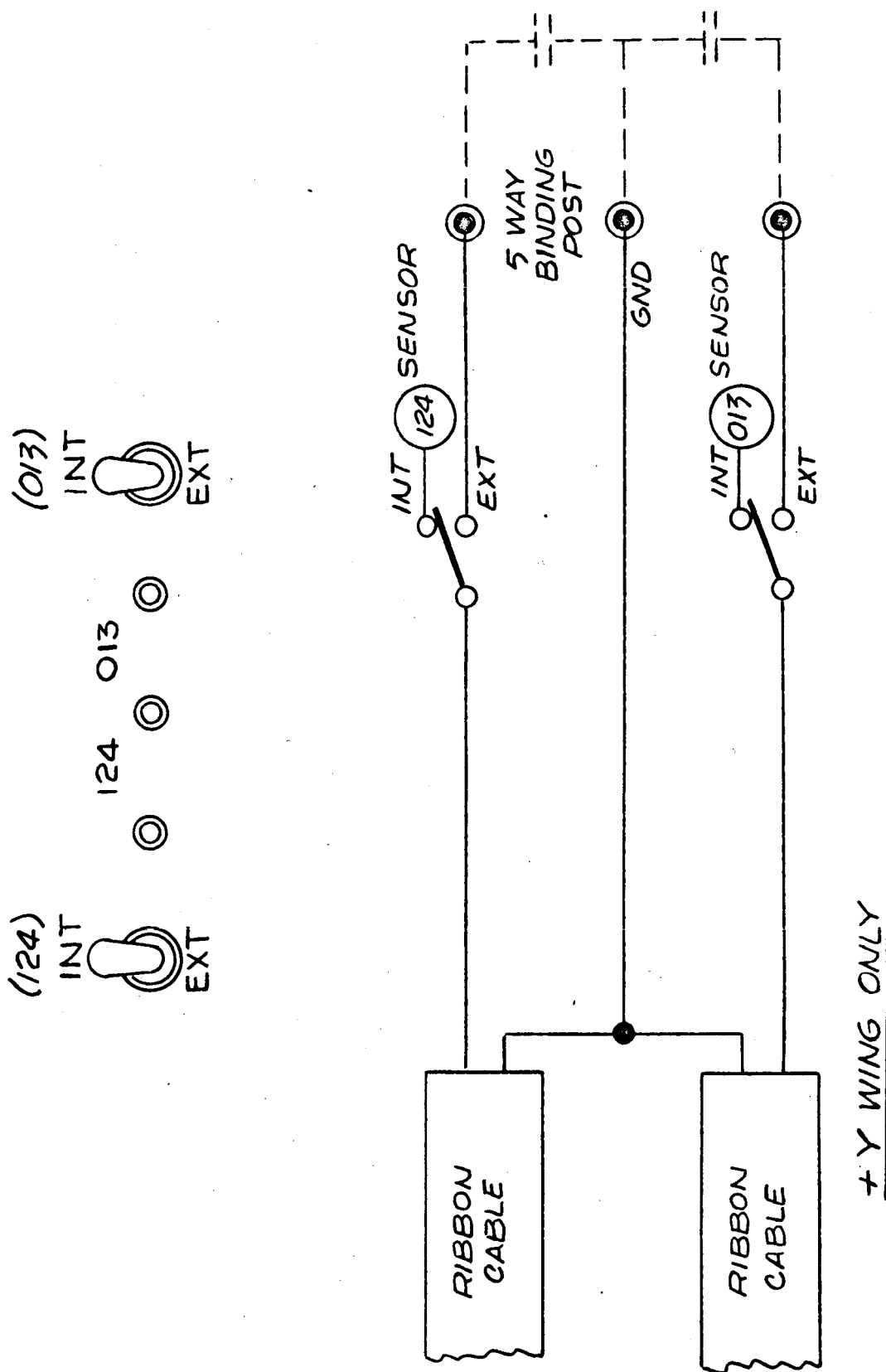


Figure 3.7 Schematic Diagram, External Simulated Sensor

3.9 Burnout/Blowout

An off/on switch, on the front panel is connected to the power distribution unit in such a manner as to provide the ability to perform the burnout/blowout operation as done in the Pegasus spacecraft.

4.0 PARTS LIST

APPLICATION		QTY PER	REVISIONS			
NEXT ASSY	USED ON		SYM	DESCRIPTION	DATE	APPROVED

SIGNATURES		DATE	 NEOTEC CORPORATION	ROCKVILLE, MARYLAND	
DR R. L. Simms		2/23/67			
CHK			PARTS LIST		
			PEGASUS DETECTOR SYSTEM EVALUATION		
			TOOL S/N 6701		
PROJ			SIZE	CODE IDENT NO.	REV
CONTRACT NO. NAS 8-20647				25498	025EG10000
			SCALE:		WT
					Page 1 of 9



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ROCKVILLE, MARYLAND

CODE IDENT. NO.

25498

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DATE

CHG. R.L. Simms

2/23/67

ENGR.

QUANTITY USED		PART NUMBER	ITEM	DESCRIPTION	REF. CODE IDENT.	MATERIAL SPEC.	CKT SYM	ZONE	UNIT
	-1								
			1	Pegasus Test Tool					
			2						
	*		3	Block Diagram					
	*		4	Wire Running List					
	1	900A10A17	5	Power Distribution					
	1	900A10A3	6	Detector Matrix					
	1	900A10A4	7	Detector Matrix & Hit Amplifier					
	1	900A10A5	8	Detector Current Recharge Amplifier					
	1	900A10A10	9	Detector Panel Disconnect Unit					
	1	900A10A63A4	10	Filter Network					
	8	300ED10152-11	11	Ribbon Cable					
	8	300ED10152-41	12	Ribbon Cable					
	16		13	Simulated Wing Capacitor Boards - Neotec					
	2	6200A	14	Power Supplies					
	1	C1	15	Relay Card #1					

SYM.

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QTY	PART NUMBER	ITEM	DESCRIPTION	MFR. CODE IDENT.	MATL. SPEC.	CKT SYM	QTY
1	C2	16	Oscillator Card #2	Neotec			
1	C3	17	Relay Card #3	Neotec			
29	327	18	Lamps	General Electric			
29	9830-14-604	19	Indicator Base Assembly	Dialco			
14	184-5073	20	Lens Cap Assy (Amber)	Dialco			
9	184-5071	21	Lens Cap Assy (Red)	Dialco			
2	184-5072	22	Lens Cap Assy (Green)	Dialco			
2	184-5075	23	Lens Cap Assy (Yellow)	Dialco			
2	184-5074	24	Lens Cap Assy (Blue)	Dialco			
35	105G	25	Switch (SPDT)	Alco			
3	105D	26	Switch (SPDT)	Alco			
1	ST22N	27	Switch (AC)	A-H-Harf			
1	31-236	28	WG-625 B/U Connector	Amphenol			
1	105-803	29	Phone Tip Jacks (Black)	E.F. Johnson			
2	105-802	30	Phone Tip Jacks (Red)	E.F. Johnson			

SYM.	DESCRIPTION	APPROVED	SYM.	DESCRIPTION	APPROVED



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QUANTITY REQUIRED		PART NUMBER	ITEM	DESCRIPTION	ASR. CODE IDENT.	MATERIAL SPEC.	CIRCUIT SYMBOL	UNIT
	-1							
	1	342014	31	Fuse Holder	Little Fuse	XPL		
	1	5200-232-323	32	AC Indicator	Drake			
	1	NE-51H	33	Neon Lamp	General Electric			
	1	111-103	34	6 Way Binding Post (Blk)	E.F. Johnson			
	2	111-104	35	6 Way Binding Post (Grn)	E.F. Johnson			
	3	R635	36	Connector	Vector			
	2	PT06P20-	37	Connector	Bendix	A10	P1-P3	
	2	PT06P14-	38	Connector	Bendix	A10	P2-P4	
	2	415 (011)	39	Connector	Bendix	A10	P13	
	1	PT06P14-	40	Connector	Cannon	A4-P1 A5 A3	P1-P2 P1-P2	
	5	DDM-	41	Connector	Cannon	A17	P2-P3	
	2	50S-10MB-2	42	Connector	Bendix	A17	P1	
	1	DDM-	43	Vector Board	Vector			
	16	85F24EP	44	Resistor 1 meg, 1/4W, 5%	Allen Bradley			
	17	RC07GF105J	45	Diode	General Electric			
	17	1W645						

SYA.

DESCRIPTION

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ENCLOSURE

QUANTITY REQUIRED				PART NUMBER	ITEM	DESCRIPTION	MFR. CODE IDENT.	MATL. SPEC.	CKT SYM	UNIT
			-1		61					
					62					
					63					
					64					
					65					
					66	Schematic				
			1	848WE	67	Card	Vector		C2	
			4	2N3904	68	Transistor	Motorola			
			3	RC07GF103J	69	Resistors, 10K, $\frac{1}{4}$ W, 5%	Ohmite			
			2	RC07GF472J	70	Resistors, 4.7K, $\frac{1}{4}$ W, 5%	Ohmite			
			2	RC07GF122J	71	Resistor, 1.2K, $\frac{1}{4}$ W, 5%	Ohmite			
			2	RC07GF823J	72	Resistor, 82K, $\frac{1}{4}$ W, 5%	Ohmite			
					73					
			9	1W645	74	Diodes	General Electric			
			2		75	Capacitor, .0043 μ t $\pm$ 5% 500V				

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QUANTITY REQUIRED			PART NUMBER	ITEM	DESCRIPTION	MFR. CODE IDENT.	MATERIAL SPEC.	CIRCUIT SYMBOL	REMARKS			
		-1										
		2	DM-15-680J	76	Capacitor, 68 pf	Elmenco						
		1		77	Capacitor, .01 t	Sprague						
				78								
				79								
				80								
				81	Schematic Diagram							
		1	848WE	82	Card	Vector		C3				
		13	SL11DA	83	Relays	Potter & Brumfield		K1-K13				
		13	2W3904	84	Transistors	Motorola		Q1-Q13				
		26	RC07GF103J	85	Resistors, 10K, 1/4W, 5%	Ohmite		R1-R26				
		13	1N645	86	Diodes	General Electric		CR1-CR13				
		117	1512-2-05	87	Terminals	Cambion						
		26		88	Screw, Pan Head	4-40 x 1/4"						
		26		89	Nuts, Hex.	4-40						
				90								
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QUANTITY REQUIRED				PART NUMBER	ITEM	DESCRIPTION	MFR. CODE IDENT.	MATL. SPEC.	CKT SYM	ZONE	UNIT
			-1		91						
					92						
					93						
					94						
					95	Earth Sensor Block Diagram					
					96	Schematic Diagram					
			12	2W3904	97	Transistor	Motorola		Q1-Q12		
			24	RC07GF103J	98	Resistor, 10K, 1/4W, 5%	Ohmite		R1-R24		
			6	184-9830-5173-604	99	Indicator Assembly	Dialco				
			6	184-9830-5171-604	100	Indicator Assembly	Dialco				
			12	327	101	Lamp 28V, 40 ma	General Electric				
			1	AC421	102	Aluminum Chassis	Bud				
			1	BPA1590	103	Aluminum Bottom Plate	Bud				
			1	PT07P14-19P (011)	104	Connector	Bendix				
			1	111-104	105	6 Way Binding Post (Grn)	E.F. Johnson				

DESCRIPTION				APPROVED	SYM.	DESCRIPTION	APPROVED



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5.0 WIRING LIST

WIRE RUNNING LIST

REMARKS

FROM			TO		
UNIT	CONN	TERM	UNIT	CONN	TERM
Select	Sensor	121	A10	P2	A
Select	Sensor	121	A10	P2	B
Select	Sensor	023	A10	P2	C
Select	Sensor	023	A10	P2	D
Select	Sensor	052	A10	P2	E
Select	Sensor	052	A10	P2	F
Select	Sensor	015	A10	P2	G
Select	Sensor	007	A10	P2	H
Select	Sensor	130	A10	P2	J
Select	Sensor	130	A10	P2	K
Select	Sensor	141	A10	P2	L
Select	Sensor	141	A10	P2	M
Select	Sensor	160	A10	P2	N
Select	Sensor	160	A10	P2	P
Select	Sensor	106	A10	P2	R
Select	Sensor	106	A10	P2	S
Select	Sensor	045	A10	P2	T
Select	Sensor	045	A10	P2	U
Select	Sensor	112	A10	P2	V
Select	Sensor	112	A10	P2	W
Select	Sensor	150	A10	P2	X
Select	Sensor	150	A10	P2	Y
Select	Sensor	043	A10	P2	Z
Select	Sensor	043	A10	P2	A

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Control Panel
(Switches & Indicator) Call Back

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Control Panel
(Switches & Indicator) Call Back

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WIRE RUNNING LIST

FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
Select	Sensor	032	A10	P2	b	Switch
Select	Sensor	032	A10	P2	c	Switch
Select	Sensor	025	A10	P2	d	Switch
Select	Sensor	025	A10	P2	e	Switch
Select	Sensor	015	A10	P2	f	Switch
Select	Sensor	015	A10	P2	g	Switch
Select	Comm.	*(1)	A10	P2	h	Switch
Select	Comm.	*(2)	A10	P2	i	Switch
Select	Comm.	** (1)	A10	P2	j	Switch
Select	Comm.	** (2)	A10	P2	k	Switch
Select	Comm.	*** (1)	A10	P2	n	Switch
Select	Comm.	*** (2)	A10	P2	p	Switch
Select	Comm.	*** (1)	A10	P2	q	Switch
Select	Comm.	*** (2)	A10	P2	r	Switch
Select	Sensor	016	A10	P4	A	Switch
Select	Sensor	016	A10	P4	B	Switch
Select	Sensor	124	A10	P4	C	Switch
Select	Sensor	124	A10	P4	D	Switch
Select	Sensor	111	A10	P4	E	Switch
Select	Sensor	111	A10	P4	F	Switch
Select	Sensor	051	A10	P4	G	Switch
Select	Sensor	051	A10	P4	H	Switch
Select	Sensor	105	A10	P4	J	Switch
Select	Sensor	105	A10	P4	K	Switch

* Connect Command

** Disconnect Command

*** +Y1 Wing Command

**** -Y1 Wing Command

WIRE RUNNING LIST

REMARKS

FROM			TO		
UNIT	CONN	TERM	UNIT	CONN	TERM
Select	Sensor	026	A10	P4	L
Select	Sensor	026	A10	P4	M
Select	Sensor	142	A10	P4	N
Select	Sensor	142	A10	P4	P
Select	Sensor	054	A10	P4	R
Select	Sensor	054	A10	P4	S
Select	Sensor	103	A10	P4	T
Select	Sensor	103	A10	P4	U
Select	Sensor	013	A10	P4	V
Select	Sensor	013	A10	P4	W
Select	Sensor	046	A10	P4	X
Select	Sensor	046	A10	P4	Y
Select	Sensor	034	A10	P4	Z
Select	Sensor	034	A10	P4	a
Select	Sensor	031	A10	P4	b
Select	Sensor	031	A10	P4	c
Select	Sensor	144	A10	P4	d
Select	Sensor	144	A10	P4	e
Select	Sensor	122	A10	P4	f
Select	Sensor	122	A10	P4	g
Select	Sensor	114	A10	P4	h
Select	Sensor	114	A10	P4	i
Select	Sensor	061	A10	P4	j
Select	Sensor	061	A10	P4	k

NEOTEC
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Control Panel
(Switches & Indicator) Call Back

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WIRE RUNNING LIST

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Control Panel
(Switches & Indicator) Call Back

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Control Panel
(Switches & Indicator) Call Back

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WIRE RUNNING LIST

FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
			C1	J1	22	+Y (1.5)
			C1	J1	20	+Y (8)
			C1	J1	18	+Y (16)
			C1	J1	28	-Y (1.5)
			C1	J1	26	-Y (8)
			C1	J1	24	-Y (16)
			C1	J1	4	+Y CRA (1)
			C1	J1	6	+Y CRA (2)
			C1	J1	8	+Y CRA (3)
			C1	J1	10	+Y CRA (4)
			C1	J1	12	+Y CRA (5)
			C1	J1	14	+Y CRA (6)
			C1	J1	16	+Y CRA (7)
			C3	J3	4	-Y CRA (1)
			C3	J3	6	-Y CRA (2)
			C3	J3	8	-Y CRA (3)
			C3	J3	10	-Y CRA (4)
			C3	J3	12	-Y CRA (5)
			C3	J3	14	-Y CRA (6)
			C3	J3	16	-Y CRA (7)
			C2	J2	4	Pulse Verify
			A17	P2	40	Burn Out/Blow Out On/Off

WIRE RUNNING LIST

FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
C1	J1	1	C3	J3	1	Power Supply 24 VDC
C1	J1	2	C2	J2	2	
			C3	J3	2	GND
C1	J1	3	A5	P1	44	
			C2	J2	17	CRA #1 +Y wire
C1	J1	4	(Front Panel)			CRA lamp #1 + Y wire
C1	J1	5	A5	P2	19	CRA #2
			C2	J2	15	
C1	J1	6	(Front Panel)			CRA lamp #2
C1	J1	7	A5	P2	13	CRA #3
			C2	J2	13	
C1	J1	8	(Front Panel)			CRA lamp #3
C1	J1	9	A5	P2	35	CRA #4
			C2	J2	11	
C1	J1	10	(Front Panel)			CRA lamp #4
C1	J1	11	A5	P2	24	CRA #5
			C2	J2	9	
C1	J1	12	(Front Panel)			CRA lamp #5
C1	J1	13	A5	P2	41	CRA #6
			C2	J2	7	
C1	J1	14	(Front Panel)			CRA lamp #6
C1	J1	15	A5	P2	46	CRA #7
			C2	J2	5	
C1	J1	16	(Front Panel)			CRA lamp #7



NEOTEC
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Relay Card C1
+Y Wing (CRA) & (+)(-) Hit Amp
Output Indicators

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WIRE RUNNING LIST

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NEOTEC
CORPORATION

Relay Card C1
+Y wing (CRA) & (+)(-) Hit Amp
Output Indicators

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WIRE RUNNING LIST

FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
C2	J2	1				NC
C2	J2	2				GND
C2	J2	3				NC
C2	J2	4				Pulse verify
C2	J2	5				+Y CRA #7
C2	J2	6				NC
C2	J2	7				+Y CRA #6
C2	J2	8				NC
C2	J2	9				+Y CRA #5
C2	J2	10				NC
C2	J2	11				+Y CRA #4
C2	J2	12				NC
C2	J2	13				+Y CRA #3
C2	J2	14				NC
C2	J2	15				+Y CRA #2
C2	J2	16				NC
C2	J2	17				+Y CRA #1



NEOTEC
CORPORATION

Voltage Controlled Oscillator
2048 cps C2

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ZETEX
CORPORATION

Voltage Controlled Oscillator
2048 cps C2

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WIRE RUNNING LIST

FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
C2	J2	18				NC
C2	J2	19	C3	J3	15	-Y CRA #7
			A5	P2	2	
C2	J2	20				NC
C2	J2	21	C3	J3	13	-Y CRA #6
			A5	P1	27	
C2	J2	22				NC
C2	J2	23	C3	J3	11	-Y CRA #5
			A5	P1	35	
C2	J2	24				NC
C2	J2	25	C3	J3	9	-Y CRA #4
			A5	P1	12	
C2	J2	26				NC
C2	J2	27	C3	J3	7	-Y CRA #3
			A5	P1	19	
C2	J2	28				NC
C2	J2	29	C3	J3	5	-Y CRA #2
			A5	P1	9	
C2	J2	30				NC
C2	J2	31	C3	J3	3	-Y CRA #1
			A5	P1	4	
C2	J2	32				NC
C2	J2	33				NC
C2	J2	34	A17	P3	7	+6 VDC

WIRE RUNNING LIST

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NEOTEC
CORPORATION

Voltage Controlled Oscillator
2048 cps C2

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WIRE RUNNING LIST

FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
C3	J3	1				+24V
C3	J3	2				GND
C3	J3	3	A5	P1	4	CRA #1
C3	J3	3	C2	J2	31	
C3	J3	4	(Front Panel)			CRA Lamp #1
C3	J3	5	A5	P1	9	CRA #2
C3	J3	5	C2	J2	29	
C3	J3	6	(Front Panel)			CRA Lamp #3
C3	J3	7	A5	P1	19	CRA #3
C3	J3	7	C2	J2	27	
C3	J3	8	(Front Panel)			CRA Lamp #3
C3	J3	9	A5	P1	12	CRA #4
C3	J3	9	C2	J2	25	
C3	J3	10	(Front Panel)			CRA Lamp #4
C3	J3	11	A5	P1	35	CRA #5
C3	J3	11	C2	J2	23	
C3	J3	12	(Front Panel)			CRA Lamp #5
C3	J3	13	A5	P1	27	CRA #6
C3	J3	13	C2	J2	21	
C3	J3	14	(Front Panel)			CRA Lamp #6
C3	J3	15	A5	P2	2	CRA #7
C3	J3	15	C2	J2	19	
C3	J3	16	(Front Panel)			CRA Lamp #7
C3	J3	17				NC



NEOTEC
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Relay Card (C3)
-Y Wing CRA Indicators

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WIRE RUNNING LIST

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NEOTEC
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Relay Card (C3)

-Y Wing CRA Indicators

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WIRE RUNNING LIST

REMARKS

FROM			TO		
UNIT	CONN	TERM	UNIT	CONN	TERM
A3	P1	1			
A3	P1	2			
A3	P1	3			
A3	P1	4			
A3	P1	5	A10	P3	D
A3	P1	6	A10	P3	Y
A3	P1	7	A10	P3	A
A3	P1	8	A10	P3	U
A3	P1	9	A10	P3	C
A3	P1	10	A10	P3	N
A3	P1	11	A10	P3	H
A3	P1	12	A10	P3	E
A3	P1	13	A4	P1	24
A3	P1	14	A4	P1	19
A3	P1	15	A10	P3	R
A3	P1	16	A4	P1	25
A3	P1	17	A17	P2	1
A3	P1	18	A10	P3	V
A3	P1	19	A10	P3	A
A3	P1	20	A10	P3	L
A3	P1	21	A10	P3	G
A3	P1	22	A10	P3	S
A3	P1	23	A10	P3	P
A3	P1	24	A10	P3	R

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Detector Matrix
900A10A3

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Detector Matrix
900A10A3

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WIRE RUNNING LIST

FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
A3	P1	25	A10	P3	B	-Y1 sensor (DPD) 016
A3	P1	26	A10	P3	W	-Y1 sensor (DPD) 141
A3	P1	27	A10	P3	e	-Y1 sensor (DPD) 043
A3	P1	28	A10	P3	b	-Y1 sensor (DPD) 045
A3	P1	29	A10	P3	K	-Y1 sensor (DPD) 144
A3	P1	30	A10	P3	F	-Y1 sensor (DPD) 142
A3	P1	31	A10	P3	G	-Y1 sensor (DPD) 031
A3	P1	32	A10	P3	F	-Y1 sensor (DPD) 032
A3	P1	33	A10	P3	M	-Y1 sensor (DPD) 034
A3	P1	34	A10	P3	X	-Y1 sensor (DPD) 160
A3	P1	35	A10	P3	H	-Y1 sensor (DPD) 054
A3	P1	36	A10	P3	C	-Y1 sensor (DPD) 051
A3	P1	37	A10	P3	T	-Y1 sensor (DPD) 052
A3	P1	38	A10	P3	D	-Y1 sensor (DPD) 150
A3	P1	39	A10	P3	J	-Y1 sensor (DPD) 046
A3	P1	40				NC
A3	P1	41				NC
A3	P1	42				NC
A3	P1	43				NC
A3	P1	44				NC
A3	P1	45				NC
A3	P1	46				NC
A3	P1	47				NC
A3	P1	48				NC

WIRE RUNNING LIST

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Detector Matrix
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Detector Matrix
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WIRE RUNNING LIST

FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
A3	P2	1	A5	P2	1	-Y Recharge amp.
A3	P2	2	A5	P1	34	-Y5 Recharge amp.
A3	P2	3	A5	P1	28	-Y6 Recharge amp.
A3	P2	4	A5	P1	1	-Y1 Recharge amp.
A3	P2	5	A5	P1	10	-Y2 Recharge amp.
A3	P2	6	A5	P1	13	-Y4 Recharge amp.
A3	P2	7	A5	P1	18	-Y3 Recharge amp.
A3	P2	8				NC
A3	P2	9				NC
A3	P2	10	A10	P1	J	+Y sensor DPD 103
A3	P2	11	A10	P1	E	+Y sensor DPD 105C
A3	P2	12	A10	P1	b	+Y sensor DPD 106C
A3	P2	13	A10	P1	W	+Y sensor DPD 007C
A3	P2	14	A10	P1	C	+Y sensor DPD 111B
A3	P2	15	A10	P1	c	+Y sensor DPD 061B
A3	P2	16	A10	P1	K	+Y sensor DPD 013B
A3	P2	17	A10	P1	V	+Y sensor DPD 112B
A3	P2	18	A10	P1	B	+Y sensor DPD 124
A3	P2	19	A10	P1	T	+Y sensor DPD 025
A3	P2	20	A10	P1	F	+Y sensor DPD 026
A3	P2	21	A10	P1	i	+Y sensor DPD 023
A3	P2	22	A10	P1	R	+Y sensor DPD 122
A3	P2	23	A10	P1	A	+Y sensor DPD 016
A3	P2	24	A10	P1	h	+Y sensor DPD 015



NEOTEC
CORPORATION

Detector Matrix
900A10A3

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WIRE RUNNING LIST

FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
A3	P2	25	A10	P1	U	+Y sensor DPD 121
A3	P2	26	A10	P1	f	+Y sensor DPD 130
A3	P2	27	A10	P1	N	+Y sensor DPD 031
A3	P2	28	A10	P1	Y	+Y sensor DPD 032
A3	P2	29	A10	P1	g	+Y sensor DPD 141
A3	P2	30	A10	P1	G	+Y sensor DPD 142
A3	P2	31	A10	P1	P	+Y sensor DPD 144
A3	P2	32	A10	P1	Z	+Y sensor DPD 043
A3	P2	33	A10	P1	M	+Y sensor DPD 034
A3	P2	34	A4	P1	1	+Y matrix 7 line 3
A3	P2	35	A4	P1	2	+Y matrix 7 line 4
A3	P2	36	A4	P1	3	+Y matrix 7 line 2
A3	P2	37	A4	P1	4	+Y matrix 7 line 1
A3	P2	38	A4	P1	5	+Y matrix 7 line 7
A3	P2	39	A4	P1	7	+Y matrix 7 line 6
A3	P2	40	A4	P1	6	+Y matrix 7 line 5
A3	P2	41	A4	P1	9	Sig. GND
A3	P2	42				NC
A3	P2	43				NC
A3	P2	44				NC
A3	P2	45				NC
A3	P2	46				Shield GND
A3	P2	47	A4	P1	21	+YB buss
A3	P2	48	A4	P1	23	+YC buss

WIRE RUNNING LIST

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Detector Matrix
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NEOTEC
CORPORATION

Detector Matrix & Hit Amplifier
900A10A4

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WIRE RUNNING LIST

FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
A4	P1	1	A3	P2	34	+Y1 matrix 7 (det. matrix) line 3
A4	P1	2	A3	P2	35	+Y1 matrix 7 (det. matrix) line 4
A4	P1	3	A3	P2	36	+Y1 matrix 7 (det. matrix) line 2
A4	P1	4	A3	P2	37	+Y1 matrix 7 (det. matrix) line 1
A4	P1	5	A3	P2	38	+Y1 matrix 7 (det. matrix) line 7
A4	P1	6	A3	P2	40	+Y1 matrix 7 (det. matrix) line 5
A4	P1	7	A3	P2	39	+Y1 matrix 7 (det. matrix) line 6
A4	P1	8	A17	P3	41	GND (DPDU)
A4	P1	9	A3	P2	41	Sig. GND (det. matrix)
A4	P1	10	A17	P3	28	-6V (DPDU)
A4	P1	11	C1	J1	17	+Y discharge pulse "A"
A4	P1	12	A5	P2	40	+Y6 from CRA
A4	P1	13	A5	P2	25	+Y5 from CRA
A4	P1	14	A5	P2	47	+Y7 from CRA
A4	P1	15	A5	P1	43	+Y1 from CRA
A4	P1	16	A5	P2	18	+Y2 from CRA
A4	P1	17	A5	P2	34	+Y4 from CRA
A4	P1	18	A5	P2	12	+Y3 from CRA
A4	P1	19	A3	P1	14	-YA buss det. matrix
A4	P1	20	A17	P3	30	+6V DPDU
A4	P1	21	A3	P2	47	+YB buss det. matrix
A4	P1	22				NC
A4	P1	23	A3	P2	48	+YC buss det. matrix
A4	P1	24	A3	P1	13	-YE buss det. matrix



ZETEC
CORPORATION

Detector Matrix & Hit Amplifier
900A10A4

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WIRE RUNNING LIST

FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
A4	P1	25	A3	P1	16	-YC buss det. matrix
A4	P1	26	A3	P2	50	+YA buss det. matrix
A4	P1	27	A17	P2	2	GND return
A4	P1	28	C1	J1	25	-Y1 discharge pulse (B)
A4	P1	29				NC
A4	P1	30	C1	J1	19	+Y1 discharge pulse (B)
A4	P1	31				NC
A4	P1	32	C1	J1	21	+Y1 discharge pulse (C)
A4	P1	33				NC
A4	P1	34	A10	P1	H	+Y (detector panel disconnect unit) sensor 054
A4	P1	35	A10	P1	S	+Y (detector panel disconnect unit) sensor 114
A4	P1	36	A10	P1	X	+Y (detector panel disconnect unit) sensor 052
A4	P1	37	A10	P1	a	+Y (detector panel disconnect unit) sensor 160
A4	P1	38	A10	P1	D	+Y (detector panel disconnect unit) sensor 051
A4	P1	39	A10	P1	d	+Y (detector panel disconnect unit) sensor 150
A4	P1	40	A10	P1	L	+Y (detector panel disconnect unit) sensor 046
A4	P1	41	A10	P1	e	+Y (detector panel disconnect unit) sensor 045
A4	P1	42				NC
A4	P1	43	C1	J1	23	-Y1 discharge pulse (A)
A4	P1	44				NC
A4	P1	45	C1	J1	27	-Y1 discharge pulse (C)
A4	P1	46				NC
A4	P1	47				NC
A4	P1	48				NC

WIRE RUNNING LIST

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NEOTEC
CORPORATION

Detector Matrix & Hit Amplifier
900A10A4

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WIRE RUNNING LIST

FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
A5	P1	1	A3	P2	4	Output to matrix -Y1 (DM)
A5	P1	2				NC
A5	P1	3				+6V DPDU
A5	P1	4	C3	J3	3	-Y1 recharge pulse no. 1
			C2	J2	31	
A5	P1	5				NC
A5	P1	6				+22V DPDU
A5	P1	7				NC
A5	P1	8				Return GND (DPDU)
A5	P1	9	C3	J3	5	-Y1 recharge pulse no. 2
			C2	J2	29	
A5	P1	10	A3	P2	5	Output to matrix -Y2 (detmatrix)
A5	P1	11				NC
A5	P1	12	C3	J3	9	-Y1 recharge pulse no. 4
			C2	J2	25	
A5	P1	13	A3	P2	6	Output to matrix -Y4
A5	P1	14				NC
A5	P1	15				NC
A5	P1	16				NC
A5	P1	17				+50V (DPDU)
A5	P1	18	A3	P2	7	Output to matrix -Y3 (DM&HA)
A5	P1	19	C3	J3	7	-Y1 recharge pulse no. 3
			C2	J2	27	
A5	P1	20				NC



NFOC
CORPORATION

Detector Current Recharge
Amplifier
900A10A5

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WIRE RUNNING LIST



NEOTEC
CORPORATION

Detector Current Recharge
Amplifier
900A10A5

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FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
A5	P1	21				NC
A5	P1	22				NC
A5	P1	23				NC
A5	P1	24				NC
A5	P1	25				NC
A5	P1	26				NC
A5	P1	27	C3	J3	13	-Y1 recharge pulse no. 6
			C2	J2	21	
A5	P1	28	A3	P2	3	Output to matrix -Y6 (det. matrix)
A5	P1	29				NC
A5	P1	30				NC
A5	P1	31				NC
A5	P1	32				NC
A5	P1	33				NC
A5	P1	34	A3	P2	2	Output to matrix -Y5 (det. matrix)
A5	P1	35	C3	J3	11	-Y1 recharge pulse no. 5
			C2	J2	23	
A5	P1	36				NC
A5	P1	37				NC
A5	P1	38				NC
A5	P1	39				NC
A5	P1	40				NC
A5	P1	41				NC
A5	P1	42				NC

WIRE RUNNING LIST

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Detector Current Recharge
Amplifier
900A10A5



ZETEC
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Detector Current Recharge
Amplifier
900A10A5

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WIRE RUNNING LIST

FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
A5	P2	1	A3	P2	1	Output to matrix -Y7
A5	P2	2	C3	J3	15	-Y1 recharge pulse no. 7
			C2	J2	19	
A5	P2	3				NC
A5	P2	4				NC
A5	P2	5				NC
A5	P2	6				NC
A5	P2	7				NC
A5	P2	8				NC
A5	P2	9				NC
A5	P2	10				NC
A5	P2	11				NC
A5	P2	12	A4	P1	18	Output to matrix +Y3 (DM&HA)
A5	P2	13	C1	J1	7	+Y1 recharge pulse no. 3
			C2	J2	13	
A5	P2	14				NC
A5	P2	15				NC
A5	P2	16				NC
A5	P2	17				NC
A5	P2	18	A4	P1	16	Output to matrix +Y2 (det. mat.)
A5	P2	19	C1	J1	5	+Y1 recharge pulse no. 2
			C2	J2	15	
A5	P2	20				NC
A5	P2	21				NC



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Detector Current Recharge
Amplifier
900A10A5

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WIRE RUNNING LIST

FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
A5	P2	22				NC
A5	P2	23				NC
A5	P2	24	C1	J1	11	+Y1 recharge pulse no. 5
			C2	J2	9	
A5	P2	25	A4	P1	13	Output to matrix +Y5 (DM&HA)
A5	P2	26				NC
A5	P2	27				NC
A5	P2	28				NC
A5	P2	29				NC
A5	P2	30				NC
A5	P2	31				NC
A5	P2	32				NC
A5	P2	33				NC
A5	P2	34	A4	P1	17	Output to matrix +Y4 (DM&HA)
A5	P2	35	C1	J1	9	+Y1 recharge pulse no. 6 PI
			C2	J2	7	
A5	P2	36				NC
A5	P2	37				NC
A5	P2	38				NC
A5	P2	39				NC
A5	P2	40	A4	P1	12	Output to matrix +Y6 (DM&HA)
A5	P2	41	C1	J1	13	+Y1 recharge pulse no. 6 PI
			C2	J2	7	
A5	P2	42				NC

WIRE RUNNING LIST

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Detector Current Recharge
Amplifier
900A10A5

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WIRE RUNNING LIST

REMARKS

FROM			TO		
UNIT	CONN	TERM	UNIT	CONN	TERM
A10	P1	A	A3	P2	23
A10	P1	B	A3	P2	18
A10	P1	C	A3	P2	14
A10	P1	D	A4	P1	38
A10	P1	E	A3	P2	11
A10	P1	F	A3	P2	20
A10	P1	G	A3	P2	30
A10	P1	H	A4	P1	34
A10	P1	J	A3	P2	11
A10	P1	K	A3	P2	16
A10	P1	L	A4	P1	30
A10	P1	M	A3	P2	33
A10	P1	N	A3	P2	27
A10	P1	P	A3	P2	31
A10	P1	R	A3	P2	22
A10	P1	S	A4	P1	35
A10	P1	T	A3	P2	19
A10	P1	U	A3	P2	25
A10	P1	V	A3	P2	17
A10	P1	W	A3	P2	13
A10	P1	X	A4	P1	36
A10	P1	Y	A3	P2	28
A10	P1	Z	A3	P2	32
A10	P1	a	A4	P1	37

+Y1 sensor 016

+Y1 sensor 124

+Y1 sensor 111B

+Y1 sensor 051

+Y1 sensor 105C

+Y1 sensor 026

+Y1 sensor 142

+Y1 sensor 054

+Y1 sensor 103

+Y1 sensor 013B

+Y1 sensor 046

+Y1 sensor 034

+Y1 sensor 031

+Y1 sensor 144

+Y1 sensor 122

+Y1 sensor 114

+Y1 sensor 025

+Y1 sensor 121

+Y1 sensor 112B

+Y1 sensor 007C

+Y1 sensor 052

+Y1 sensor 032

+Y1 sensor 043

+Y1 sensor 160



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WIRE RUNNING LIST

FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
A10	P2	A				Select sensor 121
A10	P2	B				121
A10	P2	C				023
A10	P2	D				023
A10	P2	E				052
A10	P2	F				052
A10	P2	G				015
A10	P2	H				007
A10	P2	J				130
A10	P2	K				130
A10	P2	L				141
A10	P2	M				141
A10	P2	N				160
A10	P2	P				160
A10	P2	R				106
A10	P2	S				106
A10	P2	T				045
A10	P2	U				045
A10	P2	V				112
A10	P2	W				112
A10	P2	X				150
A10	P2	Y				150
A10	P2	Z				043
A10	P2	a				Select sensor 043

Switches on Front Panel

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Detector Panel Disconnect
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WIRE RUNNING LIST

FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
A10	P3	A	A3	P1	19	-Y1 sensor 124
A10	P3	B	A3	P1	25	-Y1 sensor 016
A10	P3	C	A3	P1	36	-Y1 sensor 051
A10	P3	D	A3	P1	5	-Y1 sensor 105C
A10	P3	E	A3	P1	12	-Y1 sensor 111B
A10	P3	F	A3	P1	30	-Y1 sensor 142
A10	P3	G	A3	P1	31	-Y1 sensor 031
A10	P3	H	A3	P1	35	-Y1 sensor 054
A10	P3	J	A3	P1	39	-Y1 sensor 046
A10	P3	K	A3	P1	29	-Y1 sensor 144
A10	P3	L	A3	P1	20	-Y1 sensor 026
A10	P3	M	A3	P1	33	-Y1 sensor 034
A10	P3	N	A3	P1	10	-Y1 sensor 114
A10	P3	P	A3	P1	23	-Y1 sensor 122
A10	P3	R	A3	P1	24	-Y1 sensor 121
A10	P3	S	A3	P1	22	-Y1 sensor 023
A10	P3	T	A3	P1	37	-Y1 sensor 052
A10	P3	U	A3	P1	8	-Y1 sensor 007C
A10	P3	V	A3	P1	18	-Y1 sensor 130
A10	P3	W	A3	P1	26	-Y1 sensor 141
A10	P3	X	A3	P1	34	-Y1 sensor 160
A10	P3	Y	A3	P1	6	-Y1 sensor 103
A10	P3	Z				NC
A10	P3	a	A3	P1	7	-Y1 sensor 106C

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WIRE RUNNING LIST

FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
A10	P4	A				Select sensor 016
A10	P4	B				016
A10	P4	C				124
A10	P4	D				124
A10	P4	E				111
A10	P4	F				111
A10	P4	G				051
A10	P4	H				051
A10	P4	J				105
A10	P4	K				105
A10	P4	L				026
A10	P4	M				026
A10	P4	N				142
A10	P4	P				142
A10	P4	R				054
A10	P4	S				054
A10	P4	T				103
A10	P4	U				103
A10	P4	V				013
A10	P4	W				013
A10	P4	X				046
A10	P4	Y				046
A10	P4	Z				034
A10	P4	a				Select sensor 034

Switches on Front Panel

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WIRE RUNNING LIST

FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
A10	P5	1				Ribbon cable to sensor filter unit 054 filter
A10	P5	2				Ribbon cable to sensor filter unit 054, 103C com.
A10	P5	3				Ribbon cable to sensor filter unit 103C
A10	P5	4				Ribbon cable to sensor filter unit NC
A10	P5	5				Ribbon cable to sensor filter unit 013B
A10	P5	6				Ribbon cable to sensor filter unit 013B, 046 com.
A10	P5	7				Ribbon cable to sensor filter unit 046
A10	P5	8				Ribbon cable to sensor filter unit NC
A10	P5	9				Ribbon cable to sensor filter unit 034 com.
A10	P5	10				Ribbon cable to sensor filter unit 034
A10	P5	11				Ribbon cable to sensor filter unit NC
A10	P5	12				Ribbon cable to sensor filter unit 031 com.
A10	P5	13				Ribbon cable to sensor filter unit 031
A10	P5	14				Ribbon cable to sensor filter unit NC
A10	P5	15				Ribbon cable to sensor filter unit 144 com.
A10	P5	16				Ribbon cable to sensor filter unit 144
A10	P5	17				Ribbon cable to sensor filter unit NC
A10	P5	18				Ribbon cable to sensor filter unit 122 com.
A10	P5	19				Ribbon cable to sensor filter unit 122
A10	P5	20				Ribbon cable to sensor filter unit NC
A10	P5	21				Ribbon cable to sensor filter unit NC
A10	P5	22				Ribbon cable to sensor filter unit NC
A10	P5	23				Ribbon cable to sensor filter unit NC
A10	P5	24				Ribbon cable to sensor filter unit 114 com.

WIRE RUNNING LIST

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WIRE RUNNING LIST

FROM			TO		
UNIT	CONN	TERM	UNIT	CONN	TERM
A10	P6	1			
A10	P6	2			
A10	P6	3			
A10	P6	4			
A10	P6	5			
A10	P6	6			
A10	P6	7			
A10	P6	8			
A10	P6	9			
A10	P6	10			
A10	P6	11			
A10	P6	12			
A10	P6	13			
A10	P6	14			
A10	P6	15			
A10	P6	16			
A10	P6	17			
A10	P6	18			
A10	P6	19			
A10	P6	20			
A10	P6	21			
A10	P6	22			
A10	P6	23			
A10	P6	24			

REMARKS

Ribbon cable to sensor filter unit 054 com.
Ribbon cable to sensor filter unit 054 filter
Ribbon cable to sensor filter unit NC
Ribbon cable to sensor filter unit 142 com.
Ribbon cable to sensor filter unit 142 filter
Ribbon cable to sensor filter unit NC
Ribbon cable to sensor filter unit 026 com.
Ribbon cable to sensor filter unit 026 filter
Ribbon cable to sensor filter unit NC
Ribbon cable to sensor filter unit 105C filter
Ribbon cable to sensor filter unit 105C, 051 com.
Ribbon cable to sensor filter unit 051 filter
Ribbon cable to sensor filter unit NC
Ribbon cable to sensor filter unit 111B filter
Ribbon cable to sensor filter unit 111B, 013B com.
Ribbon cable to sensor filter unit 013B filter
Ribbon cable to sensor filter unit NC
Ribbon cable to sensor filter unit 124 com.
Ribbon cable to sensor filter unit 124 filter
Ribbon cable to sensor filter unit NC
Ribbon cable to sensor filter unit NC
Ribbon cable to sensor filter unit NC
Ribbon cable to sensor filter unit NC
Ribbon cable to sensor filter unit 016 com.

WIRE RUNNING LIST

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WIRE RUNNING LIST

FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
A10	P7	1				Ribbon cable to sensor filter unit 106C filter
A10	P7	2				Ribbon cable to sensor filter unit 106C, 160 com.
A10	P7	3				Ribbon cable to sensor filter unit 160 filter
A10	P7	4				Ribbon cable to sensor filter unit NC
A10	P7	5				Ribbon cable to sensor filter unit 061B filter
A10	P7	6				Ribbon cable to sensor filter unit 061B, 150 com.
A10	P7	7				Ribbon cable to sensor filter unit 150 filter
A10	P7	8				Ribbon cable to sensor filter unit NC
A10	P7	9				Ribbon cable to sensor filter unit 045 com.
A10	P7	10				Ribbon cable to sensor filter unit 045 filter
A10	P7	11				Ribbon cable to sensor filter unit NC
A10	P7	12				Ribbon cable to sensor filter unit 130 com.
A10	P7	13				Ribbon cable to sensor filter unit 130 filter
A10	P7	14				Ribbon cable to sensor filter unit NC
A10	P7	15				Ribbon cable to sensor filter unit 141 com.
A10	P7	16				Ribbon cable to sensor filter unit 141 filter
A10	P7	17				Ribbon cable to sensor filter unit NC
A10	P7	18				Ribbon cable to sensor filter unit 015 com.
A10	P7	19				Ribbon cable to sensor filter unit 015 filter
A10	P7	20				Ribbon cable to sensor filter unit NC
A10	P7	21				Ribbon cable to sensor filter unit NC
A10	P7	22				Ribbon cable to sensor filter unit NC
A10	P7	23				Ribbon cable to sensor filter unit NC
A10	P7	24				Ribbon cable to sensor filter unit 023 com.

WIRE RUNNING LIST

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WIRE RUNNING LIST

FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
A10	P8	1				Ribbon cable to sensor filter unit 160 com.
A10	P8	2				Ribbon cable to sensor filter unit 160 filter
A10	P8	3				Ribbon cable to sensor filter unit NC
A10	P8	4				Ribbon cable to sensor filter unit 043 com.
A10	P8	5				Ribbon cable to sensor filter unit 043 filter
A10	P8	6				Ribbon cable to sensor filter unit NC
A10	P8	7				Ribbon cable to sensor filter unit 032 com.
A10	P8	8				Ribbon cable to sensor filter unit 032 filter
A10	P8	9				Ribbon cable to sensor filter unit NC
A10	P8	10				Ribbon cable to sensor filter unit 052 filter
A10	P8	11				Ribbon cable to sensor filter unit 052, 007C com.
A10	P8	12				Ribbon cable to sensor filter unit 007C filter
A10	P8	13				Ribbon cable to sensor filter unit NC
A10	P8	14				Ribbon cable to sensor filter unit 061B filter
A10	P8	15				Ribbon cable to sensor filter unit 061B, 112B com.
A10	P8	16				Ribbon cable to sensor filter unit 112B filter
A10	P8	17				Ribbon cable to sensor filter unit NC
A10	P8	18				Ribbon cable to sensor filter unit 121 com.
A10	P8	19				Ribbon cable to sensor filter unit 121 filter
A10	P8	20				Ribbon cable to sensor filter unit NC
A10	P8	21				Ribbon cable to sensor filter unit NC
A10	P8	22				Ribbon cable to sensor filter unit NC
A10	P8	23				Ribbon cable to sensor filter unit NC
A10	P8	24				Ribbon cable to sensor filter unit 025 com.



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WIRE RUNNING LIST

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WIRE RUNNING LIST

FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
A10	P9	1				Ribbon cable to sensor filter unit 103 filter
A10	P9	2				Ribbon cable to sensor filter unit 103, 054 com.
A10	P9	3				Ribbon cable to sensor filter unit 054 filter
A10	P9	4				Ribbon cable to sensor filter unit NC
A10	P9	5				Ribbon cable to sensor filter unit 111B filter
A10	P9	6				Ribbon cable to sensor filter unit 111B, 046 com.
A10	P9	7				Ribbon cable to sensor filter unit 046 filter
A10	P9	8				Ribbon cable to sensor filter unit NC
A10	P9	9				Ribbon cable to sensor filter unit 144 com.
A10	P9	10				Ribbon cable to sensor filter unit 144 filter
A10	P9	11				Ribbon cable to sensor filter unit NC
A10	P9	12				Ribbon cable to sensor filter unit 026 com.
A10	P9	13				Ribbon cable to sensor filter unit 026 filter
A10	P9	14				Ribbon cable to sensor filter unit NC
A10	P9	15				Ribbon cable to sensor filter unit 034 com.
A10	P9	16				Ribbon cable to sensor filter unit 034 filter
A10	P9	17				Ribbon cable to sensor filter unit NC
A10	P9	18				Ribbon cable to sensor filter unit 114 com.
A10	P9	19				Ribbon cable to sensor filter unit 114 filter
A10	P9	20				Ribbon cable to sensor filter unit NC
A10	P9	21				Ribbon cable to sensor filter unit NC
A10	P9	22				Ribbon cable to sensor filter unit NC
A10	P9	23				Ribbon cable to sensor filter unit NC
A10	P9	24				Ribbon cable to sensor filter unit 122 com.

WIRE RUNNING LIST

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WIRE RUNNING LIST

FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
A10	P10	1				Ribbon cable to sensor filter unit 054 com.
A10	P10	2				Ribbon cable to sensor filter unit 054 filter
A10	P10	3				Ribbon cable to sensor filter unit NC
A10	P10	4				Ribbon cable to sensor filter unit 031 com.
A10	P10	5				Ribbon cable to sensor filter unit 031 filter
A10	P10	6				Ribbon cable to sensor filter unit NC
A10	P10	7				Ribbon cable to sensor filter unit 142 com.
A10	P10	8				Ribbon cable to sensor filter unit 142 filter
A10	P10	9				Ribbon cable to sensor filter unit NC
A10	P10	10				Ribbon cable to sensor filter unit 046 filter
A10	P10	11				Ribbon cable to sensor filter unit 046, 111B com.
A10	P10	12				Ribbon cable to sensor filter unit 111B filter
A10	P10	13				Ribbon cable to sensor filter unit NC
A10	P10	14				Ribbon cable to sensor filter unit 105C filter
A10	P10	15				Ribbon cable to sensor filter unit 105C, 051 com.
A10	P10	16				Ribbon cable to sensor filter unit 051 filter
A10	P10	17				Ribbon cable to sensor filter unit NC
A10	P10	18				Ribbon cable to sensor filter unit 016 com.
A10	P10	19				Ribbon cable to sensor filter unit 016 filter
A10	P10	20				Ribbon cable to sensor filter unit NC
A10	P10	21				Ribbon cable to sensor filter unit NC
A10	P10	22				Ribbon cable to sensor filter unit NC
A10	P10	23				Ribbon cable to sensor filter unit NC
A10	P10	24				Ribbon cable to sensor filter unit 124 com.



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WIRE RUNNING LIST

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WIRE RUNNING LIST

FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
A10	P11	1				Ribbon cable to sensor filter unit 160 filter
A10	P11	2				Ribbon cable to sensor filter unit 160, 160C com.
A10	P11	3				Ribbon cable to sensor filter unit 160C filter
A10	P11	4				Ribbon cable to sensor filter unit NC
A10	P11	5				Ribbon cable to sensor filter unit 045 filter
A10	P11	6				Ribbon cable to sensor filter unit 045, 112B com.
A10	P11	7				Ribbon cable to sensor filter unit 112B filter
A10	P11	8				Ribbon cable to sensor filter unit NC
A10	P11	9				Ribbon cable to sensor filter unit 150 com.
A10	P11	10				Ribbon cable to sensor filter unit 150 filter
A10	P11	11				Ribbon cable to sensor filter unit NC
A10	P11	12				Ribbon cable to sensor filter unit 043 com.
A10	P11	13				Ribbon cable to sensor filter unit 043 filter
A10	P11	14				Ribbon cable to sensor filter unit NC
A10	P11	15				Ribbon cable to sensor filter unit 032 com.
A10	P11	16				Ribbon cable to sensor filter unit 032 filter
A10	P11	17				Ribbon cable to sensor filter unit NC
A10	P11	18				Ribbon cable to sensor filter unit 025 com.
A10	P11	19				Ribbon cable to sensor filter unit 025 filter
A10	P11	20				Ribbon cable to sensor filter unit NC
A10	P11	21				Ribbon cable to sensor filter unit NC
A10	P11	22				Ribbon cable to sensor filter unit NC
A10	P11	23				Ribbon cable to sensor filter unit NC
A10	P11	24				Ribbon cable to sensor filter unit 015 com.



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WIRE RUNNING LIST

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WIRE RUNNING LIST

FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
A10	P12	1				(Ribbon cable) sensor to filter unit 160 com.
A10	P12	2				(Ribbon cable) sensor to filter unit 160 filter
A10	P12	3				(Ribbon cable) sensor to filter unit NC
A10	P12	4				(Ribbon cable) sensor to filter unit 141 com.
A10	P12	5				(Ribbon cable) sensor to filter unit 141 filter
A10	P12	6				(Ribbon cable) sensor to filter unit NC
A10	P12	7				(Ribbon cable) sensor to filter unit 130 com.
A10	P12	8				(Ribbon cable) sensor to filter unit 130 filter
A10	P12	9				(Ribbon cable) sensor to filter unit NC
A10	P12	10				(Ribbon cable) sensor to filter unit 007C filter
A10	P12	11				(Ribbon cable) sensor to filter unit 007C, 052 com.
A10	P12	12				(Ribbon cable) sensor to filter unit 052 filter
A10	P12	13				(Ribbon cable) sensor to filter unit NC
A10	P12	14				(Ribbon cable) sensor to filter unit 112B filter
A10	P12	15				(Ribbon cable) sensor to filter unit 112B, 045 com.
A10	P12	16				(Ribbon cable) sensor to filter unit 045 filter
A10	P12	17				(Ribbon cable) sensor to filter unit NC
A10	P12	18				(Ribbon cable) sensor to filter unit 023 com.
A10	P12	19				(Ribbon cable) sensor to filter unit 023 filter
A10	P12	20				(Ribbon cable) sensor to filter unit NC
A10	P12	21				(Ribbon cable) sensor to filter unit NC
A10	P12	22				(Ribbon cable) sensor to filter unit NC
A10	P12	23				(Ribbon cable) sensor to filter unit NC
A10	P12	24				(Ribbon cable) sensor to filter unit 121 com.



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WIRE RUNNING LIST

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WIRE RUNNING LIST

REMARKS

FROM TO

UNIT CONN TERM UNIT CONN TERM

A17 P1 A
A17 P1 B
A17 P1 C
A17 P1 D
A17 P1 E
A17 P1 F
A17 P1 G
A17 P1 H
A17 P1 J
A17 P1 K
A17 P1 L
A17 P1 M

+28V power supply

+28V

Supply GND

Gnd



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Power Distribution Unit
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WIRE RUNNING LIST

WIRE RUNNING LIST						
FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
A17	P2	1	A3	P1	17	10 KC test signal
A17	P2	2	A4	P1	27	Return detmat. hit amp
A17	P2	3				
A17	P2	4				
A17	P2	5	Not Connected			+28VDC detector fuse circuit
A17	P2	6				
A17	P2	7				
A17	P2	8				
A17	P2	9				
A17	P2	10				
A17	P2	11				
A17	P2	12				
A17	P2	13				
A17	P2	14				
A17	P2	15				
A17	P2	16				
A17	P2	17				
A17	P2	18				
A17	P2	19				
A17	P2	20				
A17	P2	21				
A17	P2	22				
A17	P2	23				



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WIRE RUNNING LIST

REMARKS

FROM			TO		
UNIT	CONN	TERM	UNIT	CONN	TERM
A17	P2	24			
A17	P2	25			
A17	P2	26			
A17	P2	27			
A17	P2	28			
A17	P2	29			
A17	P2	30			
A17	P2	31			
A17	P2	32			
A17	P2	33			
A17	P2	34			
A17	P2	35			
A17	P2	36			
A17	P2	37			
A17	P2	38			
A17	P2	39			
A17	P2	40			
A17	P2	41			
A17	P2	42			
A17	P2	43			
A17	P2	44			
A17	P2	45			
A17	P2	46			
A17	P2	47			



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WIRE RUNNING LIST

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FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
A17	P3	1	A5	P1	17	+50 VDC/DCRA1
A17	P3	2				
A17	P3	3				
A17	P3	4				
A17	P3	5	A10	P4	P	+28V unreg.
A17	P3	6				
A17	P3	7	C2	J2	34	+6 VDC
A17	P3	8				
A17	P3	9				
A17	P3	10				
A17	P3	11				
A17	P3	12				
A17	P3	13				
A17	P3	14				
A17	P3	15				
A17	P3	16				
A17	P3	17				
A17	P3	18				
A17	P3	19				
A17	P3	20				
A17	P3	21				
A17	P3	22				
A17	P3	23				
A17	P3	24				

WIRE RUNNING LIST

FROM			TO			REMARKS
UNIT	CONN	TERM	UNIT	CONN	TERM	
A17	P3	25				
A17	P3	26				
A17	P3	27				
A17	P3	28	A4	P1	10	-6V reg. DM&HA
A17	P3	29	A5	P1	3	+6V (DCRA)
A17	P3	30	A4	P1	20	+6V DM&HA
A17	P3	31				
A17	P3	32				
A17	P3	33				
A17	P3	34				
A17	P3	35				
A17	P3	36				
A17	P3	37				
A17	P3	38				
A17	P3	39				
A17	P3	40	A5	P1	8	Return (DCRA)
A17	P3	41	A4	P1	8	Return (DM&HA)
A17	P3	42				
A17	P3	43				
A17	P3	44				
A17	P3	45				
A17	P3	46				
A17	P3	47	A5	P1	6	+22V (DCRA)
A17	P3	48				



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WIFE RUNNING LIST

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WIRE RUNNING LIST

[illegible]

NEOTEC
CORPORATION

Earth Aspect Sensor
P.S. to IR Junction Box

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WIRE RUNNING LIST

[illegible]

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Earth Aspect Sensor
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WIRE RUNNING LIST

[illegible]

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Earth Aspect Sensor
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WIRE RUNNING LIST

[illegible]

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Earth Aspect Sensor
P.S. to IR Junction Box

WIFE RUNNING LIST

[illegible]

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Earth Aspect Sensor
P.S. to IR Junction Box

WIRE RUNNING LIST

[illegible]

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Earth Aspect Sensor
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WIRE RUNNING LIST

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