CHAPTER 6

OVERLOAD INDICATORS

6.1 INTRODUCTION

The 580 is equipped with an overload warning system that provides both visual and audible indication of component overloads. The visual overload indicator panel (Figure 6.1) is equipped with lamps that illuminate the least significant address digit of any overloaded amplifier, including the plus and minus reference amplifiers. The audible alarm produces a tone whenever any of the visual indicator lamps is illuminated. In addition to these indications of an overload, a logic signal connected to the patch panel goes high when an overload occurs. This signal may be patched to an Override Hold (ORH) terminal, forcing the integrators into *hold* when a component overloads; or patched to an Overload Store (OLS) terminal, causing the indicator to remain illuminated after the overload is removed.

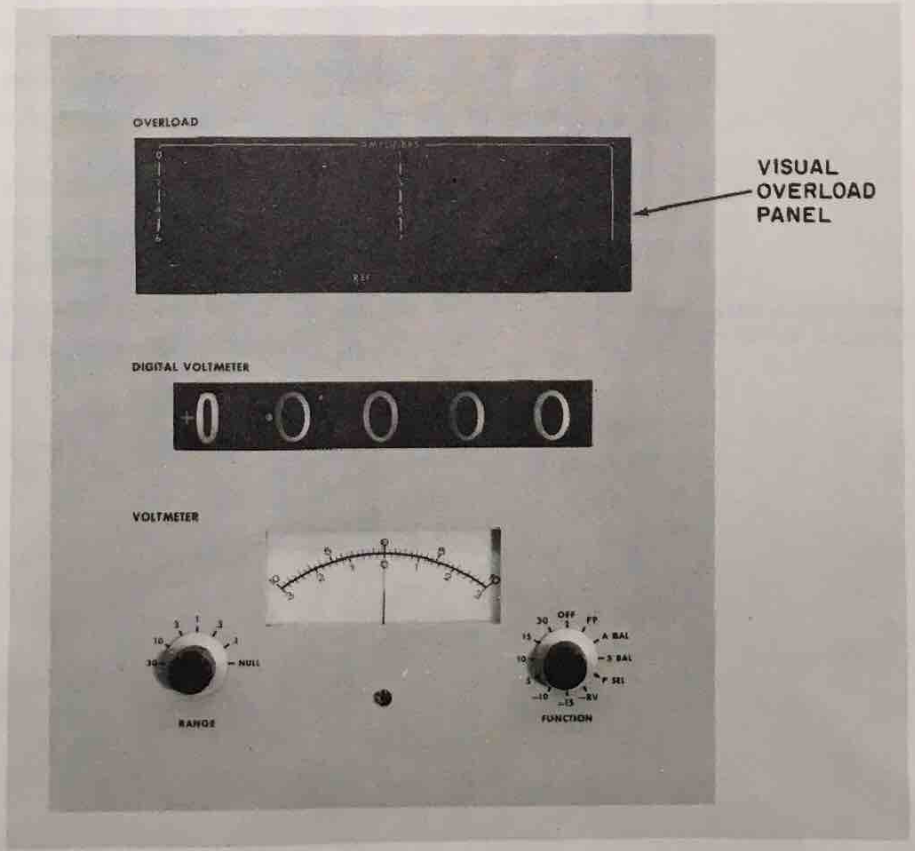


Figure 6.1. Visual Overload Panel

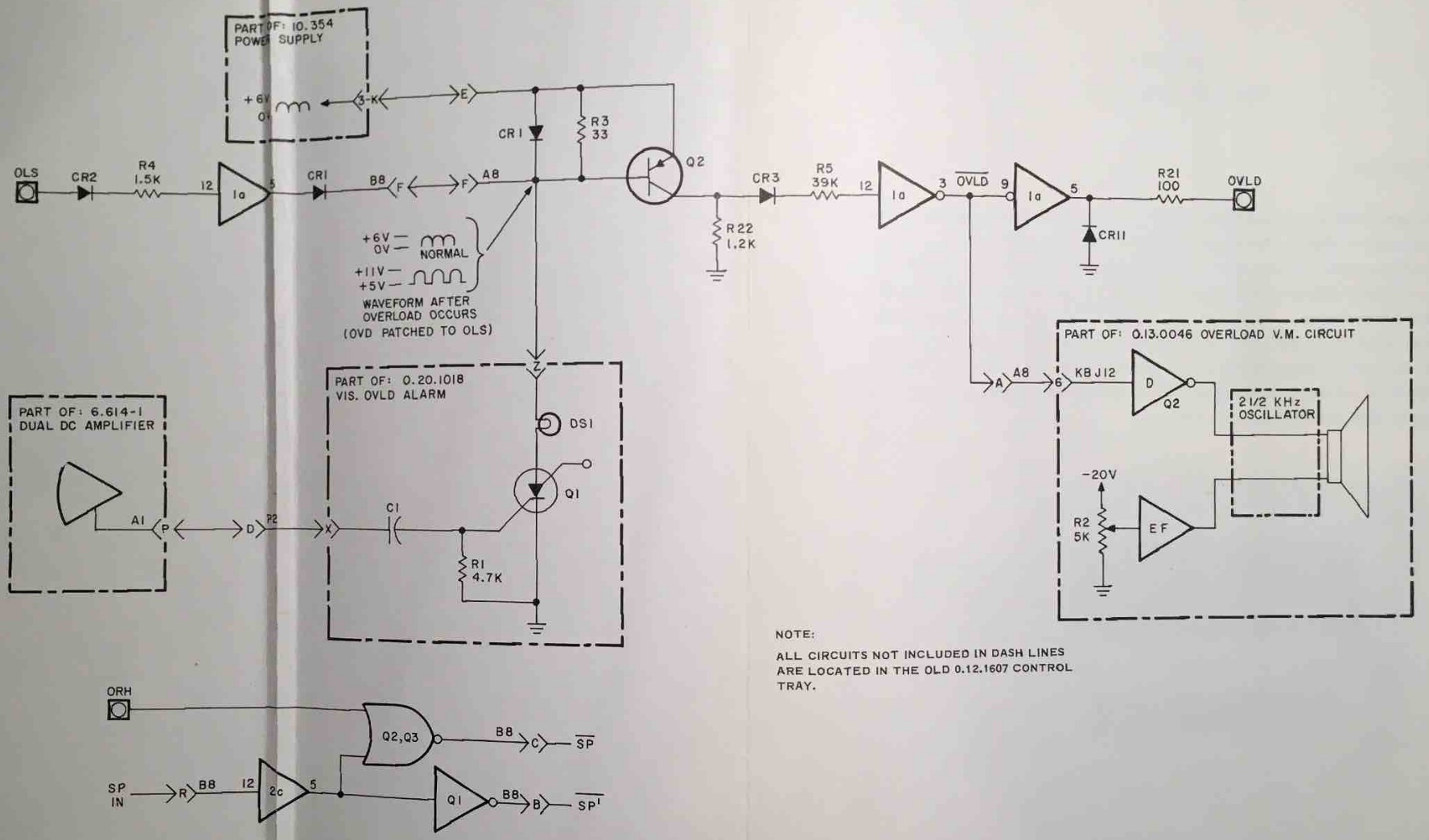


Figure 6.2.
Typical Overload Alarm Circuit

6.2 THEORY OF OPERATION

6.2.1 Visual Overload Indicators

A simplified schematic of an amplifier overload indicator circuit connected to an amplifier stabilizer output is shown in the left center portion of Figure 6.2. The pulsating stabilizer output signal normally has a very low amplitude. If an amplifier overloads, the stabilizer output signal increases greatly in amplitude. Capacitor C1 couples this signal to the cathode gate of silicon-controlled switch (SCS) Q1. The SCS then allows current to flow through the overload indicator lamp, DS1.

Once an SCS begins conducting, it remains conducting until the anode-to-cathode potential is removed. Thus, if power for the lamps were supplied from a filtered dc source, the lamps would remain illuminated indefinitely once an overload occurred. For this reason, the overload lamp power is supplied from a rectified but *unfiltered* source, except when the OVD terminal is patched to the OLS terminal. The voltage thus decreases to zero 120 times per second (assuming a 60 cps primary supply frequency), and the lamps are extinguished almost immediately after an overload is removed. This type of circuit is used to monitor all stabilized amplifiers in the computer. Ten circuits identical with that shown in Figure 6.2 are mounted on a 0.20.1018-3 Visual Overload Alarm etched-circuit card. The indicator lamps are mounted on the edge of the card, which is installed directly behind the overload indicator panel. A metal mask directs the light from illuminated lamps to the appropriate numbers on the panel.

The overload indicator circuits for the encapsulated MDFG amplifier (which are not chopper-stabilized), are shown in Figure 6.3. The input signal to an overload circuit of this type may be slowly changing dc level, rather than a pulsating signal. For this reason, resistive rather than capacitive coupling is employed in the circuit. The MDFG units are equipped with overload level detection circuits that provide an amplified signal to the indicator network when an overload occurs.

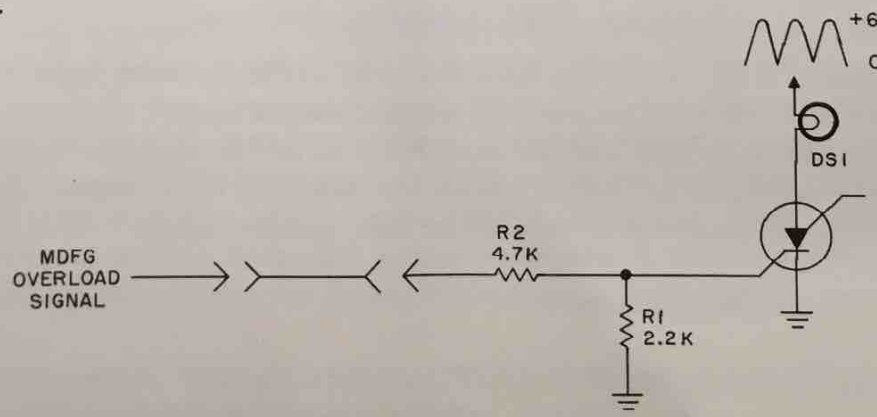


Figure 6.3. MDFG Overload Indicator Circuit, Model 0.20.1018-3

Figure 6.4 illustrates the overload detection circuit for an MDFG unit. Each MDFG unit has a pair of amplifiers (AR1 and AR2). The detection circuit uses a cascaded inverter network to sense an overload of either polarity. For example, if the output of either AR1 or AR2 exceeds about +11.5 volts, Q1 becomes forward biased. The low from the collector or Q1 reverse biases Q2, and the collector of Q2 goes positive. Conversely, if the output of either AR1 or AR2 goes more negative than about -11.5 volts, one of the diodes connected through the 13K resistor to the base of Q2 reverse biases the transistor. In either case, the collector of Q2 goes positive, and the SCS on the 0.20.1018-3 Visual Overload Alarm card is triggered, causing the associated lamp to light.

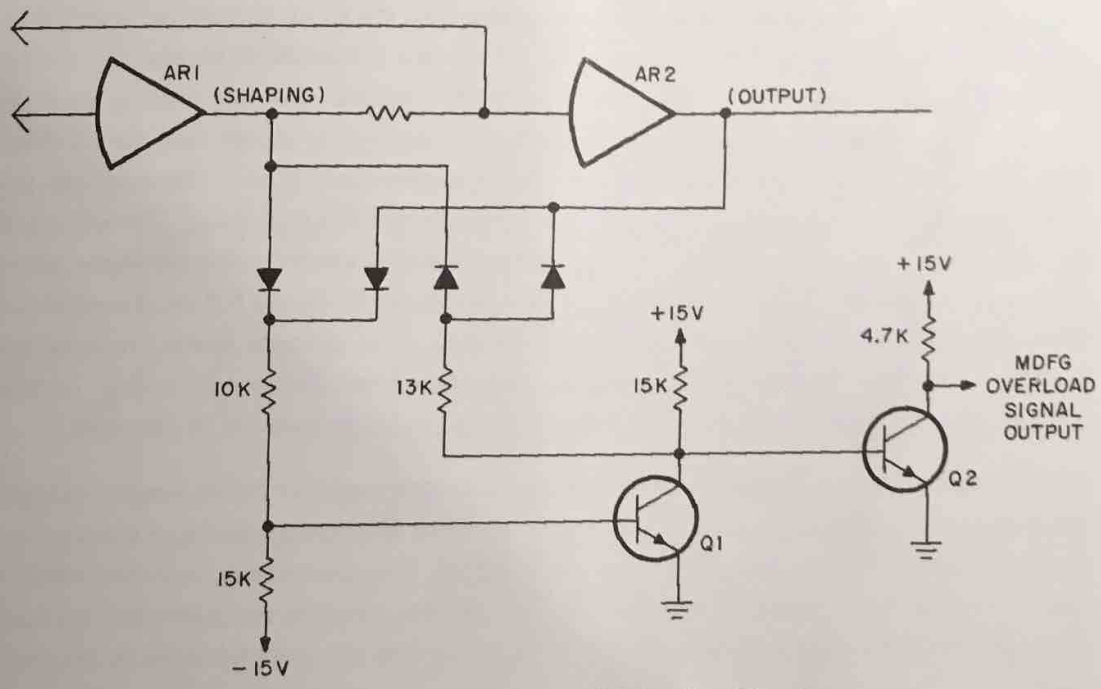


Figure 6.4. MDFG Overload Detection Circuit

The third variation of the overload indicator circuit (0.20.1018-2) is shown in Figure 6.5. This circuit indicates an overload in the positive or negative reference supply. This circuit is identical with the circuit for the other stabilized amplifiers (0.20.1018-3), except that the 27K series resistor (R2) is mounted on the overload indicator card rather than on the amplifier card. Two identical circuits are mounted on the card, one for each reference amplifier.

6.2.2 Audible Overload Alarm

The audible overload alarm consists of an oscillator and a loudspeaker, mounted on the monitor panel. A logic circuit, located in the 0.12.1607 Control Tray, inhibits the oscillator, except when one or more visual indicator lamps is illuminated.

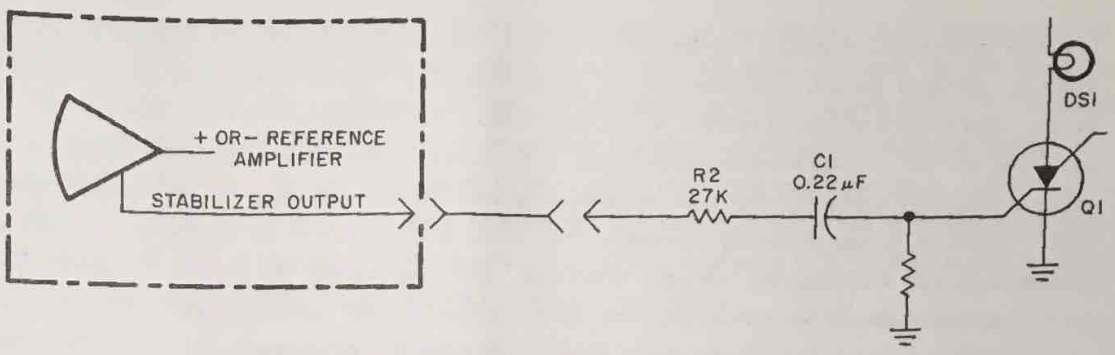


Figure 6.5. Reference Amplifier Overload Circuit, Model 0.20.1018-2, Simplified Schematic

The audible overload alarm, together with its logic control circuitry, is shown in Figure 6.2. When an overload occurs, Q1 of the visual overload alarm conducts, grounding the +6 volts from the power supply through diode CR1. The base of Q2 becomes more negative than its emitter, the transistor conducts and its collector and the input of inverter 1a (pin 12) go high. With its output high, the output of inverter 1a (pin 3) goes low, and transistor Q2, located in the 0.13.0046 Overload Card, conducts. The conduction of Q2 provides a ground path for the encapsulated oscillator circuit (located on the 0.13.0046 Overload Card), the oscillator starts and the alarm sounds. Adjustment of potentiometer R2 varies the audible output of the unit from zero to maximum value.

When the audible overload alarm is heard, the operator can check the visual overload indicator panel to determine which component (or components) is overloaded, and correct the problem. However, some overloads may be of a transient nature when a high-speed problem is on the computer. In these cases it is difficult to locate visually the overloaded component. Therefore, the collector of Q2 (which goes high during an overload) is connected through a buffer stage to the patch panel, and can be used to force the computer instantly into the *hold* mode when an overload occurs, or to store a transient overload. Figure 6.2 illustrates the circuits that provide the automatic *hold* or overload store functions. If the OVD terminal is patched to the OLS terminal, the output of the 1a buffer circuit goes high when an overload occurs. This high output is added to the +6 volt peak unfiltered supply voltage for the indicator lamps. The voltage no longer drops to zero at a 120 cps rate, but appears as shown in Figure 6.2. The conducting SCS thus remains conducting after the overload is removed, and the indicator remains illuminated.

When an overload is cleared, the patching connection between the OVD and OLS terminals must be momentarily removed to clear the indication.

If the OVD terminal is patched to the ORH terminal, the output of the Q2, Q3 NOR gate goes low when an overload occurs. This low output, designated $\overline{SP}$ forces all integrators into the *hold* mode. Since the problem is stopped at the point where the overload occurred, the overload indicator for the overloaded component remains illuminated, and the operator can check the input and output parameters for this component to determine the cause of the overloaded condition. However, if any of the inputs causing the overload are removed for checking, the overload disappears, and the computer resumes operation. For this reason, the manual HD pushbutton on the keyboard should be depressed, forcing the computer mode control circuits into the *hold* mode. If this is done, the circuit can be checked by removing patch cords, etc., and the computer cannot resume normal operation until the overload is cleared and the OP pushbutton is depressed.

The OVD terminal may also be used to accomplish some other function, if desired, by patching the OVD output through a differentiator to a logic component.

6.3 MAINTENANCE AND TROUBLESHOOTING

None of the overload warning circuits require periodic maintenance or adjustments. It is normal for the visual indicators to flicker when the computer is first switched on. After 15 to 30 seconds, all visual indicators should be extinguished and the audible alarm should stop.

If none of the indicator lamps light during the computer warm-up, check fuse F8 on the 0.10.0354 Power Supply. If it is desired to check all indicator lamps individually, remove the patch panel and place the computer in the *IC* mode. The indicator lamps for all the amplifiers in the computer should light.

The VDFG overload indicators may be checked by placing the slope switch for segments 1 and 2 of each MDFG unit in the +SL position, setting the BP potentiometers for these segments fully counter-clockwise, and setting the SL potentiometers for these segments fully clockwise. It is now necessary to patch the MDFG X input to reference voltage of the proper polarity (+ reference for +MDFG units, - reference for -MDFG units) to cause the overload alarm to light. Repeat this test for all MDFG overload indicators in the computer.

If any of these tests do not cause the appropriate indicator to light, tilt up the overload indicator panel and remove the metal mask to expose the card on which the lamp is mounted. The card can now be removed by pulling it forward. When the card is removed, the lamp can be checked with an ohmmeter. If the lamp appears to be good, check the SCS by substitution.

If the audio alarm fails to operate when a visual indicator is illuminated, first ensure that the volume control is not at its minimum setting. Then check the OVD terminal. If this terminal is high, the trouble is in the oscillator circuit. If this terminal is low, check pin KBP12-6 on the 0.20.1180 Monitor Panel with an oscilloscope (see the component location diagram facing Schematic D00 020 1180 0S). The signal at this point should be a negative-going, full-wave rectified voltage with a peak amplitude of between -0.5 and -1.0 volt when an overload is present. If this signal does not appear, check the wiring as shown in Figure 6.2. If this signal is present, use point-to-point signal tracing to locate the faulty component.

APPENDIX 1

REPLACEABLE PARTS LISTS

This appendix contains Replaceable Parts Lists for the equipment described in this chapter. In each case, a brief description of the part, the EAI part number and, where applicable, a reference symbol (schematic designation) is included. To enable a particular sheet to be readily located, an index precedes the individual replaceable parts lists.

The category column indicates the availability of each part so that a replacement can be obtained as quickly as possible.

Category "A" - The parts in category "A" are standard electronic items that are usually available from any commercial electronic supplier.

Category "B" - The parts in category "B" are proprietary items that are available only from EAI.

CAUTION

If proprietary items are replaced with items obtained from other sources, EAI cannot assume responsibility for a unit not operating within its published specifications.

ORDERING INFORMATION

To expedite your order for replacement parts the procedures below should be followed:

1. Specify the EAI part number and description of the part required. The model number and serial number of the next higher assembly should also be included.

NOTE

EAI is currently revising the part numbering system. All parts effected by this revision are identified using the new and the old number (the number in parenthesis). All parts should be ordered using the new number. The old number is provided to cross reference parts that may still be identified physically, or in other publications by that number.

2. When ordering complete assemblies (networks, printed circuit cards, etc.), specify the model and serial numbers of the equipment the assembly is to be used with. If possible, include the purchase order number or the EAI project number of the original equipment purchased.

3. When ordering expansion components, note if mounting hardware is required. If hardware is needed, add to the purchase order the statement "INCLUDING MOUNTING HARDWARE".

NOTE THAT EAI RESERVES THE RIGHT TO MAKE PART SUBSTITUTIONS WHEN REQUIRED. EAI GUARANTEES THAT THESE SUBSTITUTIONS ARE ELECTRICALLY AND PHYSICALLY COMPATIBLE WITH THE ORIGINAL COMPONENT.

PARTS LIST INDEX

ITEM	REF. DESIG.	DESCRIPTION	EAI NO.	*CAT.
1	C1-()	Capacitor, Fixed, Plastic: 220 nf ±20%, 50V (Good-All X663F or equal)	00 521.1398-0	A
2	C2-(1-10)	Capacitor, Fixed, Ceramic: 0.047 pf ±20%, 25V (Sprague 3C15 or equal)	00 511.5473-4	A
3	DS1-()	Lamp	00 578.0077-0	B
4	Q1-()	Stabistor: 3N84	00 648.0016-0	A
5	R1-()	Resistor, Fixed, Composition: 4.7K ohms ±5%, 1/4W (Allen-Bradley CB or equal)	00 625.0472-0	A
5	R2-()	Resistor, Fixed, Composition: 27K ohms ±5%, 1/4W (Allen-Bradley CB or equal)	00 625.0273-0	A

*NOTE: THE CATEGORY COLUMN IS DESIGNED TO INDICATE AVAILABILITY OF PARTS.
A - INDICATES PARTS THAT SHOULD BE PURCHASED LOCALLY.
B - INDICATES PARTS THAT SHOULD BE PURCHASED FROM EAI.

UNIT TITLE
VISUAL OVERLOAD ALARM

MODEL NO.
0.20.1018-2 Sh. 1 of 1 Sh.

8

DATE 4 / 25 / 68

M446

ITEM	REF. DESIG.	DESCRIPTION	EAI NO.	*CAT.
1	C1-(1 thru 6,9,10)	Capacitor, Fixed, Plastic: 220 nf ±20%, 50V (Good-All X663F or equal)	00 521.1398-0	A
2	C2-(1 thru 10)	Capacitor, Fixed, Ceramic: 47 nf ±20%, 25V (Sprague 3C15 or equal)	00 511.5473-4	A
3	DS1-()	Lamp	00 578.0077-0	B
4	Q1-()	Stabistor: 3N84	00 648.0016-0	A
5	R1-(1 thru 6,9,10),R2-(7,8)	Resistor, Fixed, Composition: 4.7K ohms ±5%, 1/4W (Allen-Bradley CB or equal)	00 625.0472-0	A
6	R1-(7,8)	Resistor, Fixed, Composition: 2.2K ohms ±5%, 1/4W (Allen-Bradley CB or equal)	00 625.0222-0	A

*NOTE: THE CATEGORY COLUMN IS DESIGNED TO INDICATE AVAILABILITY OF PARTS.
A - INDICATES PARTS THAT SHOULD BE PURCHASED LOCALLY.
B - INDICATES PARTS THAT SHOULD BE PURCHASED FROM EAI.

8

DATE 10 / 10 / 67

UNIT TITLE

VISUAL OVERLOAD AIARM

MODEL NO.

0.20.1018-3 Sh. 1 of 1 Sh.

M446

APPENDIX 2

DRAWINGS

This appendix contains necessary schematics and wiring diagrams of equipment described in this manual. To facilitate locating a particular sheet, an index is provided that lists the model number of each unit or component, the type of drawings, and the associated drawing number. The drawings are bound into the manual in the order listed under the index Drawing Number column.

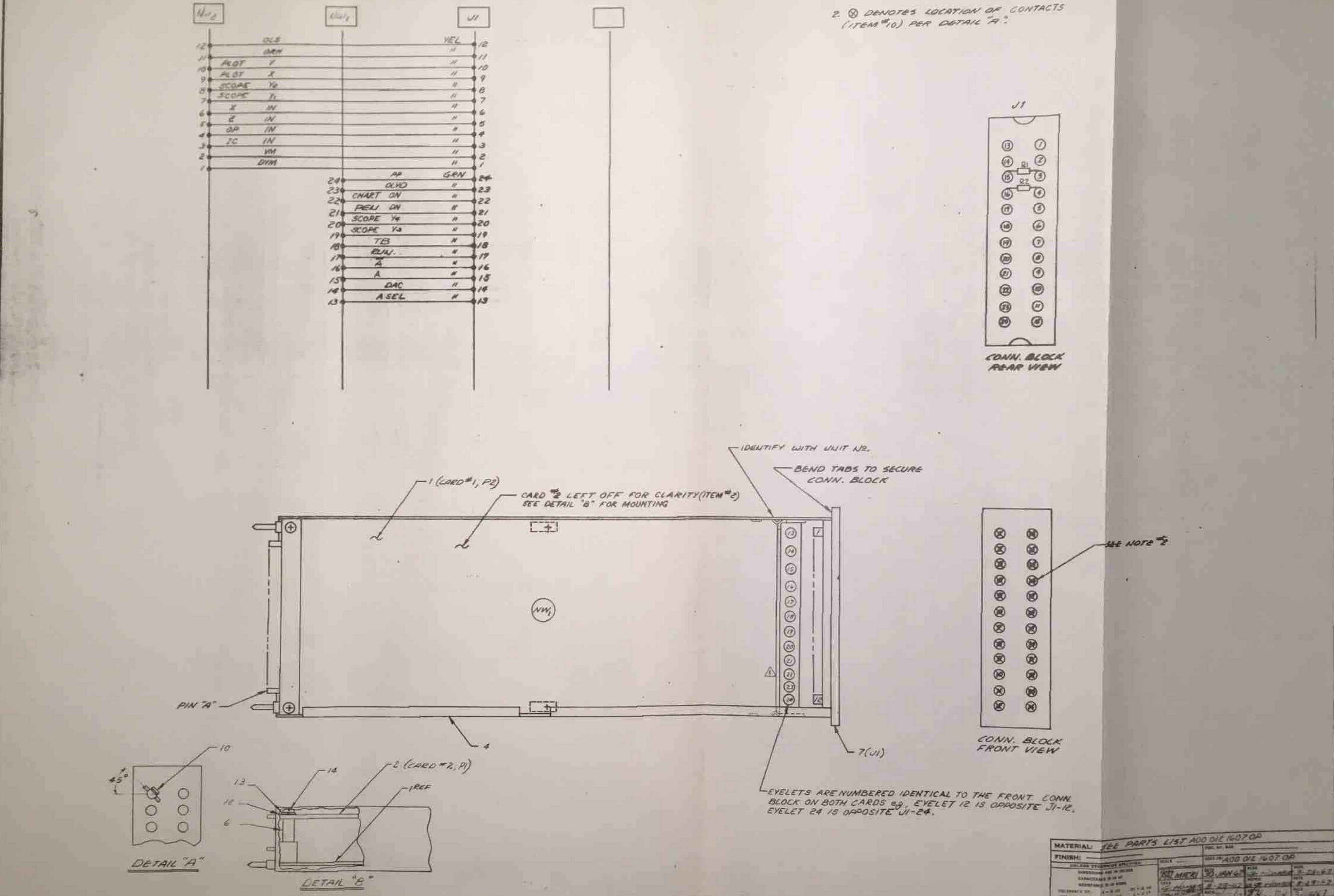
EAI drawings are prepared in accordance with standard drafting practices for electro-mechanical and electronic equipment. All symbols are in accordance with current government standards.

INDEX

Unit or Component	Type of Drawing	Drawing Number
0.12.1607 Control Tray	Assembly W Wiring	D00 012 1607 0A
0.12.1615 Control Card 1	Schematic	D00 012 1615 0S
0.12.1616 Control Card 2	Schematic	D00 012 1616 0S
20.1018 Visual Overload Alarm	Schematic	B020 1018 0S (Sheets 1 and 2)
0.20.1180 Monitor Panel	Schematic Wiring	D00 020 1180 0S D00 020 1180 0W (Sheet 1 Only)

NOTES:
1. UNLESS OTHERWISE SPECIFIED:
a) WIRES TO BE #22 P.H.U.

2. ⊗ DENOTES LOCATION OF CONTACTS (ITEM #10) PER DETAIL "A".



MATERIAL: SEE PARTS LIST A00 012 1607 OP

FINISH: —

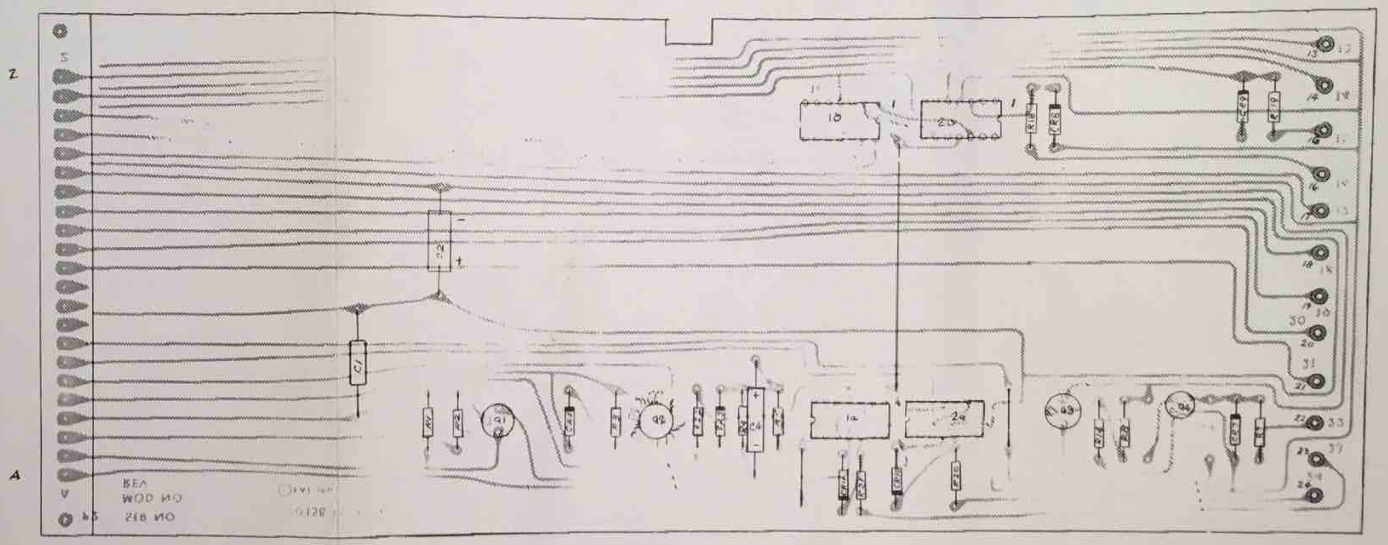
USED ON A00 012 1607 OP

EAI

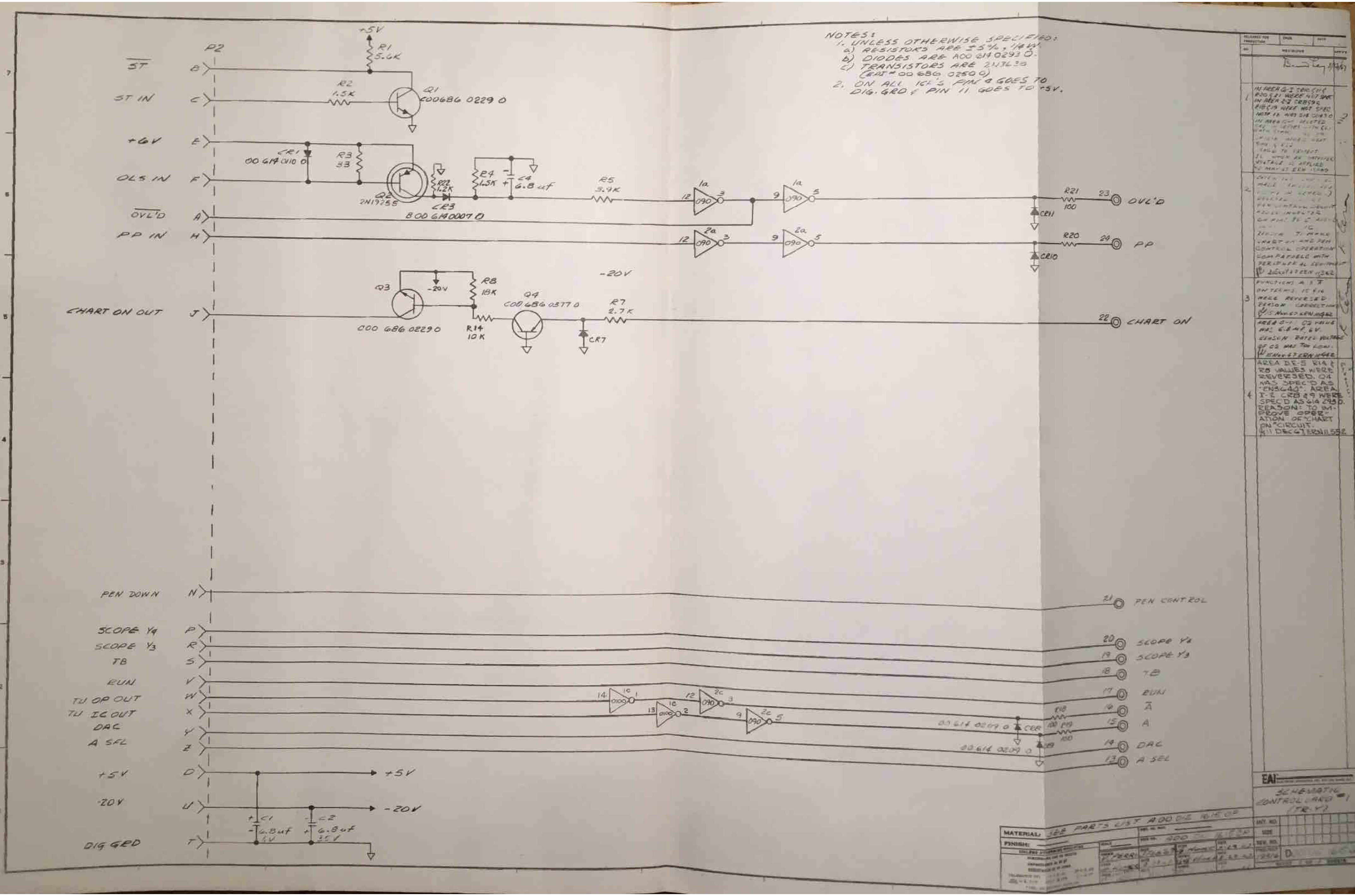
ASSEMBLY W/WIRING INFO
CONTROL TRAY
(TR-Y)

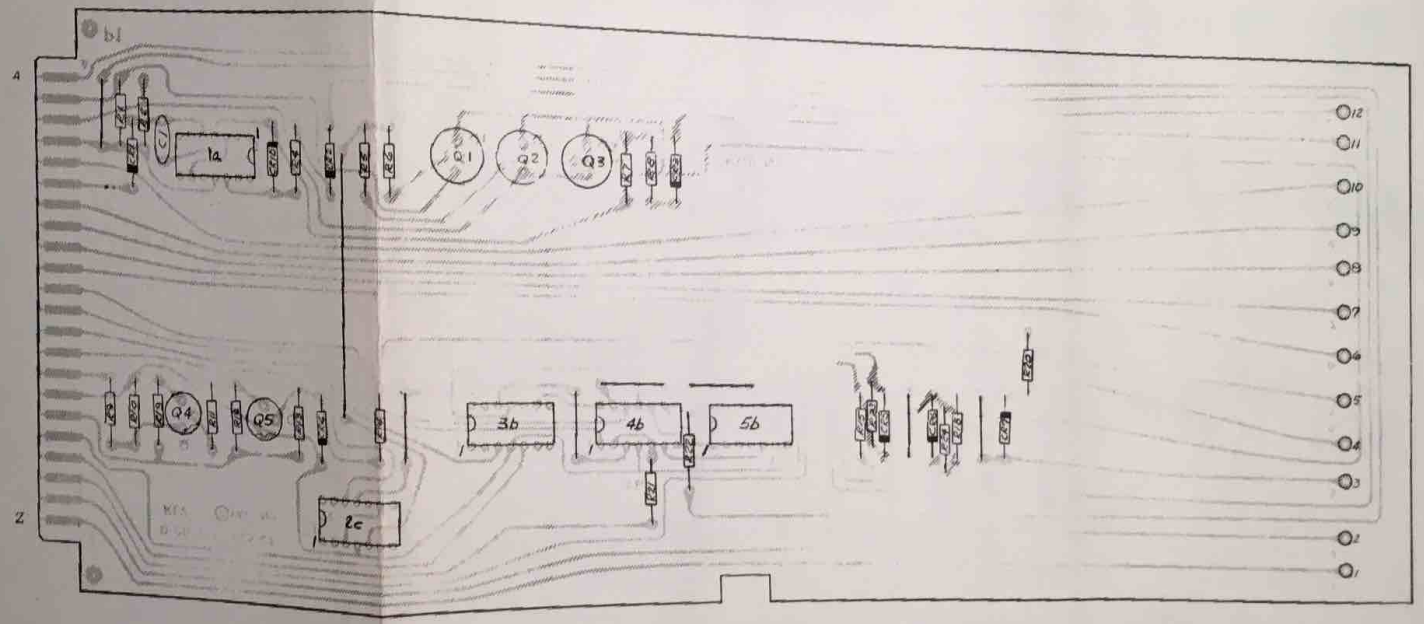
PROJECT 19316

D00 012 1607 OA



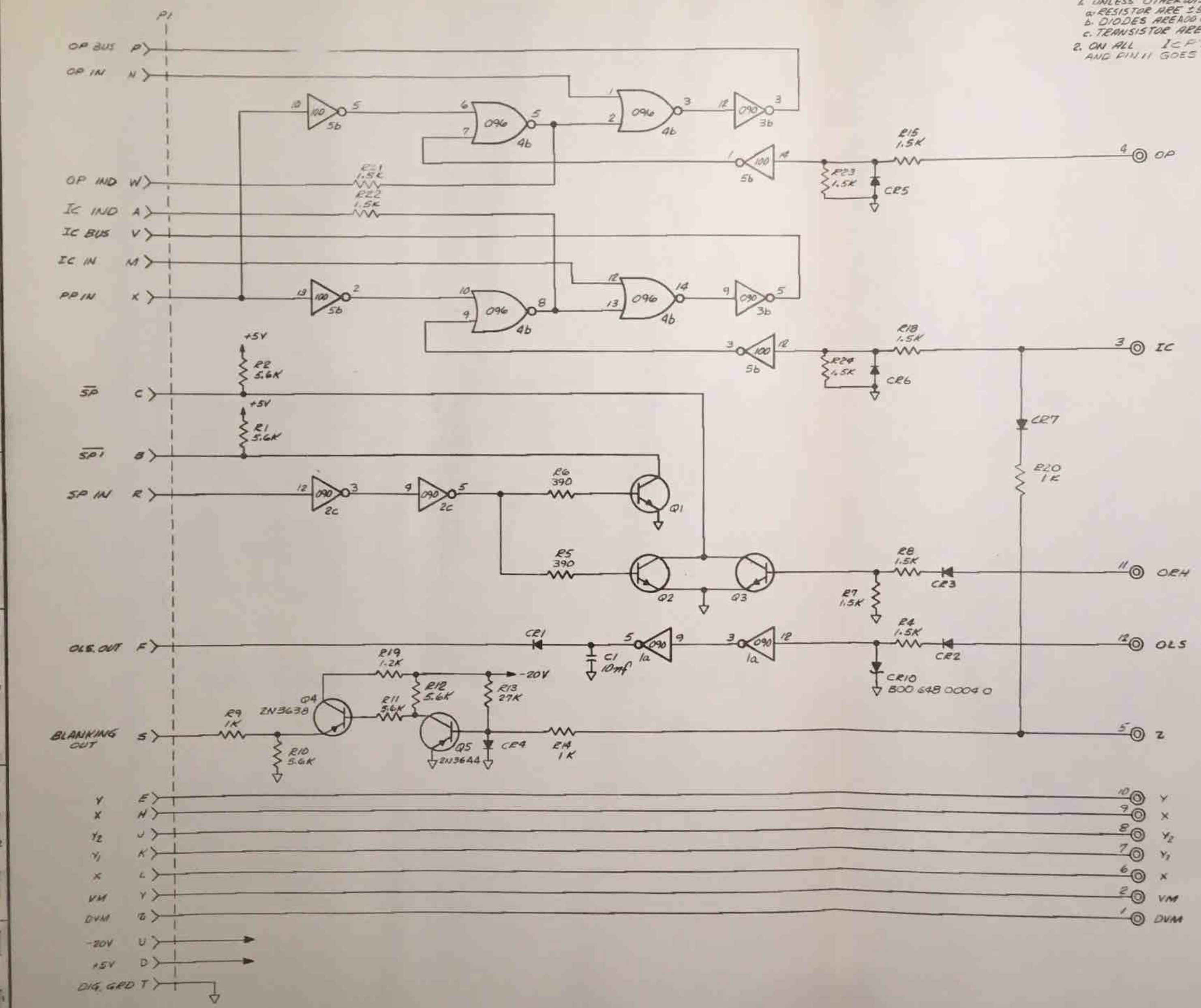
0.12.1615 Control Card 1


NOTES:
1. UNLESS OTHERWISE SPECIFIED:
a) RESISTORS ARE ±5%, 1/4W.
b) DIODES ARE A00 614 0293 0.
c) TRANSISTORS ARE 2N3638 (EAI# 00 686 0250 0)
2. ON ALL IC'S PIN 4 GOES TO DIG. GRD & PIN 11 GOES TO +5V.
P2
ST
ST IN
+6V
OLS IN
OVL'D
PP IN
CHART ON OUT
PEN DOWN
SCOPE Y4
SCOPE Y3
TB
RUN
TU OP OUT
TU IC OUT
DAC
A SEL
+5V
-20V
DIG GRD
R1 5.6K
R2 1.5K
Q1 C00686 0229 0
CR1 00 614 0110 0
R3 33
Q2 2N1925S
R22 1.2K
CR3 800 6140007 0
R4 1.5K
C4 6.8 uf
R5 3.9K
Q3 000 686 02290
R8 18K
R14 10K
Q4 C00 686 0377 0
R7 2.7K
CR7
-20V
R21 100
CR11
R20
CR10
23 OVL'D
24 PP
22 CHART ON
21 PEN CONTROL
20 SCOPE Y4
19 SCOPE Y3
18 TB
17 RUN
16 A
15 A
14 DAC
13 A SEL
00 614 0209 0
C1 6.8uf
C2 6.8uf 35V
+5V
-20V
MATERIAL: SEE PARTS LIST A00 012 1615 0P
FINISH:
EAI
SCHEMATIC CONTROL CARD #1 (TR-4?)
AREA D-E-5 R14 & R8 VALUES WERE REVERSED. Q4 WAS SPEC'D AS "EN3640". AREA 1-2 CR8 & 9 WERE SPEC'D AS 614 0290. REASON: TO IMPROVE OPERATION OF "CHART ON" CIRCUIT.



0.12.1616 Control Card 2

NOTES:
1. UNLESS OTHERWISE SPECIFIED:
a. RESISTOR ARE ±5%, 1/4 W.
b. DIODES ARE 400 6A 0253 0.
c. TRANSISTOR ARE EAI # C 00 636 02200
2. ON ALL IC P'S PIN 4 GOES TO DIG GND AND PIN 11 GOES TO +5V.



P1
OP BUS P
OP IN N
OP IND W
IC IND A
IC BUS V
IC IN M
PP IN X
SP C
SP1 B
SP IN R
OLS OUT F
BLANKING OUT S
Y E
X H
Y2 J
Y1 K
X L
VM Y
DVM Z
-20V U
+5V D
DIG GRD T
100 5b
096 4b
090 3b
090 2c
090 1a
R21 1.5K
R22 1.5K
R15 1.5K
R23 1.5K
R18 1.5K
R24 1.5K
R2 5.6K
R1 5.6K
R6 390
R5 390
R8 1.5K
R7 1.5K
R4 1.5K
R19 1.2K
R12 5.6K
R11 5.6K
R13 27K
R9 1K
R10 5.6K
R14 1K
R20 1K
CR1
CR2
CR3
CR4
CR5
CR6
CR7
CR10 800 648 0004 0
C1 10mf
Q1
Q2
Q3
Q4 2N3638
Q5 2N3644
+5V
-20V
4 OP
3 IC
11 ORH
12 OLS
5 Z
10 Y
9 X
8 Y2
7 Y1
6 X
2 VM
1 DVM

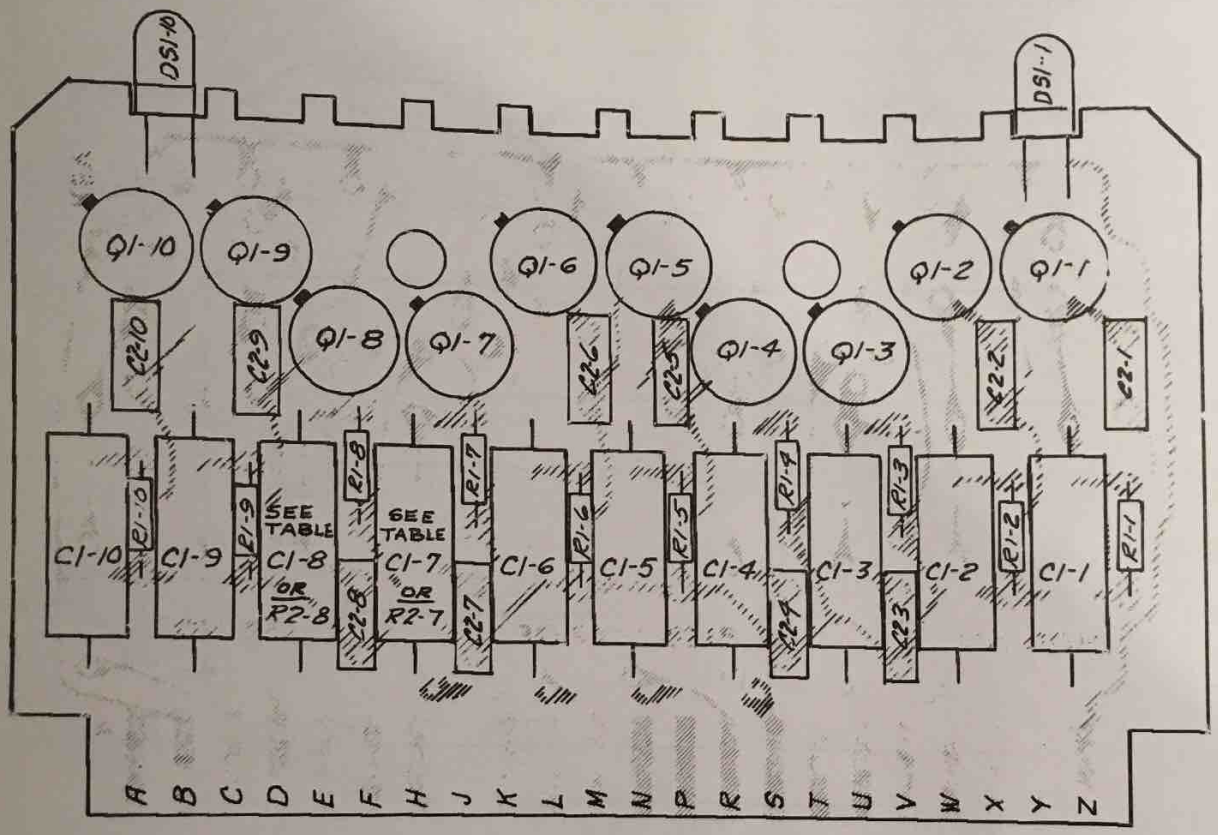
REVISIONS
1 IN AREA E CR3, 5, 7, 10 ...
2 AREA F-5 & 6 ... REASON: ... ERN ...
3 AREA C-D 3 Q5 WAS 2N3638 & R14 WAS 1.8K. AREA G4 R20 WAS 1.8K. REASON: TO IMPROVE OPERATION OF THE BLANKING CIRCUIT. 28 NOV 67 ERN 11,458
4 AREA F-G-5 CR6 WAS CR9 (648 0004) CR6 WAS LOC'D BETWEEN R18 & PIN 3 (CATH TO R18). AREA F-G-6 CR5 WAS CR8 (648 0004) CR5 WAS LOC'D BETWEEN R15 & PIN 4 (CATH TO R15). REASON: TO IMPROVE OPERATION OF BLANKING CIRCUIT IC & OP BUS DRIVERS. 11 DEC 67 ERN 11,552

MATERIAL: SEE PARTS LIST 400 012 1616 OP

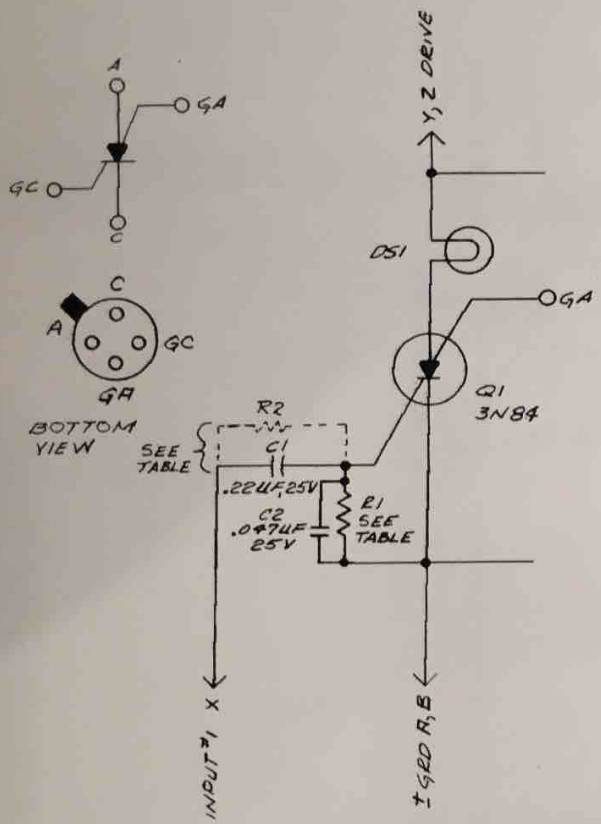
EAI

SCHEMATIC
CONTROL CARD #2
(TR-X)

D00 012 1616 0S



20.1018 Visual Overload Alarm



NOTES:

1. UNLESS OTHERWISE SPECIFIED RESISTORS ARE ± 5%, ½W.

CIRCUIT TYPICAL REPEAT 10 TIMES

RELEASED FOR PRODUCTION:	ENGR	DATE

NO.	REVISIONS	APP'D
1	[illegible]	
2	[illegible]	
3	[illegible]	
4	[illegible]	
5	IN TABLE -3 DISC. "R1 (1-6, 9 & 10) = 2.7K" WAS NOT SPECD. (WAS 4.7K) TO PREVENT VISUAL IND WHEN DRIVING A AMP. WITH A 20V TP INPUT 16 JAN 68 ERN 11,601	
6	[illegible] 26 JAN 68 ERN 11689	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITANCE IS IN μf
RESISTANCE IS IN OHMS
TOLERANCE OF: .X = ± .03 .XX = ± .02 .XXX = ± .015 .XXX = ± .005 ∠ = ± 1°
* TOL OF MATERIAL SUPPLIED

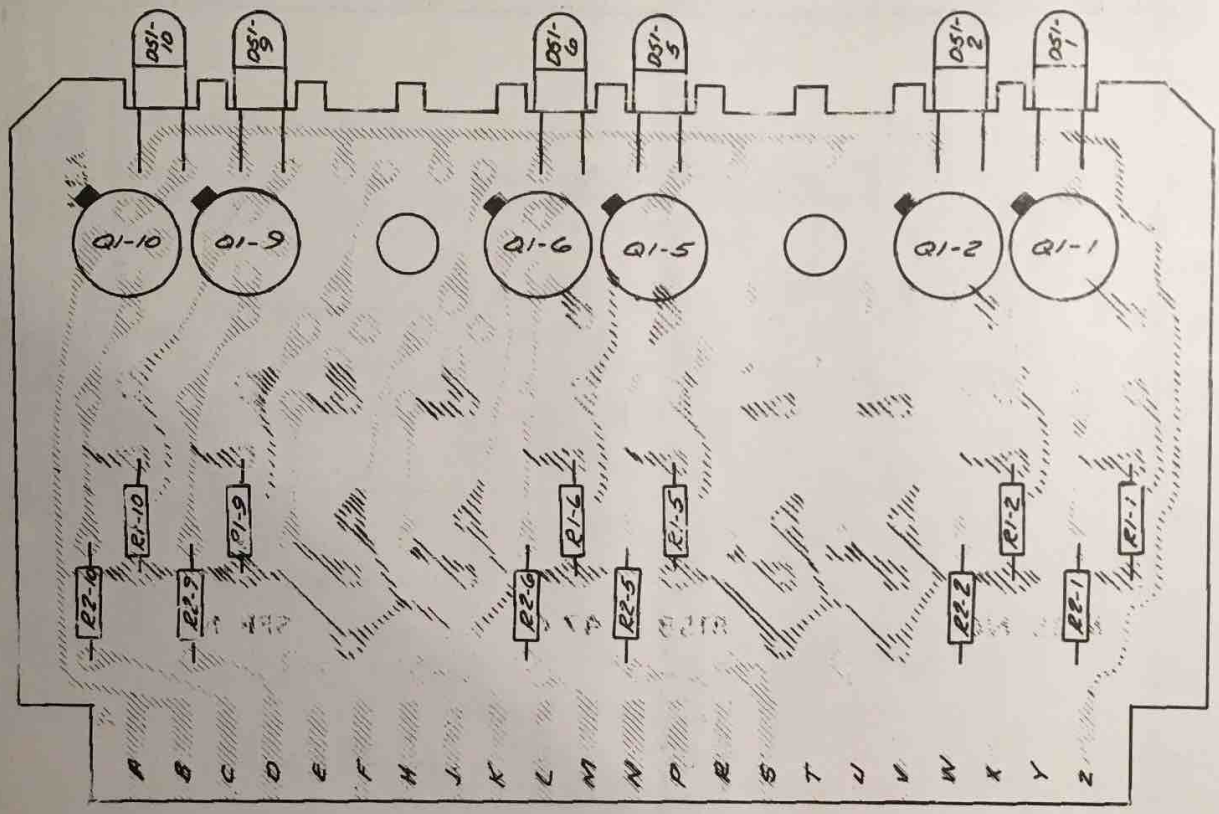
ELECTRONIC ASSOCIATES, INC.
LONG BRANCH, NEW JERSEY

SCHEMATIC
VISUAL OVL'D ALARM

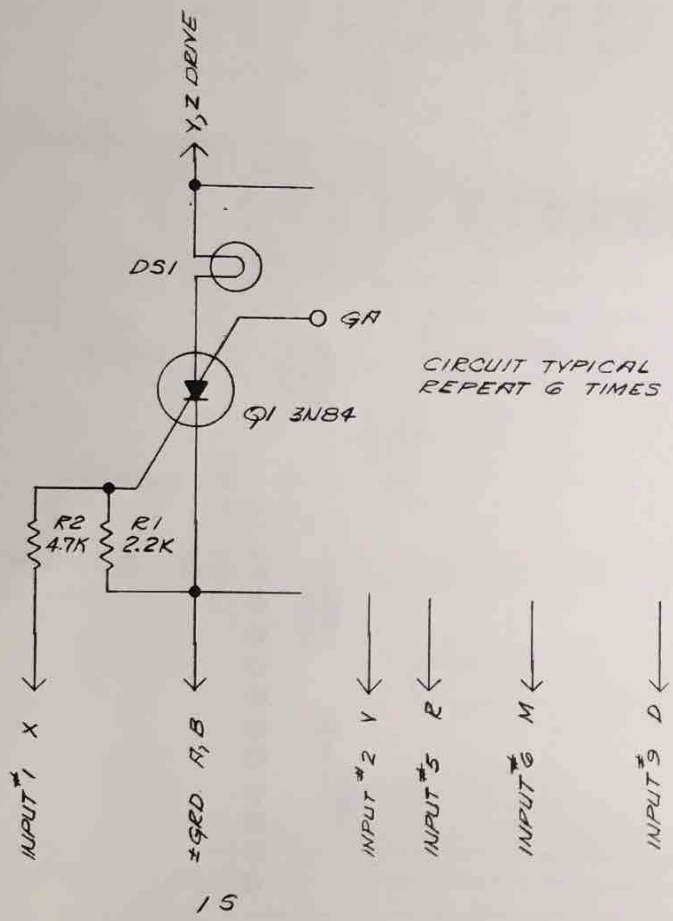
MAT'L: SEE TABLE	
FINISH: —	DWG. NO. WAS:
SCALE —	USED ON: SEE TABLE
DRAWN [illegible]	DATE
CHKD [illegible]	DATE
DSGN [illegible]	DATE
ECOR	DATE
REVWD	DATE
APPVD	DATE
SHT. NO.	
SIZE	
REV. NO.	
PROJECT 19137	B020 1018 OS
SHEET 1 OF SHEETS	

UNIT NUMBER	SCHEMATIC NUMBER	PARTS LIST & NEXT ASSY.	DESCRIPTION	PARTS LIST USED ON	ERN NUMBER
20.1018-3	020 1018 3S	020 1018 3P	AS SHOWN SHT 1 EXCEPT STAGES 7 & 8. R2-7 & 8, 4.7K. R2-PLACE C1-7 & 8 RESP. R1-(1-6, 9 & 10)= 2.7K. R1-7 & 8 = 2.2K	—	ERN 11,189
20.1018-2	020 1018 2S	020 1018 2P	AS SHOWN, SHT 3,	—	19137
20.1018-1	020 1018 1S	020 1018 1P	AS SHOWN, SHT 2,	—	19137
20.1018	B020 1018 0S	A020 1018 0P	AS SHOWN SHT 1 R1 = 4.7K	—	19137

TABLE OF UNIT NUMBERS



20.1018 Visual Overload Alarm



CIRCUIT TYPICAL
REPEAT 6 TIMES

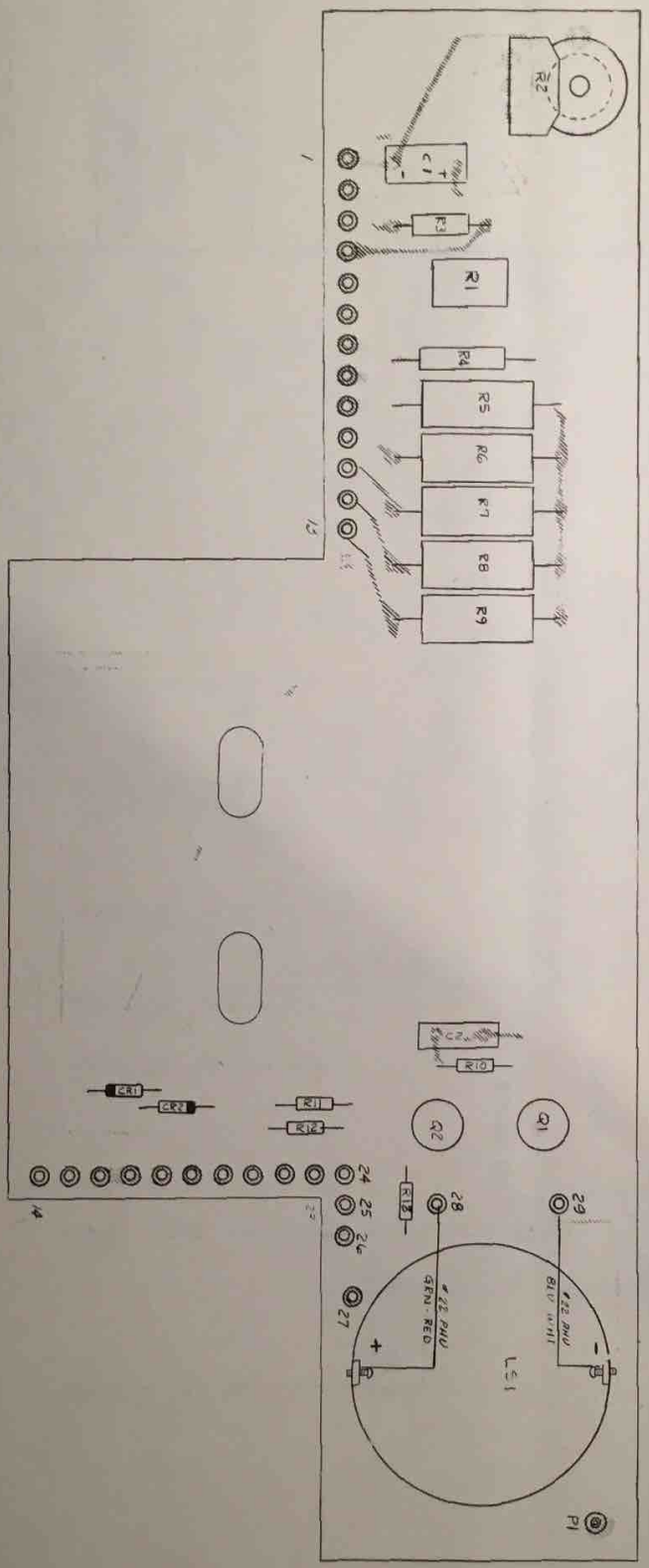
RELEASED FOR PRODUCTION:	ENGR	DATE
NO.	REVISIONS	APP'V'D
1		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITANCE IS IN μf
RESISTANCE IS IN OHMS
TOLERANCE OF: .X = ± .03 XX = ± .02
.XXX = ± .015 XXX = ± .005 ∠ = ± 1°
* TOL. OF MATERIAL SUPPLIED

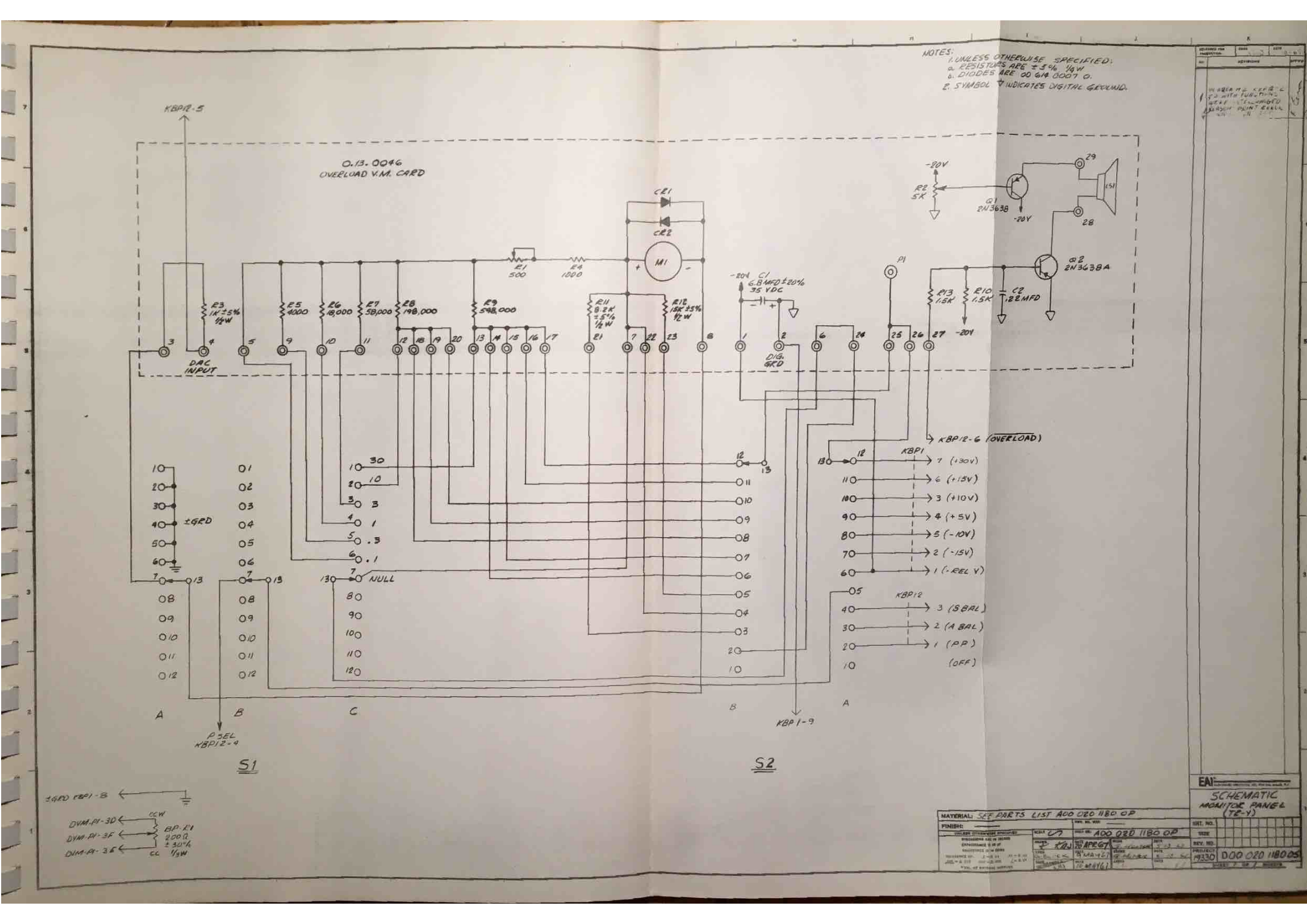
ELECTRONIC ASSOCIATES, INC.
LONG BRANCH, NEW JERSEY

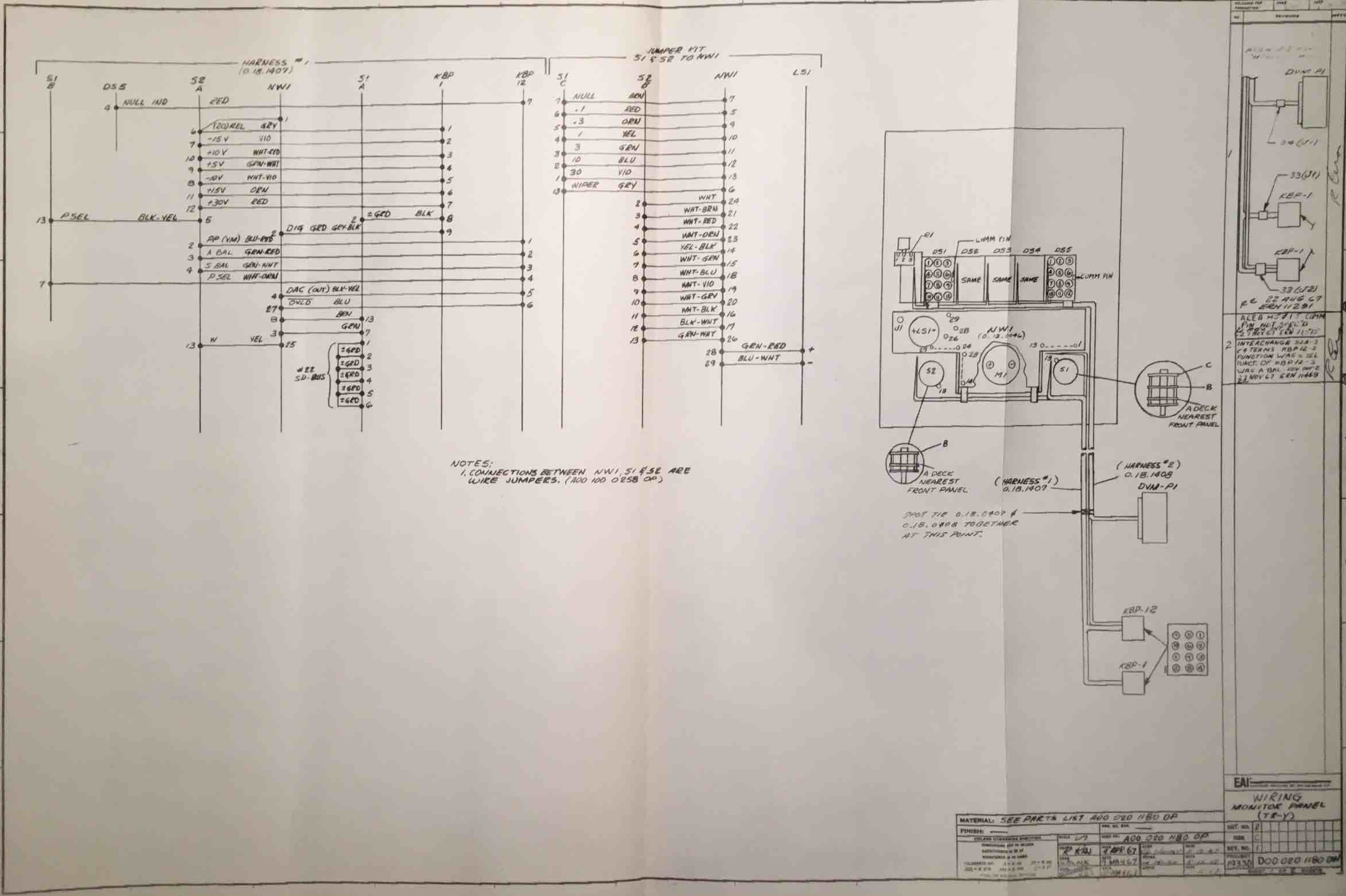
MAT'L:			
FINISH:		DWG. NO. WAS:	
SCALE	USED ON:		
DRAWN	DATE	RCDR	DATE
CHK'D	DATE	REVWD	DATE
DSGR	DATE	APPVD	DATE

SHT. NO.
SIZE
REV. NO.
PROJECT B020 1018 05
SHEET OF SHEETS



0.13.0046 Voltmeter Card


NOTES:
1. UNLESS OTHERWISE SPECIFIED:
a. RESISTORS ARE ±5% 1/4W
b. DIODES ARE 00 614 0007 0.
2. SYMBOL ▽ INDICATES DIGITAL GROUND.
KBP12-5
0.13.0046
OVERLOAD V.M. CARD
-80V
R2 5K
Q1 2N3638
-20V
29
28
(51)
Q2 2N3638A
CR1
CR2
M1
R1 500
R4 1000
R3 1K ±5% 1/4W
R5 4000
R6 18,000
R7 58,000
R8 198,000
R9 598,000
R11 8.2K ±5% 1/2W
R12 18K ±5% 1/2W
-20V C1 6.8 MFD ±20% 35 VDC
P1
R13 1.5K
R10 1.5K
C2 .22 MFD
-20V
DAC INPUT
DIG. GRD
KBP12-6 (OVERLOAD)
KBP1
7 (+30V)
6 (+15V)
3 (+10V)
4 (+5V)
5 (-10V)
2 (-15V)
1 (-REL V)
KBP12
3 (S BAL)
2 (A BAL)
1 (P.P.)
(OFF)
±GRD
NULL
P SEL KBP12-4
KBP1-9
S1
S2
A
B
C
34 FD KBP1-B
DVM-P1-3D
DVM-P1-3F
DVM-P1-3E
CCW
BP-R1 200Ω ±30% CC 1/8W
MATERIAL: SEE PARTS LIST ADO 020 1180 OP
FINISH:
ADO 020 1180 OP
SCHEMATIC MONITOR PANEL (72-Y)
DOO 020 1180 05


HARNESS #1 (0.18.1407)
JUMPER KIT S1 & S2 TO NW1
S1 B
DS5
S2 A
NW1
S1 A
KBP 1
KBP 12
S1 C
S2 B
LS1
NULL IND
RED
(20)REL GRY
-15V VIO
+10V WHT-RED
+5V GRN-WHT
-10V WHT-VIO
+15V ORN
+30V RED
PSEL
BLK-YEL
DIG GRD GRY-BLK
±GRD
BLK
PP (VM) BLU-RED
A BAL GRN-RED
S BAL GRN-WHT
P SEL WHT-ORN
DAC (OUT) BLK-YEL
OVLD BLU
BRN
GRN
W
YEL
#22 SD-BUS
NULL BRN
.1 RED
.3 ORN
1 YEL
3 GRN
10 BLU
30 VIO
WIPER GRY
WHT
WHT-BRN
WHT-RED
WHT-ORN
YEL-BLK
WHT-GRN
WHT-BLU
WHT-VIO
WHT-GRY
WHT-BLK
BLK-WHT
GRN-WHT
GRN-RED
BLU-WHT
R1
COMM PIN
DS1
DS2
DS3
DS4
DS5
SAME
J1
+LS1-
NW1 (0.18.0046)
M1
S2
S1
A DECK NEAREST FRONT PANEL
(HARNESS #2) 0.18.1408
(HARNESS #1) 0.18.1407
DVM-P1
SPOT TIE 0.18.0407 & 0.18.0408 TOGETHER AT THIS POINT.
KBP-12
KBP-1
DVM P1
34(J1)
33(J1)
33(J2)
22 AUG 67 ECN 11291
ALEB H5 #1 COMM PIN NOT SPEC'D
INTERCHANGE 33A-3 & TERMS KBP12-3 FUNCTION WAS S SEL FUNCT. OF KBP12-3 WAS A BAL.
EAI
WIRING MONITOR PANEL (TR-Y)
MATERIAL: SEE PARTS LIST A00 020 1180 OP
FINISH:
A00 020 1180 OP
7 APR 67
D00 020 1180 DW

NOTES:
1. CONNECTIONS BETWEEN NW1, S1 & S2 ARE WIRE JUMPERS. (A00 100 0258 OP)