EAI®

580

ANALOG/HYBRID COMPUTING SYSTEM

MAINTENANCE SERIES

CONSOLE COMPONENTS

EAI® 580

ANALOG/HYBRID COMPUTING SYSTEM

MAINTENANCE SERIES

CONSOLE COMPONENTS

 • PRINTED IN U.S.A. • PUBL. NO. 00 800.2056-0 • MAY 1968

RELATED PUBLICATIONS

The table below lists other publications which may be of interest to the readers of this manual. Unless otherwise indicated by title or footnote, all are maintenance handbooks. Note that maintenance handbooks directly applicable to a particular system are normally supplied with the system.

Title	Publication Number
Handbook of Analog Computation	00 800.0001-3
Basics of Parallel Hybrid Computation	07 800.0016-0
580 Reference Handbook	00 800.2055-0
580 Console Components Manual	00 800.2056-0
580 Computing Components Manual	00 800.2057-0
580 Logic Expansion Group	00 800.2058-0
580/680 Digital Voltmeter, Model 26.268	00 800.2059-0
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CHAPTER 1

SYSTEM INTRODUCTION

1.1 GENERAL DESCRIPTION

The 580 Analog/Hybrid Computing System (Figure 1.1) is a medium scale, general purpose, 10 volt computer. This analog/hybrid computer features selection of a wide variety of analog and synchronous logic components to provide many classes of problem solving capabilities. The basic system is pre-wired to permit plug-in expansion to a full equipment complement. This feature permits the user to select those components necessary for the immediate needs at hand, and, as desired, to expand the system to meet futrue requirements.

1.1.1 General Layout

The computer console is organized to optimize both electrical operation and operator convenience. Figure 1.2 shows the location of the major components at the front of the computer.

In general, active computing components are housed in trays that plug into connectors at the rear of the patch bay area. These trays are self-shielding, with critical components directly connected to gold-plated patching contacts to minimize lead length. The removable patch panel (covering the patch bay area), can be pre-programmed remotely from the computer. The use of multiple pre-programmed patch panels permits different groups to share the computer with a minimum amount of wasted computer time. A motor-driven locking system positions the patch panel holes precisely in front of the patching contacts and assures positive connections.

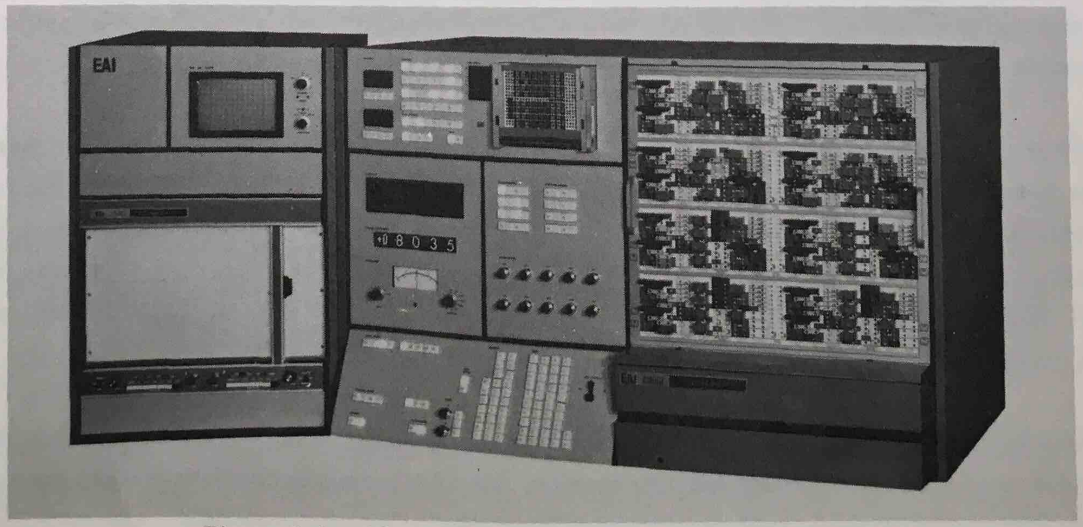


Figure 1.1. The 580 Analog/Hybrid Computing System

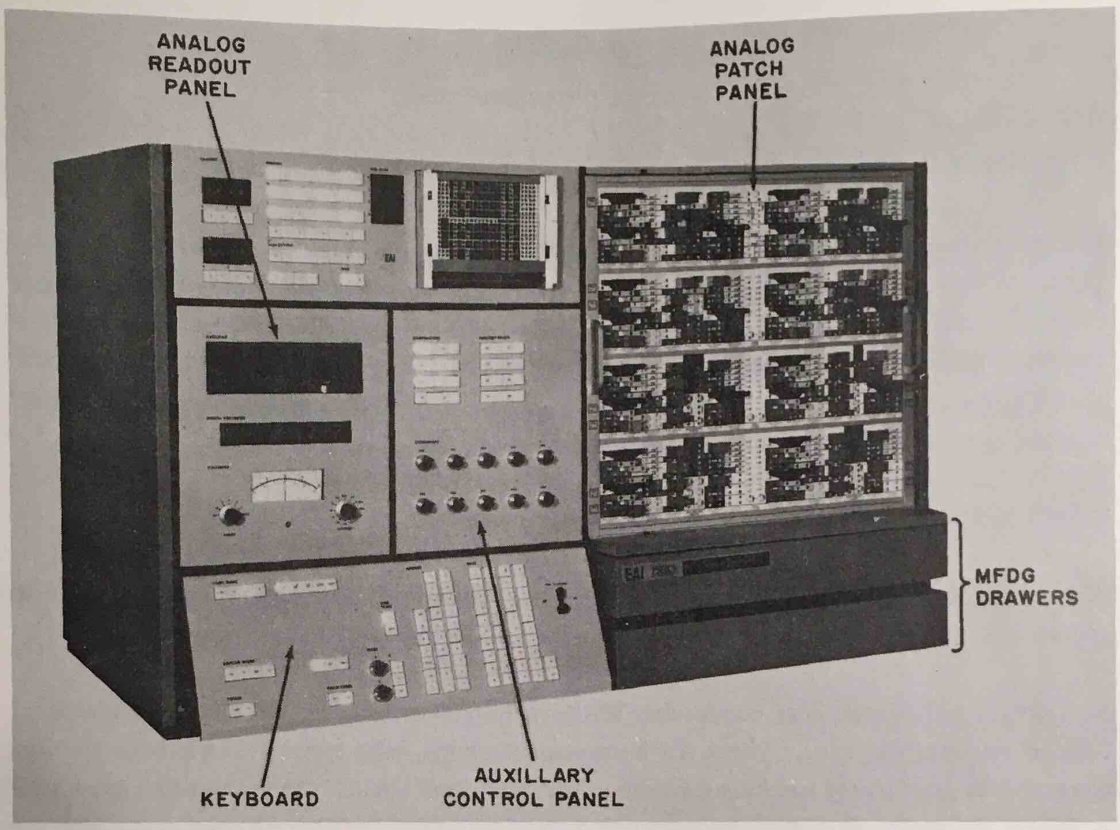


Figure 1.2. 580 Computer Console Layout (Front View)

Controls for variable diode function generators are housed in slide-out drawers mounted beneath the patching area. All controls within the drawers are clearly identified and positioned to assure ease of operation.

The power supply is mounted behind the control panel area and is accessible from the rear of the computer. Level-setting potentiometers, fuse and ac receptacles are located on the front panel of the power supply and are also accessible from the rear of the computer. A terminal board (TB1) is mounted inside the power supply with jumpers arranged for 105-125 volts or 210-250 volts. (See Paragraph 1.4.2.) The regulated output voltages are wired directly to bus bars at the rear of the patch bay.

The main operating control pushbuttons are keyboard mounted on the work shelf. The pushbuttons are arranged in logical groups for convenience, and are the only controls necessary for normal operation during problem setup or computer operation.

Auxiliary and less-frequently used controls, manual attenuators, and indicators for analog and logic computing components are included on panels adjacent to the patch panel. Some of these controls are supplied as expansions with digital logic components.

The servo-set attenuators are mounted on a hinged panel at the rear of the computer, as shown in Figure 1.3. As many as 70 attenuators, each having a drive motor and a relay switching circuit, may be installed. Wiring for a complete potentiometer complement is included with the basic panel; expansion is accomplished by inserting potentiometer assemblies into mating connectors and securing the units in place with screws.

The digital voltmeter (DVM) is mounted in the area beneath the logic expansion unit. Space is provided below the control chassis for the addition of interface components if the system is expanded for full hybrid computation.

1.1.2 Patch Bay Organization

The layout of the patch bay provides maximum convenience and requires a minimum amount of programming time. A description of the electronic location (address) and physical location (position) is given below.

For purposes of addressing components for readout, the patching area is divided into 8 fields (Figure 1.4). Each field consists of seven trays, grouped in an arrangement similar to that

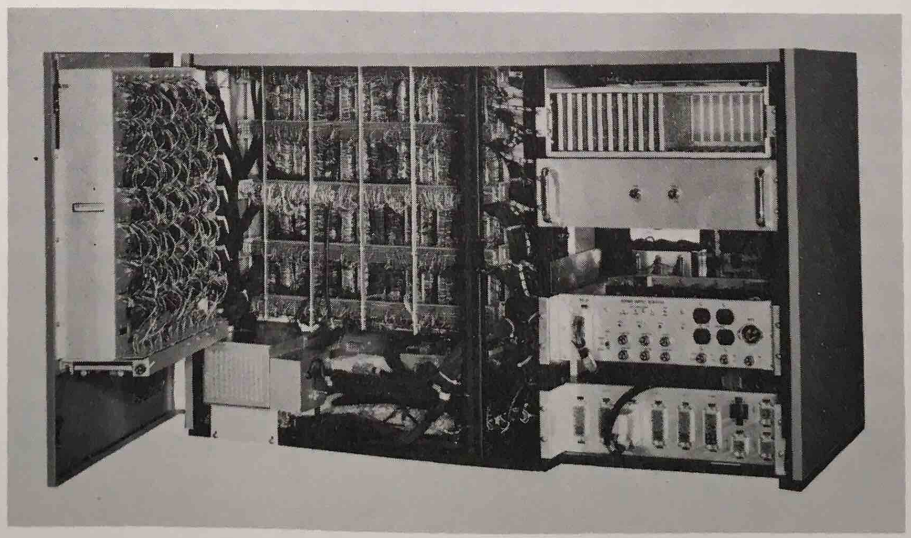


Figure 1.3. 580 Computer Console Layout (Rear View)

shown in Figure 1.5. The units portion of the address is displayed on the components patching area. For example, the 0.6.0704-2 Quad Amplifier is designated as -2, -3, -4, and -5 in each field. To complete the address, add the field number in the tens position. The address for the amplifiers in the quad amplifier tray located in field 0 would then appear as 02, 03, 04, and 05. This system of numbering is used for all components capable of being addressed for readout. Note that due to the flexibility of the 580 Computer, trays that are not designed for readout (depending on system requirements) may replace trays that have readout capability. For example, the 0.16.0355 QUAD LOG DFG and the 0.16.0356 Sine-Cosine DFG which each contain amplifiers -6 and -7 may be replaced by a 0.7.0146 Multiplier which has no addressable feature.

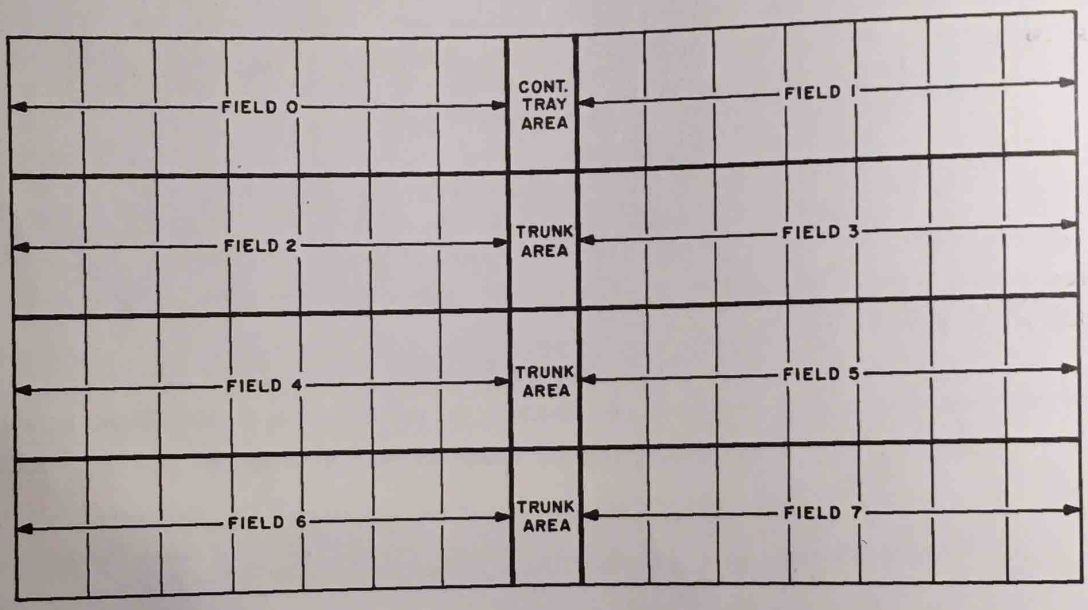


Figure 1.4. Basic Patch Panel Layout

For physical location purposes, each tray position is numbered in ascending numerical order from left to right. The top row of trays are numbered 1 through 15. The positions in the second row are numbered 16 through 30. This numbering system is carried out for a total of 60 tray positions. Numerical identification of tray position is used to allow easy correlation with the rack wiring. (See Appendix 2 of this chapter.) For example, tray position 1 coincides with connector A1 on the wiring sheets. When two connectors are used in a single tray position, one connector is labeled A and the other connector is labeled B. Both connectors have the same position number (i.e., A47 and B47).

Detailed descriptions of all plug-in computing trays are provided in the Computing Components Manual of the 580 Computing System (EAI Publication Number 00 800.2057-0).

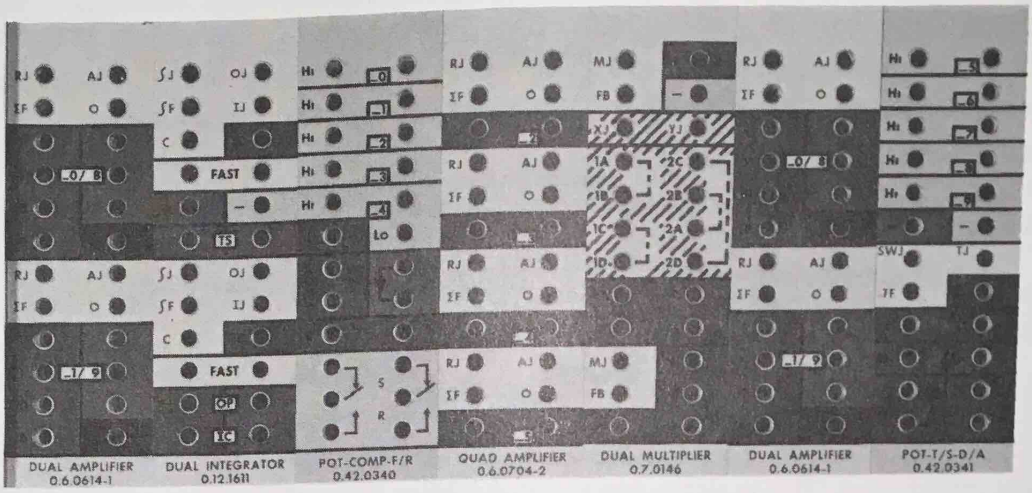


Figure 1.5. Typical 580 Patch Panel Field Arrangement

1.2 SCOPE OF MANUAL AND STANDARDS

This manual, and the other manuals in the 580 Analog/Hybrid Computing System Maintenance Series, are intended to provide sufficient information to permit reasonably skilled personnel to maintain the computer at specified accuracy. Basic theoretical information is omitted, as are detailed patching instructions and application information. A summary of the basic principles of analog circuits is provided in Appendix 1; a bibliography at the end of this manual lists many useful books for those desiring more detailed theoretical and background information. The 580 Reference Handbook (EAI Publication Number 00 800.2055-0) provides complete patching and operating information for the computer. A Handbook of Analog Computation (EAI Publication Number 00 800.0001-3), supplied with all 580 Computers, provides basic programming and scaling information.

1.2.1 Standards, Definitions, and Conventions

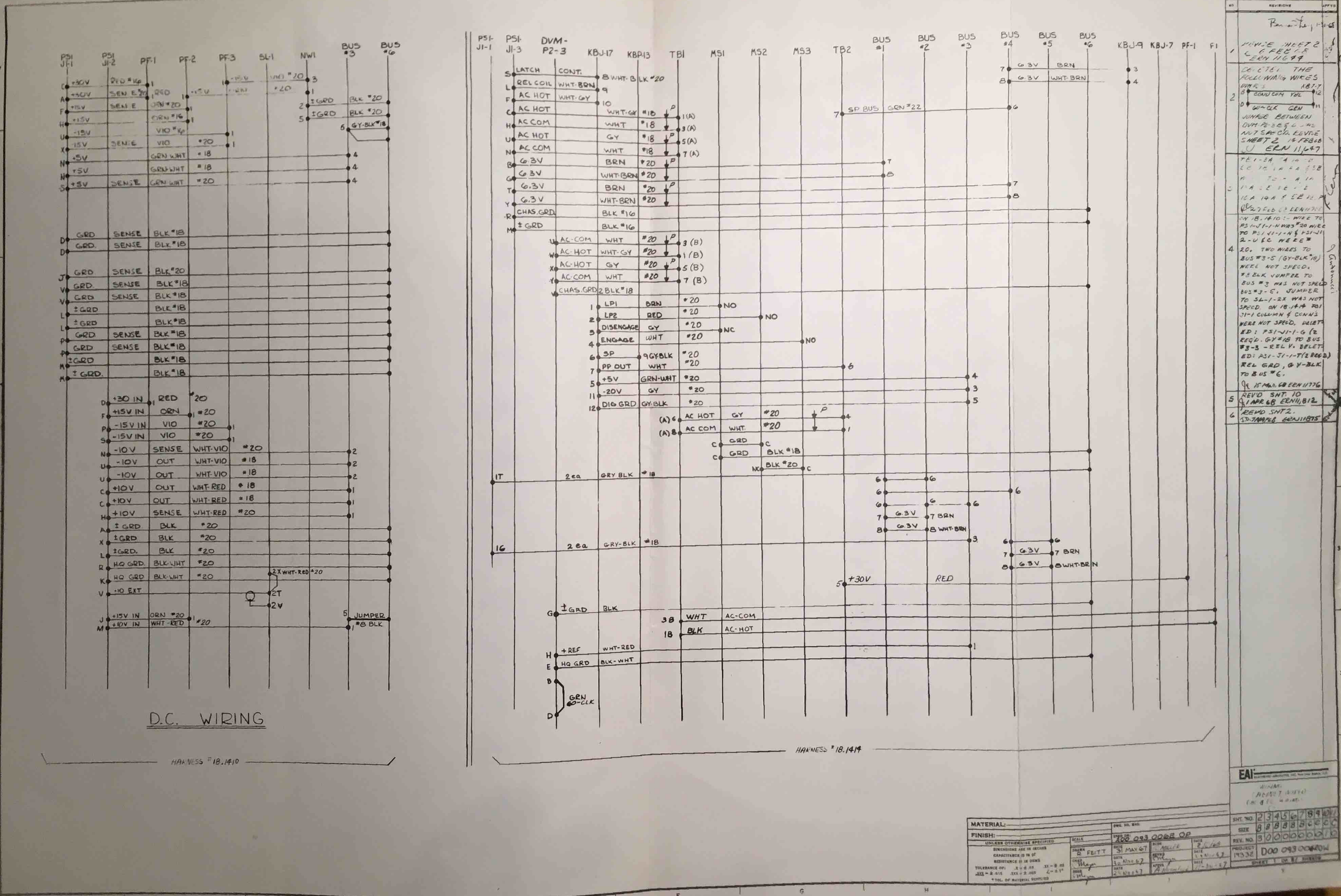
The 580 Maintenance Series manuals conform with commercial standards in format and content. In addition, military standards and abbreviations and schematic and logic symbols (MIL-STD-12B, MIL-STD-15-1A, and MIL-STD-806B, respectively) are used whenever applicable. However, many specialized terms and phrases are frequently abbreviated in the text of these manuals; these abbreviations are defined in Paragraph 1.2.1.1. In addition, several terms have special or restricted meanings when used in the 580 Maintenance Series manuals; these terms are defined in Paragraph 1.2.1.2.

1.2.1.1 *Abbreviations and Symbols.* The abbreviations and contractions used in the 580 Scientific Computing System Maintenance Manuals generally comply with MIL-STD-12B. Due to space limitations on the patch panel, and the use of many special terms, some deviations have been necessitated. The following is a list of abbreviations used with the 580 Scientific Computing System.

Abbreviations	Definitions
A (Timer)	Output for IC bus drive
$\overline{A}$ (Timer)	Output for operate bus drive
AJ	Amplifier junction
A SEL	Amplifier select line
C	Integrator capacitor termination
CHT ON (Plot)	Input for recorder chart drive
COMP	Input control for analog to digital comparator
CONSL	Console
COS	Cosine
D/A SW	Digital-to-Analog Switch
DFG	Diode function generator
DN (Plot)	Input for plotter pen control
DVM	Input to digital voltmeter
F	Feedback for shaping network
FAST	selects 10 times smaller capacitor when word exposed
FB	Feedback
FET	Field effect transistor
FF	Flip-Flop
FJ	Function junction
F(X)	Function of (X), MDFG output
GRD	Ground
H	Hold
HI	High end of potentiometer
HQ GRD	High quality ground
IC (Control)	Override for IC bus
IC	Input for initial condition
	Integrator IC mode control
IJ	Initial condition junction
IND	Indicator
INV	Inverter
I/O	Input/Output

Abbreviations	Definitions
J	Junction for shaping network
L	Latch
LJ	Limiter junction
LO	Low end of ungrounded pot
MAN	Manual
MDFG (VDFG)	Manual diode function generator (Variable diode function generator)
MJ	Multiplier junction
MULT	Multiplier
O	Output
OJ	Operate junction
OLS (Control)	Input for overload store
OP (Control)	Override for operate bus
	Integrator operate mode control
ORH (Control)	Input for override hold (integrator only)
OVD (Control)	Overload output
P	Wiper of pot
PC	Pot coefficient
POT	Potentiometer
PP (Control)	Output from patch panel mode
R	Input to reset function relay
	Passive precision resistor (10 = 10K; 100 = 1K)
RDAC	Output from reference digital-to-analog converter
REF	Reference
REL	Relay
RJ	Resistor junction
RO	Repetitive operation
RUN	Input to control REP-OP timer
S	Set function relay
SCOPE	Monitoring oscilloscope
SIN	Sine
SP	Set pot
SJ, SJ_1	Summing junction
SL	Slave
ST	Static test
SW	Input for digitally controlled analog switch
SWJ	Digitally controlled analog switch junction

Abbreviations	Definitions
T	Track input
TB (Control)	Output of sweep sawtooth
TF	Track feedback
TJ	Track junction
TS	Time scale, selects 500 to 1 capacitor
T/S	Track/Store
VM (Control)	Voltmeter input
X (Plot)	Input to plotter arm
X (Scope)	Horizontal input for display scope
XJ	Multiplier X junction
Y (Plot)	Input to plotter pen
Y_1 (Scope)	Input to channel 1 of display scope
Y_2 (Scope)	Input to channel 2 of display scope
Y_3 (Scope)	Input to channel 3 of display scope
Y_4 (Scope)	Input to channel 4 of display scope
YJ	Multiplier Y junction
Z	Override for display scope blanking
+	Plus reference
-	Minus reference
+ in	Input to plus log
- in	Input to minus log
+L	Input for plus limit
-L	Input for minus limit
+X	X input to multiplier
-X	Inverted X input to multiplier
+Y	Y input to multiplier
-Y	Inverted Y input to multiplier
1A	Termination to aid multiplier patching
1B	Termination to aid multiplier patching
1C	Termination to aid multiplier patching
1D	Termination to aid multiplier patching
2A	Termination to aid multiplier patching
2B	Termination to aid multiplier patching
2C	Termination to aid multiplier patching
2D	Termination to aid multiplier patching
ΣF	Summer feedback
$\int$	Integral



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HARNESS #18.1414
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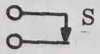
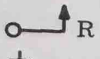
Abbreviations	Definitions
∫ F	Integrator feedback
∫J	Integrator junction
θ	Phase angle (Theta)
	Digital inverter
	Digitally controlled analog switch
	Function relay in set position
	
	Passive diode

1.2.1.2 *Glossory of Terms.* This paragraph provides a list of computer and integrated circuit terms used in the 580 Scientific Computing System Maintenance Series manuals. Many terms not unique to the 580 System are specifically defined as used in this manual.

Address	The location of a computing component; code designating the exact storage location of an operand.
Amplifier Junction	The input terminal of an operational amplifier.
Digitize	Converting an analog measurement of a physical variable into a numerical value.
Digital Voltmeter	A voltage measuring device that provides a numeric indication of the value of an analog input.
Attenuator	A device used to reduce the level of a signal. This term is used interchangeably with potentiometer in this manual.
Buffer	An isolation or driver circuit common to digital logic. Also used as temporary storage units in the computer. Normally a buffer is an emitter-follower type of circuit.
Bus	Electrical circuit over which power or data is transmitted.
Diode Function Generator	A circuit using diodes as switches for input or feedback resistors. Used to simulate many non-linear functions.
Flip-Flop (FF)	Electronic circuit with two stable states.
Gate	A circuit with two or more inputs and one output, the output depends on the combination of input logic. The gates used in the 580 System are NOR and negative NAND gates.

High-Quality Ground	A separate ground return provided for sensitive computing components. No current flow is permitted, eliminating noise resulting from an IR voltage drop in the wire or bus.
Hybrid	A computer which has both analog and digital capabilities.
Integrated Circuit	The EIA (Electronic Industries Association) defines a semi-conductor integrated circuit as: "The physical realization of a number of electrical elements inseparably associated on a continuous body of semiconductor material to perform the function of a circuit."
Inverter	A circuit in which the output logic level is always opposite to the input logic signal.
Logic	Mathematical approach to the solution of involved problems by the use of symbols which define basic concepts. The three basic logic symbols are: "AND, OR, and NOT".
Mnemonic	Pertaining to the assisting of human memory; thus, a mnemonic code is usually an easily remembered abbreviation.
Monitor	To supervise and check the correct operation of a program during its execution. Monitoring equipment available with the 580 System includes indicator lights, visual and audible overload alarms, a digital voltmeter, and an oscilloscope.
Offset	An undesirable voltage appearing at the output of an operational amplifier whose input is held at zero.
Passive Elements	Circuit components with no gain characteristics: resistors, capacitor, inductors.
Peripheral Equipment	Auxiliary units which may be placed under computer control.
Potentiometer; Pot	An adjustable resistor used in analog computers for multiplication by a constant, also called an attenuator.
Real Time	A computing operation speed adjusted so that it can influence the process being controlled.
Register	Device used as a storage element. It may also be made to shift, circulate or perform other operations.

Scale Factor	A number used to multiply or divide quantities so that each desired variable is within the problem parameters.
Stabilizer	A circuit in an operational amplifier that increases dc gain and reduces offset.

1.3 INSTALLATION INFORMATION

1.3.1 Site Preparation

The 580 Analog/Hybrid Computing System requires no specific site preparation. It is designed to operate in normal laboratory, lecture hall, or office environments. The computer is designed for operation on a base such as a desk or table. It is suggested that the base be equipped with casters, simplifying maintenance or relocation of the console. Specific primary power requirements and operating and storage environments are listed in Table 1.1.

Table 1.1. 580 Computer Characteristics

Characteristics	English Units	Metric Units
Operating Voltages	105 Volts AC ±10% 115 Volts AC ±10% 125 Volts AC ±10%	210 Volts AC ±20% 230 Volts AC ±20% 250 Volts AC ±20%
Operating Frequency	50/60 CPS, 1 Ø	50/60 CPS, 1 Ø
Operating Power (Maximum, Fully Expanded)	0.5 kVA	0.5 kVA
Length	52 Inches	134 Centimeters
Width (Depth)	28.8 Inches	73.1 Centimeters
Height	32.4 Inches	82.3 Centimeters
Weight (Maximum, Fully Expanded)	600 Pounds	272 Kilograms
Relative Humidity (No Condensation)	From 20% to 90%	From 20% to 90%
Altitude	Sea Level to 10,000 Feet	Sea Level to 3 Kilometers
Storage Environment Temperature	From 0°F to 120°F	From -17.8°C to 48.9°C
Relative Humidity (No Condensation)	From 20% to 90%	From 20% to 90%
Altitude	Sea Level to 50,000 Feet	Sea Level to 15.2 Kilometers

1.3.2 Uncrating

The computer is normally shipped crated. For domestic shipment, all components are installed (unless otherwise noted in the invoice or marked with caution tags on the computer). Computers packed for foreign shipment usually have all computing trays and certain other components separately packed to minimize the possibility of damage.

After the computer crate is opened (following the instructions attached to the crate), the computer may be positioned on the base.

Figure 1.6 illustrates the major dimensions of the computer. Computers shipped to destinations within the United States or Canada are normally wired for 115 Vac operation unless 230 Vac operation is specifically requested on the Purchase Order.

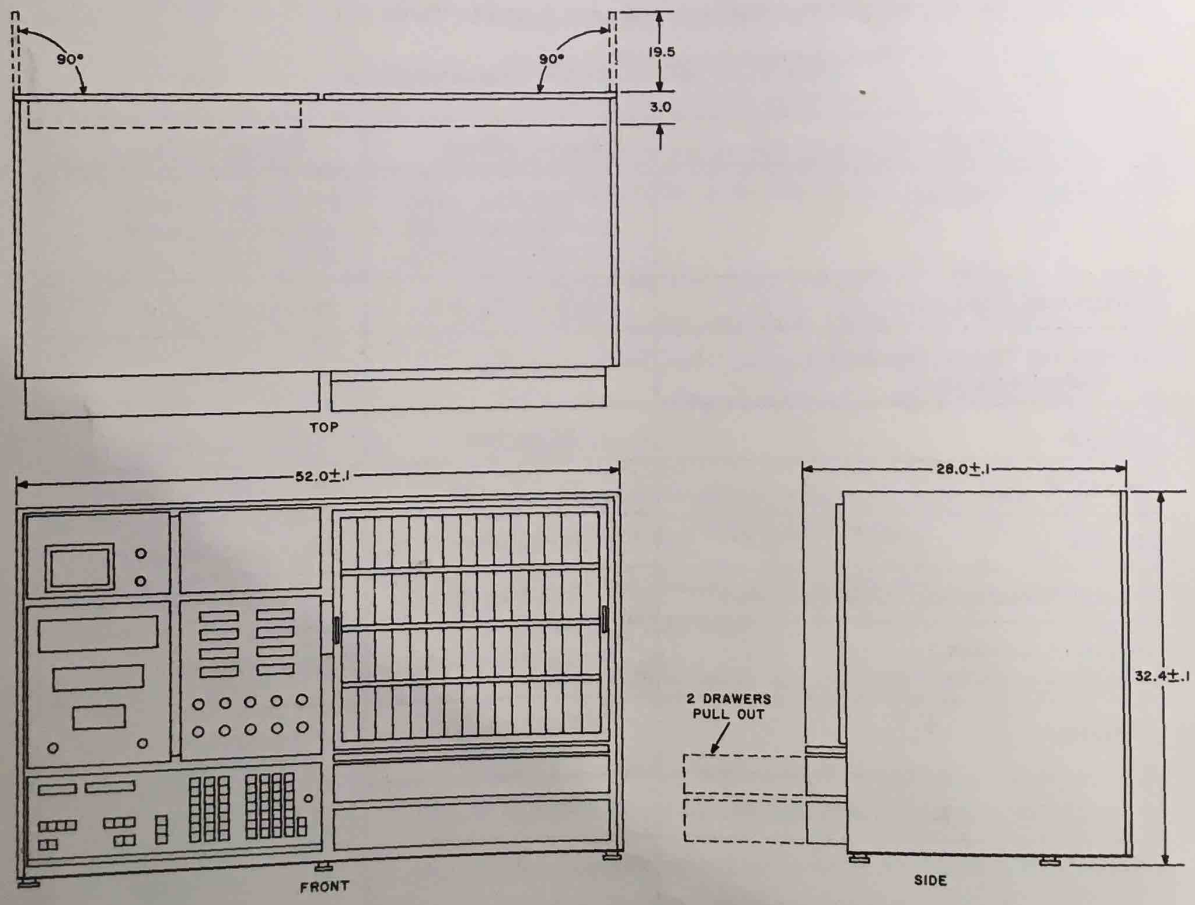


Figure 1.6. 580 Computer Dimensions

Computers shipped to points outside the USA or Canada are normally prepared for operation from a 230 Vac single phase source. Changing from one voltage to another is easily accomplished by changing jumpers on terminal board TB1 (mounted inside the power supply). Figure 1.7 illustrates the jumper position for 115 Vac or 230 Vac operation.

CAUTION

Do not connect the computer to a primary power source until the jumper positions are checked. See Figure 1.7.

Figure 1.7. TB1 Jumper Positions

1.3.3 Accessory and Trunk Connectors

Accessories for the 580, such as plotter, recorders, etc., are connected to the computer by cabling to the appropriate connector on the trunk connector panel. Figure 1.8 shows the functions terminated at each connector. Note that one connector position is blank; connectors may be installed in this position for custom hybrid computer systems. If the additional connector is installed at the factory, its functions are described in supplemental system publications.

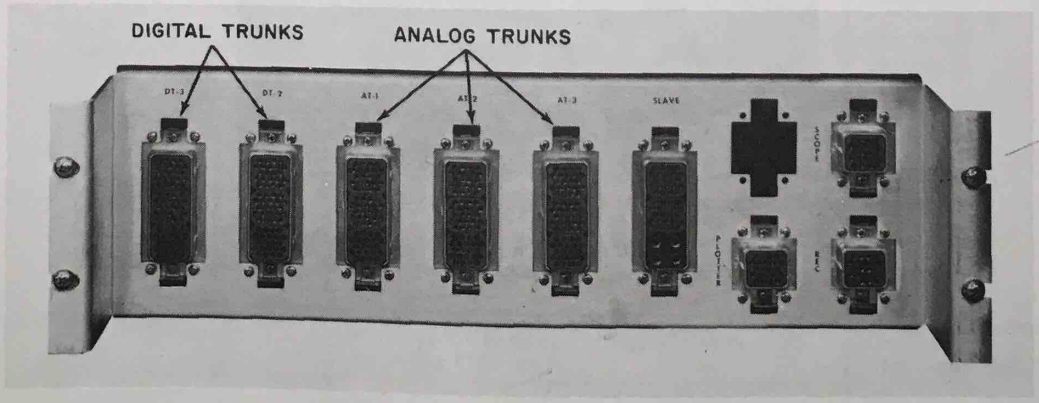


Figure 1.8. Trunk and Accessory Connector Panel

The analog and logic trunks are also terminated in this area. Connectors AT1, AT2, and AT3 terminate the analog trunks. Connectors DT2 and DT3 terminate the logic trunks.

NOTE

Prior to operating the computer, check to ensure that these connectors and the PS1-J1 connector are in their proper positions and fully inserted.

1.3.4 Insertion of Pre-Patch Panel

To insert the pre-patch panel, align the lugs on the bottom of the pre-patch panel frame with the slots in the bottom rail of the patch bay (Figure 1.9). Push the pre-patch panel forward until the lugs on the top of the frame mate with the slots on the top rails of the patch bay. Gently slide the pre-patch panel slightly to the right. Depress the ENG switch. The patch panel drive system forces the pre-patch panel to the right into the locked position.

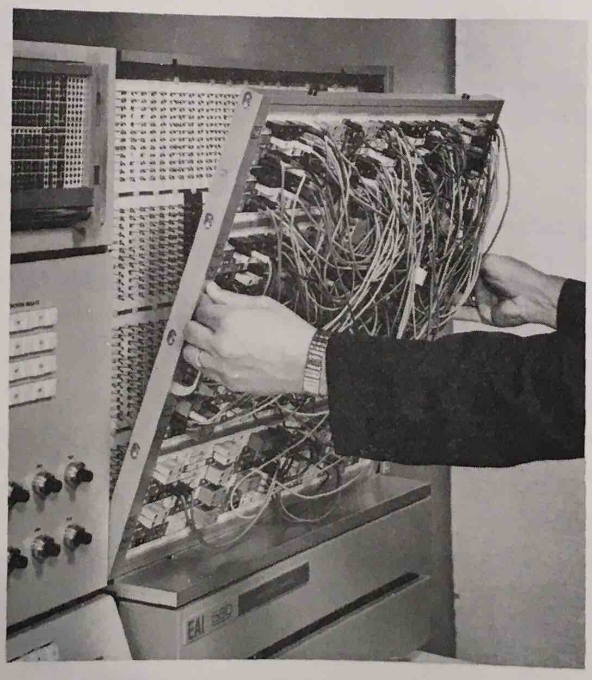


Figure 1.9. Inserting the 580 Pre-Patch Panel

Depressing the DIS button disengages the locking system and forces the pre-patch panel to the left for removal.

1.4 OPERATING INSTRUCTIONS

Table 1.2 briefly describes the functions of the various operating controls located on the 580 Computer Control area. The table also includes references to the chapters in which the various control circuits are described.

Table 1.2. Operating Mode Functions

Control	Function	Refer to:
PP Analog Mode	Provides for control of IC and OP modes from patch panel.	Chapter 3
IC (Initial Condition)	Used to manually control the IC bus.	Chapter 3
HD (Hold)	This switch, when depressed, removes the computer from the PP, IC, or OP modes.	Chapter 3
OP (Operate)	Manually controls the operate mode of the computer.	Chapter 3
SP (Set Pot)	Switches computer to Set Pot mode permitting the setting of potentiometers.	Chapter 3
ST (Static Test)	Switches computer to static test mode to permit checking computed levels at various points in the program	Chapter 3
RMT (Remote)	This switch, when depressed, permits analog mode selection from an external device.	Chapter 3
POWER-OFF/ON	Controls ac power to computer.	Chapter 8
Patch Panel-DIS/ENG	Activates the motorized patch panel engaging and disengaging system.	Chapter 8
Time Scale - 1S/2MX	Permits selection of integrated time scales.	Chapter 3
Timer A/$\overline{A}$	Provides for adjustment of OP($\overline{A}$) and IC(A) switching rate.	Chapter 3
ADDRESS	Permits selection of any component capable of being addressed for readout purposes.	Chapter 4
RDAC	Permits entering the desired pot coefficient to the addressed pot.	Chapter 5
SET	Connects servo amplifier to pot setting drive system.	Chapter 5
CL (Clear)	Disconnects servo amplifier from pot setting drive system.	Chapter 5
ATTENUATORS (P00 through P09)	Used to set manually operated attenuators.	Chapter 5
Pot Control	Used to set selected pots at desired value without using RDAC.	Chapter 5
VM Function	Provides for selection of voltages to be read out on the VM.	Chapter 4
VM RANGE	Attenuator switch for adjusting the range of the VM.	Chapter 4
COMPARATORS	Provides capability of overriding inputs patched to a comparator.	Chapter 9 Computing Comp Manual
FUNCTION RELAYS	Provides capability of overriding inputs to a function relay.	Chapter 9 Computing Comp Manual

1.5 RECOMMENDED TEST EQUIPMENT

The 580 Analog/Hybrid Computing System provides long term accuracy and reliability. However, to maintain the equipment at peak performance, some of the components must be periodically calibrated. Pertinent performance checks and adjustment procedures are provided in the succeeding chapters of this manual, and the computing components manual (as applicable). It is important to note that the computer cannot be more accurate than the equipment used for calibration, plus the accumulated tolerances of the components and the test equipment. Therefore, it is essential that the test equipment meets the minimum standards specified in the following paragraphs.

Types of Equipment:

1. *Precision Voltmeter.* A voltage measuring instrument is essential for component calibration. A device recommended for this purpose is frequently known as a null voltage test set. It incorporates a precision six-place voltage divider and a null sensing galvanometer (or the equivalent). Some units may also include a standard reference cell or power supply. Of course, a separate voltage divider and galvanometer may be combined to accomplish the same function if the voltage divider is sufficiently accurate and the galvanometer has the required sensitivity. In any case, the device must have an absolute accuracy of ±0.01% of full scale, and have a resolution of 0.005% of full scale. A differential null meter such as the Keithley, Model 662 or the Fluke, Model 825 is recommended by EAI experience, but any instrument meeting the accuracy and resolution requirements may be used.

2. *Multimeter.* A multimeter, VOM or VTVM is useful for troubleshooting. Any unit having a sensitivity of at least 10,000 ohms per volt for dc measurements may be used. The resistance range of a multimeter may be used effectively to locate circuit faults and to perform rudimentary checks of diodes and transistors. The ohmmeter battery should not have a voltage greater than 1.5, since a higher voltage may damage some of the semiconductors. Typical of the instruments that may be used are the Triplett, Model 630 or the Simpson, Model 260.

3. *Oscilloscope.* An oscilloscope is required for many adjustment procedures, in addition to being extremely useful for troubleshooting. For maximum usefulness, the scope should have dual trace capabilities along with direct coupled vertical amplifiers. Typical of the scopes that meet these requirements is the Tektronix 545A with Type CA (dual trace) and Type H (wide-band) plug-in pre-amplifiers.

4. *Sine-Wave Oscillator.* An audio oscillator with a low-distortion, fairly uniform output over the range from about 10 cps to 500 kc is required for several check procedures. A Hewlett-Packard 200 CD is typical of the instruments that meet these requirements.

5. *Triangular-Wave Generator.* Checking the sine-cosine tray requires the use of a triangular-wave generator such as the Wavetek 103.

6. *Digital Voltmeter.* The 580 is equipped with a digital voltmeter that may be used for many checks and adjustments. The internal DVM is slaved to computer reference. This improves the accuracy of the DVM for computing functions (if the computer reference deviates slightly from its absolute value, the DVM shifts in the same direction, thus cancelling any apparent error). However, this renders the DVM less accurate for absolute measurements if the computer reference differs at all from 10.000 volts. Therefore, an external DVM is very useful for many procedures, and if sufficiently precise, can be used to replace the precision voltmeter listed in Item 1.

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		Amplifier (Potted)	00 006.0681-1	B
2		PATCH CORD KIT: c/o	00 100.0281-0	B
		35 each - Horizontal Plug: 4 Prong	00 005.0172-0	B
		12 each - "T" Bottle Plug: 2 Prong	00 005.0173-0	B
		30 each - Horizontal Plug: 2 Plug	00 005.0174-0	B
		20 each - Cable 6" - Black	00 510.0043-0	B
		30 each - Cable 12" - Brown	00 510.0043-1	B
		20 each - Cable 18" - Orange	00 510.0043-2	B
		10 each - Cable 30" - Blue	00 510.0043-3	B
		6 each - Connector	00 542.0605-0	B
3		Contact Spring	00 550.0061-0	B
		Inserting Tool	00 777.0221-0	B
		Tray Extraction Tool	00 286.0112-0	B
4		Service Shelf	00 051.0382-0	B
5		Fuse, Cartridge, Fast Acting: 1 Amp, 250V (Littelfuse 312001 or equal) (Used on 0.10.0354 Power Supply)	00 570.0085-0	A
6		Fuse, Cartridge, Fast Acting: 3 Amp, 250V (Littelfuse 312003 or equal) (Used on 0.10.0354 Power Supply)	00 570.0088-0	A
7		Fuse, Cartridge, Fast Acting: 5 Amp, 250V (Littelfuse 312005 or equal) (Used on 0.10.0354 Power Supply)	00 570.0090-0	A
8		Fuse, Cartridge, Medium Acting: 1 Amp, 250V (Littelfuse 314001 or equal) (Used on 0.42.0348 Attenuator)	00 570.0116-0	A
9		Fuse, Cartridge, Medium Acting: 8 Amp, 250V (Littelfuse 314008 or equal) (Used on 0.10.0354 Power Supply)	00 570.0120-0	A
10		Lamp (Used on 0.20.1018-2, 0.20.1018-3 Monitor Panels)	00 578.0077-0	B

*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
580 COMPUTER
(OPERATING EQUIPMENT)

MODEL NO.
0.45.0134 Sh. 1 of 2 Sh.

1

DATE 10 / 9 / 67

M446

ITEM	REF. DESIG.	DESCRIPTION	EAI NO.	*CAT.
11		Lamp, Incandescent: 28V, 4 MA; Clear T1-3/4 Bulb (Hudson 369 or equal) Used on: 0.12.1636 Comparator and Function Relay Control Card; 0.51.0357 Mode Control Card; 0.51.0359 Address Select Card; 0.51.0363-1 DAC Control Card; 0.51.0365 ON/OFF and Disengage/Engage Card	00 578.0089-0	A
12	R1	Resistor, Non-Linear Used on: 0.42.0326 DAS Attenuator Card	00 646.0062-0	B
		0.12.1609 TRUNK TRAY		
1	J1	Connector Block: White	00 542.1545-2	B
2	R1,2	Resistor, Precision	00 638.1050-1	B
3		Connector Block: Lettered (TRUNKS 0.12.1609)	00 542.1551-1	B
		0.12.1610 TRUNK CARD		
1		Connector, Plug: 22 Contacts; Male (Amphenol 133-022-43 or equal)	00 542.0488-0	A
		0.19.0263-1 TEST CABLE		
1	P1	Connector, Receptacle: 22 Contacts; Female (Amphenol 143-022-1 or equal)	00 542.0091-0	A
2	P2	Connector, Plug: 22 Contacts; Male (Amphenol 133-022-21 or equal)	00 542.0569-0	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
580 COMPUTER
(OPERATING EQUIPMENT)

MODEL NO.
0.45.0134 Sh. 2 of 2 Sh.

1-3-1-1

DATE 4 / 25 / 68

M446

APPENDIX 2

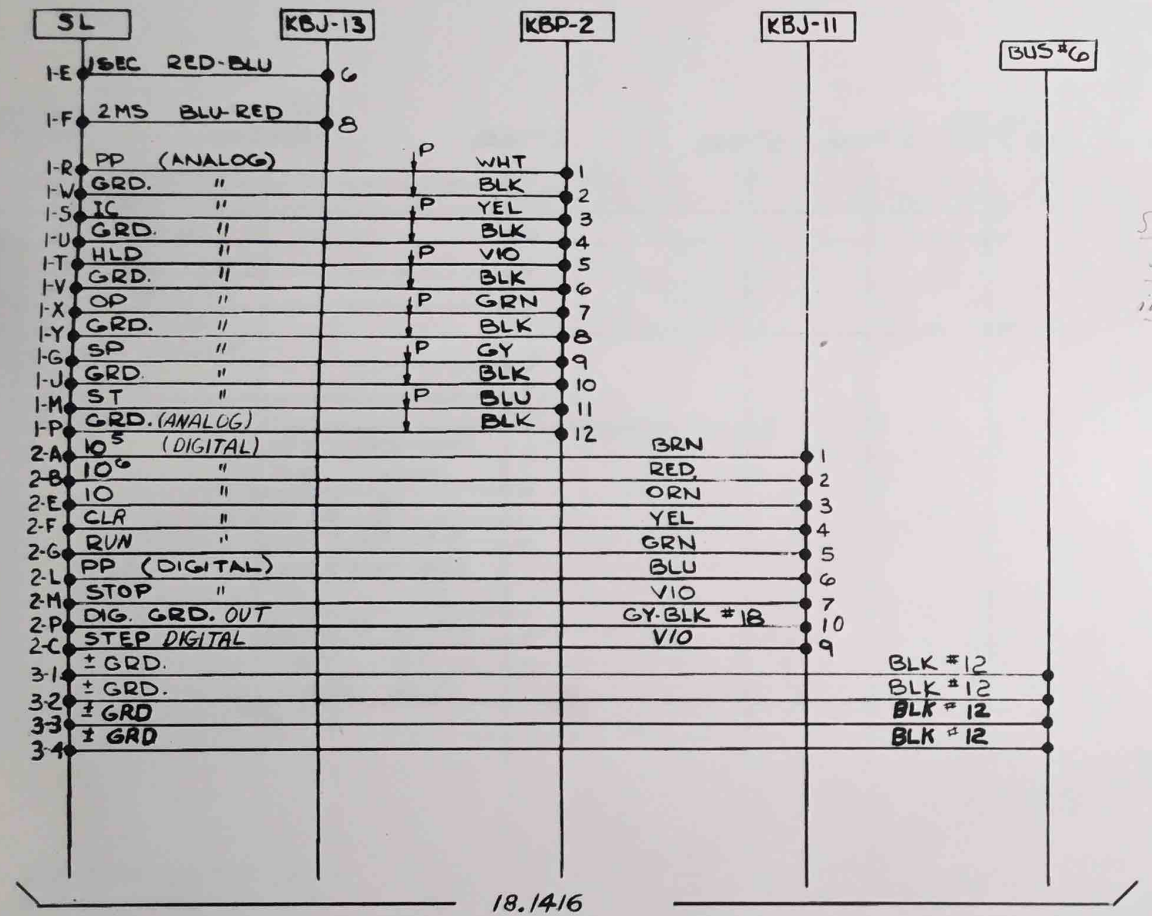
DRAWINGS

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
0.93.0062 580 Computer	Wiring	D00 093 0062 0W (Sheets 1 through 21)



Schalter
SLAVE - OFF - MASTER
in Feld oberhalb des Steckers
Funktion markiert

NO.	REVISIONS	APP'V'D
1	REVISE SHT 16 & FLD 6 & 5 PER ERN 11699	
2	REVISE SHT 20 14 FEB 68 PER ERN 11647	

RELEASED FOR PRODUCTION: ENGR DATE

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

EAI ELECTRONIC ASSOCIATES, INC.

SLAVE WIRING (SOT)

MAT'L:
FINISH: DWG. NO. WAS:
SCALE USED ON:

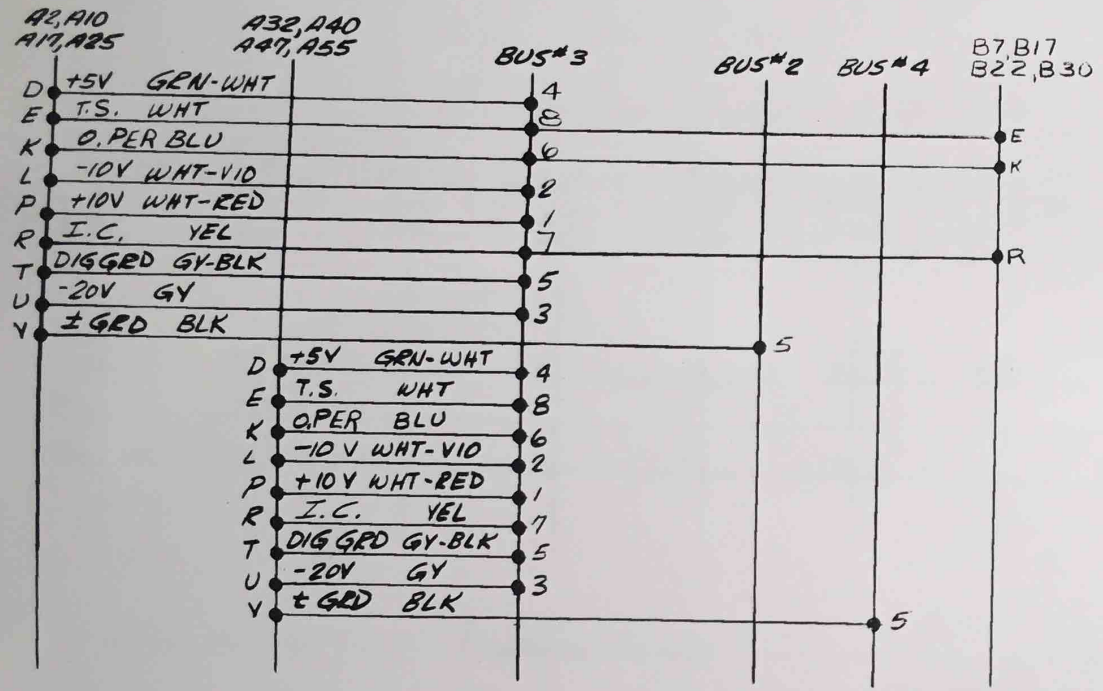
DRAWN R.F. FEITT	DATE 31 MAY '67	RCDR	DATE
CHKD	DATE	REVWD	DATE
DSGR	DATE	APPVD A.N.	DATE -21 67

SHT. NO.	12	13	14	15	16	17	18	19	20	21
SIZE	C	C	C	C	C	D	D	D	D	B
REV. NO.	0	0	0	0	1	0	0	0	1	0

PROJECT 19332 B 00 093 0062 0W

SHEET 2 OF 20 SHEETS

EAI 999-3273-0 BLUEPRINT CO. 25275-10



A2 & A10 HARNESS # 18.1369
A17 & A25 HARNESS # 18.1370
A32 & A40 HARNESS # 18.1371
A47 & A55 HARNESS # 18.1372
B7 & B17 HARNESS # 18.1488
B22 & B30 HARNESS # 18.1487

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

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

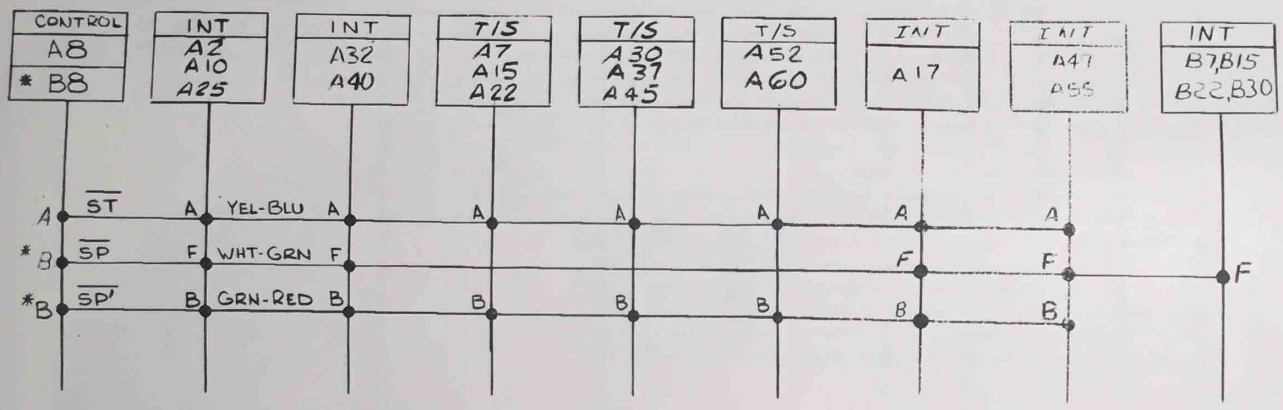
EAI ELECTRONIC ASSOCIATES, INC.

INTEGRATOR POWER
FIELD WIRING

MAT'L:			
FINISH:		DWG. NO. WAS:	
SCALE	USED ON:		
DRAWN	DATE	RCDR	DATE
CHKD	DATE	REVWD	DATE
DSGR	DATE	APP'VD	DATE 11-21-67

SHT. NO.
SIZE
REV. NO.
PROJECT 19332 B00 093 0062 0W
SHEET OF SHEETS

NOTES:
1.- SP, SP', & ST TO BE DAISY CHAINED ACROSS REAR OF PATCHING AREA.
2.- ALL WIRES TO BE #22 PHU.



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

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

EAI ELECTRONIC ASSOCIATES, INC. West Long Branch, N.J.

SP, $\overline{SP}$ & ST WIRING

(580)

MAT'L:			
FINISH:		DWG. NO. WAS:	
SCALE	USED ON:		
DRAWN R.F. FEITT	DATE 6 JUNE '67	RCDR	DATE
CHKD	DATE	REVWD	DATE
DSGR	DATE	APPVD A Norwi	DATE 11-

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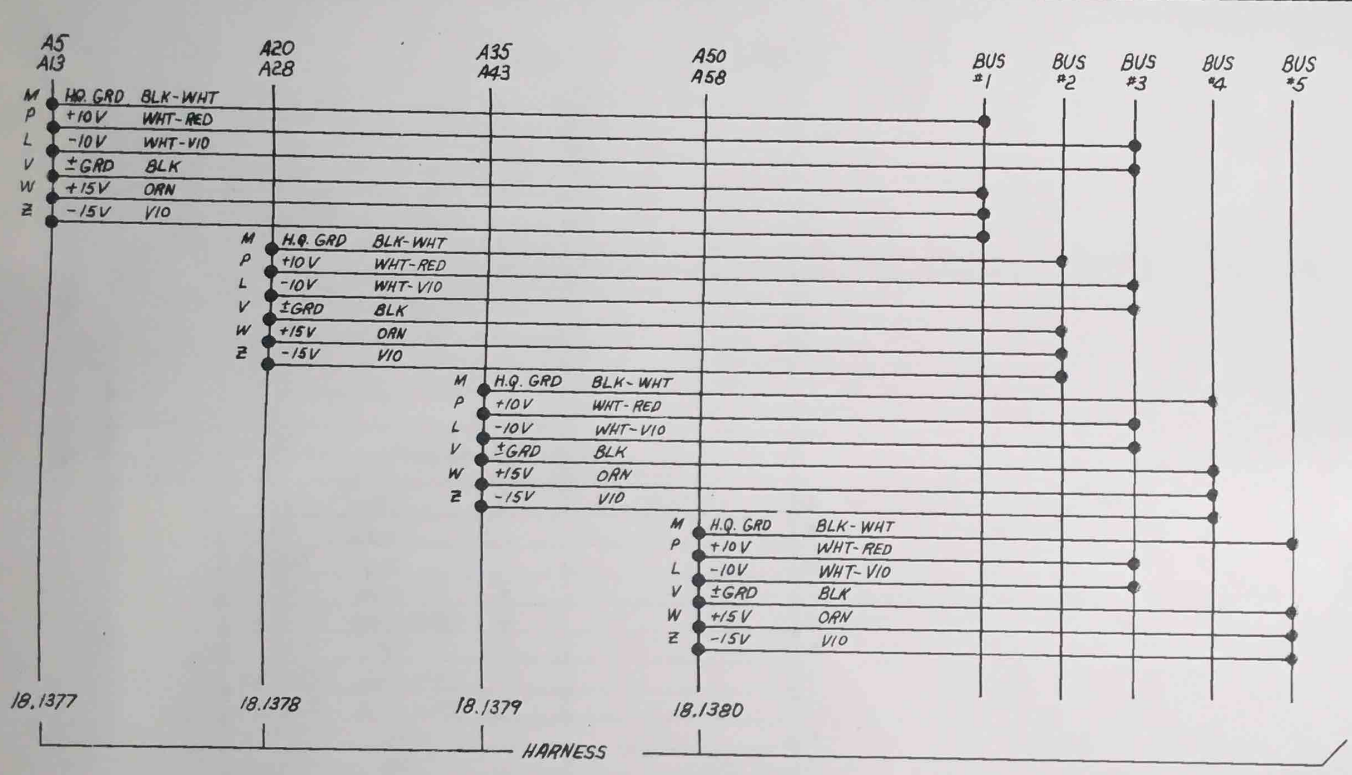
SIZE
REV. NO.
PROJECT 19332
B 00 093 0062 0W
SHEET 1 OF 1 SHEETS

D & W BLUEPRINT CO. 28276-10



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NO.	REVISIONS	APP'V'D

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CAPACITANCE IS IN pf
RESISTANCE IS IN OHMS
TOLERANCE OF: .X = ± .03 .XX = ± .02
.XXX = ± .015 .XXX = ± .005 ∠ = ± 1°
*TOL. OF MATERIAL SUPPLIED

EAI ELECTRONIC ASSOCIATES, INC.

MULT POWER FEED
BUS# 1 - 5
(580)

MAT'L:			
FINISH:		DWG. NO. WAS:	
SCALE ___	USED ON:		
DRAWN LAFFERTY	DATE 27SEPT67	RCDR	DATE
CHKD	DATE	REVWD	DATE
DSGR	DATE	APPVD ANDATION	DATE

SHT. NO.	
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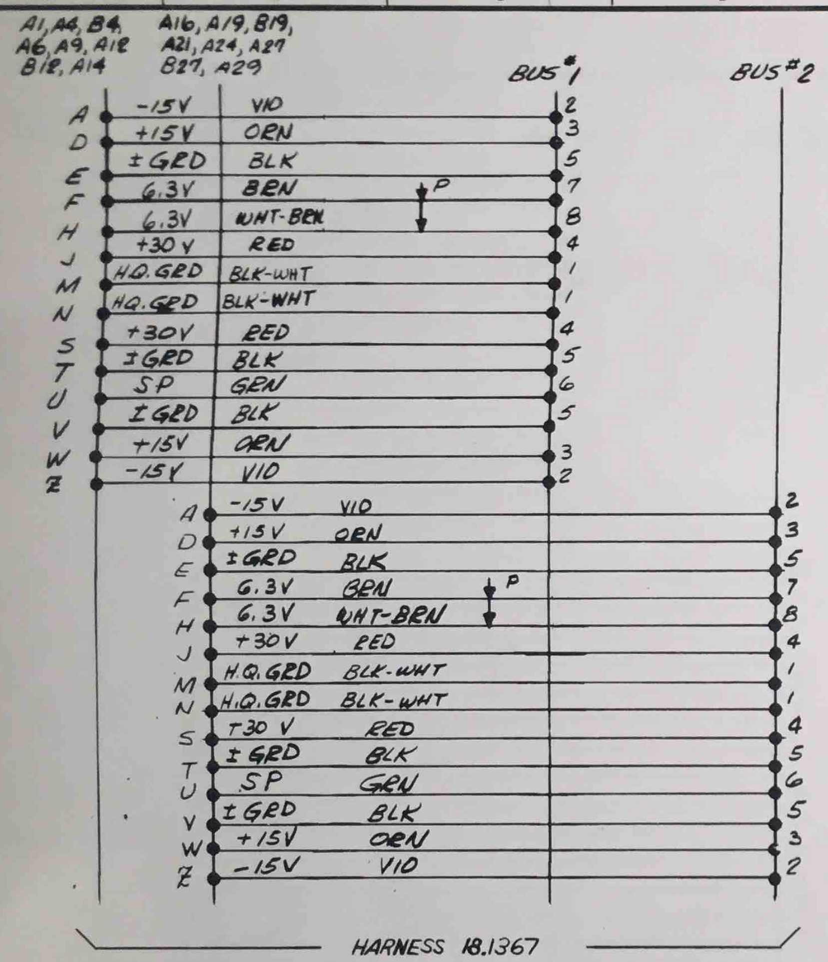
REV. NO.	
PROJECT 19332	B00 093 0062 0W

SHEET 5 OF SHEETS

EAI 999-3273-0 BLUEPRINT CO. 25276



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CAPACITANCE IS IN pf
RESISTANCE IS IN OHMS
TOLERANCE OF: .X = ± .03 .XX = ± .02
.XXX = ± .015 .XXX = ± .005 ∠ = ± 1°
*TOL. OF MATERIAL SUPPLIED

EAI ELECTRONIC ASSOCIATES, INC.

AMPL POWER FEEDS
BUS #1 & 2

MAT'L:				
FINISH:			DWG. NO. WAS:	
SCALE ∞	USED ON:			
DRAWN KAJ	DATE 7 JUNE 67	RCDR	DATE	
CHKD	DATE	REVWD	DATE	
DSGR	DATE	APP'VD H. NOLAN	DATE 11-21-67	

SHT. NO.
SIZE
REV. NO.
PROJECT 19332
B00 093 0062 CW
SHEET 1 OF SHEETS

A31, A34, B34, A36, A39, A42, B42, A44

A46, A49, B49, A51, A54, A57, B57, A59

	BUS #4		BUS #5
A	-15V	VIO	2
D	+15V	ORN	3
E	± GRD	BLK	5
F	6.3V	BRN	7
H	6.3V	WHT-BRN	8
J	+30V	RED	4
M	H.Q. GRD	BLK-WHT	1
N	H.Q. GRD	BLK-WHT	1
S	+30V	RED	4
T	± GRD	BLK	5
U	SP	GRN	6
V	± GRD	BLK	5
W	+15V	ORN	3
Z	-15V	VIO	2

P

HARNESS 18.1368

RELEASED FOR PRODUCTION

NO	REVISIONS

EAI

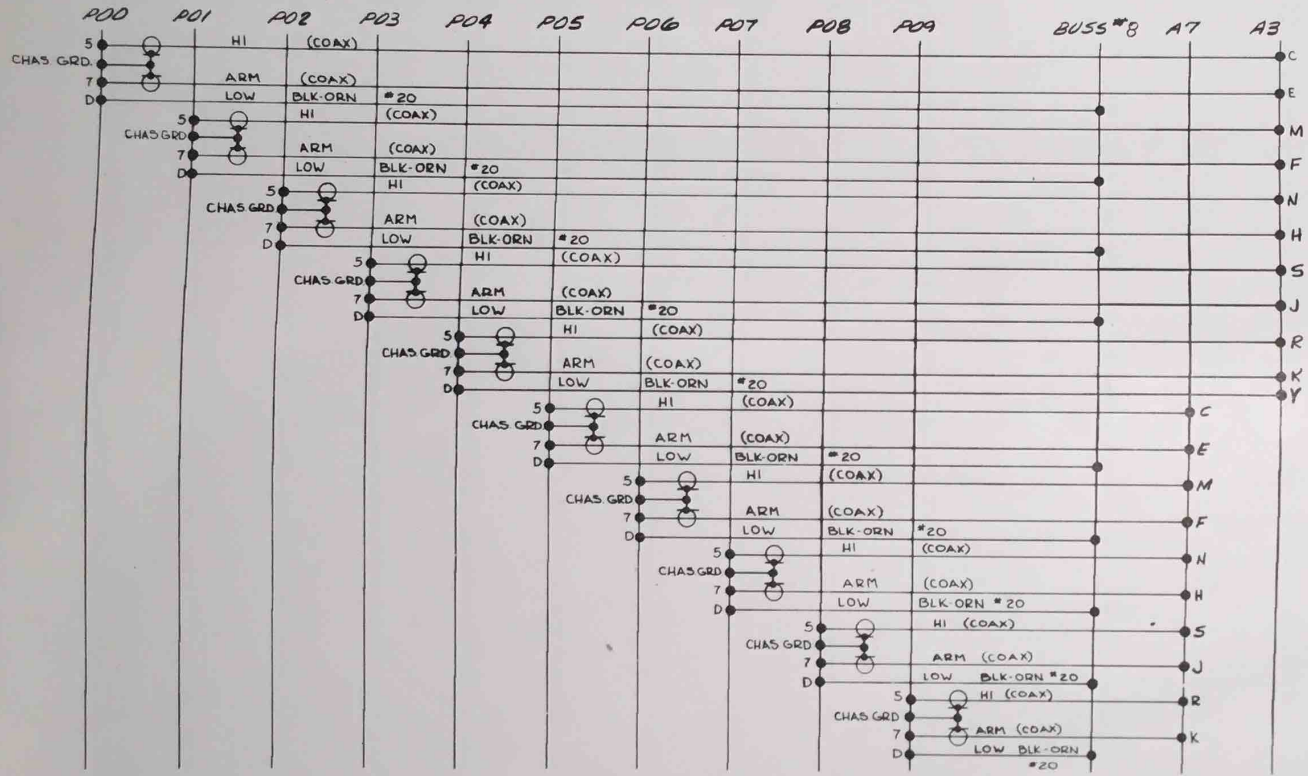
AMPL POWER FEED BUSS #4 & #5 (SA)

MAT'L:			
FINISH:			
SCALE	USED ON		
DRAWN KRDJ	DATE 8 JUN 67		
CHKD	DATE	REVISED	
DSGR	DATE	APPROVED A NOVATIN	11-21-67

SIZE B

B00 093 0062 0W

SHEET 7 OF 21



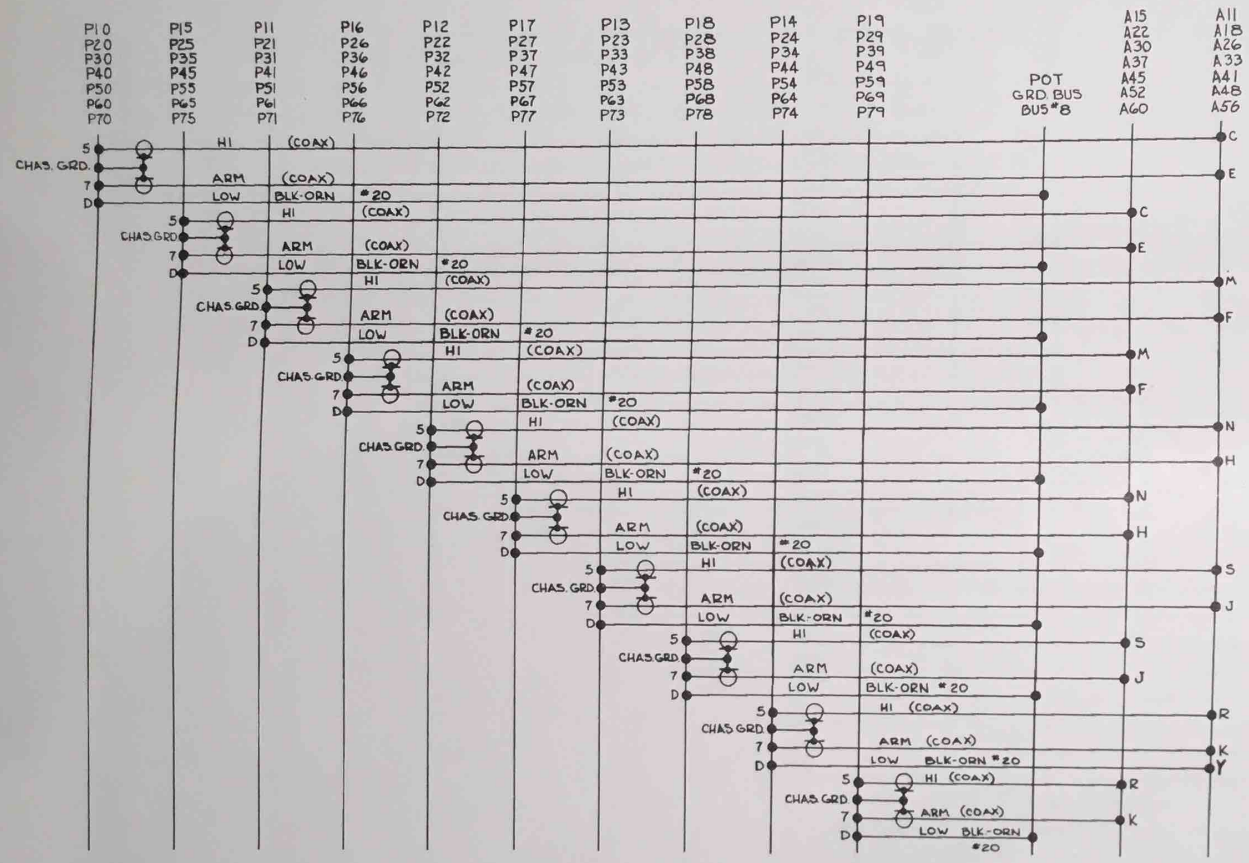
MATERIAL:			
FINISH:			
UNLESS OTHERWISE SPECIFIED			
DIMENSIONS ARE IN INCHES			
CAPACITANCE IS IN pf	DRAWN R F FEITT	DATE 24 MAY 67	
RESISTANCE IS IN OHMS			
TOLERANCE OF			
* TOL OF MATERIAL SUPPLIED			

EAI

HANDSET ATTENUATOR WIRING (550)

SHT NO	
SIZE	
REV NO	
PROJECT 19332	C00 093 0062 0W

SHEET OF SHEETS



A15, A30, A45, A60 HARNESS # 18.1381
A11, A26, A41 & A56
A22, A37, A52, A18 HARNESS # 18.1382
A33 & A48

RELEASED FOR PRODUCTION:	ENGR	DATE
NO.	REVISIONS	APPVD

MATERIAL:
FINISH:
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITANCE IS IN pf
RESISTANCE IS IN OHMS
TOLERANCE OF: .X = ± .03 .XX = ± .02 .XXX = ± .015 .XXX = ± .009 ∠ = ± 1°
* TOL. OF MATERIAL SUPPLIED

SCALE
DWG. NO. WAS:
USED ON:
DRAWN R.F. FEITT DATE 24 MAY 67
CHKD DATE
DSGR DATE
RCDR DATE
REVWD DATE
APPVD A. Novellino DATE 11-24-67

EAI ELECTRONIC ASSOCIATES, INC.

DAS ATTENUATOR WIRING (-1)

SHT. NO.
SIZE
REV. NO.
PROJECT 19332
C 00 093 0062 0W
SHEET 1 OF SHEETS

RELEASED FOR PRODUCTION:	ENGR	DATE

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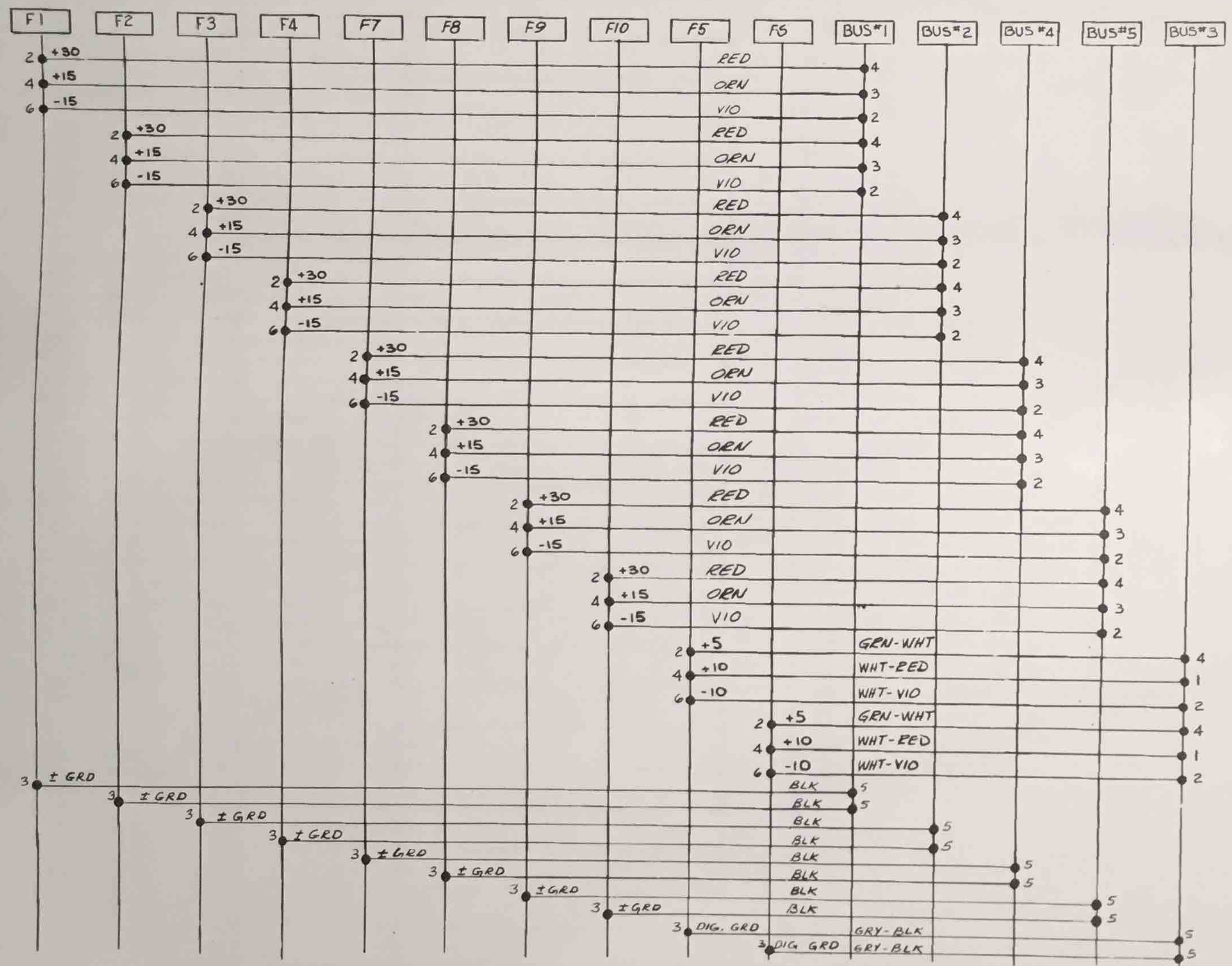


MATERIAL:

FINISH:

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

DWG. NO. WAS:	
USED ON:	
SCALE	
DRAWN R. F. FEITT	DATE 27 MAY '67
CHKD	DATE
DSGR	DATE
APP'VD	DATE 11-27-67

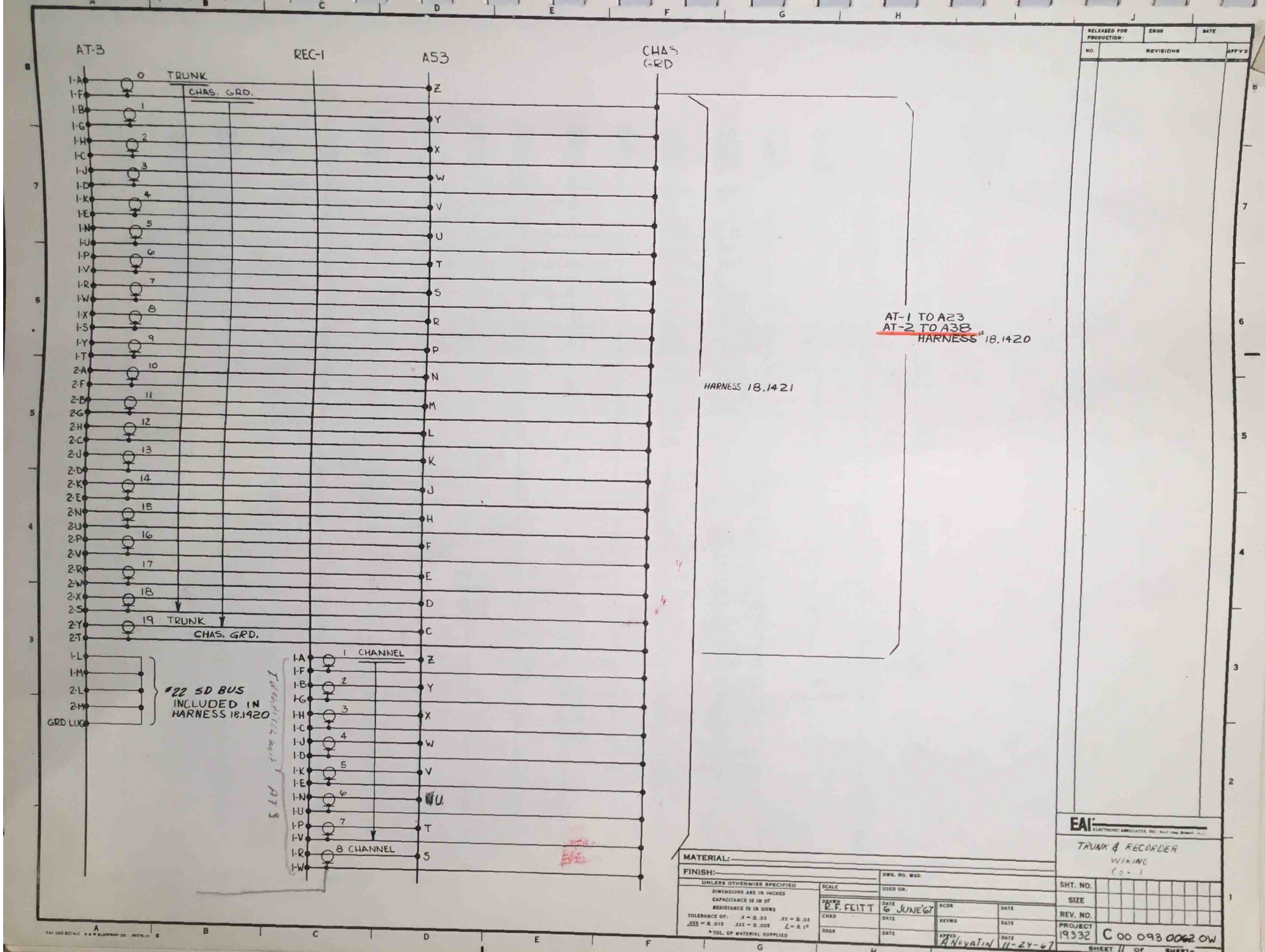
EAI ELECTRONIC ASSOCIATES, INC.

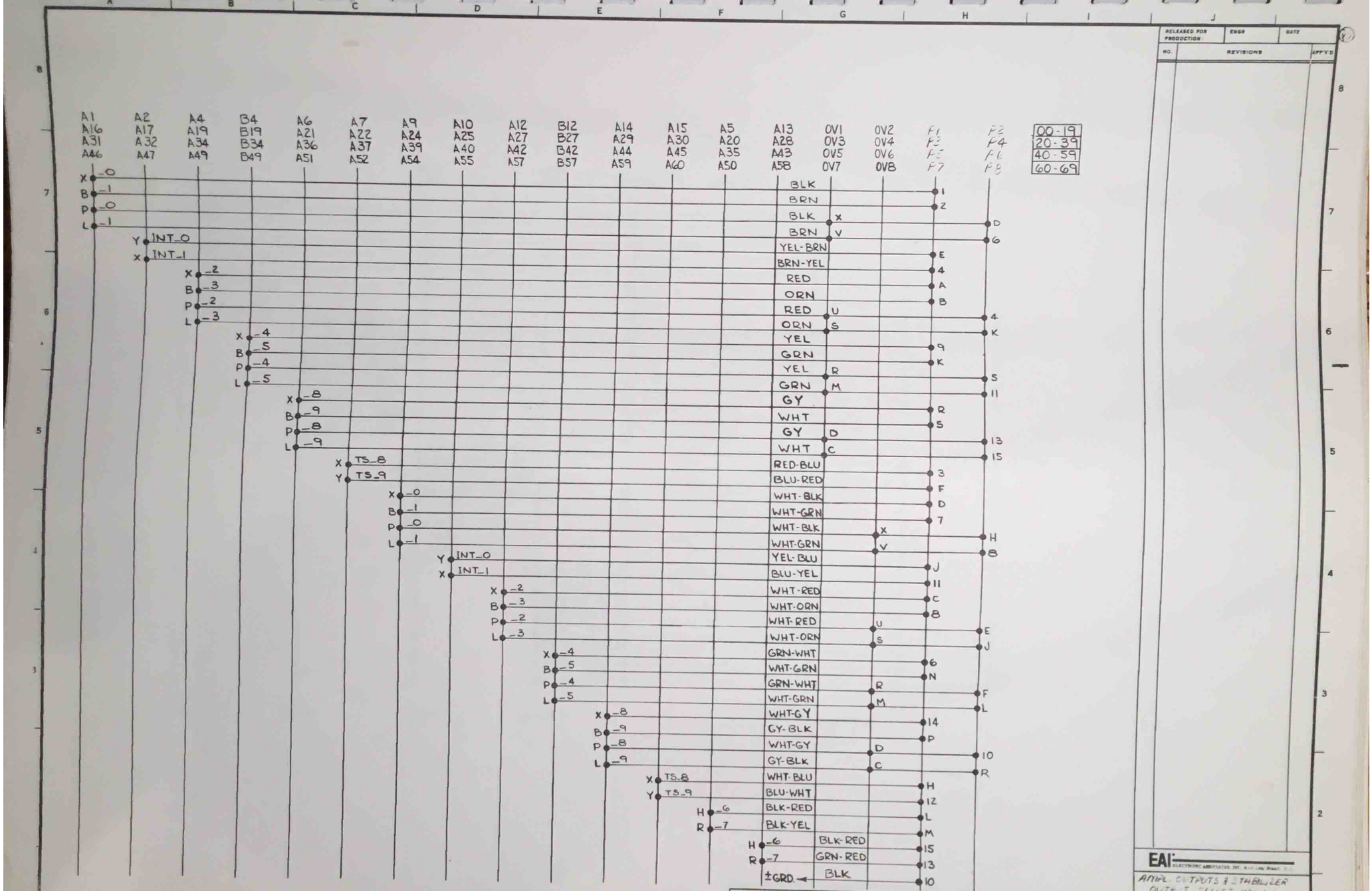
BUS BAR FILTER WIRING

SHT. NO.
SIZE
REV. NO.
PROJECT 19332

C00 093 0062 0W

SHEET OF SHEETS


AT-3
REC-1
A53
CHAS GRD
0 TRUNK
CHAS. GRD.
1-A
1-F
1-B
1-G
1-H
1-C
1-J
1-D
1-K
1-E
1-N
1-U
1-P
1-V
1-R
1-W
1-X
1-S
1-Y
1-T
2-A
2-F
2-B
2-G
2-H
2-C
2-J
2-D
2-K
2-E
2-N
2-U
2-P
2-V
2-R
2-W
2-X
2-S
2-Y
2-T
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
Z Y X W V U T S R P N M L K J H F E D C
19 TRUNK
CHAS. GRD.
1-L
1-M
2-L
2-M
GRD LUG
#22 SD BUS
INCLUDED IN
HARNESS 18.1420
1 CHANNEL
8 CHANNEL
HARNESS 18.1421
AT-1 TO A23
AT-2 TO A38
HARNESS 18.1420
RELEASED FOR PRODUCTION
ENGR
DATE
NO.
REVISIONS
APP'D
MATERIAL:
FINISH:
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITANCE IS IN pf
RESISTANCE IS IN OHMS
TOLERANCE OF: .X = ± .03 .XX = ± .01
.XXX = ± .005 ∠ = ± 1°
* TOL. OF MATERIAL SUPPLIED
SCALE
DRAWN R.F. FEITT
CHKD
DSGR
DWG. NO. WAS:
USED ON:
DATE 6 JUNE'67
RCDR
REVWD
APPRD A. NEVATIN
DATE 11-24-67
EAI ELECTRONIC ASSOCIATES, INC.
TRUNK & RECORDER WIRING (SH 1)
SHT. NO.
SIZE
REV. NO.
PROJECT 19332
C 00 093 0062 0W
SHEET 1 OF SHEETS

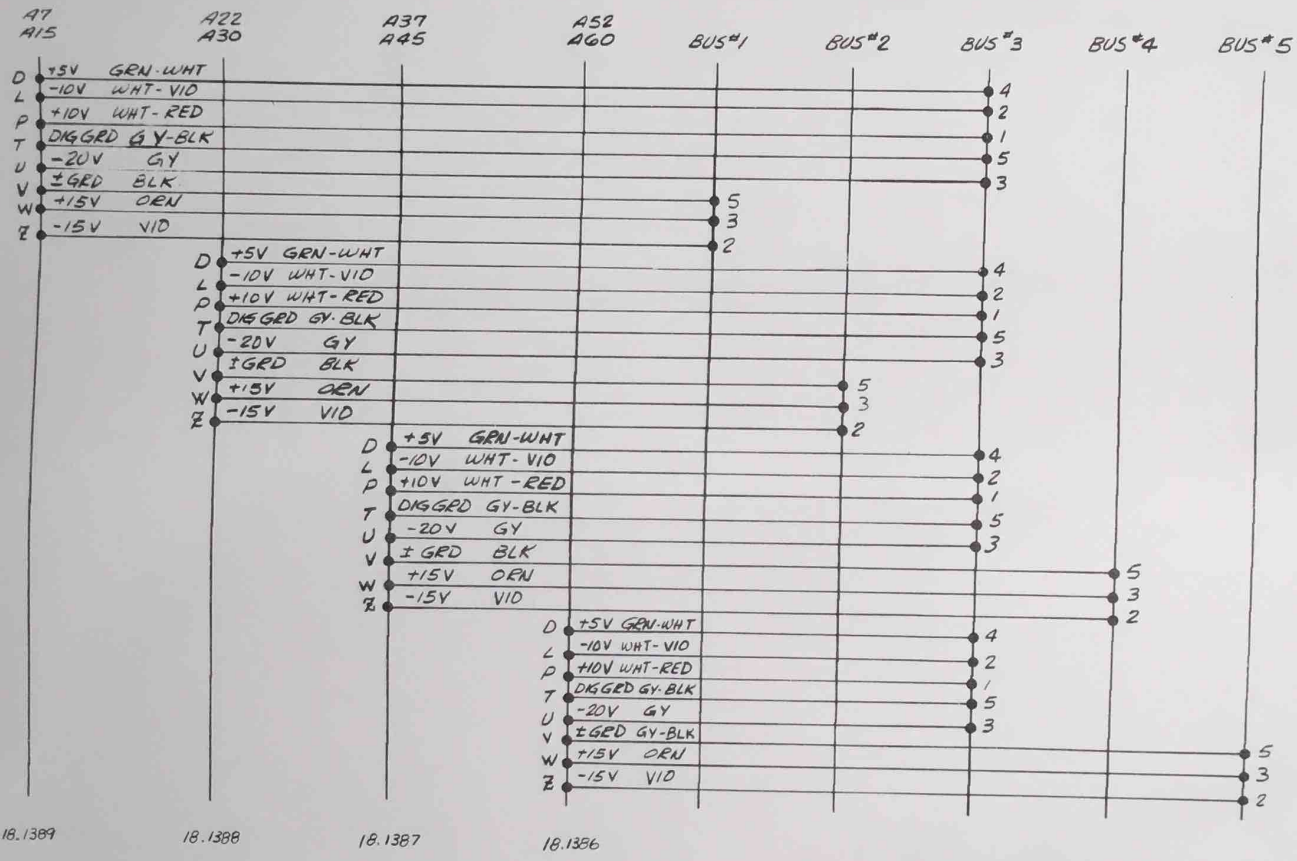


P2, P4, P6, P8 18.1385 AMPL OUTPUT HARNESS
P1, P3, P5, P7 18.1384 STABILIZER OUTPUT HARNESS

RELEASED FOR PRODUCTION	ENGR	DATE
NO.	REVISIONS	APP'D

MATERIAL:
FINISH:
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITANCE IS IN pf
RESISTANCE IS IN OHMS
TOLERANCE OF: X = ± .03 XX = ± .02 XXX = ± .015 XXX = ± .005 ∠ = ± 1°
* TOL. OF MATERIAL SUPPLIED
SCALE
DWG. NO. WAS:
USED ON:
DRAWN K.F. FEITT DATE 23 MAY '67
CHKD DATE
DSGR DATE
RCDR DATE
REVWD DATE
APVD DATE 11-1-67

EAI
AMPL. OUTPUTS & STABILIZER OUTPUT SELECT WIRING
SHT. NO.
SIZE
REV. NO.
PROJECT 19330
C00 093 0062 0W
SHEET 1 OF SHEETS



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

EAI ELECTRONIC ASSOCIATES, INC.

TALK/STORE & D/A SWITCH PANEL WIRING (S-1)

MATERIAL:

FINISH:

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

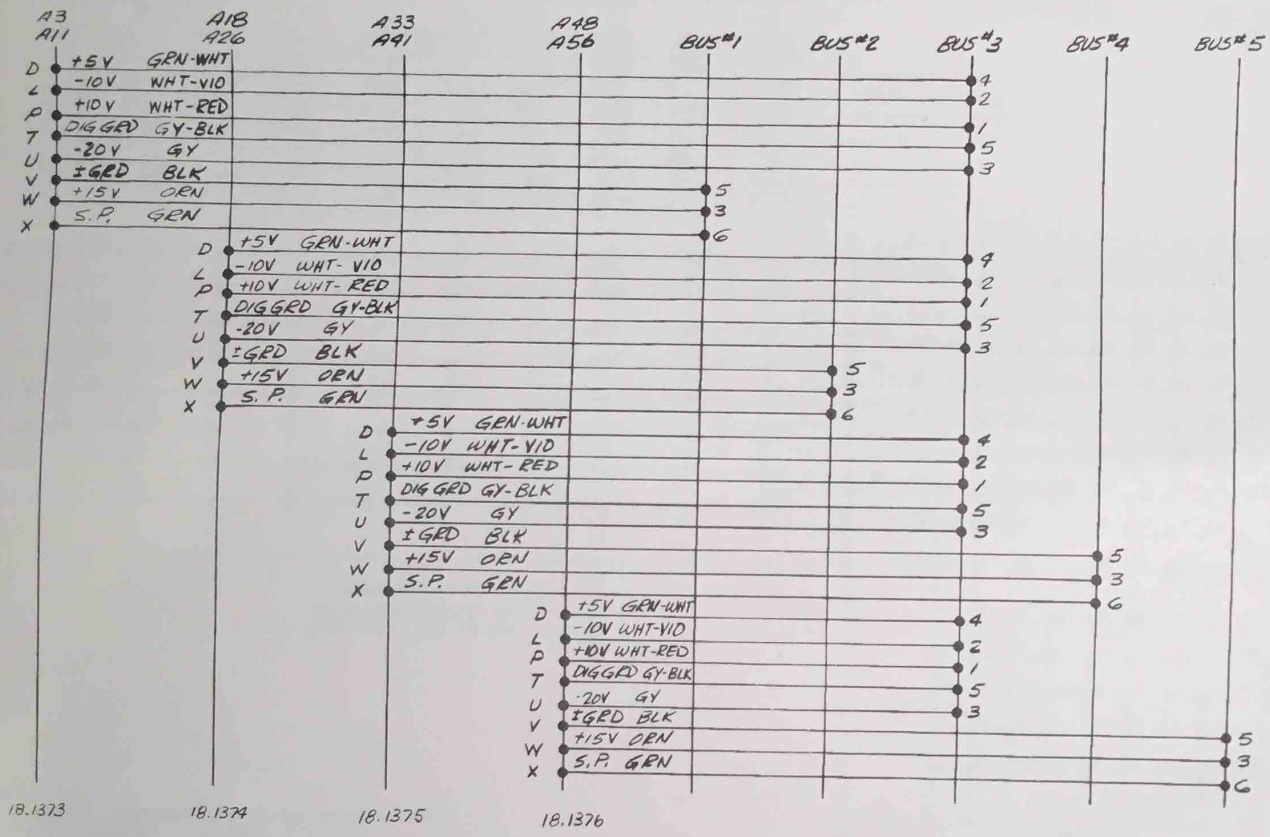
SCALE | DWG. NO. WAS: | USED ON:

DRAWN | DATE | RCDR | DATE

CHKD | DATE | REVWD | DATE

DSGR | DATE | APP'D A NOVATNY | DATE 11-29-67

SHT. NO.
SIZE
REV. NO.
PROJECT 19332
C00 093 0062 0W
SHEET 12 OF SHEETS



RELEASED FOR PRODUCTION: | ENGR | DATE

NO.	REVISIONS	APP'D

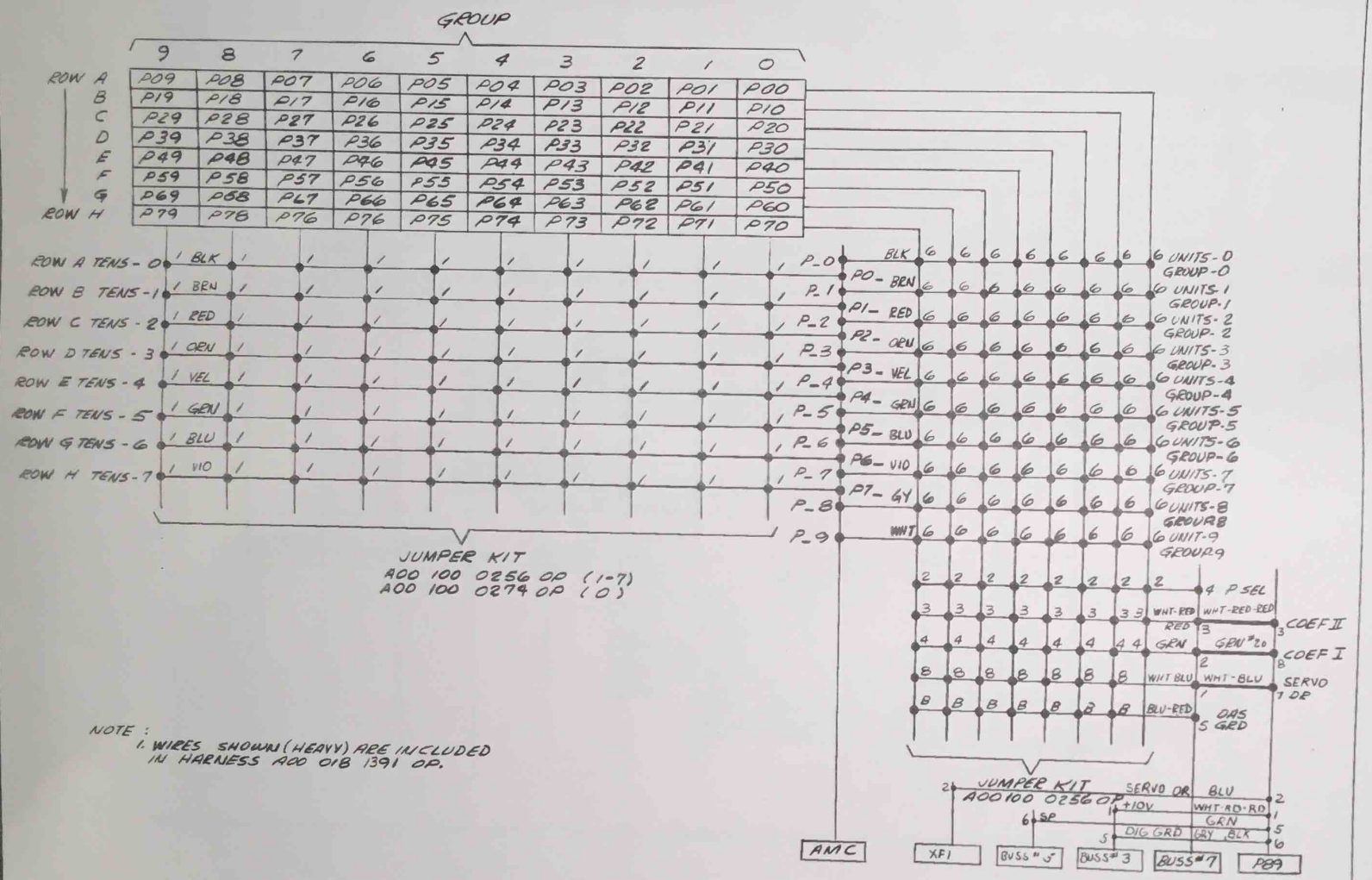
EAI ELECTRONIC ASSOCIATES, INC.

COMPARATOR F/A
POWER WIRING
(-1)

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

SCALE: C
DRAWN: [illegible] 8 JUN 67
CHKD
DSGR
DWG. NO. WAS:
USED ON:
REVD
APPD: [illegible] 6-21-67

SHT. NO.
SIZE
REV. NO.
PROJECT 19332
C00 093 0062 0W
SHEET 4 OF SHEETS



NOTE :
1. WIRES SHOWN (HEAVY) ARE INCLUDED IN HARNESS A00 018 1391 OP.

RELEASED FOR PRODUCTION | ENGR | DATE

NO. | REVISIONS | APPVD

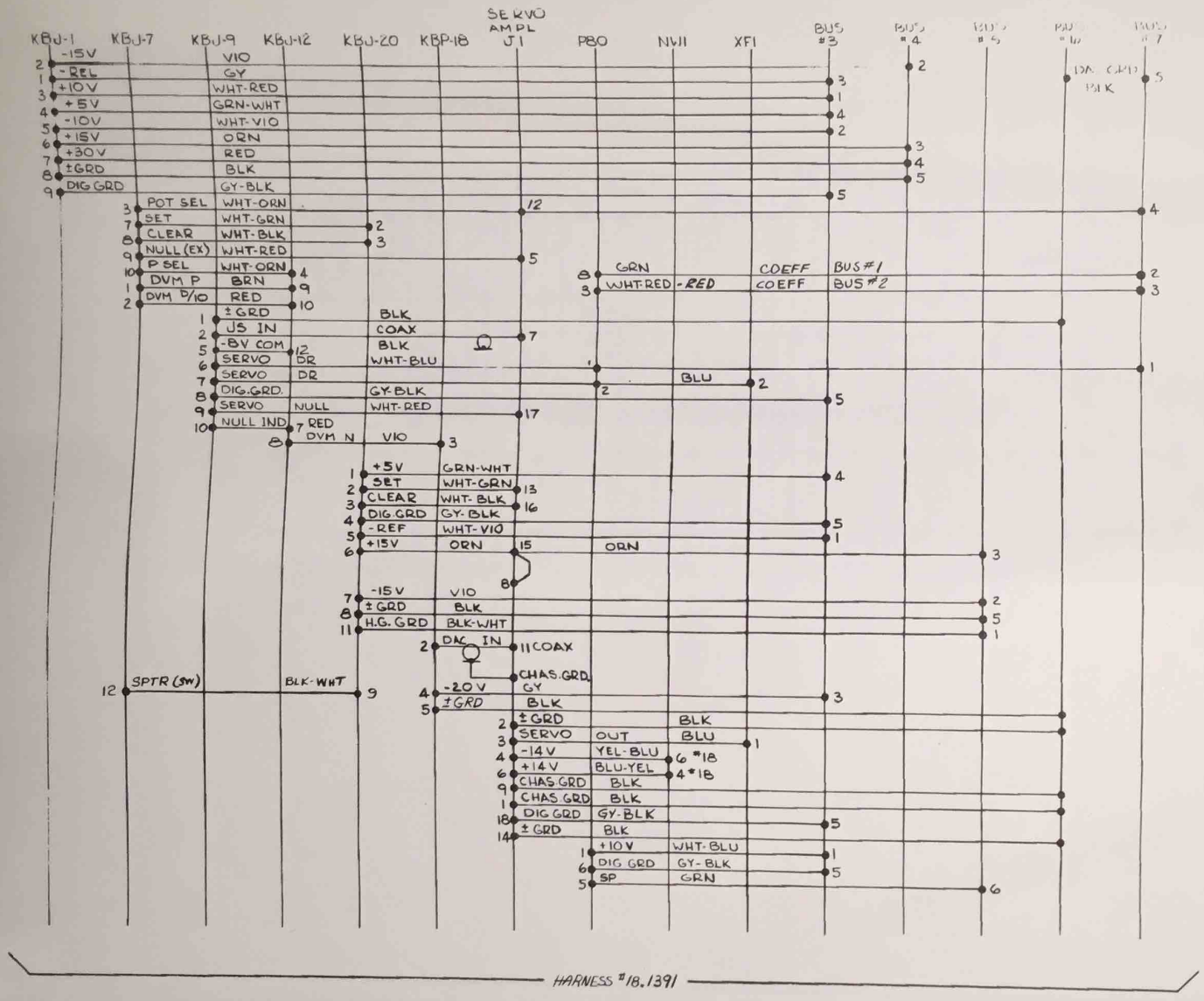
EAI ELECTRONIC ASSOCIATES, INC.

ATTENUATOR PANEL
JUMPER WIRING

MATERIAL:
FINISH:
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITANCE IS IN pf
RESISTANCE IS IN OHMS
TOLERANCE OF: .X = ± .03 .XX = ± .02
.XXX = ± .010 .XXX = ± .005 ∠ = ± 1°
*TOL. OF MATERIAL SUPPLIED

SCALE NONE
DRAWN K KAJ DATE 6 JUN 67
CHKD DATE
DSGR DATE
DWG. NO. WAS
USED ON
ENGR DATE
REVWD DATE
APPVD A Hurvitz DATE 11-29-67

SHT. NO. 1
SIZE C
REV. NO.
PROJECT 19332 C00 093 0062 0W
SHEET 1 OF 1 SHEETS

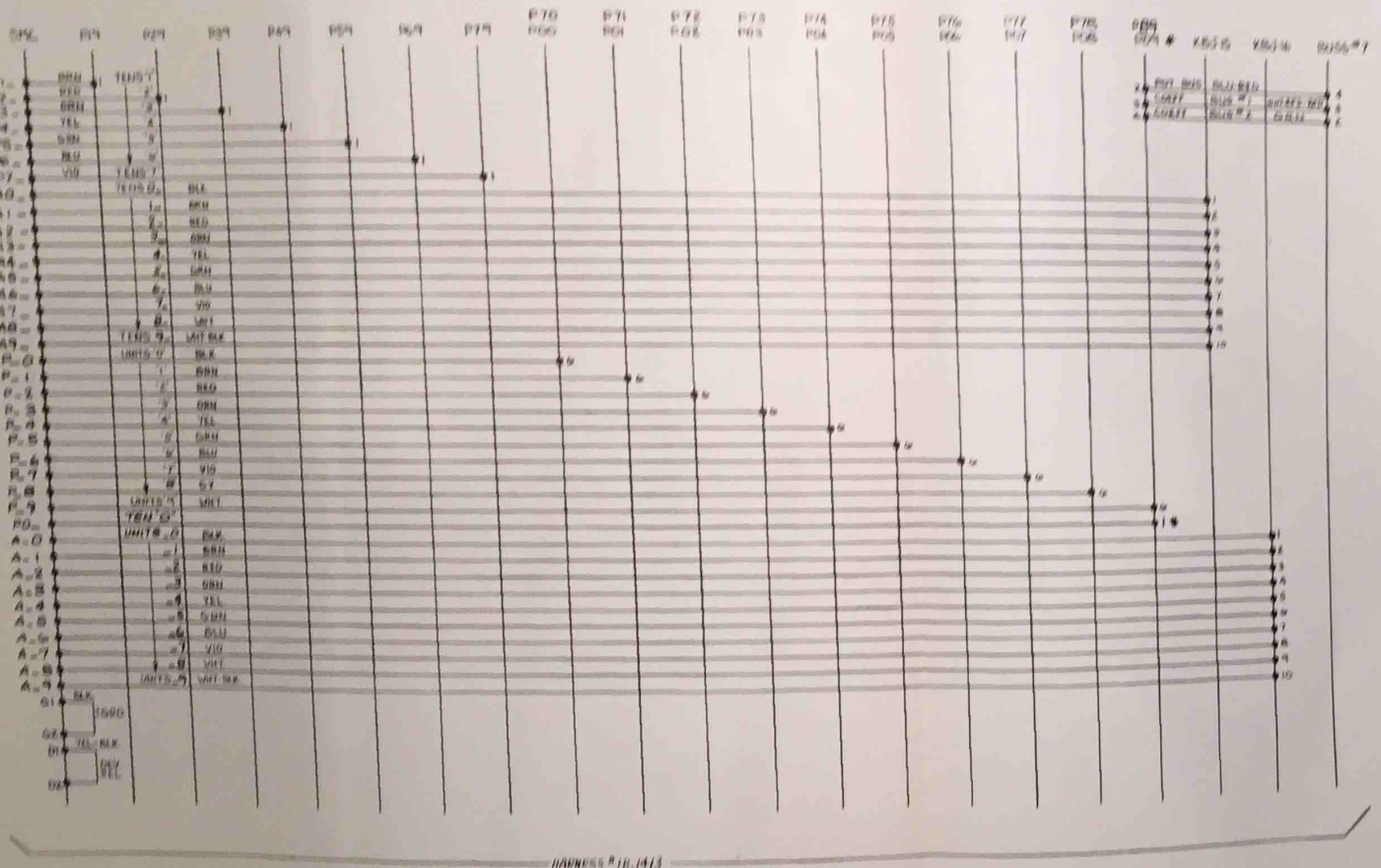


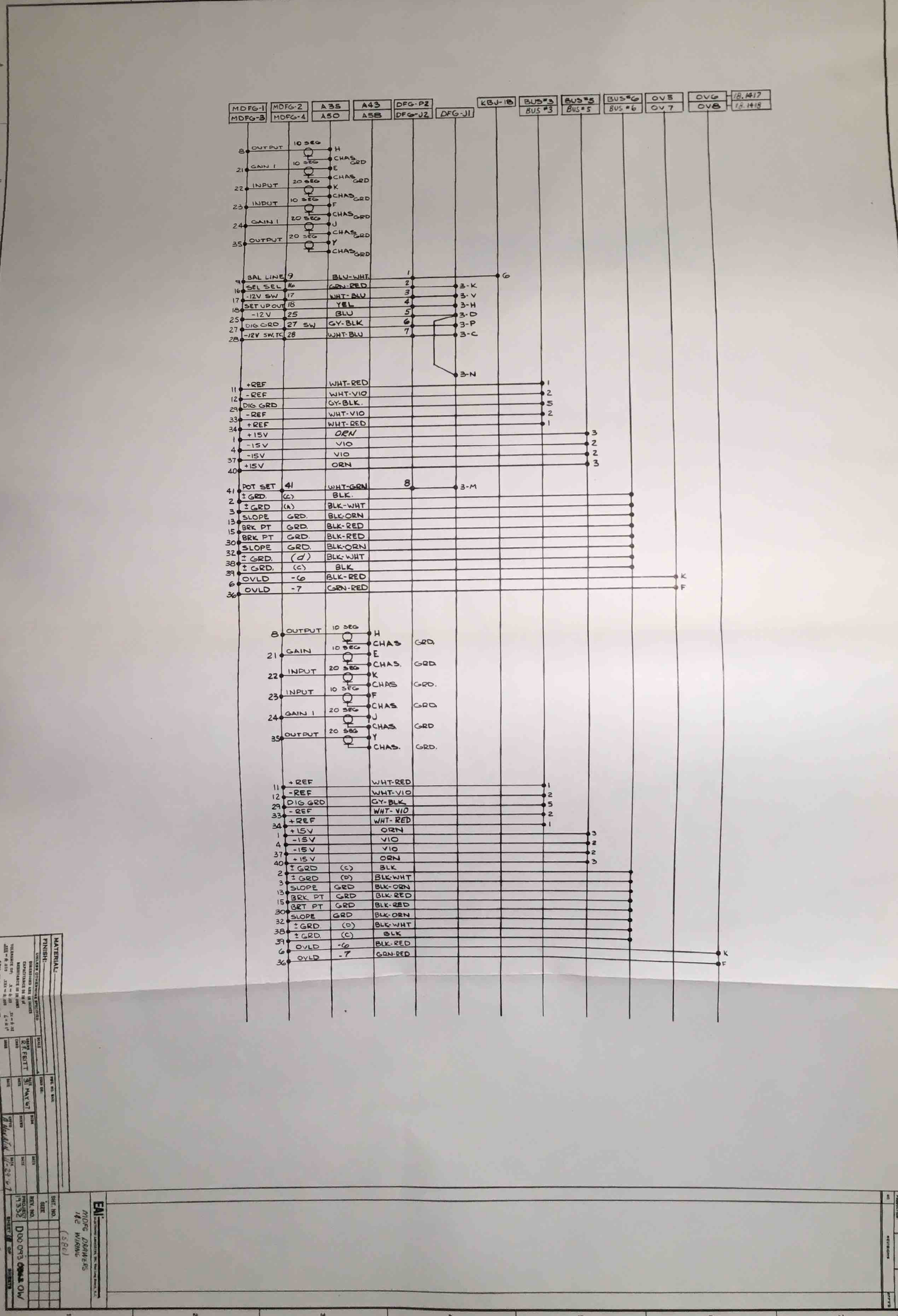
RELEASED FOR PRODUCTION	ENGR	DATE
NO.	REVISIONS	APP'D
1	WIRE BETWEEN KBJ9-12 TO KBJ20-9 WAS NOT SPEC'D. IPC 6 FEB 68 ERN 11649	

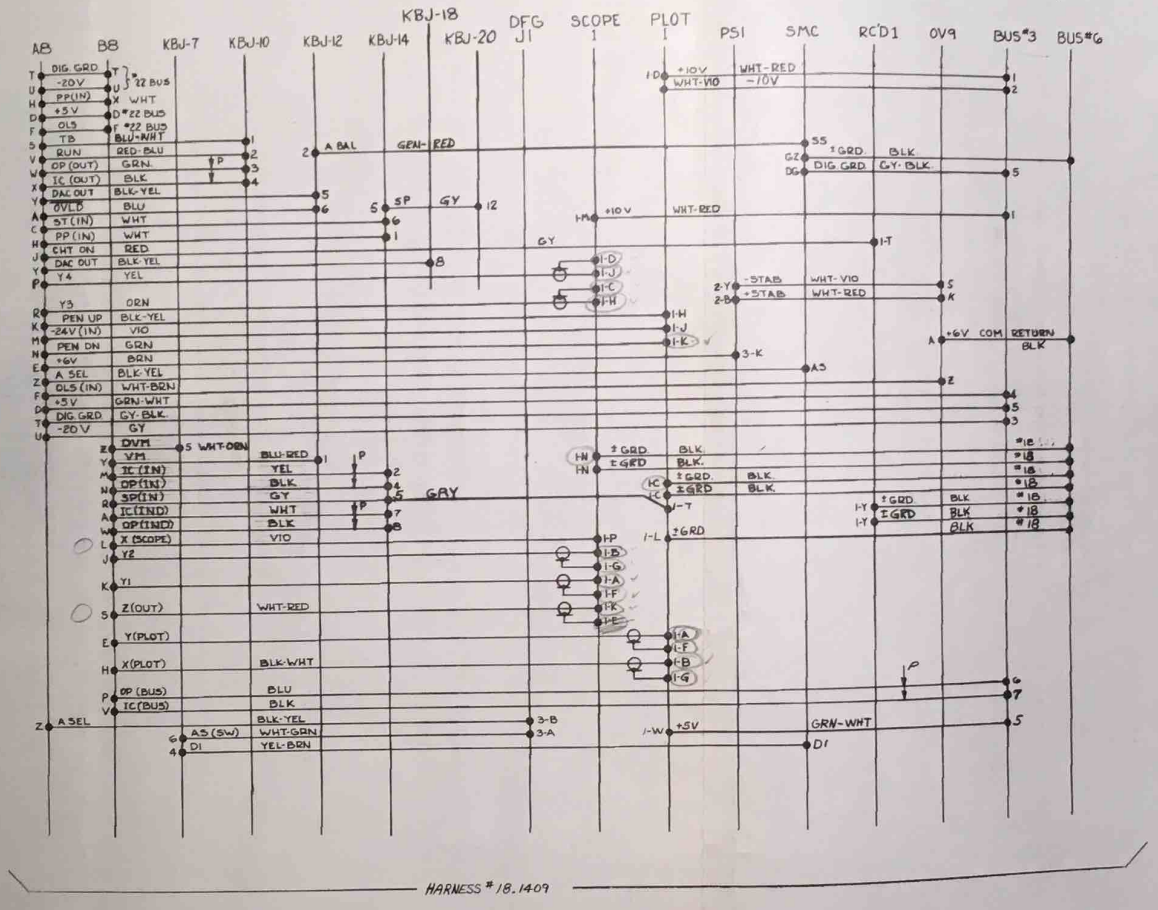
EAI ELECTRONIC ASSOCIATES, INC.

SERVO AMPLIFIER WIRING

MATERIAL:	
FINISH:	
UNLESS OTHERWISE SPECIFIED	
DIMENSIONS ARE IN INCHES	
CAPACITANCE IS IN pf	
RESISTANCE IS IN OHMS	
TOLERANCE OF: .X = ±.03 .XX = ±.02 .XXX = ±.015 .XXX = ±.005 ∠ = ±1°	
* TOL. OF MATERIAL SUPPLIED	
SCALE	
DWG. NO. WAS:	
USED ON:	
DRAWN R. F. FEITT	DATE 5 JUNE '67
CHKD	DATE
DSGR	DATE
RCD'D	DATE
REVWD	DATE
APP'D	DATE 11-7
SHT. NO.	
SIZE	
REV. NO.	
PROJECT 19332	C00 093 0062 0W
SHEET 6 OF 1 SHEETS	

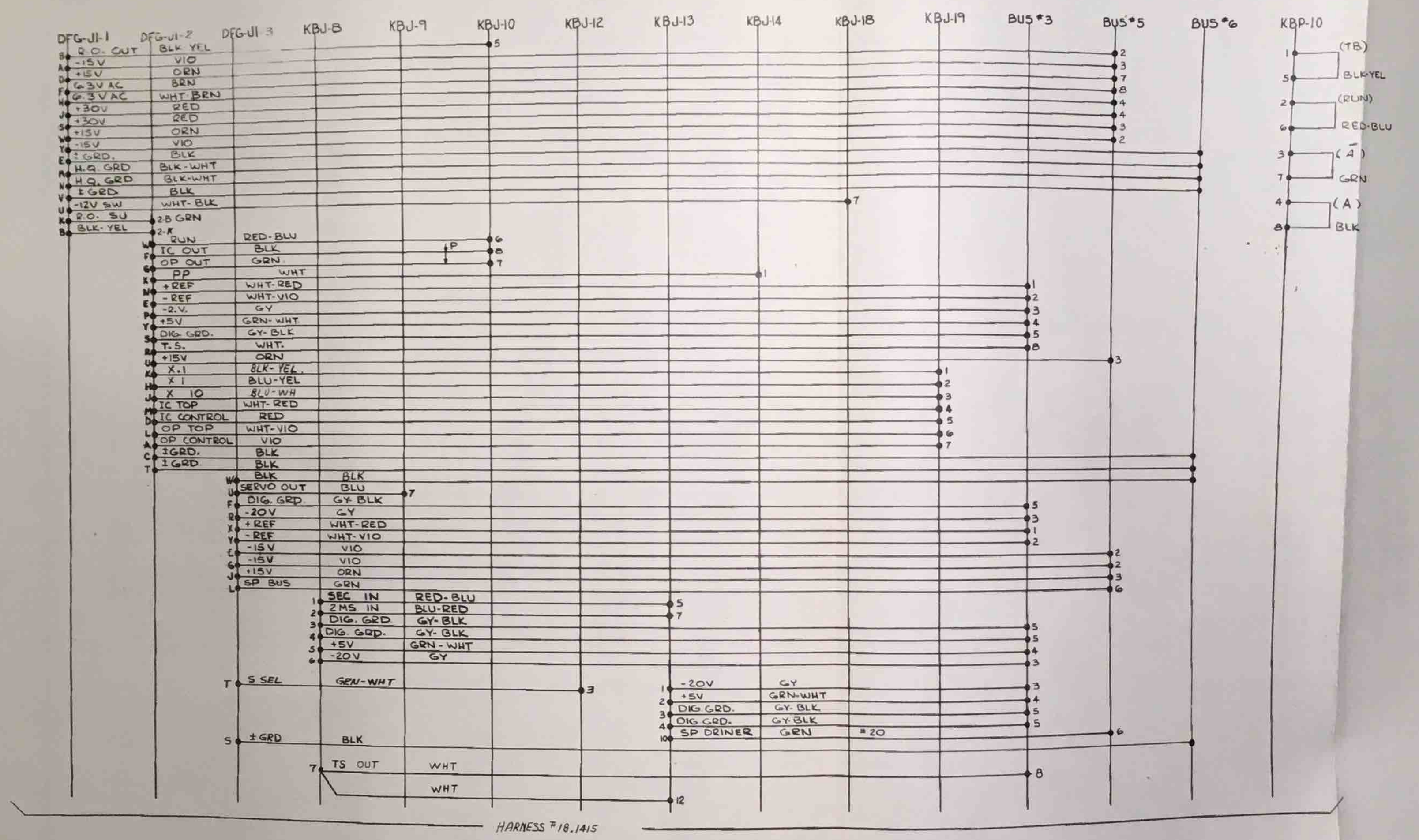

SMC
P29
P39
P49
P59
P69
P79
P80
P81
P82
P83
P84
P85
P86
P87
P88
P89
XB515
XB516
XB56#7
HARNESS #18.1413


MDFG-1
MDFG-3
MDFG-2
MDFG-4
A35
A50
A43
A58
DFG-P2
DFG-J2
DFG-J1
KBJ-1B
BUS#3
BUS#5
BUS#6
OV5
OV7
OV6
OV8
18.1417
18.1418
OUTPUT
GAIN 1
INPUT
10 SEG
20 SEG
CHAS GRD
BAL LINE
SEL SEL
-12V SW
SET UP OUT
-12V
DIG GRD
-12V SW.TC
BLU-WHT
GRN-RED
WHT-BLU
YEL
BLU
GY-BLK
+REF
-REF
+15V
-15V
WHT-RED
WHT-VIO
ORN
VIO
POT SET
± GRD
SLOPE
BRK PT
OVLD
WHT-GRN
BLK
BLK-WHT
BLK-ORN
BLK-RED
EAI
MDFG DRIVERS 1&2 WIRING
R.F. FEITT
31 MAY 67
D00093



MATERIAL:
FINISH:
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITANCE NOW IN pF
RESISTANCE IN Ω OHMS
TOLERANCE ON: .X = ± .03 .XX = ± .010 .XXX = ± .005 ∠ = ± 1°
* TBL OF MATERIAL SUPPLIED
SCALE
DRAWN R.C. FEITT 23 MAY 67
CHKD
ISSUED
DWG. NO. WAS
ISSUED ON
SHT. NO.
SIZE
REV. NO.
PROJECT 19332
D 00 093 0062 0W
SHEET 1 OF SHEETS

EAI
CONTROL WIRING (SEL)



NO.	REVISIONS	APP'V'D
1	WIRE BETWEEN KBJ-7 & KBJ-13-12 WAS NOT SPEC'D 14 FEB 68 ERN 11647	
2	COLOR OF KBJ-8-7 TO KBJ 13-12 WAS BLU 7 MAY 68 ERN 11875	

RELEASED FOR PRODUCTION | CHKR | DATE

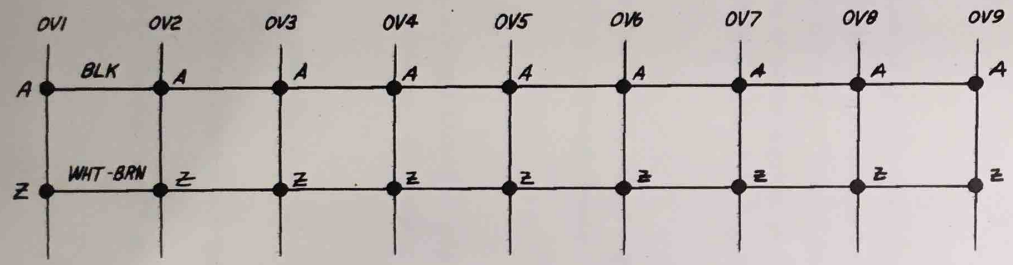
MATERIAL:
FINISH:

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES, CAPACITANCE IS IN µF, RESISTANCE IS IN OHMS

EAI

SETUP AMPL & TIME SCALE WIRING

DRAWN	R. FEITT
DATE	2 JUNE '67
PROJECT	19332
DWG. NO.	D00 093 0062 OW
SHEET	10 OF SHEETS



HARNESS 100.0257

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

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

EAI ELECTRONIC ASSOCIATES, INC. West Long Branch, N.J.

OVERLOAD INDICATOR
JUMPER KIT
(580)

MAT'L:			
FINISH:		DWG. NO. WAS:	
SCALE	USED ON:		
DRAWN LAFFERTY	DATE 27 SEPT 67	RCDR	DATE
CHKD	DATE	REVWD	DATE
DSGR	DATE	APPVD A Newton	DATE 11-24-67

SHT. NO.
SIZE
REV. NO.
PROJECT 19332 B00 093 0062 0W
SHEET 21 OF 21 SHEETS

EAI 999-8273-0