

★
UNCLASSIFIED

MASTER

TECHNICAL MANUAL

for

MULTIPLE APPLICATION
SYSTEM

MAS - 1/ TR



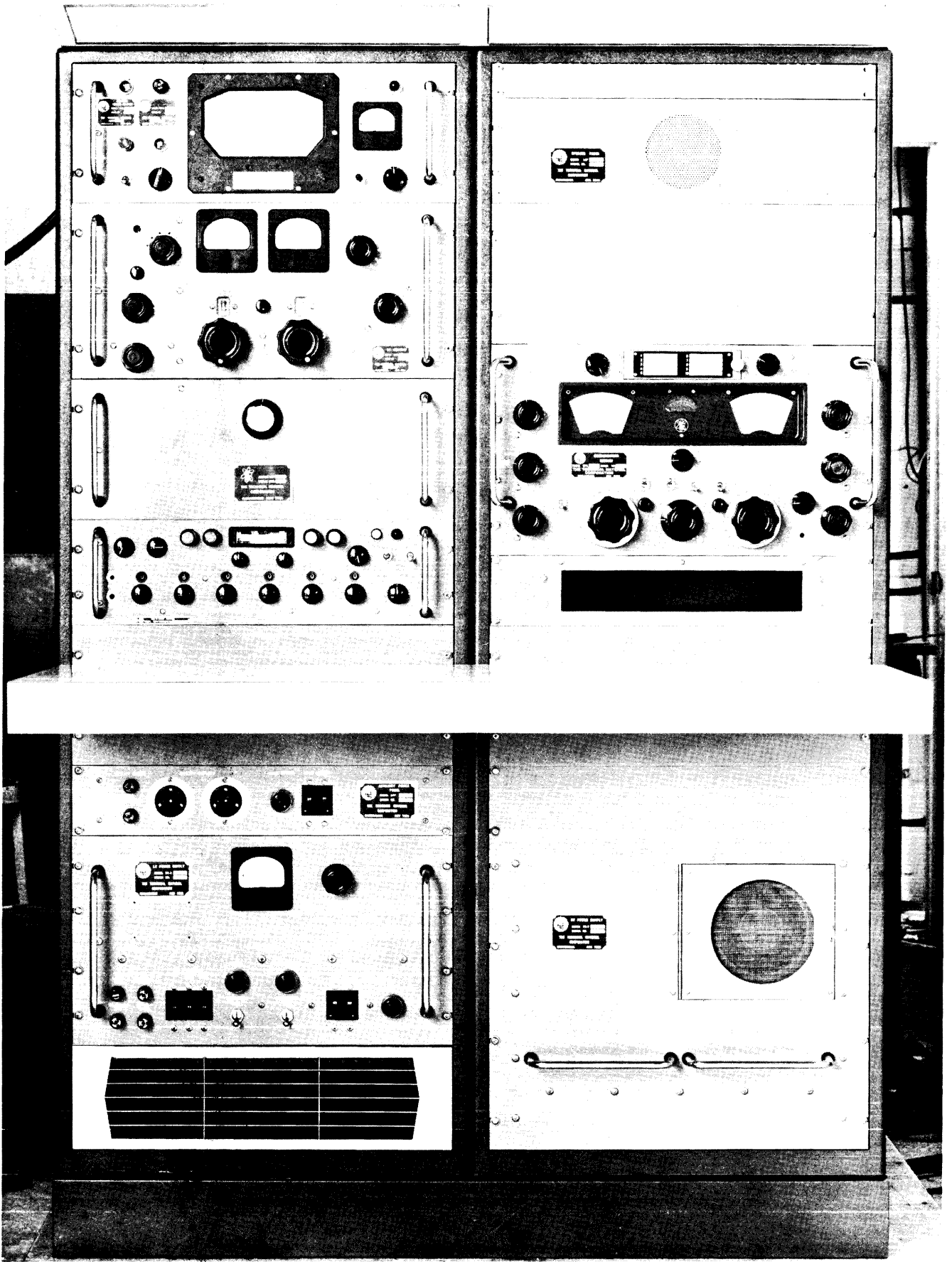
THE TECHNICAL MATERIEL CORPORATION
MAMARONECK, N.Y.

OTTAWA, ONTARIO

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NOTICE

THE CONTENTS AND INFORMATION CONTAINED IN THIS INSTRUCTION MANUAL IS PROPRIETARY TO THE TECHNICAL MATERIEL CORPORATION TO BE USED AS A GUIDE TO THE OPERATION AND MAINTENANCE OF THE EQUIPMENT FOR WHICH THE MANUAL IS ISSUED AND MAY NOT BE DUPLICATED EITHER IN WHOLE OR IN PART BY ANY MEANS WHATSOEVER WITHOUT THE WRITTEN CONSENT OF THE TECHNICAL MATERIEL CORPORATION.



SECTION 1

GENERAL INFORMATION

1-1. GENERAL DESCRIPTION:

The multiple Application System, MAS-1/TR, provides a transmitter receiver system that combines the following TMC equipments:

- a. Linear Amplifier. Model PAL-1(K)/1KW Linear Amplifier, 2-30 MHz range.
- b. Exciter. MMXM-2 Synthesized Multi-Mode Exciter with 1 part in 10^8 per day stability; 100Hz tuning increments, 1.6 through 32.999MHz in 100-cycle incremental steps.
- c. Filters. TFP-2.5K Switchable Filter, RF. LPFA-1K Low Pass Filter, RF.
- d. Antenna Tuning. ATS-2-50 Antenna Tuning Unit, with Remote Control Panel, VSWR and Power Meter.
- e. Antenna. AW-108 Fiberglass-enclosed Whip Antenna free-standing, 35ft. high.
- f. Receiver. GPR-90RXDS General Purpose Receiver, with tuning capabilities from .54 to 32MHz, in six bands.
- g. Equipment Cabinet. Dual Rack complete with operators table speakers, slides, headset, key, blower, T/R relay, and cabling.

1-2. SYSTEM FUNCTIONAL DESCRIPTION

The MAS-1/TR system functions as a multi-purpose transmitter-receiver; detailed information concerning the functions of the various subassemblies is contained in the following TMC manuals (enclosed as part of this manual).

TMC Technical Manual	TMC Model
Linear Power Amplifier	Pal-1(K)A
Auxiliary Power Panel	App-4
Multi-Mode Exciter	MMX()-2
Low-Pass Filter	LPFA-1K, LPFA-10K and LPFA-40K
Harmonic Filter	TFP-2.5K
Antenna Tuning System	ATS-2
Communications Receiver	GPR-90RDDS
Loudspeaker Panel	LSP-4A

1-3. TECHNICAL SPECIFICATIONS

This single^ssideband shipboard communications system meets or exceeds the following specifications:

FREQUENCY RANGE:	2 to 30 megacycles
OUTPUT POWER:	1000 watts PEP, SSB, CW, FSK
OUTPUT IMPEDANCE:	50 ohms nominal unbalanced. Pi-L network will match a load with up to 2:1 VSWR

*Check with
W. J. ...*

FREQUENCY STABILITY: 1 part in 10^8 per day for ambient temperature change of 15°C within the range of $0-50^{\circ}\text{C}$ after 24 hour warm up.

TUNING: All tuning and bandswitching controls on front panels (no plug in components)

SIGNAL/DISTORTION RATIO: 1. Distortion at least 40db below either tone of a standard two tone test 2.00 to 22 megacycles.
2. Distortion at least 35db below either tone of a standard two tone test 22 to 32 megacycles.

UNWANTED SIDEBAND REJECTION: 1000 cps tone at least 60db down
SPURIOUS SIGNAL All spurious outputs as a result of internal mixing are at least 60db below Full PEP output.

HUM AND NOISE LEVEL: Hum is at least 50 db below full PEP.
All other noise down at least 60 db.

CARRIER SUPPRESSION: 1. 2nd harmonic at least 40db below PEP.
2. 3rd harmonic at least 50db below PEP.

AUDIO RESPONSE: 1. SBG-2 and SBE-8 $\pm 1.5\text{db}$ 250 to 3500 cps.
2. SBG-1 and SBE-9 $\pm 1.5\text{db}$ 250 to 8500 cps.
3. SBG-1 and SBE-10 $\pm 1.5\text{db}$ 275 to 6000 cps.

VOX OPERATION: Voice control with anti-trip features.

AUDIO INPUT: 1. Two 600 ohm channels balanced or unbalanced -20dbm to 10dbm input will provide full RF output.
2. One 50,000 ohm input for crystal or dynamic mike, -50dbm for full output. SME-8,9, and 10, only.

HEAT DISSIPATION: 2500 watts for standard models.
3200 watts for synthesized models.

ALDC: A front panel automatic load and drive control minimizes overload and distortion during high drive peak or load changes.

T/R FUNCTION: A co-axial antenna relay and receiver muting circuit is provided to facilitate half-duplex operation

METERING: Front panel meters indicate operation of all critical circuits.

ENVIRONMENTAL CONDITIONS: Designed to operate in any ambient temperature between 0 and 50°C , and any value of humidity up to 90%.

SIZE OF LARGEST CONTAINER: Non-synthesized 78-5/8 x 32 x 25.

SAFETY FEATURES: 1. Full interlock protection
2. Full overload and fuse protection

PRIMARY POWER: 115/230v, 50/60 cps, 1 phase.
For power consumption, refer to specifications on individual units shown on chart.

COMPONENTS AND CONSTRUCTION: All equipment manufactured in accordance with JAN/MIL specifications wherever practicable

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all this page spec

The Multi-Mode exciter shall meet or exceed the following specifications:

- FREQUENCY RANGE: 1.6 - 70 mc (MHz) in 100 cycle incremental steps.
- FREQUENCY PRESENTATION: Direct reading
- MODES OF OPERATION: CW, AM SSB, ISB, FSK-FAX
- OUTPUT POWER: 1. Continuously adjustable to 1 watt, CW, FSK, FAX.
2. Continuously adjustable to 250 mv PEP, SSB, ISB, AM.
- OUTPUT IMPEDANCE: 50 ohm nominal
- FREQUENCY STABILITY: 1 part in 10^7 or 10^8 per day.
(Optional extra)
- FREQUENCY CONTROL: All frequency determining elements referenced to a built-in lmc (MHz) source.
- METERING: Built-in multi-meter to allow monitor of critical circuits and RF output.
- TUNING: Digital frequency selection by front panel control
- SIGNAL/DISTORTION RATIO: Distortion products to be at least 40db below either tone of a two-tone test at 250mv
- UNWANTED SIDEBAND REJECTION: A signal at 500 cps (Hz) injected in the wanted sideband will be suppressed at least 60db from PEP in the unwanted sideband.
- SPURIOUS SIGNALS: Spurious signals greater than 120 cps (Hz) removed from the carrier are at least 60db below full PEP output.
- HUM AND NOISE LEVEL: Noise level is at least 60db down from either tone of a two-tone test.
- CARRIER INSERTION: -55db to full output, continuously variable
- AUDIO RESPONSE: 1. Flat within 1.5db, 350-3500 cps (Hz) either upper or lower sideband.
2. A filter providing ± 1.5 db, 250-3040 cps (Hz)
3. A filter providing ± 1.5 db, 250-6080 cps (Hz)
- HARMONIC SUPPRESSION: 2nd harmonics to be at least 45db below full PEP output
- AUDIO INPUT: 1. For ISB, 2 independent 600-ohm channels, balanced or unbalanced -20dbm to +5dbm.
2. Built-in microphone preamplifier for low level dynamic mike with front panel selection
- MIKE INPUT: -55db into 47,000 ohms, front-panel jack
- AUDIO CONTROL: Two front panel "fader" controls to allow ease in selection microphone or line input into either the upper or the lower channel
- ALDC: to accept 0 to approximately -11 volts DC from ALDC circuit of an associated linear amplifier to improve linearity, limit distortion, and deliver a relatively constant output level during high modulation peaks or load changes
- ENVIRONMENTAL CONDITIONS: Designed to operate in any ambient temperature between -30 and 50°C and any value of humidity up to 95%

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CW KEYING INFORMATION: Key jack on front panel and connection on rear panel for up to 300 wpm carrier keying in CW mode dry contact.

INSTALLATION DATA: Size 5-1/4" H x 19" W x 18" D., weight: approximately 30 lbs.

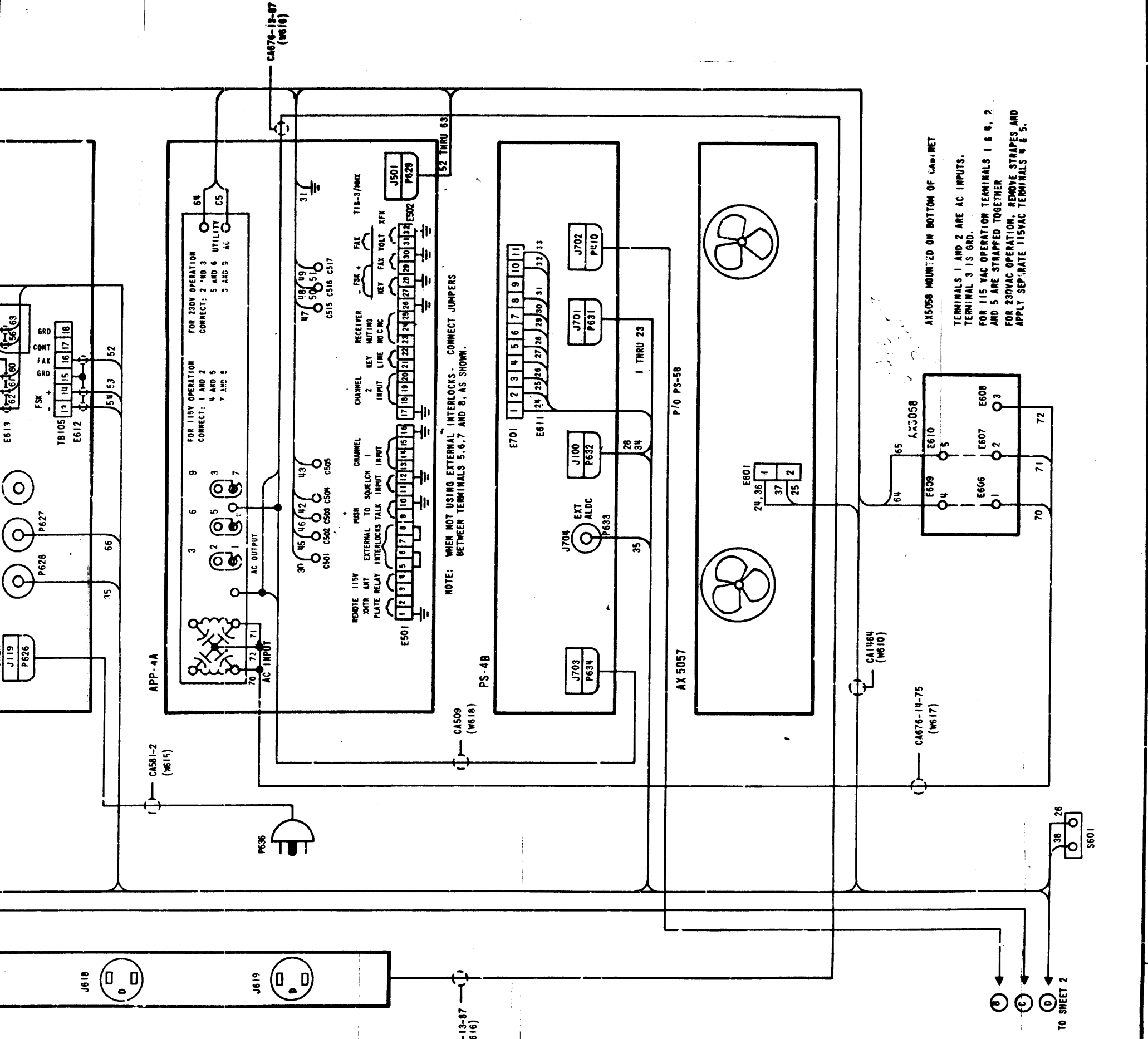
PRIMARY POWER: 115/230v $\pm 10\%$ 50/60 cps (Hz), single phase, 60 watt

LOOSE ITEMS: Mating coaxial fittings (BNC) and two instruction manuals.

COMPONENTS AND CONSTRUCTION: All equipment manufactured in accordance with JAN/MIL specifications wherever practicable.

SECTION 2
INSTALLATION

REVISIONS							
ZONE	LTR	DESCRIPTION	DATE	E. M. N. NO.	DRAFT	CHKD	APPD
		ORIGINAL RELEASE	11/2/68	1		AKG	



MAS-1/TR		
QTY / UNIT	MODEL USED ON	ASS'Y NO.
APPLICATION		
CODE		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE CHEMICALLY APPLIED OR PLATED FINISHES

TOLERANCES ON
 DECIMALS
 .X ± .05
 .XX ± .01
 .XXX ± .005

FRACTIONS
 ± 1/64
 ANGLES
 ± 0° 30'

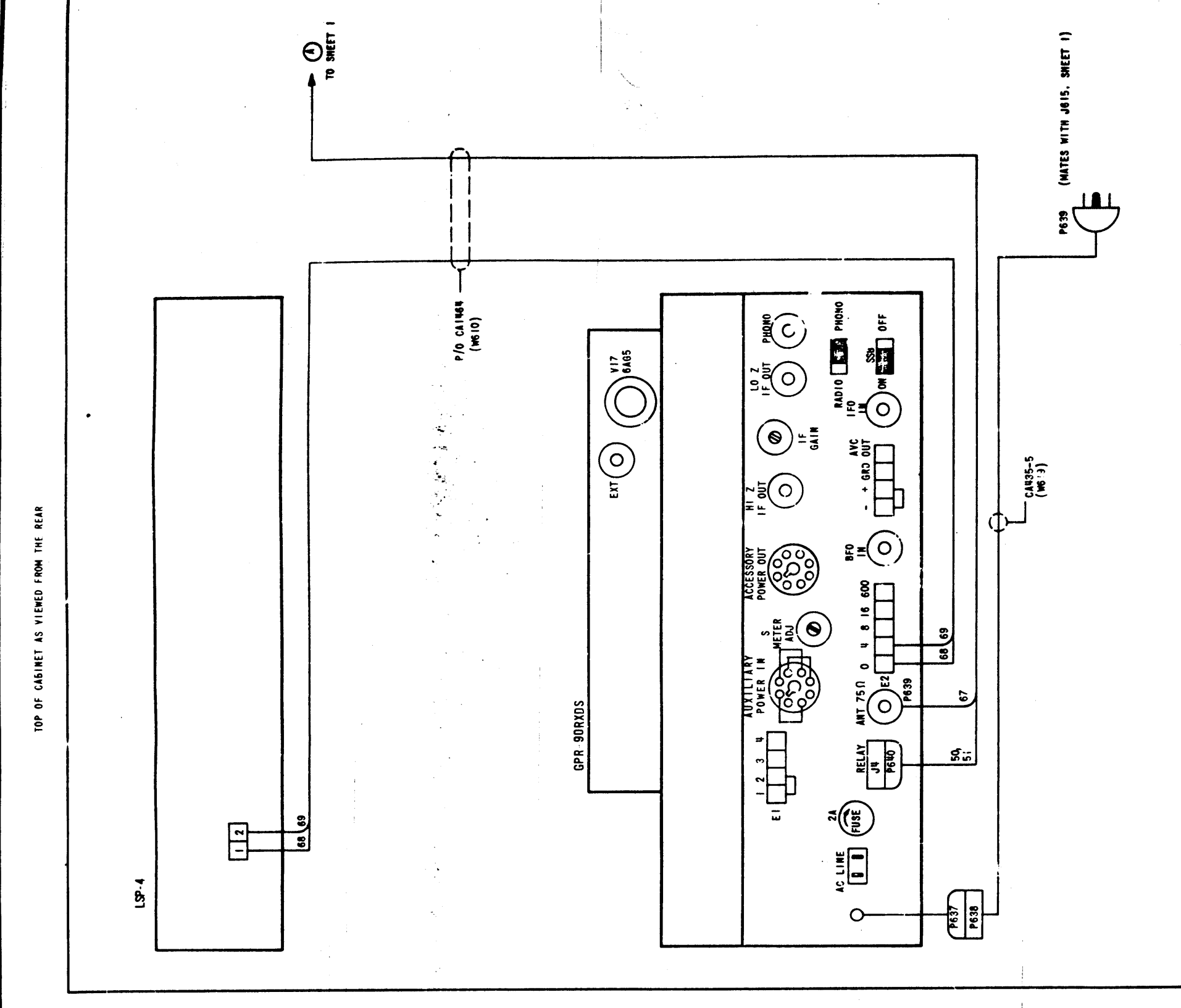
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LIST OF MATERIAL				
BUDETTI				
FINAL APPROVAL		DATE		
MECH. DES.		DATE		
ELECT. DES.		DATE		
CHECKED		DATE		
DRAWN		DATE		
THE TECHNICAL MATERIEL CORP. MAMARONECK, NEW YORK				
DIAGRAM, CABINET, CABLING				
SIZE	CODE IDENT. NO.	DWG. NO.	ISSUE	
D	82679		CK 2303 1563	
SCALE				SHEET 1 OF 2

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D
C
B
A

CAIINGH TERMINATION POINTS	
ITEM	FROM TO
1	P631 PIN A J605 PIN A
2	B B
3	C C
4	D D
5	E E
6	F F
7	G G
8	H H
9	I I
10	J J
11	K K
12	L L
13	M M
14	N N
15	O O
16	P P
17	Q Q
18	R R
19	S S
20	T T
21	U U
22	V V
23	W W
24	X X
25	Y Y
26	Z Z
27	AA AA
28	AB AB
29	AC AC
30	AD AD
31	AE AE
32	AF AF
33	AG AG
34	AH AH
35	AI AI
36	AJ AJ
37	AK AK
38	AL AL
39	AM AM
40	AN AN
41	AO AO
42	AP AP
43	AQ AQ
44	AR AR
45	AS AS
46	AT AT
47	AU AU
48	AV AV
49	AW AW
50	AX AX
51	AY AY
52	AZ AZ
53	BA BA
54	BB BB
55	BC BC
56	BD BD
57	BE BE
58	BF BF
59	BG BG
60	BH BH
61	BI BI
62	BJ BJ
63	BK BK
64	BL BL
65	BM BM
66	BN BN
67	BO BO
68	BP BP
69	BQ BQ

CAIINGH TERMINATION POINTS	
ITEM	FROM TO
70	EG06 APP-4A AC INPUT
71	EG07 APP-4A AC INPUT
72	EG08 APP-4A AC INPUT



TOP OF CABINET AS VIEWED FROM THE REAR

TO SHEET 1

(MATES WITH J615, SHEET 1)

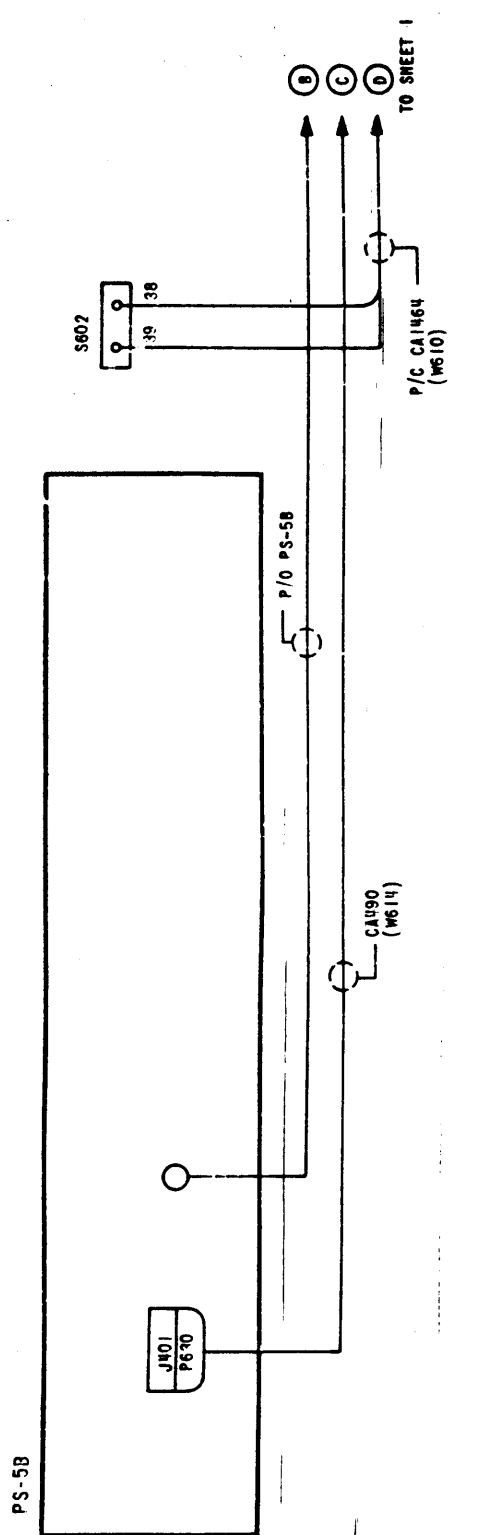
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REVISIONS						
ZONE	LTR	DESCRIPTION	DATE	E	M	N



CAN35-5 (W613)



ITEM	FROM	TO
60		
61		
62		
63		
64		
65		
66		
67		
68		
69		

ITEM	FROM	TO
70	APP-NA	AC INPUT
71	APP-NA	AC INPUT
72	APP-NA	AC INPUT

LAST SYMBOLS ON A25056	SYMBOLS USED
C607	C601 THRU C607
CP613	CP601 THRU CP606
E615	E602, E603
J621	J601, J602, J606 TO J611
K601	K601
P640	P601 THRU P608
S603	S603
W622	W605

MATERIAL		FINISH	
QTY / UNIT	MODEL USED ON	ASS'Y NO.	
APPLICATION			
CODE			

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TOLERANCES ON
 DECIMALS: X ± .05, XX ± .01, XXX ± .005
 FRACTIONS: ± 1/64 ANGLES, ± 0°-30'

QTY. REQ.	ITEM	PART NO.	DESCRIPTION	SYMBOL
LIST OF MATERIAL				
THE TECHNICAL MATERIEL CORP. MAMARONECK, NEW YORK				
DIAGRAM, CABINET, CABLING				
SIZE	CODE	IDENT. NO.	DWG. NO.	ISSUE
D	82679		CK 1583	
SCALE				SHEET 2 OF 2



MAS-1/TIR (REAR VIEW)

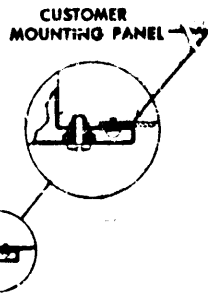
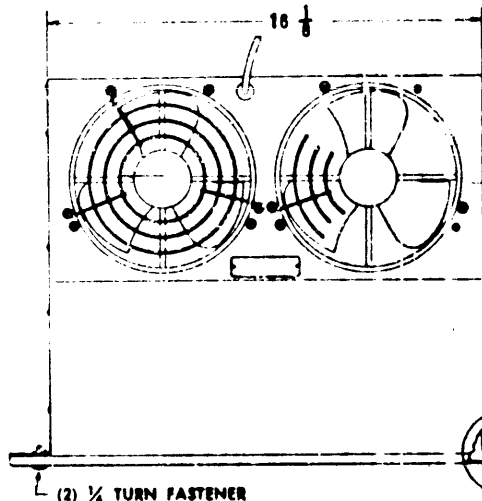
APPLICATION			REVISIONS						
QTY	MODEL USED ON	ASS'Y NO.	LTR	DESCRIPTION	DATE	E.M.N.NO	DRAFT	CHKD	APPD
1	MAS-1/TR		X	EXPERIMENTAL RELEASE	3/14/68		C.V.		

MFGR (TMC CODE NO): S401-19
 MFGR PART NUMBER: TWINPAX-2
 MFGR CATALOG NO: L-7000A

SPECIFICATIONS

1.9 KW HEAT DISSIPATED WITH 15°F TEMPERATURE RISE
 400 CFM QUIET ONLY 55dB (SIL)
 115 VAC, 50/60 CPS, 1-PHASE (CAPACITORS SUPPLIED) 84 WATTS
 ONLY 5-1/4" PANEL HEIGHT REQUIRE"
 DESIGNED FOR STANDARD 19" EIA RACKS— USES STANDARD
 EIA NOTCHING

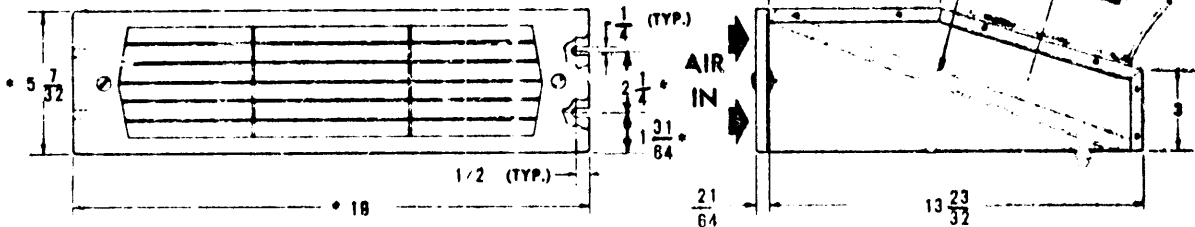
WASHABLE ALUMINUM FILTER



TOLERANCE

$\pm \frac{1}{64}$

FILTER 1/2" THICK
 ALL ALUMINUM
 REUSABLE
 AIR OUT



PURCHASING NOTE: VENDOR MUST INCLUDE THE FOLLOWING INFORMATION WHEN SHIPPING THIS ITEM TO TMC.

1. AN OUTLINE DRAWING OR ILLUSTRATION FROM CATALOG SHOWING ALL PERTINENT DIMENSIONS AND TOLERANCES.
2. ELECTRICAL AND/OR MECHANICAL SPECIFICATIONS AS SHOWN IN THEIR CATALOGS.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE CHEMICALLY APPLIED OR PLATED FINISHES	REQ'D	ITEM	PART NUMBER	DESCRIPTION	SYM.
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LIST OF MATERIAL

THE TECHNICAL MATERIEL CORP.
 MAMARONECK, NEW YORK

FAN ASSEMBLY, CABINET COOLING

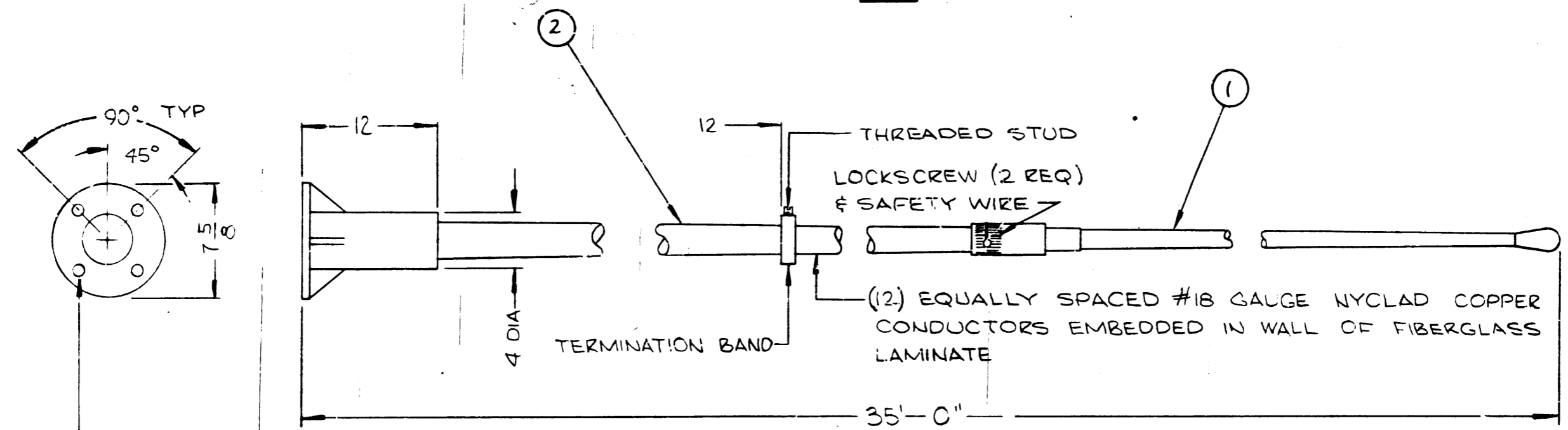
DECIMALS	FRACTIONS	TOLS	ANGLES	FINAL APPROVAL	DATE
X ± .05	1/64				
XX ± .01					
XXX ± .005					
MATERIAL				MECH DES	DATE
FINISH				ELECT DES	DATE
				CHECKED	DATE
				DRAWN C.V.	DATE 3/14/68

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SIZE	CODE IDENT. NO.	DWG NO.	ISSUE
A	82679	AX 598	
SCALE		SHEET	OF

AW108

REVISIONS						
SYM	DESCRIPTION	DATE	E.M.N. NO.	DRAFT	CHKD	APPD
Ø	ORIGINAL RELEASE FOR PRODUCTION	10/6/66	5	CV		
A	7 5/8 WAS 7 7/8	12-17-69	19685	KD	L.H.	O.F. KH



21/32 DIA ON 6 DIA BASE CIRCLE
HOLE PATTERN TO FIT NAVY
BASE #61335

1	2	AW104-3	ELEMENT, ANTENNA (BOT. SECTION)	
1	1	AW104-1	ELEMENT ANTENNA (TOP SECTION)	
REQ'D.	ITEM	PART NUMBER	DESCRIPTION	SYMBOL

Q. LAY LIST OF MATERIAL

MATERIAL THE TECHNICAL MATERIEL CORP.
MAMARONECK, NEW YORK

FINISH TITLE
WHIP, ANTENNA

Q'TY./UNIT	MODEL USED ON	ASS'Y. NO.
SCALE	CODE C	5401-235

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		WJW		[Signature]	10/5/66
		CHECKED			

DECIMALS	FRACTIONS	ELECT. DES.	DATE	MECH. DES.	DATE	SHEET	REV. LTR.
.X ± .05	± 1/64						A
.XX ± .01	ANGLES ± 0° 30'						
.XXX ± .005							

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