TYPE ACCEPTANCE APPLICATION

COLLINS RADIO COMPANY

TYPE 820E-1

5000 WATT AM TRANSMITTER

November 24, 1965

Type 820E-1
Type Acceptance
Application

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TYPE NUMBER

Type No. 820E-1 has been assigned by the manufacturer, Collins Radio Company, as the equipment type number for the 5000/1000 watt AM broadcast transmitter described herein.

TYPE NUMBER
(Continued)

EXPLANATORY NOTE

The Collins Radio Company Type 820F-1 10,000/5000 watt AM transmitter is similar to the Type 820E-1 described herein. The Type 820F-1 will be the subject of a separate type acceptance application to be submitted shortly.

In the schematic diagram, electrical parts list, installation diagram and in the descriptive material contained herein, the transmitters will be treated jointly as the Type 820E/F-1. Except as noted, the information applies equally to the 820E-1 and 820F-1 units.

SERVICE AND RULE PART

The Type 820E-1 5000/1000 watt AM transmitter, as described herein, is intended for standard commercial broadcast service under Part 73.1 of the F.C.C. Rules and Regulations.

TECHNICAL DESCRIPTION

General: The Collins Radio Company Type 820E-1 and Type 820F-1 are AM standard broadcast transmitters, with nominal power output ratings of 5000 and 10,000 watts, respectively. The equipment is designed for the 540 to 1600 kc band, with A3 emission. The Type 820E-1 is equipped for reduced power operation to 1000 watts, while the 820F-1 is arranged to reduce power to 5000 watts. The Type 820E-1, the subject of this type acceptance application, is essentially identical to the 10,000 watt version, except for a few component changes. These changes are listed below. The technical description, therefore, applies to the Type 820E/F-1, except as noted.

The Type 820E/F-1 transmitter is housed in an aluminum enclosure, made up of a heavy, bolted-together aluminum Unistrut frame with suitable sheet-metal panels and inner enclosures. Except for the extended control panel and r-f exciter (discussed below), all components are self-contained. (Refer to photographs in section 6.)

The transmitter front doors are for appearance, and are not interlocked. The rear doors and all front access panels and sub-doors are interlocked to remove transmitter control circuit voltage upon opening. In addition, compartments in which bias and higher voltages are present are equipped with high-voltage grounding switches which short-circuit the appropriate power supplies as doors are opened. An interlocked, grounded shorting stick is provided in the high-voltage transformer area.

TECHNICAL DESCRIPTION
(Continued)

From the front, the transmitter is divided into three rack-width sections. The left section houses the modulator tubes and audio driver amplifier, while the center section contains the power amplifier and r-f driver stages. The large tubes are cooled by pressurizing separate air plenum chambers, using a common centrifugal blower.

The right portion of the transmitter is designated the "control" section, and houses control circuit components, customer wiring terminations, and low-voltage power supplies. Protective circuit breakers for all circuits are mounted on the front panel of this section, and a filament running time meter is provided as well. A hinged upper front door gives access to relays and wiring terminations in the upper area. The lower removable panel exposes the electronic filament voltage regulator, and cabinet cooling fan.

The cabinet cooling fan pressurizes the entire cabinet, drawing air through a rear filter. A portion of the pressurized air is picked-up by the centrifugal blower and is used to cool the tubes. The remainder of the air exhausts via grills in the output network enclosure, except for a small outlet near the top of the control section, providing some air circulation in that chamber. All air outlets are concentrated in the top surface of the cabinet.

TECHNICAL DESCRIPTION
(Continued)

In addition to the control section rear door, double rear doors provide access to the output network section and high voltage transformer area. The doors are provided with r-f weatherstripping for a good electrical seal and in addition, the output network enclosure has a separate aluminum cover.

The modulation transformer and reactor, and the high voltage power supply are located in the area under the output network, along with other miscellaneous components. Floor skids are provided for easy installation of the heavier items.

All meters, control devices, and status indicators are grouped on the "extended control panel," described in detail below. This unit and the r-f exciter are rack-mounted panels intended for mounting external to the transmitter cabinet proper. Fifty feet of interconnecting cable is provided for customer installation of these units in an adjacent speech rack or control console. The cable distance may be extended to as much as 250 feet, if desired.

Audio Driver: Audio circuitry for the Type 820E/F-1 transmitter uses push-pull amplification, with tubes used in the modulator position only. The solid-state audio driver uses three stages of Class A amplification with the first two stages employing 2N2102 transistors. The

TECHNICAL DESCRIPTION
(Continued)

amplifiers are direct-coupled for good frequency response and maximum gain, and for minimum component usage.

The driver output amplifier, using 2N3055 transistors, operates into an output coupling transformer, which steps up the audio voltage to the 150-volt peak level required at the modulator grids. Feedback voltage is derived from the modulator plates, via resistor-capacitor ladder networks, and applied to the audio driver input. The driver design is common to the 5 and 10 kw versions of this transmitter.

Modulator: The high-level modulator employs push-pull 4CX5000A tubes operating in Class AB_1. A conventional modulation transformer/reactor circuit is used, and the tubes operate with a nominal plate voltage of 5100-volts. PA screen modulation is provided by a separate winding on the modulation reactor.

Individual controls are provided for adjusting modulator fixed bias. Dynamic adjustments of grid drive are also provided, as are filament hum balance potentiometers.

Typical operating conditions per tube are listed below for the modulator. Values are for transmitter output powers of 5.5 and 10.6 kw, respectively, at 100% modulation.

TECHNICAL DESCRIPTION
(Continued)

	820E-1	820F-1
DC Plate Voltage	5100 v	5100 v
DC Screen Voltage	850 v	850 v
DC Grid Voltage	-190 v	-170 v
DC Plate Current, unmod.	0.3 a	0.4 a
DC Plate Current, 100% mod.	0.67 a	1.20 a
DC Screen Current, unmod.	0 ma	0 ma
DC Screen Current, 100% mod.	50 ma	30 ma
Peak AF Driving Voltage	104 v	150 v
Driving Power	0 w	0 w
Load Resistance, Plate-to-Plate	9000 ohms	4500 ohms
Plate Dissipation, 100% mod.	1630 w	2430 w
Plate Output Power, 100% mod.	1795 w	3740 w

RF Driver: Two 6146B tubes in parallel are employed as the r-f drivers for either the 5 or 10 kw transmitter. The stage operates Class C and supplies approximately 35 watts per tube to the power amplifier grid circuit.

-50 volts protective bias is supplied at the driver grid upon loss of drive. The tuned plate circuit provides drive to the power amplifier at approximately 500-volts peak. Typical operating conditions per tube are listed below.

TECHNICAL DESCRIPTION
(Continued)

DC Plate Voltage	550 v
DC Screen Voltage	135 v
DC Grid Voltage	-70 v
DC Plate Current	83 ma
DC Screen Current	11 ma
DC Grid Current	1.5 ma
Peak RF Grid Voltage	95 v
Plate Dissipation	8 w
Plate Output Power	39 w

Power Amplifier: 4CX5000A tetrodes are used in the power amplifier, with one tube in the 5 kw transmitter and two in parallel in the 10 kw version. Class C operation is used with conventional plate modulation, and screen modulation is achieved via an auxiliary winding on the modulation reactor. Partial screen self-modulation also occurs through series resistors, which have been chosen to limit screen dissipation.

A nominal 5000 volts is supplied to the PA plate, and the amplifier is designed to deliver 11 kw carrier power at the PA plate for the 10 kw case, and proportionate powers for the 5 kw and reduced power levels. Nominal plate impedance is 1000 ohms for the 820F-1, and 2000 ohms for the 820E-1 transmitter.

TECHNICAL DESCRIPTION
(Continued)

The tubes are operated grounded-cathode with the screens near r-f ground potential through bypass capacitors. The -300 v. grid voltage results from self bias in combination with the -240 v. bias supply which supplies protective voltage in case of drive loss.

Typical carrier operating conditions per tube are shown below for transmitter output levels of 5.5 and 10.6 kw, respectively.

	820E-1	820F-1
DC Plate Voltage	5000 v	5000 v
DC Screen Voltage	900 v	900 v
Peak AF Screen Voltage	500 v	500 v
DC Grid Voltage	-330 v	-310 v
DC Plate Current	1.45 a	1.4 a
DC Screen Current	300 ma	250 ma
DC Grid Current	70 ma	50 ma
Peak RF Grid Voltage	520 v	500 v
Grid Driving Power	36 w	25 w
Screen Dissipation	150 w	125 w
Plate Dissipation	1550 w	1470 w
Plate Output Power	5700 w	5500 w
Efficiency*	78.5 %	79 %

*based on power into output network

TECHNICAL DESCRIPTION
(Continued)

Output Network: Conventional low-pass L-sections are used, transforming the 50 ohm output to nominal plate impedance. The network consists of three series inductances and three shunt capacitances, plus a second harmonic shunt trap. Harmonic attenuation exceeds the FCC requirement of -80 db with respect to carrier.

Overall phase shift through the network is approximately -360°, and the design is such for presentation of a favorable plate impedance characteristic when operating into loads within the EIA limit for "normal" loads.

Motor-driven variable vacuum capacitors are provided in the PA tuning and loading positions, controllable from the extended control panel. The PA loading control is used as the means for adjusting transmitter power output and may be operated from the distant studio in the case of remote control installations.

Because of the Q of the network and the inclusion of a series blocking capacitor, PA tuning for plate dip does not occur at the point of maximum power output (unity power factor). Rather, it is necessary to adjust for best efficiency at the particular point of power output. To facilitate this adjustment, and to avoid extension of the plate tuning function to the remote control point, a phase-discriminator circuit has been included to

TECHNICAL DESCRIPTION
(Continued)

automatically adjust the plate tuning control to unity power factor. A manual/automatic switch is provided at the extended control panel for manual adjustment of tuning in the conventional manner.

Power Supplies: A 28-volt d-c supply powers control circuits and pilot lamps and also furnishes power for the audio driver transistor stages, and the r-f exciter. Silicon rectifiers furnish unfiltered d-c to the control circuit. Filtering is provided in the transistorized circuits.

Single-phase line voltage is provided to separate filament transformers for each of the large tubes via an electronic voltage regulator. This regulator operates a motor-controlled variable auto-transformer and is normally set to hold output constant at 225-volts ±1%. In addition, the voltage for the large tubes is individually adjustable by means of transformer taps and series rheostats.

Bias and screen supplies each utilize silicon rectifiers and have separate circuit breaker protection. The screen supply transformer employs two secondary windings with individual rectifiers for the PA and modulator tubes. The separate supplies are also isolated from ground, permitting remote metering of PA plate current at ground level, through isolation of screen and grid currents.

TECHNICAL DESCRIPTION
(Continued)

The 5100-volt plate supply uses a dual-secondary transformer with three-phase silicon diodes connected for 12-phase rectification. The resulting low ripple voltage allows elimination of the conventional filter choke, and the single filter capacitor provides sufficient filtering and harmonic current bypassing. The transformer primary is normally connected in delta for full power operation. For reduced power, the primary is reconnected in wye using special taps for proper plate voltages.

All power transformers are provided with primary taps to allow operation at nominal power levels of from 208 to 240 volts.

Control Circuit: 28-volts d-c is used for all door interlock and relay control signals, and also powers the indicating lamps on the extended control panel. Main control sequences for filament and plate control are pushbutton operated and these functions are arranged also for remote control operation. To change power during operation, it is only necessary to depress the button for the incoming power mode. Power change switching is accomplished within one-half second.

Overloads in the PA or modulator tubes, or in the high-voltage d-c return circuit are monitored with solid-state overload sensing units which in turn drive an overload recycling unit. If a second overload occurs within a

TECHNICAL DESCRIPTION
(Continued)

five-second period, the overload recycle relay locks out, removing power until manually restored. Auxiliary circuits trigger silicon-controlled switches and associated overload indication lamps for each overload circuit.

Extended Control Panel: The transmitter is suitable for installation at an unattended site, and may be remotely controlled from the distant studio location in the conventional manner. As a convenience for attended operation and maintenance, all meters, operating controls, and status indications are grouped on a separate unit designated the "extended control panel." This 12-1/4" x 19" panel is normally supplied with 50 feet of multiconductor, shielded cable and is intended for installation in the customer's console or equipment rack. It may be extended to a maximum cable distance of 250 feet with additional cable. Location must be such that the panel operator is within viewing range of the transmitter itself.

All voltages connecting from the transmitter to the extended control panel are at the 28-volt level, or below. All metering circuits are operated against ground or at near-ground potentials.

Certain transmitter front panel adjustments, such as PA grid tuning, modulator bias controls, etc., must be made in conjunction with metering observations. Since the extended control panel may be located at a distance such that these

TECHNICAL DESCRIPTION
(Continued)

observations would be difficult, test jacks are provided on the transmitter front panel. Thus, a conventional volt-ohm-milliammeter may be used at this point to determine the required test jack voltage associated with a particular front panel adjustment.

Remote Control: Remote control relays are provided on a special panel within the transmitter to perform the following switching functions:

Filament On/Off

High Power On/Plate Off-Reset

Low Power On/Plate Off-Reset

PA Loading Raise/Lower

Remote Control Failsafe

The panel which mounts the nine relays required is mounted in the transmitter control section. The relays are of a common type and have coils chosen to operate from 115 VAC, or 28 or 48 VDC.

In addition to the panel above, each transmitter contains built-in meter shunts for remote samples of plate voltage and current. Also, the modulation monitor sampling coil has two adjustable taps which are switched to a common output lead for equal-level sampling voltage during reduced power operation.

TECHNICAL DESCRIPTION
(Continued)

Power Increase: The Type 820E-1, 5000 watt transmitter is designed to be easily converted to 10,000 watts in the field, if power increase should be authorized. The major components required to convert the 5000 watt transmitter to a Type 820F-1 are listed below.

Symbol	Component
C68	Mod. coupling capacitor
C100*	PA plate blocking capacitor
C101*	PA plate bypass capacitor
Various*	Output network coils and capacitors
CB6*	High voltage circuit breaker
L4*	Modulation reactor
L13*	PA plate choke
R8	PA2 fila. adjust rheostat
T4	PA2 filament transformer
T9*	High voltage transformer
T12*	Modulation transformer
V6	PA2 tube, socket, and connecting resistors and capacitors
A1M2*	Plate current meter

*replaces 5 kw value

TECHNICAL DESCRIPTION
(Continued)

RF Exciter: The Type 310W-1 r-f exciter is designed for use as the frequency generator for the Type 820E/F-1 or other AM standard broadcast transmitter. The exciter is a separate 3-1/2" rack panel unit and is intended for mounting in the customer's speech rack or control console, with the transmitter extended control panel. The exciter output is connected to the transmitter via coaxial cable, and a 50 foot length of cable is supplied with the unit.

The exciter requires an external power source of +28 vdc ±10% at approximately 0.3 ampere. This power is normally derived from the extended control panel rear terminal block in a typical installation.

The exciter is an all solid-state unit, utilizing a total of seven transistors and one or two integrated circuit flip-flops. The basic source is a high-stability oscillator using a 2N3564 transistor and an ovenless crystal operating in the 2.16 to 4.32 mc range. No temperature control is required for maintenance of frequency stability within the specified range. (See section 4.) Two 2N3564 transistor amplifiers follow the crystal oscillator stage.

Frequency generation at two or four times the carrier frequency has been used to capitalize on the frequency range in which quartz crystals are inherently most stable, and to permit division of any frequency drift with

TECHNICAL DESCRIPTION
(Continued)

temperature which does occur. Division by four, using two integrated circuit astable multivibrators, is used for the frequency range 540 through 1080 kc. For frequencies above 1080 kc, only one integrated circuit is required, for division by two.

The divider stages are followed by two stages of push-pull amplification using 2N3250 and 2N2102 transistors. These stages operate in the switching mode with the output produced at a level of approximately two watts. Although the exciter output is a square wave when used with a resistive load, the action of the transmitter r-f driver tuned circuit produces essentially a sine wave at the driver grid. A complementary filter at the transmitter input maintains a 50 ohm exciter load at frequencies above the fundamental.

No tuned circuits are used in the r-f exciter, and the only adjustments are those for trimming frequency, located on the front panel. The panel also mounts a crystal selector switch for changing between main and alternate crystals. If it should be required to change to a new operating frequency, it is only necessary to replace the crystal and to strap in either one or two of the integrated circuit dividers.

The crystals used with the Type 310W-1 exciter are Bliley Electric Company standard AT cut units, but their characteristics have been tightly controlled during the manufacturing process to meet the transmitter temperature environmental specification. (See part 4, herein.) The crystals require no

TECHNICAL DESCRIPTION
(Continued)

temperature control in their application, and for this reason have been especially cut and ground to take advantage of the most linear portion of the frequency vs. temperature curve.

A glass holder with octal socket has been selected to aid in control of aging. The units have been effectively "pre-aged" by specifying their long term aging characteristic after an initial operating period of 30 days.

A group of six crystals on representative frequencies throughout the operating range, have been subjected to qualification testing in the Collins component testing laboratories. Frequency and other electrical specifications were measured over the temperature range, and environmental tests including shock and vibration were then carried out. Electrical testing was repeated after completion of the environmental checks. Qualification testing of these crystals has now been successfully completed.

In addition, a long-term aging test is now in process in the qualification laboratories, on the six crystals, operating in the Type 310W-1 oscillator circuit. Frequency drift is checked periodically during the test, which is expected to continue for one year.

A copy of the Collins component specification, No. 289-7021, for the crystal unit, may be found in the next pages.

289-7021*

NOTICE:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. THE CLASS DESIGNATION AND THE SYMBOLS CAL, TA, CR, RA, SSA AND NSR WHICH MAY APPEAR ON THIS DRAWING ARE FOR INTERNAL USE ONLY BY THE COLLINS RADIO COMPANY AND ARE NOT RELATED TO THE ENGINEERING DATA CONTAINED HEREIN.
3. THE SYMBOL — IN THE REV STATUS BLOCK DENOTES ORIGINAL ISSUE.

DWG DATE 22 FEB 1965

REVISIONS

LTR	DESCRIPTION	DATE	APPROVED
A	A61033-REVISION STATUS CHANGE: (1) 670 freq. was 2760 KC.	16 Mar 1965	KLM
B	A61976-REVISION STATUS CHANGE: (1)PARA. 1.3 - ADDED "AFTER INITIAL 30 DAYS AGING"	10 MAY 1965	KLM

DESCRIPTION: Quartz crystal units mounted in a standard octal tube base holder designed to operate at parallel resonance into a 32.0 ± 0.5 μμF load in the fundamental mode.

*DASH NUMBER: See Table.

*WHEN REFERRING TO COLLINS PART NUMBER, SPECIFY DRAWING NUMBER FOLLOWED BY APPLICABLE DASH NUMBER. WHEN PART NUMBER APPEARS AS 289-7021-XX9, MILITARY INSPECTION IS REQUIRED.

Bliley Electric Co., Erie, Pa. CR	71034	Use Collins PN.
SUGGESTED SOURCES OF SUPPLY	CODE IDENT	VENDOR PN

REV STATUS OF SHEETS	REV	B	B	—	A																				
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

CLASS 2B | CAL CHANGE DATE 7 JUL 1965 | SPECIFICATION CONTROL DRAWING | ENGRG PN 090-0177/0275-289

UNLESS OTHERWISE SPECIFIED DIM ARE IN INCHES TOL ON FRACTIONS± NA DEC± NA ANGLES± NA

MATERIAL: AS REQUIRED

	NAME	DATE
PREP	E.W. Allen 1st	12 Feb 1965
CHK	K.L. Morris	12 Feb 1965
PROJ	M.B. Carter	18 FEB 1965

COLLINS RADIO COMPANY
CEDAR RAPIDS, IOWA

CRYSTAL UNIT, QUARTZ

SIZE	CODE IDENT NO.	DWG NO.
A	13499	289-7021*

SCALE NONE | WTCALC: 3 OZ | SHEET 1 OF 4

REV B

1. ELECTRICAL REQUIREMENTS: The following requirements shall be met when tested on crystal impedance meter type TS330/TSM, or equivalent. Procedure shall be in accordance with applicable portions of MIL-C-3098.

1.1. FREQUENCY (f_c): See Table.

1.2. FREQUENCY TOLERANCE:

1.2.1. FINISHING TOLERANCE: -0.0015% + 0.0005% of the specified frequency when measured at +25°C ± 2°C.

1.2.2. FREQUENCY STABILITY WITH TEMPERATURE: The center frequency (f_c) shall vary no more than the value specified below when operated within the indicated temperature ranges.

	MAX CHANGE IN f_c	
	f_c between	
TEMPERATURE RANGE	2160 and 3200 KC	3201 KC and 4320 KC
0°C to +35°C	± 10 CPS	± 20 CPS
-25°C to +45°C	± 40 CPS	± 80 CPS

1.3. AGING: 5×10^{-9} parts/day, maximum., after initial 30 days aging.

1.4. DRIVE LEVEL: 0.1 MW, maximum.

1.5. EQUIVALENT SERIES RESISTANCE: 25 ohms, maximum.

1.6. MODE OF OPERATION: Fundamental.

1.7. RESONANCE: Parallel.

1.8. LOAD CAPACITANCE: 32.0 ± 0.5 μμF.

1.9. UNWANTED MODES: Crystal units shall have no unwanted modes of oscillation, no abrupt frequency shifts, and no intermittent oscillations when measured over the operating temperature range.

2. MECHANICAL REQUIREMENTS:

2.1. HOLDER: The crystal units shall be vacuum sealed in a standard octal base T-9 glass bulb. See drawing for dimensions.

2.2. PIN CONNECTIONS: Pin 2 and pin 6.

2.3. MARKINGS: The units shall be permanently and legibly marked with the frequency in KC, manufacturer's identification, date code and Collins PN.

3. ENVIRONMENTAL REQUIREMENTS:

3.1. TEMPERATURE RANGE: -25°C to +45°C operating and storage.

3.2. SHOCK: In accordance with Method B of MIL-C-3098. See Note 4.1.

SIZE	CODE IDENT NO.	DWG. NO.
A	13499	289-7021

SCALE NONE	WT	SEE SHEET 1	SHEET 2

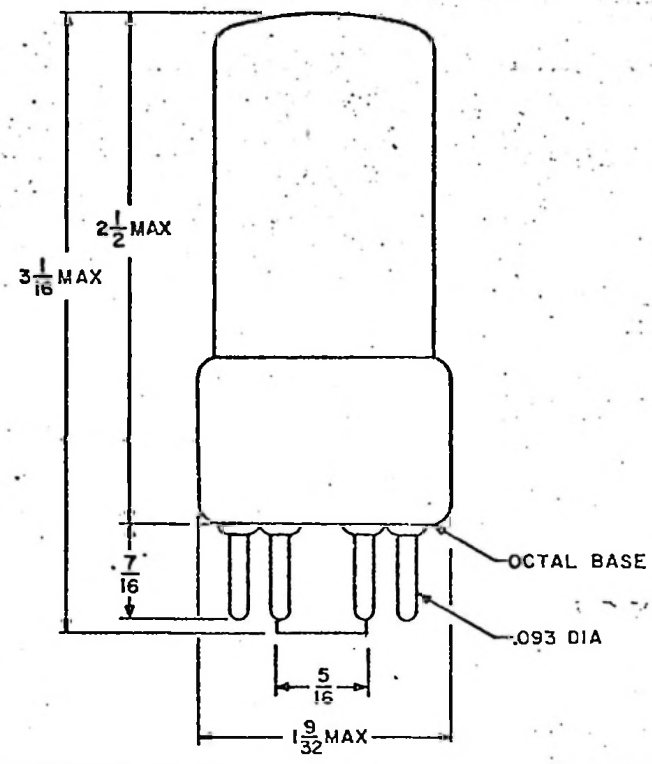
REV

3.3. VIBRATION: 0.06 inch double amplitude at 10 to 55 CPS for 2 hours in accordance with MIL-STD-202, Method 201. See note 4.1.

3.4. MOISTURE RESISTANCE: 240 hours at 90 to 95% relative humidity in accordance with MIL-STD-202, Method 106.

4. NOTES:

4.1. Upon completion of shock and vibration tests, the maximum frequency change shall be ±0.001% and the maximum equivalent resistance change shall be ±15%.



SIZE	CODE IDENT NO.	DWG. NO.	
A	13499	289-7021	
SCALE NONE	WT	SEE SHEET 1	SHEET 3

REV A

TABLE

DASH NUMBER	FREQ. (KC)	DASH NUMBER	FREQ. (KC)
-010	2160	-410	2960
-020	2180	-420	2980
-030	2200	-430	3000
-040	2220	-440	3020
-050	2240	-450	3040
-060	2260	-460	3060
-070	2280	-470	3080
-080	2300	-480	3100
-090	2320	-490	3120
-100	2340	-500	3140
-110	2360	-510	3160
-120	2380	-520	3180
-130	2400	-530	3200
-140	2420	-540	3240
-150	2440	-550	3280
-160	2460	-560	3320
-170	2480	-570	3360
-180	2500	-580	3400
-190	2520	-590	3440
-200	2540	-600	3480
-210	2560	-610	3520
-220	2580	-620	3560
-230	2600	-630	3600
-240	2620	-640	3640
-250	2640	-650	3680
-260	2660	-660	3720
-270	2680	-670	3760
-280	2700	-680	3800
-290	2720	-690	3840
-300	2740	-700	3880
-310	2760	-710	3920
-320	2780	-720	3960
-330	2800	-730	4000
-340	2820	-740	4040
-350	2840	-750	4080
-360	2860	-760	4120
-370	2880	-770	4160
-380	2900	-780	4200
-390	2920	-790	4240
-400	2940	-800	4280
		-810	4320

SIZE	CODE IDENT NO.	DWG. NO.	
A	13499	289-7021	
SCALE NONE	WT	SEE SHEET 1	SHEET 4

TECHNICAL SPECIFICATIONS

Type 820E-1 5000/1000 Watt Transmitter

Output Power Capability:	5500 watts (1100 watts reduced power)
Output Impedance:	50 ohms, unbalanced
Frequency Range:	540 to 1600 kc
Frequency Stability:	±5 cps, 0°C to +35°C ±10 cps, -10°C to +45°C ±20 cps, -25°C to +45°C
Audio Input Impedance:	150/600 ohms, balanced
Audio Input Level:	+10 dbm ± 2 db
Audio Frequency Response:	±1 db, 100-7500 cps ±2 db, 50-10,000 cps
Audio Harmonic Distortion:	Less than 3%, 50-7500 cps
Carrier Shift:	Less than 3%, 0 to 100% modulation
Noise, Unweighted:	60 db below 100% modulation
Modulation Type:	High level plate
Ambient Temperature Range:	-25°C to +45°C
Ambient Humidity Range:	Up to 95%
Altitude:	Up to 7000 ft.
Power Source:	208/240 volts, three phase, 50/60 cps
Permissible Combined Voltage Variation and Regulation:	±5%
Power Requirement at 5500 watts, 100% Modulation:	18.5 kw, 0.98 P.F.

TUBE AND TRANSISTOR COMPLEMENT

Function	Type	Quantity
RF Driver Amplifier	6146B	2
Power Amplifier	4CX5000A	1
Modulator	4CX5000A	2
RF Exciter Oscillator and Amplifier	2N3564	3
RF Exciter Driver Amplifier	2N3250	2
RF Exciter Output Amplifier	2N2102	2
Audio Driver Amplifier	2N2102	4
Audio Output Amplifier	2N3055	2
Filament Voltage Regulator	2N637	1

EQUIPMENT PHOTOGRAPHS

A. Transmitter Cabinet

B. Front View, Doors Removed

C. Front View, Inner Doors Open, Panels Removed

D. Modulator, Audio Driver Section

E. Power Amplifier, RF Driver Section, (820E-1 version shown)

F. Front View, Lower Control Section

G. Rear View, Doors Removed

H. Rear View, Control Section, Upper Left Side

I. Rear View, Control Section, Upper Right Side

J. Output Network Section, Cover On

K. Output Network Section, Cover Off

L. High Voltage Transformer Area

M. Front Panels, Extended Control Panel and RF Exciter, (820E-1 version shown)

N. Rear View, Extended Control Panel

O. Top View, RF Exciter, Cover Off

P. Bottom View, RF Exciter, Cover Off

INSTALLATION DIAGRAM

Drawing 762-8886-000

SCHEMATIC DIAGRAM

Drawing 762-8855-000

ELECTRICAL PARTS LIST

Report 39813

The parts list included herein describes the Type 820E/F-1 transmitters, and lists frequency determining components for all frequencies in the operating band 540 to 1600 kc.

Where components differ between the 820E-1 5000 watt and 820F-1 10,000 watt transmitters, an appropriate note is made in the "function" column. For example, L13 is listed twice, giving 5 and 10 kw versions.

Plate tank coil L14 changes both with frequency and with power level, and the listing gives all versions of this component. Similar cases arise wherein components carry repeated listings to describe their variations with usage.

SYMBOL		FUNCTION	PART NAME	DESCRIPTION	PART NUMBER
B	1	MAIN BLOWER	FAN	1150CFM/FREE AIR DBC	009-1782-010
B	2	CABINET	FAN	1230CFM/FREE AIR	009-1783-010
B	3	TUNING	MOTOR 50CPS	208/230VAC 72RPM	230-0553-150
B	3	TUNING	MOTOR 50CPS	208/230VAC 72RPM	230-0553-150
B	3	TUNING	MOTOR 60CPS	208/230VAC 72RPM	230-0553-140
B	4	LOADING	MOTOR 50CPS	208/230VAC 72RPM	230-0553-150
B	4	LOADING	MOTOR 50CPS	208/230VAC 72RPM	230-0553-150
B	4	LOADING	MOTOR 60CPS	208/230VAC 72RPM	230-0553-140
C	1	TIME DELAY	CAPACITOR	1400MF 50V	184-2516-000
C	2	28V SUPPLY SUPPRESSOR	CAPACITOR	0.68MF 200V	951-0087-000
C	3	BIAS SUPPLY SUPPRESSOR	CAPACITOR	0.01MF 600V	931-4572-000
C	4	BIAS SUPPLY FILTER	CAPACITOR	250MF 300V	184-2536-000
C	5	MOD SCRN SUPPLY FILTER	CAPACITOR	25MF 1.5KV	930-0770-020
C	6	PA SCRN SUPPLY FILTER	CAPACITOR	25MF 1.5KV	930-0770-020
C	7	HIGH VOLT SUPPRESSOR	CAPACITOR	0.03MF 7.5KV	930-0776-010
C	8	HIGH VOLT SUPPRESSOR	CAPACITOR	0.03MF 7.5KV	930-0776-010
C	9	HIGH VOLTAGE FILTER	CAPACITOR	20MF 6KV	930-0766-010
C	10	AUDIO DVR FILTER	CAPACITOR	1400MF 50V	184-2516-000
C	11	FEEDBACK COUPLING	CAPACITOR	0.02MF 1KV	931-0022-000
C	12	FEEDBACK COUPLING	CAPACITOR	0.02MF 1KV	931-0022-000
C	13	Q5 BYPASS	CAPACITOR	1000MF 10V	184-5010-000
C	14	Q6 BYPASS	CAPACITOR	1000MF 10V	184-5010-000
C	15	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	16	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	17	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	18	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	19	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	20	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	21	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	22	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	23	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	24	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	25	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	26	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	27	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	28	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	29	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	30	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	31	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	32	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	33	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	34	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	35	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	36	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	37	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	38	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	39	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	40	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	41	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	42	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	43	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	44	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	45	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	46	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	47	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	48	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	49	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	50	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	51	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	52	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	53	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	54	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	55	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	56	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	57	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	58	FEEDBACK NETWORK	CAPACITOR	27PF 500V	912-2774-000
C	59	V1 GRID BYPASS	CAPACITOR	0.1MF 600V	931-5511-000
C	60	V2 GRID BYPASS	CAPACITOR	0.1MF 600V	931-5511-000
C	61	PA GRID CURRENT BYPASS	CAPACITOR	1000PF 500V FEEDTHRU	913-1292-000
C	62	V1 FIL BYPASS	CAPACITOR	0.01MF 600V	936-0316-000

SYMBOL		FUNCTION	PART NAME	DESCRIPTION	PART NUMBER
C	63	V1 FIL BYPASS	CAPACITOR	0.01MF 600V	936-0316-000
C	64	V2 FIL BYPASS	CAPACITOR	0.01MF 600V	936-0316-000
C	65	V2 FIL BYPASS	CAPACITOR	0.01MF 600V	936-0316-000
C	66	PA GRID CURRENT BYPASS	CAPACITOR	1000PF 500V FEEDTHRU	913-1292-000
C	67	MOD COUPLING	CAPACITOR	2MF 6KV	930-0327-000
C	68	10KW MOD COUPLING	CAPACITOR	2MF 6KV	930-0327-000
C	69	RF DVR PLATE BYPASS	CAPACITOR	2200PF 2KV FEEDTHRU	913-4845-000
C	70A	RF DVR COMP FILTER	CAPACITOR	1000PF 500V	912-3001-000
C	70B	RF DVR COMP FILTER	CAPACITOR	680PF 500V	912-2989-000
C	70C	RF DVR COMP FILTER	CAPACITOR	470PF 500V	912-2974-000
C	71A	RF DVR COMP FILTER	CAPACITOR	1000PF 500V	912-3001-000
C	71B	RF DVR COMP FILTER	CAPACITOR	680PF 500V	912-2989-000
C	71C	RF DVR COMP FILTER	CAPACITOR	470PF 500V	912-2974-000
C	72	DVR GRID TUNING	CAPACITOR	140PF VARIABLE	922-3910-010
C	73	RF DVR NEUTING BYPASS	CAPACITOR	1000PF 500V FEEDTHRU	913-1294-000
C	74	RF DVR NEUTING	CAPACITOR	10PF 2KV	913-4965-000
C	75	V3 GRID COUPLING	CAPACITOR	2200PF 500V	912-3025-000
C	76	V3 GRID BYPASS	CAPACITOR	0.01MF 500V	913-3013-000
C	77	V3 SCREEN BYPASS	CAPACITOR	3300PF 500V	912-3040-000
C	78	V4 SCREEN BYPASS	CAPACITOR	3300PF 500V	912-3040-000
C	79	V4 GRID COUPLING	CAPACITOR	2200PF 500V	912-3025-000
C	80	V4 GRID BYPASS	CAPACITOR	0.01MF 500V	913-3013-000
C	81	RF DVR BIAS BYPASS	CAPACITOR	5600PF 500V FEEDTHRU	913-1295-000
C	82	RF DVR SCRN BYPASS	CAPACITOR	5600PF 500V FEEDTHRU	913-1295-000
C	83	PA GRID TUNING	CAPACITOR	325PF VARIABLE 500V	922-1400-000
C	84A	PA GRID TUNE PADDING	CAPACITOR	180PF 1.5KV	913-3751-000
C	84B	PA GRID TUNE PADDING	CAPACITOR	240PF 1.5KV	913-3752-000
C	84C	PA GRID TUNE PADDING	CAPACITOR	480PF 1.5KV	913-3744-000
C	85	RF DVR PLATE BYPASS	CAPACITOR	0.01MF 2.5KV	937-2024-000
C	86	V5 GRID COUPLING	CAPACITOR	0.01MF 2.5KV	937-2024-000
C	87	V5 GRID BYPASS	CAPACITOR	0.01MF 600V	936-0316-000
C	88	V5 FIL BYPASS	CAPACITOR	0.01MF 600V	936-0316-000
C	89	V5 FIL BYPASS	CAPACITOR	0.01MF 600V	936-0316-000
C	90	MOD SCRN FILTER	CAPACITOR	4MF 600V	951-4020-000
C	91A	V5 SCREEN BYPASS	CAPACITOR	3300PF 2.5KV	913-2830-000
C	91B	V5 SCREEN BYPASS	CAPACITOR	3300PF 2.5KV	913-2830-000
C	91C	V5 SCREEN BYPASS	CAPACITOR	3300PF 2.5KV	913-2830-000
C	92	BYPASS	CAPACITOR	2.2MF 35V	184-7704-000
C	93A	V6 SCREEN BYPASS	CAPACITOR	3300PF 2.5KV	913-2830-000
C	93B	V6 SCREEN BYPASS	CAPACITOR	3300PF 2.5KV	913-2830-000
C	93C	V6 SCREEN BYPASS	CAPACITOR	3300PF 2.5KV	913-2830-000
C	94	V6 FIL BYPASS	CAPACITOR	0.01MF 600V	936-0316-000
C	95	V6 FIL BYPASS	CAPACITOR	0.01MF 600V	936-0316-000
C	96	V6 GRID COUPLING	CAPACITOR	0.01MF 2.5KV	937-2024-000
C	97	V6 GRID BYPASS	CAPACITOR	0.01MF 600V	936-0316-000
C	98	PA BIAS BYPASS	CAPACITOR	5600PF 500V FEEDTHRU	913-1295-000
C	99	PA NEUTING + AUTO TUNE	CAPACITOR	FIXED,DUAL SECTION	762-8816-001
C	100	5KW PA PLATE BLOCKING	CAPACITOR	1000PF 30KV MICA	912-4128-040
C	100	10KW PA PLATE BLOCKING	CAPACITOR	1500PF 25KV MICA	912-4128-060
C	101	5KW PA PLATE BYPASS	CAPACITOR	510PF 20KV MICA	912-4127-010
C	101	10KW PA PLATE BYPASS	CAPACITOR	1000PF 20KV MICA	912-4127-040
C	102A	PA PLATE TUNING	CAPACITOR	25-1000PF 10KV UCSX	919-0127-000
C	102B	5KW 540-840 PL TUN	CAPACITOR	1000PF 10KV MC1	919-0150-000
C	102B	5KW 540-840 PL TUN	CAPACITOR	1000PF 10KV MC1	919-0150-000
C	102B	5KW 540-840 PL TUN	CAPACITOR	1000PF 10KV MC1	919-0150-000
C	102B	5KW 540-840 PL TUN	CAPACITOR	1000PF 10KV MC1	919-0150-000
C	102B	5KW 540-840 PL TUN	CAPACITOR	1000PF 10KV MC1	919-0150-000
C	102B	5KW 540-840 PL TUN	CAPACITOR	1000PF 10KV MC1	919-0150-000
C	102B	5KW 540-840 PL TUN	CAPACITOR	1000PF 10KV MC1	919-0150-000
C	102B	5KW 540-840 PL TUN	CAPACITOR	1000PF 10KV MC1	919-0150-000
C	102B	5KW 850-1290 PL TUN	CAPACITOR	500PF 10KV MC1	919-0148-000
C	102B	5KW 850-1290 PL TUN	CAPACITOR	500PF 10KV MC1	919-0148-000
C	102B	5KW 850-1290 PL TUN	CAPACITOR	500PF 10KV MC1	919-0148-000
C	102B	5KW 850-1290 PL TUN	CAPACITOR	500PF 10KV MC1	919-0148-000
C	102B	5KW 850-1290 PL TUN	CAPACITOR	500PF 10KV MC1	919-0148-000
C	102B	5KW 850-1290 PL TUN	CAPACITOR	500PF 10KV MC1	919-0148-000
C	102B	5KW 850-1290 PL TUN	CAPACITOR	500PF 10KV MC1	919-0148-000
C	102B	5KW 850-1290 PL TUN	CAPACITOR	500PF 10KV MC1	919-0148-000
C	102B	10KW 540-810 PL TUN	CAPACITOR	1000PF 10KV MC1	919-0150-000
C	102B	10KW 540-810 PL TUN	CAPACITOR	1000PF 10KV MC1	919-0150-000
C	102B	10KW 540-810 PL TUN	CAPACITOR	1000PF 10KV MC1	919-0150-000
C	102B	10KW 540-810 PL TUN	CAPACITOR	1000PF 10KV MC1	919-0150-000

SYMBOL	FUNCTION	PART NAME	DESCRIPTION	PART NUMBER
C 102B	10KW 540-810 PL TUN	CAPACITOR	1000PF 10KV MC1	919-0150-000
C 102B	10KW 540-810 PL TUN	CAPACITOR	1000PF 10KV MC1	919-0150-000
C 102B	10KW 540-810 PL TUN	CAPACITOR	1000PF 10KV MC1	919-0150-000
C 102B	10KW 540-810 PL TUN	CAPACITOR	1000PF 10KV MC1	919-0150-000
C 102B	10KW 820-1290 PL TUN	CAPACITOR	500PF 10KV MC1	919-0148-000
C 102B	10KW 820-1290 PL TUN	CAPACITOR	500PF 10KV MC1	919-0148-000
C 102B	10KW 820-1290 PL TUN	CAPACITOR	500PF 10KV MC1	919-0148-000
C 102B	10KW 820-1290 PL TUN	CAPACITOR	500PF 10KV MC1	919-0148-000
C 102B	10KW 820-1290 PL TUN	CAPACITOR	500PF 10KV MC1	919-0148-000
C 102B	10KW 820-1290 PL TUN	CAPACITOR	500PF 10KV MC1	919-0148-000
C 102B	10KW 820-1290 PL TUN	CAPACITOR	500PF 10KV MC1	919-0148-000
C 102B	10KW 820-1290 PL TUN	CAPACITOR	500PF 10KV MC1	919-0148-000
C 102B	10KW 820-1290 PL TUN	CAPACITOR	500PF 10KV MC1	919-0148-000
C 103A	5KW 540-710 OUT NET	CAPACITOR	3000PF 12KV MICA	912-4127-100
C 103A	5KW 540-710 OUT NET	CAPACITOR	3000PF 12KV MICA	912-4127-100
C 103A	5KW 540-710 OUT NET	CAPACITOR	3000PF 12KV MICA	912-4127-100
C 103A	5KW 540-710 OUT NET	CAPACITOR	3000PF 12KV MICA	912-4127-100
C 103A	5KW 540-710 OUT NET	CAPACITOR	3000PF 12KV MICA	912-4127-100
C 103A	5KW 720-880 OUT NET	CAPACITOR	2400PF 12KV MICA	912-4127-090
C 103A	5KW 720-880 OUT NET	CAPACITOR	2400PF 12KV MICA	912-4127-090
C 103A	5KW 720-880 OUT NET	CAPACITOR	2400PF 12KV MICA	912-4127-090
C 103A	5KW 720-880 OUT NET	CAPACITOR	2400PF 12KV MICA	912-4127-090
C 103A	5KW 890-980 OUT NET	CAPACITOR	2000PF 15KV MICA	912-4127-080
C 103A	5KW 890-980 OUT NET	CAPACITOR	2000PF 15KV MICA	912-4127-080
C 103A	5KW 990-1050 OUT NET	CAPACITOR	1800PF 15KV MICA	912-4127-070
C 103A	5KW 1060-1110 OUT NET	CAPACITOR	1500PF 15KV MICA	912-4127-060
C 103A	5KW 1120-1250 OUT NET	CAPACITOR	1200PF 15KV MICA	912-4127-050
C 103A	5KW 1120-1250 OUT NET	CAPACITOR	1200PF 15KV MICA	912-4127-050
C 103A	5KW 1260-1410 OUT NET	CAPACITOR	1000PF 20KV MICA	912-4127-040
C 103A	5KW 1260-1410 OUT NET	CAPACITOR	1000PF 20KV MICA	912-4127-040
C 103A	5KW 1420-1530 OUT NET	CAPACITOR	820PF 20KV MICA	912-4127-030
C 103A	5KW 1540-1600 OUT NET	CAPACITOR	750PF 20KV MICA	912-4127-020
C 103A	10KW 540-620 OUT NET	CAPACITOR	3000PF 20KV MICA	912-4128-090
C 103A	10KW 540-620 OUT NET	CAPACITOR	3000PF 20KV MICA	912-4128-090
C 103A	10KW 540-620 OUT NET	CAPACITOR	3000PF 20KV MICA	912-4128-090
C 103A	10KW 630-760 OUT NET	CAPACITOR	2000PF 20KV MICA	912-4128-070
C 103A	10KW 630-760 OUT NET	CAPACITOR	2000PF 20KV MICA	912-4128-070
C 103A	10KW 630-760 OUT NET	CAPACITOR	2000PF 20KV MICA	912-4128-070
C 103A	10KW 770-960 OUT NET	CAPACITOR	1500PF 25KV MICA	912-4128-060
C 103A	10KW 770-960 OUT NET	CAPACITOR	1500PF 25KV MICA	912-4128-060
C 103A	10KW 770-960 OUT NET	CAPACITOR	1500PF 25KV MICA	912-4128-060
C 103A	10KW 770-960 OUT NET	CAPACITOR	1500PF 25KV MICA	912-4128-060
C 103A	10KW 970-1100 OUT NET	CAPACITOR	1200PF 25KV MICA	912-4128-050
C 103A	10KW 970-1100 OUT NET	CAPACITOR	1200PF 25KV MICA	912-4128-050
C 103A	10KW 970-1100 OUT NET	CAPACITOR	1200PF 25KV MICA	912-4128-050
C 103A	10KW 1110-1330 OUT NET	CAPACITOR	1000PF 30KV MICA	912-4128-040
C 103A	10KW 1110-1330 OUT NET	CAPACITOR	1000PF 30KV MICA	912-4128-040
C 103A	10KW 1110-1330 OUT NET	CAPACITOR	1000PF 30KV MICA	912-4128-040
C 103A	10KW 1110-1330 OUT NET	CAPACITOR	1000PF 30KV MICA	912-4128-040
C 103A	10KW 1110-1330 OUT NET	CAPACITOR	1000PF 30KV MICA	912-4128-040
C 103A	10KW 1340-1470 OUT NET	CAPACITOR	820PF 30KV MICA	912-4128-030
C 103A	10KW 1480-1600 OUT NET	CAPACITOR	750PF 30KV MICA	912-4128-020
C 103B	5KW 540-640 OUT NET	CAPACITOR	3000PF 12KV MICA	912-4127-100
C 103B	5KW 540-640 OUT NET	CAPACITOR	3000PF 12KV MICA	912-4127-100
C 103B	5KW 540-640 OUT NET	CAPACITOR	3000PF 12KV MICA	912-4127-100
C 103B	5KW 650-810 OUT NET	CAPACITOR	2000PF 15KV MICA	912-4127-080
C 103B	5KW 650-810 OUT NET	CAPACITOR	2000PF 15KV MICA	912-4127-080
C 103B	5KW 650-810 OUT NET	CAPACITOR	2000PF 15KV MICA	912-4127-080
C 103B	5KW 650-810 OUT NET	CAPACITOR	2000PF 15KV MICA	912-4127-080
C 103B	5KW 820-880 OUT NET	CAPACITOR	2400PF 12KV MICA	912-4127-090
C 103B	5KW 820-880 OUT NET	CAPACITOR	2400PF 12KV MICA	912-4127-090
C 103B	5KW 890-980 OUT NET	CAPACITOR	2000PF 15KV MICA	912-4127-080
C 103B	5KW 890-980 OUT NET	CAPACITOR	2000PF 15KV MICA	912-4127-080
C 103B	5KW 990-1050 OUT NET	CAPACITOR	1800PF 15KV MICA	912-4127-070
C 103B	5KW 1060-1110 OUT NET	CAPACITOR	1500PF 15KV MICA	912-4127-060
C 103B	5KW 1120-1250 OUT NET	CAPACITOR	1200PF 15KV MICA	912-4127-050
C 103B	5KW 1120-1250 OUT NET	CAPACITOR	1200PF 15KV MICA	912-4127-050
C 103B	5KW 1260-1410 OUT NET	CAPACITOR	1000PF 20KV MICA	912-4127-040
C 103B	5KW 1260-1410 OUT NET	CAPACITOR	1000PF 20KV MICA	912-4127-040
C 103B	5KW 1420-1530 OUT NET	CAPACITOR	820PF 20KV MICA	912-4127-030
C 103B	5KW 1540-1600 OUT NET	CAPACITOR	750PF 20KV MICA	912-4127-020
C 103B	10KW 540-620 OUT NET	CAPACITOR	3000PF 20KV MICA	912-4128-090

SYMBOL	FUNCTION	PART NAME	DESCRIPTION	PART NUMBER
C 103B	10KW 540-620 OUT NET	CAPACITOR	3000PF 20KV MICA	912-4128-090
C 103B	10KW 540-620 OUT NET	CAPACITOR	3000PF 20KV MICA	912-4128-090
C 103B	10KW 630-760 OUT NET	CAPACITOR	2000PF 20KV MICA	912-4128-070
C 103B	10KW 630-760 OUT NET	CAPACITOR	2000PF 20KV MICA	912-4128-070
C 103B	10KW 630-760 OUT NET	CAPACITOR	2000PF 20KV MICA	912-4128-070
C 103B	10KW 770-960 OUT NET	CAPACITOR	1500PF 25KV MICA	912-4128-060
C 103B	10KW 770-960 OUT NET	CAPACITOR	1500PF 25KV MICA	912-4128-060
C 103B	10KW 770-960 OUT NET	CAPACITOR	1500PF 25KV MICA	912-4128-060
C 103B	10KW 770-960 OUT NET	CAPACITOR	1500PF 25KV MICA	912-4128-060
C 103B	10KW 970-1100 OUT NET	CAPACITOR	1200PF 25KV MICA	912-4128-050
C 103B	10KW 970-1100 OUT NET	CAPACITOR	1200PF 25KV MICA	912-4128-050
C 103B	10KW 970-1100 OUT NET	CAPACITOR	1200PF 25KV MICA	912-4128-050
C 103B	10KW 1110-1330 OUT NET	CAPACITOR	1000PF 30KV MICA	912-4128-040
C 103B	10KW 1110-1330 OUT NET	CAPACITOR	1000PF 30KV MICA	912-4128-040
C 103B	10KW 1110-1330 OUT NET	CAPACITOR	1000PF 30KV MICA	912-4128-040
C 103B	10KW 1110-1330 OUT NET	CAPACITOR	1000PF 30KV MICA	912-4128-040
C 103B	10KW 1110-1330 OUT NET	CAPACITOR	1000PF 30KV MICA	912-4128-040
C 103B	10KW 1340-1470 OUT NET	CAPACITOR	820PF 30KV MICA	912-4128-030
C 103B	10KW 1480-1600 OUT NET	CAPACITOR	750PF 30KV MICA	912-4128-020
C 103C	5KW 540-570 OUT NET	CAPACITOR	3000PF 12KV MICA	912-4127-100
C 103C	5KW 580-810 OUT NET	CAPACITOR	2000PF 15KV MICA	912-4127-080
C 103C	5KW 580-810 OUT NET	CAPACITOR	2000PF 15KV MICA	912-4127-080
C 103C	5KW 580-810 OUT NET	CAPACITOR	2000PF 15KV MICA	912-4127-080
C 103C	5KW 580-810 OUT NET	CAPACITOR	2000PF 15KV MICA	912-4127-080
C 103C	5KW 580-810 OUT NET	CAPACITOR	2000PF 15KV MICA	912-4127-080
C 103C	5KW 580-810 OUT NET	CAPACITOR	2000PF 15KV MICA	912-4127-080
C 103C	5KW 820-880 OUT NET	CAPACITOR	1000PF 20KV MICA	912-4127-040
C 103C	5KW 820-880 OUT NET	CAPACITOR	1000PF 20KV MICA	912-4127-040
C 103C	5KW 890-980 OUT NET	CAPACITOR	1200PF 15KV MICA	912-4127-050
C 103C	5KW 890-980 OUT NET	CAPACITOR	1200PF 15KV MICA	912-4127-050
C 103C	5KW 990-1050 OUT NET	CAPACITOR	1000PF 20KV MICA	912-4127-040
C 103C	5KW 1060-1110 OUT NET	CAPACITOR	1500PF 15KV MICA	912-4127-060
C 103C	5KW 1120-1250 OUT NET	CAPACITOR	1200PF 15KV MICA	912-4127-050
C 103C	5KW 1120-1250 OUT NET	CAPACITOR	1200PF 15KV MICA	912-4127-050
C 103C	5KW 1260-1530 OUT NET	CAPACITOR	820PF 20KV MICA	912-4127-030
C 103C	5KW 1260-1530 OUT NET	CAPACITOR	820PF 20KV MICA	912-4127-030
C 103C	5KW 1260-1530 OUT NET	CAPACITOR	820PF 20KV MICA	912-4127-030
C 103C	5KW 1540-1600 OUT NET	CAPACITOR	750PF 20KV MICA	912-4127-020
C 103C	10KW 540-570 OUT NET	CAPACITOR	3000PF 20KV MICA	912-4128-090
C 103C	10KW 580-760 OUT NET	CAPACITOR	2000PF 20KV MICA	912-4128-070
C 103C	10KW 580-760 OUT NET	CAPACITOR	2000PF 20KV MICA	912-4128-070
C 103C	10KW 580-760 OUT NET	CAPACITOR	2000PF 20KV MICA	912-4128-070
C 103C	10KW 580-760 OUT NET	CAPACITOR	2000PF 20KV MICA	912-4128-070
C 103C	10KW 580-760 OUT NET	CAPACITOR	2000PF 20KV MICA	912-4128-070
C 103C	10KW 770-960 OUT NET	CAPACITOR	1500PF 25KV MICA	912-4128-060
C 103C	10KW 770-960 OUT NET	CAPACITOR	1500PF 25KV MICA	912-4128-060
C 103C	10KW 770-960 OUT NET	CAPACITOR	1500PF 25KV MICA	912-4128-060
C 103C	10KW 770-960 OUT NET	CAPACITOR	1500PF 25KV MICA	912-4128-060
C 103C	10KW 970-1100 OUT NET	CAPACITOR	1200PF 25KV MICA	912-4128-050
C 103C	10KW 970-1100 OUT NET	CAPACITOR	1200PF 25KV MICA	912-4128-050
C 103C	10KW 970-1100 OUT NET	CAPACITOR	1200PF 25KV MICA	912-4128-050
C 103C	10KW 1110-1330 OUT NET	CAPACITOR	1000PF 30KV MICA	912-4128-040
C 103C	10KW 1110-1330 OUT NET	CAPACITOR	1000PF 30KV MICA	912-4128-040
C 103C	10KW 1110-1330 OUT NET	CAPACITOR	1000PF 30KV MICA	912-4128-040
C 103C	10KW 1110-1330 OUT NET	CAPACITOR	1000PF 30KV MICA	912-4128-040
C 103C	10KW 1110-1330 OUT NET	CAPACITOR	1000PF 30KV MICA	912-4128-040
C 103C	10KW 1340-1470 OUT NET	CAPACITOR	820PF 30KV MICA	912-4128-030
C 103C	10KW 1480-1600 OUT NET	CAPACITOR	750PF 30KV MICA	912-4128-020
C 103D	5KW 1120-1250 OUT NET	CAPACITOR	510PF 20KV MICA	912-4127-010
C 103D	5KW 1120-1250 OUT NET	CAPACITOR	510PF 20KV MICA	912-4127-010
C 103D	5KW 1260-1530 OUT NET	CAPACITOR	820PF 20KV MICA	912-4127-030
C 103D	5KW 1260-1530 OUT NET	CAPACITOR	820PF 20KV MICA	912-4127-030
C 103D	5KW 1260-1530 OUT NET	CAPACITOR	820PF 20KV MICA	912-4127-030
C 103D	5KW 1540-1600 OUT NET	CAPACITOR	750PF 20KV MICA	912-4127-020
C 103D	10KW 630-680 OUT NET	CAPACITOR	1500PF 25KV MICA	912-4128-060
C 103D	10KW 690-760 OUT NET	CAPACITOR	750PF 30KV MICA	912-4128-020
C 103D	10KW 690-760 OUT NET	CAPACITOR	750PF 30KV MICA	912-4128-020
C 103D	10KW 770-860 OUT NET	CAPACITOR	1500PF 25KV MICA	912-4128-060
C 103D	10KW 770-860 OUT NET	CAPACITOR	1500PF 25KV MICA	912-4128-060
C 103D	10KW 770-860 OUT NET	CAPACITOR	1500PF 25KV MICA	912-4128-060
C 103D	10KW 870-960 OUT NET	CAPACITOR	820PF 30KV MICA	912-4128-030
C 103D	10KW 970-1030 OUT NET	CAPACITOR	1200PF 25KV MICA	912-4128-050

SYMBOL		FUNCTION	PART NAME	DESCRIPTION	PART NUMBER
C	103D	10KW 1040-1210 OUT NET	CAPACITOR	1000PF 30KV MICA	912-4128-040
C	103D	10KW 1040-1210 OUT NET	CAPACITOR	1000PF 30KV MICA	912-4128-040
C	103D	10KW 1040-1210 OUT NET	CAPACITOR	1000PF 30KV MICA	912-4128-040
C	103D	10KW 1220-1330 OUT NET	CAPACITOR	820PF 30KV MICA	912-4128-030
C	103D	10KW 1220-1330 OUT NET	CAPACITOR	820PF 30KV MICA	912-4128-030
C	103D	10KW 1220-1330 OUT NET	CAPACITOR	820PF 30KV MICA	912-4128-030
C	103D	10KW 1220-1330 OUT NET	CAPACITOR	820PF 30KV MICA	912-4128-030
C	103D	10KW 1340-1600 OUT NET	CAPACITOR	750PF 30KV MICA	912-4128-020
C	103D	10KW 1340-1600 OUT NET	CAPACITOR	750PF 30KV MICA	912-4128-020
C	104	5KW 540-570 TRAP	CAPACITOR	1000PF 5KV MICA	912-4125-060
C	104	5KW 580-590 TRAP	CAPACITOR	820PF 5KV MICA	912-4125-050
C	104	5KW 600-710 TRAP	CAPACITOR	680PF 5KV MICA	912-4125-040
C	104	5KW 600-710 TRAP	CAPACITOR	680PF 5KV MICA	912-4125-040
C	104	5KW 600-710 TRAP	CAPACITOR	680PF 5KV MICA	912-4125-040
C	104	5KW 720-960 TRAP	CAPACITOR	510PF 5KV MICA	912-4125-030
C	104	5KW 720-960 TRAP	CAPACITOR	510PF 5KV MICA	912-4125-030
C	104	5KW 720-960 TRAP	CAPACITOR	510PF 5KV MICA	912-4125-030
C	104	5KW 720-960 TRAP	CAPACITOR	510PF 5KV MICA	912-4125-030
C	104	5KW 720-960 TRAP	CAPACITOR	510PF 5KV MICA	912-4125-030
C	104	5KW 970-1250 TRAP	CAPACITOR	390PF 5KV MICA	912-4125-010
C	104	5KW 970-1250 TRAP	CAPACITOR	390PF 5KV MICA	912-4125-010
C	104	5KW 970-1250 TRAP	CAPACITOR	390PF 5KV MICA	912-4125-010
C	104	5KW 970-1250 TRAP	CAPACITOR	390PF 5KV MICA	912-4125-010
C	104	5KW 970-1250 TRAP	CAPACITOR	390PF 5KV MICA	912-4125-010
C	104	5KW 1260-1600 TRAP	CAPACITOR	270PF 5KV MICA	912-4125-130
C	104	5KW 1260-1600 TRAP	CAPACITOR	270PF 5KV MICA	912-4125-130
C	104	5KW 1260-1600 TRAP	CAPACITOR	270PF 5KV MICA	912-4125-130
C	104	5KW 1260-1600 TRAP	CAPACITOR	270PF 5KV MICA	912-4125-130
C	104	10KW 540-570 TRAP	CAPACITOR	1000PF 5KV MICA	912-4125-060
C	104	10KW 580-590 TRAP	CAPACITOR	820PF 5KV MICA	912-4125-050
C	104	10KW 600-710 TRAP	CAPACITOR	680PF 5KV MICA	912-4125-040
C	104	10KW 600-710 TRAP	CAPACITOR	680PF 5KV MICA	912-4125-040
C	104	10KW 600-710 TRAP	CAPACITOR	680PF 5KV MICA	912-4125-040
C	104	10KW 720-960 TRAP	CAPACITOR	510PF 5KV MICA	912-4125-030
C	104	10KW 720-960 TRAP	CAPACITOR	510PF 5KV MICA	912-4125-030
C	104	10KW 720-960 TRAP	CAPACITOR	510PF 5KV MICA	912-4125-030
C	104	10KW 720-960 TRAP	CAPACITOR	510PF 5KV MICA	912-4125-030
C	104	10KW 720-960 TRAP	CAPACITOR	510PF 5KV MICA	912-4125-030
C	104	10KW 970-1250 TRAP	CAPACITOR	390PF 5KV MICA	912-4125-010
C	104	10KW 970-1250 TRAP	CAPACITOR	390PF 5KV MICA	912-4125-010
C	104	10KW 970-1250 TRAP	CAPACITOR	390PF 5KV MICA	912-4125-010
C	104	10KW 970-1250 TRAP	CAPACITOR	390PF 5KV MICA	912-4125-010
C	104	10KW 970-1250 TRAP	CAPACITOR	390PF 5KV MICA	912-4125-010
C	104	10KW 970-1250 TRAP	CAPACITOR	390PF 5KV MICA	912-4125-010
C	104	10KW 1260-1600 TRAP	CAPACITOR	270PF 5KV MICA	912-4125-130
C	104	10KW 1260-1600 TRAP	CAPACITOR	270PF 5KV MICA	912-4125-130
C	104	10KW 1260-1600 TRAP	CAPACITOR	270PF 5KV MICA	912-4125-130
C	104	10KW 1260-1600 TRAP	CAPACITOR	270PF 5KV MICA	912-4125-130
C	105A	PA PLATE LOADING	CAPACITOR	25-1000PF 10KV UCSX	919-0127-000
C	105B	5KW 540-590 PL LOAD	CAPACITOR	2400PF 12KV MICA	912-4127-090
C	105B	5KW 540-590 PL LOAD	CAPACITOR	2400PF 12KV MICA	912-4127-090
C	105B	5KW 600-790 PL LOAD	CAPACITOR	2000PF 15KV MICA	912-4127-080
C	105B	5KW 600-790 PL LOAD	CAPACITOR	2000PF 15KV MICA	912-4127-080
C	105B	5KW 600-790 PL LOAD	CAPACITOR	2000PF 15KV MICA	912-4127-080
C	105B	5KW 600-790 PL LOAD	CAPACITOR	2000PF 15KV MICA	912-4127-080
C	105B	5KW 800-960 PL LOAD	CAPACITOR	1500PF 15KV MICA	912-4127-060
C	105B	5KW 800-960 PL LOAD	CAPACITOR	1500PF 15KV MICA	912-4127-060
C	105B	5KW 800-960 PL LOAD	CAPACITOR	1500PF 15KV MICA	912-4127-060
C	105B	5KW 800-960 PL LOAD	CAPACITOR	1500PF 15KV MICA	912-4127-060
C	105B	5KW 970-1220 PL LOAD	CAPACITOR	1000PF 20KV MICA	912-4127-040
C	105B	5KW 970-1220 PL LOAD	CAPACITOR	1000PF 20KV MICA	912-4127-040
C	105B	5KW 970-1220 PL LOAD	CAPACITOR	1000PF 20KV MICA	912-4127-040
C	105B	5KW 970-1220 PL LOAD	CAPACITOR	1000PF 20KV MICA	912-4127-040
C	105B	5KW 1230-1600 PL LOAD	CAPACITOR	750PF 20KV MICA	912-4127-020
C	105B	5KW 1230-1600 PL LOAD	CAPACITOR	750PF 20KV MICA	912-4127-020
C	105B	5KW 1230-1600 PL LOAD	CAPACITOR	750PF 20KV MICA	912-4127-020
C	105B	5KW 1230-1600 PL LOAD	CAPACITOR	750PF 20KV MICA	912-4127-020
C	105B	5KW 1230-1600 PL LOAD	CAPACITOR	750PF 20KV MICA	912-4127-020
C	105B	10KW 540-590 PL LOAD	CAPACITOR	2400PF 20KV MICA	912-4128-080
C	105B	10KW 540-590 PL LOAD	CAPACITOR	2400PF 20KV MICA	912-4128-080
C	105B	10KW 600-790 PL LOAD	CAPACITOR	2000PF 20KV MICA	912-4128-070
C	105B	10KW 600-790 PL LOAD	CAPACITOR	2000PF 20KV MICA	912-4128-070

SYMBOL	FUNCTION	PART NAME	DESCRIPTION	PART NUMBER
C 105B	10KW 600-790 PL LOAD	CAPACITOR	2000PF 20KV MICA	912-4128-070
C 105B	10KW 600-790 PL LOAD	CAPACITOR	2000PF 20KV MICA	912-4128-070
C 105B	10KW 600-790 PL LOAD	CAPACITOR	2000PF 20KV MICA	912-4128-070
C 105B	10KW 800-960 PL LOAD	CAPACITOR	1500PF 25KV MICA	912-4128-060
C 105B	10KW 800-960 PL LOAD	CAPACITOR	1500PF 25KV MICA	912-4128-060
C 105B	10KW 800-960 PL LOAD	CAPACITOR	1500PF 25KV MICA	912-4128-060
C 105B	10KW 970-1230 PL LOAD	CAPACITOR	1000PF 30KV MICA	912-4128-040
C 105B	10KW 970-1230 PL LOAD	CAPACITOR	1000PF 30KV MICA	912-4128-040
C 105B	10KW 970-1230 PL LOAD	CAPACITOR	1000PF 30KV MICA	912-4128-040
C 105B	10KW 970-1230 PL LOAD	CAPACITOR	1000PF 30KV MIÇA	912-4128-040
C 105B	10KW 970-1230 PL LOAD	CAPACITOR	1000PF 30KV MICA	912-4128-040
C 105B	10KW 1240-1600 PL LOAD	CAPACITOR	750PF 30KV MICA	912-4128-020
C 105B	10KW 1240-1600 PL LOAD	CAPACITOR	750PF 30KV MICA	912-4128-020
C 105B	10KW 1240-1600 PL LOAD	CAPACITOR	750PF 30KV MICA	912-4128-020
C 105B	10KW 1240-1600 PL LOAD	CAPACITOR	750PF 30KV MICA	912-4128-020
C 105B	10KW 1240-1600 PL LOAD	CAPACITOR	750PF 30KV MICA	912-4128-020
C 105C	5KW 540-680 PL LOAD	CAPACITOR	2000PF 15KV MICA	912-4127-080
C 105C	5KW 540-680 PL LOAD	CAPACITOR	2000PF 15KV MICA	912-4127-080
C 105C	5KW 540-680 PL LOAD	CAPACITOR	2000PF 15KV MICA	912-4127-080
C 105C	5KW 540-680 PL LOAD	CAPACITOR	2000PF 15KV MICA	912-4127-080
C 105C	5KW 690-810 PL LOAD	CAPACITOR	1500PF 15KV MICA	912-4127-060
C 105C	5KW 690-810 PL LOAD	CAPACITOR	1500PF 15KV MICA	912-4127-060
C 105C	5KW 690-810 PL LOAD	CAPACITOR	1500PF 15KV MICA	912-4127-060
C 105C	5KW 810-960 PL LOAD	CAPACITOR	1200PF 15KV MICA	912-4127-050
C 105C	5KW 810-960 PL LOAD	CAPACITOR	1200PF 15KV MICA	912-4127-050
C 105C	5KW 810-960 PL LOAD	CAPACITOR	1200PF 15KV MICA	912-4127-050
C 105C	5KW 970-1220 PL LOAD	CAPACITOR	1000PF 20KV MICA	912-4127-040
C 105C	5KW 970-1220 PL LOAD	CAPACITOR	1000PF 20KV MICA	912-4127-040
C 105C	5KW 970-1220 PL LOAD	CAPACITOR	1000PF 20KV MICA	912-4127-040
C 105C	5KW 970-1220 PL LOAD	CAPACITOR	1000PF 20KV MICA	912-4127-040
C 105C	5KW 1230-1600 PL LOAD	CAPACITOR	750PF 20KV MICA	912-4127-020
C 105C	5KW 1230-1600 PL LOAD	CAPACITOR	750PF 20KV MICA	912-4127-020
C 105C	5KW 1230-1600 PL LOAD	CAPACITOR	750PF 20KV MICA	912-4127-020
C 105C	5KW 1230-1600 PL LOAD	CAPACITOR	750PF 20KV MICA	912-4127-020
C 105C	5KW 1230-1600 PL LOAD	CAPACITOR	750PF 20KV MICA	912-4127-020
C 105C	10KW 540-680 PL LOAD	CAPACITOR	2000PF 20KV MICA	912-4128-070
C 105C	10KW 540-680 PL LOAD	CAPACITOR	2000PF 20KV MICA	912-4128-070
C 105C	10KW 540-680 PL LOAD	CAPACITOR	2000PF 20KV MICA	912-4128-070
C 105C	10KW 540-680 PL LOAD	CAPACITOR	2000PF 20KV MICA	912-4128-070
C 105C	10KW 690-810 PL LOAD	CAPACITOR	1500PF 25KV MICA	912-4128-060
C 105C	10KW 690-810 PL LOAD	CAPACITOR	1500PF 25KV MICA	912-4128-060
C 105C	10KW 690-810 PL LOAD	CAPACITOR	1500PF 25KV MICA	912-4128-060
C 105C	10KW 690-810 PL LOAD	CAPACITOR	1500PF 25KV MICA	912-4128-060
C 105C	10KW 820-960 PL LOAD	CAPACITOR	1200PF 25KV MICA	912-4128-050
C 105C	10KW 820-960 PL LOAD	CAPACITOR	1200PF 25KV MICA	912-4128-050
C 105C	10KW 970-1230 PL LOAD	CAPACITOR	1000PF 30KV MICA	912-4128-040
C 105C	10KW 970-1230 PL LOAD	CAPACITOR	1000PF 30KV MICA	912-4128-040
C 105C	10KW 970-1230 PL LOAD	CAPACITOR	1000PF 30KV MICA	912-4128-040
C 105C	10KW 970-1230 PL LOAD	CAPACITOR	1000PF 30KV MICA	912-4128-040
C 105C	10KW 970-1230 PL LOAD	CAPACITOR	1000PF 30KV MICA	912-4128-040
C 105C	10KW 1240-1600 PL LOAD	CAPACITOR	750PF 30KV MICA	912-4128-020
C 105C	10KW 1240-1600 PL LOAD	CAPACITOR	750PF 30KV MICA	912-4128-020
C 105C	10KW 1240-1600 PL LOAD	CAPACITOR	750PF 30KV MICA	912-4128-020
C 105C	10KW 1240-1600 PL LOAD	CAPACITOR	750PF 30KV MICA	912-4128-020
C 105C	10KW 1240-1600 PL LOAD	CAPACITOR	750PF 30KV MICA	912-4128-020
C 105D	5KW 540-590 PL LOAD	CAPACITOR	2000PF 15KV MICA	912-4127-080
C 105D	5KW 540-590 PL LOAD	CAPACITOR	2000PF 15KV MICA	912-4127-080
C 105D	5KW 600-680 PL LOAD	CAPACITOR	1500PF 15KV MICA	912-4127-060
C 105D	5KW 600-680 PL LOAD	CAPACITOR	1500PF 15KV MICA	912-4127-060
C 105D	5KW 690-960 PL LOAD	CAPACITOR	1200PF 15KV MICA	912-4127-050
C 105D	5KW 690-960 PL LOAD	CAPACITOR	1200PF 15KV MICA	912-4127-050
C 105D	5KW 690-960 PL LOAD	CAPACITOR	1200PF 15KV MICA	912-4127-050
C 105D	5KW 690-960 PL LOAD	CAPACITOR	1200PF 15KV MICA	912-4127-050
C 105D	5KW 690-960 PL LOAD	CAPACITOR	1200PF 15KV MICA	912-4127-050
C 105D	5KW 690-960 PL LOAD	CAPACITOR	1200PF 15KV MICA	912-4127-050
C 105D	5KW 970-1220 PL LOAD	CAPACITOR	1000PF 20KV MICA	912-4127-040
C 105D	5KW 970-1220 PL LOAD	CAPACITOR	1000PF 20KV MICA	912-4127-040
C 105D	5KW 970-1220 PL LOAD	CAPACITOR	1000PF 20KV MICA	912-4127-040
C 105D	5KW 970-1220 PL LOAD	CAPACITOR	1000PF 20KV MICA	912-4127-040
C 105D	5KW 1230-1600 PL LOAD	CAPACITOR	750PF 20KV MICA	912-4127-020
C 105D	5KW 1230-1600 PL LOAD	CAPACITOR	750PF 20KV MICA	912-4127-020
C 105D	5KW 1230-1600 PL LOAD	CAPACITOR	750PF 20KV MICA	912-4127-020

SYMBOL		FUNCTION	PART NAME	DESCRIPTION	PART NUMBER
C	105D	5KW 1230-1600 PL LOAD	CAPACITOR	750PF 20KV MICA	912-4127-020
C	105D	5KW 1230-1600 PL LOAD	CAPACITOR	750PF 20KV MICA	912-4127-020
C	105D	10KW 540-590 PL LOAD	CAPACITOR	2000PF 20KV MICA	912-4128-070
C	105D	10KW 540-590 PL LOAD	CAPACITOR	2000PF 20KV MICA	912-4128-070
C	105D	10KW 600-680 PL LOAD	CAPACITOR	1500PF 25KV MICA	912-4128-060
C	105D	10KW 600-680 PL LOAD	CAPACITOR	1500PF 25KV MICA	912-4128-060
C	105D	10KW 690-960 PL LOAD	CAPACITOR	1200PF 25KV MICA	912-4128-050
C	105D	10KW 690-960 PL LOAD	CAPACITOR	1200PF 25KV MICA	912-4128-050
C	105D	10KW 690-960 PL LOAD	CAPACITOR	1200PF 25KV MICA	912-4128-050
C	105D	10KW 690-960 PL LOAD	CAPACITOR	1200PF 25KV MICA	912-4128-050
C	105D	10KW 690-960 PL LOAD	CAPACITOR	1200PF 25KV MICA	912-4128-050
C	105D	10KW 690-960 PL LOAD	CAPACITOR	1200PF 25KV MICA	912-4128-050
C	105D	10KW 690-960 PL LOAD	CAPACITOR	1000PF 30KV MICA	912-4128-040
C	105D	10KW 970-1230 PL LOAD	CAPACITOR	1000PF 30KV MICA	912-4128-040
C	105D	10KW 970-1230 PL LOAD	CAPACITOR	1000PF 30KV MICA	912-4128-040
C	105D	10KW 970-1230 PL LOAD	CAPACITOR	1000PF 30KV MICA	912-4128-040
C	105D	10KW 970-1230 PL LOAD	CAPACITOR	1000PF 30KV MICA	912-4128-040
C	105D	10KW 1240-1600 PL LOAD	CAPACITOR	750PF 30KV MICA	912-4128-020
C	105D	10KW 1240-1600 PL LOAD	CAPACITOR	750PF 30KV MICA	912-4128-020
C	105D	10KW 1240-1600 PL LOAD	CAPACITOR	750PF 30KV MICA	912-4128-020
C	105D	10KW 1240-1600 PL LOAD	CAPACITOR	750PF 30KV MICA	912-4128-020
C	105D	10KW 1240-1600 PL LOAD	CAPACITOR	750PF 30KV MICA	912-4128-020
C	106	MOD MONITOR ADJUST	CAPACITOR	325PF VARIABLE 500V	922-1400-000
C	107A	DVR GRID TUNE PADDING	CAPACITOR	100PF 500V	912-2816-000
C	107B	DVR GRID TUNE PADDING	CAPACITOR	100PF 500V	912-2816-000
C	107C	DVR GRID TUNE PADDING	CAPACITOR	200PF 500V	912-2837-000
C	107D	DVR GRID TUNE PADDING	CAPACITOR	300PF 500V	912-2849-000
C	107E	DVR GRID TUNE PADDING	CAPACITOR	390PF 500V	912-2858-000
C	108	V3 CATHODE BYPASS	CAPACITOR	0.1MF 500V	913-3152-000
C	109	V4 CATHODE BYPASS	CAPACITOR	0.1MF 500V	913-3152-000
C	110	FREQ MON COUPLING	CAPACITOR	0.05MF 1KV	913-3153-000
C	111	AUDIO DVR INPUT BYPASS	CAPACITOR	500PF 500V	912-2977-000
C	112	AUDIO DVR INPUT BYPASS	CAPACITOR	500PF 500V	912-2977-000
C	113	Q3 COLLECTOR BYPASS	CAPACITOR	115MF 12V	183-1160-000
C	114	Q4 COLLECTOR BYPASS	CAPACITOR	115MF 12V	183-1160-000
C	115	V1 SCREEN BYPASS	CAPACITOR	3300PF 2.5KV	913-2830-000
C	116	V2 SCREEN BYPASS	CAPACITOR	3300PF 2.5KV	913-2830-000
C	117	TIME DELAY	CAPACITOR	250MF 300V	184-2536-000
C	118	OUTPUT I MTRING BYPASS	CAPACITOR	1000PF 500V FEEDTHRU	913-1292-000
C	119	OUTPUT I MTRING BYPASS	CAPACITOR	1000PF 500V FEEDTHRU	913-1292-000
C	120	K10 COIL BYPASS	CAPACITOR	1000PF 500V FEEDTHRU	913-1292-000
C	121	K10 COIL BYPASS	CAPACITOR	1000PF 500V FEEDTHRU	913-1292-000
C	122	CR27 RF BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
C	123	MOD MON PADDING	CAPACITOR	330PF 500V	912-2852-000
C	124	MOD MON COUPLING	CAPACITOR	330PF 500V	912-2852-000
C	125	28V STABILIZING	CAPACITOR	1400MF 50V	184-2516-000
C	126	PA SCREEN METER	CAPACITOR	0.1MF 200V	913-3681-000
C	127	V5 GRID TRAP	CAPACITOR	240PF 2.5KV	913-0846-000
C	128	V6 GRID TRAP	CAPACITOR	240PF 2.5KV	913-0846-000
C	129	INPUT COMPENSATING	CAPACITOR	820PF 500V	912-2995-000
C	130	INPUT COMPENSATING	CAPACITOR	820PF 500V	912-2995-000
C	131	FEEDBACK COMPENSATING	CAPACITOR	1800PF 500V	912-3333-000
C	132	FEEDBACK COMPENSATING	CAPACITOR	1800PF 500V	912-3333-000
C	133	K15 BYPASS	CAPACITOR	15MF 30V	184-7775-000
C	134	K16 BYPASS	CAPACITOR	15MF 30V	184-7775-000
CB	1	28V SUPPLY	CKT BREAKER	0.55A 3P CURVE 3	260-4038-030
CB	2	BLOWERS	CKT BREAKER	4A 2P CURVE 1	260-1709-000
CB	3	FILAMENTS	CKT BREAKER	9-15-9A 3P CURVE 3	260-4037-090
CB	4	BIAS SUPPLY	CKT BREAKER	0.5A 2P CURVE 3	260-4036-090
CB	5	SCREEN SUPPLY	CKT BREAKER	4.5A 3P CURVE 3	260-4038-090
CB	6	5KW HIGH VOLTAGE	CKT BREAKER	100A 3P	260-4055-010
CB	6	10KW HIGH VOLTAGE	CKT BREAKER	150A 3P	260-4055-020
CR	1	K1 ARC SUPPRESSING	DIODE	1N645 225PIV 400MA	353-2607-000
CR	2	TIME DELAY BLOCKING	DIODE	1N645 225PIV 400MA	353-2607-000
CR	3	K2 ARC SUPPRESSING	DIODE	1N645 225PIV 400MA	353-2607-000
CR	4	K3 ARC SUPPRESSING	DIODE	1N645 225PIV 400MA	353-2607-000
CR	5	K4 ARC SUPPRESSING	DIODE	1N645 225PIV 400MA	353-2607-000
CR	6	K5 ARC SUPPRESSING	DIODE	1N645 225PIV 400MA	353-2607-000

SYMBOL		FUNCTION	PART NAME	DESCRIPTION	PART NUMBER
CR	7	K6 ARC SUPPRESSING	DIODE	1N645 225PIV 400MA	353-2607-000
CR	8	K7 ARC SUPPRESSING	DIODE	1N645 225PIV 400MA	353-2607-000
CR	9	K9 ARC SUPPRESSING	DIODE	1N645 225PIV 400MA	353-2607-000
CR	10	K11 ARC SUPPRESSING	DIODE	1N645 225PIV 400MA	353-2607-000
CR	11	K12 ARC SUPPRESSING	DIODE	1N645 225PIV 400MA	353-2607-000
CR	12	K13 ARC SUPPRESSING	DIODE	1N645 225PIV 400MA	353-2607-000
CR	13	K14 ARC SUPPRESSING	DIODE	1N645 225PIV 400MA	353-2607-000
CR	14	28V SUPPLY	RECTIFIER	3 PHASE 28V	353-6327-010
CR	15	BIAS SUPPLY	RECTIFIER	1N4585 800PIV 600MA	353-6467-040
CR	16	BIAS SUPPLY	RECTIFIER	1N4585 800PIV 600MA	353-6467-040
CR	17	BIAS SUPPLY	RECTIFIER	1N4585 800PIV 600MA	353-6467-040
CR	18	BIAS SUPPLY	RECTIFIER	1N4585 800PIV 600MA	353-6467-040
CR	19	MOD SCREEN SUPPLY	RECTIFIER	3 PHASE 2500PIV	353-6464-010
CR	20	MOD SCRN SUPPLY SUPPR	THYRECTOR	6RS21VR6D 120V	353-0292-010
CR	21	PA SCREEN SUPPLY	RECTIFIER	3 PHASE 2500PIV	353-6464-010
CR	22	PA SCRN SUPPLY SUPPR	THYRECTOR	6RS21VR6D 120V	353-0292-010
CR	23	HIGH VOLTAGE	RECTIFIER	6LEGS,5000PIV/LEG	353-6465-010
CR	24	NOT USED		NOT USED	
CR	25	V3 BIAS BLOCKING	DIODE	1N645 225PIV 400MA	353-2607-000
CR	26	V4 BIAS BLOCKING	DIODE	1N645 225PIV 400MA	353-2607-000
CR	27	PL VOLT METER PROTECT	DIODE	1N976A 43V ZENER	353-3236-000
CR	28	NOT USED		NOT USED	
CR	29	NOT USED		NOT USED	
CR	30	BLOCKING	DIODE	1N645 225PIV 400MA	353-2607-000
E	1	V1 FIL	SPARK GAP	350V CARBON FILLED	762-8880-001
E	2	V2 FIL	SPARK GAP	350V CARBON FILLED	762-8880-001
E	3	PL VOLTAGE METER	SPARK GAP	350V CARBON FILLED	762-8880-001
E	4	V5 FIL	SPARK GAP	350V CARBON FILLED	762-8880-001
E	5	V6 FIL	SPARK GAP	350V CARBON FILLED	762-8880-001
E	6	CONTROL BAY GROUND	TERMINAL	1-1/8 IN 1/4-20NPB	343-0371-000
E	7	FLOOR CHASSIS GROUND	TERMINAL	1-1/8 IN 1/4-20NPB	343-0371-000
E	8	HV GROUND	TERMINAL	1-1/8 IN 1/4-20NPB	343-0371-000
E	9	NOT USED		NOT USED	
E	10	NOT USED		NOT USED	
E	11	PA SCRN MODULATION	TERMINAL	CERAMIC INSULATED	762-8843-001
E	12	MOD GROUND	TERMINAL	1 IN 1/4-20 NPB	343-0370-000
E	13	NOT USED		NOT USED	
E	14	V1 SCRN	SPARK GAP	2KV	762-8885-001
E	15	V2 SCRN	SPARK GAP	2KV	762-8885-001
E	16	V5 SCRN	SPARK GAP	2KV	762-8885-001
E	17	V6 SCRN	SPARK GAP	2KV	762-8885-001
E	18	A9 CONNECT	TERMINAL	CERAMIC INSULATED	762-8843-001
E	19	A9 CONNECT	TERMINAL	CERAMIC INSULATED	762-8843-001
E	20	A9 CONNECT	TERMINAL	CERAMIC INSULATED	762-8843-001
E	21	A9 CONNECT	TERMINAL	CERAMIC INSULATED	762-8843-001
E	22	750V PLATE CONNECT	TERMINAL	1/2X1 IN STAND-OFF	190-0018-000
E	23	MOD MON GROUND	TERMINAL	5/8 IN 8-32NPB	343-0312-000
E	24	A9 CONNECT	TERMINAL	CERAMIC INSULATED	762-8843-001
E	25	RF OVR SCRN CONNECT	TERMINAL	SOLDER TYPE	306-0976-000
E	26	FREQ MON	TERMINAL	SOLDER TYPE	306-0976-000
E	27	FREQ MON GROUND	TERMINAL	SOLDER TYPE	306-0976-000
E	28	MOD COUPLING GROUND	TERMINAL	1/2 IN 8-32NPB	343-0311-000
E	29	PA SCRN CURR METER	TERMINAL	SOLDER TYPE	306-0976-000
E	30	PA SCRN CURR METER	TERMINAL	SOLDER TYPE	306-0976-000
E	31	PA GRID CURR METER	TERMINAL	SOLDER TYPE	306-0976-000
E	32	PA GRID CURR METER	TERMINAL	SOLDER TYPE	306-0976-000
E	33	MOD SCREEN CONNECT	TERMINAL	1/2X2 IN STAND-OFF	190-0021-000
E	34	R118 CONNECT	TERMINAL	SOLDER TYPE	306-0976-000
E	35	R118 CONNECT	TERMINAL	SOLDER TYPE	306-0976-000
E	36	CR27 CONNECT	TERMINAL	SOLDER TYPE	306-0976-000
E	37	CR27 CONNECT	TERMINAL	SOLDER TYPE	306-0976-000
E	38	R138 CONNECT	TERMINAL	SOLDER TYPE	306-0976-000
E	39	R138 CONNECT	TERMINAL	SOLDER TYPE	306-0976-000
E	40	F27 CONNECT	TERMINAL	SOLDER TYPE	304-0318-000
E	41	K9 CONNECT	TERMINAL	SOLDER TYPE	304-0318-000
E	42	K17 GND CONNECT	TERMINAL	SOLDER TYPE	304-0318-000
E	43	CB3-2 CONNECT	TERMINAL	PRESS IN	304-0082-000
E	44	MOD INPUT GROUND	TERMINAL	SOLDER TYPE	304-0319-000
E	45	CB3-1 CONNECT	TERMINAL	PRESS IN	304-0082-000
E	46	AUX METER CONNECT	TERMINAL	1/2 IN 8-32NPB	343-0311-000

SYMBOL		FUNCTION	PART NAME	DESCRIPTION	PART NUMBER
E	47	MOD MON	TERMINAL	SOLDER TYPE	306-0976-000
E	48	MOD MON GROUND	TERMINAL	SOLDER TYPE	306-0976-000
E	49	R168 CONNECT	TERMINAL	SOLDER TYPE	306-0976-000
E	50	R168/R169 CONNECT	TERMINAL	SOLDER TYPE	306-0976-000
E	51	R169/R170 CONNECT	TERMINAL	SOLDER TYPE	306-0976-000
E	52	R170 CONNECT	TERMINAL	SOLDER TYPE	306-0976-000
E	53	PA SCRN METER GND	TERMINAL	SOLDER TYPE	304-0318-000
E	54	C11 CONNECT	TERMINAL	PRESS IN	306-1270-000
E	55	C12 CONNECT	TERMINAL	PRESS IN	306-1270-000
E	56	Q5-B CONNECT	TERMINAL	PRESS IN	306-1270-000
E	57	Q6-B CONNECT	TERMINAL	PRESS IN	306-1270-000
E	58	Q1-E/Q3-B CONNECT	TERMINAL	PRESS IN	306-1270-000
E	59	Q2-E/Q4-B CONNECT	TERMINAL	PRESS IN	306-1270-000
E	60	R174 CONNECT	TERMINAL	SOLDER TYPE	306-0976-000
E	61	R174 CONNECT	TERMINAL	SOLDER TYPE	306-0976-000
E	62	CR24-AC1 CONNECT	TERMINAL	CERAMIC	190-0021-000
E	63	CR24-AC2 CONNECT	TERMINAL	CERAMIC	190-0021-000
E	64	CR24-AC3 CONNECT	TERMINAL	CERAMIC	190-0021-000
E	65	FEEDBACK CONNECT	TERMINAL	SCREW TYPE	306-0197-000
E	66	FEEDBACK CONNECT	TERMINAL	SCREW TYPE	306-0197-000
J	1	PA 1 FIL VOLTAGE	TEST JACK	GREEN TIP	360-0153-000
J	2	PA 1 FIL VOLTAGE	TEST JACK	GREEN TIP	360-0153-000
J	3	PA 2 FIL VOLTAGE	TEST JACK	GREEN TIP	360-0153-000
J	4	PA 2 FIL VOLTAGE	TEST JACK	GREEN TIP	360-0153-000
J	5	MOD 1 FIL VOLTAGE	TEST JACK	GREEN TIP	360-0153-000
J	6	MOD 1 FIL VOLTAGE	TEST JACK	GREEN TIP	360-0153-000
J	7	MOD 2 FIL VOLTAGE	TEST JACK	GREEN TIP	360-0153-000
J	8	MOD 2 FIL VOLTAGE	TEST JACK	GREEN TIP	360-0153-000
J	9	RF INPUT	CONNECTOR	UG-909A/U BNC	357-9248-000
J	10	DRIVER CATHODE CURRENT	TEST JACK	RED TIP	360-0150-000
J	11	DRIVER CATHODE CURRENT	TEST JACK	BLACK TIP	360-0151-000
J	12	PA GRID CURRENT	TEST JACK	BLACK TIP	360-0151-000
J	13	PA GRID CURRENT	TEST JACK	RED TIP	360-0150-000
J	14	MOD 1 CATH CURRENT	TEST JACK	RED TIP	360-0150-000
J	15	MOD 1 CATH CURRENT	TEST JACK	BLACK TIP	360-0151-000
J	16	MOD 2 CATH CURRENT	TEST JACK	BLACK TIP	360-0151-000
J	17	MOD 2 CATH CURRENT	TEST JACK	RED TIP	360-0150-000
J	18	MODULATION MONITOR	CONNECTOR	UG909A/U BNC	357-9248-000
J	19	PA SCREEN VOLTAGE	TEST JACK	RED TIP	360-0150-000
J	20	PA SCREEN VOLTAGE	TEST JACK	BLACK TIP	360-0151-000
J	21	DISCR BAL	TEST JACK	RED TIP	360-0150-000
J	22	DISCR BAL	TEST JACK	BLACK TIP	360-0151-000
K	1	BLOWERS	RELAY	28VDC 2A 2B + NO AUX	401-1686-010
K	2	FILAMENTS/BIAS	RELAY	28VDC 3A + 1A 1B AUX	401-1688-010
K	3	LOW PWR PLATE CONTROL	RELAY	28VDC 2A 2B + NO AUX	401-1686-010
K	4	HIGH PWR PLATE CONTROL	RELAY	28VDC 2A 2B + NO AUX	401-1686-010
K	5	LOW PWR PLATE	RELAY	28VDC 3A + 1A 3B AUX	401-1687-010
K	6	HIGH PWR PLATE	RELAY	28VDC 3A + 1A 3B AUX	401-1687-010
K	7	SCREEN	RELAY	28VDC 3A + 1A 1B AUX	401-1688-010
K	8	AUDIO INPUT	RELAY	28VDC/115VAC COIL 2C	972-1347-000
K	9	PA SCREEN	RELAY	28VDC/115VAC COIL 2C	970-2438-030
K	10	MODULATION MONITOR	RELAY	28VDC 2C	970-2437-080
K	11	TUNING LOWER	RELAY	28VDC/115VAC COIL 2C	972-1347-000
K	12	TUNING RAISE	RELAY	28VDC/115VAC COIL 2C	972-1347-000
K	13	LOADING LOWER	RELAY	28VDC/115VAC COIL 2C	972-1347-000
K	14	LOADING RAISE	RELAY	28VDC/115VAC COIL 2C	972-1347-000
K	15	AUTO TUNE LOWER	RELAY	1.5K OHM 4.5 MA COIL	408-1193-000
K	16	AUTO TUNE RAISE	RELAY	1.5K OHM 4.5 MA COIL	408-1193-000
K	17	MOD RECUCED POWER	RELAY	24VDC 3C	970-2259-000
L	1	BIAS SUPPLY FILTER	INDUCTOR	12HY 200MA	668-0077-010
L	2	MOD SCRN SUPPLY FILTER	INDUCTOR	4HY 400MA E-14299	668-0070-010
L	3	PA SCRN SUPPLY FILTER	INDUCTOR	4HY 1A E-14300	668-0071-010
L	4	5KW MODULATION	INDUCTOR	30HY + AUX WINDING	668-0080-010
L	4	10KW MODULATION	INDUCTOR	15HY + AUX WINDING	668-0079-010
L	5A	RF DVR COMP FILTER	INDUCTOR	12UHY 450MA	240-1601-000
L	5B	RF DVR COMP FILTER	INDUCTOR	8.2UHY 600MA	240-1599-000

SYMBOL	FUNCTION	PART NAME	DESCRIPTION	PART NUMBER
L 5C	RF DVR COMP FILTER	INDUCTOR	5.6UHY 850MA	240-1597-000
L 6	PA GRID TUNING	INDUCTOR	60UHY WITH 2 ADJ TAP	549-5098-004
L 7	RF DVR PLATE CHOKE	INDUCTOR	4MHY 400MA	240-9006-000
L 8	V5 GRID PARASITIC TRAP	INDUCTOR	0.17UHY	762-8820-001
L 9	V5 GRID CHOKE	INDUCTOR	5MHY 105MA	240-0843-000
L 10	V6 GRID PARASITIC TRAP	INDUCTOR	0.17UHY	762-8820-001
L 11	V6 GRID CHOKE	INDUCTOR	5MHY 105MA	240-0843-000
L 12	PA PLATE CHOKE	INDUCTOR	4MHY 4A	762-8801-002
L 13	5KW PA PLATE CHOKE	INDUCTOR	17MHY 4A	762-8800-002
L 13	10KW PA PLATE CHOKE	INDUCTOR	4.3MHY 4A	762-8800-003
L 14	5KW 540-810 OUT NET	INDUCTOR	120UHY 1/2 IN RIBBON	980-0062-000
L 14	5KW 540-810 OUT NET	INDUCTOR	120UHY 1/2 IN RIBBON	980-0062-000
L 14	5KW 540-810 OUT NET	INDUCTOR	120UHY 1/2 IN RIBBON	980-0062-000
L 14	5KW 540-810 OUT NET	INDUCTOR	120UHY 1/2 IN RIBBON	980-0062-000
L 14	5KW 540-810 OUT NET	INDUCTOR	120UHY 1/2 IN RIBBON	980-0062-000
L 14	5KW 540-810 OUT NET	INDUCTOR	120UHY 1/2 IN RIBBON	980-0062-000
L 14	5KW 540-810 OUT NET	INDUCTOR	120UHY 1/2 IN RIBBON	980-0062-000
L 14	5KW 820-1600 OUT NET	INDUCTOR	60UHY 1/2 IN RIBBON	980-0063-000
L 14	5KW 820-1600 OUT NET	INDUCTOR	60UHY 1/2 IN RIBBON	980-0063-000
L 14	5KW 820-1600 OUT NET	INDUCTOR	60UHY 1/2 IN RIBBON	980-0063-000
L 14	5KW 820-1600 OUT NET	INDUCTOR	60UHY 1/2 IN RIBBON	980-0063-000
L 14	5KW 820-1600 OUT NET	INDUCTOR	60UHY 1/2 IN RIBBON	980-0063-000
L 14	5KW 820-1600 OUT NET	INDUCTOR	60UHY 1/2 IN RIBBON	980-0063-000
L 14	5KW 820-1600 OUT NET	INDUCTOR	60UHY 1/2 IN RIBBON	980-0063-000
L 14	5KW 820-1600 OUT NET	INDUCTOR	60UHY 1/2 IN RIBBON	980-0063-000
L 14	5KW 820-1600 OUT NET	INDUCTOR	60UHY 1/2 IN RIBBON	980-0063-000
L 14	5KW 820-1600 OUT NET	INDUCTOR	60UHY 1/2 IN RIBBON	980-0063-000
L 14	5KW 820-1600 OUT NET	INDUCTOR	60UHY 1/2 IN RIBBON	980-0063-000
L 14	5KW 820-1600 OUT NET	INDUCTOR	60UHY 1/2 IN RIBBON	980-0063-000
L 14	10KW 540-620 OUT NET	INDUCTOR	120UHY 1/2 IN RIBBON	980-0062-000
L 14	10KW 540-620 OUT NET	INDUCTOR	120UHY 1/2 IN RIBBON	980-0062-000
L 14	10KW 540-620 OUT NET	INDUCTOR	120UHY 1/2 IN RIBBON	980-0062-000
L 14	10KW 630-1250 OUT NET	INDUCTOR	60UHY 1/2 IN RIBBON	980-0063-000
L 14	10KW 630-1250 OUT NET	INDUCTOR	60UHY 1/2 IN RIBBON	980-0063-000
L 14	10KW 630-1250 OUT NET	INDUCTOR	60UHY 1/2 IN RIBBON	980-0063-000
L 14	10KW 630-1250 OUT NET	INDUCTOR	60UHY 1/2 IN RIBBON	980-0063-000
L 14	10KW 630-1250 OUT NET	INDUCTOR	60UHY 1/2 IN RIBBON	980-0063-000
L 14	10KW 630-1250 OUT NET	INDUCTOR	60UHY 1/2 IN RIBBON	980-0063-000
L 14	10KW 630-1250 OUT NET	INDUCTOR	60UHY 1/2 IN RIBBON	980-0063-000
L 14	10KW 630-1250 OUT NET	INDUCTOR	60UHY 1/2 IN RIBBON	980-0063-000
L 14	10KW 630-1250 OUT NET	INDUCTOR	60UHY 1/2 IN RIBBON	980-0063-000
L 14	10KW 630-1250 OUT NET	INDUCTOR	60UHY 1/2 IN RIBBON	980-0063-000
L 14	10KW 630-1250 OUT NET	INDUCTOR	60UHY 1/2 IN RIBBON	980-0063-000
L 14	10KW 630-1250 OUT NET	INDUCTOR	60UHY 1/2 IN RIBBON	980-0063-000
L 14	10KW 630-1250 OUT NET	INDUCTOR	60UHY 1/2 IN RIBBON	980-0063-000
L 14	10KW 1260-1600 OUT NET	INDUCTOR	30UHY 1/2 IN RIBBON	980-0064-000
L 14	10KW 1260-1600 OUT NET	INDUCTOR	30UHY 1/2 IN RIBBON	980-0064-000
L 14	10KW 1260-1600 OUT NET	INDUCTOR	30UHY 1/2 IN RIBBON	980-0064-000
L 14	10KW 1260-1600 OUT NET	INDUCTOR	30UHY 1/2 IN RIBBON	980-0064-000
L 15	5KW 540-960 OUT NET	INDUCTOR	50UHY 1/2 IN RIBBON	980-0050-000
L 15	5KW 540-960 OUT NET	INDUCTOR	50UHY 1/2 IN RIBBON	980-0050-000
L 15	5KW 540-960 OUT NET	INDUCTOR	50UHY 1/2 IN RIBBON	980-0050-000
L 15	5KW 540-960 OUT NET	INDUCTOR	50UHY 1/2 IN RIBBON	980-0050-000
L 15	5KW 540-960 OUT NET	INDUCTOR	50UHY 1/2 IN RIBBON	980-0050-000
L 15	5KW 540-960 OUT NET	INDUCTOR	50UHY 1/2 IN RIBBON	980-0050-000
L 15	5KW 540-960 OUT NET	INDUCTOR	50UHY 1/2 IN RIBBON	980-0050-000
L 15	5KW 540-960 OUT NET	INDUCTOR	50UHY 1/2 IN RIBBON	980-0050-000
L 15	5KW 540-960 OUT NET	INDUCTOR	50UHY 1/2 IN RIBBON	980-0050-000
L 15	5KW 540-960 OUT NET	INDUCTOR	50UHY 1/2 IN RIBBON	980-0050-000
L 15	5KW 970-1600 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L 15	5KW 970-1600 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L 15	5KW 970-1600 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L 15	5KW 970-1600 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L 15	5KW 970-1600 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L 15	5KW 970-1600 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L 15	5KW 970-1600 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L 15	5KW 970-1600 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L 15	5KW 970-1600 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L 15	10KW 540-960 OUT NET	INDUCTOR	50UHY 1/2 IN RIBBON	980-0050-000
L 15	10KW 540-960 OUT NET	INDUCTOR	50UHY 1/2 IN RIBBON	980-0050-000
L 15	10KW 540-960 OUT NET	INDUCTOR	50UHY 1/2 IN RIBBON	980-0050-000
L 15	10KW 540-960 OUT NET	INDUCTOR	50UHY 1/2 IN RIBBON	980-0050-000

SYMBOL		FUNCTION	PART NAME	DESCRIPTION	PART NUMBER
L	15	10KW 540-960 OUT NET	INDUCTOR	50UHY 1/2 IN RIBBON	980-0050-000
L	15	10KW 540-960 OUT NET	INDUCTOR	50UHY 1/2 IN RIBBON	980-0050-000
L	15	10KW 540-960 OUT NET	INDUCTOR	50UHY 1/2 IN RIBBON	980-0050-000
L	15	10KW 540-960 OUT NET	INDUCTOR	50UHY 1/2 IN RIBBON	980-0050-000
L	15	10KW 540-960 OUT NET	INDUCTOR	50UHY 1/2 IN RIBBON	980-0050-000
L	15	10KW 540-960 OUT NET	INDUCTOR	50UHY 1/2 IN RIBBON	980-0050-000
L	15	10KW 970-1600 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	15	10KW 970-1600 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	15	10KW 970-1600 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	15	10KW 970-1600 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	15	10KW 970-1600 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	15	10KW 970-1600 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	15	10KW 970-1600 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	15	10KW 970-1600 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	15	10KW 970-1600 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	15	10KW 970-1600 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	16	5KW 540-1050 TRAP	INDUCTOR	26UHY 3/8 IN RIBBON	980-0127-000
L	16	5KW 540-1050 TRAP	INDUCTOR	26UHY 3/8 IN RIBBON	980-0127-000
L	16	5KW 540-1050 TRAP	INDUCTOR	26UHY 3/8 IN RIBBON	980-0127-000
L	16	5KW 540-1050 TRAP	INDUCTOR	26UHY 3/8 IN RIBBON	980-0127-000
L	16	5KW 540-1050 TRAP	INDUCTOR	26UHY 3/8 IN RIBBON	980-0127-000
L	16	5KW 540-1050 TRAP	INDUCTOR	26UHY 3/8 IN RIBBON	980-0127-000
L	16	5KW 540-1050 TRAP	INDUCTOR	26UHY 3/8 IN RIBBON	980-0127-000
L	16	5KW 540-1050 TRAP	INDUCTOR	26UHY 3/8 IN RIBBON	980-0127-000
L	16	5KW 540-1050 TRAP	INDUCTOR	26UHY 3/8 IN RIBBON	980-0127-000
L	16	5KW 540-1050 TRAP	INDUCTOR	26UHY 3/8 IN RIBBON	980-0127-000
L	16	5KW 540-1050 TRAP	INDUCTOR	26UHY 3/8 IN RIBBON	980-0127-000
L	16	5KW 540-1050 TRAP	INDUCTOR	26UHY 3/8 IN RIBBON	980-0127-000
L	16	5KW 1060-1600 TRAP	INDUCTOR	15UHY 3/8 IN RIBBON	980-0126-000
L	16	5KW 1060-1600 TRAP	INDUCTOR	15UHY 3/8 IN RIBBON	980-0126-000
L	16	5KW 1060-1600 TRAP	INDUCTOR	15UHY 3/8 IN RIBBON	980-0126-000
L	16	5KW 1060-1600 TRAP	INDUCTOR	15UHY 3/8 IN RIBBON	980-0126-000
L	16	5KW 1060-1600 TRAP	INDUCTOR	15UHY 3/8 IN RIBBON	980-0126-000
L	16	5KW 1060-1600 TRAP	INDUCTOR	15UHY 3/8 IN RIBBON	980-0126-000
L	16	5KW 1060-1600 TRAP	INDUCTOR	15UHY 3/8 IN RIBBON	980-0126-000
L	16	10KW 540-1050 TRAP	INDUCTOR	26UHY 3/8 IN RIBBON	980-0127-000
L	16	10KW 540-1050 TRAP	INDUCTOR	26UHY 3/8 IN RIBBON	980-0127-000
L	16	10KW 540-1050 TRAP	INDUCTOR	26UHY 3/8 IN RIBBON	980-0127-000
L	16	10KW 540-1050 TRAP	INDUCTOR	26UHY 3/8 IN RIBBON	980-0127-000
L	16	10KW 540-1050 TRAP	INDUCTOR	26UHY 3/8 IN RIBBON	980-0127-000
L	16	10KW 540-1050 TRAP	INDUCTOR	26UHY 3/8 IN RIBBON	980-0127-000
L	16	10KW 540-1050 TRAP	INDUCTOR	26UHY 3/8 IN RIBBON	980-0127-000
L	16	10KW 540-1050 TRAP	INDUCTOR	26UHY 3/8 IN RIBBON	980-0127-000
L	16	10KW 540-1050 TRAP	INDUCTOR	26UHY 3/8 IN RIBBON	980-0127-000
L	16	10KW 540-1050 TRAP	INDUCTOR	26UHY 3/8 IN RIBBON	980-0127-000
L	16	10KW 540-1050 TRAP	INDUCTOR	26UHY 3/8 IN RIBBON	980-0127-000
L	16	10KW 540-1050 TRAP	INDUCTOR	26UHY 3/8 IN RIBBON	980-0127-000
L	16	10KW 1060-1600 TRAP	INDUCTOR	15UHY 3/8 IN RIBBON	980-0126-000
L	16	10KW 1060-1600 TRAP	INDUCTOR	15UHY 3/8 IN RIBBON	980-0126-000
L	16	10KW 1060-1600 TRAP	INDUCTOR	15UHY 3/8 IN RIBBON	980-0126-000
L	16	10KW 1060-1600 TRAP	INDUCTOR	15UHY 3/8 IN RIBBON	980-0126-000
L	16	10KW 1060-1600 TRAP	INDUCTOR	15UHY 3/8 IN RIBBON	980-0126-000
L	16	10KW 1060-1600 TRAP	INDUCTOR	15UHY 3/8 IN RIBBON	980-0126-000
L	16	10KW 1060-1600 TRAP	INDUCTOR	15UHY 3/8 IN RIBBON	980-0126-000
L	16	10KW 1060-1600 TRAP	INDUCTOR	15UHY 3/8 IN RIBBON	980-0126-000
L	17	5KW 540-1050 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	17	5KW 540-1050 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	17	5KW 540-1050 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	17	5KW 540-1050 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	17	5KW 540-1050 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	17	5KW 540-1050 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	17	5KW 540-1050 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	17	5KW 540-1050 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	17	5KW 540-1050 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	17	5KW 540-1050 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	17	5KW 540-1050 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	17	5KW 540-1050 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	17	5KW 1060-1600 OUT NET	INDUCTOR	15UHY 1/2 IN RIBBON	980-0132-000
L	17	5KW 1060-1600 OUT NET	INDUCTOR	15UHY 1/2 IN RIBBON	980-0132-000
L	17	5KW 1060-1600 OUT NET	INDUCTOR	15UHY 1/2 IN RIBBON	980-0132-000
L	17	5KW 1060-1600 OUT NET	INDUCTOR	15UHY 1/2 IN RIBBON	980-0132-000
L	17	5KW 1060-1600 OUT NET	INDUCTOR	15UHY 1/2 IN RIBBON	980-0132-000

SYMBOL		FUNCTION	PART NAME	DESCRIPTION	PART NUMBER
L	17	5KW 1060-1600 OUT NET	INDUCTOR	15UHY 1/2 IN RIBBON	980-0132-000
L	17	5KW 1060-1600 OUT NET	INDUCTOR	15UHY 1/2 IN RIBBON	980-0132-000
L	17	10KW 540-1050 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	17	10KW 540-1050 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	17	10KW 540-1050 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	17	10KW 540-1050 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	17	10KW 540-1050 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	17	10KW 540-1050 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	17	10KW 540-1050 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	17	10KW 540-1050 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	17	10KW 540-1050 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	17	10KW 540-1050 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	17	10KW 540-1050 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	17	10KW 540-1050 OUT NET	INDUCTOR	28UHY 1/2 IN RIBBON	980-0049-000
L	17	10KW 1060-1600 OUT NET	INDUCTOR	15UHY 1/2 IN RIBBON	980-0132-000
L	17	10KW 1060-1600 OUT NET	INDUCTOR	15UHY 1/2 IN RIBBON	980-0132-000
L	17	10KW 1060-1600 OUT NET	INDUCTOR	15UHY 1/2 IN RIBBON	980-0132-000
L	17	10KW 1060-1600 OUT NET	INDUCTOR	15UHY 1/2 IN RIBBON	980-0132-000
L	17	10KW 1060-1600 OUT NET	INDUCTOR	15UHY 1/2 IN RIBBON	980-0132-000
L	17	10KW 1060-1600 OUT NET	INDUCTOR	15UHY 1/2 IN RIBBON	980-0132-000
L	17	10KW 1060-1600 OUT NET	INDUCTOR	15UHY 1/2 IN RIBBON	980-0132-000
L	17	10KW 1060-1600 OUT NET	INDUCTOR	15UHY 1/2 IN RIBBON	980-0132-000
L	18	MOD MON SAMPLING	INDUCTOR	81.5UHY	762-8908-001
L	19	V5 GRID TRAP	INDUCTOR	0.17UHY	762-8820-001
L	20	V6 GRID TRAP	INDUCTOR	0.17UHY	762-8820-001
L	21	CURRENT SENSING	INDUCTOR	150UH TOROID	762-8819-003
L	22	FEEDBACK COMPENSATING	INDUCTOR	30MH	240-0431-000
L	23	FEEDBACK COMPENSATING	INDUCTOR	30MH	240-0431-000
L	24	FEEDBACK COMPENSATING	INDUCTOR	30MH	240-0431-000
L	25	FEEDBACK COMPENSATING	INDUCTOR	30MH	240-0431-000
M	1	FILAMENT HOURS	METER 50CPS	230VAC 9999.9HRS	458-0190-010
M	1	FILAMENT HOURS	METER 50CPS	230VAC 9999.9HRS	458-0190-010
M	1	FILAMENT HOURS	METER 60CPS	230VAC 9999.9HRS	458-0190-000
Q	1	FIRST AUDIO	TRANSISTOR	2N2102 NPN 5W	352-0646-010
Q	2	FIRST AUDIO	TRANSISTOR	2N2102 NPN 5W	352-0646-010
Q	3	SECOND AUDIO	TRANSISTOR	2N2102 NPN 5W	352-0646-010
Q	4	SECOND AUDIO	TRANSISTOR	2N2102 NPN 5W	352-0646-010
Q	5	AUDIO CVR	TRANSISTOR	2N3055 NPN 115W	352-0583-010
Q	6	AUDIO OVR	TRANSISTOR	2N3055 NPN 115W	352-0583-010
R	1	TIME DELAY LIMITING	RESISTOR	100 OHM 2W 10PC	745-5610-000
R	2	RECYCLE DELAY CHARGE	RESISTOR	5.6K OHM 1/2W 10PC	745-1384-000
R	3	RECYCLE DELAY DISCHG	RESISTOR	220K OHM 1/2W 10PC	745-1408-000
R	4	28V SUPPLY SUPPRESSOR	RESISTOR	47 OHM 2W 10PC	745-5596-000
R	5	28V SUPPLY BLEEDER	RESISTOR	150 OHM 25W 5PC	710-3150-000
R	6	28V SUPPLY METERING	RESISTOR	28.7K OHM 1/2W 1PC	705-7666-000
R	7	PA 1 FIL VOLT ADJUST	RESISTOR	5 OHM 75W POT	737-0027-000
R	8	PA 2 FIL VOLT ADJUST	RESISTOR	5 OHM 75W POT	737-0027-000
R	9	MOD 1 FIL VOLT ADJUST	RESISTOR	5 OHM 75W POT	737-0027-000
R	10	MOD 2 FIL VOLT ADJUST	RESISTOR	5 OHM 75W POT	737-0027-000
R	11	BIAS SUPPLY SUPPRESSOR	RESISTOR	1K OHM 2W 10PC	745-5652-000
R	12	AUDIO CVR 28V LIMITING	RESISTOR	1 OHM 10W 1PC	747-8950-000
R	13	BIAS SUPPLY BLEEDER	RESISTOR	1K OHM 100W 5PC	710-9290-000
R	14	BIAS SUPPLY BLEEDER	RESISTOR	430 OHM 26W 5PC	747-1793-000
R	15	BIAS SUPPLY METER	RESISTOR	75K OHM 3/4W 1PC	705-7686-000
R	16	BIAS SUPPLY METER	RESISTOR	75K OHM 3/4W 1PC	705-7686-000
R	17	BIAS SUPPLY METER	RESISTOR	1.5K OHM 1/2W 1PC	705-7811-000
R	18	THYRECTOR LIMITING	RESISTOR	100 OHM 10W 5PC	710-2900-000
R	19	MOD SCRN SUP BLEEDER	RESISTOR	20K OHM 100W 5PC	710-9299-000
R	20	MOD SCRN SUPPLY METER	RESISTOR	249K OHM 3/4W 1PC	705-7711-000
R	21	MOD SCRN SUPPLY METER	RESISTOR	249K OHM 3/4W 1PC	705-7711-000
R	22	MOD SCRN SUPPLY METER	RESISTOR	249K OHM 3/4W 1PC	705-7711-000
R	23	MOD SCRN SUPPLY METER	RESISTOR	1.5K OHM 1/2W 1PC	705-7811-000
R	24	THYRECTOR LIMITING	RESISTOR	100 OHM 10W 5PC	710-2900-000
R	25	PA SCRN SUPPLY BLEEDER	RESISTOR	15K OHM 100W 5PC	710-9298-000
R	26	PA SCRN SUPPLY BLEEDER	RESISTOR	7.5K OHM 25W 5PC	710-0068-000
R	27	PA SCRN SUPPLY METER	RESISTOR	249K OHM 3/4W 1PC	705-7711-000

SYMBOL	FUNCTION	PART NAME	DESCRIPTION	PART NUMBER
R 28	PA SCRN SUPPLY METER	RESISTOR	249K OHM 3/4W 1PC	705-7711-000
R 29	PA SCRN SUPPLY METER	RESISTOR	249K OHM 3/4W 1PC	705-7711-000
R 30	PA SCRN SUPPLY METER	RESISTOR	1.5K OHM 1/2W 1PC	705-7811-000
R 31	HIGH VOLT SUPPRESSOR	RESISTOR	300 OHM 15W 10PC	712-4401-120
R 32	HIGH VOLT SUPPRESSOR	RESISTOR	300 OHM 15W 10PC	712-4401-120
R 33	HV FILTER CAP LIMITING	RESISTOR	25 OHM 90W 10PC	712-4401-110
R 34	HV SUPPLY BLEEDER	RESISTOR	50K OHM 200W 5PC	710-3138-320
R 35	HV SUPPLY BLEEDER	RESISTOR	50K OHM 200W 5PC	710-3138-320
R 36	DC OVLD SHUNT	RESISTOR	0.5 OHM 100W10PC	710-5076-050
R 37	5KW AUDIO INPUT PAD	RESISTOR	200 OHM 1/2W 10PC	745-1322-000
R 37	10KW AUDIO INPUT PAD	RESISTOR	100 OHM 1/2W 10PC	745-1310-000
R 38	5KW AUDIO INPUT PAD	RESISTOR	200 OHM 1/2W 10PC	745-1322-000
R 38	10KW AUDIO INPUT PAD	RESISTOR	100 OHM 1/2W 10PC	745-1310-000
R 39	5KW AUDIO INPUT PAD	RESISTOR	240 OHM 1/2W 10PC	745-1326-000
R 39	10KW AUDIO INPUT PAD	RESISTOR	820 OHM 1/2W 10PC	745-1349-000
R 40	5KW AUDIO INPUT PAD	RESISTOR	200 OHM 1/2W 10PC	745-1322-000
R 40	10KW AUDIO INPUT PAD	RESISTOR	100 OHM 1/2W 10PC	745-1310-000
R 41	5KW AUDIO INPUT PAD	RESISTOR	200 OHM 1/2W 10PC	745-1322-000
R 41	10KW AUDIO INPUT PAD	RESISTOR	100 OHM 1/2W 10PC	745-1310-000
R 42	5KW AUDIO CUTBACK PAD	RESISTOR	220 OHM 1/2W 10PC	745-1323-000
R 42	10KW AUDIO CUTBACK PAD	RESISTOR	39 OHM 1/2W 10PC	745-1293-000
R 43	5KW AUDIO CUTBACK PAD	RESISTOR	680 OHM 1/2W 10PC	745-1344-000
R 43	10KW AUDIO CUTBACK PAD	RESISTOR	3.9K OHM 1/2W 10PC	745-1377-000
R 44	5KW AUDIO CUTBACK PAD	RESISTOR	220 OHM 1/2W 10PC	745-1323-000
R 44	10KW AUDIO CUTBACK PAD	RESISTOR	39 OHM 1/2W 10PC	745-1293-000
R 45	AUDIO INPUT LOADING	RESISTOR	27K OHM 1W 10PC	745-3412-000
R 46	AUDIO INPUT LOADING	RESISTOR	3.48K OHM 1/4W 1PC	705-6622-000
R 47	AUDIO INPUT LOADING	RESISTOR	3.48K OHM 1/4W 1PC	705-6622-000
R 48	AUDIO INPUT LOADING	RESISTOR	27K OHM 1W 10PC	745-3412-000
R 49	FEEDBACK LOADING	RESISTOR	7.5K OHM 1/4W 1PC	705-6638-000
R 50	FEEDBACK LOADING	RESISTOR	7.5K OHM 1/4W 1PC	705-6638-000
R 51	Q3 COLLECTOR	RESISTOR	100 OHM 2W 10PC	745-5610-000
R 52	Q4 COLLECTOR	RESISTOR	100 OHM 2W 10PC	745-5610-000
R 53	Q5 EMITTER	RESISTOR	2 OHM 5W 1PC	747-9744-000
R 54	Q6 EMITTER	RESISTOR	2 OHM 5W 1PC	747-9744-000
R 55	Q5 EMITTER	RESISTOR	2 OHM 5W 1PC	747-9744-000
R 56	Q6 EMITTER	RESISTOR	2 OHM 5W 1PC	747-9744-000
R 57	MOD MON LOADING	RESISTOR	1K OHM 2W 10PC	745-5652-000
R 58	RF DVR CATH CURR METER	RESISTOR	15 OHM 2W 10PC	745-5575-000
R 59	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 60	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 61	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 62	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 63	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 64	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 65	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 66	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 67	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 68	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 69	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 70	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 71	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 72	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 73	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 74	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 75	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 76	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 77	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 78	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 79	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 80	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 81	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 82	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 83	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 84	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 85	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 86	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 87	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 88	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 89	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 90	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 91	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000

SYMBOL	FUNCTION	PART NAME	DESCRIPTION	PART NUMBER
R 92	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 93	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 94	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 95	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 96	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 97	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 98	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 99	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 100	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 101	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 102	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 103	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 104	FEEDBACK NETWORK	RESISTOR	200K OHM 2W 5PC	745-5748-000
R 105	MOD 1 DRIVE ADJ	RESISTOR	1K OHM 4W POT	377-0716-080
R 106	MOD 1 DRIVE LOAD	RESISTOR	3.3K OHM 10W 5PC	746-8000-070
R 107	MOD 2 DRIVE LOAD	RESISTOR	3.3K OHM 10W 5PC	746-8000-070
R 108	MOD 2 DRIVE ADJ	RESISTOR	1K OHM 4W POT	377-0716-080
R 109	MOD 1 BIAS ADJ	RESISTOR	10K OHM 4W POT	377-0716-120
R 110	MOD 2 BIAS ADJ	RESISTOR	10K OHM 4W POT	377-0716-120
R 111	MOD BIAS DROPPING	RESISTOR	7.5K OHM 10W 5PC	710-2932-000
R 112	V1 GRID STABILIZING	RESISTOR	50 OHM 16.5W 10PC	712-0129-000
R 113	V1 SCRN STABILIZING	RESISTOR	33 OHM 2W 10PC	745-5589-000
R 114	MOD 1 HUM BAL ADJ	RESISTOR	10 OHM 50W POT	735-1013-500
R 115	MOD 1 OVLD SHUNT	RESISTOR	1 OHM 36W 10PC	710-5076-040
R 116	MOD 1 CATH CURR METER	RESISTOR	1 OHM 36W 1PC	710-5076-010
R 117	MOD PLATE CURR METER	RESISTOR	0.5 OHM 36W 1PC	710-5076-030
R 118	MOD SCRN CURR METER	RESISTOR	1 OHM 2.5W 1PC	746-9443-000
R 119	MOD 2 CATH CURR METER	RESISTOR	1 OHM 36W 1PC	710-5076-010
R 120	MOD 2 OVLD SHUNT	RESISTOR	1 OHM 36W 10PC	710-5076-040
R 121	MOD 2 HUM BAL ADJ	RESISTOR	10 OHM 50W POT	735-1013-500
R 122	V2 GRID STABILIZING	RESISTOR	50 OHM 16.5W 10PC	712-0129-000
R 123	V2 SCRN STABILIZING	RESISTOR	33 OHM 2W 10PC	745-5589-000
R 124	RF OVR COMP FILT LOAD	RESISTOR	47 OHM 1/2W 10PC	745-1296-000
R 125	V3 GRID STABILIZING	RESISTOR	47 OHM 2W 10PC	745-5596-000
R 126	V3 GRID	RESISTOR	6.8K OHM 2W 10PC	745-5687-000
R 127	V3 CATHODE	RESISTOR	10 OHM 2.5W 1PC	746-9442-000
R 128	V3 GRID	RESISTOR	47K OHM 1W 10PC	745-3422-000
R 129	V3 SCRN STABILIZING	RESISTOR	100 OHM 1W 5PC	745-3310-000
R 130	V3 PL PARASITIC SUPPR	RESISTOR	47 OHM 2W 10PC	745-5596-000
R 131	V4 PL PARASITIC SUPPR	RESISTOR	47 OHM 2W 10PC	745-5596-000
R 132	V4 SCRN STABILIZING	RESISTOR	100 OHM 1W 5PC	745-3310-000
R 133	V4 CATHODE	RESISTOR	10 OHM 2.5W 1PC	746-9442-000
R 134	V4 GRID STABILIZING	RESISTOR	47 OHM 2W 10PC	745-5596-000
R 135	V4 GRID	RESISTOR	6.8K OHM 2W 10PC	745-5687-000
R 136	V4 GRID	RESISTOR	47K OHM 1W 10PC	745-3422-000
R 137	28V STABILIZING	RESISTOR	10 OHM 1W 10PC	745-3268-000
R 138	PLATE VOLTAGE METER	RESISTOR	10K OHM 2W 10PC	745-5694-000
R 139A	5KW PA SCREEN	RESISTOR	1.5K OHM 200W ADJ	716-0055-070
R 139A	10KW PA SCREEN	RESISTOR	1K OHM 200W ADJ	716-0055-060
R 139B	5KW PA SCREEN	RESISTOR	1.5K OHM 200W ADJ	716-0055-070
R 140	5KW DRIVER PLATE	RESISTOR	2.5K OHM 50W 5PC	710-3374-000
R 140	10KW DRIVER PLATE	RESISTOR	1.5K OHM 50W 5PC	710-3372-000
R 141	V5 GRID PARASITIC TRAP	RESISTOR	50 OHM 16.5W 10PC	712-0129-000
R 142	V5 GRID	RESISTOR	1.25K OHM 25W 5PC	710-0059-270
R 143	V5 GRID TRAP	RESISTOR	50 OHM 16.5W 10PC	712-0129-000
R 144	V5 CATH CURR METER	RESISTOR	0.5 OHM 36W 1PC	710-5076-030
R 145A	5KW V5 SCREEN	RESISTOR	250 OHM 50W 5PC	710-3367-000
R 145A	10KW V5 SCREEN	RESISTOR	500 OHM 50W 5PC	710-3368-000
R 145B	5KW V5 SCREEN	RESISTOR	250 OHM 50W 5PC	710-3367-000
R 146	5KW PA SCREEN	RESISTOR	500 OHM 200W ADJ	716-0055-050
R 146	10KW PA SCREEN	RESISTOR	250 OHM 200W ADJ	716-0055-040
R 147	PA SCRN CURR METER	RESISTOR	1 OHM 2.5W 1PC	746-9443-000
R 148	PA GRID CURR METER	RESISTOR	5 OHM 2.5W 1PC	746-9441-000
R 149	PA PLATE CURR METER	RESISTOR	0.5 OHM 36W 1PC	710-5076-030
R 150	PA OVLD SHUNT	RESISTOR	4 OHM 100W 10PC	710-5076-060
R 151	FREQ MON LOAD	RESISTOR	1K OHM 2W 10PC	745-5652-000
R 152	V6 SCREEN	RESISTOR	500 OHM 50W 5PC	710-3368-000
R 153	V6 GRID TRAP	RESISTOR	50 OHM 16.5W 10PC	712-0129-000
R 154	V6 CATH CURR METER	RESISTOR	0.5 OHM 36W 1PC	710-5076-030
R 155	V6 GRID PARASITIC TRAP	RESISTOR	50 OHM 16.5W 10PC	712-0129-000
R 156	V6 GRID	RESISTOR	1.25K OHM 25W 5PC	710-0059-270
R 157	PLATE VOLTAGE METER	RESISTOR	1.5M OHM 25W	732-0051-010

SYMBOL	FUNCTION	PART NAME	DESCRIPTION	PART NUMBER
R 158	PLATE VOLTAGE METER	RESISTOR	1.5M OHM 25W	732-0051-010
R 159	Q3 LOAD	RESISTOR	150 OHM 1W 10PC	745-3317-000
R 160	Q4 LOAD	RESISTOR	150 OHM 1W 10PC	745-3317-000
R 161	TIME DELAY LIMITING	RESISTOR	10 OHM 1W 10PC	745-3268-000
R 162	V5 SCRN PARASITIC SUPP	RESISTOR	10 OHM 2W 10PC	745-5568-000
R 163	V5 SCRN PARASITIC SUPP	RESISTOR	10 OHM 2W 10PC	745-5568-000
R 164	V5 SCRN PARASITIC SUPP	RESISTOR	10 OHM 2W 10PC	745-5568-000
R 165	V6 SCRN PARASITIC SUPP	RESISTOR	10 OHM 2W 10PC	745-5568-000
R 166	V6 SCRN PARASITIC SUPP	RESISTOR	10 OHM 2W 10PC	745-5568-000
R 167	V6 SCRN PARASITIC SUPP	RESISTOR	10 OHM 2W 10PC	745-5568-000
R 168	PA SCREEN METER	RESISTOR	249K OHM 3/4W 1PC	705-7711-000
R 169	PA SCREEN METER	RESISTOR	249K OHM 3/4W 1PC	705-7711-000
R 170	PA SCREEN METER	RESISTOR	249K OHM 3/4W 1PC	705-7711-000
R 171	PA SCREEN METER	RESISTOR	750 OHM 3/4W 1PC	705-7590-000
R 172	MOD BIAS DROPPING	RESISTOR	1.5K OHM 10W 5PC	710-2930-000
R 173	REDUCED PWR BIAS ADJ	RESISTOR	10K OHM 4W POT	377-0716-120
R 174	MOD BIAS DIVIDER	RESISTOR	4.7K OHM 2W 10PC	745-5680-000
R 175	MOD SCRN DIVIDER	RESISTOR	7.5K OHM 50W 5PC	710-3378-000
R 176	MOD SCRN DIVIDER	RESISTOR	7.5K OHM 50W 5PC	710-3378-000
R 177	FEEDBACK COMPENSATING	RESISTOR	2.2K OHM 1W 10PC	745-3366-000
R 178	FEEDBACK COMPENSATING	RESISTOR	2.2K OHM 1W 10PC	745-3366-000
R 179	FEEDBACK COMPENSATING	RESISTOR	1K OHM 1W 10PC	745-3352-000
R 180	FEEDBACK COMPENSATING	RESISTOR	1K OHM 1W 10PC	745-3352-000
R 181	LIMITING	RESISTOR	2.2K OHM 1/2W 10PC	745-1366-000
S 1	RT FRONT PANEL INTLK	SWITCH	SPDT TYPE 2AC2	266-0013-000
S 2	LEFT REAR DOOR INTLK	SWITCH	SPDT TYPE 2AC2	266-0013-000
S 3	RT FRONT DOOR INTLK	SWITCH	SPDT TYPE 2AC2	266-0013-000
S 4	CENTER REAR DOOR INTLK	SWITCH	SPDT TYPE 2AC2	266-0013-000
S 5	RT REAR DOOR INTLK	SWITCH	SPDT TYPE 2AC2	266-0013-000
S 6	MODULATOR DOOR INTLK	SWITCH	SPDT TYPE 2AC2	266-0013-000
S 7	AUDIO DVR DOOR INTLK	SWITCH	SPDT TYPE 2AC2	266-0013-000
S 8	PA DOOR INTLK	SWITCH	SPDT TYPE 2AC2	266-0013-000
S 9	RF DVR DOOR INTLK	SWITCH	SPDT TYPE 2AC2	266-0013-000
S 10	RT FRONT PANEL GROUND	SWITCH	3 POLE HV	762-8837-001
S 11	RT/CTR REAR DR GROUND	SWITCH	3 POLE HV	762-8836-001
S 12	BLOWER AIR	SWITCH	SPDT 1000FPM	266-8309-000
S 13	FAN AIR	SWITCH	SPDT 1800FPM	266-8311-000
S 14	GROUNDING STICK INTLK	SWITCH	SPDT TYPE 2AC2	266-0013-000
S 15	NOT USED		NOT USED	
S 16	NOT USED		NOT USED	
S 17	NOT USED		NOT USED	
S 18	PA/MOD HV GROUND	SWITCH	2 POLE HV	762-8898-001
S 19	MOD DOOR GROUND	SWITCH	3 POLE HV	762-8837-004
S 20	PA DOOR GROUND	SWITCH	3 POLE HV	762-8837-002
S 21	RF DVR DOOR GROUND	SWITCH	2 POLE HV	762-8840-001
S 22	LEFT REAR DOOR GROUND	SWITCH	3 POLE HV	762-8837-003
S 23	RT FRONT DOOR GROUND	SWITCH	3 POLE HV	762-8837-002
T 1	28V SUPPLY	TRANSFORMER	27.5V 4.75A E-14331	664-0096-010
T 2	DRIVER FILAMENTS	TRANSFORMER	6.3V 2.25A E-14312	662-0221-010
T 3	PA 1 FILAMENT	TRANSFORMER	7.8V 75A E-9186A	662-0213-000
T 4	PA 2 FILAMENT	TRANSFORMER	7.8V 75A E-9186A	662-0213-000
T 5	MODULATOR 1 FILAMENT	TRANSFORMER	7.8V 75A E-9186A	662-0213-000
T 6	MODULATOR 2 FILAMENT	TRANSFORMER	7.8V 75A E-9186A	662-0213-000
T 7	BIAS SUPPLY	TRANSFORMER	250VDC 165MA E-14301	662-0218-010
T 8	SCREEN SUPPLY	TRANSFORMER	850V/850V E-14617	664-0093-010
T 9	5KW HIGH VOLTAGE	TRANSFORMER	5100V 5.15A E-14268	664-0094-010
T 9	10KW HIGH VOLTAGE	TRANSFORMER	5100V 2.74A E-14269	664-0095-010
T 10	AUDIO INPUT	TRANSFORMER	TYPE BI-2	667-0180-000
T 11	AUDIO DVR OUTPUT	TRANSFORMER	12W E-14313	667-9531-010
T 12	5KW MODULATION	TRANSFORMER	3.75KW E-14270	667-0159-010
T 12	10KW MODULATION	TRANSFORMER	7.5KW E-14272	667-0158-010
T 13	RF DRIVER INPUT	TRANSFORMER	132UHY	762-8808-002
T 14	AUTO TUNE POWER	TRANSFORMER	26V 0.75A	662-0057-000
TB 1A	EXTENDED CONTROL PANEL	TERMINAL BRD	16 TERMINAL	367-0128-000
TB 1B	EXTENDED CONTROL PANEL	TERMINAL BRD	17 TERMINAL	367-0129-000
TB 1C	EXTENDED CONTROL PANEL	TERMINAL BRD	16 TERMINAL	367-0128-000

SYMBOL	FUNCTION	PART NAME	DESCRIPTION	PART NUMBER
TB 1D	EXTENDED CONTROL PANEL	TERMINAL BRD	17 TERMINAL	367-0129-000
TB 2	AUX METERING	TERMINAL BRD	3 TERMINAL	367-0119-000
TB 3A	EXTERNAL CONNECTION	TERMINAL BRD	16 TERMINAL	367-0128-000
TB 3B	EXTERNAL CONNECTION	TERMINAL BRD	17 TERMINAL	367-0129-000
TB 4	FIL VOLTAGE REGULATOR	TERMINAL BRD	7 TERMINAL	367-4070-000
TB 5	CABINET FAN	TERMINAL BRD	2 TERMINAL	367-0001-000
TB 6	EXCITER SUPPLY	TERMINAL BRD	2 TERMINAL	367-0001-000
TB 7	B3 CONNECTING	TERMINAL BRD	3 TERMINAL	367-0119-000
TB 8	B4 CONNECTING	TERMINAL BRD	3 TERMINAL	367-0119-000
V 1	MOD 1	TUBE	4CX5000A	256-0122-000
V 2	MOD 2	TUBE	4CX5000A	256-0122-000
V 3	RF DRIVER	TUBE	6146B	256-0200-010
V 4	RF DRIVER	TUBE	6146B	256-0200-010
V 5	PA 1	TUBE	4CX5000A	256-0122-000
V 6	PA 2	TUBE	4CX5000A	256-0122-000
XQ 1	Q1 TRANSISTOR	SOCKET	4 PIN MICA FILLED	352-9872-000
XQ 2	Q2 TRANSISTOR	SOCKET	4 PIN MICA FILLED	352-9872-000
XQ 3	Q3 TRANSISTOR	SOCKET	4 PIN MICA FILLED	352-9872-000
XQ 4	Q4 TRANSISTOR	SOCKET	4 PIN MICA FILLED	352-9872-000
XV 1	MOD 1 TUBE	SOCKET	SK-300A	220-1382-000
XV 2	MOD 2 TUBE	SOCKET	SK-300A	220-1382-000
XV 3	RF DVR TUBE	SOCKET	OCTAL MICA FILLED	220-1121-000
XV 4	RF DVR TUBE	SOCKET	OCTAL MICA FILLED	220-1121-000
XV 5	PA 1 TUBE	SOCKET	SK-300A	220-1382-000
XV 6	PA 2 TUBE	SOCKET	SK-300A	220-1382-000
A 1	5KW CONTROL PANEL	ASSEMBLY	EXTENDED CONTROL PNL	762-8850-001
A 1	10KW CONTROL PANEL	ASSEMBLY	EXTENDED CONTROL PNL	762-8850-002
A 1 C 1	M1 BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 2	M2 BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 3	M3 BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 4	M4 BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 5	METERING BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 6	METERING BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 7	METERING BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 8	METERING BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 9	METERING BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 10	METERING BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 11	METERING BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 12	METERING BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 13	METERING BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 14	METERING BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 15	METERING BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 16	METERING BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 17	METERING BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 18	METERING BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 19	METERING BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 20	METERING BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 21	METERING BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 22	METERING BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 23	METERING BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 24	METERING BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 25	METERING BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 26	METERING BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 27	METERING BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 28	METERING BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 29	Q1 TRANSIENT SUPP	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 30	Q2 TRANSIENT SUPP	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 31	Q3 TRANSIENT SUPP	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 32	Q4 TRANSIENT SUPP	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 33	28V TRANSIENT SUPP	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 34	Q1 GATE BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1 C 35	Q2 GATE BYPASS	CAPACITOR	0.1MF 200V	913-3681-000

SYMBOL	FUNCTION	PART NAME	DESCRIPTION	PART NUMBER
A 1C 36	Q3 GATE BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1C 37	Q4 GATE BYPASS	CAPACITOR	0.1MF 200V	913-3681-000
A 1CR 1	DS4A LAMP BLOCKING	DIODE	1N645 225PIV 400MA	353-2607-000
A 1CR 2	DS4C LAMP BLOCKING	DIODE	1N645 225PIV 400MA	353-2607-000
A 1CR 3	DS4D LAMP BLOCKING	DIODE	1N645 225PIV 400MA	353-2607-000
A 1CR 4	DS5A LAMP BLOCKING	DIODE	1N645 225PIV 400MA	353-2607-000
A 1DS 1A	FILAMENT OFF	LAMP	TYPE 327 28V 40MA	262-0179-000
A 1DS 1C	FILAMENT OFF	LAMP	TYPE 327 28V 40MA	262-0179-000
A 1DS 2A	FILAMENT ON	LAMP	TYPE 327 28V 40MA	262-0179-000
A 1DS 2C	FILAMENT ON	LAMP	TYPE 327 28V 40MA	262-0179-000
A 1DS 3A	DOORS	LAMP	TYPE 327 28V 40MA	262-0179-000
A 1DS 3B	DOORS	LAMP	TYPE 327 28V 40MA	262-0179-000
A 1DS 3C	AIR	LAMP	TYPE 327 28V 40MA	262-0179-000
A 1DS 3D	AIR	LAMP	TYPE 327 28V 40MA	262-0179-000
A 1DS 4A	PA OL	LAMP	TYPE 327 28V 40MA	262-0179-000
A 1DS 4B	PA OL	LAMP	TYPE 327 28V 40MA	262-0179-000
A 1DS 4C	MOD1 OL	LAMP	TYPE 327 28V 40MA	262-0179-000
A 1DS 4D	MOD2 OL	LAMP	TYPE 327 28V 40MA	262-0179-000
A 1DS 5A	DC OL	LAMP	TYPE 327 28V 40MA	262-0179-000
A 1DS 5B	DC OL	LAMP	TYPE 327 28V 43MA	262-0179-000
A 1DS 5C	LAMP RESET	LAMP	TYPE 327 28V 40MA	262-0179-000
A 1DS 5D	LAMP RESET	LAMP	TYPE 327 28V 40MA	262-0179-000
A 1DS 6A	LOW PWR ON	LAMP	TYPE 327 28V 40MA	262-0179-000
A 1DS 6C	LOW PWR ON	LAMP	TYPE 327 28V 40MA	262-0179-000
A 1DS 7A	HIGH PWR ON	LAMP	TYPE 327 28V 40MA	262-0179-000
A 1DS 7C	HIGH PWR ON	LAMP	TYPE 327 28V 40MA	262-0179-000
A 1DS 8A	PLT OFF/RESET	LAMP	TYPE 327 28V 40MA	262-0179-000
A 1DS 8C	PLT OFF/RESET	LAMP	TYPE 327 28V 40MA	262-0179-000
A 1E 1	GROUND	TERMINAL	SOLDER TYPE	304-0318-000
A 1M 1	TEST METER 1	METER	1MA 1.5KOHM 0-1.5/3	458-0783-050
A 1M 2	5KW PLATE CURRENT	METER	1MA 1KOHM 0-2AMP DC	458-0783-080
A 1M 2	10KW PLATE CURRENT	METER	1MA 2KOHM 0-4AMP DC	458-0783-070
A 1M 3	PLATE VOLTAGE	METER	2MA 1KOHM 0-6KV DC	458-0783-060
A 1M 4	TEST METER 2	METER	1MA 1.5KOHM 0-1.5/3	458-0783-050
A 1Q 1	PA OL INDICATION	SC RECTIFIER	C6F 50PIV 600MA	353-6468-010
A 1Q 2	MOD 1 OL INDICATION	SC RECTIFIER	C6F 50PIV 600MA	353-6468-010
A 1Q 3	MOD 2 OL INDICATION	SC RECTIFIER	C6F 50PIV 600MA	353-6468-010
A 1Q 4	DC OL INDICATION	SC RECTIFIER	C6F 50PIV 600MA	353-6468-010
A 1R 1	DS1A+C LAMP DROPPING	RESISTOR	39 OHM 1W 10PC	745-3293-000
A 1R 2	DS2A+C LAMP DROPPING	RESISTOR	39 OHM 1W 10PC	745-3293-000
A 1R 3	DS3A+B LAMP DROPPING	RESISTOR	39 OHM 1W 10PC	745-3293-000
A 1R 4	DS3C+D LAMP DROPPING	RESISTOR	39 OHM 1W 10PC	745-3293-000
A 1R 5	Q1 GATE DIVIDER	RESISTOR	220 OHM 1/2W 10PC	745-1324-000
A 1R 6	Q1 GATE DIVIDER	RESISTOR	4.7K OHM 1/2W 10PC	745-1380-000
A 1R 7	DS4A+B LAMP DROPPING	RESISTOR	27 OHM 1W 10PC	745-3286-000
A 1R 8	Q2 GATE DIVIDER	RESISTOR	220 OHM 1/2W 10PC	745-1324-000
A 1R 9	Q2 GATE DIVIDER	RESISTOR	4.7K OHM 1/2W 10PC	745-1380-000
A 1R 10	DS4C LAMP DROPPING	RESISTOR	47 OHM 1W 10PC	745-3296-000
A 1R 11	Q3 GATE DIVIDER	RESISTOR	220 OHM 1/2W 10PC	745-1324-000
A 1R 12	Q3 GATE DIVIDER	RESISTOR	4.7K OHM 1/2W 10PC	745-1380-000
A 1R 13	DS4D LAMP DROPPING	RESISTOR	47 OHM 1W 10PC	745-3296-000
A 1R 14	Q4 GATE DIVIDER	RESISTOR	220 OHM 1/2W 10PC	745-1324-000
A 1R 15	Q4 GATE DIVIDER	RESISTOR	4.7K OHM 1/2W 10PC	745-1380-000
A 1R 16	DS5A+B LAMP DROPPING	RESISTOR	27 OHM 1W 10PC	745-3286-000
A 1R 17	DS5C+D LAMP DROPPING	RESISTOR	27 OHM 1W 10PC	745-3286-000
A 1R 18	DS6A+C LAMP DROPPING	RESISTOR	39 OHM 1W 10PC	745-3293-000
A 1R 19	DS7A+C LAMP DROPPING	RESISTOR	39 OHM 1W 10PC	745-3293-000
A 1R 20	DS8A+C LAMP DROPPING	RESISTOR	39 OHM 1W 10PC	745-3293-000

SYMBOL	FUNCTION	PART NAME	DESCRIPTION	PART NUMBER
A 1 S 1	FILAMENT OFF	SWITCH	SPDT 5A TYPE 12-327	266-6806-100
A 1 S 2	FILAMENT ON	SWITCH	SPDT 5A TYPE 12-327	266-6806-100
A 1 S 3	TEST METER 1	SWITCH	2 POLE 7 POS ROTARY	259-1949-000
A 1 S 4	TEST METER 2	SWITCH	2 POLE 7 POS ROTARY	259-1949-000
A 1 S 5	LAMP RESET	SWITCH	SPDT 5A TYPE 12-327	266-6806-100
A 1 S 6	LOW POWER ON	SWITCH	DPDT 5A TYPE 12-C	266-6806-110
A 1 S 7	HIGH POWER ON	SWITCH	DPDT 5A TYPE 12-C	266-6806-110
A 1 S 8	PLATE OFF/RESET	SWITCH	SPDT 5A TYPE 12-327	266-6806-100
A 1 S 9	PA TUNING	SWITCH	2 POLE 3 POS SPG RET	259-1980-000
A 1 S 10	PA LOADING	SWITCH	2 POLE 3 POS SPG RET	259-1980-000
A 1 S 11	AUTO/MAN TUNING	SWITCH	1 POLE 3 POS ROTARY	259-1321-000
A 1 TB 1A	CONNECTING	TERMINAL BRD	17 Y TERMINAL	367-0025-000
A 1 TB 1B	CONNECTING	TERMINAL BRD	16 Y TERMINAL	367-0024-000
A 1 TB 1C	CONNECTING	TERMINAL BRD	17 Y TERMINAL	367-0025-000
A 1 TB 1D	CONNECTING	TERMINAL BRD	16 Y TERMINAL	367-0024-000
A 1 XDS 1	FILAMENT OFF LAMP	HOLDER	TYPE 12-1 SW-LT UNIT	266-6806-010
A 1 XDS 1H	FILAMENT OFF LAMP	INSERT	TYPE 12-240-13	266-6806-270
A 1 XDS 1J	FILAMENT OFF LAMP	LENS + BASE	TYPE 12-250 DISPLAY	266-6806-230
A 1 XDS 1K	DS1A COLOR FILTER	BOOT	TYPE 12-G GRN FILTER	266-6806-040
A 1 XDS 1L	DS1C COLOR FILTER	BOOT	TYPE 12-G GRN FILTER	266-6806-040
A 1 XDS 1M	XDS1 SUPPORT	BARRIER	TYPE 12-S2 GRAY	266-6806-030
A 1 XDS 2	FILAMENT ON LAMP	HOLDER	TYPE 12-1 SW-LT UNIT	266-6806-010
A 1 XDS 2H	FILAMENT ON LAMP	INSERT	TYPE 12-240-13	266-6806-280
A 1 XDS 2J	FILAMENT ON LAMP	LENS + BASE	TYPE 12-250 DISPLAY	266-6806-230
A 1 XDS 2K	DS2A COLOR FILTER	BOOT	TYPE 12-G GRN FILTER	266-6806-040
A 1 XDS 2L	DS2C COLOR FILTER	BOOT	TYPE 12-G GRN FILTER	266-6806-040
A 1 XDS 2M	XDS1/XDS2 SUPPORT	BARRIER	TYPE 12-S2 GRAY	266-6806-030
A 1 XDS 3	DOORS/AIR LAMP	HOLDER	TYPE 12-22 IND UNIT	266-6806-020
A 1 XDS 3H	DOORS/AIR LAMP	INSERT	TYPE 12-240-16	266-6806-290
A 1 XDS 3J	DOORS/AIR LAMP	LENS + BASE	TYPE 12-252 DISPLAY	266-6806-250
A 1 XDS 3K	DS3A COLOR FILTER	BOOT	TYPE 12-G GRN FILTER	266-6806-040
A 1 XDS 3L	DS3B COLOR FILTER	BOOT	TYPE 12-G GRN FILTER	266-6806-040
A 1 XDS 3M	DS3C COLOR FILTER	BOOT	TYPE 12-G GRN FILTER	266-6806-040
A 1 XDS 3N	DS3D COLOR FILTER	BOOT	TYPE 12-G GRN FILTER	266-6806-040
A 1 XDS 3P	XDS2/XDS3 SUPPORT	BARRIER	TYPE 12-S2 GRAY	266-6806-030
A 1 XDS 3R	XDS3 SUPPORT	BARRIER	TYPE 12-S2 GRAY	266-6806-030
A 1 XDS 4	PA/MOD OL LAMP	HOLDER	TYPE 12-22 IND UNIT	266-6806-020
A 1 XDS 4H	PA/MOD OL LAMP	INSERT	TYPE 12-240-60	266-6806-300
A 1 XDS 4J	PA/MOD OL LAMP	LENS + BASE	TYPE 12-257 DISPLAY	266-6806-260
A 1 XDS 4K	DS4A COLOR FILTER	BOOT	TYPE 12-Y YEL FILTER	266-6806-050
A 1 XDS 4L	DS4B COLOR FILTER	BOOT	TYPE 12-Y YEL FILTER	266-6806-050
A 1 XDS 4M	DS4C COLOR FILTER	BOOT	TYPE 12-Y YEL FILTER	266-6806-050
A 1 XDS 4N	DS4D COLOR FILTER	BOOT	TYPE 12-Y YEL FILTER	266-6806-050
A 1 XDS 4P	XDS4 SUPPORT	BARRIER	TYPE 12-S2 GRAY	266-6806-030
A 1 XDS 5	DC OL/LAMP RESET LAMP	HOLDER	TYPE 12-1 SW-LT UNIT	266-6806-010
A 1 XDS 5H	DC OL/LAMP RESET LAMP	INSERT	TYPE 12-240-16	266-6806-310
A 1 XDS 5J	DC OL/LAMP RESET LAMP	LENS + BASE	TYPE 12-252 DISPLAY	266-6806-250
A 1 XDS 5K	DS5A COLOR FILTER	BOOT	TYPE 12-Y YEL FILTER	266-6806-050
A 1 XDS 5L	DS5B COLOR FILTER	BOOT	TYPE 12-Y YEL FILTER	266-6806-050
A 1 XDS 5M	DS5C COLOR FILTER	BOOT	TYPE 12-Y YEL FILTER	266-6806-050
A 1 XDS 5N	DS5D COLOR FILTER	BOOT	TYPE 12-Y YEL FILTER	266-6806-050
A 1 XDS 5P	XDS4/XDS5 SUPPORT	BARRIER	TYPE 12-S2 GRAY	266-6806-030
A 1 XDS 5R	XDS5 SUPPORT	BARRIER	TYPE 12-S2 GRAY	266-6806-030
A 1 XDS 6	LOW POWER ON LAMP	HOLDER	TYPE 12-1 SW-LT UNIT	266-6806-010
A 1 XDS 6H	LOW POWER ON LAMP	INSERT	TYPE 12-240-13	266-6806-320
A 1 XDS 6J	LOW POWER ON LAMP	LENS + BASE	TYPE 12-250 DISPLAY	266-6806-230
A 1 XDS 6K	DS6A COLOR FILTER	BOOT	TYPE 12-R RED FILTER	266-6806-060
A 1 XDS 6L	DS6C COLOR FILTER	BOOT	TYPE 12-R RED FILTER	266-6806-060
A 1 XDS 6M	XDS6/XDS6 SUPPORT	BARRIER	TYPE 12-S2 GRAY	266-6806-030
A 1 XDS 7	HIGH POWER ON LAMP	HOLDER	TYPE 12-1 SW-LT UNIT	266-6806-010
A 1 XDS 7H	HIGH POWER ON LAMP	INSERT	TYPE 12-240-13	266-6806-330
A 1 XDS 7J	HIGH POWER ON LAMP	LENS + BASE	TYPE 12-250 DISPLAY	266-6806-230
A 1 XDS 7K	DS7A COLOR FILTER	BOOT	TYPE 12-R RED FILTER	266-6806-060
A 1 XDS 7L	DS7C COLOR FILTER	BOOT	TYPE 12-R RED FILTER	266-6806-060
A 1 XDS 7M	XDS6/XDS7 SUPPORT	BARRIER	TYPE 12-S2 GRAY	266-6806-030

SYMBOL	FUNCTION	PART NAME	DESCRIPTION	PART NUMBER
A 1 XDS 7N	XDS7 SUPPORT	BARRIER	TYPE 12-S2 GRAY	266-6806-030
A 1 XDS 8	PLT OFF/RESET LAMP	HOLDER	TYPE 12-1 SW-LT UNIT	266-6806-010
A 1 XDS 8H	PLT OFF/RESET LAMP	INSERT	TYPE 12-240-13	266-6806-340
A 1 XDS 8J	PLT OFF/RESET LAMP	LENS + BASE	TYPE 12-250 DISPLAY	266-6806-230
A 1 XDS 8K	DS8A COLOR FILTER	BOOT	TYPE 12-G GRN FILTER	266-6806-040
A 1 XDS 8L	DS8C COLOR FILTER	BOOT	TYPE 12-G GRN FILTER	266-6806-040
A 1 XDS 8M	XDS8 SUPPORT	BARRIER	TYPE 12-S2 GRAY	266-6806-030
A 2	PA SENSOR	ASSEMBLY	OVERLOAD SENSOR	762-8834-001
A 2 C 1	RF FILTER	CAPACITOR	0.01MF 500V	913-1188-000
A 2 C 2	FILTER	CAPACITOR	35MF 6V	183-1187-000
A 2 CR 1	PEAK LIMITING	DIODE	1N746 3.3V ZENER	353-2937-000
A 2 CR 2	TRANSIENT SUPPRESSING	DIODE	1N645 225PIV 400MA	353-2607-000
A 2 CR 3	DC RETURN	DIODE	1N746 3.3V ZENER	353-2937-000
A 2 K 1	OVERLOAD	RELAY	48V COIL 4C	970-2230-000
A 2 L 1	RF FILTER CHOKE	INDUCTOR	1MHY 104MA	240-2540-000
A 2 Q 1	OVLD SENSING	SC SWITCH	3N85	353-3601-020
A 2 R 1	SENSITIVITY ADJ	RESISTOR	250 OHM 2W POT	380-2765-000
A 2 R 2	LIMITING	RESISTOR	1.5K OHM 1/2W 10PC	745-1359-000
A 2 R 3	LOAD	RESISTOR	10K OHM 1/2W 10PC	745-1394-000
A 2 R 4	LIMITING	RESISTOR	1.2K OHM 1/2W 10PC	745-1356-000
A 2 RT 1	COMPENSATING	THERMISTOR	10K OHM 1/2W 1950B	714-0182-000
A 3	MOD 1 SENS SAME AS A2	ASSEMBLY	OVERLOAD SENSOR	762-8834-001
A 4	MOD 2 SENS SAME AS A2	ASSEMBLY	OVERLOAD SENSOR	762-8834-001
A 5	DC SENSOR SAME AS A2	ASSEMBLY	OVERLOAD SENSOR	762-8834-002
A 6	RECYC TIMER/LOCKOUT	ASSEMBLY	RECYC TIMER/LOCKOUT	762-8901-002
A 6 C 1	Q1 GATE BYPASS	CAPACITOR	100MF 20V	184-7721-000
A 6 C 2	TIME DELAY	CAPACITOR	2.2MF 35V	184-7704-000
A 6 C 3	Q1 BYPASS	CAPACITOR	0.05MF 100V	913-3679-000
A 6 CR 1	20V INPUT REFERENCE	DIODE	1N3027B 20V ZENER	353-3132-000
A 6 CR 2	INPUT BLOCKING	DIODE	1N645 225PIV 400MA	353-2607-000
A 6 CR 3	INPUT BLOCKING	DIODE	1N645 225PIV 400MA	353-2607-000
A 6 CR 4	Q1 TRIGGERING	DIODE	1N961B 10V ZENER	353-3325-000
A 6 CR 5	K1 ARC SUPPRESSING	DIODE	1N645 225PIV 400MA	353-2607-000
A 6 K 1	RECYCLE/LOCKOUT	RELAY	48V COIL 4C	970-2230-000
A 6 Q 1	RECYCLE/LOCKOUT TRIG	SC SWITCH	3N58 40PIV 100MA	353-3525-000
A 6 R 1	DROPPING	RESISTOR	18K OHM 1/2W 10PC	745-1405-000
A 6 R 2	INPUT DIVIDER	RESISTOR	1.8K OHM 1/2W 10PC	745-1363-000
A 6 R 3	GATE LIMITING	RESISTOR	10K OHM 1/2W 10PC	745-1394-000

SYMBOL	FUNCTION	PART NAME	DESCRIPTION	PART NUMBER
A6 R 4	GATE RETURN	RESISTOR	51.1K OHM 1/2W 1PC	705-7178-000
A6 R 5	INPUT LIMITING	RESISTOR	68K OHM 1/2W 10PC	745-1429-000
A6 R 6	INPUT DIVIDER	RESISTOR	1K OHM 2W 10PC	745-5652-000
A7	FILAMENT REGULATOR	ASSEMBLY	VOLTAGE REGULATOR	762-8835-001
A7 R 1	VOLTAGE ADJUST	RESISTOR	50 OHM 10PC 2W POT	750-0533-000
A7 R 2	INPUT BRIDGE	RESISTOR	270 OHM 10PC 2W	745-5628-000
A7 R 3	INPUT BRIDGE	RESISTOR	270 OHM 10PC 2W	745-5628-000
A7 T 1	FIL VOLTAGE ADJUST	TRANSFORMER	VARIABLE SUP 226U-2	664-4010-010
A7A 1	CONTROL DRIVE	ASSEMBLY	CONTROL DRIVE	554-4758-004
A7A 1B 1	DRIVE	MOTOR	28VDC 300MA	230-0367-000
A7A 1C 1	Q1 BLOCKING	CAPACITOR	33MF 10VDC	184-7382-000
A7A 1C 2	Q1 EMITTER BYPASS	CAPACITOR	33MF 10VDC	184-7382-000
A7A 1C 3	COUPLING	CAPACITOR	33MF 10VDC	184-7382-000
A7A 1C 4	K3 DELAY	CAPACITOR	200MF 25VDC	184-7961-000
A7A 1C 5	K1 BYPASS	CAPACITOR	10MF 50VDC	183-1368-000
A7A 1C 6	K2 BYPASS	CAPACITOR	10MF 50V	183-1368-000
A7A 1C 7	Q4 GATE BYPASS	CAPACITOR	0.1MF 100VDC	913-3681-000
A7A 1CR 1	RAISE SUPPLY RECTIFY	DIODE	1N2611 200PIV 750MA	353-1906-000
A7A 1CR 2	LOWER SUPPLY RECTIFY	DIODE	1N2611 200PIV 750MA	353-1906-000
A7A 1CR 3	-28VDC RECTIFYING	DIODE	1N2611 200PIV 750MA	353-1906-000
A7A 1CR 4	-28VDC RECTIFYING	DIODE	1N2611 200PIV 750MA	353-1906-000
A7A 1CR 5	+28VDC TRANSIENT SUPPR	DIODE	1N3030B 27V ZENER	353-3135-000
A7A 1DS 1	INPUT BRIDGE	LAMP	28V 0.17AMP T-3-1/4	262-3270-000
A7A 1DS 2	INPUT BRIDGE	LAMP	28V 0.17AMP T-3-1/4	262-3270-000
A7A 1F 1	AC LINE INPUT	FUSE	0.250AMP 250V 3AG	264-4240-000
A7A 1K 1	RAISE	RELAY	28VDC/115VAC COIL 3C	970-2230-000
A7A 1K 2	LOWER	RELAY	28VDC/115VAC COIL 3C	970-2230-000
A7A 1K 3	TIME DELAY	RELAY	28VDC/115VAC COIL 2C	974-0464-000
A7A 1K 4	MOTOR CONTROL	RELAY	28VDC/115VAC COIL 3C	970-2230-000
A7A 1Q 1	INPUT AMPLIFIER	TRANSISTOR	2N697 NPN 2W	352-0197-000
A7A 1Q 2	RAISE SENSING	SC RECTIFIER	2N886 60PIV 200MA	353-3369-000
A7A 1Q 3	LOWER SENSING	SC RECTIFIER	2N886 60PIV 200MA	353-3369-000
A7A 1Q 4	LAMP BURN OUT PROTECT	SC RECTIFIER	2N886 60PIV 200MA	353-3369-000
A7A 1R 1	INPUT BRIDGE	RESISTOR	120 OHM 6.5W 5PC	747-5442-000
A7A 1R 2	C4 CURRENT LIMITING	RESISTOR	220 OHM 1/2W 10PCW	745-1324-000
A7A 1R 3	Q1 DIVIDER	RESISTOR	22K OHM 1/2W 10PC	745-1408-000
A7A 1R 4	Q1 BIAS	RESISTOR	5.6K OHM 1/2W 10PC	745-1384-000
A7A 1R 5	+28VDC LIMITING	RESISTOR	3.3K OHM 1/2W 10PC	745-1373-000
A7A 1R 6	Q1 EMITTER	RESISTOR	100 OHM 1/2W 10PC	745-1310-000
A7A 1R 7	RAISE SENS ADJUST	RESISTOR	50K OHM 1/2W 20PC	380-2909-000
A7A 1R 8	LOWER SENS ADJUST	RESISTOR	50K OHM 1/2W 20PC	380-2909-000
A7A 1R 9	RAISE SENS DIVIDER	RESISTOR	10K OHM 1/2W 10PC	745-1394-000
A7A 1R 10	LOWER SENS DIVIDER	RESISTOR	10K OHM 1/2W 10PC	745-1394-000
A7A 1R 11	K3 -28VDC LIMIT	RESISTOR	2.2K OHM 1W 10PC	745-3366-000
A7A 1R 12	K3 +28VDC LIMIT	RESISTOR	2.2K OHM 1W 10PC	745-3366-000
A7A 1R 13	Q1 INPUT	RESISTOR	4.7K OHM 1/2W 10PC	745-1380-000
A7A 1R 14	INPUT BRIDGE LIMIT	RESISTOR	82 OHM 11W 5PC	746-6142-000
A7A 1R 15	-28VDC LOAD	RESISTOR	1K OHM 2W 10PC	745-5652-000
A7A 1R 16	Q4 GATE	RESISTOR	1.2K OHM 1/2W 10PC	745-1356-000

SYMBOL	FUNCTION	PART NAME	DESCRIPTION	PART NUMBER
A7A 1R 17	Q4 GATE LIMITING	RESISTOR	18K OHM 1/2W 10PC	745-1405-000
A7A 1R 18	+28VDC INPUT LIMIT	RESISTOR	390 OHM 1/2W 10PC	745-1335-000
A7A 1RT 1	Q2 COMPENSATING	THERMISTOR	10K OHM 1/2W 10PC	714-1738-000
A7A 1RT 2	Q3 COMPENSATING	THERMISTOR	10K OHM 1/2W 10PC	714-1738-000
A7A 1S 1	RAISE LIMIT	SWITCH	SPDT 6AMP 28VDC	260-0025-000
A7A 1S 2	LOWER LIMIT	SWITCH	SPDT 6AMP 28VDC	260-0025-000
A7A 1T 1	INPUT VOLTAGE	TRANSFORMER	47-420CPS	662-0113-000
A7A 1XDF 1	AC LINE INPUT FUSE	HOLDER	INDICATING	265-1072-000
A7A 1XDS 1	INPUT BRIDGE LAMP	SOCKET	GREEN LAMP	262-0919-000
A7A 1XDS 2	INPUT BRIDGE LAMP	SOCKET	GREEN LAMP	262-0919-000
A8	REMOTE CONT RELAY PNL	ASSEMBLY	REM CONT RELAY PNL	762-8847-001
A8 K 1	FIL OFF	RELAY	28VDC/115VAC COIL 2C	972-1347-000
A8 K 2	FIL ON	RELAY	28VDC/115VAC COIL 2C	972-1347-000
A8 K 3	FAIL SAFE	RELAY	28VDC/115VAC COIL 2C	972-1347-000
A8 K 4	LOW PWR PL OFF/RESET	RELAY	28VDC/115VAC COIL 2C	972-1347-000
A8 K 5	LOW PWR PL ON	RELAY	28VDC/115VAC COIL 2C	972-1347-000
A8 K 6	HIGH PWR PL OFF/RESET	RELAY	28VDC/115VAC COIL 2C	972-1347-000
A8 K 7	HIGH PWR PL ON	RELAY	28VDC/115VAC COIL 2C	972-1347-000
A8 K 8	PWR ADJ LOWER	RELAY	28VDC/115VAC COIL 2C	972-1347-000
A8 K 9	PWR ADJ RAISE	RELAY	28VDC/115VAC COIL 2C	972-1347-000
A8 TB 1	RMTE CTL INTER CONNECT	TERMINAL BRD	21 TERMINAL	367-0132-000
A8 TB 2	RMTE CTL EXT CONNECT	TERMINAL BRD	11 TERMINAL	367-0123-000
A9	AUTO TUNE	ASSEMBLY	AUTO TUNE	762-8919-001
A9 C 1	BYPASS	CAPACITOR	0.05MF 500V	913-3153-000
A9 C 2	BYPASS	CAPACITOR	0.01MF 500V	912-2735-000
A9 C 3	BYPASS	CAPACITOR	0.01MF 500V	912-2735-000
A9 C 4	BYPASS	CAPACITOR	5500PF 200V FEEDTHRU	241-0441-000
A9 C 5	BYPASS	CAPACITOR	5500PF 200V FEEDTHRU	241-0441-000
A9 C 6	BYPASS	CAPACITOR	5500PF 200V FEEDTHRU	241-0441-000
A9 C 7	BYPASS	CAPACITOR	5500PF 200V FEEDTHRU	241-0441-000
A9 C 8	BYPASS	CAPACITOR	5500PF 200V FEEDTHRU	241-0441-000
A9 C 9	BIAS INPUT	CAPACITOR	5500PF 200V FEEDTHRU	241-0441-000
A9 C 10	BIAS COUPLING	CAPACITOR	1.0MF 25V	913-3810-000
A9 CR 1	SIGNAL RECTIFYING	DIODE	1N645 225PIV 400MA	353-2607-000
A9 CR 2	SIGNAL RECTIFYING	DIODE	1N645 225PIV 400MA	353-2607-000
A9 CR 3	BLOCKING	DIODE	1N645 225PIV 400MA	353-2607-000
A9 CR 4	BIAS CLIPPING	DIODE	1N91	353-1010-000
A9 CR 5	BIAS CLIPPING	DIODE	1N91	353-1010-000
A9 L 1	FILTER CHOKE	INDUCTOR	10MH 104MA	240-0844-000
A9 L 2	FILTER CHOKE	INDUCTOR	10MH 104MA	240-0844-000
A9 Q 1	RAISE SENSING	SC SWITCH	3N85	353-3601-020
A9 Q 2	LOWER SENSING	SC SWITCH	3N85	353-3601-020

SYMBOL	FUNCTION	PART NAME	DESCRIPTION	PART NUMBER
A 9 R 1	LOADING	RESISTOR	10 OHM 3W 3PC	705-1434-010
A 9 R 2	LOADING	RESISTOR	10 OHM 3W 3PC	705-1434-010
A 9 R 3	LOADING	RESISTOR	5.6K OHM 1/4W 1PC	705-7132-000
A 9 R 4	LOADING	RESISTOR	5.6K OHM 1/4W 1PC	705-7132-000
A 9 R 5	DISC ISOLATION	RESISTOR	10K OHM 1/2W 10PC	745-1394-000
A 9 R 6	PHASE BALANCE	RESISTOR	500 OHM 1/2W POT	380-2903-000
A 9 R 7	BIAS DROPPING	RESISTOR	2.7K OHM 1/2W 10PC	745-1370-000
A10	RF	EXCITER	310W-1 (GRAY PNL)	758-5207-002
A10	RF	EXCITER	310W-1 (GRAY PNL)	758-5207-002
A10	RF	EXCITER	310W-1 (WHITE PNL)	758-5207-001
A10 C 1	Y1 TRIMMER	CAPACITOR	1-60PF 1KV PISTON	922-3038-040
A10 C 2	Y2 TRIMMER	CAPACITOR	1-60PF 1KV PISTON	922-3038-040
A10 C 3	TRIMMER RANGE	CAPACITOR	15PF 500V	916-0671-000
A10 C 4	TRIMMER RANGE	CAPACITOR	15PF 500V	916-0671-000
A10 C 5	TRIMMER RANGE	CAPACITOR	33PF 500V	928-4012-000
A10 C 6	TRIMMER RANGE	CAPACITOR	33PF 500V	928-4012-000
A10 C 7	OSCILLATOR FEEDBACK	CAPACITOR	510PF 500V	912-2980-000
A10 C 8	OSCILLATOR FEEDBACK	CAPACITOR	510PF 500V	912-2980-000
A10 C 9	COUPLING	CAPACITOR	100PF 500V	912-2816-000
A10 C 10	Q1 BASE BYPASS	CAPACITOR	2200PF 500V	913-3011-000
A10 C 11	OSCILLATOR SUP BYPASS	CAPACITOR	0.01MF 500V	913-3013-000
A10 C 12	Q2 COUPLING	CAPACITOR	2200PF 500V	913-3011-000
A10 C 13	Q2 EMITTER BYPASS	CAPACITOR	2200PF 500V	913-3011-000
A10 C 14	Q3 COUPLING	CAPACITOR	2200PF 500V	913-3011-000
A10 C 15	Q3 EMITTER BYPASS	CAPACITOR	2200PF 500V	913-3011-000
A10 C 16	BYPASS	CAPACITOR	0.01MF 500V	913-3013-000
A10 C 17	Q5 EMITTER	CAPACITOR	0.01MF 500V	913-3013-000
A10 C 18	Q4 EMITTER BYPASS	CAPACITOR	0.01MF 500V	913-3013-000
A10 C 19	COUPLING	CAPACITOR	2200PF 500V	913-3011-000
A10 C 20	COUPLING	CAPACITOR	2200PF 500V	913-3011-000
A10 C 21	SUPPLY BYPASS	CAPACITOR	0.1MF 500V	913-3152-000
A10 C 22	RIPPLE FILTER	CAPACITOR	450MF 50V	183-1958-000
A10 C 23	INPUT BYPASS	CAPACITOR	0.1MF 600V	241-0006-000
A10 C 24	BYPASS	CAPACITOR	0.1MF 500V	913-3152-000
A10 CR 1	TRANSIENT SUPPRESSING	DIODE	1N2825A 36V ZENER	353-1418-000
A10 CR 2	12 VOLT REFERENCE	DIODE	1N963A 12V ZENER	353-3220-000
A10 CR 3	7.5 VOLT REFERENCE	DIODE	1N3017A 7.5V ZENER	353-1312-000
A10 CR 4	CLAMPING	DIODE	1N914 75PIV 75MA	353-2906-000
A10 CR 5	CLAMPING	DIODE	1N914 75PIV 75MA	353-2906-000
A10 CR 6	CLAMPING	DIODE	1N914 75PIV 75MA	353-2906-000
A10 CR 7	CLAMPING	DIODE	1N914 75PIV 75MA	353-2906-000
A10 CR 8	CLAMPING	DIODE	1N914 75PIV 75MA	353-2906-000
A10 E 1	Z2 BYPASSING	TERMINAL	FEEDTHROUGH	306-1321-000
A10 E 2	Z2 BYPASSING	TERMINAL	FEEDTHROUGH	306-1321-000
A10 E 3	CR1 CONNECT	TERMINAL	STANDOFF	306-1521-000
A10 J 1	OUTPUT	CONNECTOR	BNC	357-9804-003
A10 L 1	Q1 COLLECTOR	INDUCTOR	10 MH	240-0844-000
A10 Q 1	OSCILLATOR	TRANSISTOR	2N3564 NPN 0.2W	352-0631-010
A10 Q 2	AMPLIFIER	TRANSISTOR	2N3564 NPN 0.2W	352-0631-010
A10 Q 3	FREQ DIVIDER DRIVER	TRANSISTOR	2N3564 NPN 0.2W	352-0631-010
A10 Q 4	OUTPUT DRIVER	TRANSISTOR	2N3250 PNP 1.2W	352-0626-010
A10 Q 5	OUTPUT DRIVER	TRANSISTOR	2N3250 PNP 1.2W	352-0626-010
A10 Q 6	OUTPUT	TRANSISTOR	2N2102 NPN 5W	352-0646-010
A10 Q 7	OUTPUT	TRANSISTOR	2N2102 NPN 5W	352-0646-010

SYMBOL	FUNCTION	PART NAME	DESCRIPTION	PART NUMBER
A10 R 1	Q1 BASE BIAS	RESISTOR	6.8K OHM 1/4W 10PC	745-0779-000
A10 R 2	Q1 EMITTER	RESISTOR	5.6K OHM 1/4W 10PC	745-0776-000
A10 R 3	SWAMPING	RESISTOR	10K OHM 1/4W 10PC	745-0785-000
A10 R 4	DECOUPLING	RESISTOR	1.2K OHM 1/4W 10PC	745-0752-000
A10 R 5	Q2 BASE BIAS	RESISTOR	10K OHM 1/4W 10PC	745-0785-000
A10 R 6	Q2 BASE BIAS	RESISTOR	39K OHM 1/4W 10PC	745-0806-000
A10 R 7	Q2 COLLECTOR	RESISTOR	2.2K OHM 1/4W 10PC	745-0761-000
A10 R 8	Q2 EMITTER	RESISTOR	120 OHM 1/4W 10PC	745-0716-000
A10 R 9	Q2 EMITTER	RESISTOR	18K OHM 1/4W 10PC	745-0794-000
A10 R 10	Q3 BASE BIAS	RESISTOR	22K OHM 1/4W 10PC	745-0797-000
A10 R 11	Q3 BASE BIAS	RESISTOR	22K OHM 1/4W 10PC	745-0797-000
A10 R 12	Q3 COLLECTOR	RESISTOR	3.9K OHM 1/4W 10PC	745-0770-000
A10 R 13	Q3 EMITTER	RESISTOR	150 OHM 1/4W 10PC	745-0719-000
A10 R 14	Q3 EMITTER	RESISTOR	6.8K OHM 1/4W 10PC	745-0779-000
A10 R 15	Q4 AND Q5 BASE BIAS	RESISTOR	330 OHM 2W 10PC	745-5631-000
A10 R 16	Q5 EMITTER	RESISTOR	1K OHM 1/4W 10PC	745-0749-000
A10 R 17	Q4 EMITTER	RESISTOR	1K OHM 1/4W 10PC	745-0749-000
A10 R 18	Q4 AND Q5 EMITTER	RESISTOR	120 OHM 1/4W 10PC	745-0716-000
A10 R 19	Q5 COLLECTOR	RESISTOR	1K OHM 1/4W 10PC	745-0749-000
A10 R 20	Q4 COLLECTOR	RESISTOR	1K OHM 1/4W 10PC	745-0749-000
A10 R 21	Q7 BASE RETURN	RESISTOR	5.6K OHM 1/4W 10PC	745-0776-000
A10 R 22	Q6 BASE RETURN	RESISTOR	5.6K OHM 1/4W 10PC	745-0776-000
A10 R 23	Q6 AND Q7 EMITTER	RESISTOR	15 OHM 2W 10PC	745-5575-000
A10 R 24	INPUT COUPLING	RESISTOR	10 OHM 2W 10PC	745-5568-000
A10 R 25	Q1 BASE BIAS	RESISTOR	22K OHM 1/4W 10PC	745-0797-000
A10 R 26	STABILIZING	RESISTOR	2.2K OHM 1/4W 10PC	745-0761-000
A10 R 27	LIMITING	RESISTOR	3.9K OHM 1/4W 10PC	745-0770-000
A10 S 1	CRYSTAL SELECTOR	SWITCH	ROTARY	259-2438-010
A10 T 1	OUTPUT	TRANSFORMER		758-0328-002
A10 XQ 1	Q1 TRANSISTOR	SOCKET	4 PIN MICA FILLED	352-9872-000
A10 XQ 2	Q2 TRANSISTOR	SOCKET	4 PIN MICA FILLED	352-9872-000
A10 XQ 3	Q3 TRANSISTOR	SOCKET	4 PIN MICA FILLED	352-9872-000
A10 XQ 4	Q4 TRANSISTOR	SOCKET	4 PIN MICA FILLED	352-9872-000
A10 XQ 5	Q5 TRANSISTOR	SOCKET	4 PIN MICA FILLED	352-9872-000
A10 XY 1	Y1 CRYSTAL	SOCKET	OCTAL	220-1121-000
A10 XY 2	Y2 CRYSTAL	SOCKET	OCTAL	220-1121-000
A10 XZ 1	Z1 FLIPFLOP	SOCKET	FLIPFLOP	352-9560-010
A10 XZ 2	Z2 FLIPFLOP	SOCKET	FLIPFLOP	352-9560-010
A10 Y 1	FREQ DETERMINING	CRYSTAL	SEE PTS	289-7021-000
A10 Y 2	FREQ DETERMINING	CRYSTAL	SEE PTS	289-7021-000
A10 Z 1	FREQ DIVIDING	FLIPFLOP	SN1147	351-7008-020
A10 Z 2	FREQ DIVIDING	FLIPFLOP	SN1147	351-7008-020

INDICATING INSTRUMENTS

Collins component specifications are included herein to show compliance with the Commission's rules regarding indicating instruments.

A. Plate Current Meter, A1M2, Specification 458-0783-080

B. Plate Voltage Meter, A1M3, Specification 458-0783-060

The above instruments each have an accuracy of ±1% of their full scale reading. The associated shunt and multiplier resistors also have an accuracy of ±1%, yielding a maximum error of ±2%, in compliance with Rule 73.39.

NOTICE:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. THE CLASS DESIGNATION AND THE SYMBOLS CAL, TA, CR, RA, SSA AND NSR WHICH MAY APPEAR ON THIS DRAWING ARE FOR INTERNAL USE ONLY BY THE COLLINS RADIO COMPANY AND ARE NOT RELATED TO THE ENGINEERING DATA CONTAINED HEREIN.
3. THE SYMBOL — IN THE REV STATUS BLOCK DENOTES ORIGINAL ISSUE.

DWG DATE 4 MAR 1965

REVISIONS

LTR	DESCRIPTION	DATE	APPROVED
A	A62972-para 1.5,was,3000 VRMS; restated para 1.6.	1 Jul 1965	KLM
B	A63733-Revision status change; (1)Added "See **". to para.1.1 & 1.3.; (2) Added note to bottom of sheet 3.; (3)Submitted new sheet 4.	14 Sep 1965	KLM
C	A65743-REVISION STATUS CHANGE (1) ADDED: DASH NUMBER -090 TO TABLE.	21 OCT 1965	KLM

DESCRIPTION: 3-1/2 inch DC milliammeter with bezel for recessed mounting.

*DASH NUMBER: See Table

*WHEN REFERRING TO COLLINS PART NUMBER, SPECIFY DRAWING NUMBER FOLLOWED BY APPLICABLE DASH NUMBER. WHEN PART NUMBER APPEARS AS 458-0783-XX9, MILITARY INSPECTION IS REQUIRED°

Weston Instruments Inc. CR Newark, N.J.	65092	2534	See Table.
SUGGESTED SOURCES OF SUPPLY	CODE IDENT	VENDOR TYPE	VENDOR PN

REV STATUS OF SHEETS	REV	C	B	C	B																			
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

CLASS 2C	CAL CHANGE DATE 6OCT/965	SPECIFICATION CONTROL DRAWING	ENGRG PN NONE

UNLESS OTHERWISE SPECIFIED DIM ARE IN INCHES TOL ON FRACTIONS: 1/32 DEC: 010 ANGLES: NA

MATERIAL:

AS REQUIRED

	NAME	DATE
PREP	E.J. Goodwin	13 Feb 1965
CHK	K.L. Morris	15 Feb 1965
PROJ	C.T. Ller	18 Feb 1965

COLLINS RADIO COMPANY
CEDAR RAPIDS, IOWA

AMMETER, DC

SIZE	CODE IDENT NO.	DWG NO.
A	13499	458-0783*

SCALE NONE | WT CALC: 10 OZ | SHEET 1 OF 4

1. ELECTRICAL REQUIREMENTS:

1.1. INTERNAL RESISTANCE FROM -25°C to +45°C: See Table on sheet 3. See **.

1.2. METER RANGE AT FULL SCALE DEFLECTION: See Table on Sheet 3.

1.3. INITIAL ACCURACY: See Table on Sheet 3. See **.

1.4. INSULATION RESISTANCE: 20 megohms minimum with 500 V DC applied.

1.5. DIELECTRIC WITHSTANDING VOLTAGE: 2600 V RMS applied between the terminals and the case.

1.6. INTERNAL PROTECTION: Two diodes type 1N117 or equivalent. See table.

2. MECHANICAL REQUIREMENTS:

2.1. PHYSICAL DIMENSIONS: See drawing on sheet 4.

2.2. CASE: Dust tight enclosure with clear plastic case.

2.3. SCALE:

2.3.1. COLOR SCHEME: Black markings and pointer on a white background.

2.3.2. DIVISIONS AND MARKINGS: See Table on sheet 3 and drawings on sheet 4.

2.4. TERMINALS:

2.4.1. TERMINAL DESIGN: Stud type.

2.4.2. TERMINAL POLARITY: The left hand terminal when viewed from the rear of the unit shall be positive (+) and so marked. Positive voltage applied to positive terminal shall cause a right deflection of pointer.

2.5. MARKINGS: In addition to terminal identification, unit shall be permanently and legibly marked with the following information:
(a) Manufacturer's name and/or symbol.
(b) Manufacturer's type number.
(c) Full scale current sensitivity.
(d) Internal resistance.
(e) Manufacturer's part number.
(f) Collins Part Number.

2.6. HARDWARE: Mounting and terminal hardware and Weston part number 1909-1984870 half bezel shall be supplied attached.

2.7. POINTER: Black lance type.

SIZE	CODE IDENT NO.	DWG. NO.	
A	13499	458-0783	
SCALE NONE	WT	SEE SHEET 1	SHEET 2

3. ENVIRONMENTAL REQUIREMENTS:

3.1. TEMPERATURE:

3.1.1. RANGE: -25°C to +45°C operating and storage.

3.1.2. COMPENSATION: The unit shall be supplied temperature compensated for the above range.

3.2. HUMIDITY: 96 hours, 95 percent relative humidity at +45°C in accordance with the procedures of MIL-STD-202, Method 103, Test Condition B.

4. NOTES:

4.1. Meters shall be shipped from the manufacturer with the terminals shorted.

TABLE I

COLLINS PART NUMBER	SCALE	INTERNAL RESISTANCE	INITIAL ACCURACY	METER RANGE	INTERNAL PROTECTION	VENDOR PART NUMBER
-010	Figure I	1500 ohms ±1%	±2%	1 milliamp	Yes	253487
-020**	Figure II	1000 ohms ±1%	±1%	2 milliamps	No	253488
-030**	Figure III	2000 ohms ±1%	±1%	1 milliamp	Yes	253489
-040**	Figure IV	1000 ohms ±1%	±1%	1 milliamp	Yes	253490
-050	(Same as -010 except without bezel)					253491
-060**	(Same as -020 except without bezel)					253492
-070**	(Same as -030 except without bezel)					253493
-080**	(Same as -040 except without bezel)					253494
-090	Bezel only					1909-1984870

** The vendor shall place on the rear of each of these meters a label which indicates the internal resistance and actual current required for full scale deflection (either actual value or as a percentage of specified full scale deflection). Collins Radio Receiving Inspection shall 100% inspect these meters to verify information on label.

REV B

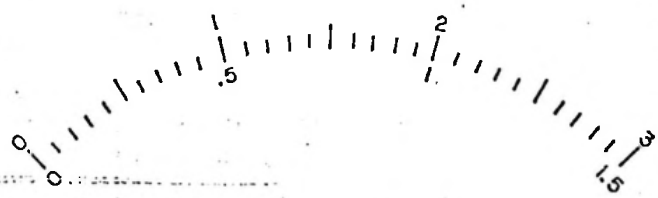
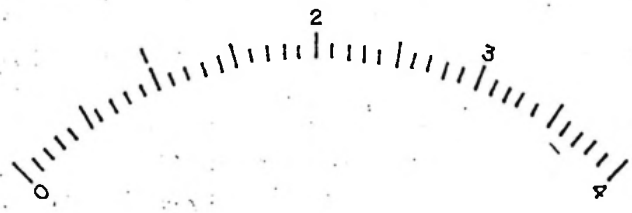


FIGURE 1

DC KILOVOLTS

FIGURE 2

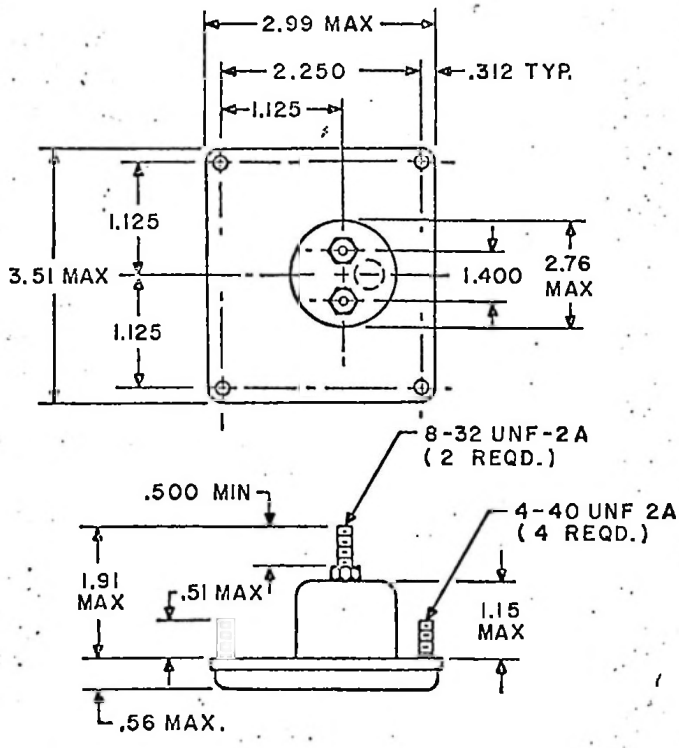


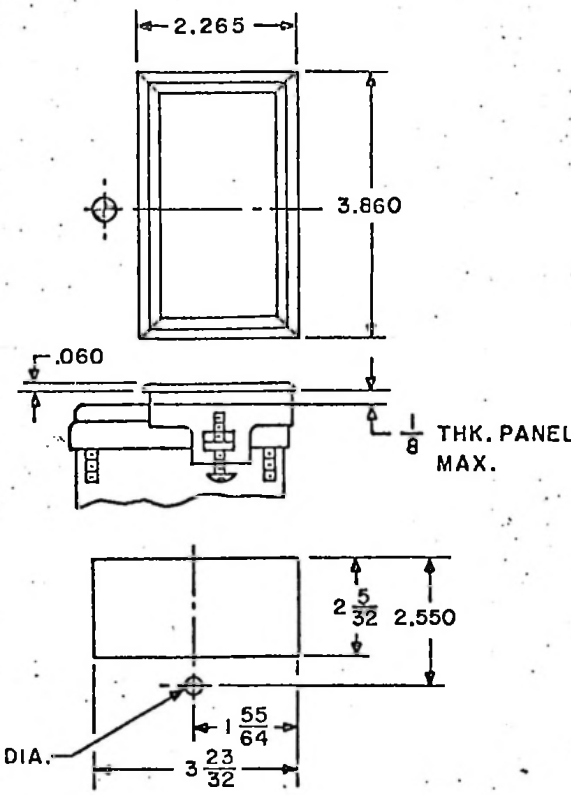
DC AMPERES

FIGURE 3

DC AMPERES

FIGURE 4





SIZE	CODE IDENT NO.	DWG. NO.
A	13499	458-0783
SCALE NONE	WT SEE SHEET 1	SHEET 4

PD-446-05 (REV 9-64) SPECIFICATION-CONTINUATION SHEET

TUNING PROCEDURE

Tuned circuit adjustments in the Type 820E/F-1 transmitter are limited to driver grid tuning, PA grid tuning, and output network adjustments. All circuits are set during factory test, and only minimal readjustment by the customer should be required.

Driver grid tuning is accomplished by tuning for maximum driver cathode current. A more sensitive indication is PA grid current, after the PA grid is tuned. PA grid tuning itself simply maximizes the grid current indication.

The fixed components of the output network are adjusted during factory test for the customer's frequency, using an r-f impedance bridge. If readjustment at the station is required, correct impedance settings for the various circuits will be found in the instruction manual.

With normal operation, no further adjustments are required. With PA tuning in the automatic mode, power output is adjusted by "raising" or "lowering" the motor-controlled PA loading control while observing antenna or r-f line current. During this adjustment, the PA plate circuit is kept in tune through operation of the automatic tuning phase-comparator circuit. As loading is adjusted, the PA tuning motor alternately starts and stops, keeping the PA plate impedance essentially resistive (at unity power factor).

TUNING PROCEDURE
(Continued)

The plate circuit may be tuned in the conventional manner by adjustment of the PA Tuning and PA Loading motors, with the selector switch in "manual." In this case, power output is again monitored at the r-f line current indication, while correct PA plate tuning will be found near minimum plate current indication. Because of the loaded Q of the output network tank circuit however, the correct operating point will not occur at plate current "dip," but rather at a point where correct power output is obtained at maximum plate circuit efficiency. This is the point corresponding to unity power factor, or at resistive plate impedance.

MEASUREMENT PROCEDURE

A. GENERAL. The procedures discussed below apply to the data of part 13 herein, and describes the technique and instrumentation employed for each test. All measurements were made on the prototype of the Type 820E/F-1 transmitter, which had been arranged in the 5000 watt configuration for these tests. The measurements were made in the Dallas, Texas facilities of the applicant, during November, 1965. With the exception of the field intensity measurements, the test arrangement was as shown in figure 12-1.

Fig. 12-1 Laboratory Test Facility

MEASUREMENT PROCEDURE (Continued)

A. GENERAL (Continued)

In all cases, the transmitter was operated on a carrier frequency of 980 kc and modulated as required. Adjustment was made to an output power of 5500 watts for full power, and the reduced power level was set at 1100 watts.

MEASUREMENT PROCEDURE
(Continued)

B. POWER OUTPUT. The transmitter output was connected via 1-5/8" coaxial transmission line to the Bird Electronic Corporation phantom antenna. This load is a completely enclosed coaxial assembly, employing a resistive-coated ceramic element which is immersed in a circulating coolant. Heat dissipated in the resistor element is transferred by the coolant to an external water heat exchanger, which is a part of the phantom antenna assembly.

Primary measurement of power was made using a shielded rf ammeter connected in series with the load at the transmitter output. (See Figure 12-1). Power output was determined as the product of the load current squared and the resistance of the load. The rf ammeter used was especially calibrated in its mounting, with calibration traceable to the National Bureau of Standards. The impedance of the phantom antenna was measured to be 51.4 + j0 ohms over the frequency range of interest.

Close confirmation of power output level was obtained by the calorimetric method. The inlet and outlet temperatures of the phantom antenna cooling water were monitoring with Weston Laboratory-grade thermometers, and water flow was measured using a Wallace and Tiernan Flowmeter.

MEASUREMENT PROCEDURE
(Continued)

B. POWER OUTPUT (Continued)

The resulting indications were used to determine transmitter output power by the relation:

$$P = 0.264\ Q\ (T_2 - T_1)$$

where P = power in kw

Q = water flow in gallons per minute

T_2 = water outlet temperature in degrees Centigrade

T_1 = water inlet temperature in degrees Centigrade

The calorimeter was first calibrated by dissipating 60 cps power in the load at the approximate operating power level, with the ac power level determined by laboratory-grade current and voltage meters.

C. MODULATION CHARACTERISTICS. The modulation characteristics detailed in subparts B through E of Part 13 herein, were determined using the Hewlett-Packard Model 206A Audio Oscillator and Model 330D Distortion Analyzer, and Metron Model 506B Modulation Monitor. The measurements were made in accordance with the methods recommended by the manufacturer of the test equipment, at the required levels specified by the F.C.C.

D. BANDWIDTH. The transmitter output signal was examined for the presence of spurious emissions or unwanted higher-order modulation products through the use of a spectrum analyzer, the Singer-Metrics Model SPA-3/25a.

MEASUREMENT PROCEDURE
(Continued)

D. BANDWIDTH (Continued)

The measurement data section includes photographs of the resulting oscilloscope traces presented during these tests.

A sample of the transmitter output signal was derived from a capacitive divider (described in subpart E(1) below) and connected via coaxial cable to the analyzer. The transmitter was modulated 85% at 7500 cps, and photographic records were made for analyzer sweep widths of ±50 and ±100 kc.

E. SPURIOUS EMISSIONS

(1) RF Voltage at Antenna Terminal. A further examination of the spectrum was made at the transmitter antenna terminal using the Empire Devices, Inc. Model NF-105 Noise and Field Intensity meter. The transmitter was modulated 85% at 7500 cps during these tests.

A short section of 3-1/8" coaxial line, at the phantom antenna input, was fitted with a capacitive divider connected directly to the inner conductor and enclosed in a small copper shield which was in turn bonded to the transmission line outer conductor. The divider consisted of two capacitors in series to ground, with values of 67 picofarads and 0.01 microfarads. A double-shielded 50 ohm, coaxial

MEASUREMENT PROCEDURE
(Continued)

E. SPURIOUS EMISSIONS (Continued)

cable, approximately 95 feet long, was connected across the larger capacitance to provide a sample voltage for the Empire Devices NF-105 meter, located within a copper screen room. A coaxial 50 ohm, 10 db pad was connected at all times at the NF-105 input, for isolation purposes. The NF-105 includes a 50 ohm input termination.

To properly correct the sampling system for loss differences which might be present in the sampling capacitors and cable with frequency, the system was calibrated with a Hewlett-Packard Model 606A RF Signal Generator, using the substitution method. Replacing the transmitter, the generator was connected directly to the phantom antenna via the transmitter output transmission line and sampling section. With the generator output held constant at 1.0 volt, using the instrument's output meter which had previously been checked for accuracy, and arbitrary signal level was read at the NF-105 via the sampling connection. The generator was then reconnected directly to the NF-105 meter and suitable attenuation added at the generator output attenuator to establish the previously-indicated level at the NF-105. Generator output was recorded as db below 1.0 volt. This measurement was made for the fundamental and each harmonic frequency and the relative gain or loss of the sampling system, in db, was determined by subtracting the reading at each harmonic

MEASUREMENT PROCEDURE
(Continued)

E. (1) RF Voltage at Antenna Terminal (Continued)

from the indication at the fundamental. The resulting relative corrections appear in the Measurement Data section.

For the transmitter harmonic measurements, the sampling voltage had been set high enough (about 2.9 volts at full power) so as to allow NF-105 meter indications well above the meter noise level at figures 20 to 40 db below the required 80 db supression level. To avoid overloading the meter with fundamental signal, a reject filter was constructed and adjusted to have greater than 40 db rejection at 980 kc. (Bandwidth was approximately 100 kc at the 3 db points). This filter was connected in series with the 10 db pad, at the NF-105 meter input, during all measurements.

The substitution method was again used as described above and for each frequency, as the signal generator was substituted at the NF-105 input (via the rejection filter and pad), the sampling line was terminated in a coaxial 50 ohm resistor for determination of fundamental reference level. A Hewlett-Packard Model 411A RF Millivoltmeter was bridged across this load, which had previously been determined equal in impedance to the NF-105 meter termination.

Measurements of each harmonic voltage were thus made by the substitution

MEASUREMENT PROCEDURE
(Continued)

E. (1) RF Voltage at Antenna Terminal (Continued)

method and expressed in db below 1.0 volt. Simultaneous measurements were made of fundamental voltage and recorded as db above 1.0 volt. The two figures added, gave the ratio of harmonic to fundamental power level for each observed frequency. Finally, these results were corrected by the sampling calibration figures as shown in the Measurements Data section.

E. SPURIOUS EMISSIONS (Continued)

E. (2) Field Intensity Measurements. For measurements of spurious emissions radiated directly from the cabinet, control circuits, power leads, and intermediate circuit elements, the transmitter and phantom antenna were installed in a small all-wooden building located in an open area of the Collins antenna range. Figures 12-2 and 12-3 on the next pages illustrate the installation.

Excellent grounding was obtained by bonding the transmitter by heavy copper strap to an existing copper radial system, which had been previously installed for an antenna test. Power was furnished via a grounded, metal conduit from a distribution point approximately 200 feet away. Cooling water for the phantom antenna was obtained by circulation from storage drums adjacent to the building. Equipment

MEASUREMENT PROCEDURE
(Continued)

E. (2) Field Intensity Measurements (Continued)

Figure 12-2 Antenna Range Area

MEASUREMENT PROCEDURE
(Continued)

E. (2) Field Intensity Measurements (Continued)

Figure 12-3 Enclosure for Field Measurements

MEASUREMENT PROCEDURE
(Continued)

E. (2) Field Intensity Measurements (Continued)

installation within the building was similar to that shown in Figure 12-1. The transmitter was situated facing South and subsequent measurements were made in the four cardinal directions.

Field intensity measurements were made with a Stoddart Aircraft Radio Company Model NM-20B Field Intensity meter. The "large" loop antenna (Stoddart No. 91077-2) was used for all measurements and the instrument with this antenna has a specified sensitivity of 2 to 5 uv/m. The transmitter was operated at 5500 watts during these tests, and was modulated 85% at 7500 cps.

At the test carrier frequency of 980 kc, one wavelength is approximately 1000 feet. To be free from near-field effects, therefore, measurements were first made at one-half mile west of the transmitter site. No detectable signal could be observed at this point, and repeated readings were made on the western radial, halving the distance each time until the location was close enough to detect readable signals on most harmonic frequencies. The final point of measurement was 165 feet from the site, and repeated readings were recorded at this distance in four directions from the transmitter.

The data recorded in the measurements section gives field intensity

MEASUREMENT PROCEDURE
(Continued)

E. (2) Field Intensity Measurements (Continued)

directly in microvolts-per-meter, and a sample computation relates a typical indication to the fundamental carrier power. To assure that the close-in measurements were not abnormally high due to proximity effects, typical readings for the second harmonic as recorded on the western radial were plotted on the Groundwave Field Intensity charts (F.C.C. graphs in Part 73.184). These were found to have a straight line relation following the expected attenuation of six db per octave, except for a slight flattening of the curve at the most distant point, due to the ambient noise level.

F. POWER INPUT. Power input and power factor vs. modulation level were recorded using the three-phase Weston Industrial Analyzer. Power in kilowatts was read directly, and power factor was computed by two methods, using the indication of kvar's and by the separate readings of line current and voltage.

MEASUREMENT PROCEDURE
(Continued)

G. FREQUENCY STABILITY. As a measure of transmitter carrier frequency stability, the Type 310W-1 rf exciter was tested under conditions of varying temperature and supply voltage, as specified in part 2.579 of the F.C.C. Rules and Regulations. The entire exciter assembly including crystal, was placed in a temperature chamber and supplied +28 volts dc from an external supply. The voltage supply was an unfiltered three-phase full-wave rectifier similar to the normal transmitter supply, and was controlled to allow variation of the dc level over a ±15% range, as required.

For the first tests, a resistive load of 50 ohms was provided for the exciter. For the test of output level a tuned circuit load was provided, simulating the transmitter rf driver grid circuit, and rf grid voltage was measured.

The Type 310W-1 exciter operates with a crystal frequency of two or four times its output carrier frequency, using one or two integrated circuits for division, as required. To properly test the exciter using both configurations, and to determine performance at the band limits, carrier frequencies of 540 and 1600 kc were chosen. The resulting crystal frequencies were 2160 and 3200 kc, respectively.

MEASUREMENT PROCEDURE
(Continued)

G. FREQUENCY STABILITY(Continued)

The exciter was first tested on 1600 kc, using frequency division circuit Z1, and a 3200 kc crystal. A Hewlett-Packard electronic counter was used for these tests. The exciter frequency was adjusted to 1600 kc ±0 cps.

As frequency was monitored continuously, the temperature chamber was adjusted for +45°C and after stabilization, output frequency was recorded for power source limits of ± 15% (23.8 and 32.2 vdc). Temperature was then lowered from +45°C to +35°C and frequency again recorded at the two supply voltages. The procedure was repeated for temperature ranges of +35°C to 0°C, 0°C to -10°C, and -10°C to -25°C, allowing stabilization at the initial temperature in each range. To assure that the maximum deviation was noted, the frequency was continuously monitored during each temperature change and the maximum frequency error within the range was the one recorded.

With the temperature stabilized at +45°C, +35°C, 0°C, -10°C, and -25°C, the rf voltage at the output of the grid tank circuit simulated load was also recorded. Values were noted for the two power source voltage extremes.

MEASUREMENT PROCEDURE
(Continued)

G. FREQUENCY STABILITY (Continued)

The tests described above were repeated in their entirety at an output frequency of 540 kc. For these measurements, dividers Z1 and Z2 were employed, and a 2160 kc crystal was used. Test results are shown in the Measurement Data section.

At room temperature, and nominal supply voltage of +28.0 volts, the crystal trimmer adjustment range was recorded, as shown in the data.

H. TYPICAL METER READINGS. A record of the transmitter meter indications was made, and is included in the Measurements Data section. Indications of voltages and currents applied to the elements of the power amplifier and modulator tubes, as required by the F.C.C., are included therein.

I. TEST EQUIPMENT. A record of the test equipment used during type acceptance was made, and is included in the Measurements Data section.

MEASUREMENT DATA

A. Power Output

Power output was measured with a calibrated rf ammeter in series with the phantom antenna (I^2R) and confirmed by the calorimetric method, as described in Part 12 herewith. The transmitter was determined capable of achieving an output of 5500 watts with 7500 cps, 95% modulation, and otherwise capable of maintaining the conditions as prescribed in Part 3.48 of the F.C.C. Rules and Regulations. All data in Part 13 hereof were recorded at an output level of 5500 watts for full power, and at 1100 watts for reduced power.

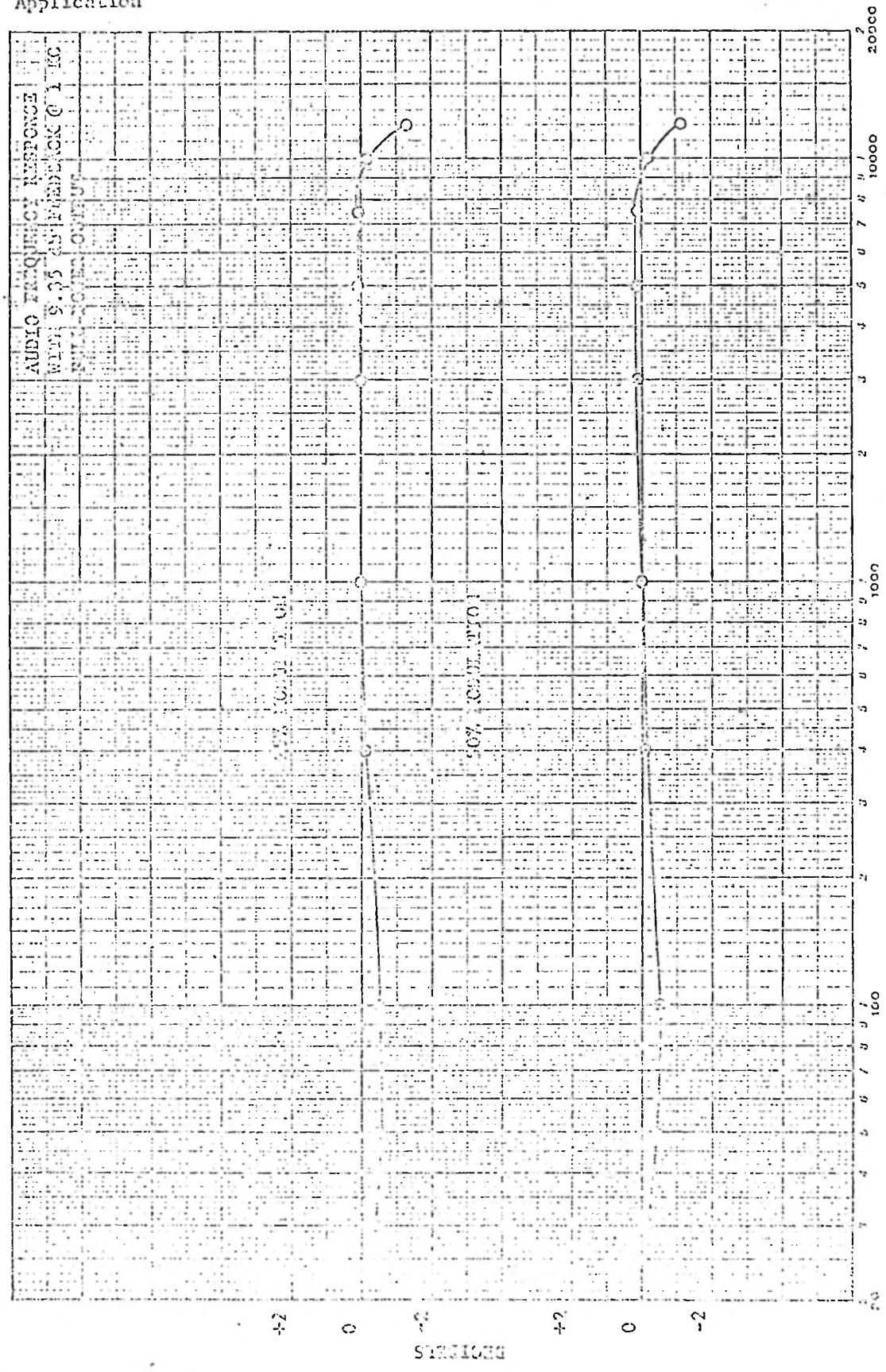
MEASUREMENT DATA
(Continued)

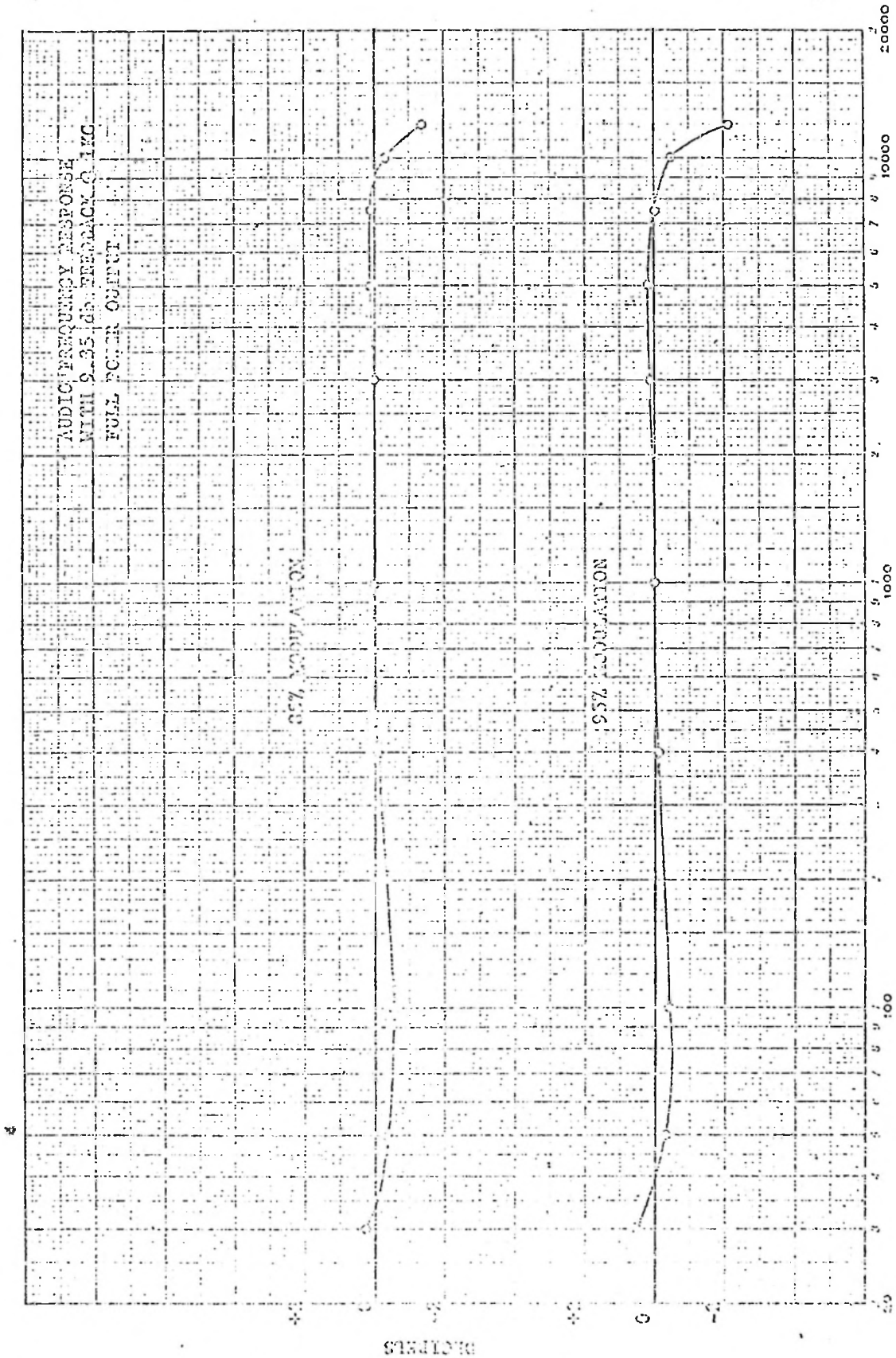
B. AUDIO FREQUENCY RESPONSE

Full Power Output
in db, Referred to 1000 cps

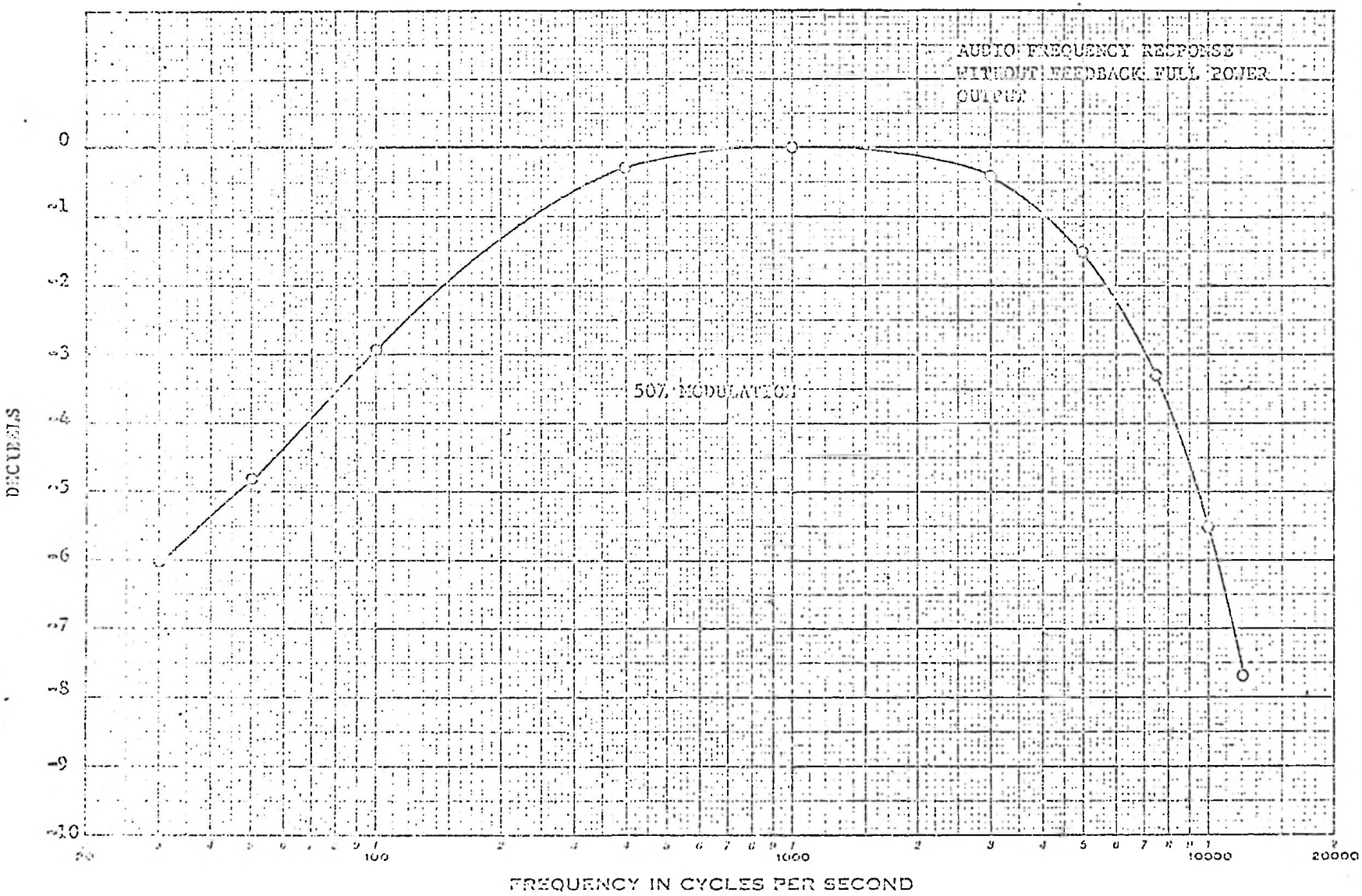
Frequency (cps)	Modulation Level With 9.35db Feedback @ 1 kc*				Without Feedback	
	25%	50%	85%	95%	50%	95%
30	-0.4	-0.2	+0.3	+0.5	-6.0	----
50	-0.5	-0.4	-0.4	-0.3	-4.8	-4.8
100	-0.5	-0.5	-0.5	-0.4	-2.9	-2.8
400	-0.1	-0.1	-0.1	-0.1	-0.3	-0.4
1000	0	0	0	0	0	0
3000	0	+0.1	0	+0.1	-0.4	-0.4
5000	+0.1	+0.1	+0.1	+0.2	-1.5	-1.5
7500	+0.1	+0.1	+0.1	0	-3.3	-3.5
10,000	-0.2	-0.2	-0.3	-0.5	-5.5	-6.0
12,000	-1.3	-1.2	-1.4	-2.1	-7.7	-9.0

*NOTE: Input level for 100% modulation, 1 kc = +10.35 dbm

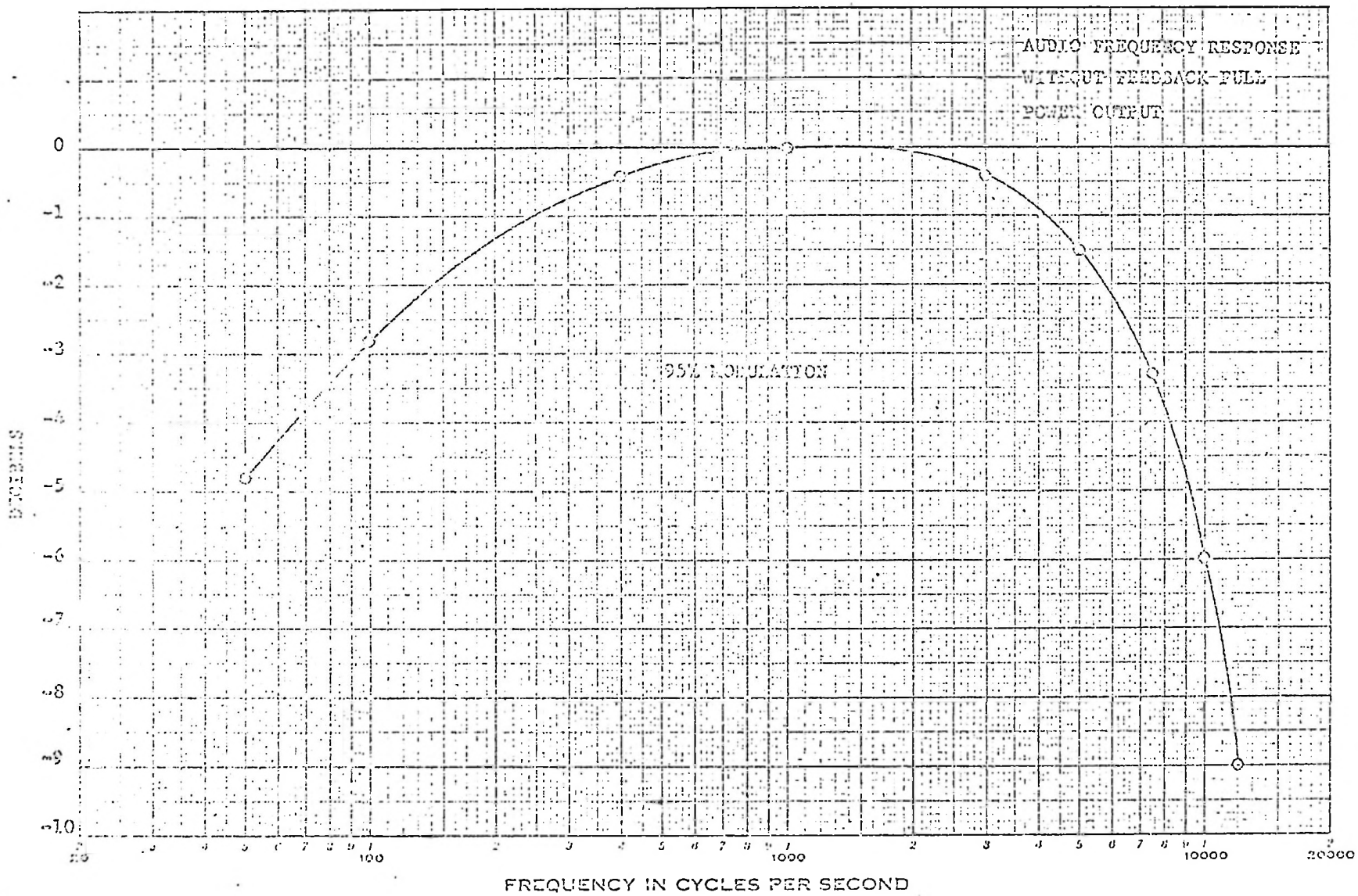



FREQUENCY IN CYCLES PER SECOND
20000
10000
1000
100
DECIBELS
NOMINAL 75%
NOMINAL 25%
AUDIO FREQUENCY
KEUFFEL & ESSER CO.
46 6882

Type 8203-1
Type Acceptance
Application



13-5


AUDIO FREQUENCY RESPONSE
WITHOUT FEEDBACK-FULL
POWER OUTPUT
95% MODULATION
DECIBELS
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
20
100
1000
10000
20000
FREQUENCY IN CYCLES PER SECOND

MEASUREMENT DATA
(Continued)

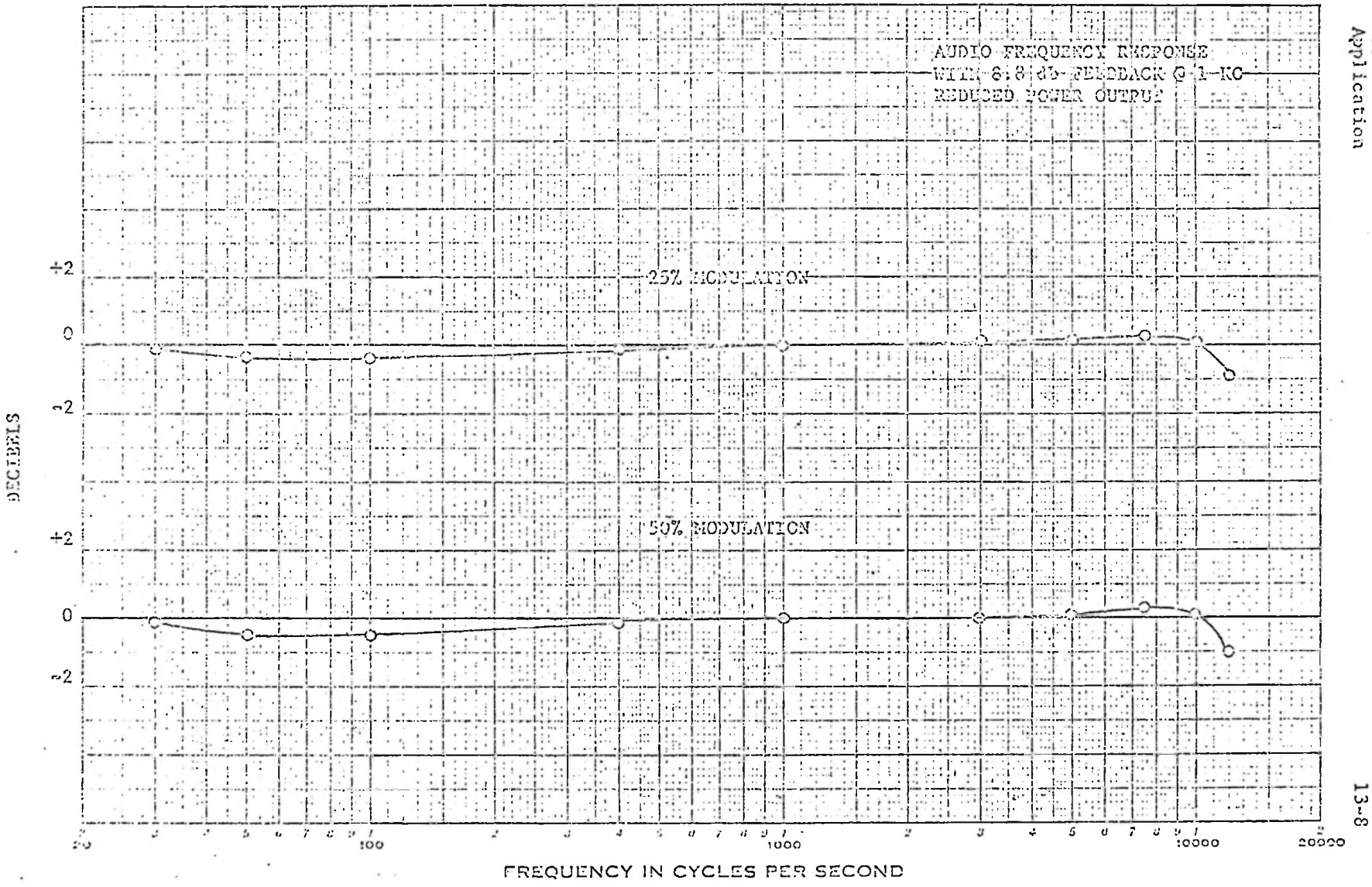
B. AUDIO FREQUENCY RESPONSE (Continued)

Reduced Power Output
in db, Referred to 1000 cps

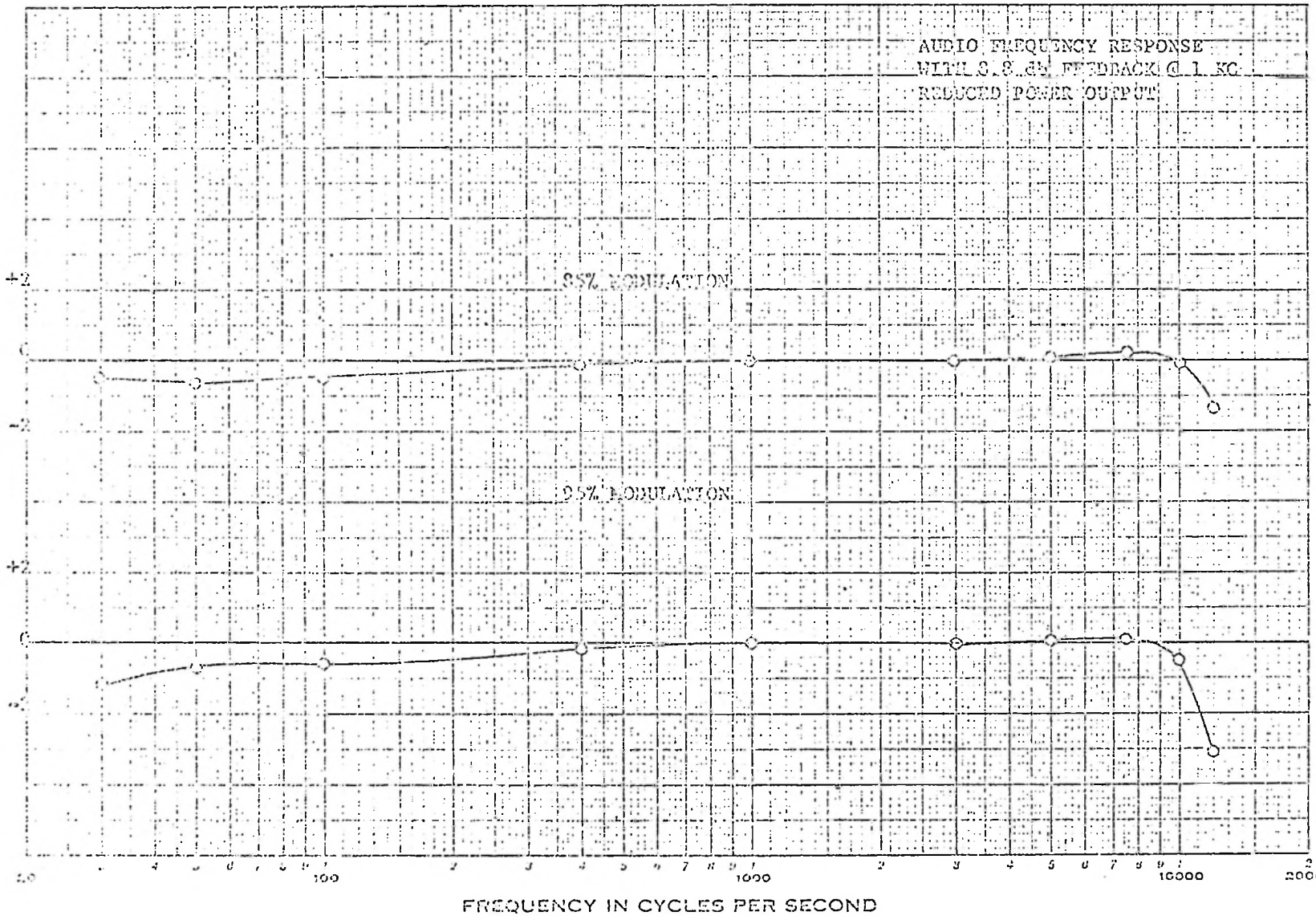
Frequency (cps)	Modulation Level With 8.8 db Feedback @ 1 kc* 25%	50%	85%	95%	Without Feedback 50%	95%
30	-0.1	-0.2	-0.5	-1.2	-6.2	-6.7
50	-0.3	-0.5	-0.6	-0.7	-4.9	-5.1
100	-0.4	-0.5	-0.5	-0.6	-2.9	-3.0
400	-0.1	-0.1	-0.1	-0.2	-0.4	-0.4
1000	0	0	0	0	0	0
3000	+0.1	0	0	0	-0.4	-0.4
5000	+0.2	+0.1	+0.1	+0.1	-1.5	-1.5
7500	+0.3	+0.3	+0.2	+0.1	-3.4	-3.6
10,000	+0.1	-0.1	-0.1	-0.5	-5.8	-6.4
12,000	-0.9	-1.0	-1.4	-3.1	-8.0	-10.0

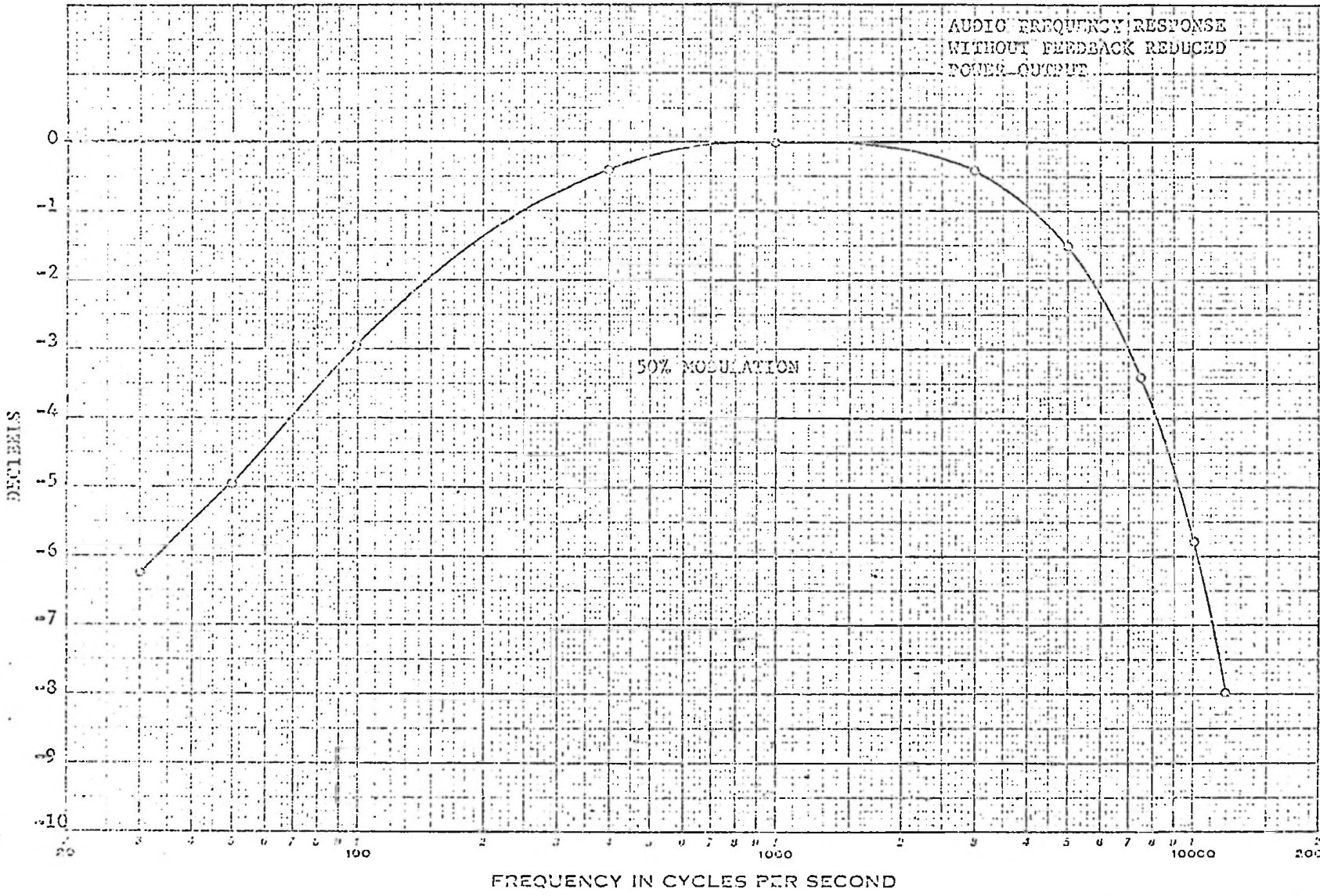
*NOTE: Input level for 100% modulation, 1 kc = +10.6 dbm

AUDIO FREQUENCY 46 6882
MADE IN U.S.A.
KRUFFEL & ESSER CO.

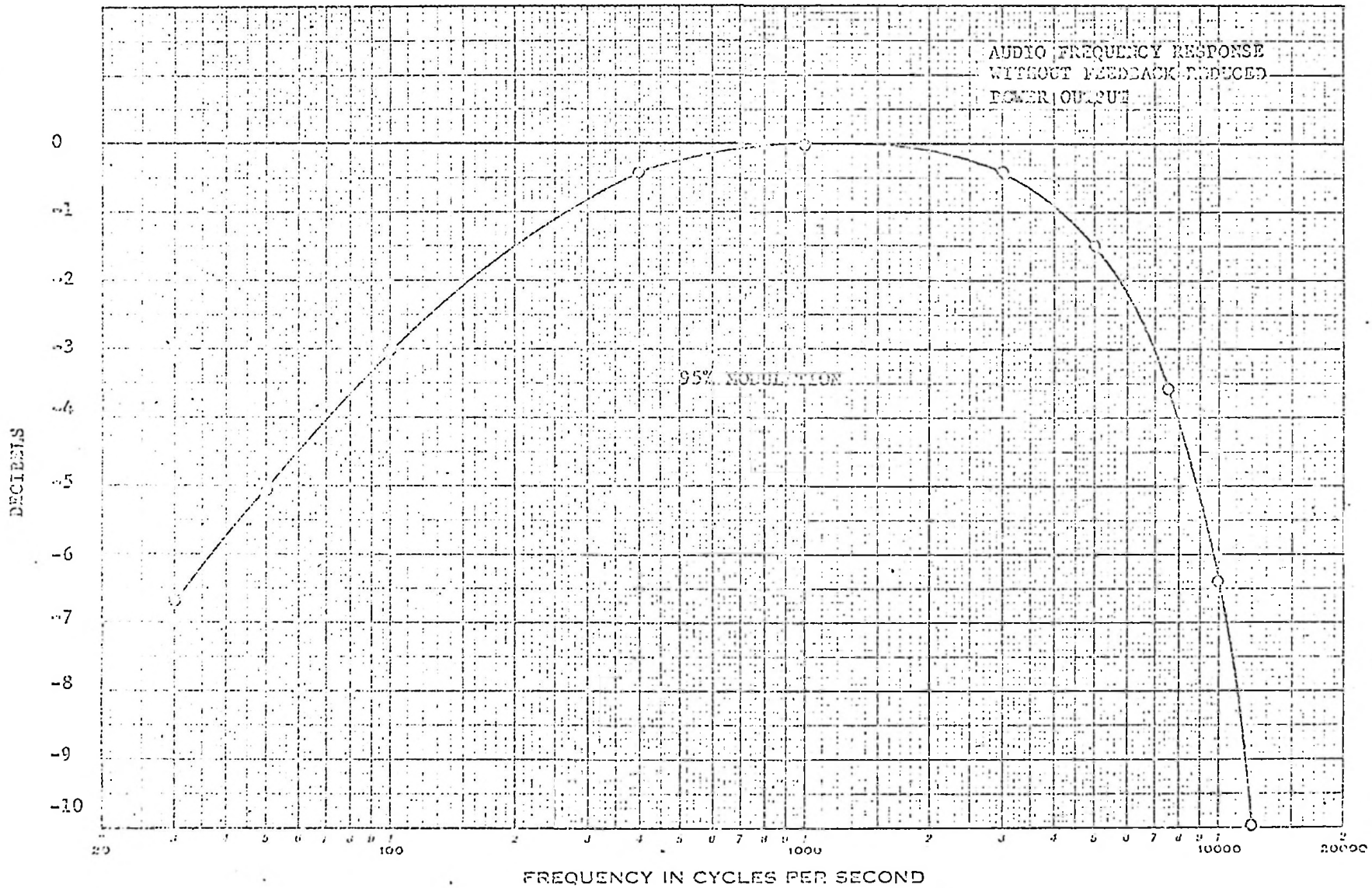


Type 820E-1
Type Acceptance
Application




AUDIO FREQUENCY RESPONSE
WITHOUT FEEDBACK REDUCED
POWER OUTPUT
50% MODULATION
DECIBELS
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
20
100
1000
10000
20000
FREQUENCY IN CYCLES PER SECOND

AUDIO FREQUENCY 46 6882
KEUFFEL & ESSER CO.

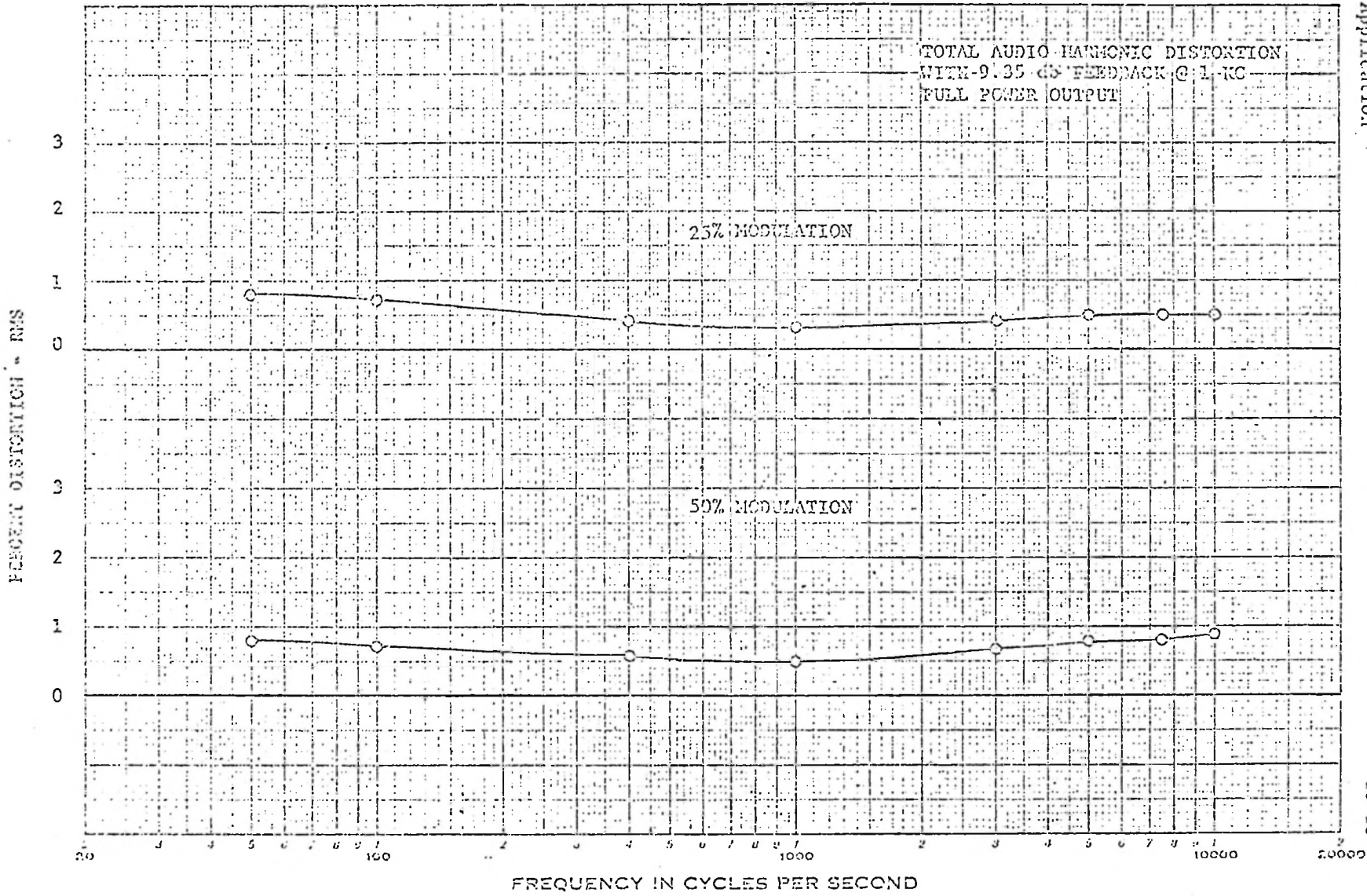


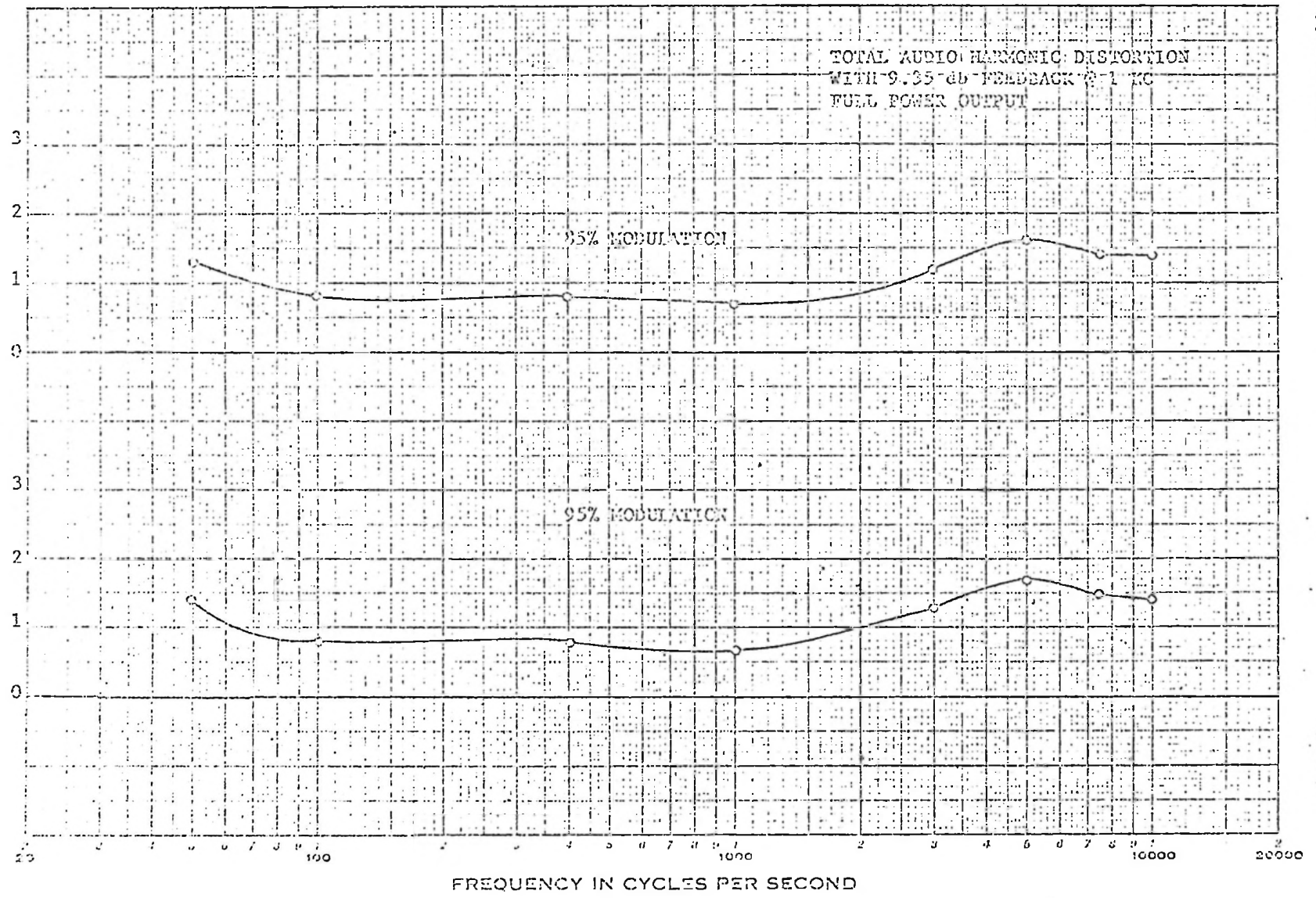
MEASUREMENT DATA
(Continued)

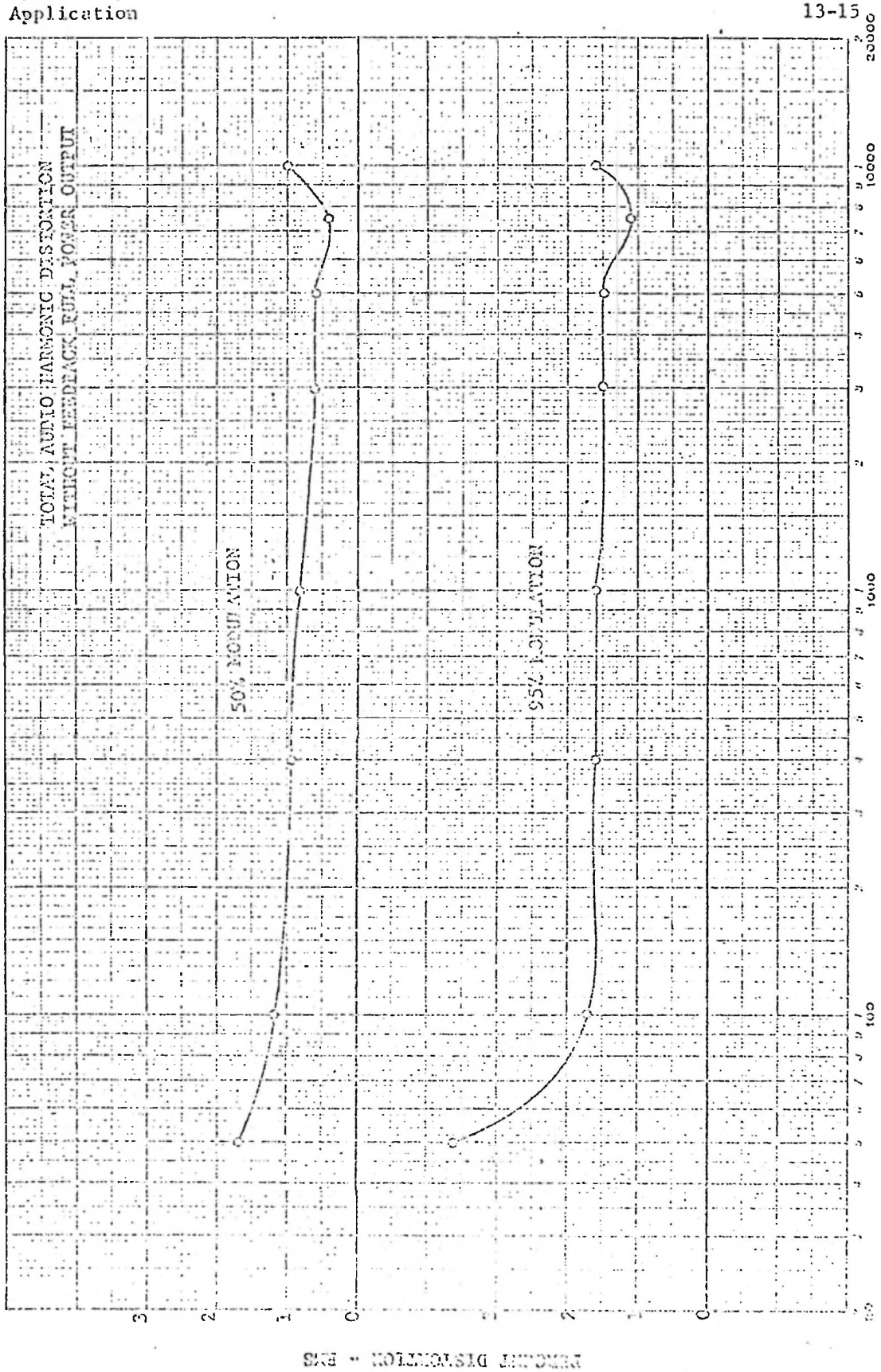
C. TOTAL AUDIO HARMONIC DISTORTION

Full Power Output
in percent

Frequency (cps)	Modulation Level With 9.35 db Feedback @ 1 kc				Without Feedback	
	25%	50%	85%	95%	50%	95%
50	0.8	0.8	1.3	1.4	1.7	3.6
100	0.7	0.7	0.8	0.8	1.2	1.7
400	0.4	0.6	0.8	0.8	0.9	1.6
1000	0.3	0.5	0.7	0.7	0.8	1.6
3000	0.4	0.7	1.2	1.3	0.6	1.5
5000	0.5	0.8	1.6	1.7	0.6	1.5
7500	0.5	0.8	1.4	1.5	0.4	1.1
10,000	0.5	0.9	1.4	1.4	1.0	1.6


TOTAL AUDIO HARMONIC DISTORTION
WITH-9.35 db FEEDBACK @ 1 KC
FULL POWER OUTPUT
25% MODULATION
50% MODULATION
PERCENT DISTORTION - RMS
3
2
1
0
3
2
1
0
20
100
1000
10000
20000
FREQUENCY IN CYCLES PER SECOND


AUDIO FREQUENCY 46 6882
KLUPPEL & EGGER CO.
TOTAL AUDIO HARMONIC DISTORTION
WITH -9.35 db FEEDBACK @ 1 KC
FULL POWER OUTPUT
95% MODULATION
95% MODULATION
3
2
1
0
3
2
1
0
20
100
1000
10000
20000
FREQUENCY IN CYCLES PER SECOND
PERCENT DISTORTION - SIN

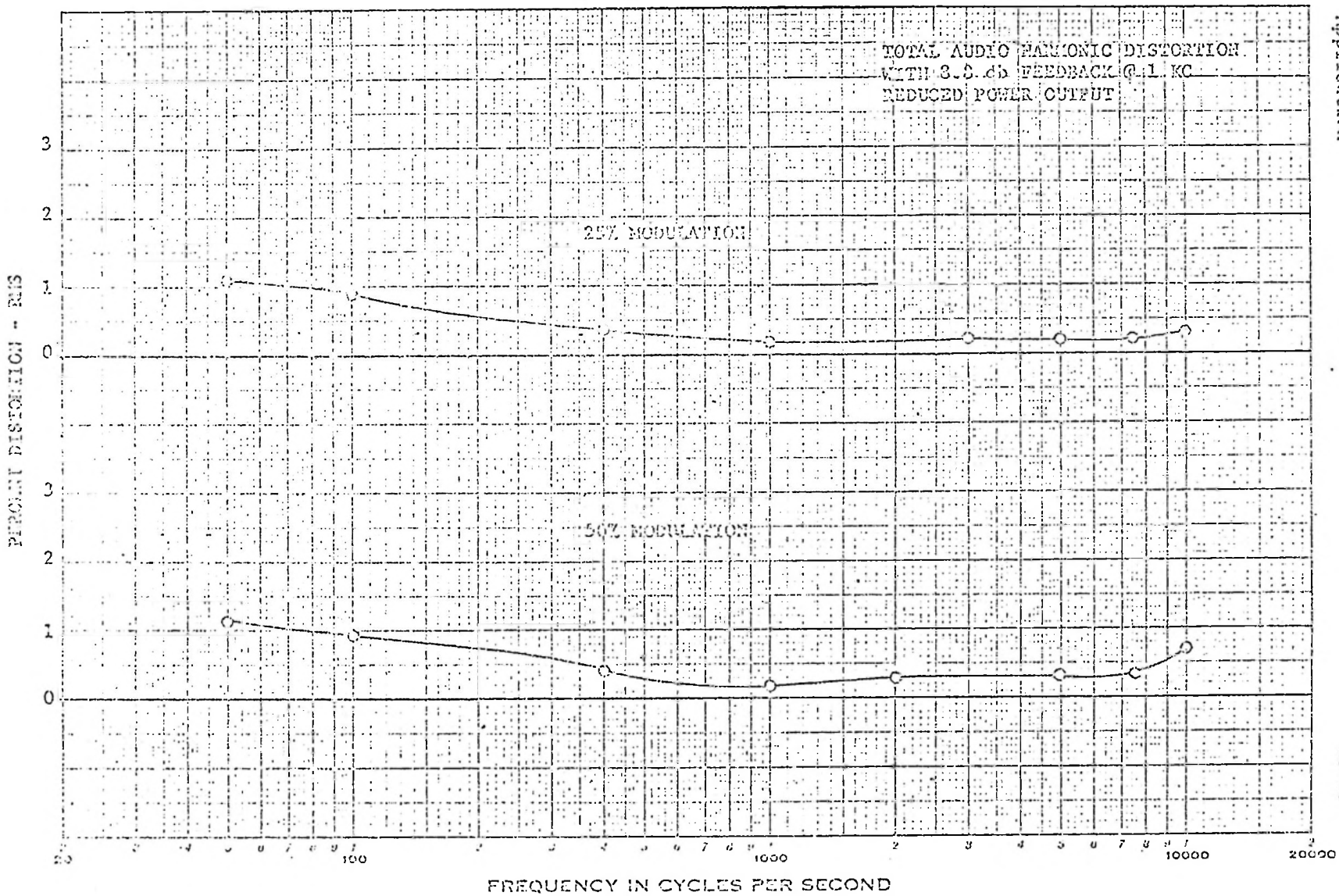


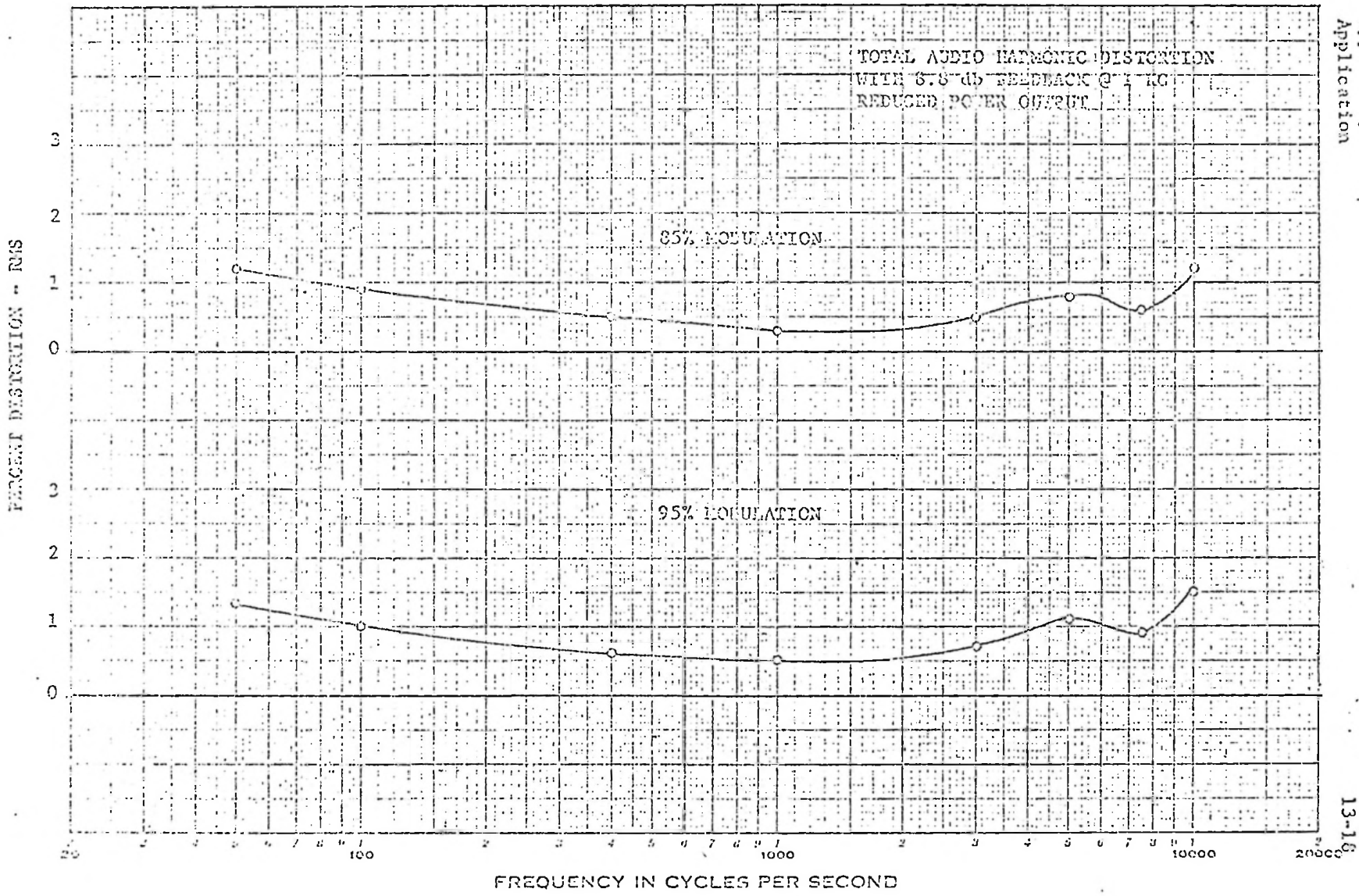
MEASUREMENT DATA
(Continued)

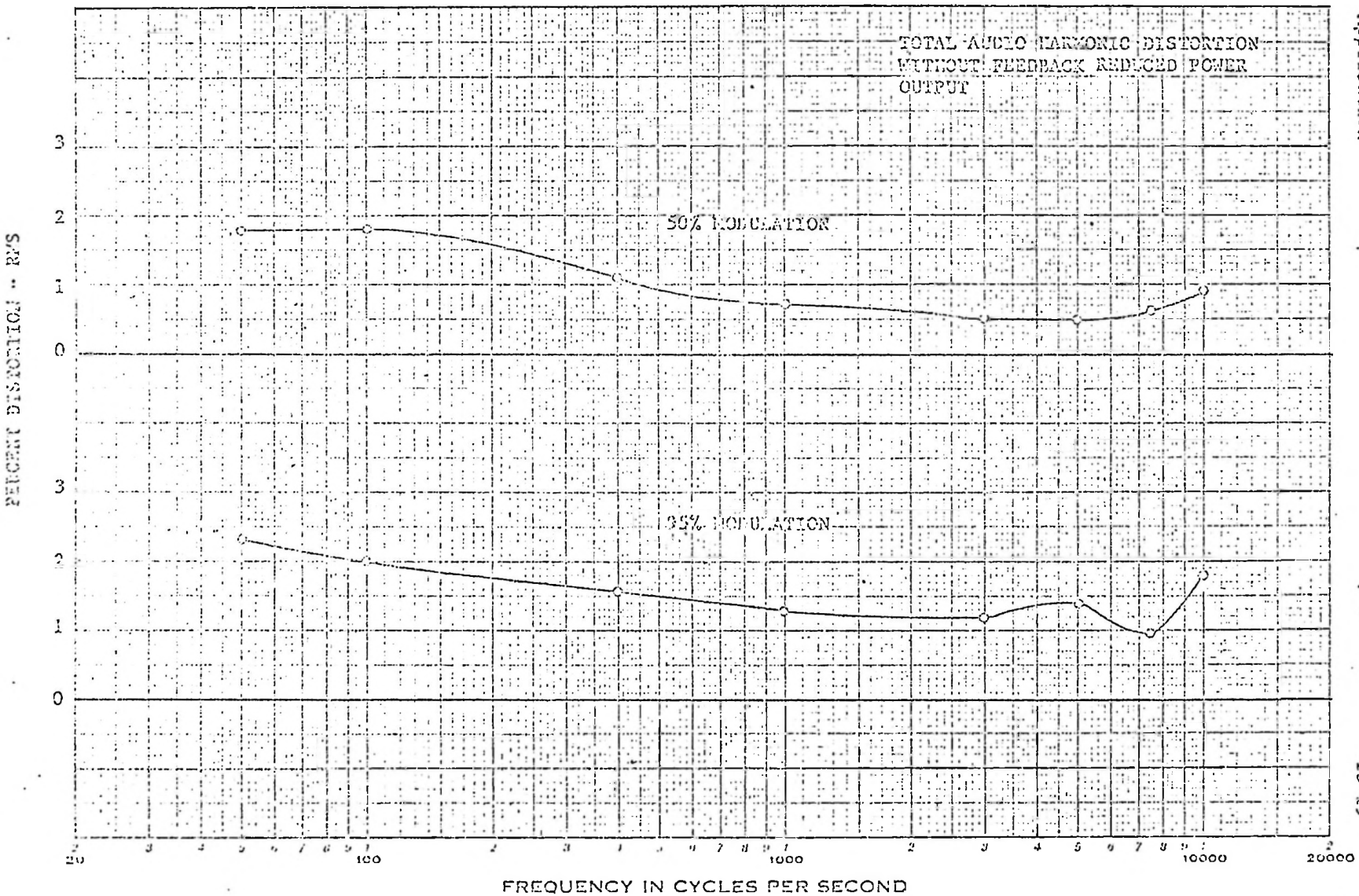
C. TOTAL AUDIO HARMONIC DISTORTION (Continued)

Reduced Power Output
in percent

Frequency (cps)	Modulation Level: With 8.8 db Feedback @1 kc 25%	50%	85%	95%	Without Feedback 50%	95%
50	1.1	1.1	1.2	1.3	1.8	2.3
100	0.9	0.9	0.9	1.0	1.8	2.0
400	0.4	0.4	0.5	0.6	1.1	1.6
1000	0.2	0.2	0.3	0.5	0.7	1.3
3000	0.2	0.3	0.5	0.7	0.5	1.2
5000	0.2	0.3	0.8	1.1	0.5	1.4
7500	0.2	0.3	0.6	0.9	0.6	1.0
10,000	0.3	0.7	1.2	1.5	0.9	1.8


AUDIO FREQUENCY
40 6882
KEUFFEL & ESSER CO.
TOTAL AUDIO HARMONIC DISTORTION
WITH 8.5 db FEEDBACK @ 1 KC
REDUCED POWER OUTPUT
25% MODULATION
50% MODULATION
PERCENT DISTORTION - RMS
3
2
1
0
3
2
1
0
25
100
1000
10000
20000
FREQUENCY IN CYCLES PER SECOND


AUDIO FREQUENCY 46 6802
KEUFFEL & ESSER CO.
TOTAL AUDIO HARMONIC DISTORTION
WITH 8.8 db FEEDBACK @ 1 KC
REDUCED POWER OUTPUT
85% MODULATION
95% MODULATION
PERCENT DISTORTION - RMS
FREQUENCY IN CYCLES PER SECOND
100
1000
10000
20000


AUDIO FREQUENCY 46 6832
KEUFFEL & ESSER CO.
TOTAL AUDIO HARMONIC DISTORTION
WITHOUT FEEDBACK REDUCED POWER
OUTPUT
50% MODULATION
95% MODULATION
PERCENT DISTORTION - R/S
3
2
1
0
3
2
1
0
20
100
1000
10000
20000
FREQUENCY IN CYCLES PER SECOND

MEASUREMENT DATA
(Continued)

D. PERCENT CARRIER SHIFT
at 400 cps

% Modulation	% Carrier Shift	
	Full Power	Reduced Power
25	0	0
50	0	0
75	0	0
95	0	0
100	-0.5	0

MEASUREMENT DATA
(Continued)

E. HUM AND NOISE

Referred to 100% modulation, 1 kc

Full Power Output

With 9.35 db feedback	-67 db
Without feedback	-64 db

Reduced Power Output

With 8.8 db feedback	-71 db
Without feedback	-62 db

MEASUREMENT DATA
(Continued)

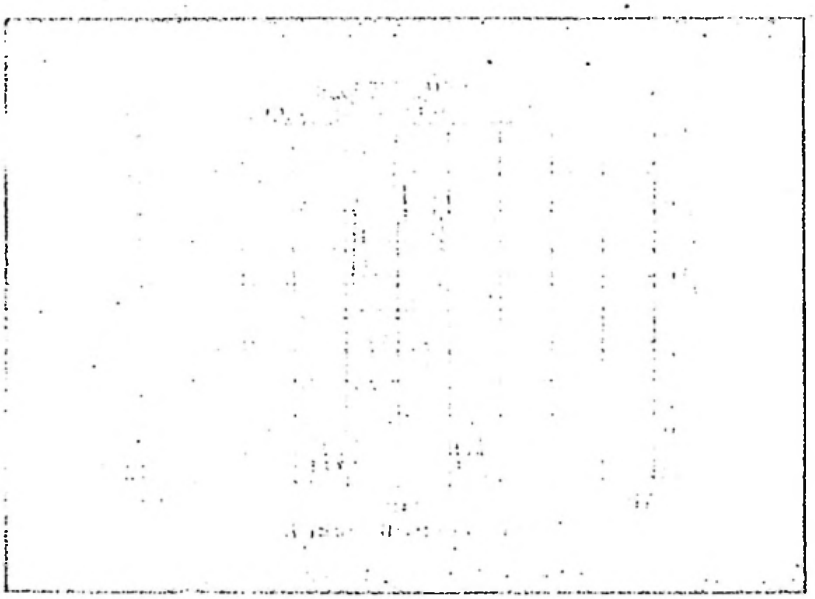
F. BANDWIDTH OCCUPIED

The bandwidth containing 99% of the total radiated power is less than 20 kc. The spectrum analyzer photographs on the next two pages show bandwidth occupied and demonstrate compliance with Part 73.40 of the Commission's Rules and Regulations. Modulation was at 7500 cps, 85%.

The photographs shown were taken at full power output. On reduced power, the higher order modulation products were consistantly lower by 5 db or more from those shown.

MEASUREMENT DATA
(Continued)

F. BANDWIDTH OCCUPIED (Continued)

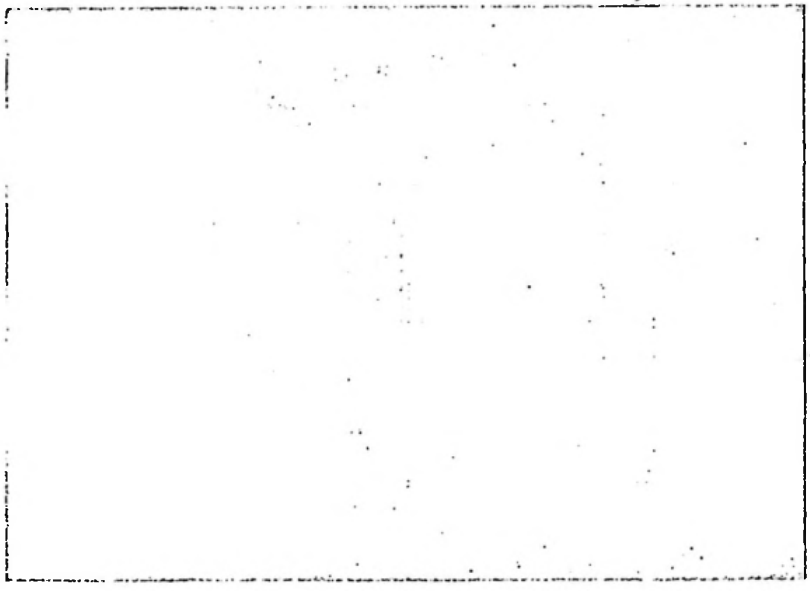


Ordinate: Log scale

Abscissa: ±50 kc sweep

MEASUREMENT DATA
(Continued)

F. BANDWIDTH OCCUPIED (Continued)



Ordinate: Log scale

Abscissa: ±100 kc sweep

MEASUREMENT DATA
(Continued)

G. SPURIOUS EMISSIONS

(1) RF Voltage at Antenna Terminal, in db

Full Power Output

(Modulated 85%, 7500 cps)

Harmonic	Sampling Calibration Relative Correction Value	Transmitter Output Relative Value Uncorrected	Transmitter Output Relative Value Corrected
Fund.	0	0	0
2nd	+0.1	-93.8	-93.9
3rd	0	-81.9	-81.9
4th	-0.6	-95.9	-95.3
5th	-1.0	-105.7	-104.7
6th	-1.5	-107.1	-105.6
7th	-2.7	-121.1	-118.4
8th	-3.8	-122.8	-119.0
9th	-5.0	-121.1	-116.1
10th	-6.9	-132.5	-125.6

MEASUREMENT DATA
(Continued)

G. SPURIOUS EMISSIONS (Continued)

(1) RF Voltage at Antenna Terminal, in db

Reduced Power Output

(Modulated 85%, 7500 cps)

Harmonic	Sampling Calibration Relative Correction Value	Transmitter Output Relative Value Uncorrected	Transmitter Output Relative Value Corrected
Fund	0	0	0
2nd	+0.1	-90.6	-90.7
3rd	0	-83.4	-83.4
4th	-0.6	-89.9	-89.3
5th	-1.0	-102.5	-101.5
6th	-1.5	-108.1	-106.6
7th	-2.7	-115.9	-113.2
8th	-3.8	-119.6	-115.8
9th	-5.0	-120.6	-115.6
10th	-6.9	-131.6	-124.7

MEASUREMENT DATA
(Continued)

G. SPURIOUS EMISSIONS (Continued)

(2) Field Intensity Measurements

Full Power Output

(Modulated 85%, 7500 cps)

(a) Ambient Noise. With the transmitter off, measurements of ambient noise indicated levels which varied from 3.8 to 12 uv/m for the harmonic frequencies at the various points of measurement.

A typical record of ambient noise, as measured 165 feet west of the transmitter site follows:

Harmonic	Ambient Noise Level
	uv/m
2nd	5.0
3rd	4.0
4th	12.0
5th	7.2
6th	6.0
7th	6.0
8th	6.0
9th	8.0
10th	8.0

MEASUREMENT DATA
(Continued)

G. (2) Field Intensity Measurements (Continued)

(b) Field Intensity at 1/2 mile. Measurements were made at one-half mile west of the transmitter site on all harmonic frequencies. No detectable signal was found above ambient noise level.

Measurements were repeated on the western radial at one-quarter mile, but no readable signal was found.

(c) Field Intensity at 1/8 mile. The following transmitter emissions were recorded at one-eighth mile (660 feet) west of the site.

Harmonic	Field Intensity in uv/m
2nd	6.4
3rd	5.8
9th	9.6

No other readable signals were found.

(d) Field Intensity at 1/16 mile. At one-sixteenth mile (330 feet) west, the following emissions were noted.

Harmonic	Field Intensity in uv/m
2nd	11.2
3rd	10.4
9th	11.4

No other readable signals were found.

MEASUREMENT DATA
(Continued)

G. (2) Field Intensity Measurements (Continued)

(e) Field Intensity at 1/32 mile. At 1/32 mile (165 feet) readable signals were found on most harmonic frequencies. Measurements were then made in four directions from the transmitter site at this distance, as follows.

	Field Intensity in uv/m			
Harmonic	West	South	East	North
2nd	19.8	16.4	24.0	17.8
3rd	19.6	19.6	21.0	15.0
4th	*	*	*	*
5th	*	*	*	*
6th	7.2	6.0	6.8	7.6
7th	7.6	6.0	5.6	8.4
8th	7.2	8.8	8.8	8.4
9th	20.2	16.4	13.6	18.2
10th	*	*	*	*

* Indicates no readable signal.

NOTE: Radiated emission on the fundamental frequency (980 kc), was below the level of ambient interference and noise at this distance.

MEASUREMENT DATA
(Continued)

G. (2) Field Intensity Measurements (Continued)

(f) Sample computation, relating harmonic field intensity and carrier power levels.

Considering the transmitter as an isotropic radiator, measured harmonic field intensity may be expressed as a power level at the source by the relation:

$$P = \frac{r^2 E_o^2}{30}$$

where P is power radiated in watts

r is radius in meters

E_o is free-space field in volts per meter

An example of measured second harmonic field intensity at 1/8 mile, from (c) above, is 6.4 uv/m. Equivalent power at the source is 553 microwatts.

Level of second harmonic power with respect to 5.5 kw carrier power = -109.95 db.

MEASUREMENT DATA
(Continued)

H. POWER INPUT REQUIREMENT

Full Power Output = 5500 watts

Modulation Level (Percent)	Total Power Input (Kilowatts)	Power Factor
0	14.70	0.982
30	15.10	0.980
50	15.75	0.975
75	17.00	0.979
100	18.30	0.980

Reduced Power Output = 1100 watts

Modulation Level (Percent)	Total Power Input (Kilowatts)	Power Factor
0	5.55	0.988
30	5.70	0.987
50	5.75	0.987
75	5.80	0.985
100	5.98	0.988

MEASUREMENT DATA
(Continued)

I. FREQUENCY STABILITY

(1) Stability at 1600 kc

(a) Frequency Deviation

Supply Voltage	Temperature Range	Max. Frequency Deviation (cps)	Permissible Limits (cps)
28.0	Room Ambient	1,600,000	1,600,000
23.8	+45°C to +35°C	1,599,991	1,600,000 ±10
32.2	+45°C to +35°C	1,599,991	1,600,000 ±10
23.8	+35°C to 0°C	1,599,995	1,600,000 ±5
32.2	+35°C to 0°C	1,599,995	1,600,000 ±5
23.8	0°C to -10°C	1,600,005	1,600,000 ±10
32.2	0°C to -10°C	1,600,005	1,600,000 ±10
23.8	-10°C to -25°C	1,599,995	1,600,000 ±20
32.2	-10°C to -25°C	1,599,995	1,600,000 ±20

MEASUREMENT DATA
(Continued)

I. (1) Frequency Stability at 1600 kc (Continued)

(b) Output Level

Supply Voltage	Temperature	RMS Output Voltage *
28.0	Room Ambient	85
25.2	-25°C	78
30.8	-25°C	85
25.2	-10°C	78
30.8	-10°C	85
25.2	0°C	78
30.8	0°C	86
25.2	+35°C	81
30.8	+35°C	90
25.2	+45°C	81
30.8	+45°C	90

*Minimum permissible output voltage = 65 v rms, for ±10% change in supply voltage.

MEASUREMENT DATA
(Continued)

I. FREQUENCY STABILITY (Continued)

(2) Stability at 540 kc

(a) Frequency Deviation

Supply Voltage	Temperature Range	Max. Frequency Deviation (cps)	Permissible Limits (cps)
28.0	Room Ambient	540,000	540,000
23.8	+45°C to +35°C	539,998	540,000 ±10
32.2	+45°C to +35°C	539,998	540,000 ±10
23.8	+35°C to 0°C	539,999	540,000 ±5
32.2	+35°C to 0°C	539,999	540,000 ±5
23.8	0°C to -10°C	539,998	540,000 ±10
32.2	0°C to -10°C	539,998	540,000 ±10
23.8	-10°C to -25°C	539,995	540,000 ±20
32.2	-10°C to -25°C	539,995	540,000 ±20

MEASUREMENT DATA
(Continued)

I. (2) Frequency Stability at 540 kc (Continued)

(b) Output Level

Supply Voltage	Temperature	RMS Output Voltage*
28.0	Room Ambient	74
25.2	-25°C	65
30.8	-25°C	67
25.2	-10°C	66
30.8	-10°C	70
25.2	0°C	67
30.8	0°C	70
25.2	+35°C	72
30.8	+35°C	75
25.2	+45°C	72
30.8	+45°C	77

*Minimum permissible output voltage = .65 v rms, for ±10% change in supply voltage.

MEASUREMENT DATA
(Continued)

I. FREQUENCY STABILITY (Continued)

(3) Crystal Trimmer Range

Output Frequency at Minimum Capacitance	=	540,048 cps
Output Frequency at Maximum Capacitance	=	539,979 cps
Change in Frequency*	=	69 cps

*Minimum permissible range = 51 cps

MEASUREMENT DATA
(Continued)

J. TYPICAL METER READINGS

Meter	Switch Position	Indication: Full Power	Indication: Reduced Power
Plate Current	---	1.49a	0.65a
Plate Voltage	---	4.90kv	2.23kv
Test Meter 1	Driver 1K	69ma	73ma
	PA 1K	1.98a	1.11a
	Mod 1K (0%)	0.3a	0.2a
	(100%)	0.7a	0.29a
	PA Grid I	77ma	82ma
	PA Screen I	0.32a	0.32a
	PA Screen V	880v	890v
	Bias Supply V	-241v	-248v
Test Meter 2	Driver 2K	66ma	72ma
	PA 2K	----	----
	Mod 2K (0%)	0.3a	0.2a
	(100%)	0.68a	0.29a
	Mod Plate I (0%)	0.59a	0.4a
	(100%)	1.32a	0.54a
	Mod Screen I (0%)	0	0
	(100%)	0.02a	0.01a
	Mod Screen V	870v	880v
	28V Supply V	27.0v	27.2v

NOTE: Indications are for carrier conditions, except for 1 kc modulation as noted.

MEASUREMENT DATA
(Continued)

K. TEST EQUIPMENT

The following listed test equipment was utilized during the tests for type acceptance.

Bemco Model DF-100/212-1 Temperature Chamber, Ser. No. 1503.005

Bird Electonic Corp. Model 890 Termaline Coaxial Resistor, Ser. No. 1135

Empire Devices, Inc. Model NF-105 Noise and Field Intensity Meter, Ser. No. 1905

General Radio Company Model 1606-A RF Impedance Bridge, Ser. No. 1540

Hewlett-Packard Model 206A Audio Signal Generator, Ser. No. 152-023-0

Hewlett-Packard Model 330D Distortion Analyzer, Ser. No. 009-07518

Hewlett-Packard Model 410B Vacuum-Tube Voltmater, Ser. No. 2340-019

Hewlett-Packard Model 411A RF Millivoltmeter, Ser. No. 131-01303

Hewlett-Packard Model 412A DC Multimeter, Ser. No. 2352.003

Hewlett-Packard Model 425A DC Microvoltmeter, Ser. No. 142-04996

Hewlett-Packard Model 524C Electronic Counter, Ser. No. 1616.002

Hewlett-Packard Model 525A Counter Plug-in, Ser. No. 1612.003

Hewlett-Packard Model 606A HF Signal Generator, Ser. No. 301-05443

Metron Instruments, Inc. Model 506B AM Modulator Monitor, Ser. No. 219

Singer-Metrics, Inc. Model SPA-3/25a Spectrum Analyzer, Ser. No. 15-199-448

Stoddart Aircraft Radio Company, Inc. Model NM-20B Radio Interference and Field Intensity Meter, Ser. No. 636-20

Stoddart Aircraft Radio Company, Inc. Model 91077-2 Large Loop Antenna, no serial number

MEASUREMENT DATA
(Continued)

K. TEST EQUIPMENT (Continued)

Tektronix, Inc. Model 545A Oscilloscope, Ser. No. 038202

Tektronix, Inc. Model CA Oscilloscope Plug-In, Ser. No. 023629

Wallace and Tiernan, Inc. 12GPM Flowmeter, Ser. No. KKN701

Weston Model 443 AC Ammeter, Ser. No. 111193

Weston Model 904 AC Voltmeter, Ser. No. 5588

Weston Model 743-60 15 ampere RF ammeter, Ser. No. AC96082

Weston Model 639 Industrial Analyzer, Ser. No. F10971

Weston Model 4500 Dial Thermometers

SALES PRICE

At this time, the sales price of the 820E-1 5000/1000 watt AM transmitter is established at $18,240.00, F.O.B. Dallas, Texas, including one complete set of tubes and one crystal.

CERTIFICATION OF DATA

The undersigned, Richard P. Buckner, certifies that he is a qualified radio engineer, and that the technical measurements supplied herein were prepared and executed under his supervision and apply to representative samples of the Type 820E-1 AM transmitters manufactured by the applicant.

_____
Head, Group 2-B
Engineering Division "J"

State of Texas
County of Dallas

Subscribed and sworn to before me this _____ day of _____, 19____.

_____
Notary Public

My commission expires_____

QUALIFICATIONS OF CERTIFYING ENGINEER

Name: Richard P. Buckner

Education: B.S. in E.E., Southern Methodist University, 1953
M.S. in E.E., Southern Methodist University, 1962

Professional: Registered Professional Engineer, Texas (#19566)
Member, Institute of Electrical and Electronics Engineers

Experience: 1963 to Present. Group Head, Collins Radio Company. Assigned as Project Engineer for the design and development of commercial broadcast transmitters and related products. Previously designated Project Engineer for the development of a large air-borne military VLF communications transmitter.

1955 to 1963. Senior Engineer, Continental Electronics Mfg. Company. Responsible for the development of 5, 10, and 50 kilowatt AM broadcast transmitters, including vapor-cooled designs. As Engineer-in-Charge of the Commercial Engineering Department, he designed and installed AM directional antenna coupling systems and was Project Engineer for the development of a remote control system for broadcast transmitter plants. Previous assignments included the development of a microwave communications system for commercial sale.

ADDENDUM 1

TYPE ACCEPTANCE APPLICATION

COLLINS RADIO COMPANY

TYPE 820E-1

5000 WATT AM TRANSMITTER

December 15, 1965

Addendum 1
Type 820E-1
Type Acceptance
Application

CONTENTS

INTRODUCTION:

Addendum 1 to the Type 820E-1 type acceptance application has been compiled to present additional technical information in two of the measurement sequences previously discussed.

Data giving the values recorded, and the comparisons between measurement techniques employed, is given for the determination of power output.

A method of correlating r-f exciter d-c input power with transmitter a-c input voltage is described, and supporting measurements are included.

Power Output Determination:

Primary measurement of power output utilized an r-f ammeter connected in series with the phantom antenna. Measurements made with the General Radio Model 1606-A RF Impedance Bridge indicated a load resistance of 51 to 52 ohms over the frequency range of interest. As a part of the calorimeter calibration (discussed below), 60 cps power was dissipated in the phantom antenna, with current and voltage monitored by laboratory-grade instruments. Confirmation of load resistance was obtained from these measurements, which were:

$$\text{Load resistance} = \frac{\text{load voltage}}{\text{load current}}$$

$$= \frac{468 \text{ volts}}{9.0 \text{ amperes}} = 52.0 \text{ ohms}$$

Finally, load resistance was checked using a General Radio Model 1608-A Impedance Bridge (Serial No. 059-0003-683) which has a basic accuracy of 0.1%. Resistance was:

51.42 ohms at 1000 cps

51.39 ohms at d-c

On the basis of the above tests, load resistance was considered as 51.4 ohms.

Power Output Determination:
(Continued)

The series r-f ammeter (Weston Model 743-60, Serial No. AC96082) was enclosed in an aluminum shield box, arranged with flange terminations so as to become essentially a part of the 1-5/8" transmission line connection to the load. The instrument in its enclosure was calibrated from an adjustable power source with true current determined by measuring the voltage drop across a precision resistor placed in series with the meter under test. The resistor was a Leeds and Northrup Model 7636 Current Shunt, Serial No. 1620011, which had recently been certified accurate to within $\pm$0.05% by the Collins Standards Laboratory. The voltmeter was a John Fluke Manufacturing Company Model 821A Differential Voltmeter, Serial No. 158. This instrument has also been recently certified accurate to within $\pm$0.05%. Calibration data for the r-f ammeter is shown below.

Power Output Determination:
(Continued)

RF Line Curr. Meter Reading	Shunt Voltage	Shunt Resistance	True Current
2.0	0.09608	0.05	1.922
3.0	0.14807	0.05	2.961
4.0	0.07956	0.02	3.978
5.0	0.09963	0.02	4.982
6.0	0.12140	0.02	6.070
7.0	0.14272	0.02	7.136
8.0	0.08104	0.01	8.104
9.0	0.09190	0.01	9.190
10.0	0.10204	0.01	10.204
11.0	0.11245	0.01	11.245
12.0	0.12250	0.01	12.250
13.0	0.13272	0.01	13.272
14.0	0.14290	0.01	14.290
15.0	0.15251	0.01	15.251

A sample calculation of power output using r-f line current ammeter readings corrected as above is:

Line Current = 10.2 a (indicated)

= 10.4 a (corrected)

Load Resistance = 51.4 ohms

Power = $(10.4)^2(51.4)$

= 5560 watts

Power Output Determination:
(Continued)

As a further check on power output, a water calorimeter was employed to measure flow rate and temperature rise of the phantom load cooling water. Initial confirmation of calorimeter accuracy was made by dissipating 60 cps power in the load while measuring flow, temperature rise, and 60 cps input voltage and current. The data below shows close correlation of power by the two methods.

AC load current	= 9.0 a.
AC load voltage	= 468 v.
AC power input	= (9.0)(468) = 4210 watts
Outlet temperature	= 27.0° C.
Inlet temperature	= 23.0° C.
Water flow rate	= 3.9 gpm
Calor. power input	= $264(T_o-T_i)$ Flow
	= (264)(4.0)(3.9)
	= 4120 watts

WHAT ACCURACY ? ±2% ?

Comparison r-f measurements were made, with transmitter output power determined by the I^2R and calorimetric methods. A typical comparison is shown below, and indicates agreement within 2.5% between the two methods.

Power Output Determination:
(Continued)

Line current	= 10.4 a. (corrected)
I^2R power	= $(10.4)^2(51.4)$
	= 5560 watts
Outlet temperature	= 27.8° C.
Inlet temperature	= 23.0° C.
Water flow rate	= 4.5 gpm
Calor. power	= (264)(4.8)(4.5)
	= 5700 watts

Frequency Stability Measurements:

In the type acceptance data previously submitted, frequency stability measurements were made which show frequency deviation with variation in dc input voltage to the Type 310W-1 rf exciter. To provide additional correlation between the exciter dc supply and the ac input voltage to the transmitter, a separate test of frequency stability was made with the exciter powered directly from the transmitter.

In this test, the exciter output frequency was 980 kc and the input voltage to the transmitter was varied by means of a three-phase variable voltage regulator. The exciter ambient temperature was held constant at 25.6°C.

Laboratory-grade voltmeters were used to monitor transmitter a-c input voltage and d-c voltage at the exciter input. In addition, voltage was monitored at zener diode A10CR2 (a 1N963, 12 volt unit), to confirm the voltage regulating action at the oscillator stage supply. Frequency was read to the nearest cycle with an electronic counter.

Equipment utilized in this test was as follows:

Transmitter input voltage:

Weston Model 455, 0-150/300 v ac voltmeter, Ser. No. 5643

Exciter input voltage:

Weston Model 455, 0-30/60 v dc voltmeter, Ser. No. 45545

A10CR2 zener voltage:

Hewlett-Packard Model 410B Vacuum-tube voltmeter, Ser. No. 024-38677

Frequency Stability Measurements:
(Continued)

Frequency:

Hewlett-Packard Model 5245L electronic counter, Ser. No. 455-02931.

The following test data was recorded:

Transmitter a-c Voltage	Exciter d-c Voltage	A10CR2 d-c Voltage	Frequency (cps)
173.0	22.0	11.80	980,000
181.0	23.0	11.80	980,000
188.0	23.8	11.85	980,000
188.5	24.0	11.85	980,000
198.0	25.0	11.85	980,000
205.5	26.0	11.85	980,000
208.0	26.4	11.85	980,000
210.3	27.0	11.85	980,000
220.0	28.0	11.85	980,000
228.5	29.0	11.85	980,000
236.0	30.0	11.85	980,000
243.0	31.0	11.90	980,000
250.0	32.0	11.95	980,000
250.5	32.2	12.00	980,000

CERTIFICATION OF DATA

The undersigned, Richard P. Buckner, certifies that he is a qualified radio engineer, and that the technical measurements supplied herein were prepared and executed under his supervision and apply to representative samples of the Type 820E-1 AM transmitters manufactured by the applicant.

_____
Head, Group 2-B
Engineering Division "J"

State of Texas
County of Dallas

Subscribed and sworn to before me this _____ day of _____, 19___.

_____
Notary Public

My commission expires _____