

TYPE TE-T1 RADIO TRANSMITTER EQUIPMENT DESIGN REQUIREMENTS RADIO SYSTEMS

1. GENERAL

Scope

1.01 This specification, together with the supplementary information listed herein, covers equipment design requirements for the various components to be used in the engineering, manufacturing, and installation of the type TE-T1 radio transmitter of the type TE radio system. Equipment included in this specification may be ordered by specifying the code and list numbers covered in part 4.

1.02 This specification is reissued to incorporate previous appendix changes.

Description

Type TE Radio System

1.03 The type TE radio system provides for transmitting video signals over line-of-sight paths by the use of sharply-beamed, frequency-modulated super-high frequency (SHF) radio in the 3880-4200-mc band. This system may be used for such applications as relaying television video signals from originating studios to commercial television transmitting stations, pickup to local offices; or as a radio link to extend wire or radio facilities. The sound program which accompanies a television video signal cannot be transmitted over this system, therefore, paralleling facilities for sound program and order-wire requirements must be provided. When the color modifications as covered herein are made, the system will carry NTSC color signals as well as monochrome signals.

Type TE-T1 Radio Transmitter

1.04 The type TE-T1 radio transmitter covered by this specification provides for the radio equipment required at a transmitting terminal of a type TE radio system. The equipment consists of two fundamental components, namely; video

equipment in a floor-supported cabinet and an r-f equipment unit. An additional component consisting of a highly directive antenna is required. The r-f equipment is supported by the antenna framework and directly connected to the antenna by waveguide fittings.

Type TE-T1 Transmitter Video Cabinet Equipment

1.05 The video equipment receives a video signal (single channel) from a television studio, pick-up point, or other facility, and provides required amplification and control prior to superimposing this signal on the repeller voltage which is passed to the r-f equipment to control a reflex oscillator tube. Included in the video cabinet are three regulated tube rectifiers which provide the d-c voltages required for driving the tubes of the video amplifier and the reflex oscillator tube of the r-f equipment. In addition, metering facilities are provided for measuring a-c line and critical d-c voltages. Patching arrangements are provided which will allow input from either a 72-ohm unbalanced line or a 110-ohm balanced line. Equalization facilities for compensating for the frequency characteristic of various lengths of unbalanced input cables up to 1200 feet may be provided if required. The range of the input signal may be from 0.5 to 10 volts peak to peak.

Type TE-T1 Transmitter R-F Cabinet Equipment

1.06 The essential element of the r-f equipment is the Western Electric Company reflex oscillator tube. The repeller voltage from the video equipment applied to this tube controls the frequency of oscillation, and variations in this voltage cause proportional changes in frequency; therefore, a video signal superimposed on the repeller voltage will cause the frequency of the oscillator to vary in step with the signal voltage resulting in a frequency-modulated output. Two different voltage ranges, -150 to -225 volts, and -200 to -300 volts, may be provided by "X" and "Y" wiring options, respectively, depending upon

the frequency of operation and the reflex oscillator repeller voltage-frequency characteristics. The correct range is determined by manufacturing testing requirements during system tests, but may have to be changed if the oscillator tube is replaced in the field, or if the frequency of operation is shifted. The oscillator is directly connected to the antenna thru waveguide components. All waveguide parts are based on the use of 2" x 1" waveguide. A directional coupler provides for tapping a small amount of energy for purpose of power and frequency measurement and also for use in providing a no- or low-carrier alarm. Frequency measurements are made thru use of a built-in coaxial-type wavemeter. A waveguide switch is provided which enables switching the oscillator off the air into an absorption load during measurement and alignment tests. The r-f equipment cabinet may be equipped for either 1- or 2-channel operation into a single antenna. This is accomplished by introducing a "Y" waveguide fitting and providing a complete second channel of equipment in the cabinet. R-F band-pass channel separation filters are provided to avoid interchannel interference when operating two channels. Filters available provide for operation in three pairs of frequencies, namely 3890 and 4090 megacycles, 3930 and 4130 megacycles, and 3970 and 4170 megacycles. When operating 2-channel, two associated video equipments are required.

Antennas

1.07 Antenna and antenna mounting arrangements for use with the type TE-T1 radio transmitter are covered in specification J41610 and shall be ordered separately in accordance with information covered therein. As indicated in the previous paragraph, one antenna with associated antenna supporting framework and r-f equipment supporting framework is required for a 1-channel or 2-channel type TE-T1 radio transmitter. In general, there are two types of antennas available for use with this equipment; a shielded lens type or a parabolic reflector type. The choice of antenna to be used for a specific application will depend on several variables, such as path length, clearance, directivity, and fading margin. Since this equipment uses a 2" x 1" waveguide, the antenna must terminate in a 2" x 1" waveguide and be designed to operate in the 3880-4200 mc band. When operating 2-channel into a single antenna, present requirements dictate the use of the shielded lens. For single-channel operation, either the shielded lens or parabolic reflector may be used.

AC Power

1.08 This equipment requires a primary power source of 115 volts ± 5 per cent, 60 cycles a-c. The drain is approximately 320 watts at 90 per cent power factor per channel (see note 5.04). In order to obtain reliability, consideration should be given to an adequate source of standby power.

Alarms

1.09 As indicated in paragraph 1.06, a small amount of the oscillator power is diverted and used in part to give an alarm indication for no- or low-carrier signal. This power operates a sensitrol relay located in the video cabinet, which gives an indication when the power drops below a predetermined value. Facilities are provided for connection to individual office alarm circuits.

Divisions of Equipment

1.10 The equipments as covered herein may be obtained in two general arrangements; namely, a single-channel system or a 2-channel system operating into a single antenna. In addition, two conversion arrangements are available for changing from single- to 2-channel operation. The following information describes these arrangements and the associated table covers a detailed breakdown of the components required.

(a) **One-channel Transmitter:** Equipment consists of a single video cabinet equipment, an r-f cabinet equipped for a single channel, and an antenna and associated mounting. This arrangement is adaptable for use where a single channel or an odd number of channels is required. (See first item in the following table.)

(b) **2-channel Transmitter:** Equipment consists of two video cabinet equipments, an r-f cabinet equipped for 2-channel operation, a set of filters for operating at 3890 and 4090 megacycles, 3930 and 4130 megacycles, or 3970 and 4170 megacycles, and an antenna (shielded lens type only) and associated mounting. This arrangement is adaptable for use where a regular and spare channel is required or for two operating channels. (See second item in the following table.)

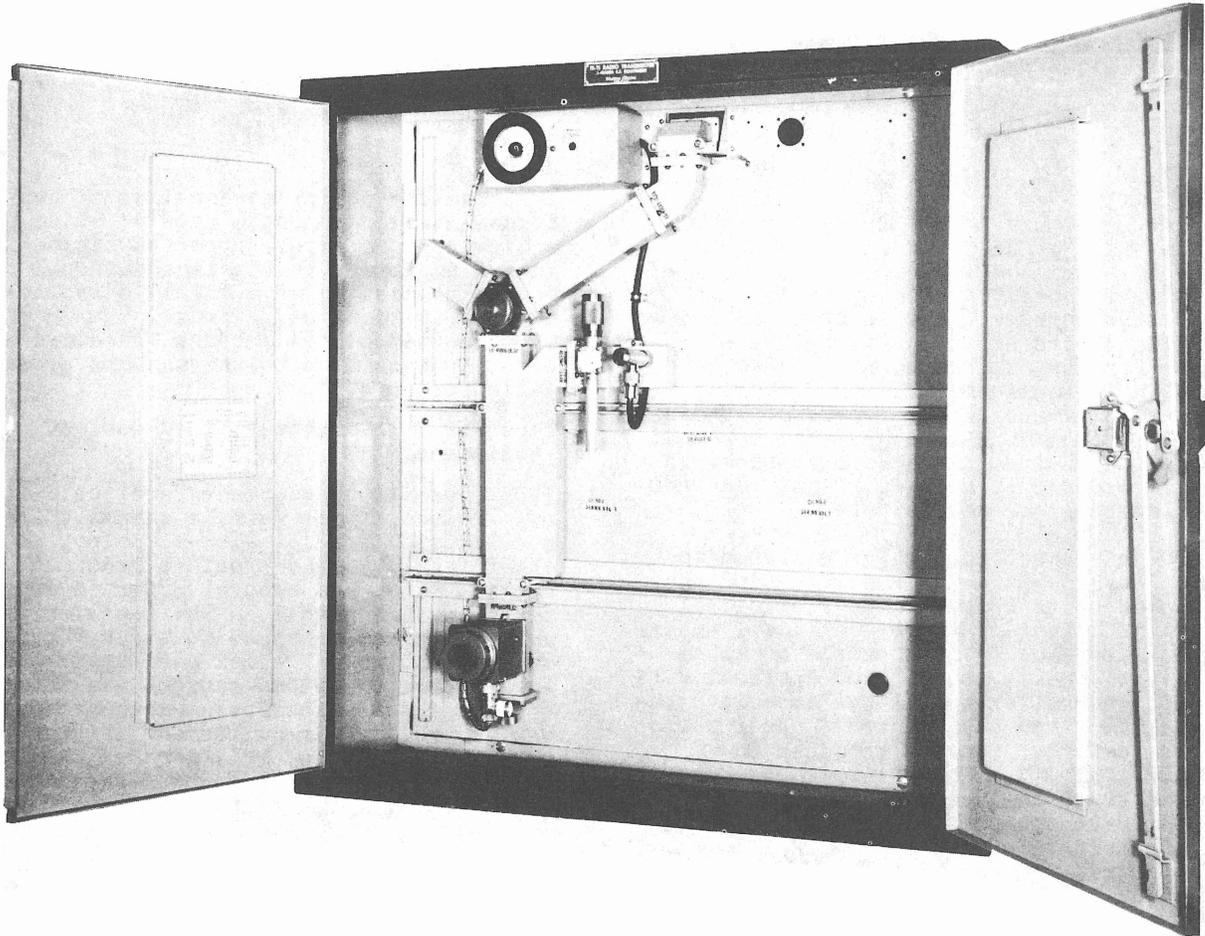


Fig. 1—J41608A Type TE-T1 Transmitter R-F Cabinet Equipment—Front View—Arranged for One-Channel Operation

(c) **Conversion Equipment—For Converting a 1-channel System to a 2-channel System:**

Equipment consists of a single video cabinet equipment, additional waveguide components to equip the second channel in the r-f cabinet, and a set of filters for operating at 3890 and 4090 megacycles, 3930 and 4130 megacycles, or 3970 and 4170 megacycles. A shielded lens type of antenna is required in the event that the existing single-channel system to be modified used a parabolic reflector. (See third item in the following table.)

(d) **Conversion Equipment—For Converting Two 1-channel Systems to a Single 2-channel System:**

Equipment consists of additional waveguide components required to assemble the existing separate r-f channel parts

into a single cabinet, and a set of filters for operating at 3890 and 4090 megacycles, 3930 and 4130 megacycles or 3970 and 4170 megacycles. A shielded lens type of antenna is required in the event that both the existing 1-channel systems were equipped with parabolic reflectors. (See fourth item in the following table.)

System Components—Description

J41608A Type TE-T1 Transmitter R-F Cabinet Equipment

1.11 The transmitter r-f cabinet equipment consists essentially of waveguide components, mounted in a cabinet structure designed to mount directly behind the antenna on the mounting framework for the antenna. This cabinet is 2'-10" wide, 11" deep, and 2'-10" high, and weighs approximately

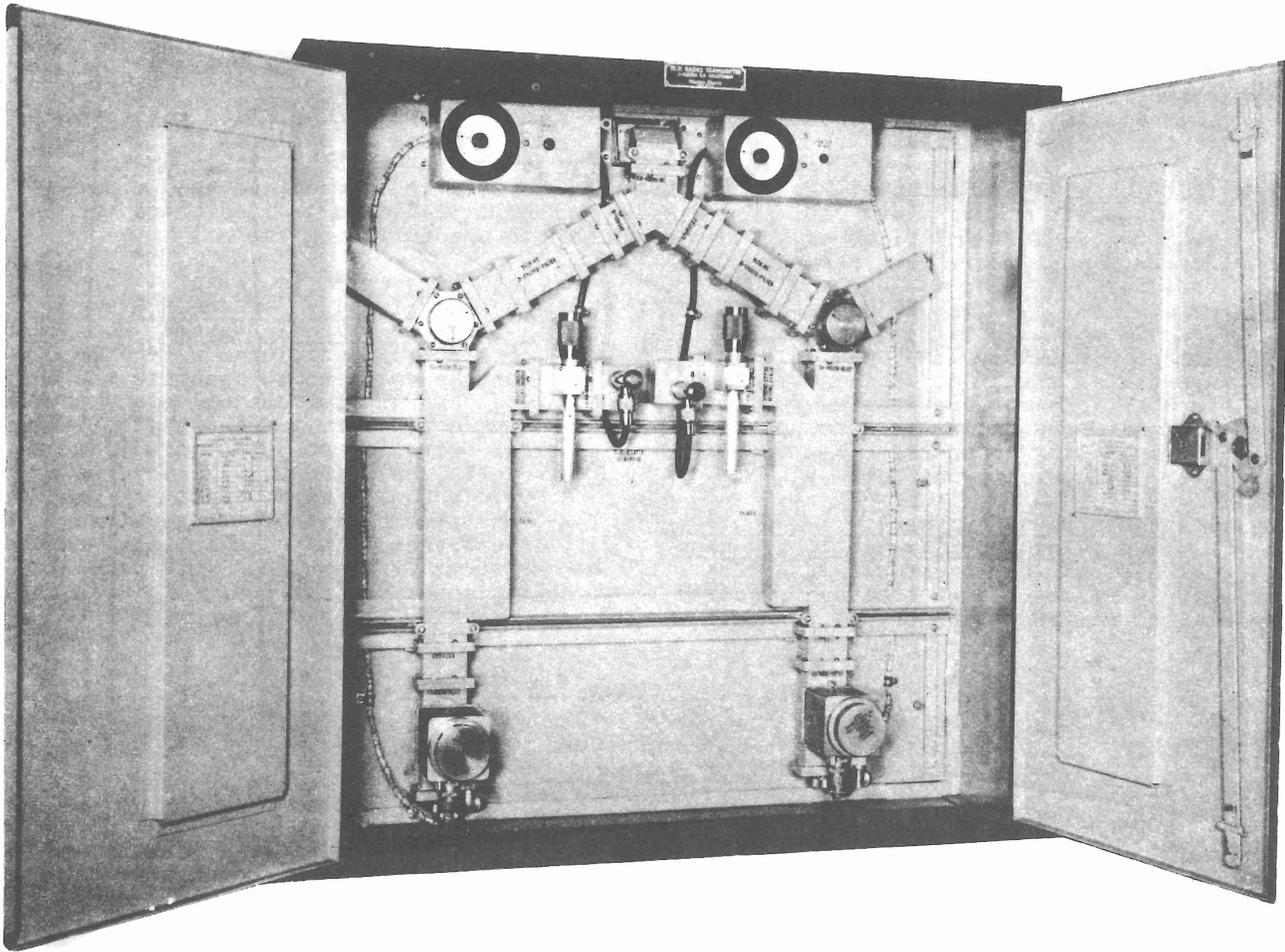


Fig. 2—J41608A Type TE-T1 Transmitter R-F Cabinet Equipment—Front View—Arranged for 2-Channel Operation

62 pounds with equipment installed for single-channel operation, or 74 pounds with the 2-channel arrangement. Two front doors, provided with a lock, give access to the frequency adjustment and power measurement controls. The unit may be equipped for either 1- or 2-channel operation using a single antenna. Each channel equipment incorporates a Western Electric Company reflex oscillator which supplies the frequency-modulated signal, a directional coupler which taps a small amount of power and connects to a coaxial wavemeter and plug-in crystal mount providing frequency and relative power level measurements, and a waveguide switch which enables switching the system off the air and into an absorption load during testing and alignment. When two channels are equipped, r-f band-pass channel separation filters are provided to avoid interchannel interference. Absolute power measurements may be made by removing the plug-in

crystal mount and using a portable power measuring test set.

J41608B Type TE-T1 Transmitter Video Cabinet Equipment

1.12 The transmitter video cabinet equipment consists essentially of equipment units and associated regulated tube rectifiers mounted in a standard floor-supported cabinet 3'-10-3/4" high, occupying a floor area of 2'-2-1/4" by 1'-2", exclusive of door and lifting handles. Doors are provided at front and rear, furnished with locks, to provide access to the apparatus and wiring sides of the equipment units. The mounting framework within the cabinet is similar to the standard duct-type framework. The completely equipped cabinet weighs approximately 200 pounds. The equipment provides an amplifier (J41608D) for amplification and control

TABLE OF SYSTEM REQUIREMENTS

System Requirements	Frequency of Operation	Filter and Shim Assemblies	Type TE-T1 Transmitter R-F Cabinet Equipment		Antenna and Mounting Framework
			Equipment Less Filters and Shim Assemblies	Type TE-T1 Transmitter Video Cabinet Eqpt.	
1-channel system	3890 to 4170 mc	None required	1 - J41608A, Lists 1 & 2	1 - J41608B, List 3 (See note 4)	1 - Antenna and mounting framework (Refer to J41610)
	3890 and 4090 mc	1 - J41608A, List 8 (See note 2)			
2-channel system	3930 and 4130 mc	1 - J41608A, List 5 (See note 2)	1 - J41608A, Lists 1 & 3	2 - J41608B, List 3 (See note 4)	1 - Antenna (shielded lens type) and mounting framework (Refer to J41610)
	3970 and 4170 mc	1 - J41608A, List 6 (See note 2)			
Equipment required to convert a 1-channel system to a 2-channel system	3890 and 4090 mc	1 - J41608A, List 8 (See note 2)			
	3930 and 4130 mc	1 - J41608A, List 5 (See note 2)	1 - J41608A, List 4	1 - J41608B, List 3 (See note 4)	See note 3
	3970 and 4170 mc	1 - J41608A, List 6 (See note 2)			
Equipment required to convert two 1-channel systems to a 2-channel system	3890 and 4090 mc	1 - J41608A, List 8 (See note 2)			
	3930 and 4130 mc	1 - J41608A, List 5 (See note 2)	1 - J41608A, List 7	None required	See note 3
	3970 and 4170 mc	1 - J41608A, List 6 (See note 2)			

Notes

1. R-F band-pass channel separation filter and shim assemblies are not required for single-channel operation of the TE-T1 radio transmitter.
2. Frequency bands 3890 and 4090 mc, 3930 and 4130 mc, or 3970 and 4170 mc are the combinations used in the equipment for 2-channel operation. Therefore, channel separation filters for any of these band combinations covered by J41608A, List 8, 5, or 6, respectively, must be specified as shown above.
3. A shielded lens type of antenna is required when two channels operate into a single antenna. If the existing antennas for 1-channel operation are of the parabolic type, it will be necessary to obtain a shielded lens when converting to 2-channel operation. (Refer to J41610 and paragraph 1.07.)
4. Equalization facilities for compensating for the frequency characteristic of various lengths of unbalanced input cables up to 1200 feet may be obtained by specifying J41608B, List 2, for each channel. These facilities may be added in the field to existing video cabinet equipments, if desired.

of the input video signal prior to modulation in the r-f equipment, and metering and patching facilities (J41608C) for measuring and testing purposes and for certain monitoring functions. Equalization facilities (J41608B, List 2) for compensating for the frequency characteristic of various lengths of unbalanced input cables up to 1200 feet may be provided. A no- or low-carrier alarm feature is provided which consists of a sensitrol relay operating under control of a small amount of rectified power from the r-f equipment. Three regulated tube rectifiers are provided, furnishing -250 , $+300$, and $+450$ volts d-c required for operation of the equipment units in the video cabinet, and also to furnish the voltages required for the r-f equipment. For transmission reasons, a limitation of 6'-0" maximum separation between the r-f and video cabinets has been imposed, and the interconnecting cables furnished with this equipment are cut to allow this separation. This unit may be modified for color per J41608B, List 4. This involves modification of the J41608D video amplifier equipment.

J41608C Transmitter Meter, Jack, and Power Distribution Equipment

1.13 The transmitter meter, jack, and power distribution equipment, a component of the J41608B type TE-T1 transmitter video equipment, consists of a 7" high unit designed for mounting on a 19" wide duct-type framework, and provided with a removable dust cover to permit access to the wiring side. The unit provides metering facilities for the d-c voltages of the transmitter, the a-c line voltage and the sensitrol relay which provides a no- or low-carrier alarm. A main a-c power circuit breaker and pilot light, convenience outlets, separately fused for 3 amperes, and coaxial patching jacks for input and monitoring purposes are also provided as well as connectors for interconnecting cables. The unit is so arranged that certain controls and all of the meters are available for operational maintenance without opening the cabinet door.

J41608D Transmitter Video Amplifier Equipment

1.14 The transmitter video amplifier, a component of the J41608B type TE-T1 transmitter video equipment, consists of a 5 1/4" high unit, designed for mounting on a 19" wide duct-type framework, and provided with a removable dust cover to permit access to the wiring side. The unit provides the initial amplification and control of the video input

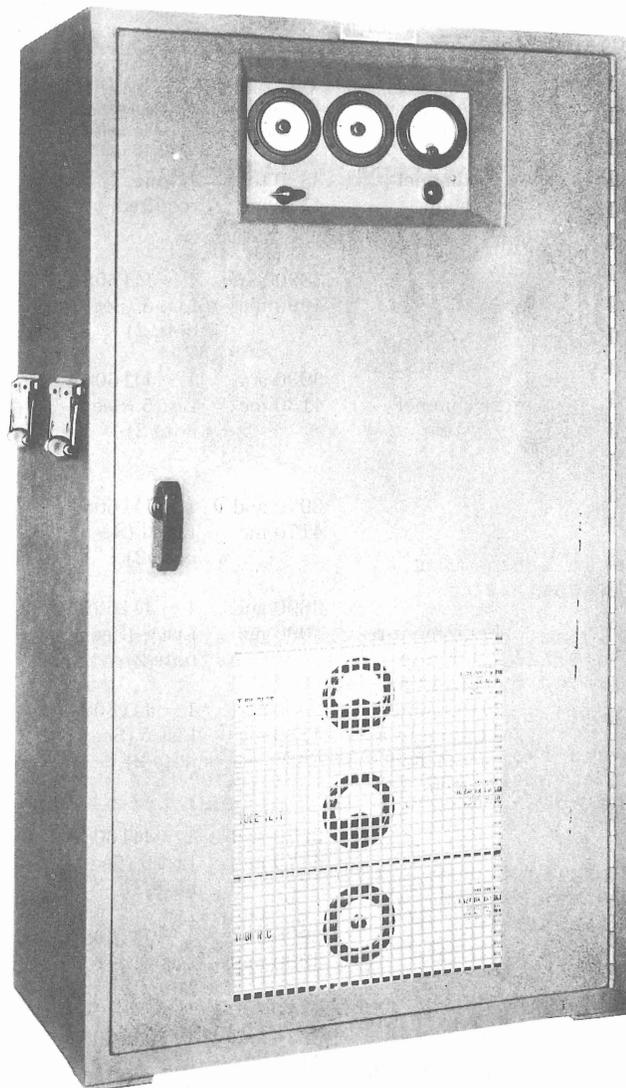


Fig. 3—J41608B Type TE-T1 Transmitter Video Cabinet Equipment—Front View—Door Closed

signal prior to modulation of the oscillator of the transmitter. The unit comprises a 3-stage feedback amplifier, providing approximately 20-db gain, followed by a cathode-follower output stage. A portion of the output signal is amplified and passed through a phase inverter to give a balanced signal. These voltages are applied to a pair of diodes controlling the charge on the coupling condenser to the output stage. This provides instantaneous alignment of the tops of the synchronizing pulses of the output video signal to a predetermined voltage, independent of picture content. A gain control is provided at the input of the amplifier

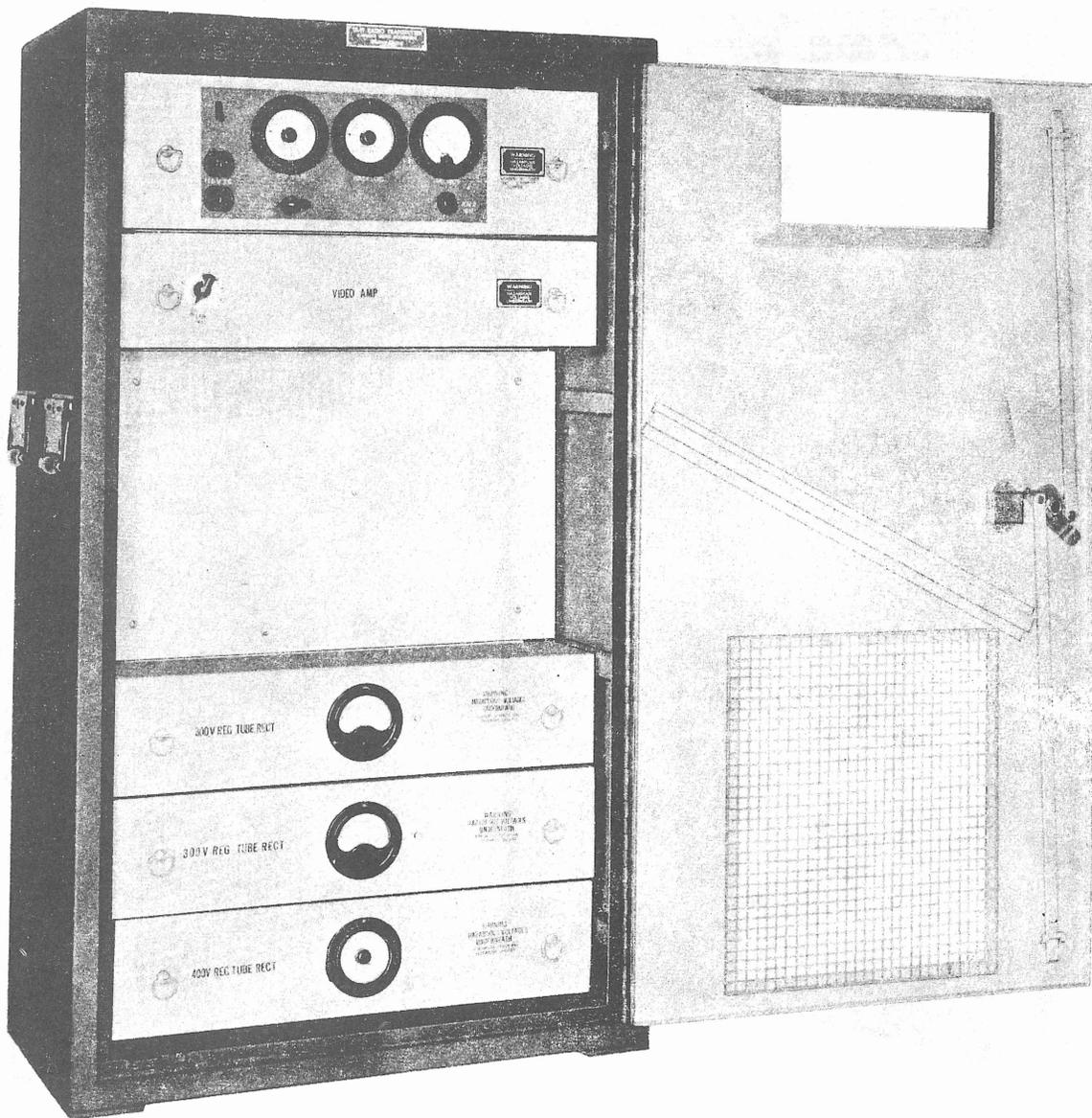


Fig. 4—J41608B Type TE-T1 Transmitter Video Cabinet Equipment—Front View—Cabinet Door Open

giving an adjustment range of 20 db, in ten steps of approximately 2 db. The modification kit per J41608D, List 3 provides equipment and information required to enable transmission of NTSC color television signals as well as monochrome signals. This modification eliminates the video amplifier clamping function and also improves the low-frequency response and power handling capability.

Cabling Arrangements

1.15 The cables and connectors required to interconnect the transmitter r-f equipment and the transmitter video equipment are furnished with the video equipment under J41608B, List 3. All interconnections between the equipments are accomplished by means of cables provided with

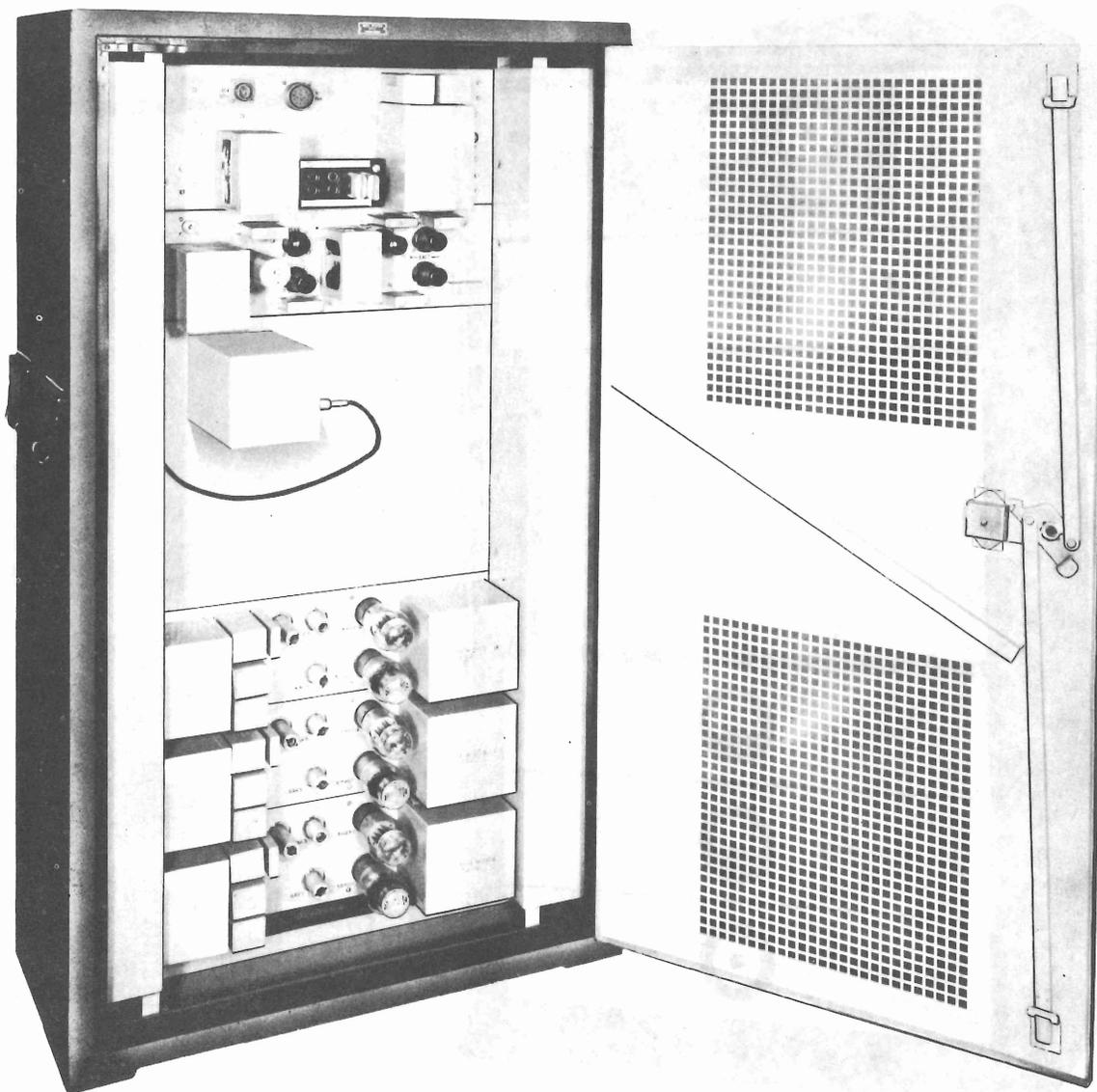


Fig. 5—J41608B Type TE-T1 Transmitter Video Cabinet Equipment—Rear View—Cabinet Door Open

screw-type connectors at both ends. These cables are cut to allow a 6'-0" maximum separation between the r-f and video cabinets. The power cable for connection to 115-volt a-c power is furnished in 25'-0" lengths. Video input and output monitoring cables, as required, must be furnished on a job installation basis. (See note 5.05.)

1.16 Monitor and patching jack circuit SD-45024-01 and associated equipment requirements information ED-45253-01 show typical arrangements for connecting a TE-T1 radio transmitter to a TE-R1 radio receiver on a back-to-back basis at a repeater point, or for providing monitoring and

patching arrangements at a TE radio terminal. Provision is made for monitoring both receiver and transmitter video outputs.

Modification for Transmission of NTSC Color Television Signals as well as Monochrome Signals

1.17 Modification of a TE-T1 radio transmitter for transmission of NTSC color television signals as well as monochrome signals requires:

- (a) Modification of the J41608B video cabinet per list 4 as covered in Section 4.

(b) Provision for an externally mounted pre-emphasis network as covered on SD-45336-01, Fig. 101, for unbalanced input, and Fig. 102 for balanced input. J44107R, List 1 and 2 or Lists 1 and 8 provides for the network and necessary patch jacks mounted on a 19-inch wide and 3-15/32-inch high panel suitable for relay rack mounting. When this unit is ordered, adequate 372A patch plugs as indicated on SD-45336-01 should be included. On a multilink system, a pre-emphasis network is required in the input to the first transmitter only.

(c) If waveguide runs, in excess of 5 feet, are used and the TE-A1 amplifier (J41621A) is not involved, a Cascade Research Corporation isolator, Uniline 38-42WE, or its equivalent shall be installed at the transmitter end of the waveguide run, as close to the transmitter as possible. The Uniline-type 38-42WE isolator fits the 1-inch by 2-inch waveguide used with TE equipment. Application information for antenna waveguide runs is covered in J41622 and J68335.

Maintenance and Testing Equipment

1.18 The following items are required for various testing and maintenance procedures at a TE-T1 radio transmitter and are desirable in whole or in part dependent on procedures established in BSP section R10.240:

- 1—J64047B—Sending Unit of 47A Transmission Measuring System (Used at sending end of microwave system)
- 1—J64047C—Receiving Unit of 47A Transmission Measuring System (Used at receiving end of microwave system)
- 1—J64061B—Signal Generator (Video)
- 1—J64070A—Power Meter (Video)
- 1—J64071A—Frequency-Power Meter
- 1—J64080A—Oscilloscope (or Equivalent)
- 1—J64081A—Monitoring Oscilloscope
- 1—J68646A—Modification of 62ITS RCA Television Receiver for Monitoring

1—J68646B—Modification of 630TS RCA Television Receiver for Monitoring

1—Model 260 Voltohmmeter—Simpson Electric or Model 779 Voltohmmeter—Western Electrical Instrument Co. or any comparable meter

1—Model 400A Vacuum Tube Voltmeter—Hewlett Packard or Model 300A Vacuum Tube Voltmeter—Ballentine

1—Model 410A Vacuum Tube Voltmeter—Hewlett Packard—Model 62 Vacuum Tube Voltmeter—Measurements Corp. or Model 1800A Vacuum Tube Voltmeter—General Radio

1—KS-13588, List 1, Vacuum Tube Test Set or KS-5727 Vacuum Tube Test Set

Canvas Cover Arrangements

1.19 This equipment was designed for use in sheltered enclosures where exposure would not be encountered. In pickup applications, where the r-f cabinet equipment may be subjected to adverse weather conditions for short periods of time, a waterproof canvas cover arrangement may be obtained per ED-45135-01, Group 1, which provides protection to the equipment against rain or snow, and partial protection to the operator if adjustments are required on the equipment. (See note 5.07.)

Subdivisions of Equipment

- J41608A—AT&TCo Std—Type TE-T1 Transmitter R-F Cabinet Equipment
- J41608B—AT&TCo Std—Type TE-T1 Transmitter Video Cabinet Equipment
- J41608C—AT&TCo Std—Type TE-T1 Transmitter Meter, Jack, and Power Distribution Equipment
- J41608D—AT&TCo Std—Type TE-T1 Transmitter Video Amplifier

2. SUPPLEMENTARY INFORMATION

- 800-600-000—List of General Equipment Requirement Sections
- 806-000-000—Equipment Design and General Equipment Requirements and Engineering Information—Radio Systems and Television Systems

806-107-180—Performance Requirements—TE Radio Systems
 A301-327—J86227 Regulated Tube Rectifier
 A301.328—J86228 Regulated Tube Rectifier
 E-8005—Order Blank—TE Radio System
 R10.240—Type TE-T1 Radio Transmitter
 R20.300—Type TE-R1 Radio Receiver
 R90.210—Type TE Radio System
 J41609—Mfr Disc.—Type TE-R1 Radio Receiver
 J41610—Mfr Disc.—Antennas for Microwave Transmission
 J41622—806-107-150—Field Applications of TE1 and TE2 Radio
 J44100—Mfr Disc.—Type A2 Video Amplifier Equipment
 J44107—806-317-150—Switching, Interconnecting, and Testing Equipment for use at TOC
 J64047—804-910-169—47A Transmission Measuring System
 J64061—804-911-152—Signal Generator
 J64070—804-911-153—Power Meter
 J64071—Mfr Disc.—Frequency-Power Meter
 J64080—Mfr Disc.—Oscilloscope
 J64081—Mfr Disc.—Monitoring Oscilloscope (Television)
 J68335—Mfr Disc.—Antenna Waveguide
 J68646—Mfr Disc.—Modification of 62ITS or 630TS RCA Television Receiver for Monitoring
 J86227—802-404-151—Regulated Tube Rectifier (300 Volts)
 J86228—Mfr Disc.—Regulated Tube Rectifier (400 Volts)
 KS-5727—Vacuum Tube Test Set
 KS-13588—Vacuum Tube Test Set
 X-67251—Manufacturing Testing Requirements for TE-T1 Radio Transmitter
 X-67288—Manufacturing Testing Requirements for TE-T1 Transmitter Video Cabinet
 X-67293—Manufacturing Testing Requirements for ED-45008-01 Directional Coupler
 X-67294—Manufacturing Testing Requirements for ED-45004-01 Wavemeter
 X-67296—Manufacturing Testing Requirements for TE Radio System

3. DRAWINGS

Circuits

SD-45008-01—Transmitter Video Amplifier
 SD-45009-01—Transmitter Meter, Jack, and Power Distribution Panel
 SD-45011-01—Type TE-T1 Transmitter Video Cabinet Equipment
 SD-45012-01—Type TE-T1 Transmitter R-F Cabinet

Equipment

SD-45013-01—Type TE-T1 Radio Transmitter Application Schematic
 SD-45024-01—Monitor and Patching Jack Circuit
 SD-45336-01—Application Schematic for Video Networks
 SD-81010-01—J86227A, L1, Regulated Tube Rectifier
 SD-81010-03—J86227A, L2, Regulated Tube Rectifier
 SD-81013-01—J86228A, L1, Regulated Tube Rectifier

Equipments

J41608B-90—TE-T1 Transmitter Video Cabinet Equipment
 J41608D-90—TE-T1 Transmitter Video Amplifier
 ED-45004-01—Wavemeter Assembly
 ED-45007-01—Oscillator Mount Assembly
 ED-45008-01—Directional Coupler
 ED-45009-01—90-degree E Plane Elbow
 ED-45010-01—Waveguide Mounting Handwave
 ED-45011-01—120-degree H Plane Y Junction
 ED-45012-01—60-degree H Plane Elbow
 ED-45016-01—Cabinet Assembly
 ED-45018-01—TE-T1 Transmitter R-F Cabinet Equipment
 ED-45021-01—Transmitter Video Amplifier Equipment
 ED-45027-01—Transmitter Meter, Jack, and Power Distribution Equipment
 ED-45028-01—TE-T1 Transmitter Video Cabinet Equipment
 ED-45032-01—TE-T1 Radio Transmitter System Perspective
 ED-45036-01—Method of Assembling Type "N" Connectors
 ED-45037-01—Power Cable Assembly
 ED-45038-01—Coaxial Cable Assembly
 ED-45040-01—Waveguide Receptacle
 ED-45042-01—Cabling—TE-T1 Transmitter Video Cabinet
 ED-45044-01—Interconnecting Cabling—TE-T1 Radio Transmitter
 ED-45045-01—R-F Switch
 ED-45046-01—Termination
 ED-45047-01—Crystal Mount
 ED-45135-01—Canvas Cover Assembly
 ED-45136-01—Modification of Cabinet Assembly for Canvas Cover
 ED-45253-01—Monitor and Patching Jack Equipment
 ED-45446-01—J41608B Transmitter Video Cabinet—Modification Instructions for Adding J41608E Remote Control Panel
 ED-81322-01—J86227A, L1, Regulated Tube Rectifier
 ED-81323-01—J86228A, L1, Regulated Tube Rectifier
 ED-81336-01—J86227A, L2, Regulated Tube Rectifier

ED-92049-01—Methods of Terminating Coaxial and Twin-conductor Office Cable
 ED-92188-01—24-Mounting Plate Duct-type Equipment Cabinet Assembly

4. EQUIPMENT

J41608A—AT&T Co Std—Type TE-T1 Transmitter R-F Cabinet Equipment (One or Two Channels)

Equipment—ED-45018-01

List 1—Common equipment for a 1- or 2-channel TE-T1 transmitter r-f equipment

	Wire	Equip
Cabinet Assembly ED-45016-01, G2		1
Waveguide Mtg. Hardware ED-45010-01, G4		1
Radio-frequency Ckt. SD-45012-01, Fig. 3	1	1

List 2—Assembly, wiring, and equipment required in addition to list 1 for a 1-channel TE-T1 transmitter r-f equipment

	Wire	Equip
Waveguide Mtg. Hardware ED-45010-01, G2 & G3		1
Radio-frequency Ckt. SD-45012-01: Fig. 1, Less Osc. Shim (See Note A)	1	1
Fig. 4		1

List 3—Assembly, wiring, and equipment required in addition to list 1 for a 2-channel TE-T1 transmitter r-f equipment, less filter and shim assemblies

	Wire	Equip
Waveguide Mtg. Hardware ED-45010-01, G2 & G3		2
Radio-frequency Ckt. SD-45012-01, Figs. 1 & 2 Less Osc. Schims (See Note A)	1	1

List 4—Wiring and equipment required to convert a 1-channel TE-T1 transmitter r-f equipment per lists 1 and 2 to a 2-channel TE-T1 transmitter r-f equipment, less filter and shim assemblies

	Wire	Equip
Waveguide Mtg. Hardware ED-45010-01, G2 & G3		1
Radio-frequency Ckt. SD-45012-01: Fig. 2, Less Osc. Shim (See Note A)	1	1
Fig. 5, 120° H Plane Y Junction Only		1

List 5—Filter and shim assemblies required in addition to list 3, 4, or 7 for 2-channel operation on 3930 and 4130 mc (See note B)

List 6—Filter and shim assemblies required in addition to list 3, 4, or 7 for 2-channel operation on 3970 and 4170 mc (See note B)

List 7—Wiring and equipment required to convert two r-f 1-channel equipments per lists 1 and 2 to a single 2-channel r-f equipment, less filter and shim assemblies

	Wire	Equip
Radio-frequency Ckt. SD-45012-01, Fig. 5 120° H Plane Y Junction Only		1

List 8—Filter and shim assemblies required in addition to list 3, 4, or 7 for 2-channel operation on 3890 and 4090 mc (See note B)

Notes

A. The oscillator mount ED-45007-01, Group 2, specified in Fig. 1 of SD-45012-01 is furnished with "Y" wiring to provide repeller voltages in the range of -200 to -300 volts. Where the reflex oscillator does not develop maximum power at voltages over 225 volts, furnish "X" wiring to provide repeller voltages in the range of -150 to -225 volts.

B. Filter and shim assemblies for 2-channel operation only shall be furnished in accordance with Figs. 1, 2, and 5, and note 103 of SD-45012-01.

**J41608B—AT&T Co Std.—Type TE-T1 Transmitter
Video Cabinet Equipment**

Equipment—J41608B-90

List 4—Modification kit equipment and information per J41608B-90, List 4 required in addition to lists 1 or 3 for transmission of NTSC color television signals as well as monochrome signals. This involves changing equipment from SD-45011-01, Fig. 1, "S" option to "T" option.

Equipment—ED-45028-01

List 2—Framework and apparatus required in addition to list 3 for input equalizer

	WIRE	EQUIP
Application Schematic for Video Cabinet Ckts. SD-45011-01, Fig. 2	1	1

List 3—Assembly, wiring, equipment, and interconnecting cables for one transmitter video cabinet equipment

	Wire	Equip
Eqpt. Cabinet Assembly ED-92188-01, G1		1
Application Schematic for Video Cabinet Ckts. SD-45011-01, Fig. 1	1	1
Application Schematic for Transmitter SD-45013-01, Fig. 3	1	1

**J41608C—AT&T Co Std.—Type TE-T1 Transmitter
Meter, Jack, and Power Distribution
Equipment**

Equipment—ED-45027-01

List 1—Assembly, wiring, and equipment for one transmitter meter, jack, and power distribution equipment

Wire Equip

Meter, Jack, and Power Distribution Ckts. SD-45009-01, Figs. 1 & B

1 1

**J41608D—AT&T Co Std.—Type TE-T1 Transmitter
Video Amplifier**

Equipment J41608D-90

List 3—Modification kit equipment and information per J41608D-90, List 3 required in addition to lists 1 or 2 for transmission of NTSC color signals as well as monochrome signals. This involves changing equipment from SD-45008-01, Figs. 1 and 2, "E" option, to Figs. 1 and 3, "F" option.

Equipment—ED-45021-01

List 2—Framework, assembly, and wiring for one transmitter video amplifier for single link and attended repeatered systems (See note A)

	Wire	Equip
Video Amplifier Ckt. SD-45008-01, Figs. 1 & B and "X" App.	1	1

Note

A. For unattended repeatered systems of three or more links, specify list 2 and remove "X" apparatus on SD-45008-01.

**J41608E—A&M Only—Type TE-T1 Radio
Transmitter—Remote Control Panel**

Equipment—ED-45445-01

List 1—Assembly, wiring, and equipment for one remote control panel. This is normally supplied as a component of the ED-45446-90, G1 Set of Parts for modifying a J41608B Video Cabinet equipment for providing remote control facilities.

	Wire	Equip	J or ED Code	Index Drawing	Description
Remote Control Ckt. SD-45280-01, Fig. 1	1	1	J86228A	BL-490073	Regulated Tube Rectifier
			ED-45004-01	BL-490046	Wavemeter Assembly
			ED-45007-01	BL-490049	Oscillator Mount Assembly
			ED-45008-01	BL-490050	Directional Coupler
			ED-45009-01	BL-490051	90-degree E Plane Elbow
			ED-45010-01	BL-490060	Waveguide Mounting Hardware
			ED-45011-01	BL-490052	120-degree H Plane Y Junction
			ED-45012-01	BL-490053	60-degree H Plane Elbow
			ED-45016-01	BL-490056	Cabinet Assembly
			ED-45040-01	BL-490061	Waveguide Receptacle
			ED-45045-01	BL-490062	R-F Switch
			ED-45046-01	BL-490063	Waveguide Termination
			ED-45047-01	BL-490064	Crystal Mount

5. GENERAL NOTES

Manufacturing Information

5.01 The following drawing indices have been issued for each of the individual J or ED coded units and are intended for manufacturing reference purposes only:

J or ED Code	Index Drawing	Description
J41608A	BL-490042	TE-T1 Transmitter R-F Cabinet Equipment
J41608B	BL-490041	TE-T1 Transmitter Video Cabinet Equipment
J41608C	BL-490044	TE-T1 Transmitter Meter, Jack, and Power Distribution Equipment
J41608D	BL-490043	TE-T1 Transmitter Video Amplifier
J86227A	BL-490072	Regulated Tube Rectifier

Ordering Information

5.02 Vacuum tubes, crystals, and fuses required for operation of this equipment are furnished installed in their respective sockets. The following is a listing of a vacuum tube, crystal, and fuse complement:

Equipment Code	Vacuum Tube, Crystal, and Fuse Type								D-169305	3AG-3-Amp.
	OA2	5R4GY	6AC7	6AG7	403B	6AS7G	6H6GT/G	406A	(IN23B) Crystal	Bussmann Fuse
J41608A - Type TE-T1 Trans. R-F Cabinet Equipment								1	1	
J41608C - Trans. Meter, Jack, and Power Distribution Panel										1
J41608D - Trans. Video Ampli- fier			4	2			1			
J86227A, L1, Re- gulated Tube Rectifier	1	1			2	1				1
J86227A, L2, Re- gulated Tube Rectifier	1	1			2	1				1
J86228A, L1, Re- gulated Tube Rectifier	1	1			2	1				1
No. Req. To Equip All Sockets for a One-channel System	3	3	4	2	6	3	1	1	1	4
No. Req. to Equip All Sockets for a 2-channel System	6	6	8	4	12	6	2	2	2	8

Note: When the transmitter video cabinet equipment, J41608B, is modified per list 4 for the transmission of NTSC color television signals, as well as monochrome signals, the 6H6GT/G electron tube is not required; only two instead of four 6AC7 tubes are required, and three instead of two 6AG7 tubes are required for a 1-channel system.

of the 406A in order to obtain improved stability and extension of frequency.

5.03 Order blank E-8005 has been prepared for associated Telephone Company use in ordering TE radio equipment.

Installation Information

5.04 One branch power 115-volt ± 5 per cent, 60-cycle a-c circuit, fused for 15 amperes, and provided with a suitable receptacle to match a

*If the transmitter has been modified per ED-45532-01 it is possible to use the 431A vacuum tube in place

Harvey Hubbell #7572 twist-lock polarized cap, is required for each J41608B type TE-T1 transmitter video cabinet equipment.

ED-45135-01, Group 1, canvas cover assembly, refer to ED-45136-01 for drilling and installation information.

5.05 For cabling type TE-T1 radio transmitters, see ED-45044-01.

List of A&M Only and Mfr. Disc. Equipment

5.06 For mounting and installation information of J41608A type TE-T1 transmitter r-f cabinet equipments on antenna and mounting framework, see J41610.

EQUIPMENT	RATING	COVERED IN ISS.	REPLACING EQUIPMENT
J41608B,L1	Mfr Disc.	4	J41608B,L3
J41608D,L1	Mfr Disc.	4	J41608D,L2

5.07 For modification of J41608A type TE-T1 transmitter r-f cabinet equipment to use

5.08 The above equipment has been replaced as indicated.

Bell Telephone Laboratories, Inc.

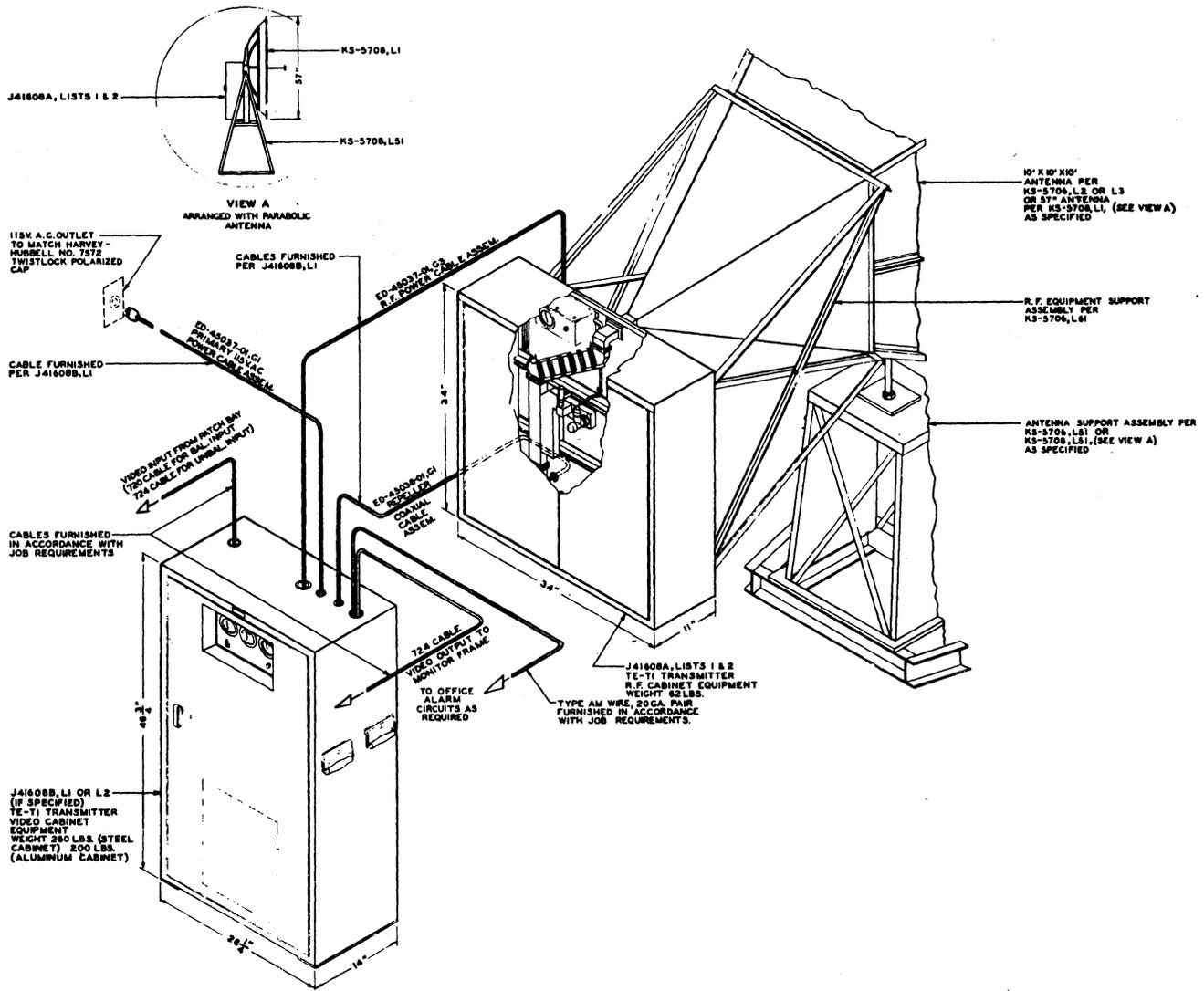


Fig. 6—Type TE-T1 Radio Transmitter—System Perspective—Arranged for One-Channel Operation

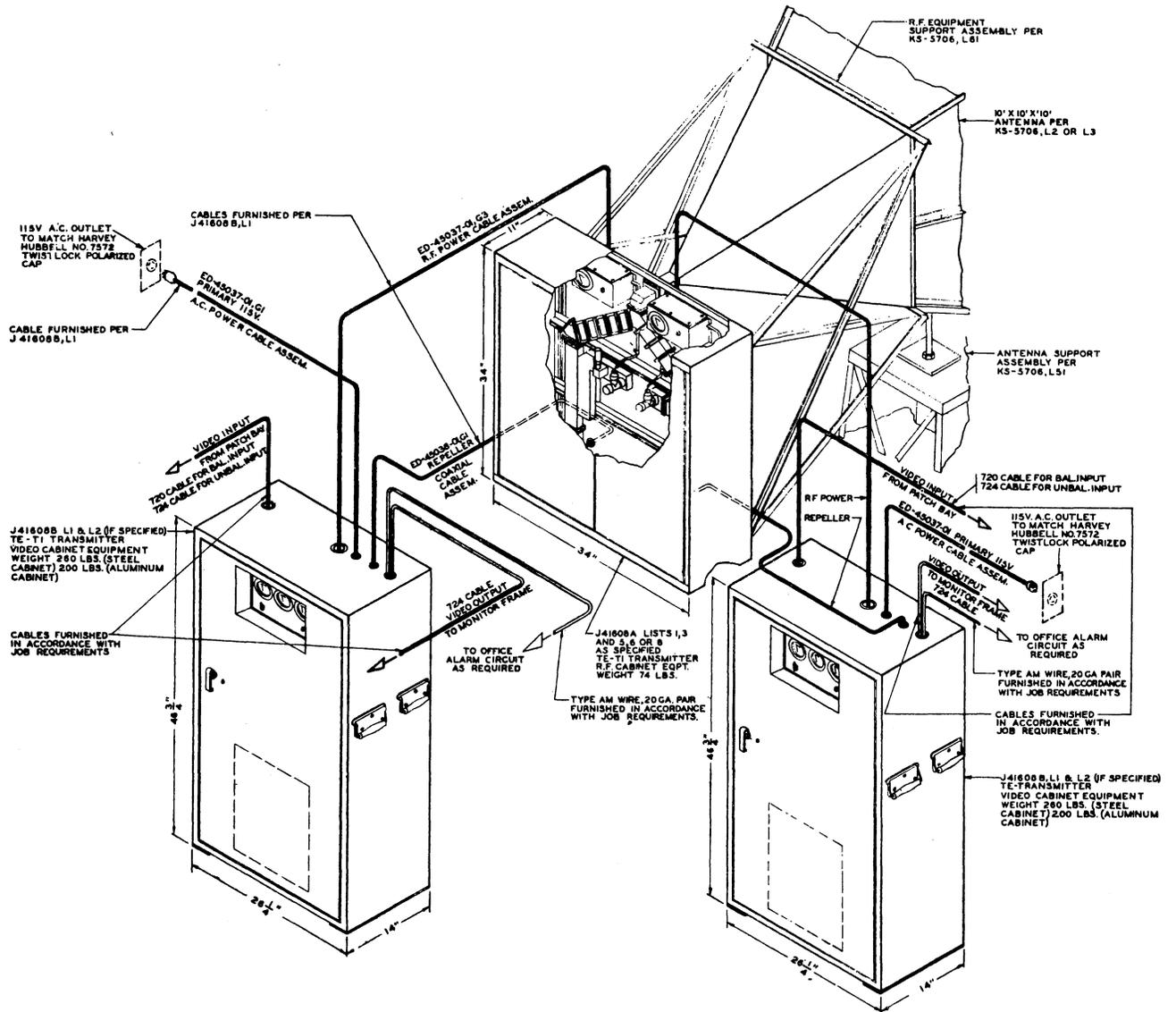


Fig. 7—Type TE-T1 Radio Transmitter—System Perspective—Arranged for 2-Channel Operation