

ELECTRONIC TUBE REFERENCE

11E15

Power - Tetrode (NOT beam) electronic tube

CONSOLIDATED TECHNICAL DATA

2 SECTIONS

CONSTRUCTION

TETRODE-TETRODE

Internally neutralized double high-frequency tetrode designed for push-pull amplification or frequency-tripler service to approximately 500 MHz. Two RF tetrode sections share one envelope.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	7
NOMINAL HEATER	12.6 V / 900 mA	PARALLEL HEATER	6.3 V / 1.8 A
HEATING	Indirect	SERIES OPERATION	Capable
CATHODE ARRANGEMENT	Common cathode	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Tetrode	
TRANSCONDUCTANCE	0.0045 S
MAXIMUM PLATE VOLTAGE	750 V
MAXIMUM SCREEN VOLTAGE	300 V
MAXIMUM PLATE DISSIPATION	20 W
Representative section for repeated identical sections.	

SECTION2 Tetrode	
TRANSCONDUCTANCE	0.0045 S
MAXIMUM PLATE VOLTAGE	750 V
MAXIMUM SCREEN VOLTAGE	300 V
MAXIMUM PLATE DISSIPATION	20 W
Identical second physical section; duplicated from representative section per physical-section-row policy.	

11E15 — High-Frequency Double Tetrode

An indirectly heated, internally neutralized high-frequency double tetrode designed for push-pull amplification and frequency trebler service at frequencies up to 500 Mc/s.

Overview

The **11E15** is an indirectly heated high-frequency double tetrode developed by Associated Electrical Industries Limited (AEI) under the Ediswan brand. It is designed for use as a push-pull radio-frequency (r.f.) power amplifier or a frequency trebler in transmitter circuits operating at frequencies up to 500 Mc/s.

The tube features internal neutralization optimized specifically for push-pull operation, which simplifies circuit design by reducing the need for external neutralizing components at very high frequencies. The 11E15 is capable of operating under several distinct service classes, including Class C r.f. push-pull power amplification (for continuous wave telegraphy or frequency modulation telephony), Class B audio-frequency (a.f.) power amplification or modulator service, Class C r.f. power amplification with combined anode and screen modulation, and frequency trebler service.

Physical Construction, Mounting, and Base Connections

The 11E15 is constructed with a glass envelope and utilizes a **B7A** base featuring an index boss to ensure correct orientation. The anodes of the two tetrode sections are connected to two top caps, each consisting of a 2 mm diameter wire.

Physical Dimensions

- **Maximum Overall Length:** 103 mm
- **Maximum Diameter:** 47 mm
- **Maximum Seated Height:** 91 mm
- **Approximate Net Weight:** 2.3 ozs

Mounting Constraints

The mounting position of the 11E15 is unrestricted. However, when the tube is mounted horizontally, it must be oriented such that the anode pins lie within a horizontal plane.

Base Pinout Configuration

The B7A base connections, viewed from the free end of the pins, are assigned as follows:

Pin / Cap	Connection	Symbol
Pin 1	Heater	h

Pin / Cap	Connection	Symbol
Pin 2	Control Grid, Section 1	$g1'$
Pin 3	Screen Grid (Common)	$g2', g2''$
Pin 4	Cathode, Beam Plates, Shield	k, bp, s
Pin 5	Heater Centre Tap	hct
Pin 6	Control Grid, Section 2	$g1''$
Pin 7	Heater	h
Cap No. 1	Anode, Section 1	a'
Cap No. 2	Anode, Section 2	a''

Heater Characteristics

The 11E15 features a flexible, indirectly heated cathode system that can be operated from either a 12.6 V or a 6.3 V supply, depending on whether the heater filaments are connected in series or parallel using the heater center tap (Pin 5).

Parameter	Series Connection	Parallel Connection
Heater Voltage (V_h)	12.6 V	6.3 V
Heater Current (I_h)	0.9 A	1.8 A

Typical Electrical Characteristics

The typical electrical characteristics for each individual tetrode section of the 11E15, measured under static Class A conditions, are defined at a specific operating point:

- **Anode Voltage (V_a):** 300 V
- **Screen Grid Voltage ($V_{[g2]}$ (/tubes/G2)):** 250 V
- **Anode Current (I_a):** 30 mA
- **Mutual Conductance (g_m):** 4.5 mA/V (per section)
- **Inner Amplification Factor (μ_{g1-g2}):** 8.0 (per section)

Inter-Electrode Capacitances

The capacitances of the internal structures are specified both per section and for the two sections configured in a push-pull arrangement:

Capacitance Parameter	Symbol	Value	Scope
Anode to Control Grid 1	C_{a-g1}	0.06 pF	Per section (internally neutralized)
Control Grid 1 to All Other Electrodes	C_{g1-all}	10.5 pF	Per section
Anode to All Other Electrodes	C_{a-all}	3.2 pF	Per section
Input Capacitance	C_{in}	6.7 pF	Two sections in push-pull
Output Capacitance	C_{out}	2.1 pF	Two sections in push-pull

Absolute Maximum Ratings

All limiting values specified for the 11E15 are based on the Absolute rating system, not Design Centres. Operating the tube beyond these limits may impair its performance or cause permanent damage.

General Environmental and Operating Limits

- **Maximum Operating Frequency (f_{max}):** 500 Mc/s
- **Maximum Permissible Temperature of Hottest Part of Bulb:** 200 °C
- **Maximum Permissible Temperature of the Base Pins:** 180 °C
- **Maximum Heater-to-Cathode Voltage ($V_{h-k(max)}$):** 100 V

Service-Specific Absolute Maximum Ratings

The maximum permissible electrical ratings depend heavily on the class of service and the cooling method employed.

1. Class "C" R.F. Push-Pull Power Amplifier (C.W. Telegraphy or F.M. Telephony)

- **Maximum Anode Voltage ($V_{a(max)}$):** 600 V (subject to frequency and cooling limits)
 - *Natural Cooling:* 600 V up to 150 Mc/s, limited to 280 V at 500 Mc/s.
 - *Forced Air Cooling:* 600 V up to 280 Mc/s, limited to 500 V at 500 Mc/s.
- **Maximum Screen Grid Voltage ($V_{[g2] (/tubes/G2)(max)}$):** 300 V
- **Maximum Negative Control Grid Voltage ($V_{g1(max)}$):** -100 V
- **Maximum Anode Dissipation ($P_{a(max)}$):** 20 W (per section)
- **Maximum Screen Grid Dissipation ($P_{[g2] (/tubes/G2)(max)}$):** 3.5 W (per section)

- **Maximum Control Grid Dissipation ($P_{g1(max)}$):** 1.0 W (per section)
- **Maximum Peak Cathode Current ($i_{k(pk)max}$):** 700 mA (per section)
- **Maximum Mean Cathode Current ($I_{k(av)max}$):** 120 mA (per section)
- **Maximum Mean Control Grid Current ($I_{g1(av)max}$):** 5.0 mA (per section)
- **Maximum Control Grid-to-Cathode Resistance ($R_{g1-k(max)}$):** 50 k Ω (fixed bias), 100 k Ω (automatic bias)

2. Class "B" A.F. Power Amplifier or Modulator

- **Maximum Anode Voltage ($V_a(max)$):** 600 V
- **Maximum Screen Grid Voltage ($V_{[g2] (/tubes/G2)(max)}$):** 300 V
- **Maximum Negative Control Grid Voltage ($V_{g1(max)}$):** -100 V
- **Maximum Anode Dissipation ($P_a(max)$):** 20 W (per section)
- **Maximum Screen Grid Dissipation ($P_{[g2] (/tubes/G2)(max)}$):** 3.5 W (per section)
- **Maximum Control Grid Dissipation ($P_{g1(max)}$):** 1.0 W (per section)
- **Maximum Peak Cathode Current ($i_{k(pk)max}$):** 450 mA (per section)
- **Maximum Mean Cathode Current ($I_{k(av)max}$):** 140 mA (per section)
- **Maximum Control Grid-to-Cathode Resistance ($R_{g1-k(max)}$):** 50 k Ω (fixed bias), 100 k Ω (automatic bias)

3. Class "C" R.F. Power Amplifier with Anode and Screen Modulation (Carrier Condition, Modulation Factor 1)

- **Maximum Anode Voltage ($V_a(max)$):** 600 V (subject to frequency and cooling limits)
 - *Natural Cooling:* 600 V up to 150 Mc/s, limited to 280 V at 500 Mc/s.
 - *Forced Air Cooling:* 600 V up to 250 Mc/s, limited to 480 V at 500 Mc/s.
- **Maximum Screen Grid Voltage ($V_{[g2] (/tubes/G2)(max)}$):** 300 V
- **Maximum Negative Control Grid Voltage ($V_{g1(max)}$):** -175 V
- **Maximum Anode Dissipation ($P_a(max)$):** 14 W (per section)
- **Maximum Screen Grid Dissipation ($P_{[g2] (/tubes/G2)(max)}$):** 2.3 W (per section)
- **Maximum Control Grid Dissipation ($P_{g1(max)}$):** 1.0 W (per section)
- **Maximum Peak Cathode Current ($i_{k(pk)max}$):** 1.0 A (per section)
- **Maximum Mean Cathode Current ($I_{k(av)max}$):** 120 mA (per section)
- **Maximum Mean Control Grid Current ($I_{g1(av)max}$):** 5.0 mA (per section)
- **Maximum Control Grid-to-Cathode Resistance ($R_{g1-k(max)}$):** 50 k Ω (fixed bias), 100 k Ω (automatic bias)

4. Frequency Trebler Service

- **Maximum Anode Voltage ($V_a(max)$):** 750 V

- **Maximum Screen Grid Voltage ($V_{[g2]}(/tubes/G2)(max)$):** 300 V
- **Maximum Negative Control Grid Voltage ($V_{g1}(max)$):** -175 V
- **Maximum Anode Dissipation ($P_{a(max)}$):** 20 W (per section)
- **Maximum Screen Grid Dissipation ($P_{[g2]}(/tubes/G2)(max)$):** 3.5 W (per section)
- **Maximum Control Grid Dissipation ($P_{g1}(max)$):** 1.0 W (per section)
- **Maximum Peak Cathode Current ($i_{k(pk)max}$):** 700 mA (per section)
- **Maximum Mean Cathode Current ($I_{k(av)max}$):** 100 mA (per section)
- **Maximum Mean Control Grid Current ($I_{g1(av)max}$):** 5.0 mA (per section)
- **Maximum Control Grid-to-Cathode Resistance ($R_{g1-k}(max)$):** 50 k Ω (fixed bias), 100 k Ω (automatic bias)

Technical Summary

The **11E15** is a high-frequency double tetrode designed for transmitter and modulator applications up to 500 Mc/s. Featuring a dual-voltage heater (6.3 V / 12.6 V) and a B7A base, it integrates two internally neutralized tetrode sections in a single envelope. With an anode dissipation rating of up to 20 W per section (14 W under modulated conditions) and a maximum anode voltage rating of up to 750 V in frequency trebler service, the 11E15 provides a robust solution for compact VHF and UHF push-pull power amplifiers, modulators, and frequency multipliers. Designers must carefully manage the cooling conditions (natural vs. forced air) to ensure the anode voltage limits are respected at higher operating frequencies.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1961 AEI Industrial Valves

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1961 AEI INDUSTRIAL VALVES

Section 1 · Tetrode

OTHER

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum operating frequency	500 MHz	—

CHARACTERISTIC

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Inner amplification factor	8	—



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1961 Associated Electrical Industries

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1961 ASSOCIATED ELECTRICAL INDUSTRIES

Section 1 · Tetrode

OTHER

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum operating frequency	500 MHz	—

CHARACTERISTIC

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Inner amplification factor	8	—

TUBE TINKER

An independent reference for electronic tubes, vacuum tubes,
and their source documents.

