

ELECTRONIC TUBE REFERENCE

15FY7

Power - TV Vertical Output electronic tube

CONSOLIDATED TECHNICAL DATA

2 SECTIONS

CONSTRUCTION

TRIODE-TRIODE

Duodecar dissimilar dual triode intended for combined television vertical-deflection oscillator and amplifier service. Its paired sections provide oscillator drive and 10 W power-output capability, with peak plate-pulse ratings reaching about 2 kV.

GENERAL CHARACTERISTICS

BASE DESIGNATION	12E0	BASE PINS	12
NOMINAL HEATER	14.7 V / 450 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Dissimilar

SECTION RATINGS

SECTION1 Triode	
PLATE RESISTANCE	40000 Ω
TRANSCONDUCTANCE	0.0015 S
AMPLIFICATION FACTOR	60
MAXIMUM PLATE VOLTAGE	330 V
MAXIMUM PLATE DISSIPATION	1.5 W
MAXIMUM CATHODE CURRENT	20 mA
Heater-variant reference sheet; electrical data explicitly cross-referenced to 6FY7.	

SECTION2 Triode	
PLATE RESISTANCE	1000 Ω
TRANSCONDUCTANCE	0.007 S
AMPLIFICATION FACTOR	6
MAXIMUM PLATE VOLTAGE	330 V
MAXIMUM PLATE DISSIPATION	10 W
MAXIMUM CATHODE CURRENT	50 mA
Heater-variant reference sheet; electrical data explicitly cross-referenced to 6FY7.	

15FY7 — Double Dissimilar Triode

The 15FY7 is a duodecar-type double dissimilar triode designed for use in television receivers. It is specifically engineered to function as a combined vertical-deflection oscillator and vertical-deflection amplifier, with its two triode sections optimized for these distinct roles.

Overview

The **15FY7** is a multi-electrode vacuum tube containing two highly dissimilar triode units within a single envelope. Triode Unit No. 1 is a high-mu triode designed to operate as a vertical-deflection oscillator, while Triode Unit No. 2 is a low-mu, high-current triode designed to serve as a vertical-deflection amplifier.

The tube is constructed using a Compactron T-9 glass envelope and utilizes a 12-pin button base. It is designed for series-string heater circuits in television receivers, featuring a controlled heater warm-up time. The 15FY7 is electrically identical to the [6FY7](#) and [11FY7](#) except for its heater voltage, current, and warm-up specifications.

Construction, Physical Dimensions, and Basing

The 15FY7 is housed in a T-9 glass bulb with a button 12-pin base (E12-70 designation). It requires a standard duodecar 12-contact socket for operation.

Physical Dimensions

- **Maximum Diameter:** 1.188 inches
- **Maximum Seated Height:** 2.500 inches
- **Maximum Overall Height:** 2.875 inches

Pin Connection Diagram (12EO Basing)

The 12EO basing arrangement provides independent connections for the electrodes of both triode sections, with the exception of the shared heater. The pin assignments, viewed from the bottom of the

tube, are as follows:

Pin Number	Connection	Description
1	H	Heater
2	NC	No Connection
3	GT2	Grid, Triode Unit No. 2 (Amplifier)
4	NC	No Connection
5	<u>PT2</u>	Plate, Triode Unit No. 2 (Amplifier)
6	NC	No Connection
7	<u>KT2</u>	Cathode, Triode Unit No. 2 (Amplifier)
8	IC	Internal Connection (Do Not Use)
9	KT1	Cathode, Triode Unit No. 1 (Oscillator)
10	<u>GT1</u>	Grid, Triode Unit No. 1 (Oscillator)
11	PT1	Plate, Triode Unit No. 1 (Oscillator)
12	H	Heater

Heater Characteristics and Ratings

The heater of the 15FY7 is designed for series-string operation with a controlled warm-up characteristic to minimize voltage surges in television receiver heater strings.

Parameter	Value
Heater Voltage (AC or DC)	14.7 V
Heater Current	0.450 A $\pm$ 0.030 A (450 mA)
Average Heater Warm-up Time	11 seconds

Heater-Cathode Voltage Ratings

To prevent insulation breakdown between the heater and the independent cathodes, the following maximum voltage limits must be observed:

- **Heater Negative with Respect to Cathode:** 200 V max (Total DC and Peak)
- **Heater Positive with Respect to Cathode:** 100 V max (DC), 200 V max (Total DC and Peak)

Electrical Characteristics and Class A1 Operation

The two triode sections of the 15FY7 exhibit highly dissimilar electrical characteristics, reflecting their specialized roles in television deflection circuitry.

Triode Unit No. 1 (Oscillator Section)

Triode Unit No. 1 is a high-mu voltage amplifier. Under typical Class A1 operating conditions, it exhibits the following characteristics:

- **Plate Voltage:** 250 V
- **Grid Voltage:** -3.0 V
- **Amplification Factor:** 65
- **Plate Resistance (Approx.):** 40,500_Ω
- **Transconductance:** 1600 _μmhos
- **Plate Current:** 1.4 mA
- **Grid Voltage (Approx.) for 30 _μA Plate Current:** -5.5 V

Triode Unit No. 2 (Amplifier Section)

Triode Unit No. 2 is a low-mu, high-current power triode. It has two documented typical operating points:

Parameter	Operating Point A	Operating Point B (Short-Interval)*
Plate Voltage	150 V	60 V
Grid Voltage	-17.5 V	0 V
Amplification Factor	6.0	—
Plate Resistance (Approx.)	920 _Ω	—
Transconductance	6500 _μ mhos	—
Plate Current	35 mA	95 mA
Plate Current at Grid Voltage of -25 V	6 mA (Approx.)	—

Parameter	Operating Point A	Operating Point B (Short-Interval)*
Grid Voltage for 50 μ A Plate Current	-36 V (Approx.)	—

*Note: Operating Point B is applied for a short interval (two seconds maximum) to prevent thermal damage to the tube.

Direct Interelectrode Capacitances

The unshielded direct interelectrode capacitances for each independent triode section are as follows:

Capacitance Parameter	Triode Unit No. 1 (Oscillator)	Triode Unit No. 2 (Amplifier)
Grid to Plate (g to p)	4.4 pF	9.5 pF
Input: g to ($h + k$)	2.2 pF	6.5 pF
Output: p to ($h + k$)	0.4 pF	1.2 pF

Vertical-Deflection Service Ratings

When operated in a standard 525-line, 30-frame television scanning system, the 15FY7 must be operated within its Design-Maximum ratings. The requirements for the oscillator and amplifier sections differ significantly:

Rating Parameter	Triode Unit No. 1 (Oscillator)	Triode Unit No. 2 (Amplifier)
DC Plate Voltage (Max.)	330 V	275 V
Peak Positive-Pulse Plate Voltage (Max.)	—	2000 V*
Peak Negative-Pulse Plate Voltage (Max.)	—	250 V
Peak Negative Grid Voltage (Max.)	400 V	—
Peak Cathode Current (Max.)	70 mA	175 mA
Average Cathode Current (Max.)	20 mA	50 mA
Plate Dissipation (Max.)	1.0 W	7.0 W**
Grid-Circuit Resistance (Max.)	2.2 M Ω	2.2 M Ω

**The pulse duration must not exceed 15% of a scanning cycle (which corresponds to 2.5 milliseconds in a vertical scanning cycle). Some technical specifications describe this limit in the context of a horizontal scanning cycle.*

***In stages operating with grid-leak bias, an adequate cathode-bias resistor or other protective means is required to protect the tube from excessive dissipation in the absence of excitation.*

Note: Peak negative voltage limits of 400 V for Unit No. 1 and 250 V for Unit No. 2 are specified; these are variously designated as peak negative grid voltage or peak negative-pulse plate voltage in different technical specifications.

Related Designations

The 15FY7 belongs to a family of identical double dissimilar triodes that differ only in their heater configurations:

- **6FY7**: Designed for standard parallel heater circuits, requiring a heater supply of **6.3 V** at **1.05 A**.
- **11FY7**: Designed for series heater strings, requiring a heater supply of **11.0 V** at **0.6 A** (600 mA) with an average warm-up time of 11 seconds.
- **15FY7**: Designed for series heater strings, requiring a heater supply of **14.7 V** at **0.45 A** (450 mA) with an average warm-up time of 11 seconds.

These three designations share identical physical dimensions, basing (12EO), interelectrode capacitances, and electrical operating characteristics for both triode units.

Technical Summary

The **15FY7** is a specialized duodecar double dissimilar triode designed for television vertical-deflection circuits. It integrates a high- μ oscillator triode (Unit No. 1, $\mu = 65$) and a low- μ power amplifier triode (Unit No. 2, $\mu = 6$) within a single Compactron T-9 envelope. Operating on a **14.7 V, 0.45 A** heater with an 11-second controlled warm-up time, it is optimized for series-string television receivers. The tube features independent cathode connections and a 12-pin button base (12EO basing), allowing it to perform both oscillator and power amplification functions with minimal external components.



SOURCE OPERATING CONDITIONS

1968 General Electric Co

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

1968 GENERAL ELECTRIC CO

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HeaterOrFilamentVoltageNominal	14.7 V	—
HeaterOrFilamentCurrentNominal	450 mA	—



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1971 RCA HB3 Binder 5 of 7

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

1971 RCA HB3 BINDER 5 OF 7

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Plate Voltage	330 V	Inherited from explicitly referenced parent 6FY7.
Plate Dissipation	1.5 W	Inherited from explicitly referenced parent 6FY7.

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate Resistance	40000 Ω	Inherited from explicitly referenced parent 6FY7.
Transconductance	1500 μS	Inherited from explicitly referenced parent 6FY7.
Amplification Factor	60	Inherited from explicitly referenced parent 6FY7.

Section 2 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Plate Voltage	330 V	Inherited from explicitly referenced parent 6FY7.
Plate Dissipation	10 W	Inherited from explicitly referenced parent 6FY7.

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate Resistance	1000 Ω	Inherited from explicitly referenced parent 6FY7.
Transconductance	7000 μS	Inherited from explicitly referenced parent 6FY7.
Amplification Factor	6	Inherited from explicitly referenced parent 6FY7.



SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

SOURCE PDF

1975 RCA RC30

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

1975 RCA RC30
Section 1 · Triode

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage (ac/dc)	14.7 volts	Published value from supplied target entry
Heater Current	0.45 amperes	Published value from supplied target entry
Heater Warm-up Time (Average)	11 seconds	Published value from supplied target entry
Plate Voltage	150 volts	Published value from supplied target entry
Grid Voltage	17.5 volts	Published value from supplied target entry
Amplification Factor	6	Published value from supplied target entry
Plate Resistance (Approx.)	920 ohms	Published value from supplied target entry
Transconductance	6500	Published value from supplied target entry

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate Current	35 mA	Published value from supplied target entry
Grid Voltage (Approx.) for plate current of	5.5 volts	Published value from supplied target entry
Grid Voltage (Approx.) for plate current of	50	Published value from supplied target entry
DC Plate Voltage	275 volts	Published value from supplied target entry
Peak Positive-Pulse Plate Voltage*	2000 volts	Published value from supplied target entry
Peak Negative-Pulse Plate Voltage	250 volts	Published value from supplied target entry
Peak Cathode Current	175 mA	Published value from supplied target entry
Average Cathode Current	50 mA	Published value from supplied target entry
Plate Dissipation	7 watts	Published value from supplied target entry
Grid-Circuit Resistance	2.2 megohms	Published value from supplied target entry

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