5CX1500B
Power Pentode

The Svetlana 5CX1500B is a high-performance ceramic/metal power pentode designed for use as a highly linear Class AB_1 linear amplifier. The pentode is ideal for VHF service and is recommended for use in FM broadcast transmitters. The 5CX1500B filament is precision fabricated in a cylindrical mesh configuration for exceptional mechanical stability and long life.

The Svetlana 5CX1500B is manufactured in the Svetlana factory in St. Petersburg, Russia, and is designed to be a direct replacement for both the 5CX1500B and 5CX1500A manufactured in the United States.

Svetlana
ELECTRON DEVICES

5CX1500B

General Characteristics

Electrical

Filament:	Thoriated tungsten
Voltage	5.0 ± 0.25 V
Current, at 5.0 volts	38.5 A
Transconductance (Average):	
I_b = 1.0 Adc, E_{c2} = 500 Vdc	24,000 µmhos
Amplification factor (average):	
Grid to Screen	5.5
Direct interelectrode capacitance (grounded cathode):	
Input	75 pF
Output	17.8 pF
Feedback	0.20 pF
Frequency of maximum rating:	
CW	110 MHz

Mechanical

Cooling	Forced air
Base	Ring and breechblock
Recommended air system socket	SK-840 series
Recommended (air) chimney	SK-806
Operating position	Axis vertical, base down or up
Maximum operating temperature	250°C
Maximum dimensions:	
Length	130 mm (5.2 in.)
Diameter	85.6 mm (3.37 in.)
Net weight	850 gm (30 oz.)

Radio Frequency Linear Amplifier Class C (CW conditions)

Absolute maximum ratings

Plate voltage	5000 volts
Screen voltage	750 volts
Plate dissipation	1500 watts
Suppressor dissipation	25 watts
Screen dissipation	75 watts
Grid dissipation	25 watts

Typical Operation

(Frequencies to 30 MHz)				
Plate voltage	3000	4000	4500	Vdc
Suppressor voltage	0	0	0	Vdc
Screen voltage	500	500	500	Vdc
Grid voltage	-200	-200	-200	Vdc
Plate current	900	800	900	mAdc
Screen current	94	66	88	mAdc
Grid current	35	25	34	mAdc
Peak rf grid voltage	255	245	255	v
Calculated driving power	9.0	6.5	9.0	W
Plate input power	2700	3200	4050	W
Plate dissipation	720	850	870	W
Plate output power	1980	2350	3180	W
Resonant load impedance	1570	2240	2520	ohms

Power Pentode

Radio Frequency Linear Amplifier, Grid Driven, Class AB_1

Absolute maximum ratings

DC plate voltage	4000	volts
DC screen voltage	750	volts
Plate dissipation	1500	watts
Suppressor dissipation	25	watts
Screen dissipation	75	watts
Grid dissipation	25	watts

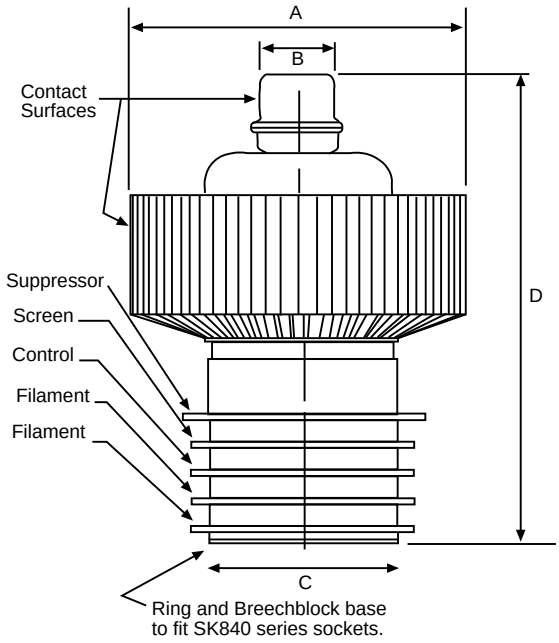
Typical Operation

(Frequencies to 30 MHz)				
Plate voltage	2500	3000	4000	Vdc
Suppressor voltage	0	0	0	Vdc
Screen voltage	500	500	500	Vdc
Grid voltage	-87	-89	-90	Vdc
Zero signal plate current	250	250	250	mAdc
Single-tone plate current	660	690	690	mAdc
Two-tone plate current	470	480	485	mAdc
Single-tone screen current	79	71	59	mAdc
Two-tone screen current	36	32	25	mAdc
Peak rf grid voltage	87	89	90	v
Peak driving power	0	0	0	W
Single tone useful output power	1090	1330	1785	W
Resonant load impedance	2340	2680	3500	ohms

Range Values for Equipment Design

	Min.	Max.	
Filament: current at 5.0 volts	38	43	A
Interelectrode capacitances (grounded grid connection)			
Input	32	37	pF
Output	14.5	18.5	pF
Feedback	—	0.05	pF
Interelectrode capactances (grounded cathode connection)			
Input	70	80	pF
Output	14.5	18.5	pF
Feedback	—	0.25	pF

5CX1500B Outline Drawing



Dimensional Data				
Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	84.7	85.6	3.33	3.37
B	20.5	20.8	0.81	0.82
C	47.5	48.3	1.87	1.90
D	124	131	4.90	5.15

Electrical Application

Filament operation The rated filament voltage for the 5CX1500B is 5.0 volts. Filament voltage, as measured at the socket, should be maintained within ±5% of this value to obtain maximum tube life.

Grid operation The rated dissipation of the grid is 25 watts. This is approximately the product of DC grid current and peak positive grid voltage. Operation at bias and drive levels near those listed will insure safe operation.

Screen operation The power dissipated by the screen must not exceed 75 watts. Screen dissipation, in cases where there is no AC applied to the screen, is the simple product of the screen voltage and the screen current. If the screen voltage is modulated, the screen dissipation will depend on RMS screen current and voltage.

Screen dissipation is likely to rise to excessive values whten the plate voltage, bias voltage, or plate load are removed with filament and screen voltages applied. Suitable protective means must be provided to limit the screen dissipation to 75 watts in the event of a circuit failure.

Suppressor operation The rated dissipation of the suppressor is 25 watts. Suppressor current will be zero or very nearly zero for all typical operating conditions specified. The 5CX1500B has been designed for zero voltage operation of the suppressor grid for most applications.

Plate operation The plate dissipation rating of the 5CX1500B is 1500 watts. The tube and associated circuitry should be protected against surge current in the event of an arc with a current limiting resistance of 10 - 25 ohms in series with the lead from the power supply to the plate. The resistor should be capable of withstanding the surge current. It should not be used as a fuse.

Mechanical Application

Mounting The 5CX1500B must be operated with its axis vertical. The base of the tube may be down or up at the convenience of the equipment designer.

Socket The Svetlana 5CX1500B is designed for the Eimac SK-840 socket and SK-806 chimney. The use of recommended airflow rate through the socket provides effective forced-air cooling of the tube. Air forced into the bottom of the socket passes over the tube terminals through the Air Chimney and exits through the anode cooling fins.

Cooling

The maximum temperature rating for the anode core and the metal/ceramic seals of the 5CX1500B is 250°C. Sufficient forced-air circulation must be provided to keep the temperature of the anode at the base of the cooling fins and the temperature of the ceramic/metal seals below 250°C. Air-flow requirements to maintain seal temperature at 225°C in 50°C ambient air are tabulated at upper right (for operation below 30 MHz).

Minimum Cooling Air-Flow Requirements

	Sea Level		6,000 feet	
Plate dissipation (watts)	Air flow (CFM)	Pressure drop (Inches of water)	Air Flow (CFM)	Pressure Drop (Inches of water)
1000	27	0.33	33	0.40
1550	47	0.76	58	.95

Since the power dissipated by the filament represents about 200 watts and since grid plus screen plus suppressor dissipation can, under some conditions, represent another 125 watts, allowance has been made in preparing this tabulation for an additional 325 watts dissipation.

The blower selected in a given application must be capable of supplying the desired air flow at a back pressure equal to the pressure drop shown above plus any drop encountered in ducts and filters.

At other altitudes and ambient temperatures the flow rate must be modified to obtain equivalent cooling. The flow rate and corresponding pressure differential must be determined individually in such cases, using rated maximum temperatures as the criteria for satisfactory cooling.

Svetlana power grid tubes

Svetlana offers a line of well-engineered, carefully-constructed power grid tubes for both OEM- and end-user applications. As Russia's leading designer and manufacturer of power grid tubes, Svetlana's product line features power tubes at all levels up to and exceeding one megawatt, and includes high-performance triodes, tetrodes and pentodes.

Svetlana power tubes are designed for single sideband transmission, UHF and VHF television, FM broadcast, industrial heating, medical and scientific applications including high voltage pulse modulator service. And, the Svetlana line features a broad range of tubes designed specifically for very high power broadband distributed amplifiers.

Svetlana Electron Devices, Inc., manages the worldwide marketing, sales and support for the recently-privatized Svetlana in St. Petersburg, Russia. Svetlana Electron Devices has its corporate headquarters in Huntsville, Alabama with sales and support offices in cities throughout the world.

Headquarters
Svetlana Electron Devices
8200 South Memorial Parkway
Huntsville AL 35802
USA
Telephone 205 880 8020
FAX 205 880 8077

Svetlana Electron Devices
3000 Alpine Road
Portola Valley, CA 94028
USA
Telephone 415 233 0429
FAX 415 233 0439