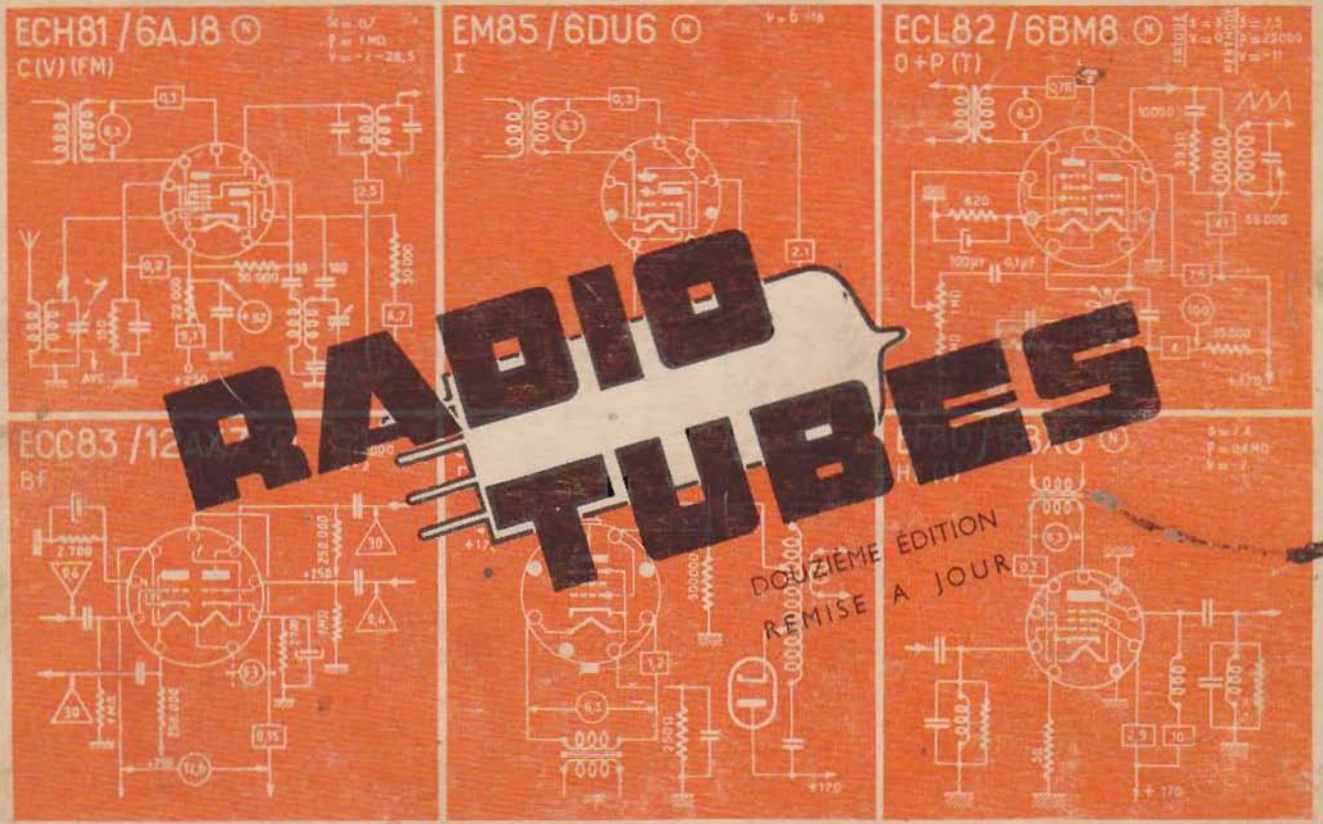
★ E. AISBERG ★ L. GAUDILLAT ★ R. DE SCHEPPER ★



RADIO TUBES

DOUZIÈME ÉDITION
REMISE A JOUR

SOCIÉTÉ DES ÉDITIONS RADIO — PARIS

4 revues françaises de réputation mondiale

TOUTE L'ÉLECTRONIQUE

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Revue mensuelle de technique expliquée et appliquée
Fondée en 1934

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TÉLÉVISION

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Le numéro 1,80 NF

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Revue bimestrielle de technique moderne destinée aux promoteurs et aux utilisateurs des méthodes et appareils — électroniques. —

Le numéro 3,90 NF

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☆ E. AISBERG ☆ L. GAUDILLAT ☆ R. DE SCHEPPER ☆

RADIO-TUBES

CARACTÉRISTIQUES ESSENTIELLES ET SCHÉMAS D'UTILISATION

Essential constants and practical circuit diagrams

☆

Características esenciales y esquemas de utilización

Wichtigsten Charakteristiken und Schaltungs - Schemata

☆

Onmisbare Karakteristieken en gebruikschema's

SOCIETE DES EDITIONS RADIO
9, rue Jacob - Paris - 6°

PRÉFACE

RADIO-TUBES ne prétend pas remplacer les recueils de caractéristiques détaillées avec diverses courbes. Il est destiné à l'utilisateur des tubes électroniques et vise à lui en faciliter l'usage. C'est donc un ouvrage essentiellement pratique qui a sa place au laboratoire et à l'atelier.

Chaque tube est représenté par son culot vu par en dessous. Il est accompagné de ses **caractéristiques de service** essentielles, et les conditions normales d'emploi figurent dans un schéma-type où sont indiquées les valeurs des éléments principaux.

Les abréviations et signes conventionnels suivants y sont utilisés :

1. **FONCTION** (sous le nom du tube) :

BF - Amplification à fréquence acoustique;
D - Détection, démodulation;
C - Changement de fréquence, mélangeur;
HF - Amplification haute fréquence ou moyenne fréquence;
I - Indicateur visuel d'accord;
M - Tube spécial pour appareil de mesure;
O - Oscillateur;
P - Etage final de puissance;
PH - Inverseur de phase (amplificateur BF);
R - Redresseur;
S - Séparatrice;
T - Tube utilisé en télévision;
THT - Très haute tension;
V - Indique que le tube est à pente variable;
VF - Amplification à vidéo-fréquence;
VHF - Tube pouvant fonctionner à des fréquences supérieures à 5 MHz ou spécialement étudié pour ondes ultra courtes.

2. **SUPPORT** (lettre entourée d'un cercle à côté ou en dessous de la fonction) :

A8 8 broches allemand;
E Européen ancien;
L Loctal (ou « clef »);
M Miniature;
N Noval;
O Octal;
R Rimlock;
S Spécial;
SM Subminiature;
T Transcontinental;
US Américain ancien.

3. **CORRESPONDANCE :**

Le signe / indique que le **même** tube existe sous deux noms (exemple : EBF80 / 6N8);

Le signe = signale une interchangeabilité complète malgré quelques faibles différences de structure (exemple : 5749 = 6BA6). Les caractéristiques ne figurent alors qu'une fois et ce sous la dénomination la plus usuelle;

Un tube inscrit entre parenthèses à côté d'un autre indique qu'ils ont des caractéristiques plus ou moins semblables, mais qu'ils diffèrent par le chauffage, les capacités internes ou le culot.

4. **CARACTERISTIQUES STATIQUES** (en haut à droite des schémas) :

S - Pente en milliampères par volt;
Sc - Pente de conversion dans le cas d'un changeur de fréquence;
μ - Coefficient d'amplification;
ρ - Résistance interne;
V - Tension de polarisation de la grille de commande;
Req - Résistance équivalente de souffle (tubes utilisés en VHF).

5. **SYMBOLES DANS LES SCHEMAS :**

Un chiffre dans un cercle indique la tension continue entre deux points ou entre un point et la masse ainsi que la tension alternative ou continue de chauffage.

Un chiffre dans un rectangle indique l'intensité en ampères dans le circuit de chauffage et en milliampères ailleurs.

Un chiffre dans un triangle indique la tension efficace du signal appliqué entre deux points ou entre un point et la masse.

Le chiffre à l'intérieur de la figure donne la puissance maximum en watts (généralement pour une distorsion totale de 10 %). Le nombre placé extérieurement donne la valeur de l'impédance de charge recommandée.


Les flèches indiquent l'entrée et la sortie des signaux.

Signe indiquant que le tube fonctionne en régime d'impulsion.


Broche connectée intérieurement; doit obligatoirement rester libre.


Broche connectée à un écran; doit être mise à la masse.


Broche non connectée intérieurement.

PREFACE

RADIO-TUBES is not intended to supersede a collection of detailed data, caracteristics and graphs. Its aim is to help all those who make use of electronic tubes by enabling them to find easily the necessary information.

Each tube is shown with its base as seen from underneath. The information given includes the essential service caracteristics and a circuit diagram showing the normal value of the principal components to be used in its most usual function.

The following abbreviations and symbols are used:

1. **FUNCTION** (below the name of the tube):

BF - Audio frequency amplification;
D - Detection, demodulation;
C - Frequency changer, mixer;
HF - High or intermediate frequency amplification;
I - Tuning indicator;
M - Special tube for mesure instruments;
O - Oscillator;
P - Power amplifier, output tube;
PH - Phase inverter (AF amplifier);
R - Rectifier;
S - Sync separator tube;
T - Tube normally used in television receivers;
THT - Very high tension (television receivers);
V - Variable mu tube (remote cutoff);
VF - Video frequency amplification;
VHF - Very high frequency. Tube suitable for frequencies higher than 5 MHz or specially built for ultra-short waves.

2. **TUBE BASE** (letter enclosed in a circle or besides below the function):

A8 German 8 pin;
E Old type european base;
L Loctal (lock-in);
M Miniature (7 pin);
N Noval (miniature 9 pin);
O Octal;
R Rimlock;
S Special;
SM Subminiature;
T Transcontinental (european side-contact);
US Old type american base.

3. **INTERCHANGEABILITY :**

The sign / means that the **same** tube exists under two names (example: EBF80 / 6N8).

The sign = indicates that the tubes are completely interchangeable notwithstanding small structural differences (example: 5749 = 6BA6). The caracteristics are then only given once and apply to the most commonly used type.

A tube enclosed by brackets placed next to another one indicates that they are more or less similar as regards their electronic properties but have different filament caracteristics, internal capacities or base.

4. **STATIC CARACTERISTICS** (right hand upper corner);

S - Mutual conductance (mA/V);
Sc - Conversion conductance (frequency changer);
μ - Amplification factor;
ρ - Internal resistance;
V - Negative grid voltage;
Req - Equivalent noise resistance (VHF tubes).

5. **SYMBOLS USED IN THE CIRCUIT DIAGRAMS:**

A number enclosed in a circle shows the DC voltage between two points or between a point and the ground and also the RMS or DC filament voltage.

A number in a rectangle shows the current in amperes flowing through the heater circuit and in mA elsewhere.

A number in a triangle indicates the maximum alternating voltage allowable between two points or between a point and the ground.

The number inside this symbol is the maximum output power in watts (generally for 10% total distorsion). The number along the side of the symbol is the recommended anode load resistance.


Arrows indicate the points of input and output of the signals.


This symbol shows that the signal delivered to the tube is in form of pulses.


Internally connected pins that must be left free.


Pins connected to an internal screen and must be grounded.


Pins that are not internally connected.

PREFACIO

Cada válvula está representada por su casquillo visto **por debajo.** Va acompañada de sus **características esenciales de servicio** y, en un esquema-tipo, figuran las condiciones normales de funcionamiento, donde se indican los valores de los elementos principales.

En el manual se emplean las abreviaturas y signos convencionales siguientes :

1. FUNCION (Inmediatamente debajo de la denominación de la válvula) :

BF - Amplificación de audiofrecuencia;
D - Detección, demodulación;
C - Conversora de frecuencia;
HF - Amplificación en mediana y alta frecuencia;
I - Indicador visual de sintonía;
M - Tubo especial para instrumentos de medida;
O - Osciladora;
P - Etapa final de potencia;
PH - Inversora de fase (amplificador BF);
R - Rectificadora;
S - Separadora;
T - Tubo utilizado en televisión;
THT - Muy alta tensión;
V - Indica que el tubo es de pendiente variable;
VF - Amplificación en video-frecuencia;
VHF - Válvula capaz de funcionar a frecuencias superiores a los 5 Mc/s o especialmente diseñada para ondas ultracortas.

2. BASE (Letra rodeada de un circulo y situada, bien debajo o al lado de la que expresa la función) :

A8 8 patitas de conexión tipo alemán;
E Europea antigua;
L Loctal;
M Tipo miniatura;
N Tipo noval;
O Octal;
R Rimlock;
S Especial;
SM Tipo subminiatura;
T Transcontinental;
US Americana antigua.

3. CORRESPONDENCIA :

El signo / indica que la misma válvula existe con dos denominaciones distintas (ejemplo : EBF80/6N8).

El signo = expresa que pueden intercambiarse completamente a pesar de algunas pequeñas diferencias en su estructura (ejemplo : 5749 = 6BA6). Las características no figuran, en consecuencia, más que una sola vez y precisamente bajo la denominación más usual.

Una válvula encerrada entre paréntesis al lado de otra indica que son de características más o menos semejantes, pero que, sin embargo, difieren en cuanto a las características del encendido de filamentos, las capacidades internas o el casquillo.

4. CARACTERISTICAS ESTATICAS

(Parte superior derecha de los esquemas) :
S - Pendiente en miliamperios por voltio;
Sc - Pendiente de conversión en el caso de conversora de frecuencia;
μ - Coeficiente de amplificación;
ρ - Resistencia interna;
V - Tensión de polarización de la rejilla de control;
Req - Resistencia equivalente de soplido (Tubos utilizados en VHF).

5. SIMBOLOS EN LOS ESQUEMAS :

Una cifra encerrada en un circulo indica la tensión continua que existe entre dos puntos o entre un punto y masa, así como también la tensión alterna o continua de alimentación de filamentos.

Una cifra encerrada en el interior de un rectángulo indica la intensidad en amperios en el circuito de alimentación de filamentos y en miliamperios en todos los demás lugares.

Una cifra en el interior de un triángulo indica la tensión eficaz de la señal aplicada entre dos puntos o entre un punto y masa.

La cifra colocada en el interior de la figura da la potencia máxima en vatios (generalmente para una distorsión total de 10 %). El número situado exteriormente da el valor de la impedancia de carga recomendada.

Las flechas indican la entrada y la salida de las señales.

Este signo indica que la válvula funciona en régimen de impulsos.

Pata conectada al interior; debe quedar libre obligatoriamente.

Pata conectada a una pantalla; debe reunirse a la masa.

Pata no existente en el zocalo de la lámpara.

VORWORT

RADIO-TUBES ist nicht bestimmt, die ausführlichen Datensammlungen mit Kurvenblättern zu ersetzen. Es wurde geschaffen, um dem Benutzer eine schnelle Übersicht über die derzeit gebräuchlichen Typen von Elektronenröhren zu geben. In erster Linie für den Praktiker bestimmt, hat dieses Buch seinen Platz in den Laboratorien und den Werkstätten.

Es umfasst alle modernen Rundfunk-, Tonverstärker- und Fernsehröhren, sowie einige ältere, noch verwendete Typen.

Jede Röhre ist durch seinen von unten gesehenen Sockelanschluss dargestellt. Daneben sind die wichtigsten **Betriebsdaten** angegeben; die normalen Betriebsbedingungen lassen sich aus einem Prinzipschaltbild ersehen, in dem die hauptsächlichen Schaltelemente eingezeichnet sind.

Hierbei werden die folgenden Abkürzungen und Zeichen benutzt :

1. **VERWENDUNG** (unter der Röhrenbezeichnung) :

BF - Tonfrequenzverstärkung;
D - Detektion, Demodulation;
C - Mischstufe;
HF - Hoch- oder Zwischenfrequenzverstärkung;
I - Abstimmanzeige;
M - Spezialröhre für Messgeräte;
O - Oszillator;
P - Leistungsendstufe;
PH - Phasenumkehr (NF-Verstärkung);
R - Gleichrichter;
S - Impulssieb;
T - Fernsehgeräte;
THT - Höchstspannungsgleichrichter;
V - Veränderliche Steilheit;
VF - Videoverstärkung;
VHF - Röhre, die bei Frequenzen über 5 MHz verwendet werden kann, oder gute UKW- Eigenschaften besitzt.

2. **SOCKEL** (Buchstabe im Kreis, unter oder neben der Verwendung) :

A8 Deutscher 3 + 5- Stift Stahlröhrensockel;
E Alter Europasockel;
L Loktal;
M Miniatur 7 Stifte;
N Noval;
O Oktal;
R Rimlock;
S Spezial;
SM Subminiatur;
T Transkontinental;
US Alter Amerikasockel.

3. **AUSTAUSCHMÖGLICHKEITEN :**

Das Zeichen / bedeutet, dass für **dieselbe** Röhre zwei Bezeichnungen gebraucht werden (Beispiel : EBF 80 /6N8).

Beim Zeichen = ist ein vollkommener Austausch trotz einiger Bauverschiedenheiten möglich (Beispiel : 5749 = 6BA6). Die Daten werden dann nur einmal angegeben, und zwar unter der gebräuchlichsten Bezeichnung.

In Klammern erscheint eine Röhre neben einer anderen bei fast gleichen Daten, aber mit Unterschieden in Heizung, Elektrodenkapazitäten oder Sockel.

4. **STATISCHE DATEN** (oben rechts in den Schaltbildern) :

S - Steilheit in Milliampere pro Volt;
Sc - Mischsteilheit bei Verwendung als Mischröhre;
μ - Verstärkungsfaktor;
ρ - Innenwiderstand;
V - Vorspannung des Steuergitters;
Req - Äquivalenter Rauschwiderstand (VHF- Röhren).

5. **SCHALTSYMBOLE :**

Eine Zahl im Kreis gibt die Gleichspannung zwischen zwei Punkten, oder einem Punkte und Masse, oder auch die Heizspannung (Gleich- oder Wechselspannung) an.

Eine Zahl im Rechteck gibt im Heizkreis den Strom in Ampere und anderorts den Strom in Milliampere an.

Eine Zahl im Dreieck bezeichnet die effektive Signal-Wechselspannung zwischen zwei Punkten oder einem Punkt und Masse.

Die Zahl im Symbol bezeichnet die Maximalleistung (meist bei 10 % Gesamtverzerrung). Der empfohlene Aussenwiderstand ist durch die danebenstehende Zahl angegeben.


Die Pfeile bezichnen Signal Ein- und Ausgang.


Bezeichnet Impulsbetrieb einer Röhre.

Innen verbundener Anschluss.


Anschluss der Abschirmung, mit Masse zu verbinden.


Innen nicht verbundener Anschluss.

VOORWOORD

RADIO-TUBES wil niet de verzamelingen van omstandige karakteristieken met verscheidene krommen vervangen. Het is bestemd voor de gebruiker van elektronische buizen en beoogd hem het gebruik ervan te vergemakkelijken. Het is dus een wezenlijk praktisch werk dat zijn plaats heeft in het laboratorium en in het werkhuis.

Het bevat alle moderne buizen bruikbaar voor de radio, de geluidsversterking of de televisie evenals sommige verouderde buizen thans nog in gebruik.

Elke buis is voorgesteld door haar voet langs onder gezien. Ze is begeleid door hare hoofdzakelijke karakteristieken en de normale gebruiksvoorwaarden komen voor in een principeschema dat de waarden der bijzonderste elementen aanduidt.

De volgende afkortingen en symbolen komen erin voor :

1. FUNCTIE (onder de benaming der buis) :

BF - Audiofrequentieversterking;
D - Detectie, demodulatie;
C - Frequentieomvorming (mengbuis);
HF - Hoogfrequencie of middenfrequencie versterking;
I - Visueel afstemmingsbuis (toveroog);
M - Bijzondere buis voor meetapparaat;
O - Oscillator;
P - Eindversterkerbuis;
PH - Phaseomkeerder (in LF versterkers);
R - Gelijkrichter;
S - Scheidingsbuis (televisie);
T - Televisiebuis;
THT - Zeer hooge spanning (televisie);
V - Duidt aan dat de buis een veranderbare steilheid heeft;
VF - Videofrequencie versterking;
VHF - Buis kunnende werken op hogere frequencies dan 5 MHz of bijzonder ontworpen voor ultra korte golflengten.

2. VOETTYPE (letter waarrond een cirkel onder of naast de functie) :

A8 Acht pinnen (Duits);
E Oud europeer;
L Loctal;
M Miniatuur;
N Noval;
O Octal;
R Rimlock;
S Speciaal;
SM Subminiatuur;
T Transcontinentaal (type P);
US Oud americaans.

3. OVEREENSTEMMING :

Het teken / duidt aan dat **dezelfde** buis onder twee benamingen bestaat (b.v. EBF80 / 6N8).

Het teken = duidt een volledige wisselbaarheid aan niettegenstaande enkele lichte struktuurverschillen (b.v. 5749 = 6BA6). De karakteristieken worden dan slechts één maal aangehaald en onder de meest gebruikte benaming.

Een buis tussen haakjes naast een andere betekent dat ze min of meer gelijkaardige eigenschappen bezitten doch dat ze verschillen uit hoofde van de gloeidraad, de inwendige capaciteiten of de voet.

4. STATISCHE KARAKTERISTIEKEN

(boven rechterzijde der schemas) :
S - Steilheid in mA/V;
Sc - Conversiesteilheid in geval van een mengbuis;
μ - Versterkingsfactor;
ρ - Inwendige weerstand;
V - Stuurroosterspanning;
Req - Gelijkwaardige ruisweerstand (buizen in VHF gebruikt).

5. SYMBOLEN IN DE SCHEMAS :

Een cijfer in een cirkel betekent de gelijkspanning tussen twee punten of tussen een punt en de massa, evenals de gloeispanning (gelijk of wissel).

Een cijfer in een rechthoek betekent de stroomsterkte uitgedrukt in ampere in de verhittingskring en elders in milliampere.

Een cijfer in een driehoek betekent de effective signaalspanning tussen twee punten of tussen één punt en de massa.

Het cijfer binnen de figuur geeft de maximum uitgangs vermogen in watts (in het algemeen voor 10 % totale vervorming). Het getal erbuiten geplaatst geeft de waarde van de aanbevole belastingsimpedancie (aanpassingswaarde).


De pijlen duiden de in- en uitgang der signalen aan.


Teken beduidend dat de buis in impulsregiem werkt.

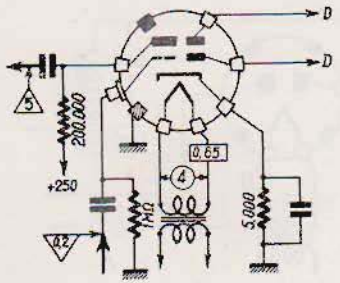

Inwendige verbinding (vrij laten !).


Inwendige scherm (moet met de chassis verbonden worden).


Mag gebruikt worden als steunpunt.

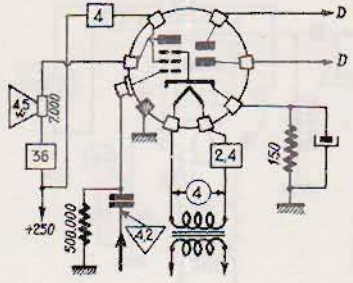
ABC1 (T)
D+BF

S = 2
ρ = 13500
V = −8



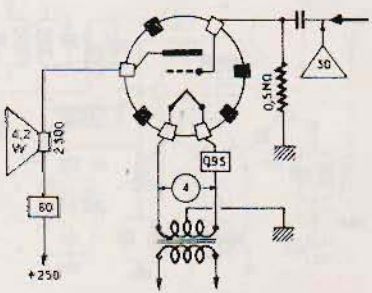
ABL1 (T)
D+P

S = 9
ρ = 58000
V = −6



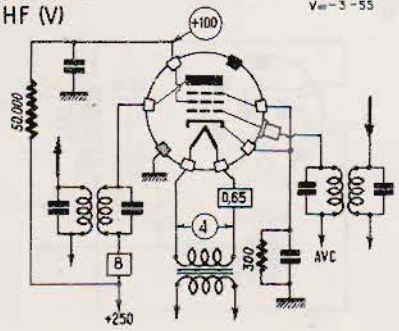
AD1 (T)
P

S = 6
ρ = 650
V = −45



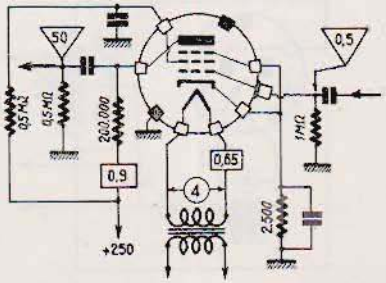
AF3 (T)
HF (V)

S = 1,8
ρ = 1,2MΩ
V = −3 −55



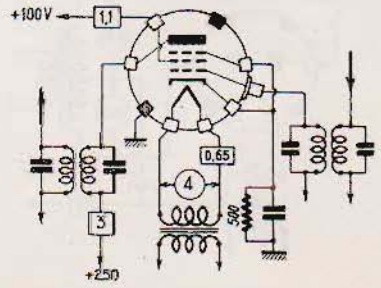
AF7 (T)
BF

S = 2,1
ρ = 2MΩ
V = −2



AF7 (T)
HF

S = 2,1
ρ = 2MΩ
V = −2

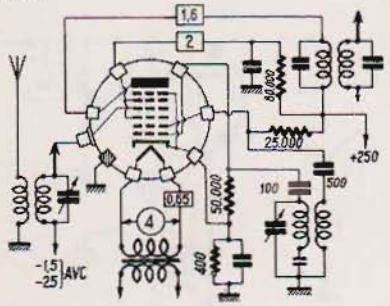


AA61 = ECC40 _ AL2 = 4682

AK2 (T)

C(V)

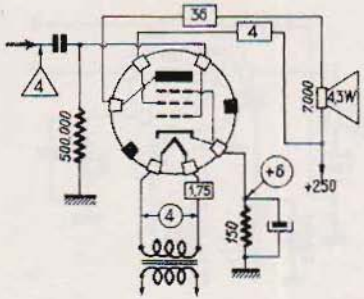
Sc = 0,5
ρ = 1,5 MΩ
V = −1,5−25



AL4 (T)

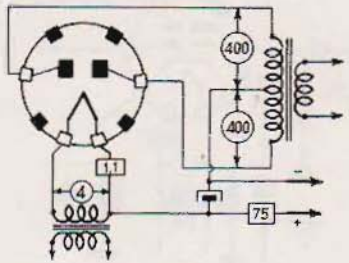
P

S = 9,5
ρ = 50.000
V = −6



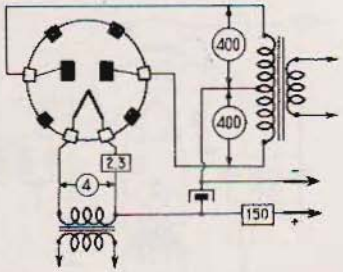
AZ1 (T)

R



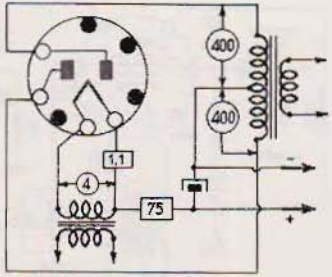
AZ4 (T)

R



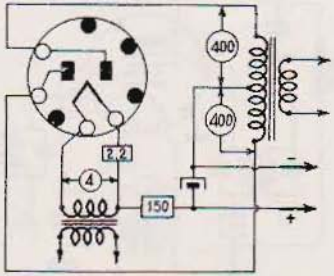
AZ11 (A8)

R



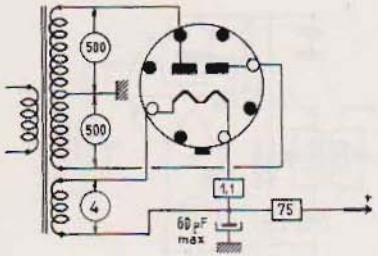
AZ12 (A8)

R



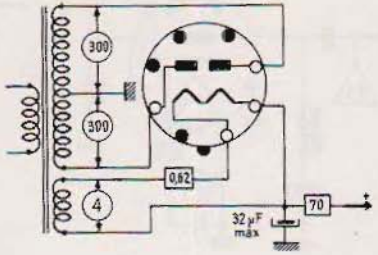
AZ 31 ⓪

R



AZ 41 Ⓡ

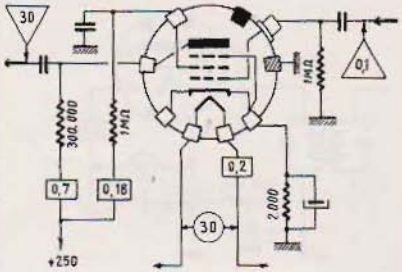
R



CF 50 Ⓣ

BF

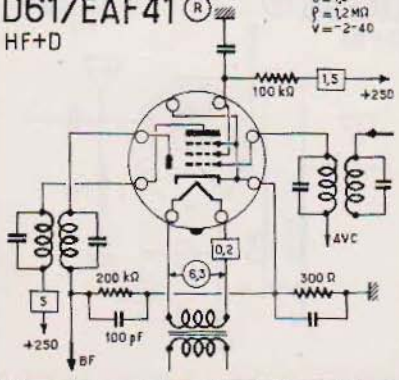
S = 3,3
ρ = 2,5 MΩ
Va = 2



D61/EAF41 Ⓡ

HF+D

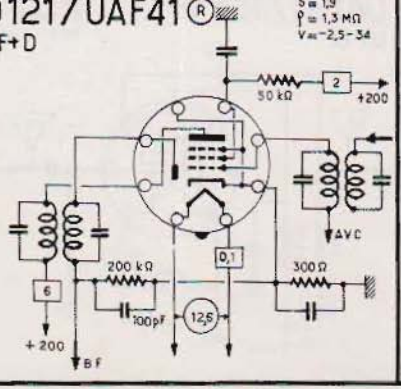
S = 1,8
ρ = 1,2 MΩ
Va = −2-40



D121/UAF41 Ⓡ

HF+D

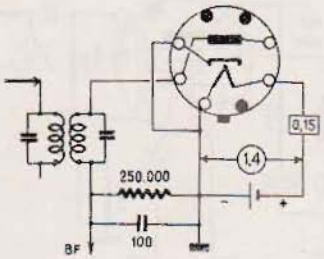
S = 1,9
ρ = 1,3 MΩ
Va = −2,5-34



BF61 = EL41
BF62 = EL42
BF451 = UL41
CF61 = ECH41
CF141 = UCH41

DA90/143 ⓞ

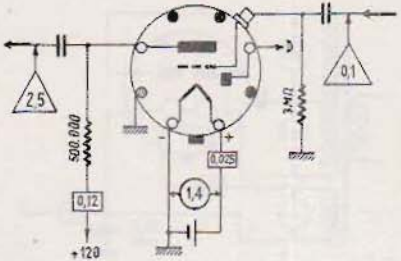
D



DAC21 ⓞ

D+BF

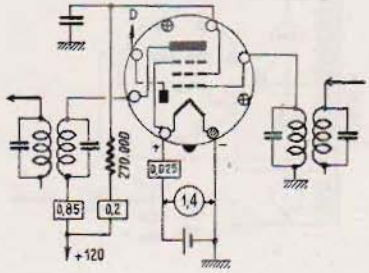
S = 0,4
ρ = 0,1 MΩ
V = 0



DAF40 Ⓡ

HF+D

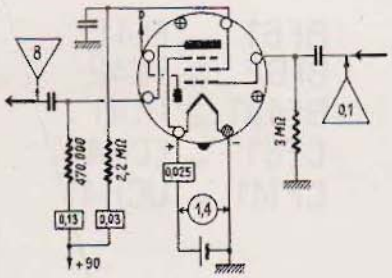
S = 0,7
ρ = 2,5 MΩ
V = 0



DAF41 Ⓡ

D+BF

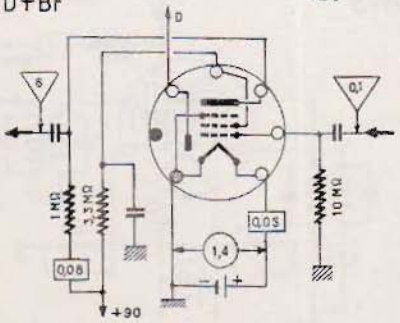
S = 0,8
ρ = 1,5 MΩ
V = 0



DAF91/1S5 Ⓜ

D+BF

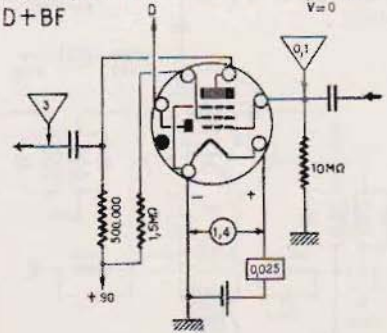
S = 0,62
ρ = 0,8 MΩ
V = 0



DAF96 Ⓜ

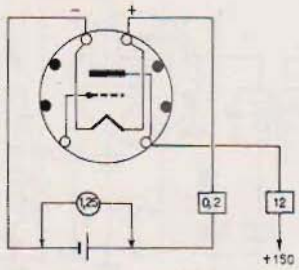
D+BF

S = 0,4
ρ = 1,6 MΩ
V = 0



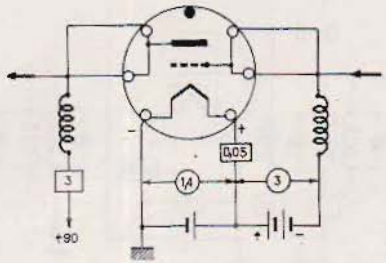
DC70 (SM)
0 (500 MHz)

S = 3,4
ρ = 4000
V = −4,5



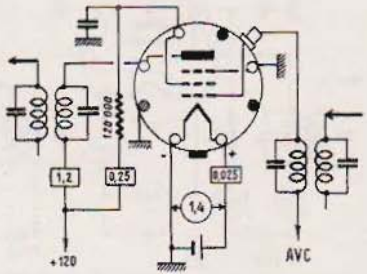
DC90 (M)
HF (VHF)

S = 1,1
V = −3



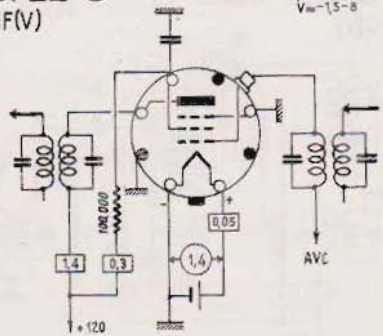
DF21 (O)
HF (V)

S = 0,7
ρ = 2,5 MΩ
V = 0–4,5



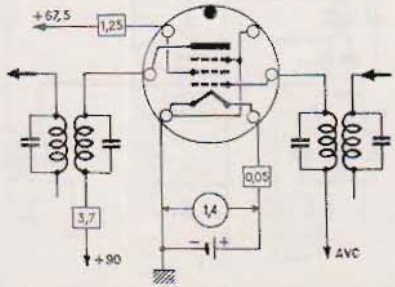
DF22 (O)
HF (V)

S = 1,1
ρ = 2,5 MΩ
V = −1,5–8



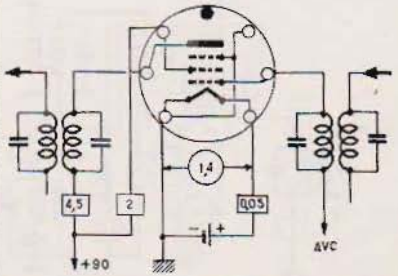
DF91/1T4 (M)
HF (V)

S = 0,9
ρ = 0,5 MΩ
V = 0–18



DF92/1L4 (M)
HF (V)

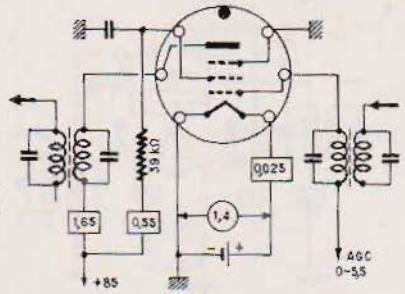
S = 1,02
ρ = 0,35 MΩ
V = 0–8



DF96/1AJ4 (M)

HF(V)

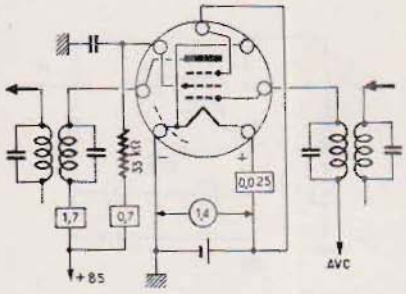
S = 0,8 S
ρ = 1 MΩ
V = 0



DF97/1AN5 (M)

HF(V)

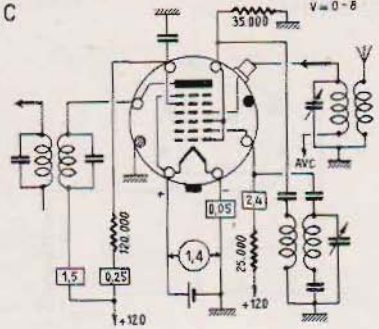
S = 0,94
ρ = 0,45 MΩ
V = 0-7



DK21 (O)

C

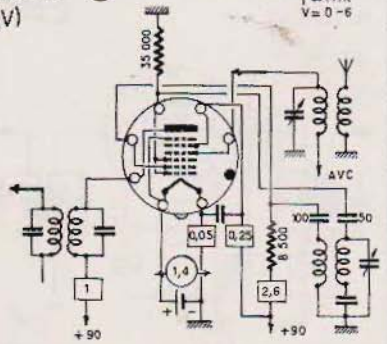
Sc = 0,5
ρ = 1,5 MΩ
V = 0-8



DK40 (R)

C(V)

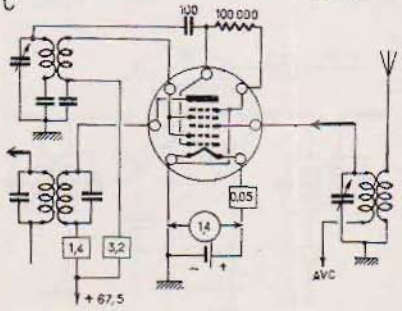
S = 0,42
ρ = 1 MΩ
V = 0-6



DK91/1R5 (M)

C

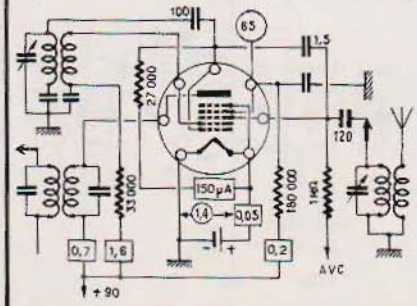
S = 0,3
ρ = 0,5 MΩ
V = 0-14



DK92/1AC6 (M)

C(V)

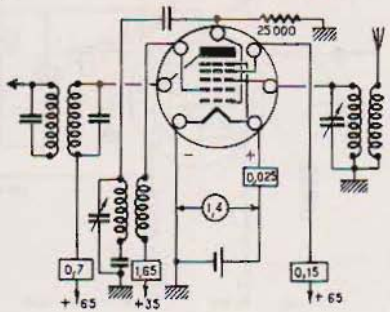
S = 0,32 S
ρ = 0,6 MΩ
V = 0-12



DK96/1AB6 Ⓜ

C

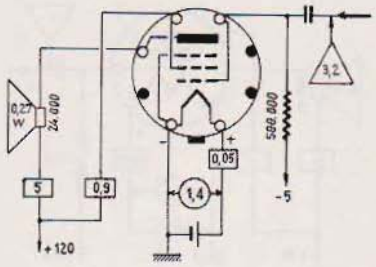
Sc = 0,3
ρ = 1 MΩ
V = 0



DL21 Ⓞ

P

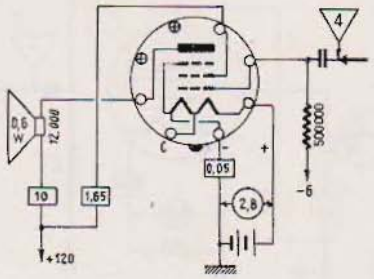
S = 1,4
ρ = 0,35 MΩ
V = −5



DL41 Ⓡ

P

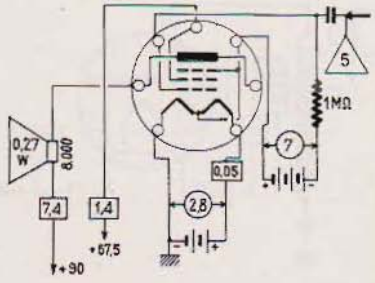
S = 2,55
ρ = 80 000
V = −5,7



DL92/3S4 Ⓜ

P

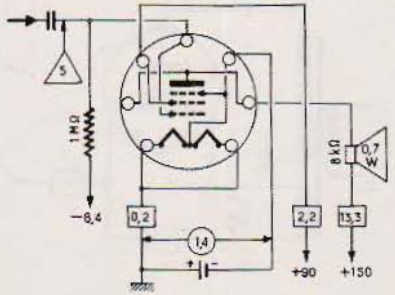
S = 1,6
ρ = 0,1 MΩ
V = −7



DL93/3A4 Ⓜ

P

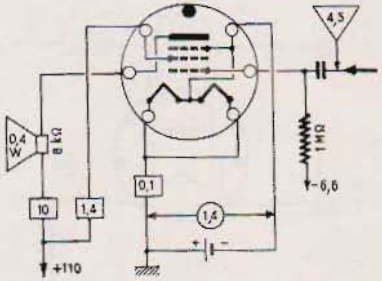
S = 1,9
V = −8,4



DL94/3V4 Ⓜ

P

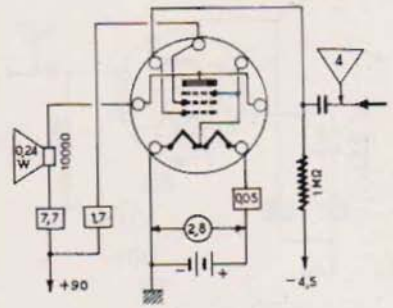
S = 2,2
ρ = 0,1 MΩ
V = −6,6



DL95/3Q4 (M)

P

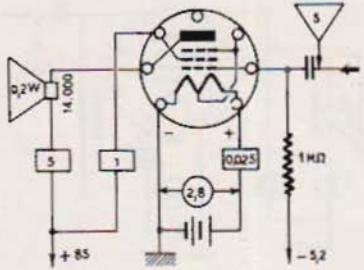
S = 2
$\hat{P}_{aa}$ 0,12 MΩ
V_{aa} = 4,5



DL96/3C4 (M)

P

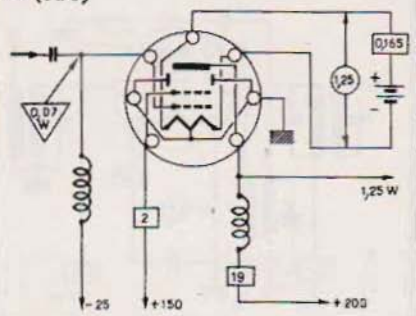
S = 1,4
V_{aa} = 5,2



DL98/3B4 (M)

HF(Cl.C)

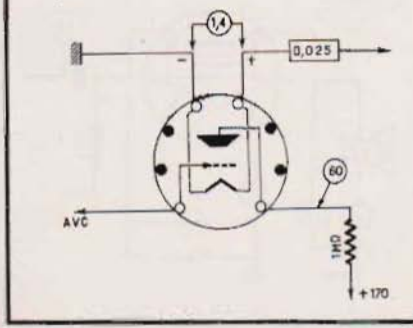
S = 1,7
μ = 4,1



DM70/DM71/1M3

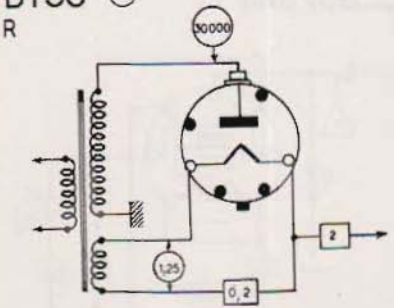
I (3M)

V = 0−10



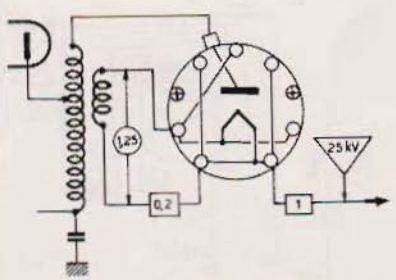
DY30 (O)

R



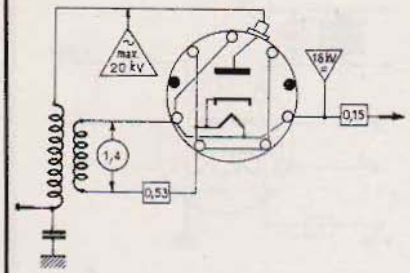
DY80/1X2A (N)

R (T)



DY86/DY87/1S2 (N)

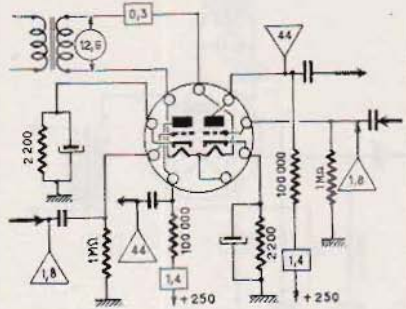
R(T)



E80CC (N)

BF

S = 2,9
ρ = 11000
V = −5,6

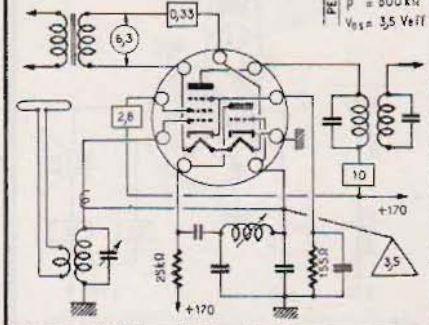


E80CF (N)

C(T)

TRIODE S = 5 μ = 18

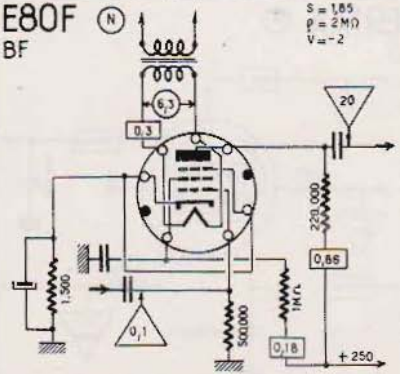
PENTODE S = 6,2 ρ = 0,4 MΩ Sc = 2,2 ρ = 800 kΩ Vgs = 3,5 Veff



E80F (N)

BF

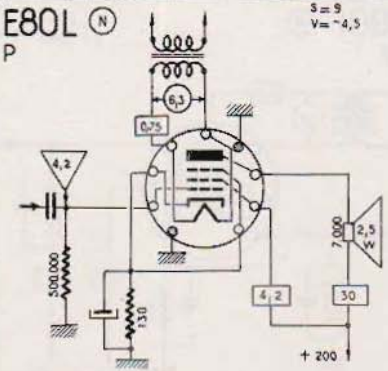
S = 1,85
ρ = 2 MΩ
V = −2



E80L (N)

P

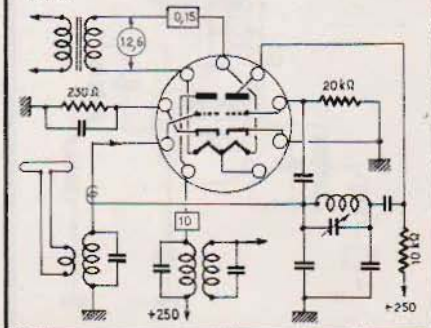
S = 9
V = −4,5



E81CC (N)

C(T)

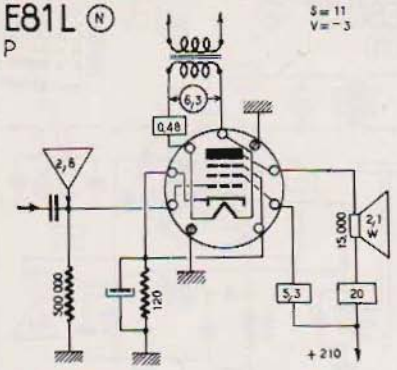
S = 5,5
ρ = 9 400
V = −2



E81L (N)

P

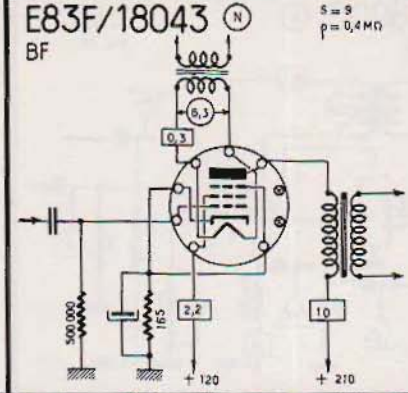
S = 11
V = −3



E83F/18043 (N)

BF

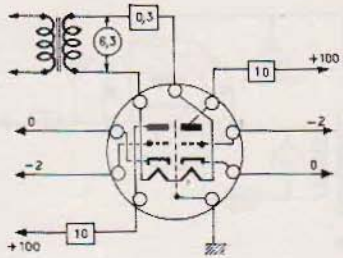
S = 9
ρ = 0,4 MΩ



E88CC (N)

HF T

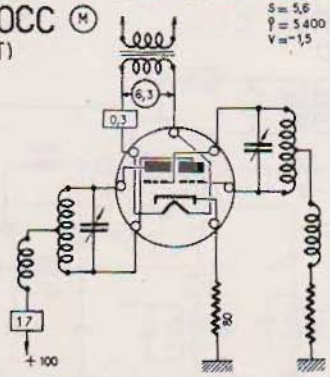
S = 12,5
ρ = 2,6 kΩ
V = −2
Req = 300 Ω



E90CC (M)

HF(T)

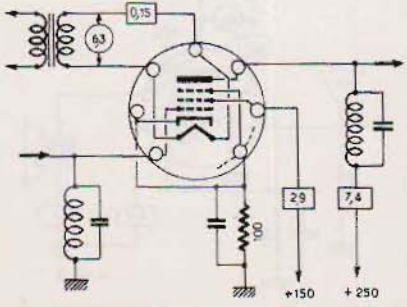
S = 5,6
ρ = 5 400
V = −1,5



E90F (M)

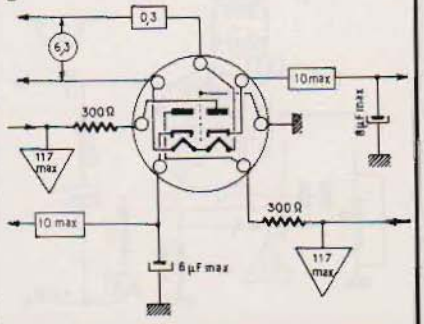
HF

S = 4,5
ρ = 1,3 MΩ



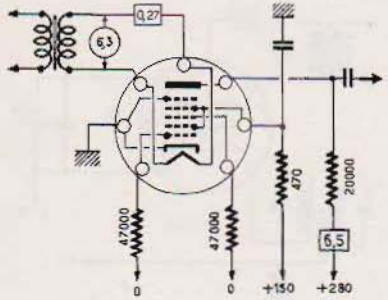
E91AA (M)

D



E91H Ⓜ

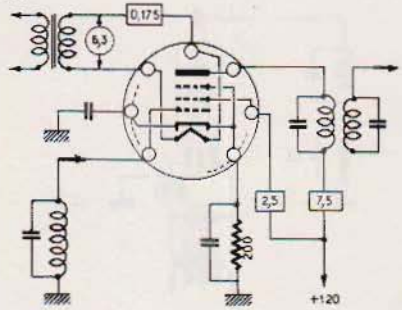
S



E95F Ⓜ

HF

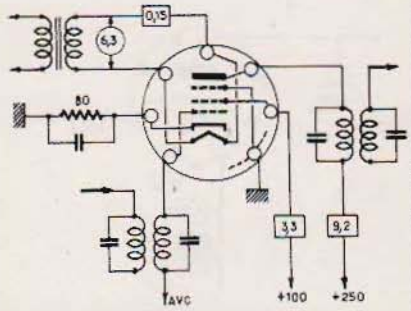
S = 5
ρ = 0,34 MΩ



E99F Ⓜ

HF(V)

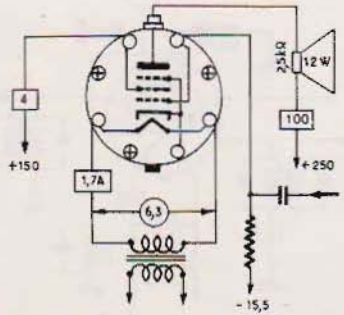
S = 3,6
ρ = 1 MΩ
V = 0-20V



E130L Ⓞ

P

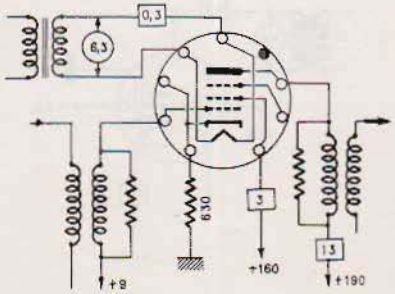
S = 25
ρ = 10 kΩ
V = -15,5



E180F Ⓝ

VF(T)

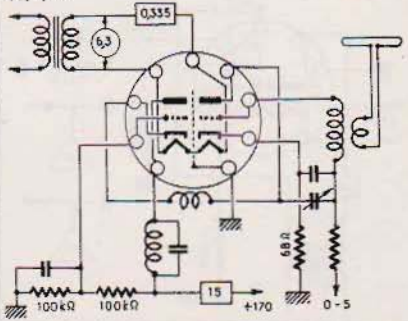
S = 16,5
ρ = 35 kΩ
V = -0,9



E188CC Ⓝ

HF(T)

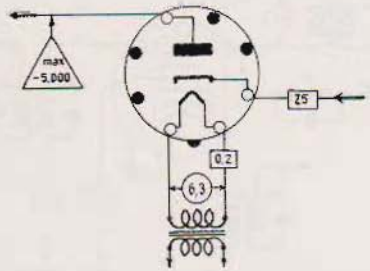
S = 12,5
ρ = 33
V = -1,2



EA40 Ⓡ

D (T)

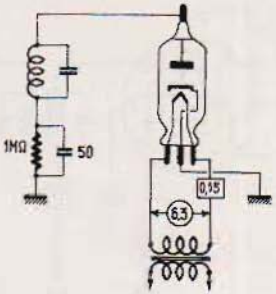
ρ = 300 Ω



EA50/2B35 Ⓢ

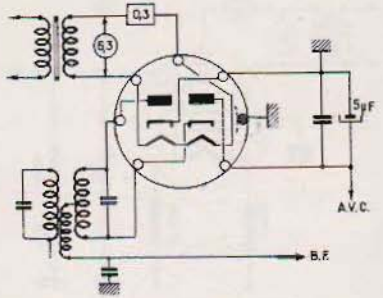
D

Imax = 5mA



EAA91/EB91/6AL5 Ⓜ

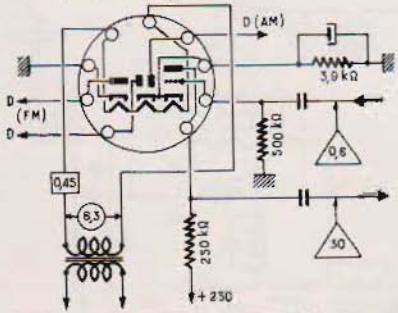
D (FM)



EABC80/6T8/6AK8 Ⓝ

D+BF (FM)

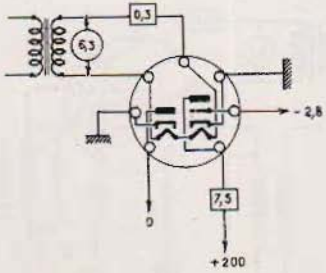
S = 1,2
ρ = 58000
V = -3



EAC91 Ⓜ

0 (UHF)+D

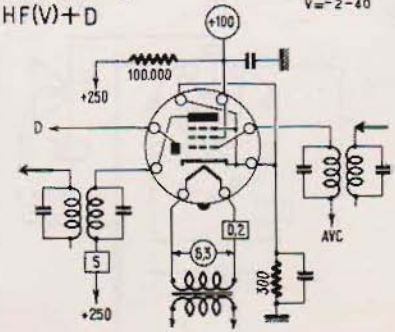
S = 2,8
ρ = 12 800
V = -2,8



EAF41 Ⓡ

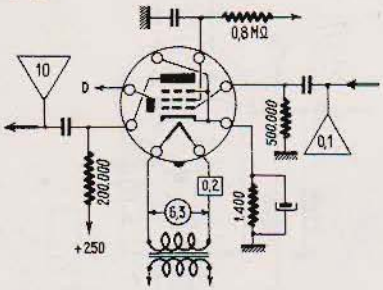
HF(V)+D

S = 1,6
ρ = 1,2 MΩ
V = -2-40



EAF41 Ⓡ

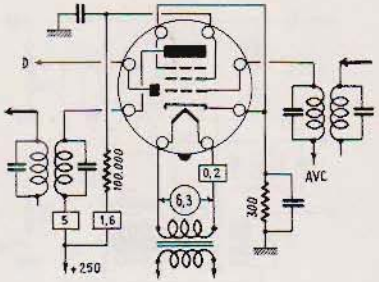
BF+D



EAF42/6CT7 Ⓡ

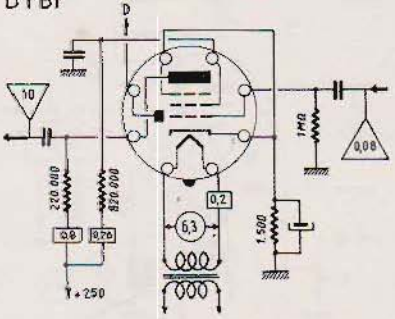
HF+D

S = 2
ρ = 1,4 MΩ
V = −2 −40



EAF42 Ⓡ

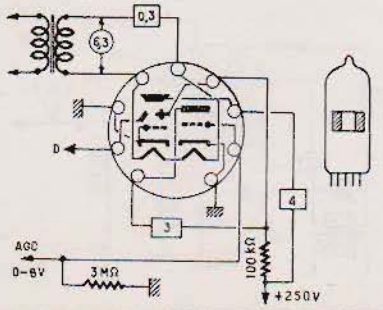
D+BF



EAM86 Ⓝ

I+D

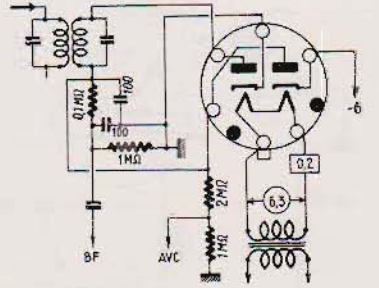
TRIODE
S = 3,8
μ = 58



EB11 Ⓐⓑ

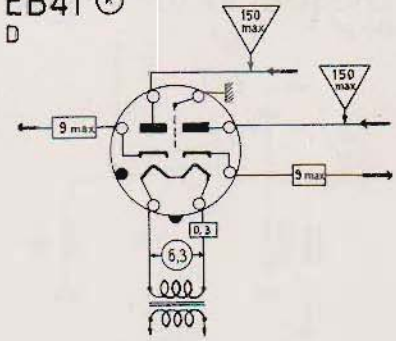
D

Imax = 0,8mA



EB41 Ⓟ

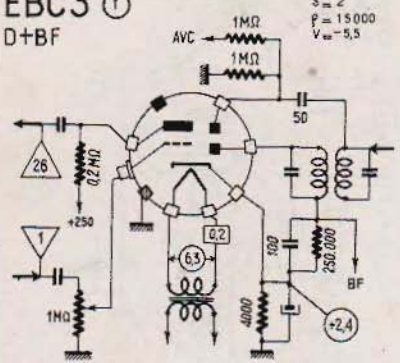
D



EB91 = EAA91

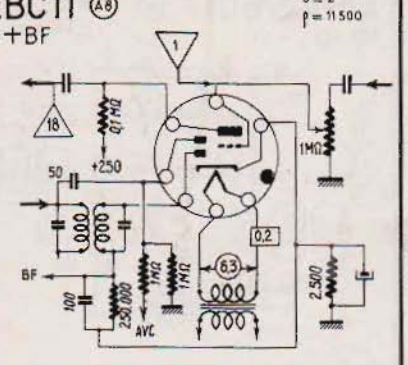
EBC3 (T)
D+BF

S = 2
ρ = 15000
Va = 5,5



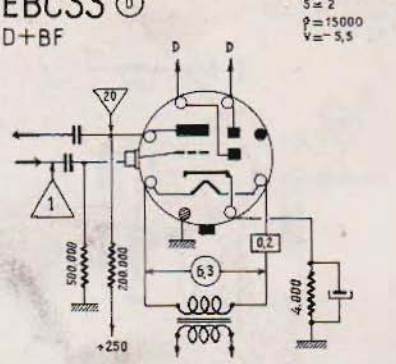
EBC11 (A8)
D+BF

S = 2
ρ = 11500



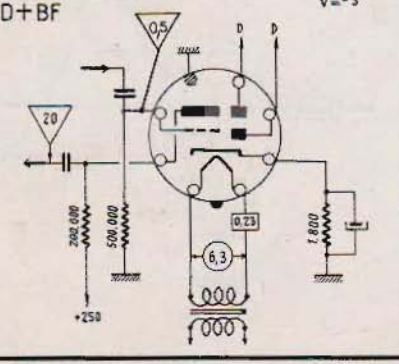
EBC33 (O)
D+BF

S = 2
ρ = 15000
Va = 5,5



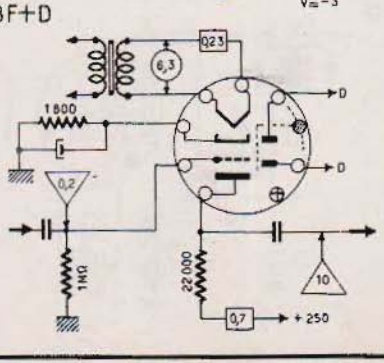
EBC41/6CV7 (R)
D+BF

S = 1,2
ρ = 58000
Va = 3



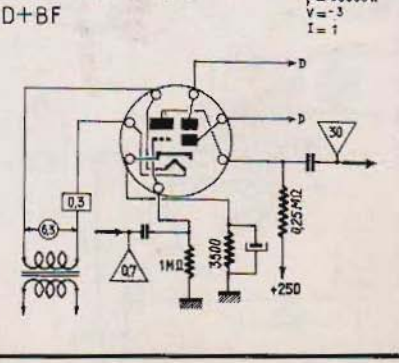
EBC81/6BD7 (N)
BF+D

S = 1,2
ρ = 58000
Va = 3



EBC90/6AT6 (M)
D+BF

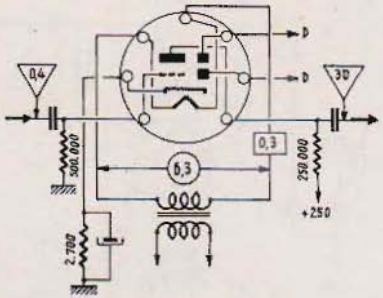
S = 1,2
ρ = 58000 Ω
Va = 3
Ia = 1



EBC91/6AV6 (M)

D+BF

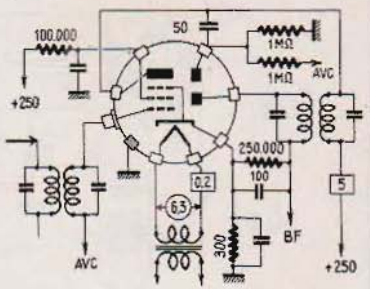
S = 1,6
ρ = 62000
V = -2



EBF 2 (T)

HF(V)+D

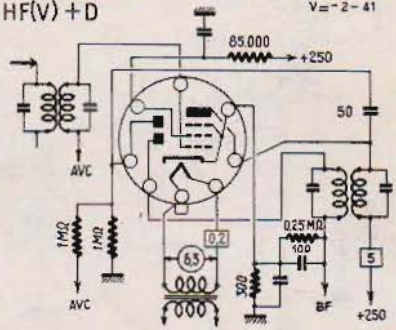
S = 1,8
ρ = 1,5 MΩ
V = -2 -50



EBF11 (A6)

HF(V)+D

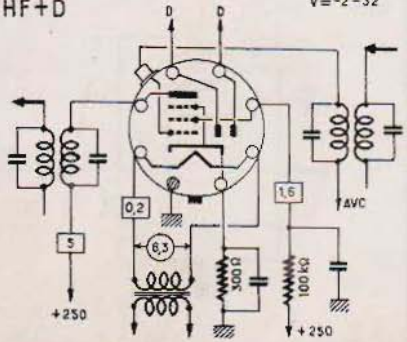
S = 1,8
ρ = 2 MΩ
V = -2 -41



EBF32/6B8 (O)

HF+D

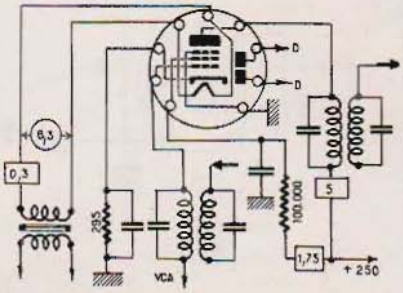
S = 1,8
ρ = 1,3 MΩ
V = -2 -32



EBF80/6N8 (N)

HF(V)+D

S = 2,2
ρ = 1,5 MΩ
V = -2 -35

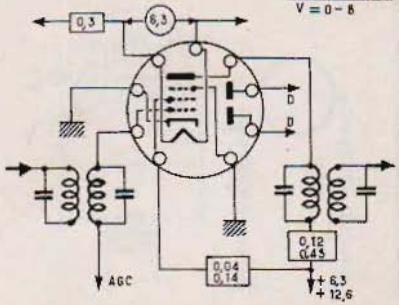


EBF83 (N)

HF(V)+D

	Va 6,3	12,6
S	=0,45	1
S	=0,85	1MΩ

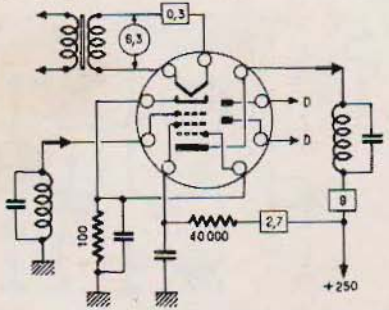
V = 0 - 8



EBF89/6DC8 (N)

HF + D(T)

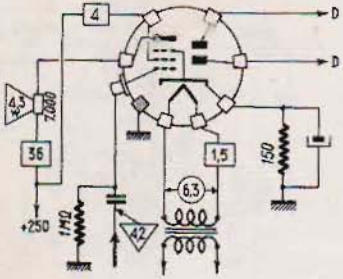
S = 3,8
ρ = 1 MΩ
V = -2



EBL1 (T)

D+P

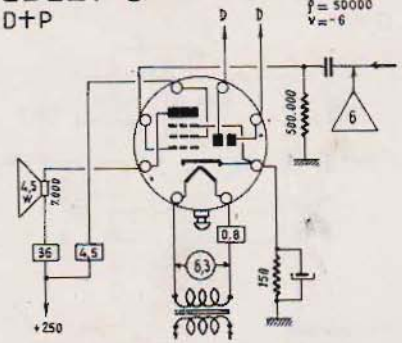
S = 9,5
ρ = 50000
V = -6



EBL21 (L)

D+P

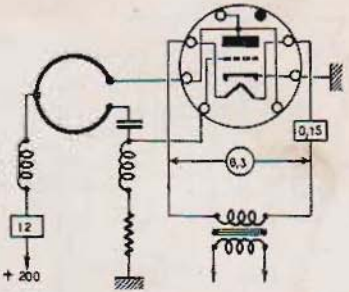
S = 9
ρ = 50000
V = -6



EC70 (SM)

O(UHF)

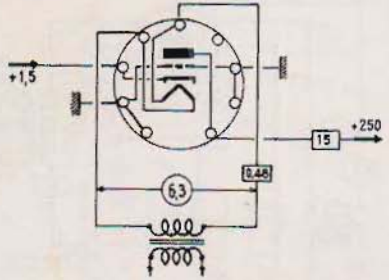
S = 3,5
ρ = 4000
V = -8



EC80/6Q4 (N)

UHF

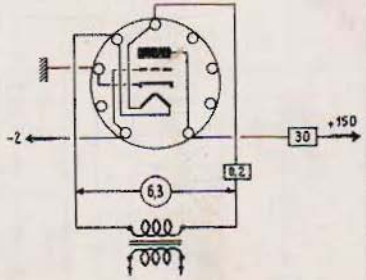
S = 12



EC81/6R4 (N)

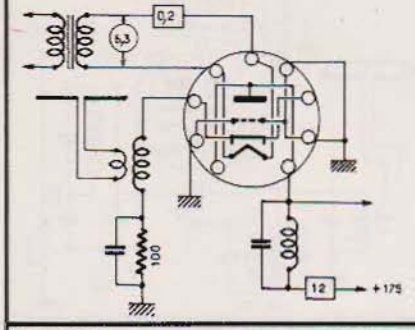
UHF

S = 5,5



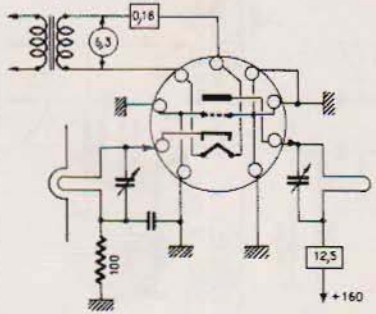
EC86 (N)
VHF

S = 14
μ = 68
V = -1,5



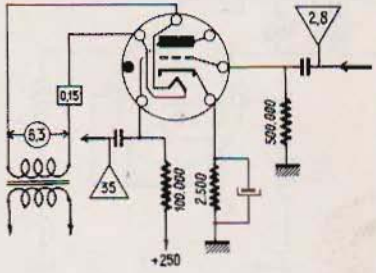
EC88 (N)
VHF (400MHz)

S = 13,5
μ = 65



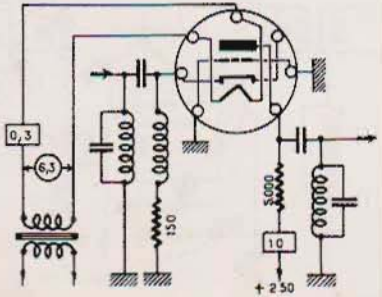
EC90/6C4 (M)
BF

S = 2,2
P = 7720
V = -8,5



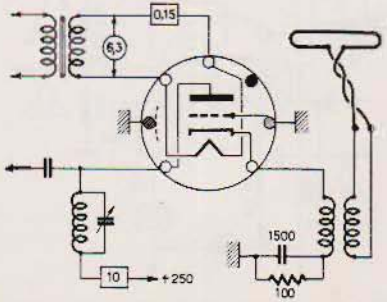
EC91 (M)
VHF (250MHz)

S = 8,5
P = 12000
V = -1,5



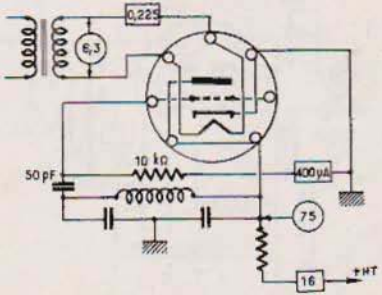
EC92/6AB4 (M)
HF(T)

S = 5
P = 12000
V = -2



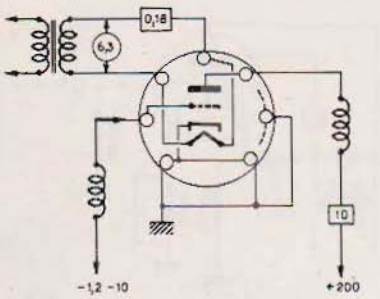
EC93/6BS4 (M)
0(T)470_890MHz

S = 8
V = -4



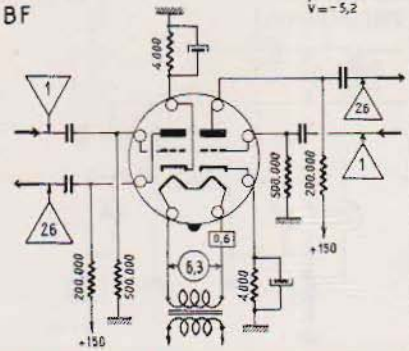
EC95 (M)
VHF(V)

S = 10,5
μ = 80



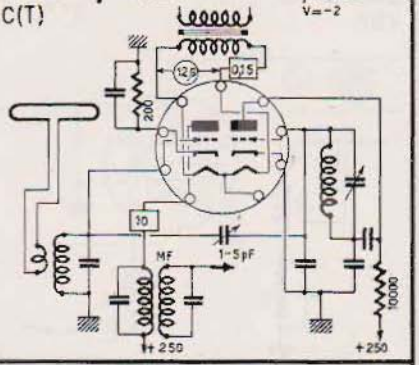
ECC40 (R)
BF

S = 2,7
ρ = 11000
V = -5,2



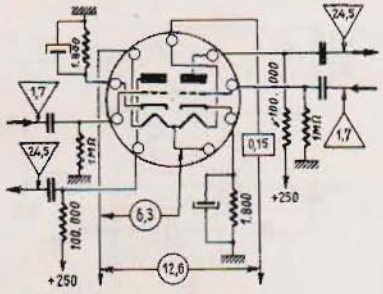
ECC81/12AT7 (N)
C(T)

S = 5,5
ρ = 9400
V = -2



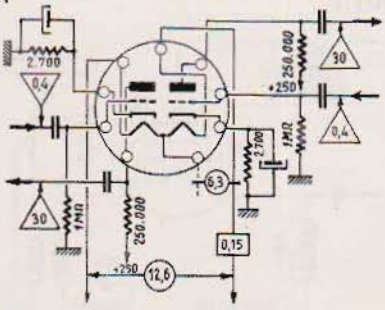
ECC82/12AU7 (N)
BF

S = 2,2
ρ = 7700
V = -8,5



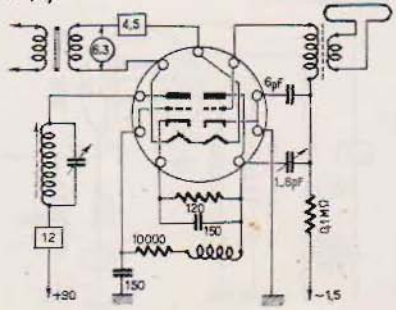
ECC83/12AX17 (N)
BF

S = 1,6
ρ = 62000
V = -2



ECC84/6CW7 (N)
HF(T)

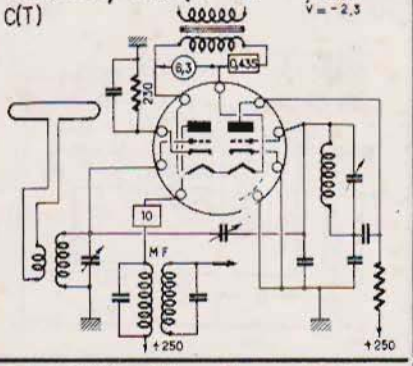
S = 6
ρ = 10000
V = -1,5



ECC85/6AQ8 (N)

C(T)

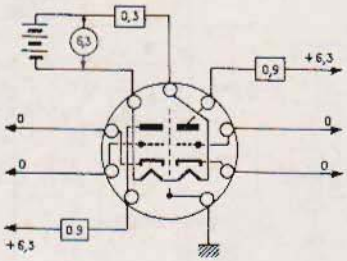
S = 6
P = 9,500
V = −2,3



ECC86 (N)

HF(Auto)

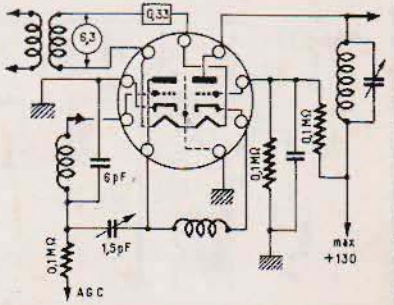
S = 2,6
V = −0,4
μ = 14
Req = 5 kΩ



ECC88 (N)

HF(V)

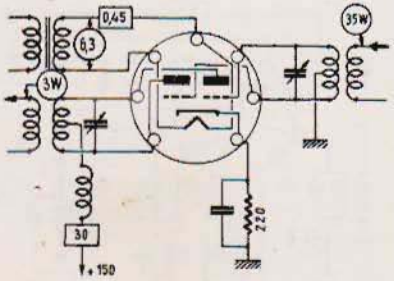
S = 12,5



ECC91/6J6 (M)

HF(Cl.C)

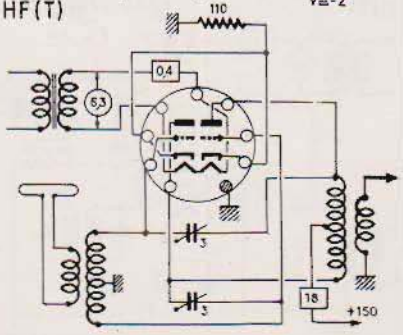
S = 5,3
ρ = 7,100
V = −10



ECC180/6BQ7 (N)

HF(T)

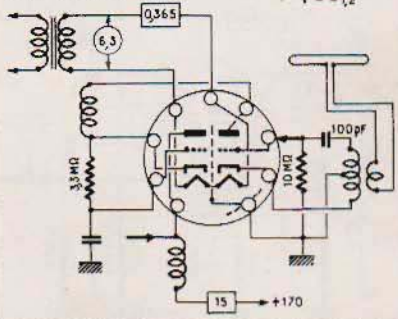
S = 6
ρ = 5,800
V = −2



ECC189 (N)

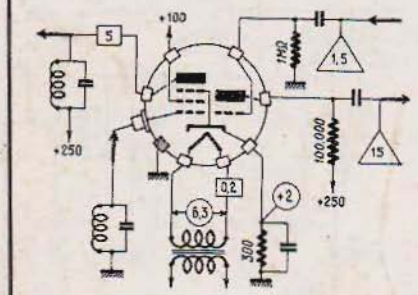
VHF (T_FM)

S = 12,5
μ = 34
ρ = 2,6 kΩ
V = −1,2



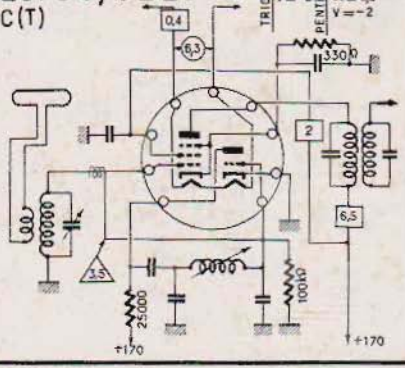
ECF1 (T)
HF + BF

PENTODE: S = 2,5 ρ ≈ 1,2MΩ V = −2
TRIODE: S = 2,55 ρ ≈ 9.000 V = −2



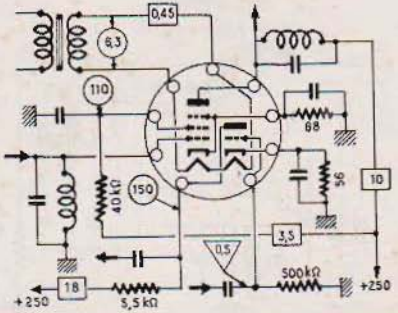
ECF80/6BL8 (N)
C(T)

TRIODE: S = 5 V = −2
PENTODE: S = 6,2 Sc = 2,2 V = −2



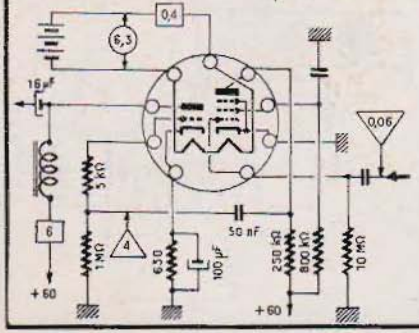
ECF82/6U8 (N)
HF-BF(T)

PENTODE: S = 5,2 ρ = 400kΩ
TRIODE: S = 8,5 ρ = 5kΩ μ = 40



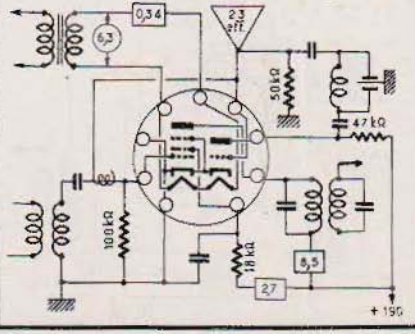
ECF83 (N)
BF(Auto)

TRIODE: S = 3,6 ρ = 3 kΩ V = −3,7 μ = 11
PENTODE: S = 1,3 ρ = 0,8MΩ V = −2,3



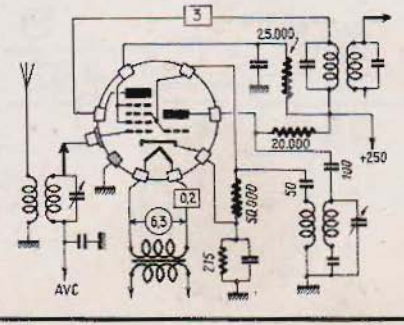
ECF86 (N)
C(T)

TRIODE: S = 6 μ = 17 V = −3
PENTODE: S = 12 ρ = 0,35MΩ Sc = 4,5



ECH3 (T)
C(V)

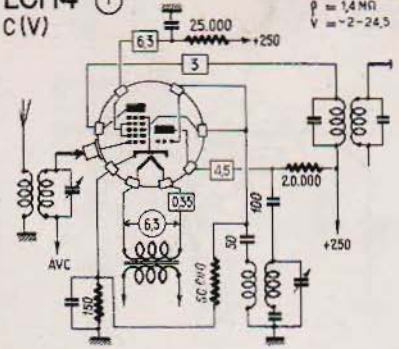
Sc = 0,65 ρ = 1,3 MΩ V = −2-31



ECH4 (T)

C(V)

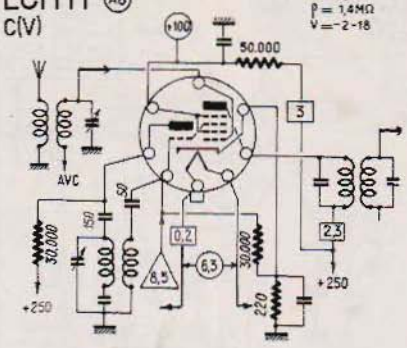
Sc = 0,75
ρ = 1,4 MΩ
V = -2-24,5



ECH11 (A8)

C(V)

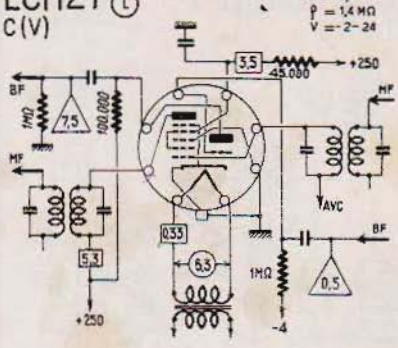
S = 0,65
ρ = 1,4 MΩ
V = -2-18



ECH21 (L)

C(V)

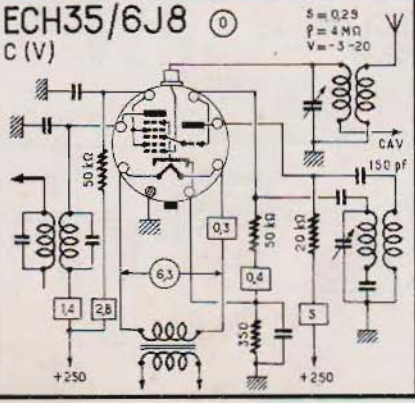
Sc = 0,75
ρ = 1,4 MΩ
V = -2-24



ECH35/6J8 (O)

C(V)

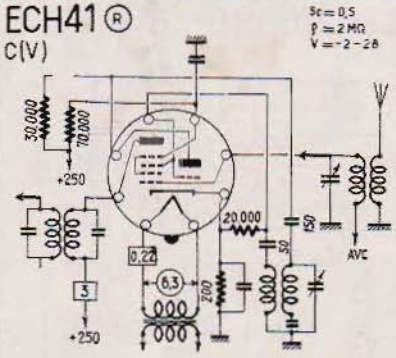
S = 0,29
ρ = 4 MΩ
V = -3-20



ECH41 (R)

C(V)

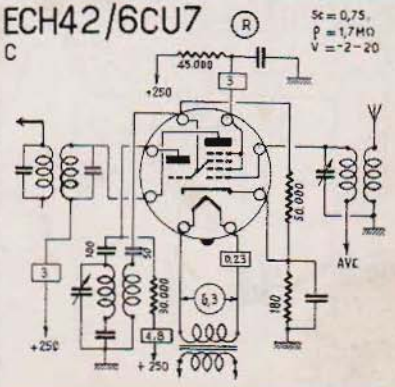
Sc = 0,5
ρ = 2 MΩ
V = -2-28



ECH42/6CU7 (R)

C

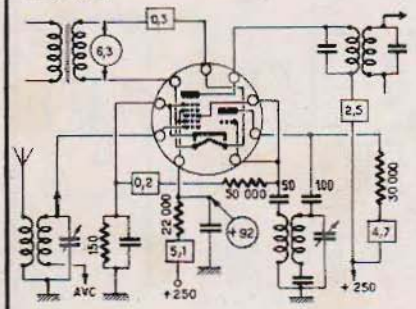
Sc = 0,75
ρ = 1,7 MΩ
V = -2-20



ECH81/6AJ8 (N)

C(V) (FM)

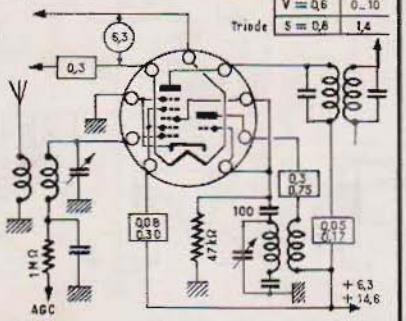
Sc = 0,7
ρ = 1 MΩ
V = −2 − 28,5



ECH83 (N)

C(V)

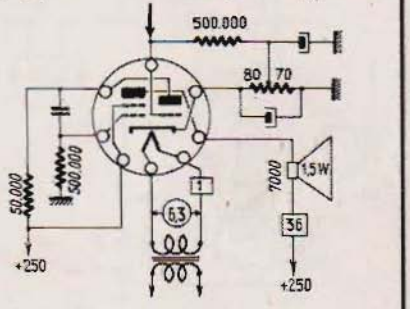
	Va 6,3	12,6
Heptode	S = 0,09	0,22
	S = 1,3 MΩ	1,5 MΩ
	V = 0,6	0...10
Triode	S = 0,8	1,4



ECL11 (AB)

BF+P

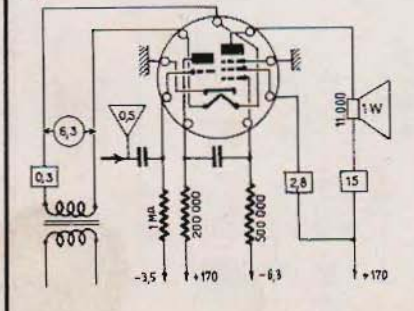
TRIODE	PENTHODE
S = 2	S = 9
V = −2	ρ = 35 000
	V = −8



ECL80/6AB8 (N)

BF

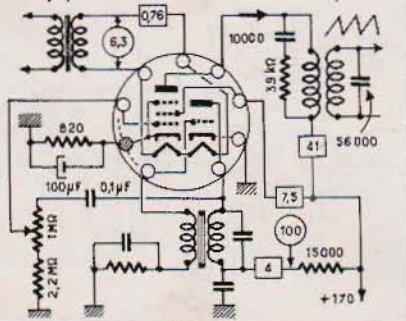
S = 3,3
ρ = 0,15 MΩ
V = −6,3



ECL82/6BM8 (N)

0+P (T)

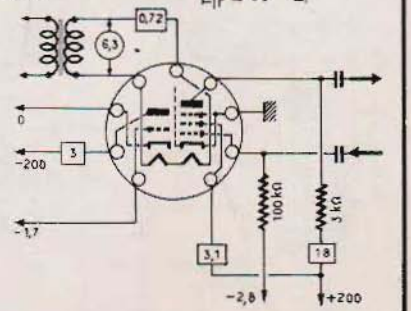
TRIODE	PENTHODE
S = 3	S = 7,5
V = −8	ρ = 25 000
	V = −11



ECL84 (N)

S+VF

TRIODE	PENTHODE
S = 4	S = 10,4
ρ = —	ρ = 0,3 MΩ
V = −1,7	V = −2,9
μ = 65	

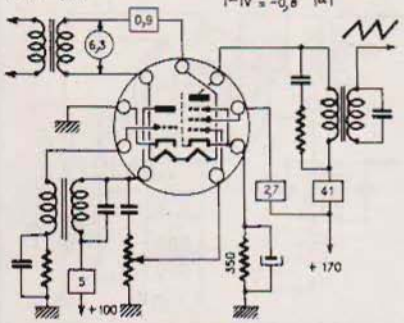


ECL85 (N)

0+P(T)

TRIODE: S = 6,5 / μ = 50 / Ri = 7,6 kΩ / V = −0,8

PENTODE: S = 7,5 / ρ = 25 kΩ / V = −15

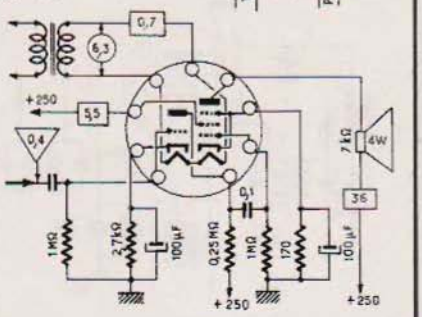


ECL86 (N)

BF +P

TRIODE: S = 1,6 / μ = 100 / V = −1,7

PENTODE: S = 10 / ρ = 45 kΩ / V = −7

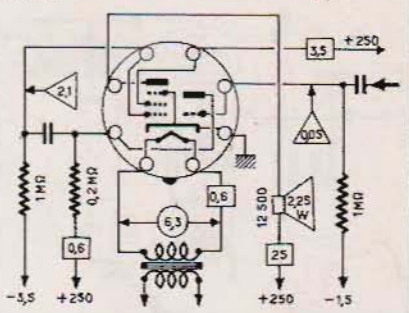


ECL113 (R)

BF+P

TRIODE: V = 1,5

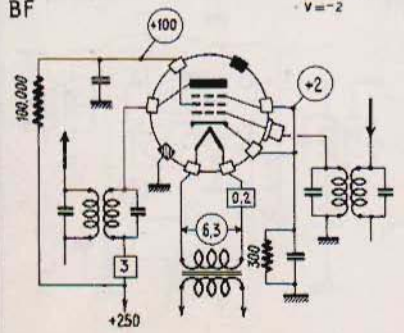
PENTODE: S = 8,5 / ρ = 40 000 / V = 3,5



EF6 (T)

BF

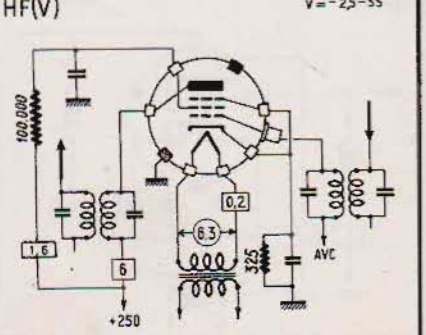
S = 2 / ρ = 2,5 MΩ / V = −2



EF9 (T)

HF(V)

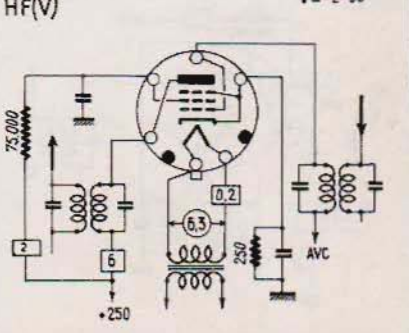
S = 2,2 / ρ = 1,25 MΩ / V = −2,5−55

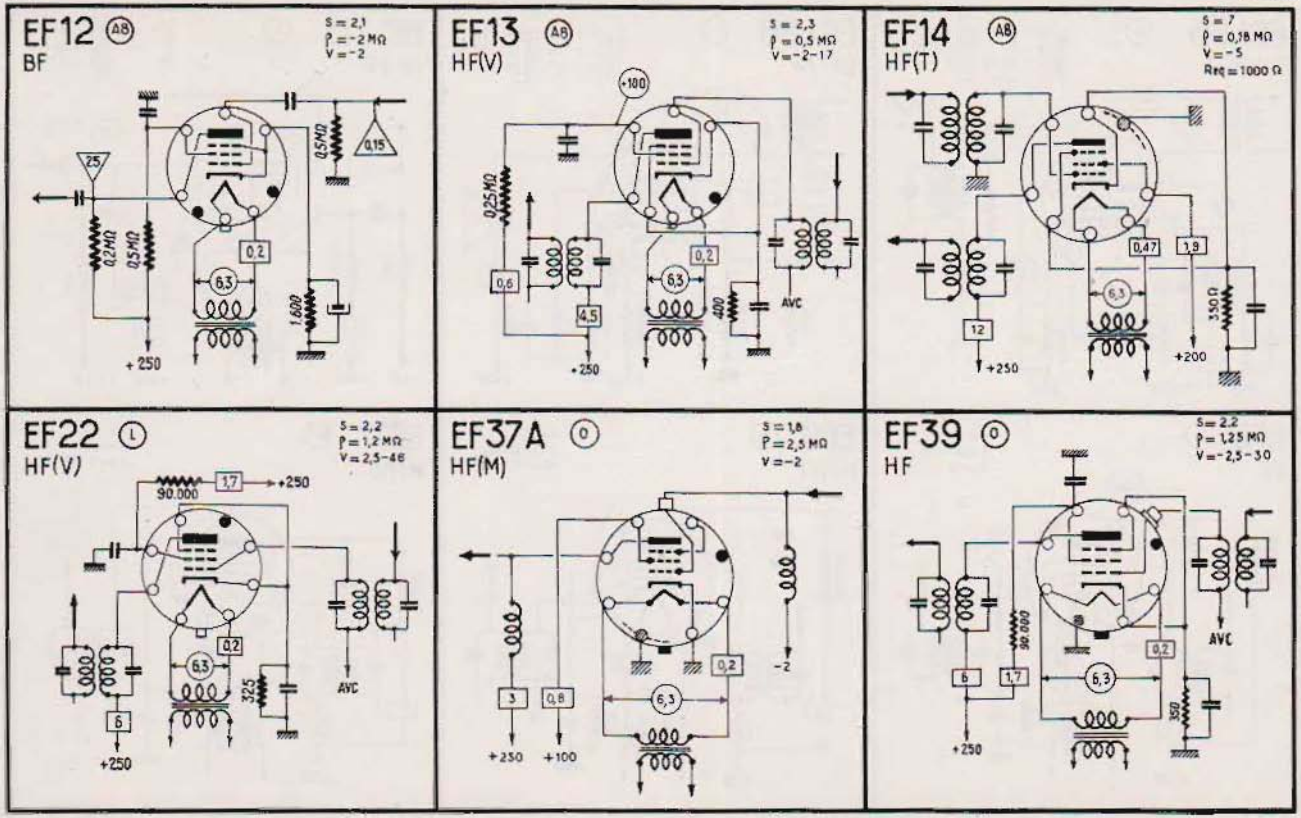


EF11 (A8)

HF(V)

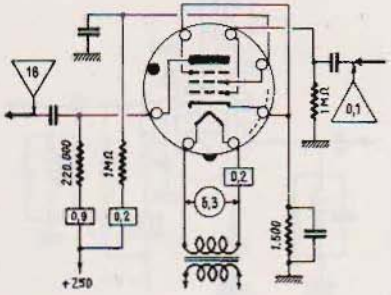
S = 2,2 / ρ = 2 MΩ / V = −2−53




EF12 A8
BF
S = 2,1
P = -2 MΩ
V = -2
25
0,2 MΩ
0,5 MΩ
0,5 MΩ
0,15
0,2
6,3
1.600
+250
EF13 A8
HF(V)
S = 2,3
P = 0,5 MΩ
V = -2-17
+100
0,25 MΩ
0,6
0,2
6,3
4,5
400
AVC
+250
EF14 A8
HF(T)
S = 7
P = 0,18 MΩ
V = -5
Rkq = 1000 Ω
0,47
1,9
6,3
12
+250
350 Ω
+200
EF22 L
HF(V)
S = 2,2
P = 1,2 MΩ
V = 2,5-46
90.000
1,7
+250
0,2
6,3
325
AVC
6
+250
EF37A O
HF(M)
S = 1,8
P = 2,5 MΩ
V = -2
0,2
-2
3
0,8
6,3
+250
+100
EF39 O
HF
S = 2,2
P = 1,25 MΩ
V = -2,5-30
90.000
AVC
0,2
6
1,7
6,3
350
+250

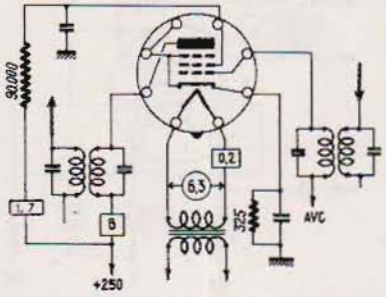
EF40 Ⓡ
BF

S = 1,85
ρ = 2,5 MΩ
V = −2



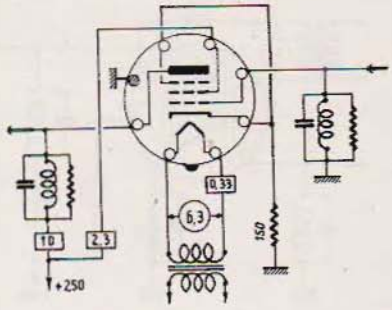
EF41/6CJ5 Ⓡ
HF(V)

S = 2,2
ρ = 1 MΩ
V = −2,5 −39



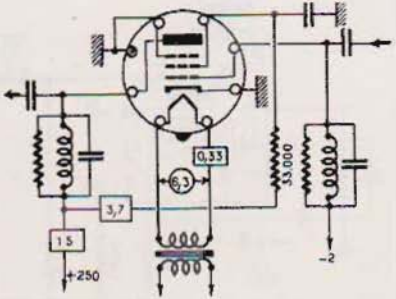
EF42 Ⓡ
HF(T)

S = 3,5
ρ = 0,5 MΩ
V = −2



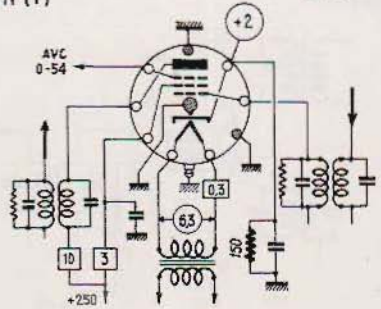
EF43 Ⓡ
HF(T)

S = 6,4
ρ = 0,7 MΩ
V = −2



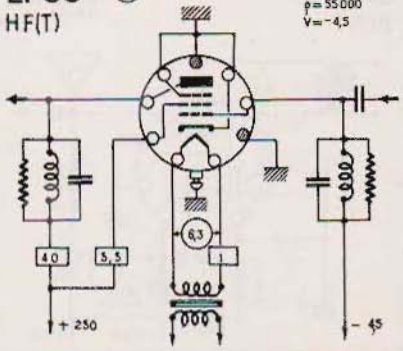
EF50 Ⓢ
HF(T)

S = 6,5
ρ = 1 MΩ
V = −2



EF55 Ⓛ
HF(T)

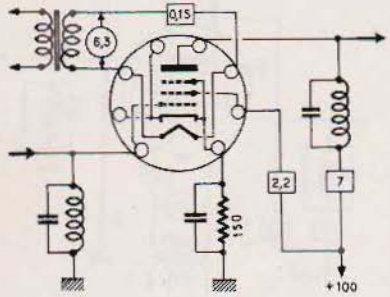
S = 12
ρ = 55 000
V = −4,5



EF72 (SM)

HF

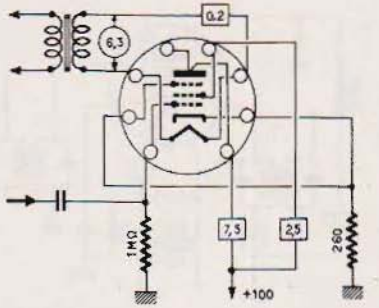
S = 5
ρ = 0,25 MΩ
V = −1,4



EF73 (SM)

BF

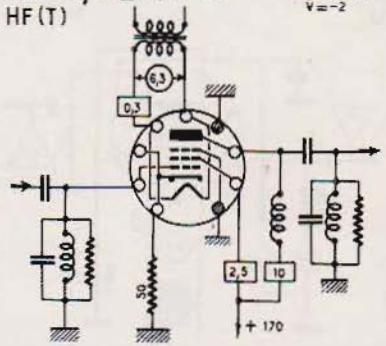
S = 5,25
ρ = 250
V = −2



EF80/6BX6 (N)

HF (T)

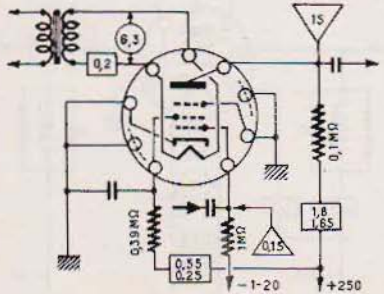
S = 7,4
ρ = 0,4 MΩ
V = −2



EF83 (N)

BF(V)

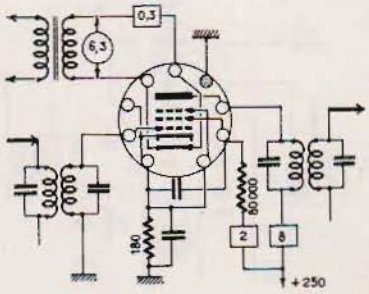
S = 1,6
ρ = 1,6 MΩ
V = −1,6



EF85/6BY7 (N)

H(T)(FM)

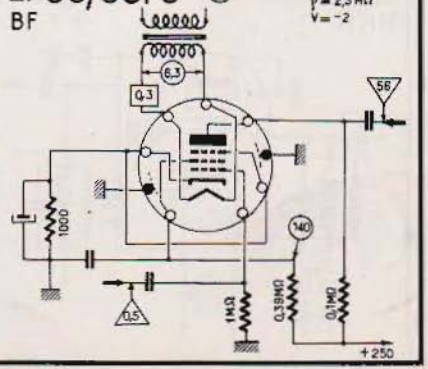
S = 5,7
ρ = 0,5 MΩ
V = −1,8



EF86/6CF8 (N)

BF

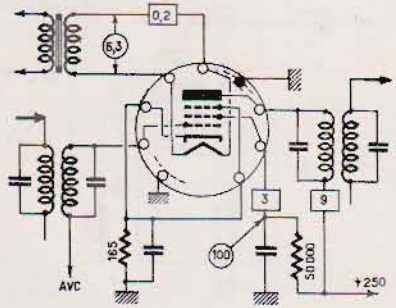
S = 1,85
ρ = 2,5 MΩ
V = −2



EF89/6DA6 (N)

HF(V)

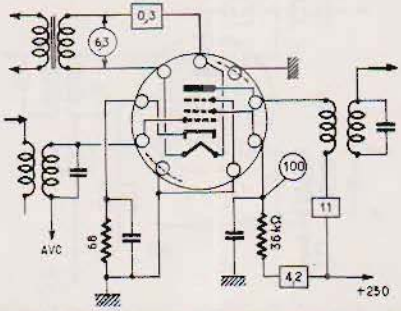
S = 3,6
ρ = 1,5 MΩ
V = −2 − 15



EF89F (N)

HF(V)

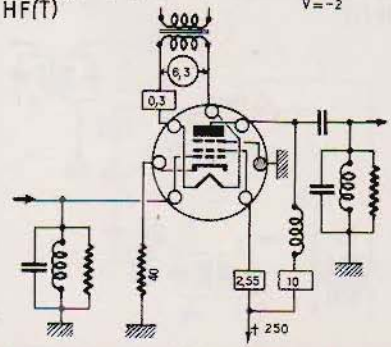
S = 4,4
ρ = 1 MΩ
V = −1 − 15



EF91/6AM6 (M)

HF(T)

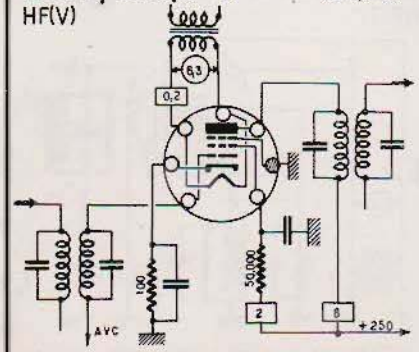
S = 7,6S
ρ = 1 MΩ
V = −2



EF92/6CQ6 (M)

HF(V)

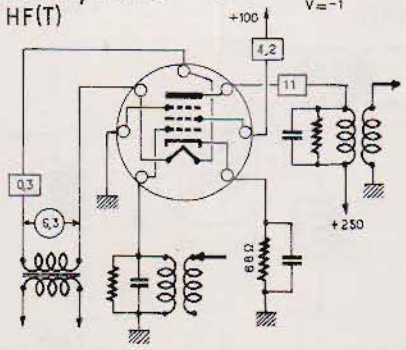
S = 2,5
V = −0,6 −20



EF93/6BA6 (M)

HF(T)

S = 4,4
ρ = 1,5 MΩ
V = −1



EF94/6AU6 (M)

HF(T)

S = 5,2
ρ = 1 MΩ
V = −1