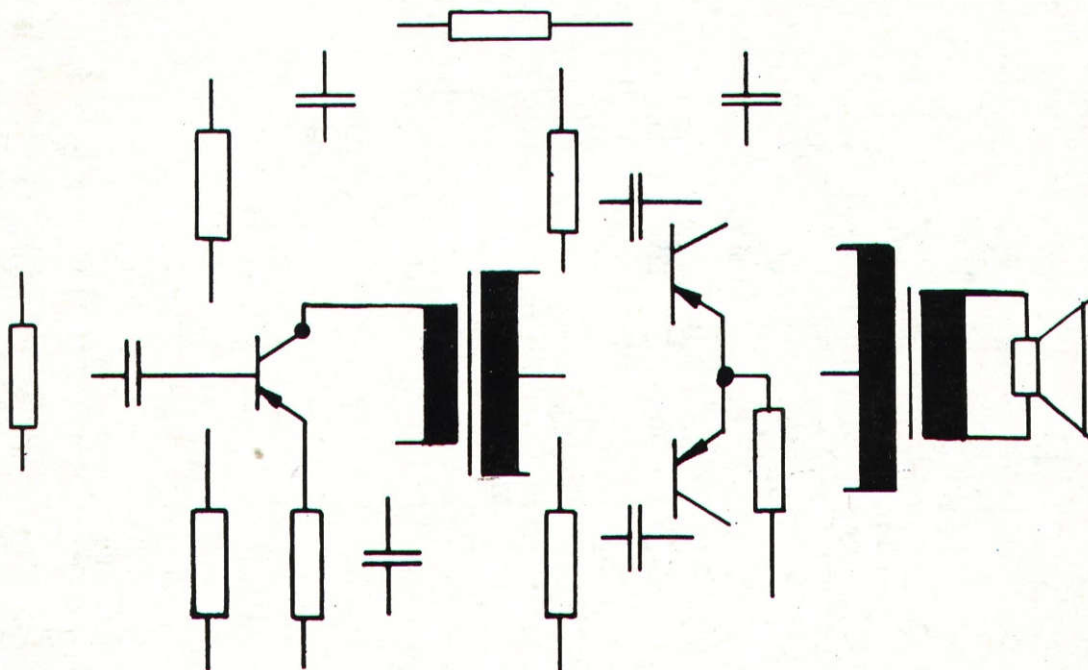
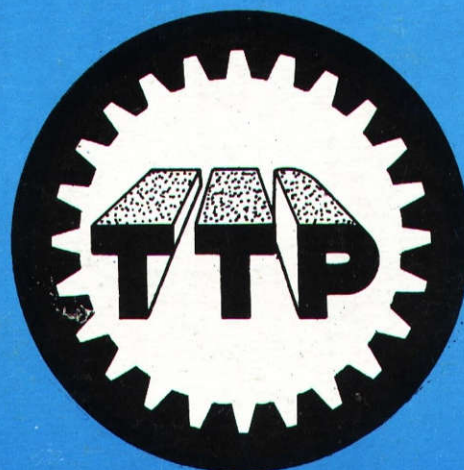


# TECHNICAL DRAWING 3&4

RADIO & TELEVISION



**DEVELOPMENT CELL  
FOR SKILLED LABOUR TRAINING**  
DIRECTORATE OF MANPOWER & TRAINING  
GOVERNMENT OF THE PUNJAB  
LAHORE



T.T.P. Series No. 90

Price Rs : 15 00

## C O N T E N T S

DRAWING NO:

### AMPLIFIER

Tone control	86
Push pull amplifiers	87,88,89,90

### FREQUENCY MODULATION

Modulated signal	91
Block diagram of F.M. receiver	92
I.F. amplifier for F.M. & A.M.	93
Ratio detector	94

### OPERATIONAL AMPLIFIER

Different types of operational amplifiers	95,96,97,98,99, 100,101,102,103
---	------------------------------------

### FIELD EFFECT TRANSISTOR

Common source, gate and drain circuits	104,105,106
--	-------------

### OSCILLATOR AND RECTIFIER

Oscillator with capacitor	107
Pulse generator with UJT	108
Controlable rectifier with thyristor	109
Voltage regulator with thyristor	110

### BLACK AND WHITE T.V. RECEIVER

Block diagram of T.V. receiver	111
I.F amplifier	112
Video detector	113
Video amplifier	114,115,116
Amplitude separator	117,118
Blocking oscillator	119,120
Vertical stage	121,122
Horizontal stage	123,124
Structure of picture tube	125
T.V. power supply	126,127,128

### COLOUR T.V. RECEIVER

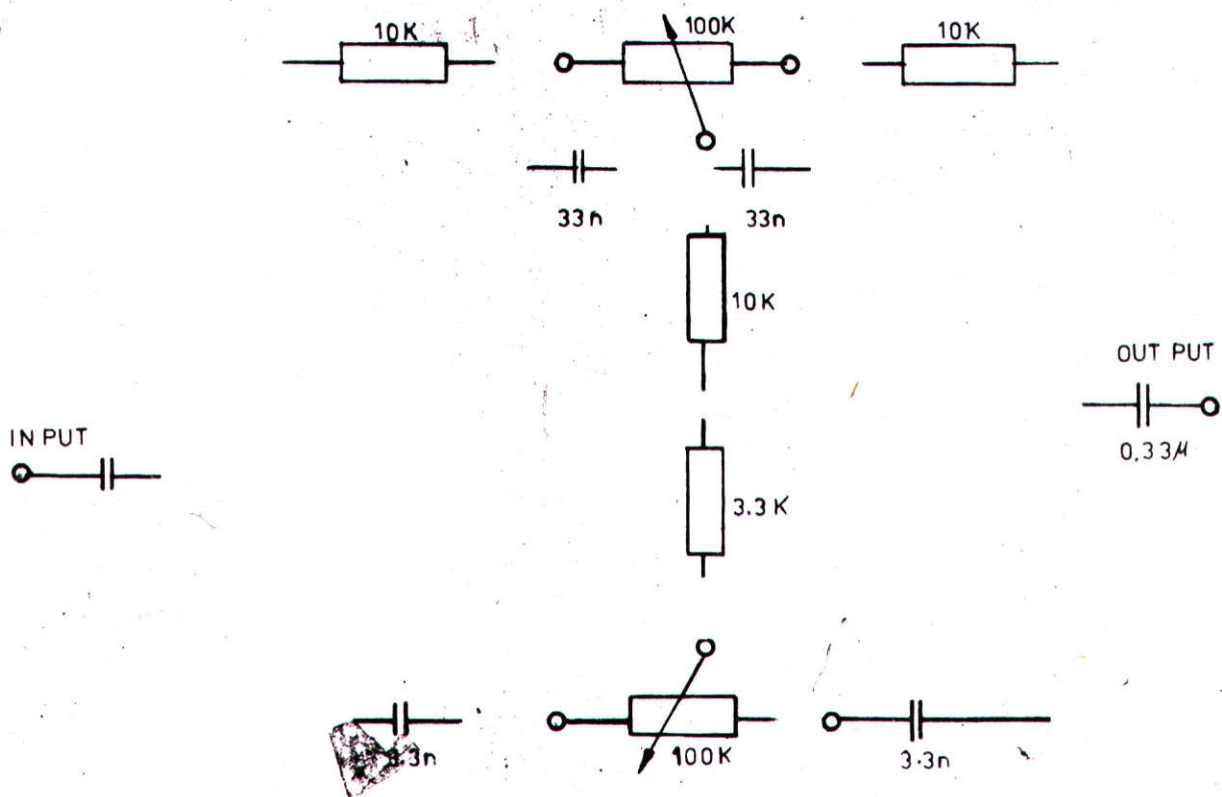
Chrominance signal amplifier	129
Pal-delay time demodulator	130
Pal-switch and sync demodulator	131
Burst gating & colour killer	132
Matrix unit	133
Block diagram of colour T.V. receiver	134
Colour picture tube	135

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Prepared and published by:-

**DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING**  
14A, BABAR BLOCK, NEW GARDEN TOWN, LAHORE.

COMPLETE CIRCUIT DIAGRAM OF TONE CONTROL



TONE CONTROL CIRCUIT

TECHNICAL DRG.  
NO-86



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio  
&  
T.V

C O N T E N T SDRAWING NO:AMPLIFIER

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Amplitude separator	117,118
Blocking oscillator	119,120
Vertical stage	121,122
Horizontal stage	123,124
Structure of picture tube	125
T.V. power supply	126,127,128

COLOUR T.V. RECEIVER

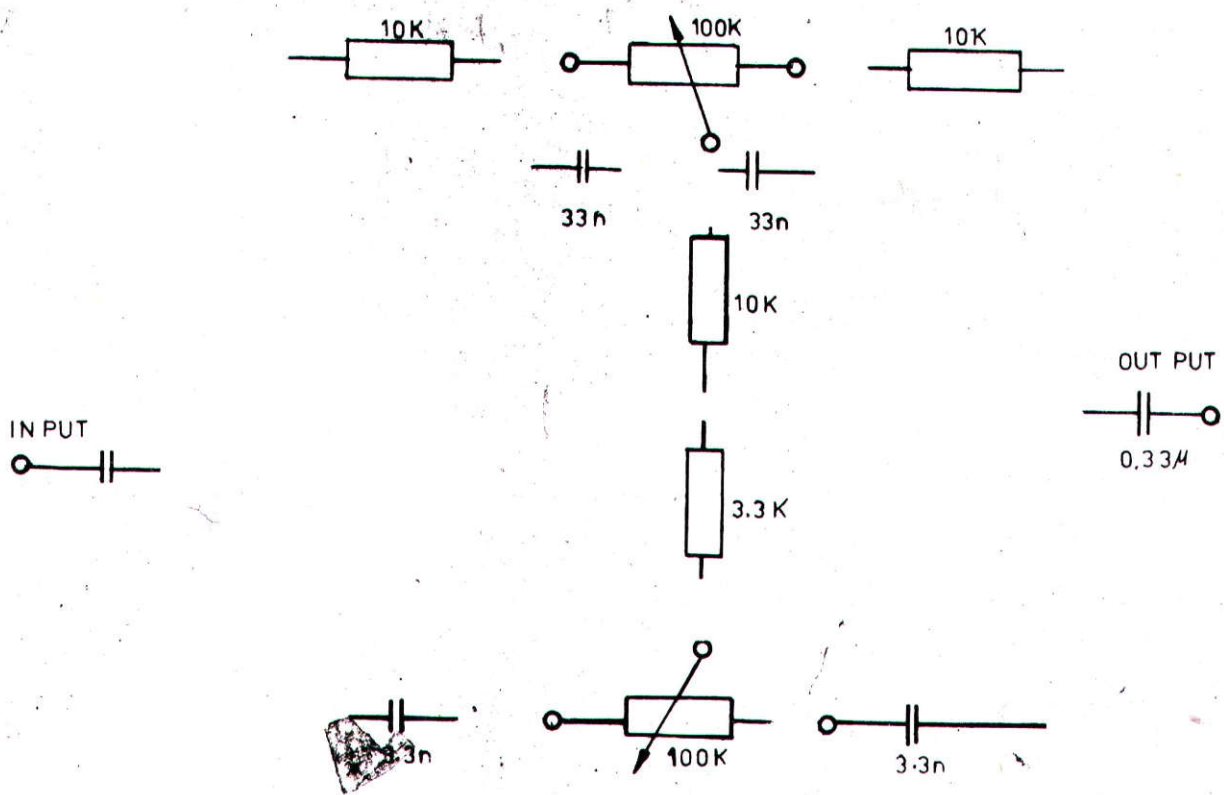
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COMPLETE CIRCUIT DIAGRAM OF TONE CONTROL



TONE CONTROL CIRCUIT

TECHNICAL DRG.  
NO-86

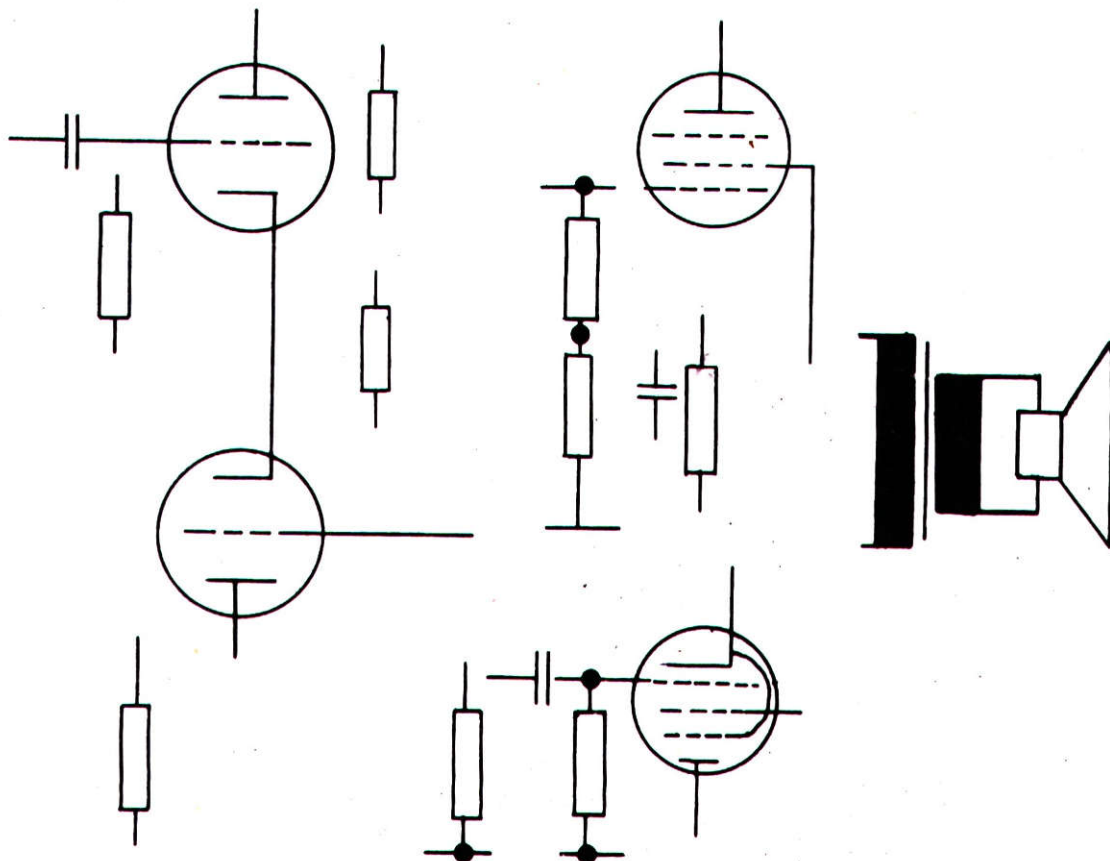


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Radio  
&  
T.V

COMPLETE CIRCUIT DIAGRAM OF PUSH PULL AMPLIFIER (VALVE TYPE)



PUSH PULL AMPLIFIER  
( VALVE TYPE )

TECHNICAL DRG.  
NO. 87

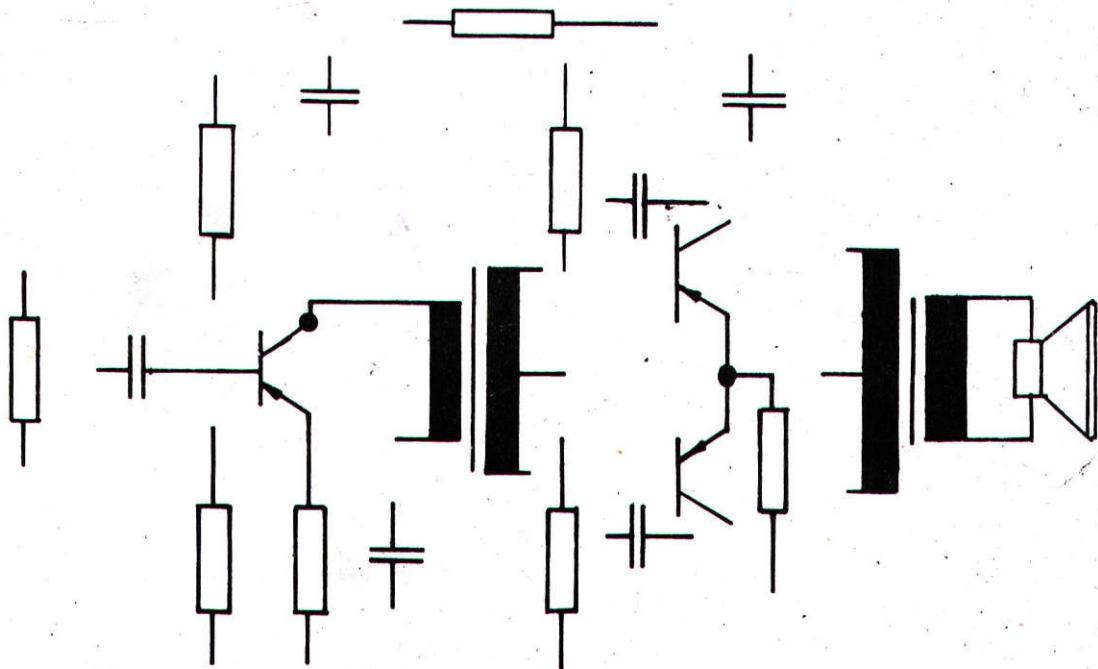


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Radio  
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T.V

COMPLETE CIRCUIT DIAGRAM OF PUSH PULL AMPLIFIER TRANSISTORIZED



PUSH PULL AMPLIFIER  
( TRANSISTORIZED )

TECHNICAL DRG.  
NO. 88

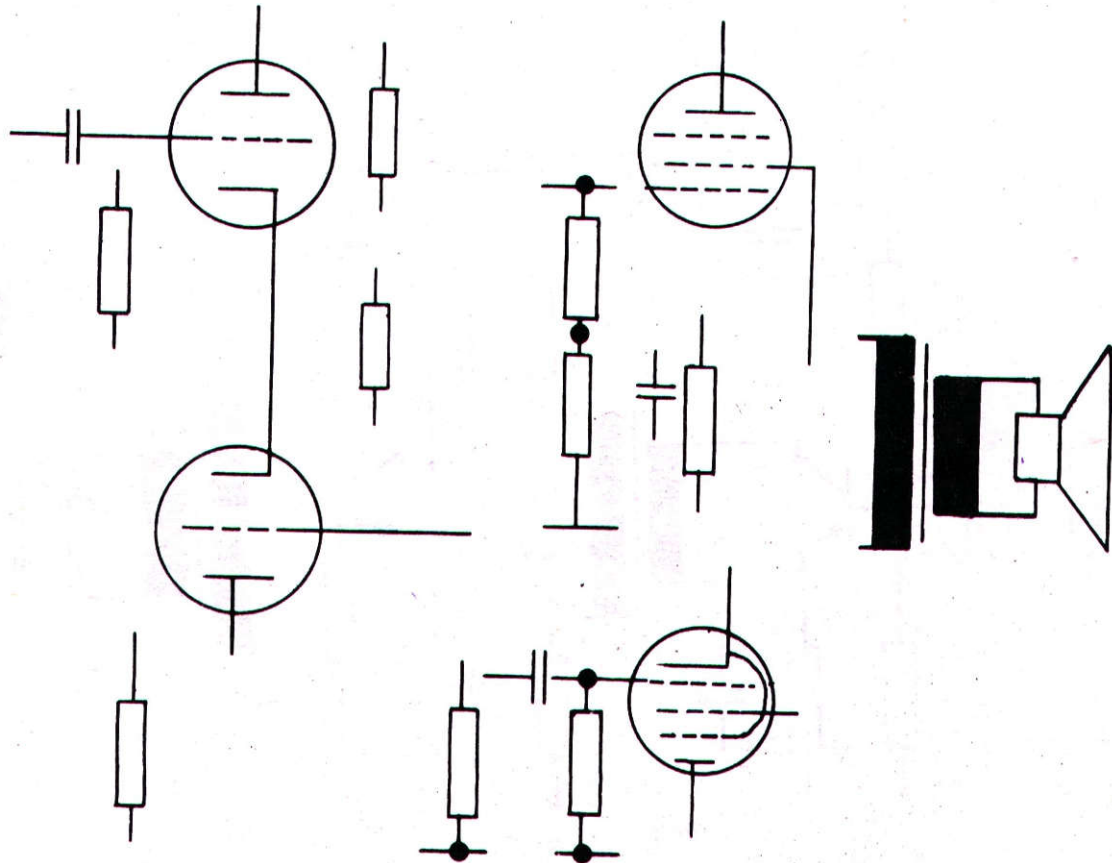


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PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio  
&  
T.V.

COMPLETE CIRCUIT DIAGRAM OF PUSH PULL AMPLIFIER (VALVE TYPE)



PUSH PULL AMPLIFIER  
( VALVE TYPE )

TECHNICAL DRG.  
NO. 87



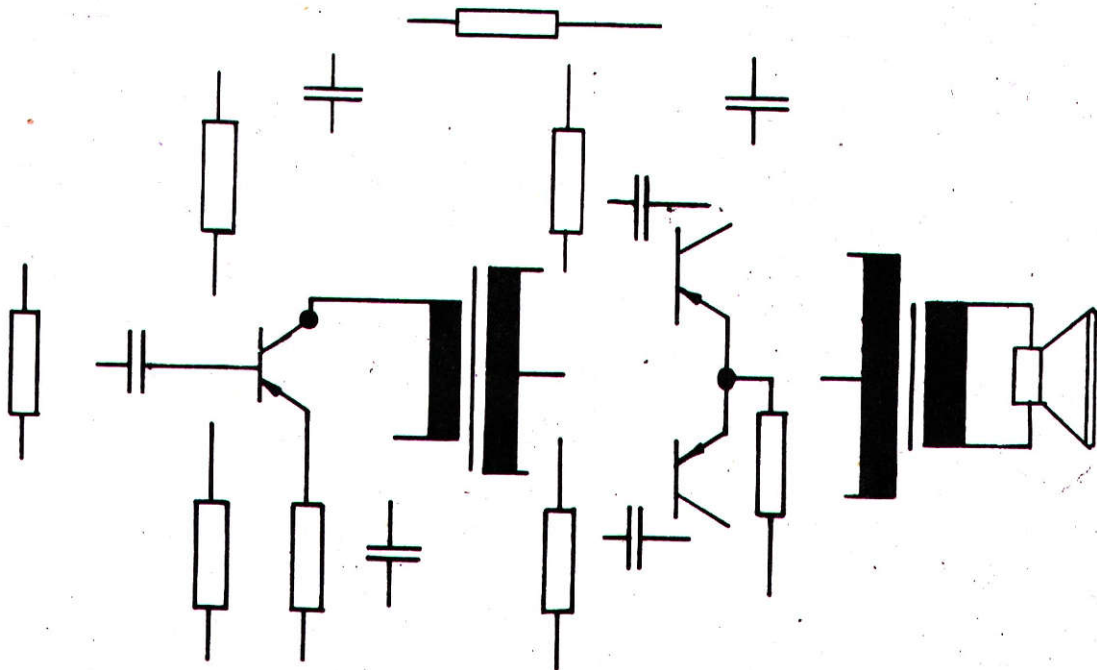
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PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio  
&  
T.V



COMPLETE CIRCUIT DIAGRAM OF PUSH PULL AMPLIFIER TRANSISTORIZED



PUSH PULL AMPLIFIER  
( TRANSISTORIZED )

TECHNICAL DRG.  
NO. 88

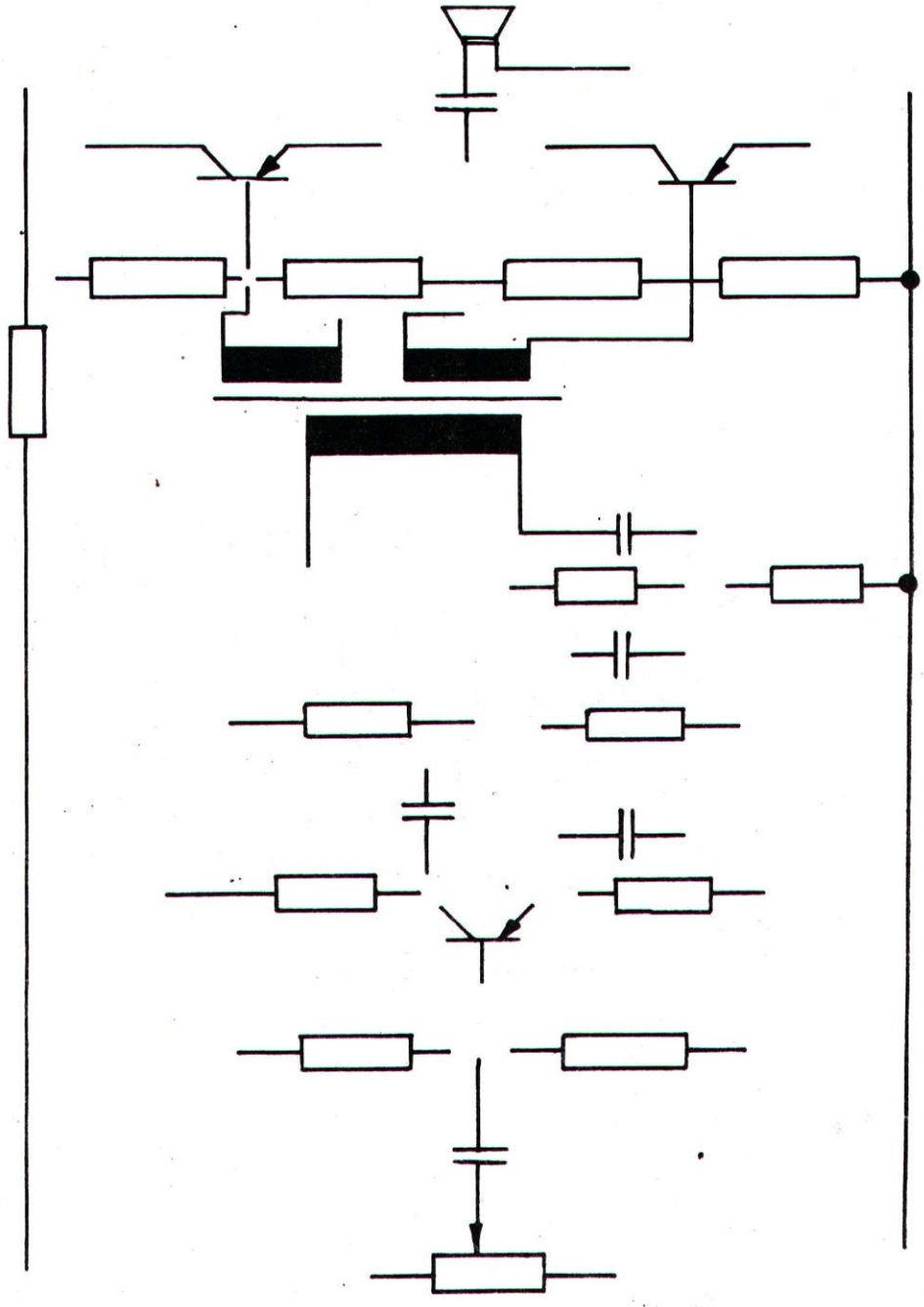


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PAK-GERMAN TECHNICAL TRAINING PROGRAMME

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COMPLETE CIRCUIT DIAGRAM OF PUSH PULL AMPLIFIER WITH ONE TRANSFORMER (TRANSISTORIZED)



PUSH PULL AMPLIFIER  
( TRNSISTORIZED )

TECHNICAL DRG.  
NO. 89

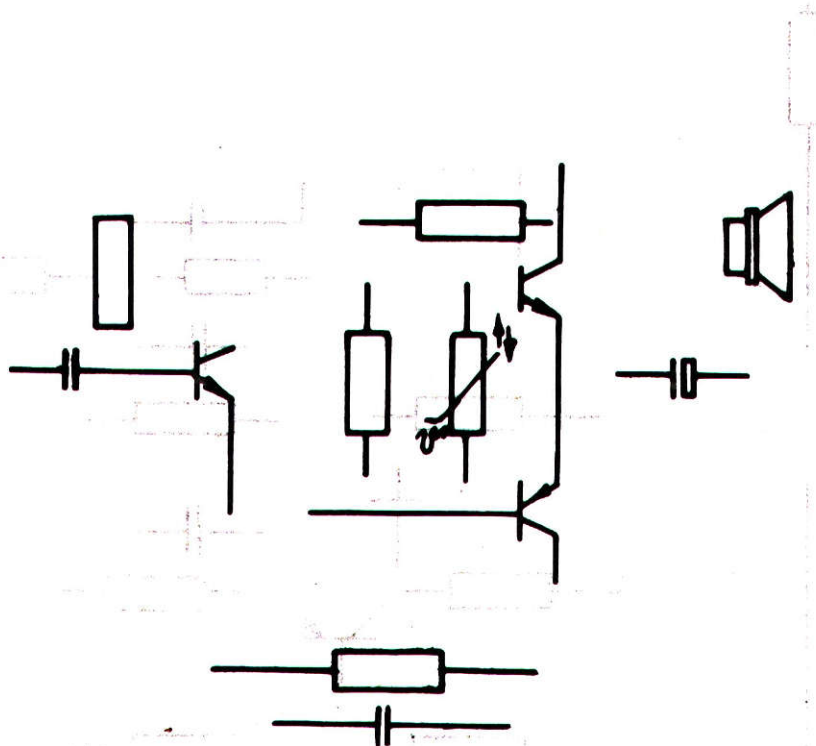


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Radio  
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T.V

COMPLETE CIRCUIT DIAGRAM OF COMPLEMENTARY PUSH PULL AMPLIFIER



**PUSH PULL AMPLIFIER  
( COMPLEMENTARY )**

**TECHNICAL DRG.  
NO 90**



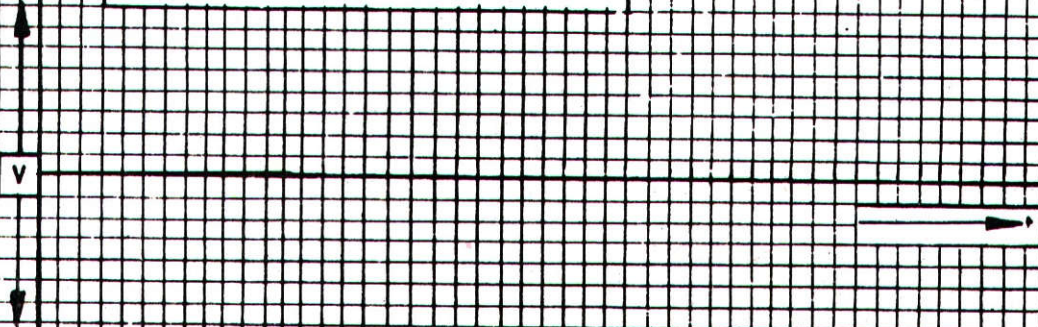
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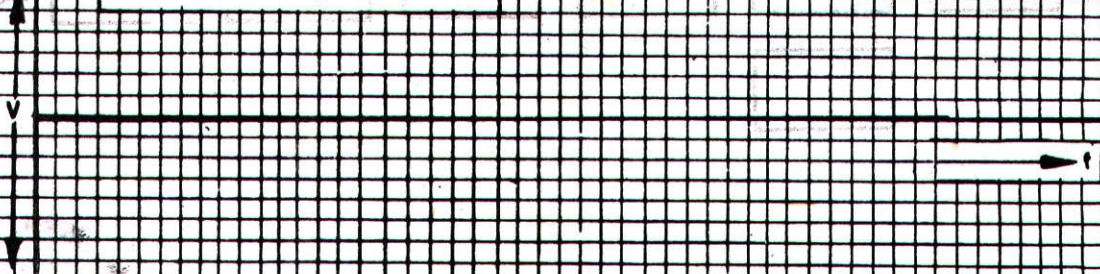
**Radio  
&  
T.V**

DRAW FREQUENCY MODULATED SIGNAL

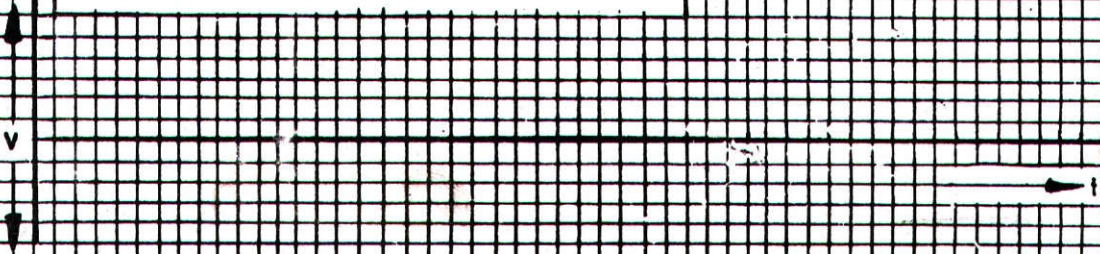
Carrier Frequency Signal



Modulation Signal



Frequency Modulated Signal



FREQUENCY MODULATED SIGNAL

TECHNICAL DRG.  
NO. 91

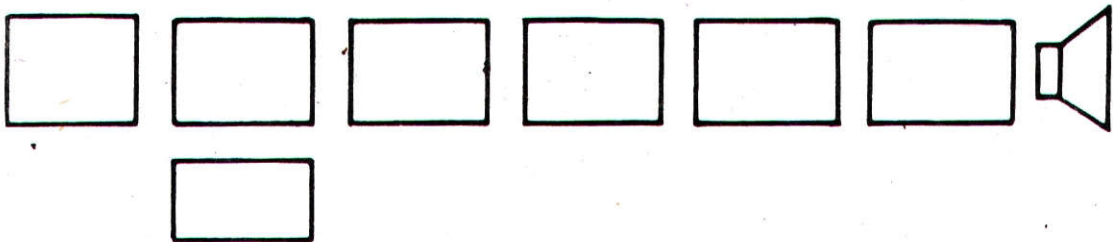


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Radio  
&  
T.V

COMPLETE BLOCK DIAGRAM OF F.M. RECEIVER AND WRITE  
THE NAME OF EACH UNIT.



F. M. RECEIVER  
( BLOCK DIAGRM )

TECHNICAL DRG.  
NO. 92

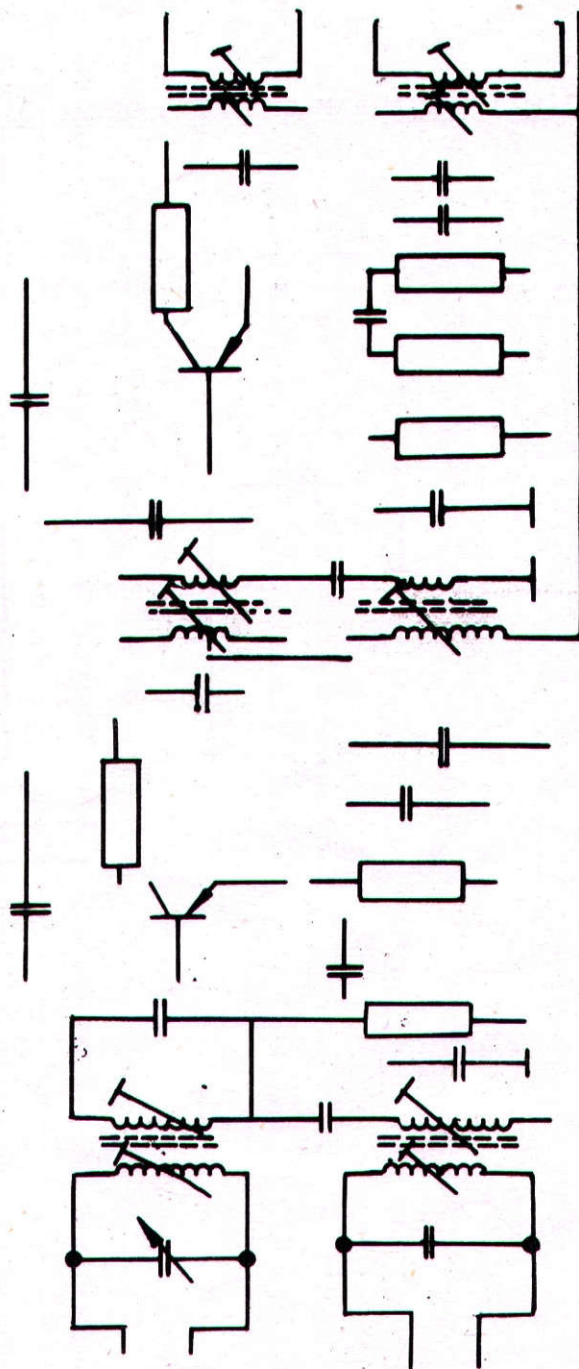


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Radio  
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T.V

COMPLETE CIRCUIT DIAGRAM OF TRANSISTORIZED I.F.  
AMPLIFIER FOR F.M. 10.7 HMZ AND 455 KHZ



INTERMEDIATE FREQUENCY

TECHNICAL DRG.  
NO. 93

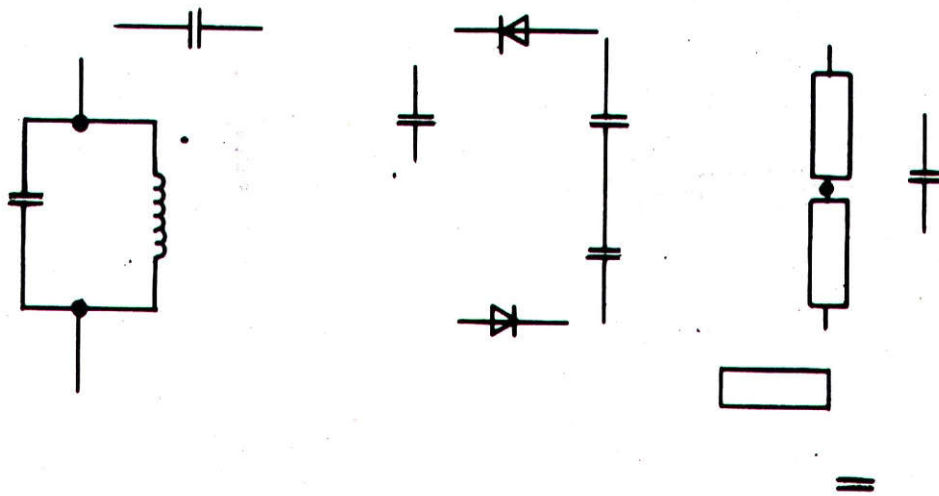


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Radio  
&  
T.V

COMPLETE CIRCUIT DIAGRAM OF RATIO DETECTOR



F. M. DEMODULATOR

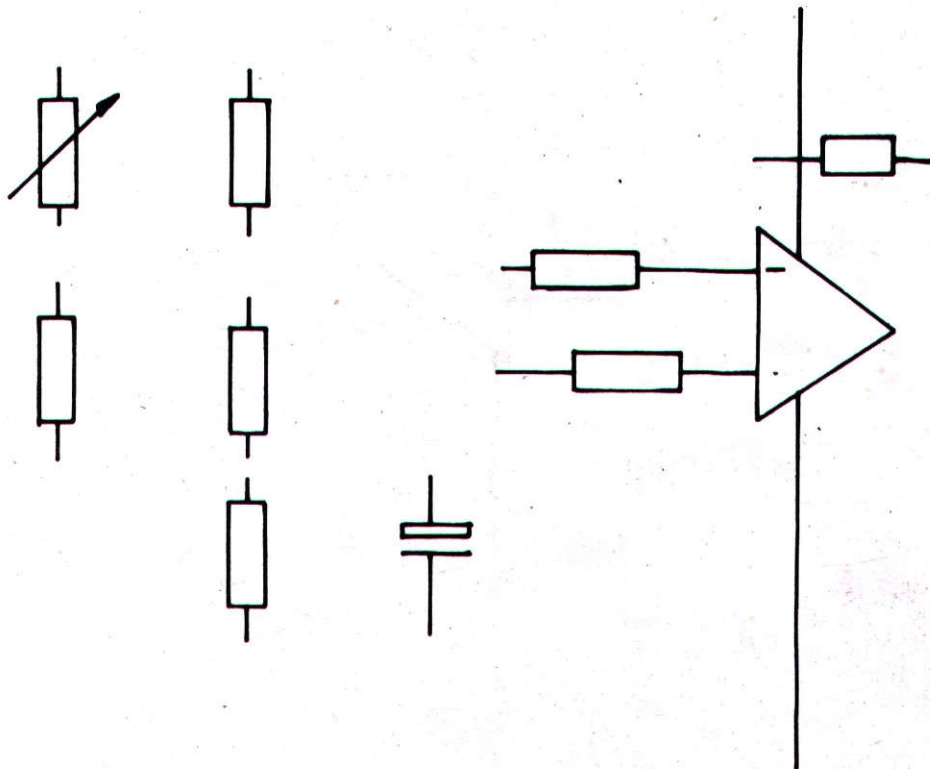
TECHNICAL DRG.  
NO. 94

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Radio  
&  
TV

COMPLETE CIRCUIT DIAGRAM OF OFF-SET COMPENSATION



OFF-SET COMPENSATION

TECHNICAL DRG.  
NO. 95



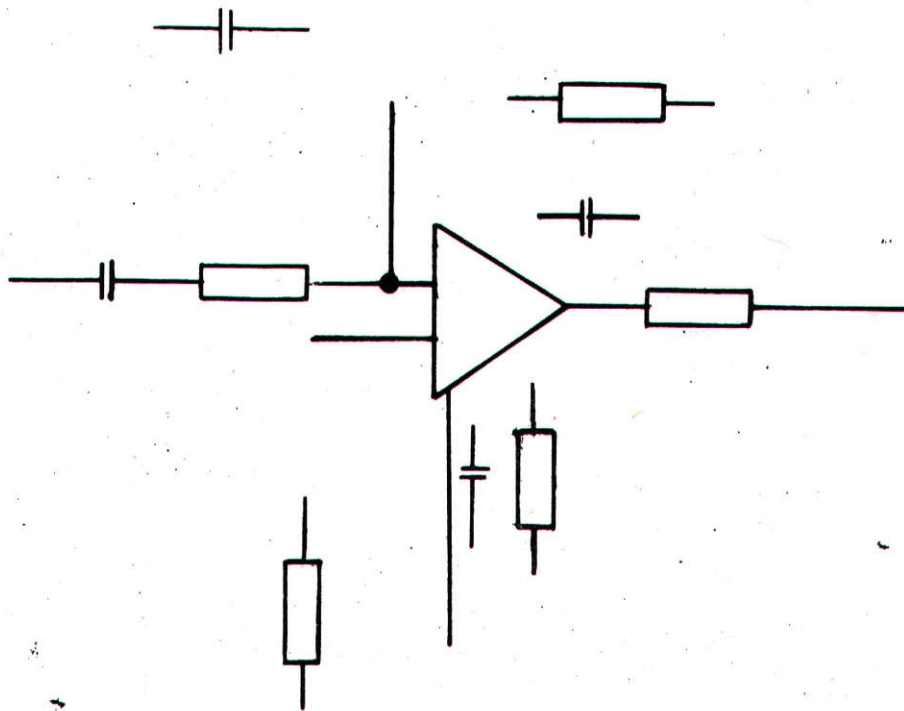
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Radio  
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COMPLETE CIRCUIT DIAGRAM OF O.P AMPLIFIER WITH  
FREQUENCY COMPENSATION



O.P AMPLIFIER WITH FREQUENCY  
COMPENSATION

TECHNICAL DRG.  
NO. 96

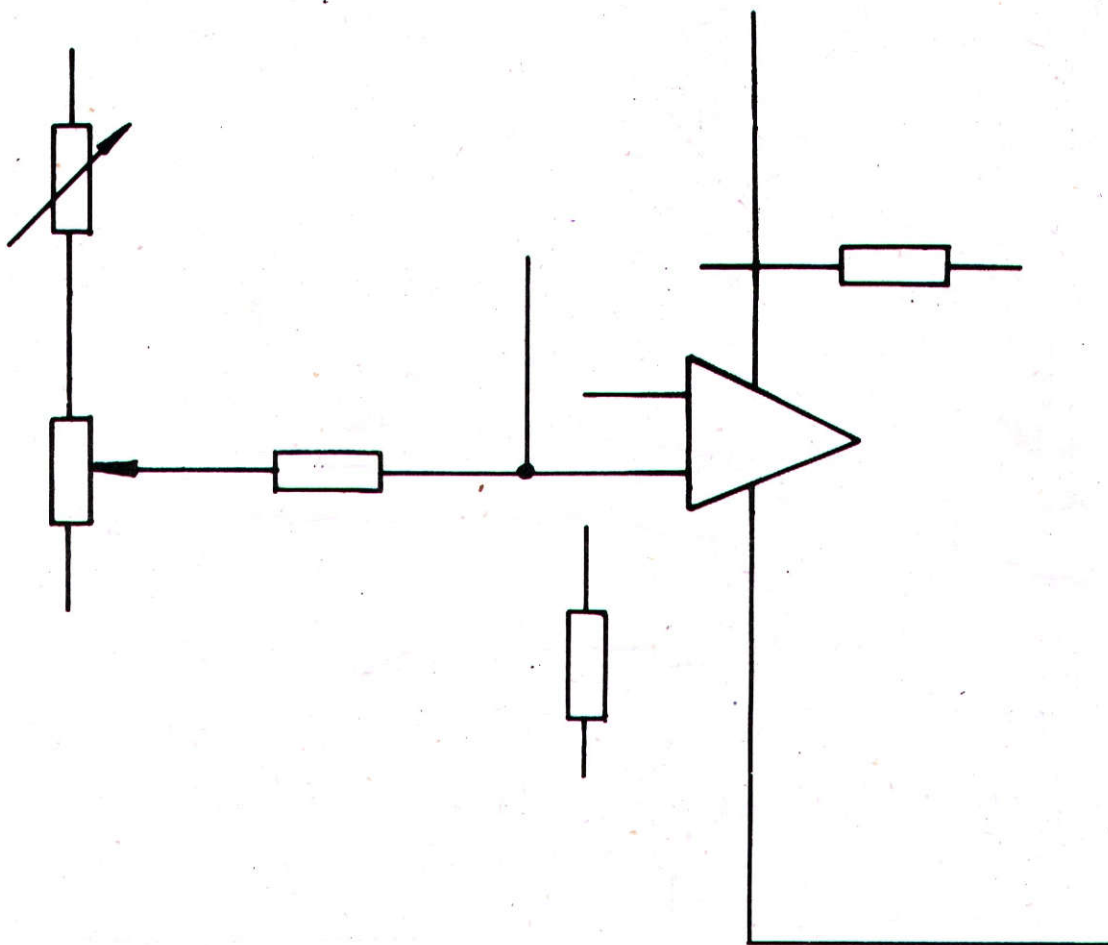


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Radio  
&  
T.V

COMPLETE CIRCUIT DIAGRAM FOR NOT INVERSE O.P. AMPLIFIER



NOT INVERSE O.P AMPLIFIER

TECHNICAL DRG.  
NO. 97

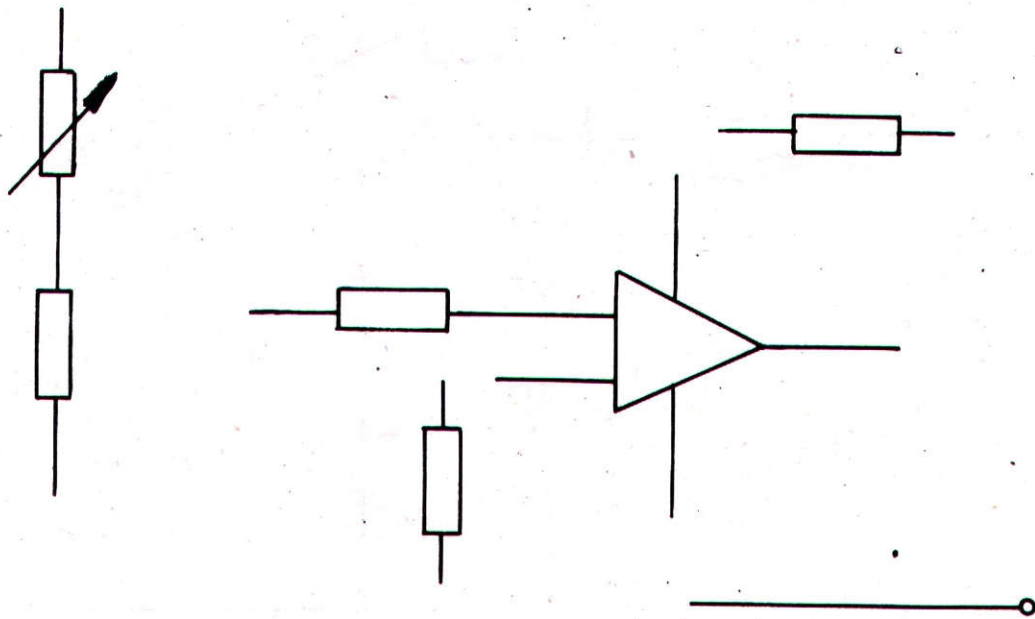


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&  
T.V

COMPLETE CIRCUIT DIAGRAM FOR INVERSE O.P. AMPLIFIER



INVERSE O.P. AMPLIFIER

TECHNICAL DRG.  
NO.98

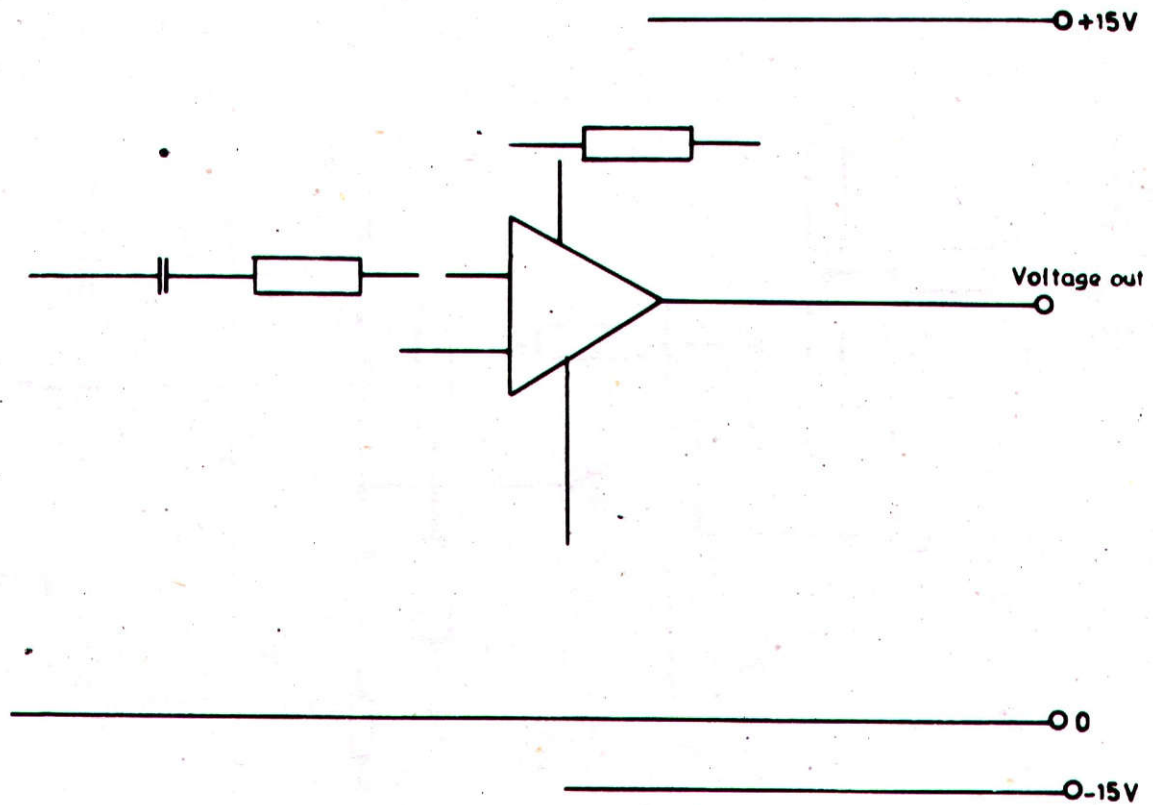


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Radio  
&  
T.V

COMPLETE CIRCUIT DIAGRAM OF HIGH PASS FILTER WITH  
INVERSE AMPLIFIER



H.P. FILTER WITH INVERSE AMP.

TECHNICAL DRG.  
NO. 99

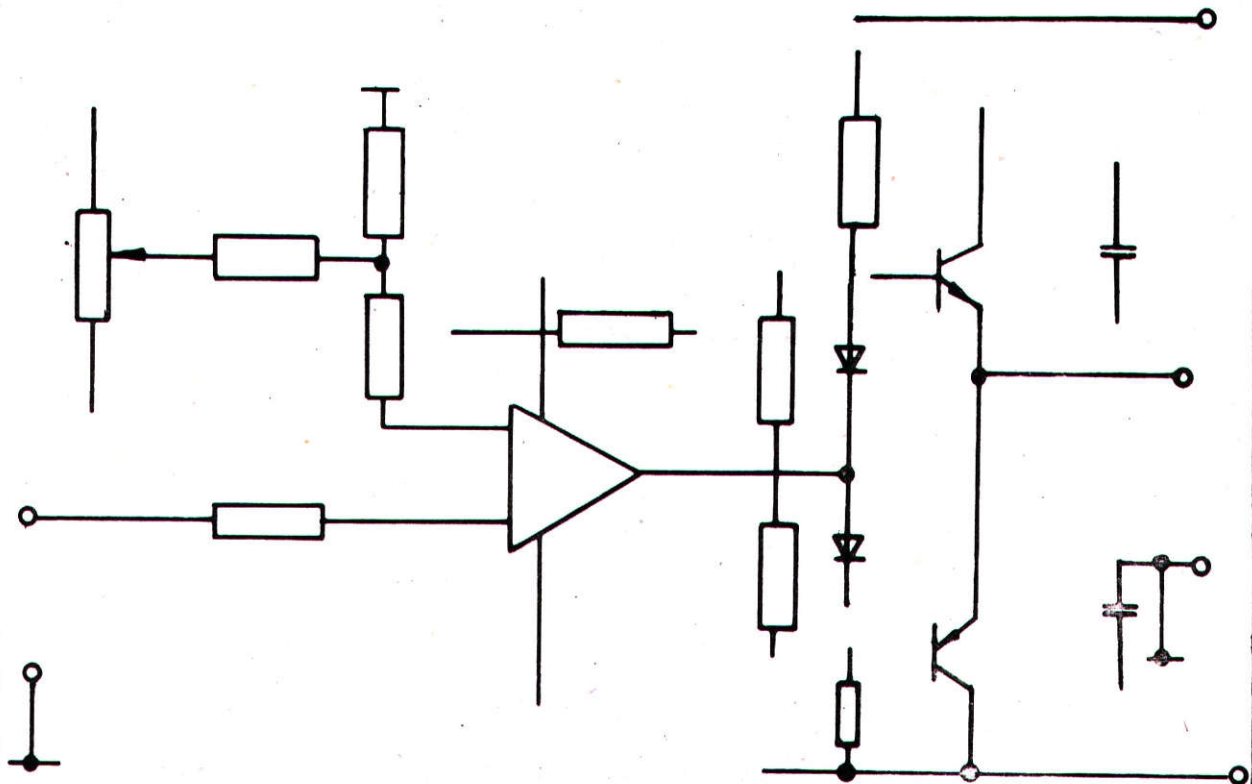


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Radio  
&  
T.V

COMPLETE CIRCUIT DIAGRAM OF O.P. WITH OUTPUT STAGE



O.P. AMPLIFIER WITH OUTPUT  
STAGE

TECHNICAL DRG.  
NO.100

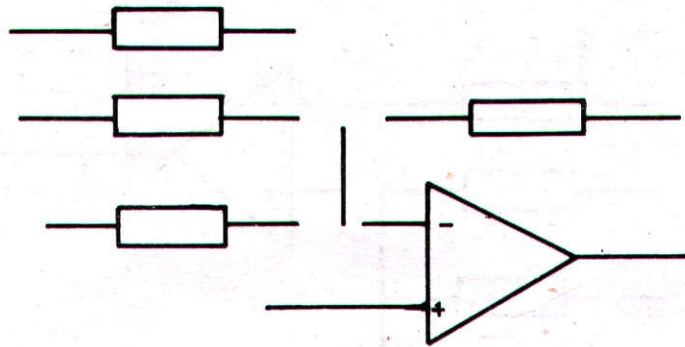


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Radio  
&  
T.V

COMPLETE CIRCUIT DIAGRAM OF ADDIER AMPLIFIER



ADDIER AMPLIFIER

TECHNICAL DRG.  
NO.101

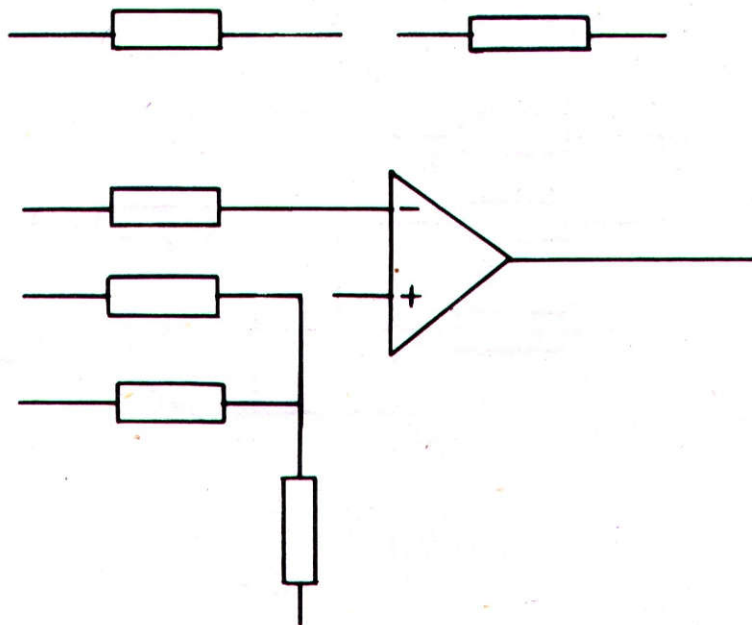


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PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio  
&  
T.V

COMPLETE CIRCUIT DIAGRAM OF SUBTRACTION AMPLIFIER



SUBTRACTION AMPLIFIER

TECHNICAL DRG.  
NO. 102

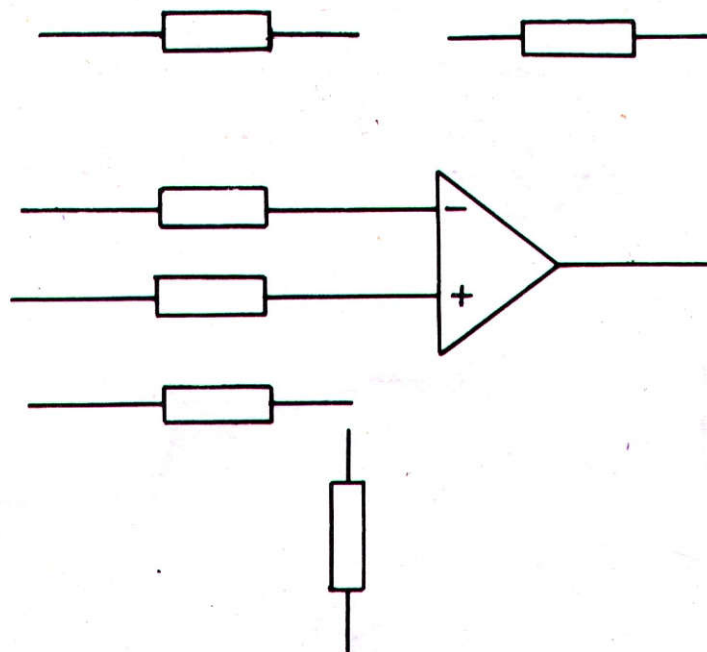


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Radio  
&  
T.V

COMPLETE CIRCUIT DIAGRAM OF SUBTRACTION AMPLIFIER



SUBTRACTION AMPLIFIER

TECHNICAL DRG.  
NO. 103



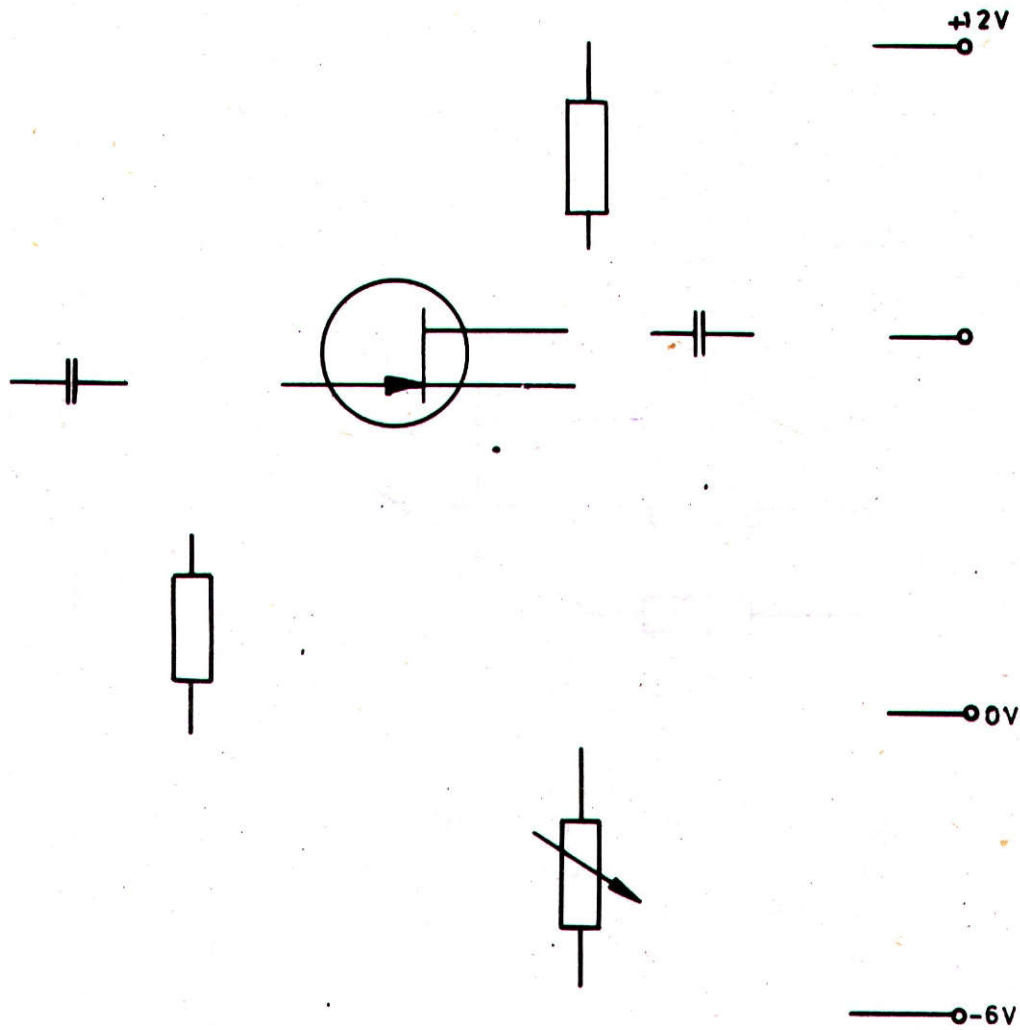
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PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio  
&  
T.V



COMPLETE CIRCUIT DIAGRAM OF COMMON SOURCE CIRCUIT



COMMON SOURCE CIRCUIT

TECHNICAL DRG.  
NO. 104

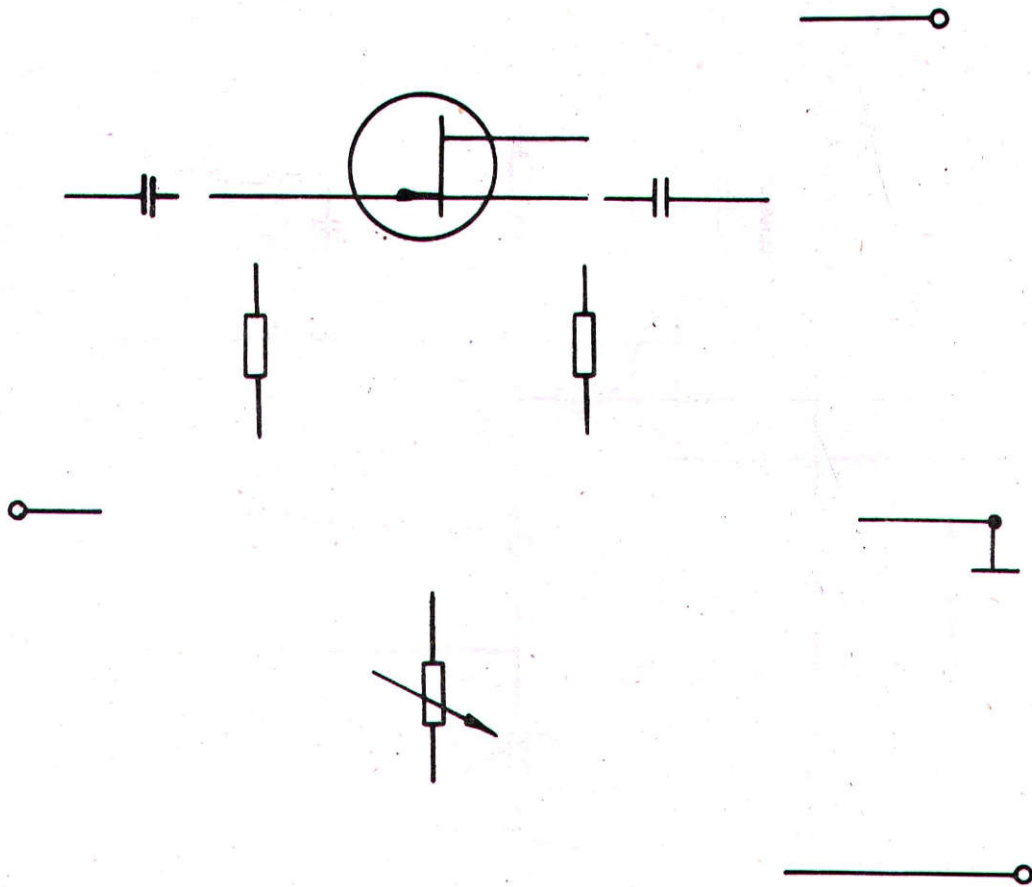


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Radio  
&  
T.V

COMPLETE CIRCUIT DIAGRAM OF COMMON DRAIN CIRCUIT



COMMON DRAIN CIRCUIT

TECHNICAL DRG.  
NO.105

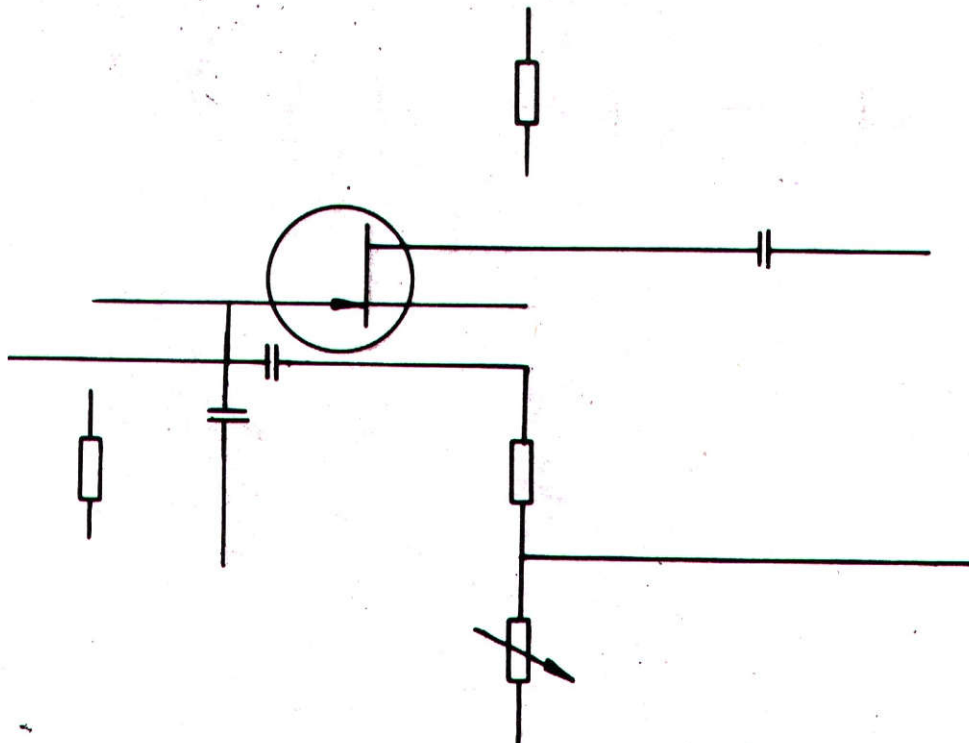


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Radio  
&  
T.V

COMPLETE CIRCUIT DIAGRAM OF COMMON GATE CIRCUIT



COMMON GATE CIRCUIT

TECHNICAL DRG.  
NO. 106

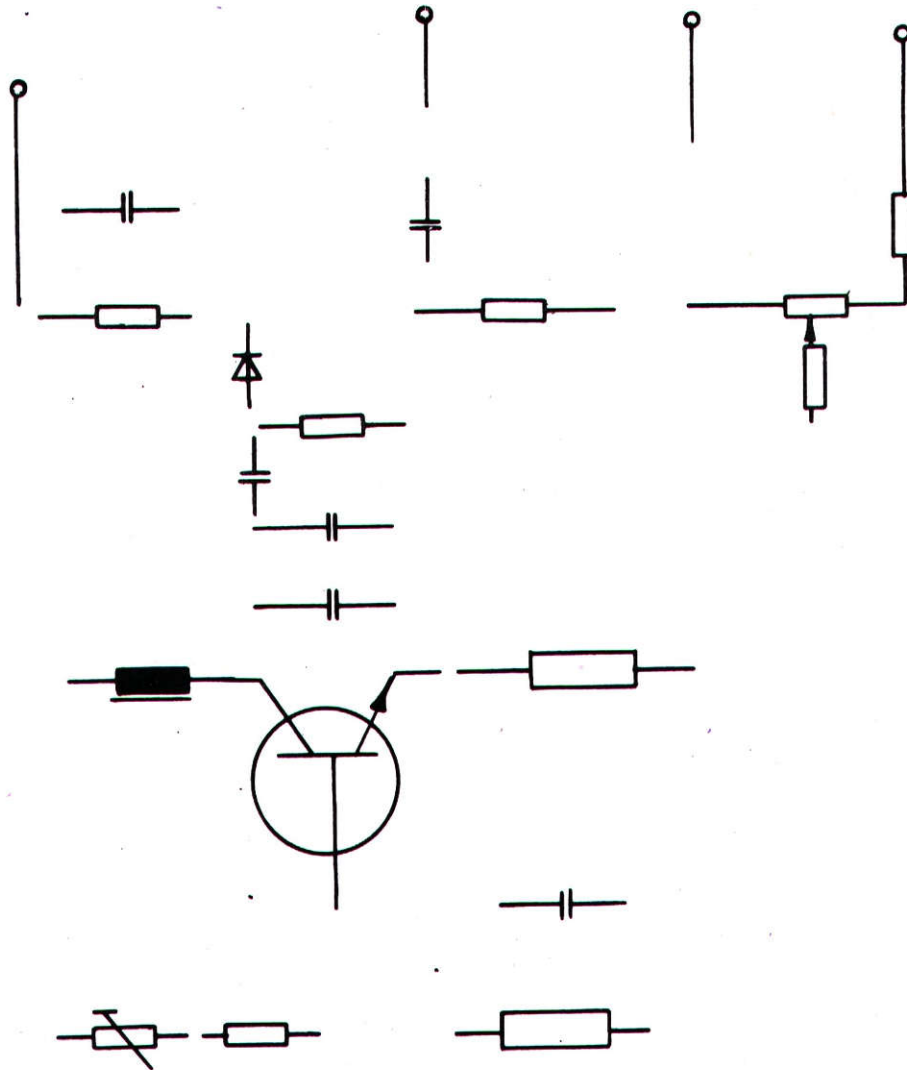


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Radio  
&  
T.V

COMPLETE CIRCUIT DIAGRAM OF OSCILLATOR WITH CAPACITOR



OSCILLATOR WITH CAPACITOR  
DIODE

TECHNICAL DRG.  
NO.107

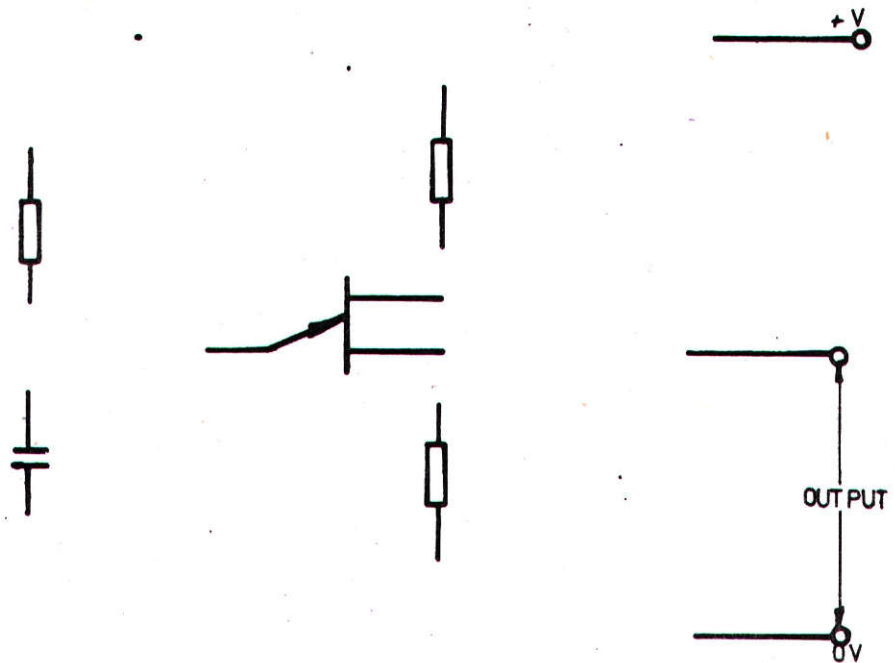


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Radio  
&  
T.V

COMPLETE CIRCUIT DIAGRAM OF PULSE GENERATOR WITH U.J.T.



PULSE GENERATOR ( U J T )

TECHNICAL DRG.  
NO. 108

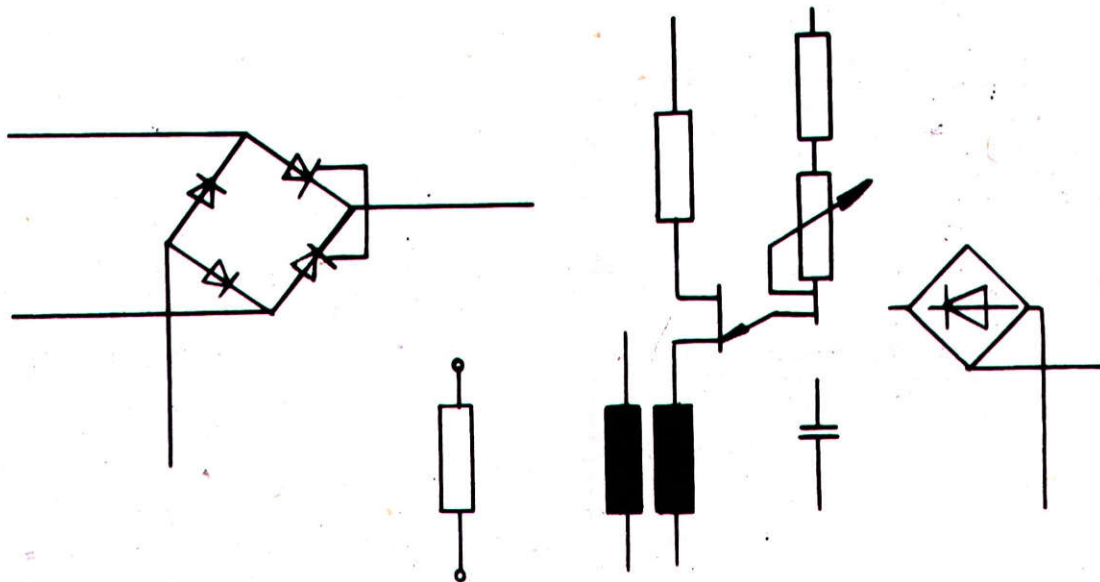


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Radio  
&  
T.V

COMPLETE CIRCUIT DIAGRAM OF CONTROLABLE RECTIFIER WITH THYRISTOR



CONTROLABLE RECTIFIER WITH  
THYRISTOR

TECHNICAL DRG.  
NO.109

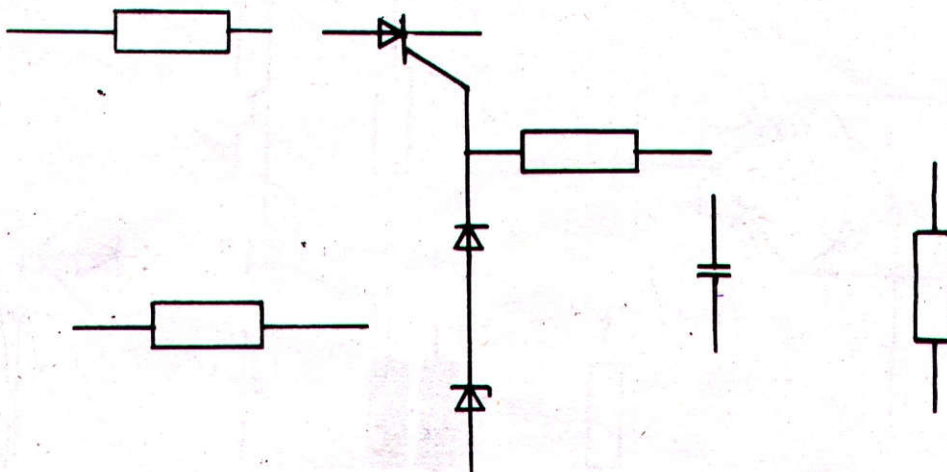


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PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio  
&  
T.V

COMPLETE CIRCUIT DIAGRAM OF VOLTAGE REGULATOR CIRCUIT  
WITH THYRISTOR



VOLTAGE REGULATOR WITH  
THYRISTOR

TECHNICAL DRG.  
NO. 110

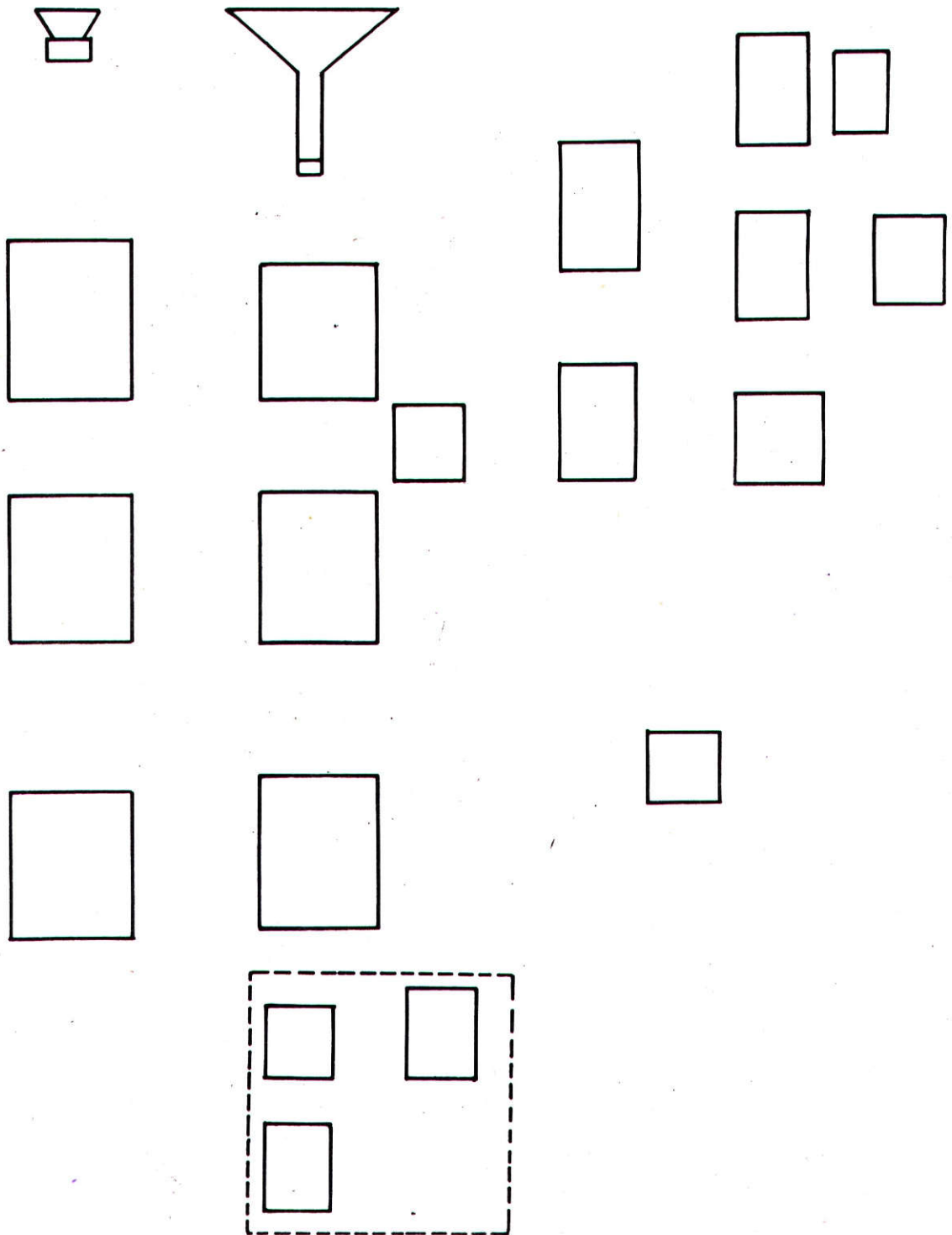


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Radio  
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T.V

COMPLETE BLOCK DIAGRAM OF BLACK AND WHITE T.V.  
RECEIVER AND WRITE ITS NAME



BLOCK DIAGRAM OF T.V  
RECEIVER ( B/W )

TECHNICAL DRG  
NO. 111



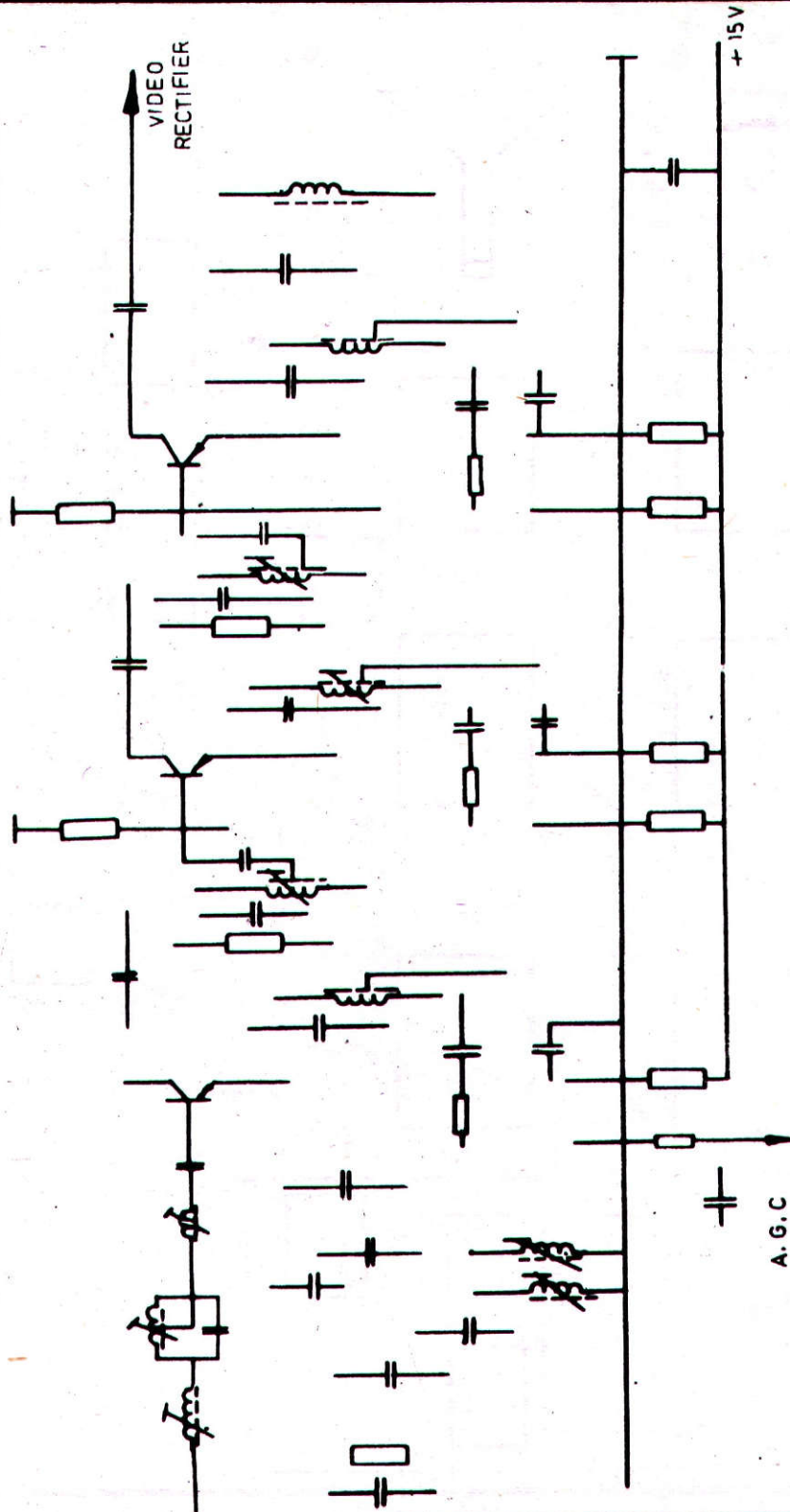
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PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio  
&  
T.V



COMPLETE CIRCUIT DIAGRAM OF I.F. AMPLIFIER  
( TRANSISTORIZED )



INTERMEDIATE FREQUENCY

TECHNICAL DRG.  
NO. 112

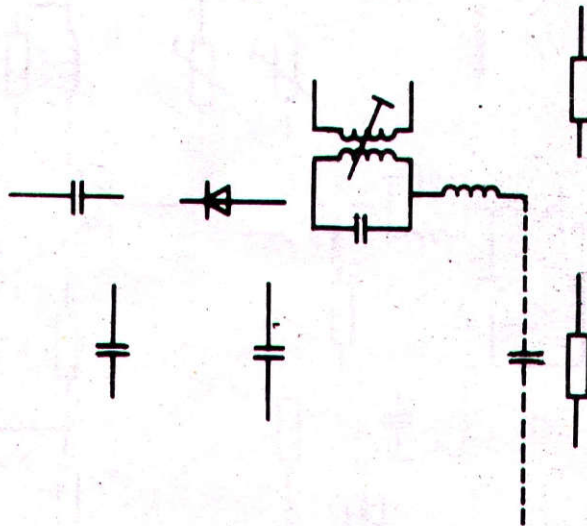


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Radio  
&  
T.V

COMPLETE CIRCUIT DIAGRAM OF VIDEO DETECTOR



VIDEO DETECTOR

TECHNICAL DRG.  
NO. 113

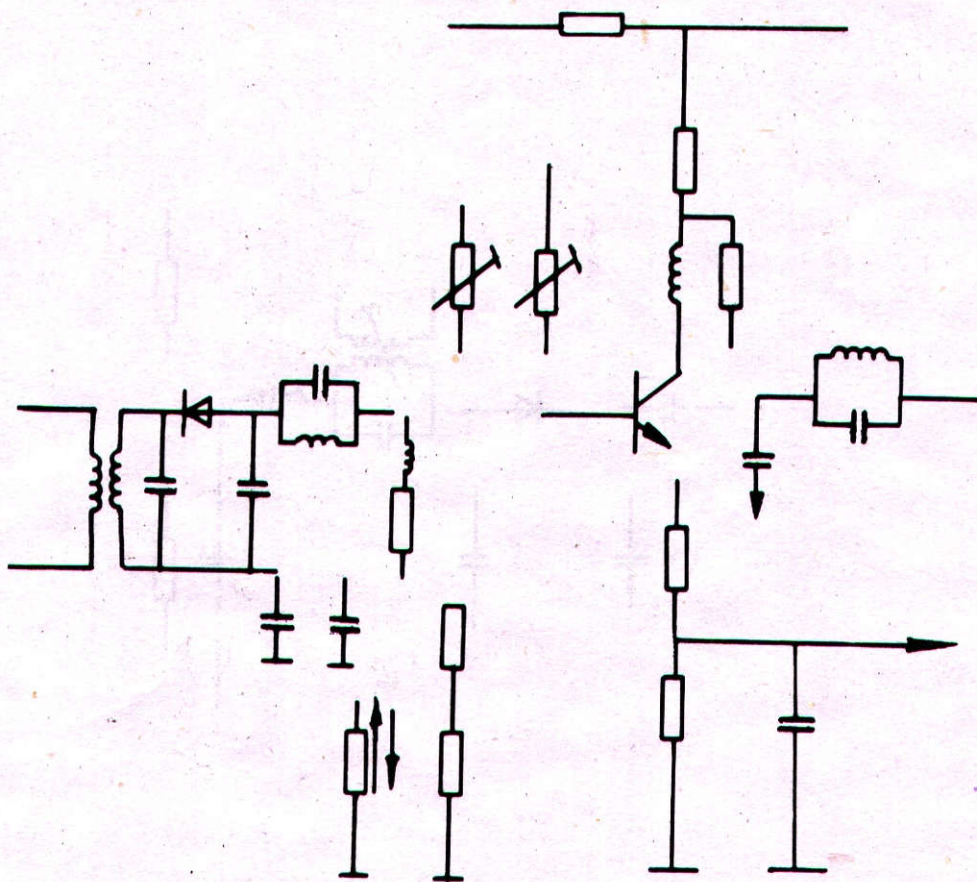


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PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio  
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T.V

COMPLETE CIRCUIT DIAGRAM OF VIDEO AMPLIFIER  
( TRANSISTORIZED )



VIDEO AMPLIFIER

TECHNICAL DRG.  
NO. 114

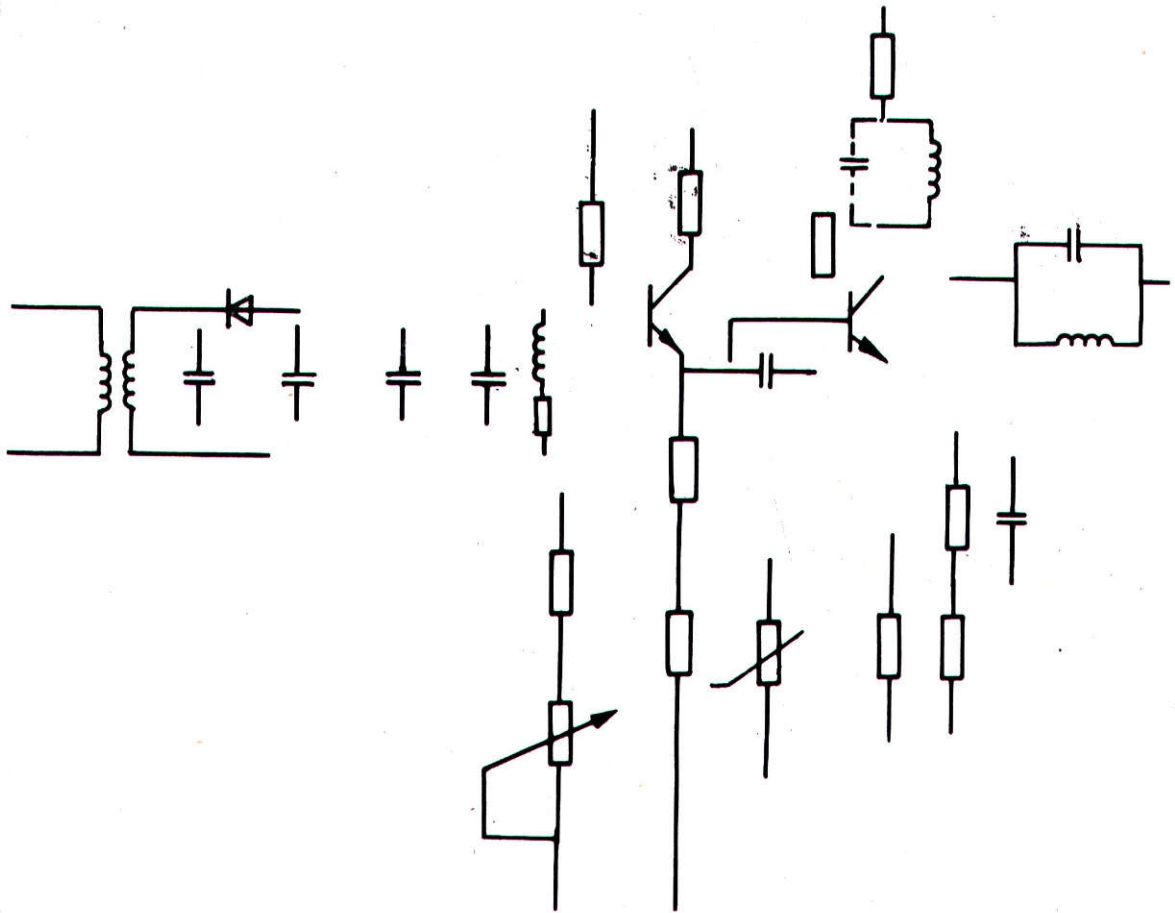


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PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio  
&  
T.V

COMPLETE CIRCUIT DIAGRAM OF VIDEO AMPLIFIER  
WITH TWO TRANSISTORIZED



VIDEO AMPLIFIER

TECHNICAL DRG.  
NO 115

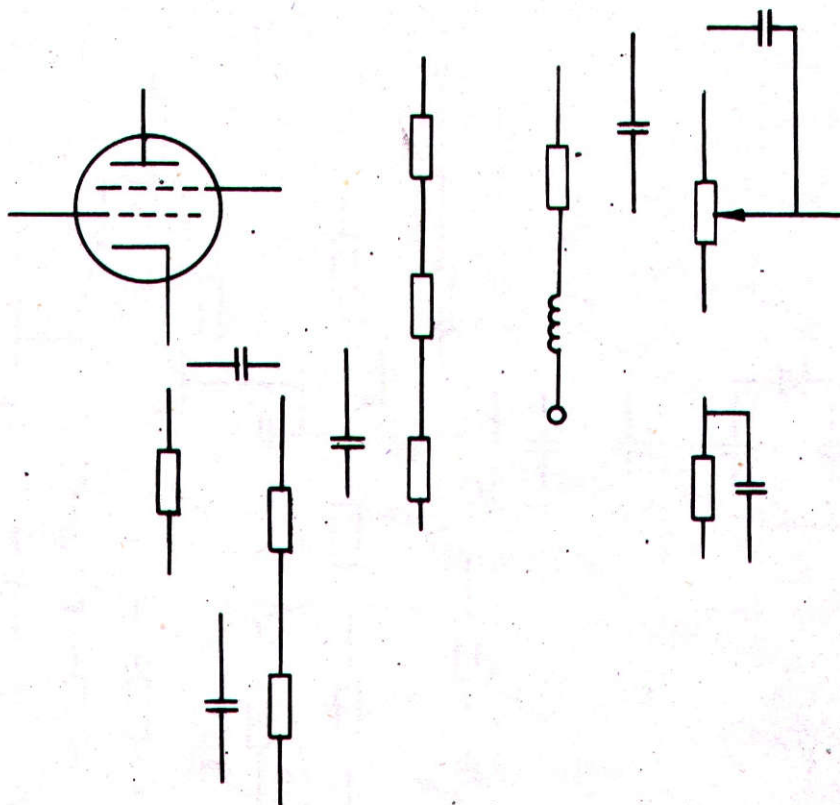


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PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio  
&  
T.V

COMPLETE CIRCUIT DIAGRAM OF VIDEO AMPLIFIER (VALVE TYPE)



VIDEO AMPLIFIER  
( VALVE TYPE )

TECHNICAL DRG.  
NO. 116

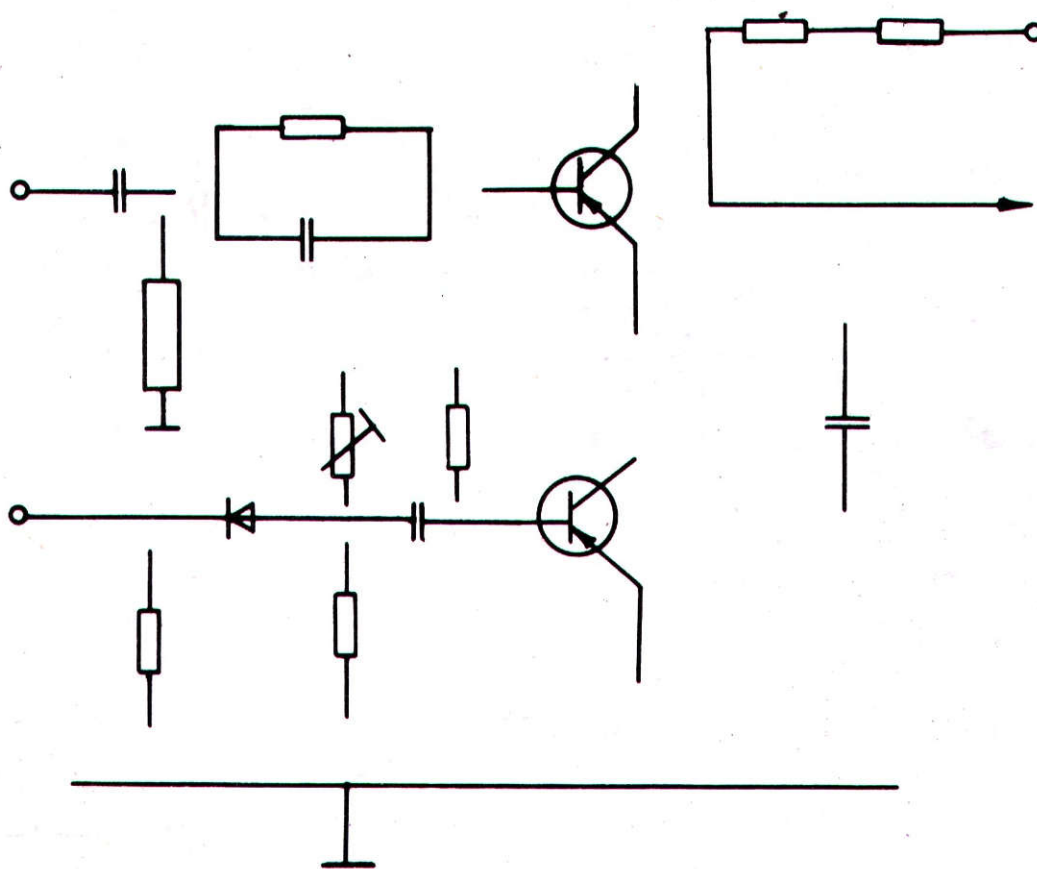


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio  
&  
T.V

COMPLETE CIRCUIT DIAGRAM OF AMPLITUDE SEPARATOR WITH TRANSISTOR



AMPLITUDE SEPARATOR

TECHNICAL DRG.  
NO. 117

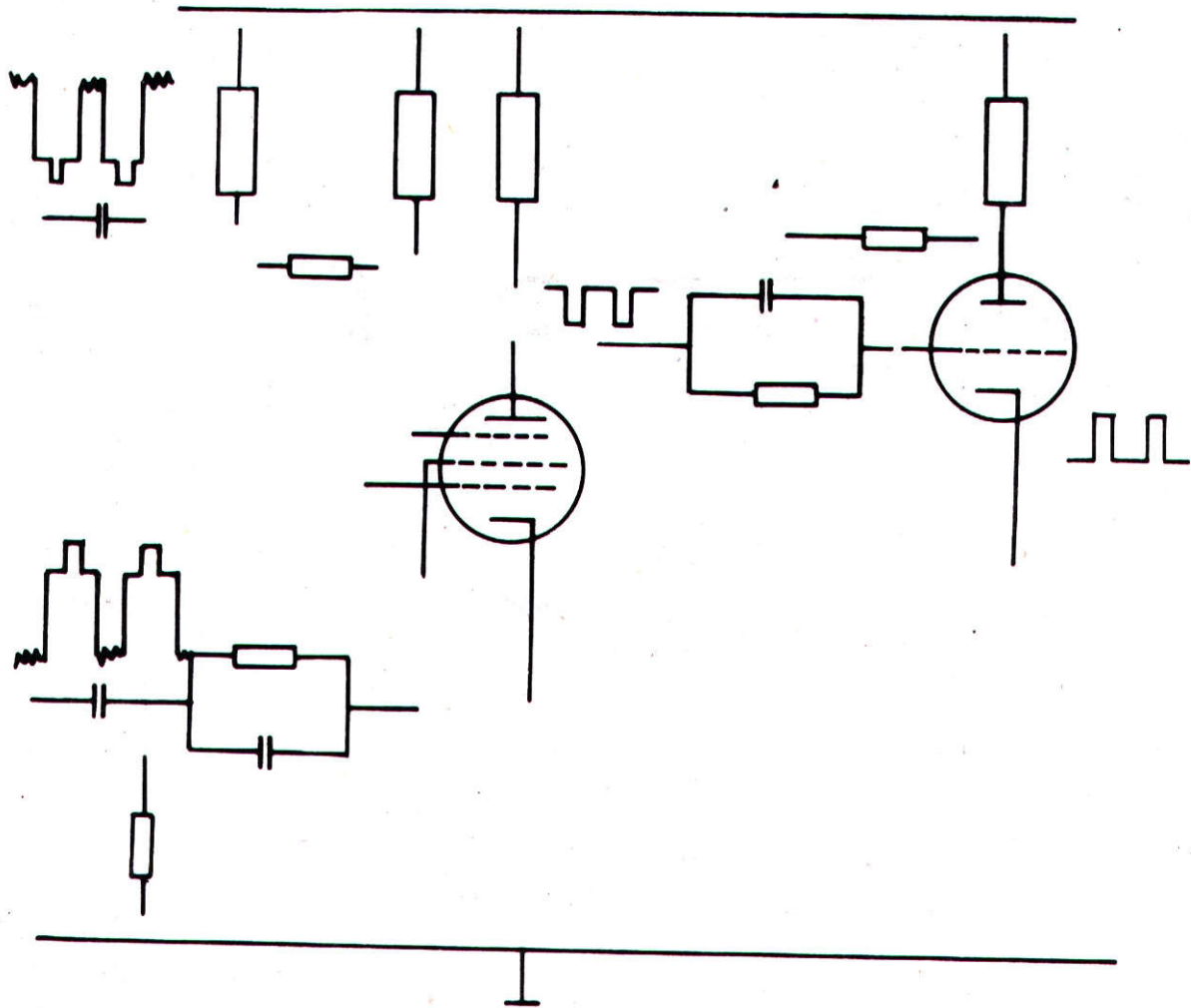


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio  
&  
T.V

COMPLETE CIRCUIT DIAGRAM OF AMPLITUDE SEPARATOR  
( VALVE TYPE )



AMPLITUDE SEPARATOR

TECHNICAL DRG.  
NO. 118

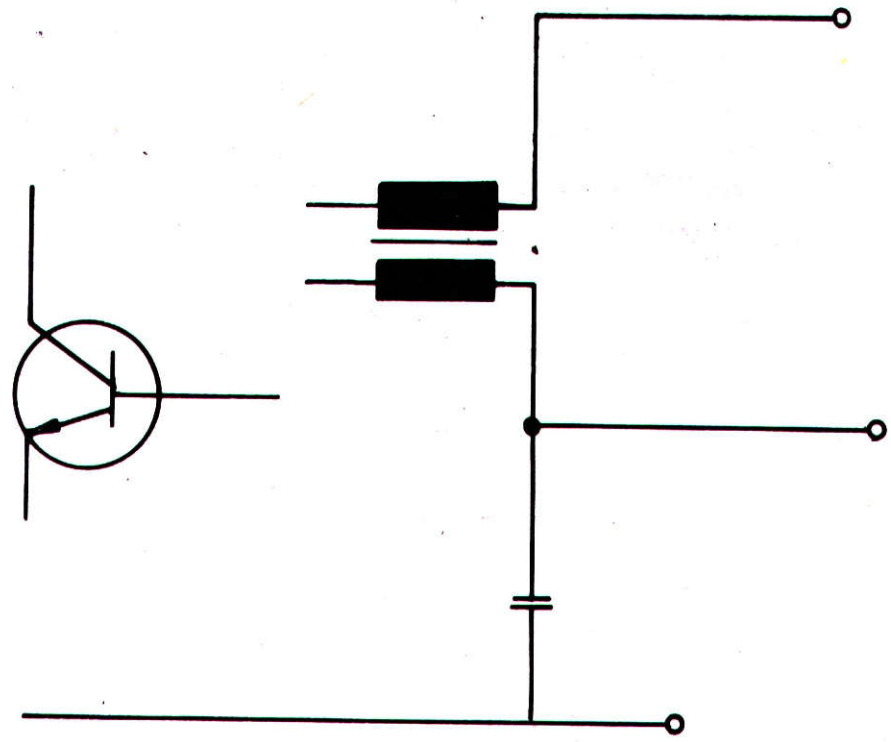


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio  
&  
T.

COMPLETE CIRCUIT DIAGRAM OF BLOCKING OSCILLATOR WITH TRANSISTOR



BLOCKING OSCILLATOR

TECHNICAL DRG.  
NO. 119



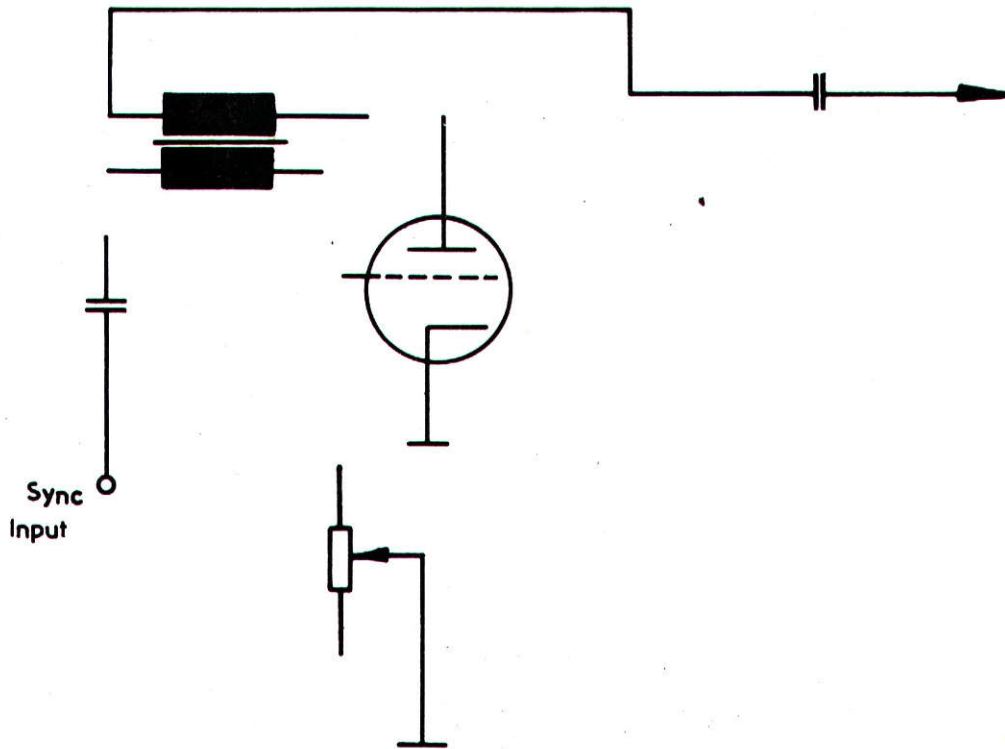
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio  
&  
T.V



COMPLETE CIRCUIT DIAGRAM OF BLOCKING OSCILLATOR (VALVE TYPE)



**BLOCKING OSCILLATOR  
( VALVE TYPE )**

**TECHNICAL DRG.  
NO.120**

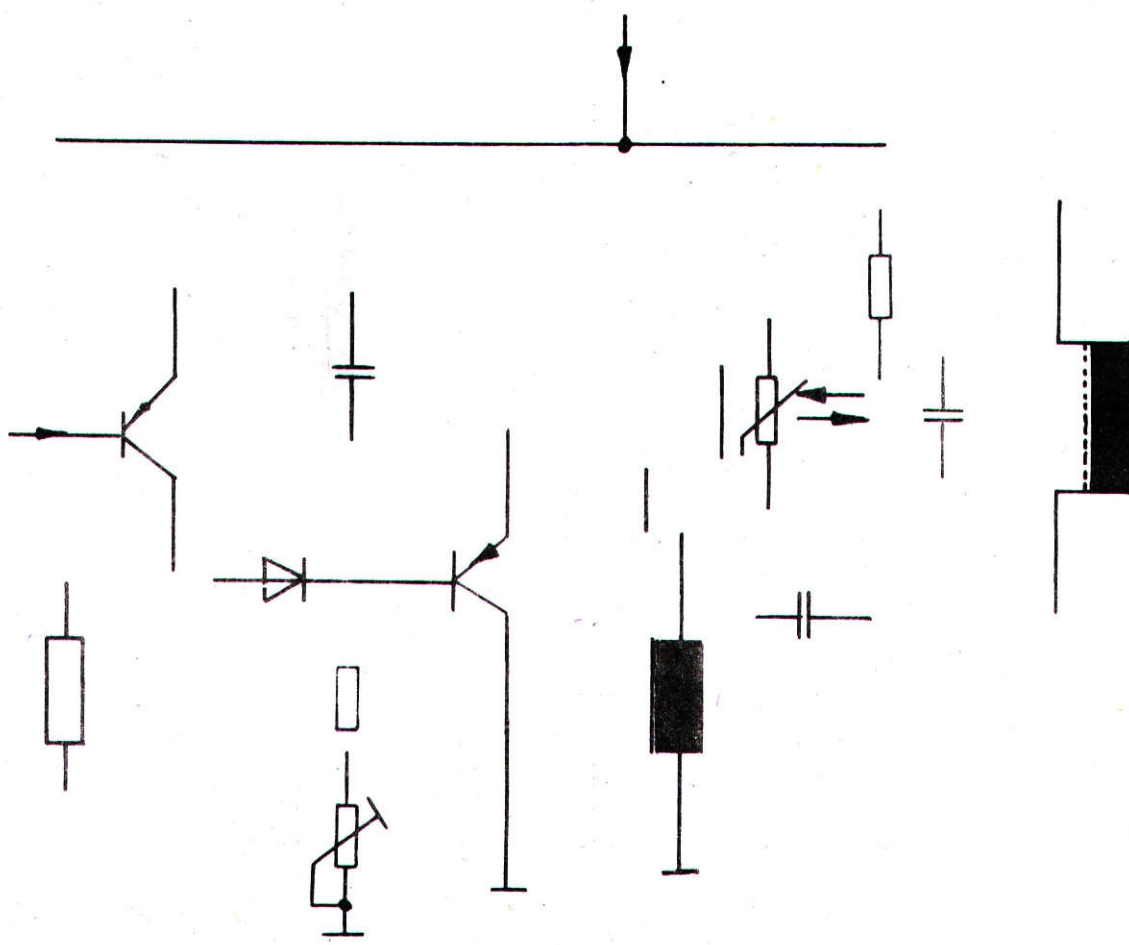


**DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING**

**PAK-GERMAN TECHNICAL TRAINING PROGRAMME**

**Radio  
&  
T.V**

COMPLETE CIRCUIT DIAGRAM OF VERTICAL OUTPUT STAGE  
( TRANSISTORIZED )



VERTICAL OUTPUT STAGE

TECHNICAL DRG.  
NO 121

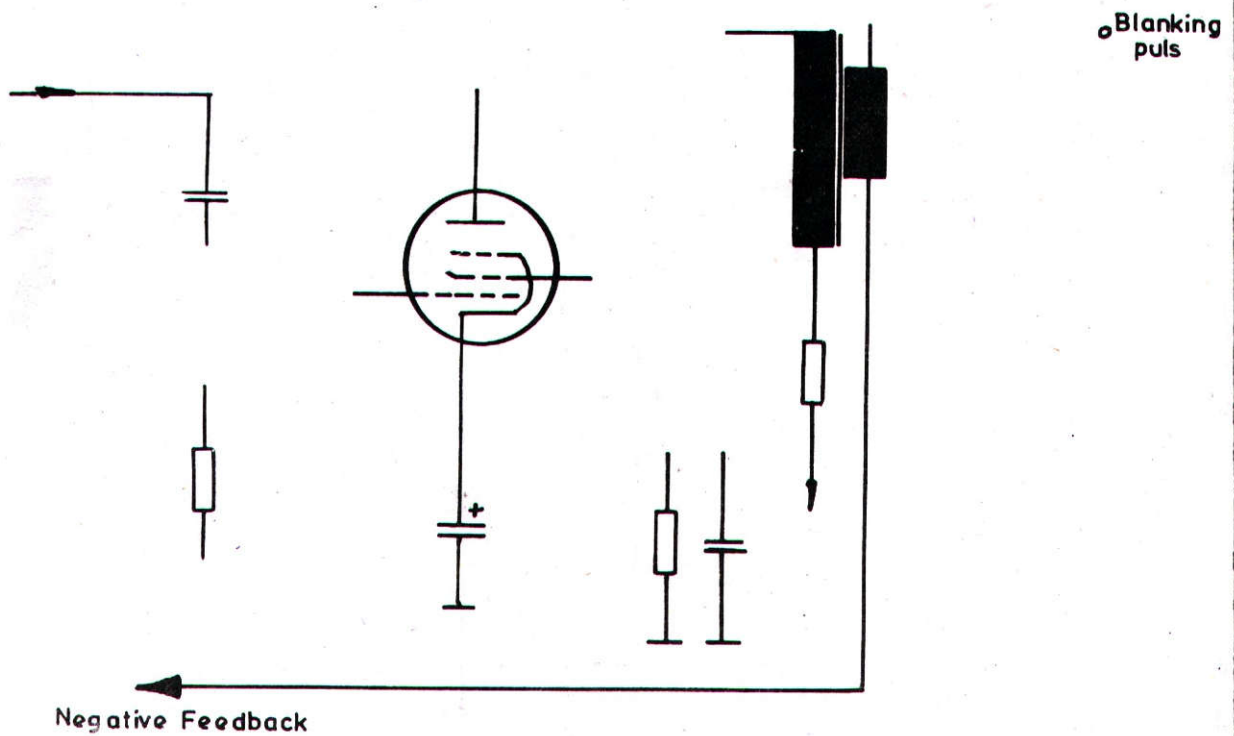


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PAK GERMAN TECHNICAL TRAINING PROGRAMME

Radio  
&  
T.V

COMPLETE CIRCUIT DIAGRAM OF VERTICAL OUTPUT STAGE  
( VALVE TYPE )



VERTICAL OUTPUT STAGE  
( VALVE TYPE )

TECHNICAL DRG.  
NO 122

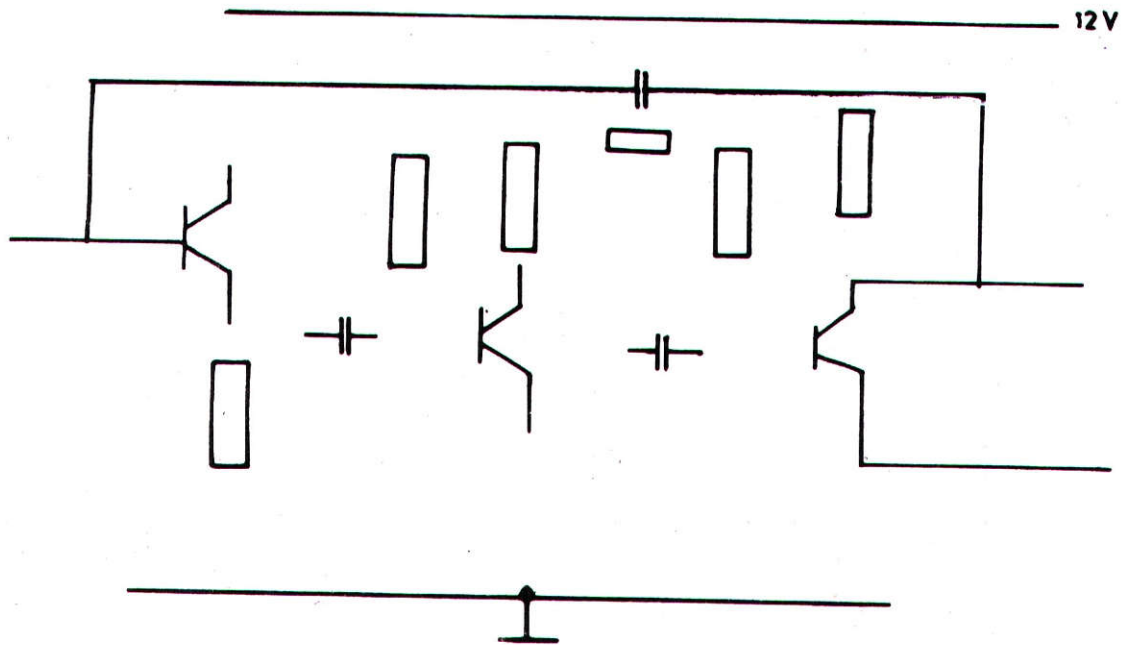


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PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio  
&  
T.V

COMPLETE CIRCUIT DIAGRAM OF HORIZONTAL FREQUENCY  
GENERATOR (TRANSISTORIZED ASTABLE MULTIVIBRATOR)



HORIZONTAL FRQUENCY  
GENERATOR

TECHNICAL DRG.  
NO 123



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio  
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T.V

DRAW BLOCK DIAGRAM OF HORIZONTAL STAGE :

- HORIZONTAL FREQUENCY GENERATOR
- HORIZONTAL AMPLIFIER
- HORIZONTAL OUTPUT (FLYBACK TRANSFORMER)
- HIGH VOLTAGE RECTIFIER
- DAMPER DIODE
- HORIZONTAL DEFLECTION COILS

HORIZONTAL STAGE  
( BLOCK DIAGRAM )

TECHNICAL DRG.  
NO 124



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio  
&  
T.V

DRAW STRUCTURE OF PICTURE TUBE (BLACK & WHITE) AND  
INDICATE DIFFERENT PARTS OF PICTURE TUBE

T. V PICTURE TUBE  
(BLACK & WHITE)

TECHNICAL DRG.  
NO 125

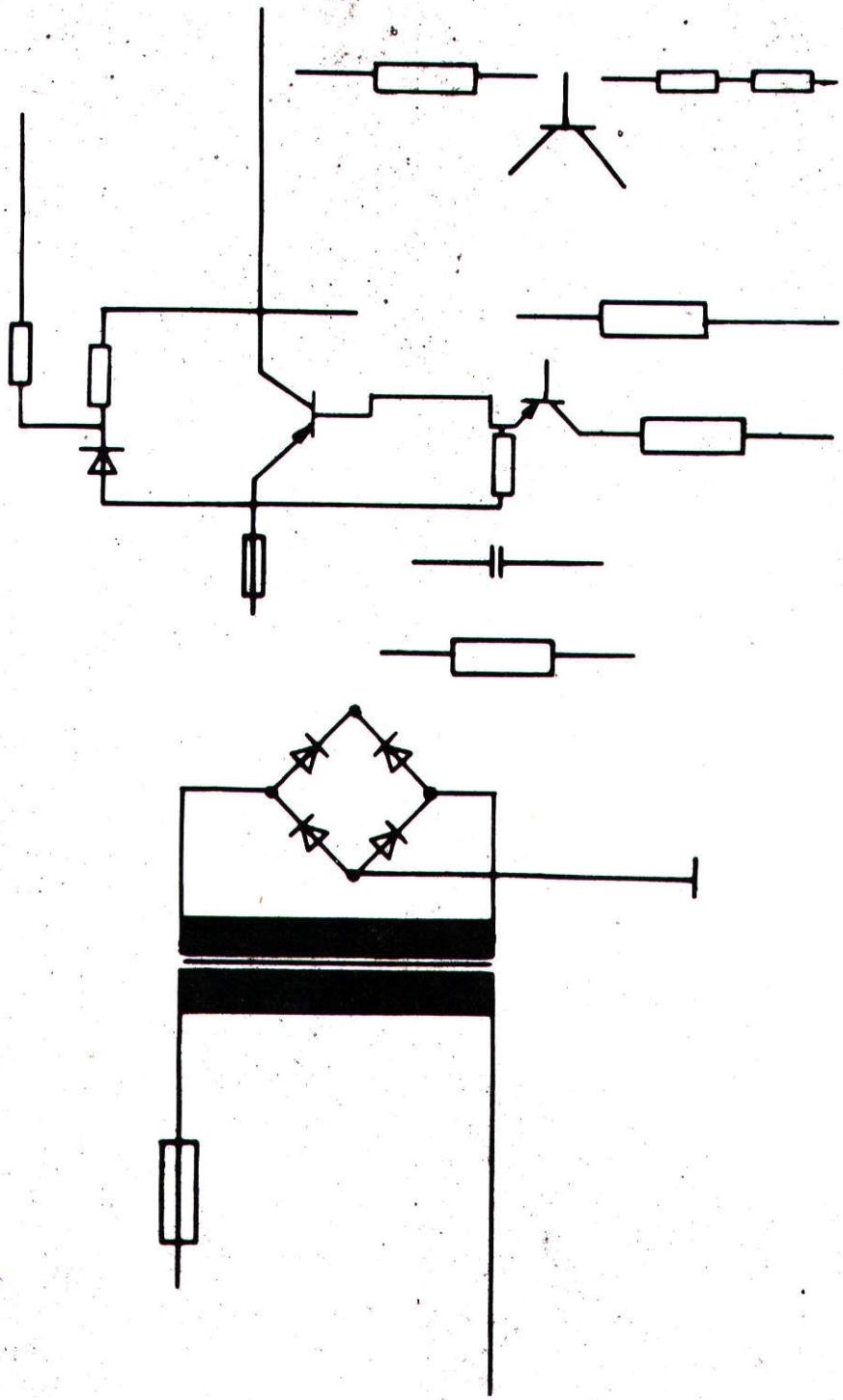


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio -  
&  
T.V

COMPLETE CIRCUIT DIAGRAM OF TRANSISTORIZED POWER SUPPLY



T. V POWER SUPPLY

TECHNICAL DRG.  
NO. 126

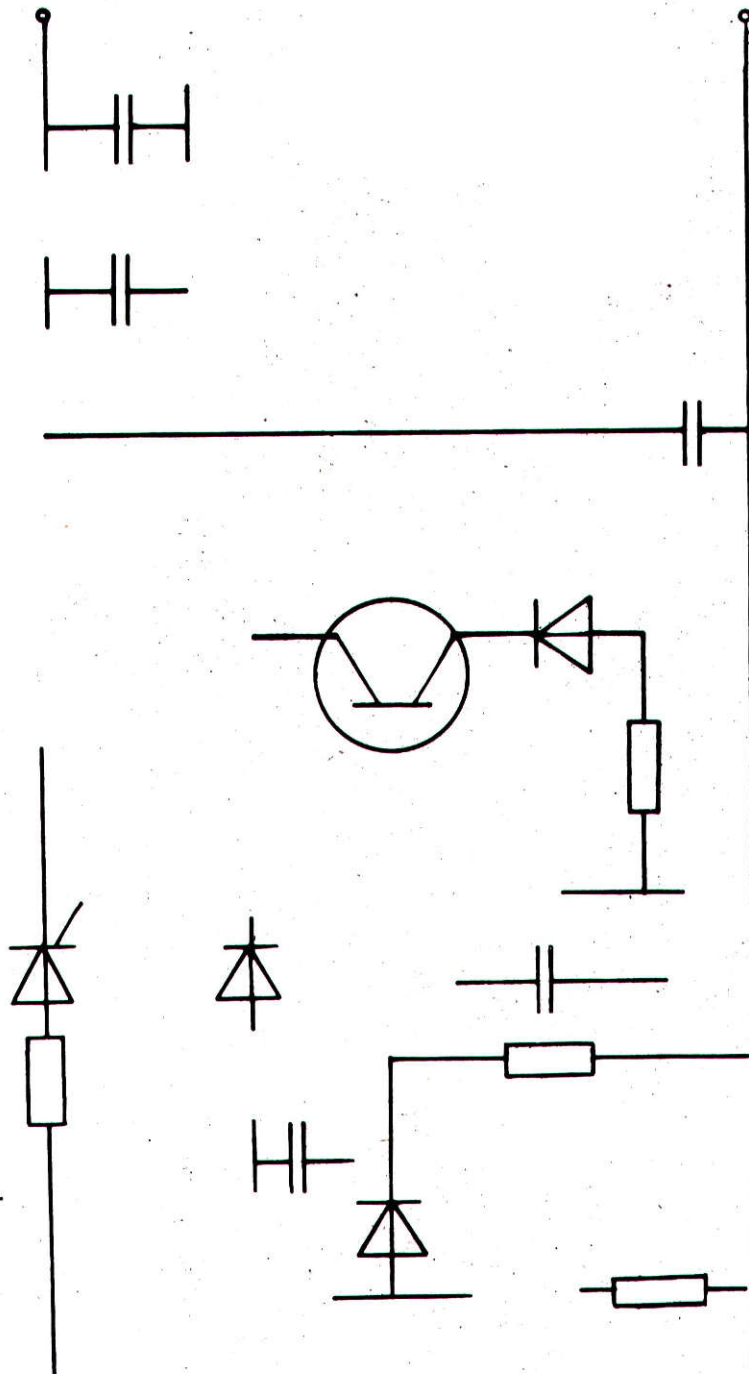


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio  
&  
T.V

COMPLETE CIRCUIT DIAGRAM OF T.V POWER SUPPLY WITH  
THYRISTOR



T.V POWER SUPPLY WITH  
THYRISTOR

TECHNICAL DRG.  
NO. 127



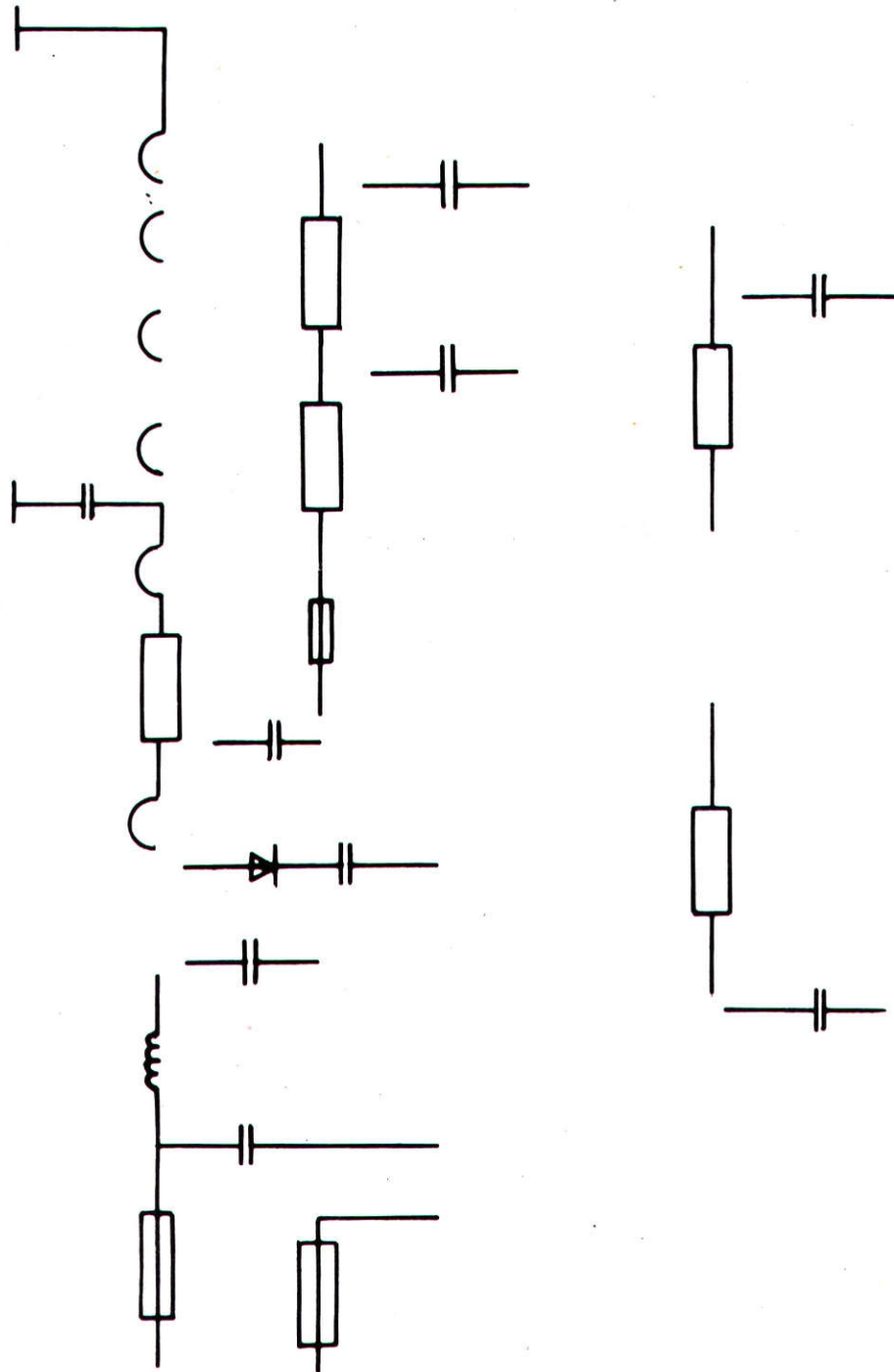
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio  
&  
T.V



COMPLETE CIRCUIT DIAGRAM OF T.V. POWER SUPPLY  
(VALVE TYPE)



T. V POWER SUPPLY  
( VALVE TYPE )

TECHNICAL DRG.  
NO. 128

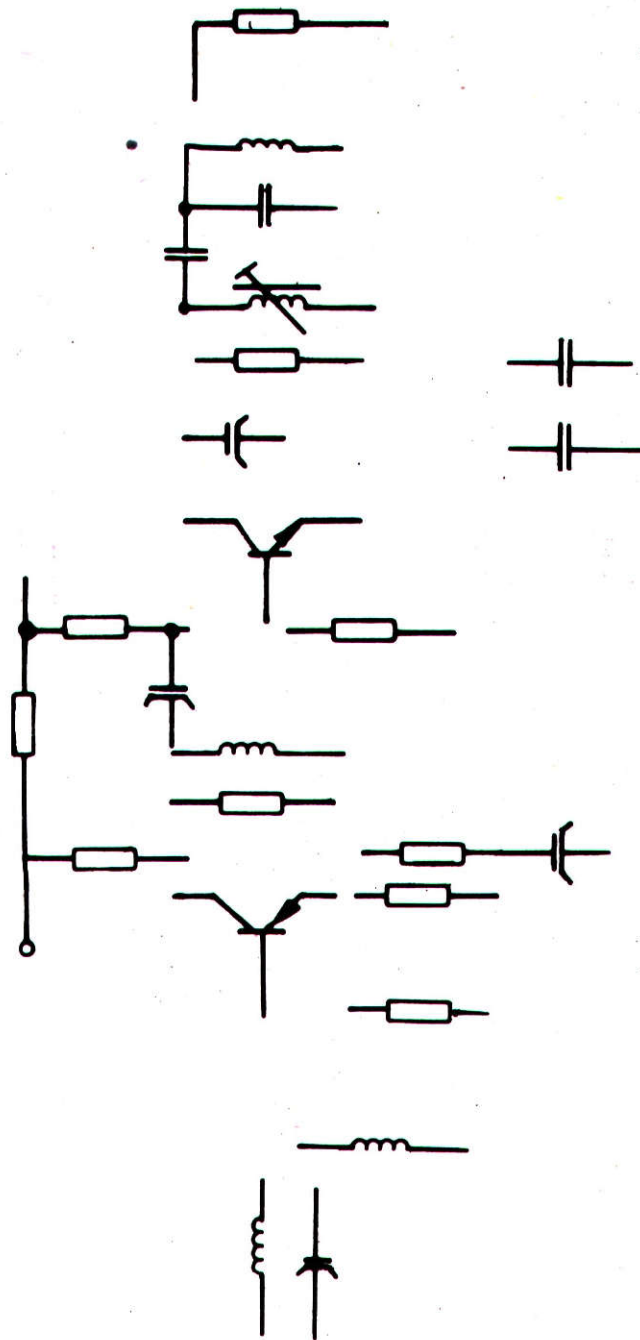


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PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio  
&  
T!

COMPLETE CIRCUIT DIAGRAM OF CHROMINANCE SIGNAL AMPLIFIER



CHROMINANCE SIGNAL AMPLIFIER

TECHNICAL DRG. NO. 129

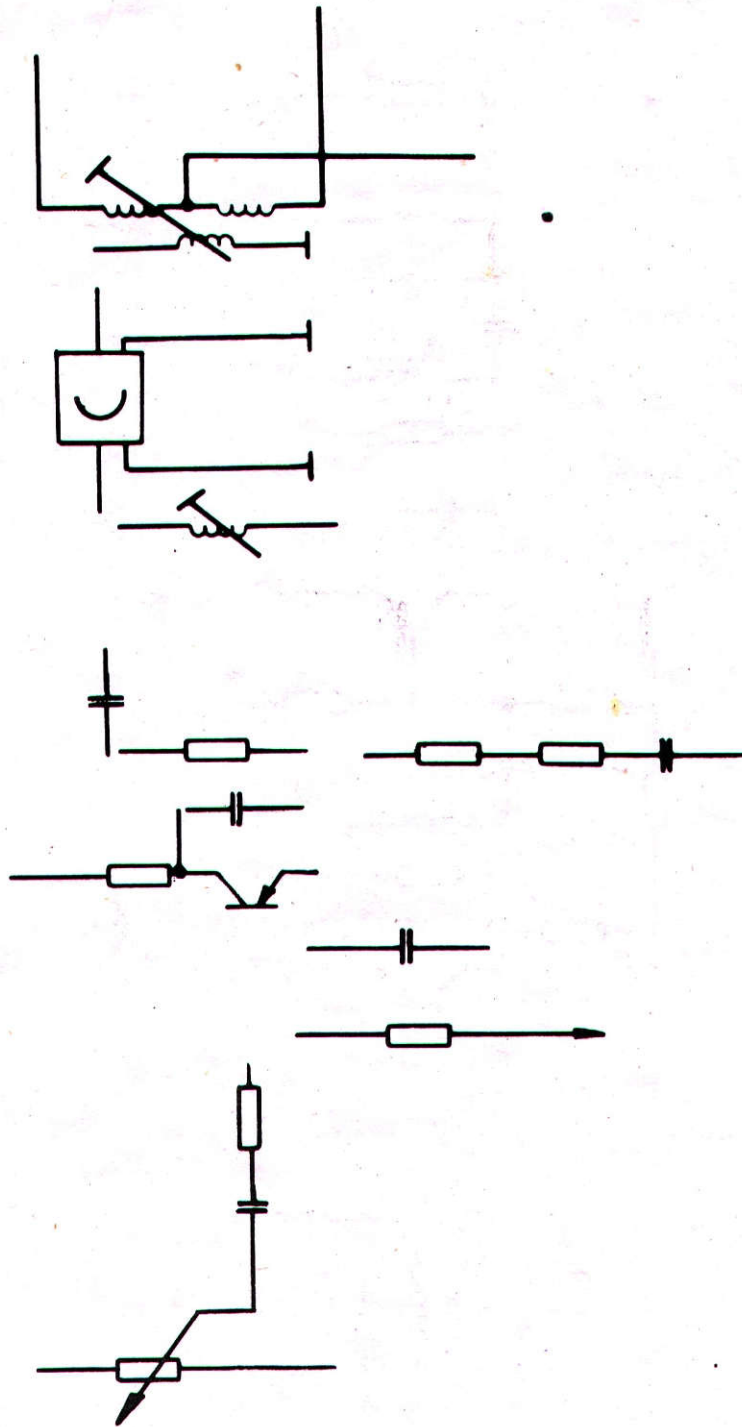


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PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio & T.V

COMPLETE CIRCUIT DIAGRAM OF PAL-DELAY TIME DEMODULATOR



PAL-DELAY TIME DEMODULATOR

TECHNICAL DRG. NO. 130

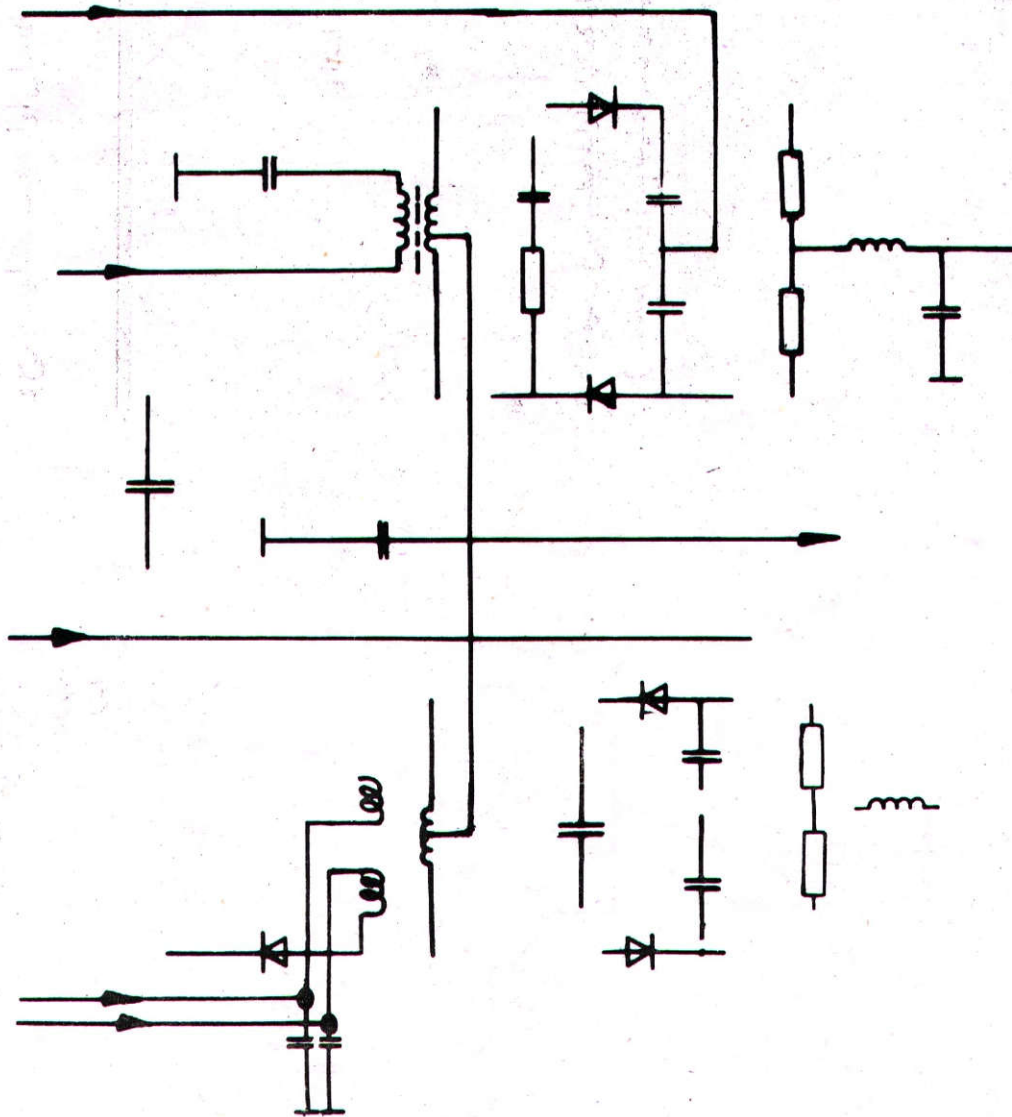


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio & T.V

COMPLETE CIRCUIT DIAGRAM OF PAL-SWITCH AND SYNC DEMODULATOR



PAL-SWITCH & SYNC  
DEMODULATOR

TECHNICAL DRG.  
NO-131

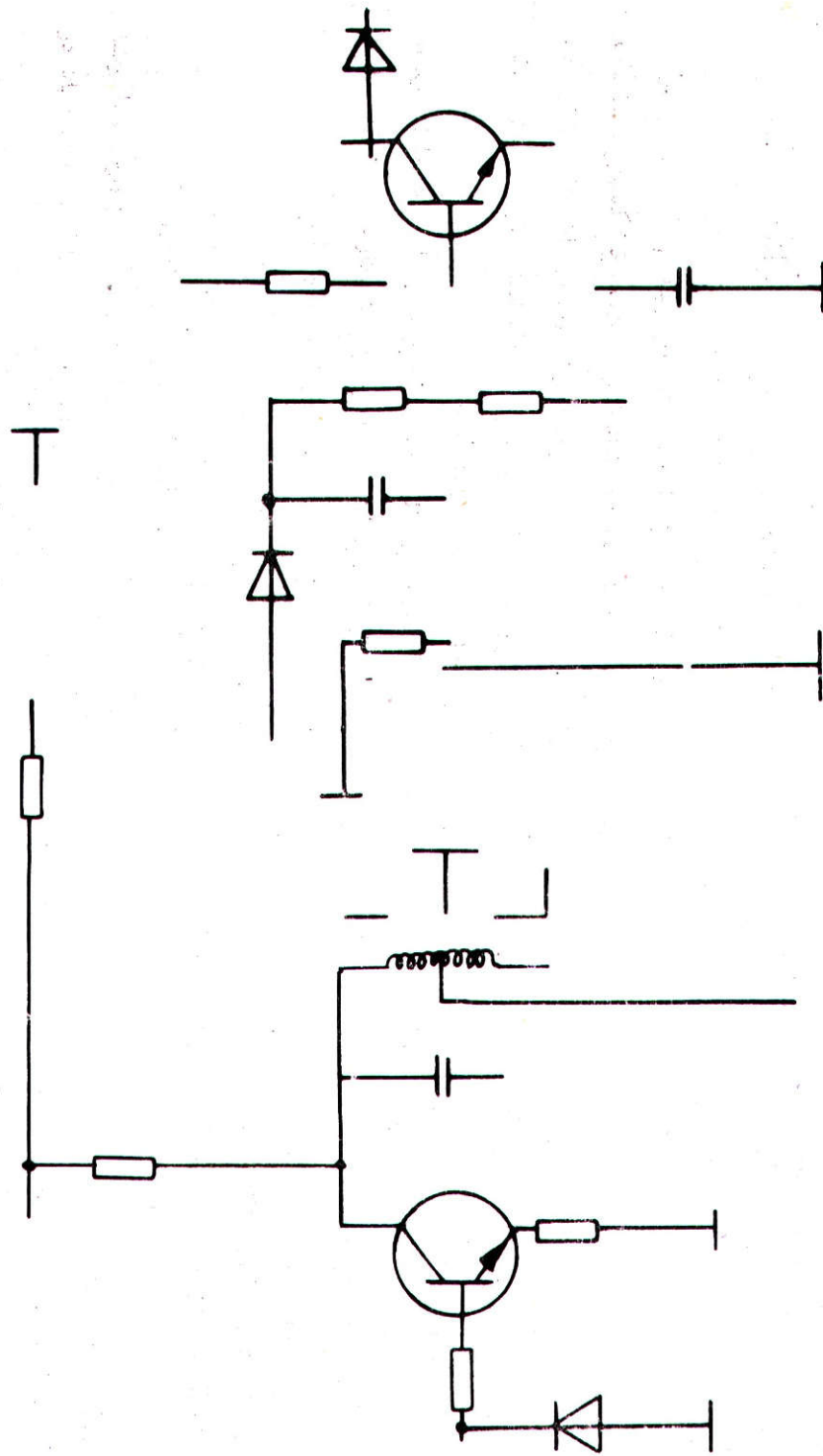


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio  
&  
T.V

COMPLETE CIRCUIT DIAGRAM OF BURST GATING AND COLOUR KILLER CIRCUIT



BURST GATING & COLOUR KILLER CIRCUIT

TECHNICAL DRG. NO.132

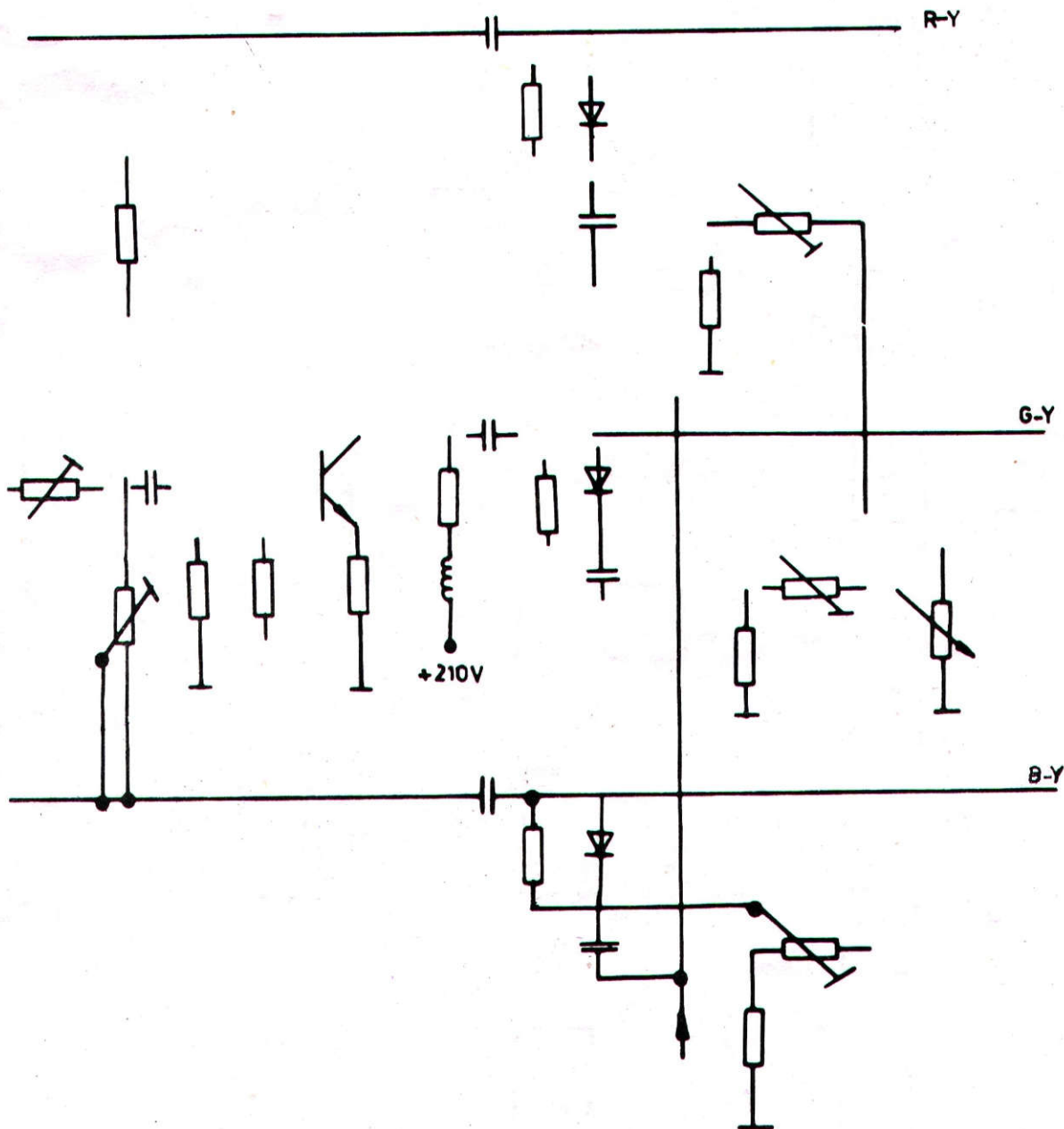


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio & T.V

COMPLETE CIRCUIT DIAGRAM OF MATRIX UNIT



MATRIX UNIT

TECHNICAL DRG.  
NO.133

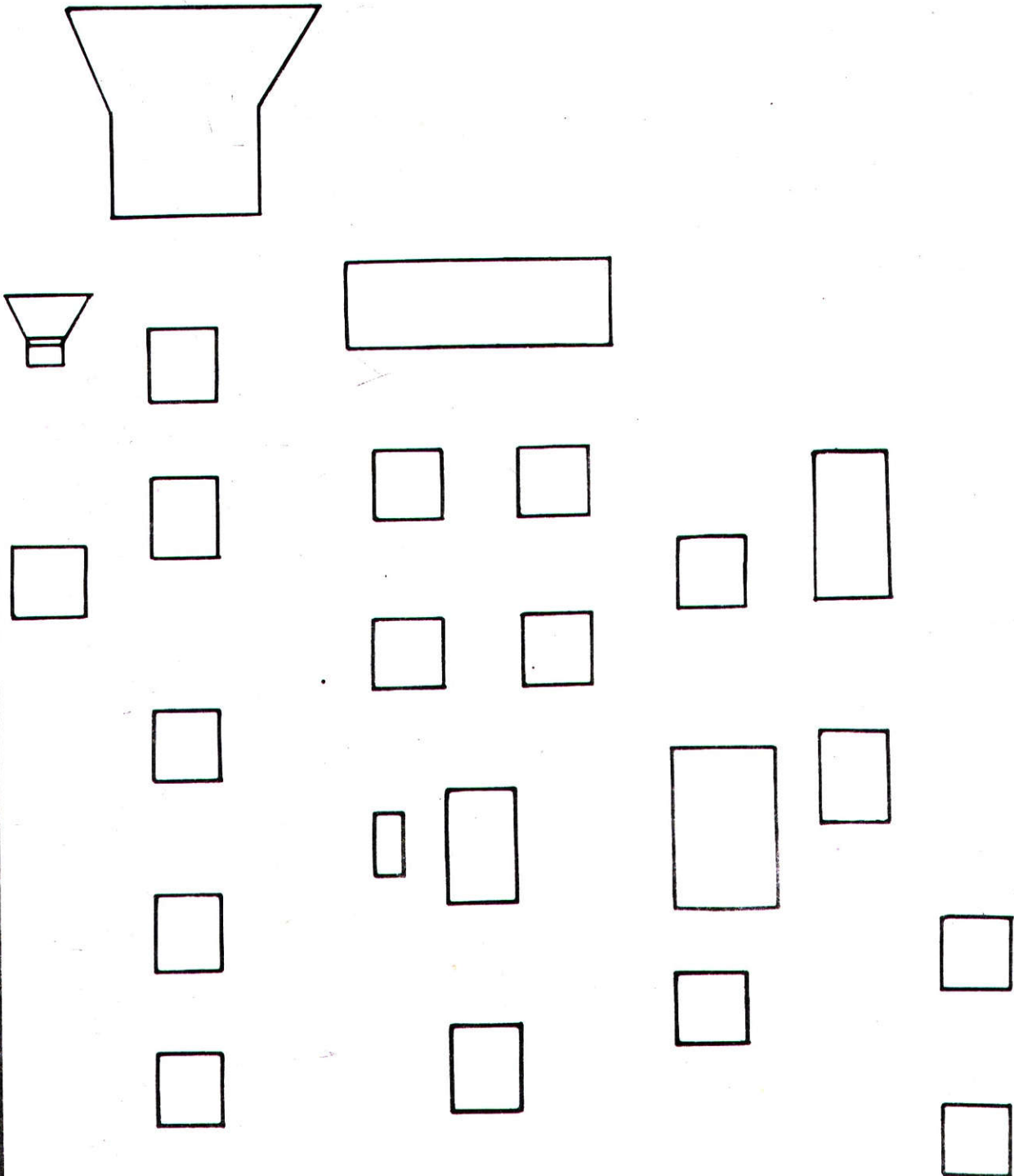


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio  
&  
T.V

COMPLETE BLOCK DIAGRAM AND INDICATE THE STAGE  
OF COLOUR T.V. RECEIVER



BLOCK DIAGRAM COLOUR T. V  
RECEIVER

TECHNICAL DRG  
NO. 134

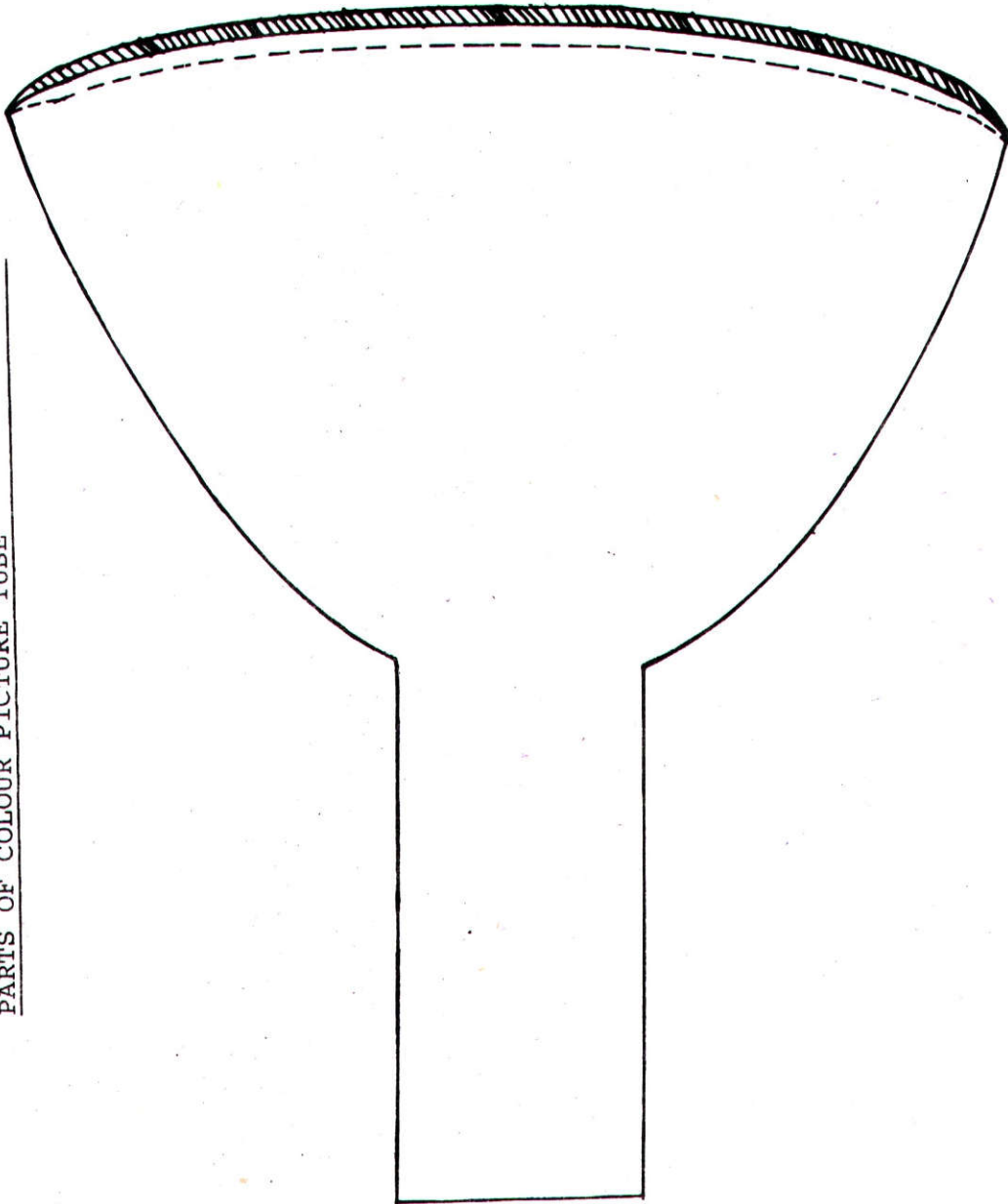


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio  
&  
T.V

COMPLETE COLOUR SHADOW MASK AND INDICATE THE PARTS OF COLOUR PICTURE TUBE



T.V COLOUR PICTURE TUBE

TECHNICAL DRG.  
NO.135



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

Radio  
&  
T.V