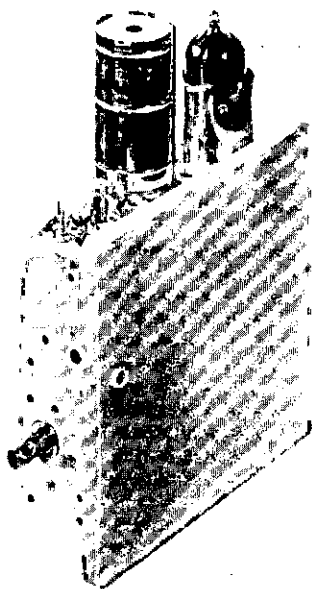


QUICK REFERENCE DATA

For use in domestic television receivers

Frequency range (continuously tunable)	470 to 890	Mc/s
Intermediate frequencies		
picture	39.5	Mc/s
sound	33.5	Mc/s



GENERAL

The tuning range from 470 to 890Mc/s of this tuner covers the television bands IV and V. Tuning is by means of a variable capacitor through a geared spindle having a rotation angle of approximately 967 degrees.

A PC88 in a grounded-grid circuit is used as an r.f. amplifier, and a PC86 operates as a self-oscillating mixer.

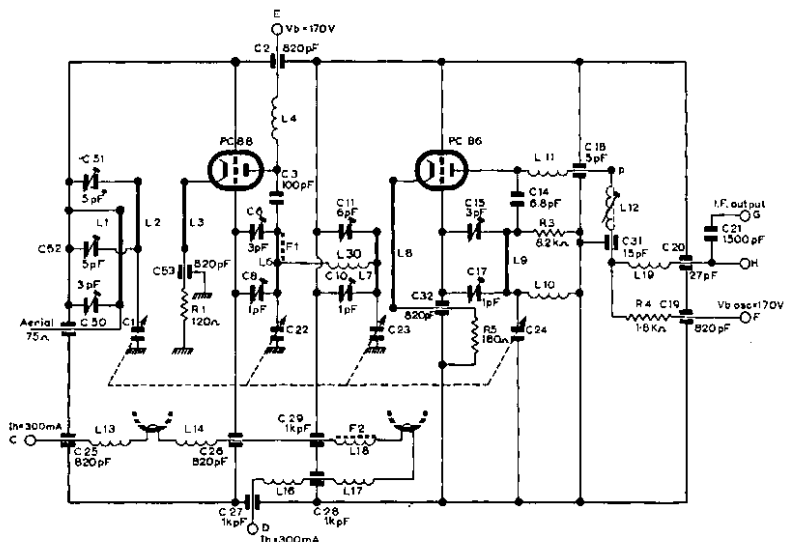


FIG. 1

Circuit diagram of tuner AT6360/02

TECHNICAL DATA

VALVES

R.F. amplifier	PC88
Self-oscillating mixer	PC86

TYPICAL OPERATING DATA

Oscillator supply	170	V
Preamplifier supply voltage	170	V
Total supply current (approx.)	25	mA
Valve heater current	300	mA
Valve heater voltage (each valve)	3.8	V

The position of the oscillator valve in the heater chain should be such that the r.m.s. heater-to-cathode voltage is less than 50V.

FREQUENCY RANGE	470 to 890	Mc/s
Spindle rotation angle (approx.)	967	deg

The frequency dependency is approximately linear. (See page C2).

GEARS

Ratio	1:5.4
Maximum permissible axial torque on tuner spindle	7.0 kg cm

INTERMEDIATE FREQUENCIES

Picture i.f.	39.5	Mc/s
Sound i.f.	33.5	Mc/s

The oscillator frequency is higher than the signal frequency.

The i.f. filter is adjusted to approximately 36.5 Mc/s.

AERIAL IMPEDANCE	75	Ω
STANDING WAVE RATIO	1:2	
R.F. BANDWIDTH at 3dB	10 to 18	Mc/s
GAIN		

For an i.f. bandwidth of 6Mc/s at 3dB

AT 470Mc/s	>25	dB
860Mc/s	>20	dB

NOISE FIGURES

AT 470Mc/s	<11	dB
650Mc/s	<13	dB
860Mc/s	<14	dB

IMAGE FREQUENCY REJECTION	Sec page C1	
Throughout bands IV and V	>58	dB

I.F. REJECTION	>60	dB
----------------	-----	----

OSCILLATOR STABILITY

At mains voltage variations of $\pm 10\%$	± 150	kc/s
Between 2 minutes and 2 hours after switching-on and including the effect of an additional rise of ambient temperature of 35°C .	<500	kc/s

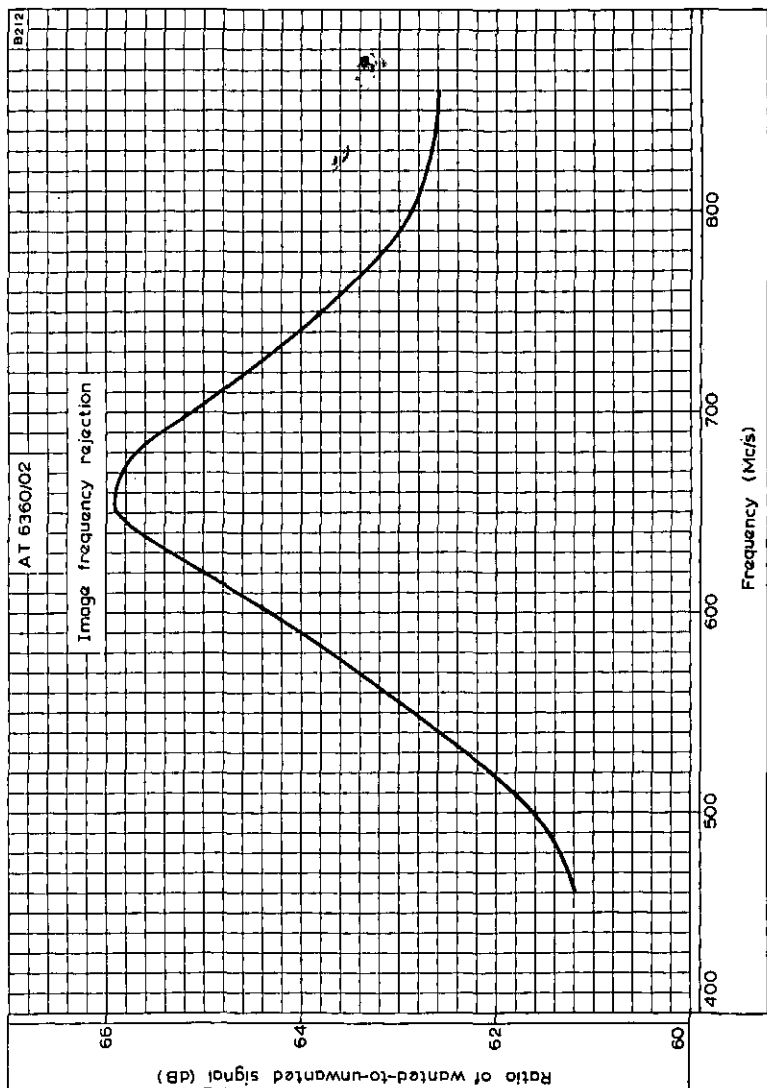
I.F. OUTPUT	Bottom capacitive coupling	
-------------	----------------------------	--

†Total output capacitance including the coaxial connecting cable (approx.)	60	pF
--	----	----

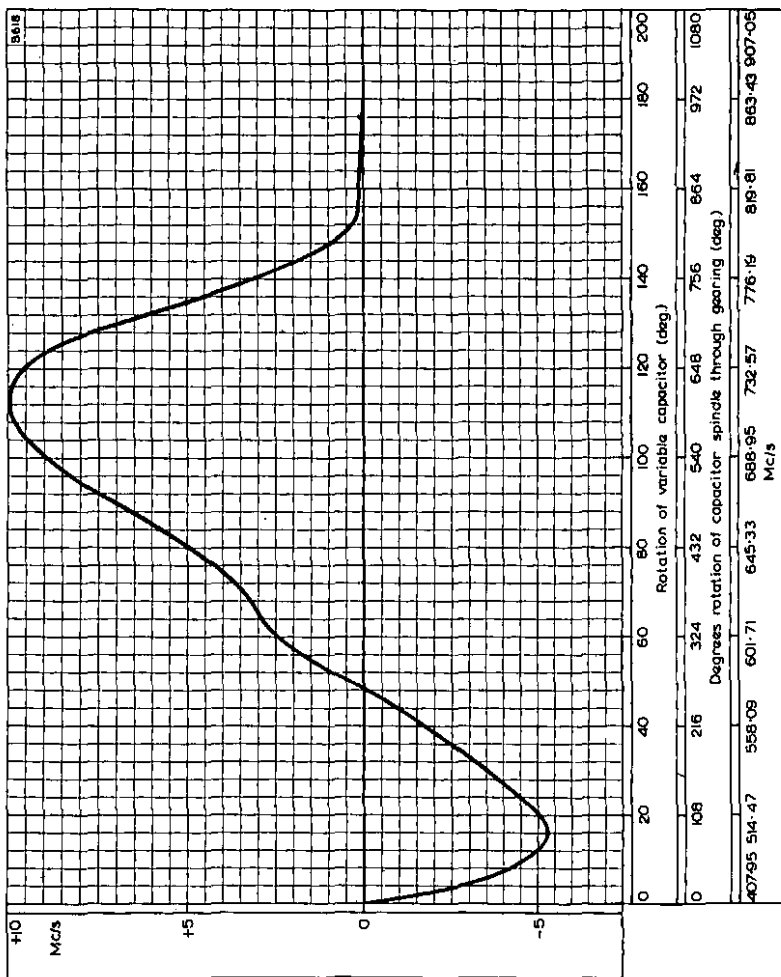
RADIATION (before mounting)

Total radiation at a distance of 10m	<450	$\mu\text{V}/\text{m}$
Chassis radiation at a distance of 10m	<50	$\mu\text{V}/\text{m}$
Oscillator voltage at i.f. output terminals	<1	mV

†This figure is dependent upon the bandwidth required.



TYPICAL IMAGE FREQUENCY REJECTION

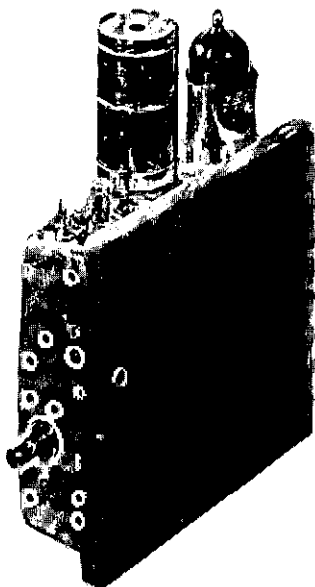


TYPICAL TRACKING CURVE

QUICK REFERENCE DATA

For use in domestic television receivers

This tuner is the same as the AT6360/02 with the addition of a.f.c.



GENERAL

The tuning range from 470 to 890Mc/s of this tuner covers the television bands IV and V. Tuning is by means of a variable capacitor through a geared spindle having a rotation angle of approximately 967 degrees.

A PC88 in a grounded-grid circuit is used as an r.f. amplifier, and a PC86 operates as a self-oscillating mixer.

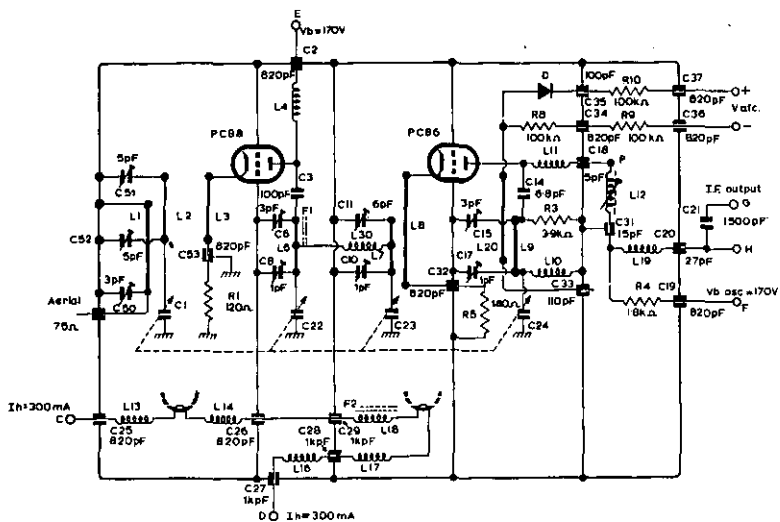
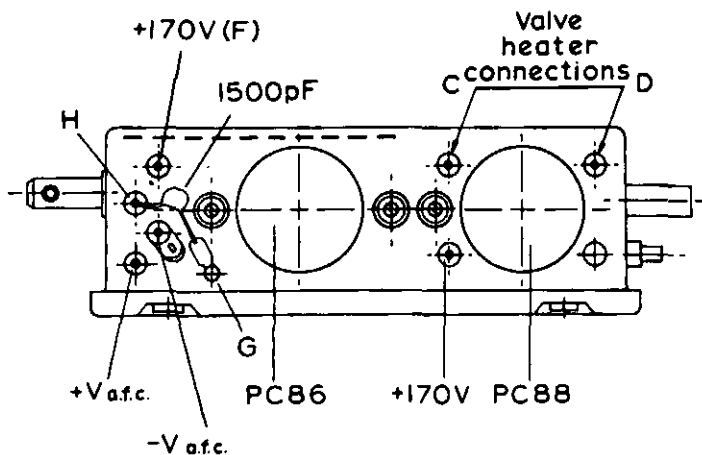


FIG. 2.

4517

Circuit diagram of tuner AT6361/02



CONNECTIONS

A. F. C. TUNING

Control voltage	0 to -20	V
Normal setting	-7.0	V
Frequency deviation	≥1.7	Mc/s

For all other data see data sheet AT6360/02

QUICK REFERENCE DATA

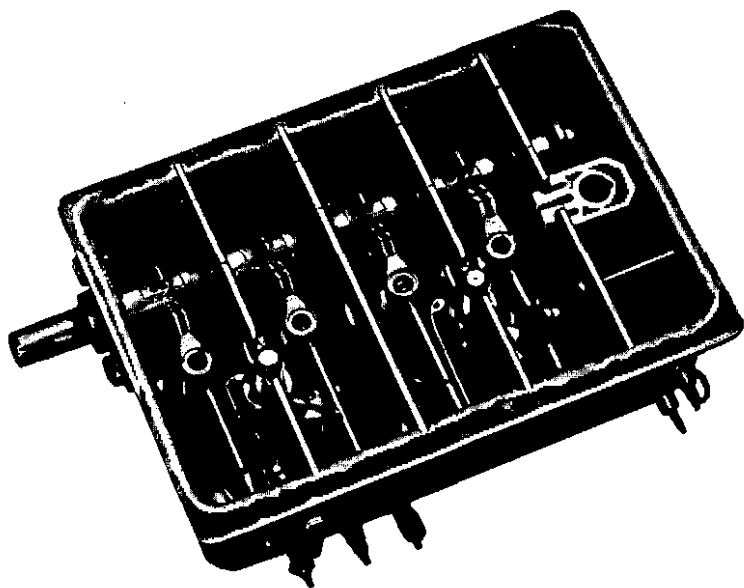
A transistorised television tuner for reception of television signals in the u.h.f. bands IV and V

Frequency coverage (continuously tunable) 470 to 890 MHz

Intermediate frequencies

picture 39.5 MHz

sound 33.5 MHz



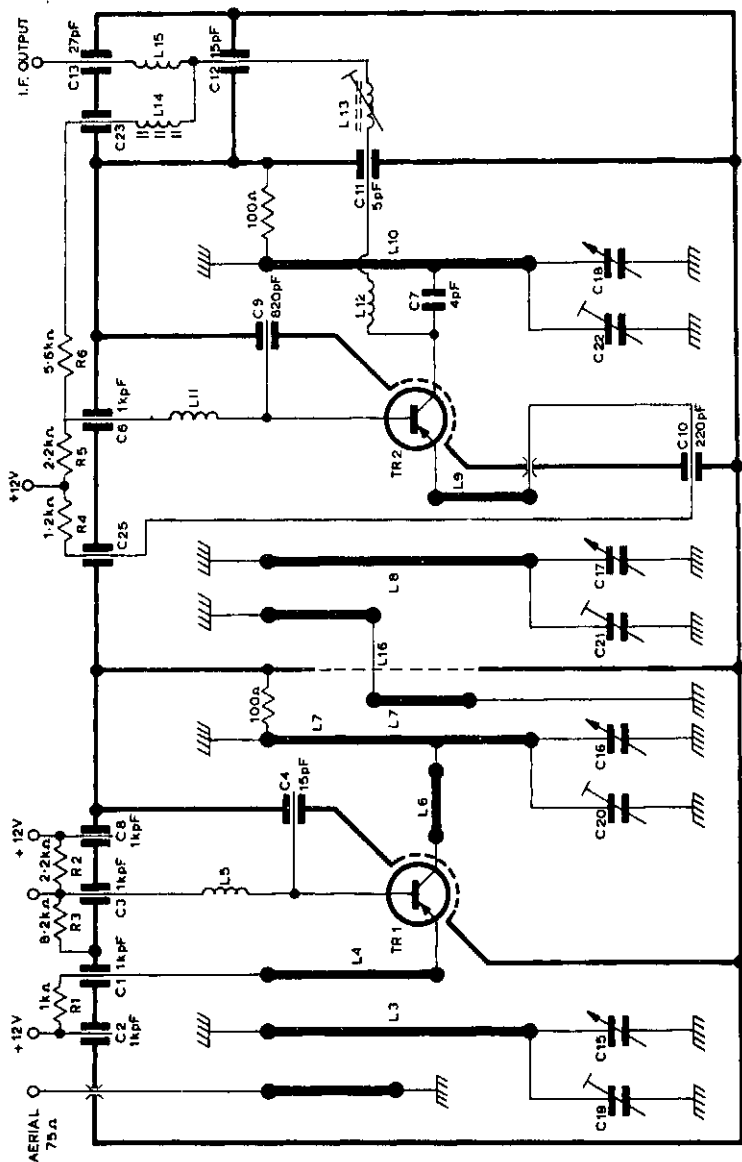
GENERAL

This continuously variable tuner has a tuning range from 470 to 890MHz which covers television signals in the u.h.f. bands IV and V.

It uses AF186 transistors both in the r.f. amplifier and mixer/oscillator stages. The use of transistors and 1/4 wave Lecher wires has made possible a considerable overall reduction in size of the tuner compared with valve tuners.

Tuning is achieved by a four gang variable capacitor, the spindle of which is brought out directly through the tuner case. The angle of rotation of the spindle is approximately 180° permitting the use of either a push drive unit or a reduction gear drive.

CIRCUIT DIAGRAM



TECHNICAL

Transistors

R. F. amplifier AF186

Oscillator/mixer AF186

Transistor supply

V_{supply} both stages (normal) 12 V

min. 9.5 V

I_{tot} (approx. without a.g.c.) 8.5 mA

Frequency range 470 to 890 MHz

Spindle rotation (approx.) 180 deg

C max. in clockwise direction, max. axial torque 5kg cm

Intermediate frequencies

picture i.f. 39.5 MHz

sound i.f. 33.5 MHz

Aerial impedance 75 Ω

Standing wave ratio < 1:2

Power gain - average throughout the band 15 dB

Power gain - minimum at 470MHz 11 dB

Gain reduction (forward a.g.c.) > 20 dB

Noise figures

at 470MHz (8.5dB average) < 10 dB

650MHz < 10 dB

800MHz (10dB average) < 11.5 dB

Image frequency rejection > 53 dB

I. F. rejection > 60 dB

I. F. output bottom capacitive coupling 60pF (approx.)

Total output capacitance including co-axial connecting cable, and dependent upon the coupling.

Oscillator stability

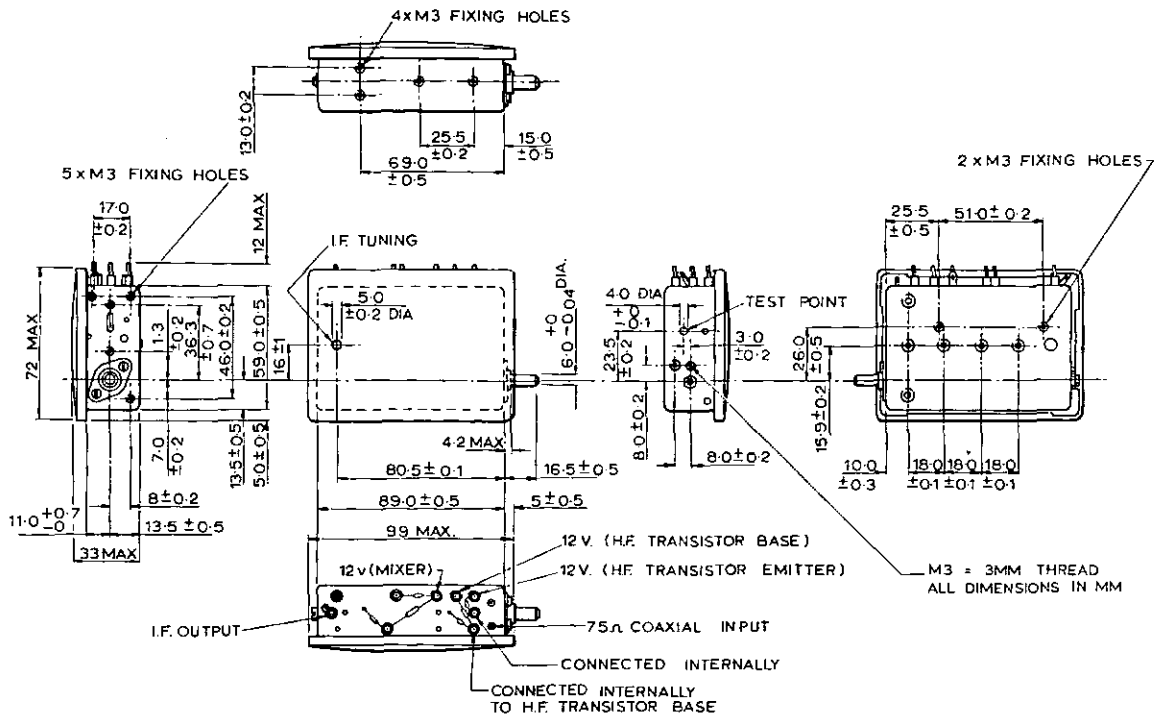
Voltage dependency: 470 to 800MHz < 200 kHz/volt

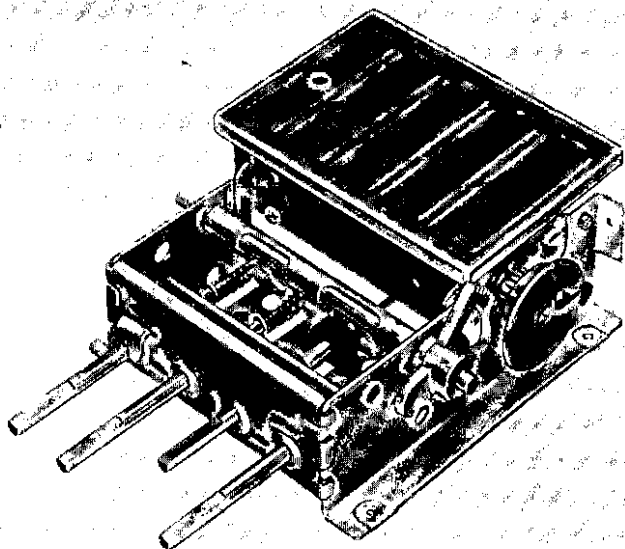
800 to 890MHz < 350 kHz/volt

Temperature dependency: between 2 and 60 minutes after switch on and including a rise in ambient temperature of 15 degrees centigrade < 500 kHz

Radiation

The tuner meets the requirements of B.S. 805 1959





This tuner is an AT6380/02 tuner with a four button push-button unit coupled in for preset tuning.

The data sheet on AT6380/02 should be consulted for all electrical data.

QUICK REFERENCE DATA

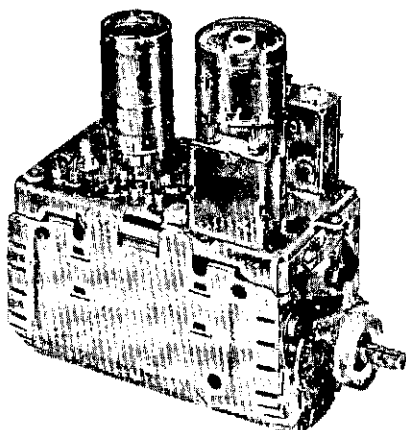
A 13 position tuner for reception of television signals in bands I and III.

Frequency coverage

Band I	41.5 to 68	Mc/s
Band III	174 to 223	Mc/s

Intermediate frequencies

Picture	34.65	Mc/s
Sound	38.15	Mc/s

**GENERAL**

This tuner is designed for reception of television signals in bands I and III. It utilises printed coil strips, which are loaded into the 13 positions in a non-sequential manner, such that quick programme selection may be made in most areas.

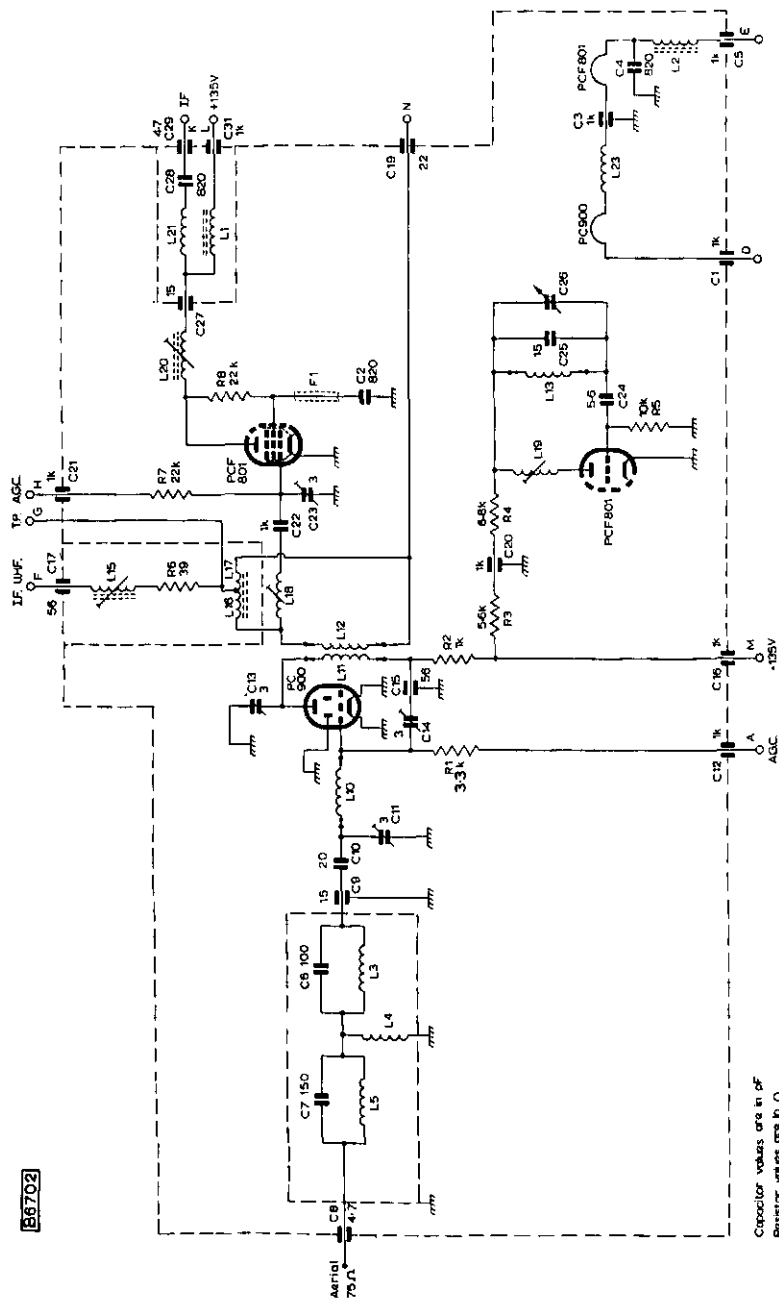
Fine tuning is capacitive and needs only to be set in initially. Subsequently it is brought in automatically when the channel is re-selected.

A PC900 is used as an r.f. amplifier followed by a PCF801 as an oscillator/mixer, the pentode section of which has a remote cut-off characteristic.

The pentode section of the PCF801 can be used as an i.f. amplifier in conjunction with a U.H.F. tuner. In this case ample gain reduction can be obtained when an a.g.c. voltage is applied to the control grid via the transformer coupling circuit. The supply voltage to the mixer stage is separate from that of the r.f. and oscillator stages, in order that U.H.F./V.H.F. reception can be effected by means of a simple d.c. supply switch.

Alternative coil strips for reception of 625 line wired distribution signals are available for insertion into certain positions of the tuner.

CIRCUIT DIAGRAM



86702

Capacitor values are in pF
Resistor values are in Ω .

TECHNICAL DATA

Valves

R. F. amplifier	PC900
Oscillator/mixer	PCF801

Typical operating data

PC900 and oscillator stage of PCF801

V_b	135	V
I max. (measured at point A via a 1.0M Ω to earth)	25	mA

Mixer stage of PCF801

V_b	135	V
I max.	11	mA
V_f (each valve)	12	V
I_f nom. (total)	300	mA

Channel frequency

	Channel	Carrier frequency (Mc/s)	
		picture	sound
Band I	1	45.0	41.5
	2	51.75	48.25
	3	56.75	53.25
	4	61.75	58.25
	5	66.75	63.25
Band III	6	179.75	176.25
	7	184.75	181.25
	8	189.75	186.25
	9	194.75	191.25
	10	199.75	196.25
	11	204.75	201.25
	12	209.75	206.25
	13	214.75	211.25

Channel loading sequence

1, 9, 2, 10, 3, 11, 5, 8, 4, 12, 13, 7, 6

Fine tuning range Δf min. 1.8 Mc/s
 Δf max. 8.0 Mc/s

R. F. bandwidth Band I 5 to 10 Mc/s
 Band III at 3dB points 5 to 15 Mc/s

Measured at point II, with 220k Ω connected to earth, with the oscillator working and with $V_{agc} = -1.4V$.

I. F. frequencies picture carrier 34.65 Mc/s
 sound carrier 38.15 Mc/s

The oscillator frequency is higher than the receiving frequency. The i. f. primary coil is adjusted to 36.4Mc/s.

Aerial input impedance (unbalanced) 75 Ω
 Reflections (at maximum gain) ≤ 40 %

Gain (from the aerial to the grid of the first i. f. for an i. f. bandwidth of 7.0Mc/s at 6dB points and flat within 5%) > 43 dB

Gain of the pentode part of PCF801 as an i. f. amplifier 20 dB

Noise Band I ≤ 5.5 dB
 Band III ≤ 7.8 dB

Image frequency suppression Band I > 60 dB
 Band III > 54 dB

I. F. suppression Band I Both picture > 40 dB
 Band III and sound* > 60 dB

Reset accuracy when switching from one channel to another and back again $\Delta f_{osc} < 100$ kc/s

Oscillator frequency stability

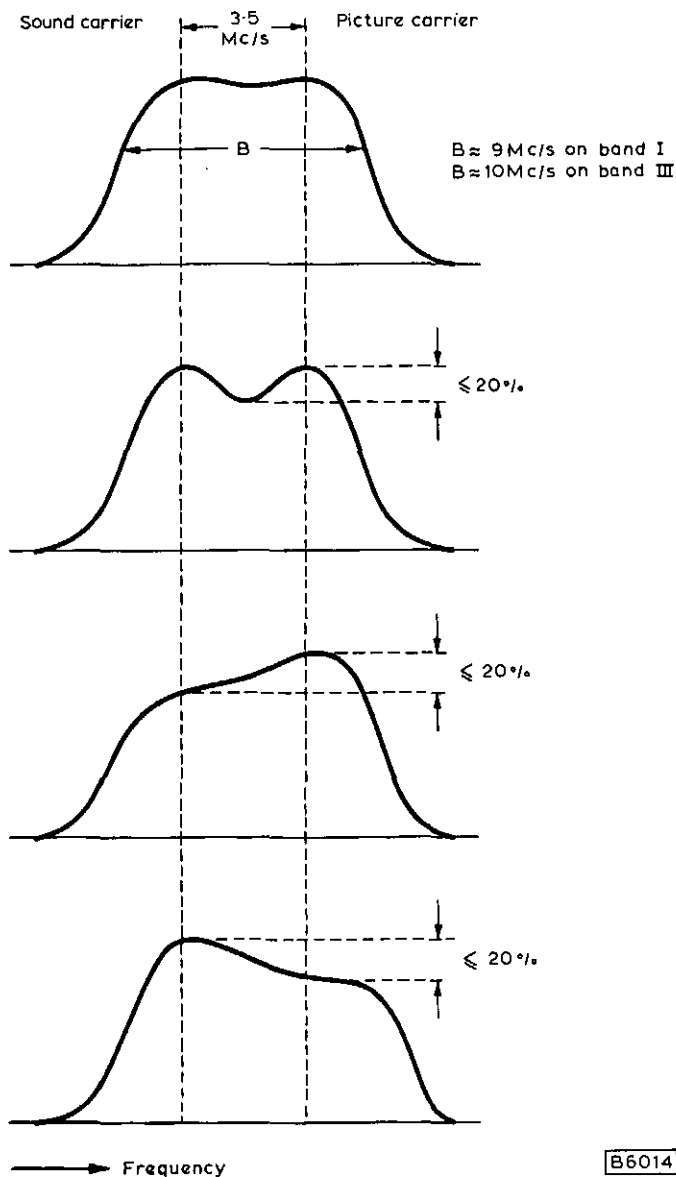
For change in supply voltage of $\pm 10\%$ $\Delta f_{osc} \pm 150$ kc/s

Temperature drift $\Delta f_{osc} < 250$ kc/s

Measured between 2 and 60 minutes after switching on, together with gradual rise in temperature from 20 to 55°C.

*Except channel I sound $> 36dB$

Ideal bandpass curves



RADIATION

The radiation from the tuner complies with B.S. 905 and the amendments in respect of radiation in the U.H.F. bands given in BREMA technical bulletin No. 284.

EXTERNAL CONNECTIONS

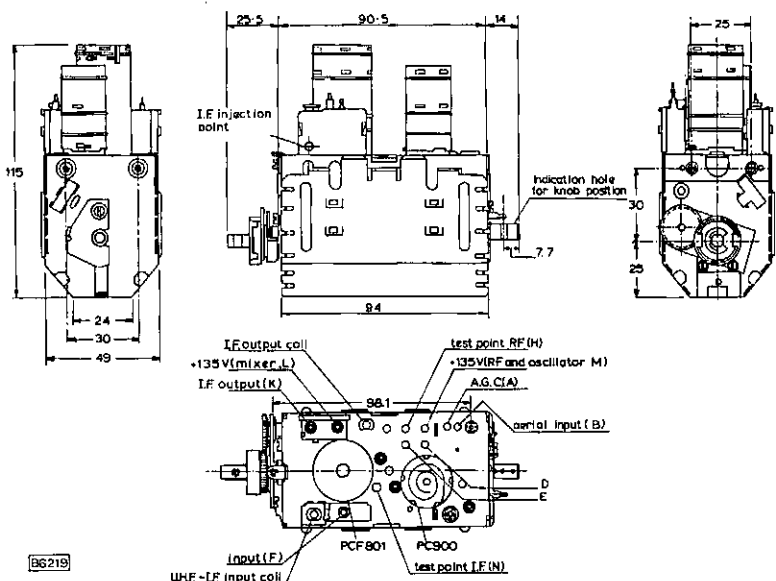
For normal operation point A must be connected to earth via $1.0M\Omega$ (to prevent overload of the PC900), point H must be connected to earth via $220k\Omega$ and the a.g.c. voltage must be connected to point A.

When used as an i.f. amplifier for U.H.F. the $220k\Omega$ must be removed and the a.g.c. connected to point H.

TESTING THE I.F. BANDPASS CURVES

Point N should be used for testing. The supply should be removed from point M (oscillator not operating), point F should be connected to earth and the tuner set to a channel in band III.

OUTLINE AND DIMENSIONS



QUICK REFERENCE DATA

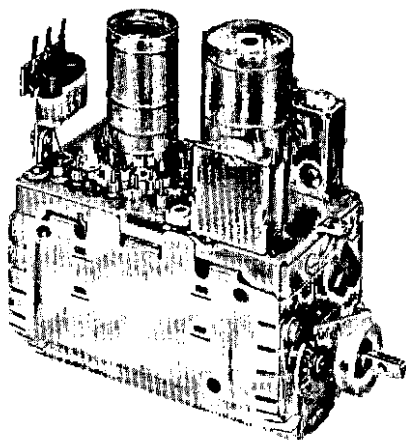
A 13 position tuner for reception of television signals of C.C.I.R. channels in bands I and III

Frequency coverage

Band I	47 to 68	Mc/s
Band III	174 to 223	Mc/s

Intermediate frequencies

Picture	38.9	Mc/s
Sound	33.4	Mc/s



GENERAL

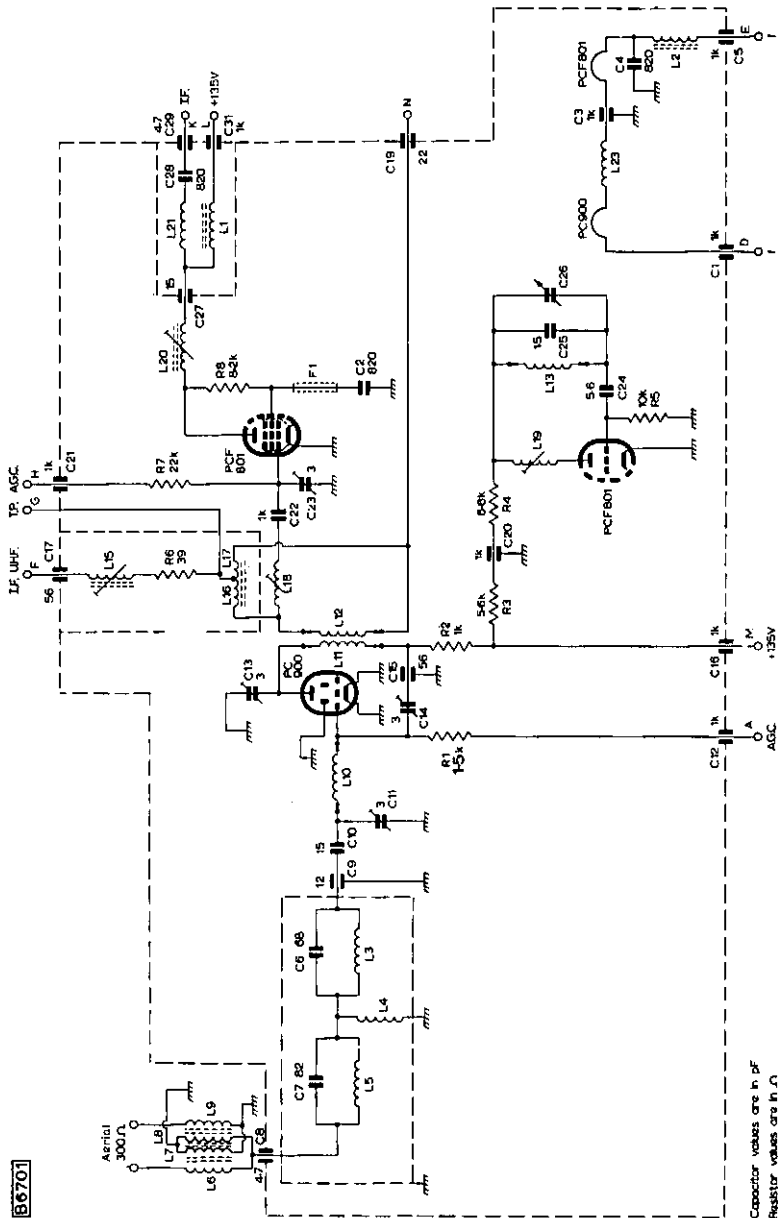
This tuner is designed for reception of C.C.I.R. television channels in bands I and III. It covers the normal European channels 2 to 11, but coil strips for reception of transmission other than the standard are available. These can be loaded into spare positions.

Fine tuning is capacitive and needs only to be set in initially. Subsequently it is brought in automatically when the channel is re-selected.

A PC900 is used as an r.f. amplifier followed by a PC801 as an oscillator/mixer, the pentode section of which has a remote cut-off characteristic.

The pentode section of the PCF801 can be used as an i.f. amplifier in conjunction with a U.H.F. tuner. In this case ample gain reduction can be obtained when an a.g.c. voltage is applied to the control grid via the transformer coupling circuit. The supply voltage to the mixer stage is separate from that of the r.f. and oscillator stages, in order that U.H.F./V.H.F. reception can be effected by means of a simple d.c. supply switch.

CIRCUIT DIAGRAM



Capacitor values are in pF
Resistor values are in Ω

B6701

TECHNICAL DATA

Valves

R.F. amplifier	PC900
Oscillator/mixer	PCF801

Typical operating data

PC900 and oscillator stage of PCF801

V_b	135	V
I max. (measured at point A via 1.0M Ω to earth)	25	mA

Mixer stage of PCF801

V_b	135	V
I max.	11	mA
V_f (each valve)	12	V
I_f nom. (total)	300	mA

Channel frequency

	Channel	Carrier frequency (Mc/s) picture	sound
Band I	2	48.25	53.75
	3	55.25	60.75
	4	62.25	67.75
Band III	5	175.25	180.75
	6	182.25	187.75
	7	189.25	194.75
	8	196.25	201.75
	9	203.25	208.75
	10	210.25	215.75
	11	217.25	222.75

Channel loading is sequential

Fine tuning range Δf min.	1.8	Mc/s
Δf max.	8.0	Mc/s

R.F. bandwidth	Band I	5 to 10	Mc/s
	Band III	5 to 15	Mc/s

at the 3dB points

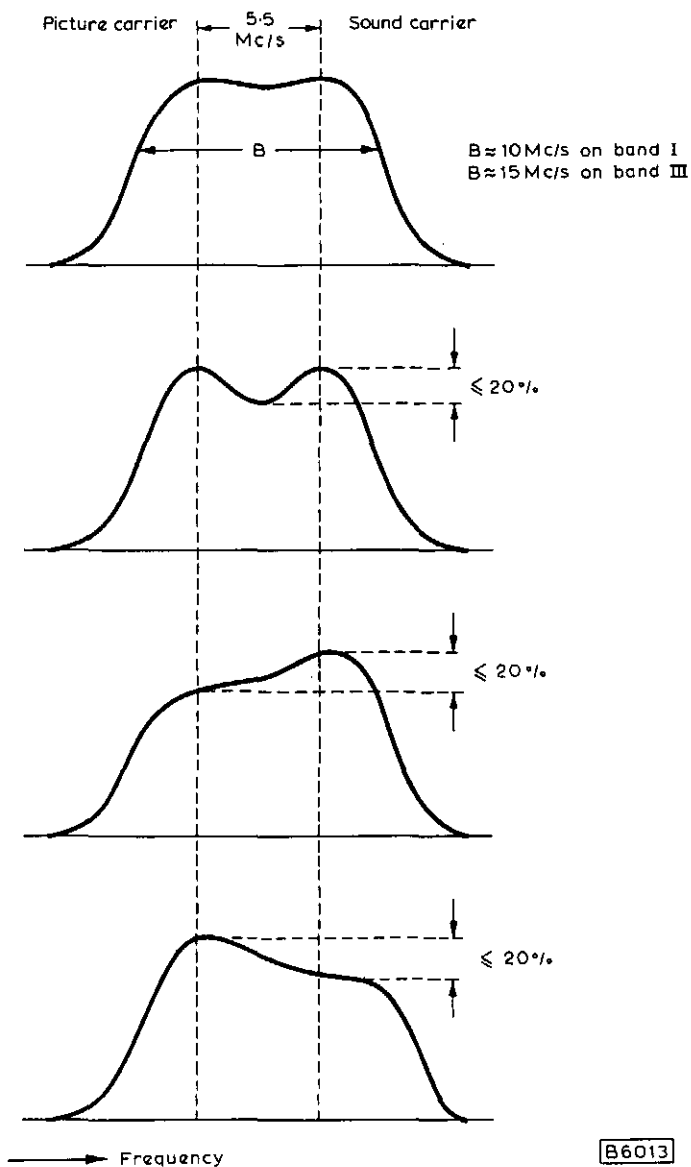
Measured at point H with 220k Ω connected to earth, with the oscillator working and with $V_{agc} = -1.4V$.

I. F. frequencies	picture carrier	38.9 Mc/s
	sound carrier	33.4 Mc/s

The oscillator frequency is higher than the receiving frequency. The i.f. primary coil adjusted to 36.5Mc/s.

Aerial input impedance (balanced)		300	Ω
Reflections (at maximum gain)		≤ 40	%
Gain (from the aerial to the grid of the first i.f. for an i.f. bandwidth of 6.5Mc/s at the 3dB points and flat within 5%)		> 35	dB
Gain of the pentode part of the PCF801 as an i.f. amplifier		20	dB
Noise	Band I	≤ 6.5	dB
	Band III	≤ 7.8	dB
Image frequency suppression	Band I	> 60	dB
	Band III	> 54	dB
I. F. suppression	Band I	both picture	> 40 dB
	Band III	and sound	> 60
Reset accuracy when switching from one channel to another and back again		$\Delta f_{osc} < 100$	kc/s
Oscillator frequency stability			
For change in supply voltage of $\pm 10\%$		$\Delta f_{osc} \pm 150$	kc/s
Temperature drift		$\Delta f_{osc} < 250$	kc/s
Measured between 2 and 60 minutes after switching on, together with gradual rise in temperature from 20 to 55°C.			

Ideal bandpass curves



RADIATION

The radiation from the tuner complies with the requirements specified by the German Post Office.

EXTERNAL CONNECTIONS

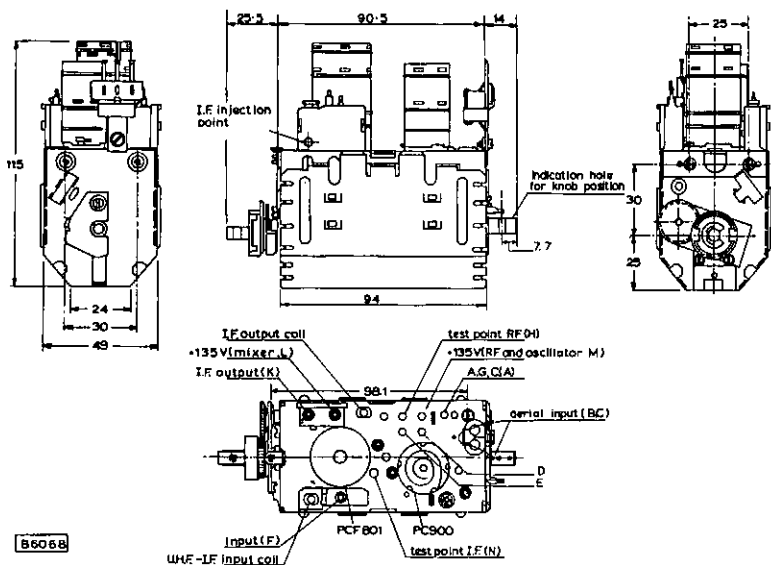
For normal operation point A must be connected to earth via $1.0M\Omega$ (to prevent overload of the PC900), point H must be connected to earth via $220k\Omega$ and the a.g.c. voltage must be connected to point A.

When used as an i.f. amplifier for U.H.F. the $220k\Omega$ must be removed and the a.g.c. connected to point H.

TESTING THE I.F. BANDPASS CURVES

Point N should be used for testing. The supply should be removed from point M (oscillator not operating), point F should be connected to earth and the tuner set to a channel in band III.

OUTLINE AND DIMENSIONS



QUICK REFERENCE DATA

This is a transistorised 13 position tuner for reception of television channels in bands I and III.

Frequency coverage

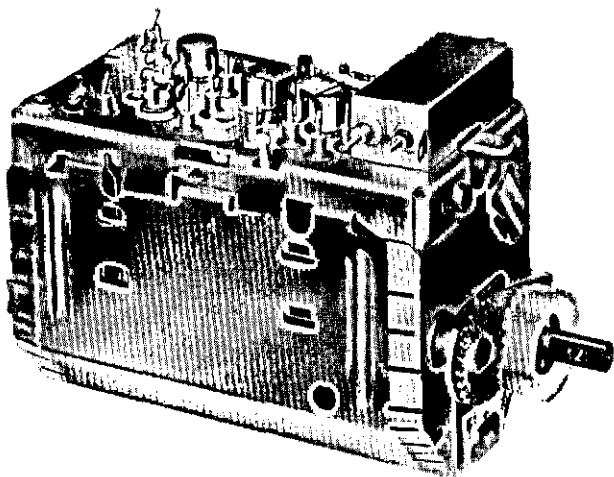
Band I	41 to 68	MHz
--------	----------	-----

Band III	174 to 223	MHz
----------	------------	-----

Intermediate frequencies

Picture	34.65	MHz
---------	-------	-----

Sound	38.15	MHz
-------	-------	-----



GENERAL

This transistorised tuner is designed for reception of television signals in bands I and III. The 13 positions are loaded in a non-sequential manner, such that quick programme selection may be made in most areas.

Fine tuning is capacitive and needs only to be set in initially. Subsequently it is brought in automatically when the channel is re-selected.

An AF180 is used in the r.f. stage, followed by two AF178's as mixer and oscillator. Gain reduction of up to 40dB can be obtained when forward a.g.c. is applied to the r.f. stage.

TECHNICAL DATA

Transistors

R. F. amplifier	AF180
Oscillator	AF178
Mixer	AF178

Typical operating data

R. F. amplifier

I_B (approx.)	50	μA
I_E (nom.)	2.5	mA
$V_{a.g.c.}$	12	V

Oscillator stage

I_B (approx.)	920	μA
I_E (approx.)	1.85	mA
V_B	12	V

Mixer stage

I_B (approx.)	1.15	mA
I_E (approx.)	1.9	mA
V_B	12	V

Channel loading

1, 6, 7, 13, 12, 4, 8, 5, 11, 3, 10, 2, 9

This loading cannot be altered without seriously affecting the overall performance of the tuner.

Fine tuning range	Band I	2.5 to 5.0	MHz
	Band III	2.5 to 8.0	MHz
R. F. bandwidth	Band I	≤ 14	MHz
	Band III	≤ 12	MHz

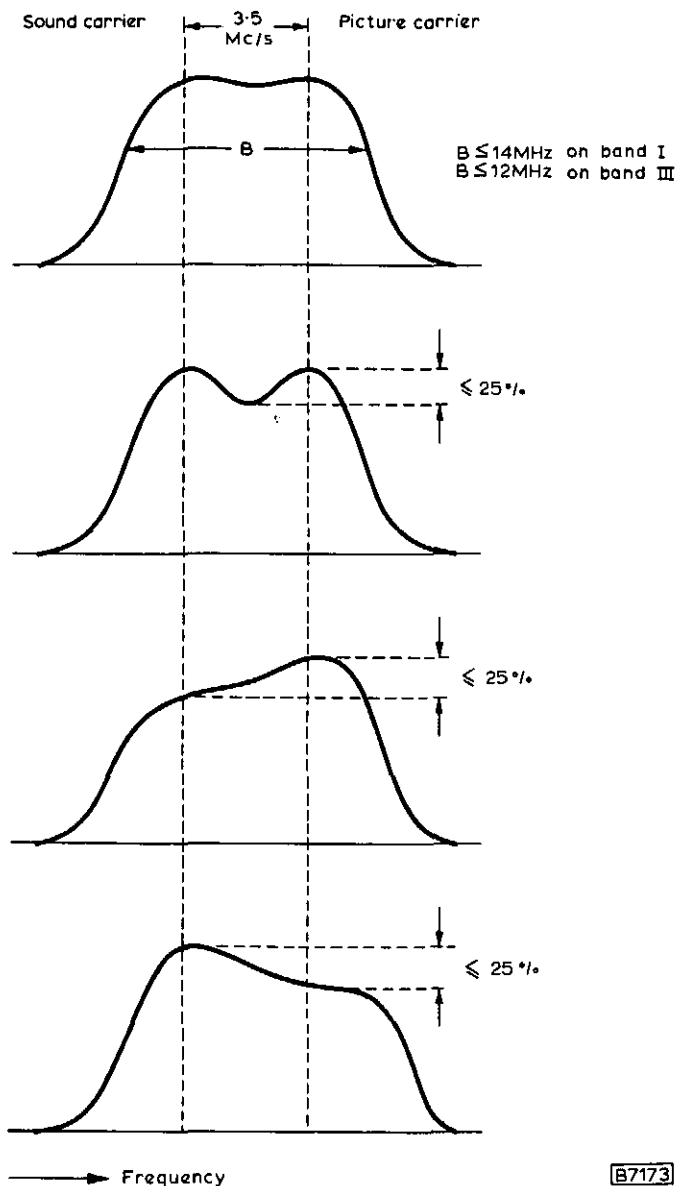
Measured at the 3dB points (the r.f. bandpass curves are adjusted at $I_E = 2.5mA$)

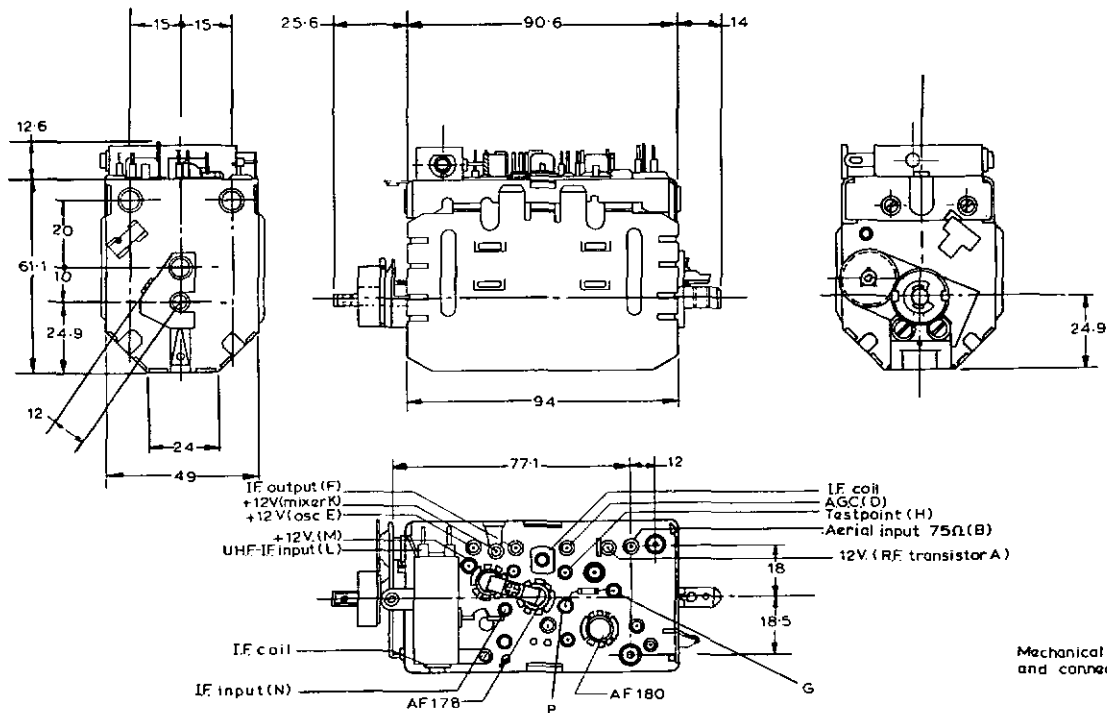
I. F. frequency	Picture carrier	34.65	MHz
	Sound carrier	38.15	MHz

The i.f. frequency of the tuner is adjusted to 36.4MHz (approx.).

Aerial input impedance (unbalanced)		75	Ω
Reflections (at maximum gain and $I_E = 2.5\text{mA}$)		≤ 40	%
Gain (measured from the aerial to the first i.f. amplifier, for an i.f. bandwidth of 6.5MHz at the 3dB points and flat within 5%)		≥ 32	dB
Noise	Band I	< 7.0	dB
	Band III	< 8.0	dB
Image frequency suppression	Band I	> 54	dB
	Band III	> 35	dB
At $V_{a.g.c.} = 12\text{V}$ for both sound and vision			
I. F. suppression	Band I	> 40	dB
	Band III	> 54	dB
At $V_{a.g.c.} = 12\text{V}$ and signal input $\leq 100\mu\text{V}$			
Reset accuracy (when switching from one channel to another, and back again)	Δf_{osc}	< 100	kHz
Oscillator frequency stability			
For $V_{supply} = 12\text{V}$ nom.			
Band I for	$\Delta V_{supply} = -2.0\text{V}$	Δf_{osc}	≤ -150 kHz
	$\Delta V_{supply} = +2.0\text{V}$	Δf_{osc}	$\leq +120$ kHz
Band III for	$\Delta V_{supply} = -2.0\text{V}$	Δf_{osc}	≤ -500 kHz
	$\Delta V_{supply} = +2.0\text{V}$	Δf_{osc}	$\leq +400$ kHz
Temperature drift (measured between 0 and 30 minutes after switch-on, together with a gradual rise in temperature from 25 to 55°C)			
		< 400	kHz

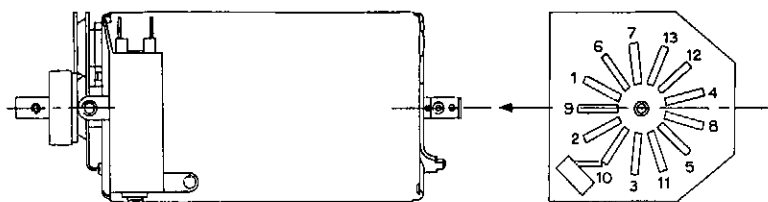
IDEAL R. F. BANDPASS CURVES





Mechanical dims.
and connections

87002



Position of coil
strips with respect to
indent on spindle with
channel 10 connected to stator

B7169

QUICK REFERENCE DATA

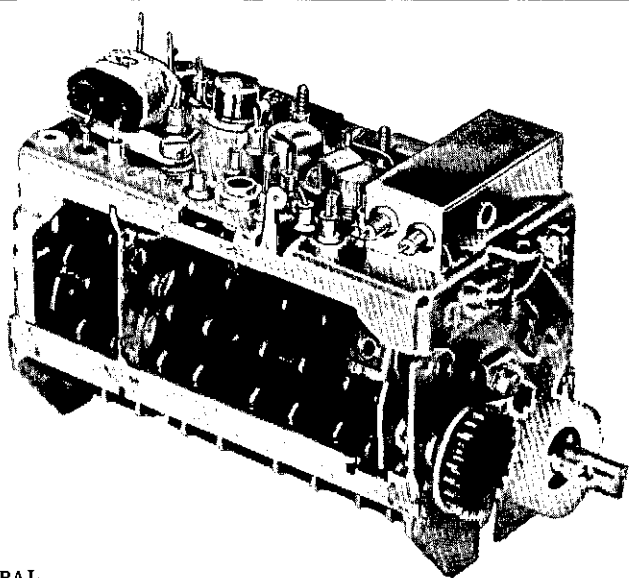
This is a transistorised 13 position tuner for reception of television signals of C.C.I.R. channels in bands I and III.

Frequency coverage

Band I	47 to 68	MHz
Band III	174 to 223	MHz

Intermediate frequencies

Picture	38.9	MHz
Sound	33.4	MHz

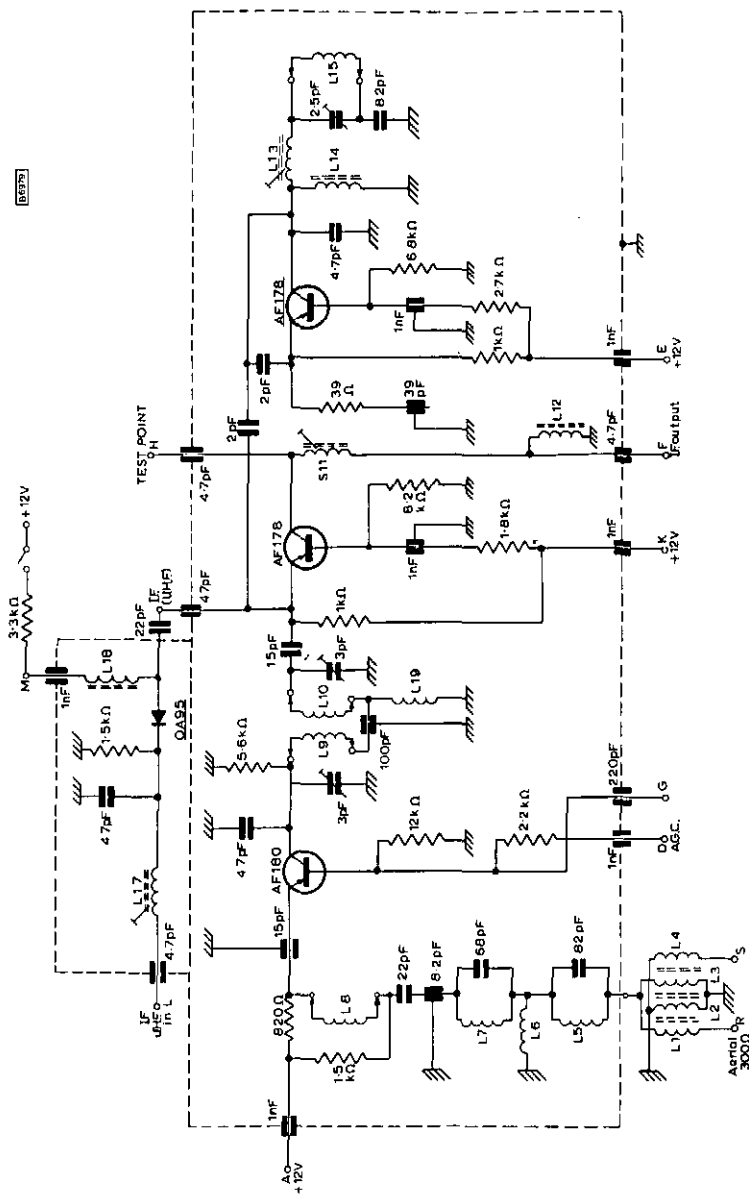


GENERAL

This transistorised tuner is designed for reception of C.C.I.R. television channels in bands I and III. It covers the normal European channels 2 to 11 and has 13 switched positions.

Fine tuning is capacitive and needs only to be set in initially. Subsequently it is brought in automatically when the channel is re-selected.

An AF180 is used in the r.f. stage, followed by two AF178's as mixer and oscillator. Gain reduction of up to 40dB can be obtained when forward a.g.c. is applied to the r.f. stage.



TECHNICAL DATA

Transistors

R. F. amplifier	AF180
Oscillator	AF178
Mixer	AF178

Typical operating data

R. F. amplifier

I_B (approx.)	50	μA
I_E (nom.)	2.5	mA
$V_{a.g.c.}$	12	V

Oscillator stage

I_B (approx.)	920	μA
I_E (approx.)	1.85	mA
V_B	12	V

Mixer stage

I_B (approx.)	1.15	mA
I_E (approx.)	1.9	mA
V_B	12	V

Channel loading is sequential and cannot be altered without seriously affecting the overall performance of the tuner.

Fine tuning range

Band I	Δf min.	2.5	MHz
	Δf max.	5.0	MHz
Band III	Δf min.	2.5	MHz
	Δf max.	8.0	MHz
R. F. bandwidth	Band I	≤ 14	MHz
	Band III	≤ 12	MHz

Measured at the 3dB points (the r.f. bandpass curves are adjusted at $I_E = 2.5mA$)

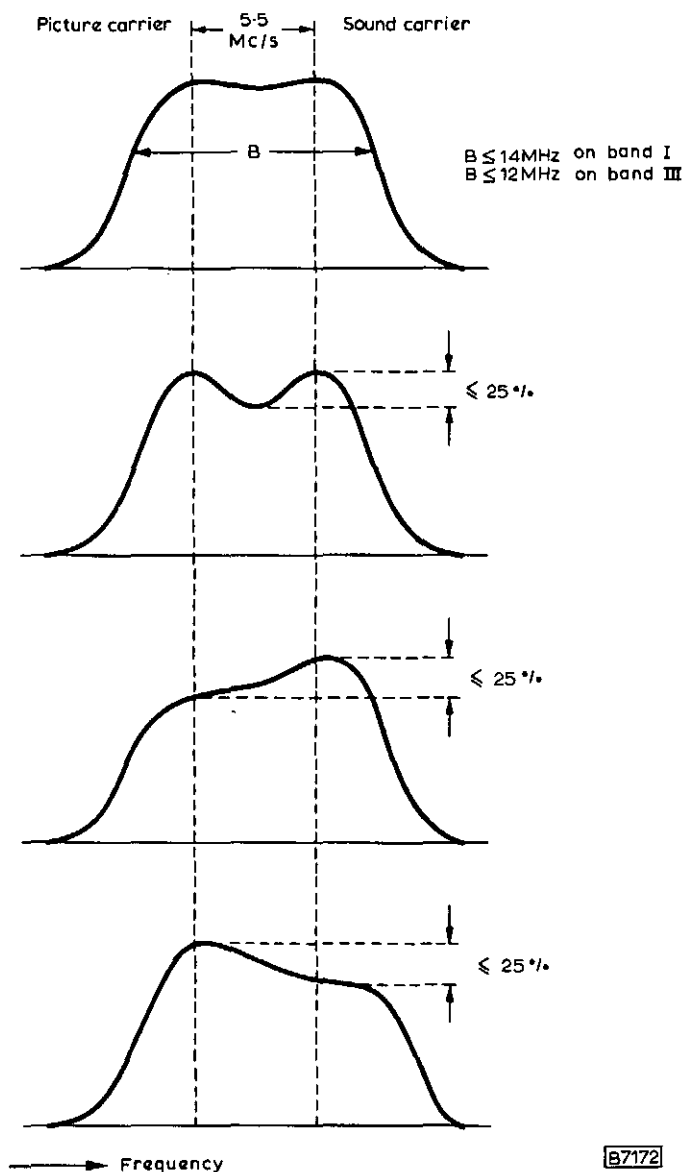
I. F. frequency	Picture carrier	38.9	MHz
	Sound carrier	33.4	MHz

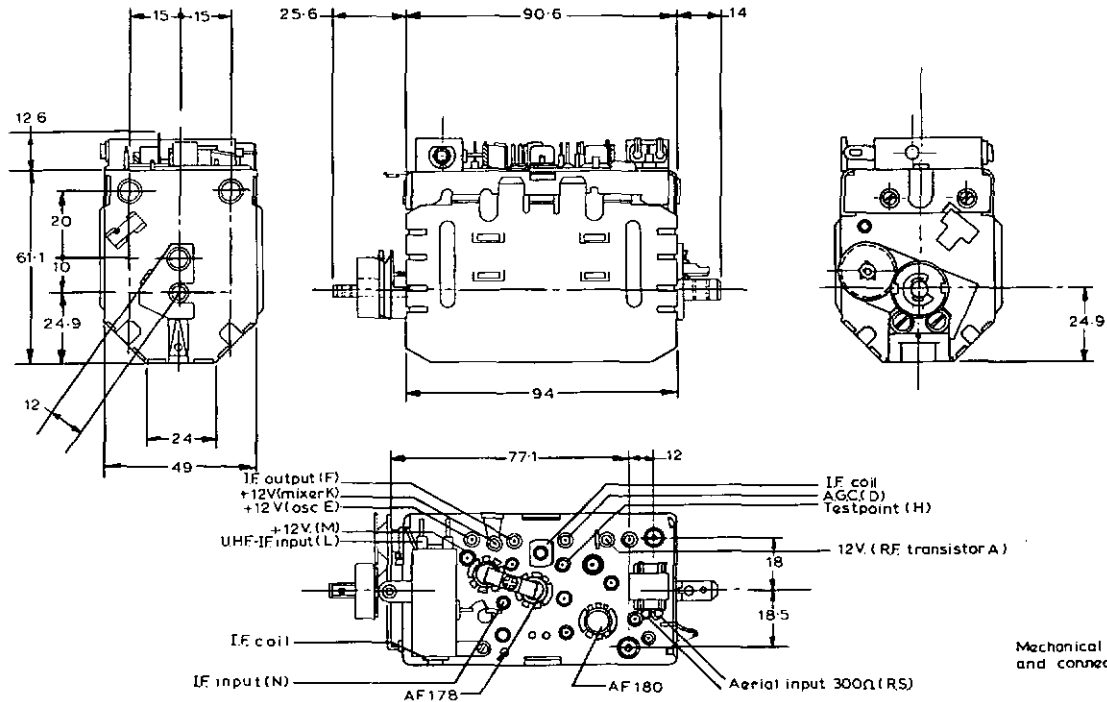
The i.f. frequency of the tuner is adjusted to 36.5MHz (approx.).



Aerial input impedance (balanced)		300	Ω
Reflections (at maximum gain and $I_E = 2.5\text{mA}$)		≤ 40	%
Gain (measured from the aerial to the first i.f. amplifier, for an i.f. bandwidth of 6.5MHz at the 3dB points and flat within 5%)		≥ 26	dB
Noise	Band I	< 7.0	dB
	Band III	< 9.5	dB
Image frequency suppression	Band I	> 32	dB
	Band III	> 46	dB
At $V_{\text{a.g.c.}} = 12\text{V}$ for both sound and vision			
I.F. suppression	Band I	> 40	dB
	Band III	> 60	dB
At $V_{\text{a.g.c.}} = 12\text{V}$ and signal input $\leq 100\mu\text{V}$			
Reset accuracy (when switching from one channel to another, and back again)	Δf_{osc}	< 100	kHz
Oscillator frequency stability			
For V_{supply} varying from 10 to 14V			
	Band I Δf_{osc}	≤ -150 to $+120$	kHz
	Band III Δf_{osc}	≤ -500 to $+400$	kHz
Temperature drift (measured between 0 and 30 minutes after switch-on, together with a gradual rise in temperature from 25 to 55°C)		< 400	kHz

IDEAL R.F. BANDPASS CURVES

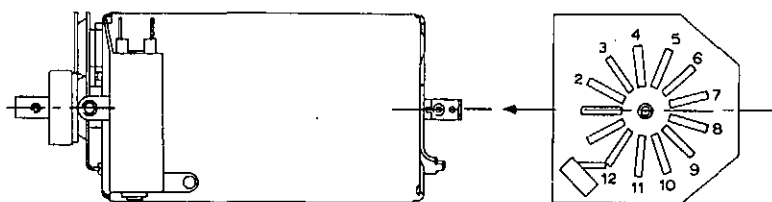




B7002

V.H.F. TELEVISION
TURRET TUNER (C.C.I.R.)

AT7652/80T



Position of coil
strips with respect to
indent on spindle with
channel 12 connected to stator

87185