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after the inductors have been set for suitable pass-band response. This unit contains a fixed coupling element, the response being controlled by the inductor adjustments only.

Unit No. 29. Two slotted studs—Inductor adjustments; Center screw—Wave-trap setting.

Adjustment of unit No. 29 is similar to that of No. 48, except that its wave trap be set for maximum attenuation at the associated sound channel intermediate frequency. It is advisable to adjust units No. 48 and 29 simultaneously, the signal being fed into the first i-f grid.

Unit No. 47. Two slotted studs—Inductor adjustments; Center screw—Wave-trap setting.

Set wave-trap for maximum attenuation of the adjacent channel sound intermediate frequency. This unit combines with No. 45 to form a suitable network. The inductor adjustment should be made only after unit No. 45 has been adjusted. Resetting of the wave-trap may be necessary after the inductors have been set for suitable pass-band response.

Unit No. 45. Two top trimmers—Adjustments for sound i-f wave trap and sound channel input circuit.

Using an associated sound channel i-f signal, set the wave-trap (side having yellow lug) for maximum attenuation in the picture i-f response. Set the sound channel input circuit trimmer (side having green lug) for maximum sound i-f channel output. Circuit interaction requires resetting of both settings after alignment of unit No. 47 is completed. When aligning the 47-45 combination the signal is fed into the converter grid.

• • • frequencies

Sound channel i-f: 8.25 mc; picture channel i-f: 12.75 mc; adjacent channel sound i-f: 14.25 mc.

TELEVISION I-FS

By F. W. SICKLES CO.

• • • wave filters

Four wave filters are incorporated to attenuate, in the picture i-f channel, the frequencies representing the sound channel and adjacent channel sound carrier. Rejection factors of 300 to 500 for the sound carrier i-f and 600 to 1000 for the adjacent channel sound carrier i-f (8.25 and 14.25 mc in the described amplifier) are attainable with a useful bandwidth of 3.85 megacycles.

• • • alignment data

Sound i-f channel: Alignment corresponds to standard i-f alignment procedure, both adjusting screws on units

R1	1,000	R25	4,000
R2	3,000	R26	100,000
R3	35	R27	100,000
R4	225	R28	68
R5	60,000	R29	1,000
R6	5,000	R30	100,000
R7	100,000	R31	100,000
R8	68	R32	68
R9	30,000	R33	30,000
R10	1,000	R34	1,000
R11	7,500	R35	50,000
R12	2,500	R36	500,000
R13	100,000	R37	2,000
R14	68	R38	500,000
R15	30,000	R39	30,000
R16	1,000	C2	400 mmd
R17	7,500	C3	0.006 mfd
R18	7,500	C16	400 mmd
R19	35	C23	50 mfd
R20	125	C24	50 mfd
R21	60,000	C25	0.02 mfd
R22	1,000	C26	5.0 mfd
R23	5,000		
R24	6,000		All others 0.01 mfd

44-R and 44-L set for maximum response at the sound channel intermediate frequency.

Picture i-f channel: Alignment of the picture i-f channel should be done by means of an i-f sweep generator, though point-to-point alignment using a signal generator is possible. A microammeter in the detector load circuit or a vacuum tube voltmeter across the load may be used for tuning indication.

General alignment procedure: Feed the generator output to the grid of the last i-f tube, make the necessary adjustments, and proceed to the grid of the preceding i-f tube. Alignment is simplified if the grid of the stage under alignment is disconnected from the preceding coupling unit. Provision must be made to maintain adequate bias.

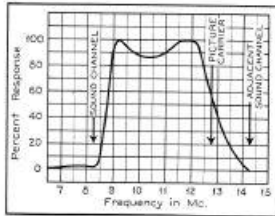
Unit No. 40: Two slotted studs—Inductor adjustments; center screw—Coupling capacitor adjustment.

Preliminary adjustment can be made by tuning both inductors to a frequency slightly higher than the high frequency peak of the desired response curve, the coupling adjustment being set several turns from its maximum capacity position. Increase the coupling slowly until the two peaks formed take the desired positions in the frequency band.

Unit No. 48: Two slotted studs—Inductor adjustments; center screw—Wave-trap setting.

Set the wave-trap for maximum attenuation at the adjacent channel sound i-f peak. Resetting may be necessary (Continued on page 301)

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Four wave filters incorporated in the picture i-f channel attenuate the frequencies representing the sound channel and adjacent channel sound carrier.

It is apparent that the varying requirements made upon television i-f systems will not be met by one particular form of amplifier. The coupling units used in the accompanying circuits were, therefore, developed so that they may be used in various amplifier combinations. Though incorporating different circuits the units are, with one exception, all the same size and are designed for sub-chassis mounting, reducing lead length to a minimum. Shield dimensions are 3/4 inches by 1 1/2 inches.

Generally speaking the coupling units consist of plate and grid inductors, permeability tuned; which, together with the tube capacitances, form tuned circuits. Coupling elements, either simple inductive or capacitive elements or tuned circuits offering the necessary reactive component, are fixed; except in the case of unit No. 40. The resulting band-pass network will have a useful bandwidth of 3.65 to 4 megacycles, depending upon alignment procedure and loading. Wave filters to attenuate further the intermediate frequencies corresponding to the associated sound and adjacent channel sound carriers are incorporated in some of the units.

• • • gain

The gain of the typical amplifier shown is approximately 3500 for a usable bandwidth of 3.85 megacycles. The sound channel gain is approximately 4000.

A simple method of increasing the gain without adding to the number of stages is the substitution of 1852 type tubes for the 1853's used in the first two stages of the i-f amplifier. Cathode resistor bias will have to be substituted for the fixed minimum bias (pavc) assumed for the operation of the 1853's in the amplifier described. Replace R-8 and R-14 each with the R-19, R-20, C-12 network. Gains of 7000 to 8000 with a useful bandwidth of 3.85 megacycles and 6000 to 6500 at a bandwidth of 4 megacycles are attainable in this way.

To neutralize the effects of input capacitance and loading change caused by changing plate currents (avc), degeneration is applied to the converter and i-f stages as may be seen in the circuit diagram.

Addition of another i-f stage, should it appear necessary, can be accomplished by using a wide band unit, No. 40 for example, in connection with the additional tube. If properly damped, the additional stage should alter the response of the amplifier only slightly, whereas the gain will be considerably increased. Other units, of course, can also be used, should it be necessary to change the sound carrier rejection characteristics at the same time.

