RADIO CORPORATION PTY. LTD.
DIVISION OF ELECTRONIC INDUSTRIES LTD.
126-130 GRANT STREET, SOUTH MELBOURNE, S.C.4.

TECHNICAL BULLETIN

Subject-Model "AL" (6406) and "AM" (12406) Metal Tubes

Model "ALL" (6406) and "AMM" (12406) Glass Tubes

6 Tube Two Unit Superheterodyne Car Radio

Receivers

For operation from:-

Model "AL" 6 Volt Accumulator
Model "AM" 12 Volt Accumulator
Model "ALL" 6 Volt Accumulator
Model "AMM" 12 Volt Accumulator

This Bulletin Contains:-

1. Technical Specifications
2. General Description
3. Alignment Procedure
4. Circuit Diagrams
5. Voltage Table
6. Component Parts List
7. Coil and IF. Transformer Connections.

SUBJECT-Technical Specifications-Receivers Type "AL, AM, ALL, and AMM"

Tube Complement:-

Model AL/AM : ALL/AMM

Type 6K7	6U7G	RF. Amplifier.
Type 6A8	6A8G or 6J8G	Converter
Type 6K7	6U7G	IF. Amplifier.
Type 6Q7	6B6G	Diode Detector, AVC. and 1st Audio.
Type 6V6	6V6G	Beam Power Output Amplifier.
Type 0Z4	0Z4G	Full Wave Rectifier.

Intermediate Frequency: 173Kc. (1st IF. trans. primary and secondary each staggered 8Kc.)

Tuning Range: 540-1550Kc.

Power Output: 5 Watts Maximum.
3 Watts Undistorted.

Battery Consumption:
6 Volt Models AL and ALL 6.5 Amps } Does not include dial lamp
12 Volt Models AM and AMM 3.25 Amps } in remote control unit.

Vibrator: Non Synchronous Type.

General Description:

The Models AL, AM (metal tubes) and ALL, AMM (glass tubes) are two unit 6 tube superheterodyne Car Radio receivers designed to operate from 6 and 12 volts. Sensitivity is of the order of 1 microvolt for an output of 500 milliwatts with a 5,000 ohm load.

The receiver circuit is of conventional design having tuned aerial and RF. stages, converter, one IF. stage, diode detector, triode 1st audio and pentode power output amplifier.

Two volts negative bias developed across the 50 ohm resistor (circuit No. 49) in the high tension negative line is supplied to the grid of the IF. tube and to the converter and RF. tubes along the AVC. line. Twelve volts bias which is also developed across the resistors in the high tension negative line is applied to the output tube. Bias for the 1st audio tube is obtained from the voltage drop across the 10 megohm resistor circuit number 43.

SUBJECT-Technical Specifications-Receivers Type "AL, AM, ALL, and AMM"

General Description: (Contd.)

The AVC. system employs the full voltage developed across the 1 megohm diode load resistor which when filtered by the usual resistive capacitive net-work is used to control the grids of the RF. and converter tubes. No AVC. is applied to the IF. stage.

Bass boost at low to medium volume is provided by the resistor and condenser, circuit numbers 10 and 40. Tone adjustment is provided by the manual tone control situated on the remote control head.

An adjustable aerial compensating condenser has been included in the design to enable the receiver to be matched to any type of aerial which may be fitted to the various types of cars.

The circuit for the 12 volt models AM and AMM is identical with the 6 volt models except for the wiring of the tube filaments which are connected in a series parallel circuit.

SUBJECT-Alignment Procedure-Receivers Type "AL, AM, ALL, and AMM"

EQUIPMENT:-

Signal Generator.
Output Meter.
Alignment Tool: Part No. PM158 or PM581.
Dummy Antenna:
(a) 0.01MFD. Mica Capacitor.
(b) Dummy Antenna-Part No. PM157. This dummy antenna consists of a 55MMFD. lead-in and a 40MMFD. mica capacitor fitted with a lead-in plug for fitting into antenna lead socket.

ALIGNMENT CONDITIONS:-

Supply Voltage-Models "AL and ALL" 6 Volt Accumulator.
Models "AM and AMM" 12 Volt Accumulator

Volume Control-Maximum Volume (Fully clockwise)

Output Level-50 Milliwatts

Load Impedance-5,000 Ohms.

ALIGNMENT:-Intermediate frequency 173Kc.

1st IF. transformer primary and secondary each staggered 8Kc. Access to all trimmer adjustment screws may be obtained by removing the top section of the metal case.

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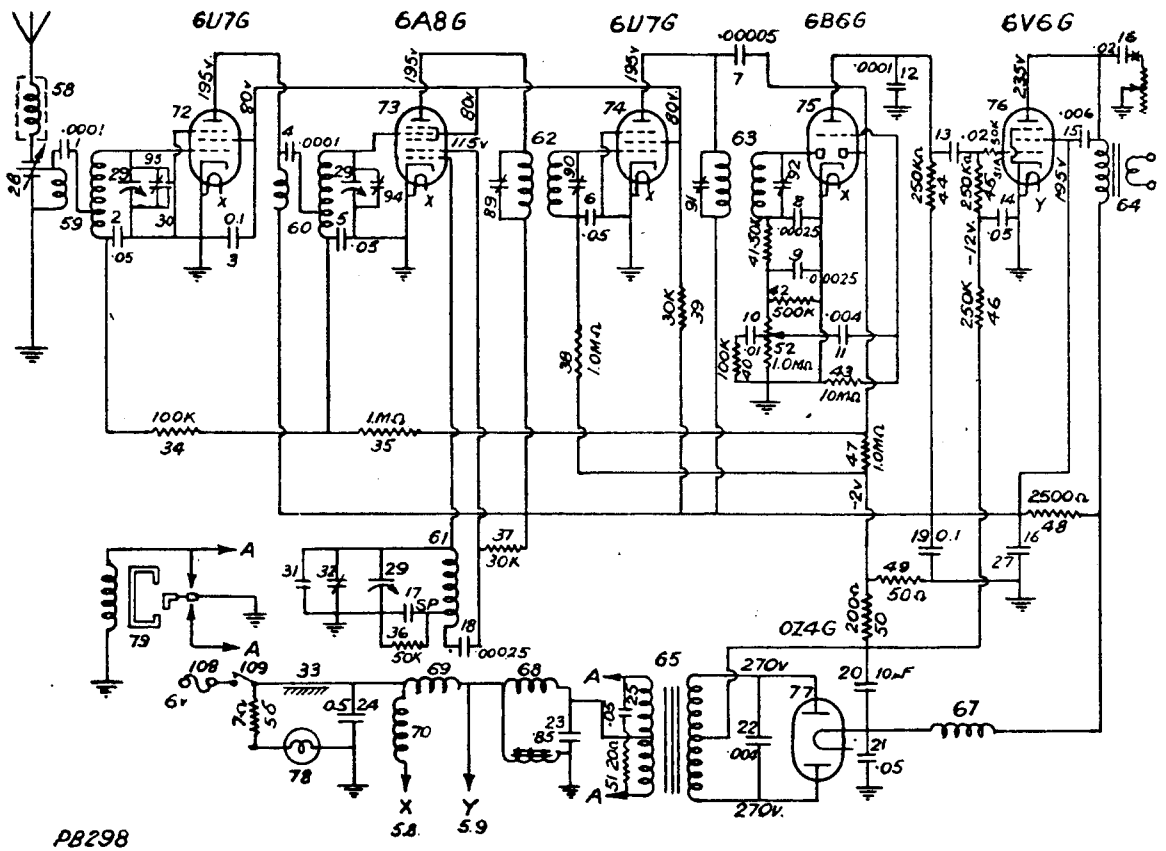
Subject-Alignment Procedure-Receivers Type "AL, AM, ALL, and AMM"

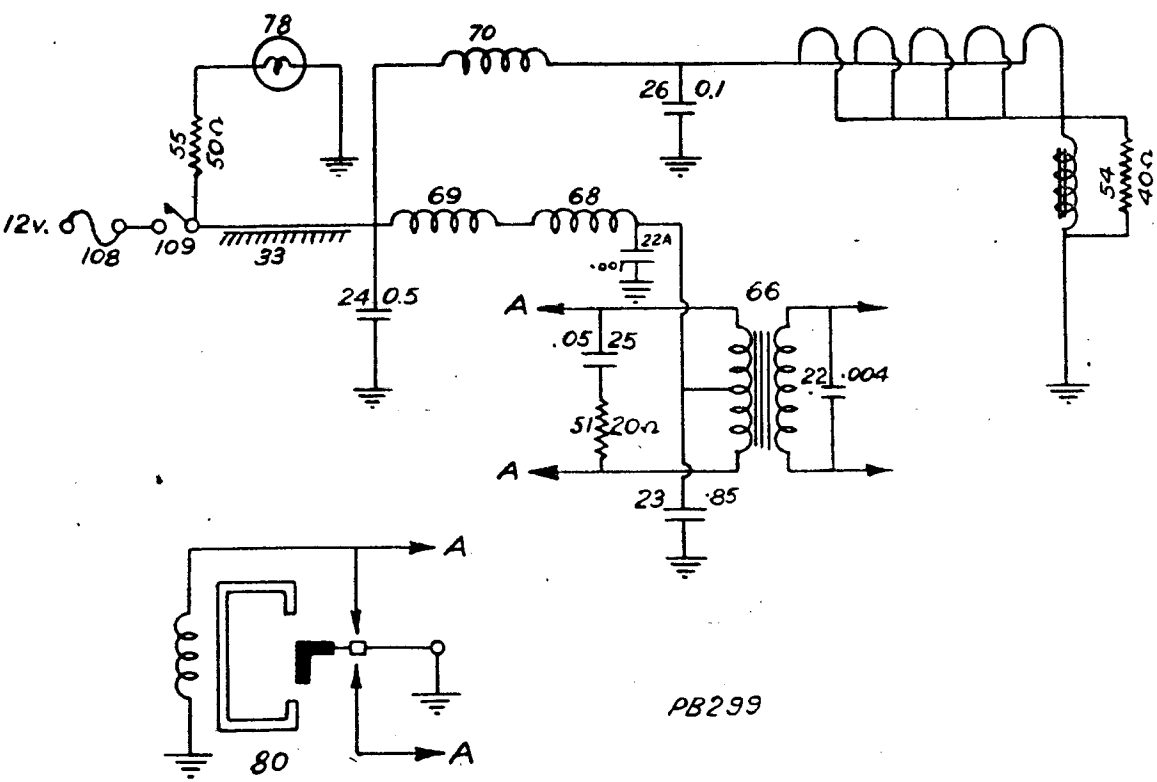
Operation	Generator Frequency	Generator Connection	Dummy Antenna	Instructions
1.	173Kc.	To control grid of IF. tube	0.01MFD. mica capacitor in series with generator.	Leave grid clip on tube. Short out oscillator section of gang. Peak 2nd IF. transformer primary and secondary.
2.	173Kc.	To control grid of convertor tube.	0.01MFD. mica capacitor in series with generator.	Leave grid clip on tube. Short out oscillator section of gang. Peak 1st IF. trans. primary and secondary.
3.	181Kc.	To control grid of converter tube	0.01MFD. mica capacitor in series with generator.	Leave grid clip on tube. Short out oscillator section of gang. Peak 1st IF. transformer secondary trimmer (circuit No. 90).
4.	165Kc.	To control grid of converter tube	0.01MFD. mica capacitor in series with generator.	Leave grid clip on tube. Short out oscillator section of gang. Peak 1st IF. transformer primary trimmer (circuit No. 89).
5.				Unscrew synchro tuning condenser to minimum before adjusting the gang trimmers.
6.	1550Kc.	To antenna lead-in socket	Dummy antenna PM157 (40MMFD) in series with generator.	Turn gang plates full out and peak oscillator gang trimmer. Oscl. gang not shorted.
7.	1400Kc.	To antenna lead-in socket	Dummy antenna PM157 (40MMFD) in series with generator.	Turn gang to 1400Kc. and peak aerial and RF. trimmers.

Tuning range after alignment 540-1550Kc.

SUBJECT-Schematic Circuit Diagram-Receivers Type "AL" and "ALL".



Schematic Circuit Diagram—Receivers Type "AM" and "AMM".



SUBJECT-Voltage Table-Receivers Type "AL, AM, ALL, and AMM".

Equipment:-

DC. Volt Meter-1,000 ohm/volt meter with 0-10 and 0-250 volt scales.
DC. Ammeter- 0-10 amp. scale.

Conditions of Test:-

Heater voltages measured across filaments.
All other voltages measured from tube socket contacts to chassis.
Receiver tuned to 1,000Kc.
Volume control full on (max. volume) no signal.
Receiver supply voltage-Model "AL and ALL" 6 volt accumulator.
Receiver supply voltage-Model "AM and AMM" 12 volt accumulator.

Tube		Plate	Screen	Oscl. Plate	Grid
AL and AM	ALL and AMM				
6K7	6U7G	195V.	80V.	-	-2V.
6A8	6A8G or 6J8G	195V.	80V.	115V.	-2V.
6K7	6U7G	195V.	80V.	-	-2V.
6Q7	6B6G	55V.	-	-	Grid leak bias
6V6	6V6G	235V.	195V.	-	-12V.
0Z4	0Z4G	Voltage at cathode of rectifier is 250 volts.			

Battery current consumption:-

Models "AL and ALL" 6.5 Amps } Does not include dial lamp in
Models "AM and AMM" 3.25 Amps } remote control unit.

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SUBJECT—Component Parts List—Receivers Type "AL, AM, ALL, and AMM"

Note:- Some of the parts used approximately eight years ago on the first production runs of the Models AL and AM are now not obtainable. It is therefore necessary to use the parts quoted on the list below which are in accordance with the last production run.

Circuit No.	Description	Tol. ±	Rating	Part No.
1.	.0001MFD. Mica Condenser (In 59)	+5%-0%	1000VT.	PC180
2.	.05MFD. Paper Condenser	20%	200V. DCW	PC102
3.	.1MFD. Paper Condenser	20%	400V. DCW	PC103
4.	.0001MFD. Mica Condenser (In 60)	+5%-0%	1000VT.	PC180
5.	.05MFD. Paper Condenser	20%	200V. DCW	PC102
6.	.05MFD. Paper Condenser	20%	200V. DCW	PC102
7.	.00005MFD. Mica Condenser	10%	1000VT.	PC141
8.	.00025MFD. Mica Condenser } In 63	10%	1000VT.	PC126
9.	.00025MFD. Mica Condenser }	10%	1000VT.	PC126
10.	.01MFD. Paper Condenser	20%	600V. DCW	PC140
11.	.004MFD. Paper Condenser	20%	600V. DCW	PC221
12.	.0001MFD. Mica Condenser	10%	1000VT.	PC110
13.	.02MFD. Paper Condenser	20%	400V. DCW	PC111
14.	.05MFD. Paper Condenser	20%	200V. DCW	PC102
15.	.006MFD. Paper Condenser	20%	600V. DCW	PC217
	or			
	.005MFD. Paper Condenser	20%	600V. DCW	PC252
16.	.02MFD. Paper Condenser	20%	400V. DCW	PC111
17.	1066MMFD. Mica Condenser (Series Pad)	1%	1000VT.	PC233
18.	.00025MFD. Mica Condenser	10%	1000VT.	PC126
19.	.1MFD. Paper Condenser	20%	400V. DCW	PC103
20.	10-10MFD. E'lytic Condenser	20%	525VP.	PC228
	Above part changed to a 10MFD. E'lytic on rectifier and a 16MFD. E'lytic on B+			
	10MFD. E'lytic Condenser	20%	525VP.	PC354
	16MFD. E'lytic Condenser	20%	525VP.	PC300
21.	.05MFD. Paper Condenser	20%	400V. DCW	PC109
22.	.004MFD. Mica Condenser	10%	2000VW	PC143
23.	.85MFD. Paper Dondenser	20%	200V. DCW	PC267
	or			
	1MFD Paper Condenser	20%	200V. DCW	PC182
24.	.5MFD. Metal Clad Condenser	20%	200V. DCW	PC545
25.	.05MFD. Paper Condenser	20%	200V. DCW	PC102
26.				
27.				
28.	Synchro Tuning Condenser			PC273

SUBJECT-Component Parts List-Receivers Type "AL, AM, ALL, and AMM".

Circuit No.	Description	Tol. ±	Rating	Part No.
96.	Oscillator gang trimmer			-
97.	Transformer Shield Box Lid			10/75-3
98.	Vibrator earth clip			42/98
99.	Battery Cable Lead Wire			WM15
100.	Midget Speaker Socket			PM149
101.	Synchro Padder Adjusting Nut			-
102.	Fuse Holder-Long Section			11/245
	Fuse Holder-Bush			17/245
	Fuse Holder-Spring			89/30C-2
	Fuse Insulator			15/245
	Fuse Holder-Short Section			14/245
103.	Aerial Contact Spring Shield			17/75
104.	Vibrator Partition			20/75
105.	Volume Control Extension Spindle Bearing			22/50-2
106.	Volume Control Extension Shaft			55/75
	Bush Spindle Bearing (inside 105)			42/75
	Spring-On Volume Control			43/75
107.	Aerial Trap Coil Complete Assembly			PT764
	Comprises:-Trap Coil			PT138
	Metal Shield Can			1/217
	Eyelet			32/291
	Spring			89/30C-2
	Bakelite Bush			17/245
	Metal Connector			3/217
108.	15 amp fuse			PM219
110.	Volume Control Spindle Drive Clutch			54/75
	Volume Control Drive Clutch Spacer Washer			21/217
111.	Small 6 pin Socket			PM146
112.	0Z4G Valve Shield			39/30C
	Earth Contact-Valve Shield			22/30C
	6X5GT Valve Shield			PM468
	6X5GT Valve Shield Wire Ring			248/30C
	Astor Badge			157/30C
	Screws-Chassis Mounting $1\frac{1}{2}$"×$\frac{3}{16}$" Whit. RD. HD.			22/560-22
	Screws-IF. Can Mounting			36/560-8
	Metal Can Base			A104/217-1
	Metal Can-Front Half			28/217

SUBJECT—Component Parts List—Receivers Type "AL, AM, ALL, and AMM".

Circuit No.	Description	Tol. ±	Rating	Part No.
29.	2 Gang Tuning Condenser			PC232
30.	6MMFD. W.W. Capacity	-1MMFD.		PC240
31.	15MMFD. W.W. Capacity	5%		PC196
31A.	50,000 ohm Carbon Resistor	10%	½ Watt	PR160
32.	0-30MMFD. Trimmer			PC663
33.	Hash plate Condenser .0005MFD.			PC239
34.	100,000 ohm Carbon Resistor	10%	½ Watt	PR103
35.	1 Megohm Carbon Resistor	10%	½ Watt	PR246
36.	50,000 Ohm Carbon Resistor	10%	½ Watt	PR160
37.	30,000 Ohm Carbon Resistor	10%	½ Watt	PR151
38.	1 Megohm Carbon Resistor	10%	½ Watt	PR246
39.	30,000 Ohm Carbon Resistor	10%	1 Watt	PR156
40.	100,000 Ohm Carbon Resistor	10%	½ Watt	PR103
41.	50,000 Ohm Carbon Resistor } In 63	10%	½ Watt	PR160
42.	500,000 Ohm Carbon Resistor } In 63	10%	½ Watt	PR245
43.	10 Megohm Carbon Resistor	10%	1 Watt	PR236
44.	250,000 Ohm Carbon Resistor	10%	1 Watt	PR496
45.	250,000 Ohm Carbon Resistor	10%	½ Watt	PR249
46.	250,000 Ohm Carbon Resistor	10%	½ Watt	PR249
47.	1 Megohm Carbon Resistor	10%	½ Watt	PR246
48.	2,500 Ohm Carbon Resistor	10%	1 Watt	PR132
49.	50 Ohm W.W. Resistor	5%	3 Watt	PR226
50.	200 Ohm W.W. Resistor	10%	1 Watt	PR207
51.	20 Ohm W.W. Resistor	10%	½ Watt	PR231
52.	1 Megohm Vol. Control. Tapped at 400K. Ohms			PR205
53.	250,000 Ohm Tone Control	20%		PR570
54.	40 Ohm W.W. Resistor (Models AM and AMM)	5%	3 Watt	PR239
55.	50 Ohm W.W. Resistor (Models AM and AMM)	5%	3 Watt	PR226
56.	7 Ohm W.W. Resistor (Models AL and ALL)	5%	3 Watt	PR601
57.				
58.	Aerial Trap Coil			PT138
59.	Aerial Transformer			PT128
60.	RF. Transformer			PT130
61.	Oscillator Transformer			PT185
62.	1st IF. Transformer			PT240
63.	2nd IF. Transformer			PT241
64A.	Input Transformer for PM369 (See 81A)			PT243
64B.	Input Transformer for PM372 (See 81B)			PT244
64C.	Input Transformer for PM373 (DM6) (See 81C)			PT245
65.	6 Volt Power Transformer (Models AL and ALL)			PT232
66.	12 Volt Power Transformer (Models AM and AMM)			PT182
67.	Universal Wound RF. Choke			PT109

TECHNICAL BULLETIN

SUBJECT-Component Parts List-Receivers Type "AL, AM, ALL, and AMM".

Circuit No.	Description	Tol. ±	Rating	Part No.
68.	Small Vibrator Choke			PT233
69.	Small Hash Choke			PT137
70.	Filament Choke			PT162
71.				
72.	6K7 Tube (Models AL and AM) 6U7G Tube (Models ALL and AMM)			
73.	6A8 Tube (Models AL and AM) 6A8G or 6J8G Tube (no circuit alterations) Models ALL and AMM			
74..	6K7 Tube (Models AL and AM) 6U7G Tube (Models ALL and AMM)			
75.	6Q7 Tube (Models AL and AM) 6B6G Tube (Models ALL and AMM)			
76.	6V6 Tube (Models AL and AM) 6V6G Tube (Models ALL and AMM)			
77.	0Z4G Tube (Models AL, AM, ALL, and AMM) 6X5GT Tube (Models AL and ALL)			
78.	6-8 Volt .15 Amp dial lamp, Bayonet base. G3½ Bulb			PM220
79.	6 Volt Non-synch. Vibrator 150 cycle (Models AL and ALL)			PM237
80.	12 Volt Non-synch. Vibrator 150 cycle (Models AM and AMM)			PM238
81A.	8" Underdash Type Speaker (Speaker only, includes 64A, less can)			PM369
81B.	8" Inverted Type Speaker (Speaker only, includes 64B, less can)			PM372
81C.	6" (DM6) Flush or Dash Type Speaker (Speaker only, includes 64C, less can)			PM373
82.	8 pin octal socket			PM532
83.	8 pin octal socket			PM532
84.	8 pin octal socket			PM532
85.	8 pin octal socket			PM532
86.	8 pin octal socket			PM532
87.	8 pin octal socket			PM532
88.	Single pin socket			
	Socket top			19/96
	Socket bottom			18/96
	Socket eyelet			6/291
	Socket contact			15/58-1
89.	Primary adjusting screw 1st IF.			-
90.	Secondary adjusting screw 1st IF.			-
91.	Primary adjusting screw 2nd IF.			-
92.	Secondary adjusting screw 2nd IF.			-
94.	RF. gang trimmer adjusting screw			-

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TECHNICAL BULLETIN

BULLETIN AL/AM-1
ALL/AMM-1
File:-Receivers
Auto.
Date: 2/12/46.

SUBJECT-Coil and IF. Transformer Connections.

Red Lead – Antenna
Blue Lead from side of can – Grid
Green Lead – Grid Return (AVC.)
Black Lead – Earth (Chassis)

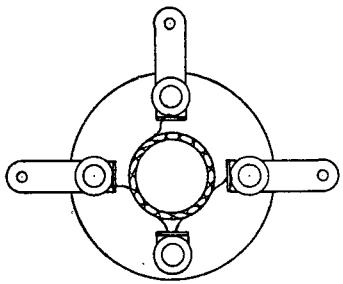
Antenna Trans.

Red Lead – B+
Brown Lead – Plate
Green Lead – Grid Return (AVC.)
Yellow Lead from side of can – Grid

RF. Trans.

Oscillator Grid

Series Pad.



Oscl. Plate Cond.
(Circuit No. 18)

Oscillator Coil

Red Lead – B+
Blue Lead – Plate
Green Lead – Grid
Black Lead – Grid Return (AVC.)

1st IF. Trans.

Red Lead – B+
Blue Lead – Plate
Green Lead – Diode
Light Blue Lead – Diode Audio Feed
Black Lead – Earth (Chassis)

2nd IF. Trans.

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TECHNICAL BULLETIN

SUBJECT–

Fitting of Replacement Switches to Universal Under-dash Remote Controls.

The original switch, which had by means of two screws a positive mounting to the remote housing, is no longer available and the replacement switch is of a type which is mounted by a clamp attachment to be soldered to the remote housing. Care must be taken in locating the clamp so as to facilitate the correct operation of the switch.

Part numbers of Control Units affected are A101/196 to A108/196.

Components Required:

1. Switch A106/230A.
1. Actuating Arm 21/196.
1. Switch Mount Clip 23/196.

Components Deleted:

1. Switch 29/161.
1. Actuating Arm 12/171A } These may be scrapped.

Procedure:

Remove the lid from remote housing and note the original position of the switch and the action required by the actuating arm to operate the switch. Unsolder switch leads and remove the old type switch 29/161. Check to see if the switch which has been removed can be re-adjusted, and thus avoid a possible unnecessary conversion to the new type. If the contact arm, or contact, is not badly burnt, clean with fine emery paper, adjust the tension and apply on the arm a drop of light machine oil at the pivot to overcome binding which may develop at this point.

Should this be impracticable, continue the conversion and remove the volume control knob and rear bearing, loosen the actuating arm 12/171A and remove the volume control shaft. Replace with new actuating arm 21/196 and re-assemble the parts removed, adjusting the arm to strike the centre of the stop lug. Check for the correct alignment of the spindle in the bush and note the amount of correction required to the housing to allow the actuating arm to travel freely into the hole at the position where the replacement switch is to be mounted.

Enlarge the hole to the extent necessary for free action of the arm and clean the outer surface of the housing of all paint for approximately ½" around the switch opening. Place Radio Corporation Type Switch A106/230A in the mounting clip 23/196 without bending down the holding lugs, and with the switch in the "off" position, adjust the position of the mounting clip for correct operation of the switch by the actuating arm, while holding firmly by hand.

Scribe a line on the remote housing around the outside of the switch clamp and note the position of the switch actuating finger in relation to the housing. Remove the switch from the mounting clip 23/196 and with the clip in its correct position, spot solder to the housing at the points where the turn up lugs are situated. Recheck the action of the switch and if satisfactory continue the operation by soldering the mounting clip firmly to the housing around its circumference.

Press the switch firmly into the clip and turn down the holding lugs so that the switch is positively located and is lying flat on the housing. There must be no movement of the switch casing after the lugs are clamped down. Clean the housing, repaint, and solder the switch leads to the correct positions, making sure that the switch lugs are not strained, bent or overheated in soldering.

Operate the switch at least twelve times with both slow and quick movements to ensure final satisfaction in operation. Replace the lid on the remote housing.

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TECHNICAL BULLETIN

SUBJECT-UNIVERSAL UNDER-DASH REMOTE CONTROL UNITS.

Models:	6406 (6-volt)	12406 (12-volt)
Chassis Type:	AL-ALL	AM-AMM.
Astor Part Nos.:	4013	4014
G.M.H. Nos.:	4004	4005

The following is a list of Under-dash Remote Control Units for the above Models. These under-dash controls are universal for all types of cars within the cable lengths and specified voltages.

Radio Corp. Part Number.	G.M.H. Part Number	Astor Part Number	Cable Length	Receiver Voltage
A101/196	M9782	-	23"	6-Volt
A102/196	-	4101	23"	6-Volt
A103/196	M8430	-	23"	12-Volt
A104/196	-	4102	23"	12-Volt
A105/196	M8323	-	30"	6-Volt
A106/196	-	4103	30"	6-Volt
A107/196	M8530	-	30"	12-Volt
A108/196	-	4104	30"	12-Volt