

JUNE
1952

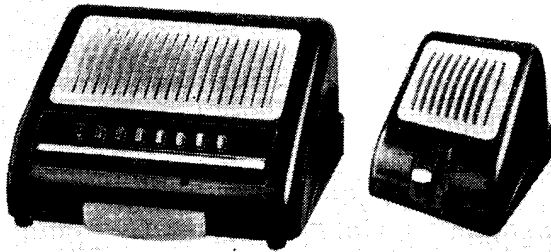
SERVICE ELECTRICAL and RADIO CHARTS

TRADING

COSSOR 926
EDISWAN
LOUDSPEAKERPHONE
CASEBOOK

EDISWAN LOUDSPEAKERPHONE INTERCOM

Mains-operated loudspeaker intercommunication system for installation in offices, shops, hotels, factories, etc., operating from 200-250V 50c/s mains. Manufactured by the Edison Swan Electric Co. Ltd., 155 Charing Cross Road, London, WC2.



THE Ediswan Loudspeakerphone intercommunication system consists of a mains-powered master unit to which can be connected a number of extension units. The master unit can call any one, several or all of the extensions by pressing the appropriate extension push-buttons and then operating a call button.

In the case of secret type extensions this causes a small buzzer to operate, giving a clear but not too obtrusive calling note. With non-secret or paging type extensions a 50c/s note is emitted.

Extensions can call the master by depressing and holding down the key positioned just below the LS/mic grille on each unit. This will produce—if the master is not engaged with another extension—a click in both extension and master speakers and,

at the same time, the appropriate extension press button on the master will be illuminated. If the master is engaged with another extension, indication is given to the caller by absence of clicks.

Non-secret or paging type extension units enable the master to carry on a conversation without the person at the extension having to operate his or her key. They have the disadvantage, however, that the master can at any time switch through to such extensions, without more than a warning click being given and eavesdrop. With secret type extensions it is not possible to talk or receive until the spring loaded key is held down.

Model A master unit has provision for six extensions and Model C provides for the maximum of 10 extension units. Models B and D provide

for four and eight extensions respectively but, in addition, have facilities for intercommunication with another master unit.

Special models which permit intercommunication between three master units are available to order. On these, however, only six extension units can be connected to each master, the remaining four buttons being employed in pairs on receive and call circuits to the other two master units. With three master units interconnected it is necessary only for the master unit making the call to be switched on, as power to operate buzzer and indicator lamp on the unit being called is supplied from the calling master.

A master unit is housed in a black moulded case with sloping cream plastic LS/mic escutcheon and talk/listen switch operating plate. Push buttons are of transparent plastic with reflected internal illumination on all, except ring button. The reversible button identification strip is white Ivorine with black etched numerals and lettering on one side; the other side has blank panels to allow individual names to be inserted.

Extension units are housed in smaller cases of similar design and with provision for hanging on wall. The secret type is identified by cream talk/listen switch knob.

Master Unit. The circuit and layout diagrams here are those of Model C, which has provision for 10 extensions. The master unit consists of a 11-way, plus release, press-button switch assembly, a speaker-microphone and a 2-valve mains-powered amplifier.

Input signal, from either internal microphone L5 or from an extension unit L11 L12, is switched by S11, the talk/listen switch, to primary L1 of

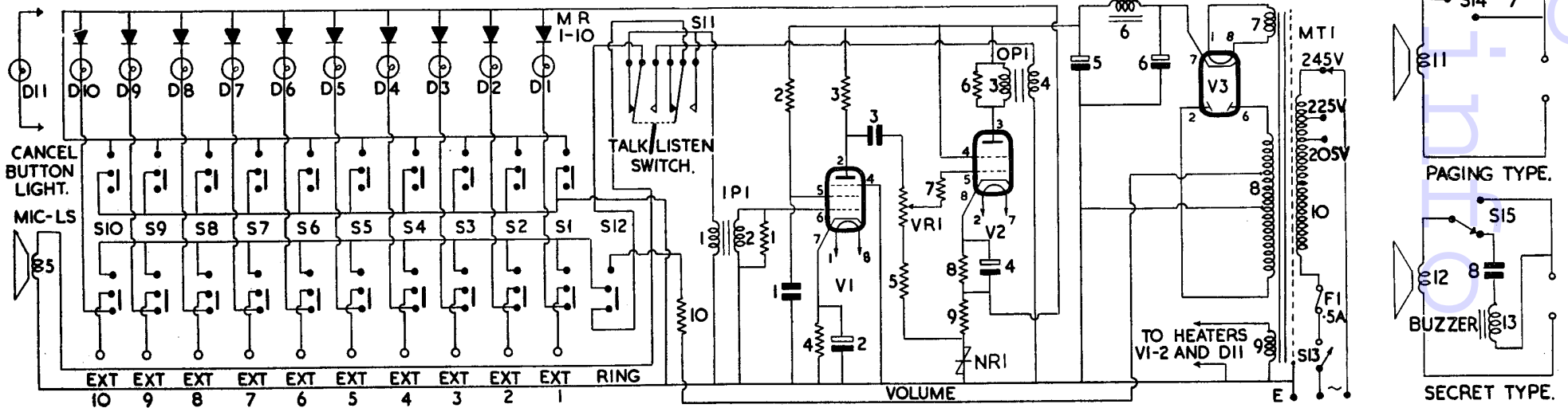
input matching transformer IP1. Secondary L2 of IP1, damped by R1, feeds signal to pentode AF amplifier V1. Cathode bias is by R4 decoupled by C2 and screen voltage obtained from R2 C1.

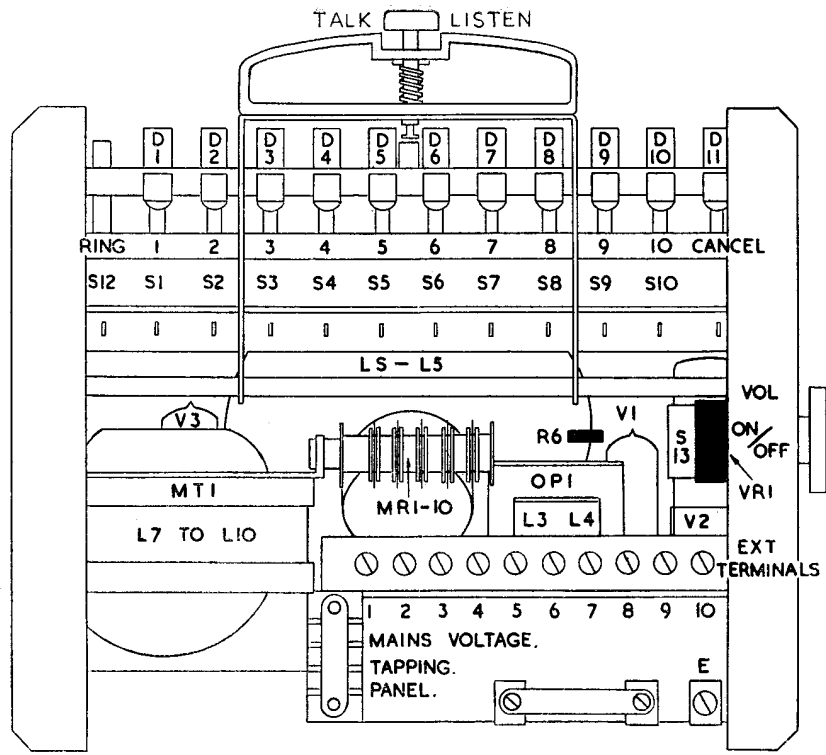
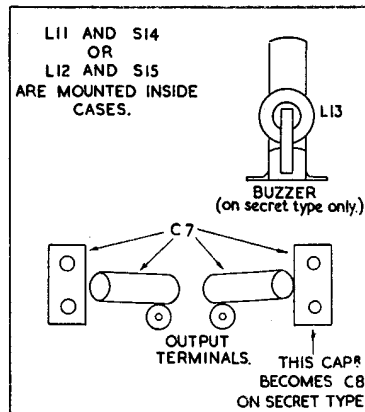
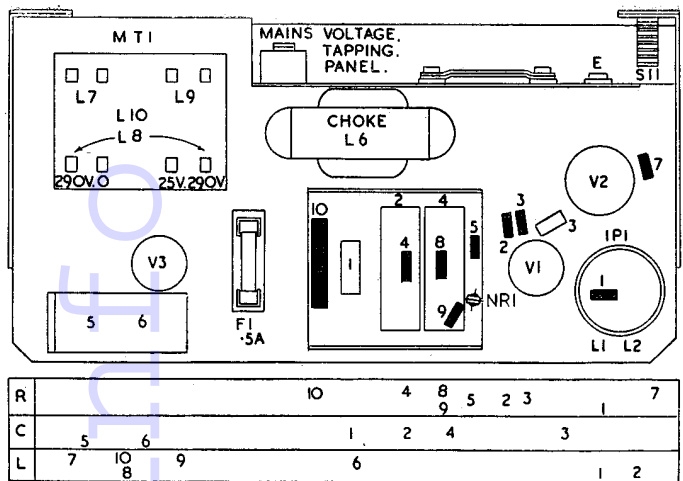
Signal across anode load R3 is fed by C3 to volume control VR1 and through stopper R7 to beam-tetrode output amplifier V2. When master unit is not switched to any of the extensions, a high value of cathode bias is developed across R8 R9 and Metrosil NR1. When any extension unit switch is operated to call the master this voltage is fed through rectifier MR1-10, indicator lamp D1-D10, lower section of switch S1-S10 and along

RESISTORS		L	Ohms
R	Ohms	Watts	
5	...	...	32
6	...	...	406
7	...	...	3
8	...	...	650
9	...	...	Very Low
10	...	...	56
11	...	...	32
12	...	...	32
13	...	...	800

CAPACITORS		C	Capacity	Type
1	0.005 Tubular	500V
2	25 Electrolytic	25V
3	0.001 Tubular	350V
4	25 Electrolytic	25V
5	8 Electrolytic	450V
6	8 Electrolytic	450V
7	8(2x4) Metal	Cased
8	2 Paper or Tubular	100V

INDUCTORS		L	Ohms
1	1150
2	2.5
3	3.5
4	1.25





connecting wires to the extension to provide power to illuminate the indicator light D1-D10. Metrosil NR1 limits extension line voltage to below 40V to comply with certain wiring regulations.

With any of the master unit extension push-buttons depressed, then R9 and NR1 are shorted down to chassis and a normal operating cathode bias is developed across R8 decoupled by C4. In this state NR1 assumes a very high resistance and R5 R9 become, in effect, inserted between bottom of VR1 and chassis to prevent zero signal input to V3 should VR1 be in its minimum volume position.

Anode V2 is transformer coupled by OPI through talk/listen switch S11 to either internal speaker L5 or any or all of the units switched in by S1-S10.

When S11 is in its static or non-depressed position then internal LS/mic L5 is connected to output transformer OPI to act as a normal speaker and primary L1 of input transformer IPI is connected through S12, the Ring switch, to open contacts on extension switches S1 to S10—thus the master is in a "ready" state to accept and listen to any incoming extension call—the input circuit to amplifier being completed when the press button of the appropriate extension is depressed.

Vice versa, if the master wishes to speak back to the extension, S11 is depressed and extension is connected to secondary L4 of OPI and internal LS/mic L5 is connected to L1 IPI as mike.

HT is provided by indirectly-heated full-wave rectifier V3 fed from HT secondary L8 of mains input transformer MT1. Choke-capacity smoothing is by L6 C5 C6. A 25V tapping is provided on secondary L8 to supply an AC potential to operate buzzer L13 fitted to secret type extensions.

Heaters of V1 V2 are fed from LT secondary L9 and heater V3 from a separate "unearthed" secondary L7 of MT1, the primary of which is tapped for inputs of 200 to 250V 50c/s. Common lead is fitted with 500mA fuse and on/off switch S13.

OPERATION

To describe operation of the instrument, let it be assumed that a secret type extension unit is connected to Ext. 1 and a non-secret type to Ext. 2.

Master calling extension 1. Press-button corresponding to Ext. 1 on master is depressed, operating switch S1, one section of which connects the

V1—6F11	V2—6P26	V3—U U9	BUTTON LAMPS.

Readings with unit in stand-by condition

extension wiring through Ring switch S12 and talk/listen switch S11 to input of amplifier. Other section of S1 short circuits R9 NR1 to allow V2 to receive normal cathode bias. To call extension 1 the Ring press-button is depressed momentarily. This operates S12 and temporarily disconnects incoming extension line from S11 and input transformer IPI and connects it to 25V AC line through limiter R10. The AC fed down the line to the extension passes through talk/call switch S15 and C8 to buzzer L13, the armature of which produces a distinct audible call tone.

Extension 1 answering master. To answer call extension 1 hold down the white key positioned on front of case. This operates S15 and connects the LS/mic L12 through to master unit and to input of amplifier.

Master talking to extension 1. For the master to speak to extension 1 it is necessary to hold down the talk/listen bar—this operates S11 and changes over the input and output of amplifier such that master speaker L5 is connected to input to function as a microphone whilst extension unit is coupled to output to reproduce amplifier output signal.

Extension 1 calling master. To call the master, white key on extension unit is moved up and down a few times. Each time the switch is pressed down the LS completes the master indicator lamp D1 circuit to chassis—the lamp is illuminated and a loud "plop" is produced in both master and extension speakers. On observing flashing light or hearing the "plop" the operator of master unit depresses Ext. 1 press-button, which, through S1,

connects extension unit to amplifier input and earths R9 NR1 to provide correct V2 cathode bias.

It is usual to acknowledge acceptance of call by depressing talk/listen bar and telling extension to go ahead. If master unit is engaged with another extension, R9 NR1 are shorted out and no "plop" is heard in either master or Ext. 1 speaker and D1 on master unit is not illuminated.

Master calling extension 2. With a non-secret type extension it is necessary only for the master to depress Ext. 2 press-button, which directly connects the LS/mic L11 of extension unit through S2 S11 to input of amplifier. No calling or ringing tone is provided, as it is only necessary for the master unit operator to press talk/listen switchbar and to ask for person required.

Extension 2 calling master. As in the case of extension 1 to call master, key on extension is moved up and down a few times. Through S2 the master indicator lamp D2 is illuminated and an audible "plop" given in both master and extension speakers, the latter giving indication that the master unit is disengaged.

INSTALLATION

Master unit can be connected to the extensions by 22 SWG cotton and wax covered twin twisted bell wire. Where large numbers of fluorescent lamps are used or interference is particularly bad Ediswan screened concentric cable type 44/9171 should be employed.

Wiring should not be run close to other electric cables or fittings which might induce hum. Maximum length of wire on each extension should not

exceed 750ft. Master unit is provided with an earthing terminal, which should be connected either to the mains earth through a three-pin plug or clamped to a near cold water pipe. It is not necessary to earth screening of any extension cables along or at the end of each run—in fact, by so doing it is possible that the interference level will be increased instead of decreased.

SERVICE AND MAINTENANCE

Occasionally a call indicator lamp may require replacement. The indication is that an extension cannot call master but master can call extension. If a call cannot be made in either direction on a particular extension, check that wires are not broken at either end.

To remove and to replace a call indicator lamp, the escutcheon plate which covers the keys should be lifted gently by means of a knife under the edge of the moulding; it will be found that this can then be removed. The transparent key can then be pulled off, giving access to lamp, which can be unscrewed. The lampholders are of the clip-on type, and after replacement of the lamp concerned (by an Ediswan 6V 0.04 MES 11mm diameter lamp only) the position of lampholder should be noted to see that it is central, close to key and that soldering tags are not shorting to anything else. They replace escutcheon.

If instrument operates but cancel key is not illuminated, the red lamp requires replacement by an Ediswan 6V 0.06A MES sprayed red type.

For circuit of Master-to-Master unit, see page 31.

SERVICE CASEBOOK

Why not show your appreciation of this helpful feature by yourself submitting details of faults special to certain chassis, notes on how a particularly 'sticky' problem was solved, or some practical workshop tips?

MARCONIPHONE VT50A

THERE must be hundreds of owners of the Marconiphone model VT50A and the HMV equivalent receiver who are being denied the use of their sets due to the shortage of Z66 valves.

These receivers can, however, be brought to a state of full serviceability by substituting Mazda type SP61. As the Mazda base is different, it is necessary to make up an adaptor utilising an old octal valve base with a Mazda octal holder mounted on top, running short connecting wires between the two. If SP61 valves are not available—and these are in somewhat short supply now—the equivalent ex-Government valve, the VR65, readily available from many sources, can be used.

We recently brought a VT50A to full serviceability, having substituted all five Z66's for VR65's with no apparent loss of sensitivity. True, we did re-align the receiver, even though it functioned well before this was done, and we are some 37 miles from A.P.—F.G.B., Cineluxe Ltd., Leigh-on-Sea.

PHILIPS 1101U, 1200V

THIS TV had a trapezoidal raster which focused only in the middle down the scan. The time-base circuits were examined and likely valves substituted. (This fault has been traced at times on other receivers to line timebase output valves.)

Since, in the Philips, the separation of line and frame zinc pulses is thorough, the deflection coils were removed and examined. They did not break down or show leakage under normal insulation tests. It was noticed, however, that the resistance of the frame coil was 25 per cent. under stated value. Substitution of the assembly cleared the fault.—T.H.

GEC BT5145—BT4542

UNCONTROLLABLE frame linearity is usually due to a faulty vertical form potentiometer (R83, maker's diagram). Slight "movement" of the picture is noticed at the top of scan. Sometimes the receiver settles to normal working condition and the fault occurs intermittently and, in advanced cases, one cannot approach the sliders of the preset controls. On normal resistance tests the potentiometer seems OK.—T.H.

MARCONI VC73DA, VT73DA

A FAULT which has happened once or twice is for the sound to be absent on switching on and to remain so for 15-30 minutes, when, as if it were switched on, to appear at normal quality and volume.

The fault was found to be in the silver mica (5pF) condenser in the oscillator circuit. This is C7 (maker's diagram) and is from the oscillator coil junction with C8 (22pF) to the X78 cathode. The condenser apparently varies its capacity and, though it permits the wide-band vision signal, it will not pass the narrow-band band.

Loss of picture strength and sync slip on these models is often due to bad pin connections on X78 (FC) or Z77 (first RF) valveholders. Probably

cleaning pins would cure the fault, but we change the valveholder concerned. This fault can be snaggy and intermittent.—T.H.

EARTH FOR SAFETY

WITH reference to the case reported by F. R. Pettit, Herne Bay, with the above heading (page viii, May Supplement) it would appear that his "ground" system is inefficiently earthed and that the two earth rods to which it is connected are not doing their job. It will be appreciated that the resistance-to-earth of this bus-bar has only to be 23 ohms to limit the possible fault current due to a "dead earth" on the phase wire of the installation (assuming a supply pressure of 230V) to a matter of 10A, which, of course, will never blow the fuse of a circuit fused to carry the load of a 2kW (10A) fire.

The existence of metalwork, such as the steel post connected to this bench, without being also connected to the earth bus-bar, is a definite danger and, in my opinion, should not be allowed to remain. The bench, and all parts of it, should either be connected to the earth system or should be completely insulated, including the floor on which a person working at the bench would normally stand.

Steps should be taken to rectify the inefficiency of the earth rods and periodical earth resistance tests should be taken at frequent intervals, say, weekly, to ensure that efficiency is maintained.—W. G. BUSBY, Hull.

AMBASSADOR TV4

SOUND was OK, except for a faint rushing noise in the background; vision was OK, except for a ragged vertical band up the right-

WANTED: ANTI-NOISE RADIO

Why is it that no manufacturer makes a radio receiver specially for those sites where the background noise level is high; in fact, why don't designers pay more attention than they do to the problem of reducing noise in the average AC radio?

Many people in my area become relay customers simply for the reason that the relay service is interference free. I believe there is a big market for a "suppressed" radio receiver among listeners in industrial areas. More than once I've taken a new set to a customer's house in one of these areas and found it completely unsatisfactory because of the background noise.

Designers seem to concentrate on sensitivity and volume, whereas I find the great majority of listeners want only to hear the local stations and Radio Luxembourg at moderate volume.

Can't we have a set completely isolated from the mains, with the volume control arranged so that decreasing volume decreases sensitivity?—G. R. WILDING, Liverpool.

hand side of the raster, the band broadening inwards as the contrast control was advanced.

The trouble was due to arcing inside the glass insulator of the wire which feeds AC-EHT from the line transformer to the EHT rectifier anode. The wire was broken and EHT was arcing across, but the arc was almost invisible. When the insulator was cleaned and a new connection made, all was correct.—E.J.B., Shepley.

PHILIPS 1101U

LOW rustling noise in sound background—vision OK. The fault was less evident at high volume levels, being much worse, and very annoying with the VC at minimum. This set a puzzle as to rough stage location of the fault, gentle use to a prodder round the AF circuits giving no clue.

The trouble was eventually traced to a dry joint on the grid of the triode portion of V4 (ECL80), the first sound AF section.—E.J.B., Shepley.

DRIVECORDS

MUCH drivecord trouble is caused by the wrong type of cord being used. I naturally assume that the service engineers who use the odd bits of parcel string which one finds occasionally on various drives are not to be found among the readers of "Service Casebook." It is, however, a fact that certain grades of drivecord on the market today are not entirely suitable for the job, because after a while they begin to stretch, and the job "bounces back."

One set manufacturer (Murphy) goes to the trouble of pre-stretching his drivecord by running a 20-yard length over pulleys and suspending a weight at each end for several days.

I found this too much trouble and the cord I always use, and which will positively not stretch, is fishing line bought in a shop for anglers' requisites. The best grade for all-round use is "Dolphin-Cuttyhunk" 42 lbs. test. For small sets such as the "Alba" midget, a thinner grade cord may be found. I do not claim this idea to be original, because several leading manufacturers (Cossor, HMV, etc.) are exclusively using fishing line.

Slipping dial-drive

If a drivecord is taut and yet slips on the drive spindle, take it off and rub it well over a piece of resin, obtainable in a musical instrument shop. The particles of resin adhering to the drive cord greatly increase the friction and prove an infallible cure.

If you don't want to take off the drivecord, a cure can often be effected by scraping the piece of resin with a knife or screwdriver blade, and covering that part of the cord which is placed round the spindle with resin dust, then turning the spindle and repeating to cover the adjoining part of the cord, and so on until the whole length of the cord is treated.

Re-stringing dial-drives

As readers of "Service Casebook" are undoubtedly aware, some dial-drives and tuning-drives are very awkward and difficult to re-string. I won't single out particular makes—no names, no packdrill.

Fortunately, there are two simple aids which facilitate this task:

1. A simple bicycle spoke. I use one which I have cut down to a length of about 8 ins. and I use it to guide the drivecord into those awkward places by looping it over the bent part where it rests against

the flat head of the spoke, and to fish it through those holes and gaps. Another useful tool for the same job is a length of metal strip barely $\frac{1}{4}$ in. wide, with one end bent at a right angle for a short length and slotted down the middle. When re-stringing, the cord securely rests in this slot, and you can guide it where you want it.

2. The second aid is a length of adhesive surgical tape or Sellotape. Start stringing along, and as you pass the cord over the various drums, pulleys, etc., stick it down with a short piece of this tape. This way it won't come off the first pulley as you are ready to tackle the last one.

Bent drive-drums

In these days of metal shortage and cutting costs which are calculated down to decimal fractions of a penny, drive-drums are often easily bent or wobbling because they have been stamped from a sheet of metal of unsuitably thin gauge.

When re-stringing a drivecord which has come off the drum, I always take the precaution of first inspecting and, if necessary, straightening the drum.—F. V. CARLSHAUSEN, London, NW5.

HMV 1122

CUSTOMER complained of station drift. A visit confirmed this and, as valve substitution failed to cure, the set was brought in.

To our surprise on switching on, what sounded like feedback howl developed as soon as volume was turned up with set tuned to local station. On removing speaker from the cabinet the howl ceased.

In a determined effort to trace the trouble, I replaced the speaker, injected an unmodulated signal and advanced the volume control until the howl commenced. With a test prod I proceeded to touch various components. When I touched the fixed vanes of the oscillator tuning condenser, the howl ceased but as soon as I removed the prod it started.

I replaced the gang. Upon examination, one of the porcelain pillars holding the fixed vanes was found to be cracked right through. This explained the frequency drift and on the bench, the howl.—ALAN J. ROSS, Kingsbridge, Devon.

ADD LOUDSPEAKERPHONE

After our review of the Ediswan Loudspeakerphone intercom was complete for last month's issue (see page 19), the diagram below, showing the modifications in a Master for inter-Master communication, was obtained.

