

Volume 2 AMENDMENT No. 13

Date of issue: May 2023.

After the publication of 'Wireless for the Warrior' Volume 2 'Wireless Sets of WW2', a small number of minor (typing) errors and incorrect data was spotted. Corrections, additional photos and newly found items are published in 'Volume 2 Amendments'.



Wired Wireless Adapter No. 1

DATA SUMMARY

Organisation: British Army.
Year of Introduction: Believed 1943/44.
Purpose: Connecting Wireless Sets No. 38 via an assault field cable for wired wireless operation.
Size (mm): Height 28, length 81, width 19.

REMARKS

Methods by which wireless sets could be used in connection with land-lines to obtain an increased range were described in two publications. Although documented, any evidence about its actual use was hitherto not found.

It came therefore as a surprise when an email with a request for identification was received from Lance Van Ooteghem who had found with his metal detector an unknown object at a former war-time location of a British Artillery and RAC regiment. He already was aware by its VAOS number ZA16064 that it should be British Signal and Wireless stores.

The only record and illustration identical to this item was on a Working Instructions Card of a Wireless Set No. 38 Mk. 2 as parachute and glider station, designated 'Wired Wireless Adapter No. 1' (1). A drawn illustration of this adapter was printed on this card, an apparently rare item, and a possible spin-off from Wired Wireless, mentioned in other publications (2).

The possibilities of Wired Wireless and Line Assisted Wireless were investigated by the Signals Experimental Group in the Middle East in 1943 and 1944. Extracts of their conclusions were published in two Royal Signal (Middle East) Monthly Summaries of Information and in a later Training Memorandum.

With Line Assisted Wireless, known as Method 'a', the aerials were sited near a telephone route, but without making direct contact.

Wired Wireless, (Method 'b') with both sets connected direct or via a matching device to a pair of telephone lines, appeared unpractical.

Not mentioned in both publications was the Wired Wireless Adapter No. 1, which connected two Wireless Sets No. 38 via a single field cable, without the use of conspicuous aerials and probably less interference.

(1), (2) Pages of these documents, scanned from the originals in the Royal Signals Museum archives, were printed in slightly reduced size on pages 2 to 4 of this WfW Amendment.



WIRED WIRELESS WORKING. Use Adaptor, Wired Wireless, No. 1 (see Fig.), as follows: (1) Insert single pin plug into LARGE Aerial Socket. (2) Connect terminal on top of Adaptor to Assault Cable. (3) Two Sets connected by Cable may now be "netted" and worked as in W.S. No.38 Working Instructions.

Note.—Assault Cable for this system is carried in Unit Store.



Internal view of the adapter, containing a capacitor and filled with an unknown substance which had been deteriorated after many years buried in the ground.

References

- Photographs and information courtesy Lance Van Ooteghem.
- Working Instructions Card No. 2, Wireless Set No. 38 Mk. 2, parachute and glider station, ZA16066, n.d.
- Royal Signals (Middle East) Monthly Summary of Information, No. 8, Aug. 1943 and No. 16, Appx. D, April 1944, published courtesy Royal Signals Museum, Blandford Forum, UK.
- Royal Signals Training Memorandum No. 9. pp 25-38, July 1945.

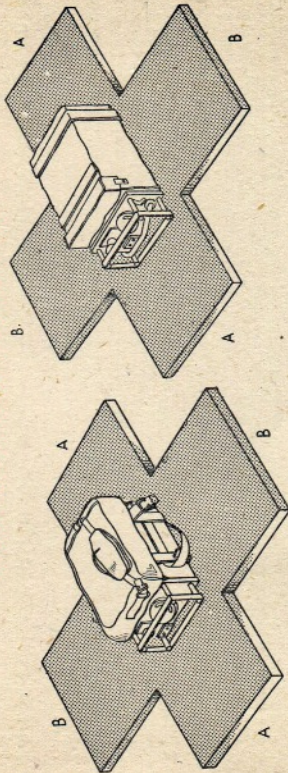


Front panel view of Wireless Set No. 38 Mk. 2 showing the large aerial socket opening where the Wired Wireless Adapter No. 1 was inserted.

PACKING AND UNPACKING

(1) **PARACHUTE STATION.** The packing (Packing strips No. 13, ZA. 16587, and Straps, securing, No. 6, ZA.16588) is a Unit Store, drawn on A.F.—G.1098. The packed Set is stowed in an Arms Container AT THE PARACHUTE END. The Aerial rods, in Cases Carrying No. 3, are stowed separately with no special packing. The Right-hand Satchel, carrying spare Batteries, is also stowed in an Arms Container, with no special packing.

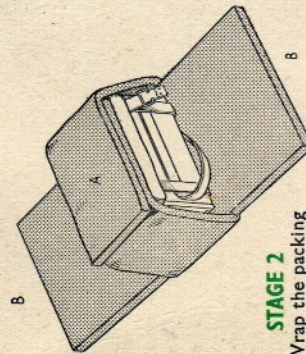
PACK IN STAGES AS FOLLOWS:—



STAGE 1

MK. 2 SETS. Place the Set and Satchel on strip, as shown.

MK. 1 SETS. Place the Set on strip as shown.

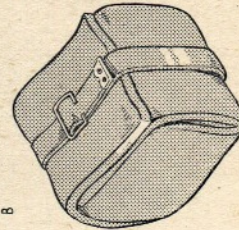


STAGE 2

Wrap the packing ends A—A tightly round Set.

STAGE 3

Wrap the packing ends B—B tightly over the ends A—A.



STAGE 4

Fasten with Straps, securing, No. 6, as Shown.

(2) **GLIDER STATION.** The equipment may be worn by the operator, or stowed in the wicker baskets provided. No special packing is necessary.

ZA. 16066

Working Instructions Card No. 2 for Wireless Set No. 38 parachute and glider station showing the Wired Wireless Adapter No. 1.

W.S. No. 38. Mk. 2.

AIRBORNE STATION

(FOR (1) PARACHUTES and (2) GLIDERS)

WORKING INSTRUCTIONS No. 2

(1) **PARACHUTE STATION.** Put on your kit as follows:—(1) Set, (2) Left-hand Satchel, (3) Right-hand Satchel, (4) Aerial Case. Only use Mk. 1 Set if Mk. 2 is unavailable. When using Mk. 1, do NOT carry Left-hand Satchel. Stow its contents in the Set.

'WEAR KIT AS SHOWN

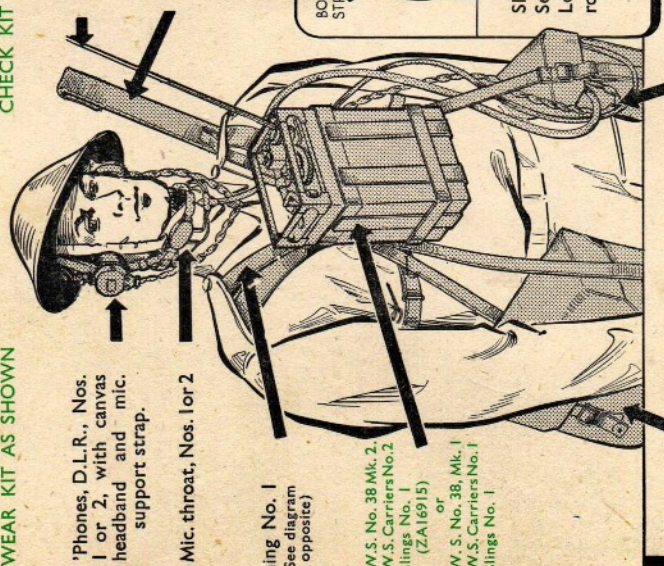
CHECK KIT BY GREEN ★ ONLY

'Phones, D.L.R., Nos. 1 or 2, with canvas headband and mic. support strap.

Mic. throat, Nos. 1 or 2

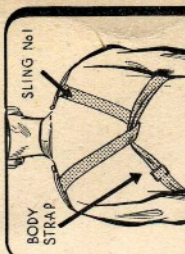
Aerial. Use the full 12-ft. rod OR the single 4-ft. rod.

★ Cases, Aerial, No. 3
Stow:—
1 Thick F Section No. 1
1 Med. F Section No. 2
2 Thin F Sections No. 3



Sling No. 1 (See diagram opposite)

★ W.S. No. 38 Mk. 2, W.S. Carriers No. 2 Slings No. 1 (ZA 16915) or W.S. No. 38, Mk. 1 W.S. Carriers No. 1 Slings No. 1



Sling No. 1 holds the Set in centre of chest. Loop it, as shown here, round the body strap of carrier.

★ Satchels, Signal, No. 2 (worn on Right). Remove centre partition and stow:—
3 Batteries, Dry HT./L.T. 150v./3v. (Nos. 1 or 2 for Mk. 1 Sets) (No. 1 only for Mk. 1 Sets)

★ Satchels, Signal, No. 2 (worn on Left) Stow:—
1 Battery, Dry (in use), 1 Junction Box, This Card, & Working Instructions Card. Adaptor, wired Wireless, No. 1. 1 Phones, 1 Throat Mic.



WIRED WIRELESS WORKING. Use Adaptor, Wired Wireless, No. 1 (see Fig.), as follows: (1) Insert single pin plug into LARGE Aerial Socket. (2) Connect terminal on top of Adaptor to Assault Cable. (3) Two Sets connected by Cable may now be "netted" and worked as in W.S. No. 38 Working Instructions. Note.—Assault Cable for this system is carried in Unit Store.

(2) **GLIDER STATION.** The same as for Parachute Station, with one exception, viz.: carry two spare batteries ONLY in Right-hand Satchel (do not remove centre partition).

REMEMBER—No. 2 BATTERIES DO NOT FIT MK. 1 SETS!

WIRED WIRELESS.

20. Tests conducted by Sigs Experimental Gp indicate the feasibility of communication by "wired wireless". The main factors of the system are as follows :-

- (a) Over a well-balanced open-wire route a wireless set will give good speech at five times its normal range.
- (b) The frequency employed is not critical but better results are obtained with lower frequencies, though not below 250 kc/s.
- (c) Only ONE wireless channel can be used on the same pair.
- (d) No interference is caused to any carrier channels on the same pair provided reasonable input levels are used, e.g. below 20w normal aerial power.
- (e) If the line used is a single pair the "wired wireless" link will not work if a break of approx one bay occurs. If the line used is a multi-wire route, the "wired wireless" link is almost unaffected, due to inductive coupling. If one wire of the "wired wireless" pair breaks, the speech is degraded but does not entirely fail.
- (f) There is practically no radiation if the pair is well-balanced.
- (g) The system will NOT work over UG sections of more than a few yards in the line.

21. There would appear to be no difficulty in designing and building suitable by-pass equipment for use where lengths of UG cable are met with.

22. *Although* line tests have ~~already been made available to above general data~~, more practical work will be necessary to gain experience in the detailed working of "wired wireless". In view of the possible damage, however, which might result from inexpert installation of "wired wireless" equipment, no experiments will be carried out without the authority of the S.O. in C. Trials will continue to be conducted by OC Sigs Experimental Gp.

23. Further information will be published as it becomes available.

Systems. LINE ASSISTED WIRELESS.

1. There are two methods by which ordinary Service Wireless Sets may be used in conjunction with landlines to obtain an increase in range.

- (a) "Line Assisted Wireless" in which aeriels are sited near to a telephone route, no direct connection being made, and
- (b) "Wired Wireless" in which use is made of an ordinary telephone pair. The Set is connected to the pair either direct or by means of a matching device.

The following notes are an abstract of work carried out by Sigs Exptl Gp ME. Full details of wired wireless are contained in a report issued by Sigs Exptl Gp which is available from X(3) Branch GHQ MEF on application.

Interference with Line Circuits.

2. The use of telephone routes or pairs for this purpose does not interfere in any way with the normal line traffic, neither telephone nor telegraph.

Security.

3. Line Assisted Wireless circuits give no additional degree of security to the transmission and the normal security instructions on the use of wireless apply.

Application.

- (a) Line Assisted Wireless is considered to be of use in the field to extend the range of field wireless sets where an overhead route runs in the direction in which transmission is desired.
- (b) Wired Wireless is considered to have few useful applications since over Field Cable or over Circuits partly composed of underground cable no increase in range is obtained. A transformer is necessary to match the set to the line if good results are to be obtained. Moreover under circumstances where wired wireless might be used Carrier Equipment would normally be available.

Line Assisted Wireless.

5. a) Aerials.

- (i) Site the set adjacent to the overhead route as shown in Fig.1. Ordinary service sets may be used without modification. The normal 12 ft rod or a short length of wire is used as an aerial.
- (ii) As a temporary measure the rod aerial may be tilted towards the route and secured by string but better results will be achieved with the short wire aerial.
- (iii) Positions of low signal strength occur and extend for about 6 ft. It is probable that not more than two such positions will be found in any one span. Tests should be made at various points along the route by moving the truck with the rod aerial tilted towards the line wires. If a position has to be selected away from a pole a length of D8 or similar

cable should be slung between the poles as a suspender for the wire aerial. The aerial should not be attached to the line wire itself.

b) Method.

- (i) If the poles are "arned", fix an 8 yd length of insulated wire such as PL3 or D3 single, to one end of the bottom arm. A spare line insulator can be used if an arm position is available, otherwise use a small shell or link type fixed closely to the underside of the arm. Poles which have stays fitted should be avoided.
- (ii) Move the W/T set away from the route (at a right angle from the route) until the wire from the arm, when connected to the set or aerial connection on the vehicle, makes an angle of approx 30° with the ground. Fig.1 illustrates a typical case.

c) Results.

- (i) Using the wire aerial as recommended increases in the range of normal service sets up to 200% over that possible with ground wave working, may be obtained. For example Two No. 19 L.P. Sets have worked 45 miles on R/T. In this case the maximum ground wave range was 19 miles. In another test two No. 49 Sets worked satisfactorily over 28 miles when the maximum ground wave was 10 - 12 miles.
- (ii) There is little difference in signal strength between a transmission at 2 M/cs and one at 8 M/cs provided that the power is equal.

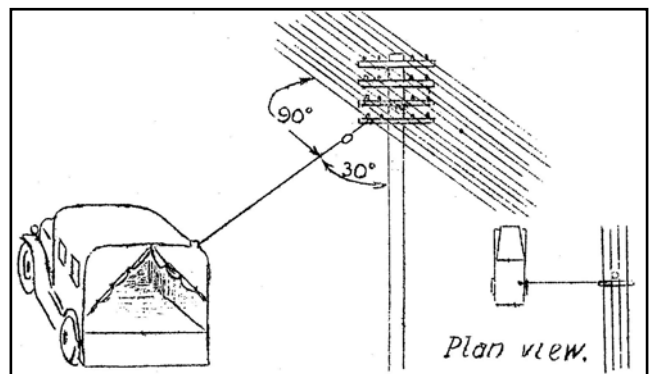


Fig.1 Typical example of Line Assisted Wireless Method 'a'.

Later publication on line assisted wireless.

More on Line Assisted Wireless was published in Royal Signals Training Memorandum No. 9, July 1945, basically following the results of the Middle East experiments, including a more simple method of aerial arrangement, but still no mention of the Wired Wireless Adapter No. 1.

SECTION 12.—LINE ASSISTED WIRELESS

1. **Introduction.**—Service wireless sets may be used in conjunction with telephone lines to obtain an increase in the ground-wave range of the set. Either of the following methods is practicable:—

- (a) *Wired wireless*, in which use is made of an ordinary telephone pair, the set being connected to it either directly or through a matching device.
- (b) *Line assisted wireless*, in which aerials are sited close to a telephone route, no direct connection being made.

Application

2. Wired wireless is generally unsatisfactory because a matching device is needed to obtain good results and because, over field cable or over circuits partly composed of underground cable, there is no increase of range. Furthermore, where wired wireless might be used, carrier equipment would normally be available.

3. Line assisted wireless, on the other hand, has useful applications in the field to extend the ground-wave range of field wireless sets where an overhead route runs in the direction in which transmission is desired.

Siting the set

4. When siting a set for line assisted wireless there will be some points along the route where signal strength is very low. These positions extend for about 6 ft and, as a rule, not more than two of them will occur in any one bay. The best way to avoid these bad portions of the line is to make preliminary signal strength tests at various points with a rod aerial tilted towards the line wires.

5. Units in the Middle East made use of a short wire aerial slung from an insulator attached to the arm of a pole. If it was found that all convenient poles were sited at points of low signal strength, or that the poles were stayed, a length of D8 or similar cable was slung between two poles and used as a suspender for the wire aerial. The aerial was slung at right angles to the route, making an angle of 30 degrees with the vertical.

6. Tests carried out by the Army Operational Research Group (AORG), however, proved that a far simpler method of aerial arrangement would give comparable results. This method is to site the set and its aerial directly under the route so that a point about a foot from the top of the rod is close to one or more of the overhead wires.

7. In practice it is most convenient to put a layer of insulating tape round the top section of the aerial and rest this section against the overhead wires. No pole climbing is then necessary, and searching down the route for the best operating position is facilitated (see Fig 14). There is no necessity to slope the aerial.

8. When the lines it is desired to use are higher than the length of the aerial, quite good results can still be obtained by siting the aerial directly under the wires, a little to one side. The aerial tip may be from 6 ft to 12 ft below the wires. It is important, whatever method is employed, to remember that only bare wires can be used for line assisted wireless.

9. **Security.**—The use of telephone routes for line assisted wireless does not in any way interfere with the normal line traffic and there is no danger of wireless signals being picked up on the telephone circuits, or *vice versa*. At the same time, line assisted wireless circuits give no additional degree of security to the wireless transmissions and the normal security instructions on the use of wireless must be strictly followed.

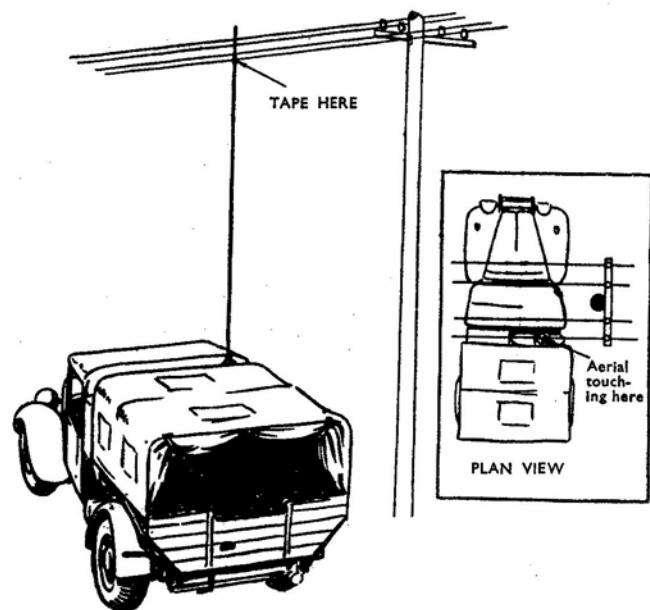


FIG 14.—An aerial in contact with one wire of a PL route for line assisted wireless

Results

10. Using the wire aerial mentioned in para 5 above, increases in range of up to 100 per cent over those possible with ground-wave working were obtained in the field. For example, two WS No. 19 (LP) have worked 45 miles on RT in circumstances where the normal ground-wave range was only 19 miles.

11. As the particular circumstances (*e.g.*, number of wires, height above aerial tops at both ends, etc.) always vary, no rules can be given for the ranges to be expected with the rod aerial method outlined in paras 6, 7, and 8 above. This is a matter of experience. It may be stated, however, that AORG tests proved that with a good overhead line range increases of from 5 to 10 times the sets' normal ground-wave ranges could be obtained, a good deal more than the factor of 2 given for the wire aerial.

12. What is important is the knowledge that, if detachments are anywhere along a bare wire line of any sort, they will vastly improve signals by getting close to it.