

Post Office Telecommunications

Customers Apparatus Guide Notes

1+1 Subscribers Carrier System (WB900)

Vocational Training Division
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1 + 1 SUBSCRIBERS CARRIER SYSTEM WB900

This system has been developed to allow two subscribers to use the same pair of wires to the exchange, but unlike shared service the two subscribers have complete **privacy** and **both** can use the telephone at the same time. All the usual facilities and telephone arrangements as well as data transmission can be provided subject to the limitations on page 5.

The two subscribers are known as the **Audio Subscriber** and the **Carrier Subscriber**.

THE AUDIO SUBSCRIBER

This works as a normal line using normal dc signalling, and 25 Hz ac to ring the bell. The only additional equipment is two small filter units, fitted at the DP and the Exchange. These filter units are used to 'separate' the Audio signal (low frequency 300 Hz – 3.4 kHz) from the high frequency carrier signals.

THE CARRIER SUBSCRIBER

This is separated from the Audio Subscriber by using high frequency carrier signals (instead of the usual dc and low frequency audio) over the underground cable pair. These signals are changed back to audio and dc at the subscribers house and the telephone exchange.

When the Carrier Subscriber lifts his handset the loop condition signals the carrier equipment in his house to send a high frequency signal (40 kHz) to the Exchange. (This signal is inaudible, being far above our normal hearing range.) At the Exchange this signal is recognised by the Carrier equipment and is converted to a dc signal to operate the Exchange equipment. This same signal is also modulated with speech signals from the Carrier Subscriber, interrupted at 10pps during dialling, and used to signal the Exchange when the telephone is answered on incoming calls.

Incoming signals to the Carrier Subscriber from the Exchange use 64 kHz as the Carrier frequency. This is modulated with 25 Hz during ringing. The ringing current is demodulated at the Subscribers house, and amplified to ring the bell (maximum 2) at the Carrier Subscriber.

The Subscribers Carrier equipment is powered by a 10V Nickel Cadmium Battery (Battery, Secondary No. 21) which is charged with current from the line when neither telephone is in use.

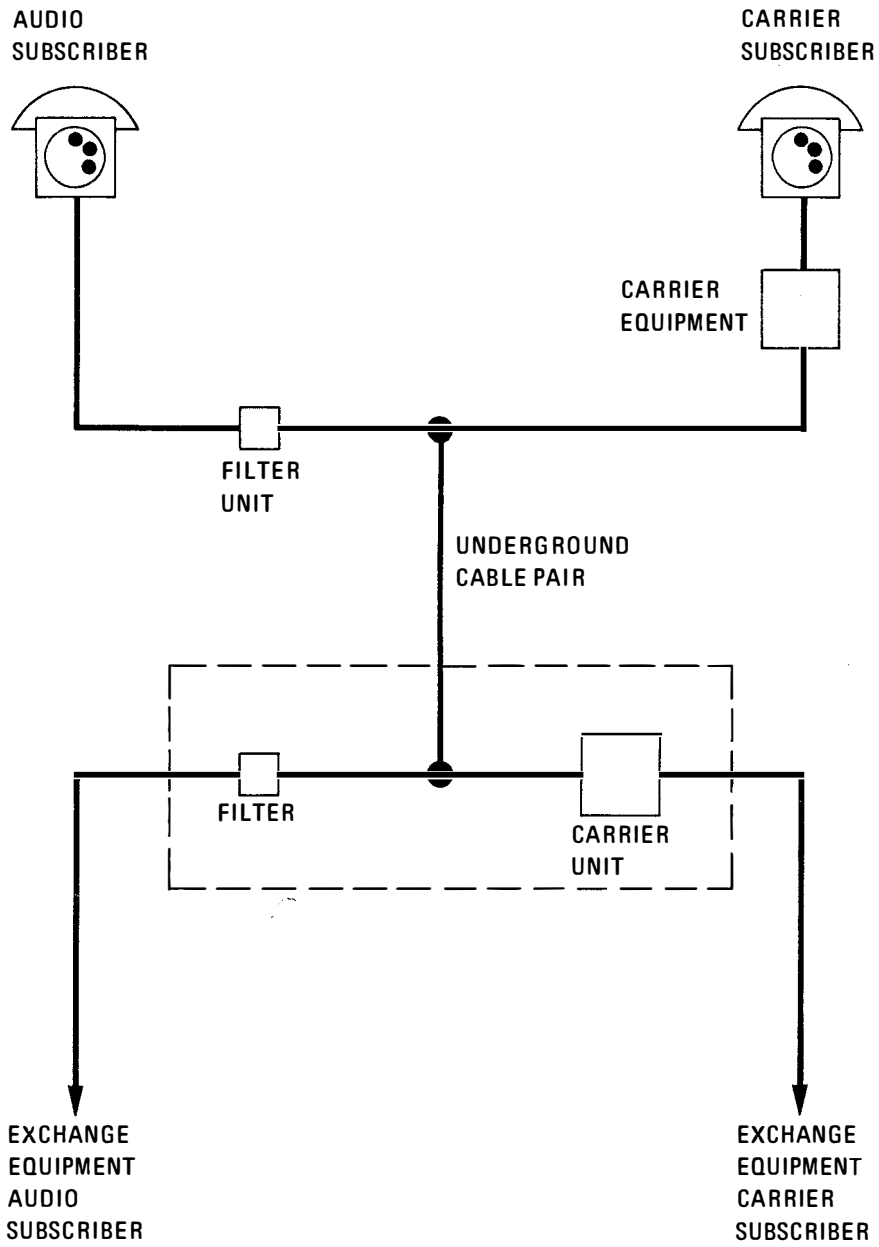


Fig. 1

INSTALLATION

AUDIO SUBSCRIBER

The Subscribers' apparatus is fitted as a normal direct line except that at the DP a Filter Unit No.8A is fitted in the line. The filter is fixed to the pole* (if possible on the right hand side of the DP block) and crimped connexions are made with Connectors, Wire, Insulated inside the DP block. The Audio Subscriber may be treated as a direct line with all facilities except Subscriber controlled night transfer.

* Filter Units No.10A may also be fitted at the Cabinet, (taped to the wall) or in a joint box – if the tee is at that point.

CARRIER SUBSCRIBER

The Subscribers' apparatus is fitted in the usual way but in addition a Subscriber Unit WB900 is fitted in the line. This Unit which is 270mm x 95mm should be fitted internally in a cool, dry accessible position that is satisfactory to the Subscriber. On installation a Battery, Secondary No.21 should be fitted in the Unit, care being taken to ensure correct polarity. The 'telephone' terminals of the unit should be treated as the A and B legs of the exchange line when fitting the telephone. Most facilities are available to the Carrier Subscriber except:

- a. Pay-on-answer coin boxes
- b. Malicious call alarm
- c. Earth calling or holding PABX's
- d. Subscribers controlled transfer
- e. Subscribers barring of calls
- f. Subscribers private metering
- g. More than **Two** series connected bells
- h. Any system that rings to earth, e.g. HES No.4
- j. Speakerset 2

CUSTOMERS ENQUIRIES

Should the customer ask about Carrier equipment he can be given the explanation that it allows the PO to provide **Full** service to two telephones on only one circuit.

There can be simultaneous use of both telephones without interference. The Customer should in no way be given the impression that he is 'sharing' as in the present Shared Service System.

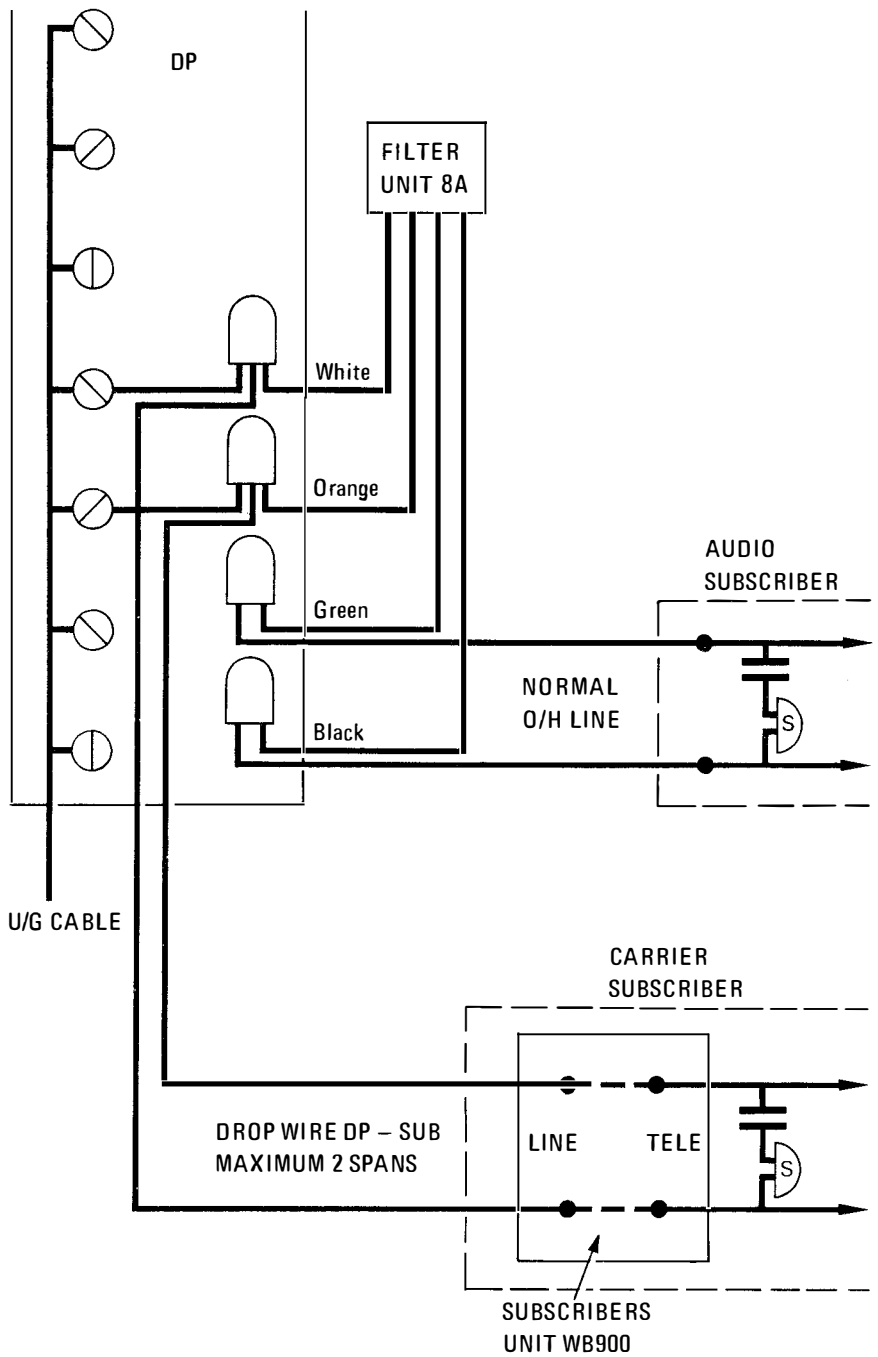


Fig.2

EXCHANGE JUMPERING

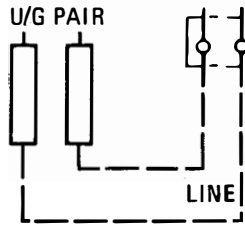
The underground pair is jumpered to line of the appropriate carrier equipment (line side to line side jumper).

The Audio and Carrier Subscribers numbers are then jumpered separately to their respective carrier equipment tags on the carrier connexion block. If the Audio Subscriber is a working line it is necessary to re-jumper the sub via the carrier connexion block.

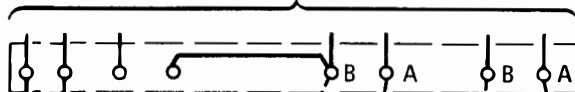
The IDF is jumpered in the normal way

MDF

LINE SIDE



CARRIER EQUIPMENT MAR

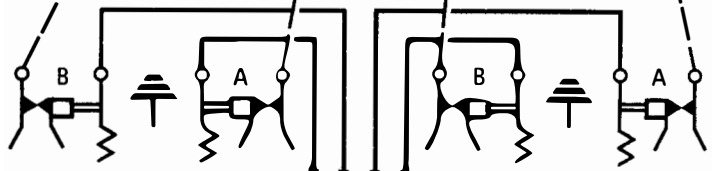


CARRIER CONNEXION BLOCK

AUDIO

CARRIER

EXCHANGE SIDE



EXCHANGE EQUIPMENT

----- JUMPERS

* CORRECT POLARITY MUST BE MAINTAINED

Fig.3

TESTING; EXCHANGE AND LINE

The following tests can be made from the exchange via the test selectors before a Faultsman is sent to the Subscribers' premises.

AUDIO SUB

Fig. 4a

Into Exchange – polarity of conditions and dial tone.

Fig. 4b

Out to line – line conditions of both Audio and Carrier Subscribers (tests as exclusive service – extra capacitance in filters not noticeable). The voltmeter key in the test cord cct. causes **Line Power Transmit Unit** to disconnect charging current and restor **Line** to 'A' sub's exchange equipment for 60 – 90 secs. The Subscriber can be rung, and dial and loop resistance tests made.

CARRIER SUB

Fig. 4c

Into Exchange – polarity of conditions and dial tone.

Fig. 4d

Towards line – the **Exchange Carrier Equipment** prevents tests of the **Line** (it can be tested as in **b.**). The Carrier equipment itself test as Low Insulation. The Subscriber can be rung and when the subscriber answers a Loop should be received from the Exchange carrier equipment. Dial tests can be made.

If the tests in **d.** are not satisfactory change the **Exchange Carrier Equipment** card and repeat the tests – if still not satisfactory replace the original card and send Faultsman to Subscribers' premises.

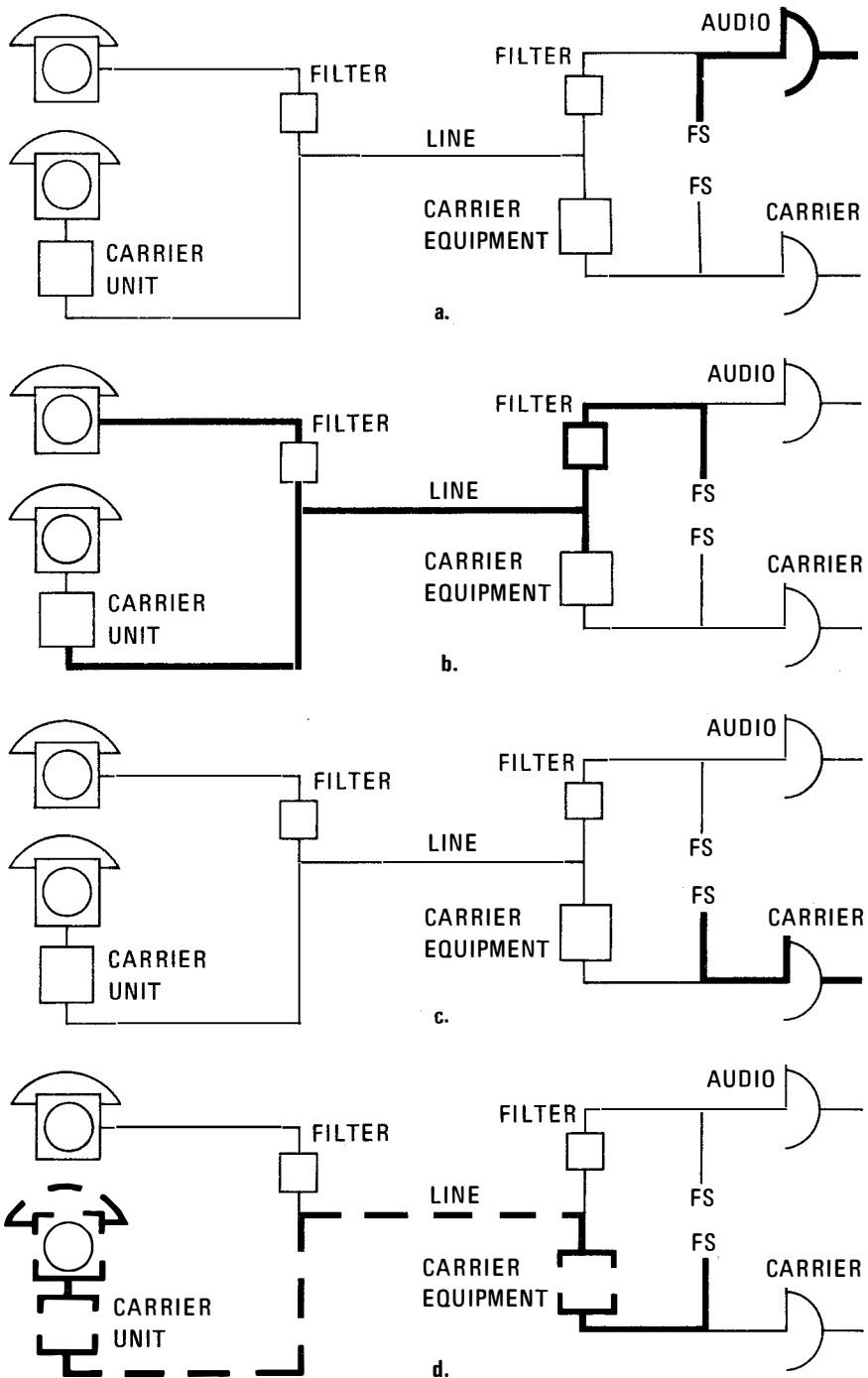


Fig.4

TESTING; SUBSCRIBER'S APPARATUS

AUDIO SUBSCRIBER

Treat as a normal direct line.

CARRIER SUBSCRIBER

Connect the telephone directly to the incoming line, the telephone will then work as the Audio Subscriber, this will test both the telephone and line. Any test calls made will tinkle the Audio Subscribers bell and will also register on the Audio Subscribers meter. These calls should be credited to the Audio Subscriber in the usual way.

If this test proves the telephone and line OK, then either the carrier unit or its power supply is faulty.

BATTERY TESTING (10V Nickel Cadmium)

1. Ensure the Audio Sub is not using the line.
2. Disconnect battery and in its place connect a Meter Multirange No. 12 on the 25V range, ensuring correct polarity.
3. Momentarily short circuit line, after 60 – 90 secs. a reading of 11 – 11.5 volts should be measured. If this reading is **Not** observed the charging circuit is faulty and the complete unit and battery should be changed.

If the battery proves to be satisfactory and the telephone still does not function then the Carrier Unit should be changed for a known good spare.

NOTE

If one leg of the Carrier pair is disconnected or is very high resistance the Carrier Subscriber will still work until the battery has discharged. Therefore when battery faults have occurred it is important to ensure that the pair to the Carrier Subscriber is good.

MAINTENANCE

Maintenance of Carrier equipment is strictly limited to changing units only – see list of maintenance spares below. Line, Telephone and Exchange equipment is maintained in the usual way.

ITEM DESCRIPTION	ITEM CODE No.
Subscribers Carrier Unit WB900/1	41 0353
Filter Unit No. 8A (contains 1 filter)	37 2710
Filter Unit No. 10A	Not yet in Vocabulary of Stores.
Battery, Secondary, No.21	19 2024

RADIO INTERFERENCE

In certain circumstances WB900 is subject to Radio Interference. In these cases the following suggestions may reduce this to an acceptable level:–

1. Check that line insulation is within limits.
2. Check that loop resistance is within limits.
3. Check for capacitive unbalance, split pairs or corroded joints using a Pulse Echo Tester.
4. Fitting a balancing unit WB400 may give marginal improvements.

If all the above fail to give improvement the line **must** be changed to Exclusive or Shared Service – contact the area external planning office.

REFERENCES

System Description	TI A2 C1009
Exchange Jumpering and Installation	TI C3 A0020
Subscribers Apparatus Maintenance	TI E9 E2710
RSC Records and Testing	TI E9 E2790
Test of Exchange Equipment TOS and OCB	TI E9 E2712

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NOTES

1. HOWLER

The use of the Howler on the Audio Subscriber will tinkle the Carrier Subscriber's bell.

The use of the Howler on the Carrier Subscriber will be ineffective.

2. RING BACK

Faultsman 'Automatic Ring Back' will work to both subscribers but SALT will only work to the Audio Subscriber.

N DIAGRAMS

Carriers Subscribers Installation Wiring	N5181 Sheet 1
Local Power for Subscribers Unit	N5181 Sheet 2
Corrections for Dropwire and Filter No. 8A	N5182
Exchange Jumpering	N5183

