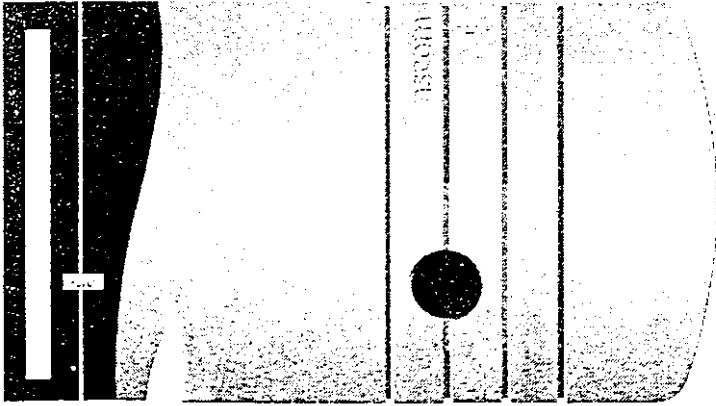


Exhibit D
FCC ID: BX2U912D



Operation

Bedienungsanleitung

Mode d'emploi

912D

Addition to Operation 912D.

There are three versions of the 912D receiver available: 912D-A, 912D-B and 912D-C.

Please refer below for the different functions.

Model	912D-A	912D-B	912D-C
Max. No. of characters / message	12	120	120
Max. No. of stored messages	4	10	10
Max. No. of characters in memory	48	480	480
Group numbers	0	5	5
Absent indication	No	No	Yes
Time tagging of message	No	Yes	Yes

Contents

English

English

Deutsch

Français

Daily use	4
Paging characteristics	
Long messages	
Scrolling through messages	
Erasing messages	
Storing messages	

Memo function	5
Info function	5

Other settings	5
----------------	---

Turning the receiver off and on	
Receiving paging messages in silence	
Changing receiver functions	

Replacing batteries	7
Absence indication	7
Receiving someone else's messages	7
Error indication	8

General	3
Operation	3
Identity	3
Display	3
Symbols	

Contents

FCC Information

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Warning:

Any modifications made to this device, not expressly approved by Ascom Tateco AB, could void the user's authority to operate this equipment.

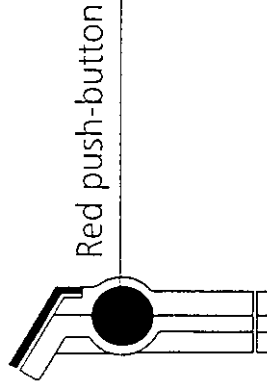
General

The teleCOURIER 900 paging system has been extended to include the U/H912D receiver. It has an easy-to-read, single-line top display, which can receive messages with up to 120 characters. The display can present 12 characters at a time. Ten paging messages can be stored.

The black dot on the front is the IR receiver. It enables the 912D to be programmed, receive messages and indicate that you are absent, when it is in the storage compartment.

Operation



The receiver is turned on by quickly pressing the red button. This button is also used to scroll through messages, acknowledge receipt and erase messages. In addition, it is used to change the receiver settings.



Identity

When you turn on the receiver, its identity is shown on the display.

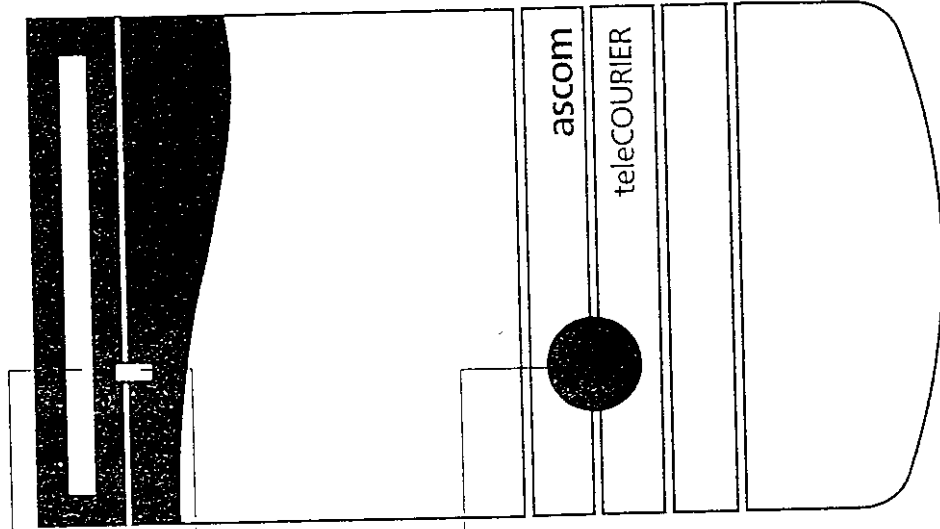
Display

The display, which is on the top of the receiver, can present twelve characters at a time. Long messages are displayed by scrolling, see "Long messages". The display also includes special symbols,  and , which indicate various functions.



912D pager

Display

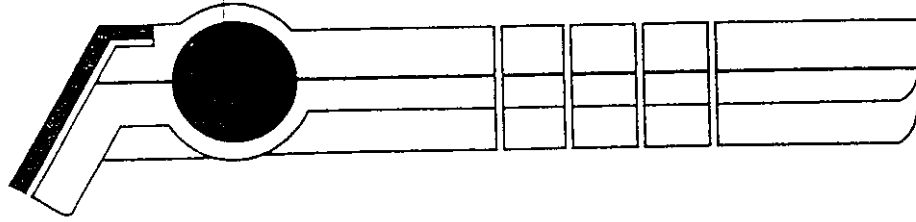


LED

IR receiver

Battery cover

Push-button



Daily use

Symbols on the display





New message. The symbol flashes.



Error indication.


Daily use

When you are being paged, the message is shown on the display, a beep signal is heard and the LED flashes. The  symbol on the display also flashes until you acknowledge the message. If you have chosen to have the message time-marked, the time will be shown after the message. If the message is more than one day old, the time marking disappears. If the message is longer than twelve characters, it is scrolled automatically so that you can read it in its entirety.

A short press on the red button acknowledges receipt of the message and the beep signal stops. At next press on the button the next unacknowledged message appears on the display.  continues to flash as long as there are unacknowledged messages.

When the receiver is not in use, it should be turned off or put in the storage compartment to extend the service life of the battery.

Paging characteristics

To make it easy to distinguish between different types of paging message, there are seven different types of beep and flash signal. The volume can be set at three levels. You can also set the sound level to begin at low volume and then increase in strength.  is then shown on the display. See also "Changing receiver functions". It is also possible to turn off the sound completely and only receive silent paging messages. This is described under "Receiving paging messages in silence".


Your receiver can also be equipped with a trembler.

Long messages

The 912D can receive long messages with a maximum of 120 characters. The text is scrolled automatically to enable it to be read in its entirety. If the scrolling stops, it can be restarted by a short press on the button which acknowledges the message at the same time.

Scrolling through messages

Messages which are stored can be recalled on the display by giving the button a quick press. Mes-

sages without a receipt are shown first. If all the messages have been acknowledged, they will be shown in chronological order, starting with the last message. The receiver identity is shown after the oldest message. As long as there are messages without a receipt,  will flash on the display. You can choose to have a reminder beep as long as the latest message has not been acknowledged (see *Other settings*).

Erasing messages

You can erase messages by pressing the button for a few seconds and ***** will appear on the display. When all the messages have been erased, the receiver identity will be shown.

Storing messages

Paging messages are stored in time order with the message that was received last as the first. When the memory is full, the first message to be erased is the oldest one with a receipt, followed by the oldest one without a receipt. Depending on the length of the new display message, several stored messages may be erased. All the messages are erased when the batteries are replaced.

Memo function

The memo function is a saving function. If your receiver has this function, it will save all the messages even when it is turned off. The memory will, however, be erased when the batteries are changed. To change the memo function settings, the receiver has to be re-programmed.

Info function

It is possible to store six so-called info pages. An info page contains information which is updated automatically and regularly, like a measurement value for air current, for example. When you receive an info message, the receiver does not normally beep or flash. The info pages are shown last when you scroll through the messages.

Other settings

Scroll through the messages until the receiver identity is shown. Pressing the red button for a few seconds produces the different receiver settings. The following settings are possible:

- Turn off the receiver
- Receive paging messages in silence

Other settings

- Change functions (Menu)

- Return to paging message display

Pressing the red button for a few seconds gives you access to the different options.

However, all these functions may not be activated on your particular receiver.

if you do not want to be disturbed, at a meeting, for example. The word **SILENT** alternates with the identity to remind you that you have made this selection. In this mode, new messages are shown for one minute and the receiver then shows its identity again. Please note that the trembler is not disconnected.

Changing receiver functions

Scroll until you reach the receiver identity. Pressing the button for a few seconds produces **OFF?** on the display. Keep pressing the button quickly until **MENU?** appears on the display. From here you can leave the main menu and enter the sub-menu. Select a change of function by pressing the button for a few seconds. Scroll through the different parameters by pressing the button quickly. The text flashes for every function that can be changed. Pressing the button for a few seconds changes the value of the parameters. The changed value is stored at the same time.

The following functions are in the sub-menu, but your receiver may be restricted to only some of them.

You can change the volume of the beep and the

Turning the receiver off and on

Pressing the button for a few seconds takes you directly to the "Turn off" function. **OFF?** appears on the display. Pressing the button again for a few seconds turns off the receiver. If the button is not pressed again, the receiver shows its identity again. If the receiver is off, press the button once to turn it on again.

Receiving paging messages in silence

Scroll until you reach the receiver identity. Pressing the button for a few seconds produces **OFF?** on the display. Keep pressing the button quickly until **BEEP?ON** appears on the display. If you then press the button for a few seconds, the loudspeaker is turned off and the display shows **BEEP?OFF**. Messages are still stored. You can select silent paging

Replacing batteries

trembler can also be connected and disconnected.

You can see the receiver paging number.

You can connect and disconnect up to five extra paging numbers.

You can connect and disconnect the time-marking of a message here (CLOCK).

You can set the reminder beep for messages which have not been acknowledged.

To make it easier to read the display when the receiver is worn/carried in different ways, you can choose the direction from which the text is read (DISPLAY).

The programming function can only be used by persons with system responsibility.

After a while, the receiver starts to receive and display paging messages again. You can get it to do so yourself by scrolling through the possible settings by quickly pressing the button until RE-TURN? appears on the display. Pressing the button for a few seconds makes the receiver show its identity again.

Replacing batteries

When CHANGE BAT appears on the display, the battery needs to be replaced. Turn off the receiver. (Described under "Turning the receiver off and on".)

Open the battery cover by pulling in the direction of the arrow with your thumb and opening it upwards. Replace the battery. The battery terminal should face inwards. Turn on the receiver and check that it is working normally.



Absence indication


When the receiver is put in a storage compartment with absence indication, anyone who pages you receives automatic absence indication. He/she then realises that you cannot be paged at that time.


Receiving someone else's paging messages

The transferred paging message is received on one of the five extra paging numbers or by the paging number being changed automatically when the paging message is transmitted. To show that


Error indication

this has taken place, the original paging number is shown at the end of the message. Either  or .

 means that the receiver has received the message on one of the five extra paging numbers.

 means that a reconnection was made before the paging message was transmitted.

Error indication

 When this symbol is displayed together with the words **WEAK SIGNAL**, you could be outside the coverage area. The symbol disappears after a while when the receiver is back in its coverage area. If it does not, take the receiver to be serviced.

The same symbol is also shown if the internal error monitoring function in the system identifies an error.

1000000

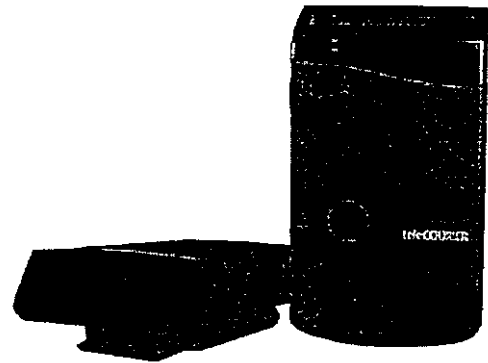
ascor

teleCOURIER 900

Display Receivers H912D, U912D

Features

- Robust, user-friendly design
- 12 characters display
- Versions B and C can receive messages consisting of 120 characters
- Seven different beep codes that help to identify the nature of the call
- All incoming messages are time tagged (versions B and C only)
- Operated by one push button
- Group hunting available (versions B and C only)
- Silent state
- Vibrator state can be provided on request
- Easy to reprogram
- Low power consumption
- Endures high voltage and magnetic field
- Handsfree operation
- Automatic out of range warning (versions B and C only)



General

There are two types of 912D receiver, H912D that operates within the HF band and U912D that operates within the UHF band. Both H912D and U912D are available in three versions: A, B and C.

The A version is very simple, it can receive messages consisting of 12 characters and store four messages.

Version B can receive messages consisting of 120 characters, store up to ten messages and time tag all incoming messages. It is equipped with automatic out of range warning and with either auto or soft scroll (customised).

Version C can receive messages consisting of 120 characters, store ten messages, time tag all incoming messages and indicate absence. It is equipped with automatic out of range warning and with either auto or soft scroll (customised).

The design of the receiver is light yet robust. It is very easy to use, all operating is carried out from the menu with the help of a large push button that is situated near the display window.

Both H912D and U912D can be easily reprogrammed if needed. This is done either via radio or when the receiver is placed in the storage rack, using the Win900 software. When reprogramming via radio only the ID and call number can be changed.

Application

Paging

An incoming paging is indicated by tone, light or vibration if available. Besides paging this type of receiver can also be used as an alarm device. It has seven different types of beeps or signals that make it easy for the user to identify the nature of the call. If the receiver is in silent mode when an alarm paging is sent, it is automatically switched to the beep function.

Memory

912D has the ability to store 10 messages or 480 characters (versions B and C only) or 4 messages (A version only).

All incoming messages are automatically stored. Any stored message can be recalled to the display at any time. The memory bank is based on the first-in first-out principle, although the messages can be deleted manually if needed.

Power supply

912D is equipped with a standard IEC LR03 battery which is easy to replace.

Technical Specifications

	H912D	U912D
Dimensions:	90 x 50 x 15/25 mm	90 x 50 x 15/25 mm
Case:	PC/ABS, grey	PC/ABS, grey
Weight-standard/vib:	70 g incl. battery	70 g incl. battery
Sound pressure level:	> 93 dBA at 10 cm	> 93 dBA at 10 cm
Temperature range:	-10 to +55°C	-10 to +55°C
Display:	12 character alphanumeric LCD	12 character alphanumeric LCD
Frequency range:	26 - 50 MHz	425 - 470 MHz
Modulation:	FM/FSK	FM/FSK
Channel spacing:	minimum 10 kHz	minimum 12,5 kHz
Antenna:	Integral	Integral
Sensitivity:	20 µV/m	20 µV/m,
Cabinet radiation:	< 2 nW	< 2 nW
Adj.channel suppression:	> 40 dB	> 40 dB
Spurious suppression:	> 10 dB	> 10 dB
Battery type:	1 x IEC LR03 (AAA)	1 x IEC LR03 (AAA)
Shock resistant:	IEC 68-2-32, procedure 1, Dropped 12 times from 1 meter	IEC 68-2-32, procedure 1, Dropped 12 times from 1 meter
Character capability:	Latin + Extended Latin	Latin + Extended Latin
Certificates:	IP 30	IP 30

Vibrator option is available for H912D and U912D.

Accessories

Alternative clips
Safety cord

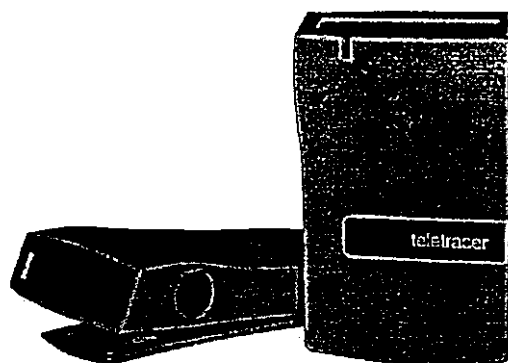
Specifications are subject to change without notice.

Receivers 5012D and 5012

Features

- Handsfree operation
- Robust, user-friendly design
- 12 characters display*
- Up to 120 characters per message (versions B and C)
- Seven different beep codes that help to identify the nature of the call
- All incoming messages are time tagged (versions B and C)
- Operated by one push button
- Group paging available (versions B,C,E and F)
- Silent state
- Vibrator state can be provided on request
- Easy to reprogram
- Low power consumption
- Endures high voltage and magnetic field
- Automatic out of range warning (versions B and C)

* versions A, B, and C



General

The receivers 5012D and 5012 are primarily used for receiving text or beep messages. However, if required they can also be used as alarm receivers for different types of alarm, e.g. fire alarm, technical alarm or medical alarm.

There are two types of 5012D and 5012, H5012D/H5012 that operates within the HF band and U5012D/U5012 that operates within the UHF band. H5012D and U5012D are available in three versions: A, B and C. H5012 and U912 are available in two versions, E and F.

Versions A, B and C are designed for users that work in semi tough environment, e.g., hospitals or industries, and need short text presentation, e.g., status information.

Versions E and F are designed for users that receive few standard messages and therefore can use beep signal to identify the nature of the message.

The design of the receiver is light, robust and user-friendly.

When using A, B or C versions all operating is carried out from the menu with the help of a large push button that is situated near the display window. When using E or F versions the operating is carried out with help of the push button, long push or short push.

Both H5012D/H5012 and U5012D/U5012 can be easily reprogrammed if needed. This is done either via radio* or when the receiver is placed in the storage rack, using the Win900 software. When reprogramming via radio only the ID and call number can be changed.

Application Paging

An incoming paging is indicated by tone, light or vibration if available. The receiver has seven different types of beeps or signals that make it easy for the user to identify the nature of the call. If the receiver is in silent mode when an

alarm paging is sent, it is automatically switched to the beep function.

Memory*

5012D has the ability to store 10 messages or 480 characters (versions B and C only) or 4 messages (A version only).

All incoming messages are automatically stored. Any stored message can be recalled to the display at any time. The memory bank is based on the first-in first-out principle, although the messages can be deleted manually if needed.

Power supply

5012D/5012 is equipped with a standard IEC LR03 battery which is easy to replace.

Technical specifications

	H5012D	U5012D
Dimensions:	90 x 50 x 15/25 mm	90 x 50 x 15/25 mm
Case:	PC/ABS, light grey	PC/ABS, light grey
Weight-standard/vib:	70 g incl. battery	70 g incl. battery
Sound pressure level:	> 93 dBA at 10 cm	> 93 dBA at 10 cm
Temperature range:	-10 to +55°C	-10 to +55°C
Display:	12 character alphanumerical LCD*	12 character alphanumerical LCD*
Frequency range:	26 - 50 MHz	425 - 470 MHz
Modulation:	FM/FSK	FM/FSK
Channel spacing:	minimum 10 kHz	minimum 12,5 kHz
Antenna:	Integral	Integral
Sensitivity:	20 µV/m	20 µV/m
Cabinet radiation:	< 2 nW	< 2 nW
Adj.channel suppression:	> 40 dB	> 40 dB
Spurious suppression:	> 10 dB	> 10 dB
Battery type:	1 x IEC LR03 (AAA)	1 x IEC LR03 (AAA)
Shock resistant:	IEC 68-2-32, procedure 1, Dropped 12 times from 1 meter	IEC 68-2-32, procedure 1, Dropped 12 times from 1 meter
Character capability:	Latin + Extended Latin	Latin + Extended Latin
Certificates :	IP 30	IP 30

Vibrator option is available for all types of 5012D/5012.

* versions A,B, and C

Functions	5012D/A	5012D/B	5012D/C	5012/E	5012/F
12 characters message	Yes	Yes	Yes	Yes	-
120 characters message	-	Yes	Yes	Yes	Yes
5 group numbers for broadcast	-	Yes	Yes	Yes	Yes
Vibrator	Option	Option	Option	Option	Option
Time tag	-	Yes	Yes	-	-
Automatic out of range warning	-	Yes	Yes	-	-
Indicate absence	-	-	-	-	Yes

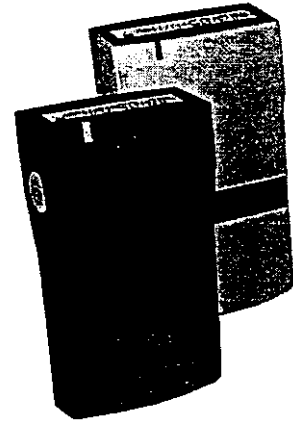
Accessories	5012D/A	5012D/B	5012D/C	5012/E	5012/F
Alternative clips	Yes	Yes	Yes	Yes	Yes
Safety cord	Yes	Yes	Yes	Yes	Yes

NOTE! Specifications are subjected to change without notice

Receivers 5012D and 5012

Features

- Handsfree operation
- Robust, user-friendly design
- 12 characters display*
- Up to 120 characters per message (versions B and C)
- Seven different beep codes that help to identify the nature of the call
- All incoming messages are time tagged (versions B and C)
- Operated by one push button
- Group paging available (versions B, C, E and F)
- Silent state
- Vibrator state can be provided on request
- Easy to reprogram
- Low power consumption
- Endures high voltage and magnetic field
- Automatic out of range warning (versions B and C)



General

The receivers 5012D and 5012 are primarily used for receiving text or beep messages. However, if required they can also be used as alarm receivers for different types of alarm, e.g. fire alarm, technical alarm or medical alarm.

There are two types of 5012D and 5012, H5012D/H5012 that operates within the HF band and U5012D/U5012 that operates within the UHF band. H5012D and U5012D are available in three versions: A, B and C. H5012 and U912 are available in two versions, E and F.

Versions A, B and C are designed for users that work in semi tough environment, e.g., hospitals or industries, and need short text presentation, e.g., status information.

Versions E and F are designed for users that receive few standard messages and therefore can use beep signal to identify the nature of the message.

The design of the receiver is light, robust and user-friendly.

When using A, B or C versions all operating is carried out from the menu with the help of a large push button that is situated near the display window. When using E or F versions the operating is carried out with help of the push button, long push or short push.

Both H5012D/H5012 and U5012D/U5012 can be easily reprogrammed if needed. This is done either via radio* or when the receiver is placed in the storage rack, using the Win900 software. When reprogramming via radio only the ID and call number can be changed.

Application Paging

An incoming paging is indicated by tone, light or vibration if available. The receiver has seven different types of beeps or signals that make it easy for the user to identify the nature of the call. If the receiver is in silent mode when an

alarm paging is sent, it is automatically switched to the beep function.

Memory*

5012D has the ability to store 10 messages or 480 characters (versions B and C only) or 4 messages (A version only).

All incoming messages are automatically stored. Any stored message can be recalled to the display at any time. The memory bank is based on the first-in first-out principle, although the messages can be deleted manually if needed.

Power supply

5012D/5012 is equipped with a standard IEC LR03 battery which is easy to replace.

Technical specifications

	H5012D	U5012D
Dimensions:	90 x 50 x 15/25 mm	90 x 50 x 15/25 mm
Case:	PC/ABS, light grey or dark grey	PC/ABS, light grey or dark grey
Weight-standard/vib:	70 g incl. battery	70 g incl. battery
Sound pressure level:	> 93 dBA at 10 cm	> 93 dBA at 10 cm
Temperature range:	-10 to +55°C	-10 to +55°C
Display:	12 character alphanumerical LCD	12 character alphanumerical LCD
Frequency range:	26 - 50 MHz	425 - 470 MHz
Modulation:	FM/FSK	FM/FSK
Channel spacing:	minimum 10 kHz	minimum 12,5 kHz
Antenna:	Integral	Integral
Sensitivity:	20 µV/m	20 µV/m
Cabinet radiation:	< 2 nW	< 2 nW
Adj.channel suppression:	> 40 dB	> 40 dB
Spurious suppression:	> 10 dB	> 10 dB
Battery type:	1 x IEC LR03 (AAA)	1 x IEC LR03 (AAA)
Shock resistant:	IEC 68-2-32, procedure 1, Dropped 12 times from 1 meter	IEC 68-2-32, procedure 1, Dropped 12 times from 1 meter
Character capability:	Latin + Extended Latin	Latin + Extended Latin
Certificates :	IP 30	IP 30

Vibrator option is available for all types of 5012D/5012.

* versions A, B, and C

Functions	5012D/A	5012D/B	5012D/C	5012/E	5012/F
12 character message	Yes	Yes	Yes	Yes	-
120 character message	Yes	Yes	Yes	Yes	Yes
5 digit numbers for broadcast	Yes	Yes	Yes	Yes	Yes
Vibrator	Option	Option	Option	Option	Option
Time tag	Yes	Yes	Yes	Yes	-
Automatic out of range warning	Yes	Yes	Yes	Yes	-
Indicate absence	Yes	Yes	Yes	Yes	Yes
Accessories	5012D/A	5012D/B	5012D/C	5012/E	5012/F
Alternative dials	Yes	Yes	Yes	Yes	Yes
Stray cord	Yes	Yes	Yes	Yes	Yes

NOTE! Specifications are subjected to change without notice

Pocket Receiver U912D - Alignment and Adjustment

Reference Drawings

Electrical Schematics

U912RX 10614

Component layouts

U912RX top 60322 (PCB 40360)

U912RX bottom 60322 (PCB 40360)

General

This document describes two alternate procedures. The first procedure, using an RF Communications Test Set, is preferred. In the alternate procedure, an FM signal generator, an oscilloscope, and a frequency counter are used.

All steps, except test pagings, are to be performed in an ESD-shielded environment and with the receiver circuit board inserted in the alignment cassette which slides into the test fixture.

Alignment components referred to in the procedures are shown in the drawings below and on pages 2 and 4.

Test Equipment

Alignment Kit MAE-912U, consisting of:

- Test Fixture MAB-U912 (including antenna)
- Selector Box MSB-912
- Test Cable 25-pin D-sub cable
- Power Cable 5-pin DIN
- Power Supply 12V Mascot battery eliminator type 8513

Test Cassette

6 dB Attenuator (BNC) Tateco AT52 or equivalent

RF Communications

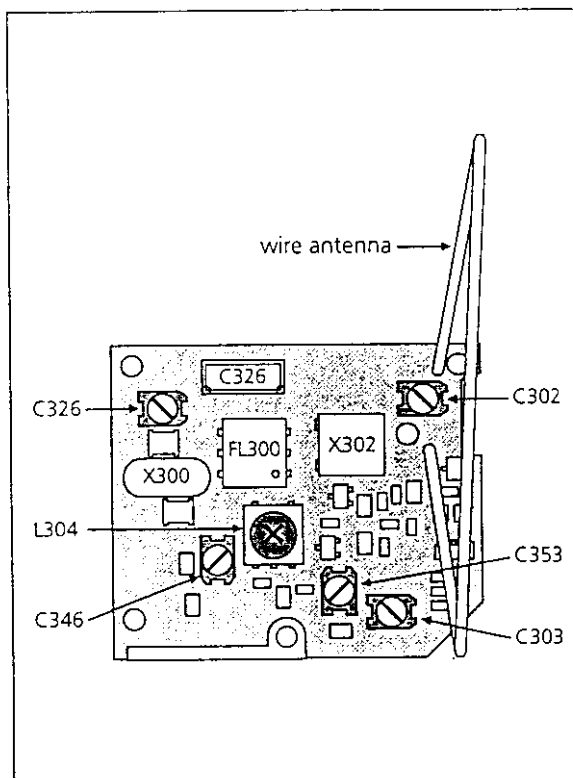
Test Set HP 8920A or equivalent

If an RF Communications Test Set is not available, the following three items can be used instead:

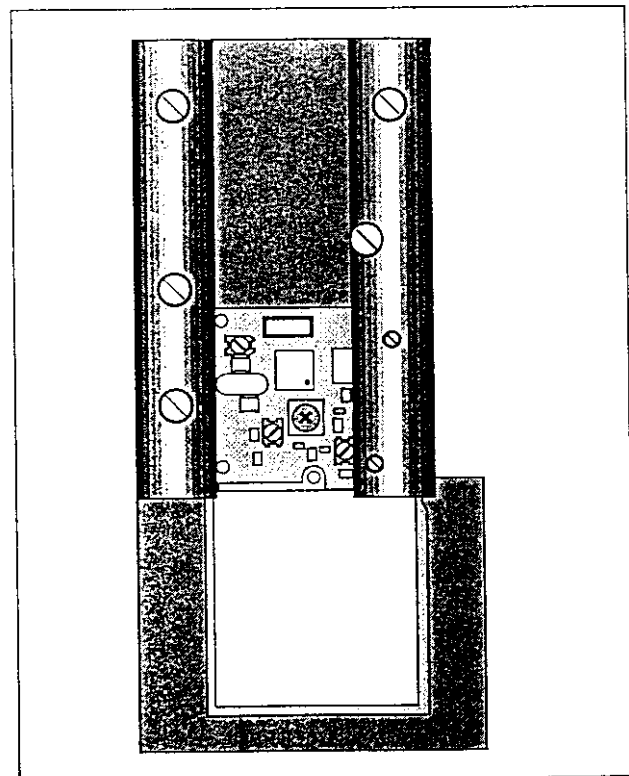
Signal Generator Phase locked, 100kHz- 500 MHz
 Frequency accuracy: $\pm 100\text{Hz}$
 Amplitude: -110 to $+6$ dBm
 Frequency modulation 1 kHz sine/square, 1,5/2,5 kHz deviation

Oscilloscope Preferably with memory function and frequency counter.

Frequency Counter Accuracy $\pm 0.5\%$ at IF (455 kHz)



U912D-RX top showing alignment components.



U912D-RX placed in test cassette.

Preferred Procedure using RF Communications Test Set

The description below is directly applicable for an HP 8920 RF Communications Test Set. If another Test Set is used the settings must be equivalent.

1. Test Setup

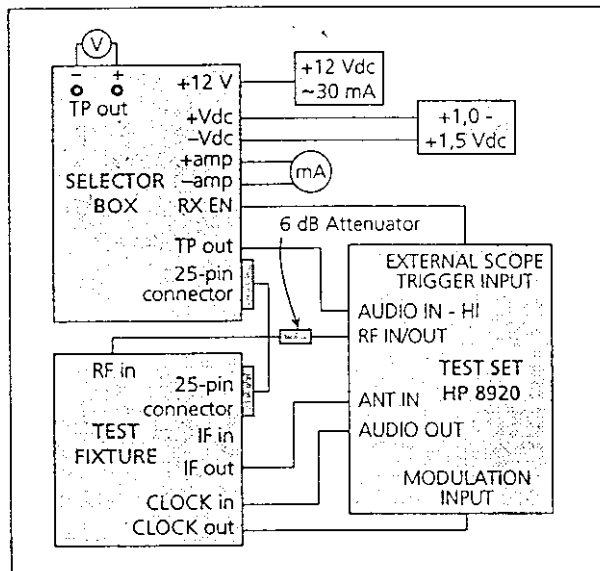


Figure 1. Equipment setup for preferred procedure using RF Communication Test Set.

1. Connect the test equipment as shown in figure 1.
2. Insert the receiver circuit board into the test cassette as shown on page 1 then slide the cassette into the test fixture and pull the lever to connect the test pins to the test points.

2. Current Consumption

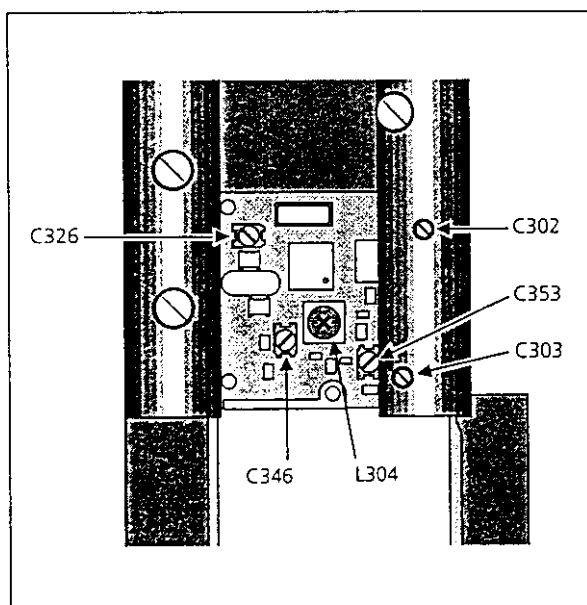
1. Set the RX supply to the selector box to 1,4 Vdc, set the RXEN switch to **On** and check that current consumption is $2,75 \pm 0,40$ mA.
2. Set RXEN switch to **Off** and check that current consumption is < 12 μ A.

3. Battery Warning

1. With RX supply at 1,4 Vdc, set the RXEN switch to **On** press the battery warning button on the selector box. The LED should light.
2. Set RX supply to 1,07 Vdc and press the battery warning button. The LED should remain off.

4. RF Adjustment

1. On HP 8920 test set:
Set to **Spectrum Analyzer** mode with center frequency 455 kHz, span 50 kHz and Ref Level = -20 dBm. Use ANT input.
Select RF Generator under **Controls**. TRACK mode with offset = channel frequency -455 kHz and amplitude = -45 dBm.
Channel frequency is marked on the cassette and on crystal X300.
Average 2 or 4 times is allowed to simplify reading of display (under **Controls/Auxiliary**).
2. With RXEN set to **On** and IF control set to **Out**, adjust trim capacitors C302, C303, C353, and C346 to mid-position. Adjust C326 until the oscillator starts (see figure 2).
3. Adjust L304 for max gain and min ripple within passband ($455 \text{ kHz} \pm 4 \text{ kHz}$). Readjust C326 for max gain. Adjust C346 for max gain.
4. Adjust C302, C303, and C353 for max gain. Repeat until no further improvement is obtained. The different trim capacitors affect each other.
5. Check following:
Level at 455 kHz: -40 dBm min
Ripple within passband: 5 dB max
Suppression at 435 and 475 kHz compared to level at 455kHz: 45 dB min



U912D-RX in test cassette showing alignment points.

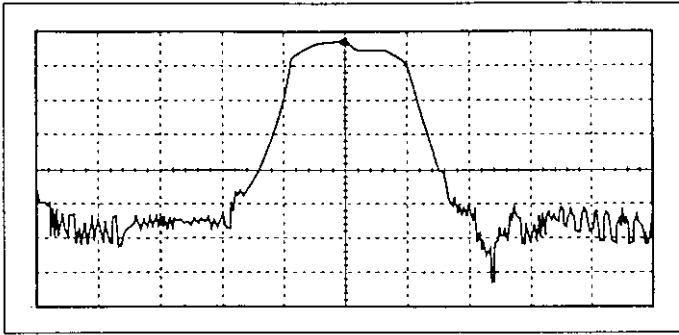


Figure 2. RF adjustment.

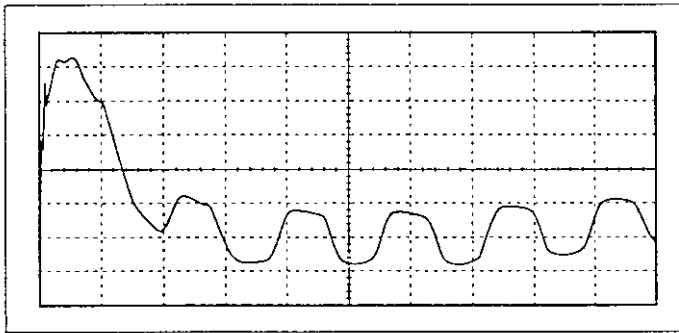


Figure 3. FM detector.

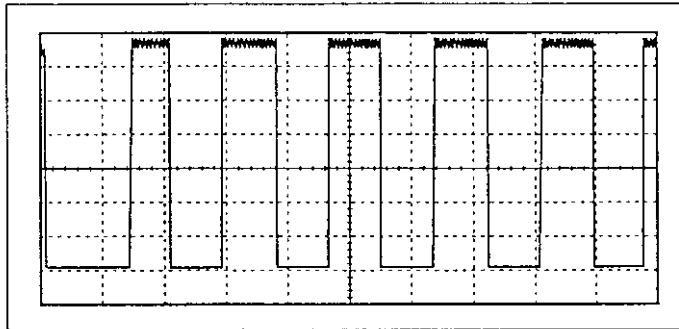


Figure 4. Code signal and start time.

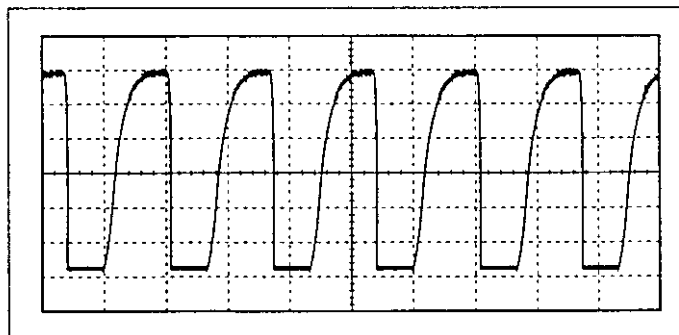


Figure 5. IR link.

5. FM Detector

- On HP 8920 test set:
Press **Preset** button and select **RFgen**.
Set RF Generator to channel frequency, amplitude = -45 dBm.
Set AFgen1TO = OFF and AFgen2TO = Audio Out with amplitude = 1,0V.
Set ModinTO = FM with deviation 1,5 kHz/Vpeak.
Under **Encoder** set AFgen2Freq = 585 Hz and square wave.
Under **AF ANL** set AFanLIN = AudioIN and Scope To = Filters.
Test set to **Scope** mode with vert = 50 mV/div, VertOffset = -1 and time = 1 ms/div.
Under Main = Trigger select external(TTL), CONT/Single, NORM and POS/NEG.

- With the test point switch on the selector box set to **TP11** and RXEN switch set to **pulse** check that the signal is as in figure 3. Amplitude 75 to 125 mVp-p.

6. CODE Signal and Start Time

- HP 8920 test set:
As above but Scope To = Input and vert = 200 mV/div, VertOffset = -3,50 on the **Scope**.
- Set the test point switch on the selector box to **TP18**, and set the RXEN switch to **pulse**.
- Check that the signal is as in figure 4, i.e. a square wave with 50% duty cycle, > 0,85 Vp-p, at 3 ms after start.

7. Check of IR Link

- HP 8920 test set:
As above but vert = 500 mV/div and VertOffset = -3,00 on the **Scope**.
- Set the test point switch on the selector box to **TP17** and check that the signal is as in figure 5. Amplitude > 2,5 Vp-p.

8. Test Paging

Test pagings are to be made on completely assembled pagers.
See "*Sensitivity Test*" on page 7.

Alternate Procedure using Signal Generator and Oscilloscope

1. Test setup

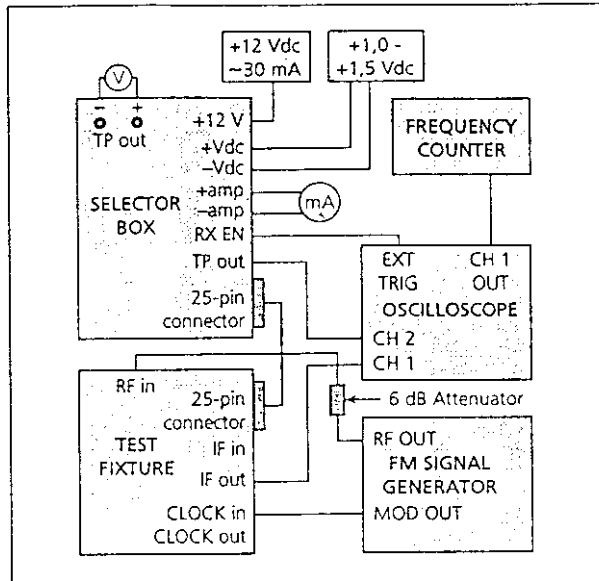


Figure 6. Equipment setup for alternate procedure using Signal Generator and Oscilloscope.

1. Connect the test equipment as shown in figure 6.
2. Insert the receiver circuit board into the test cassette as shown on page 1 then slide the cassette into the test fixture and pull the lever to connect the test pins to the test points.

2. Current Consumption

1. Set the RX supply to the selector box to 1,4 Vdc, set the RXEN switch to **On** and check that current consumption is $2,75 \pm 0,25$ mA.
2. Set RXEN switch to **Off** and check that current consumption is < 12 μ A.

3. Battery Warning

1. With RX supply at 1,4 Vdc, set the RXEN switch to **On** press the battery warning button on the selector box. The LED should light.
2. Set RX supply to 1,07 Vdc and press the battery warning button. The LED should remain off.

4. RF adjustment

1. Set signal generator RF to channel frequency marked on the cassette and on crystal X300. Amplitude -40 dBm. Modulation is not required. Set the oscilloscope to 1 μ s/div and 5 mV/div.

2. With RXEN set to **On** and IF control set to **Out**, adjust trim capacitors C302, C303, C353, and C346 to mid-position. Adjust C326 until the oscillator starts, as indicated by an increased amplitude on the oscilloscope.
3. Adjust L304 for max amplitude on the oscilloscope. Readjust C326 for max amplitude and IF $455 \pm 1,5$ kHz (filter the IF signal to aid in accurate measurement of frequency). Adjust C346 for max amplitude. See figure 7.

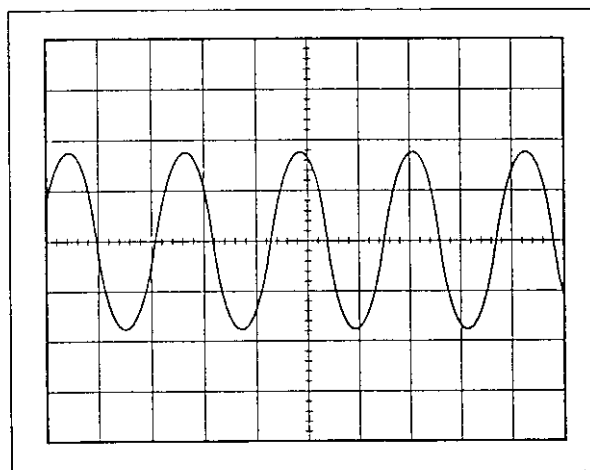
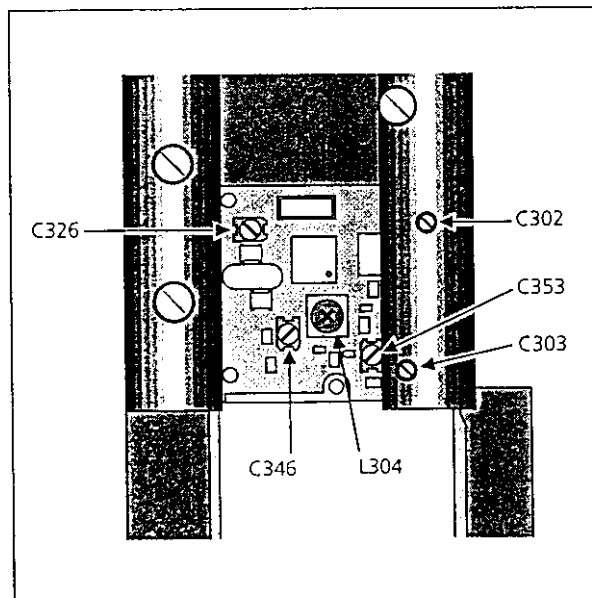


Figure 7. RF adjustment.

4. Adjust C302, C303, and C353 for max gain. Repeat until no further improvement is obtained. The different trim capacitors affect each other.



U912D-RX in test cassette showing alignment points.

5. FM Detector

1. Connect the oscilloscope to **TP out** on the selector box. Set the test point switch to **TP11** and **RXEN** switch in **on** position.
2. Set the signal generator to FM, 2,5 kHz deviation. Check the demodulated signal. The waveform should be as in figure 8, with an amplitude of 75 - 125 mVp-p.

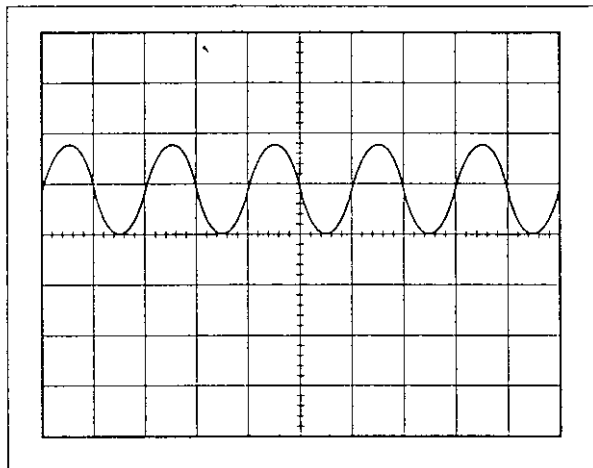


Figure 8. FM detector.

6. CODE Signal

1. Set the test point switch on the selector box to **TP18**, and set the **RXEN** switch to **on** position.
2. Set the signal generator to FM, 2,5 kHz deviation. Check that the CODE signal is as in figure 9, i.e. a square wave with amplitude > 0.85 Vp-p.

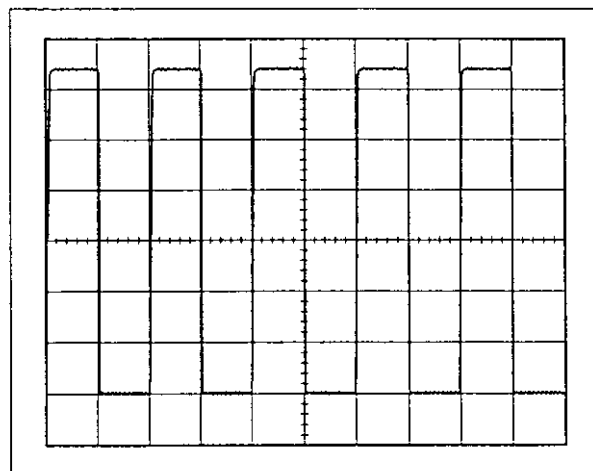


Figure 9. Code signal.

7. Start Time

1. To perform check of start time an oscilloscope with memory function is necessary, externally triggered with **RXEN** signal from the selector box.

Set test point switch to **TP18**.

Connect modulation output from the signal generator to **Clock in** on the test fixture.

Set **RXEN** switch to **pulse**.

2. Set the signal generator to FM, 2,5 kHz deviation. Check that the CODE signal is as in figure 10, i.e. a square wave with 50% duty cycle after < 3 ms.

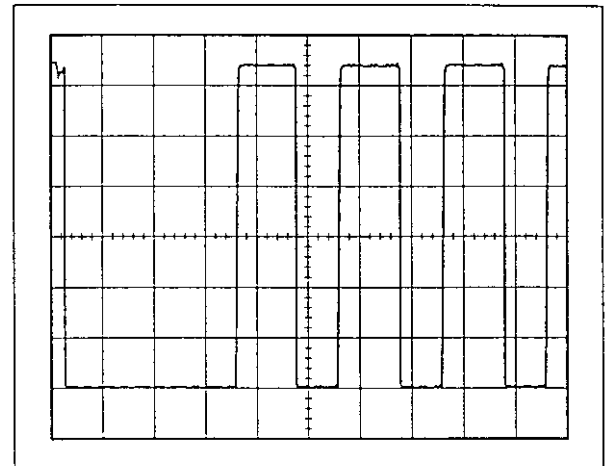


Figure 10. Start time.

8. Check of IR Link.

1. Set the test point switch to position **TP17**. Connect a 1 kHz square wave or modulation output from the signal generator with amplitude 1 Vpeak to **Clock In** on the test fixture.
2. Check that the waveform is approximately as in figure 11. Amplitude > 2,5 Vp-p.

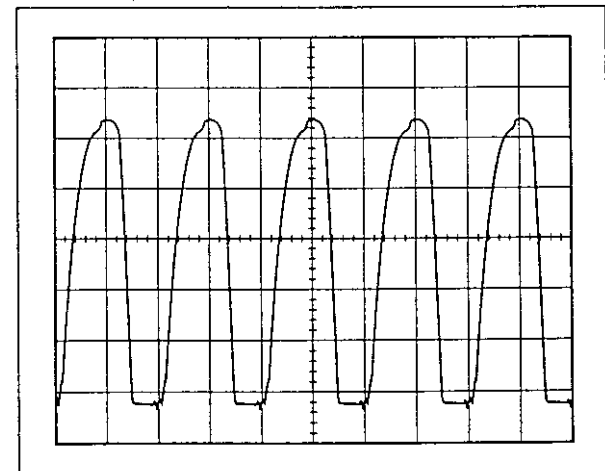


Figure 11. IR link, 3 kHz square wave to **Clock In**.

9. Test Paging

Test pagings are to be made on completely assembled pagers. See "*Sensitivity Test*" on page 7.

Appendix 1 Test Point Description

With the test point switch test points can be selected and measured at the **TP out** output on the selector box. The test points are described below in the order they appear on the test point switch.

All "Expected values" are approximate and may vary by about ± 20 mV.

Test Point	Description	Test Point	Description
TP11	Filtered output from FM detector.	TP4	DC voltage level at IF buffer stage. Expected value: 600 mV
TP18	Output from comparator that converts detected signal to CODE signal.	TP7	DC voltage level at oscillator collector. Expected value: 830 mV
TP17	Output from IR sensor.	TP8	DC voltage level at collector of tripler stage. Expected value: 790 mV
TP1	DC voltage level at collector of first stage in the front-end amplifier. Expected value: 830 mV	TP9	DC voltage level at VCC input to the FM circuit (IC300). Approximately equal to battery level. Expected value: 1250–1450 mV
TP2	DC voltage level at collector of second stage in the front-end amplifier. Expected value: 830 mV	TP12	DC voltage level of regulated supply (V10). Expected value: 1040 mV
TP3	DC voltage level at mixer stage. Expected value: 720 mV		

Appendix 2 U912D Sensitivity Test

General

Perform this test to see if a U912D pocket receiver needs alignment. An accurate test requires a shielded environment. Without shielding the test must be modified and becomes basically a function test.

Test Equipment

Test Generator	Tateco MTG-9/B
Power Supply	MPS-12/1
Test Fixture	MTA9/912
6 dB Attenuator (BNC)	Tateco AT52 or equivalent
RF Communications Test Set	HP 8920A or equivalent

If an RF Communications Test Set is not available, the following can be used instead:

Signal Generator	Phase locked, 100kHz- 500 MHz, Frequency accuracy: ± 100 Hz Amplitude: -110 to $+6$ dBm Frequency modulation 1 kHz, sine/square, 1,5/2,5 kHz deviation
-------------------------	--

Procedure

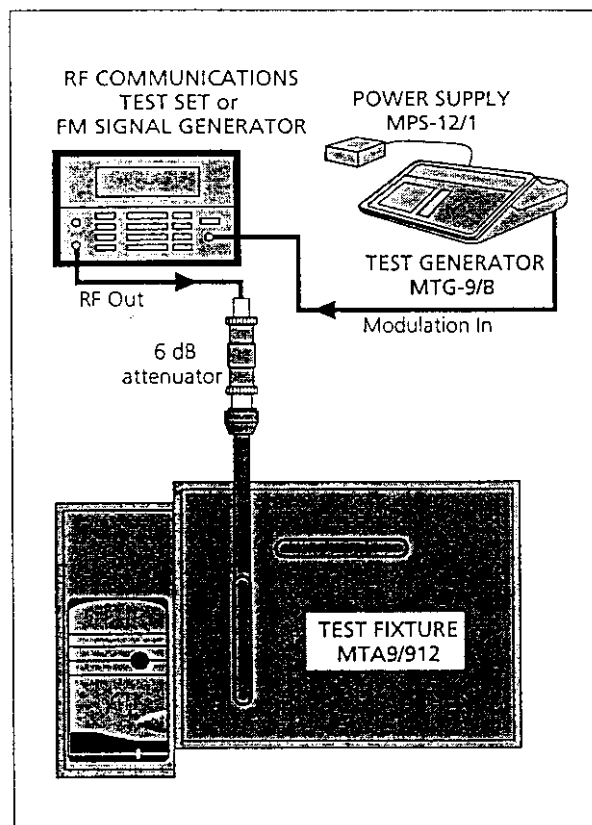
1. Connect the test equipment as shown in the drawing. Place the receiver into the cavity in test fixture MTA9/912 as shown.

2. *If HP 8920 test set is used:*
Press **Preset** button and select **Rfgen**.
Set **RFgen Freq** = channel frequency and **Amplitude** according to table below.
Set **AFgen1 To** = off and **ModIn To** = FM (Vpk), 2,50 kHz.

If other test equipment is used:
Set signal generator RF to channel frequency with amplitude according to table below.

3. Connect MTG-9/B to modulation input and initiate pagings.
Check that the receiver responds according to table below.

Environment	RF Amplitude	Receiver responds to at least
Shielded	-78 dBm	4 out of 5 pagings
Unshielded	-68 dBm	9 out of 10 pagings



Equipment setup for Sensitivity Test.