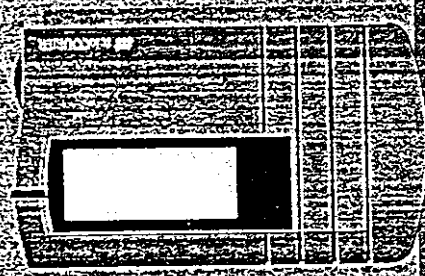


Exhibit D

FCC ID: BXR24912T

Operation
Receiver 912 T



M02164

 telecOURIER 900

© 1999 Teeco Telecommunications Systems



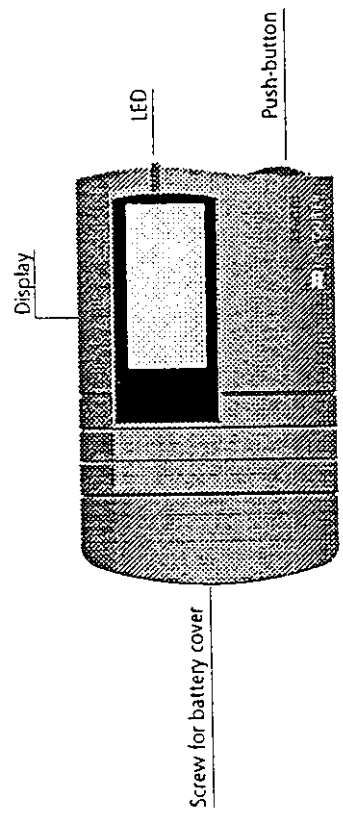
Contents

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Scrolling through messages	5	Absence indication	9
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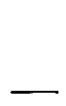




Pager 912T



960115



FCC ID: Bx2u912T

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 Ascot Teteo AB, could void the user's authority to operate this equipment.

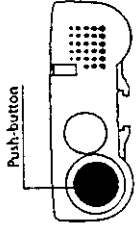


General

The teleCOURIER 900 paging system includes the U/H912T receiver. This receiver, which has a two-line display, is able to receive messages of up to 10 lines in length and to display two lines at a time. Every line can have a maximum of 12 characters. Ten paging messages can be stored.

Operation

The receiver is switched on by a short press on the red push-button on the end of the receiver. This push-button is also used to scroll through, acknowledge and erase messages, and to change the receiver settings.

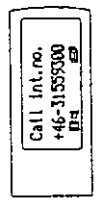


Identity

When you turn on the receiver, the identity of the receiver is shown on the display. This identity is normally the same as the individual paging number.

Display

On front of the receiver there is a 2-line display which can display as many as 24 characters at time. If the message comprises more than two lines, the remainder of the message will be shown in scrolled form, two lines at a time. The display also includes special symbols which indicate various functions.





Symbols on the display



Battery warning



New message. The symbol flashes.



Several messages.

Shows that more than one message is stored in the receiver.



Message that is longer than 2 x 12 characters.



Loudspeaker turned off - no beeping



Error indication



Info message



The message has been received by one of the five extra paging numbers.



This message was originally intended for another pager.



The paging number is displayed after the symbol.





Time marking. The time at which the message was received.






Daily use

When you are being paged, the message is shown on the display, a signal is heard and the LED flashes. The symbol  on the display also flashes. If you have chosen to have the message time-marked, this will be shown after the message. If the message is more than 24 hours old, time-marking is omitted. If the message is longer than 2 lines,  is displayed and the message is also scrolled automatically so that it can be read in its entirety. You can stop the sound signal by quickly pressing the red button. If you then press the button again quickly, receipt of the message is acknowledged and the next message is then shown on the display.

Paging indications


To make it easy to distinguish between different types of paging message, there are seven different types of sound and flashing patterns. The volume can be set at three levels. You can also set the sound signal to begin on low volume and then increase in intensity. It is also possible to turn off the sound completely and only receive silent paging messages. Your receiver can also be equipped with a vibrator.

Long messages

The U/H912T can receive long messages with a maximum of 10 lines. A message with more than two lines is marked with a . It is scrolled automatically to enable it to be read in its entirety. If the scrolling stops, it can be started again by giving the button a quick press.



Scrolling through messages

Messages which are stored in the memory can be recalled on the display by giving the button a quick press. Messages without a receipt are shown first. If all the messages have an acknowledgement receipt, they will be shown in chronological order, starting with the last message. The receiver identity and the number of messages which are stored are shown after the oldest message. As long as there are messages without a receipt,  will flash on the display. You can choose (See Other settings) to have a reminder tone as long as there are messages without a receipt in the memory.

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 on the display.

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 that has been acknowledged, followed by the oldest one that is not acknowledged. Depending on the length of the new display messages, several stored messages can be erased. All the messages are erased when the battery is changed.

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 battery is changed. To change the memo function settings, the receiver has to be re-programmed. This is done in the storage rack by the systems manager.

Info function

It is possible to store six so-called info pages. An info page contains information which is updated regularly and automatically. When an info message is shown on the display,  is also shown. 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.

Battery replacement

When  appears on the display, the battery needs to be replaced. Turn off the receiver and remove the battery cover by unscrewing the screw with a coin. Replace the battery and put the battery cover back on. The battery must be set in with the + terminal inwards. Turn on the receiver and check that it is working normally.

Other settings

Step through the messages until the receiver's identity is shown. A long press on the red button produces the different receiver settings. The following settings are possible:



- Turn off the receiver
 - Receive paging messages silently
 - Change functions
 - Show paging messages again
- However, all these functions may not be activated on your receiver.





Turning receiver off and on
 A long press on the button produces the "Turn off" function directly. Off? appears on the display. Another long press on the button turns off the receiver. If the button is not pressed again, the receiver shows its identity again. If the receiver has been turned off, press the button once to turn it on again.

Receiving paging messages silently

You can select silent paging, at a meeting when you do not want to be disturbed, for example, by stepping through the various settings by quickly pressing the button until Tone? appears on the display. A long press on the button produces . The loudspeaker is then turned off, but messages will be stored.  flashes as long as the loudspeaker is turned off.

Changing receiver functions

Scroll through the messages until the receiver's identity appears. Press the button until Off? appears on the display. Press the button twice quickly and Menu? appears. Select a change of function by a long press on the button. Scroll through the different parameters by pressing the button quickly. The word Change? is shown for every function that can be changed. A long press on the button changes the value of the parameters. The changed value is stored at the same time. You can change the volume of the beep and decide if you want a reminder tone for messages without a receipt. The function which displays a time marking for a message can be turned on and off here. To make it easier to read the display depending on how it is carried, it is also possible to choose the direction of the text. As many as five extra





paging numbers can also be connected and disconnected. Most of the receiver functions can be programmed when the receiver is in the storage rack or via radio. To program via radio, scroll through the various settings by pressing the button quickly until Program? appears on the display. A long press on the button prepares the receiver for programming. A special programming paging message must be transmitted. The display shows whether the programming attempt was successful. After a while, the receiver returns to the mode in which it can receive and display paging messages. You can return it to this mode yourself by scrolling through the settings by pressing the button quickly until Exit? appears on the display. A long press on the button now returns the receiver to the mode in which it can receive and display paging messages.



Absence indication

When the receiver is put in a storage rack with absence indication, anyone paging the receiver automatically receives indication of absence. The person sending the paging message is thus informed that you cannot be reached at this time.



Call Transfer

Call Transfer means that a receiver receives a paging message which was originally intended for another pager. The transferred message is received by one of the five extra paging numbers or by an automatic change of the paging number before the paging message is transmitted. To show that Call Transfer has taken place, the original paging number is shown at the end of the message. Either **+** or **!** is shown before the paging number.



Pocket Receiver U912T - 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 a dummy processor board (PCB with no components) placed in the cassette. Processor board, display module, and battery must be removed.

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

Test Equipment

Alignment Kit

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

Dummy Processor

Circuit Board PCB 40358 with no components

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

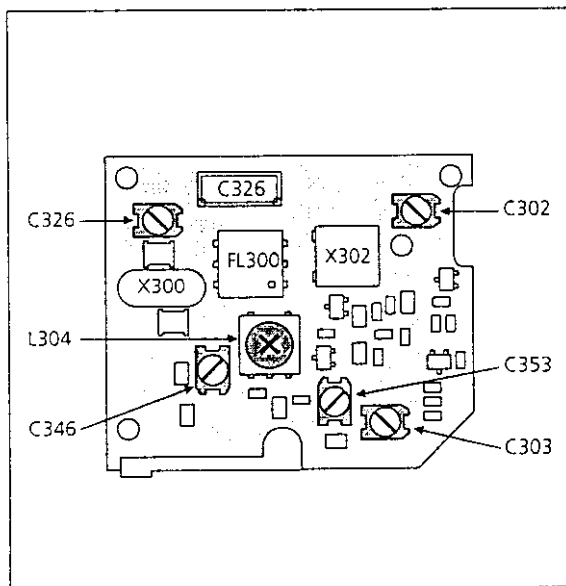
Phase locked, 100kHz- 500 MHz
 Frequency accuracy: $\pm 100\text{Hz}$
 Amplitude: -110 to +6 dBm
 Frequency modulation 1 kHz sine/square, 1,5/2,5 kHz deviation

Oscilloscope

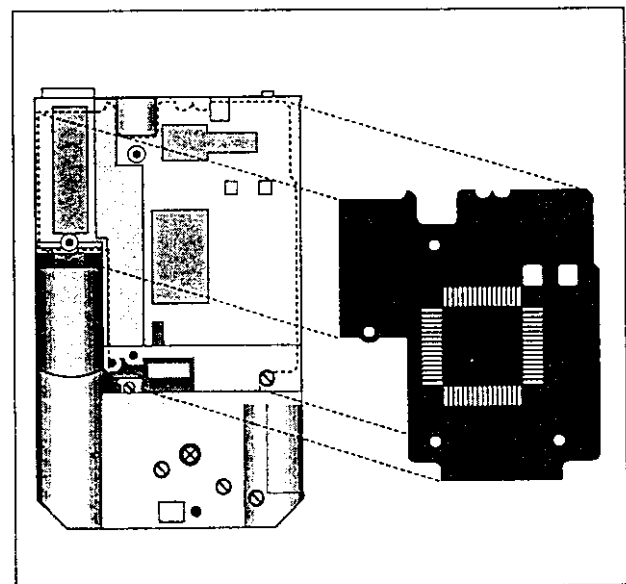
Preferably with memory function and frequency counter.

Frequency Counter

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



U912T-RX top showing alignment components.



U912T-RX cassette showing how to place the dummy processor circuit board.

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

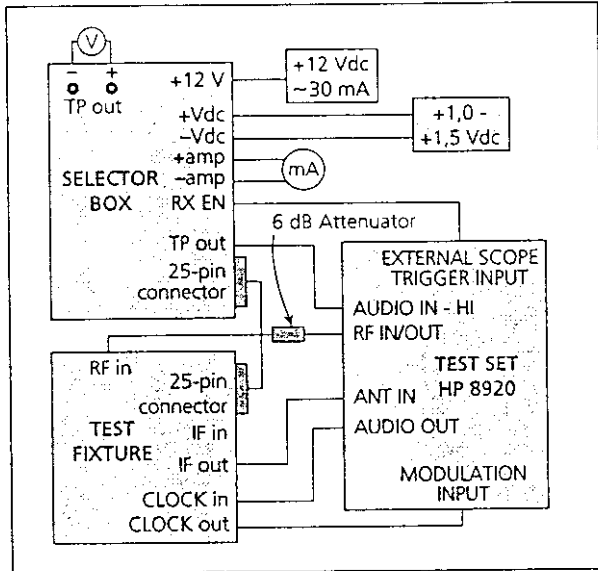


Figure 1. Equipment setup for preferred procedure using RF Communication Test Set.

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

2. Current Consumption

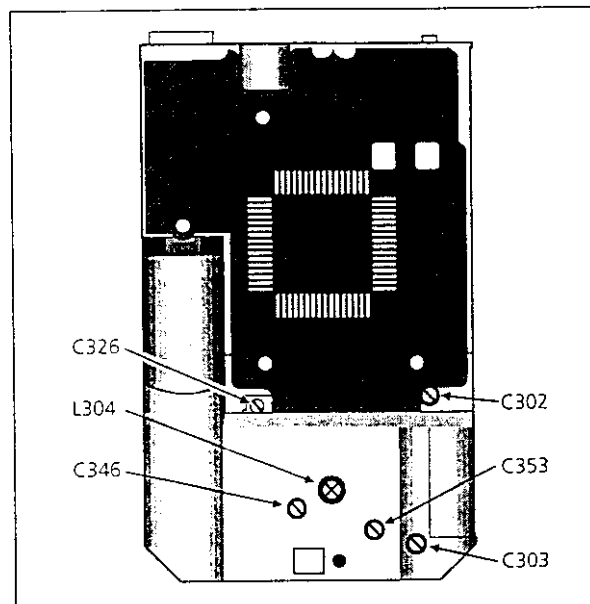
1. Set the RX supply to the selector box to 1,4 Vdc, set the RXEN switch to **On** and check that current consumption is $2,75 \pm 0,40$ mA.
2. Set RXEN switch to **Off** and check that current consumption is $< 12 \mu\text{A}$.

3. Battery Warning

1. With RX supply at 1,4 Vdc, set the RXEN switch to **On** and 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 = -30 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: -43 dBm min
 Ripple within passband: 5 dB max
 Suppression at 435 and 475 kHz compared to level at 455kHz: 45 dB min



U912T-RX in cassette showing alignment points.

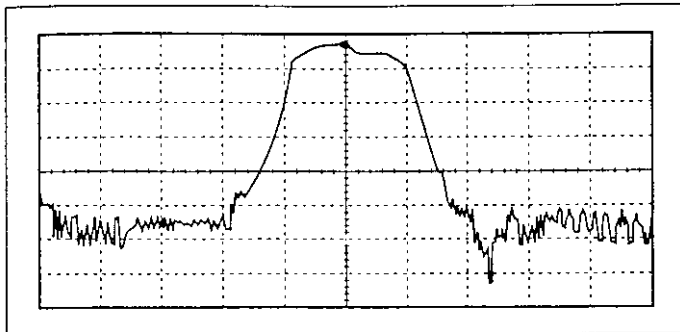


Figure 2. RF adjustment.

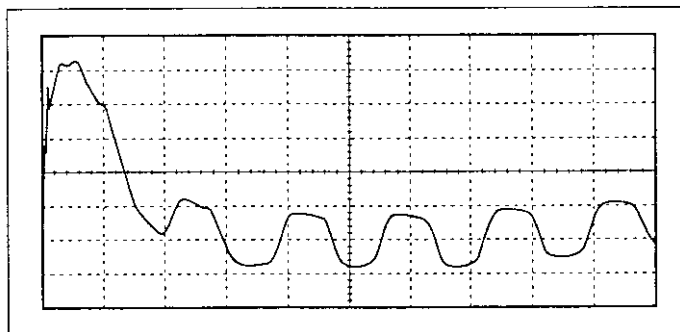


Figure 3. FM detector.

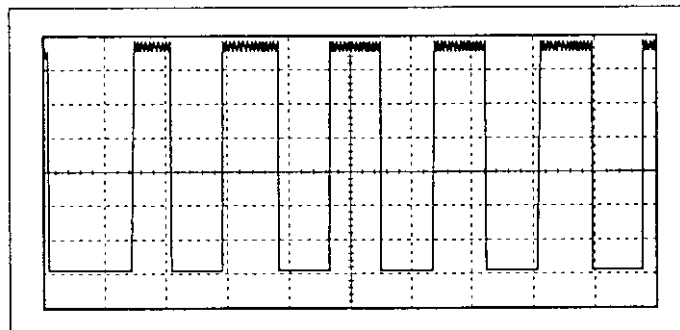


Figure 4. Code signal and start time.

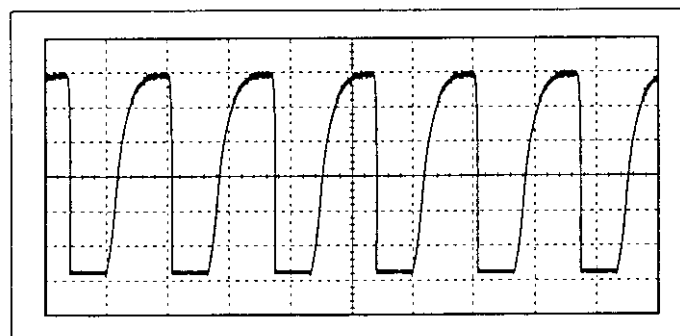


Figure 5. IR link.

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 = AudiolN 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

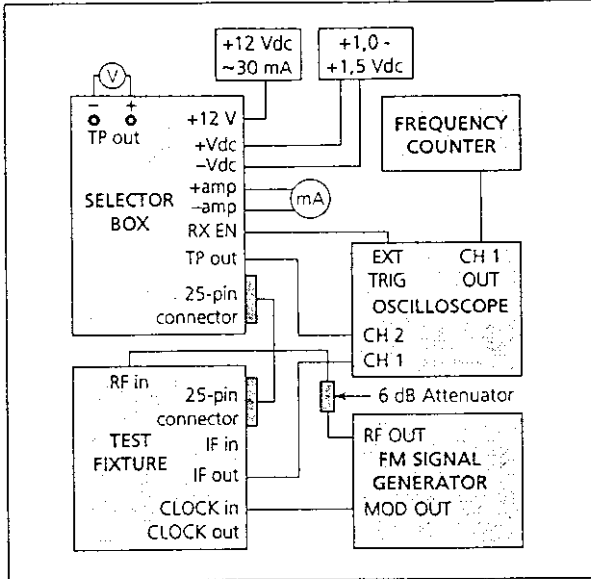


Figure 6. Equipment setup for alternate procedure using Signal Generator and Oscilloscope.

1. Connect the test equipment as shown in figure 6.
2. Place the dummy processor circuit board in the cassette as shown on page 1 then slide the receiver 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 $< 12 \mu\text{A}$.

3. Battery Warning

1. With RX supply at 1,4 Vdc, set the RXEN switch to **On** and 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 $1 \mu\text{s}/\text{div}$ and $5 \text{ mV}/\text{div}$.

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.

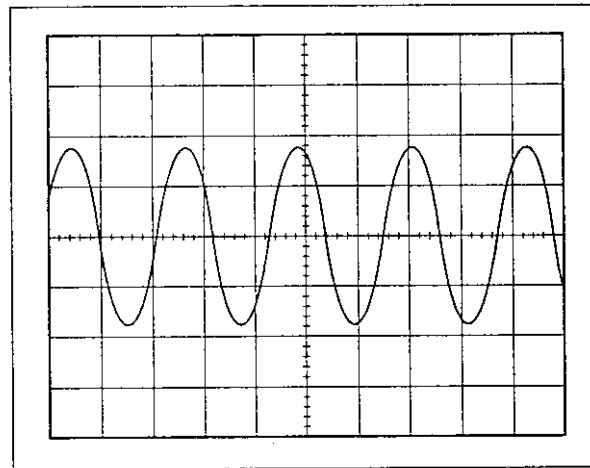
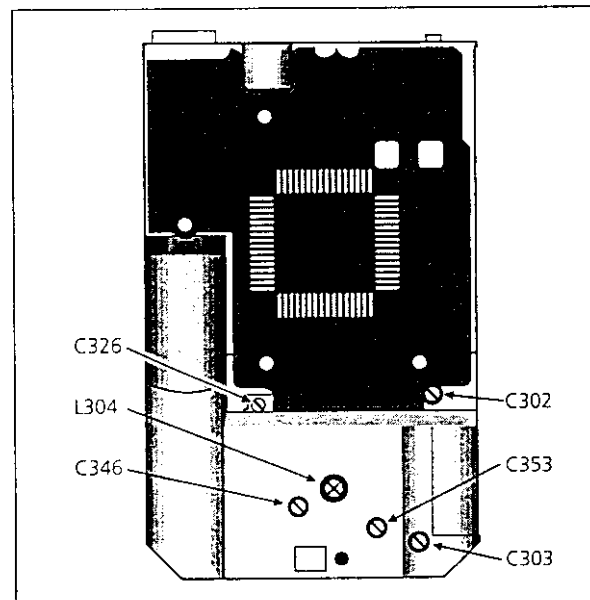


Figure 7. RF adjustment.

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



U912T-RX in 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.

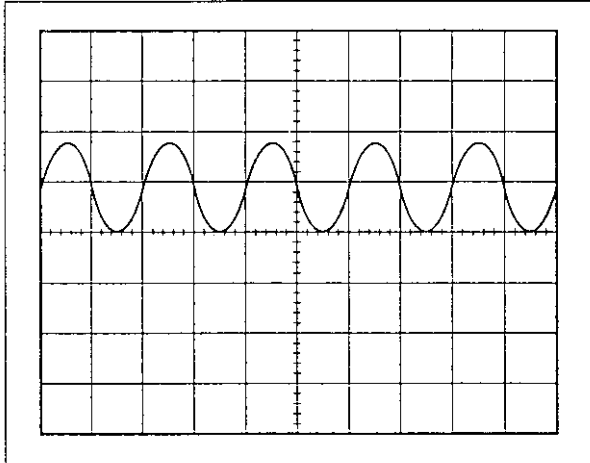


Figure 8. FM detector.

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.

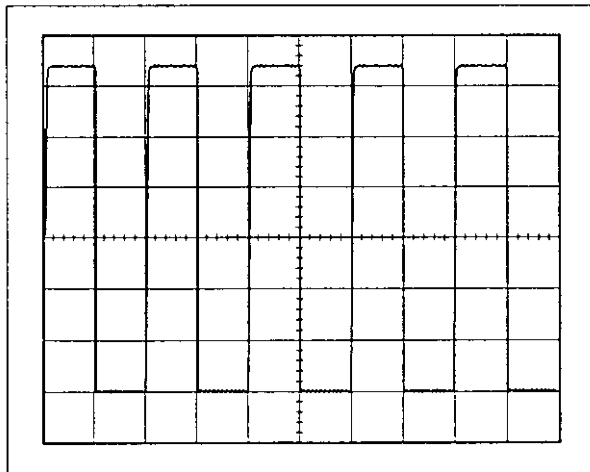


Figure 9. Code signal.

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.

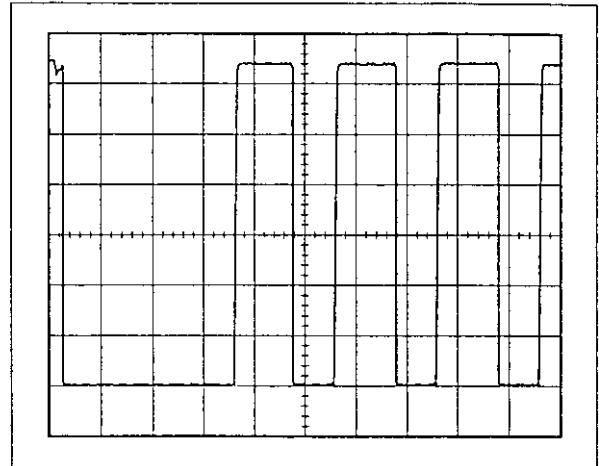
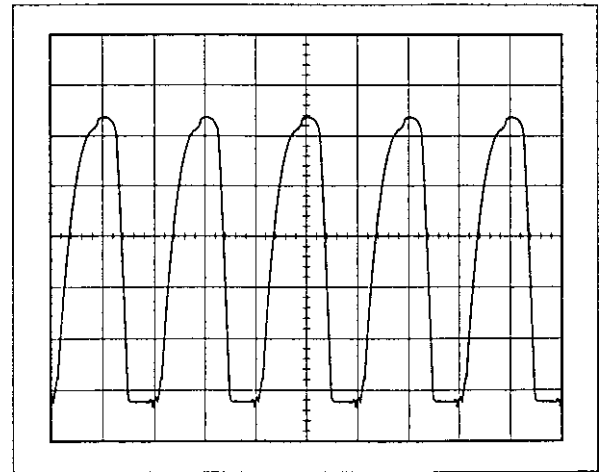


Figure 10. Start time.

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

U912T Sensitivity Test

General

Perform this test to see if a U912T 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:

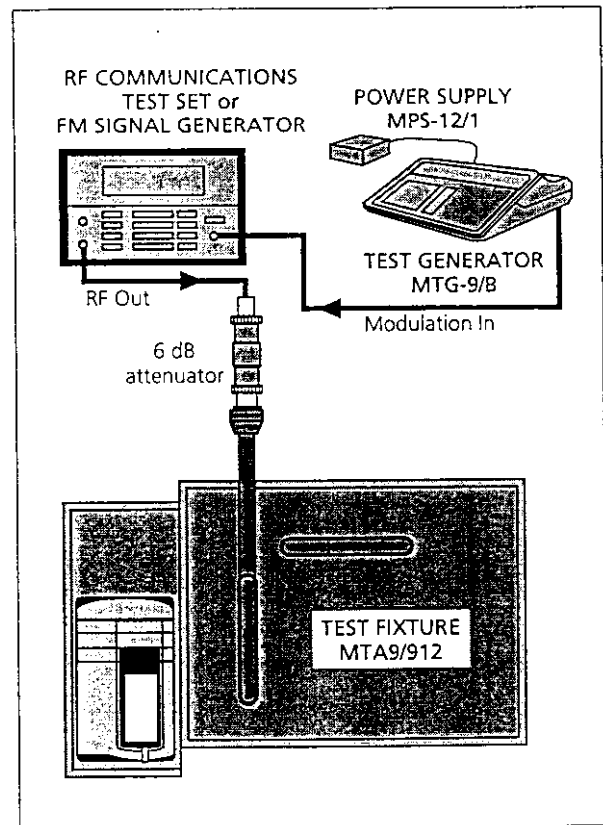
Signal Generator	Phase locked, 100kHz- 500 MHz, Frequency accuracy: ± 100 Hz Amplitude: -110 to $+6$ dBm Frequency modulation 1 kHz, sine/square, 1,5/2,5 kHz deviation
-------------------------	--

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	-80 dBm	4 out of 5 pagings
Unshielded	-70 dBm	9 out of 10 pagings



Equipment setup for Sensitivity Test.