KIT10

WENSHING®©

V1.02

Demo Board Operating Instruction

➢ Testing steps：

Power switch star to ON.

↓

Select a mode to supply power（DC power supply or USB port）

↓

Depending on the choice of power supply connected.

↓

D3, D6 two LED lights continue shine and LCD screen shows the words.

↓

Press the ENT key to choice receiving or transmitting mode.

↓

Press the ENT key can be selected to set parameters for testing.

↓

Press ENT key into test mode.

↓

Press ENT key to begin testing.

↓

Tested module has to insert to the KIT10 against mother board.

↓

According waveforms or data can be judged the quality of testing module.

➢ All parts of KIT10 instruction：

LCD monitor

TRW-400

TRW-24N
TRW-24G

TRW-24GP

TRW-900C Series
TWS-900C Series
TRW-400C Series

Power choice:
*Left side: Exterior transformer power supply.
* Right side: The USB power. supply

Power switch

USB port

External DC power supply

Power choice:
Adapter power input.

RESET

Instruction of the function key:
* The Up and Down key is for items choice.
* The middle key is for confirming to enter next page.

The main function keys instruction：

（1） Power switch：Could moved UP and DOWN, and correspond ON and OFF. After connecting with the power supply which will control the Power ON and OFF.

（2） Power select：There are 3 power supply mode to choose. One for an external DC power supply, two for the power input transformer, and three for USB port.

    (a)　External DC power supply：When we choose the external DC power, it means directly to join the power supply can be inserted.

    (b)　Power input transformer：　Choose the external transformer power supply means that it can input the external power supply into it.

    (c)　USB port：When choose USB port supply the power, direct to plug USB into a USB port.

（3） Function：Choose different functions by pressed this key to move up or down, and turn right or left. (Described words near by key).

（4） RESET：It is the reset key; you can press the reset key to make the KIT10 back to the original condition.

（5） Demo board：There are 4 different demo boards in the KIT10. Depending on which module is tested to insert on the suitable demo board.（see the instruction on page 2）

（6） LCD screen：Can show the specific parameters by the various states.

➢   **Two modes to test KIT10**：

◆Two-way Transmission: This mode is used by two KIT10 testing, one side is Transmitter, and another side is Receiver. Testing whether or not the module is working in two-way transmission mode.

◆Directly Test Mode： (1) Continue transmitting when under the transmitting condition, without adjusting the signal, and then to test the module transmitting situation.

        (2) Continue receiving when under the receiving condition, and to show the RSSI value. The TP5 pin will show the receiving data on the demo board KIT10 that in order to testing the receiving condition.

➢ **The following are the testing model by different module：**

➢ **Test TRW-400:**

1. TRW-400: Frequency=434MHz；Data Rate=4.8kbps；Mode=Normal
2. Testing Transmitter and Receiver by direction testing mode.
3. Operation steps：

（1） Move the power switch to ON.

（2） Choose the outer power（Choose the outer power to supply directly this time）.

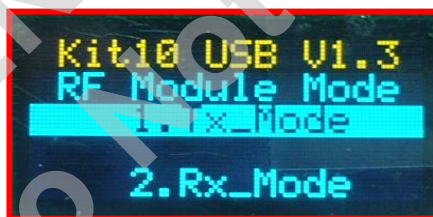（3） Connect with 2 power cables（as the under photo）and the power supply（adjust to 6.5V）
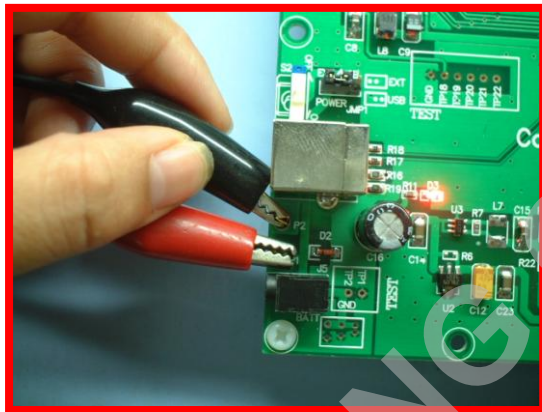
（4）According the data showed on the LCD to set the different parameters.

Transmitter:	**Receiver:**

→Choose Tx-Mode enter to next page.

→Choose the Rx-Mode to enter next page.
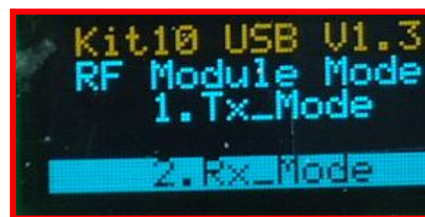
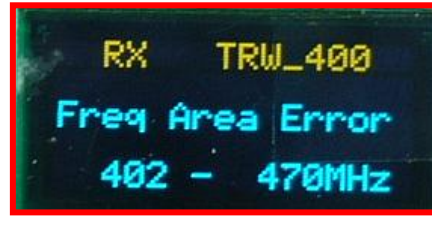→According the data showed on the LCD to set the different parameters.
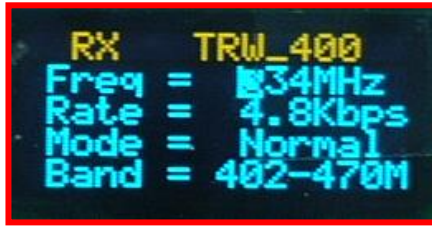

→Attention: The parameters of TX and RX must be settled the same.
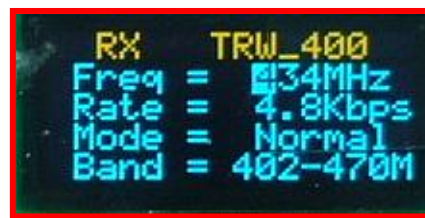
→The range of frequency should be adjusted between the bands.

```
RX      TRW_400
Freq = ▓34MHz
Rate = 4.8Kbps
Mode = Normal
Band = 402-470M
```

→If the frequency range is not between the band range, LCD will show Error.

```
RX      TRW_400
Freq Area Error
402 -   470MHz
```

→Choose "Send Package" to enter into next page.

```
TX      TRW_400
Test Mode
Send Package
```
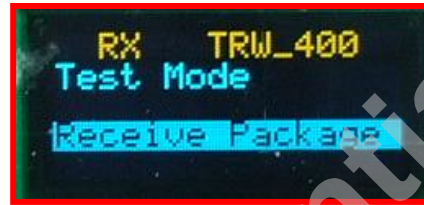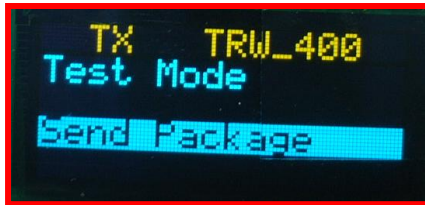
→Choose "Receive Package" to enter into next page.

```
RX      TRW_400
Test Mode
Receive Package
```

→When entering to this page, we can start to test. Send value is between 000 ～ 100.

```
TX      TRW_400
Send    = 100Time
Package= 10BYTE
```
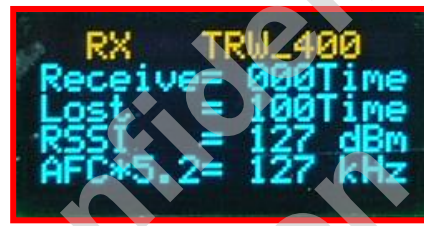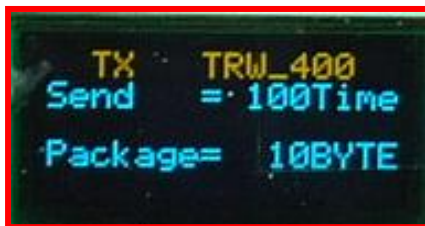
→Receive＝（000～100）
Lost＝（100～000）
According to the value of RSSI to know the quality of decision receiver modules.

```
RX      TRW_400
Receive= 000Time
Lost  = 100Time
RSSI  = 127 dBm
AFC*5.2= 127 kHz
```

（5）Testing：

（a）Connect the high-frequency spectrum to receiving side of analyzer port. (as the under photo)
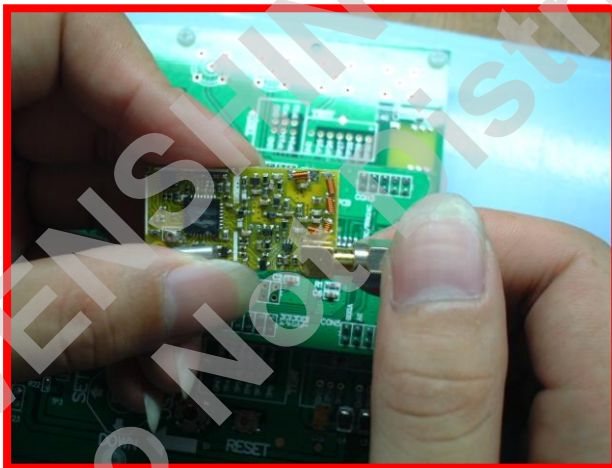
（b）Insert the TRW-400 into KIT10 Mother board. (as the under photo)
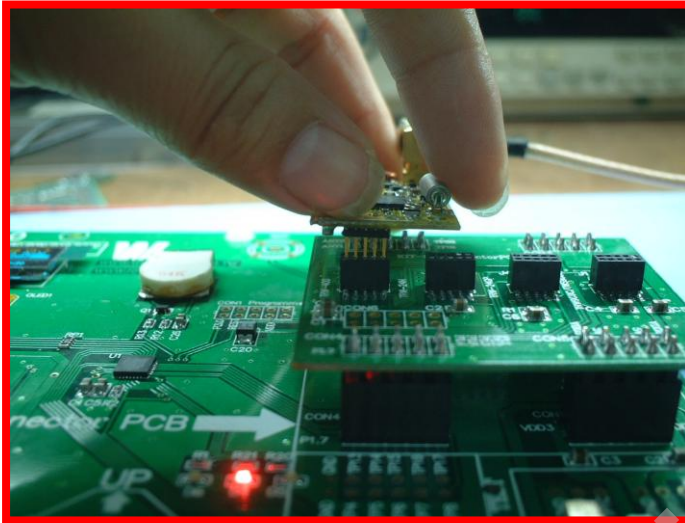
（c）According to the waveform which showed by spectrum analyzer could be determined the module is good or not. The photo as follows is the correct waveform.

➢ Test TRW-900C:

(1) The TRW-900C two ways transmitting frequency is 900MHz, the power is +10dBm, the speed
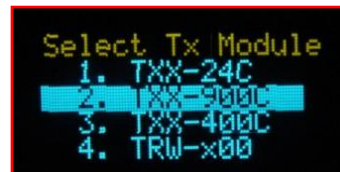
　is 100Kbps, the modulation is FSK.

(2) Under the 2 ways transmitting model, if the test value of transmitting and receiving is

　　normal.

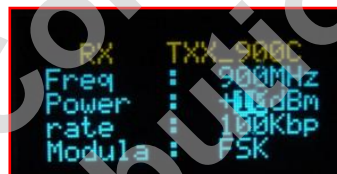→Choose "Tx Mode", press the middle key to next page.:

→Choose the 2nd item, press the middle key next page:

→Setting Parameter Value. The value of TX must the same with RX, and then press middle key to next page.

→Choose 2 ways transmitting model to send package, press the middle key to next page.

→When to set transmitting data page, if not necessary, may it not to be changed.
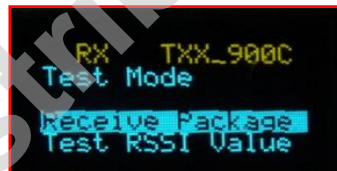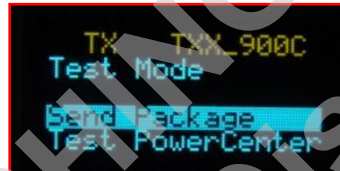
→Choose "Rx Mode", press the middle key to next page.

→Choose the 2nd item, press the middle key next page.

→Setting Parameter Value. The value of TX must the same with RX, and then press middle key to next page.

→Choose 2 ways transmitting model to receive package, press the middle key to next page.

→When to set receiving data page, if not necessary, may it not to be changed. Press the middle key to next page.

Start to test Transmitter:			**Start to test Receiver:**	

Value from Receiver	**Value from Transmitter**		**Value from Transmitter**	**Value from Receiver**

```
TX     TXX_900C
Receive Package
  R 050   E 000
Send:    050 Time
RSSI:    160  170
```

```
RX     TXX_900C
Receive Package
  R 050   E 000
Send:    050 Time
RSSI:    155  148
```

Transmitter RSSI value	**Receiver RSSI value**		**Receiver RSSI value**	**Transmitter RSSI value**

➢ Model 2: Test TRW-900C Transmitter Module

(1) Test transmitter direct mode.

(2) The module testing and parameter value setting are all the same with model 1.

Choose "Test PowerCenter", then press the middle key to next page.	**Start to test:**

```
TX     TXX_900C
Test Mode

Send Package
Test PowerCenter
```

```
TX     TXX_900C

Press any Key
Exit Test Power
Center Status
```

Note: The module continues transmitting. Empty code, therefore, when using spectrum to test,

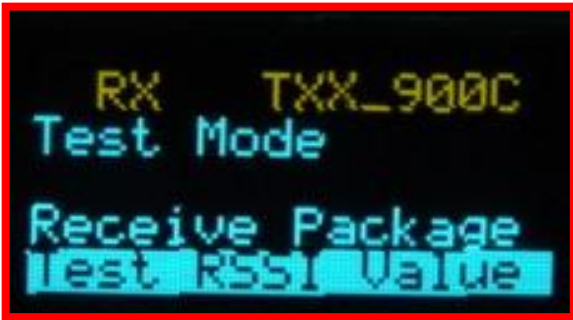it's very easy to see the present transmitting power rate.

➢ Model 3: Test TRW-900C Receiver Module

(1) Test Receiver direct mode.

(2) The module testing and parameter value setting are all the same with model 1.

Choose "Test RSSI Value", then press the middle key to next page:

Start to test:

Note: The condition of module is continuing to receive, and also demonstrate the present RSSI value. When receiving data, the main board TP5 of KIT10 will show all the receiving data.

➢ Test TRW-24C:

A. Frequency = 2400 ~ 2499 MHz; Data Rate = 2.4 Kbps; Module = FSK.

B. Perform Two-way Transmission test on a pair of modules used as transmitter and receiver.

C. Operation steps:

(i.) Plug the male connectors of the two TRW-24C to be tested into the sockets on two KIT10 units; refer to Figure 1:

Figure 1

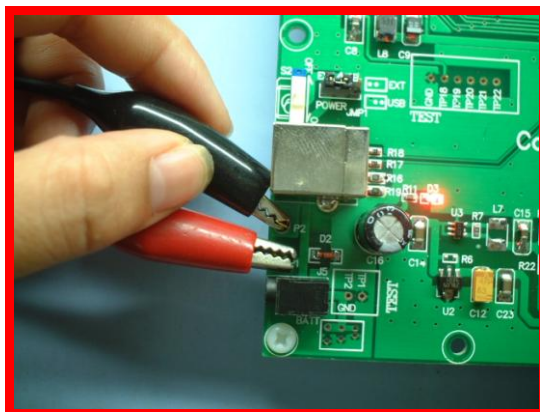**(ii.)** Push the power switch to ON; refer to Figure 2:

Figure 2

(iv.) External power supply should be used; the following illustration is based on using an external DC power source.

(v.) After each external power unit (which should be adjusted to 6.5v) is connected to the KIT10s by using a pair of power cables (as shown in Figure 2), LED D3 should light up continuously to indicate that the power is on. D4, D5, D6 will blink for approximately 2 seconds (IC initialization).

(vi.) After powering up, the display on the LCD monitor will be as shown in Figure 3, providing a list of different modules, such as items 1, 2, and 3. Item 2.TRW_24c, which is the selected module to be tested, is highlighted here. By pushing the function key upward once, item 1.TRW_900C is highlighted; pushing the function key upward a second time will move the cursor to the bottom of the list of modules that can be tested, in this case, item 3.RWS_900C. Pushing the function key downward will cycle through the list of modules, in reverse order. An audible prompt is produced when pushing the function key. Now select 2.TRW_24C, and press the ENT key to bring up the next monitor display.

Figure 3

(vii.) First, select the module to be tested. Next, select the working mode parameters, as in Figure 4; TRW_24C is displayed in yellow on the top row, indicating that the selected module is TRW_24C. The working parameter is shown under RF Work Mode, of which, 1. Tx_Mode is the transmission mode, and 2. RTx_Mode is the receive mode, which can be selected in a similar manner as before. Move the highlighting cursor to the required working mode by pushing the function key: Select 1. Tx_Mode (transmission mode) in one of the KIT10, and set the other KIT10 to 2. Rx_Mode (Receive mode), as illustrated in Figure 4-1. To simplify the explanations here, we will call the KIT10 set to Tx_Mode the transmitter board, and the KIT10 set to Rx_Mode the receiver board. Now press the ENT key on each board to bring up the next display on the LCD monitor.

Figure 4
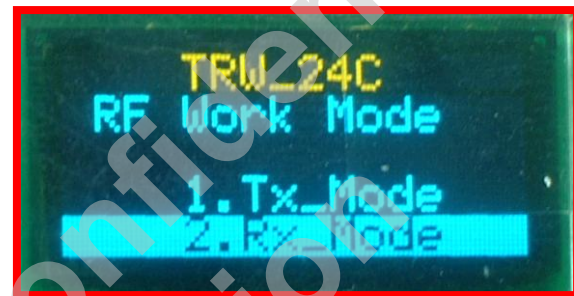

Figure 4-1

(viii.) With the Tx or Rx working mode chosen, the transmission and receive parameters can be set. The LCD displays in Figure 5 and Figure 5-1 show Frequency = 2499 MHz; Data rate = 2.4 Kbps; Power=+1dbn; and Module = FSK. Frequency is the working frequency of the selected module; the selected Data Rate involves a transmission rate of 2.4 kilo bits per second; Power is the transmission power rating; and Module is the modulation method, FSK or MSK may be chosen. Moreover, notice that the digit 4 in the frequency value is currently highlighted, pushing the function key to the left now will decrement the highlighted digit by 1, pushing the function key to the left one more time will decrement the highlighted digit by 1 again, and pushing the function key to the left when the highlighted digit is at zero will return the cycle back to 9; all other digits will remain unaffected. Pushing the function key to the right will increment the highlighted digit, and pushing the function key to the right when the highlighted digit is at 9 will return the cycle back to zero. Pushing the function key downward will select digit 9 to the immediate right of the current digit 4; keep pushing the function key downward again to select other digits to the right of digit 9. The value of each digit can also be modified at this time. When you finish setting the last digit of the working frequency, push the function key downward once more to move the cursor to highlight the Data Rate row. Pushing the function key left or right when Data Rate is highlighted will select different Data Rate values, or set the data transmission rate for the module under test; this value is intrinsic

to the particular module being tested. The available settings are: 250 Kbps, 10 Kbps, and 2.4 Kbps; MSK mode will be shown on the Module row when 250 Kbps is selected, and FSK will be shown for all other data transmission rates. Now the parameters for the transmitter board and the receiver board can be set. (NB: Transmitter board and receiver board parameters must be consistent for data to be successfully transferred.) In this example, a frequency of 2499 MHz, Data Rate of 2.4 Kbps, is set for both transmitter board and receiver board. Pressing the ENT key for each device, respectively, after setting the data transmission rates, will bring up the next set of LCD monitor displays.
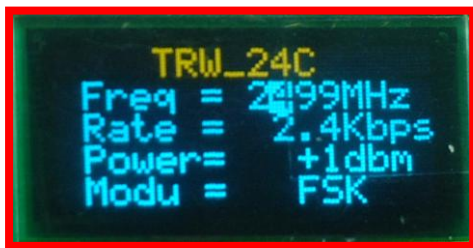

Figure 5   Figure 5-1

  (ix.) Should an attempt be made to set the frequency to a value outside the range for the device under test, such as that shown in Figure 6, and the ENT key is pressed, then an LCD display, as that shown in Figure 7, will appear indicating that an error has occurred when setting the frequency, and the correct frequency range is displayed; the LCD display will jump back to Figure 6 after releasing the ENT key. Now set the correct frequency for this test as 2499 MHz and press the ENT key to bring up the next setting panel.
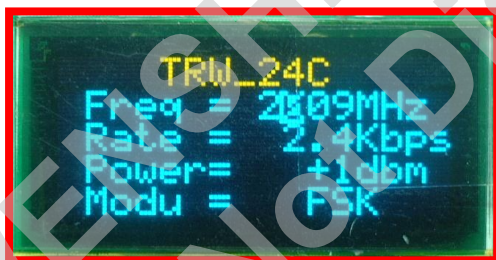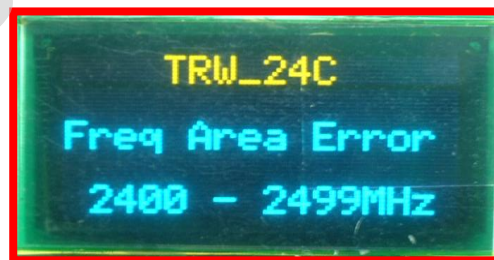

Figure 6   Figure 7

Provided that all the parameters up this point are correctly set, the LCD monitor will show the Test Mode Panel (see Figure 8 and Figure 8-1). Notice the different setting options for the transmitter board and receiver board: the two options of Send Package (transmit data packets) and Test Power Center (output power rating test) are present on the transmitter board, while Receive Package (receive data packets) and Test RSSI Value (test signal field strength) are available on the receiver board. In the manner similar to that of selecting the transmission and receive mode, the Send Package on the transmitter board, and the Receive Package on the

receiver board can now be selected by appropriately operating the function keys; then press ENT for the respective boards to bring up the next group of settings.
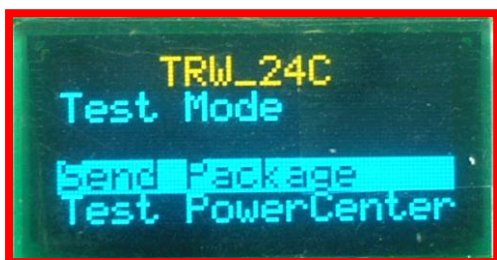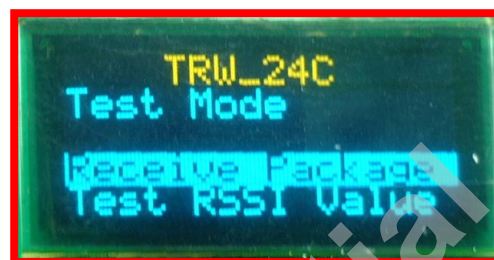

Figure 8

Figure 8-1

(x.) When the LCD display is as shown, as in Figure 8 and the Test Power Center (output power rating test) is selected for the transmitter board, pressing the ENT key will bring up the display, as in Figure 9. At this juncture, analysis may be performed using appropriate instrumentation to assess the RF output and check for frequency center drift. Pressing any key will exit Test Power Center mode and return to figure 3. On the other hand, when the LCD display is as shown in Figure 8-1 and Test RSSI Value (test signal field strength) is selected for receiver board, pressing the ENT key will bring up the display panel, as in Figure 9-1, at which point, signal strength and reception sensitivity tests may be performed for the receiver module. Here, the RSSI = xdBm is not the true dBm value, but merely reflects a relative signal strength: the stronger the signal the bigger this value. Pressing the ENT key will exit Test Power Center mode and return to Figure 3.
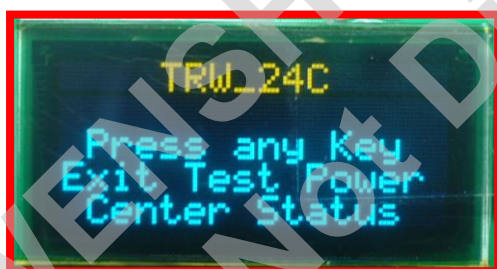

Figure 9

Figure 9-1

(xi.) When the LCD monitors for transmitter and receiver are respectively as shown in Figure 8 and Figure 8-1, with Send Package (transmit data packets) and Receive Package (receive data packets) selected, pressing the ENT key will bring up the same LCD display for both transmitter and receiver, as in Figure 10 and Figure 10-1, at which point transmission data packet size can be set in a manner similar to that for setting the working frequency; the default size is Package = 25Byte. As no change is needed here, simply press ENT to accept

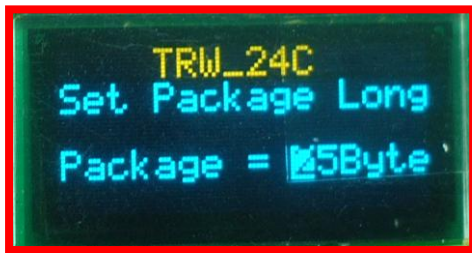the settings. NB: Data packet size must be consistent for both devices in order to perform two-way data transmission.
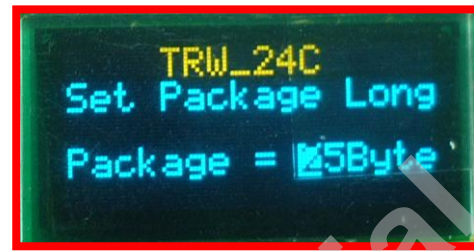

Figure 10

Figure 10-1

  (xii.) When the LCD monitor for the transmitter board is as shown in Figure 10, pressing ENT will initiate data transmission, and bring up the monitor panel in Figure 11. Transceiver Tx appearing on the second row indicates that the module under test is working in transmission mode, with R xxx indicating the number of data packets received, E xxx denoting the number of error packets received; the value for Send fluctuates between 0 and 100, with this number representing the total number of data packets transmitted. The figures beside RSSI show the value for transmission, and reception field strength. A blinking LED D4 on the KIT10 indicates that data is being transmitted. When the LCD monitor for the receiver board is as shown in Figure 10-1, pressing ENT instructs the module to start to receive data, and brings up the monitor panel as in Figure 11-1. Transceiver Rx appearing on the second row indicates the module under test is working in data receive mode, with R xxx and E xxx carrying the same information as per transmission mode. Provided that the transmitter board is correctly transmitting data and that the receiver board is correctly receiving, the R and E values for the receiver board should be non-zero, and the same parameters for the transmitter should read zero. This concludes the descriptions for setting up transmission and reception. Naturally, setting the transmission board to receive and the receiver board to transmit, should provide the same result.
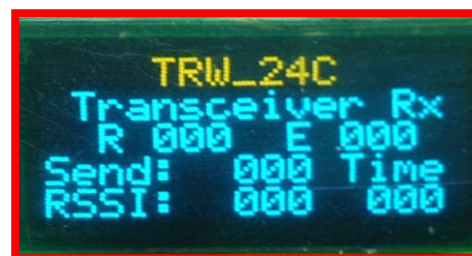

Figure 11

Figure 11-1