GUI Software Guide

Protek 783O

Rev. 2.0

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6. Firmware upgrade

1. GUI Software

1.1. Introduce

Protek 7830 is handheld spectrum analyzer and user can interface between PC and 7830 to receive the measurement data and diagram, so GSI supply the GUI program software.

User can review the analyzed data from Supplied GUI software and 7830 and revises the diagram and measurement data also save the data. User can make full use of GUI program. 7830 support the communication with RS232C (Direct communication

1.2. Features

Protek 7830's specifications are as below and if user needs the detail information, please check the user manual.

- Frequency bandwidth : 100kHz~2.9MHz

- Function of Frequency spectrum analyzer and frequency counter

- Measures and demodulates W-F M/W-FM/AM and SSB

- Enhanced accuracy for signal level

- Convenience for using the marker mode

  (Marker / Delta Marker / Squelch)

- Channel Power measurement

- Support PLL tuning system for the setting exact frequency

- Internal speaker

- 192 pixels X 192 pixels Back Light LCD

- Convenience to use function selection of method for selected menu

- RS-232C interface

- User-friendly icon display

- Field wire/wireless equipment installation and maintenance

- Cable installation and maintenance

- RFID Tag RF Strength measurement

- Jammer(for hospital and theater, etc) performance test

- Satellite antenna installation and maintenance

- Tapping, hidden camera detection

2. Installation

2.1. Preparation

To use the GUI software, Preparation is as below.

- Protek 7830

- RS 232C cable supplied

- PC (RS232C interface port)

- OS: MS Windows XP recommended

    - MS Windows ME. 2000 support

    - This product can be working with MS Windows 98SE, by the way, it can be not working due to memory capacity.

- GUI software.

2.2. Installation of GUI software

Double click "Setup.exe" file from GUI software, which will be installed automatically.

2.3. PC environment installation

Installation between Protek 7830 and PC is as below.

1) First at all, power on the computer and check the OS whether it is working or not

2) Check the power off Protek 7830

3) Connect SMPS type adaptor (DC12V.3A) with Protek 7830.

4) Connect the RS 232C between PC and Protek 7830.

5) Next, set up Protek7830

6) Turn Protek 7830 on.

7) Click the "Menu" key to display "Main Menu" on LCD monitor.

8) Use the "UP/Down" key, find the "Connect PC" Manu and enter this mane.

9) List "None" and "Remote PC" displayed and clicks "Remote PC" and push "Enter" key.

10) And then check the "Remote PC" message on the monitor. If "Remote PC" message was displayed on monitor, Protek 7830 is ready to connect PC, It means GSI mode.

11) Next, explain the GUI software.

12) Find the icon of "7830.exe" on desktop and double click it to start the GUI program. Check the Instruction 2.1.

Figure 2.1. Protek 7830 GUI software

3. The method of GUI software key button

3.1. GUI software

GUI software is classified for Menu part and Protek 7830

First from this chapter explain the method of using GUI equipment and from next chapter explain the menu part. Refer the instruction 2.1.

GUI equipment organizes the LCD display and keypad button. First LCD display show the measurement data same as real equipment.

The measurement graph is displayed GUI equipment on LCD monitor and this graph can be enlarged for user reviewing. To use enlargement mark function, the user can use the window of graph. As the Figure 3.1, double click the LCD display, run the window of graph.

More detail information is mentioned on 4.3.2. Running method for the window of Graph and 4.7 additional explanation for the window of graph
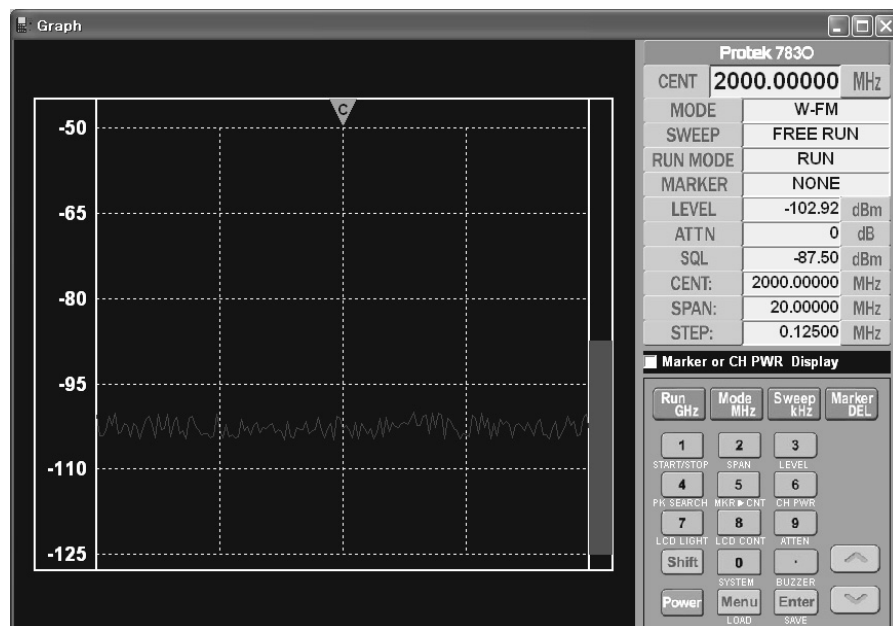
Figure 3.1. Function of LCD display

and in case of GUI equipment of the keypad button, it is working same as real keypad button. (But Wheel key of GUI equipment is not working during the communication)

GUI equipment use is same as real equipment so if user needs more detail information, refer the user manual of Protek 7830.

3.2. The method of key button

Check the Figure 3.2. to recognize the arrangement of keypad button.

Figure 3.2. Keypad button

3.2.1. "Shift" keypad button

1) Push the "Shift" button.

2) After pushed "Shift" button, display the "Shift" icon from "7830" icon on upper right side monitor.

3) If user runs the window of graph as the Figure 3.1, user can check whether "Protek 7830" icon is changed to the "Shift" icon on upper right side monitor

4) Push the "Shift" key again.

5) From that time, "Shift" icon will be changed to "7830" icon.

6) For more additional explanation of No.5, when Protek 7830's icon is changed from "Shift" icon to "7830" icon, frequency mark is changed from the lower end at LCD display monitor. In other word, from the selection of "Shift" key twice, the user can convert the each mark of center frequency, span frequency, step frequency, start frequency, stop frequency, and step frequency. (LCD display mark:

CENT/SPAN/STEP ←→ STAR/STOP/STEP)

7) If user runs the window of graph as the Figure 3.1., user can check whether "Protek 7830" icon is changed to the "Shift" icon on upper right side window of graph.

8) For more additional explanation of No.7 same as No. 6, when Protek 7830's icon is changed from "Shift" icon to "7830" icon, frequency mark is changed from the lower end at LCD display monitor. In other word, from the selection of "Shift" key twice, the user can convert the each mark of center frequency, span frequency, step frequency, start frequency, stop frequency, and step frequency.

(Mark of window of graph: CENT/SPAN/STEP↔STAR/STOP/STEP)

3.2.2. "DEL" keypad button

1) The user can delete the number of frequency value with "Marker/DEL" as below.

2) The user can use "DEL" key to delete the miss-typing number (0~9 and ".")

3) If the user push "DEL" key one time, the one letter will be deleted from the last input letter.

4) The user can push "DEL" key repeatedly to delete all of the letter,

5) Next, Protek 7830 is display the previous frequency value automatically.

3.2.3. "Mode" keypad button

1) Generally, push "Mode" key to select measurable demodulation mode.

2) When the user push the "Mode" key, the demodulation mode is changed in orders W-FM → SSB → AM → N-FM repeatedly.

3) In case of SSB mode changed, when sweep mode is stopped, the user can use "U/Down" key to change the frequency value.
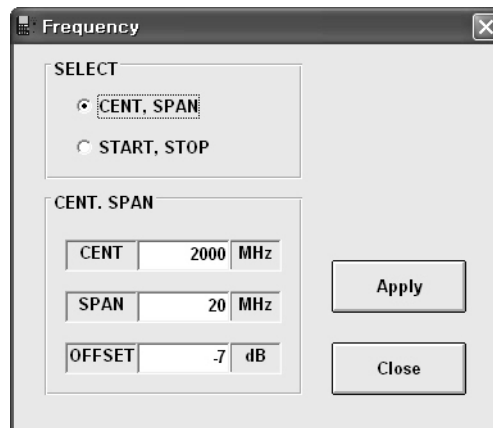
Figure 3.3. The window of set frequency

3.2.4. Input the center frequency

1) The user can input the center frequency value with Protek 7830 keypad button (The number & unit)

2) GUI program support to input the center frequency value with keypad button.

3) But, to set the frequency value up easily, prepare the main menu of GUI equipment separately.

4) Refer the Figure 3.3. Set frequency and 4.2.3 Set frequency

3.2.5. Input the span frequency

1) The user can input the span frequency value with Protek 7830 keypad button (The number & unit)

2) GUI program support to input the span frequency value with keypad button.

3) But to set the frequency value up easily, prepare the main menu of GUI equipment separately. The user can use "Set frequency" to input the span frequency value from the* main menu "Run"

4) Refer the Figure 3.3. Set frequency and 4.2.3 Set frequency

3.2.6. Input the start frequency and the stop frequency

1) The user can input the start frequency value and the stop frequency value with Protek 7830 keypad button (The number & unit)

2) GUI program support to input the start frequency value and stop frequency value with keypad button

3) But to set the frequency value up easily, prepare the main menu of GUI equipment separately. The user can use "Set frequency" to input the span frequency value from the main menu "Run"

4) Refer the Figure 3.3. Set frequency and 4.2.3 Set frequency

3.2.7. Setting the reference level

1) The user can input the reference level value and the stop frequency value with Protek 7830 keypad button (The number & unit)

2) But to set up the reference level value and the difference level value easily, prepare the main menu of GUI equipment separately. The user can input the reference level value and the difference level value from "Set REF.Level".

3) Refer 4.2.5. Set reference level

3.2.8. The function of Mark1/Mark2/Squelch

1) Generally push the "Marker/Del" to use the selection for marker mode

2) When the user push the "Maker" key, the marker mode is changed in orders None → Marker1 (Marker) → Marker2 (Delta Marker) → Squelch Marker repeatedly.

3) For entering the Marker1 on None mode, push the "Marker" key. Check <M> icon mark whether it is displayed or not on upper middle of window. This mark is the changed Marker1 mode. The user can arbitrate Marker1 with "Up/Down" key from Marker1 mode.

4) To change the mode from Marker1 to Marker2, Push "Marker" key too. Check the "△" icon mark whether it is displayed or not on upper middle of window. This mark is for changed the marker2 mode. The user can arbitrate Marker2 with "Up/Down" key from Marker2 mode, also the user can use Marker2 mode with Delta Marker from the standard value of Marker1.

5) To change from Marker 2 mode to Squelch Marker mode, push

"Marker" key too. Check the "S" icon mark whether it is displayed or not on upper middle of window. This mark is for changed the Squelch mode. The user can arbitrate Squelch Marker with "Up/Down" key from Squelch Marker. The user can set up the Squelch level value to run Sweep mode and check the Squelch Marker value from LCD monitor lower right side "SQL"

6) To change the mode from Squelch to None, push the "Marker" key.

7) Additionally, in case of None mode, the user cancel the Marker mode from Protek 7830, but the user can use Marker 10 sets with GUI equipment to click the data. If the user needs more explanation, refer the chapter 4.7 the additional explanation for the window of graph.

3.2.9. Sweep function

1) The user can select the sweep mode using "Sweep/kHz" key generally. Sweep mode is changed in orders Free Run → Squelch Run → Single Run repeatedly.

2) GUI software supports the function of free run, therefore when input the frequency value with "Sweep/kHz" key, the user can input the value per kHz.

3) To use the function of free run, push the "Run/GHz" key. The user can run and stop it with "Run/GHz" key.

4) Or the user select the main menu "Run" → "Run". In case of "Stop" the sub menu displays "Run" and for the state of "Run" the sub menu displays "Stop".

3.2.10. The function of Peak search and Marker to center

1) The function of "Peak search" searches the peak of frequency with Marker1 or Marker2.

2) The function of "Marker to center" sets the center frequency from Marker1 located. This function moves the frequency to window of center between Marker1 and input frequency on LCD monitor.

3) The user uses the function of "Peak search" and "Marker to center" with Marker1 on Marker1 mode.

4) But, the user should use the function of "Peak search" with Marker2 on Marker2 mode and Marker1 is used from "Marker to Center"

5) First, to use the function of "Peak search", push "Shift" key and push the No.4 key to select the additional function of "PK search" and check the running operation comparing the article 2.

6) To use the function of "Marker to center" push "Shift" key and push No.5 key to select the additional function of "MKR→CF" and check the running operation comparing the article 3.

3.2.11. The Function of measuring channel power

1) For the Function of measuring channel power, the user can measure the frequency with Protek 7830 between Marker1 and Marker2 on Marker2 mode (Delta Marker).

2) But, the user can use the window of graph for the function of measuring channel power with GUI equipment trough the GUI software

3) Refer the Figure 3.4. measuring channel power or the article 4.7.1 the window of graph (16)~(22)
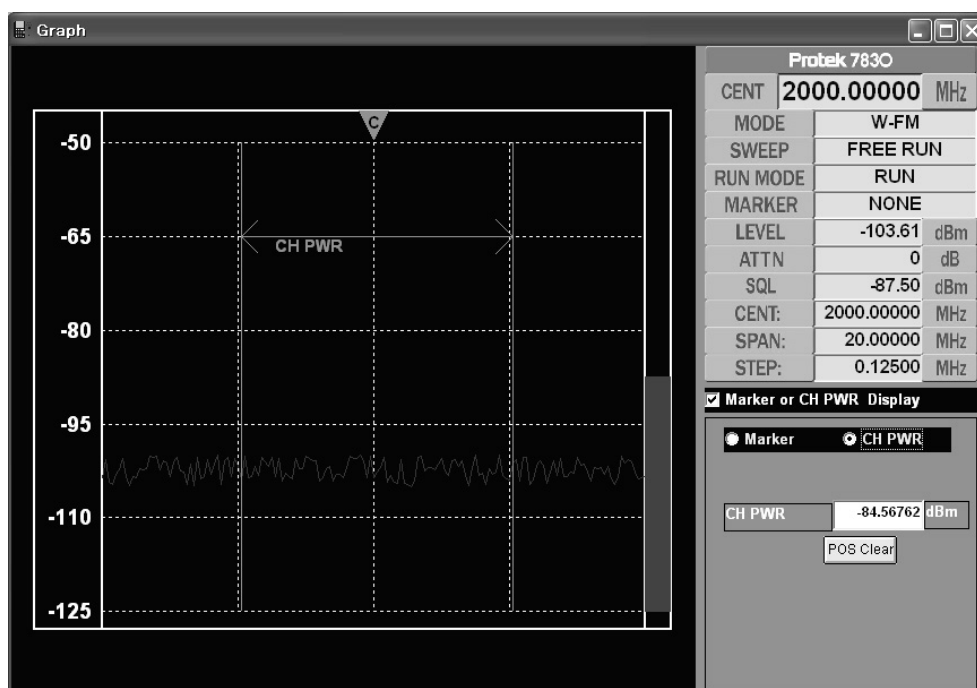
Figure 3.4. Measuring channel power

3.2.12. The function of LCD Light ON/OFF

The user can set the LCD back light to turn on or off. The initial setting is power off.

Push "shift" key one time and push the No.7 key to select the additional function of "LCD LIGHT".

If the user push the No. "7" repeatedly, the on/ off of LCD back light is changed repeatedly automatically.

3.2.13. The Function of LCD contrast

Following environment, the contrast of LCD is different so the user can set the LCD contrast.

Push "Shift" key and push the No.8 to select the additional function of "LCD CONT"

The user can set LCD contrast with "Up/Down" key.

3.2.14. The function of internal ATTEN (Attenuator)

Protek 7830 is set with the internal ATTEN

The user can set the dB value. As 0dB, 10dB, 20dB, 30dB and 35dB

Push "Shift" key one time and push the No.9 key to select the additional function of "ATTEN"

The user can select the ATTEN value with "Up/Down" key.

Push "Enter" key.

3.2.15. The function of buzzer on/off

The user can set the key buzzer and the initial setting is buzzer off.

Push "shift" key and push "." to select the function of "BUZZER"

If the user push the ".", the On/Off of LCD back light is changed repeatedly automatically.

3.2.16. The function of SAVE/LOAD/DELETE

1) Protek 7830 can save and load the measuring data and setting

equipment. In other word the user can save or load date for displayed data except LCD part.

2) To use the function of "SAVE/LOAD/DELET" easily, Protek 7830 of the main menu supports the each function, but GUI equipment is not supported.

3) Refer more information trough the article 4. The user main menu of GUI software at 4.1 "File menu".

4. The method of main menu for GUI software

From the article 3, explained keypad function of GUI equipment part and the article 4 is explained for Menu part.

GUI software main menu is as Figure 4.1. and the user learn the each function of menu.

File	Run	Display	Print	Setup	Help

File
Load
Save

Save Graph as BMP
Data to CSV

Exit

Run
GUI Mode Open
GUI Mode Close

Run (or Stop)

Set Frequency
Set REF. Level
Data List

Display
Level
Graph

Marker

Print
Level
Graph

Setup
Port Open
Port Close

Port Set
Graph Color

Help
About
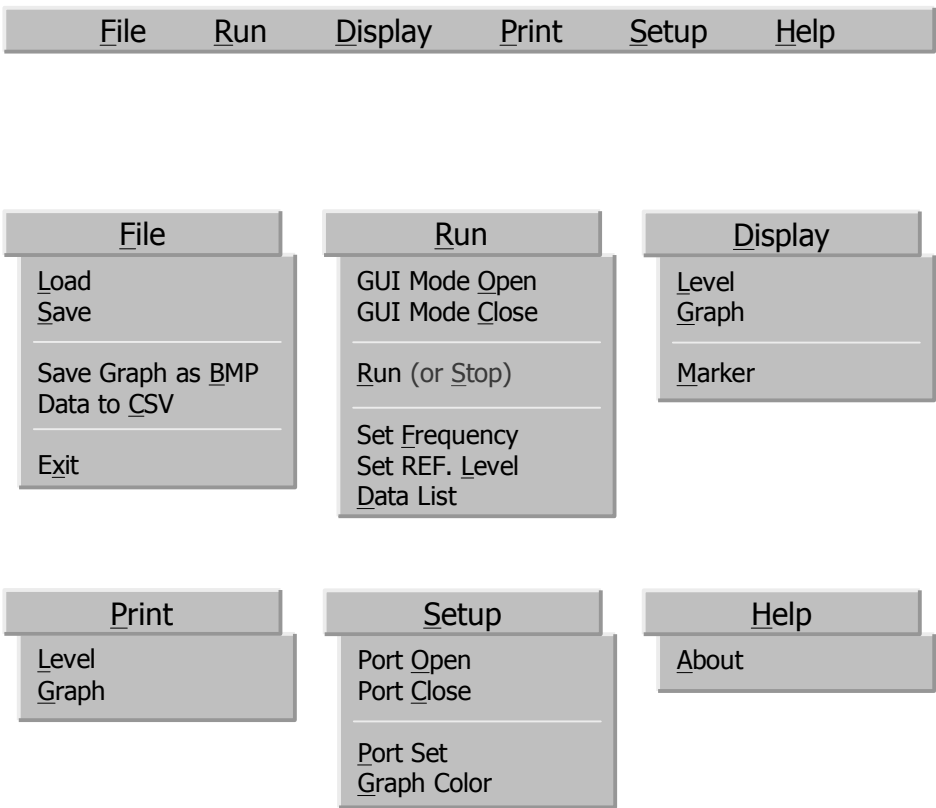
Figure 4.1. Main menu list

4.1. "File" menu

4.1.1. Load

1) Protek 7830 can save and load the measuring data and setting equipment. In other word the user can save or load date for displayed data except LCD part.

2) But If the user use the function of Save and Load, the data is saved or loaded with Protek 7830's memory, buy the way if the user use the function of save and load with GUI equipment, the date is saved or loaded to PC.

3) For your reference, if the user save or load the file, refer the article 4.2.4. "Data list".

4) The user loads the save file for the measuring data and setting value of equipment.

5) Select "File" of the main menu → Load to open the window of Load as Figure 4.2.

6) Select the desired save file and click the "Open".
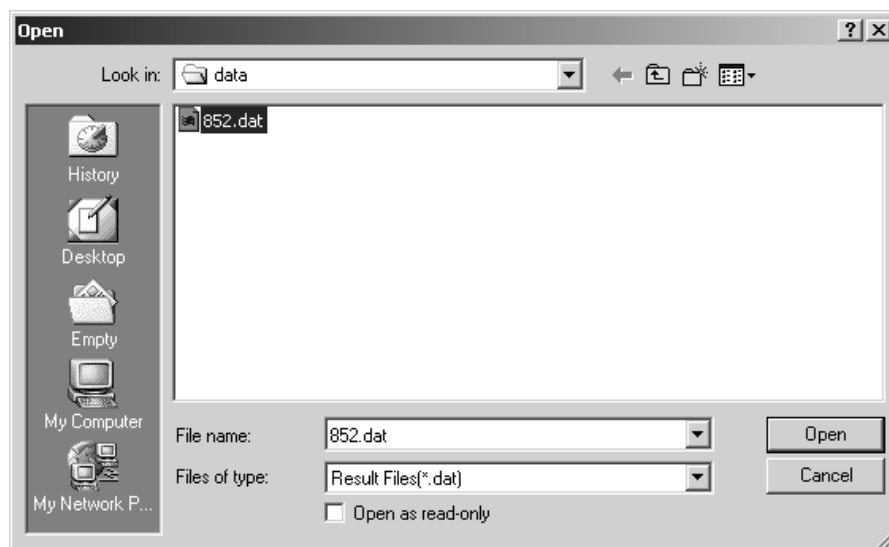
Figure 4.2. The window of Load

4.1.2. Save

1) The function of "Save" menu is used to save the measuring data

or setting value of the equipment.

2) Select "File" of the main menu → Save to open the window of Save Figure 4.3.

3) The user can name the file for save and click the "Save".
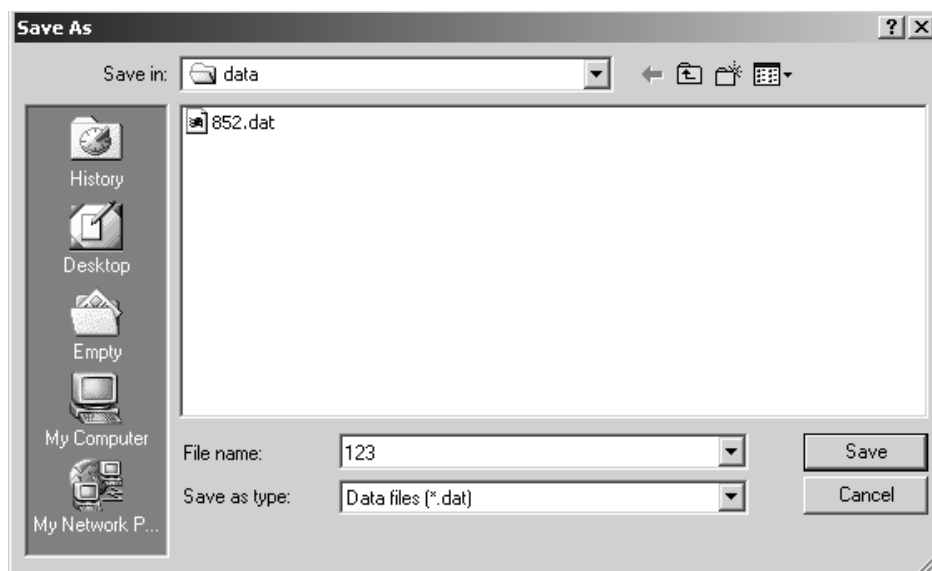
Figure 4.3. The window of Save
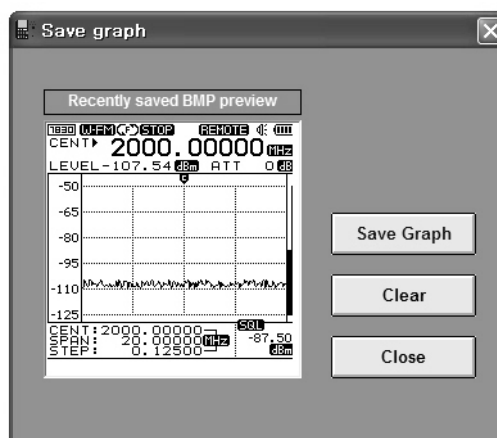
Figure 4.4. The window of Save Graph as BMP

4.1.3. Save Graph as BMP

1) To use the function of "Save Graph as BMP" easily, GUI equipment support to save the data of graph as bitmap file also the user can check the latest data from the bitmap preview of graph.

2) Select "File" of the main menu → Save Graph as BMP to open the window of Save Figure 4.4.

3) After push "Save Graph", Input the desired Graph name and push the "Save" button, Automatically open the message of "Waiting" during a few second.

4) The present measured graph will be saved and display the recent saved graph. (Refer the recently saved BMP preview)

4.1.4. Data to CSV

1) "Data to CSV" is the function for saving the measuring data to CSV.File. This file is opened with Excel program. If the user double click the CSV.File, the excel program is run to display the measuring data automatically.

2) If the user selects the main menu File → Data to CSV, the window of Data to CSV is opened.

3) The user can name the desired CSV.File and click the "Save" button

4.1.5. Exit

1) The user can exit the GUI software from "Exit" menu.

2) But Protek 7830 is kept at the states of "REMOTE PC"

3) So the user can re-start the GUI program with Protek 7830 and it is not necessary the procedure as below.

   "Menu → CONNECT PC → REMOTE PC"

4) If Protek 7830 is kept at the states of "REMOTE PC" as the procedure No., reset Protek 7830 to work it without GUI equipment.

5) Also if user exits the GUI software abnormally (Disconnect the RS232C before using the function of "Exit", Stop the GUI software compulsorily, etc), the user should exit the GUI software and Protek 7830 reset and re-install the user environment. Refer the article 2.3.

4.2. "Run" menu

4.2.1. GUI Mode Open

1) "GUI Mode Open" menu is used for connection with Protek 7830 through the GUI software. In other hand, this menu is for re-installation of the environment.

2) This function of menu is as below.

   -The user fails the installation of the user environment.

   -The user closed user environment through the function of "GUI Mode Close"

3) As additional explanation, this function can be displayed on "Communication Fail" from these symptoms.

   -Fail to install the user environment.

   -Protek 7830 is out of power

   -Protek 7830 is operated on "REMOTE PC" without RS232C cable.

   -Protek 7830 mode is not changed to the mode of "REMOTE PC"

   -The user operates the GUI software.

4) In case of the procedure No.2, the user should select the function of "REMOTE PC" at Protek 7830, also RS232C was connected between Protek 7830 and PC to re-install the user environment.

5) Next, select GUI Mode open from Run menu to install the user environment.

4.2.2. GUI Mode Close

1) "GUI Mode Close" menu is same as the function of "Exit" to close the GUI Mode (Refer 4.1.5 "Exit")

2) But, this function is different with "Exit" so "GUI Model close" can not exit the GUI software, so the user can install the user environment following the "GUI Mode Open" menu as the article 4.2.1 GUI Mode Open

4.2.3. RUN

1) "Run" menu is operated to start and stop the Sweep mode of Protek 7830. GUI software supports the Sweep mode of Free Run

(Free Run, Squelch Run and Single run). Refer the article 3.2.9. The function of sweep and the instruction 4.5

2) If Protek 7830 display the "Run" icon at upper monitor, it is the free mode of Sweep Run and in this case, select the menu Run → STOP to change the mode of sweep from run to stop.

3) If Protek 7830 display the "Stop" icon at upper monitor, it is the free mode of Sweep Stop and in this case, selects the menu Run → Run, it is Sweep STOP.
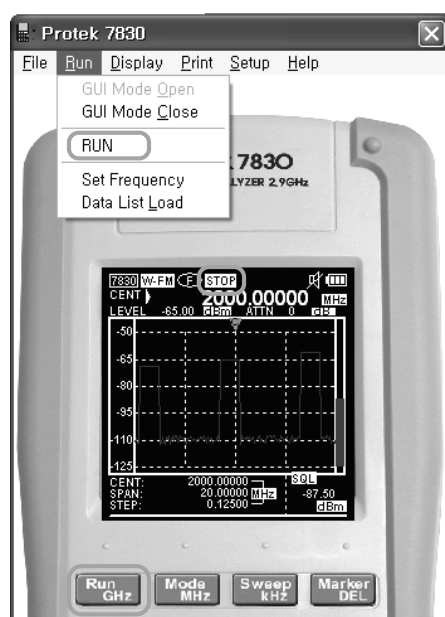
Figure 4.5. Run menu
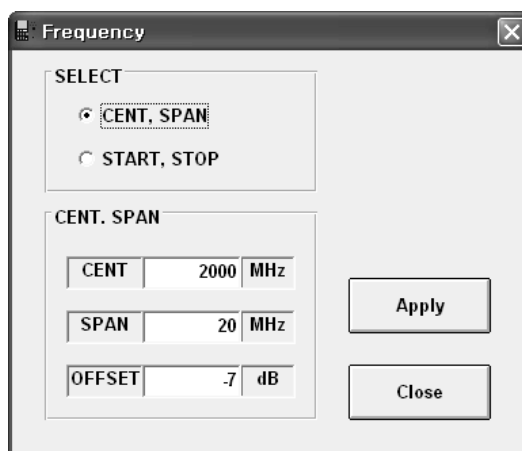
Figure 4.6. The window of set frequency

4.2.4. Set Frequency

1) "Set Frequency" menu is that the user can easily fix the measuring frequency range and offset value. If the user selects this menu, the window of Set frequency is displayed as the Figure 4.6. Regarding more information, refer the article 3.2.5. Input the center frequency, 3.2.5. Input the span frequency and 3.2.6. Input the start and stop frequency.

2) At first choose the desired method of input frequency from the window of Set frequency. In other words choose the one method between "CENT,SPAN" or "START,STOP"

3) Next, input the frequency value & OFFSET value and etc, and then push "Apply" button

4) For reference Span value could be set a multiple from 1MHz to 20MHz, for example If the desired span value range is 12MHz, the user should input the span frequency as 12MHz.

5) If the span frequency range is over 21MHz, the user can set the span frequency range as multiple 20MHz so if the desired span frequency range is 25MHz, the user can set the span frequency range to 40MHz and in case of 78MHz, the use can set the span frequency range to 80MHz.

4.2.5. Data List

1) In practically, Measuring instrument function that is measuring data, setting equipment (etc.) save to save file(save function), load file that already saved(load function) or can delete this save file(delete function).

2) On this GUI software easily manage by using "Data List" menu.(save, load and delete function) refer to 4.7

No	Name
01	
02	DK
03	3KE GUA
04	
05	04.AAAAAAA
06	05.AAAAAAA
07	06.AAAAAAA
08	
09	89
10	
11	
12	
13	
14	
15	
16	
17	
18	

Load   Save   Delete   Close
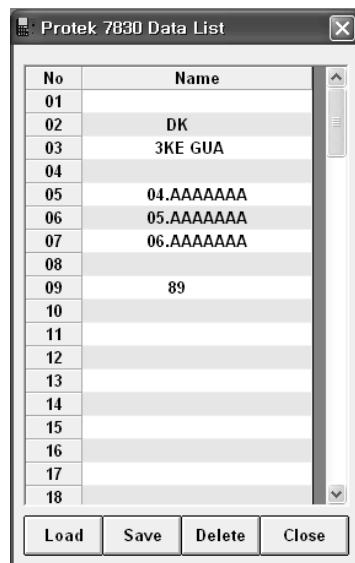
Figure 4.7 the window to manage "Save File"

3) On manage window the left side number is save file list number.(01~100). Name means save file.

4) If you want to load saved file at first select saved file by mouse then push "load" button.

5) If you want to delete save file at first select saved file by mouse then push "delete" button.
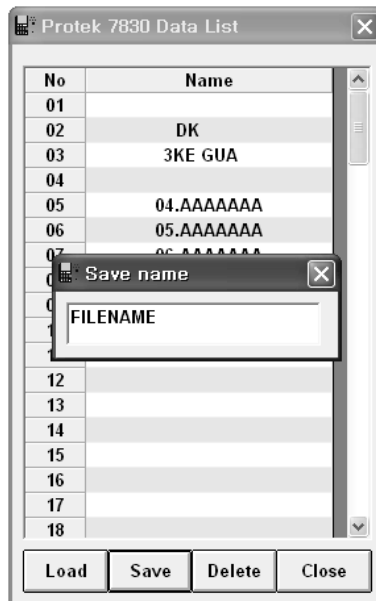
Figure 4.8. Input the name of "Save File"

6) For saving the present measuring data, setting equipment, push "save" button. As refer to 4.8 execute input name file of save file.

7) Also using possibly input letters are capital letters "A"~" Z" number "0"~" 9" blank letter (space) "," , dot letter(Dot) "." . Using possible maximum input letters are one to ten. Assigned more than ten letters, automatically appoint ten letters.

8) If completed inputting name, push "enter" key

9) Refer to sub menu, which is belonging to main menu load & save function, in this case practically it is not belonging to measuring instrument problem, On the PC without limit using save & load function. In detail description refers to "4.1.1. load ; 4.1.2. Save " **.**

4.2.6. Set Reference (REF) Level

1) "Set REF. Level" menu function could be using by setting reference level value. Select this menu as figure 4.9 executing set reference level windows. Relating this contents refer to " 3.2.7. setting reference level " .
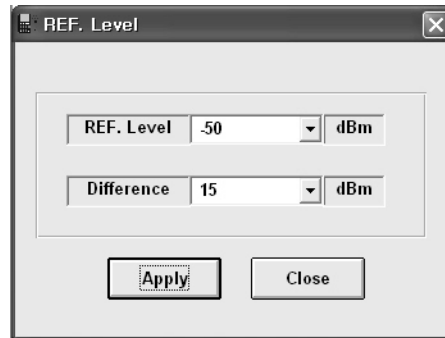
Figure 4.9. Setting window of 〝Set Reference Level and Difference Level〞

2) As Figure 4.9 set reference level window display Reference level value and difference level value. For reference consideration measuring signal for which appointing display window level value also Difference level value is level grid value of display window.

3) Reference level value support, as following figure 4.10 directly inputting or select combo box list etc.

4) According to assign level unit, it's different supporting list level

        - dBm unit: -50,-60,-70,-90,-100,-110,-120

        - dBuV unit: 60,50,40,30,20,10,0-10

        - dBmV unit: 0,-10,-20,-30,-40,-50,-60,-70

5) For reference method of changing level unit, actually using measuring instrument 〝menu〞 keypad select 〝main menu〞,〞level unit〞 then select level unit.

6) Difference level value also support directly inputting or select combo box list etc. Supporting value are 5, 10, 15 and 20. Fundamental value is 15. If measuring instrument appointing unit is dBm, appointing 15 then level grid value interval value 15dBm.

7) Select setting value then after input push 〞apply〞 button

8) Directly input reference level value or Difference value, push 〝apply〞 button, In discord with supporting level value (For reference 3)) in this case output 〝Check the REF. Level value support!〞 message. Check reference value and Input again or at list input selected value.
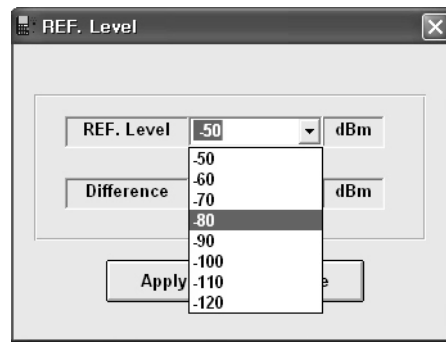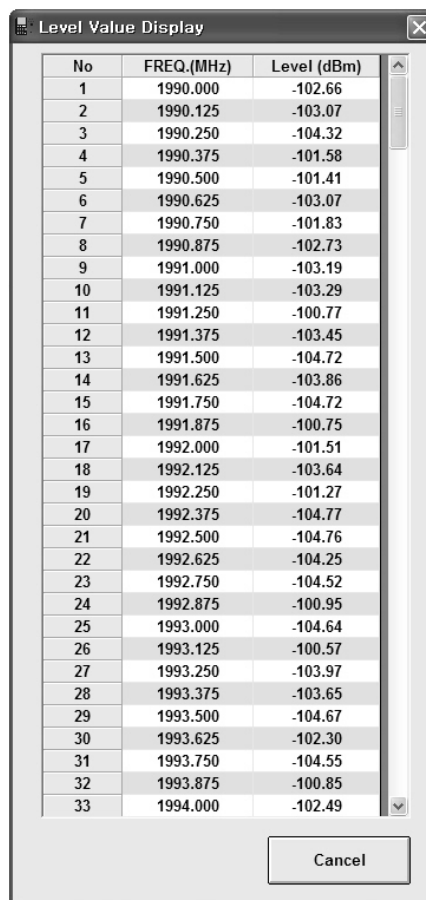
Figure 4.10. Setting the values of Reference Level and Difference Level

4.3. "Display" menu

4.3.1. Level

1) "Level" menu function display measuring data that converted numerical value information. Display 161 unit measuring numerical value data one after the other.

2) Display main menu → Select level, as following figure 4.11 operate level value display window.

Level Value Display

No	FREQ.(MHz)	Level (dBm)
1	1990.000	-102.66
2	1990.125	-103.07
3	1990.250	-104.32
4	1990.375	-101.58
5	1990.500	-101.41
6	1990.625	-103.07
7	1990.750	-101.83
8	1990.875	-102.73
9	1991.000	-103.19
10	1991.125	-103.29
11	1991.250	-100.77
12	1991.375	-103.45
13	1991.500	-104.72
14	1991.625	-103.86
15	1991.750	-104.72
16	1991.875	-100.75
17	1992.000	-101.51
18	1992.125	-103.64
19	1992.250	-101.27
20	1992.375	-104.77
21	1992.500	-104.76
22	1992.625	-104.25
23	1992.750	-104.52
24	1992.875	-100.95
25	1993.000	-104.64
26	1993.125	-100.57
27	1993.250	-103.97
28	1993.375	-103.65
29	1993.500	-104.67
30	1993.625	-102.30
31	1993.750	-104.55
32	1993.875	-100.85
33	1994.000	-102.49

Cancel

Figure 4.11. The window of Level Value Display

4.3.2. Graph

1) "Graph" menu function as prescribed figure 3.1, for looking enlarged measuring data.

2) Main menu display → select graph or click two times measuring instrument GUI of LCD display window. As figure 4.12 execute graph window.

3) In this chapter briefly prescribe graph window, detailed description refer to "4.7.graph window additional description"
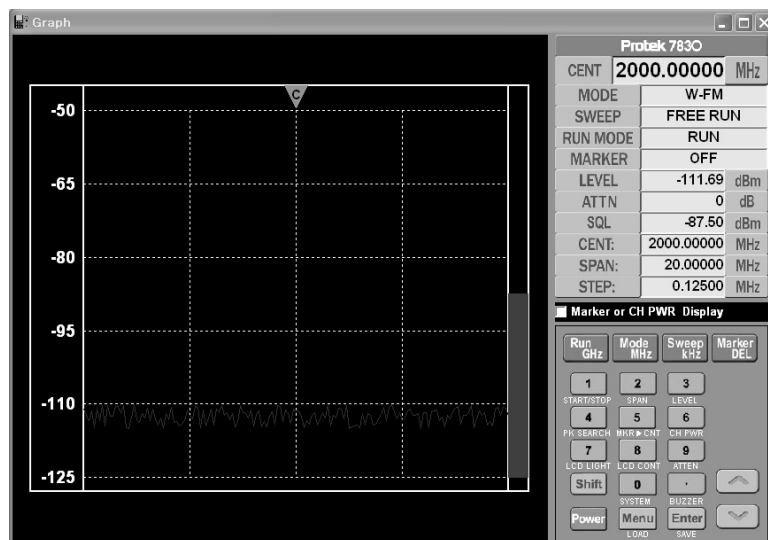
Figure 4.12. Graph window

4.3.3. Marker

1) "Marker" menu function of marker mode is none mode in this case User for looking assigned marker information use this mode.

2) Click at graph window left side arranged "maker or CH PWR display" check box also can look marker information at graph window. Click again, check box convert keypad mode.

Main menu display → select marker as figure 4.13 execute marker display window.
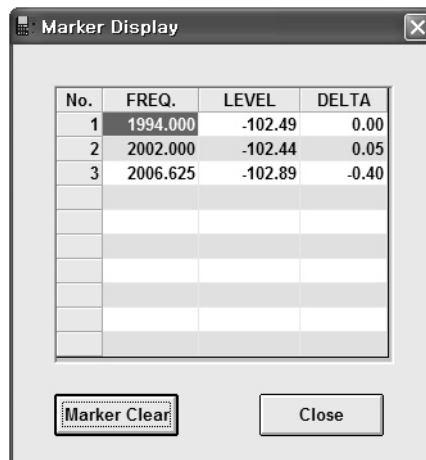
Figure 4.13. Marker Display window

4.4. "Print" menu

4.4.1. Level

1) "Level" menu function, which prints installed at PC, is output function graph of numerical value.

2) Main menu print → select level, executed print option window click "confirm" output by print installed at PC.

4.4.2. Graph

1) "Graph" menu function, which prints installed at PC, is output function graph of numerical value.

2) Main menu print → select level, executed print option window click "confirm" output by print installed at PC.

4.5. "Setup" menu

4.5.1. Port Open

1) "Port open" menu function setting separated RS232C series port (For reference " 4.5.3. port set ") or when use for open closed RS232C series port. RS232C series port mean COM port.

2) Main menu set up → select port open, open RS232C series port (COM port).

4.5.2. Port Close

1) Main menu setup → select port close, open RS232C series port(COM port & Baud rate).

4.5.3. Port Set

1) "Port Set" menu function for using that assigning RS232C series port at GUI software. It is able to set COM port & Baud rate.

2) Main menu set up → Select port set as figure 4.14 execute port setting window.
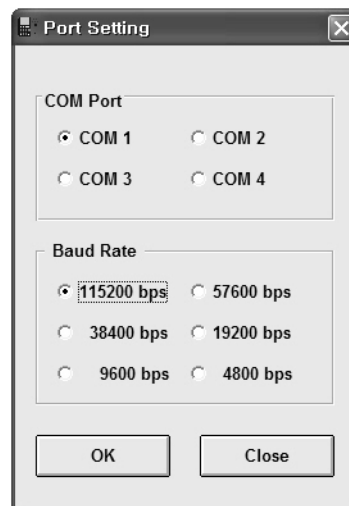
Figure 4.14. Port Setting window

4.5.4. Graph Color

1) "Graph Color" menu function when setting LCD display window of GUI software. Click each setting buttons, execute color figure, and select what you want color then click "confirm" button or click two times what you want color. Click "Default" button convert the first stage color.

2) Main menu setup → select graph color as figure 4.15 executes graph color setting.
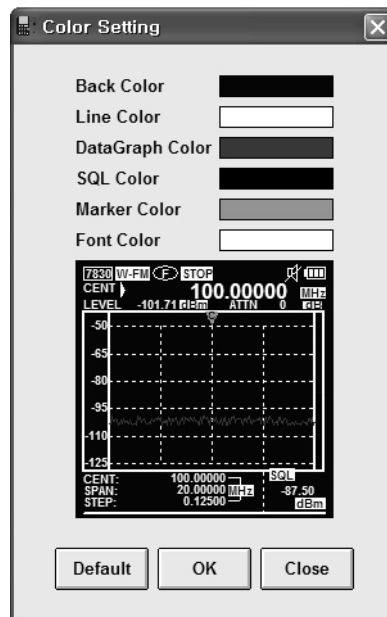
Figure 4.15. Graph Color Setting window

4.6. "Help" menu

4.6.1. About

1) "About menu function offer GUI software version and information.

4.7. additional description of Graph window

4.7.1. Graph window

1) Graph window executive method refer to "4.3.2.Graph"

2) This chapter explains about describe graph window introduction.

3) Graph window support two kinds of mode. Keypad mode, maker information.

4) Look at graph window left side, there is "Maker or CH PWR display" check box. Basically didn't check as figure 4.16 support keypad mode.

5) If user check "Maker or CH PWR Display" item check box as figure 4.17 note 5 support maker information.

6) Basically explain figure 4.16 figure. 4.16 figure note 1 to 3 same as

figure 4.15

7) Note 1 use GUI measuring instrument measure some data, among these data, this shown sweep measuring data(graph)

8) Note 2 shown standard levels, According to three units can convert by dBm, dBuV, dBmV.
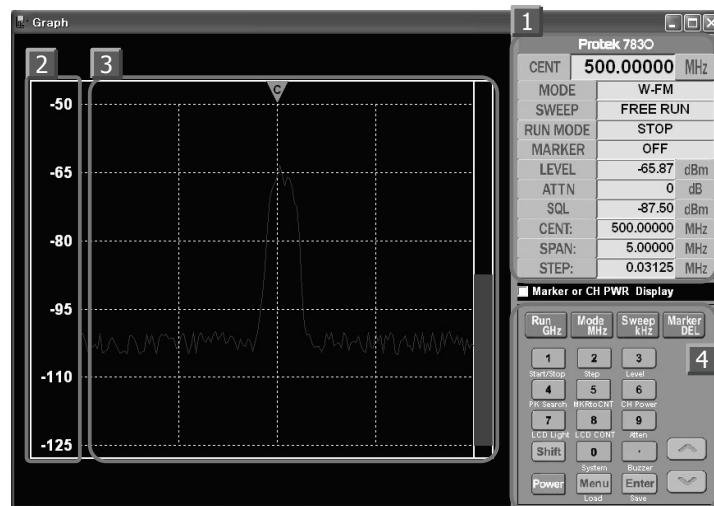
Figure 4.16. Keypad mode on graph window

9) Note 3 use GUI measuring instrument measure some data among these data, this shown sweep measuring data(graph).

10) Figure 4.16, note 4 as keypad mode, GUI measuring instrument similar with practical measuring instrument. In detail instruction refer to "3. GUI software keypad instruction.

11) Marker information & Channel information, at first describe Marker information.

12) Figure 4.17 note 5 information, as following describe, if "Marker or CH PWR Display" check box be selected check & "Marker" list in this case could be convert.

13) The right side the lower end marker display part be shown marker data, at none mode user appoint marker frequency, level value, delta etc.

14) Main menu → selecting marker executive data is similar as window of data. Related contents refer to "4.3.3. Marker.

15) Figure 4.17, note 5 User use "ALL DEL", "ROW Clear",

"DELTA" can get information. User want to delete all marker point (maximum 10 point) push "ALL DEL" button. User wants to delete marker, select marker on marker list then push button. "DELTA", if user select standard marker, as selected marker basis shown difference value.
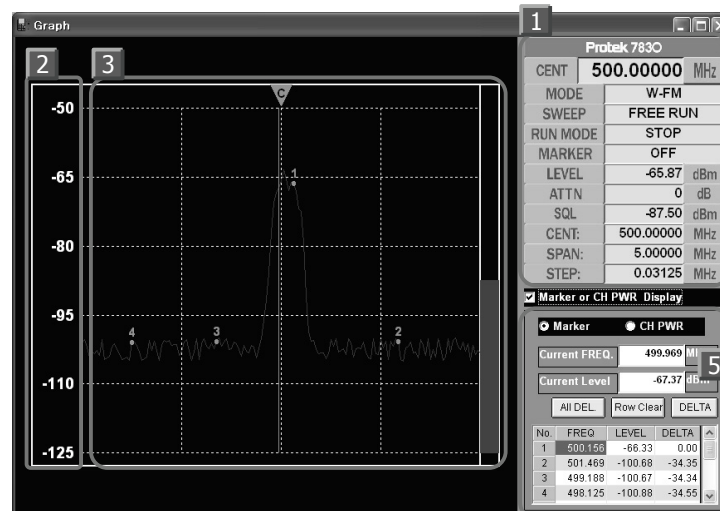
Figure 4.17. Information of Marker of Graph window

16) Lastly describe channel power information.

17) Figure 4.18 note 6 is channel power information, as previously stated if user on "marker or CH PWR display" check "Check" & "check power list" it could be convert. Note 6 channel power display part be shown CH PWR(channel power) value is between marker 1 to marker 2 value.

18) On GUI measuring instrument or graph window at first select marker mode none. About marker mode refer to "4.3.3.Marker"

19) Click located right side "marker or CH PWR display" check box.

20) Select below list "CH PWR".

21) For looking Channel power value mark at display channel marker 1 and marker 2 , using mouse click position what user want to, for reference only can mark marker 1 or marker 2, using mouse move position what user want.

22) If user wants to erase marker 1 and marker 2 clicks "POS Clear" located at graph window left side below.
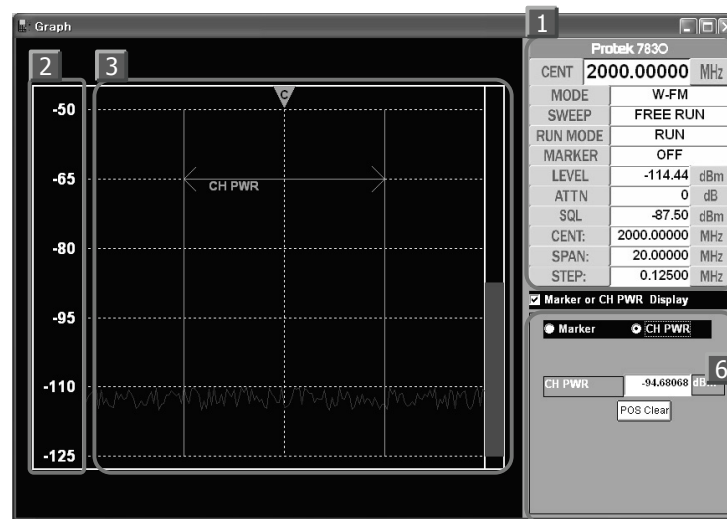
Figure 4.18. Information of Channel Power of Graph window

5. Communication Protocol

5.1. General

Protek 7830 equipment connects with pc for user convenience offer GUI software. For Protek 7830 equipment communicate with GUI software use communication protocol. Communication protocol describe at "5.communication protocol definition". If user use this communication protocol make GUI software, can obtain and manage what user want measuring data.

5.2. Defin Communication Protocol

For using communication protocol at first open GUI mode, If user use "GUI mode open" open GUI mode then can use "keypad" communication protocol for using measuring instrument. User use "requesting data communication protocol" can receive measuring data also use that on LCD display window displayed graph information "requesting LCD" can receive and request graph data. For closing GUI mode use "GUI mode close" communication protocol normally close.

5.2.1. "GUI Mode Open" Protocol

1) "Command" is TX data that send to measuring instrument, "response" is RX data that send to pc.

2) "Respond" have two kinds of order. Generated fail, receiving didn't stipulate communication protocol or didn't open GUI except this receiving communication protocol then inform user.

3) Command : GUI@

4) OK Response : OK@

5) Fail Response : FA@
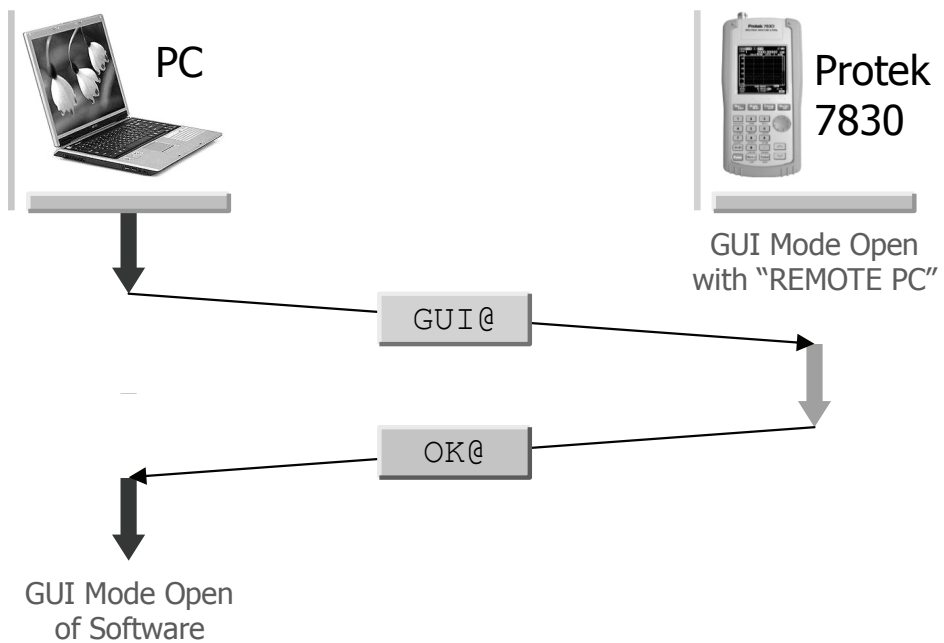
Figure 5.1. "GUI Mode Open" 통신 Protocol
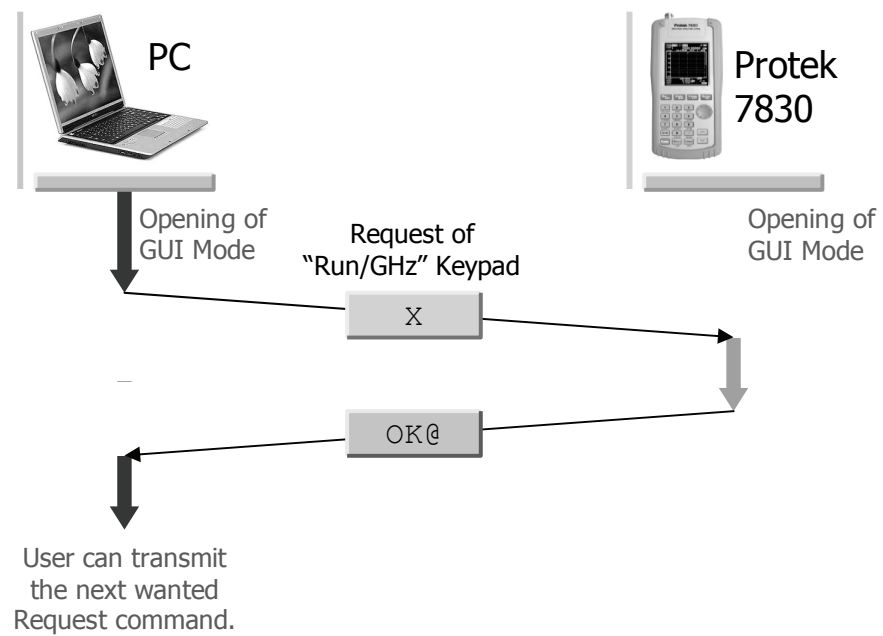
Figure 5.2. "Keypad" Protocol (example: "Run/GHz" Keypad)

5.2.2. "Key pad" Protocol

1) Offered GUI software, in this case, use keypad button remote control measuring instrument keypad. If user use Communication protocol it also can use at GUI software, response is same,

2) "Run/GHz" Command : X

3) "Mode/MHz" Command : T

4) "Sweep/kHz" Command : Z

5) "Marker/DEL" Command : S

6) "1" Command : R

7) "2" Command : U

8) "3" Command : V

9) "4" Command : O

10) "5" Command : P

11) "6" Command : Q

12) "7" Command : K

13) "8" Command : L

14) "9" Command : M

15) "0" Command : H

16) "Shift" Command : G

17) "." Command : I

18) "Menu" Command : B

19) "Enter" Command : D

20) "Up" Command : J

21) "Down" Command : E

22) OK Response : OK@

23) Fail Response : FA@

5.2.3. "Setting of Center/Span frequency and Offset" Protocol

1) Using this protocol can appoint measuring instrument measuring range and measuring offset value. If user appoint Center frequency value and span frequency value, in this way can appoint frequency range. Unit is Hz.

2) The initial offset value of Protek 7830 is "0". Following the user's measuring environment, the offset value will be applicable. From the length of wire cable or other equipment used, measuring value will be influenceable.

3) The user can use the function of Protocol as below. Refer Figure 5.4.

4) Freq. Range & Offset Setting Command

                       :   y   (Y small letter)

5) OK Response   :   OK@

6) Fail Response   :   FA@

7) If display "OK message" on monitor, the user can input the center frequency and the span frequency. Unit is "Hz" for input frequency value and the user can input the letter within 10 letters. Also the unit is "dB" for Offset value and the user should input the letter within 5 letters following the structure of letter.

8) For example, if the center frequency value is "824.5MHz", the span frequency value is "100MHz" and the offset value is "0dB" (The recommendation value), the input data will be converted as "0824500000", "0100000000" and "00000" so the user can transmit 082450000001000000000000@. No display response.

9) Freq. Range & Offset :   FREQ. RANGE & OFFSET@

10) Response   :   None

- The user can set the Span value from 1MHz to 20MHz limited and from this range the user can set value per multiple 1MHz. For example, if the span frequency setting range is "12MHz", the user should the input the span frequency setting value as "12MHz".

- If the span frequency setting range is over 21MHz, the user can set the span frequency range per multiple 20MHz. For example, if the desired span frequency range is 25MHz, the user can set the span

frequency range to 40MHz and in case of 78MHz, the use can set the span frequency range to 80MHz.

PC

Protek 7830

Opening of GUI Mode

Freq. Range & Offset Setting Command
(Lower Case "Y")

Opening of GUI Mode

y

OK@

ex) Center Freq. = 824.5 MHz, Span Freq. = 100 MHz, Offset = 0 dB
(Length : 25 Char.)
: "0824500000010000000000000@"

When OK Response, Setting Value

None

User can transmit the next wanted Request command.
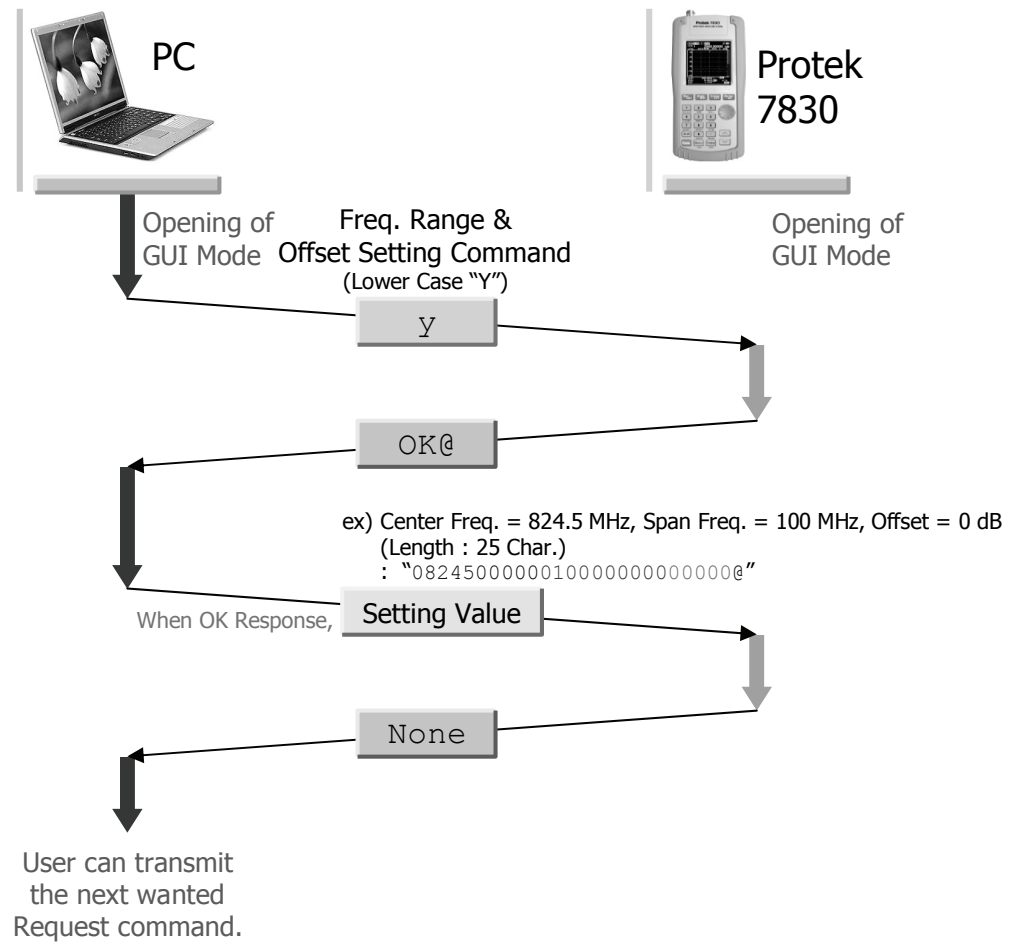
Figure 5.4.　〝Setting of Frequency range and Offset〞 Protocol

5.2.4. "Setting of Reference and Difference Level" Protocol

1) It's possible to set the reference level and difference level using protocol.

2) The important items which are already fixed the value by the level unit of the instrument are adapted as below.

   a. dBm Unit   : -50, -60, -70, -80, -90, -100, -110, -120

   b. dBuV Unit   : 60, 50, 40, 30, 20, 10, 0, -10

   c. dBmV Unit   : 0, -10, -20, -30, -40, -50, -60, -70

3) Also, the value of Difference Level is the difference between the axis of display graph and guide line. Without reference to level unit, it is selected one among system 5, 10, 15 and 20. The default is 15. For example, if the level unit is dBm and difference level is 15, the value of difference between level grids must be 15dBm.

4) The using of this communication protocol is as below and refers the Figure 5.5.

5) Reference Level & Difference Level Setting Command
                              :   z   (Z small letter)

6) OK Response   :   OK@

7) Fail Response   :   FA@

8) If the response is OK, the values of Reference Level and Difference Level must be inputted. The input level unit is applied with the present level unit and it is consist of the sign of reference level (+ or -), the value of reference level (3 letters) and the value of difference level (2 letters). After assigning the 6 letters, add the @ letter and then send them.

9) For example, if the value of reference level is -60dBm and the value of difference level is 15dBm with dBm unit, have to send "-06015".

10) For another example, if the value of reference level is 50dBuV and the value of difference level is 10dBuV with dBuV unit, have to send "+05010".

11) Freq. Range & Offset :   REF. LEVEL   & DIFFERENCE LEVEL @

12) Response   :   OK@

PC

Protek
7830

Opening of
GUI Mode

Reference/Difference
Level Setting Command
(Lower Case "Z")

Opening of
GUI Mode

z

OK@

ex) REF. Level = -60dBm, Difference Level = 15
(Length : 7 Char.)
: "-06015@"

When OK Response,   Setting Value

OK@

User can transmit
the next wanted
Request command.
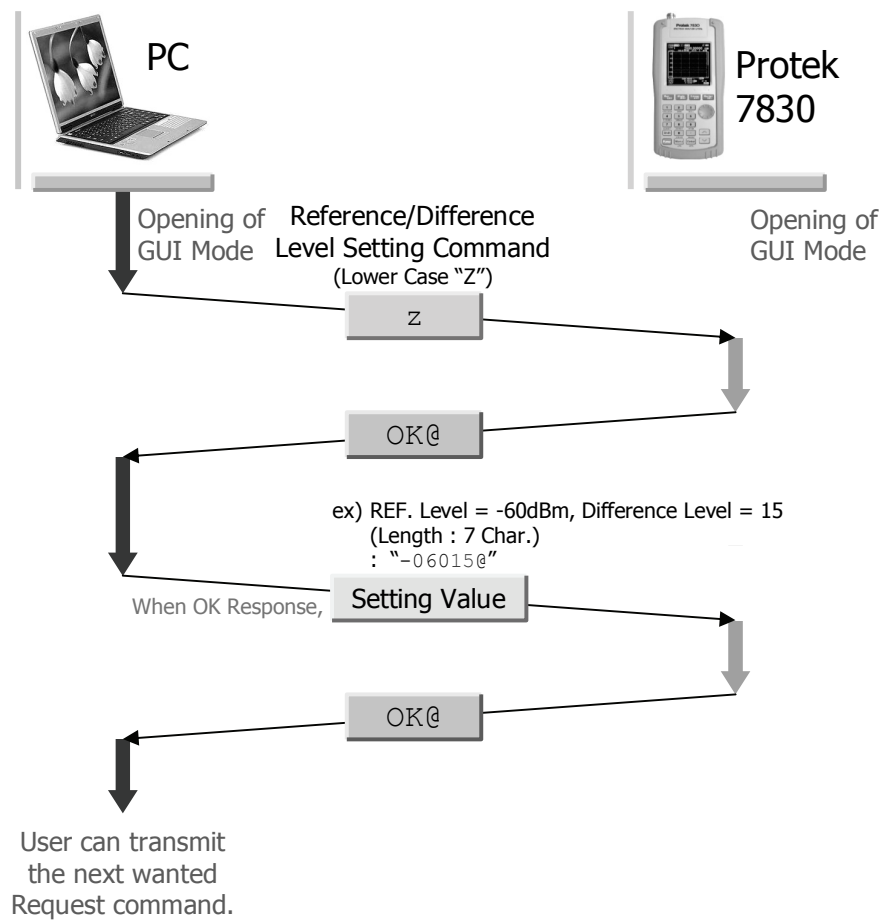
Figure 5.5. 〝**Setting of Reference and Difference**〞 **Protocol**

5.2.5. "Data Request" Protocol

1) Using this communication protocol, setup data of the unit and measuring data (Level value) are obtained. Setup data (Setting Data) received actually and characters of measuring data (Measured Level Data) are 1,050 characters. The indications of received information are " , ", the last contents also are " and ". Please refer more detail descriptions for received setting parameters in article 12).

2) As occasion require, user can received the setup data and measuring data severally. Both data are received at same time or one of them can be received. Refer the Figure 5.6.
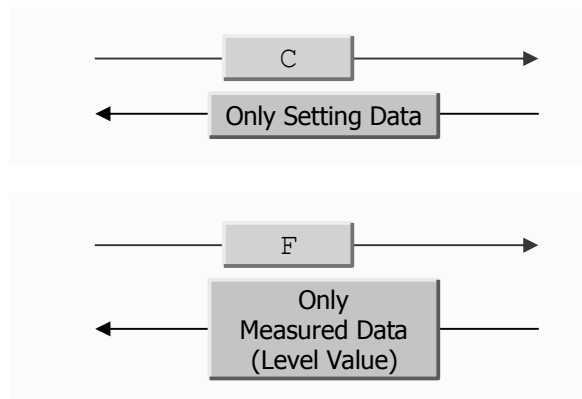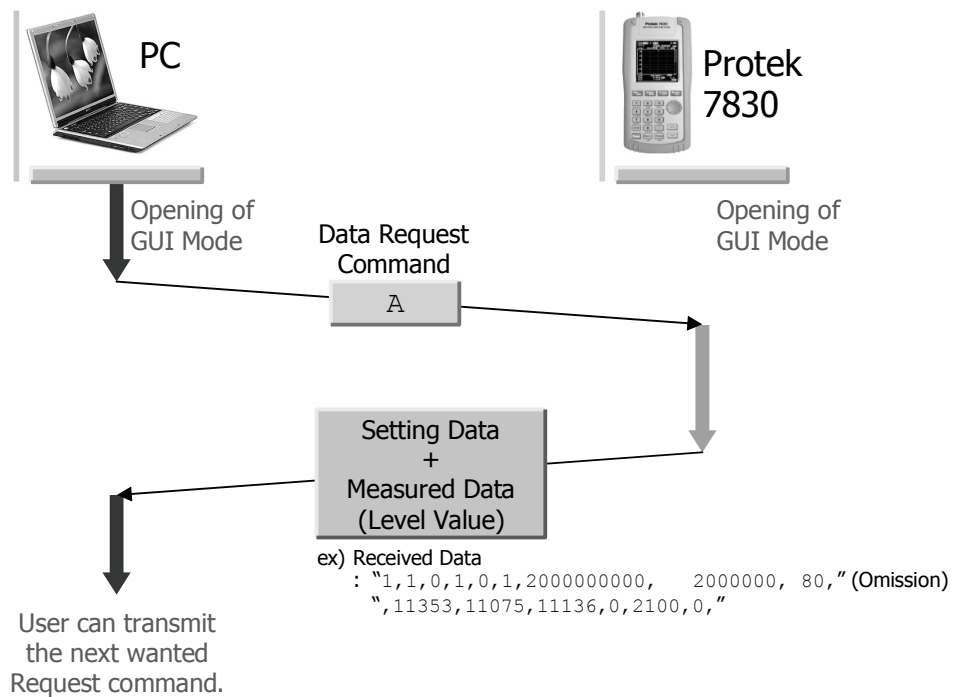
Figure 5.6. "Data Request" Protocol

3) The communication protocol to receive the setup and measuring data at same time is as below.

4) Data Request Command   :   A

5) Data Response   :   setup data and measuring data

6) The communication protocol to receive the setup data is as below.

7) Data Request Command   :   C

8) Data Response   :   setup data

9) The communication protocol to receive the measuring data is as below.

10) Data Request Command   :   F

11) Data Response   :   measuring data

12) The basic forms are arranged such as "the first setup data", "measuring data" and "the second setup data".

13) The reception sequence and contents of the first setup data are as below and the values of each item use ",". If there is no value, only show the " " (Space). This part is different of "5.2.3. "Frequency range and Offset setting communication protocol".

    d.   Mode   :   1 (N-FM),
                                        2 (W-FM),
                                        3 (SSB),
                                        4 (AM)

    e.   Sweep Mode   :   1 (Free Run),
                                          2 (Squelch Run)
                                        3 (Single Run)

    f.   Run Mode   :   0 (Stop),
                                          1 (Run)

    g.   Marker Mode   :   0 (None),
                                          1 (Marker1 Mode)
                                        2 (Marker2 or Delta Marker Mode)
                                        3 (Squelch Marker Mode)

h.   Buzzer Mode   :   0 (Buzzer OFF),
                                              1 (Buzzer ON)

i.   Unit   :   1 (dBm),
                                              2 (dBuV),
                                              3 (dBmV)

j.   Center frequency   :   10 characters are basic and the unit is "Hz".

    Ex) in case of 824.5MHz, the center frequency is "824500000".

k.   Span frequency   :   It is same as information of Center frequency. Also the unit is "Hz".

    Ex) In case of 100MHz, the Center frequency is "100000000".

l.   Marker1 Position   :   It is the value to indicate the position of the frequency range on Marker1. The measuring positions of frequency range are 161 points and the value is from "0" to "160". For example, if the position is on center frequency, the value will be "80".

m. Marker2 Position   :   It is the value to indicate the position of the frequency range on Marker2.

    It is same as "Marker1 Position".

n.   Squelch   :   It indicates the rate of Squelch Bar(%). For example, if the display

    level is -50dB to -125dB, the 50% means -87.5dB and displayed value is "50".

o.   Reference Level   :   It uses dBm unit by the value of reference level in default. The default

is -50dBm.

In the default, the reference level shows "-50". When the units are changed, the level will be changed by the units.

p. Difference Level : It is the interval value between the

upper and lower line. The default is 15dB and from -50dB to -125dB, it can be set by 15dB and the "15" will be showed on the screen.

q. Frequency setting Mode: 0(On Center/Span frequency

r. display)

1 (On Start/Stop frequency display)

s. Internal ATTEN : It's for using internal ATTEN and the

default is 0dB. The setting value is 0, 10, 20, 30 and 35d.
For example, if 10dB is set, the display will be showed "1000" (5 letters). The displayed value is 10 times of real level value.

t. External ATTEN : It's for using the external ATTEN

and the default is 0dB. The setting level can be 0 to 100dB by 10db step.

u. OFFSET : The default is 0dB and it is for

setting the offset function.
For example, if 2dB is set, the

display will be showed "200" (5 letters). The setting value is 10 times of real offset value.

14) The data received straight is measuring data. This data is the level value for 161 points into the frequency range and in the frequency range, in case of the basic unit is dBm, if want to use real dBm value, divide the received value by -100. For example, if the received value is

"11481", the real level value will be -11.48dBm.

Even though the unit on the instrument is changed, the measuring data unit is always dBm. Therefore if the value of dBm is changed by dBuV, user must apply that formula (received value/-100)+107. when change into the dBmV unit, also must apply next formula (received value/-100)+47. Each received value is separated by " , ".

15) The received sequence and contents of the second setup data is same as below and the values of each item use " , ". If there is no value, only show the " " (Space).

    a. Shift icon   :   0 (OFF; on display 7830 icon)
                                                 1 (ON;   on display Shift icon)

    b. Menu Selection   :   It is received total 4 characters and

                                               2 characters in front mean Menu and the rest characters mean sub menu. The information of Menu Selection is as Figure 5.6.

    c. Menu   :   It is displayed whether Menu is se

                                             selected or not on the screen and in case of Menu is not selected, Sweep Mode is displayed.
                                           0 (Sweep Mode)
                                           1 (Select Main Menu)
                                           2 (Select System Menu)

#Menu	Menu Name
1100	**FUNCTION**
1101	SPECTRUM
1102	F.COUNTER

1200	**RECEP MODE**
1201	N−FM
1202	W−FM
1203	SSB
1204	AM

1300	**SWEEP MODE**
1301	FREE RUN
1302	SQUEL RUN
1303	SINGLE RUN

1400	**MARKER**
1401	NONE
1402	MARKER
1403	DELTA MARKER
1404	SQUEL MARKER
1405	PK SEARCH
1406	MKR 2 CENT
1407	CHAN POWER

1500	**SAVE**
1600	**DELETE**

1700	**LEVEL UNIT**
1701	dBm
1702	dBuV
1703	dBmV

1800	**RESET**
1801	PRESET
1802	MEMORY CLR
1803	SYSTEM INI

1900	**BAUD RATE**
1901	115200BPS
1902	57600BPS
1903	38400BPS
1904	19200BPS
1905	9600BPS
1906	4800BPS

2000	**CONNECT PC**
2001	NONE
2002	REMOTE PC

2100	**AUTO POWER**
2101	NONE
2102	05MINUTES
2103	10MINUTES
2104	20MINUTES
2105	30MINUTES

2200	**BUZZER**
2201	ON
2202	OFF

2300	**LCD LIGHT**
2301	ON
2302	OFF
2303	AUTO

2400	**LCD CONTRA**
2401	01STEP
2402	02STEP
2403	03STEP
2404	04STEP
2405	05STEP
2406	06STEP
2407	07STEP
2408	08STEP
2409	09STEP
2410	10STEP

2500	**INT. ATTEN**
2501	NONE
2502	10dB
2503	20dB
2504	30dB
2505	35dB

2600	**EXT. ATTEN**
2601	NONE
2602	10dB
2603	20dB
2604	30dB
2605	40dB
2606	50dB
2607	60dB
2608	70dB
2609	80dB
2610	90dB

2700	**OFFSET**

2800	**DEFAULSAVE**
2801	SAVE

Figure 5.7. Menu selection Numbers

5.2.6. "Save File management" Protocol

1) This instrument has the save, load function and delete function of 100 files for measuring data and setup data. In GUI software, those functions are used on base PC for users to use easily.

2) Also, before the LOAD and DELETE functions is used, at first, please check the numbers of saved data files. "Save File name list request" is used to get the numbers of saved data file. After checking it, use the LOAD and DELETE functions.

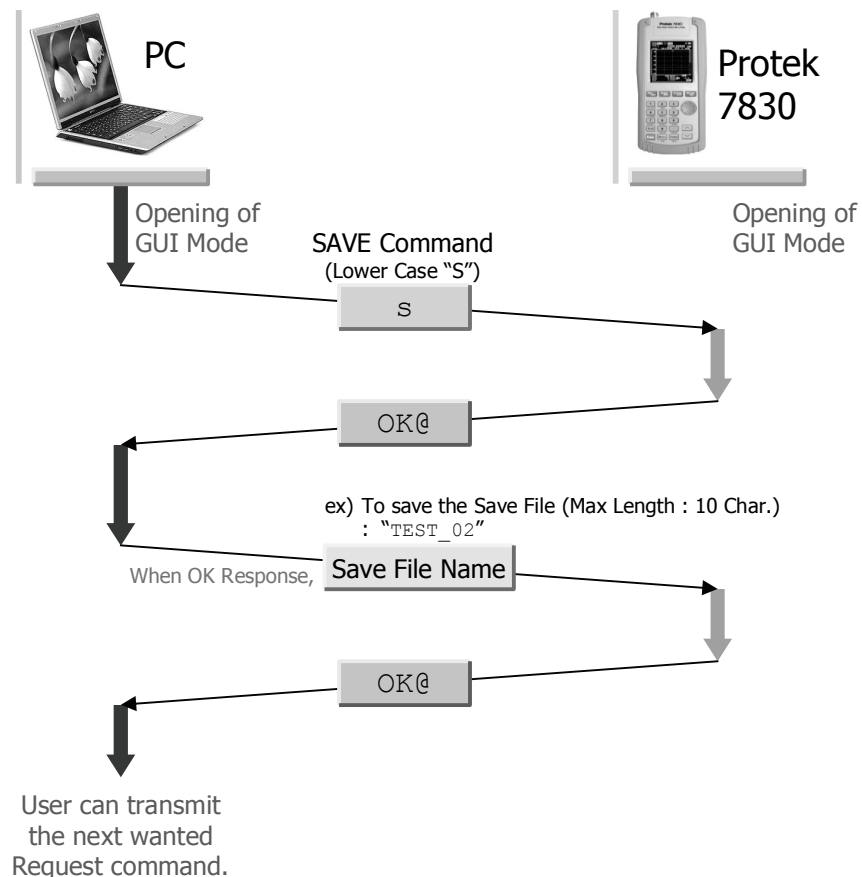3) The below Figure are showing the SAVE function protocol.

Figure 5.8. "SAVE function" Protocol

4) SAVE Command   :   s   (S small letter)

5) OK Response   :   OK@

6) Fail Response   :   FA@

7) If the massage of OK@ is received, total letters are 11 and first 10 letters are consisting only alphabet and numeral. The last letter must be "@". For example, if the name of saved file is SAVE_01, send "SAVE_01@".

8) File Name   :   STRING@

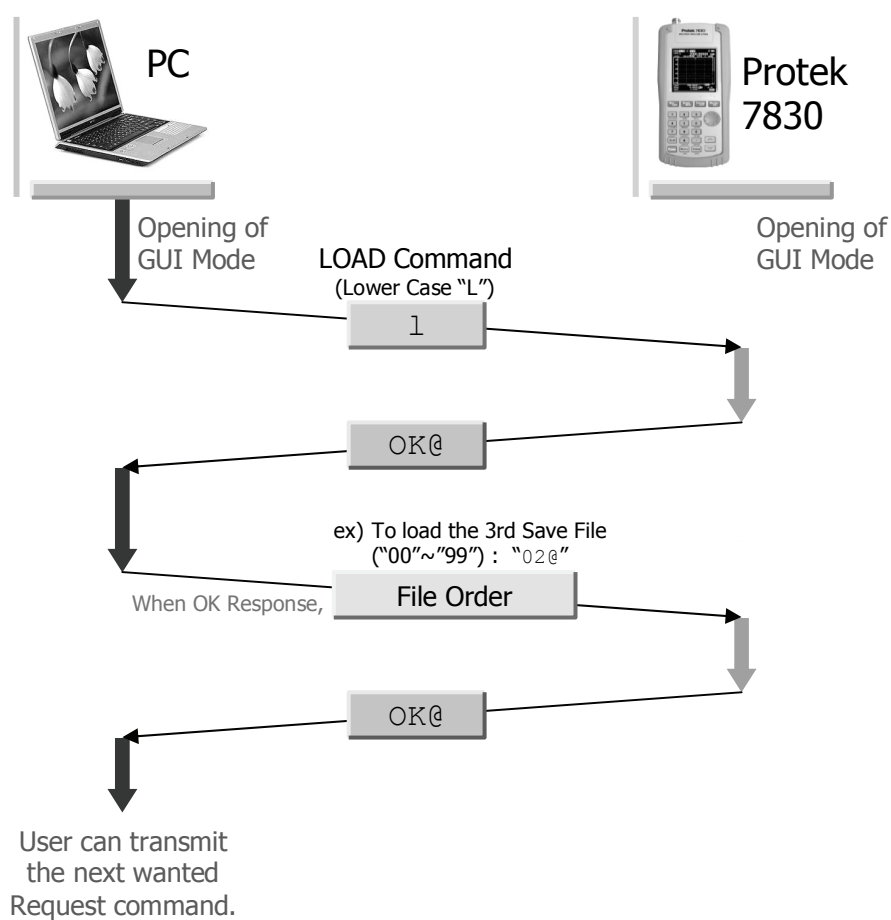9) OK Response   :   OK@

10) Fail Response   :   FA@

Figure 5.9. "LOAD function" Protocol

11) The using of LOAD function is as below.

12) SAVE Command   :   l   (L small letter)

13) OK Response   :   OK@

14) Fail Response   :   FA@

15) After received OK, must assign the Save File to recall at saved file list (Max. 100 lists). And then send the numbers from "00" to "99" with @. For example, when recalled the 3rd Save File, send "02@".

16) File List Number   :   NUMBER@

17) OK Response   :   OK@

18) Fail Response   :   FA@
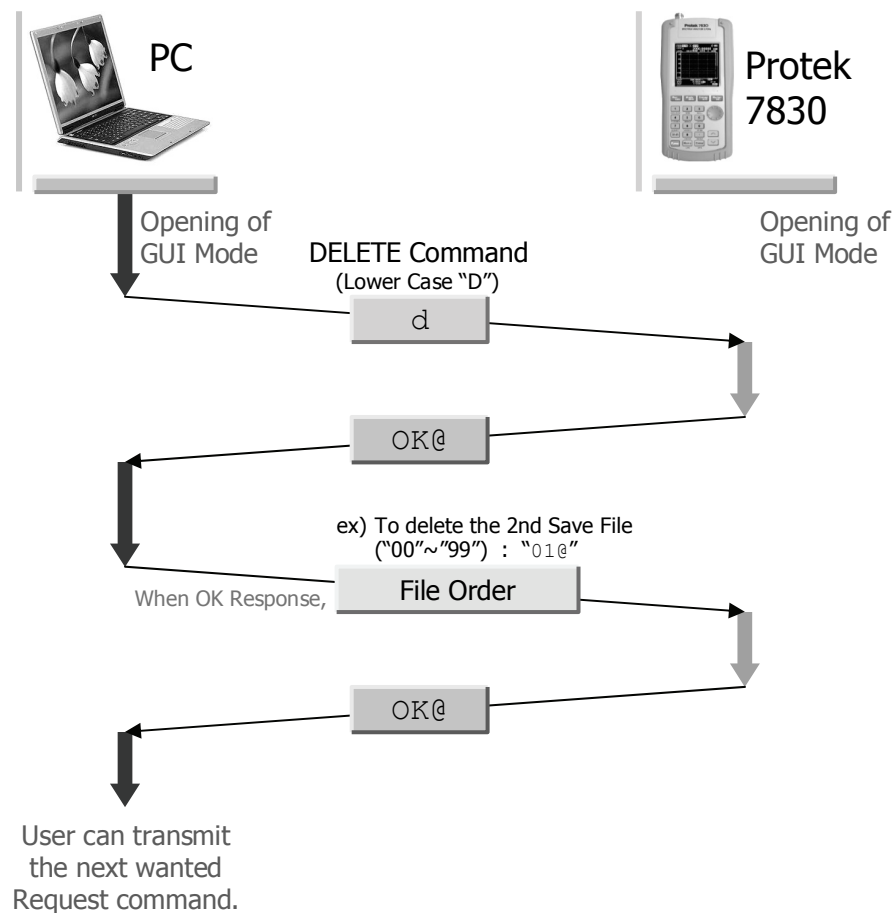

Figure 5.10. "DELETE Function" Communication Protocol

19) The using of DELETE function is as below.

20) SAVE Command   :   d   (D small letter)

21) OK Response   :   OK@

22) Fail Response   :   FA@

23) After received OK, must assign the Save File to recall at saved file list

(Max. 100 lists). And then send the numbers from "00" to "99" with @. For example, when recalled the 2nd Save File, send "01@".

24) File List Number   :   NUMBER@

25) OK Response   :   OK@

26) Fail Response   :   FA@

27) The one of protocols which is "Save File Name List Request" is as below. Please refer the 2) for more detail description.
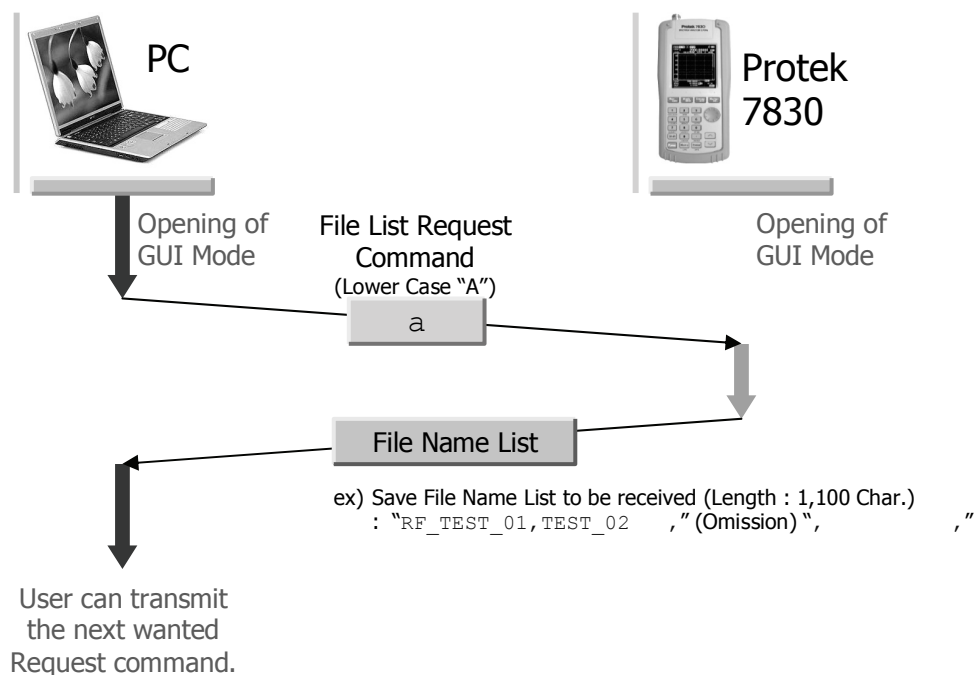

Figure 5.11. "Save File List Request" Protocol

28) File Name List Request   :   a   (A small letter)

29) File Name List Response :   Save File Name List

30) The lists of Save File Name could be got though response. Total number of received characters is 1,100 letters. One of save file name received is 10 letters and it is separated in "," . When there is nothing to name the save file, there is only " " (Space). In case of that there is less than 10 letters for the name of save file, Space " " will be putted in the resting letters.

31) For example, if the saved files are 3 which are "RF_TEST_01" (consist of 10 letters), "TEST_02" (consist of 7 letters) and "ETC_0721" (consist of 8 letters), the response are "RF_TEST_01,TEST_02   ,ETC_0721   ,   ," ⋯ ",   ," .

32) The number of File name is 10 characters and total file is 100. Therefore, the number of file name will be 1,000 including the space letter and the "," letter is using after file name. So 1,100 letters are received totally.

5.2.7. "LCD Request" Protocol

1) The data of displayed graph on the instrument can be asked or received. Those data are mono pixel data and user can use this received data to save or use by bitmap data of GUI software. Refer Figure 5.12.

2) Command   :   N

3) OK Response :   received LCD (Graph) data
                              refer Figure 5.12 if need more detail description.

4) Fail Response :   FA@

Figure 5.12. ＂LCD Request＂ Protocol

[LCD (Graph) Data to be Received]

Figure 5.13. LCD (Graph) Reception data

5.2.8. "GUI Mode Close" Protocol

1) Using the "GUI Mode Open", after opening the GUI mode, when closing it again, this protocol is using. Refer Figure 5.14. At first GUI mode is closed and then open the GUI mode again. The "GUI Mode Open" is used.

2) Command   :   W

3) OK Response   :   OK@

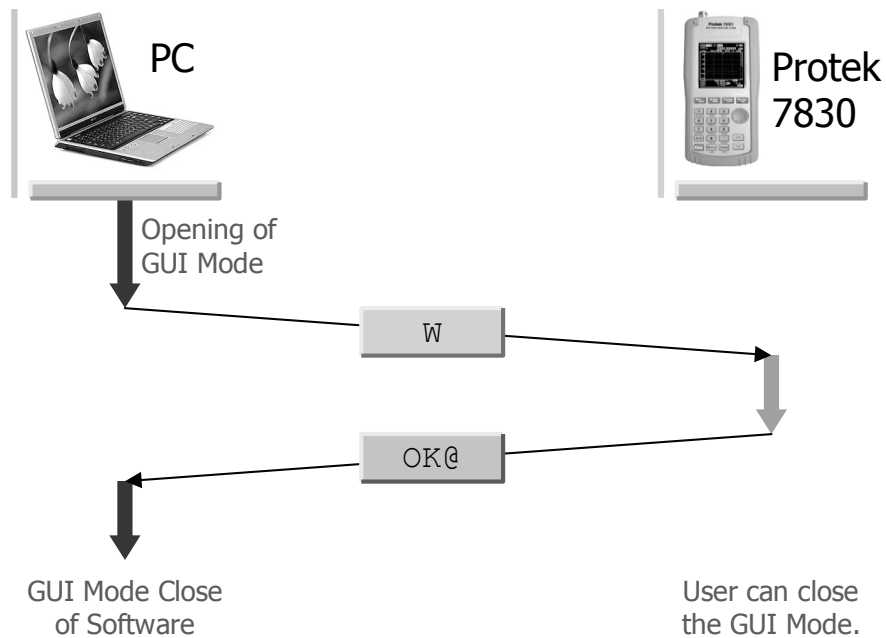4) Fail Response   :   FA@

Figure 5.14. "GUI Mode Close" Protocol

6. Firmware Upgrade

6.1. General

Protek 7830 have more convenient functions for user. That is firmware upgrade function for user to download and update the firmware source directly. If we make new powerful function for users we will support it by our internet side on download.

When users make the unit to be upgrade directly, must be careful not to fail the update. If in case of that the firmware upgrade is failed, the instrument might get some problem and it have to be repaired at the A/S team.

6.2. Procedure of upgrading firmware

At first, download the "Protek7830_FW.exe" which is for updating software and updating source file on your PC from our website.

6.2.1. Prepare the Protek 7830 unit

1) After confirm the power of Protek 7830 is OFF,

2) Connecting the power line at right side of the unit offered SMPS type adaptor (DC12V, 3A) to supply the DC voltage to the unit.

3) And then connect the RS-232C cable between the port of the right side of unit and PC.

4) Turn on the power of Protek 7830.

5) Push the "Menu" key on the keypad, the Main Menu massage will be showed on the screen.

6) Select the "CONNECT PC" icon using the Up/Down key, and then press the "Enter" key.

7) "NONE" and "REMOTE PC" icon will be displayed. Using the Up/Down key, select the "REMOTE PC" and then press the "Enter" key.

8) The "REMOTE PC" massage will be displayed on the middle of

screen. That means it is ready to connect to the PC. That is, it means on GUI mode.

9) After then, run the firmware upgrading program you received from our website.

6.2.2. Firmware upgrading program

1) After doing the procedure as the chapter of "6.2.1. Prepare Protek 7830 unit",

2) Click the "Protek7830_FW.exe" twice to run this program as lower Figure 6.1.

Figure 6.1. Firmware upgrading program for Protek 7830

3) To upgrade firmware, RS232C serial port which is COM Port on the program must be selected correctly. After running this program, the default is COM Port.

4) If "F/W mode error" massage is displayed on the screen of PC, must reset the COM Port. Select the "ComPort Set" on the display. The window to set the COM Port will be run as like Figure 6.2.
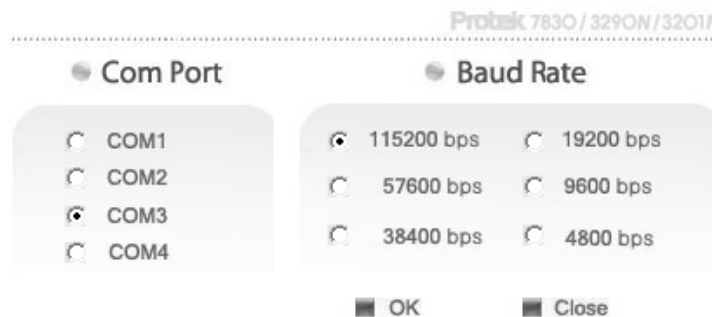

Figure 6.2. The window to set COM Port

5) On the window to set COM Port, after selecting the "COM Port" and "Baud Rate", press the "OK" button. After then, if the massage of "F/W mode error" is not displayed, the COM Port is setting correctly and it means ready to download the source file.

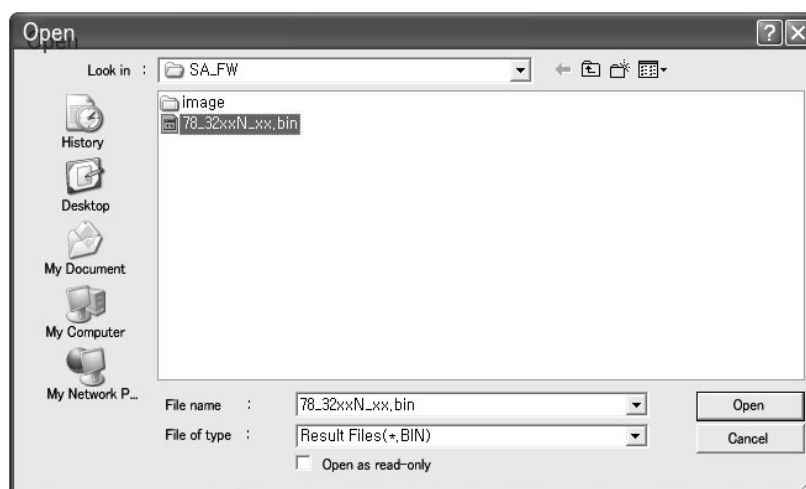6) Select the prepared source file from your PC pressing the Select icon.

Figure 6.3. The window to select source file

7) After pressing the button of "Select", the window to select the source file will be activity as like Figure 6.3.

8) After selecting the source file, press the Open button or click the source file twice and then the source file will be downloaded into the unit automatically as like Figure 6.4.

9) During the download, left the unit and the PC until the working is finishing. During working, if the PC is using another program, the unit can take wrong data. In case of that, the unit makes wrong operating after upgrading the source file.

10) As upper articles 8) and 9), during the download, displayed massages are changing like that "REMOTE PC" ➔ "F/W UPGRADE" ➔ "BUFFER SAVING" ➔ "ON WRITING···" in sequence.

Figure 6.4. During running the download of source file

Figure 6.5. Finish the download of source file

11) After about 4 or 5 minutes, the massage of "F/W Update Success!!!" will be showing on the screen.

12) After finish the update, the massage of "ON WRITING···" is changed with "UPGRADE SUCCESS" on the screen of the unit.

13) All procedures are finished and then put off the power of the unit to disconnect the unit from the PC.

14) That is all to update the source file. From now, the Protek7830 will accept new version of firmware.

Copyright

Revision History

Date	Version	Changes
11/2006	Original	
3/2008	Version 2.0	Update Firmware

Specifications and features of this guide are subject to change without notice or obligation.