PeakTech® **- Spitzentechnologie, die überzeugt**
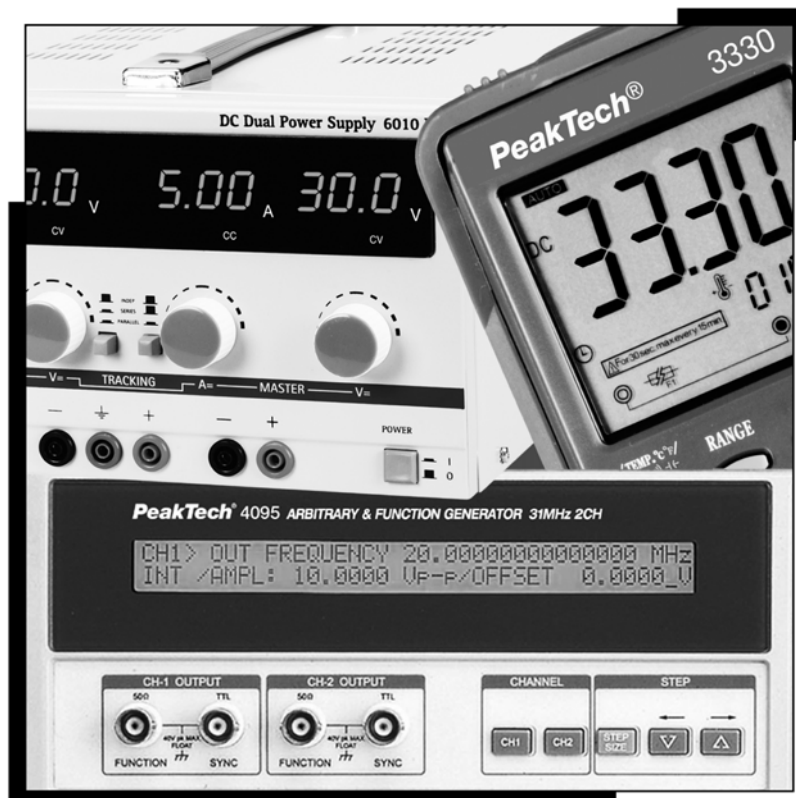
Operation manual

Testsignal-Generator

DAB-Standard

ETS 300 401

PeakTech® **1140**

Read First

In order for a long period of trouble-free service of the instrument, please pay special attention to the following precautions:

1. Protect the instrument from excessive impact during transportation and installation.

2. Be sure to verify whether the line voltage setting matches the line voltage used.

3. Use a fuse with correct ratings only.

4. Do not apply excessive AC or DC voltage to the signal output connector beyond the maximum voltage allowed.

5. Use the instrument within operating temperature range, which is from 15 deg C to 35 deg C.

6. For an accurate measurement, allow approximately 30 minutes of instrument warm-up time.

7. Avoid operating the instrument under the following conditions; direct sun light, rapid temperature variation, high humidity, or strong magnetic field.

8. Do not alter or change the parts or their locations inside the instrument. please contact *PeakTech*® company for service and calibration.

This Information contained in this document is subject to change without Notice

Safety Notes

The following symbols on instrument and in the documentation indicate precautions which must be taken to maintain safe operation of the instrument.

⚠ **Warning**

: A warning calls attention to a procedure, practice or the like which. correctly performed or adhered to, could result in injury or loss of life.

⚠ **Caution**

: A Caution calls attention to a procedure, practice or the like which. if not correctly performed or adhered to, could result in damage to or the destruction of part or all of the equipment.

[Safety Symbols]

⏚ GROUND TERMINAL

⏛ PROTECTIVE CONDUCTOR

⏗ FRAME TERMINAL

⚠ CAUTION REFER TO ACCOMPANYING DOCUMENTS

| ON (Supply)

○ OFF (Supply)

Clearing and Maintenance

1. In order for a long period of trouble-free use of the instrument,
   please read this manual carefully.

2. Be sure to verify whether the line voltage setting matches
   the line voltage used.   Use a fuse with the correct rating only.

3. ⚠ **Caution**

   Use 3 pin power cable to avoid any damage caused by floating voltage.
   (but, Telephone analysers use 2 pin power cable)

4. Precaution
   - Note :
     If the equipment is used in a manner not specified by the
     manufacturer,
     the protection provided by the equipment may be impaired.

     - Avoid placing this instrument in an extremely hot or cold place.

     - Do not use this instrument after bring it in from the cold.

     - Do not expose the instrument to wet or dusty environment.

     - Do not place liquid-filled container,
       such as coffee cups on top of this instrument

     - Do not use this instrument where it is subject to serve vibration.

     - Do not use this instrument in strong magnetic fields, such   as near   motors.

     - Do not place heavy objects on the case or block the ventilation holes.

     - Do not leave a hot soldering iron near the instrument.

     - Cleaning :
       To clean stained case, lightly rub the stained area with a soft cloth dipped
       in a neutral detergent.

       Never use highly volatile material such as benzene or paint thinner.

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1. GENERAL

1.1 Description

The model *PeakTech*® 1140 is a test signal generator complying with Some Digital Pattern　Protocol (European DAB Standard ETS 300 401) .

It is useful to verification of Audio Service and Data Service application of DAB / DMB receivers by using DAB/DMB pattern.

1.2 General features

● Apply to Digital Pattern　　　　:　40 patterns * 4 Mode

　　■　　DAB-DMB (Terrestrial)　:　Current supply

● Save / Recall　　　　　　:　100 Patterns (00 ~ 99)

● DAB-DMB (T)　　　　:　Transmission Mode　(I, II, III , IV)

● Output Type　　　　　　:　Continuous, Single , Repeat

● Interface
- IEEE 802.3u 100Base-TX , IEEE 802.3 10Base-T
- RS-232C standard.

● LCD Display

1.3 Specifications

. Compliant with　the ETS 300 401 (May 1997)

. Transmission Mode　　　　: TI,TII,TIII,TIV

. DAB-DMB (T)　　Pattern is sorted as follows

1st folder	2nd folder	3rd folder	file
"Contents"	"Group "	"Pattern"	"Play file "

. [　Example　]

1st folder	2nd folder	3rd folder	file
"Contents"	"Group "	"Pattern"	"Play file "
\1.DAB_DMB(T)	\G01_Stream_Tone_data	\P01_0_Tone&Data	\G01P01T1.ply

Sub Channel		Bit Rate (kbit/sec)	Protection Level	Code Rate	Size (CU)	contents	Audio Data (L)	Audio Data (R)	Start Address	PAD Type
1	UEP	256	4	0.57	168	stereo	1kHz 0 dB	1kHz 0 dB	0	VAR X-PAD
2		224	3	0.50	168	stereo	2kHz 0 dB	2kHz 0 dB	168	No-X-PAD
3		224	4	0.60	140	stereo	4kHz 0 dB	4kHz 0 dB	336	Short -Xpad
4		192	3	0.51	140	stereo	1kHz 0 dB	mute	476	Short -Xpad
5		192	4	0.62	116	stereo	mute	1kHz 0 dB	616	No-X-PAD
6		64	3	0.50	48	mono	1kHz 0 dB	1kHz 0 dB	732	No-X-PAD
7	EEP(8)	64	3	0.50	48	PRBS9			780	
8	EEP(8)	24	2	0.38	24	PRBS9			828	
				…	12	Padding			852	

. **I/Q   Output**

  . Output Voltage   :   1 Vpp
  . Output Impedance   :   50 Ω

. **Digital I/Q**

  . Output Level   :   TTL
  . Connector   :   D-sub 15 pin (Female)

. **Frame Synch Output**   :   **BNC-R (TTL)**

. Interface   :   **LAN, RS-232C**

. Power Requirements   :   **100 - 240VAC, 50/60Hz, 50VAmax**

. Dimensions   :   **115(H) X 430(W) X 410(D)mm**

. Weight   (Net Weight)   :   **Approx. 8.2 kg** (Except package box, Accessary...)

. Standard Accessories   :   **Power Cable, BNC-BNC Cable (2ea),**
                                                    Operating Manual, Fuse

. Environmental Conditions :   **Indoor Use**
                                                   Amplitude up to 2000m
                                                    Temperature 15°C to 35°C
                                                    Relative Humidity 50% to 80%
                                                    Cat II
                                                    Pollution degree 2

2. INSTALLATION

2.1 Power Supply

This instrument requires a power source of 100V ~ 240V AC, 50 Hz / 60Hz. AC voltage is automatically selected to proper input range. A 3P power cord as provided with instrument grounds the instrument chassis when connected through the compatible power receptacle.

Do not use the unit if the safety ground is broken.

Fuse is 1 A (250V) at of 100V ～ 240V " Time delay " type.

2.2 Incoming confidence check

Prior to packaging the instrument for shipment, extensive operational, alignment, and calibration procedure were performed by *PeakTech*® to verify that the instrument is operating to specifications.

To ensure the electronic integrity of the instrument on your receiving bench, you must perform the following confidence check:

As certain that the operating voltage, then connect the AC power cord to the mains.

Turn on power.

The display will be as follows (System Booting)

www.peaktech.de

Finally the display will be as follows

1st

G01:Stream_Tone_data	
G02:Broadcasting Ex	
G03:Stream_DMB	
G04:Stream for BER (MSC)	↓

Warm up 1 minutes and connect the Up-Converter (*PeakTech*® 1140)

Check the DAB/DMB receiver operating

This completes the incoming confidence check.

The instrument can now be placed in.

3. OPERATING INSTRUCTIONS

3.1 Front panel controls
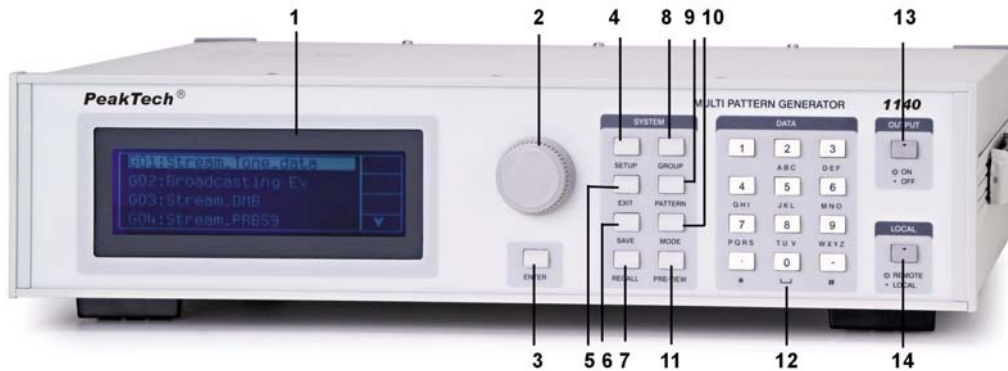
Figure 1.- Front panel.

1.   LCD Display

   Display the Ensemble contents or System states

2.   Rotary Encoder

    Increment or Decrement Display at Current Position

3.   ENTER Key

   It is used Terminal setting for next item

4.   Set_Up   Key:

    Set the the Following Menu .

        1)   Contents   : It is used to setting to 1st folder .

        2)   Output Type

        3)   Config.

        4)   System_info

5.   Exit Key:

    Use to return above Menu.

6. Save Key:

It is used to store   any files (frequently using) at some address (0 ~9) .

7. Recall   Key:

It is used to recall some patterns from address(0 ~ 9).

8. Group Key.

It is used to setting to 2nd folder.

Ex1) Contents = DAB/DMB (T)   :   T = Terrestrial

- ■ G01:Stream_Tone_data

- ■ G02:Broadcasting Ex

- ■ G03: Stream_DMB

- ■ G04:Stream for BER(MSC)

- ■ G05:Re_Configuration

- ■ G06:User define

- ■ G07:Test for production

9. Pattern Key

It is used to setting to 3rd folder .

Refer to Appendix A
The composition is updates without any notice

10. Mode (Transmission Mode)

It is used to select Transmission Mode

1) TM1   (TM I)
2) TM2   (TM II)
3) TM3   (TM III)
4) TM4 . (TM IV)

11. Preview

It is used to view the sub_channel information of Ensemble

12. Numeric Key

It is used to select Some folder or files (Pattern)

13. Output On/Off key

- ON (LED on) : Start sending the I,Q output .

- OFF (LED off) : Stop sending the I,Q output .

14. Local key

Press this key to return the *PeakTech*® 1140 to Local (Front panel : LED OFF) control from remote operation.

The key light on represents *PeakTech*® 1140 is under remote control.

Thus any panel key than this key are ignored while the key is light is turned on.

3.2 Rear panel controls
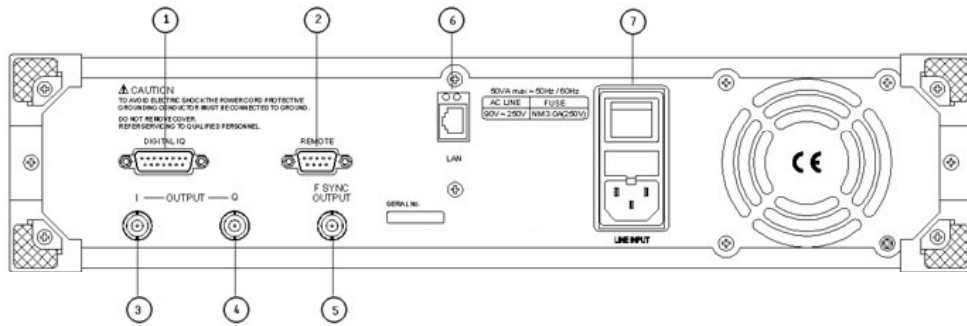
Figure 2.- Rear panel.

1. Digital IQ

   Refer to Appendix B

2. RS-232C - Remote.

3. Output I

   Outputs the I signal   (1Vpp, Impedance =   50 Ω)

4. Output Q

   Outputs the Q signal (1Vpp, Impedance =   50 Ω)

5. Output   F Synch

   Output signals synchronous with the I/Q frame synchronization and L signals NULL area.

6. LAN

   Interface connect for Ethernet_

7. Line Voltage Selector

   ● 100 ~240V setting -- Fuse 1 A (250 VAC)   " Time delay " type

   ● Fuse is Located in it

4. General Operation

4.1 Set_up

Press "SETUP" key. Then, Display as follows.

```
[ SETUP]
   1.  CONTENTS            2. OUTPUT MODE
   3.  CONFIG.             4. SYSTEM INFO
```

You will be set up next parameter.

- Contents   :
- Output Mode   : Continuous, Single, Repeat/Gap
- Config.
- System info

It is selected by next procedure

1) Press only "Number (1 ~ 4) ".

2) Select one of above Menu with "Rotary Encoder "and " ENTER " key.

4.1.1 Contents

Press "1" key (or Use   with "Rotary Encoder " and " ENTER " key) at "SETUP" mode .

Then, Display as follows

```
[CONTENTS]
DAB_DMB(T)                    --   Only   Supply
```

You will be set up next parameter.

● 1.DAB_DMB(T)   : Current Supply (default setting)

4.1.2 Output Mode

You will be set up next parameter .

● 1.DAB_DMB(T)   : Current Supply (default setting)

4.1.2 Output Mode

Press "2" key (or Use   with "Rotary Encoder " and " ENTER " key) at "SETUP " mode .

Then, Display as follows

```
[OUTPUT MODE]
   1. CONTINUOUS              2. SINGLE
   3. REPEAT /GAP
```

You will be set up next parameter.

It is determines whether the message will be output once or multiple.

● 1.Continuous   : default setting

● 2.Single

● 3. Repeat /Gap   : 00 ~99 sec

4.1.2.1 Repeat/Gap

Press " 3 " key (or Use with "Rotary Encoder " and " ENTER " key) at "OUTPUT MODE" mode .

1) Then, Display as follows

```
REPEAT/GAP
    TIME 00 sec
```

2) Press "0","4". (ex- GAP time = 4 sec   ), then display as follows

```
[OUTPUT MODE]
    1.   CONTINUOUS                 2. SINGLE
    3.   REPEAT /GAP
```

3) Press "EXIT " key, if you exit this mode

Note) Output Mode   is as follows

● 1.Continuous   : default Output Mode

Output Memorized IQ file	Output Memorized IQ file	Output Memorized IQ file	Output Memorized IQ file	…	Output Memorized IQ file

●2.Single   :   Output   only once

Output Memorized IQ   file

●3.Repeat   : default Repeat_Gap Time = 00

GAP	Output Memorized IQ file	GAP	Output Memorized IQ file	…	Output Memorized IQ file

4.1. 3 Config

Press "2" key (or Use   with "Rotary Encoder " and " ENTER " key) at "SETUP " mode .

Then, Display as follows

```
[OUTPUT MODE]


    1.  CONTINUOUS                    2. SINGLE
    3.     REPEAT /GAP
```

- ● 1.RS-232c   :   1. 9600   , 2.19200
- ● 2.Memory View   :   1. Save_view   2. Delete
- ● 3.Initialize   :   to return factory setting
- ● 4.Beep on/off   :   buzzer - on/off .

4.1.3.1 RS-232C

Press "1" key (or Use   with "Rotary Encoder " and " ENTER " key) at " CONFIG " mode .

You will show the information of RS232c at this Equipment .

1)   Press "ENTER " key, You will change the Baudrate at Next Display.

[CONFIG][RS-232]	
Data 8N1 NO Flow CTRL	
Baudrate :9600	
BAUDRATE SETUP	

```
 [CONFIG ][ RS-232][ BAUDRATE]


 9600                                                19200
```

2) Select   with "Rotary Encoder ", "ENTER" .

```
 [CONFIG ][ RS-232][ BAUDRATE]


 9600                                                **19200**
```

3)   If you select   Baudrate(Press "ENTER " key) , then Display as follows at moment.

```
 [CONFIG ][ RS-232][ BAUDRATE]


    9600                        19200
```

10

4) And return   next Display

```
[CONFIG ][ RS-232][ BAUDRATE]

9600                                                        19200
```

5) Press "EXIT " key, if you exit this mode

4.1.3.2   View Memory

Press "2" key (or Use   with "Rotary Encoder " and " ENTER " key) at " CONFIG " mode .
You will show the Saved Memory Number or delete the saved Memory.

```
[VIEW   MEMORY]

1.VIEW SAVE                          2. DELETE
```

1) If you select   " 1.View Save ", then You will show the Saved Memory Number
   ● Default Setting = Save 00 ~ Save 09

```
[VIEW SAVE]

Save00                             Save01
```

2) If you select "2.Delete " , then   you will delete some memory .
          (ex   -- delete   " SAVE 01 ")

```
[ DELETE MODE ]

Save00                             Save02
Save03                             Save04
```

3) Press "EXIT " key, if you exit this mode

4.1.3.3 Initialize

Press "3" key (or Use with "Rotary Encoder " and   " ENTER "   key) at " CONFIG " mode .
This Equipment is set up by Factory Setting

```
[ INITIALIZE MODE]

!! Initialize In Factory !!
```

11

1) If you select "Yes ",   then Next Item is as follows .

- Save File

  save 00 : G01P01T1.PLY

  save 01 : G01P01T2.PLY

  save 02 : G01P01T3.PLY

  save 03 : G01P01T4.PLY

  save 04 : G01P02T1.PLY

  save 05 : G01P03T1.PLY

  save 06 : G01P04T1.PLY

  save 07 : G01P05T1.PLY

  save 08 : G01P06T1.PLY

  save 09 : G01P07T1.PLY

- BaudRate

  9600 BPS

- Output Mode

  Continue

2) Press "EXIT " key, if you exit this mode

4.1.3.4 BEEP ON/OFF

Press "4" key (or Use   with "Rotary Encoder " and   " ENTER "   key) at " CONFIG " mode .

You will be set up   Beep on/off

[BEEP MODE]
SELECT BEEP   ON

1) Press "ENTER" key, You will select   " On/Off ".

4.1.4   System_Info

Press "4" key (or Use   with "Rotary Encoder " and " ENTER "   key) at " CONFIG " mode .

You will find the Information of this Equipment.

1st

[System Information]	
PeakTech®	
www.peaktech.de	
PeakTech® 1140	↓

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2nd   :   Turn left with Rotary Encoder

[System Information]	
Serial No : *********	
Hardware : MB*.* / FB *.*	
Software : FW*.* / SW *.*	↑

4.2 Save / Recall

4.2.1 Save

1)   This pattern file will   be Saved   to Some Memory (00 ~ 99) at next Mode

P01_0_Tone&Data	G01
File Name : G01P01T1.ply	P01
Transmission Mode 1	TM1

2)   Press " SAVE " key

[SAVE MODE]
INPUT Save No (00 –99)

3)   If you save this pattern to Memory 09 , then Press "0","9" .

[Save Mode]
Save09 Memorized

4)   Then , return to Step 1)

4.2.2 Recall

1) Press   "RECALL " key.

[RECALL   MODE]
INPUT RECALL   No (00 –99)

2) If you recall   SAVE no 03,   Press   "0","3" key .

Then Display as follows.

P01: Tone_Data	G01
File Name : G01P01T3.ply	P01
Transmission Mode 3	TM3

Note) If you select unsaved memory, then you will find   " Error Message ".

Please input New memory Number

4.3 Select Group

It is select 2nd folder to search   a pattern for test

This Mode will be approach by next Process

- Case 1) After booting (power on)
- Case 2) Press "SETUP", "ENTER","ENTER" key

1st

G01:Stream_Tone_data	
G02:Broadcasting Ex	
G03: Stream_DMB	
G04: Stream for BER(MSC)	↓

Then, Next   folder will be selected by " Rotary Encoder ", " ENTER " key

- ■ G01:Stream_Tone_data

- ■ G02:Broadcasting Ex

- ■ G03: Stream_DMB

- ■ G04:Stream for BER(MSC)

- ■ G05:Re_Configuration

- ■ G06:User define

- ■ G07:Test for production

Selected Parameter is displayed   as reversed character .

This folder Name will be updated without any notice

4.4 Select Pattern

It is select 3rd folder to search a pattern for test

This Mode will be approach by next Process

- Case 1) After booting (power on), Press "GROUP","0","1" key
- Case 2) Press "SETUP", "ENTER","ENTER" ,"ENTER" key

■ Then, Display as follows   (If selected group is "G01:Stream_Tone_data ")

1st

P01 : Tone_Data	G01
P02 : Main ID(02) Sub ID(03)	
P03 : 192bps_PL test	
P04 : 128bps_PL test	↓

This Menu will be select among the next folder

- ◆ P01 :Tone_Data
- ◆ P02 : Main id(02) Sub id(03)
- ◆ P03 :192bps_PL test
- ◆ P04 :128bps_PL test
- ◆ P05 :Bit_rate(N-X-PAD)
- ◆ P06 :Bit_rate(V-X-PAD)
- ◆ P07 :Bit_rate(S-X-PAD)
- ◆ P08 :FIDC_Component

Note) This folder Name will be updated without any notice

4.5 Select Mode

It is select a pattern by Transmission Mode

This Mode will be approach by next Process

- Case 1) After booting (power on),
    Press "GROUP","0","1" key
    Press "PATTERN","0","1" key

- Case 2) Press "SETUP", "ENTER","ENTER" ,"ENTER" , "ENTER" key
- Then, Display as follows

Select Transmission Mode		G01
File Name : G01P01T1.ply		P01
M1. TM1	M2. TM2	
M3. TM3	M4. TM4	

- Press " Mode", "Number (1~4) key .

P01_0_Tone&Data	G01
File Name : G01P01T1.ply	P01
Transmission Mode 1	TM1

- This Menu will be select among the next folder
  - ◆ TM1   : Transmission Mode 1
  - ◆ TM2   : Transmission Mode 2
  - ◆ TM3   : Transmission Mode 3
  - ◆ TM4   : Transmission Mode 4

4.6 PRE_VIEW

This function will be display the structure(the Contents of sub channel)   of   a   Ensemble .

Press " PREVIEW" key .

- ■ Then, Display as follows   (If you select   G01P01T* .ply – refer to 7. Appendix A)

1st

S01:256-4 0 V 1KHZ LR	G01
S02:224-3 168 N 2KHZ LR	P01
S03:224-4 336 S 4KHZ LR	TM1
S04:192-3 476 S 1KHZ L	↓

2nd

S05:192-4 616 N 1KHZ R	G01
S06: 64-3 732 N 1KHZ MO	P01
S07: 64-3 780 E8 PRBS9	TM1
S08: 24-2 828 E8 PRBS9	↑

This means of   above is as follows   (Group 1)

◆ S** : Sub channel - ID

◆ 256-4 : Bit rate (kbits/sec) – Protection Level   at UEP

◆ 0 : Start Address

◆ N : N0 – X - PAD

● V : Variable - X -PAD

● S : Short - X - PAD

◆ E8 : EEP (Option 0)

● E32 : EEP (Option 1)

◆ 1KHZ : Contents Information (Frequency …)

◆ LR : Stereo Dual

● L : Stereo Left

● R : Stereo Right

● MO : Mono

● JS : Joint Stereo

● DS : Dual Stereo

4.7 Output On/Off

Starts or Stops IQ Output , Digital I & Q and Frame Synch output.

It is toggle function

Output On   (LED On)   :   Start sending the I,Q

Output Off (LED Off)   :   Stop sending the I,Q

Note) Output On – available only this Mode (After select Transmission Mode)

P01_0_Tone&Data	G01
File Name : G01P01T1.ply	P01
Transmission Mode 1	TM1

4.8 Local On/Off

Press this key to return the *PeakTech®* 1140 to Local (Front panel : LED OFF) control from

remote

operation.

The Key LED light on represents *PeakTech®* 1140 is under remote control .

Thus any panel Key than this key are ignored while the key is light is turned on.

5. RS-232c

5.1 RS-232C

Communication Protocol.

-. BAUD RATE   : 9600 bps

-. PARITY   : None/8 bits,   1 stop bit

-. cable   : DTE-DTE interface cable (cross over cable)

5.2 RS-232C command List

- Command   -- Capital or Small Letter

- { }   An element inside brackets is Necessary.

      Note, the brackets are NOT part of the command

            and should NOT be sent to the Counter.

- [ ]   An element inside brackets is optional.

      Note, the brackets are NOT part of the command

- **1 | 2**   Means use either 1 or 2.

| No	Command	Description
1	0~9	Selection Menu
2	U	Line Up Cursor
3	D	Line Down Cursor
4	X	Goto previous menu
5	E	Goto Setup menu
6	GROUP [aa|a]	Group Selection aa: Group No.
7	PATTERN [aa|a]	Pattern Selection aa: Pattern No.
8	PREVIEW	Detail Preview
9	TM [aa|a]	Transmission Mode selection aa: Mode No.
10	PRESET {aa|a}	Present Pattern Save aa: Save No.
11	RECALL {aa|a}	Recall preset data aa: Recall No.
12	SFILE aabbccdd	Direct goto file aa: Contents No. bb: Group No. cc: Pattern No. dd: Mode No.
13	OUTPUT	Output ON/OFF [SWAP]
14	SETUP	Goto SETUP MENU
15	HELP	Help Command

5.3 RS-232C Cable
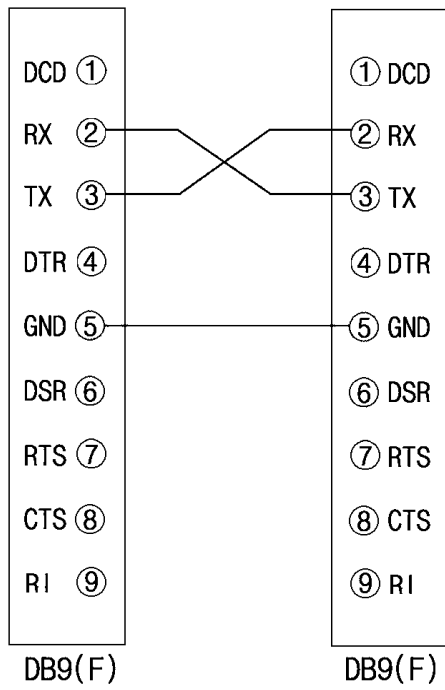
6. APPENDIX A:

A.1 Timing of I/Q Output (Digital)
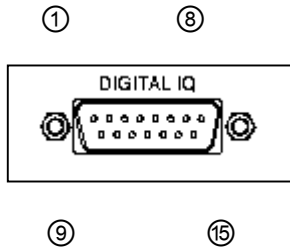
Pin	Signal Name
1	D7(MSB) Out
2	D6 Out
3	D5 Out
4	D4 Out
5	D3 Out
6	D2 Out
7	D1 Out
8	D0 (LSB) Out
9	GND
10	CLK (4.096 MHz)
11	QI Out
12	Fsync out
13	n.c.
14	/CLK (4.096 MHz)
15	GND
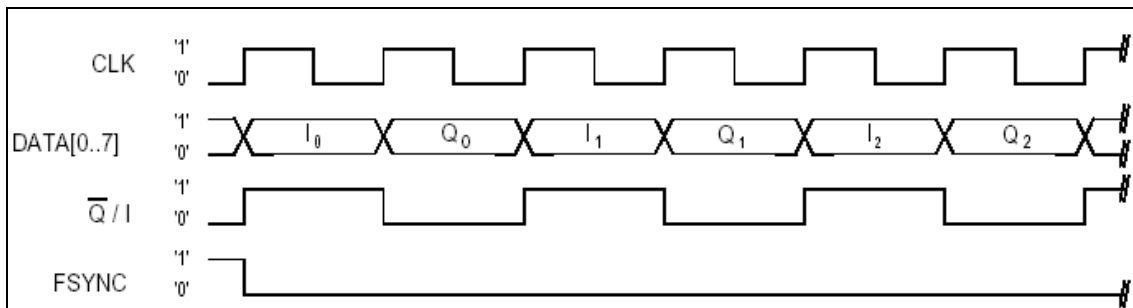
- T = 1 / 4 096 kHz = 244 ns;

- t_{CLK} = 1 / (2 × 4 096 kHz) ± 3 ns = 122 ns ± 3 ns;

- t_{DIQ} = 1 / (2 × 4 096 kHz) ± 3 ns = 122 ns ± 3 ns.