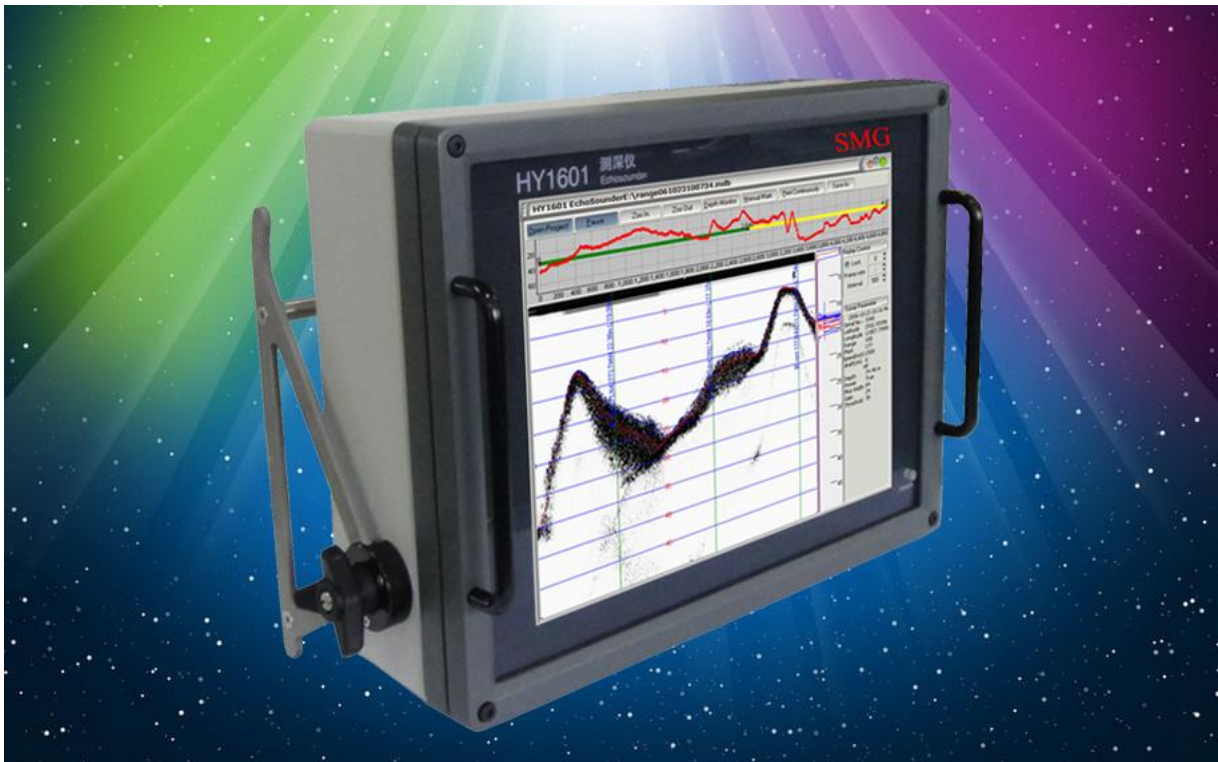# HY1601 Single-frequency

PC Platform Digital Echosounder

Operation Manual

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Content

1.   Technical description

1.1   Introduction

HY1601 is a single-beam digital echo sounder system integrating computer technique, digital signal processing and computer imaging technology. With adopting built-in system structure and internal operating control system it realizes perfect integration of echo sounder and computer platform, and highly reflects digital intelligence of sounder operation and control. By using sounding software the complete system can automatically control sounding, intelligently detect dynamic signal, recognize and lock tracking as well as monitor and control whole sounding in real time in order to ensure high-level sounding accuracy and reliability. Double functions of depth sounding and navigation can be realized by displaying and storing depth data and image in real time, also transferring data inside system to measuring software and simultaneously sending image to operating controller through sub-image display technique of computer system.

Its portable measuring module with integrated built-in computer system fully employs computer source to realize comprehensive digital depth sounding application, which makes the depth sounder be the present domestic up-to-date and reliable all digital echo depth sounder system applied for depth measurement in various complicated water states of river, port, coast, etc.
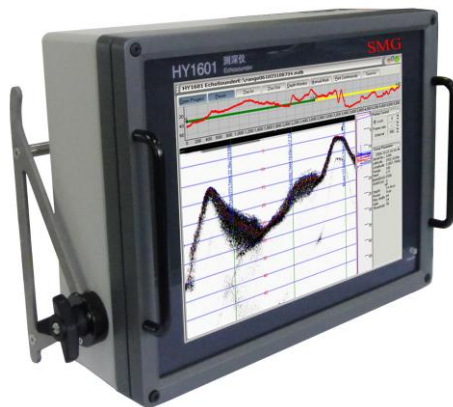
Fig. 1-1   HY1601 echo sounder

1.2 Principle of operation

HY1601 is a 208kHz operating frequency depth sounder. Its transducer transforms electric energy into acoustic energy and transmits it into water bottom. Received echoes are turned into electric energy and delivered to electronic circuit for processing and calculation. Finally, the calculated result will be displayed on operating controller.

The sounder is composed of two units: computer control and display software module and lower unit.

Computer control and display software module is used for controlling operating parameters of lower unit and displaying underwater echogram from the unit. The lower unit consists of four parts: transmitting module, receiving module, DSP processing module and power module.

Transmitting module and receiving module at the front end of sounder have main functions: transmitting circuit generates steady, high-intensity detecting sound and receiving circuit amplifies weak echo signals received by the transducer, filters unwanted noise and sends them to DSP signal processing module for successive processing—sampling and calculating.

DSP processing module serves the functions to receive control parameter delivered from computer, control transmission, provide synchronous signal for entire system and A/D sampling data, as well as send measured depth data and echogram to built-in operating controller via USB.

1.3   System configuration

Basic system of HY1601 echo sounder consists of main unit, transducer and computer control software (including DFNow.exe-sounding software and DFPlayBack.exe-Playback software).

Main unit of HY1601 is a built-in computer system containing depth sounding part, on which computer control software is operated. Normal depth sounding works on sounding software (DFNow. exe) that functions to set operating parameters of echo sounder, display and store underwater echogram of depth measurement. Echogram playback software (DFPlayBack.exe) functions to play back underwater acoustic image. The software can be implemented individually or on computer fitted with XP operating system.

1.4   Main technical specifications

Technical parameters：

Operating frequency:	208kHz
Transducer：	208kHz (Beam width is less than 8 degrees)
Measuring range:	0.3m to 150m
Measuring accuracy:	1cm±0.1% of measured depth
Output power:	> 180W
External interface:	2 RS232Cs, 4 USB2.0s, 1 VGA, 1 LAN
Power:	24VDC or 220VAC
Power consumption:	Approx. 80W
Operating system:	Window XP

Display:	15″ high-brightness LCD, Resolution 1024×768
Recording:	High-capacity electronic panel storage
Operating condition:	0 to 50 degrees, relative humanity 5 to 90%

System configuration:

Main unit:

Dimensions:	400x130x310mm
Weight:	12kg

Transducer:

Dimensions:	diameter 80x26mm
Weight:	1.5kg
Length of cable:	10m (increasing according to user's requirement)

Measuring rod:

Dimension:	diameter.7m, 3 sections
Weight:	5kg
Material:	Stainless steel pipe

2. Interfaces and connecting form

HY1601 echo sounder has a multiplicity of external interfaces for conveniently connecting with external devices as shown in Fig.2.

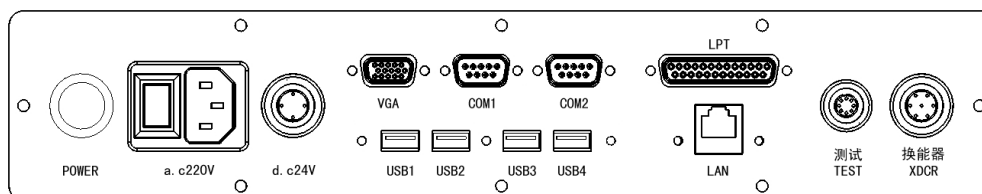Fig. 2-1 Interfaces on HY1601 rear panel

COM1, COM2——Standard 9-pin series port

VGA——Standard video output for display expansion

LAN——Standard network interface

LPT——Standard parallel port

USB1, 2, 3, 4——Standard USB ports

Test——Used before ex-factory, not for user

Transducer — — Used for connecting 208kHz transducer, ports 2 and 6 for high-frequency signal, port 4 for grounding and the rest for idle

       d.c24V——Connecting DC24V power, port 1 for positive, port 3 for negative

       a.c220V——Standard AC power socket with power switch

      POWER——Start button

3. **Loading and unloading of sounding software**

   Operating environment of control software DFNow and DFPlayBack is Window XP. Their setup files can be obtained from attached disk (setup.exe). Loading and unloading procedure of software is the setup procedure of standard WINDOWS software package and its concrete operation is executed according to prompt message during setting up software.

4. **Operating procedure of echo sounder**

   --- Connect transducer.

   --- Connect power supply, i.e. DC24V or DC220V.

   --- Turn on power switch on rear panel.

   --- When power pilot on front panel is lit properly, press the Start button on the rear panel.

   --- When system enters operation, execute DFNow sounding software to start depth sounding.

   --- When depth sounding is ended, quit the system and close the power supply.

5. **Use of real-time sounding software DFnow**

   When initiating the sounding software DFNow, user interface of depth sounding procedure will appear as shown in Fig. 5-1.
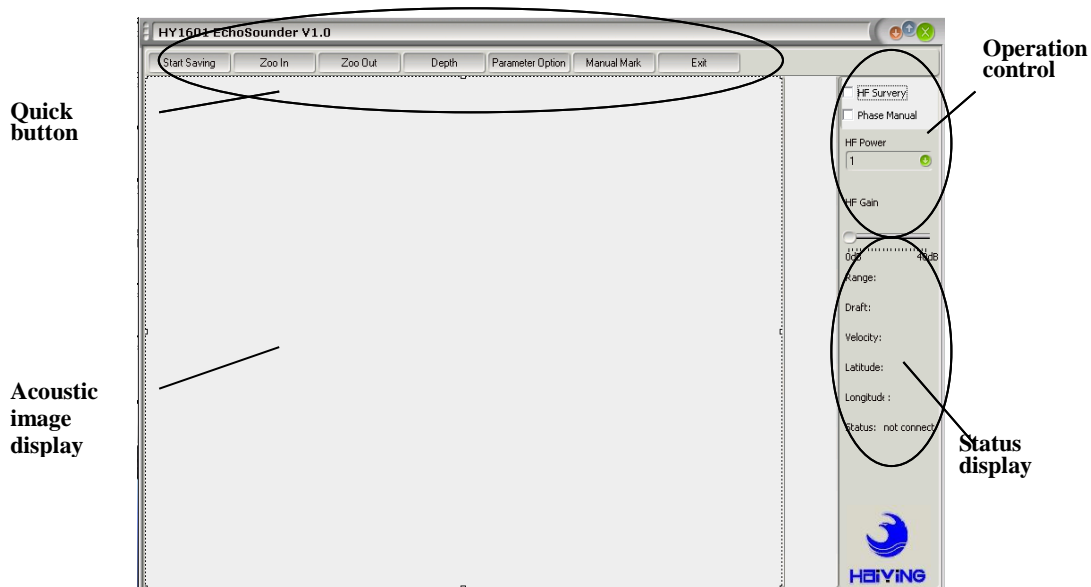
Fig. 5-1 DFNow user interface

5.1   Introduction of interface

Interface of DFNow sounding software is composed of four parts--echogram display, quick button, operation control and status display.

5.1.1 Echogram display

Echogram display indicates bottom echo data measured in real time, including ruler, scale line, ruler information, scale information, etc.

5.1.2 Quick buttons

Quick buttons contain **File Saving, Zoom In, Zoom Out, Depth, Parameter Setting, Manual Mark and Exit**.

File Saving – Use it for saving presently measured data and selecting file storing path as per dialogue box. When saving is over, click the button again. Two echogram files can be stored, one with suffix ".Bin", the other with suffix ".mdb". When playing back file, both of them are required.

Zoom In – For facilitating operator to watch details of echogram the image should be magnified. Display image on echogram interface of DFNow software has widths of 2, 5, 10, 20, 50, 100, 200 and 300 representing displayed depth range. Each time one depth sounding is done, the displayed depth range reduces one level. As displayed depth range is changed, a phasing line is printed on the echo interface and the current ruler data is presented beside the line for reminder.

Zoom Out – It is used for operator to observe greater range of echo image. Each time one depth sounding is done, the displayed depth range increases one level. The increase is related with depth range, which means that displayed image won't exceed limit of the range.

Depth Window – When it is pressed, on DFNow software interface a movable window is presented, which indicates a currently measured water depth in big characters.

Parameter Option – By clicking it, a parameter setting box is ejected for setting parameters required during depth measurement. For detailed parameter description, please see paragraph 5.2.

Manual Mark – When it is clicked, one scaling is operated and scaling line as well as scaling information of depth and time are indicated on echogram interface. Output data from series port is accompanied with scaling mark. When scaling is in the state of data saving, it will be stored in echo sounder and played back later.

Exit – Clicking it sounding software will be quitted.

5.1.3 Operation control

Basic operation of echo sounder is performed.

HF Survey– It is used for selecting the option box to start measurement and cancelling it to stop measurement.

Manual Phasing – Selecting **Manual Phasing**, a dialogue box pops up and initial depth of underwater echogram is displayed expectantly. Pressing confirmation key, the input value is regarded as initial display position on echogram interface displayed on screen. At that time whether pressing ZOOM IN or ZOOM OUT button; whether depth curve moves out of display range on the screen; whether echogram display range is not within depth range of echo sounder, initial depth value displayed in echogram on the screen won't be changed. Here it should be pointed out that in "**Phase Locking**" state, when a new initial depth value need be locked, it is necessary to cancel this option and then re-select it for inputting data again. Before performing the item, operator should consider depth variation, otherwise improper operation will make operator fail to observe real-time depth curve; however, if operator has selected data saving, depth image won't be influenced when this data is played back.

HF Power – It's used for controlling transmitting power, the greater the value is, the larger transmitting power will be. Power is selected on the basis of clearly seeing echo.

HF Gain – It's used for controlling amplification of signal, the greater the value is, the bigger gain will be. In normal case gain is adjusted for seeing clear saturation echo (i.e. envelop signal in echo window), usually using automatic gain. By moving sliding bar of gain to zero automatic gain is obtained with corresponding indication.

5.1.4 Status indication

The current operating status of echo sounder is shown as range, draft, acoustic velocity, longitude and latitude, and connecting state of echo sounder. In case the sounder is properly connected with computer, "**CONNECTED**" then appears at the lower right corner of software interface. If "**NOT FOUND**" is shown, it means the echo sounder fails to connect with operating controller. At that time user should withdraw the software and close the echo sounder to power it off. Then restart the system and execute software.

5.2   Parameter setting

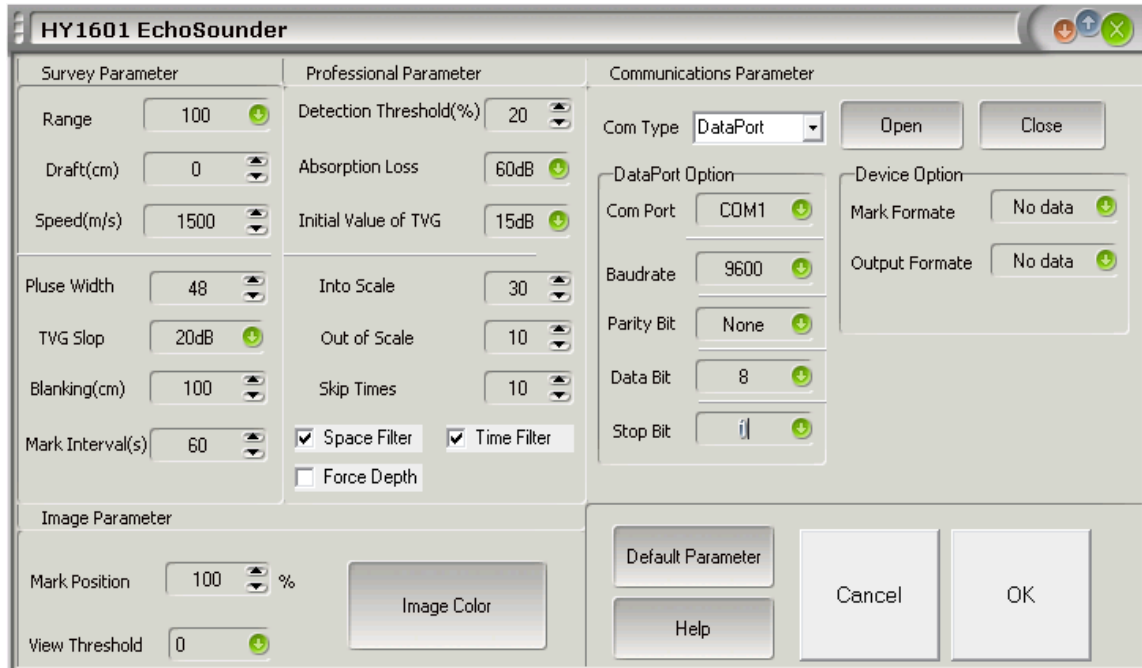Parameter option box is shown as Fig.5-2.

Fig. 5-2 Parameter setting interface

5.2.1 Survey parameter

Pulse Width – Transmitting energy is increased with pulse width increment.

Blanking – Strong interference can be suppressed through blanking setting in echo sounder. When blanking is set, data in blanking area will be filtered and not be processed and calculated.

TVG Slope – In echo sounder spherical expansion loss of acoustic wave is compensated via time-varied gain curve (TVG curve). Normally, operator can select 20dB and in rough water condition 30dB or 40dB.

Acoustic Velocity – Sound wave under water is propagated at different speed in different temperature and density environment, ranging from 1400m/s to 1700m/s. In order to make precise measurement it is necessary to set accurate underwater acoustic velocity, which can be acquired through calibrating plate or directly from velocimeter.

Scaling Interval – Setting time interval for automatic scaling.

Range – Containing automatic and manual operating modes. It is recommended to select appropriate range according to water depth in poor water state.

Draft – Draft is the distance of transducer radiating face from water surface. Its adjustment will influence echogram curve and digital display.

5.2.2 Professional parameters

Detection Threshold (%) – Echo sounder recognizes bottom signal by detecting intensity of underwater echo. When the intensity exceeds detecting threshold, echo

sounder will regard it as bottom. Detection threshold of conventional echo sounder is a fixed value. If it is too small, more false bottoms will appear; too big value will cause loss of bottom, normally taking 20%.

Absorption Loss – When sound wave is propagating under water, spherical expansion loss or acoustic energy loss is presented. In order to accurately judge intensity of underwater echoes, absorption loss need be compensated during reception. Operator should select appropriate compensation value for absorption loss according to water area and state of actual survey. "**Absorption Loss**" is related to water turbidity: the poorer the water state, the bigger the setting value of "**Absorption Loss**".

TVG Initial Value -- Spherical expansion loss of sound wave is compensated through time-varied gain curve (TVG curve). "**TVG Initial Value**" is the initial gain value of the curve. In the area of poor water state, "**TVG Initial Value**" is set to larger value. The parameter is associated with TVG slope.

Phasing In – In case software is not in the state of "**Manual Phasing**", DFNow software will automatically control phasing of echogram. When "**Phasing In**" becomes software control phasing, next ping, after phasing bottom echo, will occupy one percent position of the whole interface in echogram.

Phasing Out – In case software is not in the state of "**Manual Phasing**", DFNow software will automatically control phasing of echogram. When "**Phasing Out**" becomes condition of software control phasing, as bottom echo occupying one percent position of the whole echogram reaches "**Phasing Out**" setting value, software control echogram will create phasing.

Neglecting Times – When echo sounder loses bottom echo because of some reasons, the parameter defines the time to perform search in the greatest range ("**Manual Phasing**" should be opened, otherwise echo sounder can only search within the locked range).

Time Filtering – In order to precisely track bottom signal, HY1601 echo sounder adds "**Time Filtering**" algorithm. "**Time Filtering**" is that DSP processing chip inside echo sounder can automatically analyze echo signal or interference signal according to transmitting pulse width for coping with rough water state. When prompt before selecting the parameter is "√", that means it is chosen. As "**Time Filtering**" is opened in rough water state, bottom tracking becomes more stable.

Space Filtering -- In order to precisely track bottom signal, HY1601 echo sounder adds "**Space Filtering**" algorithm. Water bottom is continuously varied in certain regularity; interference appears randomly. Based on precious bottom data measurement, bottom signal position of the Ping survey can be approximately calculated. "**Space Filtering**" is

just bottom track algorithm created on the basis of the theory.

Forced Tracking – The parameter is mainly applied for rough water state. Echo sounder normally regards the strongest part of echo signal as water bottom; but echo signal from bottom is not the strongest one due to influence of bubble in water, undercurrent, etc. When selecting "**Forced Tracking**", operator can manually designate a water bottom for tracking. If echo signal of the designated water bottom is continuously varied (in tracking gate) and becomes bigger one (higher than gate limit) in the successive surveys, the echo sounder keeps tracking the signal and neglects other signals before it extinguishes. When echo sounder is in the state of "**Forced Tracking**", a red flashing data is presented at the ultimate right end of echo image and it means that during the current "**Forced Tracking**", the value is just the depth data obtained after forced tracking. In the state of "**Forced Tracking**" automatic gain parameter controlled in echo sounder still takes the strongest part of echo signal as reference basis, that is to say, if amplitude of echo signal of "**Forced Tracking**" has great difference with the amplitude of the strongest part of echo signal, the signal might be lost. However, whether echo sounder is in the state of "**Forced Tracking**", the criteria of judging water bottom is still the strongest part of echo signal in tracking gate; only in the state of "**Forced Tracking**" the signal is not necessarily the strongest part for all echoes.

5.2.3 Image parameters

Marking Position – It is used for controlling initial position of scaling contents displayed with DFNow software. When 100% is reached, that means no scaling contents are indicated on echogram curve.

Display Threshold – Displaying signal over threshold is beneficial to eliminating displayed background noise. The higher the threshold is, the clearer the image appears, the lower the background noise becomes.

Image Color – By clicking it, a dialogue box for setting color is presented and echo display color is then selected as shown in Fig. 5-3.
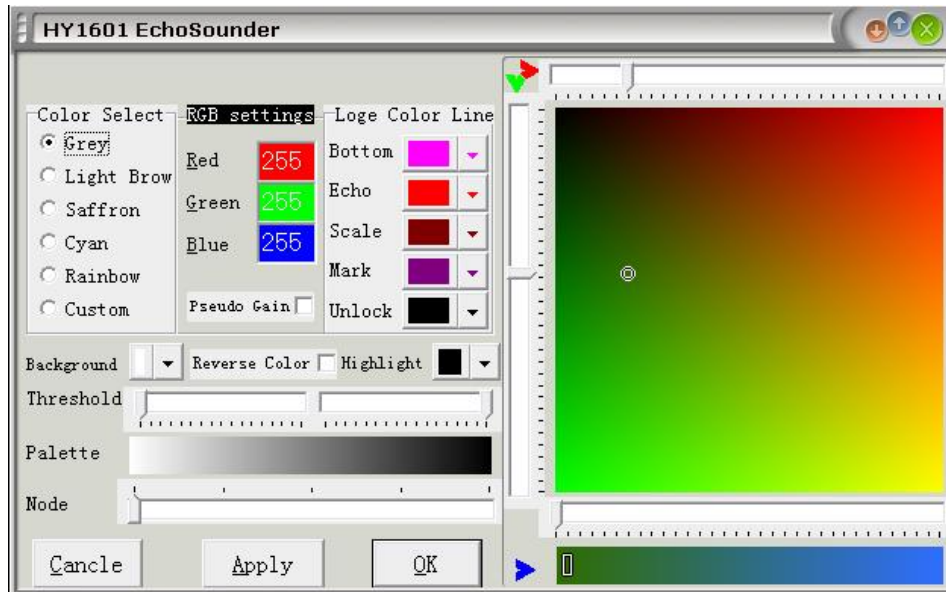
Fig. 5-3 Dialogue box for setting color

5.2.4 Communication parameter

The parameter is used for setting communication between peripheral equipment and measurement software.

Series ports are selected according to the required connecting types including data port and attitude port. Then select corresponding basic setting such as communication agreement, baud rate of series port, etc. Finally by clicking the required series port it is opened and affected, thus starting proper work.

Data port agreement has two formats: output format and marking format. Data output format has: SDH13D, Odom Single-frequency Output, Odem Single-frequency HEAVE, 0183DBT and 0183DPT; marking format has: Marking Hypack (Odom format), Marking 13D, and Marking NMEA. Agreement format for attitude port is TSS1 and for positioning port is GPGLL.

Definition of format:

Odom Single-frequency Output:

1　　　Normally "space", "F" indicates Fix Mark

2　　　Indicator "e"

3　　　Indicator "t"

4　　　Normally "space", "E" indicates H error, "O" indicates L error

5　　　"H" represents High Frequency; "L" represents Low Frequency.

6　　　Space

7 -11　Depth Data

12　　Carriage Return character <CR>

11

For example: **FetOL\<space>12345\<CR> or FetEH\<space>12345\<CR>**

Odom Single-frequency HEAVE:

1   Normally "space", "F" indicates Fix Mark

2   Indicator "e"

3   Indicator "t"

4   Normally "space", "E" indicates H error, "O" indicates L error

5   "H" represents High Frequency; "L" represents Low Frequency.

6   Space

7 -11   Depth Data

12   + or -

13 - 16 Heave data

17   Carriage Return character \<CR>

For example: **FetOL\<space>12345+0100\<CR> or FetEH\<space>12345-0050 \<CR>**

0183DBT format:

1   Indicator "$"

2   Indicator "SDDBT"

3   Comma ","

4   Integral part of Depth Data (foot)

5   Decimal point "."

6   Fractional part of Depth Data (foot)

7   Comma ","

8   Indicator "f"

9   Comma ","

10   Integral part of Depth Data (meter)

11   Decimal point "."

12   Fractional part of Depth Data (meter)

13   Comma ", "

14   Indicator "m"

15   Comma ", "

16   "0. 0, F" Character string

17   Indicator "＊"

18-19   ASCII exclusive-OR-And code for Above 2-17

20   Carriage Return character \<CR>

21   Line-feeding sign

For example: **$SDDBT,082.1,f, 025.04,M,0.0,F*2E<CR><LF>**

0183DPT format:

1   Indicator "$"

2   Indicator "SDDPT"

3   Comma ","

4   Integral part of Depth Data (meter)

5   Decimal point "."

6   Fractional part of Depth Data (meter)

7   Comma ","

8   Heave + or – indicator

9   Heave data

10   Comma ","

11   Depth range

12   Comma " , "

13   Indicator "*"

14-15   ASCII exclusive-OR-And code for Above 2-17

16   Carriage Return character <CR>

17   Line-feeding sign

For example: **$SDDPT,27.45,+0000,50*7F<CR><LF>**

SDH-13D format:

1   Normally "space", "F" indicates Fix Mark

2   Indicator "D"

3   Indicator "T"

4   Normally "space", "E" indicates error

5   Space

6   Depth data

7   Carriage Return character <CR>

Marking Hypack (Odom format)

HEX06   Control series port scaling

HEX01   Beginning annotation and continuously receiving up to 80 ASCII
annotation characters

HEX04   Ending annotation

Marking 13D

Control series port scaling of random characters

Giving scaling annotation of echo sounder

Marking NMEA

"$"   Control series port scaling of echo sounder and
                                      beginning annotation

"Carriage Return"   Ending annotation

and Line-feeding sign

TSS1 format of attitude compensation device

1   Indicator ":"

2 - 7   Heave accelerator

8   "Space"

9   Heave sign "space" being positive, "-" being negative

10 - 13   Heave value

14   Heave value "U" valid or "u" invalid

15   "Space"

16 - 24   Independent character string

25   Carriage Return character

 For example: **001234 -5432u 0000-0000<CR>**

GPGLL format for position indicator

1   Indicator "$"

2 - 3   Independent character string

4 - 6   "GLL" indicator

7   Comma ","

8 -16   GPS latitude

17   Comma ","

18   "N" north latitude, "S" south latitude

19   Comma ","

20 - 29   GPS longitude

30   Comma ","

31   "W" west longitude, "E" east Longitude

32   Comma ","

33- 41   Positioning time

42   Comma ","

43   "A" coordinate effective; "space" space, coordinate invalid

44   Indicator   "*"

46 - 47   Strings and checking

48   Carriage return

49   Line-feeding

 For example: **$GPGLL,3521.7894,N,01234.5678,W,215532,A*hh<CR><LF>**

Latitude: 3521.7894 N

Longitude: 01234.5678 W

Positioning time: 21:55:32

Status: valid (space invalid)

5.3   Communication port configuration

HY1601 sounder serial port has two forms---hardware and software. Only hardware can communicate with external equipment, while the software only can transfer data within the system. COM1, COM2 are the hardware serial ports, and COM3, COM4 are software serial ports.

To output depth value to external computer-you can choose the serial port COM1 or COM2 optionally. Please pay attention to the corresponding output port on the rear panel of the device.

To output Depth value to internal measurement software -you shall select COM3 for the serial port and COM4 for measurement software.

5.4   DFNow operation procedure

- Run DFNow

- Set parameters

- Perform High-frequency measurements

- Adjust parameter according to displaying image results

- Save measured echogram after meeting the requirements

- End and save measured result

- Exit the software

6.   Use of playback software DFPlayBack

When the operator uses HY1601 sounder to make measurements, the underwater echo data saved through the "**File Saving**" function can be replayed by using playback software (DFPlayBack). The main interface is illustrated as Figure 6-1.
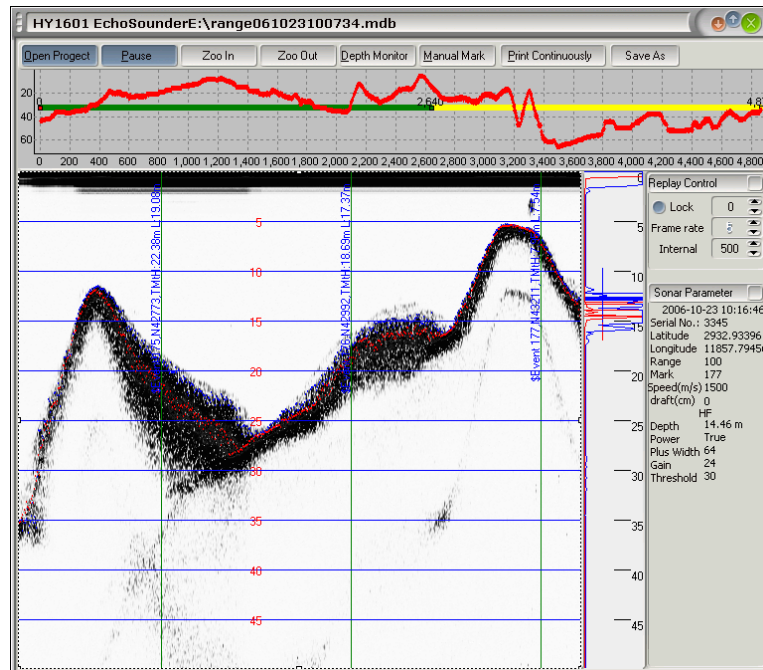

Fig. 6-1 Main playback interface

6.1 Main operation menu

Main menu options of playback software (DFPlayBack) are shown in Figure 6-2.

Figure 6-2 Main menu of playback

6.1.1 Open Project

Menu bar for Project operations will pop up by right-clicking the "**Open Project**" option on the main menu, as shown in Fig. 6-3
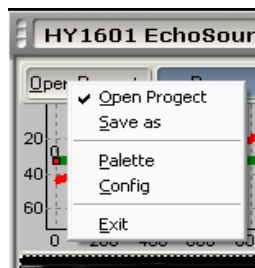
Fig. 6-3 Open project

Open project – Left-click the "**Open Project**" option on main menu, or select "**Open Project**" option in engineering menu bar.   A standard Windows file operation window will pop up (shown as Fig. 8-4). Here the operator can select the project file for playback.

Dump Acoustic Image - For convenience of operator to submit and query the stored data of underwater acoustic image, the sounder's playback software (DFPlayBack) provides a "**Dump Acoustic Image**" function. After the completion of the sounding starting and ending positions which needs be dumped, operator selects the "**Dump Acoustic Image**". The section of the acoustic image data will be saved as a new file (new project file or new acoustic image file)

Note: All data of original file is not affected.

Dump configuration – After selecting this option, a standard Windows file operation window will pop up. Here the operator can set a name for the new dump file. The new dump file name obeys the same generating rule of the acoustic image files generated by sounding software.

Color parameters - This option is used to set the echogram's color while playing back acoustic image. As illustrated in Fig. 6-4.
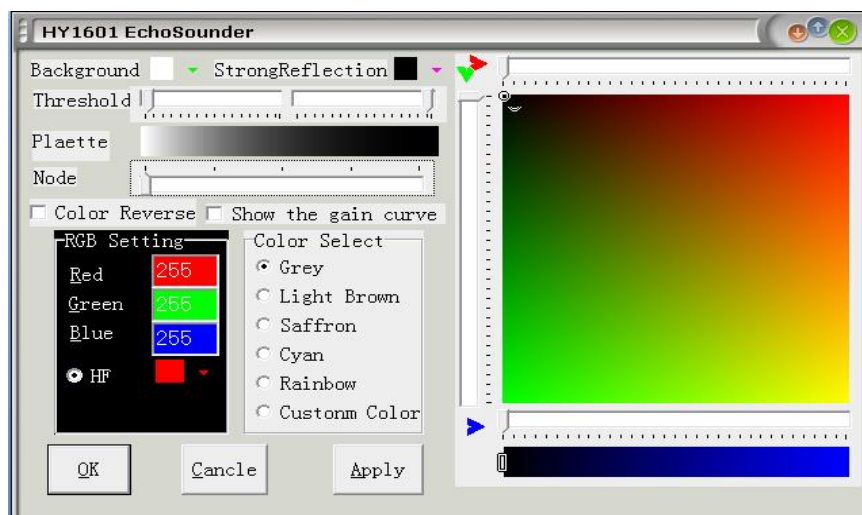

Fig. 6-4 Color parameters

Setting Page – After selecting this option, a window for setting print format of acoustic image will pop up. As illustrated in Figure 6-5.
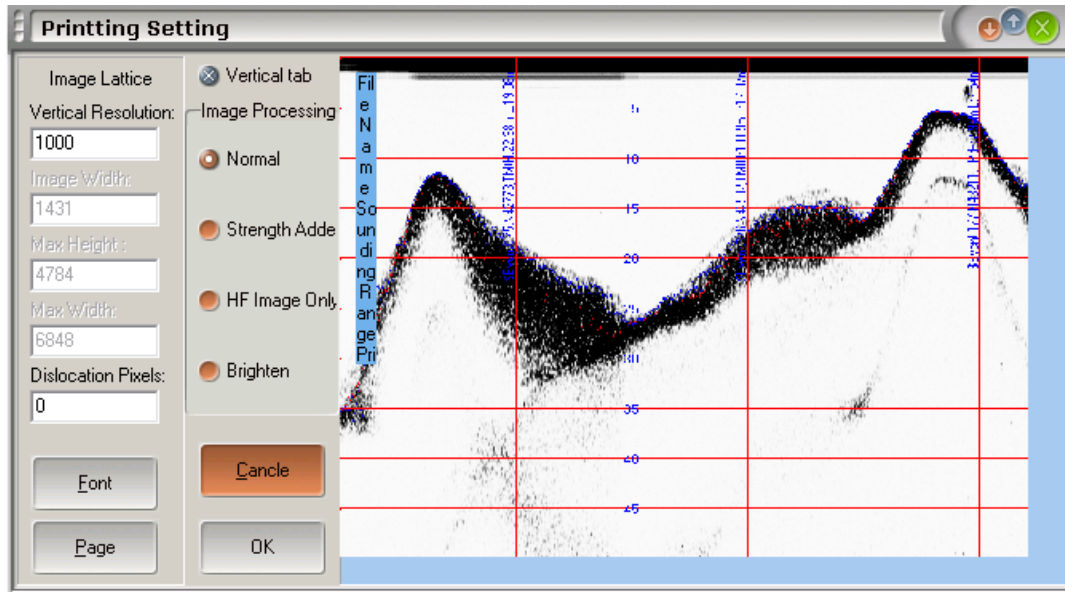
Fig. 6-5 Printing setup

6.1.2 Playback pause

Menu bar for playback control operation will pop up by right-clicking "**Playback Pause**" option on the main menu. As illustrated in Fig. 6-6.
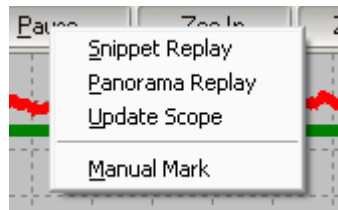

Fig. 6-6 Menu for playback control operation

Snippet Replay – When this option is selected, playback of acoustic image will be ranged within the starting to the ending positions.

Panorama Replay – When this option is selected, playback will cover all data of the original acoustic image.

Update Scope– Digital Acoustic image will be updated according to the selected scope by clicking, and the analog acoustic image will also begin to display based on the new scope.

Manual Mark – For its function see "6.1.6 **Adding mark**".

6.1.3 Zoom out – Its function is shown in "5.1.2 Quick button – **Zoom out**".

6.1.4 Zoom in – Its function is shown in "5.1.2 Quick button – **Zoom in**".

6.1.5 Digital depth - When clicking the menu item, the currently played back water depth

values of the latest Ping will appear on the acoustic image playback interface. Its function is shown in "5.1.2 Quick button - **Depth Window**".

6.1.6 Adding Mark – For the convenience of observation, the playback software (DFPlayBack) provides the "**Manual Mark**" function. Operator can add scaling mark on the playback acoustic image. The displaying method of scaling mark is the same as the "**Manual Mark**" method of the sounding software. But this mark will only be displayed in this playback image and will not be recorded in the data file.

6.1.7 Continuous printing – Print the playback images as per the set parameters.

6.1.8 File dump – It is the quick button for file dump in "**Open Project**"

6.2 Playback control area

Playback control is to set the basic parameters of playback as illustrated in Fig. 6-7.
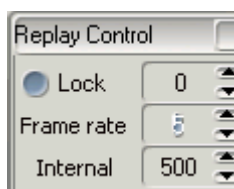

Fig. 6-7 Replay control area

Lock: When this option is selected ("×" is instructed before the option), the operator can lock the initial depth of replay file image. The function is the same as the "**Phasing Lock**" function of sounding software.

Frame rate: Acoustic image files are stored in units of Ping, a Ping is a frame data which includes all data of one sounder transmitting and receiving cycle. "**Frame rate**" is the number of Pings of the acoustic image displayed by the playback software in every "**Interval**". The higher the "Frame rate" is, the faster the speed of image display becomes.

Interval: It is the refresh time interval of playback image display, in milliseconds. The smaller the value of "**Interval**" is, the faster the speed of image display shows.

6.3 Data area

The latest Ping data is at the lower portion of "**Playback Control Area**", as shown in Fig. 6-8. These data includes parameters, status, location and other information of the sounding software while measuring and saving acoustic images.

Above the data area is the depth value where the mouse pointer indicates. Operators can get depth data from the acoustic image with this function.
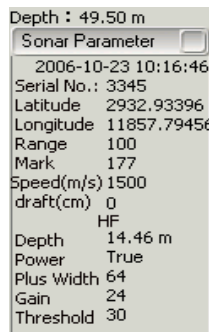

Fig. 6-8 Chart in data area

6.4　Acoustic image displaying area

The acoustic image interface of playback software can be separated into two parts—digital image and analog image.

Digital acoustic image:

When the acoustic image file for playback is selected, the software will automatically make all digital depth measurement data of the file into images and show them in digital acoustic image display area (shown as Fig. 8-10). The abscissa of digital image is the number of Pings for transmitting and receiving. The vertical axis is the depth value. There are four curves in the image, two of the fluctuant curves are all digital echo depth curves (red and blue curves, which colors are selected in "**Open Project 6.1.1 - Color Parameters**"). Yellow horizontal line part hasn't been shown in the acoustic image file, while the green horizontal line part has been shown. The green vertical line part is the current displaying Ping content. In the playback pause state, operator can change the Ping position where the image starts to display after releasing pause by pulling the green vertical line.

The operator can enlarge the framed area to entire display area of digital acoustic image by moving the mouse forward frame (from top left corner to bottom right corner) for observing the details. The enlarged state can be turned back to the original state which shows the digital depth curve of the whole acoustic image by using the mouse backward box (from the lower right corner to upper left corner) as shown in Fig. 6-9.
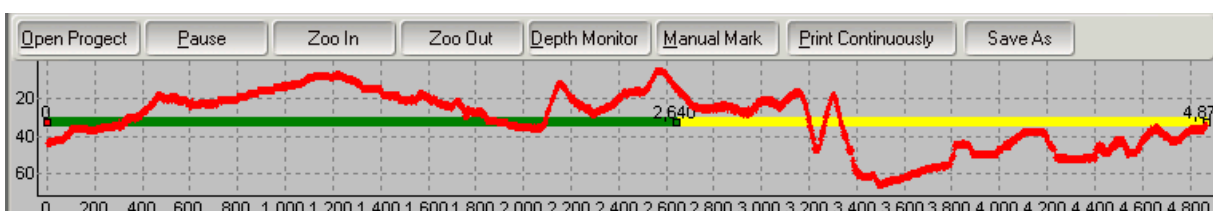
Fig. 6-9 Digital acoustic image

Analog acoustic image:

Operation of analog acoustic image display is the same as the image display interface operation of sounding software.

Right clicking the mouse on the analog playback image, a quick menu for saving images will appear. With this function operator can save the image shown in the current interface as a bit map image file (. bmp). Name the bit map file as the Ping number which is pointed by the mouse pointer as shown in Fig. 6-10
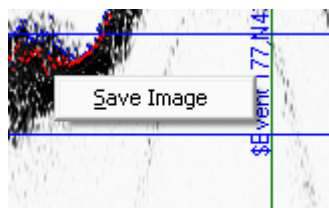

Fig. 6-10 Saving image

6.5 Operation procedure of DFPlayback

- Run DFPlayback software

- Click "**Open Project**" and select the file required for playback

- Set color parameters, and parameters to be printed if required

- Click the "**Play / Pause**" button for playback

- Click "**Continuous Print**" if requiring printing

- Exit the software after finishing playback

7. Installation and maintenance

7.1 Transducer installation

Proper installation of transducer is very important to any survey sounder installation. Otherwise, the data obtained is not acceptable.

Typically, in the case of temporary installations, the transducer is often mounted over-the-side. In permanent installations, hull mounts are generally preferred. Whatever, the transducer shall be installed as deep as possible from water surface. In cases where over-the-side mounts are exposed to wave action, ensure that the transducer is mounted far enough below the surface and near the keel so that it remains proper operation during vessel roll and pitching motions.

The transducer should be mounted far enough aft of the bow so that bubbles generated

by the bow wave will not pass over the face of the system. Transducers should be located away from sources of turbulence and cavitations bubbles such as propellers, bow thrusters and hull protrusions.

Consideration should also be given to sources of mechanical noise generated within the vessel (engines, propellers, pumps, generators, etc.). In some severe cases of mechanically coupled noise, vibration-isolating mounts may be required to mechanically decouple the transducer from the hull.

Transducer mounting can be accomplished in many different ways. Here are two common installation methods:

7.1.1 Over-the-side installation

Transducer is often mounted over-the-side as shown in Fig. 7-1. In this installation, the fixing pipe should be sized to position the transducer well deep under water. Steel cables are attached to tie transducer off fore and aft, and fix it to a sturdy support on the vessel.
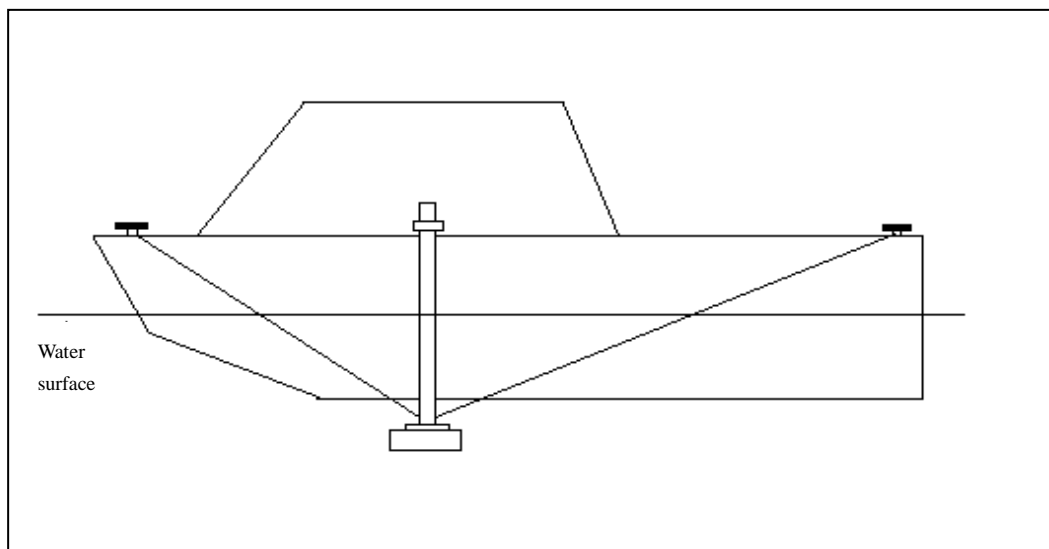

Fig. 7-1 Over-the-side mounting

7.1.2 Hull mounting

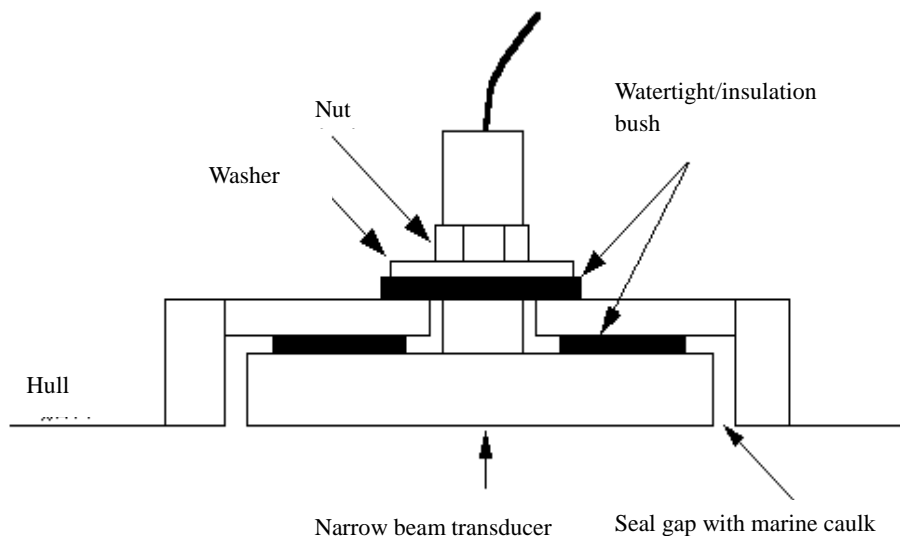Hull mounting of transducer is shown in Fig. 7-2.

Fig.7-2 Hull installation

Note: Cables and connectors of the transducer shall be protected while mounting. Special attention ——the emitting surface of transducer shall be parallel to the water surface while the ship is working.

7.2 Maintenance

  A.   If the machine fails to start, check power supply, fuses, etc.

  B.   Transducer shall be often cleaned by plastic scraper or scrub brush.

    Note: Transducer surface is not allowed to be cleaned with metallic object or sprayed with anything.

  C.   Main unit can be wiped or cleaned with frictionless agent.

  D. If the cable of system is damaged or exposed, do not put it into any conductive pipe. The cable shall be checked monthly for any insulation damage.

  E. If the equipment fails to work, replacement of circuit board is recommended as a convenient method to solve the problem, because site maintenance of current high-density and large-scale surface-mount devices is much more difficult.

Appendix:

Recommended parameters