



STANDARD HORIZON

FF520
50/200kHz BLACK BOX FISH FINDER



Owner's Manual

Congratulations on your purchase of the FF520!

The STANDARD HORIZON organization is committed to ensuring your enjoyment of this unit. STANDARD HORIZON technical support personnel stand behind every product we sell, and our Product Support team invites you to contact us should you require technical advice or assistance, at 800/767-2450.



FCC Compliance Statement

This device complies with Part 15 of the FCC limits for Class A digital devices. This equipment generates, uses, and can radiate radio frequency energy and, if not installed or used in accordance with the instructions may cause harmful interference with radio communications.

There is no guarantee that interference will not occur in a particular instance. If this equipment does cause harmful interference to other equipment, try to correct the problem by relocating the equipment.

Consult an authorized STANDARD HORIZON dealer or other qualified service technician if the problem cannot be corrected. Operation is subject to the following conditions: (1) This device cannot cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CAUTION

- The FF520 is designed for maritime use.
 - Extensive exposure to heat may result in damage to the FF520.
 - The FF520 contains dangerous high voltage circuits which only experienced technicians can handle.
 - STANDARD HORIZON will not be liable for errors contained herein, or for incidental or consequential damages in connection with the performance or use of this material.
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1. INTRODUCTION

This chapter provides basic information in becoming familiar with the advanced functions of the FF520 before you start using it combined with the STANDARD HORIZON GPS chartplotters.

1.0 GENERAL INFORMATION

The STANDARD HORIZON GPS chartplotters combined with the sonar performance of the FF520 creates the most advanced marine navigation system available. This Owner's Manual covers the Fish Finder functions of the FF520 when used with the STANDARD HORIZON GPS chartplotters.

The FF520 advanced features include:

- A-scope (displays Sonar Echo in real time)
- Auto or Manual, with preset modes (Fish, Cruise, Autorange, Bottom Lock, Manual)
- 2x and 4x Zoom (capability to magnify any part of the Fish Finder image of a fixed rate)
- Bottom Lock (capability to magnify a user defined range around the bottom)
- White Line (help distinguish between fish and bottom, when fish is swimming close to the bottom)
- Sensitivity Time Control (STC) (allows reducing or eliminating surface clutter)
- Interference rejection (allows reducing interference from other boats/Fish Finders)
- Noise Filter
- Fish Symbol feature
- Transducer ID (automatically selects power output and parameters for best performance).
- Dual Frequency: 50 and 200kHz with the capability to display the two frequency at the same time.
- Dual Power output: 500/1000W (4000/8000Wpp) depending on the transducer connected. Refer to Par. 6.1 "Optional Transducers".
- Max Depth: 1KW - 1200Ft (365m) at 200kHz, 4000Ft (1219m) at 50kHz
500W - 700Ft (213m) at 200kHz, 1500Ft (457m) at 50kHz
- Min Depth: 2.5Ft (0.8m) at 200kHz, 5Ft (1.6m) at 50kHz
- Speed Sensor (if available on transducer)
- Dual temperature inputs Sensor (One channel TEMP1, Optional second channel TEMP2) - (if available on transducer)
- Trip log
- External buzzer connections (buzzer not supplied)
- Show shallow Alarm, Depth Alarm, Temp Upper, Temp Lower

NOTE

Transducer ID is only available with STANDARD HORIZON DST520, DST521, DST523, DST525, DST526, DST527 and DST528 transducers.

1.1 PACKING LIST

When the package containing the FF520 is first opened, please check for the following contents.

1.1.0 FF520 Packing List

Replacement part	Item
S8101640	Tee cable FF520
S8101641	Power cable FF50
EY307X100	Owner's Manual
CP155C_MAX	CP155C software update card with MAX operating system
CP175C_MAX	CP175C software update card with MAX operating system
CP1000_MAX	CP1000C software update card with MAX operating system

2. MOUNTING THE FF520

The FF520 must be properly installed according the following instructions to get the best possible performance.

NOTE

TRANSDUCER: refer to Chapter 6 and to the Installation Manual supplied with the transducer.

2.0 INSTALLATION

The FF520 must be mounted in a dry, cool and well ventilated location. The FF520 can be mounted horizontally or vertically. After the cables have been run, and connected as per previous instructions mount the FF520 in the desired location using the supplied hardware.

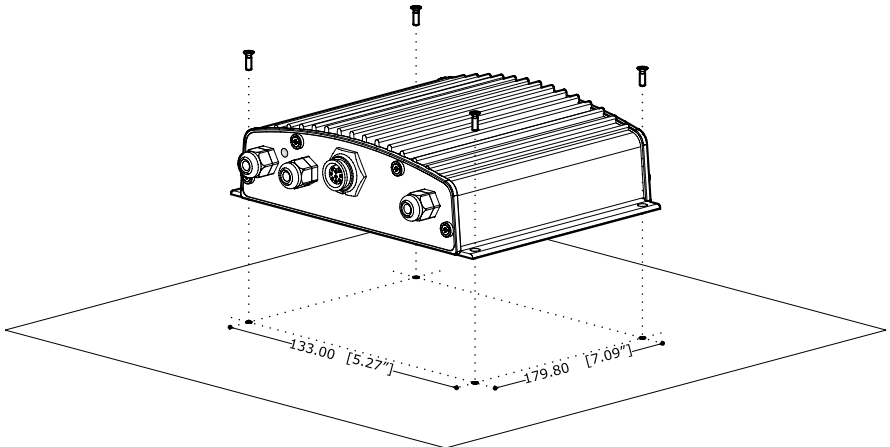


Figure 2.5 - The FF520 Installing

2.1 CONNECTIONS

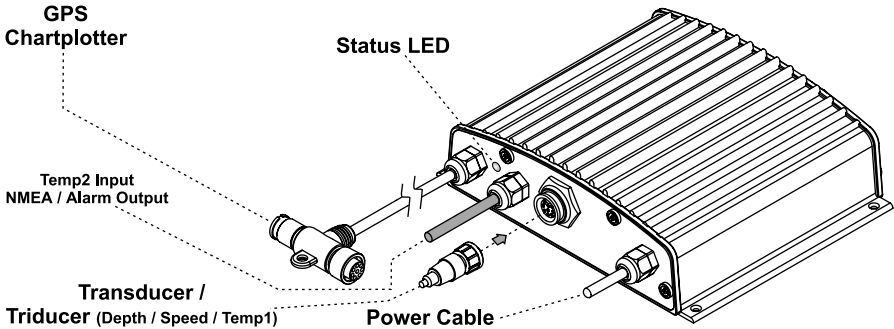


Figure 2.1 - The FF520

2.2 CONNECTING THE GPS CHARTPLOTTERS TO THE FF520

CP155C and CP1000C connections to FF520

1. If the power/data cable is plugged into the CP155C or CP1000C, remove it.
2. Route the cable from the FF520 to the GPS Chart plotters location. Note the "Tee" cable can be cut to run the cable, but care must be taken to ensure the cable is joined together and sealed from moisture.
3. Plug in the "Tee" connector into the GPS Chart plotter DC/Data connector.
4. Plug in the power data cable into the "Tee" connector.

CP155C

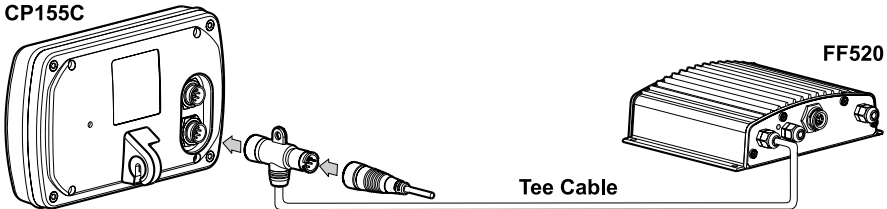


Figure 2.2 - CP155C Connection

CP1000C

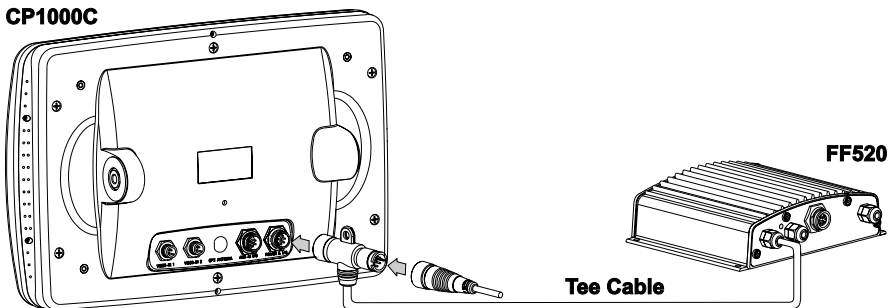


Figure 2.2a - CP1000C Connection

CP175C connections to FF520

1. Cut off the "Tee" connector on the FF520 as close to the "Tee connector as possible.
2. Route the cable from the FF520 to the CP175C location.
3. Step back the black insulation on the "Tee" cable about three inches to expose the wires inside the cable. Connect the wires from the CP175C to the FF520 "Tee" cable referring to figure 2.2b CP175C Connection.

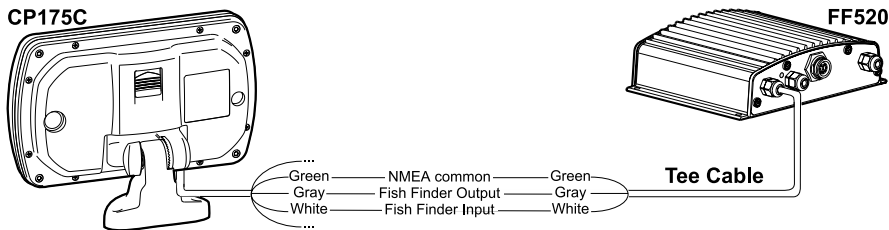
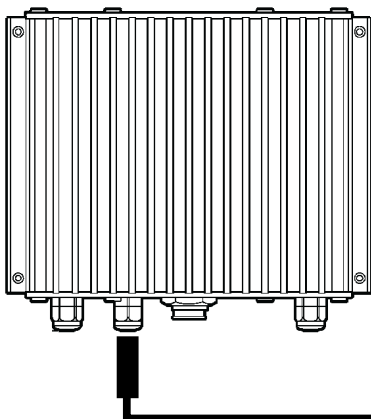


Figure 2.2b - CP175C Connection

2.3 OPTIONAL CONNECTIONS

The FF520 has one NMEA output, one alarm buzzer output and a second input for a temperature sensor.



WIRE COLOR	FUNCTION
BLACK	GND
RED	Not connected
WHITE	NMEA Output(+)
GREEN	NMEA GROUND
GRAY	Not connected
YELLOW	Temp 2 INPUT(+)
BROWN	Not connected
BLUE	Alarm OUTPUT(+)
ORANGE	Not connected
PINK	Not connected

Figure 2.3 - The FF520 Optional Connections

2.3.0 NMEA Output

The following sentences are outputted: DPT and DBT (Depth), VHW (Speed), VLW (Trip Log), MTW (Water Temperature), XDR (External Sensor Temperature).

2.3.1 Alarm Buzzer

This connection has the capability to drive a buzzer that draws 400mA. Any 12VDC buzzer within the current draw requirements is able to be connected.

2.3.2 Second temp sensor

Any thermistor type temp sensor that produces 10K ohms at 77 degrees F is able to be connected.

2.3.3 LED Status Indicator

There are seven different LED behaviors, representing seven different diagnostic conditions. These are described below.

- OFF
The FF520 is running in the bootloader, or DC power is not being supplied to the FF520.
- ON CONTINUOUSLY
The transducer is not connected to the GPS Chart plotter or problem with cable of the transducer cable..
- 1 LONG FLASH EVERY 2 SECONDS
The FF520 is not connected with the GPS Chart plotter.
- 1 SHORT FLASH EVERY 2 SECONDS
The FF520 is connected to the GPS Chart plotter and is operating correctly.
- 2 SHORT FLASHES EVERY 2 SECONDS
The FF520 is not operating as it is waiting for a command from the GPS chart plotter.
- 3 SHORT FLASHES EVERY 2 SECOND
A non-Standard Horizon transducer (without transducer ID) has been connected
- 4 SHORT FLASHES EVERY 2 SECONDS
No transducer connected.

2.4 POWER CONNECTIONS

It is recommended the installation of a switch and a (5A) fuse (not supplied) in the positive DC supply to the FF520. The FF520 is designed to remain in stand-by even when the power of the GPS chartplotter is turned off, this is the need for a switch so the vessels battery will not be drained..

In the example below you will notice the positive DC power connection is run through a switch and a fuse before connecting it to the FF520 and the GPS chartplotters.

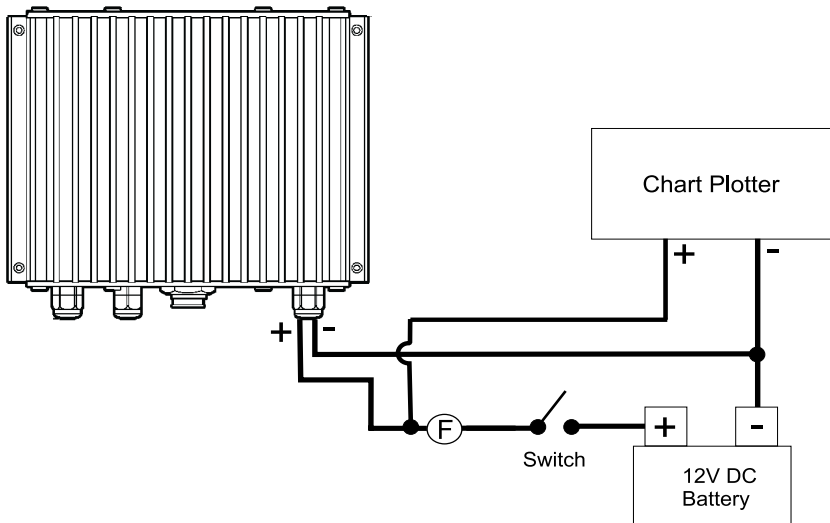


Figure 2.4 - The FF520 Power Connection

2.5 GPS CHARTPLOTTERS SOFTWARE UPDATE

Inside the box containing the FF520 you will find 3 software upgrade CARDS. These CARDS are used to update the software in the GPS chartplotters to be compatible with the FF520 and will load the MAX cartography operating system from C-Map. Pls note that NT+ cartography cards still can be used, but to use all the MAX features a MAX cartography card will have to be purchased.

NOTE

Updating the software in the GPS chartplotters with these CARDS will erase all Marks and Routes that you have stored. Please read carefully the following paragraphs.

2.5.0 Backing up Marks and Routes

If you have created Marks and Routes you will need to either make note and manually re-enter them or purchase an optional User C-CARD supplied by C-Map. C-Map can be contacted at 508/477-8010.

Refer to Par 9.0 of the GPS chartplotters's Owner's Manual for backing up the points.

2.5.1 Installing Software

Once you have backed up your User Points:

1. Turn off the GPS chartplotters and insert the Software CARD (related to your GPS chartplotters) into any C-CARD slot on the GPS chartplotters.
2. Press and hold **[PWR]** until the GPS chartplotters beeps, then release the key.
3. Wait until the Start screen is shown, then remove the CARD.
4. The software is now updated and the GPS chartplotters is compatible with the FF520.

3. FISH FINDER

This chapter is intended to help you understand how the STANDARD HORIZON GPS chartplotters with the FF520 connected operates.

The FF520 consists of a high power transmitter, sensitive receiver and a transducer. The FF520 sends an electrical pulse to the transducer which contains a element that converts the pulse into acoustic (sound) wave which is sent through the water. As this wave travels from the transducer to the bottom, it may strike fish, structures, thermal clines (temperature changes in the water). When the wave strikes an object(s) a certain amount of the wave is reflected back to the transducer depending on the composition and shape of the object. When the reflected wave is returned to the transducer it is converted into a voltage and is amplified by the receiver, processed and sent to the display. The speed of sound in water is roughly 4800 ft./sec, so the time lapse between the transmitted signal and the received echo can be measured and the distance to the object determined.

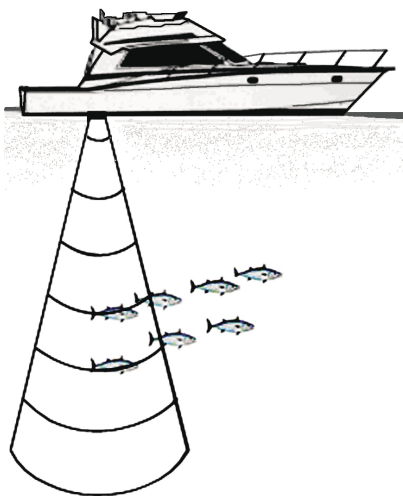


Figure 3 - Fish Finder working principle

3.0 UNDERSTANDING THE FISH FINDER PAGE

The display on STANDARD HORIZON GPS chartplotterss shows a history of time of the echoes received by the transducer. The STANDARD HORIZON GPS chartplotterss have a menu that allows adjustments to receiver sensitivity, depth range and scrolling speed of the Fish Finder display.

- ① Warning message
- ② Fish Finder window
- ③ Color Bar
- ④ Digital Depth
- ⑤ Water temperature
- ⑥ Alarm Bar
- ⑦ Depth ruler
- ⑧ Variable Depth Marker (VDM)
- ⑨ Zoom Bar
- ⑩ A-Scope
- ⑪ Operating Frequency

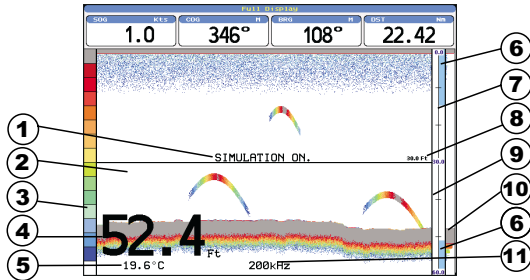


Figure 3.0 - The Fish Finder page

Following there is a brief description of terms listed in the previous Figure 3.0:

- ① **Warning Message**
This is a flashing label that is turned on when the echo sounder is in Simulation mode.
- ② **Fish Finder window**
It is the graphic presentation of sonar soundings recorded as a continuous profile scrolling across the screen from right to left. Such recordings represent the image of the water beneath your boat, items appear as they pass under your transducer; the items on the right side of the screen are closer to you than those on the left. The correct interpretation of the fish finder page allows retrieving useful information about what is under the boat. See the following Par. 3.0.0 for more information.
- ③ **Color Bar**
The colored scale located on the left side of the screen that shows the colors used in the Fish finder page to represent the echoes strength. The color on the top of the bar represents the maximum echo strength, while the color on the bottom of the bar represents the minum echo strength.
- ④ **Digital Depth**
Readout of the current bottom depth.
- ⑤ **Water Temperature**
Readout of the current water temperature returned by the temperature sensor located into the depth transducer (TEMP1 sensor).
- ⑥ **Alarm Bar**
Range located on the right side of the depth ruler showing the range outside of which the depth measurement will trigger an alarm condition. Alarm can be set as to alert the user of shallow-water conditions, deep-water conditions or both.
- ⑦ **Depth ruler**
Vertical graduated bar that is located along the right side of the screen. It is a scale which reflects the depth of the area being displayed.

8 Variable Depth Marker (VDM)

Horizontal line on to the Fish finder page window with a depth label. The up/down cursor keys can move it up and down. The label displays the depth of the cursor position. It can be moved to any location pinpointing the depth of a target.

9 Zoom Bar

Range bar that is located on the left side of the Depth Ruler representing the current zoom range. It is turned on in the un-zoomed window of the Standard/zoomed split view to indicate which portion of the Fish finder page is currently represented in the zoomed window.

10 A-Scope

Real time representation of fish and bottom features passing through the beam of the transducer. It is drawn as column of horizontal lines whose length and hue is proportional to the echo strength returned. The stronger the echo the larger shall be the line height. The hue depends on the currently selected palette. When the default palette is selected, on the color chartplotters the strongest sonar returns will be shown as red and weaker returns will be shown blue.

11 Operating Frequency

Readout of the selected operating frequency.

3.0.0 Understanding the Fish Finder display

The main elements that can be easily distinguished into a Fish Finder fish finder page are:

- ① Fishes
- ② Thermoclines
- ③ White Line
- ④ Surface Clutter
- ⑤ Structures
- ⑥ Bottom Echo Profile

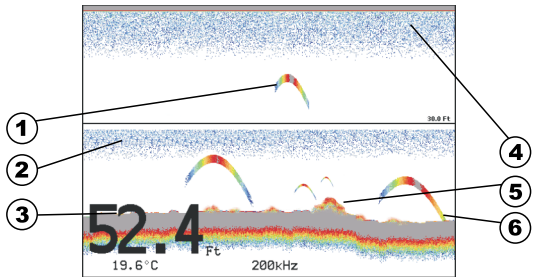


Figure 3.0.0a - The Fish Finder Fish finder page

① Fishes

Fishes are represented as arcs because of the cone angle of the transducer. In fact as the boat passes over the fish the leading edge of the cone strikes the fish, causing a display pixel to be turned on. As the boat passes over the fish, the distance to the fish decreases turning each pixel on at a shallower depth on the display. When the boat is directly over the fish, the first half of the arch is formed and since the fish is closer to the boat, the signal is stronger and the arch is thicker. As the boat moves away from the fish, the distance increases and the pixels appear at progressively deeper depths forming the remaining half of the arch.

② Thermoclines

Are the zones where two layers of different water temperatures meet. The greater the

temperature differential, the denser the thermocline shows on the screen. Thermoclines are represented as horizontal stripes of noise. They are very important for fishing since often many species of game fish like to suspend in, just above, or just below the thermoclines.

③ White Line

The White Line shows the difference between hard, soft bottoms and even distinguishes between fishes and structures located near the bottom. In this way it is easier to tell the difference between a hard and soft bottom and even to distinguish fishes and structures located nearby the bottom. For example, a soft, muddy or weedy bottom returns a weaker echo that is shown with a narrow white line while a hard bottom returns a strong echo that causes a wide white bottom line.

④ Surface Clutter

Appears like noise at the top of the screen extending many feet below the surface. It's caused by many things, including air bubbles, bait fish, plankton and algae.

⑤ Structures

Generally, the term "structure" is used to identify objects like wrecks and weeds rising from the bottom.

⑥ Bottom Echo Profile

Bottom profile recorded by the FF520. When the echo sounder is set in auto-range mode it is automatically kept in the lower half of the screen.

Other Elements

Large anchoring cables are returned by the echo sounder as very long and narrow arcs on the screen.

3.1 DISPLAYING THE FISH FINDER PAGE

This section explains how to show and customize the selection of the Fish Finder display pages.

Legend:

[MENU]

If you see brackets around a word, this is referring to a key press

PAGE SELECTION

An underlined word refers to a selection in the menu

3.1.0 Menu selection (all GPS chartplotters)

1. From all pages except the Fish Finder page, press **[MENU]**.
2. Move the ShuttlePoint knob to highlight **FISH FINDER** and press **[ENTER]** or move the ShuttlePoint knob to the right.

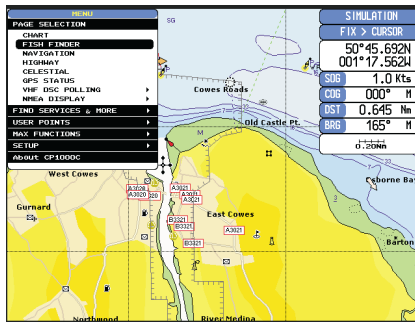


Figure 3.1.0 - Fish Finder page selection by [MENU]

3.1.0a Customizing the Fish Finder menu selection

The default setting of the **FISH FINDER** selection in the Main Menu is 200kHz Full page, however this may be changed to show images as shown in the Figure 3.1.0a.

To change:

1. Press **[MENU]**.
2. Move the ShuttlePoint knob to highlight **SETUP** and press **[ENTER]** or move the ShuttlePoint knob to the right.
3. Move the ShuttlePoint knob to highlight **FISH FINDER SETUP** and press **[ENTER]** or move the ShuttlePoint knob to the right.
4. Move the ShuttlePoint knob to highlight **PAGE SELECTION** and press **[ENTER]** or move the ShuttlePoint knob to the right.
5. A page selection window will be shown. Move the ShuttlePoint knob to the right/left or up/down to select the desired display and press **[ENTER]** to select.
6. Press **[CLEAR]** until the Main Menu is shown, move the ShuttlePoint knob to highlight **FISH FINDER** and press **[ENTER]**.

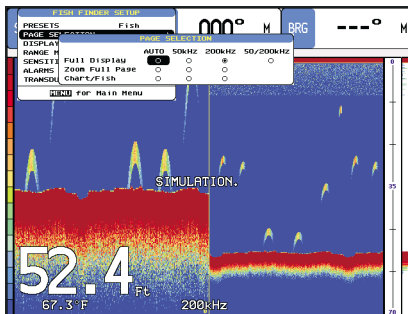


Figure 3.1.0a - Page Selection menu

3.1.1 Soft Keys (CP175C and CP1000C)

1. From any page press one of the 5 Soft Keys located under the display which will show the Soft Key selections.
2. Locate and press the Soft Key labeled 200kHz Full.

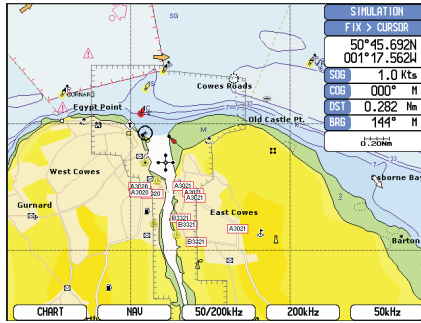


Figure 3.1.1 - Fish Finder page selection by Soft Keys

3.1.1a Customizing the Soft Keys

All of the Soft Keys can be customized to select the Fish Finder displays to which you want quick access to one or up to 3 Fish Finder FULL DISPLAY pages:

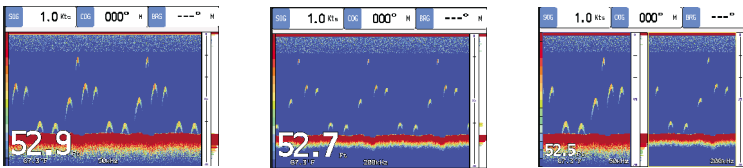


Figure 3.1.1a - Fish Finder FULL DISPLAY pages

To customize a Soft Key:

1. Press any of the Soft Keys.
2. Press and hold one of the Soft Keys until the menu is shown below.

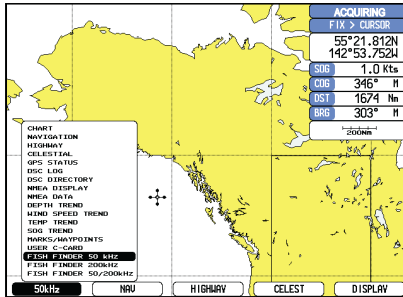


Figure 3.1.1ab - Fish Finder Soft Keys configuration

3. Move the ShuttlePoint to the desired Fish Finder page and press [ENTER].

3.1.2 Key Operation when Fish Finder page is shown

When the Fish Finder pages are shown [MENU], [ENTER], [CLEAR], [MARK], [ZOOM IN] and [ZOOM OUT] are used to perform specific functions described below.

3.1.2a The MENU key

1. Pressing this key when a Fish Finder page is displayed, will show the Fish Finder Setup

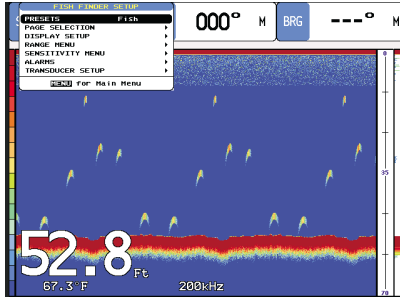


Figure 3.1.2a - The MENU key, Fish Finder Setup

2. If pressed again the GPS chartplotters Main Menu will be displayed.

NOTE

To change to the Chart page [MENU] must be pressed 2 times to show the Main Menu. Then move the ShuttlePoint Knob to select the Chart page and press [ENTER] or move the ShuttlePoint knob to select the Chart page.

3.1.2b The ENTER key

1. Pressing this key when a Fish Finder page is displayed, will show the Sensitivity Menu.

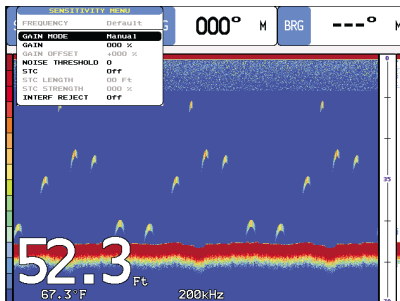


Figure 3.1.2a - The ENTER key, Sensitivity Menu

3.1.2c The CLEAR key

1. Pressing this key hides the Variable Depth Marker (VDM)
2. Pressing this key in ZOOM mode with AUTORANGE enabled, selects the BOTTOM FOLLOWING mode. In such mode the ZOOMED view automatically follows the bottom contour as to keep it always displayed in the lower half of the screen.

3.1.2d The ZOOM IN and ZOOM OUT keys

Pressing [ZOOM IN] when any of the Fish Finder displays are shown, allows the page to be zoomed into 2X or 4X the normal display.

Move the ShuttlePoint knob up or down to move the VDM to the area you wish to zoom into.

Press [ZOOM IN] once, and 2X will be shown in the bottom left corner of the display.

Pressing [ZOOM IN] again switches to 4X and again to normal operation.

Pressing [ZOOM OUT] switches from 4X to 2X and viceversa.

3.1.2e The MARK key

Pressing [MARK] when any of the Fish Finder displays are shown, place a mark on the chart page on the boat position.

3.1.2f The SHUTTLEPOINT knob

Moving up or down the ShuttlePoint knob when any of the Fish Finder displays are shown, move the VRM up and down.

3.1.2g Controls on Chart page or Fish page in Chart/Fish dual mode

When the GPS chartplotters is in the Chart/Fish display mode, it is possible to move the control between the Chart and the Fish:

1. To use the keys on the Chart Page, press [MENU] until the Main Menu is show, then press [CLEAR].
2. To use the keys to control Fish Finder operations, press [MENU] to until the display shows the Fish Finder Setup, then press [CLEAR].

3.1.3 Sounder Adjustments with Soft Keys (CP175C and CP1000C)

When the Fish Finder full page is displayed, pressing one of the Soft Keys will allow control of Gain (receiver gain), Noise (Noise threshold), Range (manual depth range), Frequency (200kHz or 50kHz) and Sensitivity Time Control. If no key is pressed the Soft Keys will disappear in 5 seconds. To manually hide the Soft Keys, press [CLEAR] .

3.1.3a The GAIN Soft Key

By pressing [GAIN] the Gain changes between AUTO GAIN and MANUAL GAIN.

If MANUAL GAIN, use the cursor left/right to adjust it: a bar with the % symbol is displayed on the screen above the [GAIN] label.

If AUTO GAIN, use the cursor left/right to adjust the Gain Offset: a bar with the % symbol is displayed on the screen above the [GAIN] label.

3.1.3b The NOISE Soft Key

Pressing the [NOISE] soft key and moving the ShuttlePoint knob to the right or left will increase or decrease the Noise threshold level..

3.1.3c The RANGE Soft Key

By pressing [RANGE] the window switches to the next RANGE status: MANUAL, BOTTOM LOCK and AUTO.

If MANUAL is selected move the ShuttlePoint knob up or down will adjust the depth vale in 10Ft steps. To adjust the Shift move the ShuttlePoint knob to the Left or Right.

When BOTTOM LOCK is selected, moving the Shuttlepoint knob up or down to adust the Bottom range 10Ft at a time.

If AUTO RANGE, the range value is set automatically by the FF520 and it cannot be changed by the user.

3.1.3d The FREQUENCY Soft Key

Pressing the [FREQUENCY] softkey toggles the FF520 output frequency between 50, 200kHz and Auto. The current value or Frequency is shown on a window right over the [FREQUENCY] label. The [FREQUENCY] is not available when the Fish Finder show 50 and 200kHz Dual page.

3.1.3e The Sensitivity Time Control (STC) Soft Key

The [STC] changes the STC value between OFF/SHORT/MID/LONG/CUSTOM. The current value of STC is shown on a window right over the [STC] label. Move the ShuttlePoint knob left or right will adjust the value.

3.2 SYSTEM INFORMATION PAGE

For troubleshooting you maybe asked by a Standard Horizon Product Support Technician for the software version of fish finder. The following procedure is how to access this information.

1. From the Chart Page press [MENU] key to open the Main Menu
2. Move the ShuttlePoint knob to highlight **ABOUT...** and press [ENTER] or move the ShuttlePoint knob to the right.
3. A window will be shown with the system information on the Fish Finder Library version and on the Fish Finder module type and version.
4. Press [CLEAR] to exit.

3.2.0 The System Update menu

The System Update menu allows downloading the Fish Finder firmware into the Fish Finder device. To select this menu follow the procedure:

1. From the Chart Page press [MENU] key to open the Main Menu.
2. Move the ShuttlePoint knob to highlight **ABOUT...** and press [ENTER] or move the ShuttlePoint knob to the right.
3. A window will be shown with the system information.
4. Press [MENU].
5. Move the ShuttlePoint knob to highlight **UPDATE BBFF FIRMWARE SOFTWARE** and press [ENTER] or move the ShuttlePoint knob to the right.
6. The current Fish Finder firmware version is shown in the System Update window that appears on the screen. Insert the C-CARD with the firmware in one of the chart plotter available slots, and the press [ENTER] to update.

7. Move the ShuttlePoint knob to highlight **YES** and press **[ENTER]** to confirm.
8. Press **[CLEAR]** to exit.

4. FISH FINDER SETUP MENU

1. From the full page fish finder page, press the [MENU] key to show the Fish Finder Setup menu.

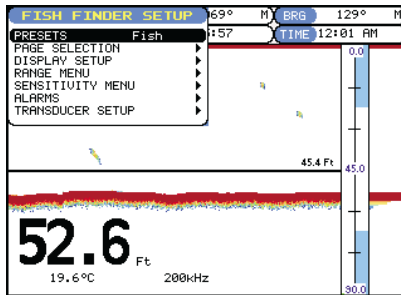


Figure 4 - Fish Finder Setup menu

2. From the Chart page, to access this menu:
 - a. Press [MENU]. Move the ShuttlePoint knob to **SETUP** and press [ENTER].
 - b. Move the ShuttlePoint knob to **FISH FINDER SETUP** and press [ENTER].

The following paragraphs describe the Fish Finder Setup menu sub-options.

4.0 PRESETS

Allows selection of the following preset modes: FISH, CRUISE, AUTO RANGE, BOTTOM LOCK and MANUAL. The default values are:

Fish	: Auto Gain, Auto Range, Gain Offset = 10, Shift = 0
Cruise	: Auto Gain, Auto Range, Gain Offset = 0, Shift = 0
Auto Range	: Manual Gain, Auto Range, Shift = 0
Bottom Lock	: Auto Gain, Bottom Lock Range Mode, Gain Offset = 0, Shift = 10m (30Ft)
Manual	: Manual Gain, Manual Range

NOTE

For Gain and Gain Offset settings please see the Sensitivity menu (Par. 4.4).
For Range and Shift settings see the Range menu (see Par. 4.3).

4.1 PAGE SELECTION

The Page Selection menu allows you to adjust the Fish Finder display page to your preference, sizing the Chart and Fish Finder Fish finder page (see also Pra. 3.1.0a).

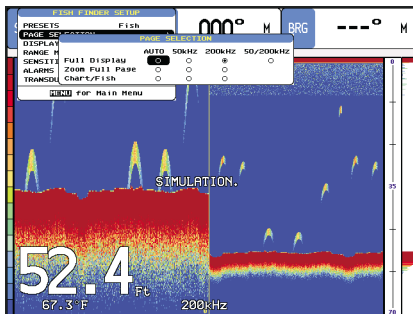


Figure 4.1 - Page Selection sub-menu

The Page Selection options are:

- Auto** : Selects automatically the 50kHz if depth is greater than 400ft and selects 200kHz if depth is less than 300ft.
- Full Display** : Shows the full Fish Finder page allowing to select among the 200kHz Standard Fish Finder, 50 kHz Standard Fish Finder or 200/50 kHz Dual Fish Finder.
- Chart/Fish** : Shows the Chart page on the left half of the screen and the Fish Finder on the right half of the screen. It is possible to select among the 200kHz Standard Fish Finder or 50 kHz Standard Fish Finder.
- Zoom Full page** : Shows the zoomed Fish Finder on the left half of the screen and the unzoomed Fish Finder on the right half of the screen. It is possible to select between the 200kHz Split Fish Finder or the 50 kHz Split Fish Finder zoomed view.

4.2 DISPLAY SETUP

The Display Setup menu allows you to change the Fish Finder display page appearance.

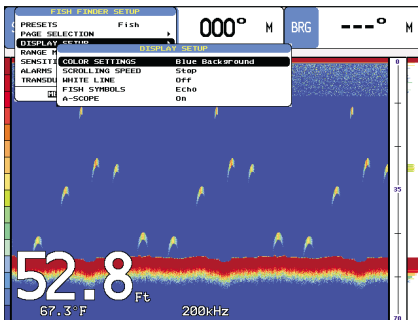


Figure 4.2 - Display Setup sub-menu

The Display Setup options are:

- Color Settings** : Allows you to change the color of the Fish Finder display.
- Scrolling Speed(*)** : Adjusts the chart scrolling rate.
- White Line** : Controls how the STANDARD HORIZON GPS chartplotters displays information about the bottom type (hard or soft). When the White Line is Off the bottom return will display as black (red). When the White Line is On it can be used to determine bottom hardness.
- Fish Symbols** : Allows determining the graphical representation of underwater suspended targets. See below.
 - Off:** shown as arches (echoes)
 - Icon:** shown as Fish icons without the arches
 - Icon + Depth:** shown as Fish icons and their relative depth values (shown accordingly to currently

selected depth unit)

Icon + Echo: shown as arches with the Fish icon

Icon + Echo + Depth: shown as arches with the Fish icon and relative depth values

A-Scope : displays Sonar Echo in real time

NOTE (*)

Note that the max scrolling rate is limited by the sound speed and the depth according with the following relation: the deeper the setting, the slower the scrolling rate.

The following are examples of Color settings:

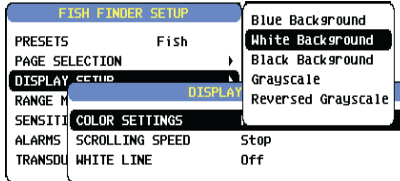


Figure 4.2a - Color Settings item

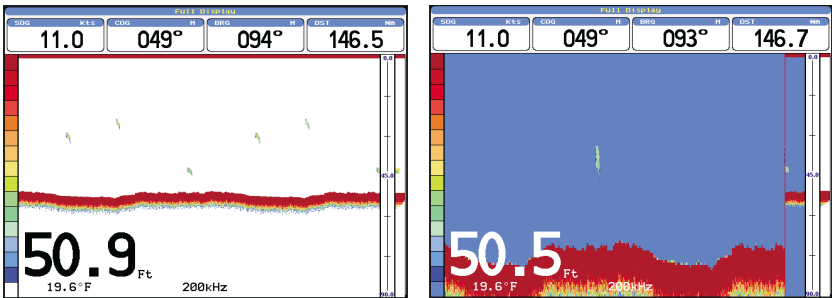


Figure 4.2b - Examples of Color Settings: white on the left and blue on the right

4.3 RANGE

The Range menu allows you to set the Fish Finder working range.

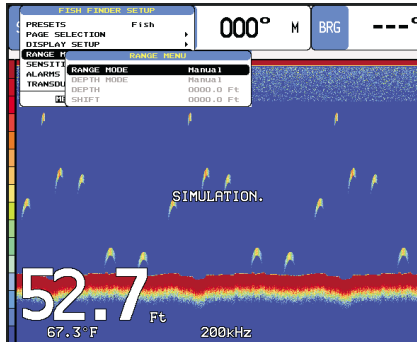


Figure 4.3 - Range sub-menu

The Range options are:

Range Mode	: Selects among Manual, Auto Range and Bottom Lock. In Manual Range Mode is possible to set Shift (the offset from the surface) and depth on which the Fish Finder shall operate. In Auto Range Mode the Fish Finder determines automatically the range as to keep the bottom visible in the lower bottom of the screen. In this mode, Shift is always set to 0. In Bottom Lock Mode the Fish Finder automatically tracks the range around the bottom specified by the Bottom Range value.
Depth	: This option is available only when Range Mode is Manual and it is disabled in Auto Range and Bottom Lock Mode. When Range Mode is Bottom Lock, Depth and Shift options are replaced by Bottom Range.
Depth Mode	: This option is available when Range mode is Manual Manual: The bottom search is done inside the range selected by the user Auto: The bottom search is done inside the full range of the Fish Finder capability (0-4000ft)
Shift	: Offset from the surface.
Bottom Range	: This option is available only when Range Mode is Bottom Lock. It is the range around the Bottom Line that has to be tracked by the Fish Finder.

NOTE

The options under Range Mode change depending on the current Range Mode.

4.4 SENSITIVITY

The Sensitivity menu is accessible both from the Fish Finder Setup menu and by pressing [ENTER] when in Fish Finder pages. All settings in the Sensitivity menu are related to the Frequency.

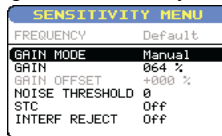


Figure 4.4 - Sensitivity sub-menu

Frequency	: Allows to choose on which frequency operate the changes.
Gain Mode	: Selects Auto or Manual.
Gain (*)	: Allows you to control the sensitivity of the unit's receiver. To see more detail, increase the receiver sensitivity by selecting a higher gain percentage. If there is too much detail or if the screen is cluttered, lowering the sensitivity may increase the clarity of the display.
Gain Offset (*)	: Allows increasing or decreasing the Sensitivity in Auto Gain mode, by adding a positive or negative value to the internal Gain setting.
Noise Threshold	: It can be turned in to a percentage setting.
STC	: Sensitivity Time Constant: it is a time varying gain curve which attenuates the sonar receiver gain in shallow water, increasing the gain gradually as the depth increases. This is for the purpose of filtering out surface clutter.
Interf Rejection	: Selects a filter to remove noise from other sources to external noises.

NOTE (*)

If the Gain Mode option is set to Auto, the Gain Offset field is active. The default Gain Offset is zero. If the Gain Mode option is set to Manual, the Gain field is active. When switching from Automatic to Manual mode, the Gain + Offset value is copied into the Manual Gain setting of the receiver.

4.5 ALARMS

The Alarms menu allows you to define alarm settings for Shallow Alarm, Depth Alarm and Temperature Upper/Lower/Rate. To set an Anchor Alarm, enter in a shallow water and depth value above and below your actual anchoring depth. The alarm will sound if the anchor is dragged shallower or deeper than the settings.

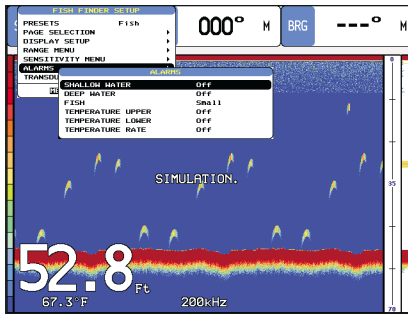


Figure 4.5 - Alarms sub-menu

Shallow Water	: Triggers an alarm when depth becomes shallower than the value set.
Depth Water	: Triggers an alarm when depth becomes deeper than the value set.
Fish Alarm	: The options for Fish Alarm set the size of the fishes that, if detected by the unit, switches an alarm to sound. These options are: Off, Small, Medium, Big and Huge. The alarm sounds if the set size (or bigger) is detected.
Temperature Upper	: Triggers an alarm when the transducer reports a temperature above the value set.
Temperature Lower	: Triggers an alarm when the transducer reports a temperature below the value set.
Temperature Rate	: Triggers an alarm when the transducer reports a temperature variation rate above the value set.

4.6 TRANSDUCER SETUP

This menu allows you to calibrate the speed through the water, water temperature and the keel/prop offset of the transducer.

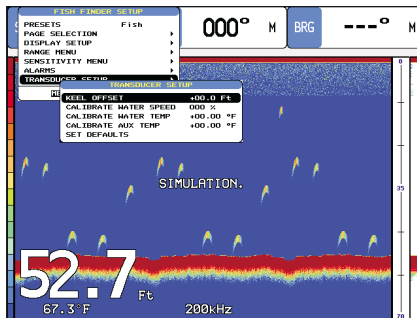


Figure 4.6 - Transducer Setup sub-menu

Keel Offset	: Allows you to offset the surface reading for the depth of a keel. This makes it possible to measure depth from the surface, bottom of the boat or bottom of the propeller(s) instead of from the transducer location.
Calibrate Water Speed	: Allows calibrating the value of Water Speed coming from the transducer. The calibration value, in the range between -10% to +10%, will be applied to the water speed from the transducer
Calibrate Water Temp	: Allows the calibration on the Water Temperature sensor. Using the readings from a precise temperature measuring device, insert a positive/negative offset to display the correct temperature.
Calibrate Aux Temp	: Allows the calibration of the Aux Temperature sensor. Using the readings from a precise temperature measuring device, insert here a positive/negative offset to display right value on FF screens.
Set Default	: Restores the factory settings.

5. SPECIFICATIONS

5.0 FF520 SPECIFICATIONS

Power supply	: 10 - 35 Volt dc
Max stand by current draw	: 170mA at 10 Volt dc
Max current draw	: 1.42A at 12 Volt dc
Sounder Power	: 500/1000W (4000/8000Wpp)
Display Colors	: 16 colors
Display Vertical Resolution	: 400 pixels on CP1000C 200 pixels on CP155C/CP175C
Frequency	: Dual 50 and 200kHz
Max Depth	: 1KW : 1200Ft (365m) at 200kHz 4000Ft (1219m) at 50kHz 500W: 700Ft (213m) at 200kHz 1500Ft (457m) at 50kHz
Min Depth	: 2.5Ft (0.8m) at 200kHz 5Ft (1.6m) at 50kHz
Data output	: proprietary format
Weight	: 1 kg (2,20 LBS)
Operating temperature range	: 32F to 122F (0C to +50C)
Storage temperature range	: -4F to 158F (-20C to +70C)

Dimensions - mm (inch) :

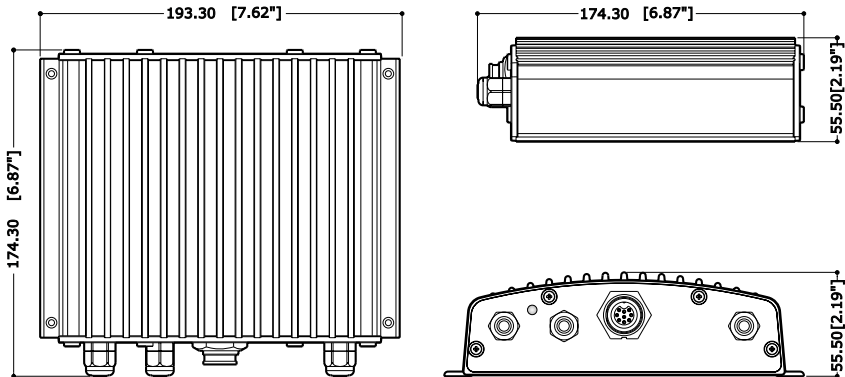


Figure 5.0 - FF520 Dimensions [mm/inch]

5.1 FF520 EXTERNAL CONNECTIONS

NOTE

The image below is for your reference only. Since the FF520 is pre-wired it is recommended that the box not be disassembled.

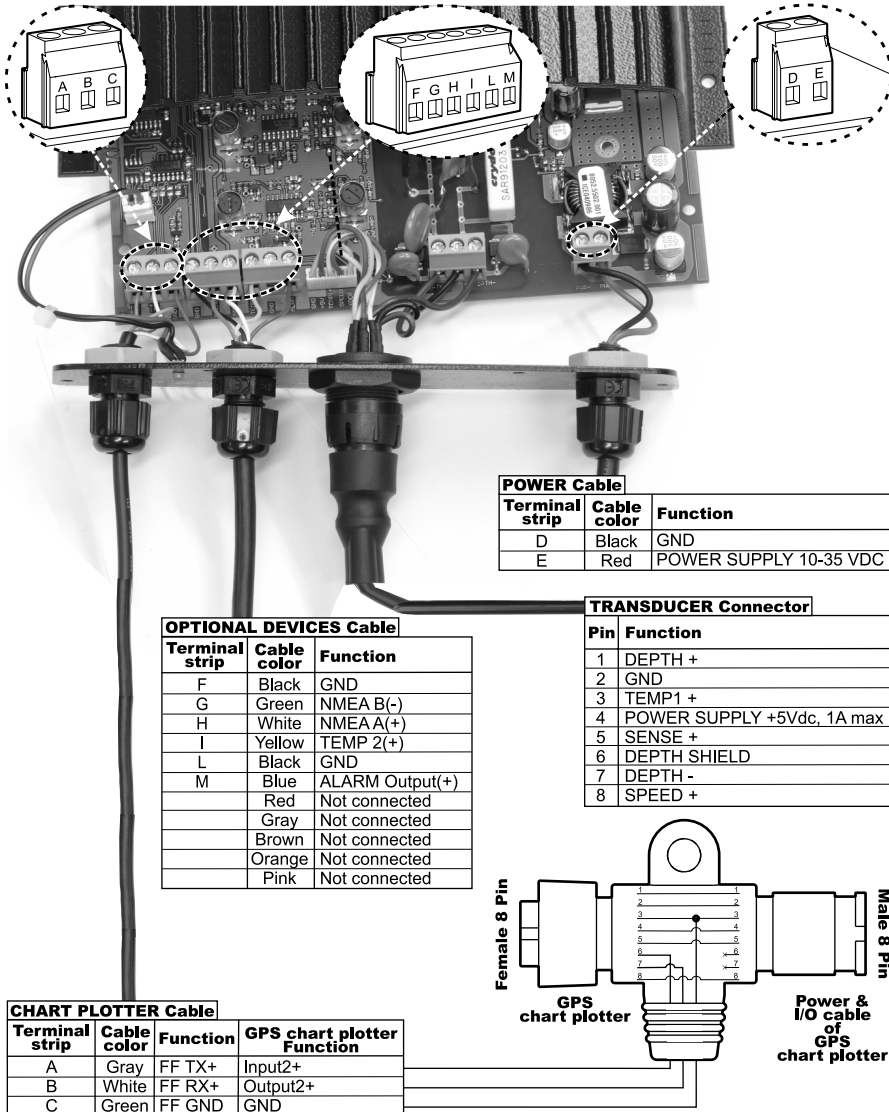


Figure 5.1 - FF520 External connections

6. TRANSDUCER

The transducer is a device that transmits and receives sound waves into the water. The active component inside the transducer is commonly referred to as an element but actually is a piezoelectric ceramic material.

6.0 TRANSDUCER MOUNTING

6.0.0 Power Boats

Basically there are 2 hull types of powerboats Planing and Displacement. In the pictures shown below the boxes with lines are where the transducer should be installed.

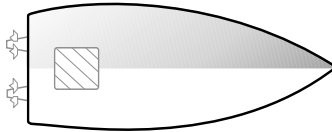


Figure 6.0.0 - Planing

The planing hull allows the boat to rise quickly out of the water, allowing the boat to travel at higher speeds.

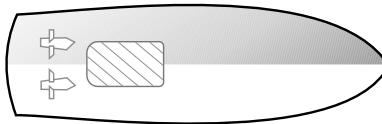


Figure 6.0.0a - Displacement

The displacement hull does not ride up on top of the water; rather it pushes through the water.

6.0.1 Sailboats

Most sailboats that use digital depth sounders/transducers are displacement hulls. There are two basic hull types of sailboats:

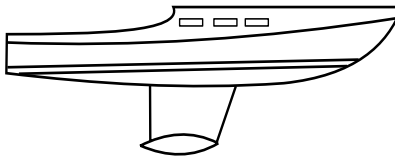


Figure 6.0.1 - Fin Keel

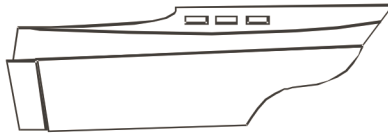


Figure 6.0.1a - Full Keel

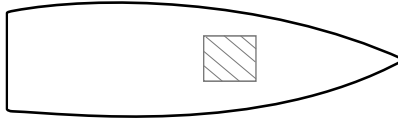


Figure 6.0.1b - Mounting Area

6.0.2 Transducer Types

Since there are many different shapes and sizes of hulls, STANDARD HORIZON offers a range of Depth transducers to fit the vessels requirements.

6.0.3 Low Profile Thru-Hull

If the user is planning to mount a thru-hull transducer first he has to know the dead rise angle where the transducer will be located on the boat. The dead rise is a nautical term that refers to the angle of the hull where the transducer will be mounted (see picture below). Specific transducers are designed to be installed on boats with different dead rises. See Par. 6.1.

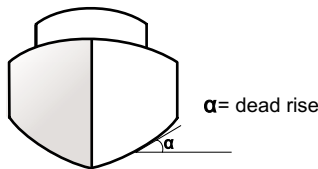


Figure 6.0.3 - Dead rise

6.0.4 Transom

POWER BOATS ONLY

The back of a boat is called the transom this is where this transducer is mounted. This transducer has a bracket that is screwed down onto the hull.

6.0.5 Fairing Block

Used when a hull is over 10-15 degrees this type of transducer should be used.

- What makes this transducer different from a Low Profile transducer is that it is used with a fairing block.
- The Fairing block is used to compensate the dead rise of the hull. The fairing block

STANDARD HORIZON offers is made from hard plastic which fits around the transducer.

- To install the transducer and fairing block, the user measures the dead rise of the hull and cuts the fairing block to that angle. One half of the fairing block mounts on the inside while the other part of the fairing block mounts on the outside of the hull.

6.0.6 In-hull

This transducer is epoxyed to the inside of the hull that is not more than 1/2 inch thick and is solid not cored.

6.1 OPTIONAL TRANSDUCERS ID SENSORS

<i>500W Transducers</i>				
				
DST 520 Nylon depth/temp 50kHz(45°) 200kHz(12°)	DST 521 Transom depth/temp 50kHz(45°) 200kHz(12°)	DST 523 Bronze depth/temp 50kHz(45°) 200kHz(12°)	DST 525 In-Hull Depth 50kHz (45°) 200kHz(14°)	DST 526 Bronze tri-Ducer 50kHz(45°) 200kHz(14°)
<i>1000W Transducers</i>				
				
DST 527 In-Hull depth 50kHz(19°) 200kHz(6°)	DST 528 Bronze depth/temp 50kHz(23°) 200kHz(5°)			

Figure 6.1 - Optional Transducers

7. Tips of operations

7.0 HOW CAN I DISCONNECT THE CABLES FROM THE FF520 IN CASE I NEED TO DO SO FOR THE INSTALLATION?

- .. Open the FF520 box unscrewing the four screws (see the following figure).

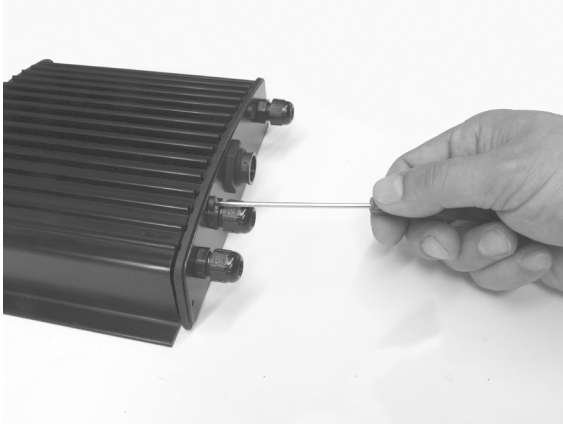


Fig. 6.1 - The FF520 (I)

- .. Once the screws are removed, pull out the panel and the Printed Circuit Board (PCB). Unscrew the cables from the PCB.

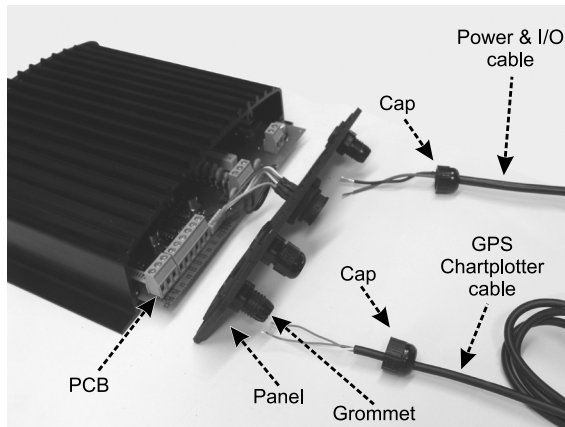


Fig. 6.1a - The FF520 (II)

- .. Wire the cables as needed.
- .. Reconnect the cables to the PCB (see the Fig. 4.5 for reference).
- .. Push the panel towards the case (be sure to have well positioned the rubber gasket).
Close the FF520 box screwing the four screws.

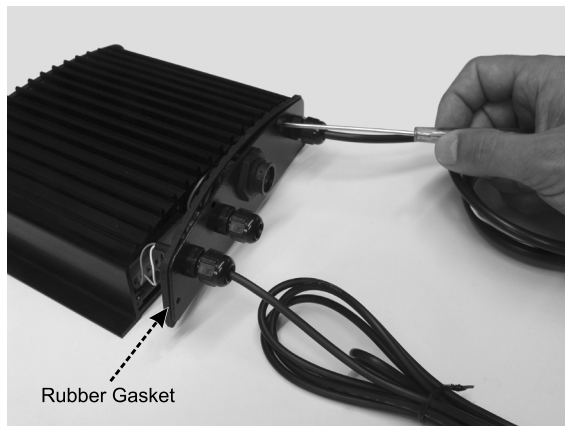


Fig. 6.1b - The FF520 (III)

7.1 HOW CAN I SET OPTIMAL OPERATING PARAMETERS.

Optimal operating parameters can be set accordingly with the intended use of the Fish Finder, anyway to quickly get optimal operational parameters for fishing it is possible to select the FISH preset from the Fish Finder Setup menu, while for cruising it is possible to select the CRUISE preset.

7.2 WHAT ARE PRESET MODES?

Preset modes are pre-defined settings of the Fish Finder operating parameters. There are five preset. You can use them to quickly set the Fish Finder in the most commonly used operating modes. These are:

- “ CRUISE: sets the Fish Finder in full auto mode with the sensitivity settings (GAIN OFFSET, NOISE level and STC) optimized for displaying at best the bottom.
- “ FISH: sets the Fish Finder in full auto mode with the sensitivity setting optimized for target searching.
- “ AUTORANGE: sets the autorange mode and the manual gain mode.
- “ BOTTOM LOCK: sets the range mode to bottom lock and the manual gain mode.
- “ MANUAL: sets the range mode and the gain mode to manual.

7.3 HOW CAN I RESTORE THE FISH FINDER DEFAULT OPERATING PARAMETERS?

Simply select the CRUISE or the FISH preset. This will restore optimal operating parameters for either cruising or fishing.

7.4 I'M USING THE FISH FINDER IN MANUAL MODE, HOW CAN I SET THE PARAMETERS FOR OPTIMAL OPERATION.

Setting operating parameters for optimal operation depends upon environment conditions, user feeling and intended usage of the Fish Finder (e.g. fishing or cruising), anyway a good starting point is to select a full auto preset such as CRUISE or FISH and then, after waiting a while to allow the echogram displayed to stabilize around the auto calculated parameters, switch to the MANUAL preset mode. At this point it will be possible to fine tune the operating parameters by slightly changing the auto calculated parameters.

7.5 CAN I ALWAYS LEAVE THE FISH FINDER IN FULL AUTO/ (AUTO GAIN AND AUTO RANGE) MODE?

Yes, but note that the full auto mode suits the 90% of the cases, however in extreme situations the auto modes may fail and thus it is necessary to switch to the Manual mode.

7.6 WHAT ARE EXTREME SITUATIONS IN WHICH AUTO MODES MAY FAIL?

When the bottom is very deep, at high boat speed, when the bottom is very shallow (< 5 feet), when the water is full of materials in suspension, with bad sea conditions.

7.7 WHAT SHOULD I DO IF THE AUTO MODES FAIL?

Failure of auto modes can happen for various reasons. Hereafter you can find a range of possibilities.

7.8 AUTO-RANGE FAILS IN VERY SHALLOW WATERS DISPLAYING A DIGITAL DEPTH READOUT DEEPER THAN THE ACTUAL VALUE. WHAT SHOULD I DO?

This usually happens if the STC is set to LONG or MID and the bottom is shallow or SHORT if the bottom is very shallow causing the auto-range to hook to the second or third echo from the bottom (since in shallow waters the sound bounces more times back and forth the surface to the bottom). Try decreasing the STC value to SHORT in shallow waters or to switch it to VERY SHORT or OFF.

7.9 AUTO RANGE FAILS, AND THE DIGITAL DEPTH READOUT DISPLAYS A VERY SHALLOW READING. WHAT SHOULD I DO?

This usually happens if the STC is off or is set to a low value causing disturbs from surface clutter to be stronger than bottom echoes. Try increasing the STC value. As general rule STC has to be set as in shallow waters and LONG in depth waters.

7.10 AUTO-RANGE FAILS IN VERY DEEP WATERS DISPLAYING A DIGITAL VERY SHALLOW DEPTH READOUT. WHAT SHOULD I DO?

The Fish Finder capability to detect the bottom decreases as the bottom depth increase. If the bottom composition is soft as mud, if the sea conditions are bad, if there are thermoclines or the water is full of materials in suspension it can further decrease thus causing the digital depth readout to fail. When this happens the auto-range algorithm also fails. To recover from this situation it is necessary to switch to manual range mode and to set the manual depth mode. When manual depth mode is selected the algorithm that calculates the digital depth readout searches for the bottom within the range manually selected by the user. At this point it is necessary to increase manually the range until the bottom becomes graphically visible. If the echoes from the bottom are strong enough, the Fish Finder shall look to the bottom giving a correct depth reading and shall be possible to return in auto range mode. Please note that if one or more of the conditions that reduce the echoes from the bottom listed above is true the bottom may be not visible at all, in this situation a strong thermocline or surface clutter may be interpreted by the Fish Finder as the bottom.

7.11 AT A VERY SHALLOW RANGE UPPER HALF OF THE SCREEN APPEARS ALMOST COMPLETELY FILLED BY THE SURFACE CLUTTER. HOW CAN I ELIMINATE IT?

This is normal in shallow waters. To clean up the surface clutter without degrading the digital depth readout algorithm functionality it is possible to set the STC value to custom setting the STC lenght to the same size of the surface clutter, and increasing the STC strenght until the image on the screen cleans up. Please note that in very shallow waters it is usually better to switch to manual gain mode to reduce gain fluctuation due to rapidly changing bottom conditions.

7.12 WHY DO I NEVER SEE FISHES IN THE RANGE BETWEEN 0 TO 0.7 METERS?

The minimum range of the fish finder is 0.7 meters. In this interval the Fish Finder can detect neither the bottom nor any target.

7.13 HOW CAN I REDUCE THE SURFACE CLUTTER?

You can act by: properly setting the STC as described at 6.12 and also by increasing the NOISE LEVEL and reducing the GAIN or the GAIN OFFSET (if you are in auto gain mode). However please note that a strong attenuation of surface clutter may also reduce the capability to detect targets.

7.14 THE FISH FINDER IS IN AUTO GAIN MODE BUT THE PICTURE DISPLAY TOO MANY SMALL TARGETS, WHAT SHALL I DO TO REDUCE THE SCREEN CLUTTER?

Try increasing the NOISE LEVEL or decreasing the GAIN OFFSET.

7.15 IN VERY SHALLOW WATERS WHEN THE AUTO GAIN MODE IS SELECTED THERE ARE FLUCTUATIONS IN THE BOTTOM PROFILE WIDTH AND ITS COLOR REPRESENTATION. WHAT SHOULD I DO?

In very shallow waters the environment situation (bottom/water condition) vary very quickly thus causing the auto gain algorithm to create oscillations while trying to set optimal GAIN value for each situation. To avoid this it is advisable to switch to MANUAL GAIN mode and fine tune the GAIN to a fixed setting.

7.16 IN VERY DEEP WATERS EVEN SETTING THE GAIN TO ITS MAXIMUM VALUE I CANNOT SEE THE BOTTOM WHAT SHALL I DO?

Try decreasing the NOISE LEVEL. If still the bottom is not visible there is nothing you can do, the bottom echo is simply too weak to be detected.

INDEX

STANDARD HORIZON LIMITED WARRANTY

STANDARD HORIZON (a division of Vertex Standard USA) warrants, to the original purchaser only, each new Marine Product ("Product") manufactured and/or supplied by STANDARD HORIZON against defects in materials and workmanship under normal use and service for a period of 3 years from the date of purchase.

In the event of a defect, malfunction or failure of the Product during the warranty period, Standard Horizon's liability for any breach of contract or any breach of express or implied warranties in connection with the sale of Products shall be limited solely to repair or replacement, at its option, of the Product or part(s) therein which, upon examination by STANDARD HORIZON, appear to be defective or not up to factory specifications. STANDARD HORIZON may, at its option, repair or replace parts or subassemblies with or reconditioned parts and subassemblies.

To receive warranty service, the purchaser must deliver the Product, transportation and Insurance prepaid, to STANDARD HORIZON (Marine Division of Vertex Standard) - Attention Factory Service - 10900 Walker Street - Cypress, CA 90630, include proof of purchase indicating model, serial number and date of purchase. STANDARD HORIZON will return the Product to the purchaser freight prepaid.

STANDARD HORIZON will not warrant installation, maintenance or service of the Products. In all instances, STANDARD HORIZON's liability for damages shall not exceed the purchase price of the defective Product. This warranty only extends to Products sold within the 50 States of the United States of America and the District of Columbia.

STANDARD HORIZON will pay all labor and replacement parts charges incurred in providing the warranty repair service except where purchaser abuse or other qualifying exceptions exist. The purchaser must pay any transportation expenses incurred in returning the Product to STANDARD HORIZON for service.

This limited warranty does not extend to any Product which has been subjected to misuse, neglect, accident, incorrect wiring by anyone other than STANDARD HORIZON, improper installation, or subjected to use in violation of instructions furnished by STANDARD HORIZON, nor does this warranty extend to Products on which the serial number has been removed, defaced, or changed. STANDARD HORIZON cannot be responsible in any way for ancillary equipment not furnished by STANDARD HORIZON which is attached to or used in connection with Products, or for the operation of the Product with any ancillary equipment, and all such equipment is expressly excluded from this warranty. STANDARD HORIZON disclaims liability for range, coverage, or operation of the Product and ancillary equipment as a whole under this warranty.

STANDARD HORIZON reserves the right to make changes or improvements in Products, during subsequent production, without incurring the obligation to install such changes or improvements on previously manufactured Products. The implied warranties which the law imposes on the sale of this Product are expressly LIMITED, in duration, to the time period specified above. STANDARD HORIZON shall not be liable under any circumstances for consequential damages resulting from the use and operation of this Product, or from the breach of this LIMITED WARRANTY, any implied warranties, or any contract with STANDARD HORIZON. IN CONNECTION WITH THE SALE OF ITS PRODUCTS, STANDARD HORIZON MAKES NO WARRANTIES, EXPRESS OR IMPLIED AS TO THE MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE, EXCEPT AS EXPRESSLY SET FORTH HEREIN.

Some states do not allow the exclusion or limitation of incidental or consequential damages, or limitation on how an implied warranty lasts, so the above limitation or exclusions may not apply. This warranty gives specific legal right, and there may be other right which may vary from state to state.
