CHIRP 3212
QUICK START GUIDE
D101-05733-Rev2.1

For use with Knudsen Chirp 3212
Part Number: D229-04405

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1. Amendment History

Version	Date	Description	Author	Approved By
2.1	Mar 2, 2016	New Format	Darren Gibson	Nolan Pretty

2. Introduction

2.1 About this Manual

This document describes the basic setup and operation of the Knudsen Chirp 3212 Echosounder.

2.2 Technical Support

For technical support or to report problems please contact your local representative or:

Technical Support
Knudsen Engineering Limited
10 Industrial Road
Perth, Ontario, Canada
K7H 3P2

Voice: (613) 267-1165 8:30am to 5:00pm E.S.T. Core hours
Fax: (613) 267-7085
E-Mail: support@knudseneng.com
WebSite: http://knudseneng.com/

2.3 Unpacking the Shipment

The Chirp 3212 is packed with custom made foam end caps and shipping box. Please keep the end caps and box for any possible return shipments. The standard shipment may contain the following items:

• Chirp 3212 Echosounder Part Number: D229-04405 • DC Input Power Cable Part Number: D219-02250 • USB Communications Cable Part Number: D219-05424 • SounderSuite Software Installation CD Part Number: D429-04216 • Quick Start Guide – Chirp 3212 Part Number: D101-05733 • EchoControl Client User Manual Part Number: D101-04380 • Cable End Connectors (may be installed on transducers)	

3.0 Description

3.1 System Overview

The Chirp 3212 is a portable two channel Echosounder housed in a rugged lightweight splashproof case that is ideal for easy transport to changing project locations and installation on open survey launch platforms.

The standard configuration of a Chirp 3212 features one low frequency, high power channel for deep water operation or sub-bottom profiling along with a high frequency, lower power channel for shallow water operation or bottom tracking.

3.2 Physical Characteristics

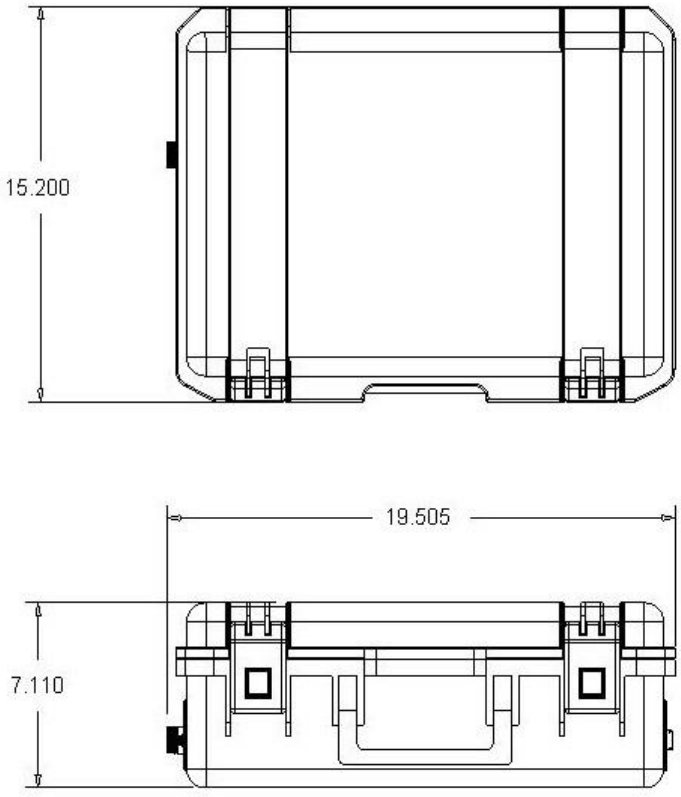
A summary of significant dimensions and weights of the Chirp 3212 are as follows:

Length:
19.5 inches
495 mm

Width:
15.2 inches
386 mm

Height:
7.30 inches
185 mm

Weight:
26 lbs
12 kg



4.0 Installation

4.1 System Overview

The Chirp 3212 is a “black box” Echosounder that interfaces to any Windows-based PC to allow the user to control all system parameters, manage peripherals, record entire echogram data, as well as internal and external data logging. The communications link from the Chirp 3212 to the PC is via USB (full speed 2.0). A USB Communications Cable (D219-05424) is provided with the shipment.

4.2 Software Installation

A CD-ROM is provided with the system which installs the software necessary to control the Echosounder as well as other support utilities, hardware drivers, and documentation files. The CD-ROM should auto-run but if it does not simply run the SounderSuite.exe file located on the disk. This will initiate the SounderSuite-USB installation wizard which will guide the user through the rest of the software installation process.

4.3 System Connection Overview

4.3.1 Input Power

The Chirp 3212 Echosounder needs to be powered from a DC source; the input voltage range is 12-30VDC (nominal 24VDC). A DC power cable (D219-02250) is provided with the shipment to allow connection to any suitable DC supply. An optional VAC to VDC converter is also available upon request.

The power consumption of the Chirp 3212 is detailed below:

Start (impulse): 60W
Quiescent (powered on, not pinging): 18W
Operating (min power, shortest pulse length): 30W
Operating (max power, longest pulse length): 55W

4.3.2 Transducer Connections

The CH1 and CH2 Transducer connections are used for interface to the matching transducers. Both channels feature three pin MIL style connectors that handle the high voltage outgoing transmit as well as the low voltage incoming receive. Pinouts for the specific transducer connections are found later in this manual.

Please note that on Knudsen Chirp systems the CH1 Transducer connections is offset from that of the CH2. This is to avoid misconnection of a lower power handling transducer to a possible higher output power channel.

4.3.3 USB Interface

As mentioned in the System Overview, the USB interface provides communications from the Chirp 3212

to the Windows-based host PC. It is a full speed 2.0 (12Mbps) connection. It is a MIL style connection matched to the provided D219-05424 USB cable but will mate with a standard “B” type USB cable in needed.

4.3.4 Analog Output

The Analog Output BNC provides a 5V analog signal referenced to circuit / chassis ground. This is the received signal from the transducer after pre-amplifications, analog gain, and anti-alias bandpass filtering, immediately prior to digitization. It is provided for diagnostic use during maintenance and service only.

4.3.5 Sync In / Out

The Sync In BNC connection can be used to sync the Chirp 3212 outgoing pulse with another device. Under the System Menu of the EchoControl Client the user will find an option to change the Sync Mode from Internal to External. Once set to External the system will look for a high-to-low-to-high transition with a low cycle hold time of at least 1ms but less then 50ms (min ping rate) on the Sync In BNC located on the system connector panel. The Echosounder transmit will occur on the rising edge of the sync signal. With the Sync Mode set to Internal the Sync Out BNC provides a similar signal on each ping interval.

4.4 System Lid and Internal Cover Plate

4.4.1 Power Switch

The Main Power located on the internal Cover Plate is a covered switch which when locked in the active position will pass the input voltage to the internal modules; the switch illuminates when active. When it is in the deactivated position, power to the internal modules will be terminated.

4.4.2 Circuit Breaker

For additional system protection there is a circuit breaker located next to the Main Power Switch.

4.4.3 Serial Number Plate

The Chirp 3212 Part Number and Serial Number are located on the ID plate located on the lid of the echosounder case. This information may be asked for during support.

4.5 System Connection

4.5.1 Peripherals / Data Logging

All peripherals such as GPS and Heave Compensators are connected directly to the host PC and setup is performed via the EchoControl Client software applications.

Same as the peripherals, any connections to an external data logger is done though the PC. There is also the capability to run the data logger package on the same PC as your EchoControl software.

5.0 System Operation

Once the software installation process has been completed, the PC should automatically recognize the Chirp 3212 upon power up. The SounderSuite Installation CD will have installed application shortcuts for the main EchoControl software onto the desktop of the PC for easy accessibility. Normally, the EchoControl Client application should be able to auto-run the required EchoControl Server application; when the Server application is started and running a "K" will appear in the task bar. If the EchoControl Client fails to auto-run the Server properly, shut the client down, start the EchoControl Server manually via it icon, then start the EchoControl Client which should now be able to connect to the Server properly.

For a complete explanation on the operation of the EchoControl Server and EchoControl Client please refer to the following software manuals:
D101-04380 EchoControl Client User Manual (hard copy provided with shipment, soft copy installed on host PC)
D101-04381 EchoControl Server User Manual (soft copy installed on PC)

5.1 Basic Operation

The EchoControl software provides access to numerous controls for system control, peripheral interfaces, data recording, and real time data display. The following section defines the usage of the main system operational controls. For a complete explanation on the operation of the EchoControl Client please refer to the following manual:
D101-04380 EchoControl Client User Manual (hard copy provided with shipment, soft copy installed on host PC)

NOTE: The following discussion assumes operation will be in shallow water depths of less the 200m. If the water depth is greater than 200m, the high frequency channel will not be able to operate effectively due to the excessive signal attenuation within the water column.

5.1.1 Control Definitions

TX Power: controls the amount of power used for the outgoing transmit pulse. There are four settings with incremental steps of approximately 25% of the total maximum power level.

TX Pulse Length: controls the duration of the outgoing transmit pulse. The maximum pulse lengths for Sounder systems is 4ms.

TX Blanking: controls where the depth digitization algorithm starts to look for a return echo. This should be set deep enough to look past any transducer ringing that may be misidentified as a return echo and improperly tracked as the bottom.

Analog Gain: controls the analog gain of the receiver circuitry.

Digital Gain: scale factor applied during the digital signal processing.

AGC: automatic gain control – an algorithm that adjusts the analog gain on a ping-by-ping basis based on previous data.

TVG: time varied gain – curves that adjust the analog gain in use during single ping acquisition cycle.

Range: determines the size of the active window.

Phase: determines the location of the search window in the water column.

Min / Max Depth: determines the upper and lower depth limits when using Auto Phase mode.

5.2 Channel Roles

The high and low frequency channels operate together but in two different operational roles. The high frequency channel can be used to determine the depth of the bottom return with little interest in the sub-bottom detail. The low frequency channel, on the other hand, is very interested in the sub-bottom detail. As a result of their different roles, their operational control settings are slightly different to allow them to operate optimally in their specific roles. The distinction between the setting differences is highlighted in the following sections.

5.2.1 High Frequency Channel - Depth Detection

To get the channel to acquire the bottom, the minimum TX Power and Pulse Length needed to determine a bottom should be used. In shallow water, lower power and shorter pulse lengths are typically adequate to get a reasonable bottom return. As the depth increases, the power and pulse length should be increased as needed to maintain the return echo.

AGC is recommended for this channel, used in combination with the Processing Shift for the best results. If the AGC algorithm is having to adjust the gain level to values above 40db, the Processing Shift should be increased until the analog gain level is reduced. This is to prevent over driving of the analog filter and saturation of the receive signal.

TX Blanking should be set deep enough for the digitization algorithm to see past the transmit pulse and any transducer ringing that may be present. The duration of the pulse and any ringing present should be clear from the echogram chart and the Tx Blanking can be adjusted accordingly.

5.2.2 Low Frequency Channel – Sub Bottom Profiling

Because the Low Frequency channel is interested in the sub-bottom details, unlike the high frequency depth detection channel, the optimal control settings tend to be quite different. For sub-bottom profiling, it is desirable to use the longest pulse length possible for the water depth. Assuming a speed of sound setting of 1500m/s, the minimum depth for the standard available pulse lengths would be:

For a 4ms pulse, min depth = 3m
For a 8ms pulse, min depth = 6m
For a 16ms pulse, min depth = 12m
For a 32ms pulse, min depth = 24m
For a 64ms pulse, min depth = 48m

The longer the pulse length, the more energy in the water column and the better the penetration into the sub-bottom.

Using this argument, it would be assumed that the higher the transmit power the better as well, but the user does need to take care not to increase the power too high or it is possible to have too much signal in the water column. Too much signal strength could cause saturation of the receive echo which would impair the post-processing analysis of the recorded echogram data. If more signal strength is required, the pulse length should be adjusted first, taking into consideration the minimum allowable depths noted previously, then the transmit power should be adjusted.

Whereas AGC is recommended for the high frequency depth detection channel, it is not recommended for the sub-bottom profiling channel. It can be used initially along with the Processing Shift to determine a starting reference for both the manual RX Gain setting and the Processing Shift setting. Once a preliminary starting point has been determined though, AGC should be disabled so that the user can then fine tune manual gain and processing shift. The goal is to find a combination of RX Gain and Processing Shift that pulls out the sub-bottom details without pushing either so high as to cause saturation of the receive signal (signal levels so high they get clipped).

Another gain tool to help pull out the sub-bottom is TVG; experimentation will determine the best results for the particular sub-bottom scenario. Again the goal is to pull out more sub-bottom detail but not at the expense of saturating any of the sub-bottom echoes.

To ensure receive signal saturation is not occurring, set the display contrast to zero and observe the return echo levels on the narrow mini-scope display on the right-hand side of the chart display. As long as these levels are not squared off or clipped, the echogram data is not being saturated. Please note that saturation of the transmit signal is to be expected: the key is to not saturate the return echoes. Once it is clear saturation is not an issue, the display contrast can be increased if a darker display chart presentation is desired in real-time. Please note that the echogram data being recorded can be post-processed in third party software to improve its visual appearance as long as the real-time data acquired is not saturated and clipped.

With regards to the data recording, the optimal format to record for post processing of the sub-bottom data is SEG-Y. To be allowed to record SEG-Y, the channel has to be setup to output one of the three carrier data formats. The recommended format is Filtered Carrier and the default Signal control settings have this format enabled by defaults.

6.0 Basic Troubleshooting

6.1 Power Indicator Off

If the power switch does not illuminate when locked in the active position first confirm the proper input voltage is provided. If the input voltage is verified them connect to PC to confirm possible operation. It may be that the bulb in the switch has become dislodged or has failed. If the problem continues please contact Knudsen Support.

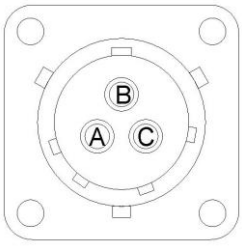
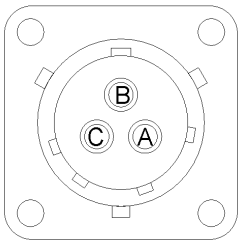
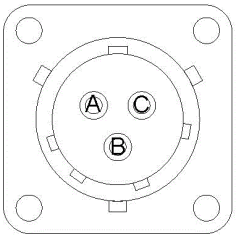
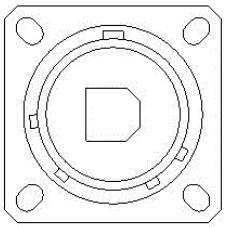
6.2 No Communications to PC

If the EchoControl Server does not automatically connect to the Chirp 3212 first confirm proper system power on. Next try to connect the USB Communication Cable to other available USB ports on the host PC. At this point change the USB cable. If the problem continues please contact Knudsen Support.

6.3 No Output to Transducer(s)

Confirm that the transducer you are wishing to operate is connected to the corresponding channel. Next, with the Echosounder output OFF check the transducer cable and the cable end connector for any possible bends, breaks, or visual damage.

7.0 Cable Connections

INPUT POWER Part Number: MS3470L12-3PY Mating Connector: MS3476L12-3SY (or equivalent) Preferred Cable: DSS-2 A – DC + B – No Connect C – DC -	
CH1 TRANSDUCER Part Number: MS3470L12-3SY Mating Connector: MS3476L12-3PY (or equivalent) Preferred Cable: DSS-2 A – HIGH B – SHIELD C - LOW	
CH2 TRANSDUCER Part Number: MS3470L12-3S Mating Connector: MS3476L12-3P (or equivalent) Preferred Cable: DSS-2 A – HIGH B – SHIELD C – LOW	
USB Interface Part Number: USBBFTV22N Mating Cable: D219-05424	
ANALOG OUT / SYNC OUT / SYNC IN Part Number: 31-10 Mating Connector: any standard BNC connection Center Pin: Signal Shell: Ground