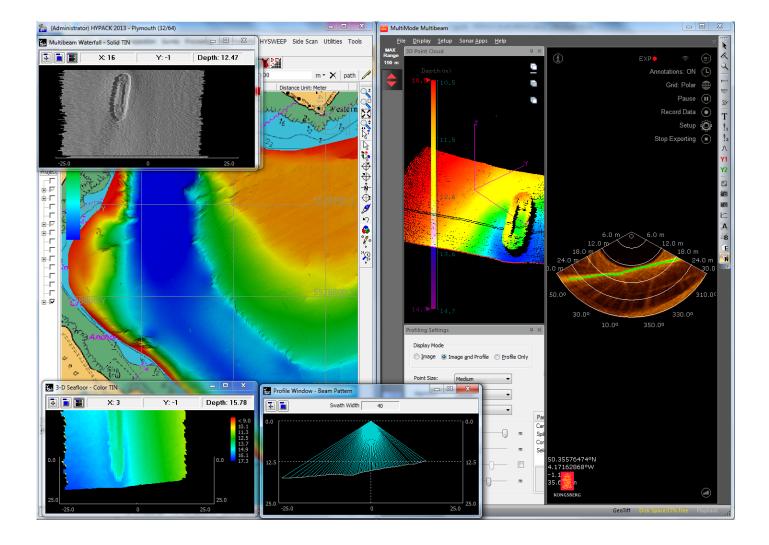


Quick start guide

M3 BATHY Multibeam Echo Sounder: Using Hypack





M3 BATHY Quick start guide: Using Hypack

Revision status

Docume	Document no: Document Number / Revision				
1.3	28.OCT.2015	Updated the offset description in M3 and Hypack software.			
		Updated the procedures through out the document.			
1.4P	11.NOV.2015	Updated the procedure to use "Raw" data in Hypack			
1.4P	25.NOV.2015	Fixed issue in ticket DTW-8. Also reviewed all changes from version 1.3 to 1.4.			
1.4	17 FEB.2016	Added extra step to Starting up the Hypack Software.			
1.5	10 JUNE.2016	Corrected some Hypack parameters in <i>Configuring Hypack Hardware</i> settings.			

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Disclaimer

Kongsberg Mesotech Ltd. endeavours to ensure that all information in this document is correct and fairly stated, but does not accept liability for any errors or omissions.

Warning

The equipment to which this manual applies must only be used for the purpose for which it was designed. Improper use or maintenance may cause damage to the equipment and/or injury to personnel. The user must be familiar with the contents of the appropriate manuals before attempting to install, operate or work on the equipment.

Kongsberg Mesotech Ltd. disclaims any responsibility for damage or injury caused by improper installation, use or maintenance of the equipment.

Support information

If you require maintenance or repair, contact your local dealer. You can also contact us by phone at: +1 604 468 8144 or by email at: km.support.vancouver@km.kongsberg.com. If you need information about our other products, visit our web site. On the web site you will also find a list of our dealers and distributors.

Kongsberg Mesotech Ltd. www.km.kongsberg.com

Feedback

To assist us in making improvements to the product and to this manual, we welcome comments and constructive criticism. Please send all such – in writing by Email to: **alan.zhao@km.kongsberg.com**

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About this manual

Purpose

The purpose of this document is to provide the necessary instructions and reference diagrams required to properly configure the M3 and Hypack software. Installation of all M3 hardware should be complete before reading this guide.

Target audience

The reader is expected to have a background in multibeam echo-sounder bathymetry survey techniques and experience using Hypack software.

Licence information

The M3 Software is included with the M3 BATHY system. Updates are available free of charge and can be downloaded from: <u>http://www.km.kongsberg.com/mesotechsoftware</u>.

A Hypack[®] license is supplied as part of the standard M3 BATHY system. Updates can be obtained directly from Hypack[®]. Annual software maintenance fees apply to the software package for updates and support.

Software version

The software references and associated figures in this manual are using:

- M3 Software v1.62
- Hypack[®] 2016

Registered trademarks

- M3 Sonar[®]
- Hypack[®]

M3 BATHY

This is the quick start guide for the software configurations of the M3 BATHY shallow water bathymetric survey system.

This manual does not give a detailed description of every function in the M3 and Hypack software. Refer to the M3 user manual and Hypack user manual for detailed information.

Topics

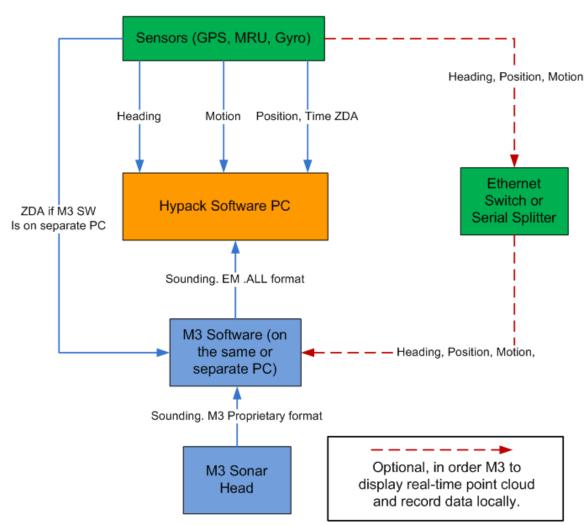
- *System description* on page 5
- *System diagram* on page 5
- *Support information* on page 6

System description

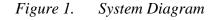
The M3 BATHY is a compact, lightweight multibeam echo-sounder system for shallow water survey. The M3 BATHY system software package includes the M3 software and the Hypack software.

The M3 software controls the M3 multibeam echo sounder, acquires sounding data and exports the sounding data to the Hypack software.

The Hypack software receives the sounding data from the M3 software through UDP with the **Kongsberg Mesotech M3** driver.



System diagram



- All sensors including GPS, Gyro, Motion Reference Unit (MRU), and ZDA need to be connected to the Hypack software. It's optional to split the sensor data to the M3 software for M3 local recording.
- The M3 software sends sounding data through EM .ALL format over UDP.
- If the Hypack software and M3 software are running on separate computers, split the ZDA string to the Hypack software and M3 software so that both computers' time can be synchronized with ZDA time.
- If the Hypack software and M3 software are running on the same computer, configure the ZDA string only to the Hypack software.

Support information

If you require assistance with your M3 BATHY system, please contact:

Kongsberg Mesotech Ltd. Phone: +1 604 464 8144

Email: km.support.vancouver@km.kongsberg.com

If you require assistance with Hypack[®] software, please visit the Hypack support website: <u>http://support.hypack.com/support/</u>

Getting started

Topics

- *Powering on the system* on page 7
- *Powering off the system* on page 8
- Starting up the M3 software on page 8
- *Starting up the Hypack software* on page 10

Powering on the system

- 1. Starting up the Sonar Processor laptop:
 - **a.** Power on the laptop.
 - **b.** Log in to Windows.
- 2. Powering on the Surface Interface Unit:
 - **a.** Plug the AC to DC power brick into the breakout box connected to the Surface Interface Unit.
 - **b.** Confirm the power indicator light on the Surface Interface Unit's power supply is turned on.
 - **c.** It will take the Motion Reference Unit (MRU) up to 15 minutes before full accuracy is achieved.
- Note! If the vessel has high dynamics during start-up, the MRU may run into problems. At worst, the alignment must be redone by restarting the MRU. High dynamics during start-up means that the MRU has moved up to ± 10 degrees on all the orientation axes.
 - **d.** The GPS will also need up to 15 minutes to acquire all satellites and achieve full accuracy.

Note! If the Surface Interface Unit (SIU) is powered on before the processor laptop, the SIU will start sending GPS strings to Windows. There is a known issue with Windows where it may detect the GPS string as a serial mouse and the mouse cursor will jump around. To fix this, turn off the SIU or disconnect the GPS, restart Windows, then turn on the SIU or connect the GPS.

Powering off the system

- **1.** Powering off the Surface Interface Unit simply requires unplugging the power cord or switching off the breaker to the Surface Interface Unit's AC to DC power-supply brick.
- 2. Powering off the Sonar Processor Laptop:
 - a. Save your settings, then close the Hypack and M3 Software.
 - b. Shut down Windows.

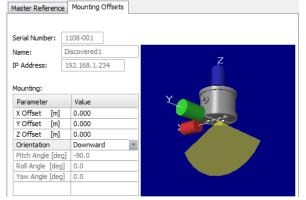
Starting up the M3 software

- **1.** Start the M3 software:
 - **a.** Double click the M3 software icon on the Windows desktop.
- 2. Confirm that the M3 Sonar is connected to the system:
 - a. Select Setup menu > System Configuration > Devices > Sonar Setup.
 - b. Click the Discover Sonar Heads button.
 - **c.** Confirm that the Sonar Head appears in the **Online Sonar Heads** list. If not, check the Ethernet connection between the laptop and the M3 Sonar Head.

#	Name	Serial Num	IP Address	Port	Discover Sonar Head
1	Discovered 1	1108-001	192.168.1.234	30	Use Discovered Head
	overy terminate				

- d. Select the Sonar Head listed under Online Sonar Heads and click on the button Use Discovered Head.
- 3. Confirm that the mounting offsets have been entered correctly:
 - **a.** Click on the **Deployment** tab > **Mounting Offsets** in the System Configuration window.

b. Confirm that the offsets are entered according to the *Configuring the sonar and sensors* section on page 13. Default configuration for M3 BATHY – Downlooking is shown in the figure below.



- c. Close the System Configuration window.
- 4. Confirm that the M3 Software data export and profiling settings are correct:
 - a. Select Setup menu > Preferences.
 - **b.** In the **Preferences** window, confirm the IP address and port settings are configured according to the *M3 Sonar data recording and exporting* section on page 16. The default values are shown in the figure below.

UDP Data Export	
Export to File	Water Column
Port for .ALL format:	20002
Port for PMB format:	20006
Remote IP Address:	127.0.0.1

- c. Close the **Preferences** window.
- **d.** Select **File** menu > **Exporting Format**, then confirm the format is set to "Profile Point (.all)".
- e. From the **Profile Settings** window (if not open, select **Display** menu > **Profiling Settings**), confirm either "Image and Profile" or "Profile Only" is selected.
- **f.** From the **Sonar Apps** menu, confirm that either "Profiling" or "Profiling Fast" is selected.
- 5. Connect the M3 Sonar and start exporting:
 - **a.** Select **Setup** menu > **Connect** to activate the M3 Sonar Head.
 - **b.** Confirm that the sonar image updates.
 - **c.** Click on the **Export Data** button located in the top-right menu of the sonar screen.

Starting up the Hypack software

- 1. Insert the Hypack dongle into a computer USB port.
- **2.** Start the Hypack software:
 - **a.** Double click the Hypack 2016 icon on the Windows desktop.
- 3. Confirm that data is being received from the Hypack software:
 - a. Select Preparation menu > Hardware Setup, then click on the Kongsberg Mesotech M3 driver entry under HYSWEEP Survey. If the hardware is not configured, see the section *Configuring Hypack Hardware settings* on page 19 to configure the HYSWEEP Hardware.
 - b. Select the Connect tab and click the Network Test button.

HYPACK Combined Hardware		
File Options Help		
Hardware Hoat HYSWEEP Survey Strongsberg Mesotech M3 TSS DMS	Manufacturer / Model Connect Offsets Image: Connect of the state	15.0 Sec
< >	Comport Test Network Test	

- **c.** Click the **UDP Connect** button on the **Network Connection** window to confirm the received UDP data from the M3 software.
- d. Close the Network Connection window.
- 4. Confirm that data is being received from the GPS:
 - **a.** Click on the **GPS NMEA-0183** entry under **Boat** (on the left side of the **HYPACK Combined Hardware** window). If the hardware is not configured, see the section *Configuring Hypack Hardware settings* on page 19.
 - **b.** Select the **Survey Connect** tab, then click the **Test Device** button.
 - c. Confirm that GPS data is being received in the test window.
- 5. Check that the following survey requirements have been met (for more details, refer to the Appendix):
 - **a.** Geodesy parameters have been entered.
 - **b.** A background chart has been added.

- **c.** Survey lines and a matrix have been plotted.
- 6. Collect Bathymetry data using Hypack:
 - **a.** Click the whale icon, then click **HYPACK Survey and HYSWEEP Survey** to start the survey.

File Draw View Settings Pre	eparation Survey Processing Final Produc
🔁 🖶 🥪 📅 📴 🍎 🔖	‰- └ 🐖 🕮 🎾 🚓
Base 🛛	WPACK Survey
Data Files	HYPACK Survey and HYSWEEP Survey
🖽 🔽 🧰 Raw Data Files	HYPACK Survey and Side Scan Survey
	<u>F</u>) DREDGEPACK

b. If this is your first time starting a survey, set the source for Heave and Pitch/Roll data to the Motion Reference Unit. You only need to do this procedure once:

- From the HYSWEEP Survey window, select **View menu > Device Selection.**

HYSWEEP Survey	- Offline					
<u>File View Matrix Targets Corrections Tools Patch Test Help</u>						
Nav Gyro	MRU Multib	eam Side Scan	Devices			
Depth	0.00	Time (Event)	00:00:00 (0)			
Tide Corr	0.00	Draft Correction	0.00			
Heave	0.00	Roll	0.00			
Pitch	0.00	Heading	0.00			
Easting	0.00	Northing 0.00				
SV From Profile	0.0	SV From Sonar	0.0			
Boat Info		🔘 Towfish Info				

- From the Device Selections page, click the Select Boat Corrections tab.
- Select $Hypack\ Navigation$ for the Heading, select $TSS\ DMS$ for Heave, and select $TSS\ DMS$ for Pitch/Roll
- Click OK.

De De	evice Selections		-	and they save		
	Survey Windows	Select Bo	at Corrections	Select Towfish C	orrections	
	Heading		Hypack Navig	gation		-
	Heave		TSS DMS			•
	Pitch / Roll		TSS DMS			•
	Defaults				ОК	Cancel

- **c.** Survey line recordings are displayed in the Data Display window. The file names should be written in a notebook during the survey for later reference.
- **d.** Start and end logging using the buttons in the Hypack Survey control window shown below:

5	Survey										X
L	ogging	Line	Chart	Vessels	Matrix	Targets	Tide	Options	Window	Help	
	11	 ©²	0	2		<u>.</u>	۲				

- Note! *You can also use* <*CTRL* + *S*> *to start logging and* <*CTRL* + *E*> *to end logging.*
- Note! See Hypack user documentation and training material for how to perform a patch test and how to collect survey data.

Appendix A: Supplemental Procedures

Topics

- M3 software setup procedures on page 13
- Hypack software setup procedures on page 17

M3 software setup procedures

Configuring the sonar and sensors

- **1.** Run the M3 software.
- **2.** Set up the sonar:
 - a. Click Setup menu > System Configuration.
 - **b.** Select the **Devices** > **Sonar Setup** tab.
 - c. Click Discover Sonar Heads.
 - d. Click Use Discovered Head to accept.

Image: Discovered1 Serial Num IP Address Port Discover Sonar Heads Image: Discovered1 1108-001 192.168.1.234 30 Use Discovered Head Discovery terminated. Image: Discovery terminated. Image: Discovery terminated. Image: Discovery terminated.

e. Set the Trigger mode to synchronize the M3 with another acoustic device. Set the trigger mode to **Master** to send out a sync pulse so that the other acoustic device can be triggered by the M3 sync pulse. Set the Trigger mode to **Slave** to be triggered by the sync pulse from the other device. For M3 BATHY system, the default is set to **Master**.

Device Properties:			
Head Name	Discovered1		Get Default
Serial Number	1108-001		
IP Address	192.168.1.234		
IP Port	30		
IP Subnet Mask	255.255.255.0		
IP Default Gateway	0.0.0.0		
Trigger Mode	Master - Immediate Start	*	
Time Sync Mode	Master - Immediate Start		
	Slave - External Pulse Triggered		

- **3.** Set up the mounting offset:
 - a. Click Setup menu > System Configuration.
 - **b.** Select the **Deployment** > **Mounting Offsets** tab.
 - c. If the M3 is installed as connector towards bow, select **Downward** from the **Orientation**. If the M3 is installed as connector towards stern, select **Downward Inverted** from the **Orientation**. If the M3 is installed as sideways looking to scan vertical structures, enter the **Roll** angle.

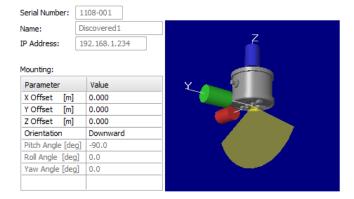
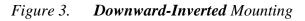


Figure 2. Downward Mounting

Serial Number: Name: IP Address:	1108-001 Discovered1 192, 168, 1, 234	Z
Mounting: Parameter	Value	
X Offset [m] Y Offset [m]	0.000	¥
Z Offset [m]	0.000	×
Orientation	Downward Inverte *	
Pitch Angle [de	g] -90.0	
Roll Angle [deg] 0.0	
Yaw Angle [deg] 180.0	



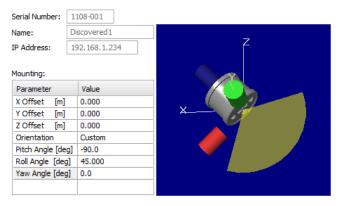


Figure 4. Downward Mounting with 45-degree roll and two poles

Note! The M3 BATHY default mounting configuration is Downward.

- 4. Save the deployment configuration:
 - **a.** Click the **Master Reference** tab.
 - **b.** Click the **Save As** button.
 - c. Enter a new configuration name and click OK. (e.g. Downlooking Mode)
 - **d.** The configuration file is saved under the M3 software installation folder: ..\KML $M3_Vxxxx$ binSettings.

Setting the sound speed

Note! Changing values in the Master Reference or Mounting Offsets tabs changes the values for the current configuration. If you want to create a new configuration, first click **Save As** or **New**, then modify the parameters.

- **1.** Measure the sound velocity at the Sonar Head or calculate the harmonic mean from the sound velocity profile.
- 2. Run the M3 Software.
- **3.** Click **Setup** menu > **Preferences**.
- 4. Enter the Variable: Sound Velocity.
- 5. Click Close.

M3 Sonar data recording and exporting

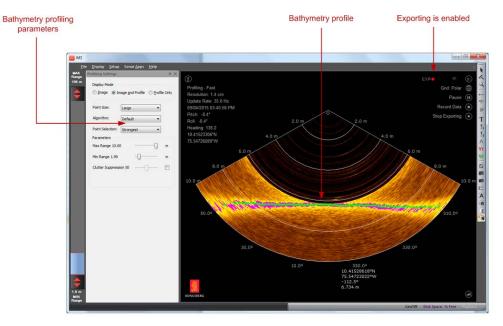
- 1. Display Profiling Settings by selecting Profiling Settings from the Display menu.
- Select Profiling or Profiling Fast application mode from the Sonar Apps menu.
 Profiling Fast mode provides a much higher ping rate but is not recommend to be used for a short range of less than 5 meters.
- **3.** Choose **Image and Profile** or **Profile Only** to enable profile points on the sonar image window.

Profiling Sett	ings	
Display Mo	de	
© <u>I</u> mage	Image and Profile	© Profile Only

- 4. Select File menu > Exporting Format > Profile Point (.all).
- 5. Select Setup menu > Preferences to configure the UDP port and IP address.

Preferences					×
4 Preferences					⊳
Units:	Variables: Sound Veloci	ity:	1600	m/s	
© Eeet	Magnetic <u>V</u> a	riation:	0.0	Degree	
Cursor Options:	© X / Y		Geographi	r	
Time System	Overlay Text		E ccogrophi	~	
Local Time	Text1				
© UTC	Text2				
File Saving:	Filename				
Name:		+ _{уууу,}	MMM,dd,hh-mr	n-ss ·	-
Use C:\KML\M3					
Images: C: KI	ML (M3_V0161)(In	nages		Browse	
Recordings: C: W	ML/M3_V0161\R	ecordings		Browse	
Exports: C:W	ML (M3_V0161)R	ecordings		Browse	
GeoTiff Auto Save: Distance Cropped Width:	3.0 m 75 %	Port fo		20006	
			Clo	se	

- 6. Enter the UDP port in **Port for .ALL format.** This is the UDP port set in the thirdparty software to receive the .ALL data from the M3. Set the **Remote IP Address**; this is the IP address of the computer running the third-party software. If the third-party software is running on the same computer as the M3, enter **127.0.0.1**.
- 7. Close the **Preferences** window.
- 8. Click the **Export Data** button in the top-right menu to enable UDP .ALL data export.
- 9. Select Setup menu > Connect to activate the M3 Sonar Head.
- **10.** The M3 data-acquisition screen should be similar to the screen below:



Hypack software setup procedures

The following configuration steps are required to interface Hypack for data acquisition. This document uses Hypack software version Hypack 2016.

Creating a Hypack project

- 1. Run Hypack 2016, then click on the **File** menu > **New Project** to create a new project (for example, M3 BATHY Harbor Acceptance Test).
- 2. Set the Geodesy by selecting **Preparation** menu > Geodetic Parameters.
 - a. Set the Grids and Zone for the project location.

le <u>T</u> ools Options Help					
Predefined Grids				Projection	
UTM North	Ellipsoid W	GS-84	•	Transverse Mercator	-
Zone	Carri Marian Avia	637813	37.000	Central Meridian	123°00'00.0000"W
Zone 10(126W-120W)	Semi-Major Axis	03701	7.000	Reference Latitude	00°00'00.0000"N
	Flattening	298.25	7223563	Scale Factor	0.999600000
istance Unit Meter 🗸					
	Datum transform	ation parameters			
epth Unit same as horizontal 🔹	Delta X 0.000	Delta rX	0.00000		
	Delta Y 0.000	Delta rY	0.00000	False Easting	500000.0000
	Delta Z 0.000	Delta rZ	0.00000	False Northing	0.0000
evation Mode (Z-axis positive going up)	Delta Scale	0.00000	1	Local Grid Adjustme	ent Local Grid
		0.00000			
	Datum shift file		X	J	
RTK Tide Calculation Not using RTK tide					
(K-N) from KTD file					
N from geoid model, K from KTD file N from geoid model, K from VDatum					
N from geoid model, K from user value					
(K-N) from user value					
	Chart Datum Lev	el	0.00	ОК	Cancel

- **b.** Click **OK** when done.
- c. Save the project by selecting the File menu > Save Project.

Configuring Hypack Hardware settings

- **1.** Configure Hypack for a GPS input:
 - a. Select **Preparation** menu > **Hardware Setup**.
 - **b.** Click on **Boat**, select the **GPS NMEA-0183** driver, then click the **Add** button. Remove other devices in the list, such as the default **HYPACK File Simulation**.

HYPACK Combined Hardware	1. Chik die Barrop Comme	
File Options Help		
	Survey Devices Survey Connect Offsets	
GPS NMEA-0183	Available All Devices -	Installed
i HTSWEP Survey	Version Version Generic Laser Device 14,0,4,3 GePto Capture 15,0,0,2 GePto MeRA-0183 15,0,1, Guintoli Dredge 14,0,1,1 Hagler Systems Inchom 14,0,2,1 HO2SA USDigital 14,0,2,4 Hone ywell HMR3000 Dig 14,0,2,4 Hone ywell HMR3000 Dig 14,0,1,0 View Image: Display the state of	Add> CPS NMEA-0183 C Remove Nav. Stations Setup Name GPS NMEA-0183 Driver C:\#TYPACK 2015\devices\GPS.dll Options Coptions C
۰ ۲		

- c. Click on GPS NMEA-0183 in the Hardware list on the left.
- **d.** Click the **Survey Connect** tab, then click the "…" button next to **Device Connection**.

HYPACK Combined Hardware		x
EEJ HYPACK Combined Hardware File Options Help → Hardware → # Gost Head Ala3 → HYSWEP Survey → # Smrad EM3002	Survey Devices Survey Connect Offsets Survey Device Connection None Recording Rate Device Connection Recording Rate Device Connection Comport Test Record Comport Test Test Device	×

- e. Select Serial for the connection type.
- f. For the M3 BATHY system, set the Speed to 115200, and Port to COM12.

- g. Click OK.
- **h.** Click the **Offsets** tab, then enter the offsets from the M3 receive array to the GPS primary antenna. For the M3 BATHY system, set **Starboard** (X) = 0 and **Forward** (Y) = -0.266 m.
- **i.** Measure the distance from the waterline to the GPS primary antenna, positive downward. Then, enter this distance as a negative number for the **Vertical** (Z) value.

HYPACK Combined Hardware					
File Options Help					
🖃 🦕 Hardware	Survey Devices Survey Co	nnect Offsets			
🖻 📥 Boat					
GPS NMEA-0183	GPS NMEA-0183			•	
Kongsberg Mesot	Position	rom Boat Reference Point (Center	Rotation	n Forward (Yaw) and Vertical	
	of Mass).		(Roll and Pitch)		
	The Vertical Offset is F From Waterline.	Positive Downward and Measured	Yaw rotation follows azimu positive). Bow up is positiv roll.	ith (dockwise rotation is e pitch, port side up is positive	
	Starboard	0.000	Yaw	0.00	
	Forward	-0.266	Pitch	0.00	
	Vertical	-1.916	Roll	0.00	
	Device Latency				
	Enter the Latency Time	e (Positive) in Seconds		0.000	
				Multiple Transducers	
4					

- **2.** Configure HYSWEEP Hardware:
 - **a.** Click on **Hardware** (on the left). Under **HYSWEEP Survey**, check **Include** to include Hysweep hardware setup.

B HYPACK Combined Hardware		
File Options Help	and the second second	and the second s
Hardware Boat Gys NvEA-0183 HrSWEEP Survey Good Kongsberg Mesotech M3	System HYSWEEP Survey Sidescan Devices on Towfish Sidescan Devices on Towfish Sidescan Survey Include Installed on Towfish Synchronize Computer Clock Select Device to Synchronize Clock None (no synch)	HTPACK Survey Show XY2 Files Start Logging at Startup Individual Tide Per Mobile Printer Connection Network (196.162.1.234;20002,1 vx)

b. Click on **HYSWEEP Survey** (on the left), then select **Kongsberg Mesotech M3**. Click the **Add** button to add the device, then click the **Setup** button.

File Options Help			
Son Hardware Boat Boat Hight CPS NMEA-0183 Hight CPS NMEA-0183 Hight CPS NMEA-0183 Hight CPS NMEA-0183 Geff Kongsberg Mesotech M3	Manufacturer / Model Manufacturer / Model Kongsberg McOtart 3300 Kongsberg McOtart 3300 Kongsberg Simrad EM2000 Kongsberg Simrad EM2040 Kongsberg Simrad EM2040 Kongsberg Simrad EM2040 Kongsberg Simrad EM3002 Kongsberg Simrad RM300 Kongsberg Simr	Add> - Remove Setup	3
	Specific Sonar Identification	Name Kongsberg Mesotech M3	

c. Select Use Raw Data in the setup window, then click OK.

📓 Simrad Setup	
EM Data Selection	
Use Seabed Image (53) Datagram for Sidescan Display Use EM Combined Heave/Draft from Depth (D or X) Datagram EM3000	
Default Setup OK	Cancel

- d. Select the Offsets tab to configure the transducer Position offsets. Leave the Rotation offsets all at zero. For the M3 BATHY system, set Starboard (X) = 0 and Forward (Y) = 0.
- **e.** Measure the distance from the waterline to the receive array, positive downward. Then, enter this distance as a positive number for the **Vertical** (Z) value.

HYPACK Combined Hardware				1.12	- • ×
File Options Help					
🖃 🦕 Hardware	Manufacturer / Model Connect	Offsets			
🖨 📥 Boat					
GPS NMEA-0183	Sonar Head 1			-	
HYSWEEP Survey					
Kongsberg Mesot	Position		Rotation		
- (g)/ 135 DMS	Enter Device Offset From B of Mass).	Boat Reference Point (Center	Enter Device Rotation from (Roll and Pitch)	n Forward (Yaw) and Vertical	
	The Vertical Offset is Positi From Waterline.	ive Downward and Measured	Yaw rotation follows azimu positive). Bow up is positiv roll.	th (dockwise rotation is e pitch, port side up is positive	
	Starboard	0.000	Yaw	0.00	
	Forward	0.000	Pitch	0.00	
	Vertical	0.73	Roll	0.00	
	Device Latency				
	Enter the Latency Time (Po	ositive) in Seconds		0.000	
				Multiple Transducers	
<					
	t				

f. Select the Connect tab to configure the port and IP Address to match the M3 computer IP address and the M3 .ALL UDP exporting port. (The default local-host configuration is: Internet Address 127.0.0.1, Port 20002). Click the Network Test button to open the Network Connection page.

B HYPACK Combined Hardware			
File Options Help			
File Options Help	Manufacturer / Model Connect Offsets Image: Connect of the state	Timeout Interval 15.0 s	ec.
	Internet Address 127.0.0, 1 Comport Test Network Test		

g. Click the **UDP Connect** button to confirm the received UDP data from the M3 software.

Network Connection			
Protocol	UDP		
Remote IP Address	127.0.0.1	Port	20002
Status	Receive Count = 24,	Message Size = 34	
Ping Device	UDP Connect		
A x3 gþÐ ^L , J D	⊐⊡" iþùÿK† └¬		
	d	ose	

h. Click on **HYSWEEP Survey** (on the left), then select **TSS DMS**. Click the **Add** button to add the device.

HYPACK Combined Hardware		- C X
File Options Help		
Hie Options Hep Son Herdware → Boat → GPS NMEA-0183 → HYSNEEP Survey → Kongaberg Mesotech M3 → TSS DMS	Manufacturer / Model Connect Offsets Manufacturer / Model Installed Seabeam Stoloo Series Add> SGBrown 10005 Gyro Add> Simulation (Multibeam) Simulation (Multibeam) Simulation (Nultibeam) Trittech Seaving Trittech Starrish 430 Trittech Starrish 430 Trittech Starrish 430 WasSp Multibeam Stars Starrish 430 Stars Starrish 430 Trittech Starrish 430 Starrish 530 Tistalled WasSp Multibeam Yase Yoo HD-328 (center beam)	
	Specific Sonar Identification Name	
	Simrad EM3002 TSS DMS	
4		

i. Select the **Connect** tab to configure the serial port and settings. For the M3 BATHY system, set the **Baud rate** to 115200, and the **Port** to COM10.

HYPACK Combined Hardware					×
File Options Help Hardware Hoat Son MEA-0183 HYSWEEP Survey Kongsberg Mesotech M3 TSS DMS TSS DMS Son Son Son Son Son Son Son Son Son Son	Manufacturer / Model Conn Connection Port Baud rate Parity Read From File Comport Networ	 Timeout Data bits Stop bits	Interval 8 1	15.0	Sec
< •		 			

j. Select the **Offsets** tab to configure the **MRU** offsets. For the M3 BATHY system, set **Starboard** (X) = 0 and **Forward** (Y) = 0.

k. Measure the distance from the waterline to the MRU reference point, positive downward. Then, enter this distance as the **Vertical** (Z) value.

W HYPACK Combined Hardware	urtup as darway.		
File Options Help			
	Manufacturer / Model Connect Offsets		
GPS NMEA-0183	MRU Offsets	•	
- 💭 Kongsberg Mesot	Position Enter Device Offset From Boat Reference Point (Center of Mass).	Rotation Enter Device Rotation from Forward (Yaw) and Vertical (Roll and Pitch)	
	The Vertical Offset is Positive Downward and Measured From Waterline.	Yaw rotation follows azimuth (clockwise rotation is positive). Bow up is positive pitch, port side up is positive roll.	
	Starboard 0.000 Forward 0.000 Vertical 0.614	Yaw 0.00 Pitch 0.00 Roll 0.00	
	Device Latency Enter the Latency Time (Positive) in Seconds	0.000	
		Multiple Transducers	
< <u> </u>			

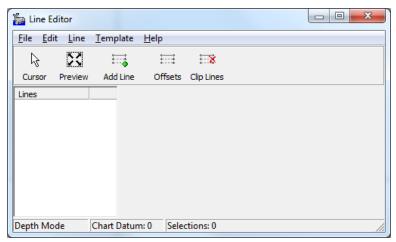
I. Click **File** menu > **Save** to save the configuration.

Creating a matrix and survey lines in Hypack

The Hypack **Line Editor** is used to layout lines that will be used to cover a survey area. Recording in Hypack can be configured to automatically begin recording when the vessel reaches the start of the line. Recording can also be stopped automatically when the vessel reaches the end of the line.

The **Matrix Editor** is used to layout the region where the bathymetry data will be displayed in the map view during the survey and in the Hypack window. The cell height and width are defined in the matrix.

1. Layout the survey lines in Hypack:



a. Select **Preparation** menu > **Editors** > **Line Editor**.

- **b.** From the **Line Editor**, click **Add Line** to define survey lines:
 - Click Add Point, Insert Point, and Offset to add lines by entering coordinates.
 - Click **Cursor** to draw survey lines.
 - Click **Offsets** to add parallel lines.

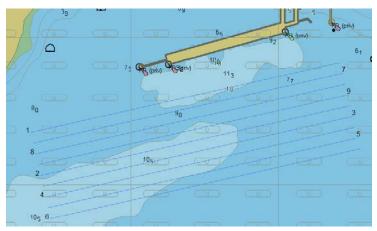
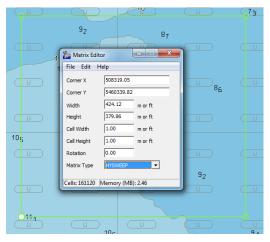


Figure 5. Survey lines displayed in the Hypack main window

- **c.** In the Line Editor window, click **File** menu > Save when done. Enter a file name for your survey lines, then click **Save**.
- **2.** Layout a matrix area around the survey lines:
 - **a.** Open the Matrix editor by selecting **Preparation** menu > **Editors** > **Matrix Editor**.
 - **b.** Set the Matrix Type to HYSWEEP.
 - c. Set the cell width and height to 1.0 m.
 - **d.** You can adjust the matrix dimensions by rotating and positiong the green rectangle around the survey lines.



e. When you are done, click **File** menu > Save in the Matrix Editor window. Enter a file name for your matrix, then click **Save**.

Performing a patch test

Once the hardware tests are complete, perform a calibration test to measure the Latency, Pitch, Roll and Yaw. Set up the patch-test survey lines before leaving the dock to save time by using the nautical chart to choose appropriate areas for each test.

Note!	When making the planned lines in Hypack, they should be 100m (300ft) long. See
	Hypack user documentation for more information about patch tests.

SPEED X1 SPEED X2	1.	 Record Latency calibration data: a. Select one survey line with a feature like a wreck, rock outcrop, or slope. b. Run the survey line in the same direction at one speed. a. Due the same survey line in the same direction at twice the same survey line in the same direction.
	2.	c. Run the same survey line in the same direction at twice the speed of the first run.Record Roll calibration data:
FLAT		 a. Select one survey line on a flat sea floor with a depth of 30m or deepest available area. b. Run the survey line at the same speed in opposite directions. c. Record a second set of lines.
SLOPE	3.	Record Pitch calibration data:
1		a. Select one line on sloped seafloor.b. Run the line at the same speed in the opposite direction.c. Record a second set of lines.
,	4.	Record Yaw calibration data:
0		 a. Select two lines offset by half the swath width. The overlap of the two runs should cover an object such as a wreck, rock outcrop, pipeline, or trench line. b. Run both lines in same directions and at the same survey speed. c. Record a second set of lines.

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