

# **USER MANUAL**

## **The CM2 SIDESCAN SONAR SYSTEM**

### **Magnetometer Supplement**

Version 1.4

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**1. INTRODUCTION**

This supplement describes operation of the Marine Magnetics Explorer and SeaSPY magnetometers when towed behind a CM2 towfish, sharing the CM2's tow cable telemetry and power. This supplement should be read in conjunction with the CM2 User Manual and with Chapter 7 of the Explorer Operation Manual or SeaSPY Operation Manual.

The primary advantage of operating the magnetometer with the sidescan interface is that it eliminates the need for a magnetometer tow cable. As well as being more convenient, sidescan tow cables usually have a better weight-to-drag ratio and the sidescan towfish acts as a depressor. The magnetometer can therefore be towed deeper, or with less layback, than on an independent tow cable.

**2. CM2-TO-MAGNETOMETER INTERFACE**

**CM2 with Magnetometer Option**

The CM2's Magnetometer Interface Kit option is intended to work with a Marine Magnetics Explorer or SeaSPY system. To work with the CM2 towfish the magnetometer must be also accompanied by a sidescan sonar interface kit, manufactured by Marine Magnetics, that includes a 10m cable to allow the magnetometer to be towed from the CM2 tow cable terminator.

The CM2 Magnetometer Interface Kit is a single version that works with both models of magnetometer. The Marine Magnetics (MM) sidescan sonar interface kit is available in two versions, specific to each model.

When the CM2 system is ordered with the Magnetometer Interface Kit option it is delivered with the following items:-

- 1) A CM2 Magnetometer Link Cable
- 2) A towfish with a rear bulkhead that includes a fourth wet-pluggable connector (4-way, female)
- 3) A dummy plug to seal the fourth connector when the magnetometer is not attached
- 4) A D-shackle (6mm, long style)
- 5) A nylon sleeve (10mm OD, 6.3mm ID, 12.5mm long)
- 6) Cable ties (4.6 x 100mm, 20 off)

The CM2 Magnetometer Link Cable connects the fourth bulkhead connector to the 8-way connector on the MM sidescan sonar interface cable. Connections in the magnetometer link cable are as follows:-

- 1 = +24V
- 2 = GND
- 3 = not connected
- 4 = RS232, to the CM2 towfish from the magnetometer
- 5-8 = not connected

The fourth (magnetometer/responder) bulkhead connector carries an RS232 receive interface and a 24VDC supply. It is internally linked to socket J4 on the Towfish PCB. Its contacts must be sealed against the surrounding water whenever the CM2 towfish is deployed without the magnetometer being connected. The dummy plug is provided for this purpose.

The D-shackle (item 4 on the list above) secures the universal joint on the MM sidescan sonar interface cable to the CM2's tow cable terminator, as shown in the illustration.

The nylon sleeve (item 5) must be pressed into the universal joint on the sidescan sonar interface cable to adjust the diameter to that of the shackle pin.

Note that the SeaSPY internal echo sounder must be disabled when the magnetometer is to be used with the CM2 towfish. This precaution, applicable only to the SeaSpy, is necessary to avoid the extra current drain that the echo sounder would otherwise apply. The CM2 software displays the altitude of the combination so the magnetometer's echo sounder output is redundant.

### Connection to MM Display Software

Note that the MM Transceiver Box, required when the magnetometer is used independently, is not required in the configuration described by this Manual Supplement where the magnetometer uses the sidescan interface for its telemetry and power. (Note also that references in this document to SeaLINK apply equally to the later "BOB" software.)

In this configuration a software DLL resident on the sonar data acquisition computer automatically extracts the magnetometer data from the cable telemetry and passes it to a USB or serial port.

Note that the magnetometer messages are sent out unchanged when they pass through the CM2 telemetry,

with the conditional exception of the depth message. If the sidescan towfish is fitted with a depth sensor then the depth of the sidescan towfish is copied into the magnetometer depth message.

The sonar data and the magnetometer data may be acquired on separate computers, eg. with MaxView recording and displaying the sonar data on one computer and SeaLINK handling the magnetometer data on another. Alternatively both programs may be run on the same computer, perhaps with an additional screen to allow adequate display. Or, a single program such as Hypack may handle both data types concurrently. The DLL outputs the magnetometer as serial data on a com port, so for the data to be acquired, a null-modem link needs to be established to an input port (on the same computer in a single computer configuration, or on a second computer if this is to be used for the magnetometer data).

If a serial port is not available for the magnetometer output data, connect a USB-to-serial adapter. Using the Device Manager in the Windows Control Panel, identify which com port number has been assigned to this adapter.

Create a file called 'mag.ini' in Notepad, save it in 'My Documents', then copy it to the root of the C: drive.

The format of the file is X,4800,Y,Y. Here X is the port number and 4800 is the baud rate (alternative values being 9600 and 19200). The first 'Y' confirms the port is open with a dialog box, and the second 'Y' overrides the timestamp on the mag data with the system time.

Each of the options (confirm, override) can be set to either Y or N.

SeaLINK software will read this magnetometer data in from another serial port. Assuming again that no serial port is available for the magnetometer data input, connect a second adapter and again identify which port number has been assigned.

Now connect the two serial ports together via a null-modem cable.

If the magnetometer data is to be acquired, not by SeaLINK, but by a third-party acquisition package, then configure that package to accept the magnetometer data over the relevant com port.

If a single computer is being used for both sonar and magnetometer data acquisition then a software null-modem link is an alternative to an external cable.

### **Magnetometer settings**

The magnetometer baud rate and sample rate should be 9600 and 1Hz respectively, the factory default settings. The data string is also the standard, factory default format. Settings can only be adjusted or reset to default when the SeaLINK computer is connected directly to the magnetometer. The CM2 telemetry does not allow downward communication with the magnetometer.

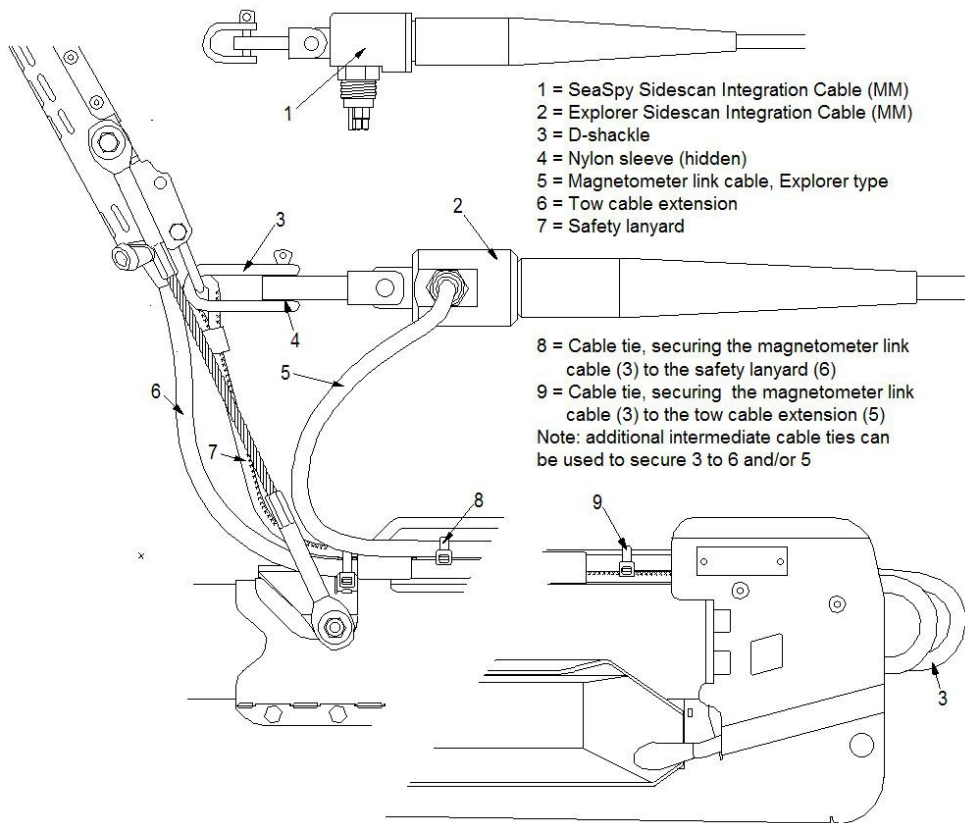
### 3. CONNECTION, DEPLOYMENT AND OPERATION

#### Connecting the Magnetometer

Before initial use press the nylon sleeve into the 9.8mm (0.385") diameter hole in the universal joint tow connector on the free end of the Marine Magnetics sidescan interface cable. This sleeve has an inner diameter to suit the removable pin in the D-shackle.

Use the D-shackle to attach the sidescan interface cable to the shackle on the CM2 tow cable terminator. The 8-way connector on the interface cable will then project to one side, either to the left or the right (Explorer) or downwards (SeaSPY). Ensure that the shackle pin is screwed fully home.

Attach the CM2 magnetometer link cable between the fourth connector on the rear bulkhead of the CM2 towfish and the 8-way connector on the Marine Magnetics sidescan interface cable.



*Connecting the Magnetometer*

Strap the magnetometer link cable to the CM2 towfish safety lanyard using plastic cable ties as shown in the illustration. This is important because, if the link cable is not secured in this way, hydrodynamic drag on the link cable may pull the plug out of the socket on the rear bulkhead. Note that the Explorer and SeaSPY Sidescan Integration Cables are different. The SeaSPY interface cable terminates in an encoder/decoder unit and an in-line 8-pin connector, instead of the Explorer's right-angle connector, but the overall configuration is similar.

Before tightening the cable ties ensure that the magnetometer link cable does not come under tension the towing bail is fully forward.

To test the system before launch start MaxView (or third-party sonar acquisition software) and SeaLINK, then start the CM2 towfish. After a delay of a few seconds power will be automatically applied to the magnetometer and sampling will begin.

### **Launch and Recovery**

The magnetometer towfish and its sidescan interface cable are relatively buoyant. This means that at survey speeds the altitudes of the magnetometer and CM2 towfish are similar. It also means that the magnetometer can be launched first or last depending on preference.

Refer to the CM2 User Manual for advice on launching the sidescan towfish.

Lower the magnetometer towfish into the water.

**CAUTION: DO NOT DROP THE MAGNETOMETER TOWFISH INTO THE WATER OR ALLOW IT TO IMPACT THE TOWING VESSEL.**

When recovering, it is normally more convenient to recover the CM2 towfish first.

### **Operating the Magnetometer**

Consult the Marine Magnetics magnetometer operation manual. Note that the optimum altitude and line spacing for the magnetometer will probably not be optimum for sidescan sonar and vice versa. A compromise is normally required.

### **Using the CM2 Towfish without the Magnetometer connected**

**CAUTION: IF THE CM2 TOWFISH (WITH MAG OPTION) IS USED WITHOUT THE MAGNETOMETER THE 4-WAY CONNECTOR ON ITS REAR BULKHEAD MUST BE SEALED USING THE DUMMY PLUG.**

The CM2 towfish automatically disconnects the power to the magnetometer connector if the magnetometer has not responded within approximately 10 seconds. This protective mechanism is intended to prevent further electrolytic corrosion of the connector if the dummy plug has been accidentally omitted: it is not a substitute for proper use of the dummy plug.