SonarWiz Cable Payout Meter Formats

Revision 4.0, 3/12/2018

Table of Contents

1   Introduction - SonarWiz Cable Counter Formats

SonarWiz users with a real-time acquisition license have the option of recording serial data from ma cable-counter (cable payout meter) during their survey, then using this data during post-processing to help account for the towfish position, by computing layback. This document helps explain the setup and recording of the various cable counter format options.

1.1   Computing Towfish Position - starts Cable Counter Recording

To get your Cable Counter data to record from the serial input (either COM port or UDP port), first enable computation of towfish position, in this dialog:
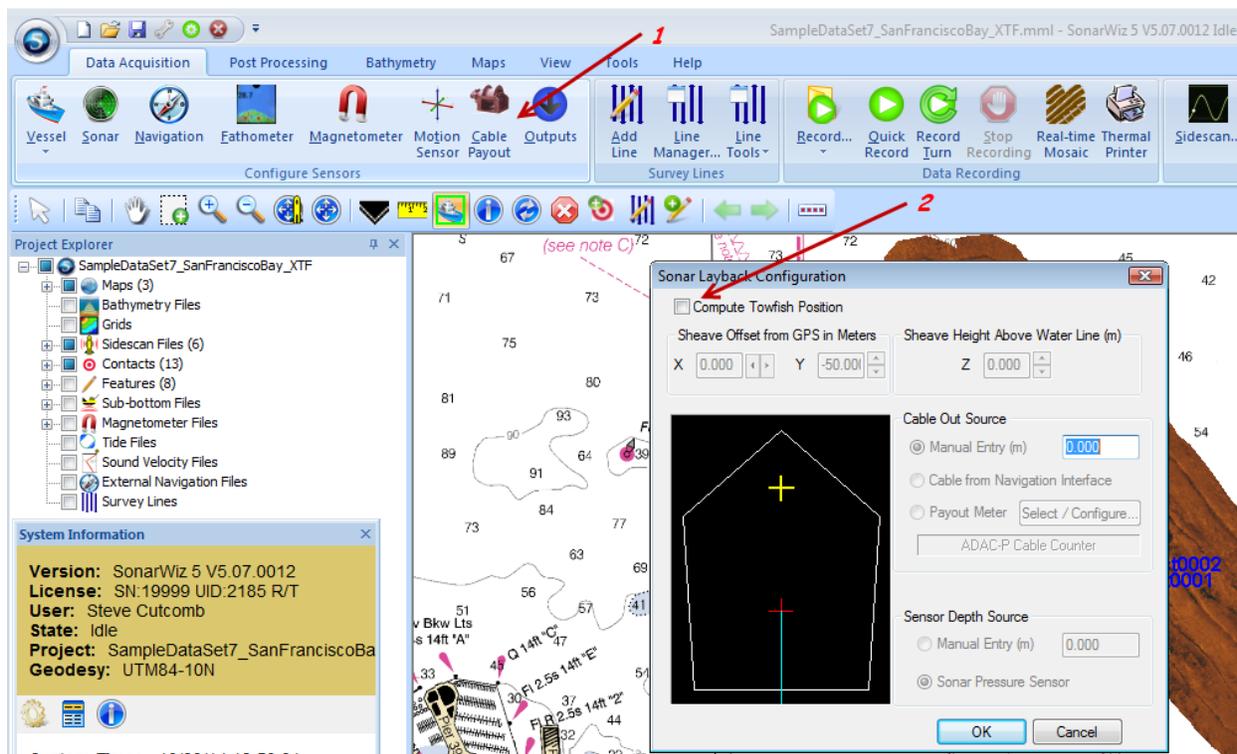
When you select to compute towfish position, it activates the SonarWiz choices lower in the dialog, and you get 3 options:

(1) can either set the towfish cable-out with a static value like 10.0m (10 meters), or

(2) select to read CableOut from your navigation data input, or

(3) select PAYOUT METER, to bring in a dynamically configured value.
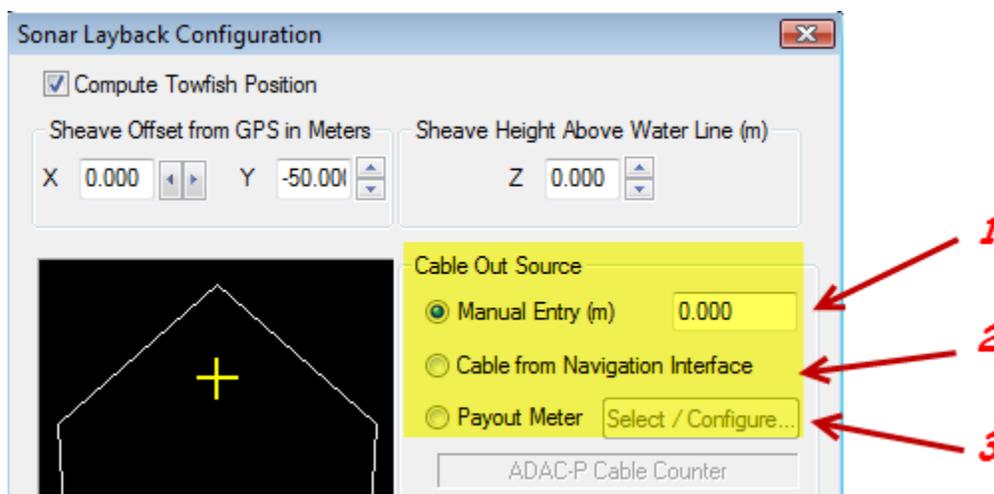
We explain in this document how to make use of option (3), and explain the formats of cable-counter serial data supported, as of SonarWiz version 6.01.0027.

1.2   Specifying the Cable Payout Meter Serial Format

Serial data is received by SonarWiz in a COM port or a UDP port in packets or sentences - individual units of formatted data, which are in most cases interpreted according to a custom template, stored b y name in the ***FFTemplates_system.db3*** file in your SonarWiz Program Files folder. The list of formats supported, is shown in the Cable Meter Type field in the dialog:

1.3   Requesting a New Cable Counter Format
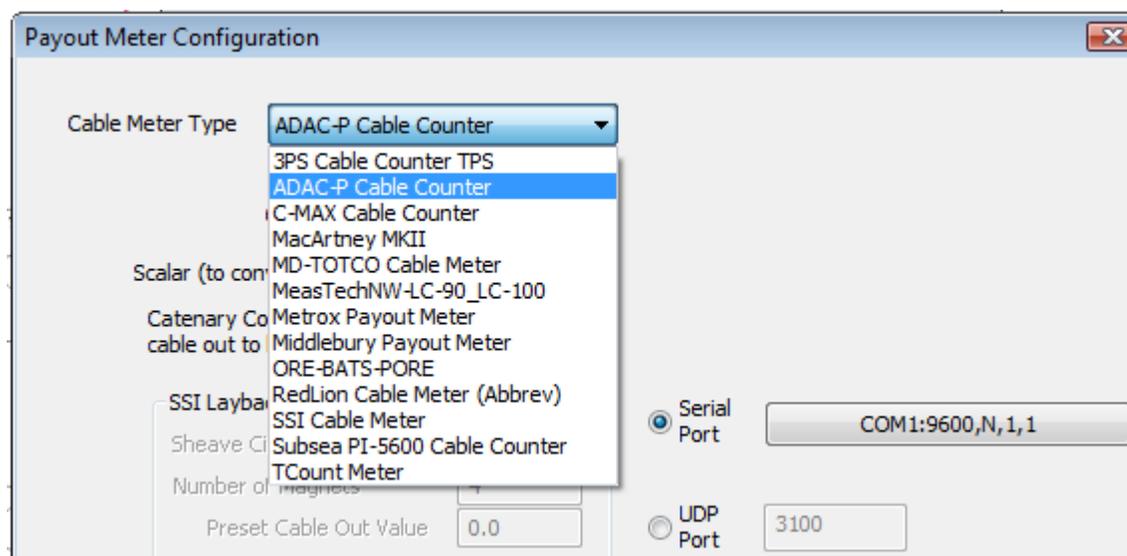
If you need a new Cable Counter format supported, which is not listed above, use the MTTTY.exe serial-data-capture application, also found in your SonarWiz Program Files folder. We have a tutorial PDF explaining how to use MTTTY.exe to capture serial data to a text file, which can be sent to us as example data. The tutorial PDF is in the

SonarWiz TECH NOTES area. First login to www.chestech-support.com and select SonarWiz:

Then scroll down to this item and download it. Here's the one you want:

Please contact support@chesapeaketech.com and send the serial data sample and explain your needs, and we'll help get the new format supported.

The following format descriptions explain how we have defined the existing formats in SonarWiz, specifically in the *FFTemplates_system.db3* templates format database.

2   Cable Payout Meters - Supported Sentence Formats

The following Cable Payout Meter formats, listed alphabetically and separately in each section, are supported in SonarWiz version 6.01.0027.

2.1   3PS Cable Counter TPS

Description	3PS cable Counter with SD41 display - Tension, payout and speed
Number of fields	8
Fields delimited by	Single delimiter character
Field delimiter	Comma

Sentence format example: 1,15.2,N,10.5,N,1.0,N,None

Format Definition:

Field	Type	Description / example
Address	Integer	Unused
Cable_tension	Floating point	Unused
Tension_alarm_state	Char	Unused
Cable_payout	Floating point	Cable payout length in meters = 10.5
Payout_alarm_state	Char	Unused
Cable_speed	Floating point	Unused
Speed_alarm_state	Char	Unused
Message	Char	Unused

2.2   ADAC-P Cable Counter

Description	ADAC-P cable counter
Number of fields	3
Fields delimited by	Single delimiter character
Field delimiter	Comma

Sentence format example: 15.2,20.1,10.5

Format Definition:

Field	Type	Description / example
Unused1	Not specified	Unused 15.2
Unused2	Not specified	Unused 20.1
Cable_payout	Floating point	Cable payout length in meters = 10.5

2.3   CMAX Cable Counter

Description	CMAX cable counter (from the company that sells CMAX CM2 sonar)
Number of fields	1
Fields delimited by	Single delimiter character
Field delimiter	Space

Sentence format example: 10.5

Format Definition:

Field	Type	Description / example
Cable_payout	Floating point	Cable payout length in meters = 10.5

2.3.1 CMAX Cable Counter - Protocol Definition

The pulley connects to a serial interface and operates at 4800 baud with no handshaking. DTR and RTS should be set to active as they are used to provide power.

The pulley starts in polled mode, giving a '[+/-]XXXX<CR>' string in response to a 'T' command but it can be set to transmit this string once per metre if needed. This non-polled mode needs to be set each time the pulley is connected by sending a 'N' command as there is no on-board non-volatile memory.

The commands to the pulley such as 'N' or 'T' are single capital characters, with no <CR> needed.

The full command list is:

R = reset counter to zero
T = transmit count - this command will get the pulley to send you a cable-count number
I = identify (returns 'P')
P[+/-XXXX]<CR> = preset counter (version 4 or later)
F = set count direction forward
B = set count direction backward
V = transmit software version
L = append LF/CR to count
C = append CR to count
N = set interrupt mode - pulley transmits cable change info, without polling, in this mode
O = set polled mode - in this mode, to see cable count, send in a T command
S = transmit status string

The status string consists of four characters. The first indicates the count direction ('F'/'B'), followed by count string termination type ('L'/'C') and then transmission mode ('O'/'N'), then finally a <CR> character.

The power on status is 'FCO', meaning forward counting, polled mode, with a carriage-return terminating each number sent to you.

2.3.2 SonarWiz Delivery of the N Command - initially, then every RESTART

When you first enable cable-meter, by selecting the CablePayout icon and then setting up the CMAX choice, and enable "Compute Towfish   Position" here:
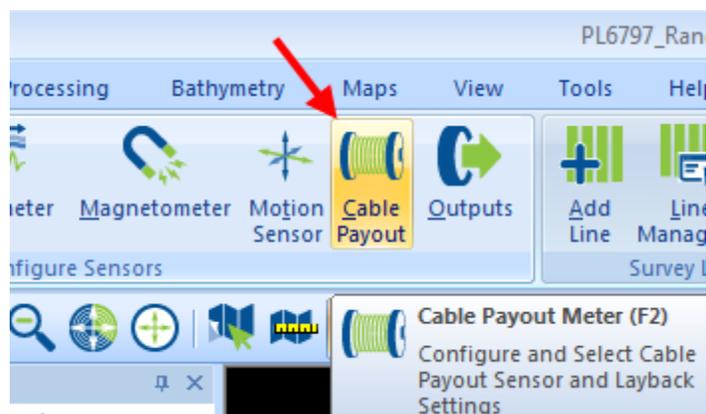
When you exit the dialog, with CMAX type payout meter selected:
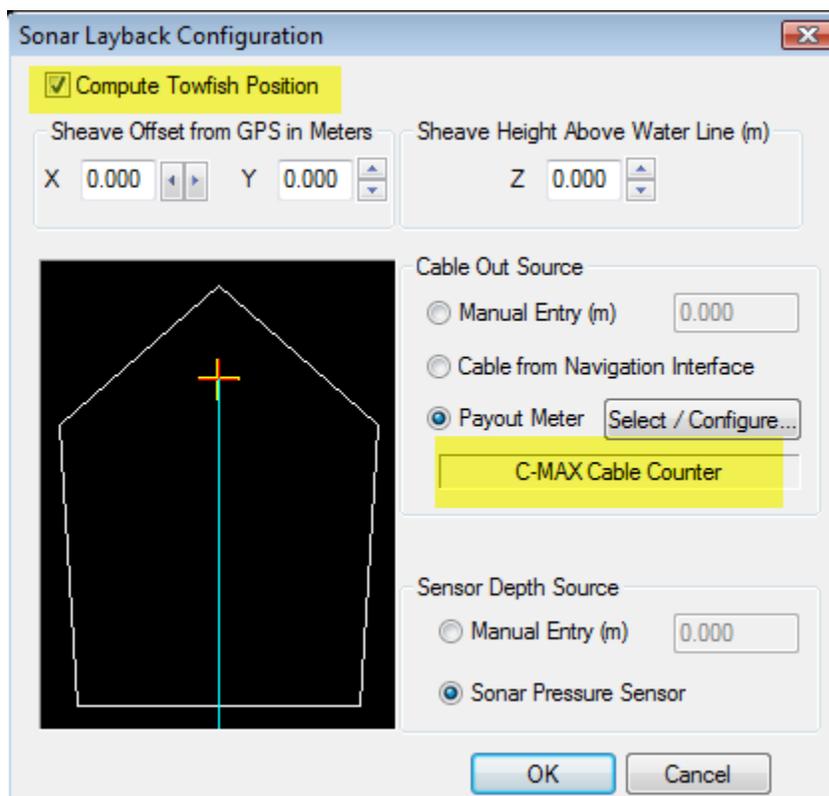
an "N" character is sent by Sonarwiz to the selected serial port, so that the cable meter is set into INTERRUPT mode:

This N is seen in the MTTTY.exe application, where we have used VSPE to record from COM2, and SonarWIz is connected to COM3, and VSPE (Eterlogic.com, virtual serial ports emulator) creates the COM2=COM3 pairing.

There is strong state memory about the cable meter, and N will only be re-sent if you restart SonarWiz at that point, but each time SonarWIz starts with this CablePayout meter set-up, an N will be sent to the COM port at the specified baud rate:
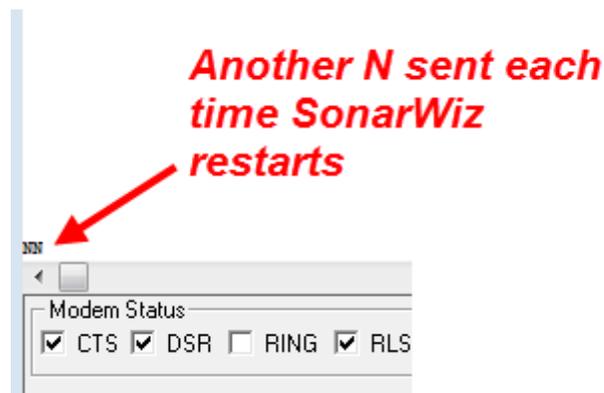
NOTE: See Section 3 for an alternate CMAX Payout Meter **polling** protocol, supported in the CMAX CM2 USBV real-time server, release 5.00.012 and any later version.

2.4   MacArtney MKII

Description	Record consists of alternating pairs of S=x.x m/sec and L=x.xm. The S fields give the line payout speed in meters/sec and the L fields give the line distance (cable payout, total) in meters
Number of fields	2
Fields delimited by	Single delimiter character
Field delimiter	Space

Sentence format example: 1.0 10.5

Format Definition:

Field	**Type**	**Description / example**

| Cable_payout_speed | Floating point | Cable payout speed in meters/sec = 1.0 |
| Cable_payout | Floating point | Cable payout length in meters = 10.5 |

2.5 MD-TOTCO Cable Meter

Description	MD-TOTCO cable meter
Number of fields	3
Fields delimited by	Single delimiter character
Field delimiter	Space

Sentence format example: 15.2 20.1 10.5

Format Definition:

Field	Type	Description / example
Unused1	Not specified	Unused 15.2
Unused2	Not specified	Unused 20.1
Cable_payout	Floating point	Cable payout length in meters = 10.5

2.6 MeasTechNW-LC-90_LC-100

Description	MeasTech cable counter interface for LC-90 and LC-100 models
Number of fields	5
Fields delimited by	Single delimiter character
Field delimiter	Comma

Sentence format example: 7,1.0,22.5, 10.5,345

Format Definition:

Field	Type	Description / example
ID	Char	Unused 7
Cable_payout_tension	Floating point	Unused 1.0
Cable_payout_speed	Floating point	Unused 22.5
Cable_payout	Floating point	Cable payout length in meters = 10.5
Checksum	Integer	Unused

2.7 Metrox Payout Meter

Description	Metrox Cable Meter. Unknown field structure at this time. Assume one field with cable payout being the first valid number in the string
Number of fields	1
Fields delimited by	Variable delimiter characters
Field delimiter	Space

Sentence format example: 10.5

Format Definition:

Field	Type	Description / example
Cable_payout	Floating point	Cable payout length in meters = 10.5

2.8 Middlebury Payout Meter

Description	Developed to handle a cable meter in use at Middlebury College.
Number of fields	1
Fields delimited by	Variable delimiter characters
Field delimiter	Space

Sentence format example: 10.5

Format Definition:

Field	Type	Description / example
Cable_payout	Floating point	Cable payout length in meters = 10.5

2.9 ORE-BATS-PORE

Description	This message is used to parse the Y value as cable out
Number of fields	13
Fields delimited by	Single delimiter character
Field delimiter	Comma

Sentence format example: A,8,23:03:14,110.2,N,110.2,55.2,10.5,25.2,0.3,-0.4,N,A

Format Definition:

Field	Type	Description / example
Skip	Char	Unused A
Target	Integer	Unused 8
Time-of-day	MM:HH:SS	Unused 23:03:14
Target-heading	Float	Unused 110.2
Heading_type	Char	Unused N
Bearing_to_target	Float	Unused 110.2
Target_x	Float	Unused 55.2
Cable_payout	Float	Cable payout in meters = 10.5
Target_z	Float	Unused 25.2
Roll	Float	Unused 0.3

Pitch	Float	Unused -0.4
Warning_code	Char	Unused N
Quality_factor	Char	Unused A

2.10 RedLion Cable Meter (Abbrev)

Description	Compatible with PAX family of meters - Abbreviated transmission
Number of fields	1
Fields delimited by	Variable delimiter characters
Field delimiter	Space, for example

Sentence format example: 10.5

Format Definition:

Field	Type	Description / example
Cable_payout	Floating point	Cable payout length in meters = 10.5

2.11 SSI Cable Meter

Description	Hydrographic Survey Products SSI Cable out device.
Number of fields	7
Fields delimited by	Fixed columns, variable width
Field delimiter	N/A

Sentence format example: <None available yet>

Format Definition:

Field	Type	Description / example
Preamble	Char	Unused
Address	Char	Unused
Cable_payout	Float	Cable payout in meters = 10.5
Units	Char	Meters = M
Comma	Char	Comma
Sign	Char	+ or -
Calibration	Integer	Accuracy 1

2.12 Subsea PI-5600 Cable Counter

Description	Subsea PI-5600 Cable Counter
Number of fields	1
Fields delimited by	Variable delimiter characters
Field delimiter	Space, for example

Sentence format example: 10.5

Format Definition:

Field	Type	Description / example
Cable_payout	Floating point	Cable payout length in meters = 10.5

2.13 TCount Meter

|	
Description	TCount cable meter format
Number of fields	2
Fields delimited by	Variable delimiter characters
Field delimiter	Space, for example

Sentence format example: 7,10.5

Format Definition:

Field	Type	Description / example
Address	Char	Unused 7
Cable_payout	Floating point	Cable payout length in meters = 10.5

3   Cable Payout Meter - Real-time Examples - CMAX Format

Since not all serial set-ups support the interrupt-mode operation of reading the CMAX payout meter optimally, there is an alternative communication mode supported with SonarWiz and the CMAX CM2 USB server - the real-time server which you can add-on to an existing license key, supporting real-time data acquisition of sidescan sonar from the CMAX CM2 towfish.

3.1   Simulating the CMAX payout meter

We used NMEAWiz and Eterlogic VSPE to set up a COM port pair, and send in serial data, at CTI labs, when testing this interface. We also tried it with a real CMAX payout meter. Here's the VSPE GUI set-up:
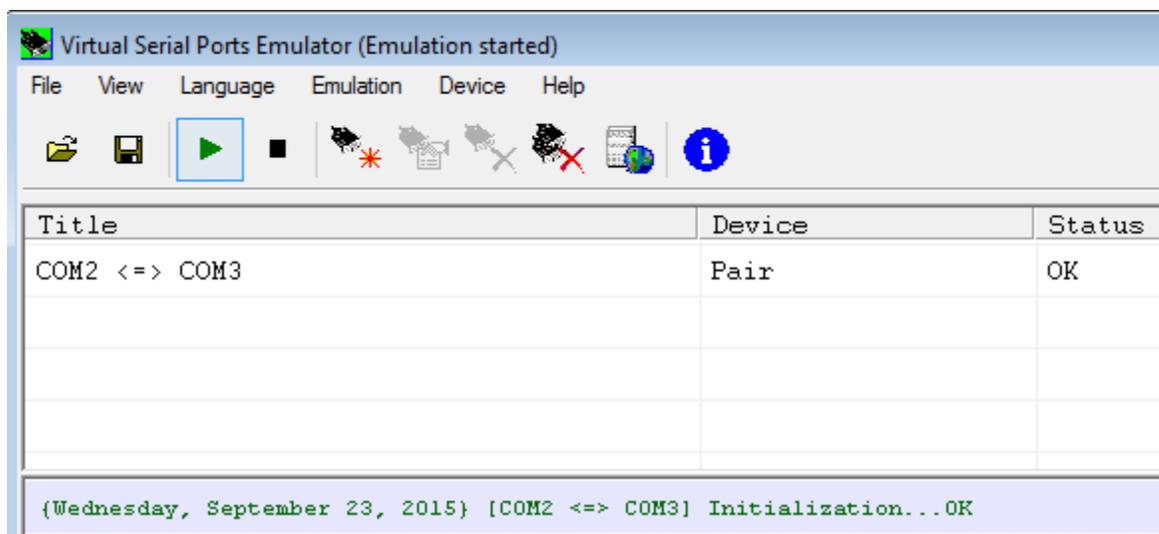
By setting up a virtual COM port pair, we can send data in using NMEAWiz, as if it were a payout meter, and connect to COM2. SonarWiz CMAX CM2 USB server connects to COM3, and reads the data there.

The polling mechanism is an approximate 1 Hz send of the "T" command, from the CMAX server to the CMAX payout meter. The CMAX payout meter reply is being simulated here by sending lines from a pre-defined numeric data file, using NMEAWiz at 9600,8,N,1 at 1 Hz:
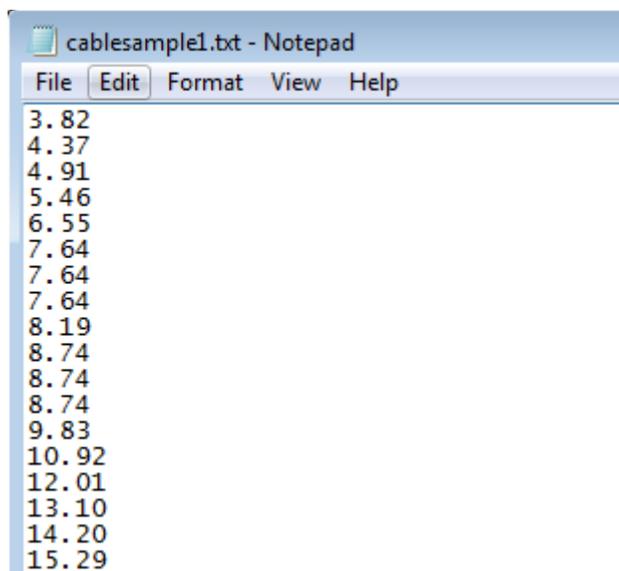
When the lines are sent in to The CMAX CM2 USB server, each line is terminated with a CR LF character pair. Other than that, it is just a series of decimal numbers representing the cable-out value in METERS.

3.2   NMEAWiz Used to Send Data

NMEAWiz is a serial-port/UDP-port simulator utility available from Chesapeake Technology, and can be used to send a data file line-by-line like cablesample1.txt, through a COM port or UDP port. The send GUI looks like this (top-right section, "Send Data File"):
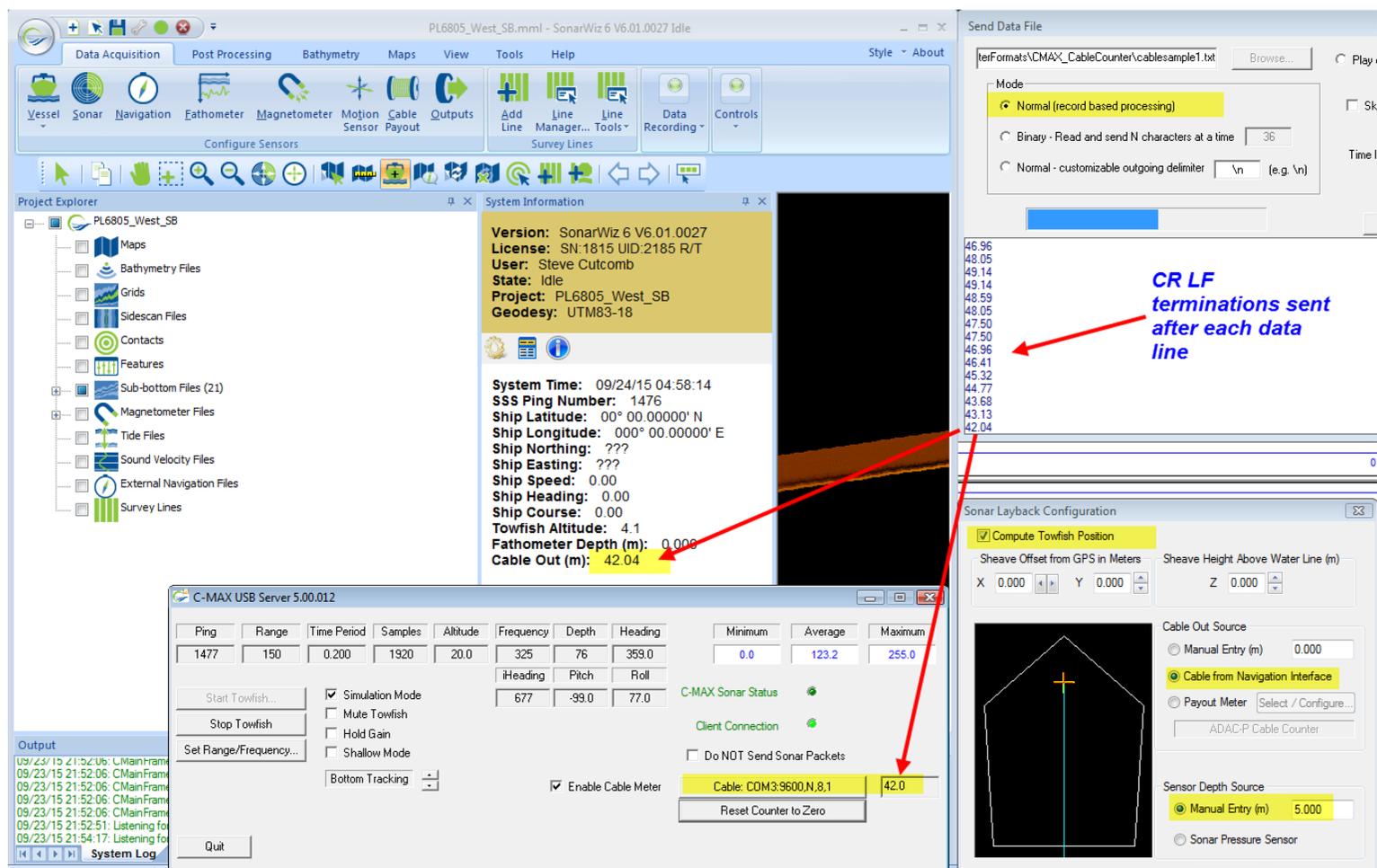
3.3   Setting up the CMAX CM2 USB Server to read a CMAX cable payout meter

In the lower-left section of the figure above, the CMAX CM2 USB server version 5.00.012 has been shown, already set up in 2 ways:

(1) Enable Cable Meter is checked, to enable serial COM port processing of CMAX payout meter serial data, and

(2) The serial port was configured like this:
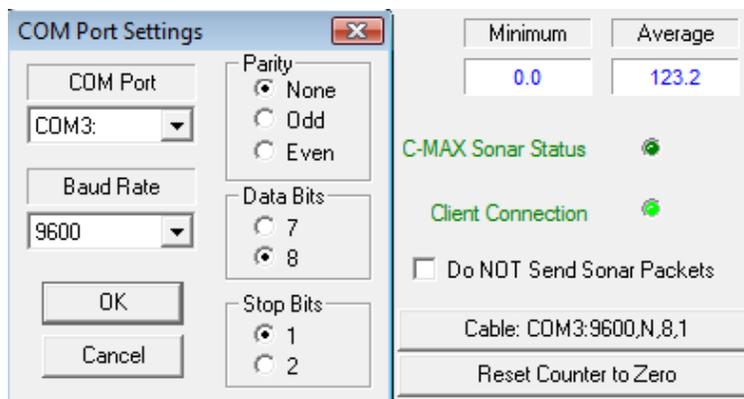
### 3.4   Setting up SonarWiz to process the Cable Payout meter input

In SonarWiz (6.01.0027 version used fro this test), the Cable Payout dialog needs to be selected and configured, too. Here's how we set it up this time, so that the serial data coming in from the CMAX CM2 USB server would be used to set cable-out:

(1) Using Views -> Data Acquisition -> System Info, you select to display real-time numerical data views, and then select the GEAR icon for settings, to select Cable-Out, if it had not already been selected to display:
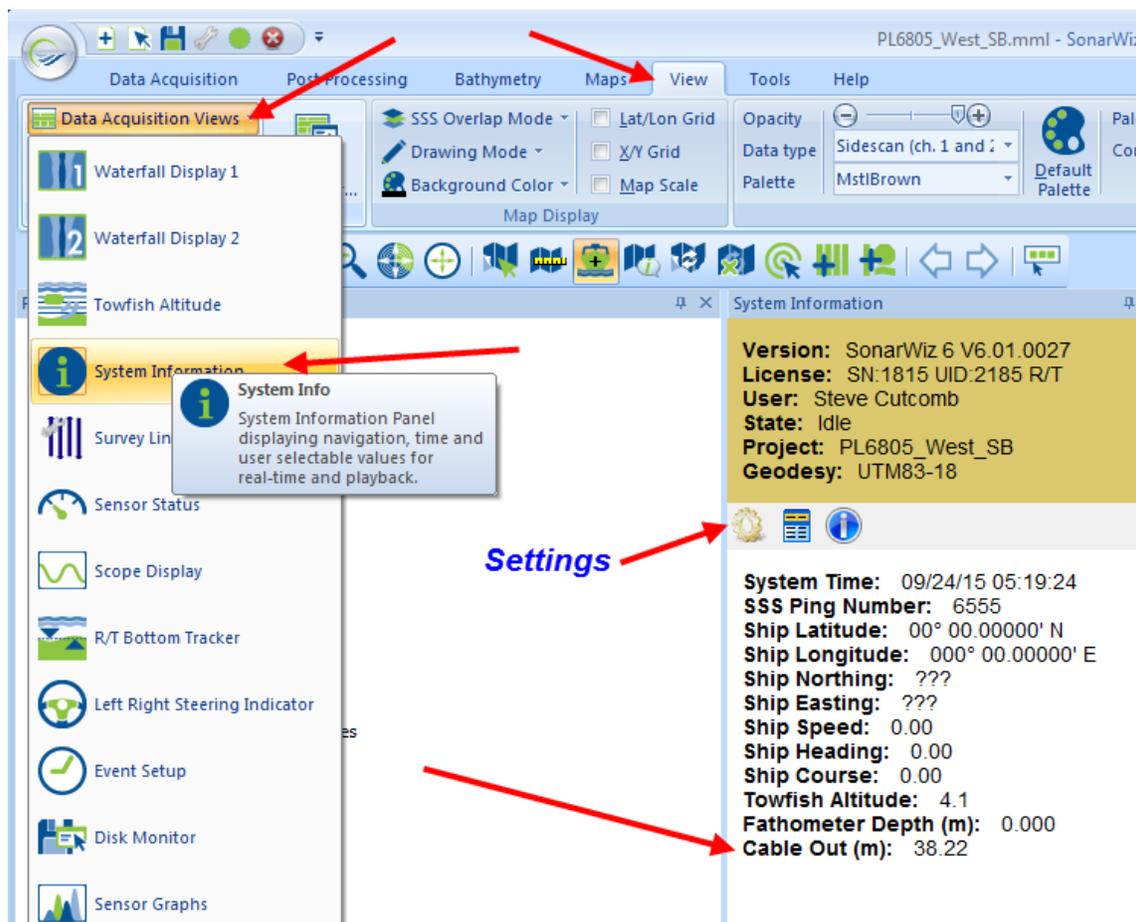
(2) Then select Cable Payout and configure the dialog below like we did in this example:
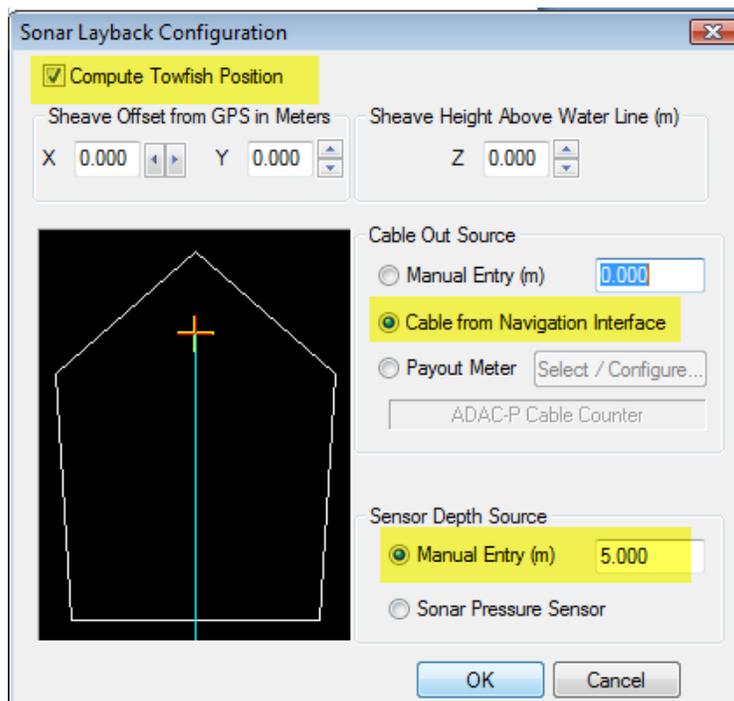
2.1 - Compute Towfish Position is important, and tells SonarWiz to use the cable-out (hypotenuse) and sensor-depth (vertical leg of triangle) to triangulate and compute the horizontal leg of the triangle, as the distance back from the ship, to the position directly above the towfish. For this reason, you should use a sensible estimate of the towfish depth, (e.g. 5m in this case), if you do not have a depth sensor running.

2.2 - **Cable from Navigation Interface should be selected**, so that SonarWiz knows not to expect to be in control of the serial port directly (it will be directly controlled by the CMAX CM2 USB server)

2.3 - In addition to setting Sheave Offset and the Z value, defining how high the cable connects to a sheave, above the waterline, please set a towfish DEPTH value manually, like 5m shown in the example above, unless you will be receiving depth from a depth sensor during real-time.

The dialog below shows graphically the measurements being used, so that SonarWiz can compute the towfish position layback behind the ship and the GPS antenna location, specifically (Sheave Offset X and Y define the sheave position with respect to the GPS antenna position).
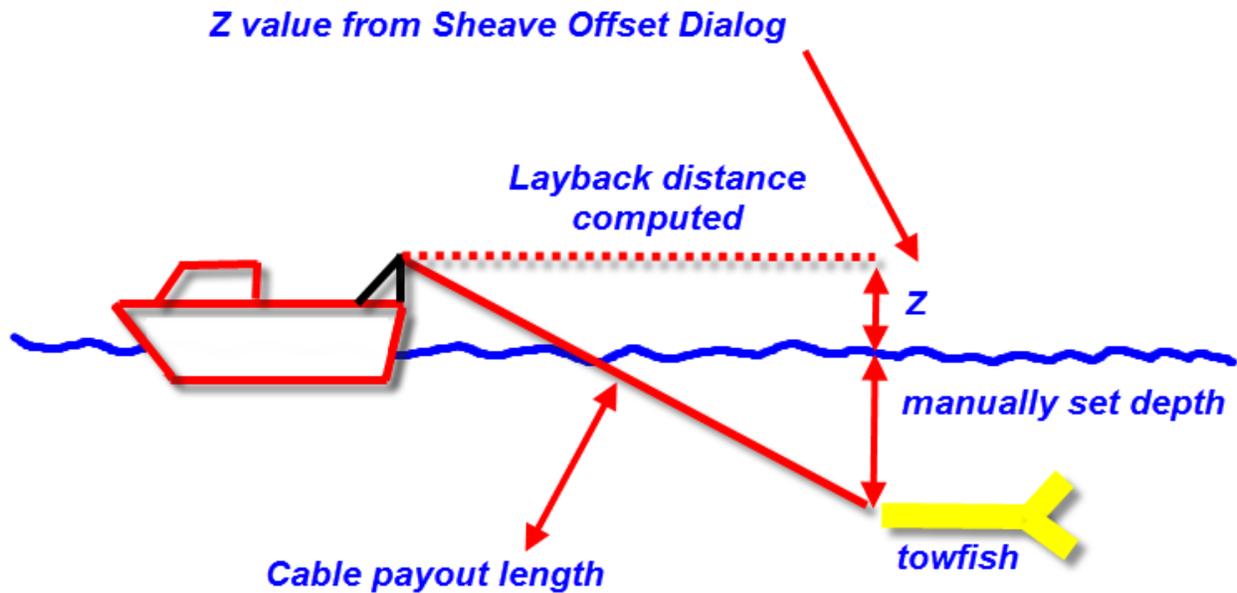
Note that setting up Sheave Offset dialog for X, Y, and Z values is assumed too, but is not covered in detail here. The Layback section of the main SonarWiz User Guide describes this in good detail.

3.5   Payout Meter - Connection Example - COM PORT direct connection

We borrowed a real CMAX Cable Payout Meter for the integration test of CMAX CM2 USB server 5.00.012 testing, and SonarWiz version 6.01.0028 was used for this test. The meter has a 9-pin female D-connector that fits a male COM port perfectly:
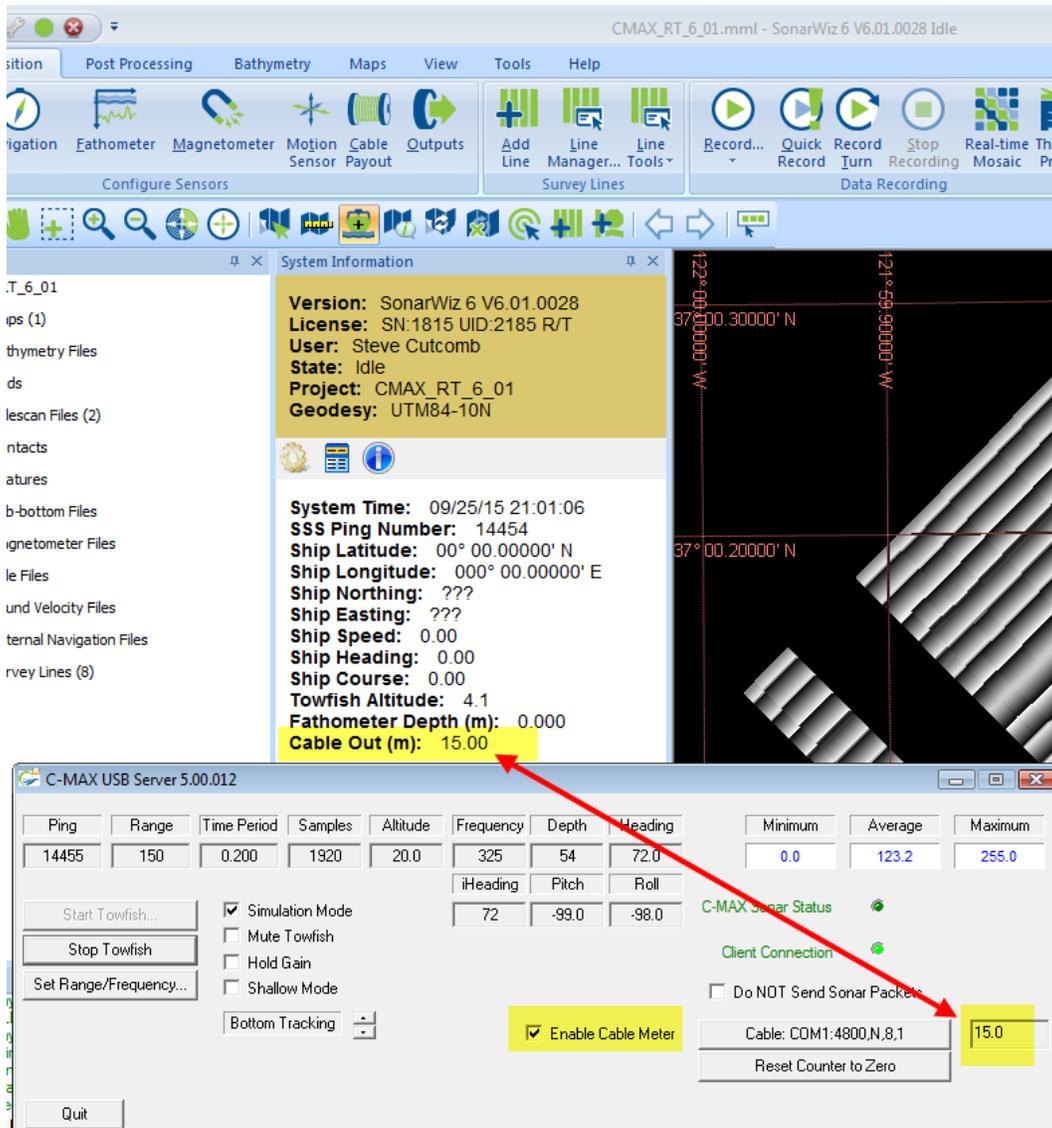
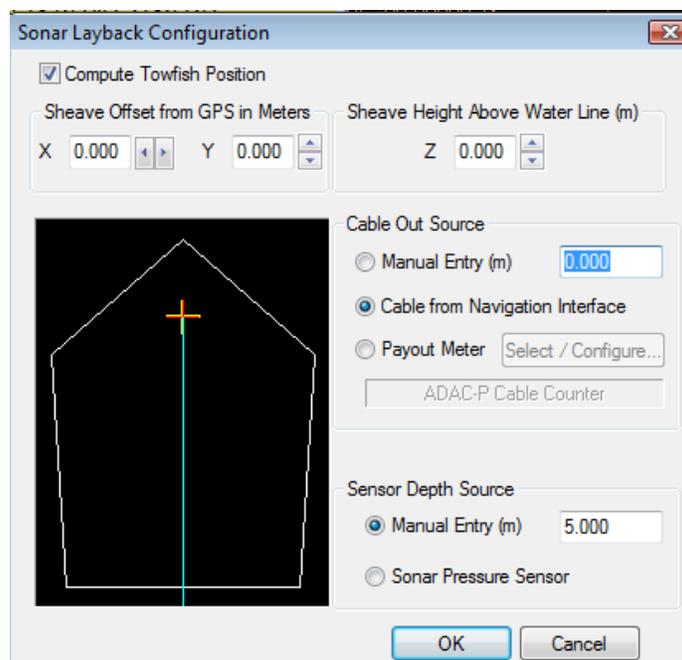**CMAX payout meter female 9-pin D connected directly to COM1 port on the rear panel of a VISTA 64-bit OS PC**

See documentation for Cable Payout Meter dialog configuration details

The Cable Payout Meter dialog was set up like this in this case:

At the main SonarWIz GUI, you may see a slightly confusing icon of the Cable Payout Meter with a flashing red X, because the meter has successfully connected to the server, not SonarWiz, and is actually functionally connected - though the red X blinks:
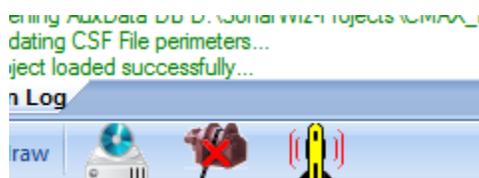

No navigation data was flowing into SonarWiz at this point, but the simulated CMAX data was enabled, and we were not recording (e.g. QUICKRECORD not pressed, RECORD not pressed).

The thing to note is that the SYS INFO displayed data for cable out matched the data seen in the CMAX CM2 USB server.

To get the number to change, all we had to do was roll the cable pulley in the direction shown:

and the meters cable-out number increased from 15.0 to 16.0:
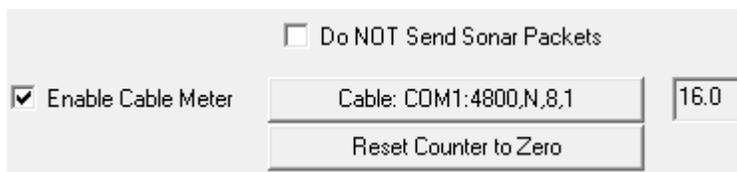
What's happening here, the developers tell me, is that the meter is being polled by SonarWiz ("T" characters sent out once or more per second), and the numbers sent in are incremented when they change.

3.6   USB Port Use of CMAX Payout Meter
A developer used a **USB port** and driver to integration test the CMAX payout meter, with similar results. Their description of the test was described like this:

(1) It was initially tested it on the tech support shuttle PC without the USB adapter. We were was able to get numbers from it and you have to connect with 4800 baud, N, 8,1.

(2) Once we decided that the interrupt mode wasn't working , we brought it back to a developer laptop and tested it using the USB adapter. If you use the USB adapter you may need a driver for it depending on which OS you're testing on.

4   Document Versions

Rev 4, 3/12/2018 - Clarification added in section 3.4 about using only one source for the cable-meter input - e.g. modern CMAX CM2 server means choice "navigation interface", rather than Cable Meter, in the main SonarWiz "Compute Towfish Position dialog.

Rev 3 - 9/25/2015 - Major revision and addition of the CMAC CM2 protocol information done.