

WinFrog Device Group:	GYRO
Device Name/Model:	LEHMKUHL LR40
Device Manufacturer:	Scandinavian Micro Systems PO Box 155 N-1411 Kolbotn Norway Tel: +47 66 81 27 40 Fax: +47 66 80 80 95 E-mail: scansys@sn.no
Device Data String(s) Output to WinFrog:	Serial Output: RS232/RS422 (2 Ports) Unit outputs proprietary format binary data to WinFrog. WinFrog reads last 5 digits for heading
WinFrog Data String(s) Output to Device:	Nil
WinFrog .raw Data Record Type(s):	Type 910

DEVICE DESCRIPTION:

The Lehmkuhl LR40 is a gyro repeater that accepts inputs from a variety of survey and navigation gyros, and converts and outputs heading data in user selectable serial RS232 format. The LR40 can be connected to most types of gyro compasses without any special interface circuits.

Ship's heading is displayed by a four digit LED display. The turning indicator is a ring of thirty solid state lamps. 5 of these lamps are lit at the same time. When the ship turns to starboard, all five lights rotate in a clockwise direction and when the ship turns to port, they rotate in an counter-clockwise direction with a resolution of 6 or 3 steps per degree of turning of the ship.

The Lehmkuhl LR40 outputs are similar to that of the Lehmkuhl LR60 and hence the driver will work for both devices. Both instruments are capable of outputting NMEA, RGC11, ANSCH, and LR40 data strings, however only the binary data output is used by this driver. Should the instrument be programmed to output the NMEA (HDT) string, the (Gyro) NMEA driver could be used.



Lehmkuhl LR40

DEVICE CONFIGURATION INSTRUCTIONS:

Baud Rate: 1200, 2400, 4800, or 9600 (9600 suggested)

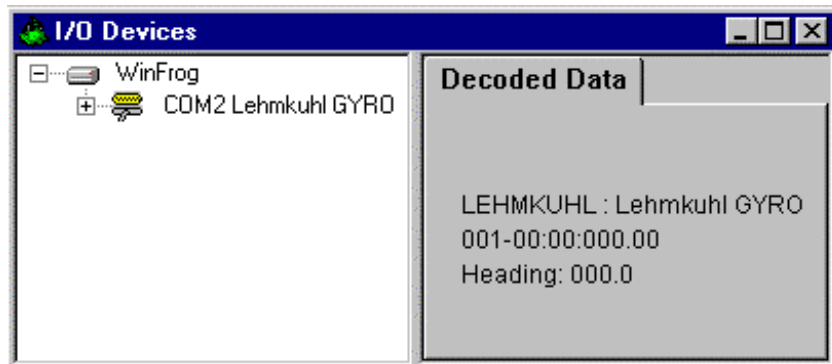
Data Bits: 8

Stop Bits: 1

Parity: None

WINFROG I/O DEVICES > CONFIG OPTIONS:

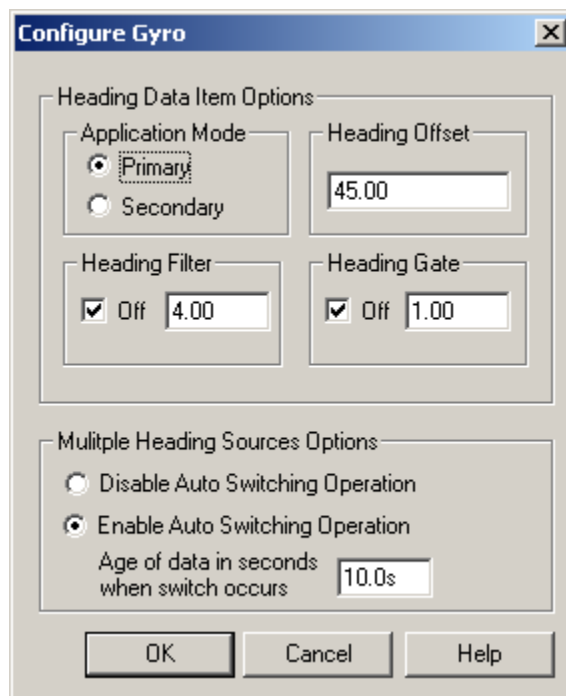
The Lehmkuhl LR40/LR60 is added to WinFrog from the Gyro device category. Adding a LR40 creates a Heading data item, as seen in the I/O Device dialog box below.



No device configuration is required or available at the I/O Device level.

WINFROG VEHICLE - DEVICE > EDIT OPTIONS:

Once the LEHMKUHL LR40 Gyro has been added to the vehicle's Device list, it must be configured to suit the application. In the Vehicle's Device list, highlight the LR40 device and click the Edit button. The Configure Gyro dialog box appears as seen below.



Heading Data Item Options:**Application Mode (Primary/Secondary):**

Set the type of calculation to Primary or Secondary by selecting the appropriate radio button. Devices set to Primary are used to provide the vehicle heading information. Devices set to Secondary are simply monitored, and are not used in the vehicle's calculations.

Note that WinFrog supports automatic switching from a designated Primary to a Secondary in the case that data from the Primary fails (see Multiple Heading Sources Options).

Heading Offset:

A correction value (as determined from a gyro calibration) can be input in the Heading Offset Box. This value is added to the heading value from the Lehmkuhl LR40 to provide a corrected heading for the vehicle. Note that positive or negative values can be entered.

Note also that the Lehmkuhl LR40 is a 'programmable' repeater, which allows for an initial heading to be entered. The repeater then notes the gyrocompass' steps to increase or decrease the heading displayed and output.

Heading Filter/Heading Gate:

The Heading Filter is used to "smooth" heading values used by the vehicle. The value entered in the Heading Filter indicates the number of headings that will be used to predict the next heading value. The larger the value entered, the "heavier" the filter will be – i.e. the slower the vehicle's heading will respond to changes.

The Heading Gate defines a tolerance value to limit the use of anomalies in gyro readings. If the next observed gyro value received falls outside the specified range of predicted values (i.e. plus or minus the entered value), the value will not be used.

Multiple Heading Sources Options:

WinFrog supports automatic switching from a designated Primary source to an alternate Secondary source in the event that the Primary fails. The first Secondary source to receive data after the Primary has failed becomes the alternate Primary providing the heading for the vehicle. When the designated Primary is detected as active again, the alternate Primary source reverts to Secondary and the designated Primary provides the heading data to the vehicle.

If an alternate Secondary fails and there are additional Secondary sources, it in turn is detected by the first of the remaining operational Secondary sources to receive data after the failure at which time this Secondary becomes the alternate Primary.

Note that this option is only available if more than 1 HEADING source is associated with the respective vehicle. Changes made to the Auto Switching options for any one

of the HEADING data items are automatically assigned to the others upon exiting this dialog with OK. If the Auto Switching option is enabled and the respective HEADING source has been set to Primary, all others are automatically set to Secondary. The exception to this is when configuring a WinFrog Controlled Remote (WinFrog with a Remote module) from a Controller. In this case, changes made to one HEADING source are not automatically made to other HEADING sources. The operator must explicitly make them for each HEADING source.

This option is not available in the WinFrog Remote package.

Disable/Enable Auto Switching Operation:

Select the mode you wish to operate WinFrog.

Age of data in seconds when switch occurs:

Enter the age of data that is permitted before the source is considered to have failed.

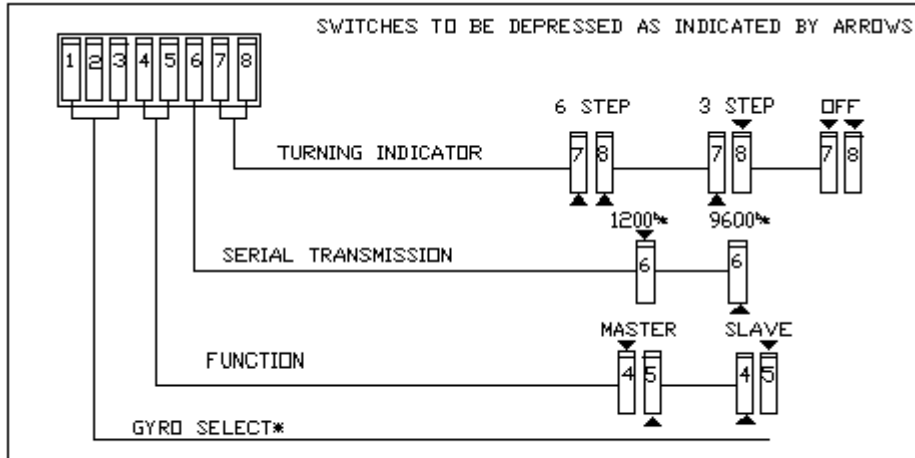
CONFIGURATION DETAILS:

The LR40 can be internally programmed to be a Master Repeater or a Slave Repeater. As a Master Repeater, the LR40 decodes 180:1 or 360:1 transmission signals, displays the ships heading, and controls the turning indicator and the RS422 serial output interface.

As a Slave Repeater the LR40 receives RS422 serial information from a Master Repeater, displays the ships heading, and controls the turning indicator and the RS422 serial output interface.

Setting of the D.I.L. switches (see figure X) determine:

1. Whether the repeater should work as master or as slave.
2. Baud rate of the data output/input.
3. Rate of turning indication (6 or 3 steps per degree turning of the ship).



* Refer to Lehmkühl LR40 'DIGITAL GYRO REPEATER' Instruction Manual for specific Gyro manufacturers and appropriate settings

Programming of SW200 D.I.L. Switch

SPECIFICATIONS:

Display:	LED digits and 5LED turn indicator
Gyro Inputs:	3 phase step 24 – 100VDC 3 phase Inductive 24VAC 400Hz 3 phase 360:1 AC Synchro 50-150V 50-500Hz 3 phase 360:1 DC Synchro +/- 24VDC 2 phase 24VDC step (24 steps per degree) Serial RS232/RS422
Serial Output:	RS232/RS422 (2 ports)
Serial Baud Rate:	1200, 2400, 4800, 9600
Serial Output Strings:	NMEA, RGC11, ANSCH, LR40
Accuracy:	Within 0.2 degrees of gyro compass reading at or below max turning rate of 720 degrees per minute.
Power:	110/240 VAC @ 7 Watts
Dimensions:	19 x 10 x 11 cm
Weight:	2.5Kg

Data Protocol:

Start bit 1		
Bit 1	Digit value	LSB
Bit 2	"	
Bit 3	"	
Bit 4	"	MSB
Bit 5	Digit Address	LSB
Bit 6	"	MSB
Bit 7 (M1)	Mode control	
Bit 8 (M2)	"	
Mode Control	Stop bit 1	
	M1 & M2 low: Transmits heading data	
	M1 & M2 high: Transmits special alarm	
	BH 6-5-4-3-2-1	
	0 0 1 0 1 0 = Alarm state in master	
	0 0 0 0 0 0 = No alarm state in master	