



## 16 K-Chief 700

16.29 Serial Lines

Ref:

Sub modules:

DMS no:



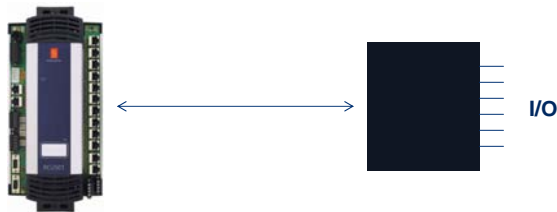
## Objective

- Basic theory of serial lines
- Be able to read information about serial lines from Station Explorer
- Understand how the serial lines are connected to the RCU

## Serial Lines



- Connecting to 3<sup>rd</sup> party equipment
  - Drilling Control System
  - Load Calculator
  - Thrusters
  - Generators
  - Fire Centrals
- K-Chief 700 is master in the communication, the node in the other end is called slave.



## HW/SW Interfaces



### Hardware interfaces:

- RS232
- RS422
- RS485

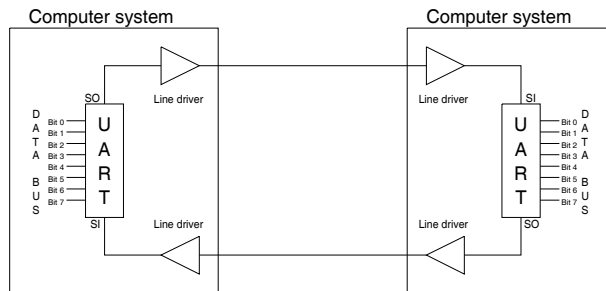
The way of packing the data for transmission on a serial line is called protocol

- Modbus
- NMEA
- Profibus

# Serial Line Theory

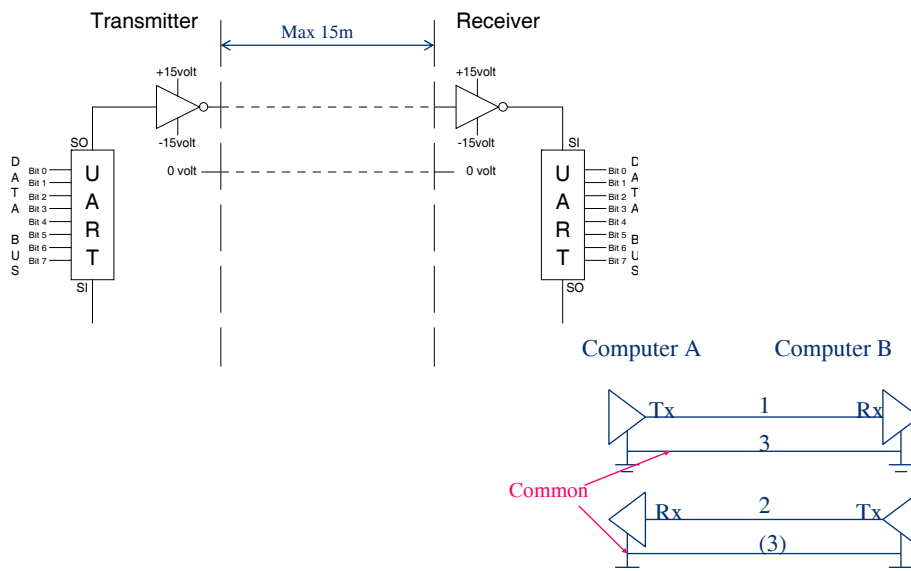


## Universal Asynchronous Receiver Transmitter



Handles the communication between two computers.  
Converts from parallel to serial data and from serial to parallel data

# RS232

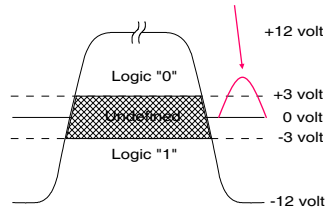


# RS232

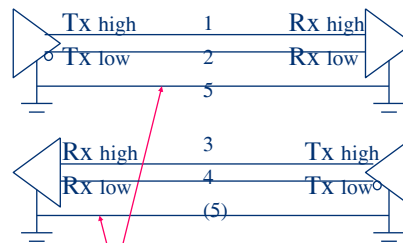
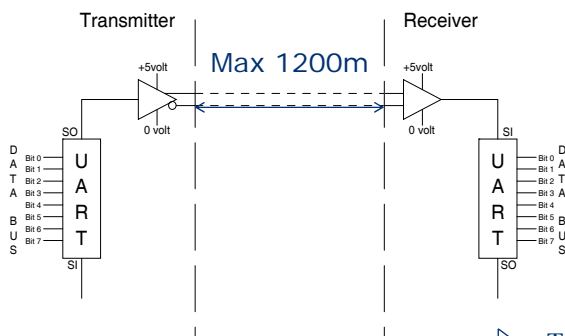


+3 to +12V = logical "0"  
 -3 to -12V = logical "1"

Noise sensitive;  
 a peak can entail  
 an unwanted bit

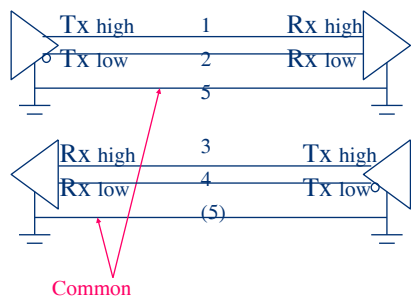


# RS422

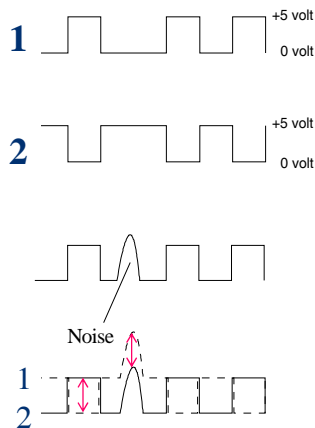


Common

## RS422



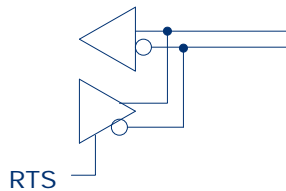
Noise is added to both lines, so the voltage level between them is constant.  
Twisted pair solution.



## RS485



Same principle as RS422, but transmit and receive is on the same lines. The communication is half-duplex multi-drop.



The master initiates a communications request (RTS) to a slave node by addressing that unit.

## RCU501 serial link connectors



- P28: Serial channel 29-32
- P27: Serial channel 25-28
- P26: Serial channel 21-24
- P25: Serial channel 17-20
- P24: Serial channel 13-16
- P23: Serial channel 9-12
- P22: Serial channel 5-8
- P21: Serial channel 1-4

## 16. K-Chief 700

16.29.01 RSER200-4



### Ref:

- Document name: RSER200-4 HW Module description
- Document nr: 300993/A
- Document name: Standard RIO Loop Typicals
- Document nr: 177699/G

DMS no: 1088907A

## Objectives



- Layout and function of RSER200-4 card
- Connection of serial lines to RCU using RSER200-4

## RSER200-4



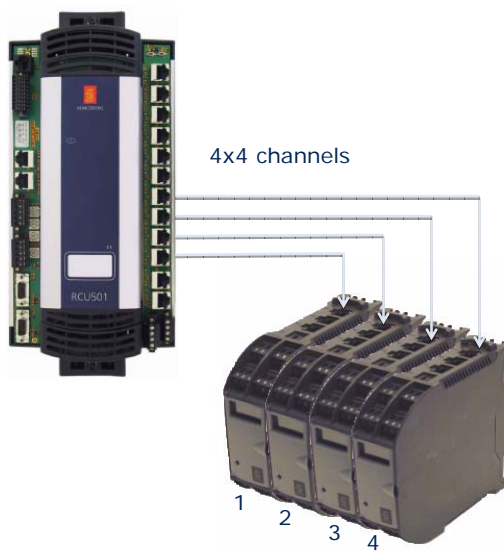
- Four galvanically isolated channels
- All channels individually configurable as:
  - RS232
  - RS422
  - RS485
  - NMEA
- Three RCU connectors
  - For redundancy
- LED indicators
  - Status
  - Traffic on channel

All configuration in software

## RSER200-4 Serial Line Interface

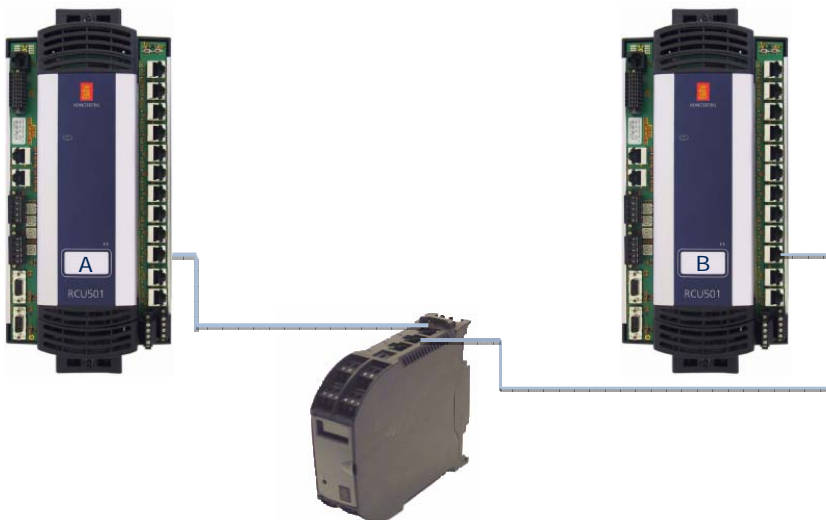


## RSER200-4 Serial Line Interface

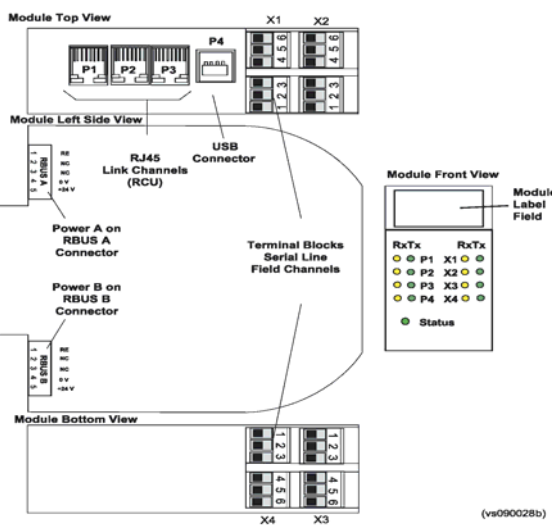




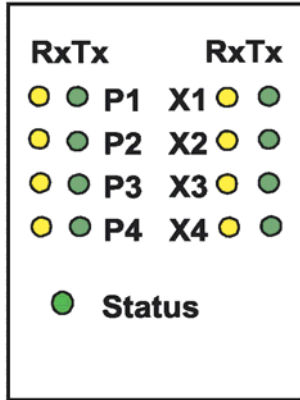
# RSER200-4 Serial Line Interface Redundant



# RSER200-4



# RSER200-4



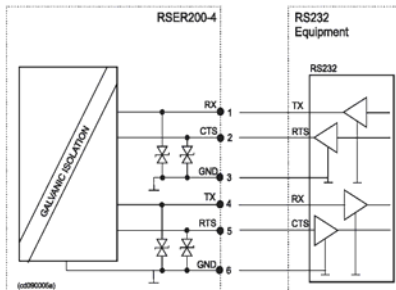
(vs090045a)

LED name	Colour, state	Function
Status	Green, fixed	Normal operation. The module is OK and it has communication with at least one RCU
	Red, fixed	Serious HW or SW error condition occurred, watchdog activated
	Red, flashing	During boot
RX P1	Yellow, flashing	Receiving data on link channel A (P1)
RX P2		Receiving data on link channel B (P2)
RX P3		Receiving data on link channel C (P3)
RX P4		Receiving data on USB port (P4)
TX P1	Green, flashing	Transmitting data on link channel A (P1)
TX P2		Transmitting data on link channel B (P2)
TX P3		Transmitting data on link channel C (P3)
TX P4		Transmitting data on USB port (P4)
RX X1	Yellow, flashing	Receiving data on field channel X1
RX X2		Receiving data on field channel X2
RX X3		Receiving data on field channel X3
RX X4		Receiving data on field channel X4
TX X1	Green, flashing	Transmitting data on field channel X1
TX X2		Transmitting data on field channel X2
TX X3		Transmitting data on field channel X3
TX X4		Transmitting data on field channel X4

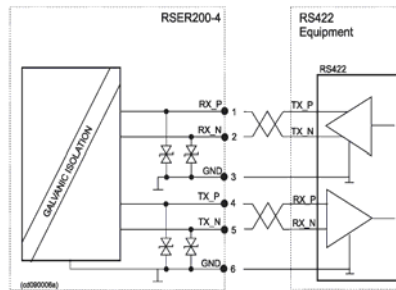
# RSER200-4



RS232 interface typical



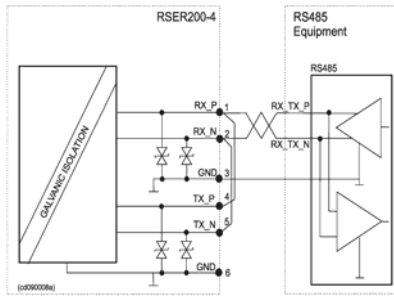
RS422 interface typical



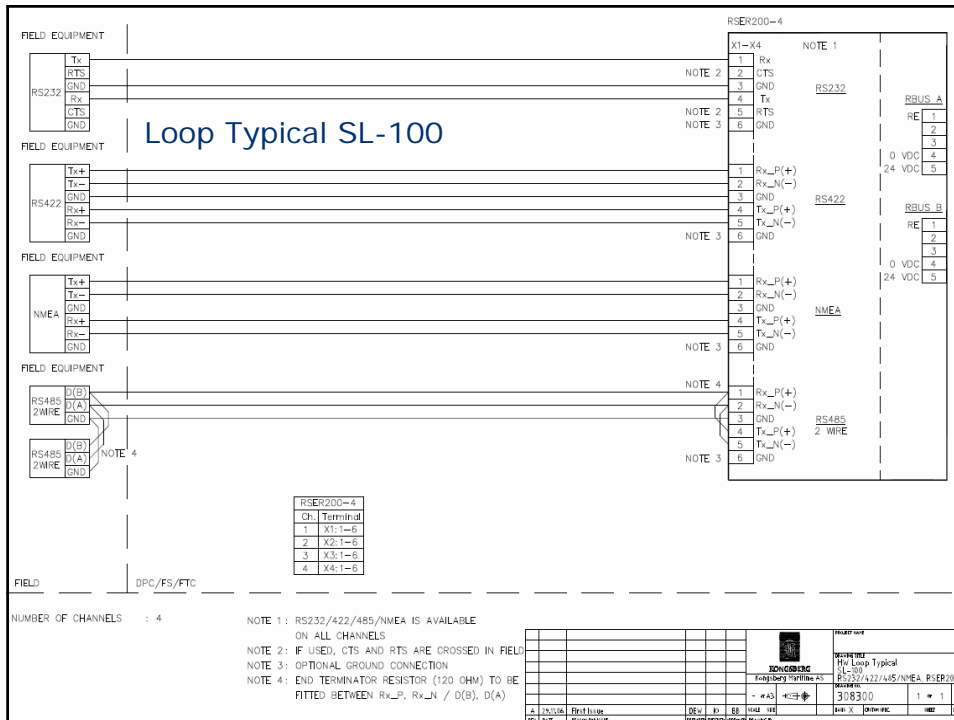
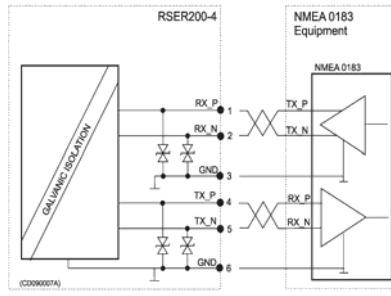
# RSER200-4



RS485 interface typical



NMEA 0183 interface typical



## 16. K-Chief 700

### 16.29.xx Serial Lines in Station Explorer

Ref:

Document name:

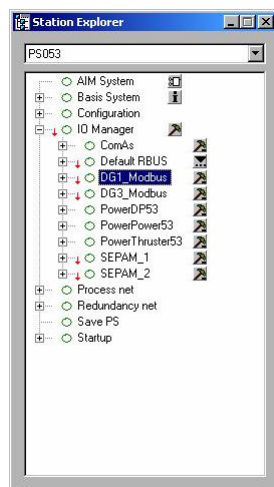
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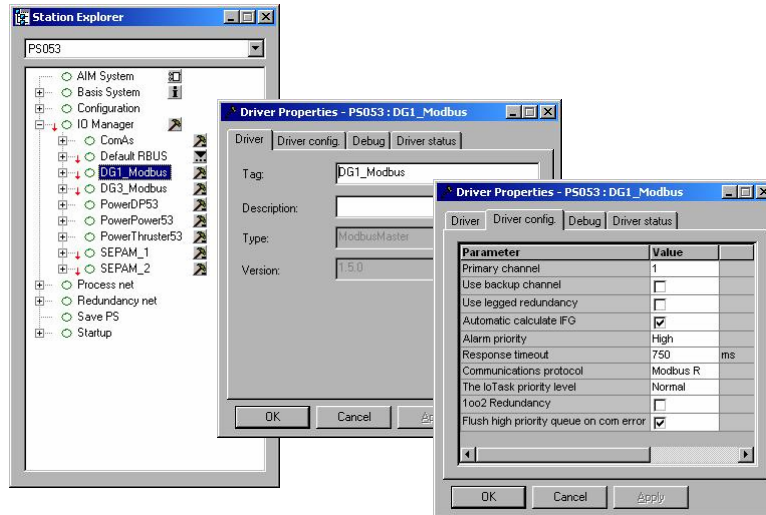
DMS no: 1088907A

## Serial Lines in Station Explorer

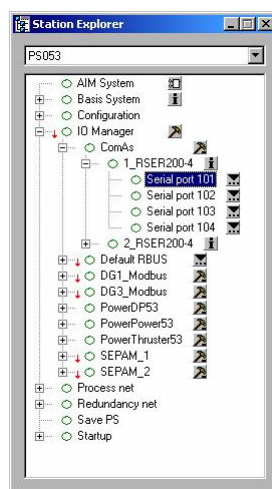



- Open IO Manager in Station Explorer
- Equipment connected by serial lines can be identified by clicking 

## Driver Properties



## RSER200-4



- The RSER200-4 module can be found under ComAs
- Four serial ports on each module
- Click  for more information about each port

## RSER200-4 Port Information



## RSER200-4 Serial Line Logger



Dir	SeqNo	Time	Hex	Ascii
Rx	483	10.36.48.625	47 50 47 47	\$GPGG
Rx	481	10.36.48.621	54 78 20 52 65 63 69 65 76 65 20 60 65 73 73 61	Tx Receive message
Tx	480	10.36.48.528	54 78 20 53 65 6E 64 20 60 65 73 73 61 67 65 0A	Tx Send message
Rx	471	10.36.47.406	47 50 47 47 41 2C 31 37 30 38 33 34 34 31 32 34	\$GPGGA,1.708344124.8963.N,08151.6838,W,1.05,1.5,280
Rx	468	10.36.47.203	54 78 20 52 65 63 69 65 76 65 20 60 65 73 73 61	Tx Receive message
Tx	468	10.36.47.093	54 78 20 53 69 6E 64 20 60 65 73 73 61 67 65 0A	Tx Send message
Rx	459	10.36.48.187	47 50 47 47 41 2C 31 37 30 38 33 34 34 31 32 34	\$GPGGA,1.708344124.8963.N,08151.6838,W,1.05,1.5,280
Rx	457	10.36.45.904	54 78 20 52 65 63 69 65 76 65 20 60 65 73 73 61	Tx Receive message
Tx	456	10.36.45.675	54 78 20 53 65 6E 64 20 60 65 73 73 61 67 65 0A	Tx Send message
Rx	447	10.36.44.968	47 50 47 47 41 2C 31 37 30 38 33 34 34 31 32 34	\$GPGGA,1.708344124.8963.N,08151.6838,W,1.05,1.5,280
Rx	445	10.36.44.765	54 78 20 52 65 63 69 65 76 65 20 60 65 73 73 61	Tx Receive message
Rx	444	10.36.44.656	54 78 20 53 65 6E 64 20 60 65 73 73 61 67 65 0A	Tx Receive message
Rx	435	10.36.43.750	47 50 47 47 41 2C 31 37 30 38 33 34 34 31 32 34	\$GPGGA,1.708344124.8963.N,08151.6838,W,1.05,1.5,280
Rx	433	10.36.43.546	54 78 20 52 65 63 69 65 76 65 20 60 65 73 73 61	Tx Receive message
Tx	432	10.36.43.437	54 78 20 53 69 6E 64 20 60 65 73 73 61 67 65 0A	Tx Send message
Rx	423	10.36.42.531	47 50 47 47 41 2C 31 37 30 38 33 34 34 31 32 34	\$GPGGA,1.708344124.8963.N,08151.6838,W,1.05,1.5,280
Rx	421	10.36.42.528	54 78 20 52 65 63 69 65 76 65 20 60 65 73 73 61	Tx Receive message
Tx	420	10.36.42.218	54 78 20 51 65 6F 64 20 60 65 73 73 61 67 65 0A	Tx Send message



## Exercises

- Serial line connection
- RSER200-4