RS232 versus RS485 Analyzer

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This paper tries to give an answer to the very reasonable question why we offer two different analyzers for RS232 and RS485/422.
Both analyzers are fully functionally indentical inside but differ in the input channels which are equipped with the respective receivers. The data evaluation is the same.
So a simple and cheap converter between both standards should work to capture both types of signals with only one analyzer.
Nevertheless we have some very substantial arguments why we decided to offer the two analyzer types.
We check different parameters and add comparison results.

Difference of the standards

RS232: It is a bi-polar signal with voltages between +3V and +12V for a logical ’1’ and -3V to -12V for a logical ’0’. The bus signals have one direction.
The range between -3V and +3V is undefined, the signal is assumed as not present.
RS485: It is a complementary signal where the difference between two unipolar data lines is crucial. +0.2V to +5V for a logical ’1’ and -0.2V to -5V for a logical ’0’. The bus is bi-directional.
The range between -0.2V and +0.2V is undefined, the bus is not driven (idle), all senders are off.
Detecting this undriven bus state is the speciality of the RS485 analyzer.
Result: Both standards are not compatible to each other, different signal receivers have to be used.

Connectors:

RS232: Two standard 9pin SUB-D connectors which allow a direct insertion of the analyzer into the RS232 connection.
RS485: RS485 has no standard connector, so screw connectors are used for versatile connection modes.
Result: While RS232 has a standardized connection RS485 needs a versatile access. Both kinds are not compatible.

Others

RS232: The bitrate is up to 1Mbps.
Eight modem lines including two serial signals are captured and logged.
A software option is available to switch and reroute the eight modem signals.
RS485: The bitrate is up to 20Mbps.
Two serial channels and only two modem lines are logged.
Switching and rerouting of signals is neither possible nor useful.
Result: The internal signal routing and logging structure is different in quantity, routing and bitrate.

Level converters

RS232 to RS485: Only 2 of the 8 modem lines can be converted. Also the RS232 switch option can not be used.
RS485 to RS232: The very important undriven bus state can not be converted and displayed.
The very helpful segment mode (splitting the bus) is not possible because the RS232 senders can not be bitwise disabled.
The bit rate is limited to 1 Mbps.
Result: Converting the signals would be possible, but with the disadvantage of losing important examination features. And appropriate converters cause additional costs.

Conclusion

Different analyzers make sense to get all available signal information for advanced examination capabilities.
In addition the connection is as easy as possible for both signal types.
If the analyzer would contain RS232 and RS485 transceivers it would become too expensive and lose its handiness.