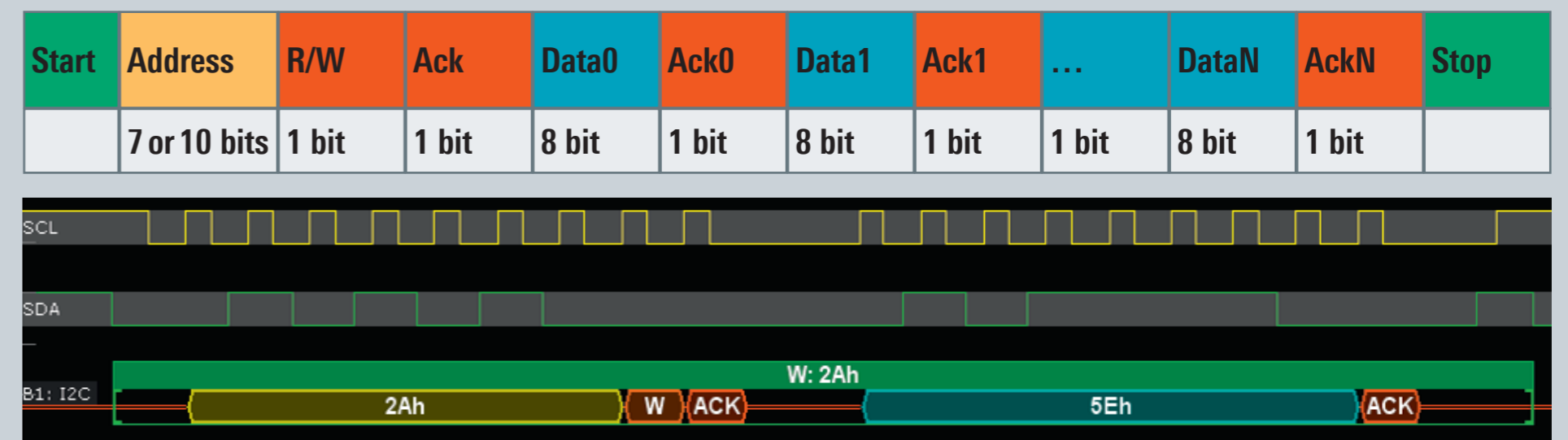


Common Low-speed Serial buses For Embedded Applications

Inter Integrated Circuit (I²C)

	Data rate	Typical Application
Topologie: Bidirectional Pins: ▪ SCL – clock ▪ SDA - data	<ul style="list-style-type: none"> 100 kbps (standard mode) 400 kbps (fast mode) 3.4 Mbps (high-speed mode) 	Chip-to-chip communication in embedded design of e.g. consumer electronics
Bus Configuration		

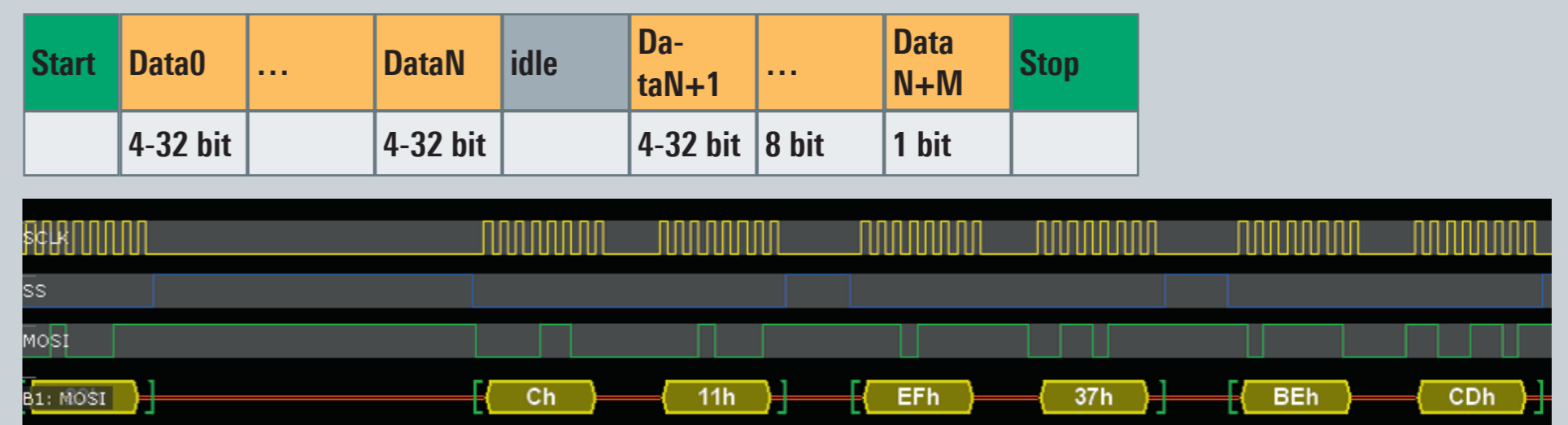
Protocol structure (I²C)



Serial Peripheral Interface Bus (SPI)

	Data rate	Typical Application										
Topologie: 2-, 3 or 4 wire topology Pins: ▪ SCLK – clock ▪ MOSI – master output/ slave input ▪ MISO – master input/slave output ▪ SS – slave select	Typical <=50 Mbps	Microcontroller-to-peripherals communication in industrial automation and mobile devices										
Bus Configuration	<table border="1"> <thead> <tr> <th>Source setup</th> <th>Polarity</th> </tr> </thead> <tbody> <tr> <td>SCLK</td> <td> <ul style="list-style-type: none"> Idle low First Edge </td> </tr> <tr> <td>MOSI</td> <td> <ul style="list-style-type: none"> Active high </td> </tr> <tr> <td>MISO</td> <td> <ul style="list-style-type: none"> Active high </td> </tr> <tr> <td>SS</td> <td> <ul style="list-style-type: none"> Active low </td> </tr> </tbody> </table>		Source setup	Polarity	SCLK	<ul style="list-style-type: none"> Idle low First Edge 	MOSI	<ul style="list-style-type: none"> Active high 	MISO	<ul style="list-style-type: none"> Active high 	SS	<ul style="list-style-type: none"> Active low
Source setup	Polarity											
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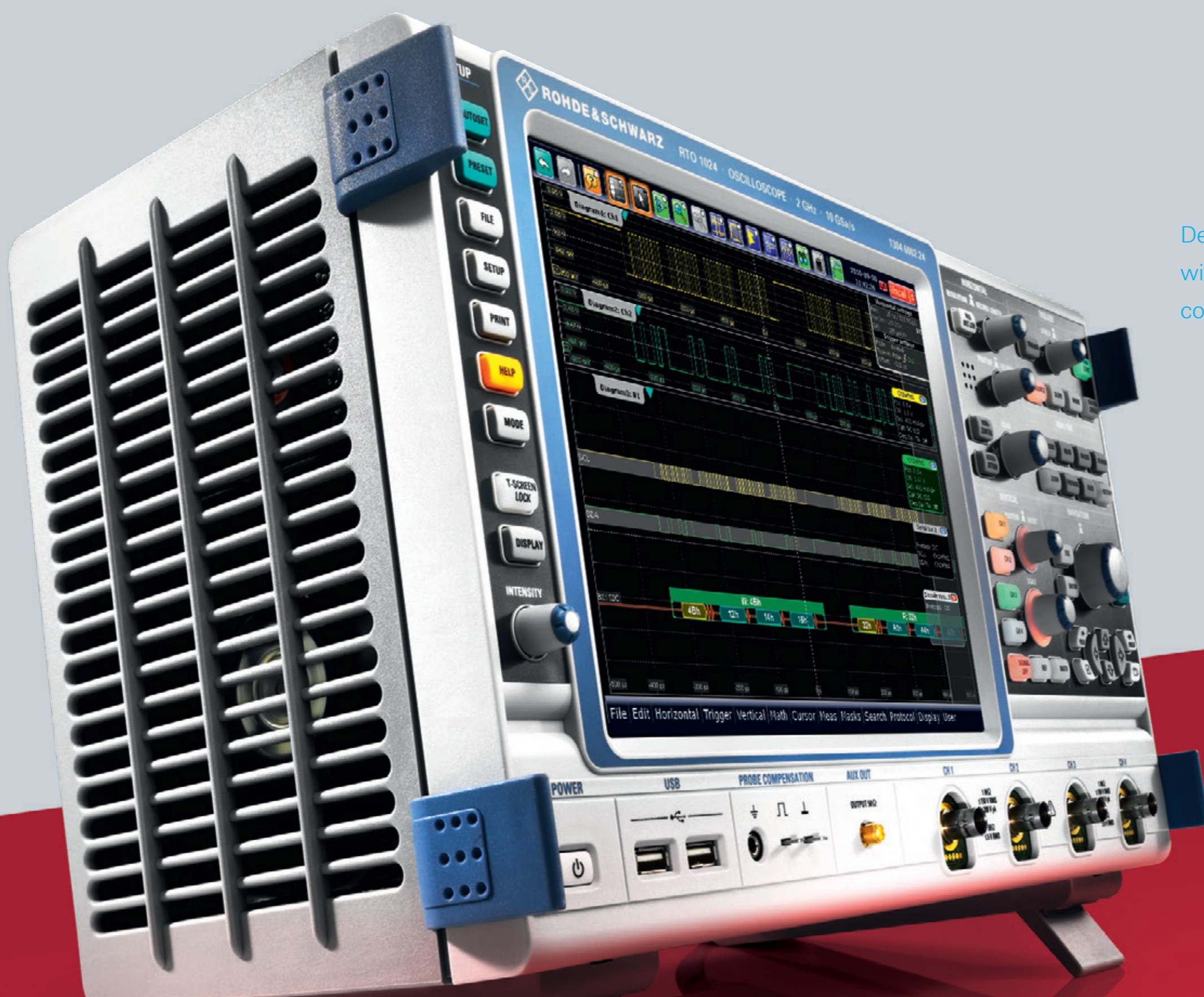
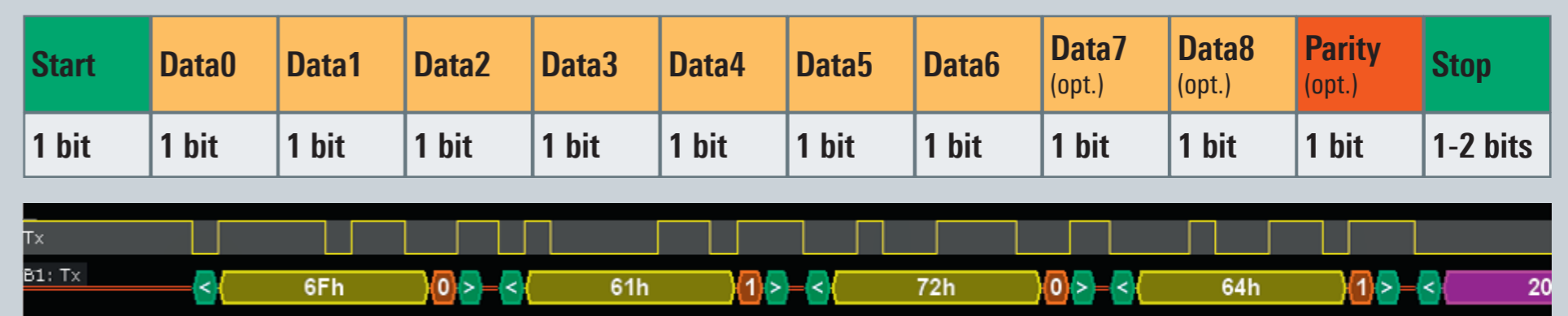
Protocol structure (SPI)



Recommended Standard/ Universal Asynchronous Receiver/Transmitter (RS-232/UART)

	Data rate	Typical Application			
Topologie: Single wire or differential Pins: ▪ Tx - Transmitter ▪ Rx - Receiver	Typical <=10 Mbps	<ul style="list-style-type: none"> Chip-to-chip and system-to-system communication UART typical as backbone for proprietary protocols 			
Bus Configuration	<table border="1"> <thead> <tr> <th>Source</th> </tr> </thead> <tbody> <tr> <td>Tx</td> </tr> <tr> <td>Rx</td> </tr> </tbody> </table>		Source	Tx	Rx
Source					
Tx					
Rx					

Protocol structure (UART)



Debugging of low-speed serial buses with R&S®RTO and R&S®RTM protocol trigger and decode applications.



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