

# LE-3500 SPI communication

LE-3500 of version 1.03 can measure the SPI communication with OP-SB5G.

## 2 Setting of Communication Condition

SPI condition can be set at "CONFIG."

< SPI Setting >



□ PROTOCOL

Set to "SPI".

□ SPEED

Set the speed up to 2.048Mbps for Simulation mode.

Set the speed for Monitor mode.

□CPOL

Select the clock polarity.

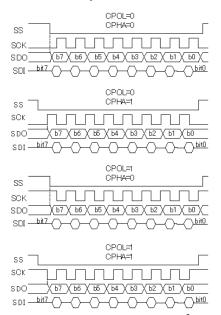
□CPHA

Select the clock phase.

□SIM MODE

Select "Master" or "Slave" for Simulation mode.

It is not necessary to set for Monitor mode.



The relationship between Clock and Data is changed by CPOL and CPHA setting.

SPI considers as one frame between the SS falling edge and SS raising edge.

When measuring SPI communication, the analyzer is connected to DUT like below.

SPI

Probe Pod	I/O direction*1		Color of the	Measuring Object
	MONITOR	SIMULATION	lead wire	Measuring Object
SD	I	O*4	BROWN	MOSI
RD	I	I*4	RED	MISO
RS	I	I/O*3	ORANGE	SS
SD_CLK	I	I / O <sup>3</sup>	BLUE	SCK
GND	-	-	BLACK	Signal Ground

- I: Input to the analyzer.
- O: Output from the analyzer.
- \*2 It is different by the simulation mode.

Master : O Slave : I

\*3 The direction of outputting is fixed. Arrange the connection without

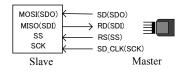
any collision.

< SPI >

□Master Mode

Set No.2, No.3, No.4 DIP switch ON.

Connect SD to MOSI, RD to MISO, RS to SS, and SD CLK to SCK.

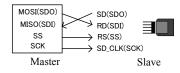


DIP Switch		
No.2	ON	
No.3	ON	
No.4	ON	

□Slave Mode

Set No.2 DIP switch ON.

Connect SD to MISO, RD to MOSI, RS to SS, and SD\_CLK to SCK.



DIP Swi	DIP Switch	
No.2	ON	
No.3	OFF	
No.4	OFF	

### 4 Simulation

On SPI communication, MANUAL mode and some kinds of commands in PROGRAM modei are available. Another modes of SIMULATION cannot be useful.

< SPI >

It can be used only in Manual mode and some commands in Program Mode. Other modes cannot be used.

#### □Master Mode

Start simulation and then press the registered table number key. It makes SS(RS) active and start data transmission/reception. When it finishes data transmission, it makes SS non-active.

#### □Slave Mode

Start simulation and then press the registered table number key for data transmission/reception. Transmit data following SS and SCK(SD CLK) from the Master.

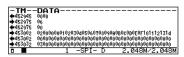
- · Steps of Master Mode and Slave Mode
  - 1.Press [RUN]
  - 2. Press registerd table number key.
  - 3. Go back to "2." if repeating transmission/reception.
  - 4. Press [STOP] to end the simulation.

## 5 Explanation of LCD Display

<SPI>

While measuring SPI, it is possible to have "Frame Diaplay" by pressing [DISPLAY] button.

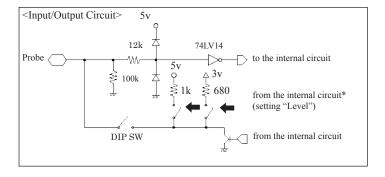




## 6 Specifications

Adaptation analyzer		LE-3500	
Interface		RS-232C, TTL, I <sup>2</sup> C, SPI	
Probe Signal		SD(SDA/SDO), RD(SDI), RS(SS), CS, EX IN, SD CLK(SCL/SCK), RD CLK, TRG.IN, TRG.OUT	
Protocol		ASYNC, SYNC(BSC), HDLC, I <sup>2</sup> C, BURST, SPI	
Function		Monitor/Simulation/BERT(*1)	
Communication speed (transfering as I <sup>2</sup> C master)		Monitor: Max 10Mbps (*2) Simulation: Max 2.048Mbps I <sup>2</sup> C Simulation: 100K/384K/1Mbps	
TTL C-MOS	MAX Input Voltage	±25V	
	Input Impedance	$\begin{array}{c} 100K\Omega(0V \leqq Vin \leqq 5V) \\ 12K\Omega(Vin < 0V, 5V < Vin) \end{array}$	
	Input Level Threshold	●High: Min 2.2V ●Low: Max 0.9V	
	Output Level Voltage	●High: 3.0V, 4.5V without pull-up(*3)	
Probe Pod size		78(W)×92(D)×22(H)	
Probe Unit		Lead length: 170mm	
Relay Cable		Cable length: 800mm	

- \*1: Only Monitoring is possble in BURST. (I<sup>2</sup>C/SPI do not support BERT)
- \*2: Max 2.048Mbps for the analyzers without "A" in the serial number.
- \*3: Can be set from the analyzer.



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