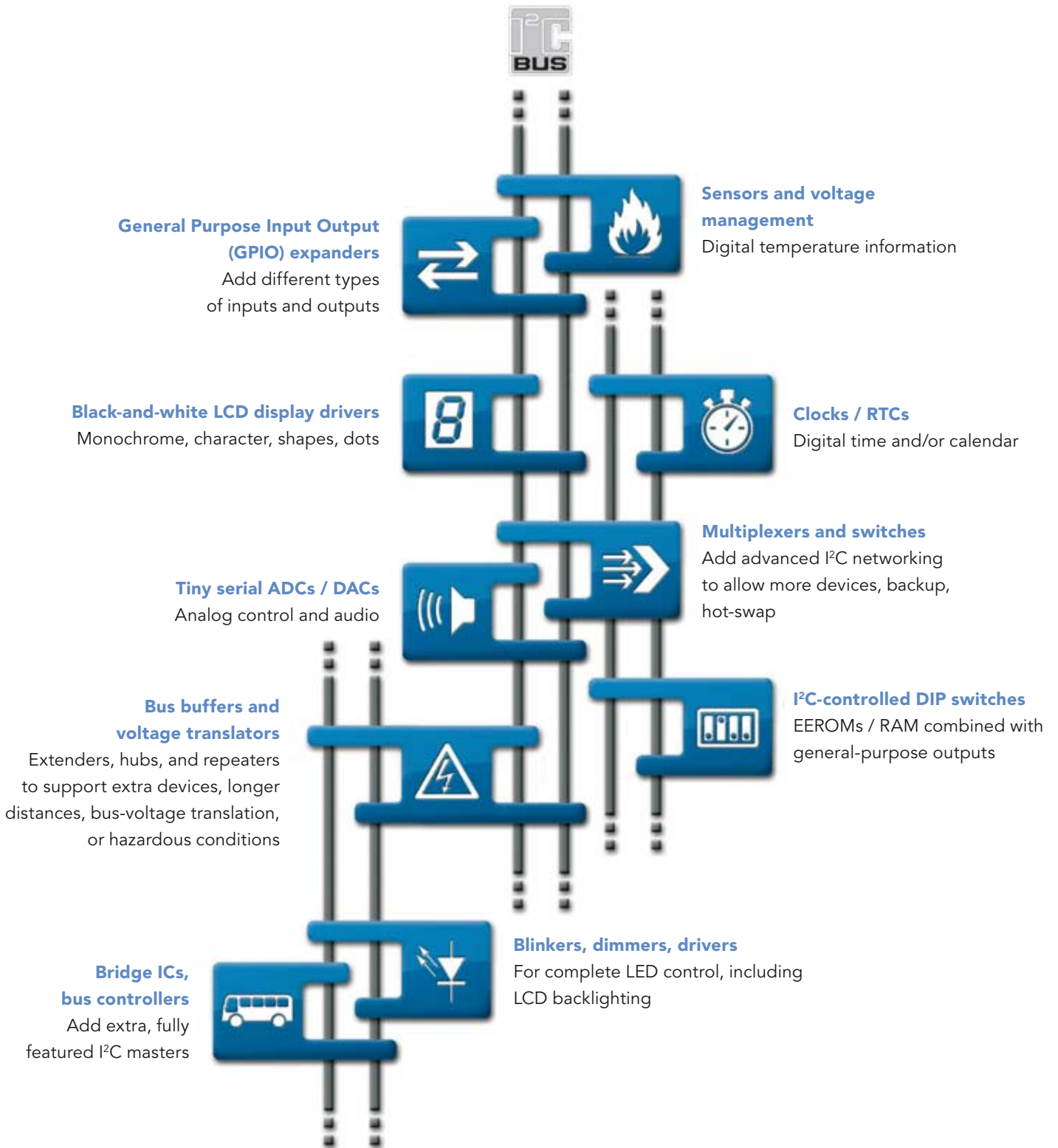




Smart, simple solutions for the 10 most common design concerns


NXP I²C-bus solutions


NXP's I²C peripherals portfolio is grouped into ten families, one for each of the most common, everyday design concerns.





More information
www.nxp.com/i2clogic

I²C-bus product summary

GPIO 		
4-bit GPIO	PCA9536	4-bit I ² C Fast Mode totem-pole GPIO with pull-up resistor
	PCA9537	4-bit I ² C Fast Mode totem-pole GPIO with interrupt and reset
8-bit GPIO	PCA8574	8-bit I ² C Fast Mode quasi-bidirectional GPIO with interrupt and pull-up resistors
	PCA8574A	8-bit I ² C Fast Mode quasi-bidirectional GPIO with interrupt and pull-up resistors (ALT address)
	PCA9500	8-bit I ² C Fast Mode quasi-bidirectional GPIO with pull-up resistors and 2-K EEPROM
	PCA9501	8-bit I ² C Fast Mode quasi-bidirectional GPIO with interrupt, pull-up resistors, and 2-K EEPROM
	PCA9502	8-bit I ² C /SPI Fast Mode totem-pole GPIO with interrupt and reset
	PCA9534	8-bit I ² C Fast Mode totem-pole GPIO with interrupt
	PCA9538	8-bit I ² C Fast Mode totem-pole GPIO with interrupt and reset
	PCA9554	8-bit I ² C Fast Mode totem-pole GPIO with interrupt and pull-up resistors
	PCA9554A	8-bit I ² C Fast Mode totem-pole GPIO with interrupt and pull-up resistors (ALT address)
	PCA9557	8-bit I ² C Fast Mode totem-pole GPIO with reset
	PCA9574	8-bit I ² C Fast Mode LV totem-pole/OD GPIO with interrupt, reset, and pull-up/pull-down resistors
	PCA9670	8-bit I ² C Fast-mode Plus quasi-bidirectional GPIO with reset and pull-up resistors
	PCA9672	8-bit I ² C Fast-mode Plus quasi-bidirectional GPIO with interrupt, reset, and pull-up resistors
	PCA9674	8-bit I ² C Fast-mode Plus quasi-bidirectional GPIO with interrupt and pull-up resistors
	PCA9674A	8-bit I ² C Fast-mode Plus quasi-bidirectional GPIO with interrupt and pull-up resistors (ALT address)
	PCF8574	8-bit I ² C 100-kHzquasi-bidirectional GPIO with interrupt and pull-up resistors
	PCF8574A	8-bit I ² C 100-kHz quasi-bidirectional GPIO with interrupt and pull-up resistors (ALT address)
PCA9702	8-bit SPI GPI interrupt with 18-V input (AEC-Q100)	
16-bit GPIO	PCA8575	16-bit I ² C Fast Mode quasi-bidirectional GPIO with interrupt and pull-up resistors
	PCA9535	16-bit I ² C Fast Mode totem-pole GPIO with interrupt
	PCA9535C	16-bit I ² C Fast Mode open-drain GPIO with interrupt
	PCA9539	16-bit I ² C Fast Mode totem-pole GPIO with interrupt and reset
	PCA9539R	16-bit I ² C Fast Mode totem-pole GPIO with interrupt and reset
	PCA9555	16-bit I ² C Fast Mode totem-pole GPIO with interrupt and pull-up resistors
	PCA9575	16-bit I ² C Fast Mode LV totem-pole/OD GPIO with interrupt, reset, and pull-up/pull-down resistors
	PCA9671	16-bit I ² C Fast-mode Plus quasi-bidirectional GPIO with reset and pull-up resistors
	PCA9673	16-bit I ² C Fast-mode Plus quasi-bidirectional GPIO with interrupt, reset, and pull-up resistors
	PCA9675	16-bit I ² C Fast-mode Plus quasi-bidirectional GPIO with interrupt and pull-up resistors
	PCF8575	16-bit I ² C Fast Mode quasi-bidirectional GPIO with interrupt and pull-up resistors
	PCF8575C	16-bit I ² C Fast Mode open-drain GPIO with interrupt
	PCA9701	16-bit SPI GPI interrupt with 18-V input (AEC-Q100)
PCA9703	16-bit SPI GPI maskable interrupt with 18-V input (AEC-Q100)	
40-bit GPIO	PCA9505	40-bit I ² C Fast Mode totem-pole GPIO with interrupt, reset, pull-up resistors and output enable
	PCA9506	40-bit I ² C Fast Mode totem-pole GPIO with interrupt, reset, and output enable
	PCA9698	40-bit I ² C Fast-mode Plus totem-pole GPIO with interrupt, reset, pull-up resistors and output enable

Temp sensors 		
Local	LM75A	I ² C local ± 2 °C temperature sensor
	LM75B	I ² C local ± 2 °C temperature sensor with SMBus time-out
	SE95	I ² C local ± 1 °C temperature sensor
	SE98A	I ² C local ± 1 °C temperature sensor DIMM (1.7 - 3.6 V)
Local and EEPROM	SE97	I ² C local ± 1 °C temperature sensor + SPD DIMM (3.0 - 3.6 V)
Local and remote	NE1617A	I ² C local ± 2 °C and remote ± 3 °C temperature sensor
	SA56004	I ² C local ± 2 °C and remote ± 1 °C temperature sensor
Local, remote, and voltage monitor	NE1619	I ² C local ± 2 °C and remote ± 3 °C temperature sensor with voltage monitor (12, 5, 3.3, and 2.5 V, V _{CCP} , and V _{DD})

LED controllers 		
Dimmer (2 PWM, 25 mA / 5 V)	PCA9530	2-bit I ² C Fast Mode open-drain LED with dimmer and reset
	PCA9531	8-bit I ² C Fast Mode open-drain LED with dimmer and reset
	PCA9532	16-bit I ² C Fast Mode open-drain LED with dimmer and reset
	PCA9533	4-bit I ² C Fast Mode open-drain LED with dimmer
Blinker	PCA9901	1-bit 1 LED low power current source blinker with three sequential PWM cycles
Blinker (2 PWM, 25 mA / 5 V)	PCA9550	2-bit I ² C Fast Mode open-drain LED with blinker and reset
	PCA9551	8-bit I ² C Fast Mode open-drain LED with blinker and reset
	PCA9552	16-bit I ² C Fast Mode open-drain LED with blinker and reset
8-segment	PCA9553	4-bit I ² C Fast Mode open-drain LED with blinker
	SAA1064	16-bit I ² C Standard Mode current source/sink 4x8-segment LED display
	PCA9632	4-bit I ² C Fast-mode Plus low-power totem-pole LED controller
Controller (PWM / Ch, 25 mA / 5 V)	PCA9633	4-bit I ² C Fast-mode Plus totem-pole LED controller with output enable
	PCA9634	8-bit I ² C Fast-mode Plus totem-pole LED controller with output enable
	PCA9635	16-bit I ² C Fast-mode Plus totem-pole LED controller with output enable
	PCA9685	16-bit I ² C Fast-mode Plus totem-pole LED controller with 12-bit PWMs and output enable
Controller (PWM / Ch, 100 mA / 40 V)	PCA9624	8-bit I ² C Fast-mode Plus open-drain LED high-voltage/ current controller with output enable
	PCA9622	16-bit I ² C Fast-mode Plus open-drain LED high-voltage/ current controller with output enable
	PCA9626	24-bit I ² C Fast-mode Plus open-drain LED high-voltage/ current controller with output enable
LED flash	SSL3250A	500-mA sink dual LED flash with torch mode
	SSL3252	500-mA source dual LED flash with torch mode


Real-time clocks 		
Low-power	PCA8802	RTC for lowest power applications, smart cards
	PCF8563	Ultra low-power clock/calendar
	PCF8564	Ultra low-power clock/calendar, COB
Normal	PCA8565	Automotive clock/calendar
	PCF8583	Clock/calendar with 256x8 SRAM
	PCF8593	Low-power clock/calendar
Temp-compensated	PCF2127A	High-accuracy, low-voltage RTC with 512x8 RAM
	PCF2129A	High-accuracy RTC


Hot product


The PCA9574 is a must-have for mobile applications that need more I/O. It's an 8-bit GPIO that has two V_{DDs} for level shifting between 1.1 and 3.6 V, a selectable pull-up/pull-down resistor, outputs configurable as totem pole or open drain, and inputs with bus hold.


Hot product


Using the SSL3250AHN LED flash driver to drive two LEDs in a >2M-pixel camera delivers 30% higher efficiency, 20% more light, and 50% lower output power (with the same LED brightness) than a single 1-A LED boost driver. Impressive fault-protection options and low standby current consumption (<1 μ A) round out the features.


Muxes and switches 		
2-channel	PCA9540B	2-channel I ² C mux
	PCA9542A	2-channel I ² C mux with interrupt
	PCA9543A	2-channel I ² C switch with interrupt and reset
2-to-1 demux	PCA9541/01	2:1 I ² C demux with interrupt and reset (channel 0 default)
	PCA9541/03	2:1 I ² C demux with interrupt and reset
4-channel	PCA9544A	4-channel I ² C mux with interrupt
	PCA9545A	4-channel I ² C switch with interrupt and reset
	PCA9546A	4-channel I ² C switch with reset
8-channel	PCA9547	8-channel I ² C mux with reset (channel 0 default)
	PCA9548A	8-channel I ² C switch with reset
Cross-bus switch	PCA9549	8-bit I ² C switch (CBT) with reset

Bus buffers 		
Hot-swap	PCA9510A	Fast Mode hot-swap I ² C/SMBus bus buffer
	PCA9511A	Fast Mode hot-swap I ² C/SMBus bus buffer
	PCA9512A	Fast Mode shift I ² C/SMBus bus buffer
	PCA9513A	Fast Mode hot-swap I ² C/SMBus bus buffer
	PCA9514A	Fast Mode hot-swap I ² C/SMBus bus buffer
Long-distance bus	P82B715	Fast Mode I ² C bus extender (no static offset)
	P82B96	Fast Mode dual bidirectional bus buffer
	PCA9600	Fast-mode Plus dual bidirectional bus buffer
Static-offset (1 side)	PCA9507	Fast Mode shift DDC buffer with accelerator
	PCA9508	Fast Mode shift hot-swap I ² C bus repeater
	PCA9509	Fast Mode shift bus buffer with current source
	PCA9517A	Fast Mode shift I ² C bus repeater
	PCA9519	4-channel version of PCA9509
	PCA9527	Fast Mode shift DDC buffer with accelerator and CEC
Static-offset (All sides)	PCA9515/15A	Fast Mode I ² C bus repeater
	PCA9516A	Fast Mode 5-channel I ² C hub
	PCA9518A	Fast Mode expandable 5-channel I ² C hub
Voltage translator (doesn't isolate capacitance)	GTL2000	Fast-mode Plus 22-bit voltage clamp translator
	GTL2002	Fast-mode Plus 2-bit voltage clamp translator
	GTL2003	Fast-mode Plus 8-bit voltage clamp translator
	GTL2010	Fast-mode Plus 10-bit voltage clamp translator
	PCA9306	Fast-mode Plus dual I ² C/SMBus voltage translator

LCD drivers 		
Character driver	PCF2113	2-line, 12-character, 120-icon driver
	PCF2116	2-line, 16-character, 160-icon driver
	PCF2119	2-line, 16-character, 160-icon driver
Graphic driver	PCF8531	34x128-pixel driver
	PCF8535	65x133-pixel driver
	PCF8578	Dot-matrix LCD driver (row/column)
	PCF8579	Dot-matrix LCD driver (column)
	PCF8811	80x128-pixel driver
Segment driver	PCF8532	640-segment, COG driver
	PCF8533	320-segment, COG driver
	PCF85133	320-segment, COG driver
	PCF8534A	240-segment driver
	PCF8576D	160-segment driver
	PCF8562	128-segment driver
	PCF8566	96-segment driver
	PCF8577C	64-segment driver

A/D-D/A converters 		
8-bit ADC	PCA9691	Fast-mode Plus ADC/DAC I ² C
	PCF8591	Fast Mode ADC/DAC I ² C

EEPROMs 		
2-kbit	PCF85102C	256x8-bit EEPROM I ² C-bus
	PCF85103C	256x8-bit EEPROM I ² C-bus (ALT address)
	PCF8582C	256x8 EEPROM I ² C-bus
	PCF8570	256x8-bit RAM I ² C-bus
4-kbit	PCF8594C	1024x8-bit EEPROM I ² C-bus
8-kbit	PCA24S08	1024x8-bit EEPROM I ² C with access protection
	PCF8598C	1024x8-bit EEPROM I ² C-bus
DIP switch	PCA8550	4-bit 1-of-2 I ² C mux
	PCA9558	5-bit MP/1-bit latch & 6-bit I ² C EEPROM
	PCA9559	5-bit mux/1-bit latch & 6-bit I ² C EEPROM
	PCA9560	2x5-bit mux/1-bit latch & 6-bit I ² C EEPROM
	PCA9561	4x6-bit mux & 6-bit I ² C EEPROM

Bridge and bus controllers 		
Bridge	SC16IS740	I ² C/SPI-to-UART bridge with IrDA
	SC16IS750	I ² C/SPI-to-UART bridge with IrDA and GPIO
	SC16IS752	I ² C/SPI-to-UART bridge with IrDA and GPIO
	SC16IS760	I ² C/SPI-to-UART bridge with IrDA and GPIO
	SC16IS762	I ² C/SPI-to-UART bridge with IrDA and GPIO
	SC16IS850	1.8-V I ² C/SPI-to-UART bridge
	SC16IS850L	1.8-V I ² C/SPI-to-UART bridge
	SC16IS852	1.8-V I ² C/SPI-to-UART bridge
	SC16IS852L	1.8-V I ² C/SPI-to-UART bridge
	SC18IM700	UART-to-I ² C-master bridge with GPIO
	SC18IS600	SPI-to-I ² C-master bridge, 4 M / GPIO
	SC18IS601	SPI-to-I ² C-master bridge, 4 M / GPIO
	SC18IS602	I ² C-slave-to-SPI master bridge
	SC18IS603	I ² C-to-SPI bridge, external clock
Controller	PCA9665	Fast-mode Plus I ² C-bus controller with 68-byte buffer
	PCF8584	100-kHz I ² C-bus controller
	PCA9564	400-kHz I ² C-bus controller

Demo boards		
e-Tools	OM6270	SPI/I ² C-to-UART bridge demo (SC16IS750)
	OM6271	SPI-to-I ² C-master bridge demo (SC18IS600)
	OM6272	UART-to-I ² C-master bridge demo (SC18IM700)
	OM6273	SPI/I ² C-to-UART/IrDA/GPIO demo (SC16IS752)
	OM6274	I ² C-to-SPI-master bridge demo (SC18IS602)
	OM6275	I ² C 2005-1 evaluation board
	OM6276	PCA9633 demo board
	OM6277	PCA9564 evaluation board
	OM6278	I ² C 2002-1A evaluation board
	OM6279	LED dimmer demo board
	OM6281	PCA9698 daughter card for I ² C 2005-1
	OM6282	PCA9633 daughter card for I ² C 2005-1
OM6285	I ² C 2002-1A evaluation board without PC controller board	
OM6290	LCD driver evaluation board: PCF8576D, PCF2119, PCF8531, PCA9633	
OM6293	PCA9600 daughter card for I ² C 2005-1	
OM6297	PCF2123 RTC Demoboard	

Hot products

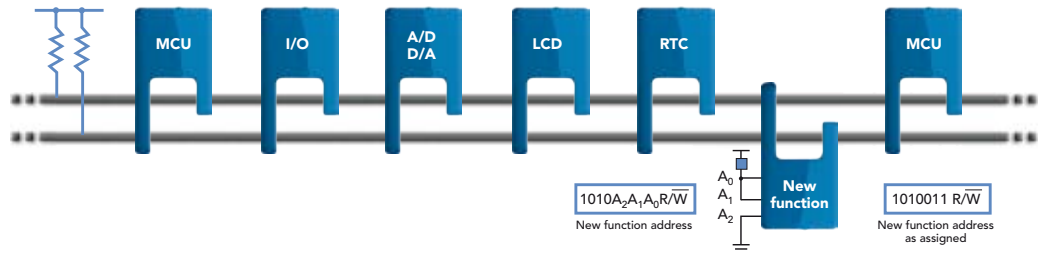
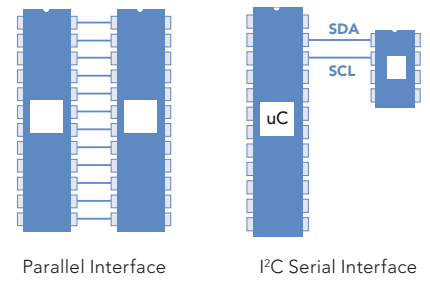
The PCA9507 translates 5 V to 3.3 V, has a rise-time accelerator supporting 1500 pF, and is perfect for HDMI DDC connections on DVDs and STRs. The PCA9665 Fast-mode Plus bus controller has a 68-byte buffer, so it greatly reduces microcontroller loading.

I²C-bus: The serial revolution

By replacing complex parallel interfaces with a straightforward yet powerful serial structure, the I²C-bus revolutionized chip-to-chip communications.

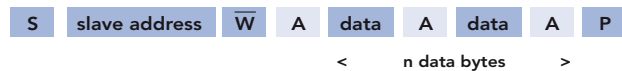
Invented by NXP (Philips) more than 30 years ago, the I²C-bus uses a simple two-wire format to carry data one bit at a time. It performs inter-chip addressing, selection, control, and data transfer. Speeds are up to 400 kHz, 1 MHz (Fast-mode Plus), or 3.4 MHz (High Speed mode).

The I²C-bus shrinks the IC footprint and leads to lower IC costs. Plus, since far fewer copper traces are needed, it enables a smaller PCB, reduces design complexity, and lowers system cost.

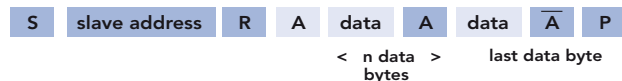


I²C-bus devices are available in a wide range of functions. Each slave device has its own I²C-bus address, selectable using address pins set high (1) or low (0). Information is transmitted byte by byte, and each byte is acknowledged by the receiver. There can be multiple devices on the same bus, and more than one IC can act as master. The master role is typically played by a microcontroller.

Write data

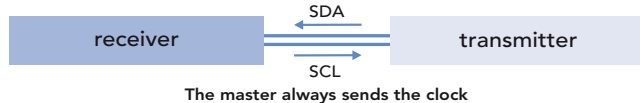


Read data



S = Start condition R/W-bar = read/write
A = Acknowledge A-bar = Not acknowledge P = Stop condition

Master



Our I²C-bus website (www.nxp.com/i2clogic) is a valuable resource for device information and training programs. It gives you direct access to a comprehensive handbook, application notes, information about evaluation kits and training materials, links to application and design support, and more.

The I2C 2005-1 evaluation board and daughter cards make it easy to program new peripherals and are a quick way to learn about the I²C-bus protocol.

OM6275 I2C 2005-1 evaluation board with OM6293 PCA9600 Fm+ 1-MHz bus buffer daughter card

OM6281 PCA9698 Fm+ 40-bit GPIO daughter card with PCA9530 2-bit LED dimmer

OM6290 LCD driver evaluation board: PCF8576D, PCF2119, PCF8531, PCA9633





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Date of release: April 2009

Document order number: 9397 750 16660

Printed in the Netherlands

