



SYSTEM MANAGEMENT I²C, I3C AND SPI SELECTOR GUIDE

A BROAD CATALOG OF INTERFACE
COMPONENTS FOR ALL YOUR DESIGN NEEDS

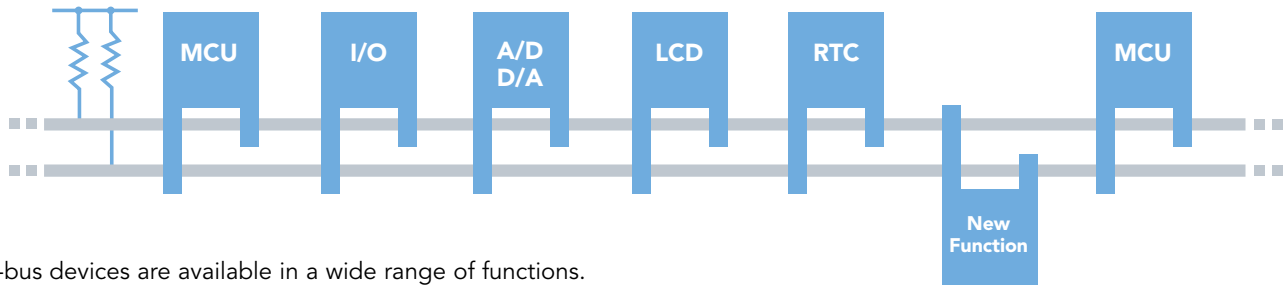
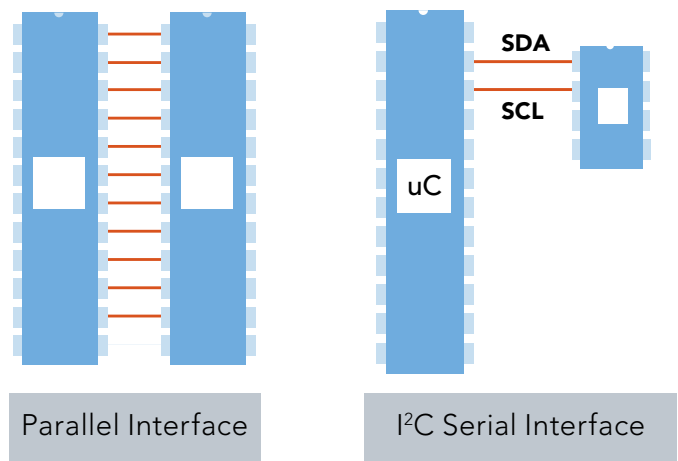


I²C-BUS: THE SERIAL REVOLUTION

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

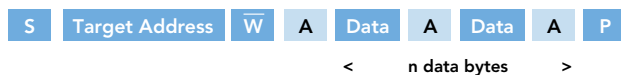
Invented by NXP (Philips) more than 30 years ago, the I²C-bus uses a simple two-wire format to carry data one bit at a time. It performs inter-chip addressing, selection, control and data transfer. Speeds are up to 400 kHz (fast mode), 1 MHz (fast mode plus), 3.4 MHz (high-speed mode), or 5 MHz (ultra-fast mode). New 12.5 MHz I²C controllers with backwards compatibility to I²C are starting to hit the market which compete with the higher speeds of the SPI bus.

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

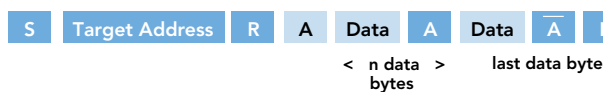


I²C-bus devices are available in a wide range of functions. Each target device has its own I²C-bus address, selectable using address pins set high (1) or low (0). Information is transmitted byte by byte, and each byte is acknowledged by the receiver. There can be multiple devices on the same bus, and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

Write data

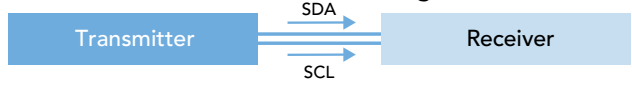


Read data



S = Start condition R/W = Read/write
A = Acknowledge \bar{A} = Not acknowledge P = Stop condition

Controller



The controller always sends the clock

OVERVIEW OF MIPI I3C

MIPI I3C (and the publicly available MIPI I3C Basic) provide a scalable, medium-speed, utility and control bus for connecting peripherals to an application processor. Its design incorporates key attributes from both I²C-bus and SPI interfaces to provide a unified, high-performance, low-power interface solution that delivers a flexible upgrade path for I²C-bus and SPI implementers. Originally introduced in 2017, I3C was the culmination of a multi-year development project based on extensive collaboration with the MEMS and Sensors Industry Group and across the broader electronics ecosystem.

As shown in Figure 1, I²C-bus targets (with 50 ns filter) can coexist with I3C controllers operating at 12.5 MHz, enabling the migration of existing I²C-bus designs to the I3C specification. Conversely, I3C targets operating at typical 400 kHz or 1 MHz I²C-bus speeds can coexist with existing I²C-bus controllers.

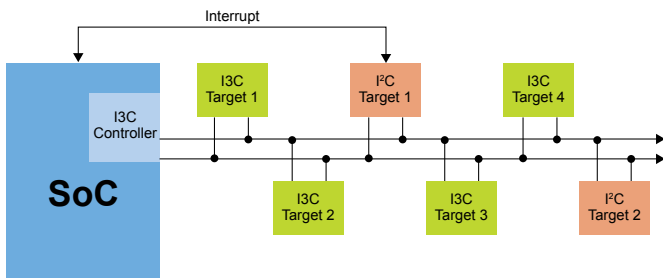


Figure 1 – I²C and I3C targets coexisting with I3C controller

Just like I²C, I3C is implemented with standard CMOS I/O pins using a two-wire interface, but unlike I²C it supports in-band interrupts enabling target devices to notify controllers of interrupts, a design feature that eliminates the need for a separate general-purpose input/output (GPIO) interrupt for each target, reducing system cost and complexity. Support for dynamic address assignments help minimize pin counts, which is key for accommodating space-constrained form factors.

I3C supports a multi-drop bus that, at 12.5MHz, supports standard data rate (SDR) of 10 Mbps with options for high-data-rate (HDR) modes. The net result is that I3C offers a leap in performance and power efficiency compared with I²C as shown in Figure 2.

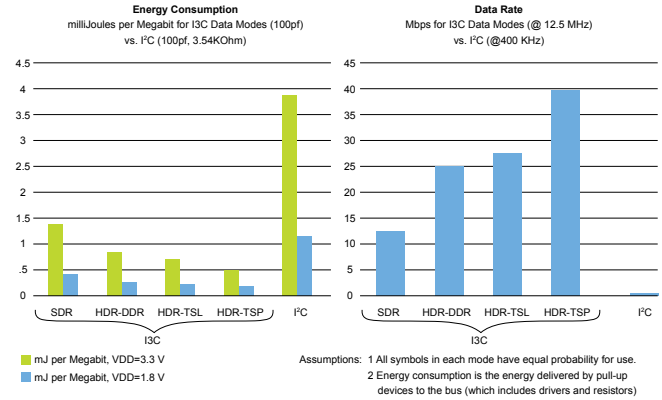


Figure 2 – Comparison of Energy Consumption and Data Rates: I3C vs I²C

Additional technical highlights for I3C include multi-controller support, dynamic addressing, command-code compatibility and a uniform approach for advanced power management features, such as sleep mode. It provides synchronous and asynchronous timestamping to improve the accuracy of applications that fuse signals from various peripherals. It can also batch and transmit data quickly to minimize energy consumption of the host processor.

COMPARISON OF FEATURES

Feature	I3C v1.0	I3C Basic	I3C v1.1	I3C Basic v1.1
12.5 MHz SDR (Controller, Target and Legacy I ² C Target Compatibility)	✓	✓	✓	✓
Target can operate as I ² C device on I ² C bus and on I3C bus using HDR modes	✓	✓	✓	✓
Target Reset	✓	✓	✓	✓
Specified 1.2V-3.3V Operation for 50pf C load	✓	✓	✓	✓
In-Band Interrupt (w/MDB)	✓	✓	✓	✓
Dynamic Address Assignment	✓	✓	✓	✓
Error Detection and Recovery	✓	✓	✓	✓
Secondary Controller	✓	✓	✓	✓
Hot-Join Mechanism	✓	✓	✓	✓
Common Command Codes (Required/Optional)	✓	✓ ✓	✓	✓ ✓
Specified 1.0V Operation for 100pf C load	✓	✓	✓	✓
Set Static Address as Dynamic Address CCC (SETAASA)	✓	✓	✓	✓
Synchronous Timing Control	✓	✓	✓	✓
Asynchronous Timing Control (Mode 0)	✓	✓	✓	✓
Asynchronous Timing Control (Mode 1-3)	✓	✓	✓	✓
HDR-DDR	✓	✓	✓	✓
HDR-TSL/TSP	✓	✓	✓	
HDR-BT (Multi-Lane Bulk Transport)	✓	✓	✓	✓
Grouped Addressing	✓	✓	✓	✓
Device to Device(s) Tunneling	✓	✓	✓	✓
Multi-Lane for Speed (Dual/Quad for SDR and HDR-DDR)	✓	✓	✓	✓
Monitoring Device Early Termination	✓	✓	✓	✓

Figure 3 – Comparison of I3C and I3C Basic Features

While the full version of I3C is available only to MIPI Alliance members, MIPI has released a public version called [I3C Basic](#) that bundles the most commonly needed I3C features for use by developers and other standards organizations. I3C Basic is available for implementation without MIPI membership and is intended to facilitate a royalty-free licensing environment for all implementers. Figure 3 summarizes the key features supported by I3C and I3C Basic.

To support developers, compatibility between different I3C implementations has been confirmed through multiple interoperability workshops, and several supporting MIPI resources are available. These include:

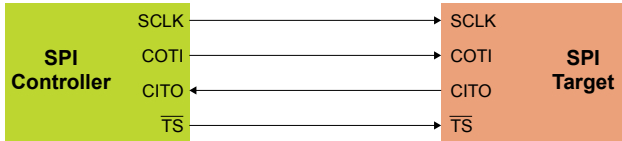
- I3C Host Controller Interface – [MIPI I3C HCISM](#)
- [I3C HCI Driver for Linux](#)
- I3C Discovery and Configuration Specification – [DisCo for I3CSM](#)
- I3C Debug and Test Interface – [MIPI Debug for I3CSM](#)

I3C intellectual property (IP) is available from multiple vendors, including a licence free version for I3C Basic. I3C conformance testing and verification IP test suites are also available from multiple vendors.

More information on I3C and I3C Basic is available via the [MIPI Alliance website](#).

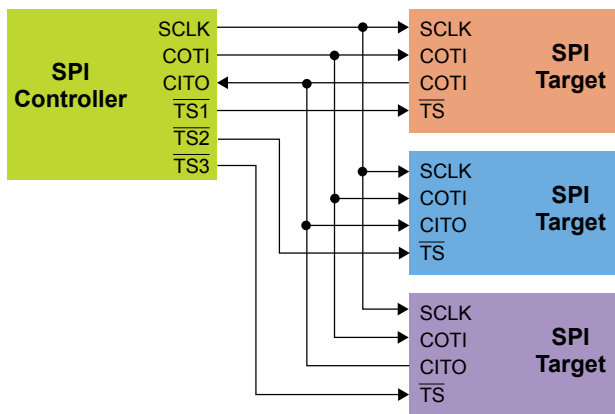
OVERVIEW OF THE SPI BUS

SPI is the full duplex synchronous serial interface consisting of four signals: SCLK (serial clock), COTI (controller out, target in), CITO (controller in, target out) and TS (target select). SPI bus operates with a single controller device and one or more target devices. Data rate ranges from 5 to 20 Mbps which is much higher than the I²C-bus rate but like the new I3C-bus.

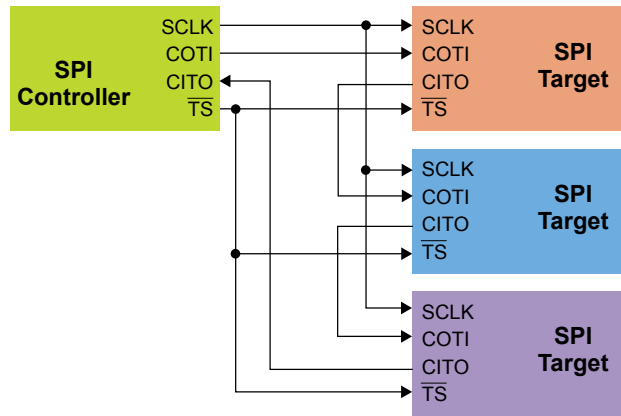


Though target devices might operate in one polarity or phase only, clock polarity and phase of the SPI bus could be configured with respect to the data to establish the valid communication link by the controller. CPOL determines the polarity of the clock. When CPOL = 0, clock is low when idle. The leading edge is the rising edge and the trailing edge is the falling edge. When CPOL = 1, clock is high when idle. The leading edge is the falling edge and the trailing edge is the rising edge.

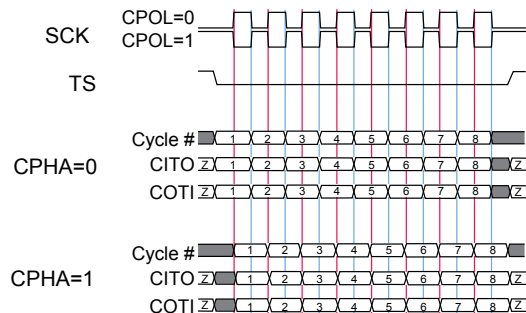
CPHA determines the timing of the data bits relative to the clock pulse. When CPHA = 1, the transmitting side changes data on the leading edge of the clock and the receiving side captures data on the trailing edge of the clock. When CPHA = 0, the transmitting side changes data on the trailing edge of the clock and the receiving side captures data on the leading edge of the clock.



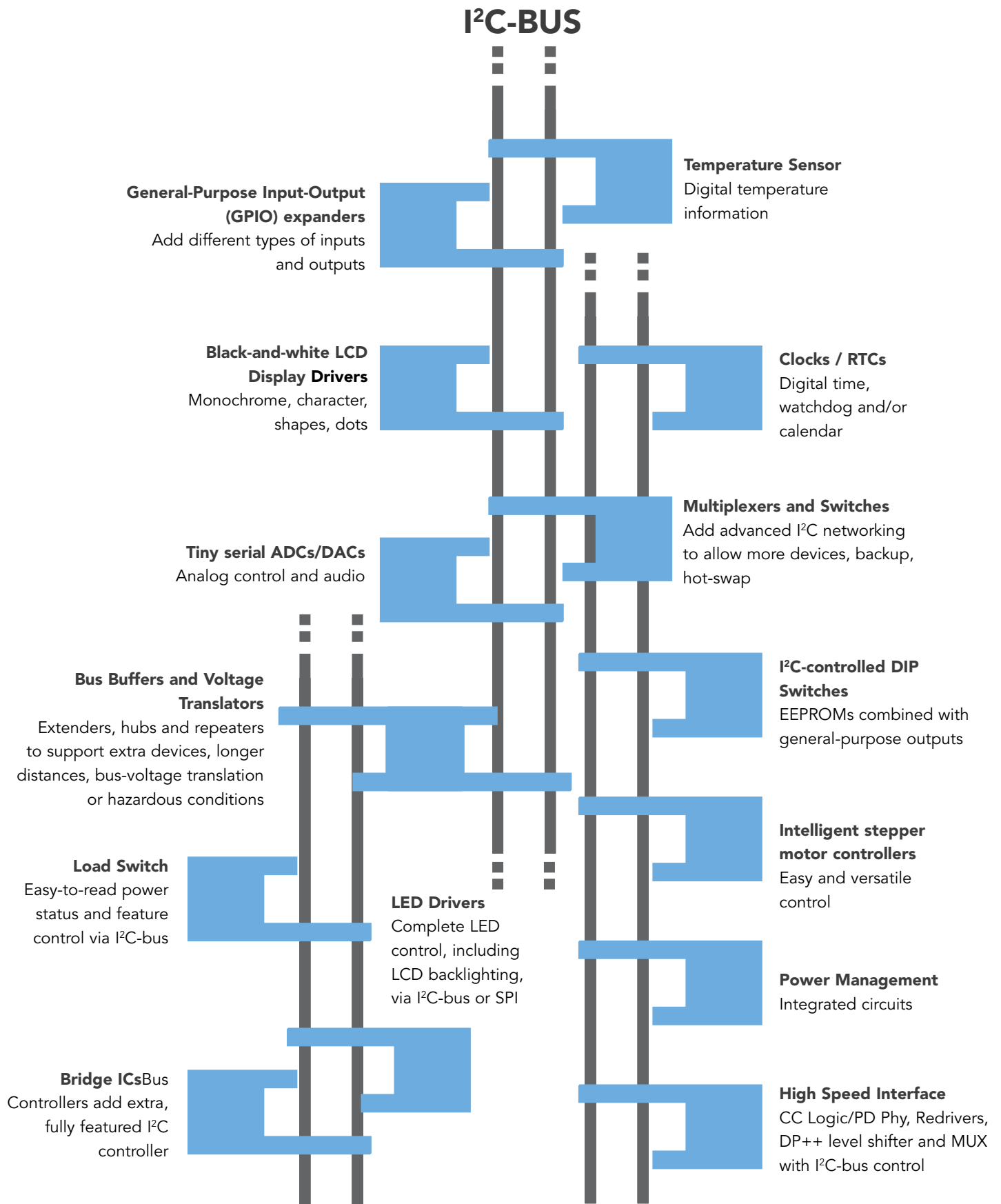
The controller could connect with multiple independent targets in parallel. Each target is controlled with the separate TS signal. When TS = 0, only the corresponding target will respond to the controller. Outputs of all others with TS = 1 remain in high impedance.



Alternatively, targets could be connected in a daisy chain configuration to reduce number of the target select signals. The controller output is connected to the first target input. The first target output is connected to the second target input and so on. Then the last target output is connected back to the controller input. Each target is designed to send out during the second group of the clock pulses the exact copy of the data it received during the first group of clock pulses. The controller receives data from the last target first then data from the first target last during the same clock group. It requires two clock groups to complete each operation which would be only one clock group in the parallel configuration




NXP I²C, I³C AND SPI PRODUCT LINES





More information: www.nxp.com/i2c.


I²C-BUS, I³C-BUS AND SPI PRODUCT SUMMARY


A/D-D/A Converters 		
8-bit ADC	PCF8591	I ² C Fm 4-channel ADC and 1-channel DAC


Bridge and Bus Controllers 		
Bridge	+ SC16IS740	I ² C Fm/SPI-to-UART bridge with IrDA
	SC16IS741A	I ² C Fm/SPI-to-UART bridge with IrDA
	SC16IS750	I ² C Fm/SPI-to-UART bridge with IrDA and GPIO
	SC16IS752	I ² C Fm/SPI-to-UART bridge with IrDA and GPIO
	SC16IS760	I ² C Fm/SPI-to-UART bridge with IrDA and GPIO
	SC16IS762	I ² C Fm/SPI-to-UART bridge with IrDA and GPIO
	SC18IM704	UART-to-I ² C Fm controller bridge with GPIO (Replacement for SC18IM700)
	SC18IS604	SPI-to-I ² C Fm controller bridge with GPIO (Replacement for SC18IS600)
	SC18IS606	I ² C Fm target-to-SPI controller bridge (Replacement for SC18IS602B)
Controller	PCF8584	I ² C Sm bus controller with bus snoop
	PCA9564	I ² C Fm bus controller
	PCA9665A	I ² C Fm+ bus controller with 68-byte buffer and restart condition fix

Bus Buffers 		
Incremental offset	PCA9510A	I ² C Fm incremental offset hot-swap bus buffer (no RTA)
	PCA9511A	I ² C Fm incremental offset hot-swap bus buffer
	PCA9512A	I ² C Fm incremental offset VLT hot-swap bus buffer
	PCA9513A	I ² C Fm incremental offset hot-swap bus buffer (92 µA CS)
	PCA9514A	I ² C Fm incremental offset hot-swap bus buffer (0.8 V offset)
Differential driver with static offset (1 side)	PCA9614	I ² C Fm+ VLT differential (4-wire) bus buffer
	PCA9615	I ² C Fm+ VLT differential (4-wire) hot-swap bus buffer
	PCA9616	I ² C Fm+ 0.8 V LV VLT differential (4-wire) hot-swap bus buffer with INT (2-wire)
No offset	PCA9646	4-channel I ² C Fm+ no offset buffer/switch with RST
Static offset (1 side)	P82B96	I ² C Fm HV bus buffer
	PCA9507	I ² C Fm VLT DDC buffer with accelerator
	PCA9508	I ² C Fm VLT hot-swap bus repeater
	PCA9509	I ² C Fm 1.0 V VLV VLT bus buffer with current source
	PCA9509P	I ² C Fm 0.8 V ULV VLT bus buffer
	PCA9517A	I ² C Fm 0.9 V ULV VLT bus repeater
	PCA9519	4-channel version of PCA9509
	PCA9527	I ² C Fm DDC VLT buffer with accelerator and CEC
	PCA9600	I ² C Fm+ HV bus buffer
	PCA9601	I ² C Fm+ HV bus buffer with stronger 15 mA local side drive to support multiple Fm+ followers
	PCA9617A	I ² C Fm+ 0.8 V ULV VLT bus repeater
	Static offset (All sides)	PCA9515A
PCA9516A		I ² C Fm 5-channel hub
PCA9518A		I ² C Fm expandable 5-channel hub

DIP Switch 		
2-kbit EE	PCA9500	8-bit I ² C Fm QB GPIO with PU and 2-K EEPROM
	PCA9501	8-bit I ² C Fm QB GPIO with INT, PU and 2-K EEPROM
DIP switch	PCA8550	I ² C Fm 4-bit 1-of-2 mux and 5-bit EEPROM
	PCA9559	I ² C Fm 5-bit mux/1-bit latch and 6-bit EEPROM
	PCA9560	I ² C Fm 2 x 5-bit mux/1-bit latch and 6-bit EEPROM
	PCA9561	I ² C Fm 4 x 6-bit mux and 6-bit EEPROM


GPIO Expander 		
4-bit	PCA9536	4-bit I ² C Fm TP GPIO with PU
	PCA9537	4-bit I ² C Fm TP GPIO with INT and RST
	PCA9570	4-bit 1 MHz LV TP GPO
8-bit	PCA8574	8-bit I ² C Sm QB GPIO with INT and PU
	PCF8574	8-bit I ² C Fm QB GPIO with INT and PU
	PCA8574A	8-bit I ² C Fm QB GPIO with INT and PU (alternate address)
	PCF8574A	8-bit I ² C Sm QB GPIO with INT and PU (alternate address)
	PCA9500	8-bit I ² C Fm QB GPIO with PU and 2-K EEPROM
	PCA9501	8-bit I ² C Fm QB GPIO with INT, PU and 2-K EEPROM
	PCA9502	8-bit I ² C Fm/SPI TP GPIO with INT and RST
	PCA9534	8-bit I ² C Fm TP GPIO with INT
	+ PCA9538	8-bit I ² C Fm TP GPIO with INT and RST
	PCA9538A	8-bit I ² C Fm LV TP GPIO with INT and RST
	PCAL9538A	8-bit I ² C Fm LV TP/OD GPIO with INT, RST, latch and PU/PD
	PCA6408A	8-bit I ² C Fm LV VLT TP GPIO with INT and RST
	PCAL6408A	8-bit I ² C Fm LV VLT TP/OD GPIO with INT, RST, latch and PU/ PD
	PCA9554	8-bit I ² C Fm TP GPIO with INT and PU
	PCA9554A	8-bit I ² C Fm TP GPIO with INT and PU (alternate address for PCA9554)
	PCA9554B	8-bit I ² C Fm LV TP GPIO with INT and PU
	PCAL9554B	8-bit I ² C Fm LV TP/OD GPIO with INT, latch and PU/PD (PU default)
	PCA9554C	8-bit I ² C Fm LV TP GPIO with INT and PU (alternate address for PCA9554B)
	PCAL9554C	8-bit I ² C Fm LV TP/OD GPIO with INT, latch and PU/PD (PU default) (alternate address for PCAL9554B)
	PCA9557	8-bit I ² C Fm TP GPIO with RST
	PCA9571	8-bit 1 MHz LV TP GPO
	PCA9574	8-bit I ² C Fm LV VLT TP/OD GPIO with INT, RST, latch and PU/PD
	PCA9670	8-bit I ² C Fm+ QB GPIO with RST and PU
	PCA9672	8-bit I ² C Fm+ QB GPIO with INT, RST and PU
	PCA9674	8-bit I ² C Fm+ QB GPIO with INT and PU
	PCA9674A	8-bit I ² C Fm+ QB GPIO with INT and PU (alternate address)
	PCA9702	8-bit SPI 18 V GPI with INT
+ PCA9704	8-bit SPI 18 V GPI with maskable INT	
14-bit	+ PCAL9714	14-bit SPI LV VLT TP/OD GPIO with INT, RST, latch and PU/PD
16-bit	PCA8575	16-bit I ² C Fm QB GPIO with INT and PU
	PCF8575	16-bit I ² C Fm QB GPIO with INT and PU
	PCF8575C	16-bit I ² C Fm OD GPIO with INT
	PCA9535	16-bit I ² C Fm TP GPIO with INT
	PCA9535C	16-bit I ² C Fm OD GPIO with INT
	PCA9535A	16-bit I ² C Fm LV TP GPIO with INT
	PCAL9535A	16-bit I ² C Fm LV TP/OD GPIO with INT, latch and PU/PD
	+ PCA9539	16-bit I ² C Fm TP GPIO with INT and RST
	+ PCA9539R	16-bit I ² C Fm TP GPIO with INT and RST (state machine only)
	PCA9539A	16-bit I ² C Fm LV TP GPIO with INT and RST
	PCAL9539A	16-bit I ² C Fm LV TP/OD GPIO with INT, RST, latch and PU/PD
	PCA6416A	16-bit I ² C Fm LV VLT TP GPIO with INT and RST
	PCAL6416A	16-bit I ² C Fm LV VLT TP/OD GPIO with INT, RST, latch and PU/PD
	PCA9555	16-bit I ² C Fm TP GPIO with INT and PU
	PCA9555A	16-bit I ² C Fm LV TP GPIO with INT and PU
	PCAL9555A	16-bit I ² C Fm LV TP/OD GPIO with INT, latch and PU/PD (PU default)
	PCA9575	16-bit I ² C Fm LV VLT TP/OD GPIO with INT, RST, latch and PU/PD
	PCA9671	16-bit I ² C Fm+ QB GPIO with RST and PU
	PCA9673	16-bit I ² C Fm+ QB GPIO with INT, RST and PU
	PCA9675	16-bit I ² C Fm+ QB GPIO with INT and PU
	PCA9701	16-bit SPI 18 V GPI with INT
+ PCA9703	16-bit SPI 18 V GPI with maskable INT	
22-bit	+ PCA9722	22-bit SPI LV VLT TP/OD GPIO with INT, RST, latch and PU/PD
24-bit	PCAL6524	24 bit I ² C Fm+ ULV VLT TP/OD GPIO with INT, RST, latch and PU/PD
34-bit	PCAL6534	34 bit I ² C Fm+ ULV VLT TP/OD GPIO with INT, RST, latch and PU/PD
40-bit	PCA9505	40-bit I ² C Fm TP GPIO with INT, RST, OE and PU
	PCA9506	40-bit I ² C Fm TP GPIO with INT, RST and OE
	PCA9698	40-bit I ² C Fm+ TP/OD GPIO with INT, RST, OE and PU


High Speed Interface 		
CC Logic/ PD Phy	PTN5150	USB Type-C Rev 1.1 CC-Logic, Pin to control NXP redriver
	PTN5110	USB Type-C Rev 3.0 PD PHY, TCPC Rev 2.0 version 1.0. Laptop/tablet applications
Redrivers	PTN36502	USB and DP Combo Redriver, SuperSpeed USB 3.1 Gen1, DP V 1.2
	PTN38007	Multi-protocol USB4 20 Gbps linear redriver
	PTN38003A	Multi-protocol USB3.2 and DisplayPort linear redriver
	PTN3944	Multi-channel PCIe 4.0 linear equalizer
Mux	CBTL08GP053	USB Type-C High performance Crossbar Switch IC
DP++ Level Shifter	PTN3360	Enhanced performance HDMI/DVI level shifter with active DDC buffer, supporting 3 Gbit/s operation
	PTN3361B	HDMI/DVI level shifter with dongle detect support and active DDC buffer
	PTN3361C	Enhanced performance HDMI DVI level shifter with active DDC buffer, supporting 1.65 Gbit/s operation
	PTN3363	Low power HDMI/DVI level shifter with active DDC buffer, supporting 3.4 Gbit/s operation
	PTN3365	Enhanced performance HDMI/DVI level shifter with active DDC buffer, supporting 3 Gbit/s operation
	PTN3366	Low power HDMI/DVI level shifter with active DDC buffer, supporting 3 Gbit/s operation
	PTN3381	(DOD) Enhanced performance HDMI/DVI level shifter with voltage regulator, dongle detect support and active DDC buffer

LCD Drivers 		
Segment driver	+ PCA8561A/B	I ² C Fm or SPI 72-segment low-power LCD driver in HVQFN32 package
	+ PCA/PCF85162	I ² C Fm 128-segment LCD driver in TSSOP48 package
	+ PCA85262	I ² C Fm 128-segment LCD driver with higher frame frequency in TSSOP48 package
	+ PCA/PCF8551A/B	I ² C Fm or SPI 144-segment low-power LCD driver with programmable frame frequency in TSSOP48 package
	+ PCA/PCE/PCF85176	I ² C Fm 160-segment LCD driver in TSSOP56 or TQFP64 package
	+ PCA85276	I ² C Fm 160-segment LCD driver with higher frame frequency in TSSOP56 package
	+ PCA/PCF8553A/B	I ² C Fm or SPI 160-segment low-power LCD driver with programmable frame frequency in TSSOP56 package
	+ PCA8546A/B	I ² C Fm or SPI 176-segment LCD driver with programmable frame frequency in TSSOP56 package
	+ PCA8547A/B	I ² C Fm or SPI 176-segment LCD driver with programmable frame frequency, charge pump, VLCD temperature compensation in TQFP64 package
	+ PCA/PCF85134	I ² C Fm 240-segment LCD driver in LQFP80 package
	PCF8545A/B	I ² C Fm or SPI 320-segment LCD driver with programmable frame frequency in TSSOP56 package
	+ PCA/PCF8536A/B	I ² C Fm or SPI 320-segment LCD driver with programmable frame frequency and LED backlight PWM control in TSSOP56 package
	+ PCA/PCF8537A/B	I ² C Fm or SPI 352-segment LCD driver with programmable frame frequency, charge pump, VLCD temperature compensation in TQFP64 package
	+ PCA9620	I ² C Fm 480-segment LCD driver with programmable frame frequency, charge pump, VLCD temperature compensation in LQFP80 package
	+ PCA/PCF8576D/E	I ² C Fm 160-segment COG LCD driver
	+ PCA8576F	I ² C Fm 160-segment COG LCD driver with higher frame frequency and higher VLCD
	+ PCA/PCE/PCF85133	I ² C Fm 320-segment COG LCD driver with selectable frame frequency
	+ PCA85233	I ² C Fm 320-segment COG LCD driver with higher selectable frame frequency
	+ PCA85232	I ² C Fm 640-segment COG LCD driver with higher programmable frame frequency
	Character drivers	PCF2119
Graphic driver	PCF8531	I ² C Fm 34 x 128-pixel COG LCD driver with charge pump, VLCD temperature compensation

Level Transceivers 		
GTL to LVTTTL Translators with Direction Pin	GTL2012	2-bit LVTTTL to GTL transceiver
	GTL2014	4-bit LVTTTL to GTL transceiver
	GTL2018	8-bit LVTTTL to GTL transceiver
	GTL2034	4-bit GTL to GTL buffer

Level Translators 		
FET No Direction Pin	NVT2001	1-bit I ² C Fm+ VLT 1.0 V to 5.5 V
	NVT2002	2-bit I ² C Fm+ VLT 1.0 V to 5.5 V
	PCA9306	Dual I ² C/SMBus Fm+ VLT 1.0 V to 5.5 V
	NVT2003	3-bit I ² C Fm+ VLT for two power supplies in same bus application 1.0 V to 5.5 V
	NVT2006	6-bit I ² C Fm+ VLT 1.0 V to 5.5 V
	NVT2008	8-bit I ² C Fm+ VLT 1.0 V to 5.5 V
	NVT2010	10-bit I ² C Fm+ VLT 1.0 V to 5.5 V
FET One Shot No Direction Pin	NTS0101	1-bit I ² C Fm+ VLT 1.65 V to 3.6 V A side and 2.3 V to 5.5 V B side
	NTS0102	2-bit I ² C Fm+ VLT 1.65 V to 3.6 V A side and 2.3 V to 5.5 V B side
	P3A9606	Dual I3C 12.5 MHz and I ² C/SMBus Fm+ VLT 0.72 V to 1.98 V
	P3S0200	Dual bidirectional I3C 12.5 MHz 1:2 and 2:1 switch and voltage level translator 0.72 V to 3.6 V
	NTS0104	4-bit I ² C Fm+ VLT 1.65 V to 3.6 V A side and 2.3 V to 5.5 V B side
	NTS0302	2-bit improved smart one shot I ² C Fm+ VLT 0.95 V to 3.6 V A side and 1.65 V to 5.5 V B side
	NTS0304E	4-bit improved smart one shot I ² C Fm+ VLT 0.95 V to 3.6 V A side and 1.65 V to 5.5 V B side with IEC 61000-4-2 Class 4, 8 kV contact on B side
	NTS0308E	8-bit improved smart one shot I ² C Fm+ VLT 0.95 V to 3.6 V A side and 1.65 V to 5.5 V B side with IEC 61000-4-2 Class 4, 8 kV contact on B side
	NTSX0102	2-bit I ² C Fm+ VLT 1.65 V to 5.5 V A side and 1.65 V to 5.5 V B side
	Buffer One Shot No Direction Pin	NTB0101
NTB0102		2-bit SPI VLT 1.2 V to 3.6 V A side and 1.65 V to 5.5 V B side
NTB0104		4-bit SPI VLT 1.2 V to 3.6 V A side and 1.65 V to 5.5 V B side

Level Translator 		
SIM Card Translator	NVT4555	SIM card VLT level translator and LDO
	NVT4557	SIM card VLT level translator for 1.8 V node
	NVT4558	SIM card VLT level translator for 1.2 V and 1.8 V node
SD Card Translator	NVT4857	SD 3.0 - SDR104 auto-direction control memory card level translator and LDO — also support SIM card for combo socket
	NVT4858	SD 3.0 — SDR104 auto-direction control memory card level translator for both 1.2 V and 1.8 V node — also supports SIM card for combo socket
eUSB2 Repeater and Level Shifter	PTN3222	1-port eUSB2 to USB2 redriver functionality

LED Drivers 		
Open Drain or Totem Pole Voltage Source		
Dimmer (2 PWM, 25 mA/ 5 V)	PCA9530	2-channel I ² C Fm OD LED dimmer with RST
	PCA9531	8-channel I ² C Fm OD LED dimmer with RST
	PCA9532	16-channel I ² C Fm OD LED dimmer with RST
	PCA9533	4-channel I ² C Fm OD LED dimmer
Blinker (2 PWM, 25 mA/ 5 V)	PCA9550	2-channel I ² C Fm OD LED blinker with RST
	PCA9551	8-channel I ² C Fm OD LED blinker with RST
	PCA9552	16-channel I ² C Fm OD LED blinker with RST
	PCA9553	4-channel I ² C Fm OD LED blinker
Controller (PWM/Ch, 25 mA/ 5 V)	PCA9632	4-channel I ² C Fm+ low-power TP LED controller
	PCA9633	4-channel I ² C Fm+ TP LED controller with OE
	PCA9634	8-channel I ² C Fm+ TP LED controller with OE
	+ PCA9635	16-channel I ² C Fm+ TP LED controller with OE
+ PCA9685	16-channel I ² C Fm+ TP LED controller with 12-bit PWMs and OE	

LED Drivers



Open Drain Constant Current

Driver (PWM/Ch, 57 mA/ 40 V)	+ PCA9952	16-channel I ² C Fm+ HV CS LED driver with OE
	+ PCA9955	16-channel I ² C Fm+ HV CS LED driver
Driver (PWM/Ch, 57 mA/ 20 V)	+ PCA9955B	16-channel I ² C Fm+ CC LED driver
	+ PCA9745B	16-channel SPI CC LED driver
	PCA9956B	24-channel I ² C Fm+ CC LED driver
Driver (PWM, 5 V)	PCA9957	24-channel SPI CC LED driver — 32 mA per ch
	+ PCA9958	24-channel SPI CC LED driver — 63 mA per ch
	PCA9959	24-channel SPI CC LED driver — 63 mA per ch — 64 grids

Load Switch



Load Switch	NX3P2902BUK	500 mA / 3.6 V load switch
	NX3P1108UK	1.5 A / 3.6 V load switch
	NX5P3363UK	3 A / 5 V source load switch
	NX20P5090UK	5 A / 20 V sink load switch
	NX30P6093UK	I ² C-controlled OVP load switch

Muxes and Switches



2-channel	+ PCA9540B	2-channel I ² C Fm mux
	P3S0200GM	2:1 and 1:2 I3C 12.5 MHz mux with select pin
	PCA9542A	2-channel I ² C Fm mux with INT
	PCA9543A	2-channel I ² C Fm switch with INT and RST
2-to-1 demux	PCA9541A/01	2-to-1 I ² C Fm demux with INT and RST (channel 0 default)
	PCA9541A/03	2-to-1 I ² C Fm demux with INT and RST (no channel default)
4-channel	PCA9544A	4-channel I ² C Fm mux with INT
	PCA9545A	4-channel I ² C Fm switch with INT and RST
	PCA9546A	4-channel I ² C Fm switch with RST
	PCA9646	4-channel I ² C Fm+ no offset buffer/switch with RST
	PCA9846	4-channel ULV VLT I ² C Fm+ switch with RST
	PCA9849	4-channel ULV VLT I ² C Fm+ mux with RST
8-channel	PCA9547	8-channel I ² C Fm mux with RST (channel 0 default)
	PCA9847	8-channel ULV VLT I ² C Fm+ mux with RST
	PCA9548A	8-channel I ² C Fm switch with RST
	PCA9848	8-channel ULV VLT I ² C Fm+ switch with RST
Arbiter	PCA9641	2 controllers to shared target I ² C Fm+ arbiter with INT and RST (no channels selected at default)

Power management integrated circuits (PMIC)



PCA942X	i.MX RT5/600 including battery charger
PCA9450	i.MX 8M family with 12 power rails
PCA9460	i.MX 8ULP with 13 power rails
PCA9451	i.MX 93 with 12 power rails

Real-time Clocks



Low-power	PCF2123	SPI lower power RTC with alarm, timer and interrupt
	PCF85053A	Bootable CPU I ² C Fm RTC with two I2C controllers, 128 Byte SRAM and alarm function
	PCF85063	I ² C Fm/Tiny RTC with 30s, 60s interrupt
	PCF85063A/B	I ² C Fm or SPI/Tiny RTC with alarm and 30s, 60s interrupt
	PCF85263A	I ² C Fm/Tiny RTC with alarms, time stamp and battery backup +1-byte RAM 0.25 mm pitch WLCS12 for cellular modem
	PCF85363A	I ² C Fm/Tiny RTC with alarms, time stamp and battery back-up switch + 64-byte RAM
	PCF8523	I ² C Fm+ ultra-low-power RTC with loss of main power detection and automatic battery backup
	PCF8563	I ² C Fm low-power clock/calendar
	PCF8583	I ² C Sm Clock and calendar with 240 x 8-bit RAM and alarm
	PCF8593	I ² C Sm Low power clock and calendar with alarm
Automotive high temperature	+ PCA21125	SPI lower power RTC with alarm, timer and interrupt to 125 °C
	+ PCA85073A	I ² C Fm/Tiny RTC with alarm and 30s, 60s interrupt -40 °C to 105 °C
	+ PCA8565	I ² C Fm high-temperature clock/calendar -40 °C to +125 °C
Temperature compensated high accuracy with embedded crystal	+ PCA2131	I ² C Fm or SPI high accuracy, low voltage 100 mA RTC with embedded crystal, time stamp, tamper pins -40 °C to 105 °C
	PCF2131	I ² C Fm or SPI high accuracy, low voltage 64 nA RTC time stamp, tamper pins -40 °C to 85 °C

Stepper Motor Controller



1 motor controller	PCA9629A	Improved I ² C Fm+ stepper motor controller with TP GPIO with INT and RSTC
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Temp Sensors



Local	LM75B	I ² C Fm TS local with ± 2 °C accuracy and SMBus timeout
	SE98A	I ² C Fm JEDEC DDR3 TS, no SPD, ±1 °C accuracy and SMBus timeout
	PCT2075	I ² C Fm+ TS with ±1 °C accuracy and SMBus timeout Default interrupt trip is + 85 °C
	PCT2075GV/ N005	Default interrupt trip -5 °C — for freezer alarm
	PCT2075GV/ P110	Default interrupt trip + 110 °C — prevent spurious alarm in high temp environment
	P3T1085UK	I3C and I ² C TS with ±0.5 °C accuracy and SMBus timeout
	P3T1755DP	I3C and I ² C TS with ±0.5 °C accuracy and SMBus timeout
	P3T1035x	I3C and I ² C interface with ±0.5C accuracy with 8 address options
	P3T2030x	I3C and I ² C interface with ±2C accuracy with 8 address options
Local and EEPROM	SE97B	I ² C Fm JEDEC DDR3 TS local with ±1 °C accuracy, 2K SPD and SMBus timeout
Local and remote	SA56004	I ² C HSmTS, 1.8 V, + 1 °C accuracy and SMBus timeout

LEGEND

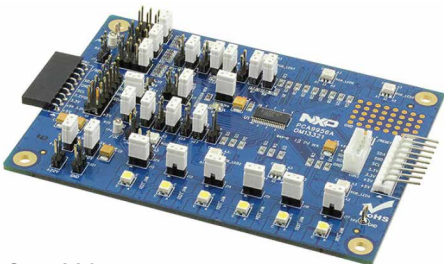
Code	Description	Code	Description	Code	Description
Sm	100 kHz Standard-mode I ² C-bus	ADC	Analog Digital Converter	INT	Interrupt
Fm	400 kHz Fast-mode I ² C-bus	LV	Supply Voltage < 2.3 V	RST	Reset
Fm+	1 MHz Fast-mode Plus I ² C-bus	VLT	Supply Voltage < 1.65 V	OE	Output enable
HSm	3.4 MHz High-speed Mode I ² C-bus	ULV	Supply Voltage < 1.0 V	Latch	Input latch
+	AEC-Q100 Compliance	HV	Outputs >10 V	PU	Pull-up resistors
GPIO	General-purpose I/O Expander	VLT	Voltage Level Translator — 2 Supplies	PU/PD	Pull-up/pull-down resistors
TS	Thermal Sensor	TP	Totem-pole (push-pull)	COG	Chip on glass
RTC	Real-time Clock	QB	Quasi-bidirectional	SPI	Serial peripheral interface
LCD	Liquid Crystal Display	OD	Open Drain	SPMI	System power management interface
DAC	Digital Analog Converter	CC	Constant current	P3A, P3T, P3S	3 indicates I3C Bus capable

DEMO BOARDS

Bridges	OM6270	SC16IS750_760 SPI_I ² C-UART EV
	OM6273	SC16IS752_762 SPI_I ² C-UART EV
	SC18IS604-EVB	SPI-to-I ² C Fm controller bridge Eval Board
	SC18IS606-EVB	I ² C Fm target-to-SPI controller bridge Eval Board
	SC18IM704-EVB	UART-to-I ² C Fm controller bridge Eval Board
LCD display	OM13506	PCF8553 LCD Demo
RTC	OM11059	PCF85063B RTC Eval - SPI
	OM11059A	PCF85063A RTC Eval - I ² C
	OM13510	PCF85263 RTC Eval
	OM13511	PCF8523 RTC Eval
	OM13512	PCF2123 SPI-bus RTC Eval
	OM13514	PCF85363 RTC Eval
	OM13515	PCF85063A RTC Eval
	OM13517	PCA21125 RTC Eval 9 pin
	OM13519	PCA8565 RTC Eval
	Voltage-Level Translator	OM13315
OM13317		NVT2008PW VLT Eval
OM13318		NVT2002DP VLT Eval
OM13319		NVT2003DP VLT Eval
OM13323		NVT2006PW VLT Eval
OM13324		NVT2010PW VLT Eval
OM13480		NVT4555UK SIM Card Eval
OM13543		NTS0304EPW VLT Test
NVT4858-4557-EVB		NVT4858 SD and NVT4557 SIM Card Eval
P3A9606JK-EVB		P3A9606JK VLT Eval



OM13318
NVT2002DP LED Demo Board

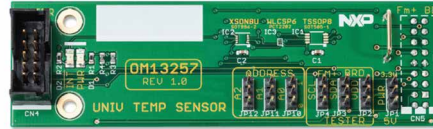


OM13321
PCA9956A 24, Non-Isolated Output
LED Driver Demo Board

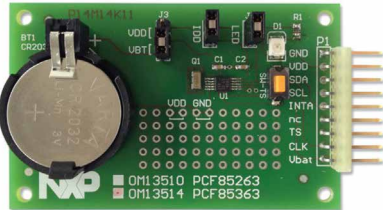
LED driver	OM13269	PCA9632 LED Eval	
	OM13321	PCA9956B LED Eval Fm_Plus	
	OM13327	PCA9634 LED Eval	
	OM13329	PCA9952 LED Eval 2005-1	
	OM13330	PCA9955 LED EVB - 2005-1	
	OM13332	PCA9685 demo board, 16-channel voltage source with 12-bit PWM demo board I ² C Fm+	
	OM13333	PCA9635 LED Eval	
	OM13483	PCA9955B LED Eval	
	OM13524	PCA9745B LED SPI Eval	
	OM13528	PCA9532BS LED Eval	
	OMPCA9957-LEDEV	PCA9957 LED Eval Socket — MCU	
	OMPCA9959-LEDEV	PCA9959 LED Eval Socket — MCU	
	Universal	OM13491	Panel A-VSSOP_QXFN_HWSOP_MSOP8
		OM13492	Panel B — 6_8_10 pin pkgs
		OM13493	Panel C — DHVQFN 24_20_16_14
OM13494		Panel D — HVQFN 14_16_20_24	
OM13495		Panel E — TSSOP 14_16_20_24	
OM13496		Panel F — Surface Mount-DIP EV	
OM13497		Panel G — HTSSOP28_VFBGA_XFBGA24	
Temperature Sensors	OM13257	Universal TS DC Fm_Plus	
Bus Buffers	OM13523	PCA9616PW I ² C Buffer Eval	
GPIO	OM13488	Universal 8-bit GPIO DC — Fm	
	OM13489	Universal 16-bit GPIO DC — Fm	
	OM13526	PCAL6524 GPIO Eval	
	OM13529	PCAL6524EV GPIO Eval Fm_Plus	
	OM13541	PCAL6534EV GPIO Eval	
	Arduino Board	PCF85063AT-ARD	Industry Standard RTC
PCT2075DP-ARD		Temp Sensor	
PCA9957HN-ARD		24-channel LED controller	
PCA9959HN-ARD		24-channel LED controller with 64-grid	
PCF85063TP-ARD		RTC	
IMX8MINI-IARD		Interposer Board for i.MX8 EVB	
NTS0304EUK-ARD		4ch Voltage Level Translator	
PCAL6534EV-ARD		34-bit GPIO	
PCAL6524EV-ARD		24-bit GPIO	
PCF85263ATL-ARD		Full Function RTC	
PCA9955BTW-ARD		16 ch LED Controller	
PCA8561AHN-ARD		LCD Display	
PCAL6408A-ARD		8-bit GPIO	
PCAL6416AEV-ARD		16-bit GPIO	
PCA9617ADP-ARD		I ² C Bus Buffer	
PCA9846PW-ARD		I ² C Low Voltage Switch	
PCT2131-ARD		Low Power Temperature Compensated RTC	
PCF85053ATK-ARD		Dual Controller RTC with RAM	
P3T1085UK-ARD		Temp Sensor - 6 pin 0.5 °C accuracy	
P3T1755DP-ARD		Temp Sensor - 8 pin 0.5 °C accuracy	
P3T1035XUK-ARD	Temp Sensor - 4 bump with 0.5C accuracy		
P3T2030XUK-ARD	Temp Sensor - 4 bump with 2.0C accuracy		



OM13512
PCF2123 SPI-bus RTC Demo Board



OM13257
Temp Sensor Daughter Card



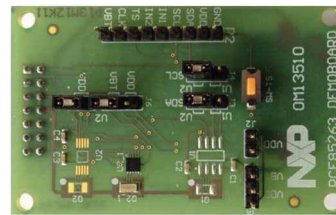
OM13514
PCF85363A I²C-bus RTC PCF85263/363
Interface



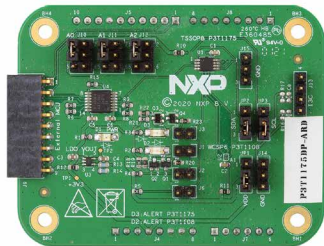
OM13489
Universal 16-bit GPIO Daughter Card



OM13528
PCA9532BS 16-CH LED Demo Board



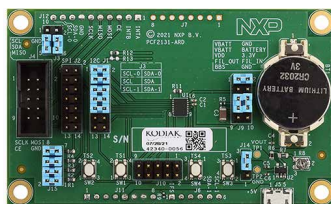
OM13515
PCF85063A RTC Timing Demo Board



P3T1755DP-ARD



P3T1085UK-ARD



PCF2131-ARD

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