



NXP contactless reader ICs CLRC663, MFRC631, MFRC630, SLRC610

The next generation of multiprotocol contactless proximity reader ICs

These new contactless proximity reader ICs support the latest payment, eGovernment, physical access, transport, eMetering and gaming applications. Combining uniquely high effective RF power with low-power card detection and a tiny footprint, they ensure reliable long reading distances for all smart cards as well as NFC devices.

The NXP CLRC663 is a full-featured IC that offers a unique set of capabilities paired with robustness and quality. The MFRC631, MFRC630, and SLRC610 serve the requirements of individual applications and support specific protocols to deliver optimized functionality.

Key features

- ▶ ISO/IEC 14443 A & B, ISO/IEC 15693, FeliCa, ISO/NFC 18092 NFC-IP1 peer to peer (Passive Initiator Mode), depending on derivate
- ▶ Supports all smart card standards as well as NFC devices and NFC tags
- ▶ Single supply supported (3.3 to 5 V)
- ▶ I²C, SPI, and RS-232 UART host interfaces
- ▶ Separate I²C interface for direct SAM AV2.6 connection
- ▶ Boundary scan interface
- ▶ 512 Byte FIFO for fast data transfers
- ▶ Clock-out provided by Integer-N PLL eliminates extra oscillator
- ▶ Integrated EEprom for fast protocol switching

Key benefits

- ▶ High output power for maximum RF performance
- ▶ Low power card detection
- ▶ Low power-down and standby mode
- ▶ EMVCo compliance to "Contactless protocol specification V2.0.1" on RF level can be achieved without additional booster (RC663 and RC631)
- ▶ Suitable for Long APDU handling, prepared for future eID standards
- ▶ Small footprint (HVQFN32)
- ▶ Fast design-in through NXP Reader Library and dedicated development boards



Protocol support depending on derivate:

CLRC663

- ▶ Fully ISO/IEC 14443 A & B, ISO/IEC 15693 and FeliCa compliant
- ▶ EPC Class-1 HF/ ISO 18000-3M3 compliant
- ▶ ISO/NFC 18092 NFC-IP1 peer to peer support (Passive Initiator Mode)
- ▶ Supports NFC tags 1, 2, 3, and 4
- ▶ MIFARE Classic support, hardware anti-collision and MIFARE Crypto1 support
- ▶ High baud rates (up to 848 kbits)
- ▶ EMVCo compliance to "Contactless protocol specification V2.0.1" on RF level can be achieved without additional booster

MFRC631

- ▶ Support of all major 13.56 MHz standards for payment applications
- ▶ Fully ISO/IEC 14443 A & B compliant
- ▶ Supports NFC tags 1, 2, and 4
- ▶ MIFARE Classic support, hardware anti-collision and MIFARE Crypto1 support
- ▶ High baud rates (up to 848 kbits)
- ▶ EMVCo compliance to "Contactless protocol specification V2.0.1" on RF level can be achieved without additional booster

MFRC630

- ▶ Optimized for closed system applications
- ▶ ISO/IEC 14443 A compliant
- ▶ Supports NFC tags 1, 2, and 4
- ▶ MIFARE Classic support, hardware anti-collision and MIFARE Crypto1 support
- ▶ High baud rates (up to 848 kbits)

SLRC610

- ▶ Provides tag reader functionality for event ticketing and item tagging
- ▶ ISO/IEC 15693 compliant
- ▶ EPC Class-1 HF/ ISO 18000-3M3 compliant

Key Applications

- ▶ Payment and loyalty schemes in POS terminals
- ▶ Physical access
- ▶ Terminals for public transportation
- ▶ Passport and eID reader
- ▶ Gaming
- ▶ Industrial, consumer, and home automation
- ▶ eMetering

Recommended products per application:

Segment	CLRC663	MFRC631	MFRC630	SLRC610
POS	EMV payment incl. P2P couponing, FeliCa	Pure EMV, PBOC, CUP		
Physical Access	All cards & tags supported	US PIV	ISO14443 Type A (MIFARE™)	Handsfree, event ticketing
eGovernment		eID and ePassport Reader		
Public Transport	ISO14443 Type A&B/B', FeliCa, open loop payment	ISO14443 Type A&B/B' open loop payment	ISO14443 Type A (MIFARE™)	
eMetering	NFC P2P communication to mobile phone, pre-payment		Pre-payment	
Industrial, White Goods	P2P communication to mobile phone, identification of goods & item tagging (proximity & vicinity tags)			Item & document tagging (vicinity tags)
Gaming	All NFC tags & ISO 15693	Tags 1,2 and 4	Tag 1, 2 and 4	ISO15693

Key technical data

Product features	CLRC663	MFRC631	MFRC630	SLRC610
Operating distance up to [mm] ⁽¹⁾	120 / 160 ⁽³⁾	120	120	160
FIFO depth [byte]	512	512	512	512
Host interface	SPI, I ² C, RS-232	SPI, I ² C, RS-232	SPI, I ² C, RS-232	SPI, I ² C, RS-232
RF interface				
Analog interface	Fully integrated	Fully integrated	Fully integrated	Fully integrated
Carrier frequency [MHz]	13.56	13.56	13.56	13.56
Modulation	10% and 100% ASK	10% and 100% ASK	100% ASK	10% and 100% ASK
Baud rate ISO 14443 [kbit/s]	106 / 212 / 424 / 848	106 / 212 / 424 / 848	106 / 212 / 424 / 848	-
Baud rate ISO 15693 [kbit/s]	26.5 / 53	-	-	26.5 / 53
Baud rate FeliCa (kbit/s)	212 / 424	-	-	-
Standards and protocols				
NFC Tag Type Reader	Tag 1, 2, 3, and 4	Tag 1, 2, and 4	Tag 1, 2, and 4 ⁽⁴⁾	-
ISO 14443 A	Yes	Yes	Yes	-
ISO 14443 B	Yes	Yes	-	-
ISO 15693	Yes	-	-	Yes
MIFARE Classic support	Yes	Yes	Yes	-
FeliCa	Yes	-	-	-
EPC Class-1 HF/ ISO 18000-3M3	Yes	-	-	Yes
ISO 18092 (NFC)	Yes ⁽²⁾	-	-	-
EMVCo	Yes	Yes	-	-
Security				
SAM support in X-Mode	MIFARE SAM AV2.6	MIFARE SAM AV2.6	MIFARE SAM AV2.6	MIFARE SAM AV2.6
Additional information				
Supply voltage digital [V]	3.3 to 5	3.3 to 5	3.3 to 5	3.3 to 5
Supply voltage analog [V]	3.3 to 5	3.3 to 5	3.3 to 5	3.3 to 5
Power down mode current, typical [µA]	0.008	0.008	0.008	0.008
Boundary scan interface	Yes	Yes	Yes	Yes
Temperature range [°C]	-25 to +85	-25 to +85	-25 to +85	-25 to +85
Package	HVQFN32	HVQFN32	HVQFN32	HVQFN32
Evaluation boards	CLEV663, CLEV663B	CLEV631B	CLEV630B	SLEV610B
Software support	NXP Reader Library	NXP Reader Library	NXP Reader Library	NXP Reader Library

⁽¹⁾ Depending on antenna, coil size, turning, and environment

⁽²⁾ Only passive mode initiator support

⁽³⁾ For ISO15693

⁽⁴⁾ ISO 14443A only

Dedicated development boards for fast design-in

To support product development and enable easy access to this next-generation of multiprotocol contact less reader ICs, NXP offers two evaluation boards: the Redboard (CLEV663), for direct connection to the host PC supporting antenna

design and the Blueboard (CLEV663B, MFEV631B, MFEV630B, SLEV610B), which supports the full development environment of NXP's LPCXpresso™. The evaluation boards come with application notes, design support documentation, and sample software.

Ordering information

Reader ICs				Evaluation boards	
Part number	Package	12NC	Details	Part number	12NC
CLRC663	HVQFN32	9352 973 32151	single tray*	CLEV663	9352 960 56699
		9352 973 32157	multiple tray*		
		9352 973 32118	tape on reel	CLEV663B	9352 978 15699
MFRC631	HVQFN32	9352 973 33151	single tray*	MFEV631B	9352 981 52699
		9352 973 33157	multiple tray*		
		9352 973 33118	tape on reel		
MFRC630	HVQFN32	9352 973 34151	single tray*	MFEV630B	9352 981 51699
		9352 973 34157	multiple tray*		
		9352 973 34118	tape on reel		
SLRC610	HVQFN32	9352 973 35151	single tray*	SLEV610B	9352 981 53699
		9352 973 35157	multiple tray*		
		9352 973 35118	tape on reel		

*without dry pack

For detailed ordering information please visit the NXP website (www.nxp.com), contact a local NXP distributor (www.nxp.com/support.html), or access the NXP distributor portal (<https://extranet.nxp.com>).

MIFARE pedigree

NXP MIFARE is the leading technology platform for contactless ticket, card, and reader solutions. With more than 50 million core reader components and over five billion cards and ticket ICs sold, MIFARE is a proven and reliable technology that represents the largest installed base worldwide.

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