LRI64

Memory TAG IC, 64-bit Unique ID with WORM User Area 13.56MHz, ISO 15693 Standard Compliant

DATA BRIEFING

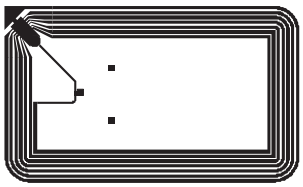
FEATURES SUMMARY

- ISO15693 Compliant
- 13.56 MHz ±7 kHz Carrier Frequency
- To the LRI64:

  10% ASK modulation using 1/4 pulse position coding (26 kbit/s)
- From the LRI64:

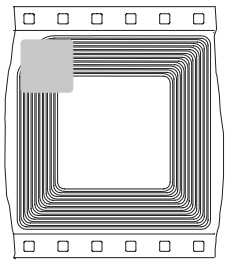
  Load modulation using Manchester coding with 423 kHz single subcarrier in fast data rate (26 kbit/s)
- Internal Tuning Capacitor
- 7 x 8 bits WORM User Area
- 64-bit Unique Identifier (UID)
- Kill Command
- READ block and WRITE block (8-bit blocks)
- 2 ms Programming Time (typical)
- More than 40 Year Data Retention

Figure 1. Delivery Forms

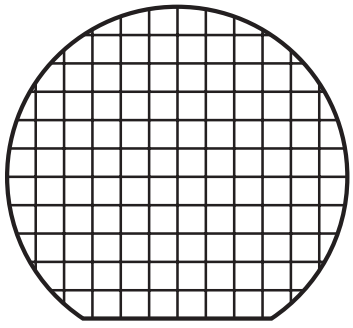


Antenna (A1)

Antenna (A6)



Antenna (C40)



Wafer

SUMMARY DESCRIPTION

The LRI64 is a contactless memory, powered by an externally transmitted radio wave. It contains a 120-bit non-volatile memory. The memory is organized as 15 blocks of 8 bits, of which 7 blocks are accessible as Write-Once Read-Many (WORM) memory.

The LRI64 is accessed using the 13.56MHz carrier. Incoming data are demodulated from the received Amplitude Shift Keying (ASK) modulation signal. The received ASK wave is 10% modulated. The Data transfer rate from the reader to the LRI64 is 26Kbit/s using the 1/4 pulse encoding mode.

Outgoing data are sent by the LRI64, generated by load variation using Manchester coding with a single sub-carrier frequency of 423kHz. The Data transfer rate from the LRI64 to the reader is 26Kbit/s in the fast data rate mode.

The LRI64 only supports the high data rate communication protocols of the ISO15693 recommendation. All other data rates and modulations are not supported by the LRI64.

Figure 2. Logic Diagram

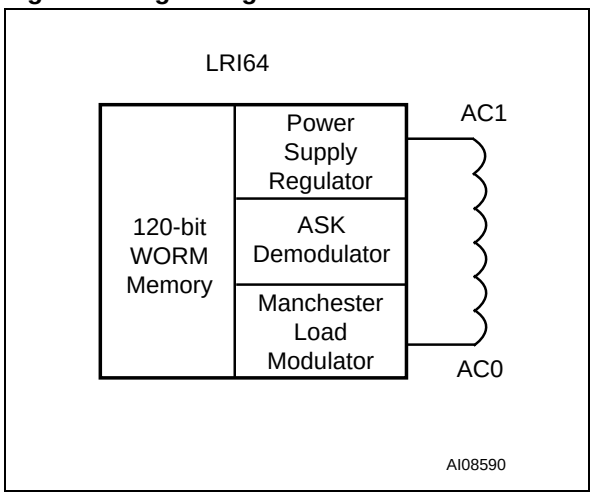


Table 1. Signal Names

AC1	Antenna Coil
AC0	Antenna Coil

Memory Mapping

The LRI64 is organised as 15 blocks of 8 bits as shown in Figure 3. Each block is automatically write-protected after the first valid write access.

Figure 3. LRI64 Memory Mapping

Block Addr	0 1 2 3 4 5 6 7
0	UID 0
1	UID 1
2	UID 2
3	UID 3
4	UID 4
5	UID 5
6	UID 6
7	UID 7
8	AFI (WORM)
9	DSFID (WORM)
10	WORM Area
11	WORM Area
12	WORM Area
13	WORM Area
14	WORM Area

The LRI64 uses the first 8 blocks (blocks 0 to 7) to store the 64-bit Unique Identifier (UID) which are writen by ST on the production line. Part of this UID can be accessed and written by customers, on special request. The UID is used during the anti-collision sequence (INVENTORY).

The LRI64 has an AFI register, in which to store the Application Family Identifier value, which is used during the anti-collision sequence.

The LRI64 has a DSFID register, in which to store the Data Storage Format Identifier value, which is provided in the LRI64 INVENTORY answer.

The 5 following blocks (blocks 10 to 14) are Write-Once Read-Many (WORM) memory. It is possible to write to each of them once. After the first valid write access, the block is automatically locked, and only read commands are authorized.

Commands

The LRI64 supports the following commands:

– ***INVENTORY***: used to perform the anti-collision sequence. The LRI64 answers to the INVENTORY command when all of the 64 bits of the UID have been correctly written.
– ***STAY QUIET:*** to put the LRI64 in quiet mode. In this mode, the LRI64 only responds to commands in addressed mode.
– ***READ BLOCK:*** to output the 8 bits of the selected block.
– ***WRITE BLOCK:*** to write the 8-bit value in the selected block, provided that it is not locked. This command can be issued only once to each block
– ***GET_SYSTEM_INFO:*** to allow the application system to identify the product. It gives the LRI64 memory size and IC reference (IC_ID).
– ***KILL:*** to put the LRI64 in Killed mode. After a valid KILL command, the LRI64 will no longer answer to any commands.

Initial Dialogue for Vicinity Cards

The dialogue between the Vicinity Coupling Device (VCD) and the Vicinity Integrated Circuit Card (LRI64) is conducted through the following consecutive operations:

– activation of the LRI64 by the RF operating field of the VCD.
– transmission of a command by the VCD.
– transmission of a response by the LRI64.

These operations use the RF power transfer and communication signal interface specified in the following paragraphs. This technique is called Reader Talk First (RTF).

PART NUMBERING

For a list of available options (speed, package, etc.) or for further information on any aspect of this device, please contact your nearest ST Sales Office, or send your enquiries to the following email address: *memories.contactless@st.com*

Table 2. Ordering Information Scheme

Example: LRI64 – W4 / XXX

Device Type

LRI64

Package

W4 =180 µm ± 15 µm Unsawn Wafer, 18.5 pF tuning capacitor
SBN18= 180µm ± 15 µm Bumped and Sawn Wafer on 8-inch Frame
A1T= 45mm x 76mm Copper Antenna on Continuous Tape
A1S= 45mm x 76mm Copper Singulated Adhesive Antenna on Tape
A6S= 35mm Copper Singulated Adhesive CD Antenna on Tape
C40= 28mm x 28mm Micromodule Antenna on Super 35mm tape

Customer Code

XXX = Given by STMicroelectronics

REVISION HISTORY

Table 3. Document Revision History

Date	Version	Revision Details
27-Aug-2003	1.0	First Issue