AN1010
APPLICATION NOTE

Moving from Using the ST1305 to Using the ST1335 In Your Application

The evolution of the application, from one that uses the ST1305 to one that uses the ST1335, is a relatively straightforward process. This document highlights the issues, and shows how the ST1335 is fully compatible with the ST1305 if the fields have been used in the conventional manner. First, the principle features of the two devices are compared, as follows:

ST1305	ST1335
■ Single 5 V Supply Voltage	■ Single 5 V Supply Voltage
■ Programming Time: 5 ms	■ Programming Time: 5 ms
■ Memory Divided Into:	■ Memory Divided Into:
– 16 bits of Circuit Identification	– 16 bits of Circuit Identification
– 48 bits of Card Identification	– 48 bits of Card Identification
– **48 bits** of Count Data	– **40 bits** of Count Data
– 16 bits of Certificate	– 16 bits of Certificate
– 64 bits of **Issuer Data**	– 64 bits of **Authentication Secret Key**
	– **32 bits of Anti-tearing Flags**
	– **56 bits of User Data**
■ Counting Capability up to **262,144**	■ Counting Capability up to **32,767**
■ Certificate for card validation	■ Certificate for card validation
	■ **Advanced Authentication Function**
	■ **Special Anti-tearing Mechanism**
■ 5 External Contacts Only (ISO 7816 Compatible)	■ 5 External Contacts Only (ISO 7816 Compatible)
■ Answer to Reset (Compatible with ISO 7816-3)	■ Answer to Reset (Compatible with ISO 7816-3)
■ E.S.D. Protection Greater than 4000 V	■ E.S.D. Protection Greater than 4000 V
■ Power-On and Low V_{CC} Reset	■ Power-On and Low V_{CC} Reset
■ 10 Year Data Retention	■ 10 Year Data Retention
■ 1 Million Erase/Write Cycle Endurance	■ 1 Million Erase/Write Cycle Endurance

Figure 1. Logic Diagram
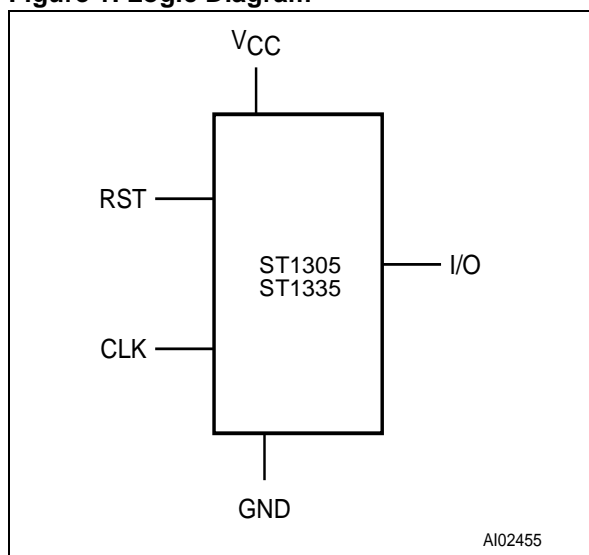
Table 1. Signal Names

CLK	Clock
RST	Reset
I/O	Data Input / Output
V_{CC}	Supply Voltage
GND	Ground

COMMANDS

The ST1335 and the ST1305 devices both recognize the following commands, issued on the RST and CLK pins:

– RESET: to reset the internal address register to 00d
– READ: to increment the internal address register, and to read the data bit at that address
– PROG: to program the bit at the current address

For a full description of these commands, please refer to the *ST1335* and *ST1305* data-sheets.

DIFFERENCES VISIBLE TO THE APPLICATION

As shown in Figure 2, the ST1335 and the ST1305 differ only in the following areas:

– One counter at location 104d on the ST1305 is not available on the ST1335
– The Issuer Data area is not readable in the ST1335, as it holds the authentication secret key

If the ISSUER data is to be used by the end-user, it should be noted that it is located at address 128d on the ST1305, and has been moved to location 320d on the ST1335.

Even if the application currently does not use the Authentication mechanism, it is recommended that a Unique Secret Key be written to location 128d of the ST1335, to anticipate future usage of active authentication.
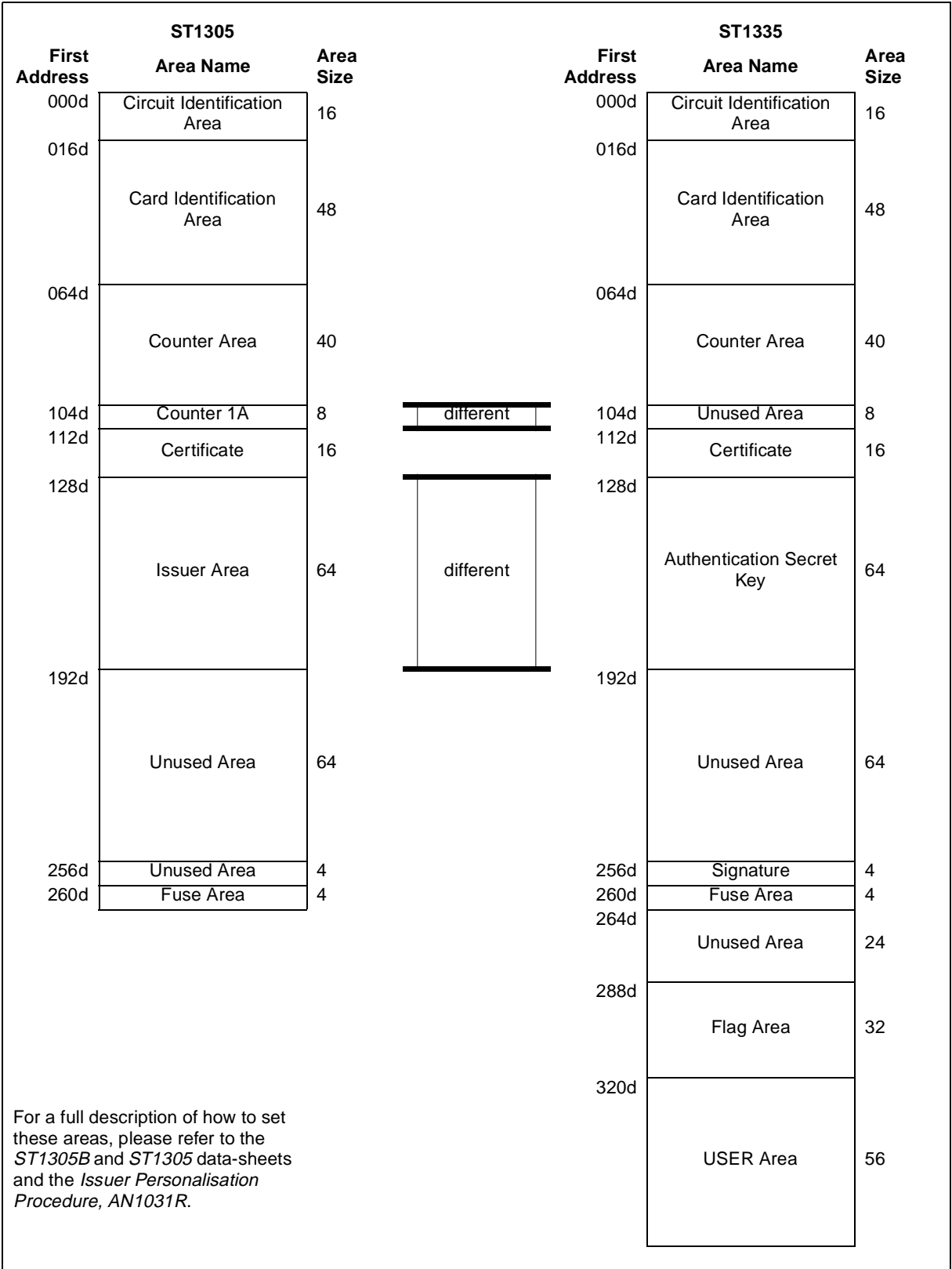
ANTI-TEARING

The usage of the new anti-tearing area, on the ST1335, is only dependent on the terminal software.

ANTI-CLONE

To make use of active authentication, the terminal software has to be upgraded with a security module (SAM). This is why a secret key has to be written in the ST1335 device during the personalization. In order to secure this value, it is recommended that the secret key be defined using a mathematical function of the following form:

$$\text{Secret Key} = F \text{ (ID area, Master Key)}$$

Figure 2. Comparison of the Memory Maps in the USER Configuration

	ST1305				ST1335	
First Address	**Area Name**	**Area Size**		**First Address**	**Area Name**	**Area Size**
000d	Circuit Identification Area	16		000d	Circuit Identification Area	16
016d	Card Identification Area	48		016d	Card Identification Area	48
064d	Counter Area	40		064d	Counter Area	40
104d	Counter 1A	8	different	104d	Unused Area	8
112d	Certificate	16		112d	Certificate	16
128d	Issuer Area	64	different	128d	Authentication Secret Key	64
192d	Unused Area	64		192d	Unused Area	64
256d	Unused Area	4		256d	Signature	4
260d	Fuse Area	4		260d	Fuse Area	4
				264d	Unused Area	24
				288d	Flag Area	32
				320d	USER Area	56

For a full description of how to set these areas, please refer to the *ST1305B* and *ST1305* data-sheets and the *Issuer Personalisation Procedure, AN1031R.*

If you have any questions or suggestions concerning the matters raised in this document, please send them to the following electronic mail addresses:

apps.memcard@st.com   (for application support)

ask.memory@st.com   (for general enquiries)

Please remember to include your name, company, location, telephone number and fax number.