

## 16-pin smartcard interfaces ST8034T, ST8034AT demonstration boards

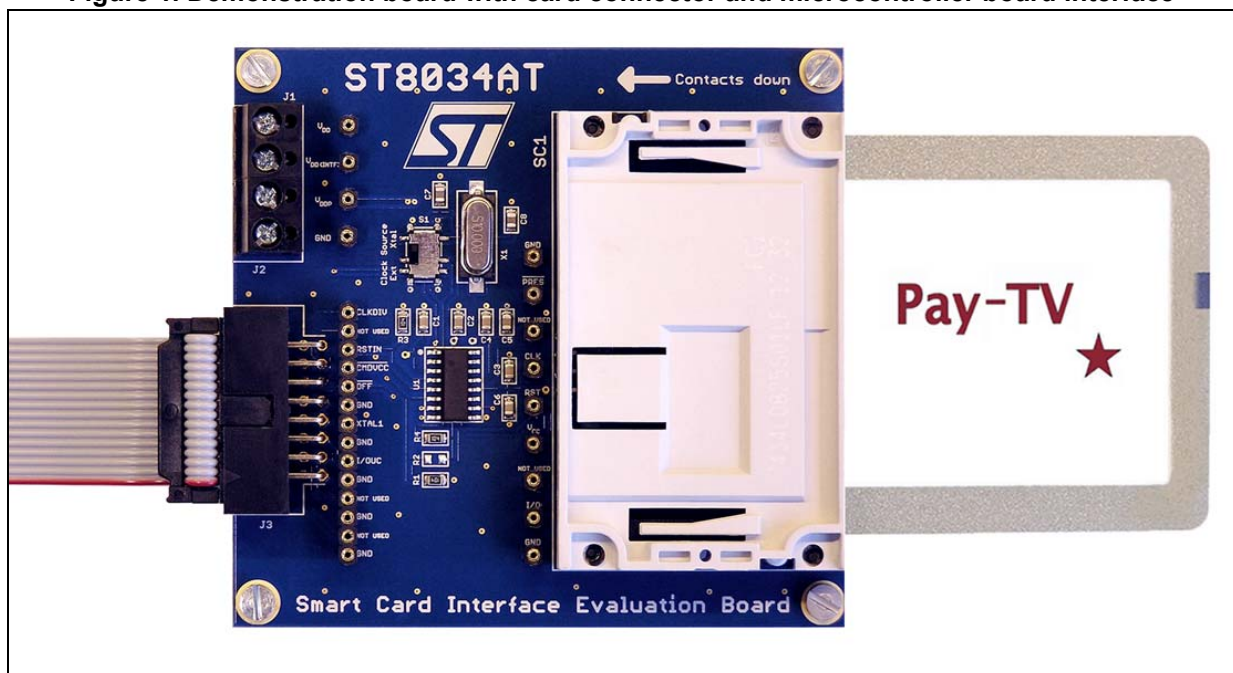
### Introduction

The purpose of this document is to describe, and provide information on, how to efficiently use the ST8034T and ST8034AT smartcard interface demonstration boards.

The ST8034xx is a family of complete smartcard interface devices, compatible with ISO 7816, NDS and EMV™ 4.3 payment systems that provide selectable supply voltage for the smartcard with automatic deactivation sequence in case of overload, short-circuit or undervoltage, with programmable internal or external clock signal, reset signal and protected I/O data lines. The ST8034HC and ST8034C product variants also provide a chip select function that allows the device interface to be isolated from the microcontroller bus signals and to share the bus among multiple card interface devices in a parallel combination.

In summary, ST8034xx interface devices are placed between the smartcard and the microcontroller to provide all supply, protection, detection and control functions, with just minimum external components.

**Figure 1. Demonstration board with card connector and microcontroller board interface**



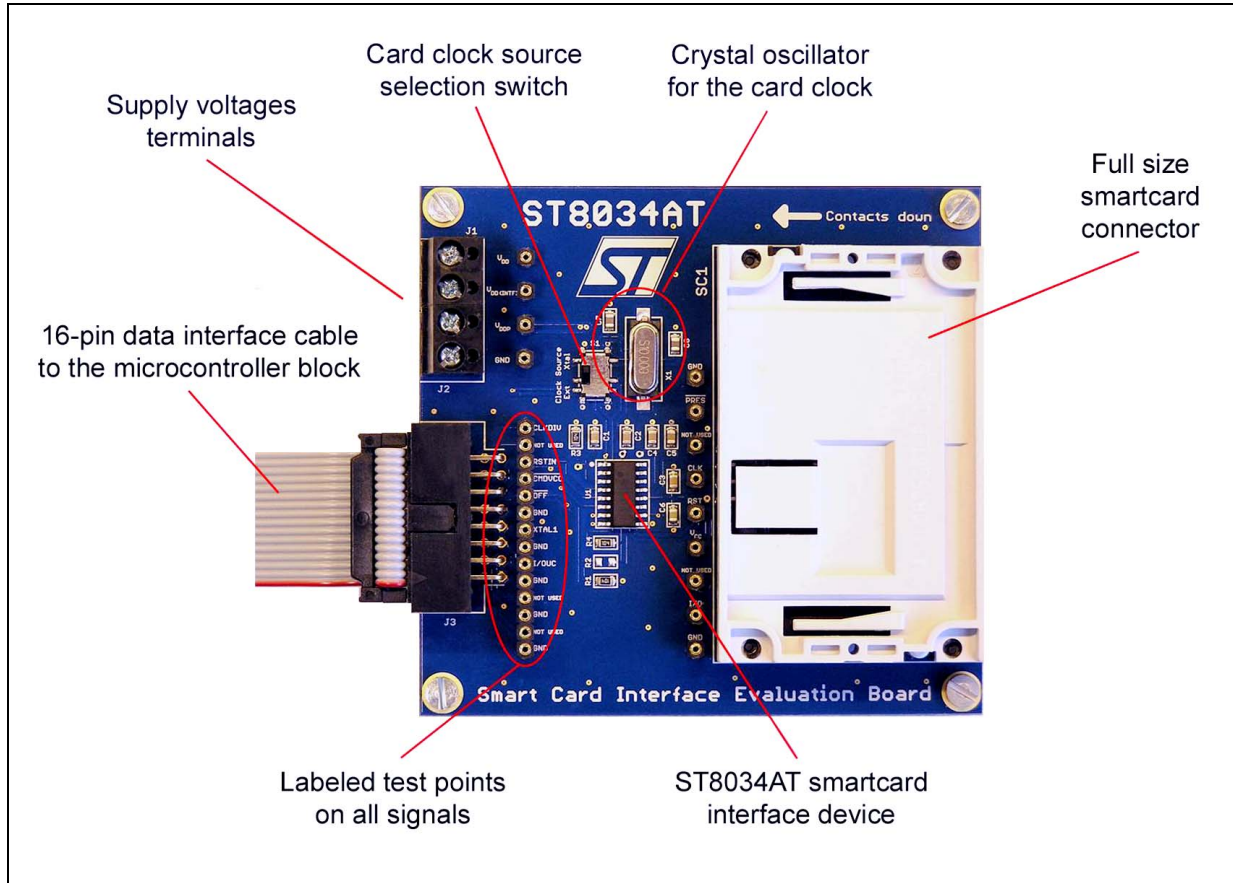
# 1 Applications

Smartcard readers for

- Set-top boxes
- Pay-TV
- Identification
- Tachographs
- Banking

## 2 Description

Figure 2. Demonstration board description



### 2.1 Use of the demonstration board

The ST8034T/AT demonstration board is designed both for standalone operation or to be fully controlled by the microcontroller; it is fully configurable and provides access to all the signals including supply voltages through labeled test points and uses a standard connector for a simple communication interface with the microcontroller block. The labeled test points on the board are in the same order as the signals in the flat interface cable.

For an easy connection of oscilloscope probes to the test points, remove the plastic tip with the hook from the probes and insert the center pin into the test point terminal. Ground test points are available in a sufficient amount throughout the board.

The following blocks provide the demonstration board configurability:

- Crystal clock oscillator (10 MHz): can be used to provide card clock in a standalone operation.
- Card clock source selection switch: allows selection between the onboard crystal oscillator as the card clock source (clock source switch position “Xtal”), or an external clock source provided by the microcontroller block through the MCU interface together with the data signals (clock source switch position “Ext”).

## 2.2 Difference between ST8034T and ST8034AT demonstration boards

The ST8034T and ST8034AT demonstration boards are identical, the only difference is control of external clock frequency divider, i.e. the response to setting on the CLKDIV input pin, see [Table 1](#).

Table 1. ST8034T and ST8034AT clock frequency selection

| CLKDIV pin level | CLK frequency |              |
|------------------|---------------|--------------|
|                  | ST8034T       | ST8034AT     |
| High             | $f_{XTAL}/2$  | $f_{XTAL}/2$ |
| Low              | $f_{XTAL}/4$  | $f_{XTAL}$   |

## 2.3 Smartcard interface

The demonstration board contains a full size smartcard connector. Insert the smartcard from the right-hand side, card contacts facing down. Card presence detection is implemented (a presence switch inside the card connector, normally open).

## 2.4 Interface to a microcontroller block

A standard 16-pin header connector with a standard cable is used to interconnect the ST8034T/AT demonstration board module with a microcontroller block. The voltage level for communication on this interface is  $V_{DD(INTF)}$ .

## 2.5 Default functionality

No floating pins: for simple standalone testing, all the input signal levels are softly defined by pull-up or pull-down resistors on the board, refer to [Figure 4: Schematic diagram](#).

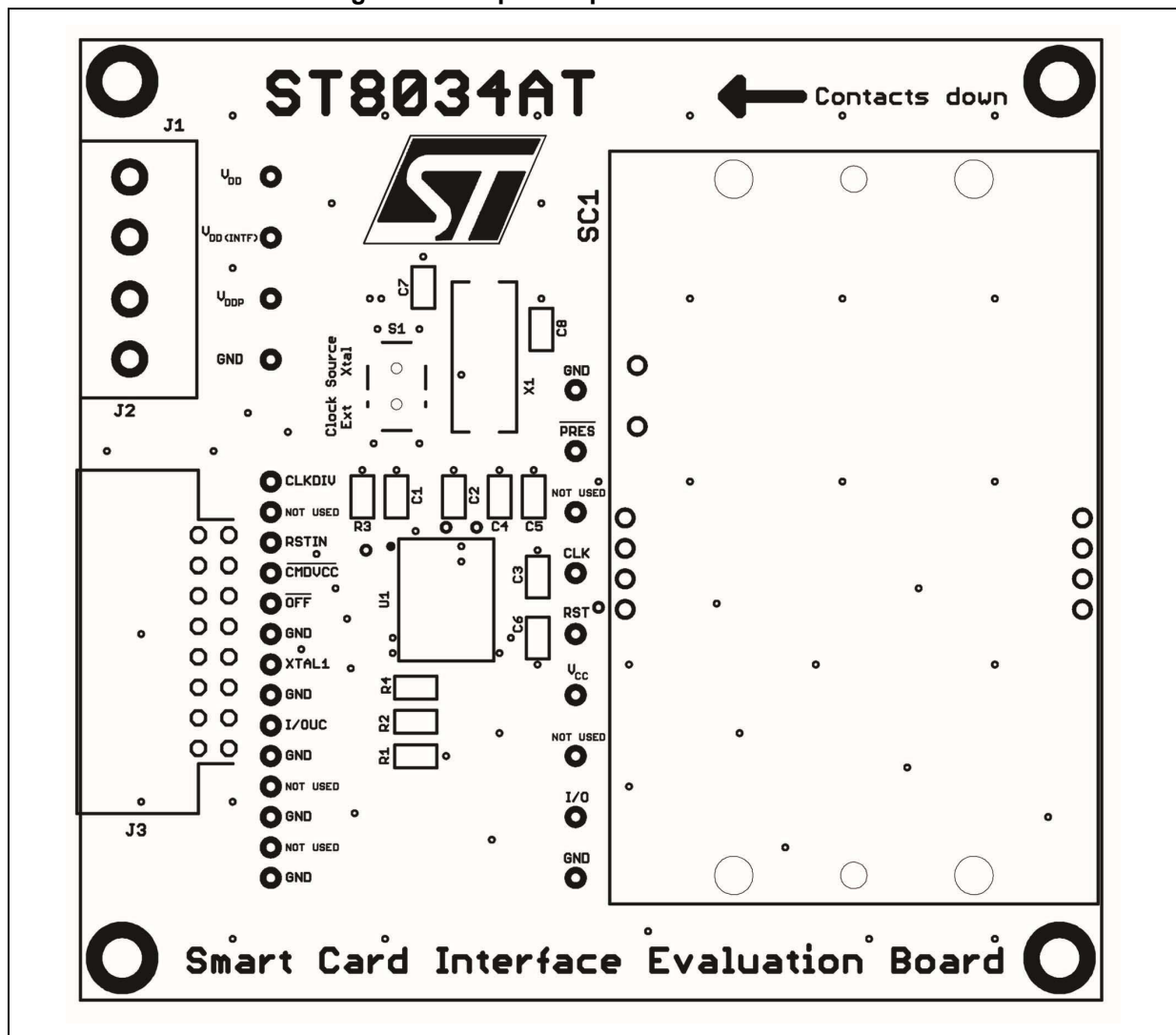
### 3 Board layout

#### 3.1 Layout recommendations

The ST8034xx family of devices includes an LDO block to generate  $V_{CC}$  supply voltage for the smartcard, which (in contrast to previous ST8024/8024L devices with a charge pump) does not generate any noise and therefore even the requirements for a printed circuit board layout and external component selection are not so strict (general PCB layout rules apply). On the other hand, the LDO requires the input voltage ( $V_{DDP}$ ) to be at least about 100 mV greater than the desired output voltage ( $V_{CC}$ ). Place the decoupling capacitors as close as possible to the appropriate pin of the ST8034 device and use sufficiently wide PCB tracks. Make the data and clock lines as short as possible and use a ground plane.

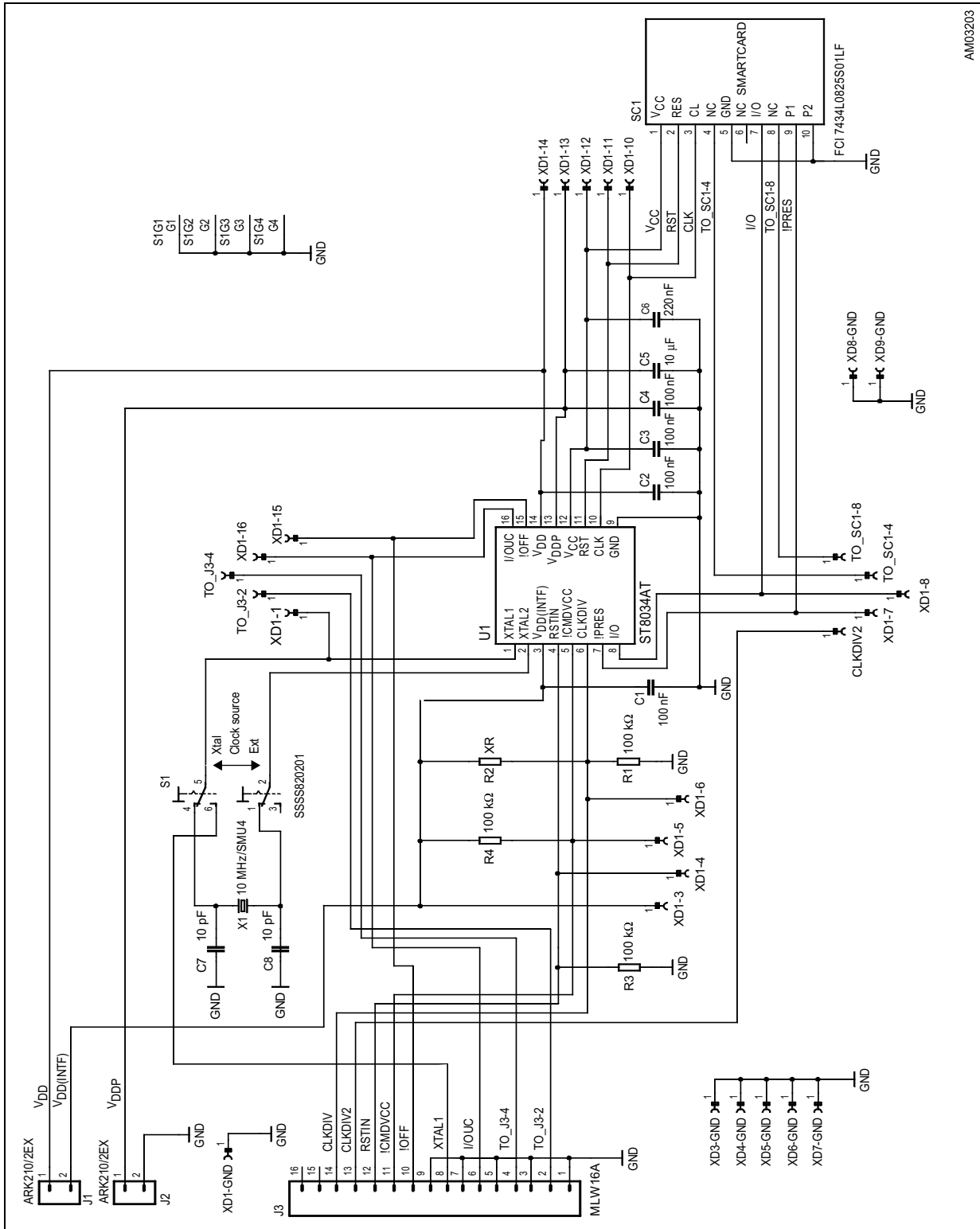
#### 3.2 Component placement

Figure 3. Component placement on the PCB



# 4 Schematic diagram

Figure 4. Schematic diagram



AM03203



## 5 Bill of material

**Table 2. Bill of material**

| Component        | Value                      | Type                    | Manufacturer        | Note                           |
|------------------|----------------------------|-------------------------|---------------------|--------------------------------|
| U1               | Smartcard interface device | ST8034TDT or ST8034ATDT | STMicroelectronics® | SO16 3.9 x 9.9 mm body package |
| SC1              | Smartcard connector        | 7434L0825S01LF          | FCI                 |                                |
| J1               | Power supply terminal      | ARK210/2EX              | Xinya               |                                |
| J2               | Power supply terminal      | ARK210/2EX              | Xinya               |                                |
| J3               | Header connector           | T821116A1R100CEU        | Amphenol            |                                |
| S1               | Clock switch               | SSSS820201              | ALPS                |                                |
| X1               | 10 MHz                     | Q 10.0-SMU4-30-30       | Jauch               |                                |
| R1               | 100 kΩ                     | 0805                    |                     | Not populated                  |
| R2               | 100 kΩ                     | 0805                    |                     |                                |
| R3               | 100 kΩ                     | 0805                    |                     |                                |
| R4               | 100 kΩ                     | 0805                    |                     |                                |
| C1               | 100 nF                     | 0805                    |                     |                                |
| C2               | 100 nF                     | 0805                    |                     |                                |
| C3               | 100 nF                     | 0805                    |                     |                                |
| C4               | 100 nF                     | 0805                    |                     |                                |
| C5               | 10 μF                      | 0805                    |                     |                                |
| C6               | 220 nF                     | 0805                    |                     |                                |
| C7               | 10 pF                      | 0805                    |                     |                                |
| C8               | 10 pF                      | 0805                    |                     |                                |
| Cable connectors | 2 x 8 pin / 16-lead        | T812116A101CEU          | Amphenol            |                                |
| Cable            | 16-lead                    | 1-57040-6               | TE Connectivity     |                                |

## 6 Revision history

**Table 3. Document revision history**

| Date        | Revision | Changes          |
|-------------|----------|------------------|
| 03-Jun-2013 | 1        | Initial release. |



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