D3, D4
MICROMODULES

Smartcard MCU Modules
General Information on D3 and D4 Packages

DATA BRIEFING

The manufacturing process of Smartcards involves various components and technologies in order to issue a finished product:

– a plastic card into which a cavity is made for micromodule embedding.

– a micromodule, the specific package of the die.

■ THE PLASTIC CARD

Usually a plastic card is made of PVC, ABS, or other materials having equal or better performance. Some characters can be embossed on it and/or a magnetic strip added. A card becomes a Smartcard once a silicon chip is added to it. For that purpose, a cavity is made into the card in order to embed the electronic micromodule.

Physical dimensions, contacts assignments of STMicroelectronics micromodules are in full compliance with ISO 7816 and EMV standards.

■ THE MICROMODULE

The micromodule is the specific package dedicated to Smartcards, allowing:

– electrical connections with the interface device via the contacts on one side.

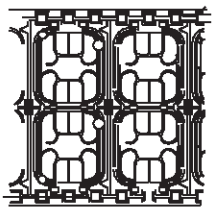
– interface area with the card body on the other side, suitable to the embedding process.

The micromodule is constituted of the silicon chip, the interconnection layer on which the die is assembled and wired, and electrical contacts.

■ THE SILICON CHIP

The chips used in Smartcards vary in form and function. From the lower cost memory chips for prepaid applications, memories integrating advanced authentication functions and anti tearing for second generation telephone applications, up to the high end chips using a CPU core, RAM, ROM and EEPROM memories up to 34 KBytes, and chips integrating a dedicated co-processor for Public Key Cryptography schemes, ST offers its whole portfolio of Smartcards IC's in micromodule.

ST MICROMODULE EXAMPLE



ST currently provides Smartcard ICs in micromodule form in super 35mm tape (which differs from 35 mm tape in terms of distance between the indexing holes on the tap).

Table 1 Portfolio in super 35mm standard tape

PRODUCT	MODULE
ST16600	D3
ST16601	D3
ST16SF41	D3
ST16SF42	D3
ST16SF44	D4
ST16SF48	D4
ST16SF4F	D4
ST16CF54 Lev B	D4
ST16ST2G	D4
ST19CF68	D4
ST19SFxx	D4
ST19KF16	D4

Continuously striving to improve the reliability of its products, ST added to its 3rd generation of Microcontrollers an ISSUER configuration, which allows fast and efficient test after assembly. Capitalising on the experience on quality and reliability results obtained with Non-Volatile memories technologies, and aware that the process of assembly may impact the reliability level of the EEPROM cells, ST enables Card Issuers to test cards at the last step of manufacturing. In addition, the level of security is increased, by submitting the ISSUER configuration to the successful presentation of a transport key.

■ THE INTERCONNECTION LAYER

It has several purposes:

– To ensure the chip assembly

– To provide the electrical contacts

– To be the embedding interface (to be glued in the card).

It is made of:

– Metallised epoxy tape.

– Contacts side, which is made to be in full conformity to ISO 7816 and EMV standards.

The main steps to make micromodules are assembly and test. ST's policy, for security and know how reasons, is to keep test operations in the ST Smartcard Manufacturing site.

SECURITY PROCEDURES

The transport of wafers or assembled micromodules between the ST Smartcard manufacturing site and the assembly plants is carried out in special reinforced vehicles. These plants (assembly and test) apply "restricted access" rules in regards to physical access and production information. A controlled storage area is designated for the assembly and test activities.

Micromodules are assembled in reels, which contain all the dice of the wafer assembled. The traceability is ensured by a label glued on the reel which contains various information.