

# SCHEDDELEAKS

Tutto ciò che avreste voluto sapere sulle schede telefoniche

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## 1 - Magnetic stripe technologies

### 2 - URMET

# ***TabsLeaks***

Everything you ever wanted to know about calling cards

## **1 - Magnetic stripe technologies**

### **1.2 - URMET**

Thanks to the success of prepaid telephony, the defects of SIDA technology began to limit the spread of the prepaid system mainly due to the costly management of public telephones.

For this reason, at the beginning of the 1980s, SIP launched a tender between various companies specialized in the sector, in order to award the contract for the creation of a new standard that exceeded the limits shown by SIDA technology.

The evaluation of the effectiveness of the technologies proposed at SIP was based on the comparison of a series of characteristics, shown below:

- read-only system: for a phone to be safe, it must allow the card to be read only, without registering a code and / or credit;
- static reading: to be reliable and inexpensive, the reading must be performed with a static system (without kinematics);
- card difficult to forge: a pay-as-you-go telephony system can be considered "safe" when the cost of forgery is such that the operation is not attractive and when fraud is extremely difficult;
- economic card;
- card not sensitive to external fields: the card must not be sensitive to external electric or magnetic fields;
- card sensitive to dirt and dust; credit card;
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- credit capacity: the card must allow a credit content greater than 200 units.

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In addition to SIDA, which presented small changes to the system already in use, the following companies participated in the tender:

- **Landis & Gyr:** holographic card system;

On the side (Figure 1) there is an example of the prototypes proposed in Italy by the Swiss company L&G.

In the same years, similar prototypes were proposed by the Swiss company in numerous other countries. Such cards

they differ according to the control number on the back.

They exist both with vertical insertion and with horizontal insertion and are currently very rare.

Among the main reasons for its setting aside are the high cost, poor safety and high maintenance of the devices equipped with an easily worn head.

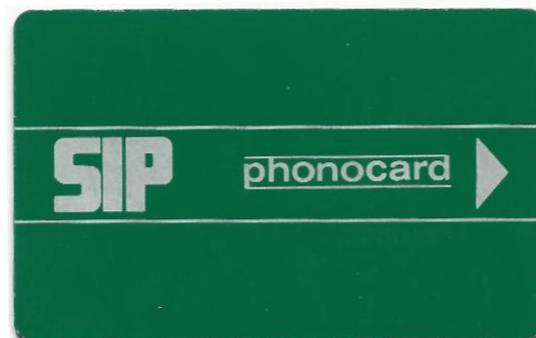


Figure 1 - L&G prototype

- **SGS - ATEs:** electronic card system;

The Italian company, born from the collaboration of the General Semiconductors Company SGS SpA and ATEs - Imprese Tecniche Elettroniche del Sud SpA, proposed several rigid plastic cards in the values of 5000 and 10000 Lire (Figure 2).

Among the main disadvantages of the technology are its high cost, fragility and sensitivity to dust and dirt.



Figure 2 - SGS-ATES prototype

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These cards used a 17x8 bits EPROM as a card.

Figure 3 shows a photograph of the technology contained within the rare blue cards, known to most people by the abbreviation "ATES".

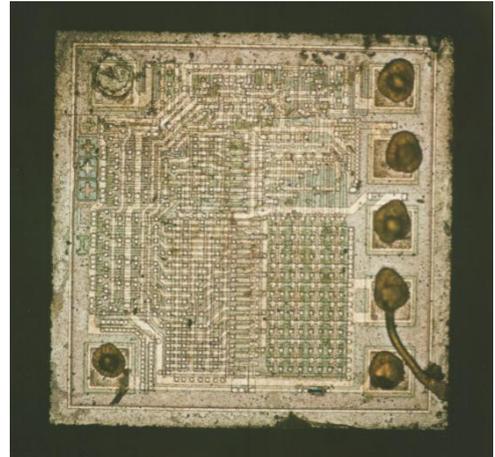


Figure 3 - EPROM memory

- **EMIDATA:** magnetic card system;

The British company EMIDATA also participated in the competition, presenting the so-called "Watermark Magnetics" technology, or "magnetic watermark". At the end of the 1980s, the English company was already established in various sectors, always concerning the security of information storage in the form of magnetic watermarks.

Below we present some images taken from an advertising brochure published in October 1977, which contains the explanation of the technology used.

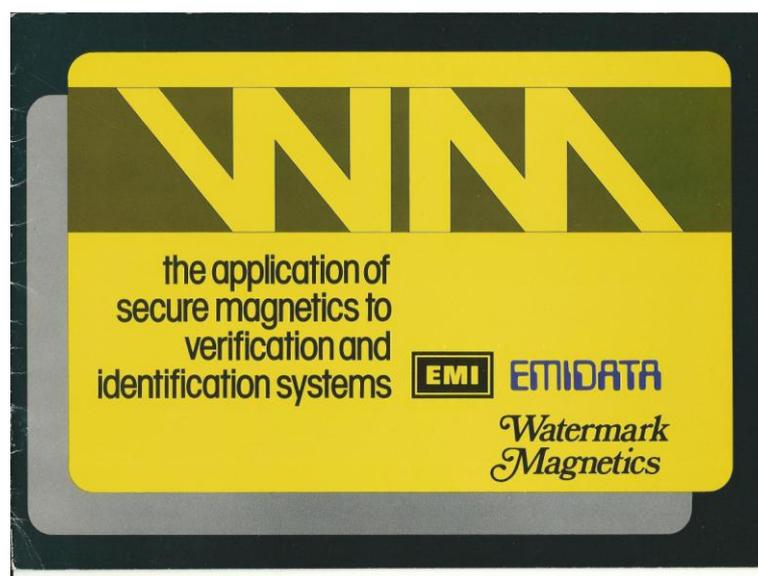


Figure 4 - EMIDATA brochure - Cover

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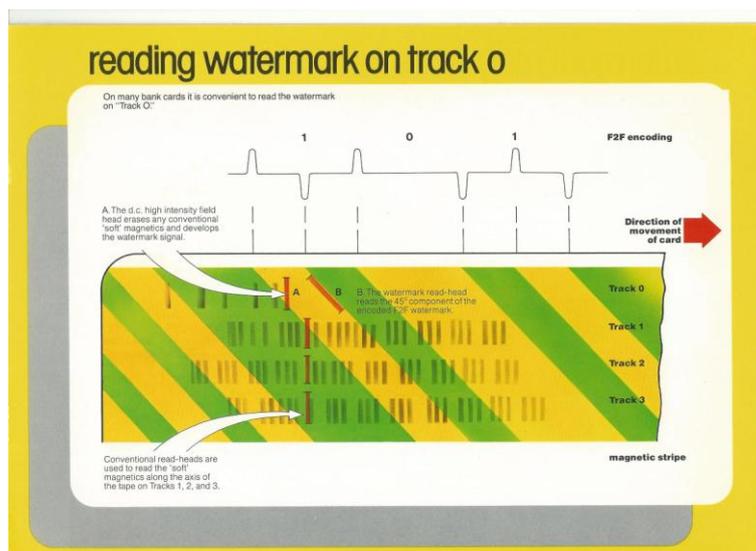


Figure 5 - EMIDATA brochure - Technology description

The technology, presented during the competition by the Mantegazza company, was patented and therefore cannot be built in Italy.



Figure 6 - EMIDATA prototype

In addition, the reader was equipped with kinematics that made the system less reliable.

Figure 6 shows one of the prototypes proposed during the 1980 tender.

- **IPM: magnetic system;**

The IPM (Industry Polytechnic Meridionale), an Italian company based in Arzano (Na) for several years already collaborated with SIP, thanks to production of tokens telephone and public telephone equipment. In 1980 and for



several years to follow, the IPM Figure 7 - IPM prototype. Note the presence of 3 rows of magnetic "dots".

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proposed numerous SIP prototypes, both with magnetic technology (with two different technologies, magnetic stripe and dot) and chip.



Figure 8 - IPM prototype with magnetic stripe and dots

Throughout the 1990s, the experiments of the IPM company continued, in collaboration with the subsidiary InCard of Marcianise (Ce). Figure 9 shows one of the very first prototypes for internal use by the InCard company.

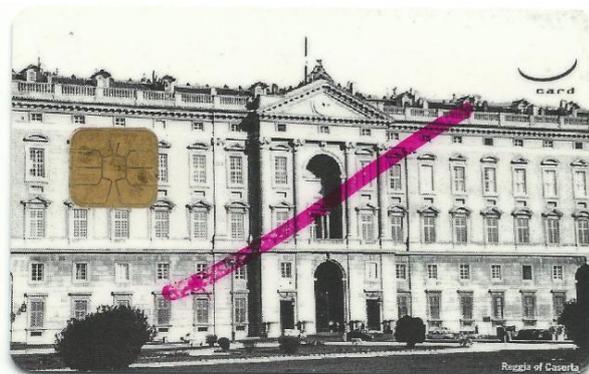


Figure 9 - InCard prototype

- **GCP:** magnetic card system, represented by Urmet;

The CGA (Compagnie Generale d'Automatisation), a French company represented by Urmet, also took part in the 1980 tender.

It was the latter that won the contract for the manufacture and magnetization of Italian telephone cards

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until today. In the following pages we will go into the details of the technology adopted by Urmet.

- **SIDA**: magnetic system, new type.

SIDA also participated in the tender by presenting a new technology. Figure 10 shows a prototype proposed at the beginning of the 1980s.

While not winning the tender, this technology provided an interesting starting point for SIP, in order to make the residual credit control much safer and more reliable: for the first time in fact a communication system was proposed between the card reader (and the

card itself, then) and a centralized accounting system in order to identify

the cards used "beyond the spending limit" in relation to the processing of all the data received by the Center from the entire network.



Figure 10 - SIDA prototype  
new system

As mentioned, it was the Urmet company of Turin that presented the most convincing proposal, establishing itself over all the other competitors and thus writing the history of Italian telephone cards (and not only) just as we know it today.

As in the SIDA technology, also in the Urmet technology a very low cost plasticized support is used, on which is applied a strip of material capable of maintaining the coded information in the form of magnetism.

The substantial difference between the technology adopted by SIDA (old system) and that proposed by Urmet lies in the data storage system in the form of magnetic information.

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In the cards that use the old SIDA system, only one value is recorded: the remaining credit of the card.

As already represented in chapter 1.1, the arrangement of the "notches" inside the magnetic strip determines the residual credit according to a standard defined by the manufacturer. The position of the notches is updated while the card is being used to record the new remaining credit.

Since the credit is established by the combination of the notches, having the coding table available it is possible to trace the residual credit using even a simple magnetism detector, such as metal powder or the Arnold reader.

In the new system adopted by URMET, on the other hand, the data is stored in digital form, just like in normal modern magnetic cards (badges, credit cards, etc.) and is translated into a sort of magnetic "Morse" code. The storage system differs from the standard ones used by other magnetic cards (badges, credit cards, etc.) and is unique in its kind.

Within the magnetic stripe of a URMET card, much smaller than that of SIDA cards, in addition to the residual credit, much more data is recorded such as the serial number of the card, a control code and others, even the famous "codes".

Unlike the SIDA coding, this time the simple metal powder or the magnetic reader cannot give quantitative evidence of the magnetism but only qualitative: it is possible to understand if the card is new or used or partially used, but it is not possible to precisely define the actual remaining credit. In the same way, it is not possible to extrapolate the other information (eg the "codes") recorded in the card. To extract all the data it is necessary to use an electronic reader capable of translating the Urmnet encoding from magnetism to numbers.

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From the beginning until today we can group the various types of cards issued:

- **Urmet white:** the first cards produced on behalf of SIP, are found in denominations of 3,000 Lire, 6,000 Lire, 10,000 Lire and 20,000 Lire. There is also the 5,000 Lire denomination, but it is most likely a prototype, in view of the mass production associated with the so-called "red Urmet".

Magnetic stripe characteristics: magnetic stripe 6 mm high, extending over the entire length of the card and structure of the magnetism on a line as shown in Figure 11.

- **Urmet red:** red in color, they are available in sizes of 5,000 Lire and 10,000 Lire. The magnetic strip is the same as the white Urmet;



Figure 11- Urmet white and red magnetism

It is important to remember that all the cards of the white and red series arrived in Urmet as basic cards, without any indication of the value and without a serial number, which were then impressed together with the magnetization. The importance of this consideration at a collector's level will be seen in the chapter dedicated to the internal codes of these cards.

- **SIP figured:** from now on one side of the card is used for promotional purposes, the available formats are: 10 shots, 1,000 Lire, 2,000 Lire, 5,000 Lire, 10,000 Lire, 15,000 Lire.

Magnetic stripe characteristics: magnetic stripe 10 mm high, extending over the entire length of the card and structure of the magnetism on two lines of the type shown in Figure 12.

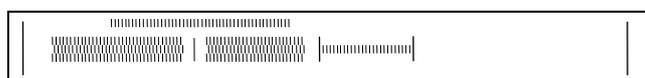


Figure 12 - SIP magnetism figured

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- **Telecom figured:** in this phase the migration from SIP to Telecom takes place and there is an important modification of the magnetic stripe.

Magnetic band characteristics: short band, 8 mm high, applied over the previous 10 mm high band and extended over the entire length of the card (Figure 13).



Figure 13 - Telecom magnetism figured

This band arises from the need to limit the now common frauds against SIP (and then Telecom) due to a now obsolete and easily circumvented magnetic medium. The structure of magnetism goes back to being on a single line, but of reduced length compared to the previous ones.

In the period 1994/95 some alternative solutions were also tested in Urmel with respect to those adopted until then: in particular mechanical obliteration tests were carried out, using a mechanical punch capable of leaving an incision on the magnetic strip (Figure 14).



Figure 14 - Mechanical obliteration tests

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Certainly this solution was adopted in some public telephones in the cities of Milan and Rome. In fact, some cards from the transition period between SIP and Telecom are found with a clear incision in the area of the magnetic track of the credit (Figure 15 and Figure 16).



Figure 15 - Mechanical obliteration - Form used



Figure 16 - Mechanical obliteration -  
Magnetic stripe detail

- **Telecom figured double-sided in Lire:** the other side of the card is also used for advertising. The facial values are the same as in the previous period, except for the 10 Shot format which is no longer used.

Magnetic stripe characteristics: short magnetic strip of variable length according to the face value of the card.

- **Telecom figured double-sided in Euro:** formats go to € 0.50, € 1.00, € 2.50, € 3.00, € 5.00, € 7.50. The magnetic strip maintains the characteristics of the previous period.

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