

**THERMAL and  
THERMAL TRANSFER  
LABEL PRINTERS**

**PROGRAMMING  
MANUAL  
RFID**



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## CONTROL COMMANDS RFID

This section describes control commands for the Smart labels and RFID transponders reading/writing device available for same Italora printers.

### MEANING OF IDENTIFIERS

|                 |                                                   |
|-----------------|---------------------------------------------------|
| <b>AFI</b>      | Application family identifier (ISO15693-3)        |
| <b>DSFID</b>    | Data storage format identifier                    |
| <b>UID</b>      | Unique identifier of the transponder (ISO15693-3) |
| <b>MEM-SIZE</b> | Memory size of the transponder (ISO15693-3)       |
| <b>IC-REF</b>   | Defined by transponder manufacturer               |

### TR-TYPE, transponder type

| Hex value | Description          |
|-----------|----------------------|
| '01'      | Philips I-Code1      |
| '02'      | Texas Transponder It |
| '03'      | ISO Transponder      |

### STATUS

| Hex value | Description                                             |
|-----------|---------------------------------------------------------|
| '00'      | Data / parameters have been read or stored failure-free |
| '01'      | No Transponder:                                         |
| '03'      | Write-Error                                             |
| '04'      | Address-Error                                           |
| '05'      | Wrong transponder-type                                  |
| '06'      | Read-Error                                              |
| '07'      | Select-Error                                            |
| '83'      | RF communication error:                                 |
| '95'      | ISO-Error                                               |

**ISO-ERROR, (ISO transponder errors)**

| Hex value | Description                                                                |
|-----------|----------------------------------------------------------------------------|
| '01'      | The command is not supported, i.e. the request code is not recognised.     |
| '02'      | The command is not recognised, for example: a format error occurred.       |
| '03'      | The command option is not supported.                                       |
| '0F'      | Error with no information given or a specific error code is not supported. |
| '10'      | The specified block is not available (doesn't exist).                      |
| '11'      | The specified block is already locked and thus cannot be locked again.     |
| '12'      | The specified block is locked and its content cannot be changed.           |
| '13'      | The specified block was not successfully programmed.                       |
| '14'      | The specified block was not successfully locked.                           |

## VERSION OF RFID CONTROLLER

This command permits to question the printer about the version of embedded RFID controller. Data transmission/reception is done via serial port, enabling the option “RFID data response” by RFID controller (command ?R1&2,0).

Syntax is:

**?R0&1**

Answer received has following structure

| Byte n.  | 1          | 2..3             | 4     | 5                   | 6               | 7 | 8                     | 9..10      |
|----------|------------|------------------|-------|---------------------|-----------------|---|-----------------------|------------|
| Meaning  | STATUS     | SW-REV           | D-REV | HW-TYPE             | RD-TYPE         | - | TR-TYPE               | Terminator |
| Contents | Error Code | Firmware Version | 0     | Hardware Identifier | Controller Type | - | Supported Transponder | CR LF      |

**Example: ?R1&2,1  
?R0&1**

### **PRINTING RFID DATA**

This command permits to print a label with data of the transponder placed under antenna at the moment of command execution.

Syntax is:

**?R0&6**

**Example: ?R0&6**

### **RFID DATA RESPONSE (VIA PRINTER SERIAL PORT)**

This command enables the transmission option (via printer serial port) of all data of operations made by RFID controller.

Syntax is:

**?R1&2,V**

“V” parameter has following meaning:

|          |                             |
|----------|-----------------------------|
| <b>0</b> | response disabled (default) |
| <b>1</b> | response enabled            |

**Example: ?R1&2,1**  
**?R0&1**

This way to get (via printer serial port) the version of RFID controller

## ISO15693 COMMANDS

All commands ?R2&.. are in conformity with standard commands of ISO15693 specification.

### INVENTORY – ISO15693 COMMAND

This command permits to get typical data of the transponder placed under antenna at the moment of command execution.

Data read by RFID controller are transmitted via printer serial port if option “RFID data response” is enabled (command ?R1&2,1)

Syntax is:

**?R2&1,0**

Response has following structure:

If STATUS = 0x0

| Byte n.  | 1      | 2         | 3          | 4     | 5..12 | 13..14     |
|----------|--------|-----------|------------|-------|-------|------------|
| Meaning  | STATUS | DATA-SETS | TR-TYPE    | DSFID | UID   | Terminator |
| Contents | 0x00   | 0x01      | ISO = 0x03 |       |       | CR LF      |

## LOCK MULTIPLE BLOCKS – ISO15693 COMMAND

This command locks one or more data blocks in transponder user memory. This command acts on the transponder placed under antenna at the moment of command execution.

Response of lock operation is transmitted via printer serial port if option “RFID data response” is enabled (command ?R1&2,1)

Syntax is:

**?R2&22, A, N**

parameters have following meaning:

**A** address of first data block to be locked (address of first block = 0)

**N** number of data blocks to be locked (maximum number = 32)

Response has following structure:

If STATUS = 0x0

| Byte n.  | 1      | 2..3       |
|----------|--------|------------|
| Meaning  | STATUS | Terminator |
| Contents | 0x00   | CR LF      |

If STATUS = 0x03

| Byte n.  | 1      | 2                                     | 3..4       |
|----------|--------|---------------------------------------|------------|
| Meaning  | STATUS | DB-ADR-E                              | Terminator |
| Contents | 0x03   | Block number where the error occurred | CR LF      |

Se STATUS = 0x95

| Byte n.  | 1      | 2                                      | 3                                     | 4..5       |
|----------|--------|----------------------------------------|---------------------------------------|------------|
| Meaning  | STATUS | ISO-ERROR                              | DB-ADR-E                              | Terminator |
| Contents | 0x95   | ISO error code of transponder response | Block number where the error occurred | CR LF      |



## READ MULTIPLE BLOCKS – ISO15693 COMMAND

This command reads transponder typical data and one or more data blocks of transponder user memory. This command acts on the transponder placed under antenna at the moment of command execution.

Response of read operation is transmitted via printer serial port if option “RFID data response” is enabled (command ?R1&2,1)

Syntax is:

**?R2&23, A, N**

parameters have following meaning:

**A** address of first data block to be read (address of first block = 0)  
**N** number of data blocks to be read (maximum number = 32)

Response has following structure:

If STATUS = 0x0

| Byte n.  | 1      | 2                     | 3                                 | 4                                            | 5-n  | n++        |
|----------|--------|-----------------------|-----------------------------------|----------------------------------------------|------|------------|
| Meaning  | STATUS | DB-N                  | DB-SIZE                           | SEC-STATUS                                   | DB   | Terminator |
| Contents | 0x00   | Number of data blocks | Number of bytes of one data block | Block security status of followed data block | data | CR LF      |
|          |        |                       |                                   | Repeated DB-N times                          |      |            |

If STATUS = 0x95

| Byte n.  | 1      | 2                        | 3..4       |
|----------|--------|--------------------------|------------|
| Meaning  | STATUS | ISO-ERROR                | Terminator |
| Contents | 0x95   | ISO error of transponder | CR LF      |

## WRITE MULTIPLE BLOCKS – ISO15693 COMMAND

This command writes one or more data blocks of transponder user memory. This command acts on the transponder placed under antenna at the moment of command execution.

Response of writing operation is transmitted via printer serial port if option “RFID data response” is enabled (command ?R1&2,1)

Syntax is:

**?R2&24, A, N, DB**

parameters have following meaning:

**A** address of first data block to be written (address of first block = 0)  
**N** number of data blocks to be written (maximum number = 8)  
**DB** Block data to be written to the transponder. Total data = (N \* Size) bytes

Response has following structure:

If STATUS = 0x0

| Byte n.  | 1      | 2..3       |
|----------|--------|------------|
| Meaning  | STATUS | Terminator |
| Contents | 0x00   | CR LF      |

If STATUS = 0x03

| Byte n.  | 1      | 2                                     | 3..4       |
|----------|--------|---------------------------------------|------------|
| Meaning  | STATUS | DB-ADR-E                              | Terminator |
| Contents | 0x03   | Block number where the error occurred | CR LF      |

If STATUS = 0x95

| Byte n.  | 1      | 2                        | 3                                     | 4..5       |
|----------|--------|--------------------------|---------------------------------------|------------|
| Meaning  | STATUS | ISO-ERROR                | DB-ADR-E                              | Terminator |
| Contents | 0x95   | ISO error of transponder | Block number where the error occurred | CR LF      |

## WRITE AFI CODE – ISO15693 COMMAND

This command writes a new AFI (Application Family Identifier) code on a transponder. This command acts on the transponder placed under antenna at the moment of command execution. Response of writing operation is transmitted via printer serial port if option “RFID data response” is enabled (command ?R1&2,1)

Syntax is:

**?R2&27, C**

“C” parameter has following meaning:

**C** AFI code in hexadecimal figures (starting from 0x00 up to 0xFF)

Response has following structure:

If STATUS = 0x0

| Byte n.  | 1      | 2..3       |
|----------|--------|------------|
| Meaning  | STATUS | Terminator |
| Contents | 0x00   | CR LF      |

If STATUS = 0x95

| Byte n.  | 1      | 2                        | 3..4       |
|----------|--------|--------------------------|------------|
| Meaning  | STATUS | ISO-ERROR                | Terminator |
| Contents | 0x95   | ISO error of transponder | CR LF      |

## LOCK AFI CODE – ISO15693 COMMAND

This command locks the AFI (Application Family Identifier) register in a transponder. This command acts on the transponder placed under antenna at the moment of command execution. Response of lock operation is transmitted via printer serial port if option “RFID data response” is enabled (command ?R1&2,1)

Syntax is:

**?R2&28, 0**

Response has following structure:

If STATUS = 0x0

| Byte n.  | 1      | 2..3       |
|----------|--------|------------|
| Meaning  | STATUS | Terminator |
| Contents | 0x00   | CR LF      |

If STATUS = 0x95

| Byte n.  | 1      | 2                        | 3..4       |
|----------|--------|--------------------------|------------|
| Meaning  | STATUS | ISO-ERROR                | Terminator |
| Contents | 0x95   | ISO error of transponder | CR LF      |

## WRITE DSFID – ISO15693 COMMAND

This command writes the DSFID (Data Storage Format Identifier) code on a transponder. This command acts on the transponder placed under antenna at the moment of command execution. Response of writing operation is transmitted via printer serial port if option “RFID data response” is enabled (command ?R1&2,1)

Syntax is:

**?R2&29, C**

“C” parameter has following meaning:

**C** DSFID code in hexadecimal figures (starting from 0x00 up to 0xFF)

Response has following structure:

If STATUS = 0x0

| Byte n.  | 1      | 2..3       |
|----------|--------|------------|
| Meaning  | STATUS | Terminator |
| Contents | 0x00   | CR LF      |

If STATUS = 0x95

| Byte n.  | 1      | 2                        | 3..4       |
|----------|--------|--------------------------|------------|
| Meaning  | STATUS | ISO-ERROR                | Terminator |
| Contents | 0x95   | ISO error of transponder | CR LF      |

## LOCK DSFID CODE – ISO15693 COMMAND

This command locks the DSFID (Data Storage Format Identifier) register in a transponder. This command acts on the transponder placed under antenna at the moment of command execution. Response of lock operation is transmitted via printer serial port if option “RFID data response” is enabled (command ?R1&2,1)

Syntax is:

**?R2&2A, 0**

Response has following structure:

If STATUS = 0x0

| Byte n.  | 1      | 2..3       |
|----------|--------|------------|
| Meaning  | STATUS | Terminator |
| Contents | 0x00   | CR LF      |

If STATUS = 0x95

| Byte n.  | 1      | 2                        | 3..4       |
|----------|--------|--------------------------|------------|
| Meaning  | STATUS | ISO-ERROR                | Terminator |
| Contents | 0x95   | ISO error of transponder | CR LF      |

## GET SYSTEM INFORMATION – ISO15693 COMMAND

This command reads the system information from a transponder. This command acts on the transponder placed under antenna at the moment of command execution.

Response of lock operation is transmitted via printer serial port if option “RFID data response” is enabled (command ?R1&2,1)

Syntax is:

**?R2&2B,0**

Response has following structure:

If STATUS = 0x0

| Byte n.  | 1          | 2     | 3..10 | 11  | 12..13   | 14     | 15..16     |
|----------|------------|-------|-------|-----|----------|--------|------------|
| Meaning  | STATUS     | DSFID | UID   | AFI | MEM-SIZE | IC-REF | Terminator |
| Contents | Error Code |       |       |     |          |        | CR LF      |

If STATUS = 0x95

| Byte n.  | 1      | 2                        | 3..4       |
|----------|--------|--------------------------|------------|
| Meaning  | STATUS | ISO-ERROR                | Terminator |
| Contents | 0x95   | ISO error of transponder | CR LF      |