RCSL No: 31-D710

Edition: September 1983

Author: Jens Peter Jacobsen

Title:

RC850 Badge Reader
Reference Manual

RCSL No 42-I 2164

A/S REGNECENTRALEN
af 1979

Keywords:

RC850, TF667, TF224, MCR501, Badge Reader, Operator Identification Reader, Magnetic Card Reader.

Abstract:

This manual describes the operation of a magnetic card reader intended to read identification cards coded in track 2. The reader is built into the keyboard and sends data on the same cable as the keyboard.

(14 printed pages)

Printed by A/S Regnecentralen af 1979, Copenhagen

RCSL No 42-I 2164

TABLE OF CONTENTS PAGE

1. MAIN CHARACTERISTICS 1.

1.1 Description 1.1

The RC850 Identification card reader is able to read the 2nd (ABA) track on magnetic stripe cards as per ANSI X4.16-1976 and ISO3554.

The card is read by passing it through the slot in the reader. Signals from a magnetic reading head placed in the slot is processed by the controller electronics.

The controller consists of an 8035 CPU and a small amount of peripheral electronics. It is physically and logically placed in series with the normal RC850 keyboard as shown in fig. 1.

The following operations are performed by the reader/controller:

- reading and buffering of up to 40 four bit characters
- parity check of each character and longitudinally of all characters
- transmission of the character buffer preceded by a unique ICR start character and a status byte
- controlling the three indicator lamps

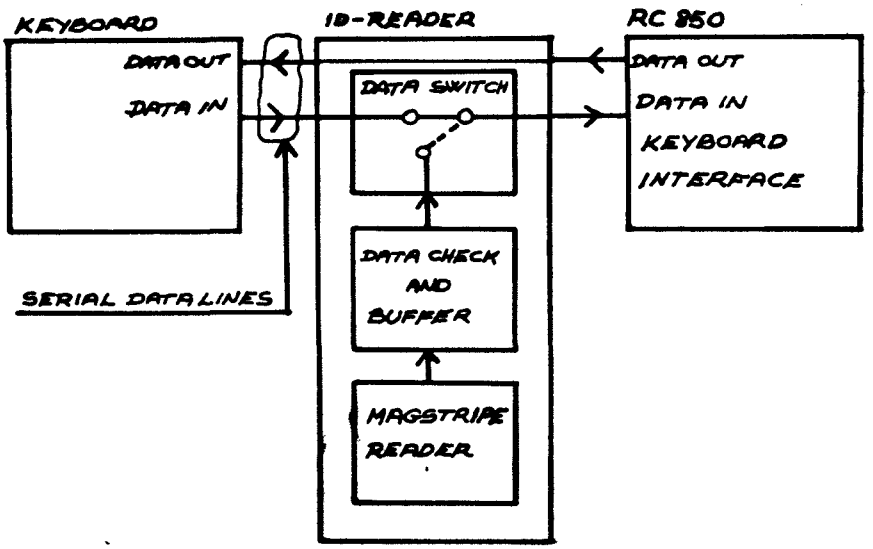

Figure 1: Logical connection of ICR.

1.2 Data Medium 1.2

The magnetic-stripe cards used for this reader shall conform in all respects to the specifications in ANSI X4.16-1976 "magnetic-stripe encoding for credit cards" applicable to Track 2.

1.3 Data Formats 1.3

1.3.1 Track 2 Data Formats 1.3.1

Track 2 information is formatted as specified in ISO3554, section 6.6 (see also fig. 2). This format corresponds closely to the IBM 10 character set used for operator identification card reader (OICR).

1.3.2 Data Format on RC850 Keyboard Input Line 1.3.2

Data on the serial line are transmitted at 300 baud, 8 data bits, even parity and one stop bit.

When the keyboard line has been silent for at least one character time then the line will be intercepted and the reader will send its data in between any data from the keyboard without loosing keyboard characters.

A data block has the following format:

1) start character (6E Hex)
2) status byte
3) 0-40 data characters corresponding to data read from a magnetic card
4) end character (6F Hex)

1.4 Applicable Documents 1.4

ANSI X4.16-1976:
Magnetic-stripe encoding for credit cards

ISO3554:
Credit cards - magnetic stripe encoding for tracks 1 and 2

ISO2894:
Embossed credit cards - specifications, numbering system and registration procedure

6.6.2 *Coded character set*

The character code, which is numeric only, shall be a BCD 4-bit subset with odd parity (P).

Bits						Character
P	b_4	b_3	b_2	b_1	Row	
1	0	0	0	0	0	0
0	0	0	0	1	1	1
0	0	0	1	0	2	2
1	0	0	1	1	3	3
0	0	1	0	0	4	4
1	0	1	0	1	5	5
1	0	1	1	0	6	6
0	0	1	1	1	7	7
0	1	0	0	0	8	8
1	1	0	0	1	9	9
1	1	0	1	0	10	(a)
0	1	0	1	1	11	Start sentinel (start character)
1	1	1	0	0	12	(a)
0	1	1	0	1	13	Separator
0	1	1	1	0	14	(a)
1	1	1	1	1	15	End sentinel (stop character)

(a) These character positions are available for hardware control purposes only and cannot contain information characters (data content).

6.6.3 *Error detection*

An odd parity bit for all encoded data characters shall be used. Clocking bits used for synchronization are not regarded as characters.

Additionally, an even bit parity longitudinal parity check code (longitudinal redundancy check, LRC) shall appear at the end of the information data. The LRC character' parity bit is not a parity of the message, but only a parity for the LRC character.

6.6.4 *Bit configuration*

In the bit configuration for each character on the magnetic area, the least significant bit (b_1) shall be encoded first and the parity bit last.

6.6.5 *Information content, format*

Start sentinel	1 character
Account number	up to 19 characters[1)]
Separator	1 character
Discretionary data	the balance up to the maximum record length (40 characters)
Stop sentinel	1 character
Longitudinal redundancy check	1 character
TOTAL	maximum : 40 characters

Figure 2: Part of ISO3554.

2. PERFORMANCE CHARACTERISTICS 2.

2.1 Card Reader Characteristics 2.1

Card Type: Magnetic card conforming to the No 2 track (75 bpi) of the ISO3554

Card Feed Speed: 100 to 1500 mm/sec

Card Feed Force: Less than 50 g (MR5 reader)

2.2 Card Reader Controller Characteristics 2.2

Input data: Recognizes standard track 2 data format

Data checks:
- Character parity
- Start and stop sentinel present
- Longitudinal parity

Operator error: It is checked that no keyboard key was pressed while a reader operation was performed

3. LOGIC SPECIFICATION 3.

3.1 Logic Survey 3.1

The Identification Card Reader is inserted in the serial asynchronous line from keyboard to display unit. The reader is able to listen to data passing from keyboard to display and to suppress keyboard data and send ID-card data blocks instead.

A data block is sent each time a card is passed through the reader. If card data is read without error, the data will be sent preceded by a status character indicating no error. If an error is detected, only the status character will be sent.

3.2 Reader Block Format 3.2

3.2.1 Block Format 3.2.1

Each data block sent by the reader has the following format:

Field	Length	Value
Start character	1 byte	6E Hex
Status byte	1 -	70 to 7F Hex
Data section	0 to 40 bytes	70 to 7F Hex
End character	1 byte	6F Hex

The bytes are transmitted at 300 baud asynchronously with 1 start bit, 8 data bits, 1 parity bit (even parity) and 1 stop bit.

3.2.2 Status Byte 3.2.2

The status byte has the following layout:

7	6	5	4	3	2	1	0
0	1	1	1	ERROR CODE			

Error code	Error description
0	- No error detected.
1	- LRC-parity error but no parity error on any single character. The data are sent anyway.
2	- Parity error in at least one character. No data are sent.
3	- Format error, i.e. missing Start Sentinel (B Hex) or End Sentinel (F Hex). No data are sent.
4	- Not used.
5	- Card removed. Transmitted in a separate data block (without data) when the card is removed from the reader.
6 to 15	- Not assigned.

3.2.3 Data Section

3.2.3

The data section is present if no fatal error has been detected while reading the magnetic stripe.

It contains all characters read from the ID-card starting with the Start Sentinel and ending with the LRC-character, i.e. the first character after End Sentinel.

The total number of characters is limited to 40.

Before transmission, the 4 bit character parity bit is checked and stripped off and the character values are converted to 8 bit codes as defined in fig. 3.

ID-card code						8 bit codes transmitted
P	b4	b3	b2	b1	Hex	Hex
1	0	0	0	0	0	70
0	0	0	0	1	1	71
0	0	0	1	0	2	72
1	0	0	1	1	3	73
0	0	1	0	0	4	74
1	0	1	0	1	5	75
1	0	1	1	0	6	76
0	0	1	1	1	7	77
0	1	0	0	0	8	78
1	1	0	0	1	9	79
1	1	0	1	0	A	7A
0	1	0	1	1	B (SS)	7B
1	1	1	0	0	C	7C
0	1	1	0	1	D (Separator)	7D
0	1	1	1	0	E	7E
1	1	1	1	1	F (ES)	7F

Figure 3: Character conversion table.

3.3 Indicator Lamps (if used) 3.3

The ID-card reader may contain three operator indicators. The indicators are colour coded green, yellow and red. One of these indicators is on (one at a time) as long as power is applied to the reader. The indicators are used as follows:

Green: ON when the reader is ready to read a magnetic stripe
OFF if yellow or red is on

Yellow: ON when data has been read and while data are transmitted to the terminal
OFF if green or red is on

Red: ON when reader data are rejected, or card removed
OFF after being on for approximately 0,1 second

RETURN LETTER

Title: RC850 Badge Reader RCSL No.: 31-D710

A/S Regnecentralen af 1979/RC Computer A/S maintains a continual effort to improve the quality and usefulness of its publications. To do this effectively we need user feedback, your critical evaluation of this manual.

Please comment on this manual's completeness, accuracy, organization, usability, and readability:

Do you find errors in this manual? If so, specify by page.

How can this manual be improved?

Other comments?

Name: _____ Title: _____

Company: _____

Address: _____

Date: _____

Thank you

42-i 1288

. . . . . Fold here . . . . . .

. . . . . Do not tear - Fold here and staple . . . . . .

Affix
postage
here

REGNECENTRALEN
af 1979

Information Department
Lautrupbjerg 1
DK-2750 Ballerup
Denmark