INTERNATIONAL STANDARD

ISO/IEC 7816-3

Second edition
1997-12-15

AMENDMENT 1
2002-06-01

Information technology — Identification cards — Integrated circuit(s) cards with contacts —

Part 3:
Electronic signals and transmission protocols

AMENDMENT 1: Electrical characteristics and class indication for integrated circuit(s) cards operating at 5 V, 3 V and 1,8 V

Technologies de l'information — Cartes d'identification — Cartes à circuit(s) intégré(s) avec contacts —

Partie 3: Signaux électroniques et protocoles de transmission

AMENDEMENT 1: Caractéristiques électriques et indication des classes pour cartes à circuit(s) intégré(s) fonctionnant à 5 V, 3 V et 1,8 V

Reference number
ISO/IEC 7816-3:1997/Amd.1:2002(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.ch
Web www.iso.ch

Printed in Switzerland

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this Amendment may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

Amendment 1 to International Standard ISO/IEC 7816-3:1997 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and personal identification*.

Information technology — Identification cards — Integrated circuit(s) cards with contacts —

Part 3:
Electronic signals and transmission protocols

AMENDMENT 1: Electrical characteristics and class indication for integrated circuit(s) cards operating at 5 V, 3 V and 1,8 V

Page 1, subclause 3.1

Insert the following term and definition:

3.1.3
operating conditions
set of values for voltage and current

Page 2, subclause 4.2

Replace subclause 4.2 with the following:

4.2 Operating conditions

4.2.1 Classes of operating conditions

This part of ISO/IEC 7816 defines three classes based on the nominal supply voltage provided to the card by the interface device through contact VCC:

— 5 V under class A,

— 3 V under class B,

— 1,8 V under class C.

The card shall support one or more consecutive classes and shall operate in interface devices offering one or more of those classes.

No card shall be damaged when operated under classes not supported by the card (by definition, a damaged card no longer operates as specified or contains corrupt data). However, some cards conforming to ISO/IEC 7816-3: 1989 could be damaged when operating under classes other than A and should be used only under class A operating conditions.

4.2.2 Selection of the class of operating conditions

The interface device applies a class to the card (see figure 1).

If the card provides an Answer-to-Reset with a class indicator (see 6.5.6), and the interface device is applying a class supported by the card, then normal operation may continue. Alternatively, the interface device may deactivate the card and after a delay of at least 10 ms, apply another class supported by the card.

If the card provides an Answer-to-Reset without a class indicator, then the interface device shall maintain the current class. If, after the answer to reset, the card does not operate, then another class may be applied.

If the card does not provide an Answer-to-Reset, then the interface device shall deactivate the card. The interface device should perform one of the following two actions after a delay of at least 10ms:

— apply another class, if any;

— abort the selection process.

After abortion of a selection process, another selection process may be initiated.

If the interface device supports more than one class, the order in which the classes are applied is not within the scope of this part of ISO/IEC 7816.

Page 3, Figure 1

Replace Figure 1 with the following:

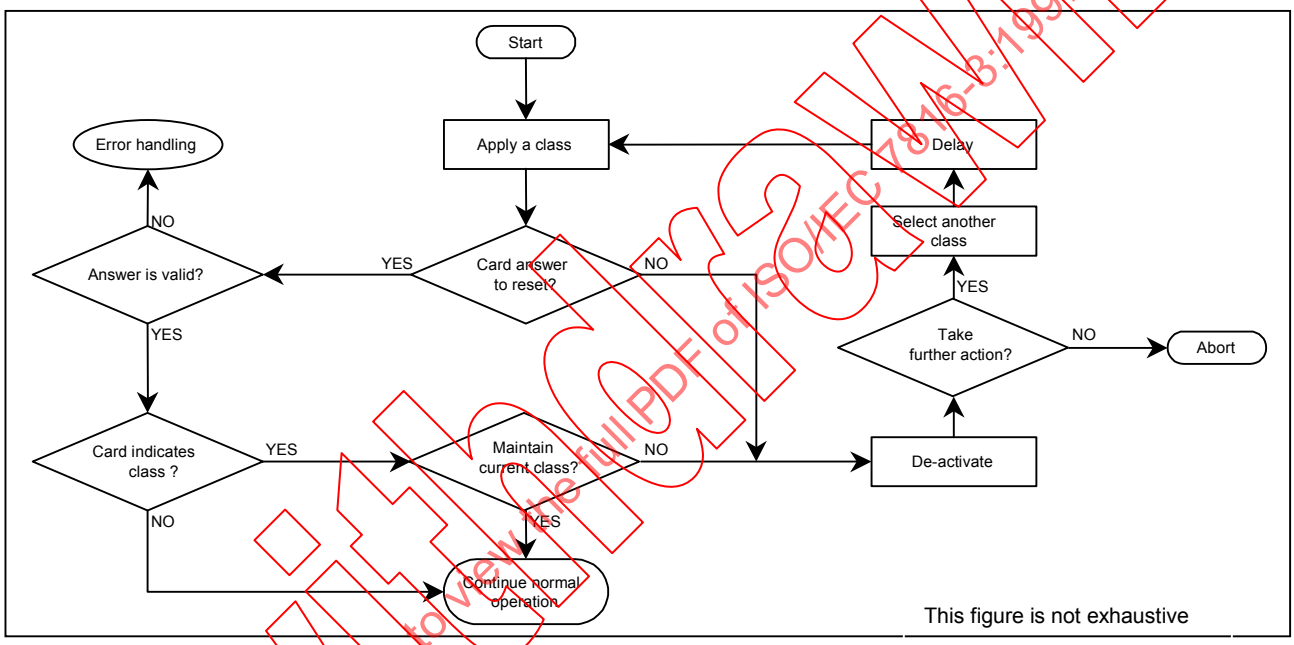

Figure 1 — Selection of the class by the interface device

Page 3, Table 1

Replace Table 1 with the following:

Table 1 — Electrical characteristics of VCC under normal operating conditions

Symbol	Conditions	Minimum	Maximum	Unit
V_{CC}	Class A	4,5	5,5	V
	Class B	2,7	3,3	
	Class C	1,62	1,98	
I_{CC}	Class A, at maximum allowed frequency		60	mA
	Class B, at maximum allowed frequency		50	
	Class C, at maximum allowed frequency		30	
	When the clock is stopped (see 5.3.4)		0,5	

Page 4, Table 2

Replace Table 2 with the following:

Table 2 — Spikes on I_{CC}

Class	Maximum charge [a]	Maximum duration	Maximum variation [b] of I_{CC}
A	20 nA s	400 ns	100 mA
B	10 nA s	400 ns	50 mA
C	6 nA s	400 ns	30 mA

[a] The maximum charge is half the product of the maximum duration and the maximum variation.

[b] The maximum variation is the difference in the supply current with respect to the average value.

Page 4, Table 3

Replace Table 3 with the following:

Table 3 — Electrical characteristics of I/O under normal operating conditions

Symbol	Conditions	Minimum	Maximum	Unit
V_{IH}	V_{IH}	0,70 × V_{CC}	V_{CC}	V
I_{IH}		−300	+20	µA
V_{IL}	V_{IL}	0	0,15 × V_{CC}	V
I_{IL}		−1000	+20	µA
V_{OH}	External pull-up resistor. 20 kΩ to *VCC*	0,70 × V_{CC}	V_{CC}	V
I_{OH}	V_{OH}		+20	µA
V_{OL}	I_{OL} = 1 mA [a] for class A or class B I_{OL} = 500 µA [a] for class C	0	0,15 × V_{CC}	V
t_R t_F	C_{IN} = 30 pF, C_{OUT} = 30 pF		1	µs
The voltage on I/O shall remain between −0,3 V and V_{CC} +0,3 V.				
[a] Interface device implementations should not require the card to sink more than 500 µA.				

Page 5, Table 4

Replace Table 4 with the following.

Table 4 — Electrical characteristics of CLK under normal operating conditions

Symbol	Conditions	Minimum	Maximum	Unit
V_{IH}	V_{IH}	0,70 × V_{CC}	V_{CC}	V
I_{IH}		–20	+100	µA
V_{IL}		0	0,5	V
V_{IL}	for class C	0	0,2 × V_{CC}	V
I_{IL}	V_{IL}	–100	+20	µA
t_R t_F	C_{IN} = 30 pF		9 % of period	
The voltage on CLK shall remain between –0,3 V and V_{CC} +0,3 V.				

Page 5, subclause 4.3.6

Replace the first line of subclause 4.3.6 with the following:

Under class B and class C, this contact is reserved for future use.

Page 6, subclause 5.2

Replace the second, fourth and fifth dashes in subclause 5.2 with the following:

— VCC shall be powered according to the class selected by the interface device: class A or class B or class C (see 4.3.2 and table 1).

— Under class A, VPP shall be put to pause state (see 4.3.6). Under class B and class C, VPP is reserved for future use.

— CLK shall be provided with a clock signal (see 4.3.4). At least during the answer to reset, the frequency *f* of the clock signal shall lie in the range of 1 MHz to 5 MHz under all classes.

Page 13, subclause 6.5.6

Replace subclause 6.5.6 with the following:

6.5.6 Class indicator U

Parameter U indicates the class(es) accepted by the card. According to table 11, each bit of UI represents a class defined in 4.2.1: b1 for class A, b2 for class B and b3 for class C.