

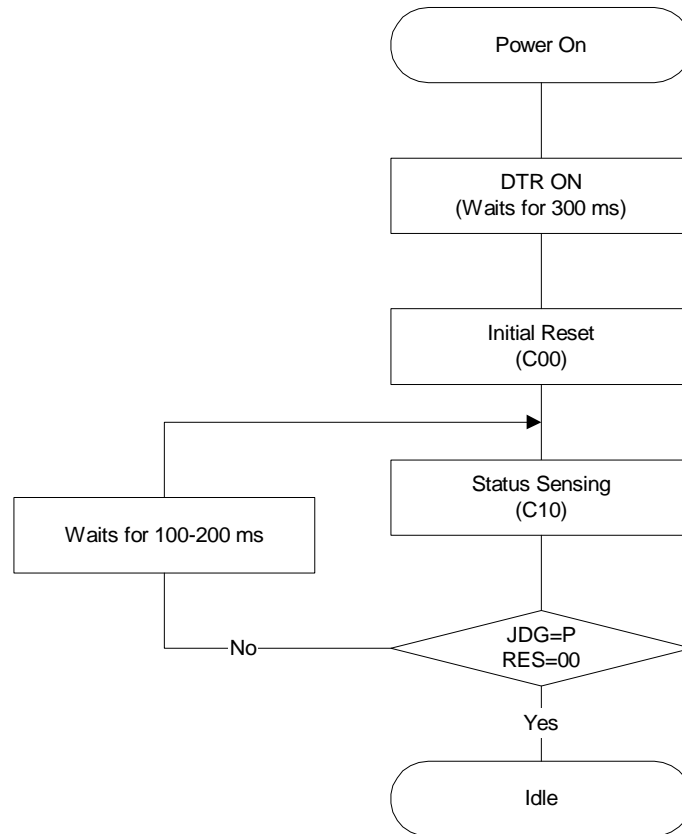
Annex to Data Transmission Specifications of V2BF Series Hybrid Card Reader

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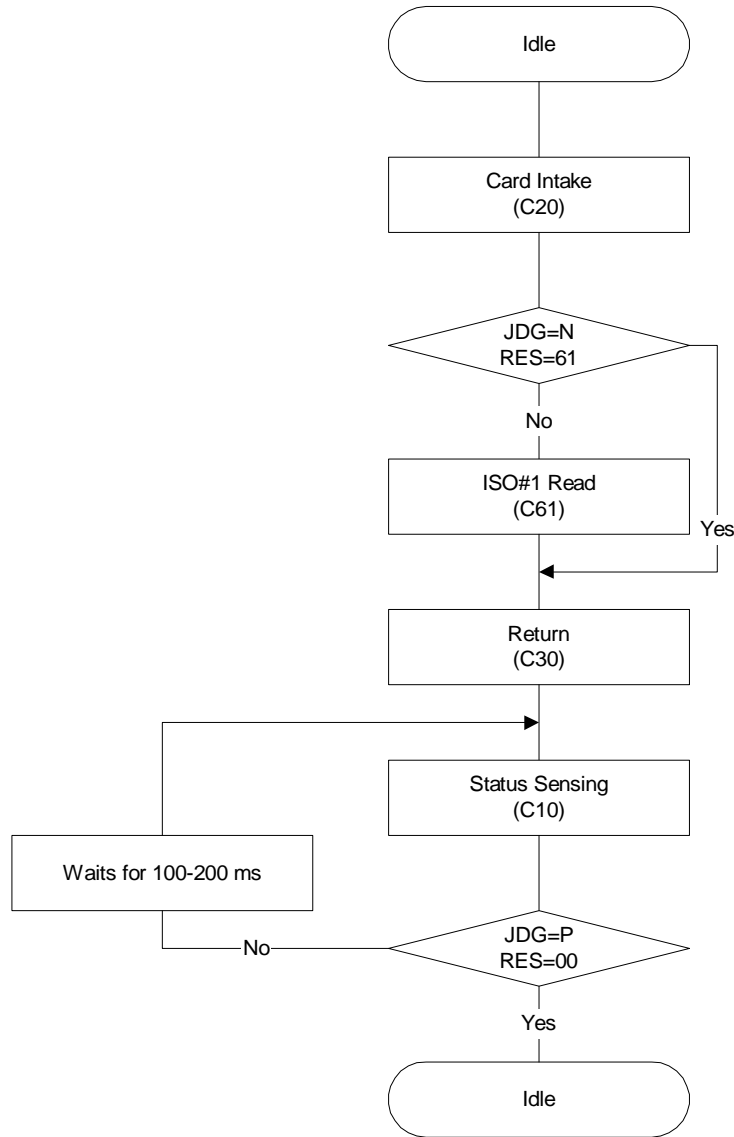
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Annex A Command Sequences of the Host Driver (Recommended)

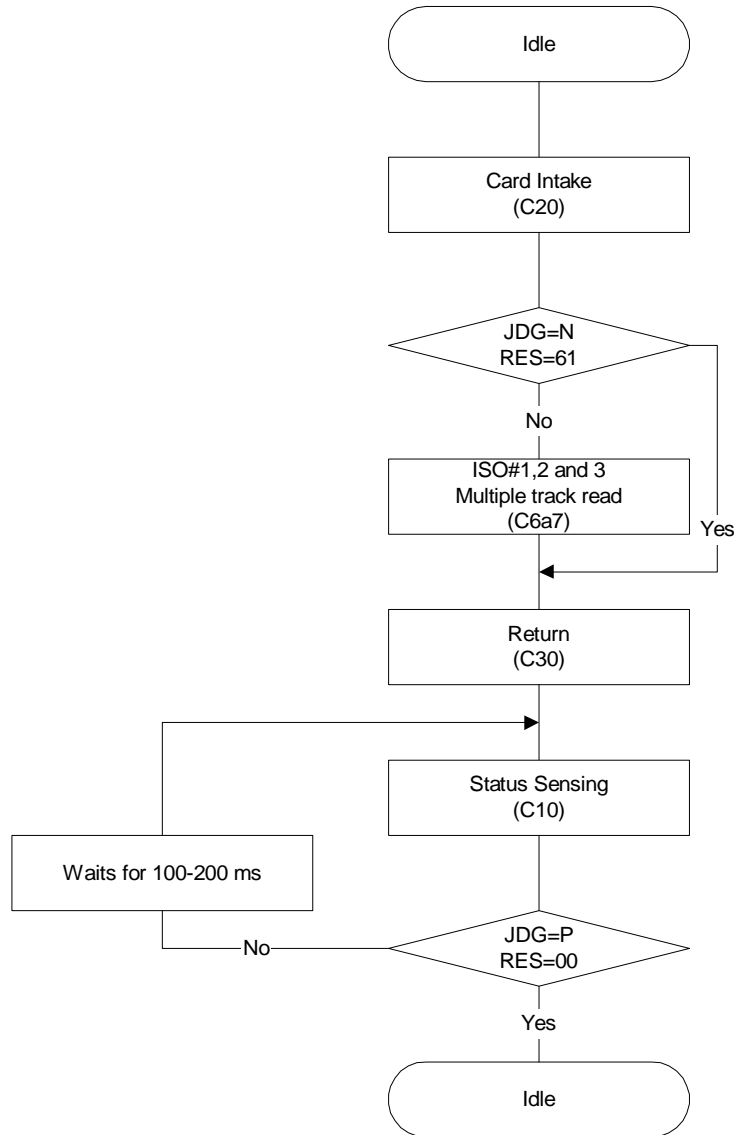
A1. Process on Power-on



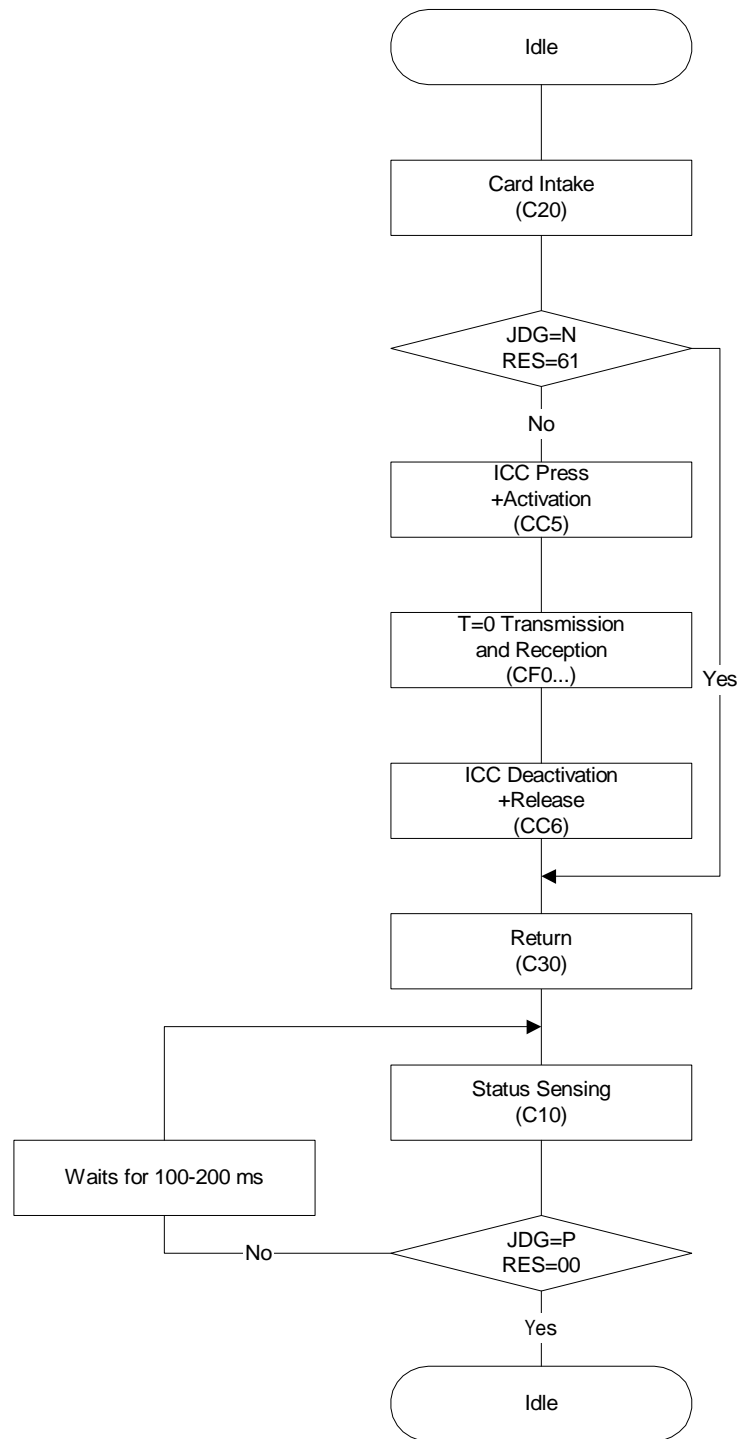
A2. Process to Read Magnetic Card (ISO#1 only)



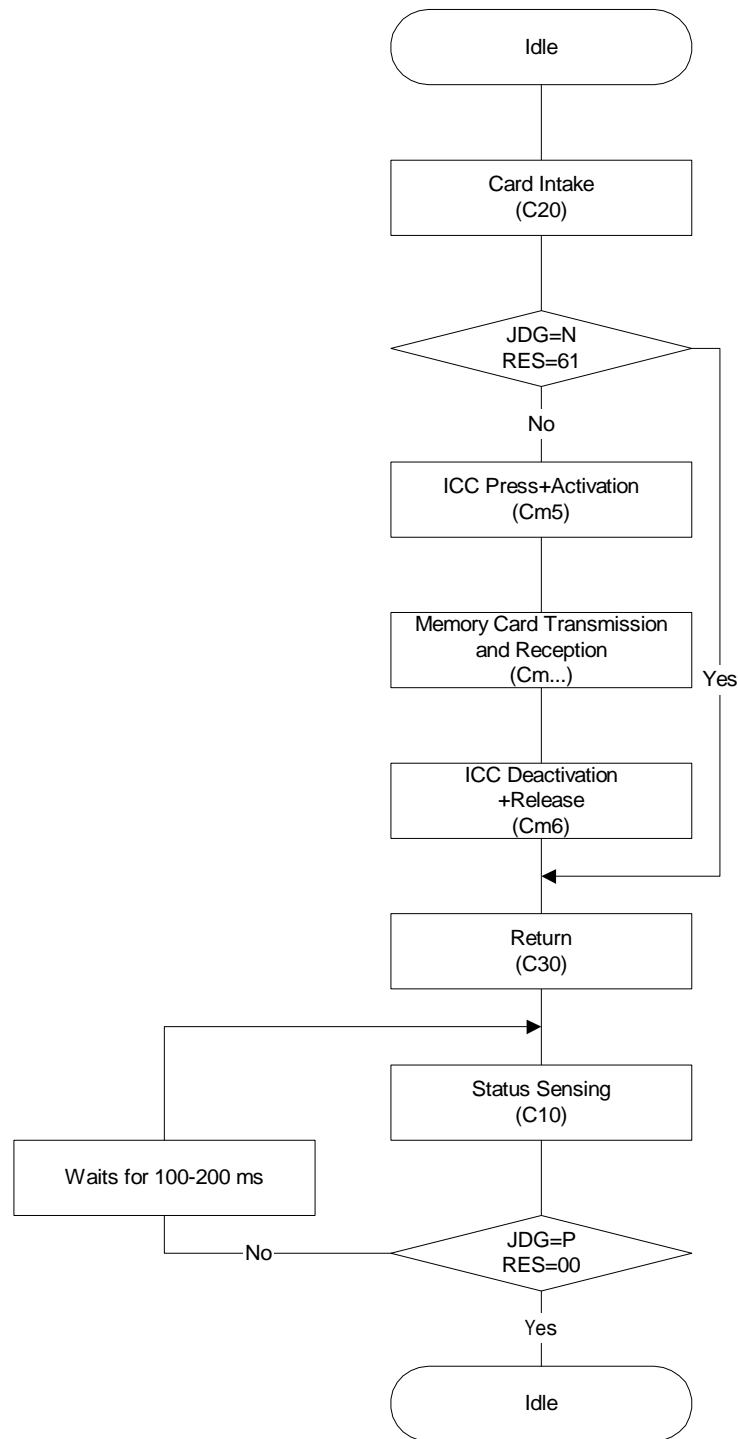
A.3 Process to Read Magnetic Card (ISO#1,2 and 3 Multiple Track)



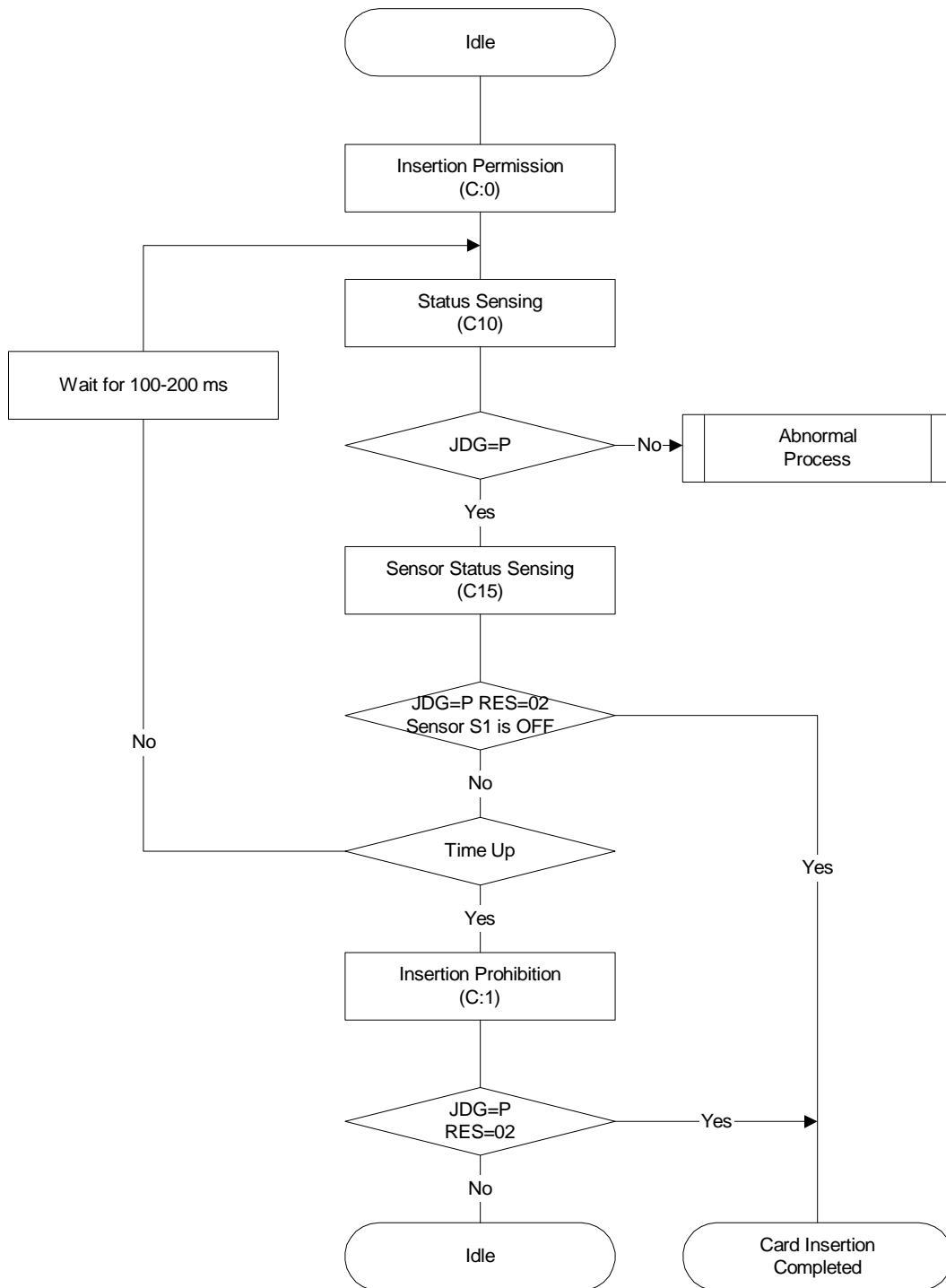
A4. Transmission and Reception with ICC (T=0)



A5. Transmission and Reception with Memory Card

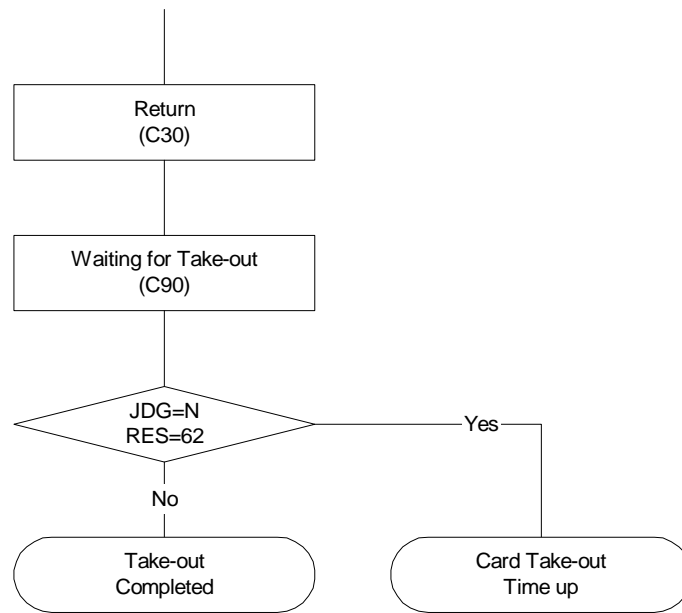


A6. Process for Insertion Permission

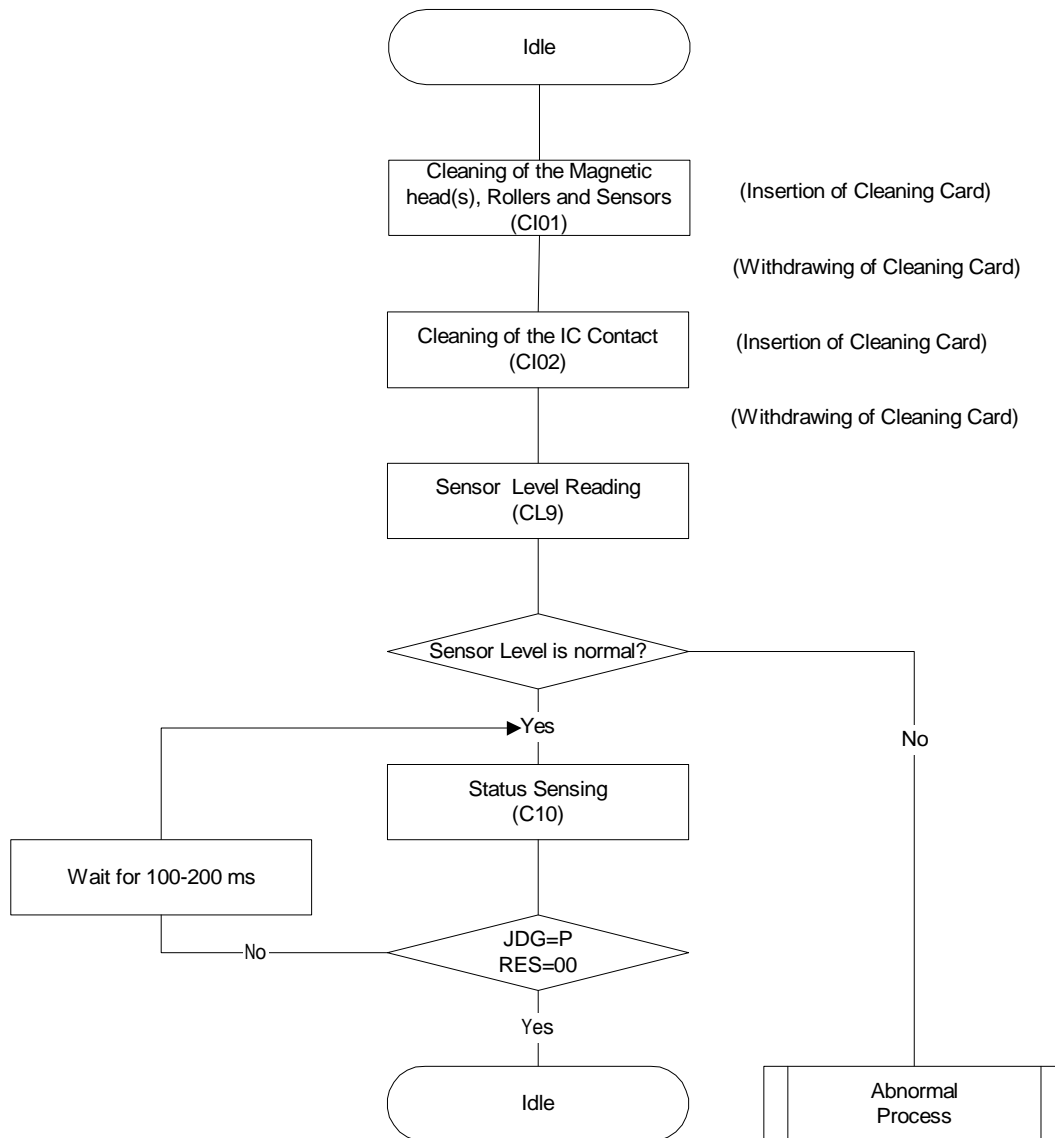


Note: The Host should check the status of C/R, and the position of the card combining two kinds of Status Sense Commands. In this case, if the C/R Sense Command (“C10”) is a positive response (JDG=P), the card position is acquired by the Sensor Sense Command (“C15”).

A7. Return Process

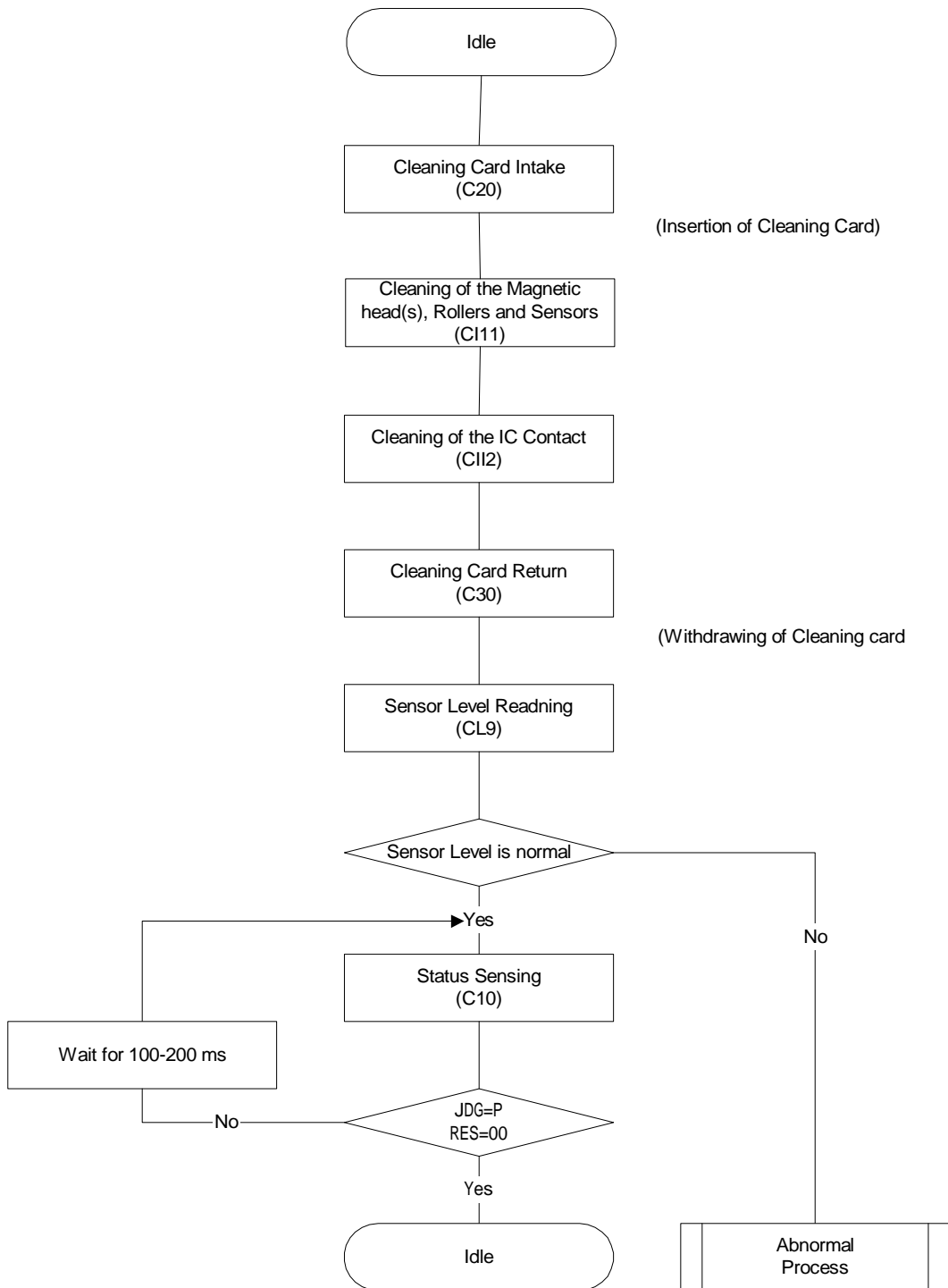


A8. Process for Cleaning (Using command "C10")



Note: When using a different cleaning card per each cleaning part, this command is more convenient than the "C11" command that is only for cleaning.

A9. Process for Cleaning (Using command "C11")



Note: When continuously using one cleaning card for more that one cleaning part, this command is more convenient than the "C10" Command that executes intaking/returning a cleaning card.

Annex B Magnetic Card Data Record Format

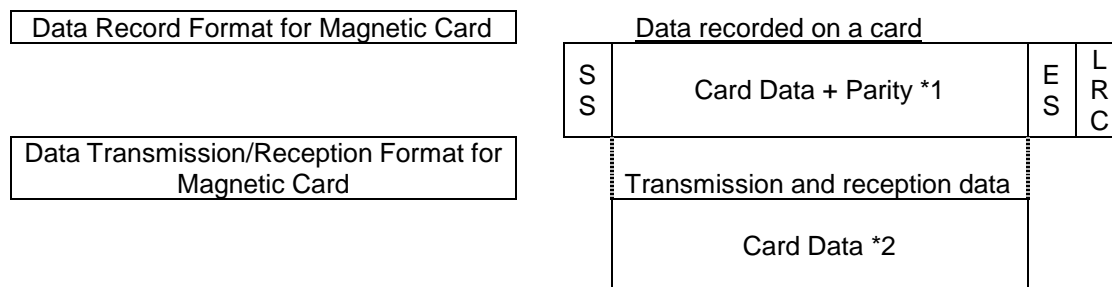
Item	Track	ISO 1	ISO 2	ISO 3	JIS 2
Character Length (including parity)		7 bits	5 bits	5 bits	8 bit
Parity		odd	odd	odd	even
Longitudinal Calculation Method (LRC) *1		even LRC	even LRC	even LRC	even LRC-2
Top Character		"SP"	"0"	"0"	NULL
Start Sentinel (SS)		"%"	"/"	"/"	DEL
End Sentinel (ES)		"?"	"?"	"?"	DEL
Data Length (byte)		1-76	1-37	1-104	1-69

*1. The LRC Calculation Method is shown below.

Name	Range to be Checked	Storage Position	Check Code	Remark
Even LRC	SS - ES	Character next to ES	1 Character	--
Even LRC-2	character next to SS - ES	Character next to ES	1 Character	--

B.1 Card Data Configuration of ISO Track (1 - 3) and JIS 2 Track

All the data recorded on a card except parity are transmitted and received in ASCII code as a command or a response by the Host and the C/R.



*1 Data recorded on a card includes both card data and parity data.

*2 The data transmitted/received by the HOST or the C/R is only card data which does not include parity.

B.2 Character Code Setting of ISO 1 Track

One character in the ISO 1 Track consists of 6 bits.
Only the ASCII codes shown below are usable.

SP	0	@ *1	P
! *1	1	A	Q
" *1	2	B	R
# *3	3	C	S
\$	4	D	T
% *4	5	E	U
& *1	6	F	V
' *1	7	G	W
(	8	H	X
)	9	I	Y
* *1	: *1	J	Z
+ 1	; *1	K	[*2
, *1	< *1	L	\ *2
-	= *1	M	] *2
.	> *1	N	^ *4
/	? *4	O	_ *1

*1. These characters can be used only for hardware control. Do not use in card data.

*2. Do not use these characters for cards used internationally.

*3. These characters have been prepared for use as the additional diagram characters. Do not use in the Card Data.

*4. Each character represents as follows:

"%": Start Sentinel (SS)

"?": End Sentinel (ES)

"^": Separator

However, since restrictions shown above do not apply to LRC, all codes in the table are usable.

B.3 Character Code Setting of ISO 2 and 3 Track

One character in the ISO 2 and 3 consists of 4 bits.
Only the ASCII codes shown below are usable.

0
1
2
3
4
5
6
7
8
9
: *1
; *2
< *1
= *3
> *1
? *4

*1. These characters can be used only for hardware control. Do not use in card data.

*2. ":" : Start Sentinel (SS)

*3. "=" : Separator

*4. "?" : End sentinel (ES)

However, since restrictions shown above do not apply to LRC, all codes in the table are usable.

B.4 Character Code Setting of JIS 2 Track

One character in the JIS 2 consists of 7 bits.

Only the codes shown below are usable.

	0	1	2	3	4	5	6	7
0	NUL	DLE	SP	0	@	P	`	p
1	SOH	DC1	!	1	A	Q	a	q
2	STX	DC2	"	2	B	R	b	r
3	ETX	DC3	#	3	C	S	c	s
4	EOT	DC4	\$	4	D	T	d	t
5	ENQ	NAK	%	5	E	U	e	u
6	ACK	SYN	&	6	F	V	f	v
7	BEL	ETB	'	7	G	W	g	w
8	BS	CAN	(	8	H	X	H	x
9	HT	EM	)	9	I	Y	i	y
A	LF	SUB	*	:	J	Z	j	z
B	VT	ESC	+	;	K	[	k	{
C	FF	FS	,	<	L	\	l	|
D	CR	GS	-	=	M	]	m	}
E	SO	RS	.	>	N	^	n	~
F	SI	US	/	?	O	_	o	DEL

DEL : Start Sentinel (SS)

DEL : End sentinel (ES)

Annex C Matrix of ICC Control Commands

Notes

- "xx" shown in positive response data indicates card position.
- When the C/R cannot support the ATR sent by ICC, the C/R responds an error response of Unsupported ICC Error ("Nxx87") to an activation command.
- When the C/R receives an activation command during ICC activation, the C/R responds a sequence error ("Nxx01") to the activation command.
- "T=0", "T=1", "PPS Request Required" and "PPS incomplection" in the matrices below represent response data to a command. For the details, see Annex D.
- If the C/R receives PPS Request Command during processing with a card by T=0 or T=1, it responds a sequence error ("Nxx01").
- Forceful Termination Command ("F4") is available only during continuous reception on processing by T=1.

C.1 Matrix Before Activation

Command (CMD) Status of C/R		Press "C0"	Release "C1"	Activation "C2"	Press + Activation "C5"	Deactivation + Release "C6"	Cold Reset "E0"	Press + Cold Reset "G1"
		0	Before Pressing Contacts	Press "PC010" ->1			Press + Activation "PC511" ->2 *1 ->5 *2 ->6			Activation + (PPS) "PG111" *3->2 T=0->5 T=1->6 PPS Req. Required->3 PPS incomplected->4
1	After Pressing Contacts		Release "PC102" ->0	Activation "PC211" ->2 *1 ->5 *2 ->6	Activation "PC511" ->2 *1 ->5 *2 ->6	Release "PC602" ->0	Activation + (PPS) "PE011" *5 ->2 *3 T=0->5 *4 T=1->6 PPS Req. Required->3 PPS incomplected->4	Activation + (PPS) "PG111" *5 ->2 *3 T=0->5 *4 T=1->6 PPS Req. Required->3 PPS incomplected->4

*1: When the protocol type of ICC indicated at TA2 by the specific mode is T=0, or when the protocol type of ICC is the single protocol type of T=0 by the negotiable mode, go to 5.

*2: When the protocol type of ICC indicated at TA2 by the specific mode is T=1, go to 6.

*3: When the protocol type of ICC indicated at TA2 by the specific mode is T=0, or when the protocol type is set to T=0 as the result of PPS, go to 5.

*4: When the protocol type of ICC indicated at TA2 by the specific mode is T=1, or when the protocol type is set to T=1 as the result of PPS, go to 6.

*5: When the command parameter is set to "No automatic execution of PPS", and also when the requirement for either *1 or *2 is not met, go to 2.

C.2 Matrix of PPS Right After Activation

Command (CMD) Status of C/R		Deactivation "C3"	Deactivation +Release "C6"	Warm Reset "E1"	T=0 Transmission/ Reception	T=1 Transmission/Reception		PPS
					Transmission/ Reception "F0"	Transmission/ Reception "F1"	Continuous Transmission "F2"	PPS Request "F8"
2	Right after Activation	Deactivation "PC310" ->1	Deactivation +Release "PC602" ->0	Warm Reset + (PPS) "PE111" *3 ->2 *1 T=0->5 *2 T=1->6 PPS Req. required->3 PPS incompletd->4	T=0 Transmission/Reception *4 "PF020" ->5	Transmission/Reception *5 "PF120" ->6 Transmission/Reception *5 "PF121" ->8	Continuous transmission *5 "PF222" ->7	PPS Request "PF820" T=0->5 T=1->6 PPS incompletd->4
3	PPS Request Required	Deactivation "PC310" ->1	Deactivation +Release "PC602" ->0	Warm Reset + (PPS) "PE111" *3 ->2 *1 T=0->5 *2 T=1->6 PPS Req. required->3 PPS incompletd->4	T=0 Transmission/Reception *4 "PF020" ->5	Transmission/Reception *5 "PF120" ->6 Transmission/Reception *5 "PF121" ->8	Continuous transmission *5 "PF222" ->7	PPS Request "PF820" T=0->5 T=1->6 PPS incompletd->4
4	PPS Incompletd Deactivation "PC310" ->1	Deactivation +Release "PC602" ->0	Warm Reset + (PPS) "PE111" *3 ->2 *1 T=0->5	*2 T=1->6 PPS Req. required->3 PPS incompletd ->4	T=0 Transmission/Reception *4 "PF020" ->5	Transmission/Reception *5 "PF120" ->6 Transmission/Reception *5 "PF121" ->8	Continuous transmission *5 "PF222" ->7 PPS Request	"PF820" T=0->5 T=1->6 PPS incompletd ->4

*1: When the protocol type of ICC indicated at TA2 by the specific mode is T=0, or when the protocol type is set to T=0 as the result of PPS, go to 5.

*2: When the protocol type of ICC indicated at TA2 by the specific mode is T=1, or when the protocol type is set to T=1 as the result of PPS, go to 6.

*3: When the command parameter is set to "No automatic execution of PPS", and also when the requirement for either *1 or *2 is not met, go to 2.

*4: When T=0 has not been indicated in the ATR as the protocol type for the ICC, a sequence error will be responded.

*5: When T=1 has not been indicated in the ATR as the protocol type for the ICC, a sequence error will be responded.

C.3 Matrix of the Status of C/R Processing with ICC of T=0/T=1

Command (CMD)		Deactivation "C3"	Deactivation + Release "C6"	Warm Reset "E1"	T=0	T=1 Transmission/Reception			
					Transmission/Reception "F0"	Transmission/Reception "F1"	Continuous Transmission "F2"	Continuous Reception "F3"	Forceful Termination "F4"
5	Processing with T=0 Card	Deactivation "PC310" ->1	Deactivation +Release "PC602" ->0	Warm Reset + (PPS) "PE111" *3 ->2 *1 T=0->5 *2 T=1->6 PPS Req. required->3 PPS incompletd->4	T0 Transmission/Reception "PF020"				
6	Processing with T=1 Card	Idle	Deactivation "PC310" ->1	Deactivation +Release "PC602" ->0	Warm Reset + (PPS) "PE111" *3 ->2 *1 T=0->5 *2 T=1->6 PPS Req. required->3 PPS incompletd->4	Transmission/Reception "PF120" ->6	Continuous Transmission "PF222" ->7		
						Transmission/Reception "PF121" ->8			
7	On Continuous Transmission	Deactivation "PC310" ->1	Deactivation +Release "PC602" ->0	Warm Reset + (PPS) "PE111" *3 ->2 *1 T=0->5 *2 T=1->6 PPS Req. required->3 PPS incompletd->4	Transmission/Reception "PF120" ->6	Continuous Transmission "PF222"			Transmission forcefully terminated "PF423" ->6
									Transmission/Reception "PF121" ->8
8	On Continuous Reception	Deactivation "PC310" ->1	Deactivation +Release "PC602" ->0	Warm Reset + (PPS) "PE111" *3 ->2 *1 T=0->5 *2 T=1->6 PPS Req. required->3 PPS incompletd->4				Continuous Reception "PF320" ->6	Transmission forcefully terminated "PF423" ->6
								Continuous Reception "PF321" ->8	

*1: When the protocol type of ICC indicated at TA2 by the specific mode is T=0, or when the protocol type is set to T=0 as the result of PPS, go to 5.

*2: When the protocol type of ICC indicated at TA2 by the specific mode is T=1, or when the protocol type is set to T=1 as the result of PPS, go to 6.

*3: When the command parameter is set to "No automatic execution of PPS", and also when the requirement for either *1 or *2 is not met, go to 2.

Annex D PPS Request/Activation (with PPS Execution) Commands

D.1 Change of Protocol Type

The table below shows the relationship between the protocol type indicated in ATR and PPS Request/Activation (with PPS Execution) commands. The processing conducted by the C/R and the responses are described in the table.

- Activation Commands with PPS Execution are "E0", "E1" and "G1". PPS is executed by setting the first value of the command parameter of these commands at the value ("0") which instructs the C/R to automatically execute PPS after receiving ATR.
- Protocol type "T=x" represents a type other than "T=0" and "T=1".
- When an ICC is in the specific mode, it responds a sequence error ("NF801") to a PPS Request Command, and it returns a response without executing PPS to an Activation Command with PPS Execution.
- ATR Information added to response data of an Activation Command is omitted in this table.

Command ICC Protocol *1	PPS Request("F8")		Activation with PPS Execution
	Protocol Type T=0("F80")	Protocol Type T=1("F81")	
T=0 *2	PPS Request succeeded -> T=0 executable ("PF8200") PPS Request failed-> PPS unfinished ("PF820N")	PPS not requested Sequence Error("NF801")	PPS not requested T=0 executable("Pxx110")
T=0 & T=1	PPS Request succeeded -> T=0 executable ("PF8200") PPS Request failed-> PPS unfinished ("PF820N")	PPS Request succeeded -> T=1 executable ("PF8201") PPS Request failed-> PPS unfinished ("PF820N")	PPS not requested PPS Request required("Pxx11P")
T=0 & T=x	PPS Request succeeded -> T=0 executable ("PF8200") PPS Request failed-> PPS unfinished ("PF820N")	PPS not requested Sequence Error ("NF801")	PPS not requested T=0 executable("Pxx110")
T=1	PPS not requested Sequence Error ("NF801")	PPS Request succeeded -> T=1 executable ("PF8201") PPS Request failed-> PPS unfinished ("PF820N")	PPS not requested T=1 executable("Pxx111")
T=1 & T=0	PPS Request succeeded -> T=0 executable ("PF8200") PPS Request failed-> PPS unfinished ("PF820N")	PPS Request succeeded -> T=1 executable ("PF8201") PPS Request failed-> PPS unfinished ("PF820N")	PPS not requested PPS Request required("Pxx11P")
T=1 & T=x	PPS not requested Sequence Error ("NF801")	PPS Request succeeded -> T=1 executable ("PF8201") PPS Request failed-> PPS unfinished ("PF820N")	PPS not requested T=1 executable("Pxx111")
T=x	PPS not requested Sequence Error ("NF801")	PPS not requested Sequence Error ("NF801")	PPS not requested Unsupported ATR Error("Nxx87")
T=x & T=0	PPS Request succeeded -> T=0 executable ("PF8200") PPS Request failed-> PPS unfinished ("PF820N")	PPS not requested Sequence Error ("NF801")	PPS Request succeeded -> T=0 executable("Pxx110") PPS Request failed-> PPS unfinished ("Pxx11N")
T=x & T=1	PPS not requested Sequence Error ("NF801")	PPS Request succeeded -> T=1 executable ("PF8201") PPS Request failed-> PPS unfinished ("PF820N")	PPS Request succeeded -> T=1 executable("Pxx111 ") PPS Request failed-> PPS unfinished("Pxx11N")
T=x & T=0 & T=1	PPS Request succeeded -> T=0 executable ("PF8200") PPS Request failed-> PPS unfinished ("PF820N")	PPS Request succeeded -> T=1 executable ("PF8201") PPS Request failed-> PPS unfinished ("PF820N")	PPS not requested PPS Request required("Pxx11P")

*1: ICC protocol types are described in the order as indicated in ATR.

*2: The case that TD1 is not transmitted is included.

D.2 Change of Transmission Parameter F&D

(1) CLK supplied to ICC

The CLK frequency of “f” supplied to ICC by the C/R is fixed at 3.5712MHz.

(2) Relationship Between PPS Request and Transmission Parameter F&D supported by the C/R

C/R executes PPS request when ATR is the following TA1 (F and D) and negotiable mode.

TA1			PPS1 of PPS Request			Transmission speed after PPS success.	
Value (BIN)	F	D	Value (BIN)	F	D	Time of 1 etu	usec/1etu
01H	372	1	01H	372	1	About 104 usec	9600 bit/s
02H	372	2	02H	372	2	About 52 usec	19200 bit/s
03H	372	4	03H	372	4	About 26 usec	38400 bit/s
04H	372	8					
05H	372	16					
06H	372	32					
08H	372	12					
09H	372	20					
11H	372	1						11H	372	1	About 104 usec	9600 bit/s
12H	372	2	12H	372	2	About 52 usec	19200 bit/s
13H	372	4	13H	372	4	About 26 usec	38400 bit/s
14H	372	8					
15H	372	16					
16H	372	32					
18H	372	12					
19H	372	20					
32H	744	2						32H	744	2	About 104 usec	9600 bit/s
33H	744	4	33H	744	4	About 52 usec	19200 bit/s
34H	744	8					
48H	1116	12	48H	1116	12	About 26 usec	38400 bit/s
53H	1488	4	53H	1488	4	About 104 usec	9600 bit/s
54H	1488	8	54H	1488	8	About 52 usec	19200 bit/s
55H	1488	16	55H	1488	16	About 26 usec	38400 bit/s
69H	1860	20	69H	1860	20		

Note: When PPS request to change transmission parameter succeeds, transmission parameters shown in the above table are used. When it fails, the default values (F=372,D=1) are used. The C/R does not transmit the result of the PPS request to the Host.

(3) Change of Transmission Parameter in the Specific Mode

C/R supports the following TA1 (F and D) in case of specific mode.

TA1(BIN)	F	D	Time of 1 etu	Transmission seed (usec/1etu)
01H	372	1	About 104 usec	9600 bit/s
02H	372	2	About 52 usec	19200 bit/s
03H	372	4	About 26 usec	38400 bit/s
11H (Default)	372	1	About 104 usec	9600 bit/s
12H	372	2	About 52 usec	19200 bit/s
13H	372	4	About 26 usec	38400 bit/s
32H	744	2	About 104 usec	9600 bit/s
33H	744	4	About 52 usec	19200 bit/s
34H	744	8	About 26 usec	38400 bit/s
48H	1116	12	About 26 usec	38400 bit/s
53H	1488	4	About 104 usec	9600 bit/s
54H	1488	8	About 52 usec	19200 bit/s
55H	1488	16	About 26 usec	38400 bit/s
69H	1860	20	About 26 usec	38400 bit/s

Annex E Matrix of Download Related Commands (DLC)

- The following matrix shows the correlation between DL related commands and the statuses of the C/R. Description of error codes responded to a command is omitted.
- This matrix is applicable when no card exists in the C/R or a card is at the inlet.
- “xx” in this matrix represents a command code.
- “Pxxnx” in this matrix represents the response of “Pxx0x”, “Pxx1x” or “Pxx2x”.

Command/Event		DL Start *1	DL Transmission *2	DL Completion *3	DL Preparation	Initial Reset	Version Read	Status Sensing	Other Commands	DLE EOT	Power Down
Status of C/R		“d4”	“d5”	“d6”	“d3”	“00”-“03”	“V0”	“10”	“xx”		
0	In Normal Operation	“Nd401”	“Nd501”	“Nd601”	“Pd3xx” ->1 Sequence error “Nd301” -> 0 Parameter error “Nd302” -> 0	“Pxxnx”	“PV0nx”	“P10nx”	Process executed “Pxxnx”	DLE EOT	*6
1	Waiting for Reception of Initial Reset	Waiting for initial reset “Nd419”	Waiting for initial reset “Nd519”	Waiting for initial reset “Nd619”	Waiting for initial reset “Nd319”	“Nxx70” ->2	Waiting for initial reset “NV019”	Waiting for initial reset “N1019”	Waiting for initial reset “Nxx19”	DLE EOT	*6 ->0
2	Waiting for Reception of DL Start Command	“Pd430” ->3 Parameter error “Nd402” -> 2 Imperfect DL Program “Nd470” -> 5	Imperfect DL Program “Nd570”	Imperfect DL Program “Nd670”	Imperfect DL Program “Nd370”	Imperfect DL Program “Nxx70” *4	Imperfect DL Program “NV070” *5	Imperfect DL Program “N1070”	Imperfect DL Program “Nxx70”	DLE EOT	*6 ->0

*1 For more details about “DL Start” command, see the flowchart of “DL Start”.

*2 For more details about “DL Transmission” command, see the flowchart of “DL Transmission”.

*3 For more details about “DL Completion” command, see the flowchart of “DL Completion”.

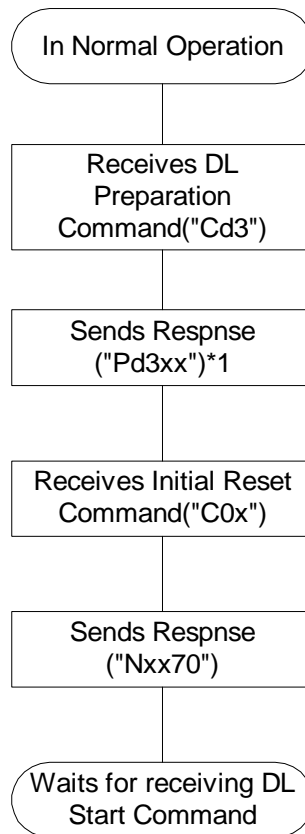
*4 When the response of Imperfect DL Program is returned to an Initial reset command, it processes only command parameter, without initializing shutter and motor.

*5 Although this is a negative response, the command has been executed and this response is returned with the response data added if any.

*6 The C/R responds “Nxx18” to the first command sent after the power-down, and waits for an initial reset command.
 When the C/R receives a command other than initial reset commands, it responds “Nxx19” (Waiting for an initial reset command).
 When it receives an initial reset command, it executes the initial reset and switches its status to “In Normal Operation (0)”.

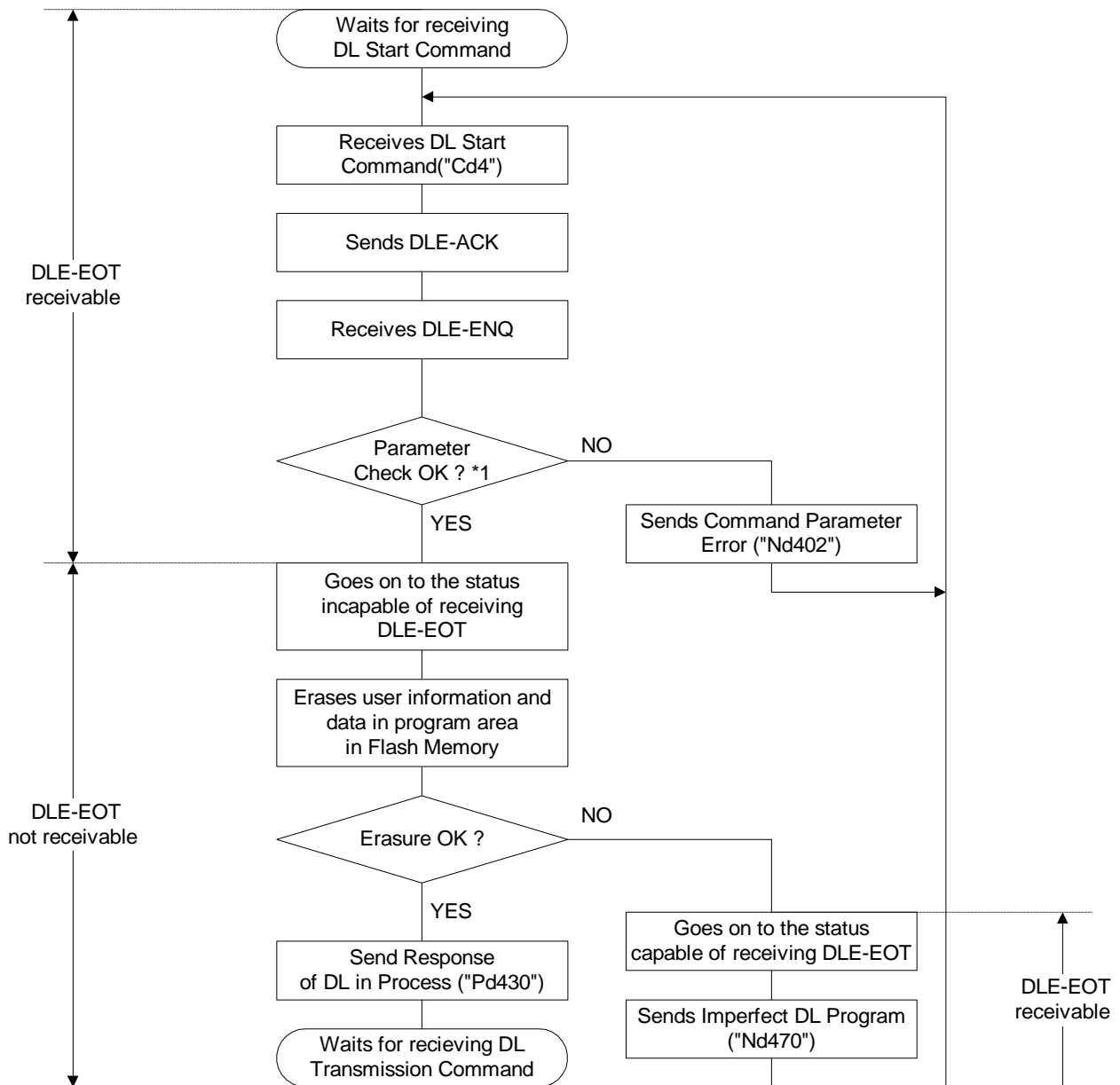
Command/ Event Status of C/R	DL Start *1	DL Transmission *2	DL Completion *3	DL Preparation	Initial Reset	Version Read	Status Sensing	Other Commands	DLE EOT	Power Down
	"d4"	"d5"	"d6"	"d3"	"00"- "03"	"V0"	"10"	"xx"		
3 In Process of DL	"Pd430" *4 ->3 Parameter error "Nd402" -> 3 Imperfect DL Program "Nd470" -> 5	"Pd530" ->3 Sequence error "Nd501" -> 3 Parameter error "Nd502" -> 3 Imperfect DL Program "Nd570" ->5	"Pd631" ->4 Sequence error "Nd601" -> 3 Imperfect DL Program "Nd670" ->5	Imperfect DL Program "Nd370"	Imperfect DL Program "Nxx70" *5 ->5	Imperfect DL Program "NV070" *6	Imperfect DL Program "N1070"	Imperfect DL Program "N1070"	Ignores *7	*8 ->5
4 DL Normal Completion	Waiting for Initial Reset "Nd471"	Waiting for Initial Reset "Nd571"	Waiting for Initial Reset "Nd671"	Waiting for Initial Reset "Nd371"	"Pxx00" ->0	Waiting for Initial Reset "NV071"	Waiting for Initial Reset "N1071"	Waiting for Initial Reset "Nxx71"	DLE EOT	*8 ->5
5 Imperfect DL Program	"Pd430" ->3 Parameter error "Nd402" -> 5 Imperfect DL Program "Nd470" -> 5	Imperfect DL Program "Nd570"	Imperfect DL Program "Nd670"	Imperfect DL Program "Nd370"	Imperfect DL Program "Nxx70" *5	Imperfect DL Program "NV070" *6	Imperfect DL Program "N1070"	Imperfect DL Program "Nxx70"	DLE EOT	*8

- *1 For more details about "DL Start" command, see the flowchart of "DL Start".
- *2 For more details about "DL Transmission" command, see the flowchart of "DL Transmission".
- *3 For more details about "DL Completion" command, see the flowchart of "DL Completion".
- *4 When the C/R receives "d4" (DL Start Command) during downloading, it has to re-download the FW from the start.
- *5 When the response of Imperfect DL Program is returned to an Initial reset command, it processes only command parameter, without initializing shutter and motor.
- *6 Although this is a negative response, the command has been executed and this response is returned with the response data added if any.
- *7 The C/R neither respond to DLE-EOT nor discontinue DL. For more details, see flowcharts of "DL start", "DL transmission" and "DL completion".
- *8 The C/R responds "Nxx18" to the first command sent after the power-down, and waits for an initial reset command.
When the C/R receives a command other than initial reset commands, it responds "Nxx19" (Waiting for an initial reset command).
When it receives an initial reset command, it executes the initial reset and switches its status to "Imperfect DL Program (5)".

Annex F Flowcharts of DL related commands (C/R side) and DL File format**F.1 Flowchart from “In Normal Operation” to “DL Start Command (“Cd4”)”**

*1: When the status of C/R is either "Waiting for DL Start Command" or "Imperfect DL Program", the C/R sends the Imperfect Program Response("Nxx70").
The C/R turns off the DTR Signal for 300 ms after sending the response. After DTR is turned on, the Host shall send "DL Start" Command.

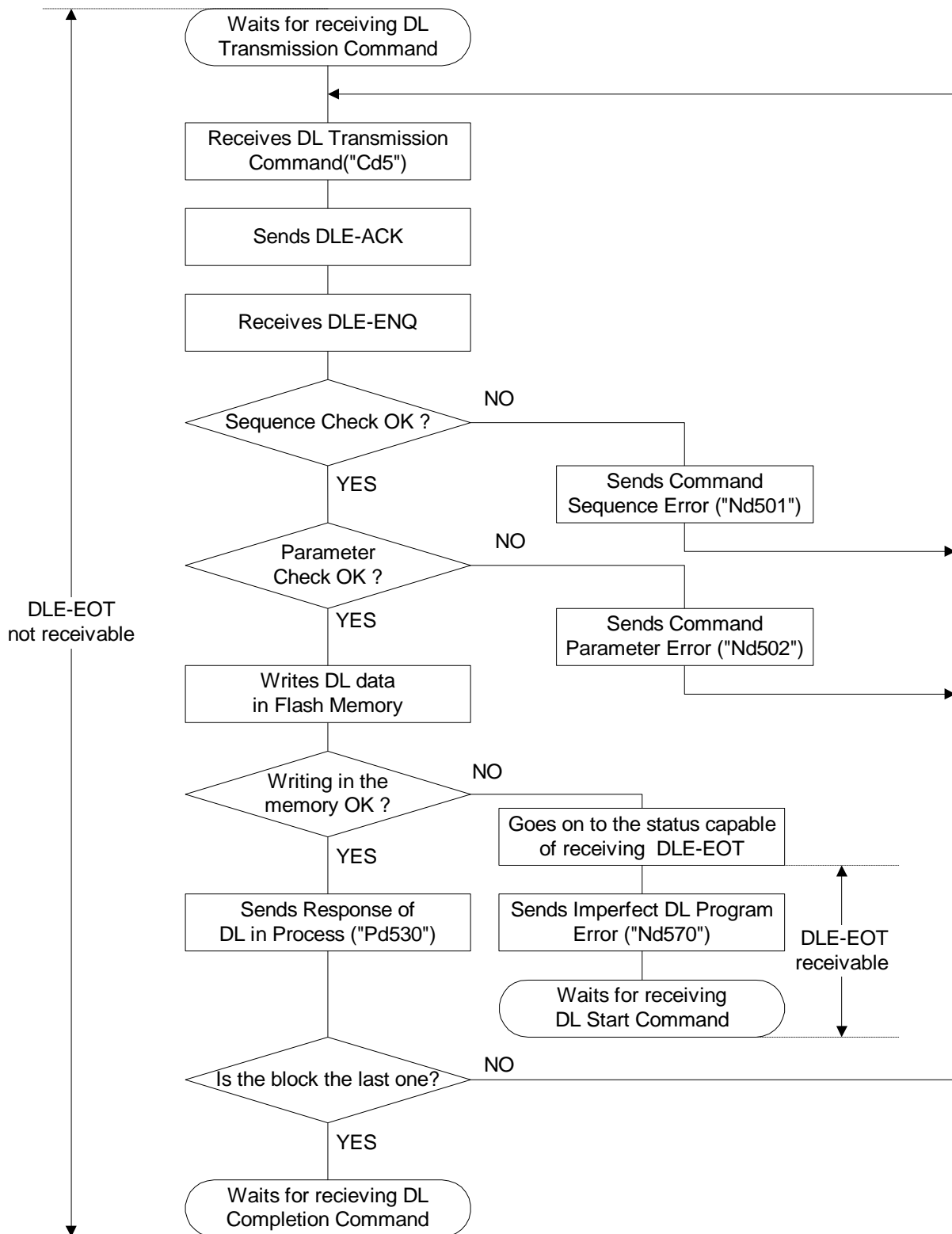
F.2 Flowchart of DL Start Command (“Cd4”)



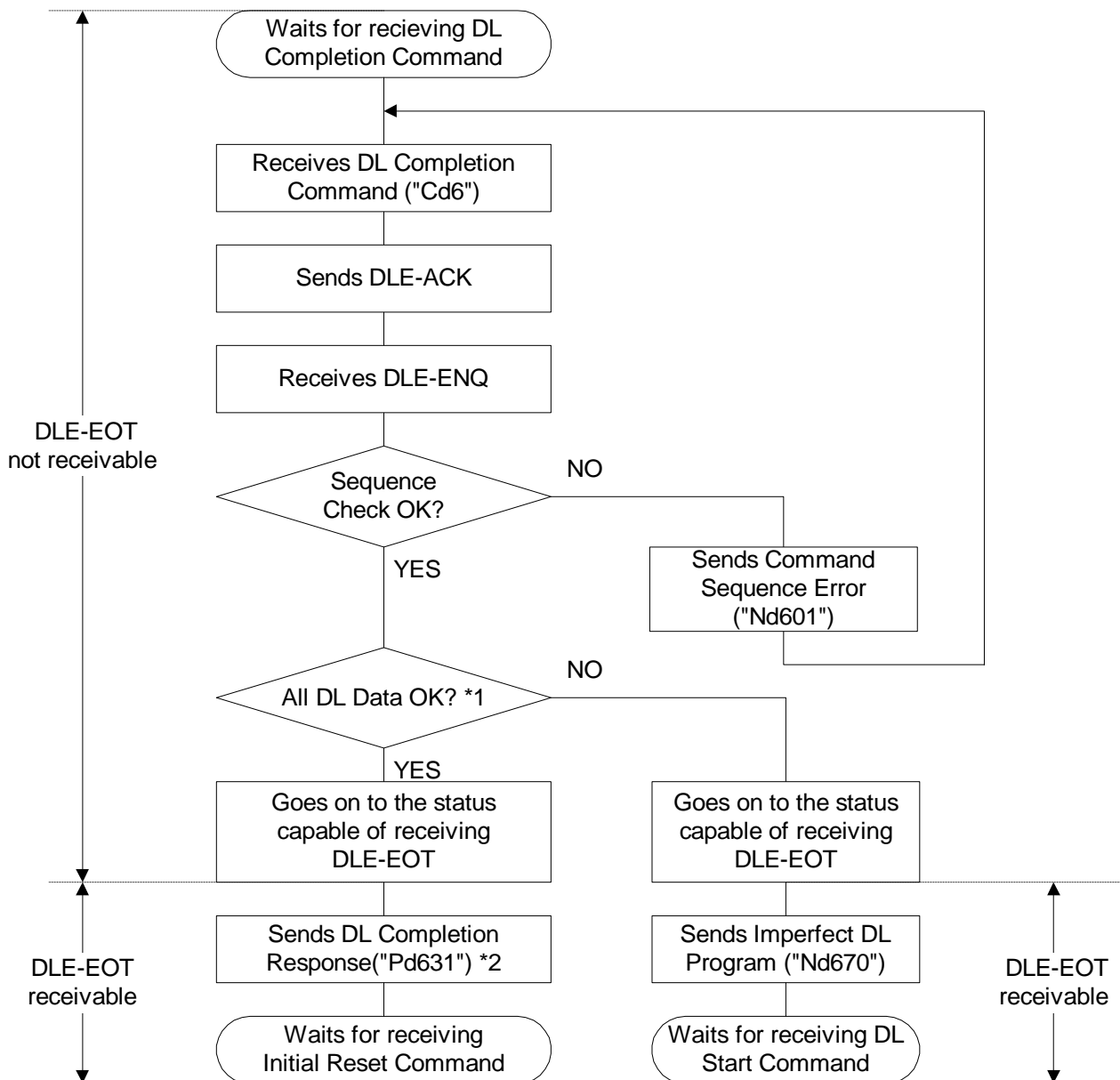
*1: “Parameter Check” verifies:

- Whether the FW type, revision and sum value of the CPU specified in the command parameter of DL Start Command agree with the actually mounted ones.
- Whether the download block size specified in the command parameter of DL Start Command is within the DL area size of C/R.

F.3 Flow chart of DL Transmission Command ("Cd5")



F.4 Flow chart of DL Completion Command (“Cd6”)



*1: “All DL Data OK” checks:

- Whether the sum value in the program in the FW in the Flash Memory is correct.
- Whether the CPU FW type, revision and sum value are the same as the ones written in the flash memory in the C/R.

*2: The C/R turns off the DTR Signal for 3 seconds after sending “DL Completion Response(“Pd631”)”. After the DTR Signal is turned on, the HOST shall send Initial Reset Command.

F.5 DL File Format

Items			Sizes (Bytes)		Attribute	Notes
Header Field	User Information		256		BIN	Variable
	Downloadable CPU Information	Type	12	20	ASCII	Variable
		Version	2			
		SUM Value	6			
	Download Firmware Information	Type	12	22	ASCII	Variable
		Version	2			
		SUM Value	8			
Downloadable Block Number (N)		3		ASCII	"001"~"999"	
Data Filed	1st Block	512 x N		BIN	This file is divided into 512 bytes each to be used as the parameter of DL Transmission Command ("Cd5").	
	2nd Block					
	:					
	Nth Brock					
File SUM Value (Calculation range is from the top to the end of download file.)		4		BIN	The host should check the justification of download file SUM value.	

Annex G Processing on Power-down

G.1 Processes Conducted by C/R on Power-down

The process conducted by the C/R after detecting power-down is either process shown below. The process to be conducted is specified by the command parameter of the Initial Reset Command (“C00” - “C03”) sent by the Host in advance.

- The C/R holds a card inside.
- The C/R returns a card to the take-out position (inlet).
- The C/R ejects the card to the rear (to the reject box).

State of C/R when power-down is detected		Process by C/R when power down is detected		
No command received	No card inside C/R		No processing	
	During Insertion permitted	Card has not been inserted yet.	Prohibits Insertion	
		Card is being inserted.	Prohibits Insertion	
		Card is being transported inside C/R.	completes transportation -> conducts the post power-down process	
	The inlet holds a returned card.		No processing	
	A card is inside the C/R		Conducts the post power-down process	
	Pressing IC contacts in process		Releases IC contacts -> conducts the post power-down process	
	ICC activation in process		Deactivates ICC-> Releases IC contacts -> conducts the post power-down process	
DL in process		No processing *1		
In command processing	During in-take	Before card insertion	Interrupts in-take	
		In card insertion (S0 ON and S1 OFF)	Interrupts in-take	
		In card insertion (S0 and S1 ON)	Interrupts in-take -> returns the card until S1 turns off	
		Card is being transported inside C/R.	Finishes in-take -> conducts the post power-down process	
	Returning a card in process		Finishes the return -> no processing	
	Reading ICC in process		Finishes reading ICC -> deactivates ICC -> releases ICC -> conducts the post power-down process	
	Writing ICC in process		Finishes writing ICC -> deactivates ICC -> releases ICC -> conducts the post power-down process	
	DL in process		Interrupts downloading of FW *1	
	During reading /writing of memory *2	No card inside C/R		Finishes reading/writing of memory
		During insertion permitted	Card has not been inserted yet	Finishes reading/writing of memory -> prohibits insertion
			Card is being inserted	Finishes reading/writing of memory -> prohibits insertion
			Card is being transported inside C/R	Finishes reading/writing of memory -> finishes transportation -> conducts the post power-down process
		The inlet holds a returned card		Finishes reading/writing the memory
		A card is inside the C/R		Finishes reading/writing the memory -> conducts the post power-down process
		Pressing IC contacts in process		Finishes reading/writing the memory -> releases ICC -> conducts the post power-down process
ICC activation in process		Finishes reading/writing the memory -> deactivates ICC -> releases ICC -> conducts the post power-down process		

*1 : The C/R has to re-download the FW after receiving an initial reset command. For more details, refer to the flowchart in G.3.

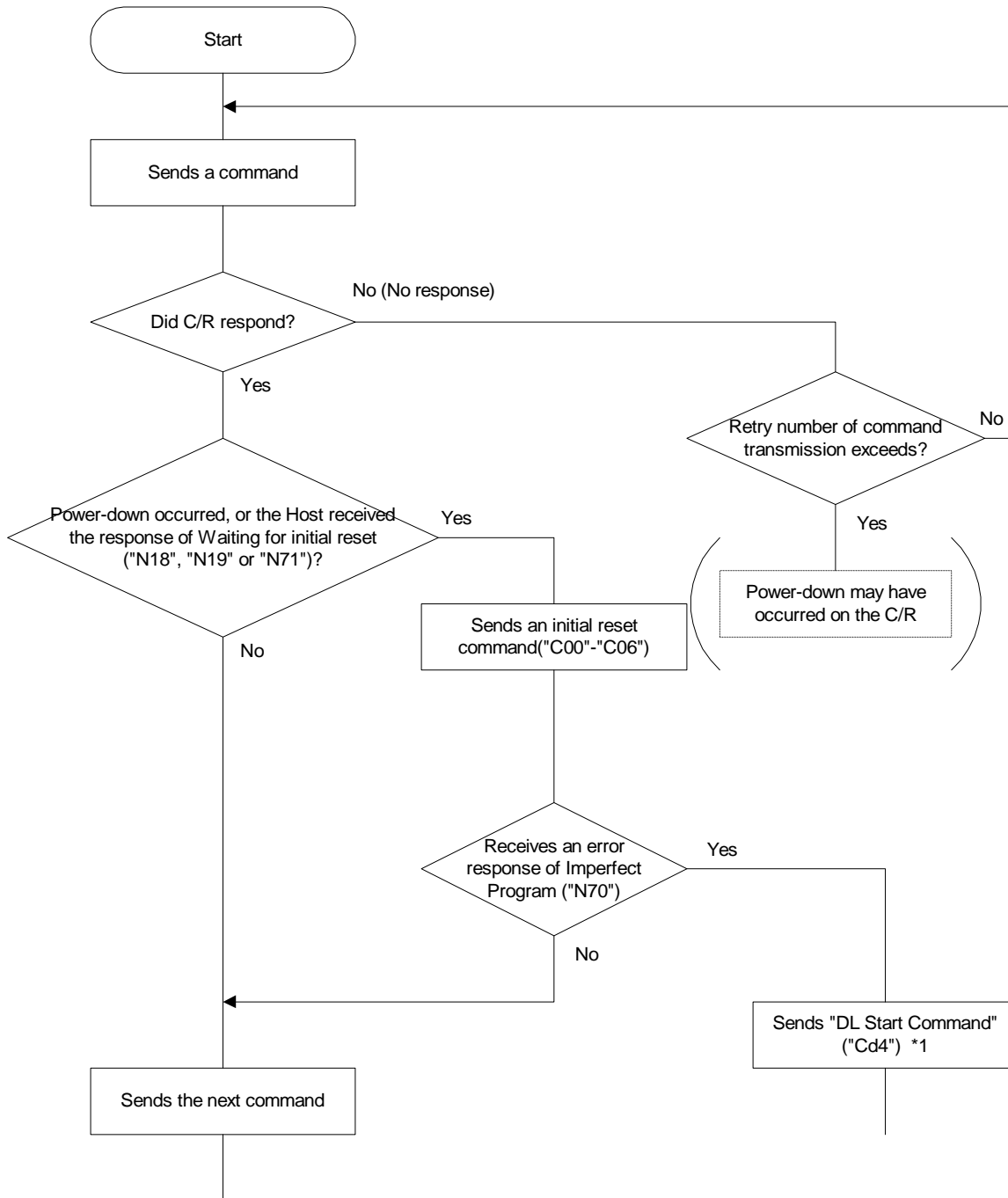
*2 : “During reading /writing of memory” indicates the period that the C/R is reading/writing the information stored in the Flash Memory.

G.2 Response sent by C/R after Power-down

State of C/R when power down is detected	The first response after power down is detected	The second or later response after power down is detected
Command not received	To the first command after power down is detected, the C/R sends one of the responses below: - Power down detection (Nxx18) - Waiting for initial reset (Nxx19) - Initial reset waiting after DL completion (Nxx71)	C/R sends a response of "Waiting for initial reset" (Nxx19) or (Nxx71). *1
In command processing	The C/R sends one of the responses below as the response to the command being processed: -Power down detection (Nxx18) -Waiting for initial reset (Nxx19) -Initial reset waiting after DL completion (Nxx71)	

*1 If the C/R receives a command other than initial reset commands ("C00"-“C03”), it returns a response of "Waiting for initial reset".

G.3 Flowchart on Power-down Detection (HOST Side)



*1: FW need to be re-loaded because the sum value in the flash memory is wrong. To see how to re-load, refer to the flowchart of the DL related commands.

Annex H Commands Available on Imperfect Program Error

The table below shows command names and CMDs which the Host can send when it receives a response of Imperfect Program Error ("N70"), that is, when the program to be downloaded to the C/R is imperfect. For the details of these commands, see 7.

The responses shown in the table are the ones to be returned by the C/R as a response to the command sent on imperfect program. Even when the C/R returns the negative response shown below, it correctly executes the command. For the details of the responses, see 7.

Command Name	CMD(ASCII)	Response	Note
Initial Reset	"00"	"N70"	Initializes only parameters. The shutter and motor will not be initialized.
	"01"	"N70"	
	"02"	"N70"	
	"03"	"N70"	
Status Sensing	"10"	"N70"	
Version Read	"V0"	"N70" + Response Data	
DL Start	"d4"	"P30" or "N70"	
DL Transmission	"d5"	"P30" or "N70"	
DL Completion	"d6"	"P31" or "N70"	

Annex I Detailed Specification of Memory Card

I.1 Matrix of Memory Card

Command(CMD)		Press "C0"	Release "C1"	Activation "m2"	Deactivation "m3"	Press + Activation "m5"	Deactivation + Release "m6"	Transmission and Reception "m7"	Verification "Cm8"
Status of C/R									
0	Before Contact Press	Press "PC010" ->1				Press + Activation "Pm511" ->2			
1	After Contact Press		Release "PC102" ->0	Activation "Pm211" ->2		Activation "Pm511" ->2	Release "Pm602" ->0		
2	After Activation				Deactivation "Pm310" ->1		Deactivation + Release "Pm602" ->0	Data Transmission and Reception "Pm720"	Verification "Pm820"

I.2 Notices

I.2.1 ATR

- When the C/R activates a memory card, it reads data of 4 bytes.
- If all the data in ATR are 00H or FFH, the C/R deactivates a memory card and sends the Host an error response ("Nxx82").

I.2.2 Transmission and Reception ("m7")

- The C/R executes communication between the Host and a memory card. It checks the validity of commands but does not check the procedure of the sequence.
- The command parameters and response data are the same as APDU.
- For the details of APDU, see ISO/IEC 7816-4. For the details of command parameters and response data, see 7.
- If the parameters specified by the Memory Card Transmission Command ("Cm7") differ from the card type specified by the Memory Card Activation Command, the C/R sends a Command Sequence Error response.

I.2.3 Verification ("m8")

- By this command ("Cm8"), the C/R automatically sends a memory card the commands necessary for verification. (See SIEMENS SLE4442 Data Book or SIEMENS SLE4428 Data Book.)
- If the Host sends the Memory Card Verification Command ("Cm8") to a card not supporting the PSC certification, the C/R sends a Command Sequence Error response.