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रेलवे सूचना प्रणाली केन्द्र
(रेल मंत्रालय, भारत सरकार का संगठन)

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1. Pl circulate o/c Divs.
Pl check with vendors
whether they have them
spec ready.

CENTRE FOR RAILWAY INFORMATION SYSTEMS
(An Organization of the Ministry of Railways, Government of India)

No. CRIS/HQ/PLCY/5/2023-UTS

Chief Commercial Manager/PM
All Zonal Railways

CCM/PM
DY. CCM/SYS
SCM/DB
ACM/SYS
CRS/UTS

Dated 10.07.2023

18.07.2023

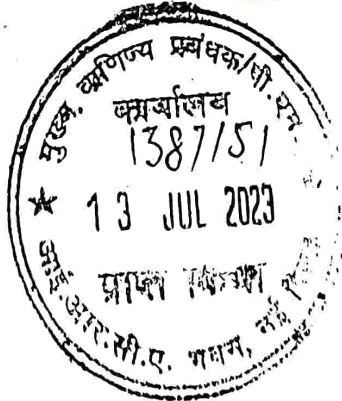
Sub:- Technical Specification of ATVM, SMC Terminal & RFID Reader.

CRIS has revised Technical Specification of Automatic Ticket Vending Machine (ATVM), Smart Card Management (SMC) Terminal and RFID Smart Card Reader. Revised specifications are enclosed in Annexure for information please.

D.A./As Above

MPah-
10.7.2023
(Madhusmita Patra)
General Manager/UTS

Copy to: General Manager, CRIS Regional Offices for information.



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Technical Specification of Smart Card Operated Ticket Vending Machine (ATVM)

Full diagram of ATVM kiosk is enclosed in Annexure-A3. The ATVM Kiosk is a collection of the following sub-components integrated together:

1. Enclosure
2. Processing Unit
3. Smartcard Reader
4. Touch Screen
5. Ticket Printer
6. API for UPS (Annexure A1)
7. API for Smart Card Reader (Annexure A2)

The Technical specifications of the various subsystems are as follows

(1) Metal/Fiber Enclosure		
1	Type	Floor Clamping
2	Enclosure	Aesthetically rugged, well designed, Sturdy, Durable. Made of High grade sheet steel powder coated cabinet with cooling fans, mounting accessories, internal power distribution arrangements with shock proof. It should be IP 21 or higher standards compliant.
3	Dimensions	W x D x H (As per Annexure-A3)
4	Color	RAL 3000 & RAL 7001
5	Outlet sheet metal structure with necessary doors with mechanical lock to access all the devices. The door should open at the front of the kiosk.	
6	The kiosk Base support should be in metal frame and should have necessary arrangement for floor Clamping.	
7	The kiosk should be powder coated and rust free.	
8	The Kiosk should have required number of socket for spike proof supply.	
9	Cooling System	Should have necessary cooling mechanism to maintain the internal temperature of kiosk below 45°C.
10	Ticket Printer	Printer should be enclosed inside a separate box with door having lock. It should be placed over a trolley.
11	UPS	The kiosk should have UPS with 30-40 minutes backup (throughout the warranty period) and should be fitted at the bottom on different compartment. SMF (Sealed Maintenance Free) battery must be used for the UPS. UPS should have soft shut facility (UPS goes online when power returns).
12	Speaker	Two speakers with sound range of 60-80 db(A) measured at 1 meter from source
13	The kiosk should have proper LED lighting arrangements inside the enclosure.	
14	Power Requirement for the kiosk	The ATVM Kiosk should operate on 230 Volts, Single Phase and should not consume current more than 5 AMPs. The kiosk should be fitted with Current surge protector MCB of 5 AMPs/6 AMPs Rating. The AC RMS voltage between Earth and Neutral should not be more than 2 Volts.

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(2) Kiosk Processing Unit		
S. No.	Item	Description
1.	Processor	Quad core processor with base frequency of Min 1.1 GHz or above and Burst frequency of Min 2.4 GHz or above (Fanless model)
2.	Memory	4GB or above DDR3 or higher
3.	Flash/SSD/DoM memory	32 GB (16GB usable + 16 GB OP) or above usable MLC/3D-TLC SATA/mSATA/M.2/eMMC in primary slot or onboard primary
4.	Keyboard & Mouse	USB based 104/107 keys Mechanical keyboard and scroll mouse
5.	Power supply	Internal SMPS/External with 110~240 V, 50 Hz, automatic power-down Power Supply
6.	Monitor	1. 17" TFT Color monitor with Touch screen facility as per the Touch screen specification. 2. Pixel Pitch – 0.27mm (or better) 3. Resolution – 1280 x 1024 @ 60 Hz (Max) 4. Contrast Ratio – 350 : 1 (or higher) 5. Viewing Angle (H/V) – 140 / 110 (or better)
7.	Ports	(minimum requirement) <ul style="list-style-type: none"> Serial ports (DB 9 Pin) are required to connect all sub components with future expandability option for one more serial port One Centronics printer port (only if printer is connected to parallel port) USB ports required to connect all sub components with future expandability option for two more USB ports Built in 10/100 Mbps Auto sensing LAN Interface SVGA/HDMI port for Monitor
8.	Networking	<ul style="list-style-type: none"> TCP / IP with DNS, DHCP support Telnet, SCP, SSH, Cron, Support for IPV6
9.	O/S and S/W embedded	<ul style="list-style-type: none"> 64 bit embedded Linux (trimmed as per CRIS requirement) having kernel version 4.18.xx and above (4.xx..xx) OS Size should be less than 4 GB of onboard/primary flash memory. (OS size includes Kernel, libraries required to run Application, X-window Interface, Mozilla Browser etc. However, OS size excludes JRE) JRE version 1.6 and 1.8 or above Touch Screen Calibration Utility, if recalibration is required Menu based Local Terminal Configuration Utility Mozilla Browser latest version with interaction with peripherals devices and option to import security certificates. There should be option for regular updates of browser. lpr printing. PDF viewer with printing support.
10.	Compatibility	<ul style="list-style-type: none"> CRIS application made in Java / C++

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		<ul style="list-style-type: none"> Indian language Printing Support (e.g. Hindi, Telugu/Bangla etc.) API for interface for UPS as per Annexure A1
11.	Remote Manageable	<ul style="list-style-type: none"> Administrator be able to do a remote installation from a central location, management of operating system, updates, patches and application software of all thin clients- asset information. Administrator should be able to Remotely control Network setting, Power options. Restart options.
12.	Security	<ul style="list-style-type: none"> Provision to enable / disable USB storage class with password (by default it should be disabled for storage class) Password protected setup for terminal configuration root password recovery module must be removed TLS version 1.3 or above supported by offered OS and browser. Upgrade option should be available
13.	SNMP support	Community string: uts.<zone>.tc. Traps to be enabled: linkup, link down, cold start SNMP community version snmpv2c should return attributes: Host name, Mac-Address, OS and its version
14.	Regulatory compliance	Self-certified RoHS (Restriction of Hazardous Substances) compliance BIS Certification for Thin Client.
15	Other OS Feature	Automatic Application Startup feature. (CRIS application should start and be visible on screen without any manual intervention.)
16	Power Consumption	Thin client: 65 W or less Monitor: 30W or less
17	Upgrades	Browser upgrade through patch – Twice a year (as per CRIS recommendation) TLS upgrade through patch - Twice a year (as per CRIS recommendation)

(3) Smart Card Reader

S.No	Item	Description
1	ISO14443A Smart Card Reader with SAM 4 SLOTS for existing Mifare 1K classic cards & Desfire family Cards. The command set for reading existing Mifare 1K classic cards on reader given in the Annexure A2.	
2	Operating distance	Up to 100 mm
3	FIFO depth (byte)	Physically must be 64 bytes, logically must be extended to 256 bytes
4	Host interface	8 BIT or higher PARALLEL / SPI
5	Interface frequency	13.56MHz.

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6	Modulation & Data Coding	ISO14443A
7	Baud rate	57600bps-N-8-1
8	Thin Client to Reader Interface	RS 232
9	Communication Standards	1. ISO14443 -2, -3, -4 2. ISO7816 (T=1), Interface supporting standard Bit rates with options of supporting up to 1.5 Mbps
10	Communication Protocols	MIFARE CLASSIC & T=CL
11	Crypto Support	Should support MIFARE Crypto & Secure Non Volatile Internal Key Memory
12	Security Feature	Should support high security Terminal with SAM's based on DES, TDES & AES with secure storage & secure downloading of keys
13	Supply Voltage	12V
14	Power down mode current typical [mA]	10
15	Wake time [micro sec]	1000 (Host to Controller)
16	Temperature Range	0°C to 50°C
17	Controller& Host communication	Should be able to open 1 single device serial interface for communication
18	Should be enclosed in an enclosure made of durable heavy-duty material.	

(4) Touch Screen		
S No	Item	Description
1	Touch screen technology	Projected capacitive with protective glass
2	Input methods	Finger or gloved hand activation only
3	Operation Force	<0.1g
4	Surface Hardness	Mohs >=7, Film as per ASTM D 3363-05(2011) e2 or equivalent standards
5	Sealability	Seal should meet NEMA 3 & 12 or IP 54 or equivalent standards.
6	Optical	Pure Glass
7	Finish	Anti-Glare & Anti Reflective
8	Resolution	<1mm
9	Speed of response	<20 ms
10	Operating temperature	0°C to 50°C
11	Operating relative humidity	Non condensing, Relative humidity 0 to 90% up to 40°C or 80% @ 60°C
12	Calibration	One-time calibration and should be stable, drift-free operation—for touch response that's always accurate, even in electrically noisy

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		environments
13	Positional accuracy	It should be less than 1.5% of reported position in recommended viewing area
14	Light transmission	Up to 90%
15	Expected life	Atleast 200 million touches at any one location. Durable, scratch-resistant glass surface
16	Chemical resistance	Glass should not be affected by household and industrial chemicals as per ASTM F 1598-95 or equivalent standards
17	Abrasion resistance	Glass front, unaffected by surface scratching.
18	Water Resistance	Resistant to water droplets on the surface
19	Impact Resistance	Meets UL-60950 and CSA C22.2 No. 60950 ball drop test (0.5 kg, 50 mm diameter ball dropped from height of 1.3 m)
20	Weather	Resistant to snow, ice, rain, sleet, hail, wind, etc
21	Regulatory Compliance	HALT/HASS, Rohs or equivalent

(5) Ticket Printer		
S No	Item	Description
1	Print Method	Direct Thermal or Thermal Line
2	Fonts	Special fonts for Railways. All vowel characters should be printed in italic
3	Character Size	Font A: 12x24
4	Multi Language Support	With multi-lingual support, for Indian Languages with Hindi and English as default and other regional language support for future.
5	Resolution	200 dpi or more
6	Printing Speed	100 mm or more per sec
7	Fast print response	Instant print operation, no warming up.
8	Paper width	81 mm
9	Printable width	77 mm
10	Paper length	90 mm
11	Printable length	86 mm
12	Paper weight	100 GSM \pm 2.5%
13	Paper thickness	100 μ m \pm 2.5%
	Paper type	Thermal
15	Sensitivity side	Outside
16	Paper feed speed	150 mm/s (Continuous paper feeding)
17	Roll Capacity	Should have provision for a single roll supporting 500 tickets. Inner Dia of inner core is 38mm \pm 1mm & outer Dia of inner core is 45 mm

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		± 1mm. Total Dia of Thermal Roll is approx 98mm.
18	Paper Cutter	Automatic & Integrated and High Speed
19	Print Head Life	100 km paper length
20	Cutter life	Minimum 0.7 million cuts with 100 gsm paper
21	Paper loading	Printer should have feature of auto loading & auto adjustment of paper so that in any case, no ticket should be wasted and paper should be adjusted at its proper position. This should be designed in such a way that different length of ticket stock should be accommodated.
22	Emulation	Epson Compatible (Epson ESC/P). Printer should support full command set of ESC/P.
23	QR Code support	Support for graphics printing capability. It should omit carriage return command in between graphics printing
24	Printer Monitoring & Status	Very comfortable & comprehensive monitoring program for checking & verifying all main printer functions (Paper out, printer cover open, power off/on) and status messages from the printer through Serial/Parallel/USB port. All these status should be returned in response of commands so that ticket printing application can be programmed to retrieve the status messages of the printer.
25	Black mark recognition	To control printing & cutting of pre-printed tickets, Width of Black Mark: 81 mm; Height of Black mark: 4 mm.
26	Sensors	Sensors for cover open paper out and ticket print status success/failure. In case of any manipulation / tampering with sensor, printer should not print ticket.
27	Reliability (MCBF)	37 million lines
28	Temperature	5°C to 45°C
29	Humidity	10 to 90% RH
30	Power Requirement	110 V to 240 V AC
31	Usable Paper	Top Coated Thermal Paper
32	Receive Buffer	45 bytes to 4 KB
33	Interface	Bi-directional Serial/Bi-directional Parallel/USB
34	Return status from Printer	1. Serial interface:- Printer Ready – 4126 (in hex), Printer not Ready -4006 (in hex) 2. Parallel interface:- Printer Ready – DF (in hex), Printer not Ready -7F (in hex) 3. USB Interface:- Printer Ready – 18 (in hex), Printer not Ready –any other positive value (in hex) Printer not ready status should return in case printer is not able to print ticket due to paper out, cover open, head open or any other error.
35	Line Spacing	Default line spacing should be 1/8. It should also support 1/6 inch line spacing.
36	Printer to stop printing when printer cover is open. It should clear the remaining ticket buffer when power off or printer is open.	

37	Printer must support printing of ticket with ticket length as per black mark (not as per fixed length) so that different length ticket stationary can be accommodated in the same printer.											
38	Printer should have paper guider to align the paper.											
39	In case of Serial interface, default baud rate should be 38400.											
40	Printer should support printing on thermal roll rolled on either side.											
41	Printer should have capability of printing ticket through CUPS and through direct transfer of Text/Image to the port.											
42	Desirable Security Feature	<p>Facility to monitor number of power on, number of auto cuts and number of times the printer is open. These numbers should be return in response of below command:-</p> <table border="1"> <thead> <tr> <th>Command</th><th>Description</th><th>Data</th></tr> </thead> <tbody> <tr> <td>1D4951</td><td>Number of Cut</td><td rowspan="3">Response in number</td></tr> <tr> <td>1D4952</td><td>Number of Power ON</td></tr> <tr> <td>1D4953</td><td>Number of Cover Open</td></tr> </tbody> </table>	Command	Description	Data	1D4951	Number of Cut	Response in number	1D4952	Number of Power ON	1D4953	Number of Cover Open
Command	Description	Data										
1D4951	Number of Cut	Response in number										
1D4952	Number of Power ON											
1D4953	Number of Cover Open											



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Common API Structure

- i) API name will be: ATVM.jar
- ii) Package Name :CrisATVM
- iii) Classes for Cris use: AtvmApi.class

i) The **AtvmApi.class** will have the following methods:-

- **int getUpsStatus():** To check whether the main supply is on/off. The status will be in
 - 0 if main power supply is on
 - 1 if main power supply is down and UPS on
 - -1 for any Exception
- **int getBatteryStatus():** To check the remaining battery status of UPS. The value will be in
 - .x (an integer value from 0 to 100) indicating % level of battery remaining
 - -1 for any Exception
- **int makeUPSSoftShutdown():** To Initiate soft shutdown of UPS. Command executes after grace period (approximately 60 seconds). The status will be in
 - 0 Success
 - -1 Failure

In case of power down and machine shutdown then after resume of power, ATVM should start automatically without manual intervention.



CRIS 1k Card Commands for RFID SMARTCARD READER

READER VERIFICATION

Cmd: "Rcr"

Answer : Name of Company | version

READER IDENTIFICATION

Cmd: "crg"

Answer : Station Id

CARD SELECTION:

Cmd: "crs"

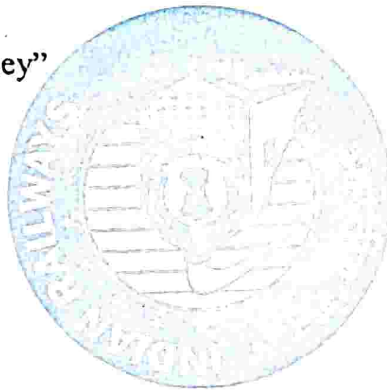
Answer: Card SNR number (8 bytes) and with data of manufacturer block "N" if no tag is present

LOGIN COMMAND

Cmd: "crl0,sectorNumber,KeyType,Key"

Example: crl01AAFFFFFFFFFFFFFF

Answer: L(successful login) or
F(login failed) or
N(No tag)



READ COMMAND

i) Cmd: "crr,blockNumber"

Answer: DATA or "N" for no tag or "F" read failure

Example : crr02 // read from block 2

ii) Cmd : "crv,blockNumber"

Example : crv07 // reads value of block 7

Answer: Data or "N" for no tag or "F" read failure

iii) Cmd: "crrAr"

Answer: Full data of Railway smart card from all blocks from all the sectors in one go(Single command).

Example : crrAr01020304 ..can be upto... 40 //will read data from given block(s)

iv) Cmd: "crre,register Number"

Answer: Data or "N" for no tag or "F" read failure

Example : crre06 //for reading register 6 which is for baud rate

Answer : will be 03 if the baud rate is 57600

WRITE COMMAND

iv) Cmd : "crw,blockNumber,data"

Answer : Data (if successful) or "N" no Tag or "F" write failure or "X" generic error

Example: crw0533424330364335303031000000000000 // write to the block 5 with 32 bytes of hex data in sector 1

ii) Cmd : "crwv,valueBlockNumber,data"

Answer : Data (if successful) or "N" no Tag or "F" write failure or "X" generic error

Example : crwv06010055EF // write the value in block 6

iii) Cmd : "crwm,keyNumber,key"

Answer : "N" no Tag or "F" write failure or "X" generic error

Example: crwm00112233445566 // store key 112233445566 in EPROM which is key 0

iv) Cmd : "crw,sectorTrailerNumber,key AA ,Access bits, KeyBB"

Answer : "N" no Tag or "F" write failure or "X" generic error

Example :w07000000000000FF078069AABBCCDDEEFF

For protocol Configuration Register and for Baud Rate
v) Cmd : "crwe,registerNumber,value to set"

Answer : "N" no Tag or "F" write failure or "X" generic error

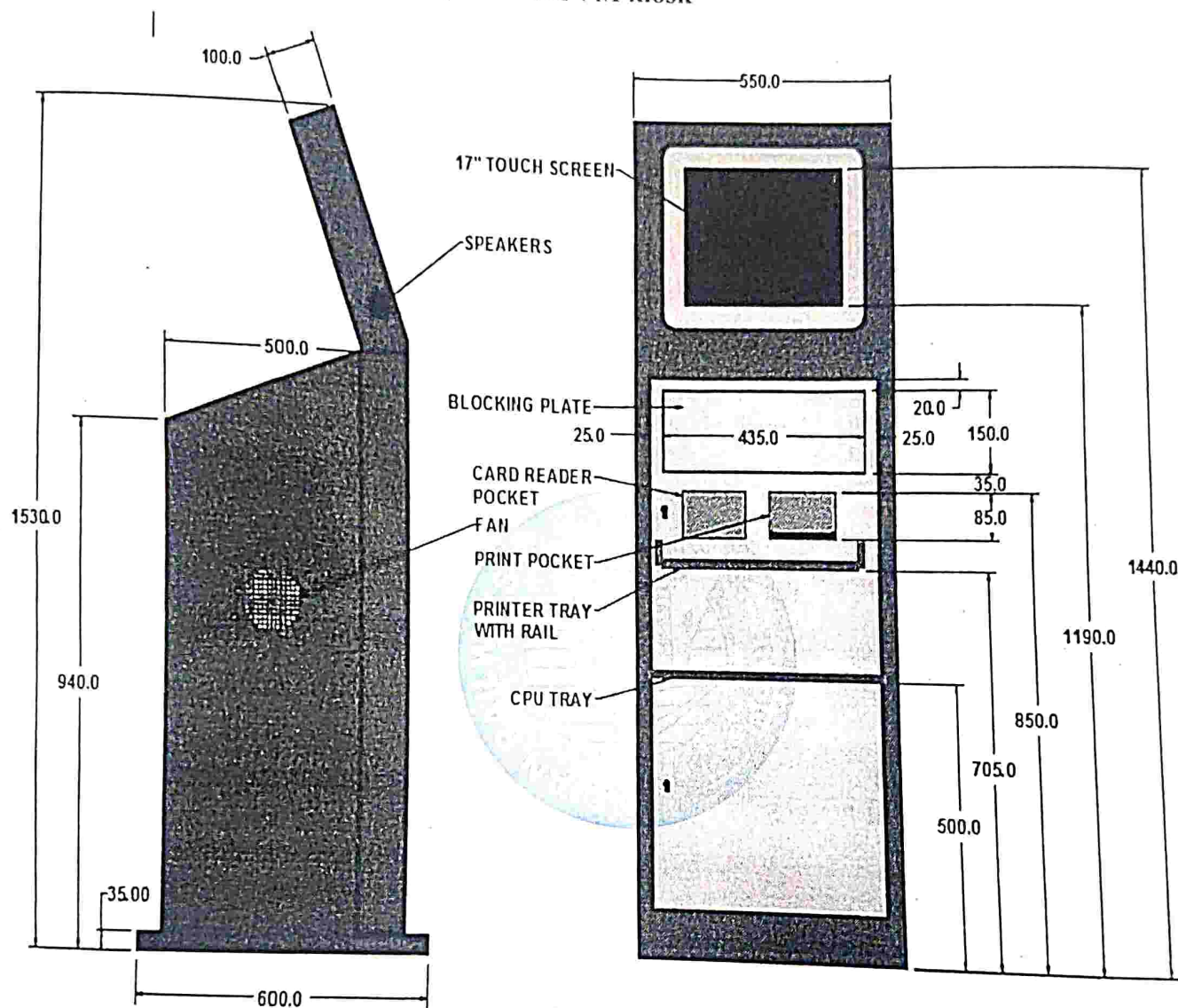
Example : crwe0600 // set reader baud rate to 9600

vi) Cmd : "crwA,data" //It should write full Railway smartcard data in one go(Single command).

Answer : It should return all same data written on the card or "N" no Tag or "F" write failure.

Layout of ATVM kiosk

Annexure-A3



Note:-

1. Dimension mentioned is for reference and minor variation is accepted. Fitting of internal components may change as per size & design of components; however, area inside blocking plate should be kept vacant for future purpose.
2. Blocking plate should be screwed from inside and it should be at same level of door. In future, blocking plate may get removed to mount POS device from inside.

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INCREMENT COMMAND

Cmd :cr+,blockNumber,data

Answer : Data (if successful) or "N" no Tag or "F" increment failure or "X" generic error or "I" no value block

Example : cr+0100000100

DECREMENT COMMAND

Cmd :cr-,blockNumber,data

Answer : Data (if successful) or "N" no Tag or "F" decrement failure or "X" generic error or "I" no value block or "E" decrement failure, empty

Example : cr-0100000100

COPY COMMANDS

Cmd : "cr=,blockNumber1 ,to blockNumber2"

Answer : Data (if successful) or "N" no Tag or "F" increment failure or "X" generic error or "I" no value block

Example : cr=0405

READ/WRITE USER PORTS

Cmd : "crpr"

Answer : Will return port number of the reader

Cmd : "crpw00" (clearing user port)

Answer : Clear the user port

Cmd : "crpw01" (sets user port)

Answer : Set the user port


वरिष्ठ मण्डल वाणिज्य प्रबन्धक,
उदरे, अम्बाला छावनी.