

Which Terminal Settings Am I Allowed to Change?

ID TECH incorporates an approved EMV Level 2 Kernel (referred to as the Kernel) into its various products. There are five principal configurations certified in the Kernel: 1C, 2C, 3, 4C, and 5C. Each has major and minor parameters. Customers can configure those parameters to suit their product needs. However, according to EMV rule, only minor parameters, and certain specific functions in the major parameters, are allowed to be changed for each configuration.

When the Kernel is incorporated into the firmware for a product, the firmware needs to limit the host so that only the allowable bits in the major parameters can be changed. A hash is used to verify that no major bits have changed in the config parameters. If you attempt to change any bits that aren't considered minor, the change will be disallowed and flagged as an error.

EMV Rules on Major and Minor Parameters

The Kernel is certified for five configurations. Each configuration has major parameters and minor parameters according to EMV rules. The parameters are set via TLVs. Each tag has its own default value for each configuration.

Seven tags govern the *major* parameters. Those major parameters cannot be changed according to EMV rules, *with the exception of certain bits*. The following are the tags for *major* parameters:

9F33 – 3 bytes

9F35 – 1 byte

9F40 – 5 bytes

DF11 – 1 byte

DF26 – 1 byte

DF27 – 1 byte

DFEE1E – 8 bytes

There are no restrictions in *minor* parameters and they can be changed according to EMV rules.

Restricted Bits in Major Parameters

Three tags contain parameters that can be configured. The other four tags cannot be changed. Within the configurable parameters, certain restrictions apply, as follows. (Note that bit numbering begins at one and goes through 8.)

Tag 9F33 - Terminal Capabilities

Byte 1: Bit 6 (IC with Contacts) NOT ALLOWED TO CHANGE

Byte 2: Bits 8,7,6,5,4 (CVM Capability) NOT ALLOWED TO CHANGE

Byte 3: Bits 8,7,4 (Security Capability, SDA/DDA/CDA) NOT ALLOWED TO CHANGE

Tag 9F40 - Additional Terminal Capabilities

Byte 1, Bits 8,7,6,5 (Transaction Type Goods, Cash, Services, Cashback) NOT ALLOWED TO CHANGE

Byte 4, Bits 2,1 (Code tables 10-9, these all need to be 0) NOT ALLOWED TO CHANGE

Byte 5, Bits 8,7,6,5,4,3,2,1 (Code tables 2-8, these all need to be 0, Bit 1 needs to be 1) NOT ALLOWED TO CHANGE.

Tag DFEE1E Terminal Configuration

Byte 2: Bits 8,7,3 (PSE, Cardholder Confirmation, Default DDOL) NOT ALLOWED TO CHANGE

Byte 3: Bits 8,7,6,5,4,3 (CAPK action, PIN functions) NOT ALLOWED TO CHANGE

Byte 4: Bits 8,7,6,5,4,3 (TRM Settings) NOT ALLOWED TO CHANGE

Byte 5: Bits 8,7,6,5,4,3,2 (TAC/IAC settings) NOT ALLOWED TO CHANGE

Byte 6: Bits 8,7,6,5,4,3,2 (Advise/Referral/Batch) NOT ALLOWED TO CHANGE

Changes to the other four major TLVs are not permitted.

Product Notes

The default configuration for **Spectrum Pro** is **4C**, which only supports no CVM. **3C** adds chip and PIN capabilities with the addition with a PIN pad (L100). Neither 3C nor 4C allow for chip-and-signature (chip-and-sig wouldn't make sense for Spectrum Pro, which is an unattended device).

Augusta supports **2C** (which allows cardholder confirmation of Language Selection and application selection) and **5C** (no customer confirmations). For Quick Chip, use 5C (2C will work as well. But some card will require the customer choose from multiple applications (i.g. credit or debit) or languages available on the card. So, 2C will work but it is not as quick).

Terminal **1C** is for attended devices using chip and PIN (e.g. **PISCES**).

See the table below for additional information about ID TECH EMV L2 Kernel configurations.

Terminal Capabilities	1C	2C	3C	4C	5C	Major/ Minor
Card Data Input Capability						
Terminal Type	22	21	25	25	21	
Manual Key Entry	Yes	No	No	No	No	Minor
Magnetic Stripe	Yes	Yes	Yes	Yes	Yes	Minor
IC with Contacts	Yes	Yes	Yes	Yes	Yes	N/A
CVM Capability						
Plaintext PIN	Yes	No	Yes	No	No	Major
Online Enciphered PIN	Yes	No	Yes	No	No	Major
Signature (Paper)	Yes	Yes	No	No	Yes	Major
Offline Enciphered PIN	Yes	No	Yes	No	No	Major
No CVM	Yes	Yes	Yes	Yes	Yes	Major
Security Capability						
SDA and DDA	Yes	Yes	Yes	Yes	Yes	Major
Card Capture	No	No	No	No	No	Minor
CDA	Yes	Yes	Yes	Yes	Yes	Major
Transaction Type Capability						
Tran Type – Cash	Yes	Yes	No	No	Yes	Major
Tran Type – Goods	Yes	Yes	Yes	Yes	Yes	Major
Tran Type – Services	Yes	Yes	Yes	Yes	Yes	Major
Tran Type – Cash Back	Yes	Yes	No	No	Yes	Major
Tran Type – Inquiry	No	No	No	No	No	Minor
Tran Type – Transfer	No	No	No	No	No	Minor
Tran Type – Payment	No	No	No	No	No	Minor
Tran Type – Admin	No	No	No	No	No	Minor
Tran Type – Cash Deposit	No	No	No	No	No	Minor
Terminal Data Input Capability						
Keypad	Yes	Yes	Yes	Yes	Yes	
Numeric Keys	Yes	Yes	Yes	Yes	Yes	Minor
Alpha and Special Character Keys	Yes	Yes	Yes	Yes	Yes	Minor
Command Keys	Yes	Yes	Yes	Yes	Yes	Minor
Function Keys	Yes	Yes	Yes	Yes	Yes	Minor
Terminal Data Output Capability						
Print, Attendant	Yes	Yes	No	No	Yes	Minor
Print, Cardholder	No	No	Yes	Yes	No	Minor
Display, Attendant	Yes	Yes	No	No	Yes	Minor

Display, Cardholder	No	No	Yes	Yes	No	Minor
Code Table 10	No	No	No	No	No	If value of supported table changed: Minor If removing all the supported tables or indicating one as supported when previously none were: Major
Code Table 9	No	No	No	No	No	
Code Table 8	No	No	No	No	No	
Code Table 7	No	No	No	No	No	
Code Table 6	No	No	No	No	No	
Code Table 5	No	No	No	No	No	
Code Table 4	No	No	No	No	No	
Code Table 3	No	No	No	No	No	
Code Table 2	No	No	No	No	No	
Code Table 1	Yes	Yes	Yes	Yes	Yes	
Application Selection						
PSE	Yes	Yes	Yes	Yes	Yes	Major
Cardholder Confirmation	Yes	Yes	Yes	No	No	Major
Preferred Display Order	No	No	No	No	No	Major
Partial AID Selection	Yes	Yes	Yes	Yes	Yes	
Multi Language	Yes	Yes	Yes	Yes	Yes	Minor
EMV Language Selection Method	Yes	Yes	Yes	Yes	Yes	Minor
Common Character Set	Yes	Yes	Yes	Yes	Yes	
Data Authentication						
Max CA Public Key	248	248	248	248	248	
Exponents	3 and 2 ¹⁶ +1	3 and 2 ¹⁶ +1	3 and 2 ¹⁶ +1	3and 2 ¹⁶ +1	3 and 2 ¹⁶ +1	
Revocation of Issuer PK Certificate	Yes	Yes	Yes	Yes	Yes	Major
Certificate Revocation List Format	RID/CA PK Index Cert SN	RID/CA PK Index Cert SN	RID/CA PK Index Cert SN	RID/CA PK Index Cert SN	RID/CA PK Index Cert SN	Major
Default DDOL	Yes	Yes	Yes	Yes	Yes	Major
Manual Act. when CA PK loading fails	No	No	No	No	No	Major
CA PK verified with Checksum	Yes	Yes	Yes	Yes	Yes	Major
Cardholder Verification Method						
Bypass PIN Entry	Yes	No	No	No	No	Major
Subsequent Bypass PIN Entry	Yes	No	No	No	No	
Get Data for PIN Try Counter	Yes	No	Yes	No	No	Major
Fail CVM	Yes	Yes	Yes	Yes	Yes	Major
Amount known before CVM process	Yes	Yes	Yes	Yes	Yes	Major
Terminal Risk Management						
Floor Limit Checking	Yes	Yes	Yes	Yes	Yes	Major
Random Transaction Selection	Yes	No	Yes	Yes	No	Major
Velocity Checking	Yes	Yes	Yes	Yes	Yes	Major
Transaction Log	Yes	No	Yes	Yes	No	Major
Exception File	No	No	No	No	No	Major

TRM irrespective of AIP setting	Yes	Yes	Yes	Yes	Yes	Minor
Terminal Action Analysis						
Terminal Action Codes Supported	Yes	Yes	Yes	Yes	Yes	Major
TAC can be changed	Yes	Yes	Yes	Yes	Yes	
TAC can be deleted of disabled	No	No	No	No	No	
Default Act. Codes prior to 1 st Gen AC	No	No	No	No	No	Major
Default Act. Codes after 1 st Gen AC	No	No	No	No	No	Major
TAC/IAC – Default Skipped	No	Yes	No	No	Yes	
TAC/IAC – Default normal processing	Yes	No	Yes	Yes	No	
CDA failure detected prior TA Analysis	Yes	Yes	Yes	Yes	Yes	
Mode 1 (CDA on ARQC and 2GenAC)	Yes	Yes	Yes	Yes	Yes	
Mode 2 (CDA on ARQC only)	No	No	No	No	No	
Mode 3 (No CDA on ARQC or 2GenAC)	No	No	No	No	No	
Mode 4 (CDA on 2GenAC only)	No	No	No	No	No	
Completion Processing						
Forced Online	Yes	N/A	No	No	N/A	Major
Forced Acceptance	No	No	No	No	No	Major
Advices	No	No	No	No	No	Major
Issuer Referrals	Yes	Yes	No	No	Yes	Major
Batch Data Capture	Yes	Yes	Yes	Yes	Yes	Major
Online Data Capture	Yes	Yes	Yes	Yes	Yes	Major
Default TDOL	Yes	Yes	Yes	Yes	Yes	Major
Exception Handling						
POS Entry Mode	80	80	80	80	80	Minor
Miscellaneous						
PIN Pad	Yes	No	Yes	No	No	Minor
Amount and PIN on same keypad	Yes	No	No	No	No	Minor
ICC/Magstripe Reader Combined	No	No	Yes	Yes	No	Minor
If Combined, is Magstripe read first?	N/A	N/A	No	No	N/A	Minor
Supports Account Type selection	Yes	Yes	Yes	Yes	Yes	Minor
Support "on fly" script processing	No	No	No	No	No	
Issuer Script device limit > 128 bytes	No	No	No	No	No	
If limit > 128, value supported?	N/A	N/A	N/A	N/A	N/A	
Internal Date Management	Yes	Yes	Yes	Yes	Yes	

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