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currenza **c²** MDB with Premium functions

The NRI coin changer currenza c² MDB provides convenient Premium functions allowing the VMC to diagnose and monitor but also control the coin changer depending on the product prices and machine environment more easily.

What is meant by Premium?

The NRI Premium functions are realised by an advanced MDB communication making the coin handling much more easier for the VMC – of course, without affecting the MDB standard.

NRI is taking advantage of the EXPANSION command providing scope for coin changer or machine-specific sub-commands and requests, as well as of the MDB FTL method used to transmit complex data between VMC and coin changer.

NRI Premium functions can help whenever you want to ...

- monitor the engaged position of the coin cassette
- know the real change stock for inventory and audit purposes (including security stock)
- minimise high inventory provision, i.e. idle capital, at will
- temporarily increase the security level or narrow the acceptance band due to acute circulation of fraud coins
- update the coin changer's firmware & configuration via the VMC within the context of a remote maintenance
- apply other customised functions making the coin handling easier for the MDB VMC





Realisation

The **Premium** functions (PF) are realised by an advanced MDB communication. Just find out in the following, how the currenza c² may help you processing the coins more easily – of course, without affecting the MDB standard.

PF 1 Has the coin cassette engaged correctly?

Expensive and infuriating for the customer: machine down times! Too often by reason of the coin cassette incorrectly installed or not installed at all, isn't it?

And this is how to find it out!

Using the standard MDB EXPANSION command the VMC may poll the coin changer's current state of operation. The diagnostic data reported by the coin changer gives information about the state of the coin cassette amongst others.

EXPANSION sub-command "SEND DIAGNOSTIC STATUS" (0FH 05H)

- 1 Transmit 0FH-05H command to coin changer.
- 2 Evaluate current state of operation sent by coin changer:
Data received: Z1–Z2 (2 bytes, Z1 = main code, Z2 = sub-code, cp. MDB spec.)
 - If Z1 = 15, the coin changer reports the state of the coin cassette
 - If Z1 = 15 and Z2 = 02, the cassette has not been installed correctly or has been removed



The MDB specification lists which status messages are sent beyond that, and recommends that this command is transmitted to the coin changer every 1–10 seconds. Please refer to the MDB specification for all details on the EXPANSION command.

PF 2 Pure change stock or total inventory provision?

Usually, an MDB VMC only polls the coin stock which can be used as change but not the coin number which is supposed to remain in the tubes as security stock. But for audit purposes, the latter is of equal importance as the change stock as it is part of your receipts. First and foremost in a large machine stock, the unknown number of security coins may accumulate to high amounts.

Example:

200 machines with coin changers with EUR1 coin cassette

Security stock/cassette: 11.55 €
 Security stock of 200 cassettes: **2,300.00 €**

A clear distinction!

The EXPANSION command 0FH FFH xx of the MDB specification provides scope for coin changer or machine-specific sub-commands and requests.

NRI is taking advantage of these free sub-commands in order to poll the tube contents amongst others. The tube data sent by the coin changer contains on the one hand the number of tube coins including security stock and on the other hand the coin quantity of the security stock of each tube coin:

NRI EXPANSION sub-command TUBE STATUS (0FH FFH **15H**)

- 1 Transmit 0FH-FFH-**15H** command to coin changer.
- 2 Evaluate current tube data sent by coin changer:
Data received: Z1–Z32 (32 bytes)
 - Z1–Z16 = Tube contents
 Indicates the highest number of coins that the coin changer "knows" definitely are present in the tubes
 A byte position in the 16 byte string indicates the number of coins for the particular coin type including security stock
 - Z17–Z32 = Security stock
 Indicates the security stock of the coin tubes
 A byte position in the 16 string indicates the number of security coins for the particular coin type



This command is not part of the MDB specification and could be used differently by other manufacturers of coin changers. Please refer to the MDB specification for all details on the EXPANSION main command.

PF 3 Far too much idle capital in coin cassette?

The demand for change depends on the product prices, additional payment systems such as bill validators, and highly differs from machine to machine. In a large machine stock with high product prices often thousands of euros of idle capital may pile up.

If the VMC controls the tube filling level and temporarily redirects excessive tube coins into the cash-box, you could reduce idle capital to a minimum.

Example:

100 machines with coin changers with EUR1 coin cassette

30 1-EUR coins less/machine: 30.00 €
 30 2-EUR coins less/machine: 60.00 €
 These actions in 100 machines: **9,000.00 €**



Produce relief!

The EXPANSION command 0FH FFH xx of the MDB specification provides scope for coin changer or machine-specific sub-commands and requests.

NRI is taking advantage of these free sub-commands in order to redirect tube coins into the machine cash-box amongst others:

NRI EXPANSION sub-command SUPPRESS COIN ROUTING TO TUBES (0FH FFH **11H**)

- 1 Transmit 0FH-FFH-**11H** command to coin changer and set coin bit to "1" according to the following format:

Data to be transmitted: Y1–Y2 (2 bytes)

Example:

Coin type 2 is not supposed to be routed into the coin cassette

Byte	Y1								Y2							
Bit	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Coin type	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Bit state	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0

If the coin is to be routed into the cassette tube again,

- 2 transmit 0FH-FFH-**11H** command to coin changer and set coin bit to "0" according to the following format:

Data to be transmitted: Y1–Y2 (2 bytes)

Example:

Coin type 2 is supposed to be routed into the coin cassette again

Byte	Y1								Y2							
Bit	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Coin type	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Bit state	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

i After a reset the coin changer routes the coins according to its default setting.

This command is not part of the MDB specification and could be used differently by other manufacturers of coin changers.

Please refer to the MDB specification for all details on the EXPANSION main command.



PF 4 Acute circulation of fraud coins?

For the acceptance of (high-value) coins programmed the coin changer is capable of having up to three acceptance bands with different acceptance tolerances. In order that genuine coins are always accepted and fraud coins rejected reliably, the VMC can control the width of the acceptance bands with the **Premium** security function ("normal" or "narrow" (smaller acceptance tolerances) acceptance band).

If a critical coin is often replaced by fraud coins, the VMC may temporarily select the narrow acceptance band.

Stop circulation!

The EXPANSION command of the MDB specification provides scope for coin changer or machine-specific sub-commands and requests.

For this function again, NRI is taking advantage of the free sub-commands of the EXPANSION command 0FH FFH xx:

NRI EXPANSION sub-command SECURE COIN ACCEPTANCE (0FH FFH **12H**)

- 1 Transmit 0FH-FFH-**12H** command to coin changer and set coin bit to "1" according to the following format:

Data to be transmitted: Y1–Y2 (2 bytes)

Example:

Coin type 1 is supposed to be accepted in the narrow band only

Byte	Y1								Y2							
Bit	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Coin type	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Bit state	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

If the problem with fraud coins has been solved and the coin is to be accepted in the normal band with normal acceptance rate again,

- 2 transmit 0FH-FFH-**12H** command to coin changer and set coin bit to "0" according to the following format:

Data to be transmitted: Y1–Y2 (2 bytes)

Example:

Coin type 1 is supposed to be accepted in the normal band again

Byte	Y1								Y2							
Bit	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Coin type	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Bit state	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

i After a reset the coin changer accepts the coins inserted according to its default setting.

This command cannot overwrite coin inhibits activated using the coin changer menu. I.e. acceptance bands inhibited this way would not be used for coin acceptance independent of the bit state of this command.

This command is not part of the MDB specification and could be used differently by other manufacturers of coin changers.

Please refer to the MDB specification for all details on the EXPANSION main command.

PF 5 Coin changer firmware update within the telemetry remote maintenance?

Why not! The current currenza c² silver firmware can be updated by means of the File Transport Layer method and the MDB interface without any additional tools. The VMC itself executes the c² firmware update.



The MDB FTL method!

The MDB File Transport Layer method is able to transmit complex data, such as files, either between the slave devices or between a slave device and the VMC. However, the VMC does not have to be able to interpret the data to be transmitted but only sends the data from source to destination address arising from the MDB command and response.

Rough outline

1. Converting changer firmware to EVA-DTS update file
2. Sending EVA-DTS update file to VMC via telemetry
3. VMC stores EVA-DTS update file
4. VMC transmits EVA-DTS update file to coin changer via MDB FTL
 - VMC transmits REQUEST TO SEND
 - Coin changer acknowledges transfer request
 - VMC sends first data block
 - Coin changer acknowledges first data block
 - ... until all data blocks have been transferred
5. Coin changer saves complete EVA-DTS update file
6. Coin changer extracts firmware
7. Coin changer replaces existing firmware with new firmware

Transferring firmware from the VMC to the coin changer

		VMC	Coin changer
Starting FTL mode		REQ TO SEND (ID = 40h, FFh data blocks)	OK TO SEND
Data transfer "1 st record"	1 st block	SEND BLOCK	ACK
	2 nd block	SEND BLOCK	ACK
	...		
	255 th block	SEND BLOCK	ACK
Announcement "2 nd record"		REQ TO SEND (ID = 40h, FFh data blocks)	OK TO SEND
Data transfer "2 nd record"	1 st block	SEND BLOCK	ACK
	2 nd block	SEND BLOCK	ACK
	...		
Announcement "last record"		REQ TO SEND (with EndOfFileFlag, n data blocks)	OK TO SEND
Data transfer "last record"	1 st block	SEND BLOCK	ACK
	...		
	n th block	SEND BLOCK	ACK

Data transfer completed

i In so doing you can transmit any other data, such as currency or configuration files to the coin changer.
Please refer to the MDB specification for all details on the MDB FTL method.



Do you require other Premium functions?

No problem! Please explain to us which additional functions could make the coin handling easier for your MDB VMC. We will take care of your matter, e.g., by expanding the MDB protocol.

Which PFs can be applied by my c²

It depends on the c² firmware version but also on its hardware which Premium functions (PF) are implemented in a currenza c².

Premium function	c ² equipment	
	Software	Hardware
PF1	9200-377-0500	no special
PF2	9200-377-0500	no special
PF3	9200-377-0500	no special
PF4	9200-377-0500	no special
PF5	9200-409-0100	currenza c ² silver

Which firmware is installed in my coin changer?

The VMC can use the standard MDB command EXPANSION IDENTIFICATION to request all data specifying the coin changer. The device data reported by the coin changer give information about the firmware version amongst others:

EXPANSION IDENTIFICATION command (0FH 00H)

- 1 Transmit 0FH-00H command to coin changer.
- 2 Evaluate device data sent by coin changer:
Data received: Z1–Z33 (33 bytes)
 - Z28–Z29 = firmware version (2 bytes)

i Please refer to the MDB specification for all details on the EXPANSION IDENTIFICATION command.

The currenza c² hardware is specified by ...

the model number indicated on the label (cp. also "currenza c² model number decoding", download at www.nri24.com).



Prospect

The aim has to be to completely check and update the currenza c² using the MDB protocol in future:

- Diagnostics
- Firmware update
- Configuration & currency update

Additional technical documentation

02.10 Schn/Goe/Roe
Version 1.0
DB.C2P-EN

All NRI product descriptions, e.g., for the currenza c² coin changer are available as PDF at www.nri24.com (→ Download).