

Mektek

Operator's Manual

Programming Coin Mechanisms

Mektek 3

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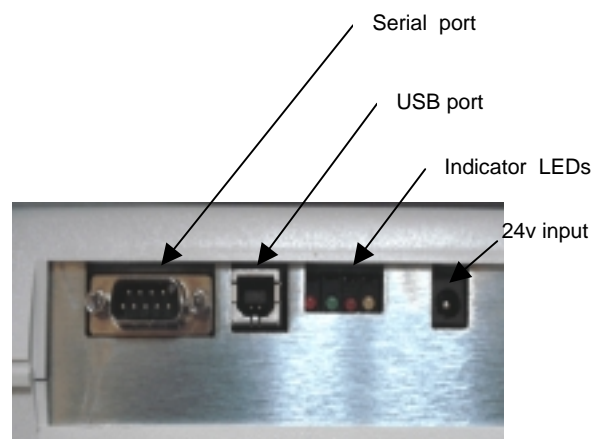
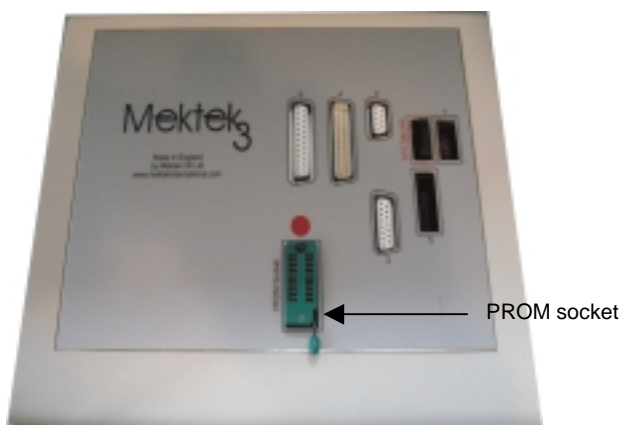
Tables:

Indicator LEDs

Description of generic Coinset Files

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Installation

Minimum PC requirements

IBM PC or compatible, Pentium 100MHz or faster
16 Mbyte RAM (32 Mbyte recommended)
20 Mbytes free hard disc space
Windows ME or XP
One free RS232 serial port with 9-pin connector or one free USB port
Standard Keyboard and Mouse
CD Rom drive
Microsoft Word or similar
Internet & Email links are recommended for credit requests & software downloads.

Software installation

- Insert the Installation CD and select **Run** from the Start menu. Select file name **Setup.exe** from the CD drive and click on **OK**. Follow the on-screen instructions.
- Then select Run from the Start Menu again. Select the file name **Coinsets** and click on OK.

Connecting the programmer to the PC (Serial port)

- Connect the Programmer to a serial port on your PC using the supplied cable. Power up the unit using the supplied 24volt PSU.
- Go to Control Panel, System, Hardware, Device Manager, Ports and note the "COM" number against the Communications Port entry.

Connecting the programmer to the PC (USB)

- Connect the Programmer to a USB port on your PC using the supplied cable.
- Power up the unit using the supplied 24volt PSU.
- A new window should open with **New Hardware found**. Click on **Go** to look for driver. If a suitable driver is found, follow the instructions.
- If no driver found go to the website www.ftdichip.com and select Drivers. Choose "**setup executable**" file. When file is downloaded **Run** the file. When the drivers have installed the New Hardware will have been found.
- Go to Control Panel, System, Hardware, Device Manager, Ports and note the "COM" number against the USB Serial Port entry.

Configuration

- Start the Programmer from Windows by clicking on Start, Programs, Mektek and Mektek Programmer. When the Main Menu appears select the **COM port** number found in the previous section and the **Language** required
- Click on **Save Config** and **Exit**. To modify settings select Change Configuration in the main menu which will appear when the Programmer is restarted.
- If an incorrect COM port has been selected an error message will appear when the program is restarted. To bring up the main menu again delete the file "config0000" file in the folder C:\Program Files\Mektek and restart the program. Select the correct COM port and save the configuration.

How the programmer works

Validator function

In principle, validators measure the outputs from in-built sensors as a coin passes them. The values are then compared with a table of preset values held in memory. If the outputs are all within the limits specified for one of the programmed coins in the table the coin is accepted and a signal sent to the host machine that a coin type A, B, 1, 2, etc has been accepted. Values are usually assigned to each coin outside the validator except in the case of a totaliser. Eg ME181, G13 totaliser.

Programmer function

20 coins of each type to be programmed are dropped through the validator. The Mektek Programmer takes the outputs from the sensors as coins are dropped through, performs a statistical analysis on the values and generates limits according to a supplied Coinset File appropriate to the validator and to the coins to be programmed. The new limits can be examined for overlaps, adjusted if necessary and then transferred to a plug-in memory device which is inserted into a socket on the validator for a Mars unit or directly into the EEPROM for Coin Controls or NRI. Coins are passed through the validator to confirm acceptance.

Credits

What is a credit?

Each time the programmer is used for a chargeable operation a credit is deducted from the total held in the Programmer. For example the routine for programming an MEI mech, including coin data gathering, transferring the data to an E+1 device and testing coin acceptance would consume one credit. A warning message is displayed when the credits need replenishing. Credits can only be purchased from the supplier of your Programmer.

Checking credits

To check the number of credits remaining in the Programmer or to order more credits start the Programmer & click on [Load Credits](#). The number of credits available is shown along with the number used since last replenishment.

Loading credits

- To replenish credits start the Programmer and click on [Load Credits](#).
- Click on the [Number Requested](#) box and enter the amount required
- Click on [Request More Credits](#) and a unique code message of up to 40 characters will appear in the Code String box. Copy (*double click on the box to select the field, right click on the mouse and click on Copy*) then paste this number into an Email or Fax and send to your supplier.

NOTE:

Do not request further credits if an outstanding credit request exists.

If a Fault Message such as **"Not a Valid Credit Issue Message"** appears check the Message Table below for details.

- Once payment has been received a similar Code String will be returned.
- Paste the new code message into the box and click on [Load New Credits](#).
- The [Number Loaded](#) will be displayed and added to those available.
- Click on [Return to Main Menu](#) to exit.

Loading Credits Message Table

Message	Cause/Action
Not a valid credit issue message Checksum error Message not accepted	Invalid code string - incomplete or wrongly entered Code String. Check & re-enter figure. Contact Mektek for assistance.
Credit Issue Message not for this serial number	Each Programmer has a unique serial number. This Code String is only valid for the box from which it was requested.
Incorrect VAR code	Credit issue has the wrong Programmer supplier code. Contact your Programmer supplier or Mektek.
Incorrect code	Security code does not match. An old Code String has been entered.

Data storage devices

Purpose

The limits generated for each of the coins to be accepted and occasionally values, inhibits and outputs are stored in a memory device .

Coin Controls & NRI EEPROM:

The data is stored in an integral EEPROM which can be reprogrammed.

Mars PROM & Mektek E+1:

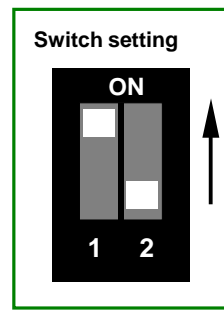
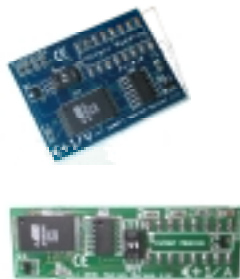
For Mars units the data is stored in a separate memory device plugged into the validator. The original – and now obsolete – PROM used in the Mars units is a one-shot device which cannot be reused. The **Mektek E+1** device used in place of the PROM can be reprogrammed as many times as required, doing away with the need to replace the expensive PROM each time a validator is reprogrammed.

Segments:

In a PROM or E+1 device the storage is divided into segments, each of which can hold the limits for 6 coins. The segment to be used can be switched from one to the other but only one segment can be active at a time. In the case of a PROM switching is done by links or switches on the validator or by withdrawing the device and removing one of it's pins. On an E+1 device Switch 1 selects the segments.

E+1V - suitable for both 1k & 2k vending applications. Coloured Blue. (Red for MS1400 only)

E+1A - suitable for both 1k & 2k amusement & gaming applications. Coloured green.

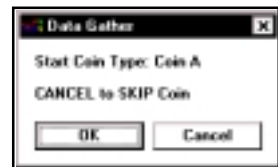


Getting Started

- Read the remainder of this Operator's Manual.
- Using the Loom Cross Reference Table supplied with the Programmer check that you have the required loom(s) for the mech type to be programmed. If a Special Order loom is necessary, contact your supplier.
- A suitable Coinset File – which instructs the Programmer unit on mech type, coin channels, quantity of coins to be dropped, limit calculations, segments used etc. – is needed. The Coinset File must be suitable for the mech type and coin configuration that you are planning to program. See the Appendix for a list of generic Coinset Files included in the installation. If a suitable file is not included contact Mektek. New Coinset Files for specific applications are supplied free-of-charge.
- For simple programming operations a Wizard can be used instead of a Coinset File.
- Obtain 20 coins of each denomination to be programmed.

Reprogramming routine MARS using Coinset Files

- Clean and dry the path of the coins through the validator using a soft cloth and a non-solvent cleaner.
- Connect validator to programmer using appropriate loom(s) See “Reprogramming by coin mech type” and Appendix for details.
- Mount the validator in the **correct alignment**
- Start Coin Programming System from Start, Programs, Mektek.
- Select **Mars** and the **type** required from the Drop down box and click on **Validator test**.
- Drop current coins through the mech and check acceptance to confirm that the validator is working
- Click on **Back to Main Menu**
- Click on **Program Mech**
- Click on **Duplicate Segments** (This will put the same data into both segments so that the mechanism will work regardless of which segment it has been set for.) Do not use if different segment data is required.
- Click on **Run Coinset File**
- Open the appropriate coinset file (See Appendix for description of files)
- Once the Coinset File has been opened the following type of message will appear. The Coin Type may be generic such as A1 or specific such as 5c.
- Click on **OK** to start the coin drop (Click on **Cancel** to skip this coin and go to the next one)
- Drop 20 coins through the validator until the following message appears.
- Click on **OK** to repeat the process for the rest of the coins which require data gathering or **Cancel** to Skip this channel and pass on to the next.
- Click on **OK** when the message “Data Gathering Complete appears.



PROM Limits

Limits	Thickness		Diameter		Material		Est. Acceptance %
Coin A2	43	52	54	62	148	157	99.8
Coin B2	42	51	85	97	101	111	100.0
Coin C2	50	57	146	160	142	155	99.1
Coin D2	0	0	0	0	0	0	0.0
Coin E2	0	0	0	0	0	0	100.0
Coin F2	0	0	0	0	0	0	100.0
Skip 1							0.0
Skip 2							0.0
Skip 3							0.0
Skip 4							0.0
Skip 5							0.0
Skip 6							0.0

Est. Rejection %

Buttons: Restore Limits, Change Limits

Display PROM Segment: 1 2 3 4

PROM size: 1K

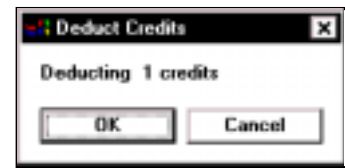
Mech Type: M51000

Target PROM Type: Mektek E=1 Bipolar

Buttons: Program New PROM, Validator Test, PROM Utilities, Back to Measurement Window

*Segment 2 is displayed. To read the rest of the data, click on the segment in **Display PROM Segments**.

- The estimated acceptance of each coin is displayed. If required adjust the limits by **overtyping** then click on **Change Limits** to see the revised Acceptance. Adjust if necessary. Clicking on Restore Limits will restore the limits to their original values.
- Select the type of device to programme in **Target Prom type**
- Click on **Program New PROM**
- The Deducting Credits message appears.
- Click on **OK** to proceed.

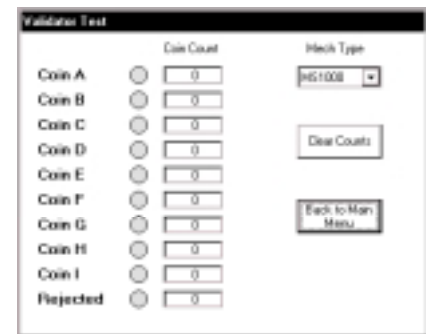


- Insert a PROM in the socket of the Programmer. (Notch in PROM towards the Red Spot)
- Click on **OK** to programme the device.
- The **Verify PROM OK** message confirms that the PROM has been correctly programmed.
- Remove the PROM from the programmer and insert it into the socket on the validator. Ensure that the legs are correctly seated in the socket and the orientation is correct.

-

- Click on **Validator Test**

- Drop each type of old coin through the validator and confirm that the appropriate **lamp** lights. If slugs are suspected drop these and confirm that they are rejected.



- If one or more coin limits need to be widened to improve acceptance or narrowed to reject a slug, click on **Back to Main Menu** to return to the Prom Limits screen. Adjust limits as required and program a new PROM as before then retest. Further adjustments and retests can be carried out on the mechanism without consuming another credit provided you do not go back to the **Measurement Window**.

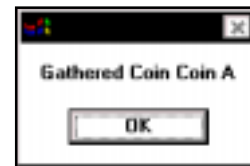
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- Click on **Back to Main Menu** and **Back to Measurement Window** ready for the next validator.
- Remove the validator from the stand, disconnect loom, and affix a suitable label to the front giving details of the new coins accepted.

Reprogramming routine Coin Controls & NRI using Coinset Files

(The description is for Coin Controls but applies equally to NRI mechanisms)

- Clean and dry the path of the coins through the validator using a soft cloth and a non-solvent cleaner.
- Connect validator to programmer using appropriate loom(s) See “Reprogramming by coin mech type” and Appendix for details.
- Mount the validator in the **correct alignment**
- Start Coin Programming System from Start, Programs, Mektek.
- Select **Coin Controls** and the **type** required from the Drop down box and click on **Validator test**.
- Drop current coins through the mech and check acceptance to confirm that the validator is working
- Click on **Back to Main Menu**
- Click on **Run Coinset File**
- Open the appropriate coinset file (See Appendix for description of files)
- Once the Coinset File has been opened the following type of message will appear. The Coin Type may be generic such as A1 or specific such as 5c.
- Click on **OK** to start the coin drop (Click on **Cancel** to skip this coin and go to the next one)
- Drop 20 coins through the validator until the following message appears.
- Click on **OK** to repeat the process for the rest of the coins which require data gathering or **Cancel** to Skip this channel and pass on to the next.
- Click on **OK** when the message “Data Gathering Complete appears.



Limit	Thickness		Diameter		Material		Est. Acceptance %
CoinA2	43	52	54	62	148	157	99.8
CoinB2	42	51	85	97	101	111	100.0
CoinC2	50	57	146	160	142	155	99.1
CoinD2	0	0	0	0	0	0	0.0
CoinE2	0	0	0	0	0	0	100.0
CoinF2	0	0	0	0	0	0	100.0
							Est. Rejection %
Skip 1							0.0
Skip 2							0.0
Skip 3							0.0
Skip 4							0.0
Skip 5							0.0
Skip 6							0.0

Buttons: Restore Limits, Change Limits

Display PROM Segment: 1 2 3 4

PROM size: TK

Mech Type: MST000

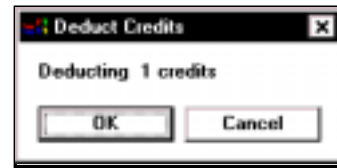
Target PROM Type: Mektek E=1 Bipolar

Buttons: Program New PROM, Validator Test, PROM Utilities, Back to Measurement Window

*Segment 2 is displayed. To read the rest of the data, click on the segment in **Display PROM Segments**.

- The estimated acceptance of each coin is displayed. If required adjust the limits by **overtyping** then click on **Change Limits** to see the revised Acceptance. Adjust if necessary. Clicking on Restore Limits will restore the limits to their original values.

- Click on **Program EEPROM**
- The Deducting Credits message appears.
- Click on **OK** to continue.



- The memory will be programmed
- Click on **OK** to complete.



- Click on **Validator Test**
- Drop each type of coin through the validator and confirm that the appropriate **lamp** lights. If slugs are suspected drop these and confirm that they are rejected.
- If one or more coin limits need to be widened to improve acceptance or narrowed to reject a slug, click on **Back to Main Menu** to return to the Prom Limits screen. Adjust limits as required by overtyping and clicking on Change Limits, reprogram the EEPROM as before then retest. Further adjustments and retests can be carried out on the mechanism without consuming another credit provided you do not go back to the **Measurement Window**.



- Click on **Back to Main Menu, Back to Measurement Window** and **Back to Main Menu** ready for the next mechanism.
- Remove the mechanism from the stand, disconnect loom, and affix a suitable label to the front giving details of the new coins accepted.

Wizards

Wizards are special routines to carry out specific tasks without going through a complete programming sequence. They do not require the use of a Coinset File. Each use of a Wizard consumes a credit.

(The description below is for MARS but a similar routine applies for NRI & Coin Controls mechanisms)

- Access the [Wizards](#) from the Main Menu
- Select make of mech to be used eg. Mars
- Click on [Program Mech](#)
- Click on [Wizards](#)



Add/Replace Coin

Used to gather data on a new coin and add it into a spare coin channel on an existing coinset held in a PROM/E+1. Instead of adding it into a spare channel, it can also replace an existing coin.

- Select **Mech Type**
- Select the **PROM segment** and **Coin Channel** to position the new coin.
- Click on **Add/Replace Coin**
- Click on **OK** and drop 20 coins
- Click on **OK** and the follow the screen prompts to read the old PROM.
- The PROM limits screen will appear with the limits from the old PROM and those **generated by the coins dropped**. Adjust as required and then Program New PROM and Validator Test as per the Basic Programming Routine.

Slug Fix

A Slug is an item which a validator incorrectly assumes is a particular genuine coin. eg machined blanks, foreign coins, two coins glued together. The validator can usually be recalibrated to discriminate between the real coin and slug by running the slug through the Programmer and adjusting the existing limits for the coin to exclude the slug. Slug Fix can be used at any time to carry out this task.

- The routine for this is the same as per Add/Replace a Coin above except that in addition the programme asks for a Slug Drop. ie drop 15 of the slug through the validator as if it were a coin. Adjust the limits as required to remove the yellow overlap between coin and slug and confirm rejection of the slug using validator test.



Edit Limits

This routine reads the data from an existing PROM or E+1 and displays it on the PROM limits screen. The limits can be manually adjusted. (For example: Opening up to improve acceptance or shutting to zero to remove a coin). The routine for this is the same as per Add/Replace a Coin above except that no coin drop is required.

Discriminating against a known slug

If a known slug exists it can be removed while programming for new coins using a suitable Coinset file or at a later date using the Slug Fix wizard.

Using a Coinset file:

- All the generic Coinset Files included with this unit include the option of dropping one known slug as part of the programming process.
- When requested drop through the quantity shown of the slug to be removed.
- At the Limits screen the slug and the coin affected will be highlighted in yellow.
- Adjust one or more of the Limits of the coin to remove the overlap and click on Change Limits. The estimated acceptance of the coin and reject %age of the slug will be displayed. If suitable proceed with programming, if not retry using a different adjustment.

Notes: In a few cases, due to the nature of the mechanism and slug, it may prove difficult to completely remove the slug while still retaining adequate coin acceptance. In this case contact Mektek for advice.

Using a Slug Fix Wizard:

See the Slug Fix option in the Wizards section.

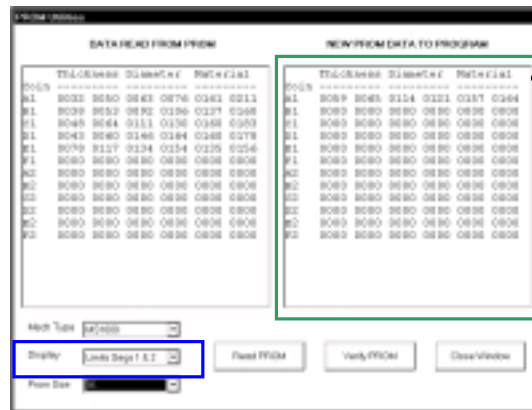
Additional Features

Mars

PROM utilities

From the Main Menu or the Prom Limits screen the option of PROM Utilities can be selected.

- Click on **PROM Utilities**
- Insert the PROM or E+1 into the socket on the Programmer.
- Click on **Read PROM**
- The contents of the PROM will be displayed in the left box.
- Select Limits or Data from the **Display** box.
- In the Limits display the upper and lower limit for each parameter of each coin are shown.
- In the Data display the data is displayed in HEX format.
- Click on **Close Window** to return to previous screen.



NOTE:
If entering from the PROM Limits screen, this box will contain the limits/data for the validator being programmed.

Flier limits

Occasionally, spurious readings are generated by the a sensor as a coin passes. This can be due to the coin bouncing, following another coin too closely etc. and is termed a “Flier”. If Fliers occur during programming an error message is shown and further coin drops may be requested to complete the Data Gather. Click on **OK** and drop the coins if required.

Coin Controls/NRI

EEPROM/Memory Utilities

- From the Main Menu select the make of mechanism
- Click on EEPROM Utilities (Coin Controls) or Memory Utilities (NRI)
- The Limits contained in the Memory are displayed.



Display of other information (eg parameters, mapping, etc):

Depending on which type of mech is being used other information may be available. See individual mechanism section for details.

Save to File:

Click on **Save to File** to save the EEPROM/Memory data to a file. Used as part of the Cloning Routine and to save the data from a mechanism in case it needs to be returned to it's original settings.

Program from File:

Click on **Program from File** to program the EEPROM from a previously saved file. Used as part of the Cloning Routine and to return a mechanism to it's original data if stored.

Cloning Routines:

Cloning of additional parameter settings:

When converting to different coinage, additional parameters in some mechanisms (eg G13, G18, G10, C120, C220B, C335, C435, C450) may require changing. The facility to change these as part of the Programming is included in some cases but not all. Also, a mechanism programmed with an incorrect coinset may need to be returned to it's original configuration. Cloning takes this data from a sample mechanism that already has the required settings and puts it into the mechanisms being programmed.

Note: All coin mechanisms must be individually reprogrammed for coins as part of the Cloning Routine.

NRI only - method

- Connect sample mechanism of same type to be programmed with known correct additional parameter settings. Using Memory Utilities, Save EEPROM to file.
- Connect mech to be programmed.
- Programme using Coinset file which does not change other parameters (or Wizard) as normal but do not program the EEPROM.
- Before leaving the PROM Limits screen go to EEPROM utilities and Program From File using saved file above. Close window.
- Click on Restore Limits and adjust limits if necessary..
- Program EEPROM and Validator Test in usual manner.

Notes: Only one credit will be deducted per mech programmed.

The saved file from the sample mech can be used for any other mechs of the same type requiring the same configuration.

Coin Controls only - method:

- Connect sample mechanism of same type to be programmed with known correct additional parameter settings. Using Memory Utilities, Save EEPROM to File.
- Connect mech to be programmed. From the Main Menu go to EEPROM Utilities, select Program from File and program using the saved file above. This will deduct one credit.
- Go back to Main Menu and program in the usual manner using a Coinset file which does not change the additional parameter settings. This will deduct another credit.

Reprogramming – by coin mech type

Mars

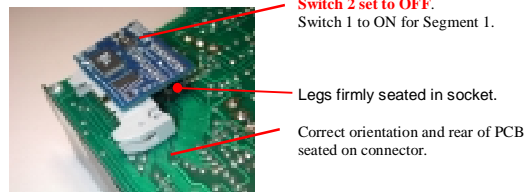
MS1000 family: See Appendix for listing of individual mechs supported.

Programme as basic MARS routine but note the following:

- Connect loom E1 MS1000 (Ribbon) from Socket 4 of programmer to bottom of validator.

E+1 usage:

- Use E+1V (Blue) fitted as shown.



- MS1900 has two PROMs – fit E+1 to lower one. Remove upper PROM when switching to Segment 2 coin set to stop acceptance of old coins G, H & I.
- If more than 6 coins are required in one coinset program coins A to F into Segment 1 of the E+1V and Coins G to I into Segment 2 of a PROM. Insert the E+1V into the lower socket and the PROM into the upper socket.

Validator Test:

- If “Duplicate Segments” was not selected during programming & all coins are rejected on Validator Test the validator may have been modified to use Segment 2. Use the Edit Limits Wizard (with Segments 1 and 2 selected) to reprogram the device with the same data in both segments and retry.

Fitting to Change giver:

- Consult the manufacturer’s documentation for details of mapping coins to change tubes etc.

MS1400 Klix

This mechanism is fully supported including the E+1K. Consult Mektek for detailed information.

ME111 family: See Appendix for listing of individual mechs supported.

Programme as basic MARS routine but note the following:

- Connect loom E2 from Socket 4 of Programmer to 20 -way connector



E+1 usage:

- Most of these mechs will have a number of **sets of pins** above the PROM socket. Before fitting E+1A (Green) clip off the tops of these pins to the level of the links to allow E+1 to seat onto PROM socket.

Validator test:

- If “Duplicate Segments” was not selected during programming & all coins are rejected on Validator Test the validator may have been modified to use Segment 2. Use the Edit Limits Wizard (with Segments 1 and 2 selected) to reprogram the device with the same data in both segments and retry.

Selecting segments:

- E+1 – use SW1 to switch from Segment 1 to Segment 2.
- PROM – withdraw Leg 15 to switch to Segment 2.



MS111 family: See Appendix for listing of individual mechs supported.

Programme as basic MARS routine and ME111 above but note the following:

- Coinset files as per ME111
- Connect loom E8 from Socket 4 on Programmer to 16 -way connector



E+1 usage:

- On some MS100 variants there may be insufficient clearance for an E+1A to be fitted. In this case use a bipolar PROM.

ME181/ME112

- Programme as per basic Mars routine but see below.
- Obtain a Coinset File with the required Coin Values from Mektek.

Looms required:

ME181:

E4 : ME181 2/2 (Wire) - socket 4 to side of mechanism

E3 : ME181 1/2 (Ribbon) – socket 3 to flying lead from mechanism

ME112:

E4 : ME181 2/2 (Wire) - socket 4 to side of mechanism

E3 : ME181 1/2 (Ribbon) – socket 3 to end of E31

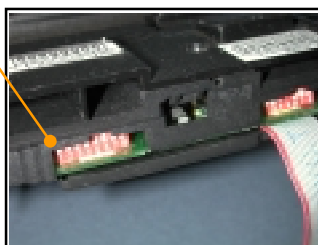
E31: ME112 2/3 (Ribbon) – between the end of E3 & bottom of mechanism

E+1 usage

- Use only E+1A (Green) or 2k PROM. Two segments are programmed with the coinsets and the other two segments have the values for the coins in these segments. Follow the on-screen prompts when programming.

Selecting segments

- Set switch 1 (SW1) on the **validator** to OFF to select Segment 1 and ON to select Segment 2.



Coin Controls

C120 family: See Appendix for listing of individual mechs supported.

Programme as basic Coin Controls routine but note the following:

- **CAUTION: Different Programmer connections are used for Acceptors and Totalisers. Connecting the E10 Ribbon Cable from an Acceptor to the G13 Tote Only socket on the Programmer can damage the Programmer and/or mechanism.**
- Looms required:
 - E10 G13/C120 from socket 1 to rear of validator as shown
 - E11 C120/C435 from socket 2 to rear of validator as shown.
- Any overlapping limits or limit greater than 254 will cause coins to be rejected.

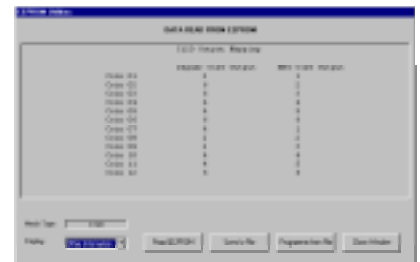


Old & new type mechanism identification:

Remove the rear cover. Old type C120s usually have the word "Jaguar" in the top right hand corner of the PCB.

Output Mapping:

- The output mapping – which Channel is output on which pin – can be changed by use of a suitable Coinset File. As the mapping data is stored differently in the old and new types it is important that the Coinset File chosen relates to the correct type if the mapping is to be changed.
- If no coins are accepted on Validator Test after programming or when fitted to the host machine it is likely that an unsuitable Coinset File has been used.



Display of other information:

- Read EEPROM and from **Display** select **Other Information**

The mapping is displayed. The settings are defined in the Coinset File and cannot be altered during programming.

Bank selection:

- Up to 12 coins can be accepted. They are split into two Banks - coins 1 to 6 in Bank 1 and 7 to 12 in Bank 2.
- Switch from Bank 1 to Bank 2 using the 4-way switch on the PCB.
- Switch 1 to ON and Switch 2 to OFF to select Bank 1. Reverse for Bank 2.

Coin Inhibit:

- Individual coins in the active Bank can be inhibited using the 6-way switch on the PCB.
- Switch 1 to ON to inhibit Coin Channel 1, switch 2 to ON to inhibit Coin Channel 2 etc.

C220B:

Programme as basic Coin Controls routine but note the following:

- Looms required;

E12 C220B/335 from socket 2 to validator

E17 C220B from socket 3 to validator

Coin Accept Mode:

- In normal mode coins 1 to 4 are output on pins 1 to 4 and coins 5 to 8 (If enabled) are also output on pins 1 to 4. To use the 8-coin mode the host machine must tie the SELECT line (Pin 6) on the interface connector to 0V (Pin 10). In the 8-coin mode all 8 coins are accepted.

Coin Inhibits:

- Coins are inhibited by the host machine via the interface connector rather than via switches on the mechanism.

Acceptance faults when fitted to host machines:

- If coins are not being accepted on some host machines ensure that the Programmer software used is V1.2C or later.
- If problems still occur, use the Cloning Routine described in a previous chapter.
- Any overlapping limits or limit greater than 254 will cause coins to be rejected.

C335:

Programme as basic Coin Controls routine but note the following:

- Looms required;

E12 C220B/335 from socket 2 to validator

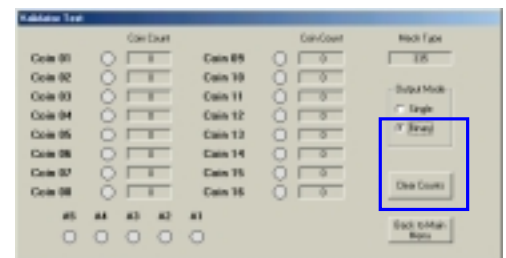
E16 C335 from socket 3 to validator

Coin Accept Mode:

- In parallel mode there are 5 outputs for up to 8 coins with coins 6,7 & 8 paired with coins 1,2 & 3 respectively. In binary mode up to 8 coins can be accepted.

Validator test:

- Select **Output Mode** of either **Single** or **Binary**.
- In binary display as well as the coins accepted in binary mode the credit code in single output is shown by lights A1 to A5.

**Coin Inhibits:**

- Coins are inhibited by the host machine via the interface connector rather than via switches on the mechanism.

Acceptance faults when fitted to host machines or validator test:

- If problems occur, use the Cloning Routine described in a previous chapter.
- Any overlapping limits or limit greater than 254 will cause coins to be rejected.

C435 & C435A:

Programme as basic Coin Controls routine but note the following:

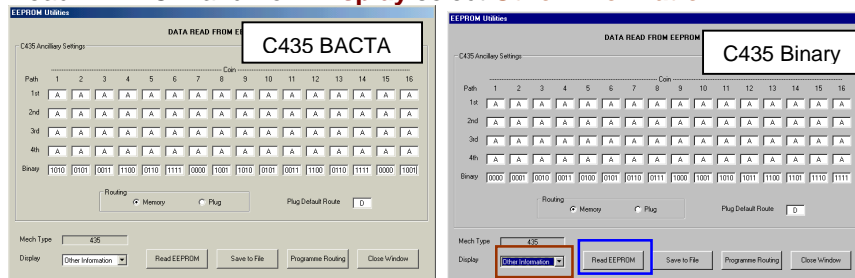
- Looms required;
E11 C120/C435 from socket 2 to validator
E13 C435 from socket 3 to validator
- Overlapping limits must be removed or coins will be rejected.

Binary coding & Coin Routing etc:

- The binary coding – which Channel is output on which pin – can be changed or left unchanged by use of a suitable Coinset File. Usually the output for the C435 is straight binary and for the C435A is the UK BACTA standard but these may have been changed. It is vital that the correct binary coding is used for a particular application.
- Generally, we recommend strongly that a Coinset File which leaves the coding, routing etc unchanged is used. See the Coinset File Description section in the Appendix.
- Routing is normally set to the Plug default – if EEPROM routing is required consult Mektek for a new Coinset File.

Display of other information:

- Read EEPROM and from **Display** select **Other Information**.



- The C435 Ancillary Settings of Coin Routing and Binary Output code for each coin are shown. To change the settings manually overtype and then click on **Programme Routing** to programme the memory. This will use a credit.

Piezo sensor:

Due to problems experienced by our customers with the reliable working of the Piezo sensor (Parameter 5) it has been disabled in the generic Coinset Files. If this sensor is required for specific coins, please consult Mektek for a new Coinset File.

Coins accepted:

- Up to 16 coins in 2 banks of 8 can be accepted in binary output and up to 5 coins in dedicated output.
- Channels 5 & 13 are often set to a Token. To replace a Token with a coin during programming set the Rotary Switch to F to start and return it to C after programming.

Coin Inhibit:

- Coins are usually inhibited by the host machine via the interface connector and Bank Select switch on the mechanism.

Acceptance faults when fitted to host machines or validator test:

- If some types of coin are rejected check and remove any overlapping limits.
- If all coins are rejected it is likely that an unsuitable Coinset File has been used. Reprogram using a Coinset File that changes the binary coding etc to the standard required.
- Any overlapping limits or limit greater than 254 will cause coins to be rejected.
- If problems persist, use the Cloning Routine described in a previous chapter.

C450

Programme as basic Coin Controls routine but note the following:

- Looms required:

E20 C450 from socket 5 to validator

E23 C450 from socket 2 to validator

- Any overlapping limits or limit greater than 254 will cause coins to be rejected.

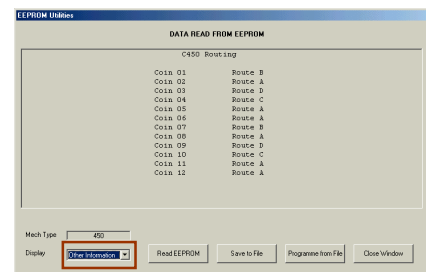
Routing:

- The coin routing is usually set to BDTA standard but it may have been changed. See below to check.
- Generally it is advisable to a Coinset File which leaves the routing unchanged. See the Coinset File Description section in the Appendix.

Display of other information:

- Read EEPROM and from **Display** select **Other Information**.

The routing for each coin is displayed.



Function of the banks of switches on rear of mechanism;

Switch Bank A:

- Coin Inhibits

Individual coins in six coin mode or pairs of coins in 12 coin mode can be inhibited using the 6-way switch.

Switch 1 UP to inhibit Coin Channels 1 & 7, switch 2 UP to inhibit Coin Channels 2 & 8 etc.

Switch Bank C:

- Coin mode:

Switch 4 DOWN selects six coin output and UP selects 12 coin binary output.

- Bank select:

Up to 12 coins can be accepted in two banks of 6 coins

Switch 5 DOWN enables coins 1 to 6.

Switch 6 DOWN enables coins 7 to 12.

Validator Test: Similar to C335 above but Binary display is not available.

Acceptance faults when fitted to host machines or validator test:

- If some types of coin are rejected check and remove any overlapping limits.
- If coins exit from the wrong router path it is likely that an unsuitable Coinset File has been used. Reprogram using a Coinset File that changes the routing to the standard required.
- If problems persist, use the Cloning Routine described in a previous section.

C220 & Sentinel:

See Appendix for listing of individual mechs supported

Programme as basic Coin Controls routine but note the following:

- Looms required;
E17 C220/Sentinel from socket 3 to validator
E25 C220/Sentinel from socket 2 to validator

Coin accepted:

- In normal mode coins 1 to 4 are output on pins 1 to 4 and coins 5 to 8 (If enabled) are also output on 1 to 4.

Coin Inhibit:

- Coins are usually inhibited by the host machine via the interface connector.

Acceptance faults when fitted to host machines:

- Reprogram using larger windows.
- Any overlapping limits or limit greater than 254 will cause coins to be rejected.
- If problems still occur, use the Cloning Routine described in a previous section.

NRI:

G13 family: See Appendix for listing of individual mechs supported.

Programme as basic NRI/Coin Controls routine but note the following:

- **CAUTION:** Different Programmer connections are used for Acceptors and Totalisers. Connecting the E10 Ribbon Cable from an Acceptor to the G13 Tote socket on the Programmer can damage the Programmer and/or mechanism.
- Coinset Files with individual coin values are required for Totaliser variants. Consult Mektek for a Coinset File specific to your needs. Validator Test is not available for Totaliser variants.
- Looms required:
E10 G13/C120 (Ribbon) from socket 1 to validator as shown
E14 G13 from socket 2 to validator as shown.

Mechanism type identification:

Acceptors:

Type G13-0000 – one loom connection visible though back cover.

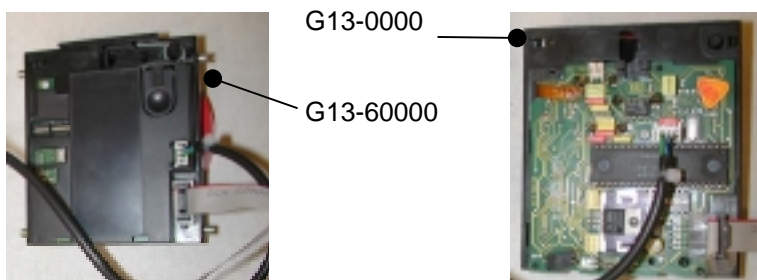
Type G13-6000 – both loom connections visible through back cover.

G13-1000 is a front plate version of G13-0000

G13-7000 is a front plate version of G13-6000

Totalisers:

A “2”, “3” or “4” in the red position indicates a Totaliser variant.

**Measuring Parameters:**

- The G13-6000 variants have selectable measuring parameters which are defined in the Coinset File.

Output & Inhibit Mapping: (G13-6000 series only)

- The output & inhibit mapping – which Channel is output on which pin and which Channel is inhibited by which switch – can be changed by use of a suitable Coinset File.
- If no coins are accepted on Validator Test after programming or when fitted to the host machine it is likely that an unsuitable Coinset File has been used.

Multiple output pulses on one output line:

- Multi-pulsing – eg one pulse for 50cent & 2 pulses for 1Euro – is defined in the Coinset File

Coins accepted:

- Up to 12 coins can be accepted in the G13-6000 family and up to 6 coins in the G13-0000 family

Coin Inhibit:

Individual coins can be inhibited using the 6-way switch(es) on the PCB.

- G13-0000 has switch bank. Switch 1 UP to inhibit Channel 1, switch 2 UP to inhibit Channel 2 etc.
- G13-6000 has 2 banks of switches. On Bank 1, Switch 1 UP to inhibit Channel 1, switch 2 UP to inhibit Channel 2 etc. On Bank 2, Switch 1 UP to inhibit Channel 7, switch 2 UP to inhibit Channel 8 etc.
- Totaliser: Refer to NRI Data Sheets.

Display of other information:

- Read EEPROM and from **Display** select **Parameter Map**

The parameters used for each coin are displayed. The parameters used are defined in the Coinset File and cannot be altered during programming.



- From **Display** select **Other Information**

The output mapping and inhibit mapping for each coin are displayed.

The "Values" column refers to Totalisers only. These are defined in the Coinset File and cannot be altered during programming.



G10 family: See Appendix for listing of individual mechs supported.

Programme as basic NRI/Coin Controls routine but note the following:

- The Coinset File to be used will contain coin values, tube routing etc and therefore no generic coinsets are available. Consult Mektek for a Coinset File specific to your needs.
- Loom E15 G10 fitted from socket 4 to validator

Mechanism variants:

- There are various variants of the G10. Most of these are similar to the 4000 or 4000/5 and are supported by the programmer. If in doubt select NRI and Mech Type in the Main Menu and then EEPROM Utilities. If the correct type is selected the contents of the Memory will be displayed.
- Should you have an unsupported variant, contact Mektek to see if it can be added.
- Validator Test – is only supported on some of the variants.

G40 family: See appendix for listing of individual mechs supported. Check the loom cross-reference as there are two main types which have different connections.

Program as basic NRI routine but note the following:

- Coinset files with individual coin values are required. Consult Mektek for a Coinset file specific to your needs.
- Additional looms used – may require removal of rear cover
E13 (socket 3) & E26 (socket 2) for G40-x3xx & G40-x4xx
E14 (socket 2) & E20 (socket 5) for G40-x0xx, G40-x5xx & G40-x6xx
- Select the exact variant on Validator Test screen

Mechanism variant identification:

- The second digit in the model number denotes the main variant.

eg G40-x4xx There could be a variety of numbers in the “x” positions dependent on coin entry exit etc. but it is programmed as a G40-x4xx.

Measuring Parameters:

- Selectable measuring parameters are defined in the Coinset file.

Output mapping, inhibit mapping and sorter settings:

- The output and inhibit mapping – which channel is assigned to each of the 6 output lines and which channel is inhibited by which switch – along with the coin routings if a sorter is fitted are set by the Coinset file.

Multiple output pulses on one output line:

- Multi-pulsing – eg one pulse for 50cent & 2 pulses for 1Euro – is supported by the mechanism and is defined in the Coinset File

Coins accepted:

- Up to 12 coins can be accepted but there are 6 output lines.

Coin inhibit:

Individual coin channels can be inhibited using the two switches on the PCB.

- On the upper bank, Switch 1 ON to inhibit Channel 1, Switch 2 ON to inhibit Channel 2 etc.
- On the lower bank, switch 1 ON to inhibit Channel 7, Switch 2 ON to inhibit Channel 8 etc.

Validator Test:

- Before passing coins through the mech select the appropriate variant from the drop-down box on Validator Test screen.
- Some mechanism variants support Binary Output and this can be selected from the Validator Test screen. See Coin Controls C335 section for details.

Display of other information:

- Read Memory and from **Display** select **Parameter Map**. The parameters used for each coin channel are displayed. The parameters used are defined in the Coinset File and cannot be altered during programming.
- From **Display** select **Other Information**. The output mapping in Hex, inhibit mapping, coin value, pulses and sorter routing is displayed for each coin. These values are defined in the Coinset File and cannot be altered during programming.



Appendix

Keeping Up to Date:

Obtaining Coinset Files:

- Generic coinset files covering most applications are included in the installation CD and can be downloaded from the Coinset Download page on our website www.mektekinternational.com.
- Specific Coinset files for a particular application will be provided free-of-charge on request. Please discuss your requirement in detail with your Programmer supplier or Mektek UK Ltd.

Updated operating software:

New features, improvements and support of new types of coin mechanism are regularly being added to the Programmer operating system in response to user feedback. Check our website www.mektekinternational.com regularly and download the latest updates free-of-charge.

Technical Help & Fault Reporting

If you require help or advice relating to the operation of Mektek equipment:

- Check out the Programming Help page on our website www.mektekinternational.com
- Contact your local Mektek Programmer supplier directly or Mektek Uk Ltd.
- Check out the technical data available on the manufacturers' websites.

Mars – www.meiglobal.com

NRI - www.nri.de

Money Controls (Coin Controls) – www.moneycontrols.com

Tables:**E+1 Switch settings**

Switch 1	When used as 1k select the active coin set		When used as 2k select the active coin segment via the validator links/switches	
	ON	OFF	OFF	ON
	Seg 1 active	Seg 2 active	Not to be used	Normal setting

Switch 2	When used as 1k or 2k enables erasing and programming		
	ON		OFF
	Erase and program enabled WARNING: Data will be erased if Switch 2 left ON when verified or fitted to a validator		E+1 is Read-only and cannot be altered

Fault-finding:

Description	Cause/Action
No response from programmer box	Comms fault - switch box off/on Disconnect mech then if OK = faulty mech Reboot system Check PC to box loom Check correct COMs port selected.
No validator detected	Check box to mech loom & correct looms fitted Comms fault - switch box off/on Faulty validator – check using Memory/EEPROM utilities if Coin Controls/NRI.
Coins not recognised when dropped during programming	Wrong coinset file used Wrong looms used or looms not fitted Mechanism not supported by Operating software version used – download latest software from our website.
Data device fails verify	PROM - check orientation in socket. Notch adjacent to red spot and opposite end to lever PROM – remove and reseal in ZIF socket E+1 – reset switch settings and retry.
Mech fails validator test See additional routine below.	Mars: Check PROM/E+1 inserted correctly Check switch settings on E+1 Single coin set - check Duplicate Segments used. Mech incorrectly fitted to stand when programmed or tested - reprogram and retest. Coin Controls/NRI: Check all looms fitted as specified. Incorrect Coinset File used when programmed - confirm mech type, reprogram and retest. Check and remove overlapping limits on C435/C435A Maximum limit value of 254 exceeded.
Mech passes validator test but rejects coins on host machine.	C435/C435A – coinset file used which changed mapping etc. to inappropriate standard. Reprogram using correct coinset file or use Cloning Routine.
Coin Controls/NRI unable to read memory	Check looms Check correct mech type selected Faulty mechanism Mechanism type not supported

Mechanism fails validator test after programming:

If a new type of mechanism is being programmed or different coins are being used and the mechanism fails validator test, first check the items in the table above. If this does not cure the problem carry out the following routine to identify and resolve the problem. (For future reference: If programming an NRI/CC mechanism, if possible use another mechanism of the same type that has not been reprogrammed and go to Read EEPROM and then Save to File to store the original values. If using a Mars keep the original PROM)

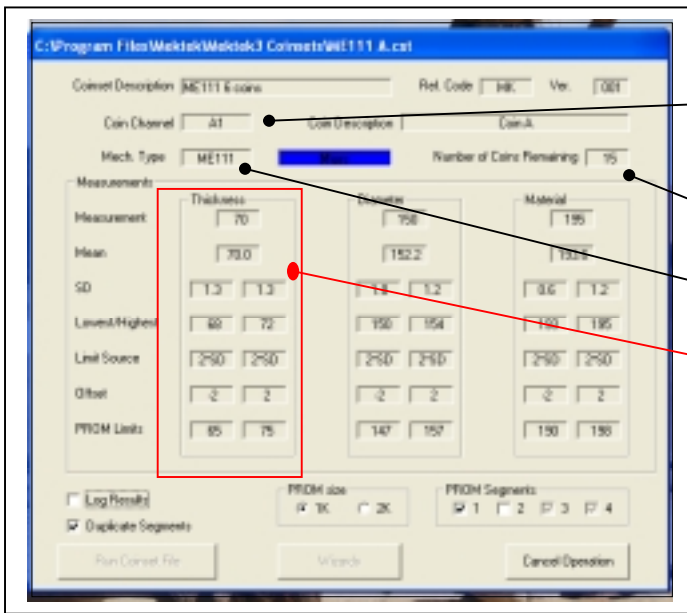
Identify the problem:

1. Program the mechanism for one coin only in Channel 1 using a suitable Generic Coinset File and basic programming routine.
2. Validator test and confirm that the coin is rejected.
3. Go to the Wizards and run Edit Limits.
4. There should be limits in Channel 1 only. Make a note of the limits generated. Overtyping the generated limits for Parameter 3 with the values 1 and 240.
5. Click on Change Limits
6. Program a PROM/E+1 and fit to mech if Mars or program the EEPROM if CC/NRI
7. Run validator test. If the coin is accepted this is the Parameter which needs adjusting. Go to the Tuning Limits section below.
8. If the coin is still not accepted repeat Steps 3,4,5,6&7 for each other Parameter in turn until coins are accepted. Now go to Edit Limits and overtype with the original limits except for the parameter which caused coins to be accepted. Repeat Steps 5,6&7. (If coins are not now accepted one of the other Parameters needs to have its window width increased.) We have now identified which Parameter(s) need to be adjusted. Go to the Tuning Limits section below.
9. If the coin is not accepted after all Parameters have been changed to 1 - 240 then contact Mekttek UK for assistance.

Tuning Limits: (For CC/NRI mechs reprogram the EEPROM. For Mars mechs use an E+1 or new PROMs).

1. Go back and run the Edit Limits Wizard.
2. Overtyping all parameters with the original values. From now on we will only adjust the parameter(s) which were identified in the previous section.
3. Decrease the lower limit and increase the upper limit by increments until the coin is accepted.
4. Make a note of how much the lower limit(s) was reduced and how the upper limit(s) was increased.
5. Apply this adjustment manually when programming this type of mechanism/coin combination or contact Mekttek UK for a free-of-charge Coinset File which makes the adjustment automatically.

Description of Capture Measurements Screen



NOTES:

Coin Channel: Coin A1 goes into the first channel A of segment 1 in the E+1. Coin B1 goes into the second channel B of segment 1 etc. Coin A2 would be the A coin in segment 2.

Number of Coins Remaining: Will decrease to zero as coins requested are dropped through the validator.

Mech Type: The family of mechs suitable for use with this Coinset File.

For each parameter eg Thickness, the sensor readings from the mech and the calculated measurements from the Programmer are displayed and updated as each coin is dropped.
Measurement – the sensor reading of the actual coin dropped.
Mean – the mean values for coins dropped so far
SD – Standard Deviation of the coins dropped so far
Lowest/highest – values for the coins dropped so far.
Limit Source – number of SDs each side of the mean
Offset – adjustments to Limit Source
PROM Limits – calculated limits for coins dropped so far.

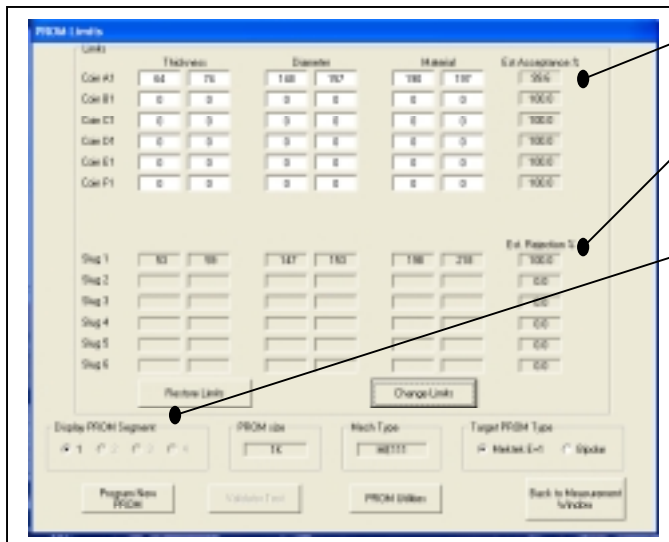
Duplicate Segments: (Mars only) Puts the same data in both segments of the PROM

Log Results: Ticking this box before dropping coins will open a dialog box to create a new Xcel file that records all the measurement readings in detail on a spreadsheet.

PROM Size: (Mars only) Selects the PROM size to be used (Tick 2k only if a 2k PROM and all 4 segments are to be used)

PROM Segments: (Mars only) Tick segments to be used (Not required if Duplicate Segments is ticked)

Description of PROM Limits Screen



For Coin A1 the Limits generated for each parameter are shown along with the Estimated Acceptance %age (based on the coins used for programming)

In this case a possible Slug has also been dropped through and the Estimated Rejection %age shown. If these two sections were highlighted it would mean the Slug would be accepted and the Limits of the Coin A need to be adjusted.

Display PROM Segment (Mars only): Tick on this section to display the contents of the other Segments.

Indicator LEDs

- LED1 (nearest USB socket) Red External 12v (or 24v) to coin mech
 - LED2 Green External 5v to Mars Coin mechs and PROM socket
 - LED3 Red Internal 12v level
 - LED4 Yellow (nearest power supply socket) Internal 5v to Mektek 3 processor
- LED's 1 and 2 show the supply to the coin mech under test - these sometimes are switched off by the software, but will always be ON when programming and during coin test
 The LEDs are really to give confidence that the Mektek 3 is powered OK (LEDs 3 & 4) and that the mech / PROM is powered (LED's 1 and 2). A faulty or reversed PROM may cause LED2 to be off, a dodgy coin mech may cause LED1 or LED2 to be off.

DESCRIPTION OF GENERIC COINSET FILES

NOTE:

- If a coin or slug is not required select "Skip" when programming to pass onto the next channel. See the Operator's Manual for details. (A Slug is a false coin which may be accepted as one of the real coins)
- Special Coinset Files are available on request free-of-charge from Mektek UK Ltd. For example, Coinset Files can be provided that automatically copy existing data from one segment to another, identify by name the coins to be dropped, alter the output routing, widen specific window limits, etc.

MARS

MS1000 family:

MS1000 coinset files work on most of the MS1000 family including MS1600, MS1604, MS1610, MS1614, MS1900, MS1904, MS1910, ME1099, ME1100,

Mech variants: If the mechanism is similar in shape to the above and the loom E1 fits the 20-way ribbon connector on the coin mechanism then use the MS1000 Coinset Files.

MS1000A add up to 6 new coins to segment 1

MS1000B add up to 12 new coins

ME111 family:

ME111 coinset files work on most of the MS100 family including ME111, ME115, ME115TS, MS111B1, MS111, ME126, ME129, & MS130B1, MS15, MS16, MS25, MS10, MS12 (For the MS150 consult Mektek).

Special Coinset Files which include coin values are required for the ME112 and ME181 – contact Mektek for assistance.

Mech variants: If loom E2 or E8 fits the lower left-hand connector on the coin mechanism then use ME111 Coinset Files.

ME111A add up to 6 new coins to segment 1

ME111B add up to 12 new coins

NRI

G13 Family: Acceptor only – for Totaliser variants contact Mektek UK Ltd

The G13 0000 and G13 6000 series require different Coinset Files.

Notes:

- For Totaliser variants the value of each coin is defined into the mechanism during programming. Contact Mektek for specific coinsets.

- G13 6000 series has selectable measuring parameters which are defined for each coin being programmed in the Coinset File. For this reason mechanisms using the Generic Coinset Files below should have their discrimination and acceptance thoroughly tested after programming to ensure that performance levels are acceptable.

G13-6000A add up to 6 new coins 1-6, outputs/inhibits 1-6 respectively

G13-6000B add up to 12 new coins, outputs/inhibits 1-6 & 1-6 respectively

G13-0000A add up to 6 new coins to channels 1-6

G18: Acceptor only – for Totaliser variants contact Mektek UK Ltd.

G18-3000A add up to 6 new coins (Output/inhibit 1-6)

G18-3000B add up to 12 new coins (output/inhibit 1-6 & 1-6)

G10: These coinsets contain individual coin values for each channel and change tube routing. For other values etc consult Mektek UK Ltd.

G10-4000Euro adds coins 5c/10c/20c/50c/1euro/2euro to channels 1-6 & 5c/10c/50c to coin tubes left/middle/right

Coin Controls

C220B:

C220BA add up to 4 new coins to channels 1-4 – output on pins 2,4,5,7

C220BB add up to 8 new coins 1-8 – output on pins 2,4,5,7 and 2,4,5,7

C335:

C335A add up to 5 new coins to channels 1-5 output on pins 3,5,6,8,1

C335B add up to 8 new coins. Output on pins 3,5,6,8,1 (Coins 6,7,& 8 twinned with coins 1,2 & 3 respectively)

C435 family:

The routing of coins through the in-built sorter in the mechanism can be defined in the memory of the mech or via an external header routing plug. Generic Coinset files use the routing plug with default route "A". The Piezo sensor is disabled in the Generic Coinset files for all coins. The Coinset files below do not change the binary coding or output routing. If changes to these are required contact Mektek UK Ltd for specific Coinset files for your application.

C435 & C435A:

C435A add up to 8 new coins (Binary Coding and Routing unchanged, Piezo disabled)

C450 family:

C450A add up to 6 new coins (Routing unchanged)

C450B add up to 12 new coins (Routing unchanged)

C120 family:

The C120, C122 and C123 use the C120 Coinset Files.

C120

C120All New & Jaguar type - add up to up to 6 new coins to channels 1-6 (Mapping unchanged)

C120New A Ngw type mech - add up to 12 new coins (Mapped 1-6 & 1-6)

C120JaguarA Jaguar tyoe mech - add up to 12 new coins (Mapped 1-6 & 1-6)

C220, C220A, Sentinel:

SentinelA add up to 4 new coins (Routing unchanged)

SentinelB add up to 8 new coins (Routing unchanged)

Mechanisms Supported by this Programmer Model Mektek 3

Mars Mechanisms			
Mechanism	Coinset file family	Loom(s)	Comments
ME111, ME115, ME115TS, ME126, ME129, MS111B1	ME111	E2	20 pin connector
MS111, MS125, MS126, MS127	ME111	E8	16 pin connector. Remove separator
MS110	ME111	E17 & E32	Edge connector
MS1600, MS1900, ME1099	MS1000	E1	
MS1400	MS1400	E7	Klix machine
MS130B1, MS180	ME111	E5 & E6	
ME181, ME112	ME181 special	E3 & E4 & E31	Connect E31 to E3 if no flying ribbon cable on mechanism
MS150	ME181 special	E9	
MS15, MS16, MS25	ME111	E30	
MS140, MS160		Special looms required	Contact Mektek
MS10	ME111	E34	
MS12	ME111	E33	

Coin Controls Mechanisms			
Mechanism	Coinset file family	Loom(s)	Comments
C120	C120 new type C120 "Jaguar"	E10 & E11	See rear of PCB for identity
C220/C220A, Sentinel	Sentinel	E17 & E25	
C220B	C220B	E12 & E13	
C335/C335S	C335	E12 & E16	
C435, C435A, C420	C435, C435A. Ensure correct binary coding option selected	E11 & E13	
C450, C455	C450	E20 & E23	

NRI Mechanisms			
Mechanism	Coinset family	Loom(s)	Comments
G13-0000, G13-1000 acceptor	G13-0000	E10 & E14	1x6 way DiL switch only
G13-6000, G13-7000 acceptor	G13-6000	E10 & E14	1x6 way DiL & 1x6 or 1x8 way DiL switches
G13-0000, G13-1000 totaliser	Special	E10 & E14	As above for acceptor
G13-6000, G13-7000 totaliser	Special	E10 & E14	As above for acceptor
G10-4000, G10-4000/2	G10-4000	E15	Ask for individual variants supported
G10-4000/5 & G10-4000/6 & G10-4000/9	G10-4000/5		
G26 (G10-4000 validator)	Special		
G26 (G10-4000/5 validator)	Special		
G18-0000		E20 & E21 & E22 & E24	G18-0000 Interface Adaptor and user-supplied 24v PSU required
G18-3000	G18-3000	E14 & E20	
G40-x3xx, G40-x4xx	G40	E13 & E26	
G40-x0xx, G40-x5xx, G40-x6xx	G40	E14 & E20	