E.G.M. '073'/'040'-Series CONTROLLERS

NETWORK INSTALLATION & DIAGNOSTIC NOTES

1. DISPENSER ORIENTATION

The manufacturer of the LCD panel recommends that the panel is NOT exposed continuously to direct sunlight, as this can adversely affect the life expectancy of the device.

2. CONTROLLER & NETWORK COMPATIBILITY

It is important to ensure that the version of EPROM ('firmware') fitted to the controller is compatible with the version of the EGM-Network program (or equivalent) software installed in the computer. EPROM versions are currently V3.13 for '073', V2.09 for '040' and the EGM-Network version is currently V2.50. EGM-Network versions 2.xx and later will not operate with '040' EPROM versions earlier than 2.01. Certain functions provided by current versions of EGM-Network are not available when using '040' controllers. The controller EPROM version is identified on the controller's display immediately after powering up; the EGM-Network version is identified by a line at the top of the screen.

3. NETWORK LINK - CABLE TYPE

For connection distances exceeding approximately 6 feet, the type of cable used to connect dispensers to the host computer is important. Only twisted-pair screened DATA CABLE with an impedance of approximately 100Ω should be used; any other type not specifically intended for data transmission will cause erratic operation, especially in certain types of installation.

Suitable cable is available from Farnell, stock code 120-2745 (100m drum) or 120-2746 (500m drum). For connection distances of 6 feet or less (e.g., for testing or demonstration purposes), ordinary 3-core 3A mains flex may be used.

4. NETWORK LINK - CONNECTIONS

The EGM-Network System will generally be used with a computer having RS232 serial ports. The RS232 signals must be converted to the RS485 half-duplex standard used by EGM-Network and this is most effectively achieved by the use of a suitable convertor. A variety of convertors have been used throughout the history of EGM-Network: the 'K2' convertor is available from Rapid Electronics under order code 19-2834 and supersedes the earlier 'K485' convertor (Rapid 19-2810). Note that the two units are NOT interchangeable, since the wiring to their respective 'D'-type connectors is different. Note also that there are other variants of these two devices, which are NOT suitable for this application. Another type of convertor, model UT203, has also been used. This has connections that differ from either of the two previously mentioned but comes with a small plug-in PCB assembly to make connection to the network cable slightly easier.

The 'K2' unit, if used, has a row of DIP switches which must be set correctly before use, thus: switch 1 'ON'; switches 2 to 6 all 'OFF'.

The 5-way terminal block required for connection at the controller is available from Farnell, stock code 113-1815. The 9-way 'D'-type plug (for 'K2' or 'UT203' convertors) and cover required are available from Farnell, stock codes 150-726 (plug) and 469-919 (cover). The 9-way 'D'-type socket (for the older 'K485') is available under stock code 150-730.

The connections required between the 'K2', 'UT203' or 'K485' device and the network link

cable are as follows:

Signal	'D' Plug 'K2'	'D' Plug 'UT203'	'D' Skt 'K485'	3-Core Flex	Network Cable	5W block ('073'/'040')
Common	Pin 1	Pin 5	Pin 5	Green/Yellow	Screen	Terminal 2
+ ('B')	Pin 3	Pin 1	Pin 6	Brown	Black	Terminal 3
- ('A')	Pin 8	Pin 2	Pin 2	Blue	White	Terminal 4

The terminal numbers of the 5-way block (PL1 on '073', PL2 on '040') at the controller end are identified on the controller's connection board adjacent to the appropriate connector. In the event that these markings are not visible, the correct terminal numbers may be identified as follows: Holding the terminal block vertically with the wire holes visible and the screw heads to the right, terminal 1 is at the top.

Where more than one dispenser is to be connected to the computer, the exact manner in which dispensers are connected to the network link cable is very important. It is important to avoid 'spur' connections, in which a signal arriving at a connection has a choice of directions in which it can continue its journey. The only way of avoiding this condition is to ensure that the cable loops in and out of every dispenser in turn on its way back to the computer. Thus, no more than two data cables are connected to any dispenser controller. This style of connection is often referred to as 'daisy-chaining'.

5. NETWORK LINK TERMINATION

Termination MUST NOT be used when an adaptor is employed. To remove termination, any jumpers fitted to the two links 'LK1' and 'LK2' on the controller's connection board must be removed.

6. MACHINE ADDRESS

Each controller to be used as part of the network must have a unique 'address' assigned to it, so that the computer can communicate with each controller independently. The range of addresses currently available is 1-8. The address is set in 'Engineer Mode', which is entered by holding down the controller's 'Start' (for '073') or 'Print' (for '040') switch whilst switching on. Setting the address to '0' suppresses any communication between that controller and the computer; it does not affect the other connected controllers. Care must be taken to ensure that no two controllers are ever set to the same address, since this will cause the communication to fail and may cause damage to the controllers' data circuits.

Note that the address (if set to anything other than '0') is shown on the left-hand end of the top line of the controller's display, along with the time and date. The indication takes the form '[x]', where 'x' is the address set.

7. DIAGNOSTIC PROCEDURES

7.1. ESSENTIAL PRE-REQUISITES

The EGM-Network system should begin to operate immediately the software is started on the computer, provided that:

(i) The controller(s) is (are) powered up for at least 1 minute beforehand;
(ii) The controller(s) is (are) correctly configured, particularly as regards machine address;
(iii) All connections have been correctly made;
(iv) The computer and software have been configured correctly to use the serial port to which the network has been connected;

(v) A suitable RS232-to-245 convertor has been installed and correctly wired to allow a computer's standard RS232 port to communicate with the dispenser network.

If the system does not appear to function correctly, i.e., no communication is taking place between the computer and the controller(s), then the tests in the following section can be made using a digital voltmeter set on its 10V DC range.

7.2. VOLTMETER TESTS

(i) Connect the black (negative) lead of the DVM to terminal 2 (common) of the 5-way block.

(ii) Connect the red (positive) lead of the DVM to terminal 3 (signal +) of the 5-way block.

(iii) With the controller(s) powered up, the computer software running and with all connections made correctly, a voltage of approximately +3.5V should be recorded. This voltage will periodically show a brief change downwards from +3.5V. The exact variation in reading displayed by the DVM depends to a large extent upon the content of the data being exchanged and also the DVM's response to rapidly-fluctuating DC input. If this result is not obtained, refer to 'INTERPRETATION OF READINGS' below.

(iv) Transfer the red lead of the DVM to terminal 4 (signal -) of the 5-way block.

(v) With the controller(s) still powered up and the computer software running and with all connections made correctly, a voltage of approximately +0.5V should be recorded. This voltage will again periodically show a brief change, this time upwards from +0.5V. As before, the exact variation in reading will depend on data and the DVM's characteristics. If this result is not obtained, refer to 'INTERPRETATION OF READINGS' below.

7.3. INTERPRETATION OF READINGS

(i) If the voltage indicated on either terminal 3 or terminal 4 shows a minus ('-') before the reading, this indicates that the wires in the network wiring have been swapped over somewhere, since the voltages on the 'signal' leads (terminals 3 & 4) are normally ALWAYS positive with respect to 'common' (terminal 2).

(ii) A constant reading of approximately +3.5V (terminal 3) or +0.5V (terminal 4) without any variation for over two minutes suggests that either the software is not running or that it is trying to communicate with a serial port other than the one to which the network is connected. Note that the normal time interval between the brief variations (during correct operation) may be as short as 1 or 2 seconds or as long as 1 minute, depending upon the function of the network.

(iii) A reading of approximately 0V on either signal terminal (3 or 4) indicates that the signal connection is either broken or shorted to the common (terminal 2) connection somewhere.

(iv) A reading that is predominantly approximately +0.5V on terminal 3 or +3.5V on terminal 4 (with or without periodic variations) indicates that the two 'signal' wires (to terminals 3 and 4) are possibly swapped over somewhere, since terminal 3 normally assumes the higher voltage and terminal 4 the lower.

(v) A reading that is identical on both signal wires indicates that there is a short between the two signal wires somewhere.