Sycologic

M16

Digital Midi Matrix
User Manual



All Drawings and text produced
on the Apple Macintosh

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v2.04

SYCOLOGIC M16
Digital Midi Matrix User Manual

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1) Introduction

The **Sycologic M16** is a digital switching matrix which has been designed to solve the many problems experienced when linking more than two Midi instruments together.

Incoming Midi data from the 16 Midi inputs can be routed to any combination of the 16 Midi outputs. These inputs and outputs are referred to as **Sources** and **Destinations** in a 16 by 16 matrix. Once a matrix has been configured it can be stored as a **Patch**. A total of 32 Patches can be stored and recalled, allowing complex routings to be established in seconds. All memory is non-volatile, being retained while the unit is powered-off.

Matrix information is displayed on an LCD contained in the remote keypad. To simplify the routing each **Source** and **Destination** can be 'named' with its own 8 character label. Also patches may be named if required. These labels can be reviewed at any time, saving the need to refer to diagrams or lists of the instruments connected.

1.1 Midi Program Changes

Patches are selected from the remote keypad or by a Midi Program Change from any one of the 16 Midi Sources. In addition, each Patch can have its own group of Midi Program Changes assigned to the Destinations. These will be transmitted, on pre-selected Midi channels, to the receiving instruments when the matrix Patch is first selected.

Thus one Midi Program Change from a 'Mother' keyboard or Sequencer can not only change the routing of the system but also select the Programs of all the Midi instruments and effects connected.

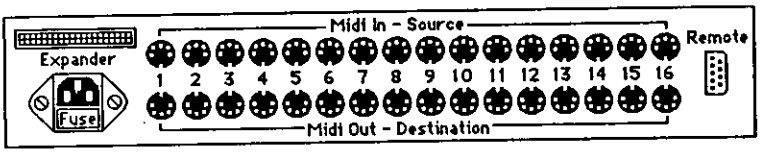
1.2 Intelligent Switching

All Midi data is sent in packets, which take a finite time to pass through the matrix. It would be possible, therefore, to corrupt this data if the matrix was to switch in the middle of a transmission. To avoid this corruption a 'Switch-Lock' is implemented which will prevent changes from being made to the Matrix while any Midi data is present at any of the 16 Sources. Any request to change the Matrix will be held until all Midi inputs are clear.

The 'Switch-Lock' cannot, however, prevent a Matrix point from being

2) Panel Details

2.1 **Rack Unit** - Rear Panel



Midi In - Source
16 Opto-Coupled Midi Inputs, on 5 pin DIN connectors.

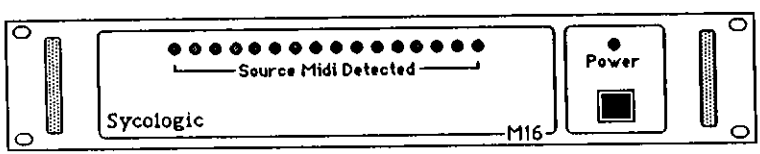
Midi Out - Destination
16 Buffered Midi Outputs, on 5 pin DIN connectors.

Expander
40 way IDC socket for connection to Expander Modules.

M16R Remote
9 way Female 'D' type Socket for connection to Remote unit.

IEC Mains socket with fuse and 115/230V selector.

2.2 **Rack Unit** - Front Panel



Source Midi Detected
16 Red LED's to display the presence of Source data.

Power
Red LED to indicate Power-On

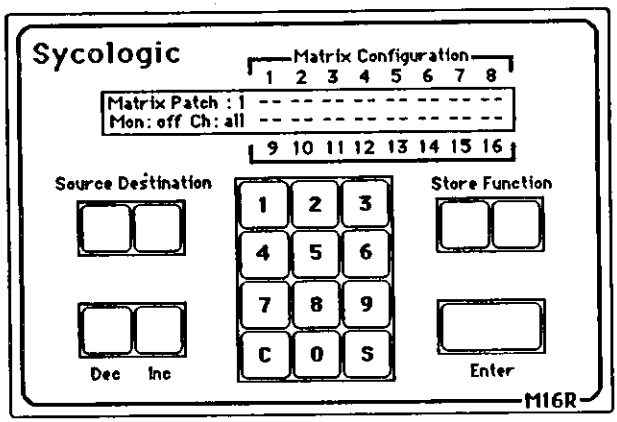
Mains Power Switch



M16 Rack
9 way Male 'D' type socket for connection to Rack Unit.

Contrast
Access to internal pre-set for LCD Contrast adjustment.

2.4 **Remote** - Front Panel



The window in the top of the panel contains a 40 Character by 2 line back-lit LCD. This is used to display all Matrix information.

Source	Select a Source to be edited.
Destination	Select a Destination to be edited.
0 - 9	Select numeric value.
Inc (>)	Increment number or character value.
Dec (<)	Decrement number or character value.
S (Set)	Set number or character.
C (Cancel)	Cancel number or fuction.
Store	Store selected Patch.
Function	Select Function mode.
Enter	Enter selection or confirm request.

3) Connections and Initial Power-Up

3.1 Voltage Selection

Before powering-up the unit, check that the voltage selector on the rear panel of the rack unit has been set to the correct voltage for your area. The selected voltage is shown next to a small pointer on the socket. To change the setting pull out the fuse holder with the blade of a small screwdriver and turn it until the correct voltage is shown next to the pointer, then push back into place.

Note : This appliance must be Earthed.

Connect the rack and remote units via the cable supplied, locking the two connectors with their thumb-screws. Then connect the IEC mains lead.

All Midi instruments can now be connected to the rack unit.

3.2 Midi Connections

Sources

Midi Sources are devices which can transmit Midi data, such as a Mother Keyboard, Remote Keyboard, Synthesiser, Sequencer or similar controller.

Connect their Midi outputs to the M16's Midi Inputs.

LED's labelled 'Source Midi detected' on the rack front panel will indicate when Midi data has been received at the inputs of the M16.

Destinations

Midi Destinations are devices which can receive Midi data, such as a Synthesiser, Sequencer, Expander Voice module, or effects unit.

Connect their Midi inputs to the M16's Midi Outputs.

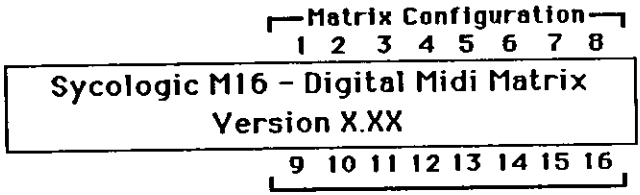
If a machine has both a Midi input and output, you may find it convenient to connect these to the same output and input numbers.

Once all of the instruments have been connected they can each be given an 8 character 'label' which will be displayed whenever the machine is referred to by number. These labels are assigned using **Function 1**, as described in Section 6.1, page 15.

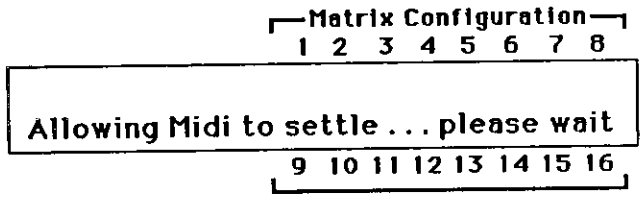
3.3 Power-Up

On Power-up no Matrix connections are made for a period of approx 4 secs to allow any instruments connected to initialise should they be switched on at the same time.

LCD



Followed by



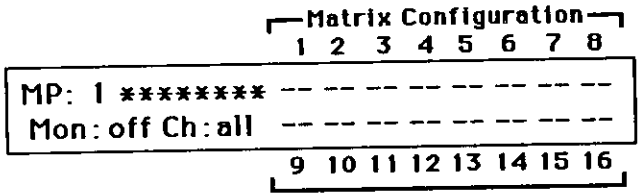
After this message the Matrix Patch which was connected on power-down will then be re-connected and any Program Changes, assigned to this Patch will be re-sent.

The Matrix is now in **Patch** mode.

4) Patch Mode

In this mode up to 32 Patches can be recalled from or saved to memory.

LCD



where **MP** is the current patch from 1 to 32.
Mon is the Midi Monitor Source which can be **off** or **1** to **16.**
Ch is the Midi Monitor Channel which can be **all** or **1** to **16.**

Matrix Configuration is the Matrix point display for the patch.

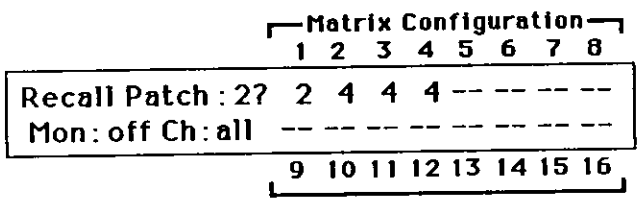
Each location marked on the panel represents a **Destination,** while the number displayed at that location represents the **Source** connected. Sources can range from **1** to **16,** or **'off'** which is displayed as two horizontal dashes.

4.1 Recalling Patches from the key pad

A patch which has been stored may be recalled by simply entering its number on the numeric key pad.

Enter **Number** from **1** to **32**
e.g.. **2**

LCD



Note that the new Matrix Configuration is displayed, but not connected, allowing the stored patches to be viewed **before** the Matrix is changed. In this example Patch 2 is shown with Source 2 connected to Destination 1 and Source 4 connected to Destinations 2, 3 & 4.

Once the desired patch has been found press **Enter** to answer the recall query and connect the displayed Matrix configuration.

Inc and **Dec** may also be used to view the stored patches, incrementing or decrementing the displayed patch number.

Cancel [C] will remove the recall query and display the previous patch.

4.2 Recalling Patches via Midi

Patches may be selected by a Midi **Program Change** received at any one of the Source inputs. In this way the Matrix Configuration may be changed from a Midi keyboard or Sequencer.

The number of the Source which is being monitored for the Program Change and the Channel it will be recognised on are displayed in the Matrix Patch window.

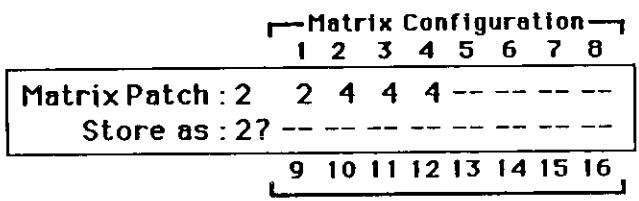
> **Mon:** is the Monitor Source number, **'off'** or **1** to **16**.
> **Ch:** is the Monitor Midi Channel, **'all'** or **1** to **16**.

When the Monitor Source is 'off' the Program Change facility is disabled. If the Monitor Source is one of the 16 inputs and the Monitor Midi Channel is set to 'all' Program Changes from that input will be recognised on any Midi channel.

These parameters are assigned using **Function 2**, as described in Section 6.2, page 17.

4.3 Storing and Copying Patches

Press **Store**
LCD



Pressing **Enter** will store the displayed patch into the same location. Obviously this would only be required after the patch had been edited.

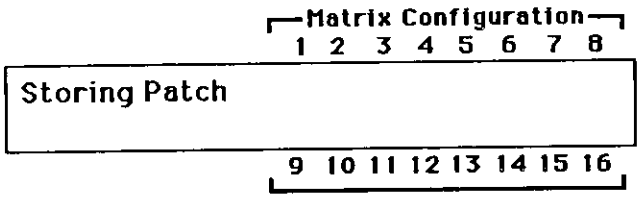
Cancel [C] will remove the store query and display previous patch.

Entering a number other than the one displayed allows patches to be copied between locations.

Enter **Number** from 1 to 32 or **Inc** and **Dec** until new patch is shown.

Press **Enter** to store configuration from the current patch to new patch.

LCD



Returning to the new Matrix Patch on completion.

As an example - to copy Patch 8 to Patch 24 :

Press	**Number [8]**	Recall Matrix Patch 8 ?
	Enter	Select Matrix Patch 8
	Store	Store as 8 ?
	Number [2]	Store as 2 ?
	Number [4]	Store as 24 ?
	Enter	Store to location 24.

5) Edit Mode

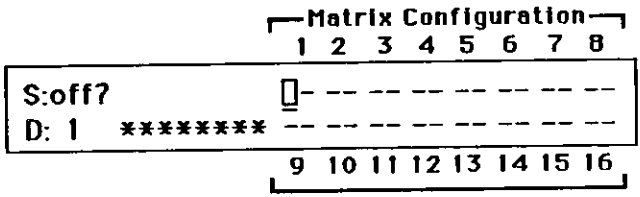
New patches can be created, or old patches edited using this mode. Each connection in the Matrix is made by selecting the required **Source** and **Destination** followed by **Set [S]**.

Either **Source** or **Destination** may be used to invoke the edit window.

5.1 Selecting a Source

Press **Source**

LCD



where **S:** is the current Source, **off** or **1** to **16.**
D: is the current Destination from **1** to **16.**

Default values of **S:off** and **D:1** will only be used when the edit mode is first invoked. Working values are retained until they are re-assigned. The square in the Matrix Configuration window represents a flashing cursor which moves to indicate the current Destination.

An 8 character 'label' is displayed next to each Source and Destination number allowing each instrument connected to be named. Whenever a Source or Destination is referred to by number, its name will also be displayed. Instrument labels are assigned using **Function 1**, as described in Section 6.1, page 15. Labels which have not been assigned are displayed as stars.

Enter **Number** from **0** to **16**, the number **0** will be displayed as '**off**'.

e.g.. **1**

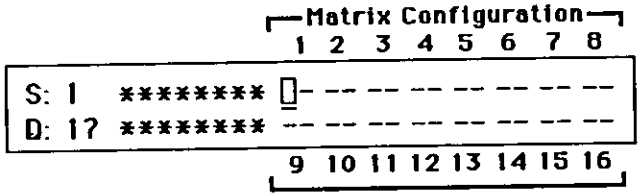
LCD

Labels can be viewed using the **Inc** and **Dec** buttons, which repeat when held down. Therefore if you can't remember which instrument is connected to a certain socket, simply hold down **Inc** or **Dec** until its label is shown.

5.2 Selecting a Destination

Press **Destination**

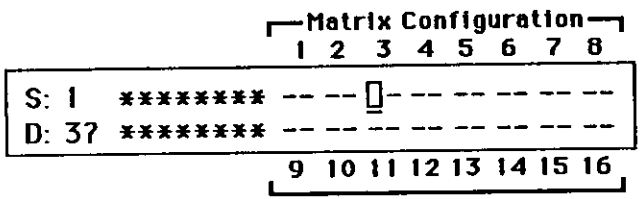
LCD



where **S:** is the current Source assigned above.
D: is the current Destination **1** to **16.**

Enter **Number** from **1** to **16**

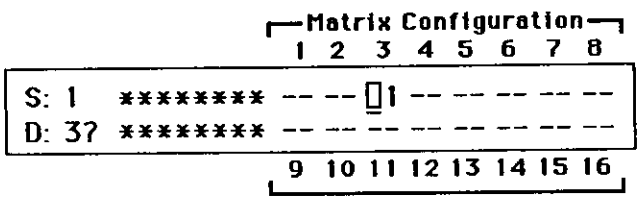
e.g.. **3**
LCD



The label for Destination 3 is displayed and the flashing cursor is located at the relevant position in the Matrix Configuration section.

5.3 Connecting the Matrix Point

Press **Set [S]** to assign the current Source to the current Destination
LCD



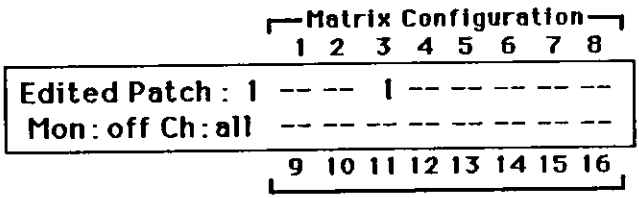
The current assigned **Source** now appears in the **Destination** location, indicated by the flashing cursor and the new selection is connected.

Edits can be made to the Matrix by jumping between **Source** and **Destination**, repeating **Number** and **Set [S]**, until all of the required points have been assigned.

Pressing **Cancel [C]** after **Set [S]** will cause that selection to be removed and replaced by the previous connection.

Press **Enter** to return to Patch mode, retaining the edits.

LCD



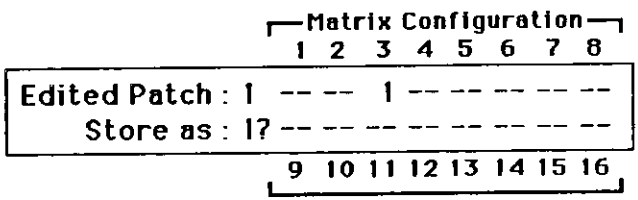
A new patch selection will cause all of the previous edits to be lost, therefore the **Store** facility, as described in Section 4.3, page 9, should be used to save the Edited Patch.

However, if no changes had been made to the Matrix before **Enter** was pressed the previous Matrix Patch will be recalled.

5.4 Storing in Edit Mode

Press **Store**

LCD



Pressing **Enter** will store the edited patch as Matrix Patch 1. Note that this will over-write whatever patch was previously in that location.

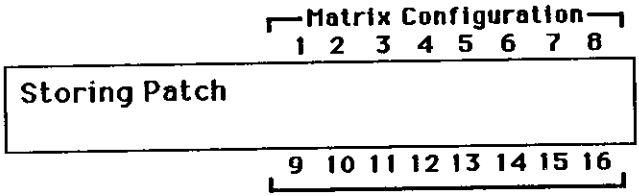
Cancel [C] will remove the store query and return to the edit window.

Entering a number other than the one displayed allows the edited patch to be stored in a different location.

Enter **Number** from **1** to **32** or **Inc** and **Dec** until new patch is shown.

Press **Enter** to store edited patch to the required location.

LCD



Returning to the edit window on completion.

6) Function Mode

There are 8 functions which may be invoked from **Patch** or **Edit** mode. All the functions are displayed in a 'menu' allowing them to be viewed, before any one is entered.

Pressing **Function** calls up this menu, where a function number is shown, accompanied by it's title. Functions may be selected by entering their number directly or by stepping through the menu, using **Inc** and **Dec**, until the desired number is found. **Enter** is then used to invoke the selection.

Pressing **Cancel [C]** will leave the menu and return to Patch or Edit mode.

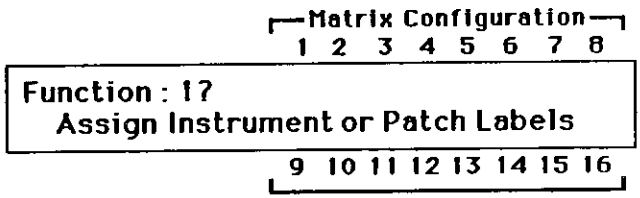
6.1 Function 1 - Assign Instrument Labels

Each of the 16 Source inputs, 16 Destination outputs and the Patches can be named using this function. These 'labels' are displayed when any Source , Destination or Patch is referred to by number.

Press **Function**

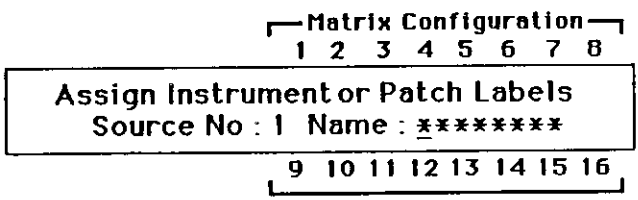
Enter **1** (default)

LCD



Press **Enter**

LCD



The Source to be named is selected by entering its number, from **1** to **16**, on the numeric key pad. A cursor under the name indicates which character can be altered.

Inc and **Dec** are used to step through the available characters which are:

Space, A to **Z** and **0** to **9.**

Once the desired character has been selected press **Set [S]** to fix the selection and move the cursor to the next character.

If the set character was wrong **Cancel [C]** can be used to move the cursor back one position.

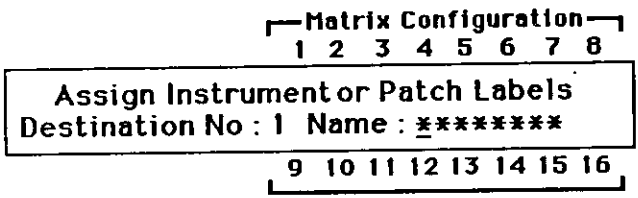
This procedure can be repeated until all the Sources have been named.

Press **Enter** to return to Patch or Edit mode.

To name any one of the 16 Destinations:

Press **Destination**

LCD



Destinations are named in the same way as Sources.

Select the required output by entering its number, from **1** to **16**, on the numeric key pad.

Inc and **Dec** until the required character is displayed.

Set [S] to fix character and move cursor.

Cancel [C] to move cursor back one position.

Repeat until all the Destinations have been named.

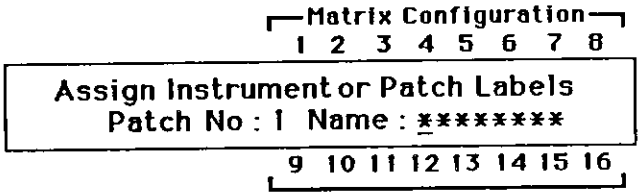
Source and **Destination** can be alternated until all labels are assigned.

Press **Enter** to return to Patch or Edit mode.

To name any one of the patches:

Press **Function**

LCD



Select the required Patch by entering its number, from **1** to **32**, on the numeric key pad.

Inc and **Dec** until the required character is displayed.

Set [S] to fix character and move cursor.

Cancel [C] to move cursor back one position.

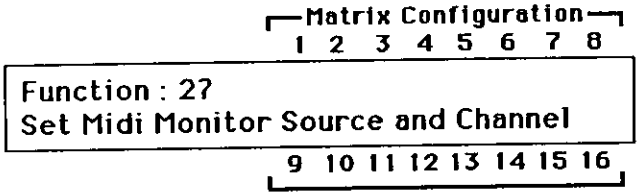
Repeat until all the Patches have been named.

Press **Enter** to return to Patch or Edit mode.

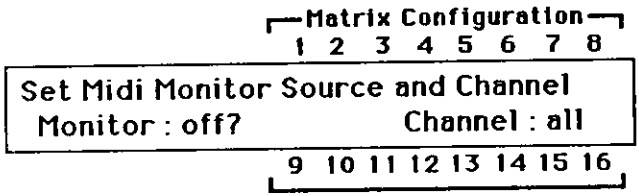
6.2 Function 2 - Set Midi Monitor Source and Channel

Any one of the 16 Source inputs can be monitored for Midi data. This data can be used to change the Matrix Patch when a Midi **Program Change** is received, or displayed in Diagnostic Mode (Function 8 - Page 29). The Midi channel which data will be recognised on can also be set as **1-16** or '**all**'.

Press **Function [2]**



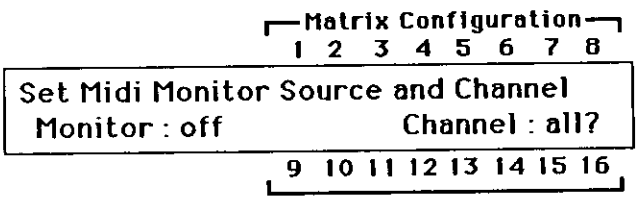
Press **Enter**



where **Monitor** is the current Source, **off** (default) or **1** to **16.**
Channel is the current Midi channel '**all**' (default) or **1** to **16.**

The Monitor Source may be altered by entering a number from **0** to **16** or by using **Inc** and **Dec.** Enter **0** for '**off**'.

Press **Function** to alternate between Monitor and Channel.



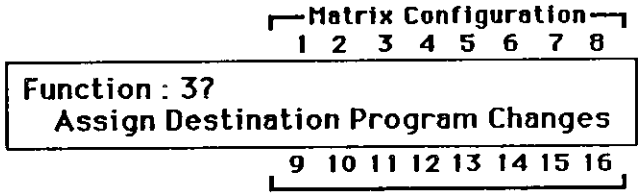
The Midi Channel may also be altered by entering a number from **0** to **16** or by using **Inc** and **Dec.** Enter **0** for '**all**'.
Press **Cancel [C]** to return to the function menu or **Enter** to return to Patch or Edit mode.

6.3 Function 3 - Assign Destination Program Changes

This function allows a Midi Program Change to be assigned to each of the 16 Destinations. A different set of these Destination Program Changes can be assigned to each of the 32 Matrix Patches. Each set of Program Changes will be sent to the relevant Destinations when the Matrix Patch is first selected, allowing the Programs of all the instruments connected to be changed, via the key pad or on receipt of a Midi Program Change from the assigned Monitor Source.

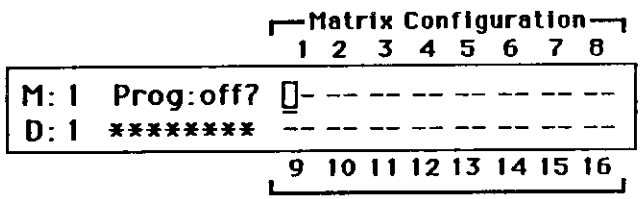
Press **Function [3]**

LCD



Press **Enter**

LCD



where **Prog:** is the Program Change number '**off**' (default) or **1** to **99**.
D: is the Destination from **1** to **16** followed by its label.
M: is the current Matrix Patch number from **1** to **32**.

Matrix Configuration now shows the Program Change numbers assigned to each Destination.

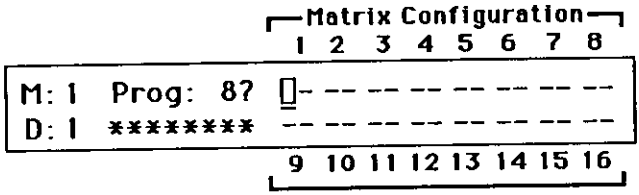
No Program Change will be sent when the assigned value is '**off**', which is entered as **0** and displayed in the Matrix Configuration as.

Program Changes are assigned in the same way as Sources in **Edit Mode** except that **Function** is used to cycle between **Program**, **Destination** and **Matrix Patch**.

Enter **Number** from **0** to **99** or **Inc** and **Dec**

e.g. **8**

LCD

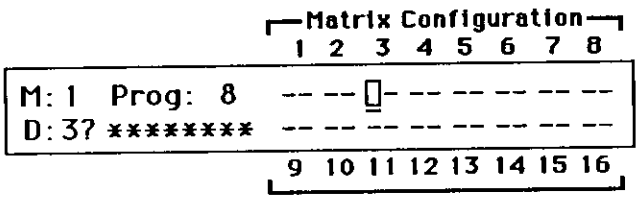


Press **Function** or **Destination** to select Destination

Enter **Number** from **1** to **16** or **Inc** and **Dec**

e.g.. **3**

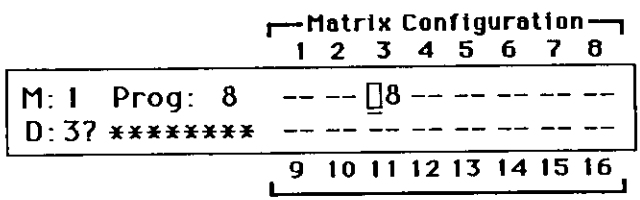
LCD



The label for Destination 3 will be displayed and the flashing cursor will be positioned at the relevant position in the Matrix Configuration section.

Press **Set [S]** to assign the current Program Change to Destination 3.

LCD

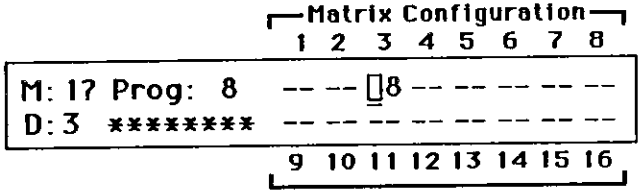


An 8 appears in position 3 and Program Change **8** is sent to Destination **3** on its assigned Midi Channel.

Pressing **Cancel [C]** after **Set [S]** will cause the selection to be removed and replaced with the previous value.

Press **Function** again to select **M:** for Matrix Patch.

LCD



Enter **Number** from **1** to **32** or **Inc** and **Dec** to select Matrix Patch.

The Matrix Configuration section will display the assigned Program Changes for each Matrix Patch. Program Changes will also be transmitted to the Destinations with every selection.

Note The Patch will also change as each Matrix Patch is selected.

Program Changes do not need to be stored in the same way as Patch edits. Each Program Change is stored automatically at the assigned Destination in the current Matrix Patch whenever **Set [S]** is used.

Store can be used to copy Patches, as described in Section 4.3, page 9 but the Patch, Program Changes and Program Change Channels will all be copied together.

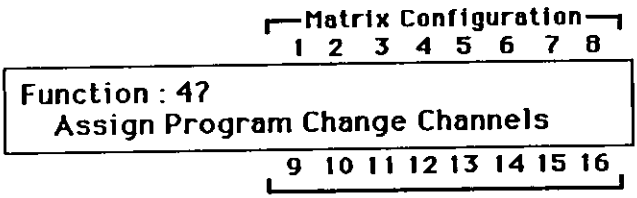
Press **Enter** to return to the function menu.

6.4 Function 4 - Assign Program Change Channels

This function allows a Midi Channel to be selected for each of the assigned Program Changes. This does not affect any data flowing through the Matrix only the Program Changes which are assigned using function 3. The Channel can be set from **1** to **16**, as would normally be the case, or '**all**' which will cause 16 Program Changes to be sent, one on each Midi Channel.

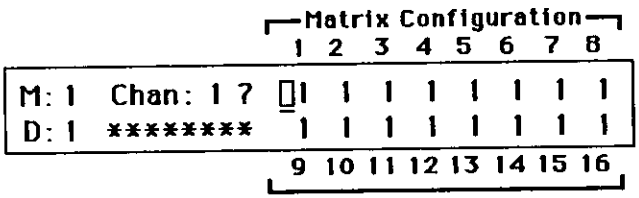
Press **Function [4]**

LCD



Press **Enter**

LCD



where **Chan:** is the Midi Channel '**all**' or **1** (default) to **16**.
D: is the Destination from **1** to **16**, followed by its label.
M: is the current Matrix Patch number from **1** to **32**.

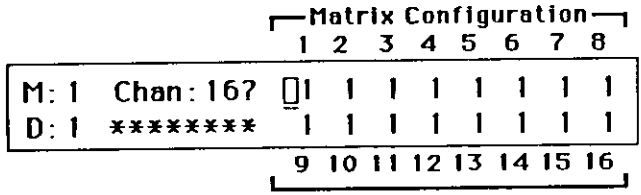
Matrix Configuration now shows the Program Change Midi Channels assigned to each Destination.

A Program Change will be repeated on all 16 Midi Channels when the assigned value is '**all**', which is entered as **0** and displayed as.

Program Change Channels are assigned in the same way as that used in function 3, using **Function** to cycle between **Channel, Destination** and **Matrix Patch**

Enter **Number** from **0** to **16** or **Inc** and **Dec**

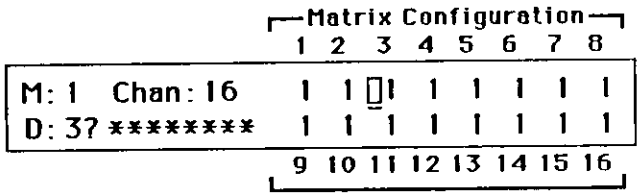
e.g. **16**



Press **Function** or **Destination** to select Destination

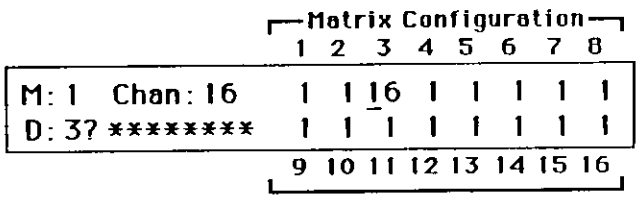
Enter **Number** from **1** to **16** or **Inc** and **Dec**

e.g.. **3**



The label for Destination 3 will be displayed and the flashing cursor will be positioned at the relevant position in the Matrix Configuration section.

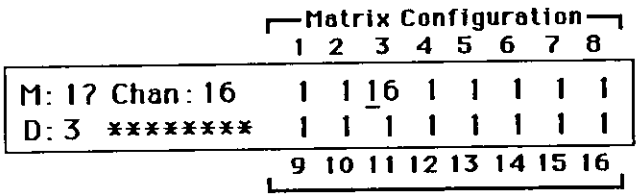
Press **Set [S]** to assign the current Midi Channel to Destination 3.



A 16 appears in position 3 indicating that the Program Change sent to Destination 3 when Matrix Patch 1 is recalled, will be transmitted on Midi channel 16.

Pressing **Cancel [C]** after **Set [S]** will cause the selection to be removed and replaced with the previous value.

Press **Function** again to select **M:** for Matrix Patch.



Enter **Number** from **1** to **32** or **Inc** and **Dec** to select Matrix Patch.

The Matrix Configuration section will display the assigned Midi Channels for each Matrix Patch. Program Changes will be transmitted on these Channels to the relevant Destinations with every selection.

Note The Patch will also change as each Matrix Patch is selected.

Assigned Midi Channels do not need to be stored in the same way as Patch edits. Each number is stored automatically at the assigned Destination in the current Matrix Patch whenever **Set [S]** is used.

Store can be used to copy Patches, as described in Section 4.3, page 9 but the Patch, Program Changes and Program Change Channels will all be copied together.

Press **Enter** to return to the function menu.

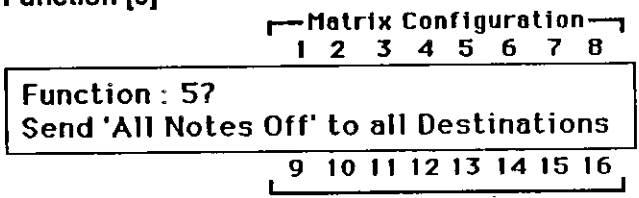
6.5 Function 5 - Send 'All Notes Off' to all Destinations

Midi Notes exist as two separate events. A 'Note On' event is sent when a key is pressed and a 'Note Off' when it is released. The time in between can obviously vary from mili-seconds to hours !
If the Matrix is switched between two Destinations in the middle of these two Midi events, it is possible that Midi 'Note Off' events which were destined for the first instrument are sent to the second. The first machine then sustains indefinitely.

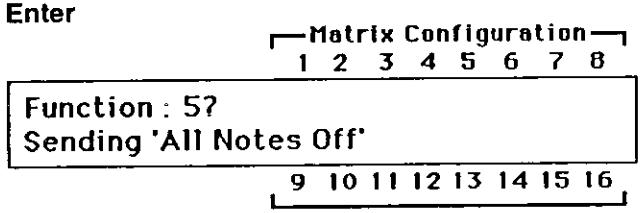
To try and reduce the possibility of this happening a Midi 'All Notes Off' command is sent on all 16 Midi channels every time a Destination is disconnected or re-assigned. However, some machines do not react to this command and instead implement 'Active Sensing'. These machines transmit 'Active Sense' events at regular intervals (around 300mS) and expect to receive the same at their input. If the 'Active Sense' events stop the machine assumes that the line has been disconnected and turns off any notes that are left on.

When this function is invoked it will clear all 16 Destinations by sending an 'All Notes Off' command, followed by an 'Active Sense' byte, then nothing for 1 second. Any machine which ignores 'All Notes Off' should therefore clear its own voices during the second when there is a break in the 'Active Sense' transmissions.

Press **Function [5]**



Press **Enter**



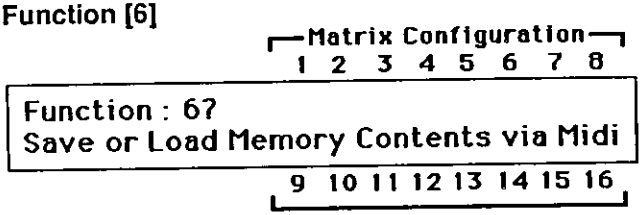
Returning to the **Patch** or **Edit** mode on completion.

6.6 Function 6 - Save or Load Memory Contents via Midi

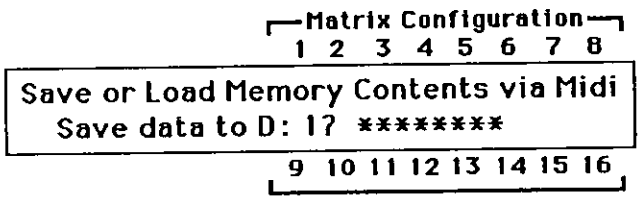
The internal memory which contains all Matrix Patches, Labels, Program Changes and Program Change Midi Channels can be transferred via Midi, being saved to an assigned Destination or loaded from an assigned Source.

The memory data is transmitted and received as Midi Note events on Midi channel 1, allowing a standard Midi Sequencer to be used as a storage medium. The sequencer must be able to record all notes 1-128 dynamically and play them back in strict sequencial order otherwise an error may result.

Press **Function [6]**



Press **Enter**



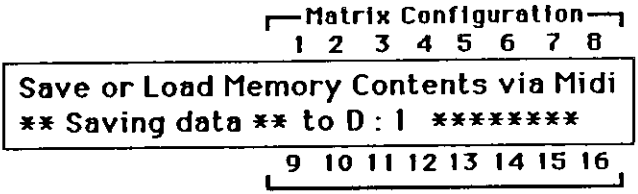
where **D:** is the Destination from **1** to **16**, followed by its label.

Pressing **Enter** will Save all of the memory to this Destination. If this function is no longer required **Cancel [C]** will return to the function menu.

Entering a number other than the one displayed allows the data to be Saved to an alternative Destination.

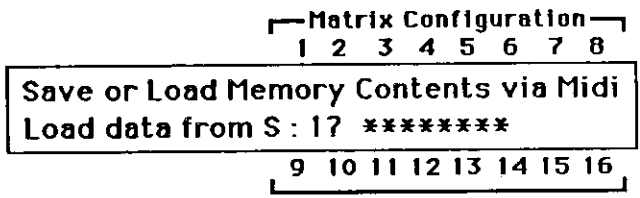
Enter **Number** from **1-16** or **Inc** and **Dec** to alternative Destination.

Press **Enter** to Save memory to the new Destination.



Returning to **Patch** or **Edit** mode when the transfer is complete.

Press **Function** to alternate between Save and Load.



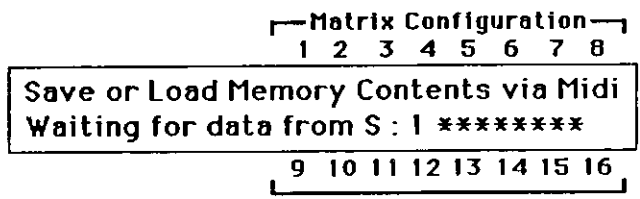
where **S:** is the assigned Source from **1** to **16**, followed by its label.

Pressing **Enter** will Load memory from this Source. If this function is no longer required **Cancel [C]** will return to the function menu.

Entering a number other than the one displayed allows the data to be Loaded from an alternative Source.

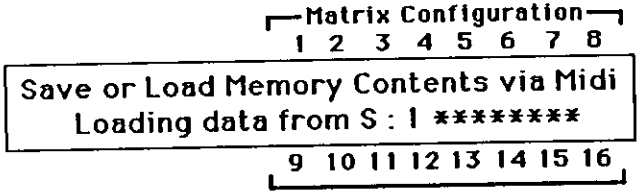
Enter **Number** from **1** to **16** or **Inc** and **Dec** to alternative Source.

Press **Enter** to Load memory from the new Source.



Pressing **Cancel [C]** will abort the load.

When Midi note data has been recognised and the correct header received:



Returning to **Patch** or **Edit** mode if the transfer is successful.

If the transfer is not successful one of four error messages will be displayed:

INCORRECT ENCODING
The Midi data received was not on Channel 1 or data which was generated by an M16 has been detected.

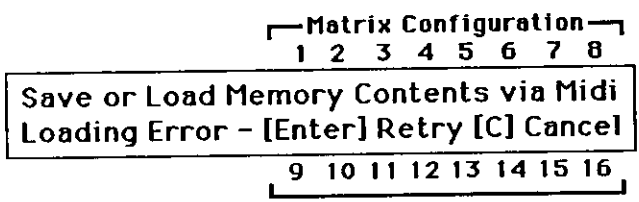
INCORRECT HEADER
Note data was received but the data started with the wrong values

INCORRECT CHECKSUM
Data has been corrupted.

TIMEOUT ERROR
There was a gap of more than 500mS between each event.

followed by:

LCD



Press **Enter** to retry or **Cancel [C]** to return to function menu.

6.7 Function 7 - Clear Memory

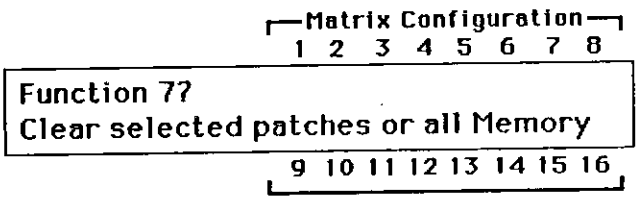
This function allows all non-volatile memory locations to be cleared.

All Matrix Patches are set to no connection (--).
All Instrument labels are set to 8 stars (********).
All Program Changes are set to no change (--).
All Program Change Midi Channels are set to 1.
Monitor Source is set to 'off'.
Monitor Midi Channel is set to 'all'.
All other variables are set to their default.

The main value of this function is to recover the unit from a 'bad state' such as variables out of their correct range. Since the memory is retained on battery back-up, any corruption will also be retained until cleared.

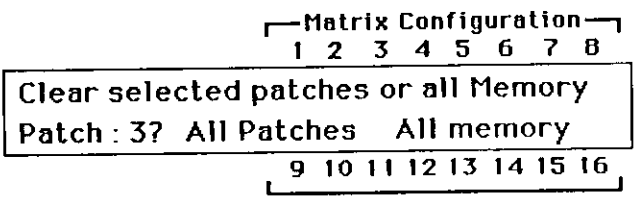
Press **Function [7]**

LCD



Press **Enter**

LCD



Press **Cancel** to return to function menu.

Press **Function** to select the clearing operation required

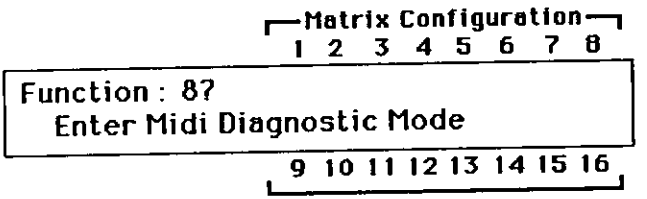
Returning to **Patch** mode on completion.

6.8 Function 8 - Enter Midi Diagnostic Mode

This function allows incoming Midi data from the assigned Monitor Source to be displayed in HEX format. This can be used to check the presence of 'Active Sense' and Clock events or to compare Midi Control Changes sent by different instruments. Consult the Midi Specification **1.0** for a complete description of the Midi Syntax.

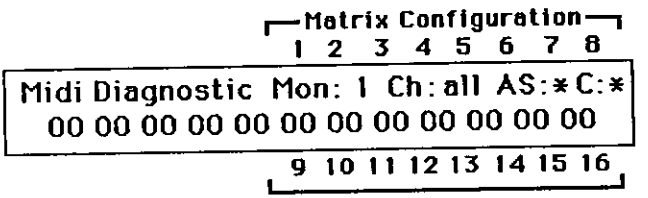
Press **Function [8]**

LCD



Press **Enter**

LCD



where **Mon:** is the current Midi Monitor Source from **1** to **16** or '**off**'.
Ch: is the current Midi Monitor Channel from **1** to **16** or '**all**'.
AS: is an indicator which flashes on 'Active Sense' events.
C: is an indicator which flashes on 'Clock' events.

The second line shows the last 12 bytes of Midi received in Hex.

Press **Cancel [C]** to return to the function menu.

7) Midi Time-Delays

7.1 Chaining Time-Delays

When Midi instruments are 'chained' together using their **In** and **Thru** sockets there will be a hardware time-delay added with each machine connected. This delay of around 4uS (millionth's of a second) is mainly due to the 'opto-coupler', a device used to isolate the machines input circuitry from the outside world. Since one Midi bit lasts 32uS, connecting more than 4 machines in **series** can lead to distortion of the digital signal and Midi errors.

The Matrix uses digitally controlled switches and therefore the only delay from Input to Output is due to the 'opto-coupler'. In addition, since all machines are now connected in **parallel**, one to each Output socket, there is no chance of distorting the Midi data.

7.2 Program Change Time-Delays

Each Midi Program Change event takes around 700uS to transmit.

If the Program Change Midi Channel is set to **'all'** there will be 16 of these transmitted, one on each Midi Channel, taking approx 11ms.

If all 16 Destinations have a Program Change assigned and every Program Change is transmitted to **all** Channels this will take around 180mS.

In addition, operation of the Switch-Lock will prevent the Program Change from being sent to a new Destination until all Midi Inputs are clear.

Therefore, if you try and select a Matrix with Program Changes to every Channel of every Destination in the middle of a complex sequence the M16 will do its best to fit in all the Program Changes during the gaps in the sequence but may take several seconds.

In normal use, however, the Matrix Patch would be selected before any notes are played allowing all of the receiving machines to configure their Program selections.

7.3 Source 16 Considerations

The Matrix uses Source 16 internally for its communication with the outside world. While 'All Notes Off' commands or Midi Program Changes are being sent the CPU will have priority over any machine connected to this Input. Therefore it is not advisable to have instruments which generate critical timing information, such as sequencers, connected to this Input.

8) Matrix Expansion

To cater for your present and future needs the M16 was designed with an 'open architecture'. This allows one or two **M16x Expander** units to be connected. Each Expander contains a 16 by 16 Matrix which expands the M16's capabilities to 16 by 32 or 16 by 48. More Destinations than Sources are supported to allow a greater number of Midi Voice Modules and Midi controlled Effects to be connected than Midi Controllers.

One 40 way IDC lead connects the M16 to the M16x's, supplying both power and data to the Expanders. The M16 'knows' which Expander is present and allows the Expander Patch to be displayed on the remote's LCD. All of the features of the M16 are available, including the 'naming' of Destinations and the ability to assign Midi Program Changes to each Destination.

In order to use expanders with your M16 it must be upgraded to version 2.04. This should be done by an experienced electronic engineer only. Serial numbers greater that 602100 do not require upgrading.

To connect the expander unit power off the M16 at the mains and connect up to two expanders to the multiway expander socket on the back of the M16. Set the identity switch on the back of the first expander to 1 and if you have a second expander connected set its identity switch to 2. Once this has been done the M16 may be powered up.

The M16 will look automatically for expanders. If an expander with identity 2 is found then the 16 assumes that there are two expanders connected. Otherwise the M16 assumes that if an expander is present there is only one. If no expanders are seen then the M16 assumes there are no expanders. When the M16 has determined how many expanders there are connected to it, it will modify the legal range of destinations to allow the extra destinations to be accessed.

9) Midi Implementation

[Sycologic M16 Digital Midi Matrix]

Date : Feb '86

Model: M16 **MIDI Implementation Chart** **Version** : 1

Function ...	Transmitted	Recognized	Remarks
Basic Default Channel Changed	Not Applicable	Not Applicable	Unchanged from Input to Output
Mode Default Messages Altered	Not Applicable	Not Applicable	Unchanged from Input to Output
Note Number True Voice	Not Applicable	Not Applicable	Unchanged from Input to Output
Velocity Note ON Note OFF	Not Applicable	Not Applicable	Unchanged from Input to Output
After Key's Touch Ch's	Not Applicable	Not Applicable	Unchanged from Input to Output
Pitch Bender	Yes, Channel 1	Yes, Channel 1	For Memory Storage
Control Change	Not Applicable	Not Applicable	Unchanged from Input to Output
Program Change True #	Yes, 1 to 99 for each of the Destinations	Yes, 1 to 32 at the assigned Source	Unchanged unless assigned
System Exclusive	Not Applicable	Not Applicable	Unchanged
System :Song Pos Common :Song Sel :Tune	Not Applicable	Not Applicable	Unchanged from Input to Output
System :Clock RealTime:Commands	Not Applicable	Not Applicable	Unchanged from Input to Output
Aux :Local on/off Mes- :All Notes Off sages :Active Sense :Reset	Not Applicable Yes, Channels 1-16 Yes Not Applicable	Not Applicable	Transmitted when a Destination has been disconnected or re-assigned.

Notes: All Midi data received at the assigned Monitor Source can be displayed in Hex format using Function 8.

Where a Matrix Connection a made Midi data transmitted from a Source will be received by the Destination unchanged.

10) Specifications

Connections

Rack Unit	16 Opto-Coupled Midi Inputs	5 pin DIN
	16 Buffered Midi Outputs	5 pin DIN
	Socket for Remote connection	9 way 'D' Female
	Matrix Expansion socket	40 way IDC
	Mains Inlet socket	IEC
Remote	Socket for Rack connection	9 way 'D' Male

Power Supply

	Selected on IEC socket between	220-240V @ 50Hz
	and	100-120V @ 60Hz
	Consumption	10W

Dimensions

	Rack Unit	482 x 186 x 88 mm
	Remote Unit	226 x 166 x 40 mm

Accessories Supplied

	Rack to Remote lead	approx 5M long
	Mains Lead	approx 2M long

Options

Sycologic **M16x** Midi Matrix Expander

11) Notes

Sycologic reserve the right to change this specification without notice.

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Macintosh is a registered trade mark of Apple Computer Inc.

Syco Systems Ltd. terms of trading apply and are available on request.