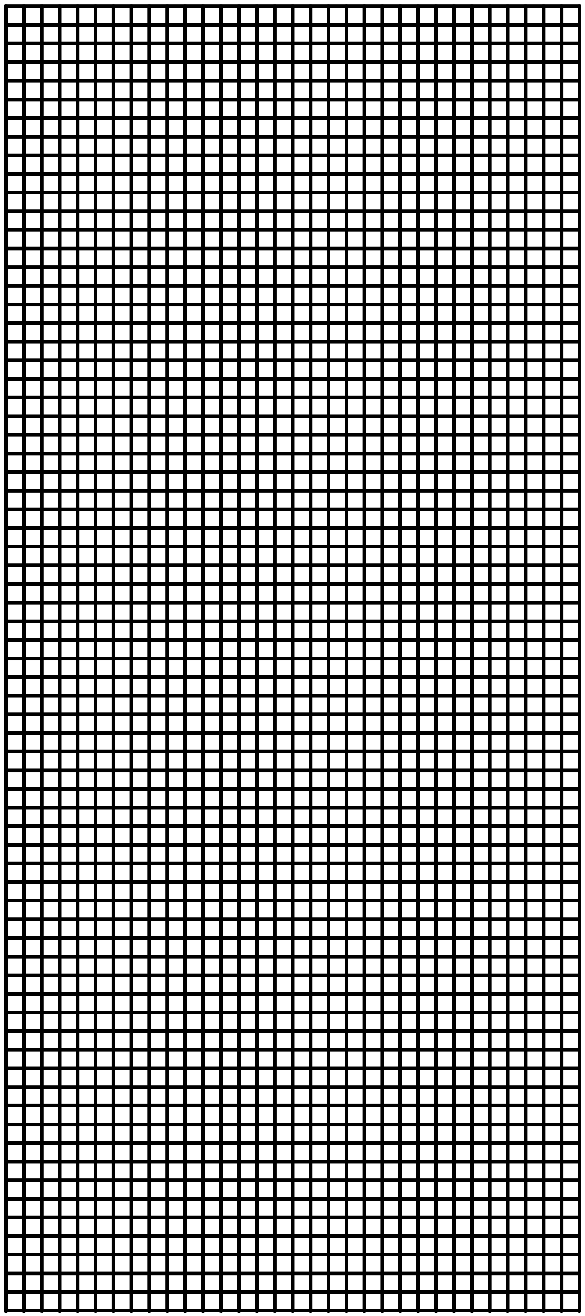
DMX C4 PROGRAMMING SERVICE FOR THE DMX 973 GRAPHIC MODULE

Lascar offers a programming service for the DMX 973 graphic module. Simply photocopy this page and complete it with the graphic image you require by colouring in the relevant squares. Complete one copy for each graphic image that you require. Up to 25 graphic pictures can be accommodated in the memory of the DMX C4.

Fax the set of completed pages to Lascar on ++44 (0)1794 884616 for a quote covering one or more DMX C4's complete with pre-programmed graphic images.



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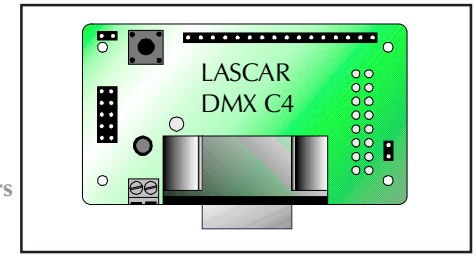
DMX C4

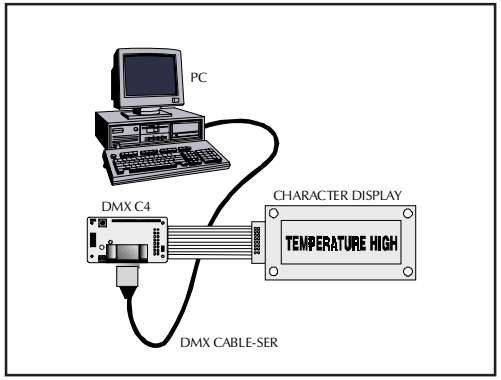
Message Store & Display Controller

The DMX C4 is a small and easy to use message store and display controller for LCD dot matrix displays. Messages are programmed into the DMX C4's non-volatile memory by connecting it directly to a suitable PC serial port and downloading text straight from Windows 95's Hyper Terminal software.

Once programmed with messages, the DMX C4 and its LCD dot matrix display can be disconnected from the PC and mounted in the target application. Messages can be recalled on the dot matrix display via the DMX C4's serial port, parallel port or via contact closures.

- **Messages stored in non-volatile EEPROM**
- **Fitted with contrast control for display**
- **Display Hold function freezes last message**
- **Drives most text displays up to 80 characters**
- **Stores up to 100 character messages**

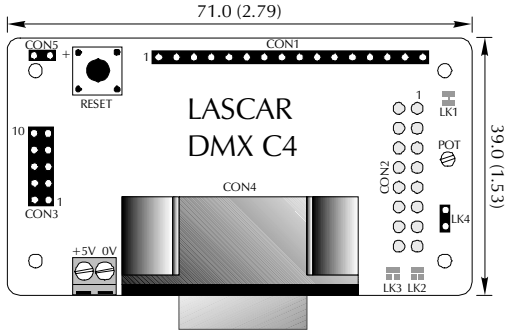




Controller Card Serial Cable				Stock Number DMX C4 DMX CABLE-SER
Specification	**Min**	**Typ**	**Max**	**Units**
Supply voltage		5		V
Supply current		15		mA
Message count			100	Messages
Message size			80	Characters

Rows/Characters	**8**	**16**	**20**	**24**	**32**	**40**
1	X	X		X		X
2	X	X	X	X	X	X
4			X			

DIMENSIONS All dimensions in mm (inches)



The DMX C4 has been designed to be used from within a Windows 3.1 DOS window or with Windows 95 HyperTerminal. The required port settings are 9600 Baud, 8 Data bits, No parity bit, 1 Start bit, 1 Stop bit, ANSI emulation and Hardware flow control. Before attempting to communicate with the DMX C4, connect it to the dot matrix display and to the PC. Then power up the DMX C4 from 5Vdc. This will cause the cursor on the dot matrix display to blink.

Using the DMX C4 within a Windows 3.1 DOS window

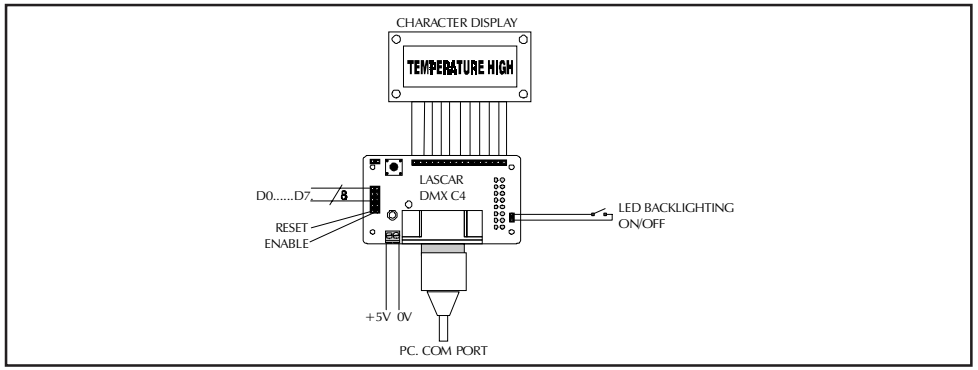
Due to limitations with Windows 3.1 Terminal, it is necessary to place a 3/10 second delay between each character in the Transfer Text settings. When a lot of text is transferred in this way, very long data transfer times ensue. It is quicker to use a DOS window and type *mode comX: 9600,n,8,1* where X is the number of the COM port that is connected to the DMX C4. Then copy the file (e.g. *messages.txt*) using the MSDOS *Copy* command to the COM port (e.g. *copy messages.txt COMx:*).
Do not use the DMX C4 with a DOS window running under Windows 95.

Using the DMX C4 with Windows 95 HyperTerminal

HyperTerminal is a program that is normally included with your Windows 95 installation. It is called *Hypertrm.exe* and usually resides in the directory *C:\Program Files\Accessories\HyperTerminal.*

- Running Hypertrm.exe will cause a new communications connection to be constructed.
- Select a suitable program icon and enter a name for the new connection, e.g. DMX C4.
- In the Connect using box of the Phone number dialogue box, select the free COM port to which the DMX C4 is connected, e.g. direct to COM 2.
- In COM x properties, select 9600 Bits per second, 8 Data bits, No parity, 1 Stop bit and Hardware flow control.
- Click OK to enable these settings.
- Select properties from the file menu, select settings and ASCII setup. Ensure 'send line ends with line feeds' is selected.
- Your system is now ready for use.

HyperTerminal will have created a program icon for your connection and called it DMX C4.ht. Copy this icon to the desktop for future use. Double clicking on it will run your DMX C4 connection with parameters as set up above.



Hints & Tips:

Message Blinking

In order to blink a message, switch intermittently between that message and a blank message location.

Multi-lingual Displays

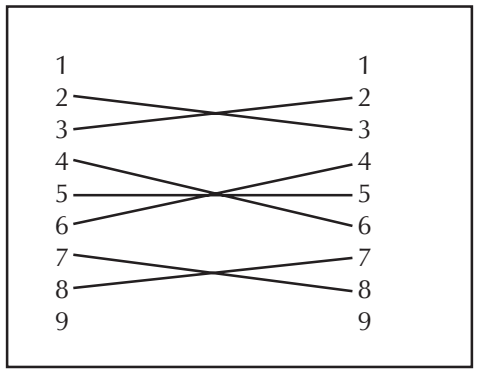
In order to produce multi-lingual message displays, use the last two bits of the message location as binary language selector.

Language Select 1	Language Select 2	...	Bit 2	Bit 1	Bit 0	Message
0	0	...	0	0	0	English Message 1
0	0	...	0	0	1	English Message 2
0	0	...	0	1	0	English Message 3
...	...	...	...	...	...	...
0	1	...	0	0	0	French Message 1
0	1	...	0	0	1	French Message 2
0	1	...	0	1	0	French Message 3
...	...	...	...	...	...	...
1	0	...	0	0	0	German Message 1
1	0	...	0	0	1	German Message 2
1	0	...	0	1	0	German Message 3
...	...	...	...	...	...	...
1	1	...	0	0	0	Italian Message 1
1	1	...	0	0	1	Italian Message 2
1	1	...	0	1	0	Italian Message 3

Number of Languages	Number of Messages per Language
1	100
2	50
4	25
8	12

Constructing a Communications Cable

To make your own DMX C4 communications cable (Full NULL Modem), the following connections must be made.



Connections

All connections are shown with DMX C4 viewed from the side of the screw terminals and D-type connector.

CON1 (Dot Matrix Display)

1	0V	Ground power supply to Display (also brought out on CON5)
2	V+	Positive power supply to Display (also brought out on CON5)
3	Vee	LCD Contrast supply to Display (internally connected to contrast control potentiometer and link Lk1)
4	A0	Register Select input for Display
5	R/W	Read/Write signal for Display
6	E	Display Enable signal
7	D0	Data Bus
8	D1	
9	D2	
10	D3	
11	D4	
12	D5	
13	D6	
14	D7	
15	LED-	LED Backlighting connection (internally connected to links Lk2, Lk3 and Lk4)
16	LED+	LED Backlighting connrction (internally connected to links Lk2, Lk3 and Lk4)

CON2 (Dot Matrix Display)

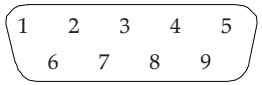
2	V+	1	0V
4	A0	3	Vee
6	E	5	R/W
8	D1	7	D0
10	D3	9	D2
12	D5	11	D4
14	D7	13	D6
16	LED+	15	LED-

CON3 (Parallel Port)

10	D0	9	D1
8	D2	7	D3
6	D4	5	D5
4	D6	3	D7
2	RESET	1	DE*

* DATA ENABLE (data D0 to D7 have effect)
Pin 1: +5V = Data enabled continuously
0V = Data latched
Pin 2: 0V = Reset, Open/+5V = Run

CON4 (Serial Port)



2	RxD
3	TxD
4	DTR
5	Ground
7	RTS
8	CTS

Links

Lk1 Break link to disable display contrast control.
Lk2 Break right hand link and make left hand link to invert backlighting polarity. Use with Lk3.
Lk3 Break right hand link and make left hand link to invert backlighting polarity. Use with Lk2.
Lk4 Remove plug to add external backlighting switch.

After powering up the DMX C4, the following menu appears in Hyper Terminal's editing window:

DMXC4 V1.1

\M =Menu

\T =Type of display
\B =Blank display
\Snn=Store in memory
\Rnn=Retrieve message
\E =Erase ROM
\C =Cursor on/off
\F =Flash cursor
\H =Home cursor
\P =Parallel on/off

A	1 x 8
B	2 x 8
C	1 x 16
D	2 x 16
E	1 x 20
F	2 x 20
G	4 x 20
H	1 x 24
I	2 x 24
J	2 x 32
K	1 x 40
L	2 x 40

Note: the menu commands are CASE SENSITIVE, and must be entered in UPPER case only.

Any choices made with the menu are saved inside the DMX C4's non-volatile memory until changed by the user.

Menu Commands (all menu commands are preceded by the \ character)

\M Displays the command menu.

\T Allows the user to select the type of dot matrix display that is connected to the DMX C4. This is expressed in lines x characters (see table above).
Note: DMX 908 must be setup as a 1x16 display (Option 'C').

\B Clears all the text on the dot matrix display, leaving the user with a blank display. The cursor is also moved to the home position (top left hand corner of the display).

\Snn Stores the text that is currently displayed on the dot matrix display in memory location *nn*. Memory locations 0 to 9 must include a leading zero. Saving messages to non-consecutive memory locations is allowed.

\Rnn Retrieves the text from memory location *nn* and displays it on the dot matrix display. Memory locations 0 to 9 must include a leading zero.

\E Erases all stored messages from the DMX C4's non-volatile memory. Use this command with care. Once erased, messages cannot be recalled. This command takes a while to complete and returns "Done" when finished.

\C Toggles the cursor on (visible) and off (not visible).

\F Toggles between a flashing cursor (block) and a steady cursor (underscore).

\H Moves the cursor to the home position (top left hand corner of the display). This command does not blank the dot matrix display.

\P Toggles parallel message selection on and off. When toggled on, the parallel port is used for message selection. When toggled off, the serial port is used for message selection.

Example:

\B\F\TD Clears the display, produces a flashing cursor and selects a 2 line x 16 character display.

Displaying Messages via the DMX C4

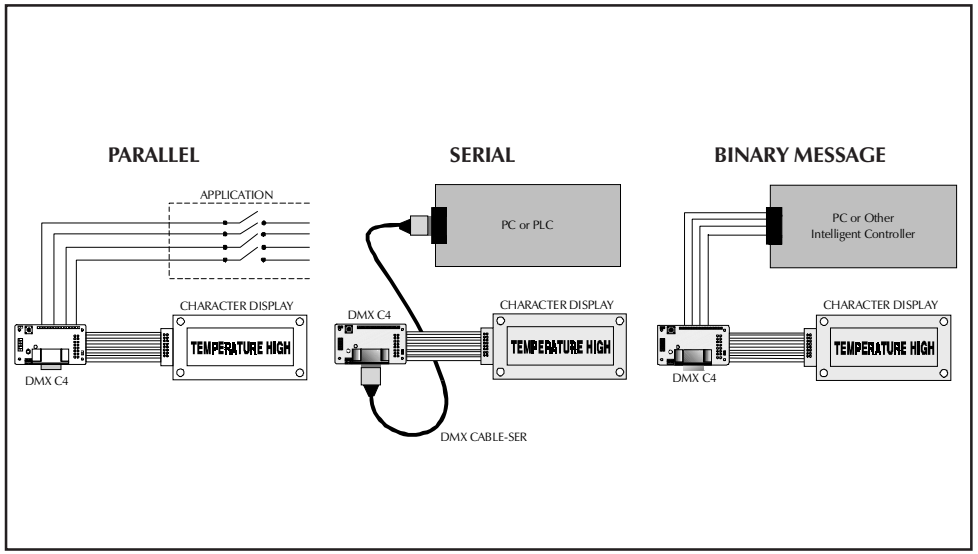
Typing Messages Straight onto the Display: Terminal Mode

- Connect the DMX C4 to the dot matrix display and to the PC.
- Power up the DMX C4. This will cause the main menu to appear on-screen.
- Typing a character on the keyboard will cause that character to appear on-screen. That character will also be downloaded to the DMX C4 and will appear on its dot matrix display.
- Once the display is full, i.e.: once the last character of the last line has been reached, the cursor moves back to the first character of the first line and that space is overwritten with new data.

Example:
\B\F\TDabcdefghijklmnop Clears the display, produces a flashing cursor, selects a 2 line x 16 character display and writes the letters a,b,c,d,e,f,g,h,i,j,k,l,m,n,o,p to the display. The cursor then moves the first position on the second line, waiting for the next character to be keyed in.

Downloading Messages from an Intelligent System or PLC

- Connect the DMX C4 to the dot matrix display and to the Intelligent System or PLC.
- Power up the DMX C4. This will cause the main menu to appear on-screen.
- Downloading a message from the intelligent system or PCL will cause that message to be downloaded to the DMX C4 and appear on its dot matrix display.
- Once the display is full, i.e.: once the last character of the last line has been reached, the cursor moves back to the first character of the first line and that space is overwritten with new data.



Message Storage with the DMX C4

When messages are downloaded to the DMX C4, they are not immediately stored in the controller card's memory. Instead, the message is first stored in the dot matrix display's own display memory. Then, once a \S*nn* command is sent by the user to the DMX C4, the contents of the dot matrix display's display memory is transferred to one of the DMX C4's non-volatile memory locations, as indicated by *nn*.

Example:
\TD LASCAR ELECTRONICS *\S54*

Each of the DMX C4's 100 memory locations is 80 characters long and this is the maximum amount of text that can be stored in each message location. Messages do not have to be stored to consecutive memory locations.

Downloading and Storing a Message File from Disk into the DMX C4
Instead of downloading one message at a time, a whole file of messages can be sent to the DMX C4. The file can be made up of two parts. The first part of the file contains the menu commands while the second part contains the messages. The whole is a continuous stream of data, without carriage returns.

- Select Transfer from the HyperTerminal menu and click on Send text file.
- Select the text file whose contents you wish to transfer to the DMX C4.
- This downloads the contents of the text file into the DMX C4, sets up the DMX C4 and loads the text messages into the DMX C4's memory locations, ready for recall via the serial or parallel port.
- The contents of the downloaded file remains inside the DMX C4, even after power is switched off. After power-up, the messages can be recalled via the serial or parallel port.

Hint: When composing messages, use spaces to position the words of the message on the dot matrix display.

Recalling Messages Stored in the DMX C4
Messages which have previously been stored in the DMX C4 using the \Snn command, or which have been previously downloaded as a text file, can be called up on the dot matrix display via the serial or parallel port.

Recall via the Serial port
To call up message number *nn* on the dot matrix display, send the command \Rnn to the DMX C4. A consecutive string of such commands with message numbers can be used to produce scrolling displays or a sequence of messages. The timing between the commands decides the speed of scrolling.

Recall via the Parallel port
Connecting one or more parallel port pins to V+ will cause the decimal equivalent of the binary word to be used as message number *nn*. The message corresponding to nn will then appear on the dot matrix display.

Using a set of microswitches, thermostats, pressure switches etc. to select message numbers results in a powerful status display system. Alternatively, use logic gates, relay contacts etc. to select a message.