Unique Micro Design
Advanced Thinking Products

Model M331
Custom Desk Top
LCD Terminal
User Manual

Revision History		
Date	Issue	Comments
31/05/95	1	First Issue

1. Introduction

This manual provides basic information about connecting to the Unique Micro Design Model 331 Custom Desk Top LCD Terminal, a member of the *UMD ProtoLink Architecture family of products.*

The Model 331 is based on the *UMD Model 301 Controller Module* which is also used internally in other products such as custom keyboards, multi-in/out wedges, peripheral controllers and custom VGA terminals.

In essence, the *UMD ProtoLink Architecture* is a versatile product development system.

The architecture specifies the following:
  • standard definitions for configuration parameters that can be
    consistently used across a broad range of products.
  • standard command set and peripheral control philosophy.
  • standard set of hardware facilities which includes non-volatile
    memory to hold configuration parameters, a peripheral
    interface bus, serial ports which provide power for scanners
    and bar code wand, display, external keyboard, keyboard
    wedge and magnetic card reader interfaces.
  • peripheral interface bus that allows the addition of other
    modules to the core controller.

The *UMD Model 301 Controller Module* has extensive programmable capabilities, which are not discussed in this manual (contact Technical Support at Unique Micro Design for further information).

2. Custom Desk Top LCD Terminal Features

Custom Desk Top LCD Terminals are packaged in a wedge shaped plastic housing. The Model 331 has flexible interfacing options incorporating dual RS232 serial, AT keyboard interface, magnetic card reader interface and bar code decoder. Power is sourced externally from either a 5 Volt regulated or 7-9 Volt unregulated supply.

The Model 331 features a 4 x 5 programmable keypad and 5 programmable LED indicators. Each key is programmable to return user defined codes by downloading a text file via the keyboard or serial port with details being permanently saved. There are no configuration switches to be tampered with. The backlit liquid crystal display (LCD) has 2 lines of 16 characters. The keypad uses low travel mechanical keys which are sealed with a polycarbonate overlay. This overlay is required to be preprinted.

As standard, all interfacing is achieved through a single DB25 socket connector, however we can easily accommodate various connectors or cables to suit you application.

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Used in serial mode, a plug pack provides power to the unit. Any key depression or bar code is output on a serial port. Any serial input can be directed to the LCD display for operator information. The second serial port is available for auxiliary I/O, eg with a printer or bar code scanner.

In keyboard mode, the Model 331 can connect directly to the keyboard port of a computer which provides the 5 volt power. In this mode a further connection to a serial port is required to send information to the LCD display.

Some options available include low cost bar code wand, a variety of bar code scanners, magnetic card reader, keylock or "Touch Memory" security. A customisation service is provided by Unique Micro Design to meet specialised requirements.

3. Keyboard layout

From the factory, the keys in the keypad are programmed with their row / column grid position, that is, the key at the top right corner, when pushed outputs the string "A1", the next key across outputs "A2" and so on.

LED 5	**LED 4**	**LED 3**	**LED 2**	**LED 1**
a5	**a4**	**a3**	**a2**	**a1**
b5	**b4**	**b3**	**b2**	**b1**
c5	**c4**	**c3**	**c2**	**c1**
d5	**d4**	**d3**	**d2**	**d1**

M331 4 x 5 Keypad key and
LED locations

4. Liquid Crystal Display (LCD)

The LCD is a backlit 2 line by 16 character display. Input to the LCD display is received through the serial ports. The display uses simple cursor control consisting of the following :

Code	Hexadecimal	Description
BS	08	Backspace
LF	0A	Line Feed
CR	0D	Carriage Return
FF	0C	Form Feed

LCD Cursor Control Codes

BS Backspace
The BS control character moves the cursor one position to the left. Any character located in the new cursor position is deleted. If the cursor is already located at the far left-hand margin the display ignores this instruction.

LF Line Feed
The LF control character sets the cursor to the next row in the same column position. If the cursor is currently on the second row that line of data is shifted up to the first row, deleting any data on the first row.
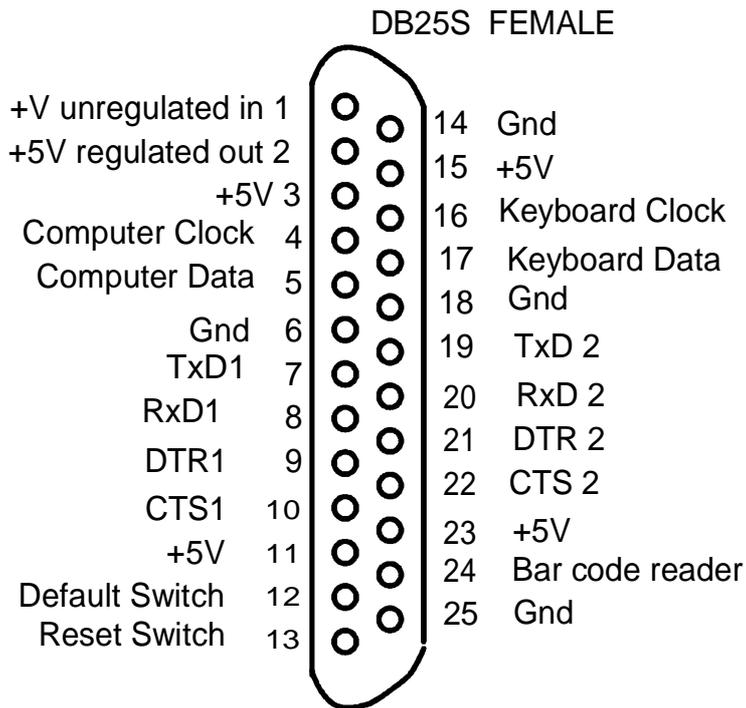
CR Carriage Return
When the CR control character is sent, the cursor is positioned at the left-hand margin of the current row. If the cursor is already at the beginning of the row, the instruction is ignored

FF Form Feed
The FF control character clears the screen and sets the cursor to the far left-hand margin, top row.

5. Connector Detail for M331

DB25S FEMALE

|		
+V unregulated in 1		14 Gnd
+5V regulated out 2		15 +5V
+5V 3		16 Keyboard Clock
Computer Clock 4		17 Keyboard Data
Computer Data 5		18 Gnd
Gnd 6		19 TxD 2
TxD1 7		20 RxD 2
RxD1 8		21 DTR 2
DTR1 9		22 CTS 2
CTS1 10		23 +5V
+5V 11		24 Bar code reader
Default Switch 12		25 Gnd
Reset Switch 13		

Looking at the DB25 socket on the M331

The M331 Interface Connector is a DB25 socket, providing connections for power, default / reset switches and distributes the signals for computer keyboard inputs, bar code reader and RS232 serial ports.

Contact Technical Support at Unique Micro Design, to discuss your cabling requirements.

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6. Connection Example

The cable that connects to the M331 Interface Connector is wired to suite your application. The example shown here provides power using a plug pack and terminates the serial ports to look like RS232 DB9 computer serial ports.
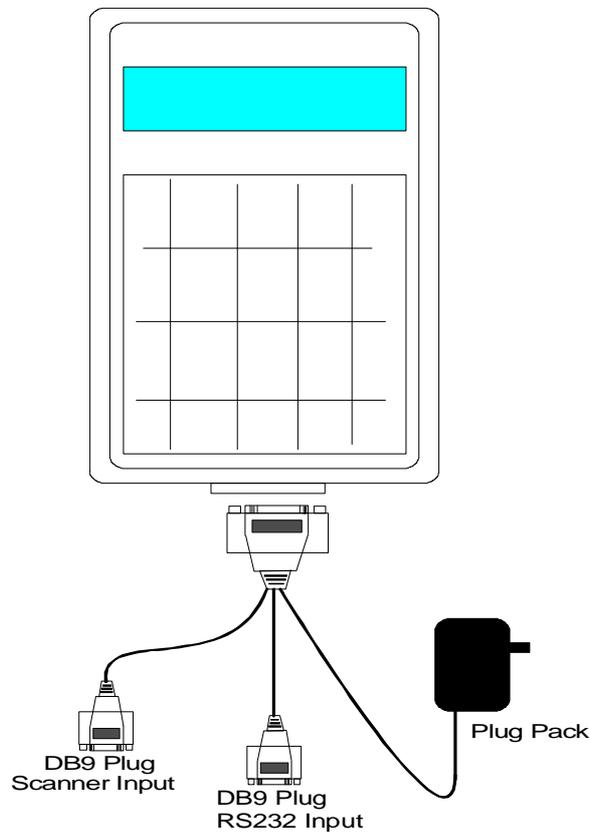
6.1. Serial Ports

The serial interfaces use RS232 +/- 9 volt levels. Five volt DC power is also provided on the interface to allow bar code scanners to derive their power from the controller module.
The default communications parameters are 9600 baud, 8 data, no parity and one stop bits.

Pin	I/O	Description
1	-	no connection
2	i/p	RxD
3	o/p	TxD
4	o/p	DTR
5	-	Ground
6	-	no connection
7	o/p	5 Volts
8	i/p	CTS
9	o/p	optional auxiliary power

Serial interface as shown in the

Front view of DB9 plug

6.2. Connecting a Plug Pack to the M331 Interface Connector

The M331 can be powered by an unregulated power source of 6-9 volts rated at 1 amp. **Note when a plug pack is used pins 2 and 3 on the interface connector must be joined.**.

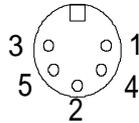The table below shows the connection details for an unregulated plug pack.

Plug Pack	Pin	M331 DB25 Connection
+ Volts	1	+ Volts unregulated in
Gnd	14	Ground
	2	+5 regulated out
	3	5V DC

6.3. Computer and External Keyboard Interface

A standard PC keyboard may optionally be connected to the external keyboard interface. Connection can also be made to the M331 from the keyboard port of a computer, when connected, this can supply power removing the need for a plug pack.

Pin	I/O	Description
1	i/o	Clock
2	i/o	Data
3	-	Reset
4	-	Ground
5	o/p	5 Volt DC

Keyboard interface 5 pin 180 degree DIN socket

Front view of 5 pin DIN socket

The table below shows the connection details to connect the M331 interface to a socket for a keyboard. Using UMD cable CA202, a 5 pin DIN plug to 5 pin DIN plug, the M331 can be connected to the keyboard port of a computer, derive power and look like a keyboard. **If power is connected in this way remove jumper from pins 2 and 3 on interface connector.**

Pin	I/O	Description		Pin	M331 DB25 Connection
1	i/o	Clock	—	4	Computer Clock
2	i/o	Data	—	5	Computer Data
3	-	Reset			N/C
4	-	Ground	—	6	Ground
5	o/p	5V DC	—	3	5V DC

Pin	I/O	Description		Pin	M331 DB25 Connection
1	i/o	Clock	—	16	Keyboard Clock
2	i/o	Data	—	17	Keyboard Data
3	-	Reset			N/C
4	-	Ground	—	18	Ground
5	o/p	5V DC	—	15	5V DC

Connection details to connect a
computer keyboard to the M331

6.4. Reset and Default Buttons

The reset button physically resets the microcontroller, forcing it to perform a power up sequence.

The default button is used to return the non volatile configuration memory back to the default settings. To use this facility, the default button is held whilst pressing the reset button. Upon reset the controller module will issue three rapid beeps to indicate that the defaults have been set.

NOTE:
If any changes have been made to the programming of the Model 331, these will be lost when the reset to defaults sequence above is used.

Default Switch 12

Reset Switch 13

25 Gnd
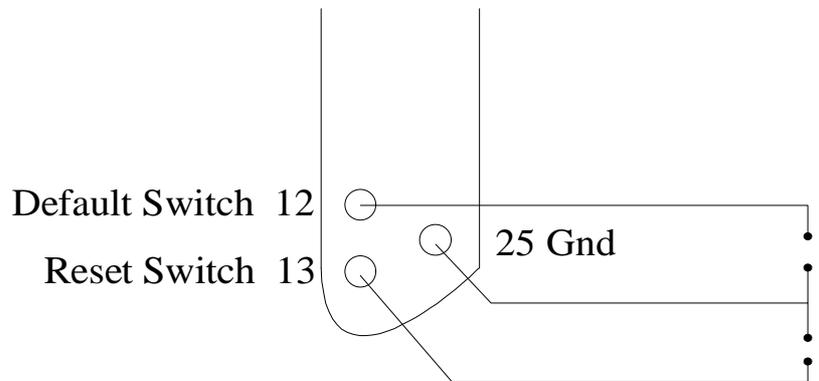
Wiring two normally open switches for default and reset.

7. Ordering information and Accessories

Part Number	Model Number	Description
M331 LCD Terminal *(Multi function D25 output)*		
9-0331-100-1	K331-100	M331-S00 - No Lexan sheet
Customisation Service *- Laminated self adhesive overlay sheets*		
		Graphic set-up - *(once only cost)*
		Item price - (*per sheet*)
Options		
	option Cx	Mag card reader *(single track, x= 1,2 or 3)**
	option Cy	Mag card reader *(two track, y= 1&2, 2&3)**
Cables and accessories		
		Cable kit - *(inc. plug pack,2 x serial cables)*
1-6004-107-5	PP6D1000-E	Plug pack *(for serial mode only)*
Documentation		
6-0331-992-5	DOC-M331-PD	Product description
6-0264-997-9		M264 programming kit
6-0331-993-3	DOC-M331-UM	M331 user manual
7-5010-122-7	DOC-AN-122	Product overview: *UMD* Custom Keyboards
7-5020-107-7	DOC-TN-107	*UMD* ProtoLink Architecture

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