



# 2V164B Relay Software

## Links to Other Documents

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User Guide: [http://www.rmspl.com.au/userguide/2v164\\_user\\_guide.pdf](http://www.rmspl.com.au/userguide/2v164_user_guide.pdf)

Software Downloads: <http://www.rmspl.com.au/digital/umatrix.htm>

## Version Control

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Issue	Date	Summary of changes
T	03/03/2016	Connection diagrams updated
P	01/09/2008	UMX updated.
Q	19/08/2009	UMX Updated
R	01/04/2010	UMX updated
S	30/09/2015	UMX updated

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DWB	DWB	DWB	



## 1.0 OVERVIEW

The 2V164 Voltage Regulator Relay continuously monitors the transformer output voltage & current. It provides "RAISE" & "LOWER" control commands to the on-load tap changer such that the load centre is automatically maintained within acceptable limits. Small variations in supply frequency will not affect the system performance.

The 2V164 relay is built on the Micro MATRIX digital platform. The standard Micro MATRIX human machine interface (HMI) is combined with fully solid-state voltage sensing & measuring circuitry to provide high accuracy, simple set up & flexible operation. Self-monitoring is carried out by hardware & software watchdogs.

The TPI inputs, output relays & opto isolated status inputs form the essential barriers against high voltage line transients while a switchmode auxiliary supply provides a wide operating range.

A programming port is provided for ease of establishing relay settings using a PC & ~MATRIXwin.

## 2.0 SOFTWARE VERSION CONTROL REGISTER

The following table is a register of the changes for the **UMX2V164B.umx** file.

DATE	SOFTWARE	CHANGES	BIOS	FIRST HARDWARE
21/01/2002	02.13	Initial release of A UMX.	03.11+	2V164K1
18/07/2002	02.14	Over current block added	03.11+	
28/08/2002	02.15	LDC function revised	03.11+	
07/09/2002	02.16	uMatrixWin display Tap Rate in floating point	03.11 – 03.14+	
25/11/2002	04.00	Major hardware upgrade	04.xx	
04/01/2003	04.10	Put elapsed time in live CDB	04.xx	
28/04/2003	04.30	Quadrature LDC calculation bugfix	04.xx	
21/05/2003	05.00	Feature upgrade	05.xx	
20/06/2003	05.01	Delay timing reset revised	05.xx	
30/07/2003	05.10	Combined pulse and level raise and lower outputs	05.xx	
02/05/2005	05.11	Move User parameters to static registers	05.xx	
13/07/2005	05.12	O/C Block On/Off function added.	05.xx	
22/08/2006	05.20	Voltage calibration adjust added	05.xx	
05/10/2006	05.22	Correct Host display	05.xx	
06/08/2007	05.23	TC features added	05.xx	
28/08/2008	05.24	Fix TPI Tap Range display	05.xx	
18/08/2009	05.25	Update Phase correction algorithm	05.xx	
29/03/2010	05.30	CR0924 - Improve Current channel linearity	05.xx	
30/09/2015	05.45	Z-Compensation added to LDC Maxtaps display added to "Digital" TPI mode	05.xx	



### **3.0 DESCRIPTION – UMX2V164B.UMX**

#### **3.1 Standard Features**

The 2V164 provides a range of standard features as described in the RMS Technical Bulletin that may be downloaded from:

[www.rmspl.com.au/handbook/2v164.pdf](http://www.rmspl.com.au/handbook/2v164.pdf)

#### **3.2 Special Features of this Software UMX Version**

TPI feedback mode:

When a tap change command is output to the OLTC, the tap change fail timer is started. If a single tap change restores the sensed voltage to a balanced condition the relay is reset. If the sensed voltage remains in error the interval time delay will start based on one of the three methods described below: The required operating mode is selected using the UMX order code.

##### **OLTC AUXILIARY CONTACT METHOD UMX2V164B**

In this mode an auxiliary contact on the OLTC is employed to signal completion of a tap change. This signal is used by the 2V164 to pause the interval time delay until the previous tap command has been completed.

The default 2V164 T/C feedback status input is set for a control voltage to be removed when the tap change starts (OLTC auxiliary contact opens) and re-applied when the tap change event is completed (OLTC auxiliary contact closes). The interval time delay is paused until the completion of the tap change event.

The tap change output contact will remain closed until the OLTC auxiliary contact first opens for a 1s minimum duration & then re-closes. The interval time delay is initiated at the moment the OLTC auxiliary contact re-closes if the sensed voltage has not already moved back to a balanced condition.

For information on the two other methods, see the 2V164 data sheet or the UMX2V164A & UMX2V164C documents.



#### 4.0 User Interface.

Refer to the ~MATRIX Users Guide for detailed instructions on the operation of the user interface.

To download a PDF version of the guide uMatrix: [www.rmspl.com.au/digital/umatrixinfo.pdf](http://www.rmspl.com.au/digital/umatrixinfo.pdf)

To download a PDF version of the guide uMatrix-S: [www.rmspl.com.au/digital/umatrix-s\\_info.pdf](http://www.rmspl.com.au/digital/umatrix-s_info.pdf)

To download USB VCP drivers for uMatrix-S: [www.rmspl.com.au/umatrix.htm](http://www.rmspl.com.au/umatrix.htm)

#### 5.0 LOAD SOFTWARE

Loading a UMX requires at least the following:

A PC with Windows 2000 or later and at least one COM (uMatrix) or USB (uMatrix-S) port.  
(Note: USB comms require drivers to be installed on your PC. See section 4.0 downloads.)

UMatrixWin software.

The correct communications cable.

A general understanding of how UMX and UMP files work with the relay.

*Settable parameters will be overwritten by loading a new UMX file. They can however, be saved to a UMP file and then returned to the relay later. To learn how to do this, refer to the uMatrix Userguide.*

##### 5.1 Loading the UMX

Before loading the UMX2V164B software, ensure that it is compatible with your hardware. Download the compatibility list from the RMS website at:

[www.rmspl.com.au/digital/compatibility.pdf](http://www.rmspl.com.au/digital/compatibility.pdf)

Ensure that the bios version in the relay matches the table in section 2.0 of this document. (If the bios version is different, you may not be able to load this UMX. Contact RMS for support.)

Load the UMX via the front panel COM port using the 'uMatrixWin' software.  
Ensure that the UMX version matches the table in section 2.0.

*To interrogate for versions, press 'SET' and 'DATA' buttons simultaneously, then select 'Version Page'. Alternatively, use uMatrixWin – Options – Utilities.*

Check versions

##### 5.2 Customer Default UMP

Load customer UMP file as per the Job Card. If no UMP file is requested, write N/A in check box.

UMP file name

The Relay is now ready for field use.

SOFTWARE INSTALLED BY :

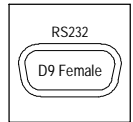
DATE :

## 6.0 CONNECTION DIAGRAM

\*Note: The status inputs & some relay outputs are assigned by the software (UMX) loaded on the relay.

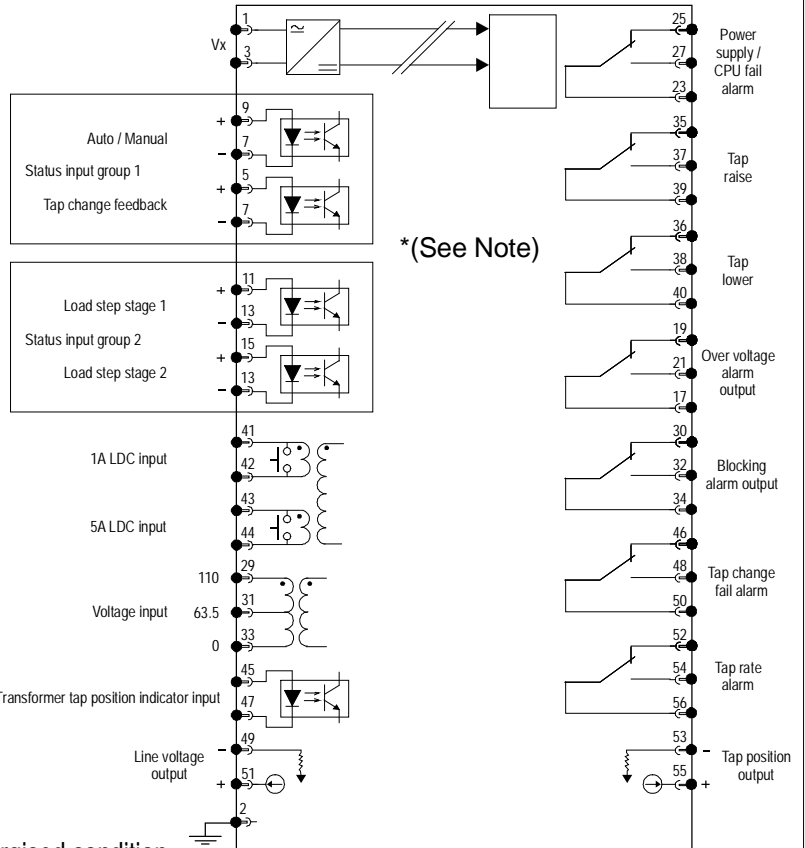
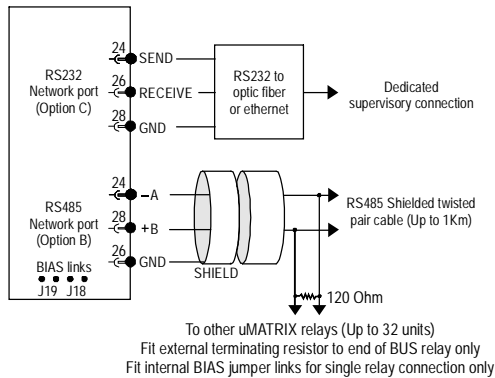
Shown here are the standard assignments of the A, B, C UMXs. Other UMX versions may differ. Consult the UMX data sheets for specific I/O assignments.

### FRONT PANEL PC PROGRAMMING PORT



One DE09 straight through male to female  
2 metre connection cable supplied  
with each order of relays  
(P/N 997-000-042B)

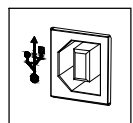
### SCADA COMMUNICATIONS PORT (Use one only)



2V164 wiring diagram\* - Relays shown in de-energised condition

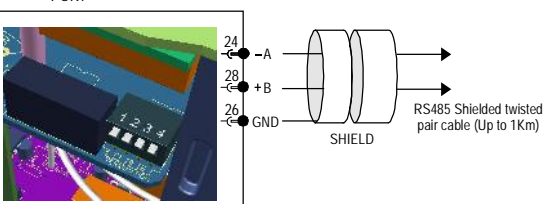
\*Note: The status inputs & some relay outputs are assigned by the software (UMX) loaded on the relay.

Shown here are the standard assignments of the A UMX. Other UMX versions may differ. Consult the UMX data sheets for specific I/O assignments.



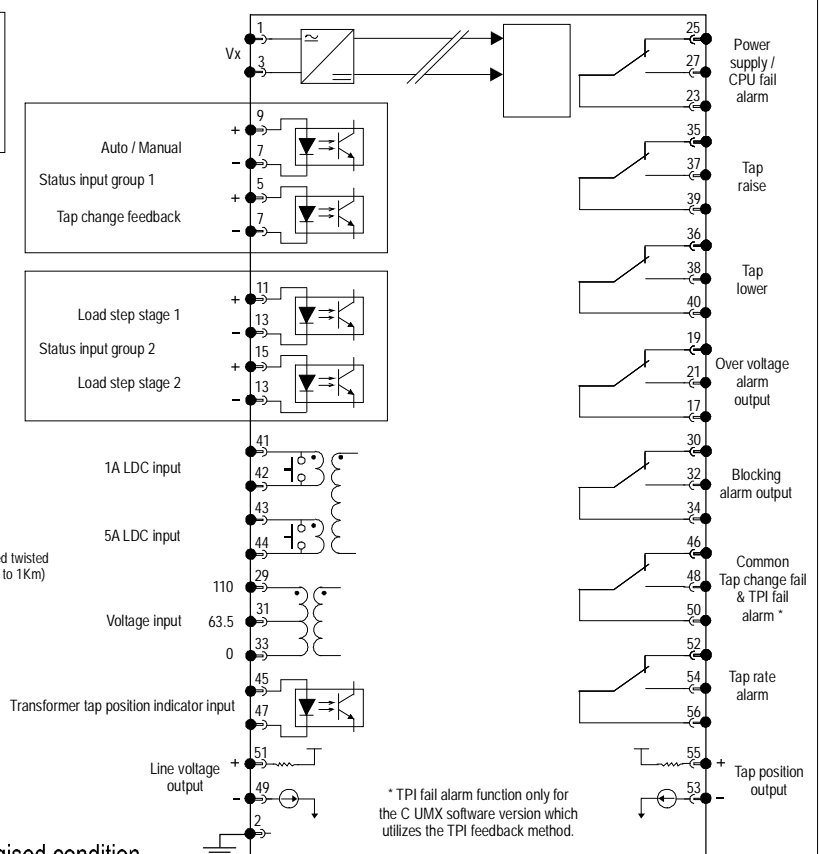
### FRONT PANEL USB PROGRAMMING PORT

### SCADA COMMUNICATIONS PORT



To other uMATRIX relays (Up to 32 units)  
Invoke terminating 120R resistor to end of BUS relay only.  
To do this set SW100-3&4 ON.

Invoke BIAS resistors for single relay connection only.  
To do this set SW100-1&2 ON.



2V164-S wiring diagram - Relays shown in de-energised condition