

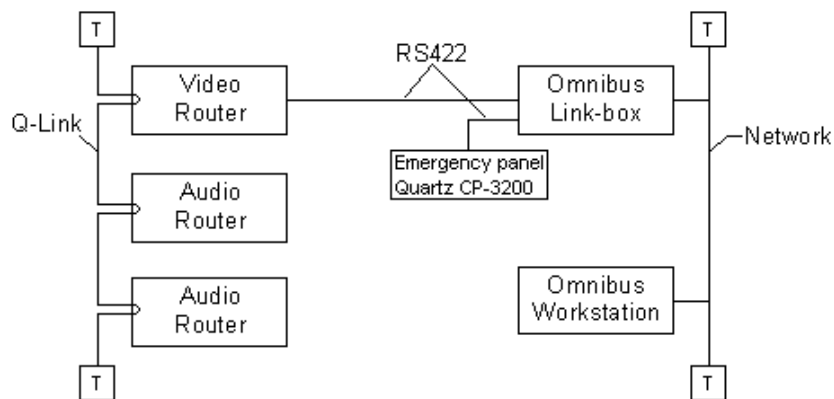
Application Note AN-0002

Interfacing Quartz Routers and Control Panels to The Omnibus Control System

Quartz routers can be controlled from the Omnibus control system. Standard Quartz remote control panels can also be connected to the Omnibus system to control both the Quartz routers and any other third party equipment connected to the system. This application note describes the hardware and software requirements of the Quartz equipment.

Routers

A typical Quartz/Omnibus router system is shown below



The Omnibus system has its normal mixture of Workstations and Link-boxes connected together on an Ethernet system. One of the Link-boxes has an RS422 connection to one of the Quartz routers. Other Quartz routers can be connected on the Q-link video cable system which needs two 75 termination's fitted.

A routing system can be any mixture of signal formats with support for 8 breakaway levels. The individual router boxes need to be configured correctly to work together and this involves programming the system using WinSetup to map any Quartz level onto any Omnibus level. For older systems slightly different methods were used, see Appendix A, B, C at the end of this document.

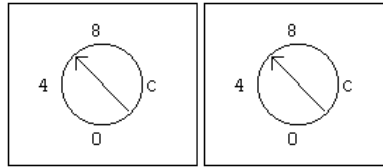
It would be useful here to explain exactly how the Quartz SETUP relates to the DIP and rotary address switches fitted to each router. For the Q-link communication link between the routers to work, each device on the Q-Link needs a unique number or address. This is the ONLY function of the rotary address switch. One of the routers acts as a master to control the communications and this has DIP-3 (piano switch, 3rd from left) in the down position. There must be one and only one master on a Q-link system. Lastly and most importantly the master holds a data table generated by WinSetup that details what function each device address on the Q-link has and what level it is mapped to. This allows for any mixture of video and audio routers to be added to one Q-link.

Due to the wide range of different system configurations it is not possible to have a standard setup.

The main points to consider when making a Quartz router work with the Omnibus system are the rotary address switch settings, the DIP switch settings, the correct WinSetup configuration, and setting up the computer interface.

The router rotary address switches

These have settings 0,1,2 ... D,E,F in hexadecimal. The 'Hi' switch supplies the upper 4 bits of the routers 8 bit address and the 'Lo' switch supplies the lower 4 bits of the routers 8 bit address, giving routers a Q-Link address range of 0x00 to 0xFF (0x0F is a standard format for hexadecimal numbers).



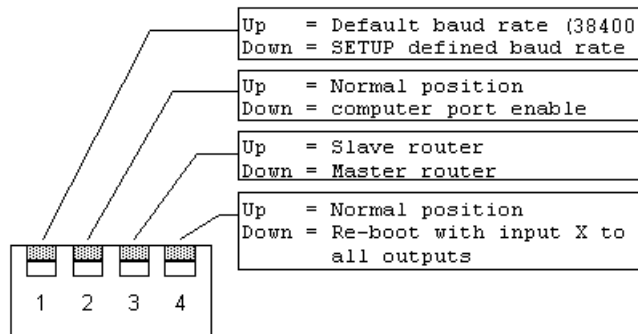
Every router or router module on the same Q-Link must have a unique address for the system to work.

The system SETUP

The system needs to be programmed using WinSetup to tell each router whether it is a video or audio unit, what level it is mapped to, and what size of router it is. This is downloaded to the master router and held in Non-Volatile RAM or NVRAM, usually type DS1230 or DS1245. Older systems may have the setup programmed into EPROM, see Older Routers at the end of this document.

The router DIP switch

This is a four way piano or DIP switch that allows four functions within the router software to be controlled.



Putting all this together gives a list of things to check before a system will work

Master Router: One of the routers is set as a master, which means it holds the setup of the system and controls the Q-link communications. The master has an NVRAM (DS1230 or DS1245) in the USER position, an NVRAM in the RAM position, and the DIP-3 is down. The master would normally have a connection to its RS422 connector, which requires DIP-2 to be down. The master routers address switch must match with the data defined in WinSetup.

WinSetup data: This is a file generated by WinSetup and downloaded to the master router. It contains data for each router on the Q-link, telling it what size it is and what level it is mapped to. The WinSetup data would normally be different for each system. The WinSetup settings must match the current address switch settings.

Computer Interface: All Omnibus systems work in RS422 mode. All Quartz products use the same pin-out of the RS232/422 connector. On all products the DIP-2 switch must be set in the down position and reset pressed before the RS232/422 port will function correctly. The currently installed communications protocol will then be enabled.

Very old systems had the Computer Interface as an option, see Appendix A at the end of this document.

Software: The routers using the RS232/422 connector must be use the Quartz standard protocol (Type 1 protocol) and the EPROM's fitted will typically be labelled as PC215-1 V5.00 where PC215 indicates the System or operating software and the -1 indicates the protocol built in to the software. The version number will change from time to time as new features are added. For older software versions, see Appendix D.

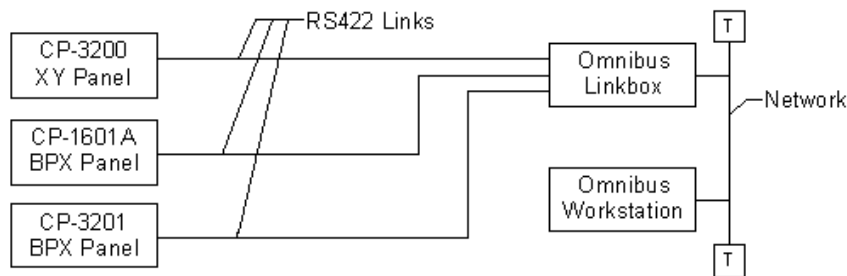
Slave routers: All routers on the same Q-link, other than the master, are slaves to the master router. Slaves have a RAM fitted in the USER position and DIP-3 is up. The slave routers address switches must match with the settings in WinSetup.

Control Panels

There are two methods available to connect of Quartz panels to Omnibus.

RS-422 Connection to Control Panels

This is shown below and involves special versions of Quartz panels. These OMNI panels are fitted with special software and a computer interface module (CI-0001) set to RS422 mode. Each RS422 link from the Omnibus system only supports one control panel so this method is best used where only a few Quartz panels are being used.

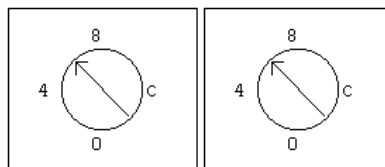


The panels should be ordered as the standard Quartz panel part number with S7 at the end of the part number i.e. a CP-3201 becomes a CP-3201-S7. These panels cost more than the standard panel as they include the computer interface.

A standard Quartz panel can be converted to an -S7 panel by ordering and installing the computer interface (CI-0003 on current panels or CI-0001 on older panels) and the relevant software EPROM.

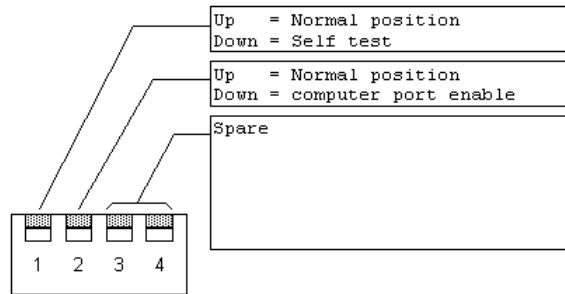
The panel rotary address switches

The Omnibus system uses the term Panel ID (short for identification) in place of panel address. The 'Hi' switch supplies the upper 4 bits of the routers 8 bit address and the 'Lo' switch supplies the lower 4 bits of the routers 8 bit address, giving routers a Q-Link address range of 0x00 to 0xFF (0x0F is a standard format for hexadecimal numbers).



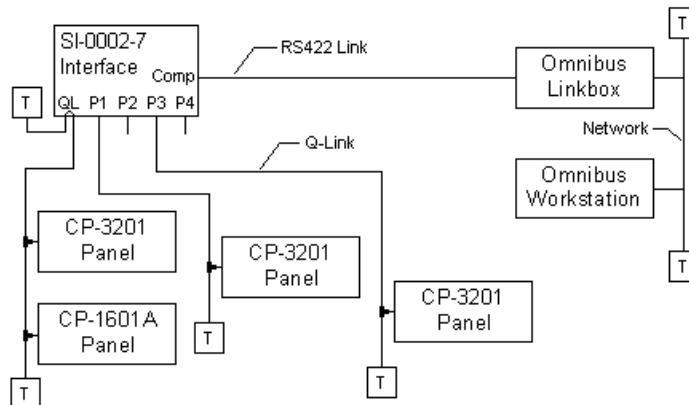
The RS-422 panel DIP switch

This is a four way piano or DIP switch that allows two software functions within the panel software to be controlled.



Q-link Connection to Control Panels

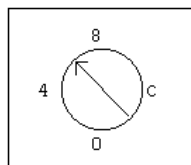
This is shown below and involves standard versions of Quartz panels connected on standard Q-link to a special interface unit, the SI-0002-7. Older systems may have used a SI-0003-7 to perform the same function, see the end of this document for further details. The interface unit is fitted with special software (SI-0002-7) and the serial port is set to RS422 mode. The interface converts the Omnibus commands into Q-link messages that the panels understand. As the interface unit can support up to 63 control panels this method is more economic where several Quartz panels are required.



The interface unit contains a SETUP that defines which panels are in use on the Q-link, and what their address switches should be set to. For the SI-0002-7 this is a Setup file programmed into a NVRAM (or setup EPROM), usually called OMNI-X. These systems use panels with 'dumb panel' software, which allows any mix of panels to be added to the SI-0002-7.

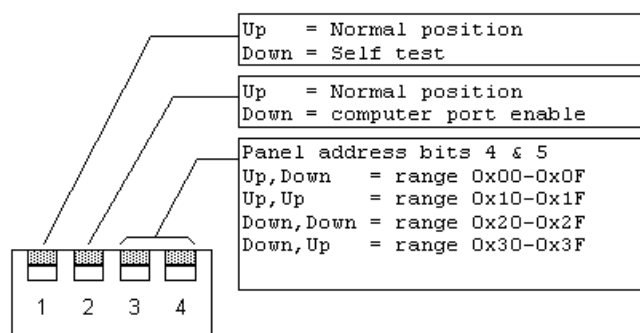
The Q-link panel rotary address switch

The Omnibus system uses the term Panel ID (short for identification) in place of panel address. The address switch supplies the lower 4 bits of the panels 8 bit address. Bits 7 & 6 are set to zero by the panel software. Bits 5 & 4 are set by the DIP-3 & DIP-4, which gives a panel the address range 0x00 to 0x3F (see DIP switch below).



The Q-link panel DIP switch

This is a four way piano or DIP switch that allows two software functions within the panel software to be controlled and the address range to be increased.



Software Versions and System Setup Data

Current Panels Supported and Software Versions

Q-link Versions (Version 4 'dumb' panel software)

These versions need a general 'setup' in the SI-0003, and then any mix of panels can be added to the Q-Link, and were tested with RPAN V1.27

Panel	Available	Software Version	Panel Addr	DIP settings
SI-0003-7	Yes	VS-3200-7 V4.02 Setup ² = OmniX V1.0 1 x SI-0003 (addr 0x00)	0x00	UDDU
31 x dumb panel (addr 0x01-0x1F)				
CP-1000	No	N/A	N/A	N/A
CP-1600	No	N/A	N/A	N/A
CP-1601A ¹	Yes	CP-3201 V4.24	0x01 to 0x1F	UUUD or UUUU
CP-1604 ¹	Yes	CP-3201 V4.24	0x01 to 0x1F	UUUD or UUUU
CP-3200	Yes	CP-3200 V4.21	0x01 to 0x1F	UUUD or UUUU
CP-3201 ¹	Yes	CP-3201 V4.24	0x01 to 0x1F	UUUD or UUUU
CP-3208	No	N/A	N/A	N/A
CP-6400	Yes	CP6400 V4.20	0x01 to 0x1F	UUUD or UUUU
CP-6408	Yes	CP6408 V4.21	0x01 to 0x1F	UUUD or UUUU

Note1: These panels work with RPAN V1.27 but the graphical test panel only works correctly with RPAN V1.28

Note 2: For additional information on the Omnibus Setup's, see Appendix E

RS-422 Versions (Stand Alone)

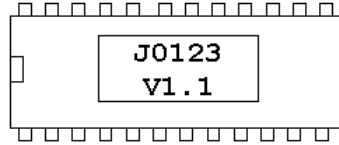
These versions are connected directly to the Omnibus system via an RS422 cable, and were tested with RPAN V1.27

Panel	Available	Software Version	Panel Addr	DIP settings
CP-1000	Yes	CP1000OB V1.00	0x00 to 0x0F	
CP-1600	No	N/A	N/A	N/A
CP-1601A	Yes	CP3201OB V1.01	0x00 to 0x0F	UDUU
CP-1604	Yes	CP3201OB V1.01	0x00 to 0x0F	UDUU
CP-3200	Yes	CP3200OB V1.04	0x00 to 0x1F	UDUD or UDUU
CP-3201	Yes	CP3201OB V1.01	0x00 to 0x1F	UDUD or UDUU
CP-3208	No	N/A	N/A	N/A
CP-6400	Yes	CP6400OB V1.01	0x00 to 0x0F	UDUU
CP-6408	Yes	CP6408OB V1.01	0x00 to 0x0F	UDUU

For older software versions, see Appendix D.

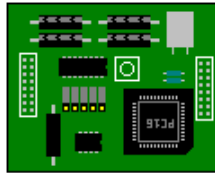
Appendix A: Older Quartz Routers

September 1998: Routers supplied before this date normally had the master router fitted with an EPROM to hold the system setup. Setup EPROM's supplied by Quartz are labelled with the job number (J0123) and its version. These are stored at Quartz on our file server so copies and updates can be sent out at any time. The original of the setup was generated by the DOS setup or WinSetup software.



To re-configure one of these systems required the optional DOS setup or WinSetup programs, an NVRAM to replace the EPROM, and a CI-0001 RS232/422 module. After this date all router systems have been supplied with WinSetup.

August 1998: Routers supplied before this date did not have a built in RS232/422 interface and require the optional CI-0001 module. This is a small daughter card that fits onto one of the main router cards, normally in the master router. There are two versions of this module.



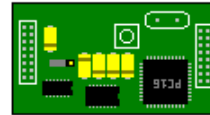
PC-106

Older type (PC-106)

This has five links to set RS232/422 mode

Set the links toward the 8 pin IC for RS422

Set the links toward the 16 pin IC for RS232



PC-180

Current type (PC-180)

This has one link to set RS232/422 mode

Set the link to 422 for RS422

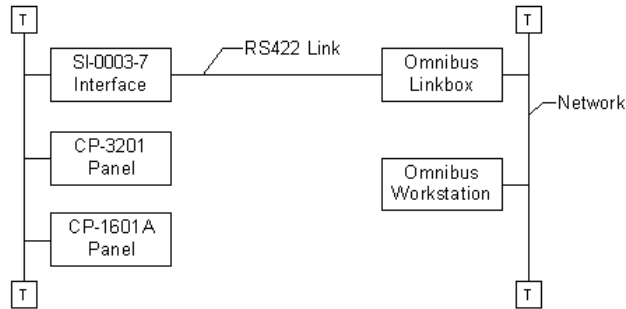
Set the links to 232 for RS232

When installing a CI-0001 module take care to align the pins with the sockets. Also check that the central mounting hole lines up with the hole in the main PCB. If removing a CI-0001 take care not to bend the pins.

August 1998: Routers supplied before this date had only one address switch. This has settings 0,1,2 ... D,E,F in hexadecimal. The switch supplies the lower 4 bits of the routers 8 bit address. The upper 4 bits are set to zero by the router software, which gives a router the address range 0x00 to 0x0F (0x0F is a standard format for hexadecimal numbers). Every router or router module on the same Q-Link must have a unique address for the system to work.

Appendix B: Older Q-link Connection to Control Panels

This is shown below and involves standard versions of Quartz panels connected on standard Q-link to a special interface unit, the SI-0003-7 (formerly known as VS-3200-OMNI). The interface unit is fitted with special software (VS-3200-7) and a computer interface module (CI-0001) set to RS422 mode. The interface converts the Omnibus commands into Q-link messages that the panels understand. The interface unit can support up to 31 control panels.

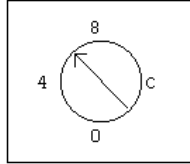


The interface unit contains a SETUP that defines which panels are in use on the Q-link, and what their address switches should be set to. For the SI-0003-7 this is programmed into a setup EPROM, usually labelled OMNI-X. These systems use panels with 'dumb panel' software which allows any mix of panels to be added to the SI-0003-7.

Older systems did not have this 'dumb panel' capability and the SI-0003-7 required a dedicated setup for each mix of panels, usually labelled OMNI-1 to OMNI-6. . There is more information on setup's at the end of this document.

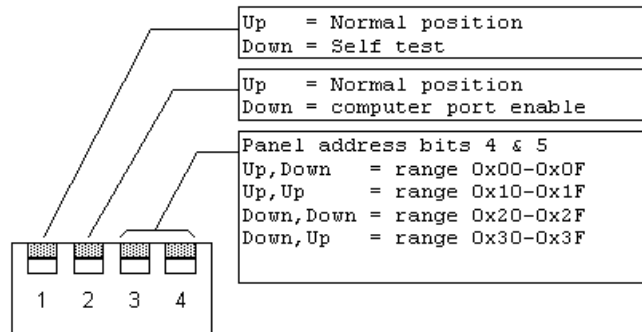
Appendix C: Older Quartz Control Panels

The Omnibus system uses the term Panel ID (short for identification) in place of panel address. The address switch supplies the lower 4 bits of the panels 8 bit address. The upper 4 bits are set to zero by the panel software, which gives a panel the address range 0x00 to 0x0F



The RS-422 panel DIP switch

This is a four way piano or DIP switch that allows two software functions within the panel software to be controlled.



Appendix D: Older Software Versions

General

A major software upgrade was implemented in October 1996. All new hardware shipped after this date is fitted with version 4 software (V4.00 onwards). This is not compatible with earlier versions. All devices on one Q-link must either have version 4 or the earlier versions and cannot be mixed. Contact Quartz for further advice.

Panels, Q-link Versions (Version 4 software)

These versions need a 'setup' in the SI-0003 that matches the mix of panels on the Q-Link, and were tested with RPAN V1.27

Panel	Available	Software Version	Panel Addr	DIP settings
SI-0003-7	Yes	VS-3200-7 V4.02 Setup's ¹ Omni1 V4.0 = 16xCP3201 Omni2 V4.0 = 8xCP1601, 8xCP3201 Omni3 V4.0 = 8xCP3201, 8xCP6408 Omni4 V4.0 = 4xCP1601, 4xCP3201, 2xCP3200, 2xCP6408, 2xCP6400, 2xCP3208 Omni5 V4.0 = 8xCP3201, 6xCP6408, 2xCP6400 Omni6 V4.0 = 15xDumb, 16xCP3201	0x00	UDDU
CP-1000	No	N/A	N/A	N/A
CP-1600	No	N/A	N/A	N/A
CP-1601A	Yes	CP3201 V4.02	0x01 to 0x1F	UUUD or UUUU
CP-1604	Yes	CP3201 V4.02	0x01 to 0x1F	UUUD or UUUU
CP-3200	Yes	CP3200 V4.21	0x01 to 0x1F	UUUD or UUUU
CP-3201	Yes	CP3201 V4.02	0x01 to 0x1F	UUUD or UUUU
CP-3208	No	N/A	N/A	N/A
CP-6400	Yes	CP6400 V4.20	0x01 to 0x1F	UUUD or UUUU
CP-6408	Yes	CP6408 V4.21	0x01 to 0x1F	UUUD or UUUU

Note 1: For additional information on the Omnibus Setup's, see Appendix E

Panels, Q-link Versions (Version 3 software)

No Longer Supported, see Version 4

Panel	Available	Software Version	Panel Addr	DIP settings
SI-0003-7	Yes	VS-3200-7 V1.08 Setups ¹ Omni1 V1.0 = 16xCP3201 Omni2 V1.0 = 8xCP1601, 8xCP3201 Omni3 V1.0 = 8xCP3201, 8xCP6408 Omni4 V1.0 = 4xCP1601, 4xCP3201, 2xCP3200, 2xCP6408, 2xCP6400, 2xCP3208 Omni5 V1.0 = 8xCP3201, 6xCP6408, 2xCP6400	0x00	UDDU
CP-1600	No	N/A	N/A	N/A
CP-1601A	Yes	CP3201 V1.19	0x01 to 0x1F	UUUD or UUUU
CP-1604	Yes	CP3201 V1.19	0x01 to 0x1F	UUUD or UUUU
CP-3200	No	N/A	N/A	N/A
CP-3201	Yes	CP3201 V1.19	0x01 to 0x1F	UUUD or UUUU
CP-3208	No	N/A	N/A	N/A
CP-6400	No	N/A	N/A	N/A
CP-6408	Yes	CP6408 V1.03	0x01 to 0x1F	UUUD or UUUU

Note 1: For additional information on the Omnibus Setup's, see Appendix E

Appendix E: Additional Information on Omnibus Setup Files

Omnibus-X

Use with Version 5 or Version 4 'dumb' panel software.

Panel Type	Q-Link Address	DIP Switch	Rotary Switch	Omnibus Panel ID
SI-0003-7	0x00	UDDU	0	N/A
Dumb Pan	0x01	UUUD	1	1
Dumb Pan	0x02	UUUD	2	2
Dumb Pan	0x03	UUUD	3	3
Dumb Pan	0x04	UUUD	4	4
Dumb Pan	0x05	UUUD	5	5
Dumb Pan	0x06	UUUD	6	6
Dumb Pan	0x07	UUUD	7	7
Dumb Pan	0x08	UUUD	8	8
Dumb Pan	0x09	UUUD	9	9
Dumb Pan	0x0A	UUUD	A	10
Dumb Pan	0x0B	UUUD	B	11
Dumb Pan	0x0C	UUUD	C	12
Dumb Pan	0x0D	UUUD	D	13
Dumb Pan	0x0E	UUUD	E	14
Dumb Pan	0x0F	UUUD	F	15
Dumb Pan	0x10	UUUU	0	16
Dumb Pan	0x11	UUUU	1	17
Dumb Pan	0x12	UUUU	2	18
Dumb Pan	0x13	UUUU	3	19
Dumb Pan	0x14	UUUU	4	20
Dumb Pan	0x15	UUUU	5	21
Dumb Pan	0x16	UUUU	6	22
Dumb Pan	0x17	UUUU	7	23
Dumb Pan	0x18	UUUU	8	24
Dumb Pan	0x19	UUUU	9	25
Dumb Pan	0x1A	UUUU	A	26
Dumb Pan	0x1B	UUUU	B	27
Dumb Pan	0x1C	UUUU	C	28
Dumb Pan	0x1D	UUUU	D	29
Dumb Pan	0x1E	UUUU	E	30
Dumb Pan	0x1F	UUUU	F	31

Omnibus-1

Panel Type	Q-Link Address	DIP Switch	Rotary Switch	Omnibus Panel ID
CP-3201	0x10	UUUU	0	16
CP-3201	0x11	UUUU	1	17
CP-3201	0x12	UUUU	2	18
CP-3201	0x13	UUUU	3	19
CP-3201	0x14	UUUU	4	20
CP-3201	0x15	UUUU	5	21
CP-3201	0x16	UUUU	6	22
CP-3201	0x17	UUUU	7	23
CP-3201	0x18	UUUU	8	24
CP-3201	0x19	UUUU	9	25
CP-3201	0x1A	UUUU	A	26
CP-3201	0x1B	UUUU	B	27
CP-3201	0x1C	UUUU	C	28
CP-3201	0x1D	UUUU	D	29
CP-3201	0x1E	UUUU	E	30
CP-3201	0x1F	UUUU	F	31

Omnibus-2

Panel Type	Q-Link Address	DIP Switch	Rotary Switch	Omnibus Panel ID
CP-3201	0x10	UUUU	0	16
CP-1601A	0x11	UUUU	1	17
CP-1601A	0x12	UUUU	2	18
CP-1601A	0x13	UUUU	3	19
CP-1601A	0x14	UUUU	4	20

CP-3201	0x15	UUUU	5	21
CP-3201	0x16	UUUU	6	22
CP-3201	0x17	UUUU	7	23
CP-3201	0x18	UUUU	8	24
CP-1601A	0x19	UUUU	9	25
CP-1601A	0x1A	UUUU	A	26
CP-1601A	0x1B	UUUU	B	27
CP-1601A	0x1C	UUUU	C	28
CP-3201	0x1D	UUUU	D	29
CP-3201	0x1E	UUUU	E	30
CP-3201	0x1F	UUUU	F	31

Omni-3

Panel	Q-Link	DIP	Rotary	Omnibus Panel ID
Type	Address	Switch	Switch	
CP-3201	0x10	UUUU	0	16
CP-3201	0x11	UUUU	1	17
CP-3201	0x12	UUUU	2	18
CP-3201	0x13	UUUU	3	19
CP-3201	0x14	UUUU	4	20
CP-3201	0x15	UUUU	5	21
CP-3201	0x16	UUUU	6	22
CP-3201	0x17	UUUU	7	23
CP-6408	0x18	UUUU	8	24
CP-6408	0x19	UUUU	9	25
CP-6408	0x1A	UUUU	A	26
CP-6408	0x1B	UUUU	B	27
CP-6408	0x1C	UUUU	C	28
CP-6408	0x1D	UUUU	D	29
CP-6408	0x1E	UUUU	E	30
CP-6408	0x1F	UUUU	F	31

Omni-4

Panel	Q-Link	DIP	Rotary	Omnibus Panel ID
Type	Address	Switch	Switch	
CP-1601A/1604	0x10	UUUU	0	16
CP-1601A/1604	0x11	UUUU	1	17
CP-1601A/1604	0x12	UUUU	2	18
CP-1601A/1604	0x13	UUUU	3	19
CP-3201	0x14	UUUU	4	20
CP-3201	0x15	UUUU	5	21
CP-3201	0x16	UUUU	6	22
CP-3201	0x17	UUUU	7	23
CP-3200 *	0x18	UUUU	8	24
CP-3200 *	0x19	UUUU	9	25
CP-6408	0x1A	UUUU	A	26
CP-6408	0x1B	UUUU	B	27
CP-6400	0x1C	UUUU	C	28
CP-6400	0x1D	UUUU	D	29
CP-3208 *	0x1E	UUUU	E	30
CP-3208 *	0x1F	UUUU	F	31

* not yet supported

Omni-5

Panel	Q-Link	DIP	Rotary	Omnibus Panel ID
Type	Address	Switch	Switch	
CP-3201	0x10	UUUU	0	16
CP-3201	0x11	UUUU	1	17
CP-3201	0x12	UUUU	2	18
CP-3201	0x13	UUUU	3	19
CP-3201	0x14	UUUU	4	20
CP-3201	0x15	UUUU	5	21
CP-3201	0x16	UUUU	6	22
CP-3201	0x17	UUUU	7	23
CP-6408	0x18	UUUU	8	24
CP-6408	0x19	UUUU	9	25
CP-6408	0x1A	UUUU	A	26
CP-6408	0x1B	UUUU	B	27
CP-6408	0x1C	UUUU	C	28
CP-6408	0x1D	UUUU	D	29

CP-6400	0x1E	UUUU	E	30
CP-6400	0x1F	UUUU	F	31

Omni-6

Panel	Q-Link	DIP	Rotary	Omnibus Panel ID
Type	Address	Switch	Switch	
SI-0003-7	0x00	UDDU	0	N/A
Dumb Pan	0x01	UUUD	1	1
Dumb Pan	0x02	UUUD	2	2
Dumb Pan	0x03	UUUD	3	3
Dumb Pan	0x04	UUUD	4	4
Dumb Pan	0x05	UUUD	5	5
Dumb Pan	0x06	UUUD	6	6
Dumb Pan	0x07	UUUD	7	7
Dumb Pan	0x08	UUUD	8	8
Dumb Pan	0x09	UUUD	9	9
Dumb Pan	0x0A	UUUD	A	10
Dumb Pan	0x0B	UUUD	B	11
Dumb Pan	0x0C	UUUD	C	12
Dumb Pan	0x0D	UUUD	D	13
Dumb Pan	0x0E	UUUD	E	14
Dumb Pan	0x0F	UUUD	F	15
CP-3201	0x10	UUUU	0	16
CP-3201	0x11	UUUU	1	17
CP-3201	0x12	UUUU	2	18
CP-3201	0x13	UUUU	3	19
CP-3201	0x14	UUUU	4	20
CP-3201	0x15	UUUU	5	21
CP-3201	0x16	UUUU	6	22
CP-3201	0x17	UUUU	7	23
CP-3201	0x18	UUUU	8	24
CP-3201	0x19	UUUU	9	25
CP-3201	0x1A	UUUU	A	26
CP-3201	0x1B	UUUU	B	27
CP-3201	0x1C	UUUU	C	28
CP-3201	0x1D	UUUU	D	29
CP-3201	0x1E	UUUU	E	30
CP-3201	0x1F	UUUU	F	31