Product Datasheet - Technical Specifications

More information in our Web-Shop at ▶ **www.meilhaus.com** and in our download section.

Your contact

Technical and commercial sales, price information, quotations, demo/test equipment, consulting:

Tel.: **+49 - 81 41 - 52 71-0**

FAX: **+49 - 81 41 - 52 71-129**

E-Mail: **sales@meilhaus.com**

Downloads:
www.meilhaus.com/en/infos/download.htm

www.meilhaus.de

2364

SERIAL TO RELAY INTERFACE

DESCRIPTION

The 2364 is a compact, RS-232/RS-485 to Relay Interface that provides 16 form 'A' contacts or 16 relay drivers for switching signals or driving external relays. The 2364's versatile commands let the user control the relays individually, configure the relays as a single or multipole scanner, or configure the relays in a preset pattern as a device controller. The 2364 also has eight isolated digital inputs that can be used to sense external signals or contact closures. In control applications, these signals can be used to verify the response of the external system to the control outputs. The 2364 can also monitor the input signals and generate an Service Request Message when the signals change state.

The 2364's serial interface provides all of the functionality of the GPIB interface in the Model 2364 but allows for control of the 2364 by any PC's COM port or over an RS-485 network. A user setable address lets multiple 2364s be operated on a RS-485 network with other RS-485 devices.

An OEM board version of the 2364 is available for applications requiring an internal relay board.

Relays and Driver Outputs

Models with relays contain 16 form 'A' (SPST) relays with both sides of each relay contact brought out to the rear panel connector. The connector pin assignments are arranged to minimize signal cross talk. The relay contacts in the Model 2364-11 are for switching low level signals up to 0.5 amperes. The relay contacts in the 2364-12 are rated for switching currents up to 1.0 amperes. The 2364-14 has relay driver outputs that sink 300 mA to activate external relays or solenoids. The relays and drivers are on a plug-in relay PCB which simplifies relay maintenance and contact type changes.

2364 GPIB Relay Interface

Digital Inputs

The 2364 provides eight isolated digital inputs for inputting TTL/CMOS signals or contact closures. Each signal has a pullup resistor to a common line that can be connected to the 2364's internal 5 Vdc power or to an external voltage source. The signals have >500 volts of isolation from the 2364 when driven by an external source.

Monitoring Capability

The 2364 can monitor the digital inputs for signal changes and generate a Service Request Message when the specified condition(s) occurs. Monitoring is accomplished by setting the 2364's Questionable transition registers to detect positive and/or negative signal transitions. When the enabled condition is detected, the 2364 generates a Service Request Message to alert the Computer which can then query the 2364's Questionable condition or event register to determine the exact signal condition and change.

Serial Controlled relays and isolated digital inputs

- Multiple relay configurations:
  - -16 low-level SPST relays
  - -16 hi-power SPST relays
  - -16 relay drivers
  Choose the right contact or relay driver for your application.

- Multiple relay programming modes:
  - individual relays
  - single or multipole scanning or pulsed
  Flexible relay programming.

- Isolated digital inputs accept contact closures and CMOS/TTL logic levels.
  Eliminates ground loops.

- IEEE-488.2 compatible unit uses SCPI commands.
  Meets the latest GPIB specifications.

- Includes a menu-driven configuration program.
  Steps user through configuration choices.

- Metal case provides full EMI/RFI protection
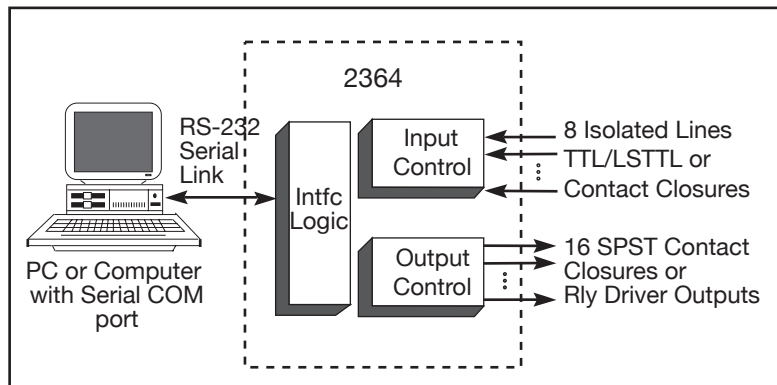 *Proven EMI/RFI Compliance.*

CE Approved

☑ RoHS

Figure 1   2364 Block Diagram

RS-232/RS-485 Interfaces

The 2364 provides both RS-232 and RS-485 signals on it's 25-pin rear panel connector. The RS-232 interface is a full-duplex, three wire interface with Tx, Rx and Ground signals. The 2364's RS-485 interface is a two-wire, half duplex interface for point-to-point or network connections.

RS-485 Address Detection

The Serial address detection capability in the 2364 enables the user to control up to sixteen 2364s on a single RS-485 network or to mix 2364s with other RS-485 devices. When address recognition is enabled, the 2364 looks for presence of the STX character followed by its address character before acting upon the remainder of the attached command string. The address character is set and saved in the 2364's flash memory with the NETwork:ADDRess command.

2364 SCPI Command Advantages

Table 1 shows the 2364's SCPI Commands and their short-form command equivalents. SCPI commands are a tree and branch structure that start from the root command and branch out to a value, action or query at the end of the branch. Because SCPI commands are so easy to read, they are self documenting and make program maintenance easier. An example of a SCPI command is one which sets a relay:

ROUT:CLOSE 4   'Closes relay 4

Many of the 2364's SCPI commands have short-form equivalents that minimize typing and serial traffic. The short-form relay command is:

O 4   'Closes relay 4

Controlling the Relays

The simplest way to control the 2364's relays (or relay driver outputs) is individually using the relay's CLOSE, OPEN or PULSe commands. Unspecified relays remain in their current state. This satisfies most users who are controlling other device(s) or are switching signals. Multiple relays can be opened and closed at the same time by entering the relay numbers in the list form. List are in parenthesis and are identified with the ASCII AT '@' character. Examples are:

ROUT:CLOS (@1,3,4)   'Closes relays 1,3 and 4
ROUT:OPEN (@11:13)   'Opens relays 11 through 13

Scanning Options

For data acquisition applications, groups of the relays can be configured to operate as a single or multi-pole scanner. The relays are selected as a list with the ROUT:SCAN command. The INIT:IMMediate command sets the relays to the first position and enables the scanner. The INIT:CONT command enables or disables the scanner. The scanner can be advanced with either the IEEE-488.1 GET command or with a 488.2 *TRG command. The scanner operates as a break-before-make scanner. Unused relays can be controlled individually and used for other non-scanning applications.

TABLE 1   2364 SCPI Command Tree

SCPI Tree	Short-Form Commands
SYSTem	**System Setup and Query**
:COMM	
:SERial	
:BAUD	<numeric> [9600]
:BITS	7 | 8
:PARITY	ODD | EVEN | NONE
:SBITs	1 | 2
:NETwork	0 | 1
:ADDRess	0-15
:ERRor?	
:VERSion?	
STATus	
:OPERation	not used in 2364
[:EVENt]?	
:CONDition?	
:ENABle	<numeric>
:ENABle?	
:QUEStionable	**Digital Inputs**
[:EVENt]?	E?
:CONDition?	D?
:ENABle	<numeric> M
:ENABle?	M?
:PTRansistion	<numeric> P
:PTRansistion?	P?
:NTRansistion	<numeric> N
:NTRansistion?	N?
ROUTe	**Relay Control**
:CLOSe	channel list C
:STATe?	Q?
:OPEN	channel list O
:ALL	A
:SCAN	Sn
:PULSe	channel list PL
:WIDTh	1-30000 [25] PW
INITiate	**Scan Control**
[:IMMeditate]	I
:CONTinuous	1(On)| 0(Off) [0] N
CALibrate	**Calibrate**
:IDN	<string>
:DATe	mm/dd/yy
:DEFault	
:LOCK	1(On)| 0(Off) [0]

The scan relay list is stored in the 2364's Flash memory with the *SAV 0 command. The maximum list size is 16 relays x 32 steps. Figure 2 shows the commands to setup a 2 pole, 3 position scanner.

ROUT:SCAN (@1,3,5), (@2,4,6)	'Defines scanner relays
INIT:IMM	'Closes initial pole (Relays 1 and 2)
*TRG or a GET	'Steps the scanner to the next position. Relays 1 and 2 open; relays 3 and 5 close)
*TRG or a GET	'Steps the scanner to the third position.
*TRG or a GET	'Steps the scanner to the home position.

Figure 2   2364 Scanner Command Example

Reading and Monitoring the Digital Inputs

The 2364's eight digital inputs are read by querying the Questionable Condition register in the 2364's Status Reporting Structure. The Questionable Event register reports the bits that have changed since its last reading. Positive and negative filter masks let the Questionable Event register capture bits that go high, go low or move in either direction with a > 1 kHz sample rate.

Enable bits allow the corresponding bits in the Questionable Event Register to be summarized in the 2364's Status Byte Register and to generate a Service Request message (SRQ) to alert the Application to the event. The user's Application program can query the 2364's Questionable Condition Register to determine the input signal states and / or the Event Register to learn which signal changed state.

Signal Connections

All 2364 relay and digital connections are brought out on a 50-pin blue-ribbon connector on the 2364's rear panel. Table 2 lists the signals. The relay outputs are floating form 'A' (normally open) contacts. Relay driver signals are brought out on the NO contact pins. The 2364's relays and drivers are not enabled after a power turn-on until the user's saved configuration has been loaded into their driving latches. This prevents erroneous switching while the 2364 is performing its power-on selftest. A Relay Enable signal is provided to control external devices that may need to be held off.
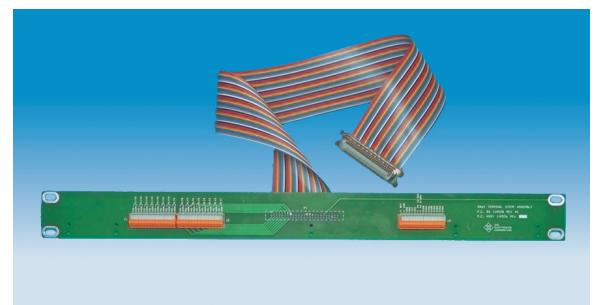
2364 Terminal Board

The 2364 Terminal Board is a small board with screw terminals that plugs into the 2364'a rear panel connector. It has terminals for the relay contacts, the digital inputs and for the miscellaneous signals. The 115750 Terminal Board includes the hardware to fasten it to the 2364.
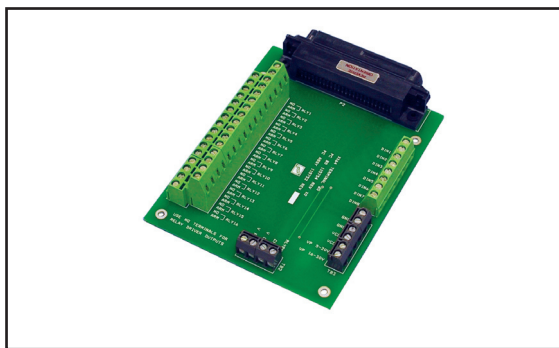
2364 Terminal Board

Rack Mounted Terminal Strip

A rack mounted Terminal Board is available for the 8064. The 114534-60 Terminal Strip mounts across the rear rails of an DIN/RETMA equipment rack and provides the user with lever actuated terminals for the 2364 signals. A 60 cm (24 inch) long flat-ribbon cable connects the Terminal Board to the 2364.

TABLE 2   2364 Signal-Pin Assignments

Signal	Pin	Description
Relay 1 NO	1	Relay Contact or Driver 1 Output
Relay 1 Arm	26	
Relay 2 NO	2	Relay Contact or Driver 2 Output
Relay 2 Arm	27	
Relay 3 NO	3	Relay Contact or Driver 3 Output
Relay 3 Arm	28	
Relay 4 NO	4	Relay Contact or Driver 4 Output
Relay 4 Arm	29	
Relay 5 NO	5	Relay Contact or Driver 5 Output
Relay 5 Arm	30	
Relay 6 NO	6	Relay Contact or Driver 6 Output
Relay 6 Arm	31	
Relay 7 NO	7	Relay Contact or Driver 7 Output
Relay 7 Arm	32	
Relay 8 NO	8	Relay Contact or Driver 8 Output
Relay 8 Arm	33	
Relay 9 NO	9	Relay Contact or Driver 9 Output
Relay 9 Arm	34	
Relay 10 NO	10	Relay Contact or Driver 10 Output
Relay 10 Arm	35	
Relay 11 NO	11	Relay Contact or Driver 11 Output
Relay 11 Arm	36	
Relay 12 NO	12	Relay Contact or Driver 12 Output
Relay 12 Arm	37	
Relay 13 NO	13	Relay Contact or Driver 13 Output
Relay 13 Arm	38	
Relay 14 NO	14	Relay Contact or Driver 14 Output
Relay 14 Arm	39	
Relay 15 NO	15	Relay Contact or Driver 15 Output
Relay 15 Arm	40	
Relay 16 NO	16	Relay Contact or Driver 16 Output
Relay 16 Arm	41	
V Return	17	External Relay Ground Return
V Common	42	External Relay + Voltage Input
Logic Gnd	18	Relay Enable and 5 V Ground
Logic Gnd	43	
+ 5 Vdc	19	5 V power output
+ 5 Vdc	44	
Shield Gnd	20	
Relay Enable	45	Output Signal
V Pullup High	21	External 16-30 Vdc Input
V Pullup Low	46	External 5-20 Vdc Input
Digital In 8	22	
Digital In 7	47	
Digital In 6	23	
Digital In 5	48	
Digital In 4	24	
Digital In 3	49	
Digital In 2	25	
Digital In 1	50	

Rack Mounted 2364 Terminal Strip

Rack Mounting Kit

The rack mounting kits are available for mounting one or two 8064s in a 1 'U' high space.   Order P/N 114212 for mounting one unit, P/N 114213 for mounting two units.
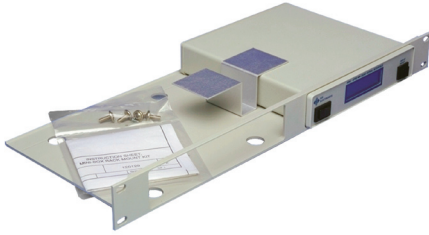
114213 Dual Rack Mount Kit

OEM Board Versions

The Relay Interfaces are available in board versions for OEMs or for any user who wants to mount the 2364 or 2364 Board Assembly in a chassis. Power can be supplied from the host's 12 V to 24 V power supply. The boards are available with GPIB and Serial interface configurations listed in Table 3.   On the OEM boards, the interface headers are mounted vertically to minimize the board footprint. The relay I/O connector is the same right angle 50-pin connector with lock bails.

RS-232/RS-485 Interfaces

On 2364 OEM boards, the RS-232/RS-485 serial interface is on a 10-pin header at the front of the board. The serial interface operates at rates up to 115,200 baud and provides all of the functionality of the GPIB interface but over an RS-232 link or over an RS-485 network. Up to sixteen 2364s can be placed on a single RS-485 network. The 2364s are addressed by a two character address sequence prefixed to the normal 2364 command. The unit address and network capability are controlled by SCPI commands.

Boards with both GPIB and serial interfaces, default to using the serial interface at power turn-on time until the GPIB interface enters the Remote state.

GPIB Header

On 2364 OEM boards with GPIB interfaces have a 26-pin vertical header for remoting the GPIB bus and address switch signals to the rear panel. The 26 pin header mates with a flat ribbon cable from one of ICS's GPIB Connector/Address switch assemblies. These compact, business card size assemblies provide a convenient way to mount a GPIB Connector and an address switch on the rear panel.

LED Header

An 8-pin header on the OEM boards allows easy extension of the LED drive signals to the user's front panel.

OEM Firmware Customization

The 2364 and 2364's firmware allows the user to store a custom IDN message and other setup parameters in Flash memory. This effectively integrates the board into the user's system and makes the OEM board appear as part of the end product. A lock function hides the setup variables from the end user and prevents accidental changes to the setup.
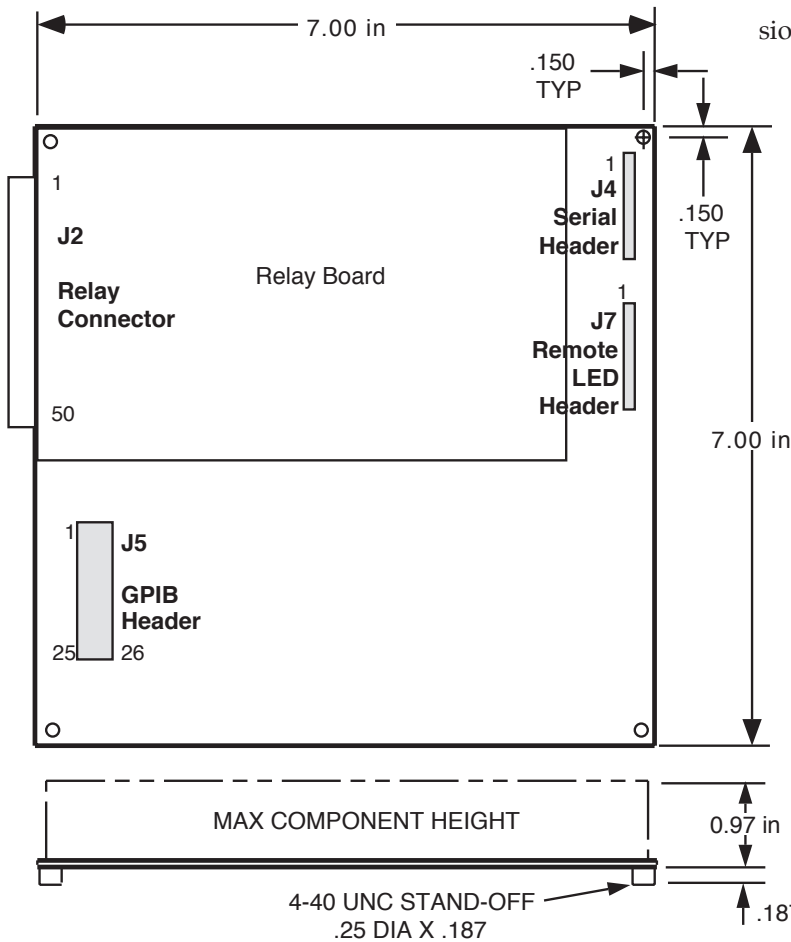
2364 OEM Board Dimensions

TABLE 3   OEM BOARD CONFIGURATIONS

Part Number	Same As	Interfaces		
		GPIB	RS-232	RS-485
114521-11	4864-11	Yes	Yes	Yes
114521-12	4864-12	Yes	Yes	Yes
114521-14	4864-14	Yes	Yes	Yes
114681-11	2364-11	No	Yes	Yes
114681-12	2364-12	No	Yes	Yes
114681-14	2364-14	No	Yes	Yes

OEM Boards have the same specifications as the 'same as' model number. OEM boards include the Instruction Manual, Configuration disk and Mating connector. GPIB Connector/Switch Assemblies, serial cables or serial cable kits must be ordered separately.

Select the 2364 version and then pick your accessory items.

Part Selection	Qty	Part Number
Standard 2364 Relay Inerface Minibox. Includes a 50-pin mating connector and hood -		
with 16 form 'A' low level contacts	(1)	2364-11
with 16 form 'A' heavy duty contacts	(1)	2364-12
with 16 sink type relay drivers	(1)	2364-14
Select an extra mating digital I/O connector, 50-pin ribbon connector and hood	(1)	902002
Select an Open end, 50 conductor, 28 AWG wire cable assembly, 5 feet long	(1)	112829-01

or

Select the 4864 Terminal Board	(1)	115750

or

Select the 4864 I/O terminal Strip with 60 cm long flat-ribbon cable	(1)	114534-60 (Note 1)

2364 OEM Relay Inerface Board. Includes a 50-pin mating connector and hood -		
with 16 form 'A' low level contacts	(1)	114521-11
with 16 form 'A' heavy duty contacts	(1)	114521-12
with 16 sink type relay drivers	(1)	114521-14
Select a Serial Cable Kit with DB-25 rear panel connector	(1)	114597
Select an extra mating digital I/O connector, 50-pin ribbon connector and hood	(1)	902002
Select an Open end, 50 conductor, 28 AWG wire cable assembly, 5 feet long	(1)	112829-01

or

Select the 4864 Terminal Board	(1)	115750

or

Select the 4864 I/O terminal Strip with 60 cm long flat-ribbon cable	(1)	114534-60 (Note 1)

Notes:
1. The dash number is the cable length in cm.
2. -L is the cable length in cm. You can order any length from 10 to 90 cm.
   Standard stocked lengths are: 30, 45, 60 and 90 cm. Select an appropriate length as it is best to not
   have extra cable coiled up in the chassis to minimize EMI pickup. See the GPIB Connector/Address
   Switch Assembly data sheet for more details.

Serial Interface

Provides RS-232 and RS-485 (RS-422) asynchronous serial interfaces. Unit responds to the serial interface that receives the command.

RS-232 Interface
  Signals: AB, BA and BB
  Mode: Full Duplex

RS-485 (RS-422) Signals
  Signals: TX/RX pair
  Mode: Half duplex with or
                    without address detection
  Addresses: 0 to 15
  Termination: 220 ohm load resistor
                    tand 1 KΩ pullup/
                    pulldown resistors.

Common Specifications
  Baud Rate: 1200 to 38.4 Kbaud
  Data bits: 7 or 8
  Stop bits :   1 or 2
  Parity: Odd, Even or None

Command Sets
SCPI and short form commands listed in Table 1 plus the following IEEE 488.2 Common Commands:
*CLS, *ESE, *ESE?, *ESR?, *IDN?, *OPC, *OPC?, *PSC, *PSC?, *RCL, *RST, *SAV, *SRE, *SRE?, *TRG, *TST, and *WAI.

Digital Inputs

Eight isolated inputs that can be queried and/or monitored for selected bit changes. Detected changes are saved and can be used to generate a Service Request (SRQ).

Data lines	8
Input signals	TTL/CMOS or contact closure to ground
Input Levels	Low = 0±0.5 V @ 2 mA High=>2.4 V or open
Pullups	1.5 Kohm to +5 Vdc or to user furnished external voltage
External Voltage	5 to 32 Vdc
Isolation	500 Vdc to internal logic with external pullup voltage.
Monitoring	1,000 samples/sec

Relay Contacts

All relay contacts are brought out to individual pins on the relay connector. Guard lines are provided between adjacent relay contacts

Model No.	2364-11	2364-12
Usage	Lo level	Hi Power
No. of Relays	16	16
Contact form	Form A (SPST)	Form A (SPST)
Contact mat'l	Ruthenium	-
Contact ratings: (Restive load)	0.5 A	1.0 A
Switching V	200 Vdc	200 Vdc
Power	10 W	50 W
Breakdown V	300 Vac	300 Vac
Resistance	0.15 Ω	0.2 Ω
Life at 100μA	20 x10^6 cycles	
at 500mA	2 x 10^6 cycles	

Relay/Solenoid Driver Outputs

In -14 version, the relays are omitted and the relay drivers are brought directly out to the connector. Drivers are open collector type with an internal snubber diode. User supplies the external voltage for the diodes.

Model No.	2364-14
Usage	External relays
No. of Drivers	16
Current	300 mA sink max
Switching V	48 Vdc max
Pulse width	1-30000 ms [25]

Scanner-Sequence Memory

16 relays x 32 steps

Front Panel Indicators

PWR	Indicates power on
RDY	Unit has passed self test
TALK	Unit is addressed to talk
LSTN	Unit is addressed to listen
SRQ	Unit is asserting SRQ
ERR	Unit sensed a command error

Physical

Size	W x H x D 7.29 x 1.52 x 7.45 inches (1185.2 x 38.6 x 189.2 mm)
Weight	3 lbs (1.4 kg)
Temperature	-10°C to +55°C Operating -40°C to +70°C Storage

Humidity 0-90% RH, no condensation

Construction   All metal case

Connectors
        IEEE bus-Std 24 pin w/metric studs
        I/O-Amphenol 57-30500 50-pin connector w/spring locks

Power   12 to 24 Vdc @ 100 mA
        plus 10 mA per closed relay

Included Accessories

Instruction Manual
Mating Connector
Support CD ROM with Configuration and
  example programs
UL/CSA/VDE approved AC power adapters
provided for:
  US - 115±10% Vac, 60 Hz (std)
  Europe - 230±10% Vac, 50/60 Hz
  UK - 230±10% Vac, 60 Hz
  Japan - 100±10% Vac, 50/60 Hz
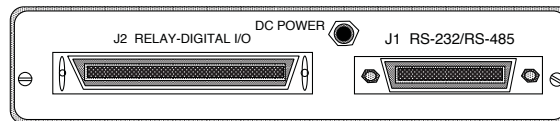
2364 Rear Panel

ORDERING INFORMATION

	Part Number
Relay Interface with 16 SPST low-level relays	2364-11
Relay Interface with 16 SPST high-power relays	2364-12
Relay Interface with 16 relay/solenoid drivers	2364-14
2364 Terminal Board	115750
RackMounted Terminal Strip Assembly with 60 cm cable (See separate data sheet)	114534-60