# profichip®
automation in silicon

PROFIBUS Lean Slave ASIC

VPCLS2

The VPCLS2 ASIC is a complete single chip solution for PROFIBUS DP. It provides 32 I/O points, which can be set to input, output or diagnostics (in groups of 8 bits). No additional microcontroller or software is needed. Therefore this ASIC is the ideal solution for simple digital field devices. The VPCLS2 is pin-compatible to the LSPM2 ASIC from Siemens.
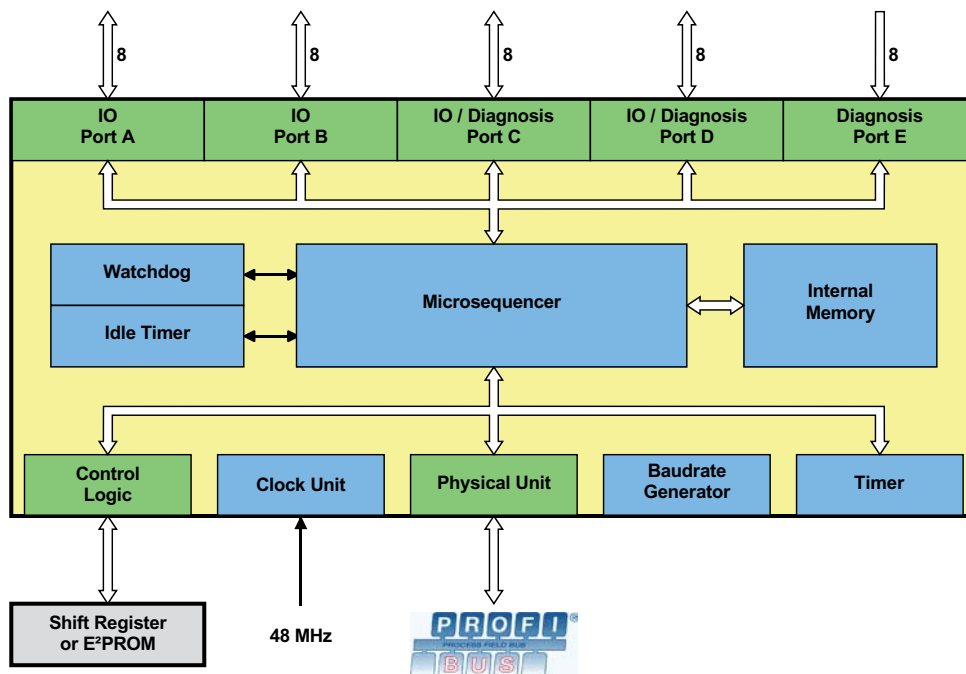
Features:

- Protocol PROFIBUS-DP
- Asynchronous interface according to PROFIBUS-DP
- Maximum data transfer rate 12 Mbit/s
- Automatic recognition of data transfer rate
- 8 bit diagnostic inputs (fixed)
- 32 bits I/O, thereof 16 bits configurable as additional diagnostic inputs
- EEPROM or DIP-Switches can be used to set the network address and ID number
- Clock supply 48 MHz
- Supply voltage 5 V
- Pin-compatible with LSPM2 from Siemens
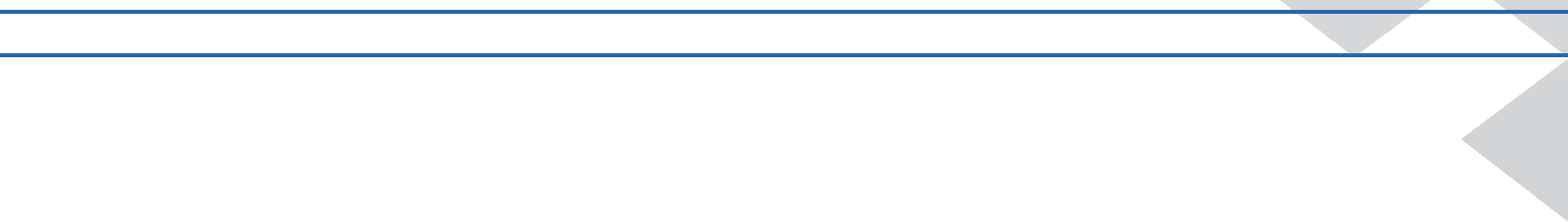- Package PQFP80 (RoHS compliant)
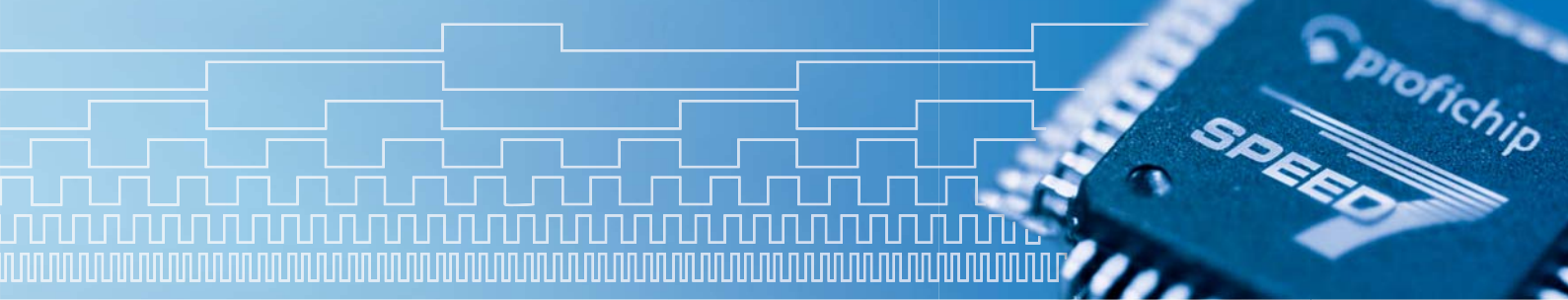
The VPCLS2 handles all communication- and diagnosis-tasks of the Profibus-DP-slave-protocol independently. No additional micro-controller or software is needed. All necessary timers and monitoring functions are implemented in hardware. After the VPCLS2 has received an error-free telegram, it automatically generates the requested response telegram. Therefore this ASIC is optimally suited for a cost effective single-chip-realization of simple digital I/O devices.
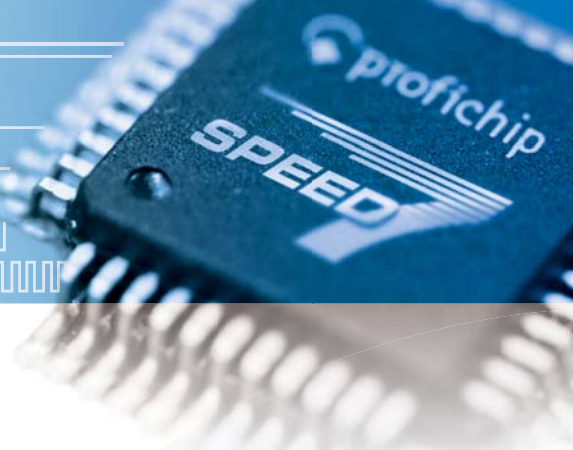
The Profibus protocol is processed by the integrated Microsequencer which is a special RISC processor architecture developed by Profichip and tailor-made for this type of Profibus slave applications. The Microsequencer checks incoming telegrams for correctness and plausibility, monitors the accuracy of the bus timings and automatically generates the response telegrams according to the Profibus standard.

The Baudrate Generator provides the internal clocks required for Profibus transmission rates of 9.6 kbit/s to 12 Mbit/s. The VPCLS2 needs to be clocked by an external 48 MHz crystal oscillator; the LSPM2 operation mode with 24 MHz clock supply and reduced transmission rates is not supported.

The I/O interface comprises four 8-bit data ports and one 8-bit diagnostic input port. Each data port can be configured to serve as input or output port, two data ports can be configured as additional diagnostic input ports. Port direction and function can be selected by five configuration pins.

The Profibus station address and ID number can be stored in an external EEPROM or serial shift register. The integrated control logic generates the signals for controlling the serial EEPROM or external shift register depending on the selected interface type.

Typical Application:

BF   ER   PWR

VCC   GND   GND

A   C   C

YEL   RED   GN

C   A   A

74HCT165

SH/LD#
CLKINH
CLK
SER
A B C D E F G H
QH QH#

SRDO 1
SRCS 15
SRCLK 2

GND 10
11 12 13 14 3 4 5 6

9 7

HIGH Byte
PNO
Identnumber

74HCT165

SH/LD#
CLKINH
CLK
SER
A B C D E F G H
QH QH#

SRDO 1
SRCS 15
SRCLK 2

10
11 12 13 14 3 4 5 6

9 7

LOW Byte
PNO
Identnumber

74HCT165

SH/LD#
CLKINH
CLK
SER
A B C D E F G H
QH QH#

SRDO 1
SRCS 15
SRCLK 2

10
11 12 13 14 3 4 5 6

9 7

Slave address

VCC

BCD Switch

C C
1
2
4
8

BCD-Schalter

C C
1
2
4
8

BCD-Schalter

2 4 6 8   2 4 6 8
10K   10K
1 3 5 7   1 3 5 7
GND   GND

PROFIBUS
Interface

SRCS
SRCLK
SRDOD
SRDI

TXD
RXD
RTS
GND

RWCONS
VCC
VCC
VCC
RESET#
GND
VCC
GND
VCC
GND

VCC

OUT 3   2

48MHz

Pin	Signal
62	DIAERROR
63	NORMOPER
77	INTERCS
76	INTERCLK
79	INTERDOD
78	INTERDI
60	SREE#
4	TXD
2	RXD
3	RTS
1	CTS#
57	RWCONS
58	TEMO#
59	TRI#
75	ACA
56	RESET#
65	TYP0
66	TYP1
67	TYP2
68	TYP3
69	TYP4
61	FQ48
72	XTAL1
71	XTAL2

PA0 6
PA1 7
PA2 8
PA3 9
PA4 10
PA5 11
PA6 13
PA7 14
PORT A Output

PB0 16
PB1 17
PB2 18
PB3 19
PB4 20
PB5 21
PB6 22
PB7 23
PORT B Output

PC0 37
PC1 38
PC2 39
PC3 40
PC4 41
PC5 42
PC6 43
PC7 44
PORT C Input

PD0 46
PD1 47
PD2 48
PD3 49
PD4 50
PD5 51
PD6 52
PD7 54
PORT D Input

PE0 26
PE1 27
PE2 28
PE3 29
PE4 30
PE5 31
PE6 34
PE7 35
PORT E Diagnosis

VPCLS2
QFP80