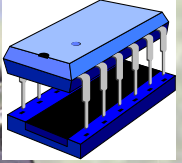
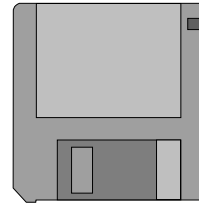
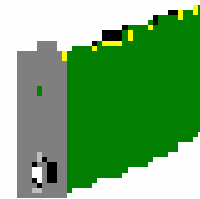
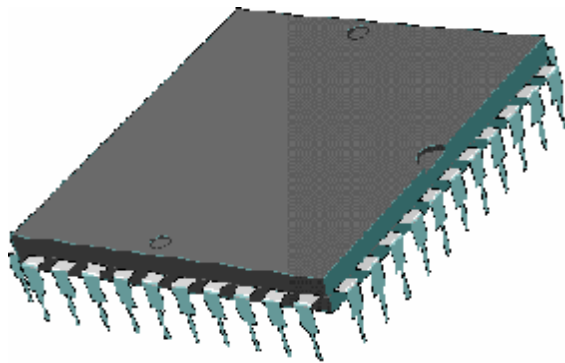




# Technology

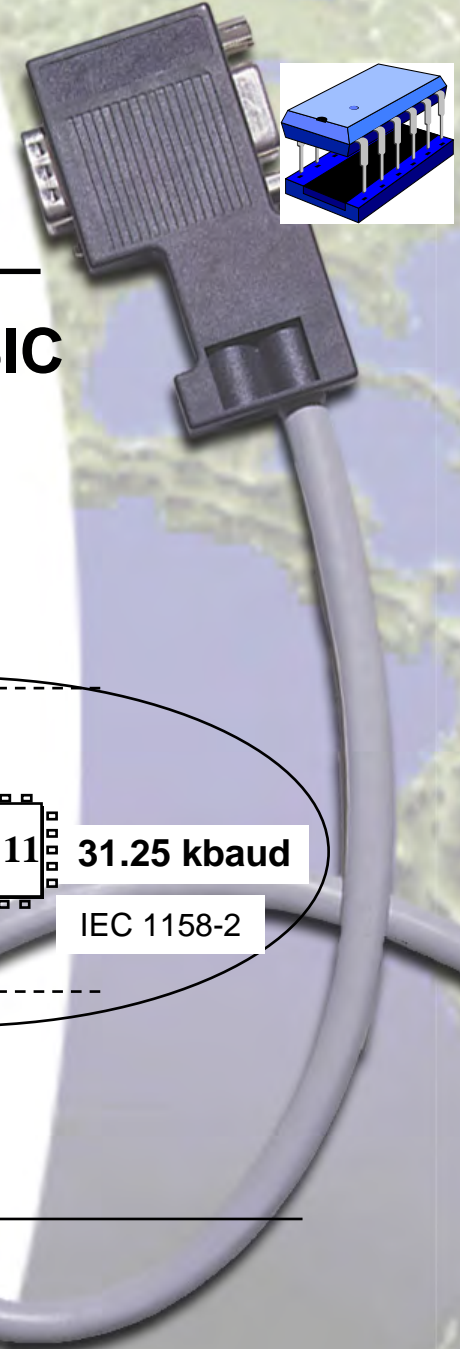


## *PROFIBUS Technology*

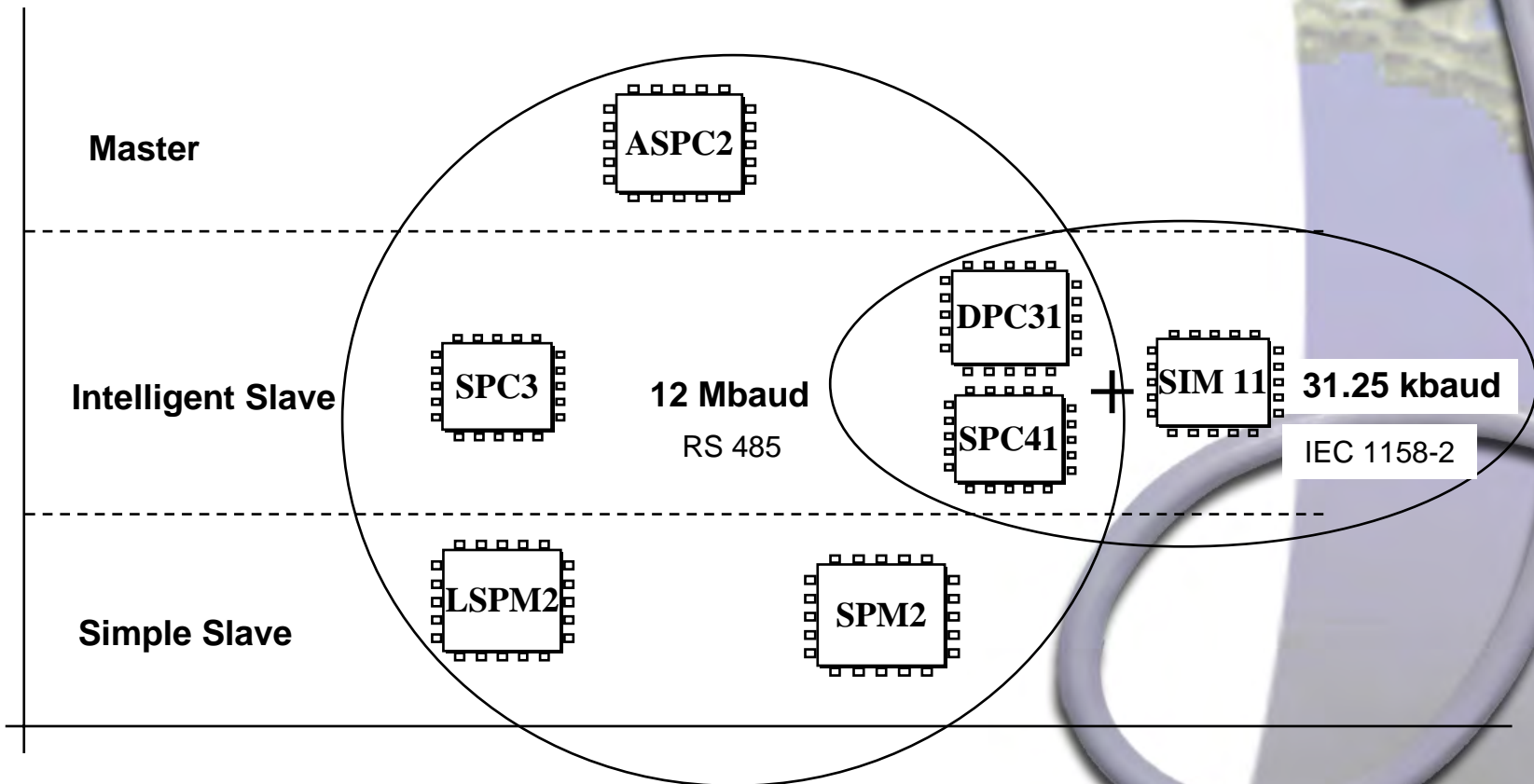


***Chips - Modules - Development Kits***

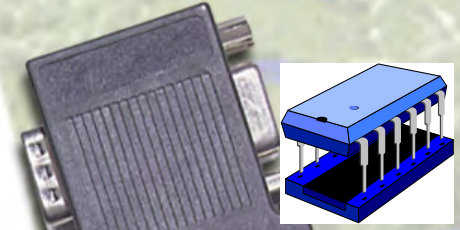
# Technology



## ❑ Application Specific Integrated Circuit - ASIC



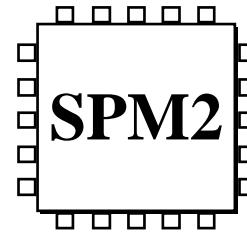
# Technology



## □ Simple Field Devices



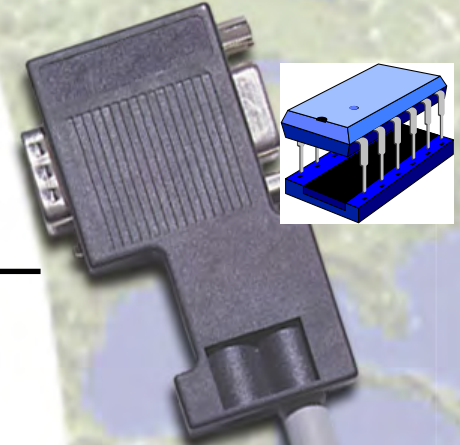
MQFB, 80 Pin, 2cm<sup>2</sup>



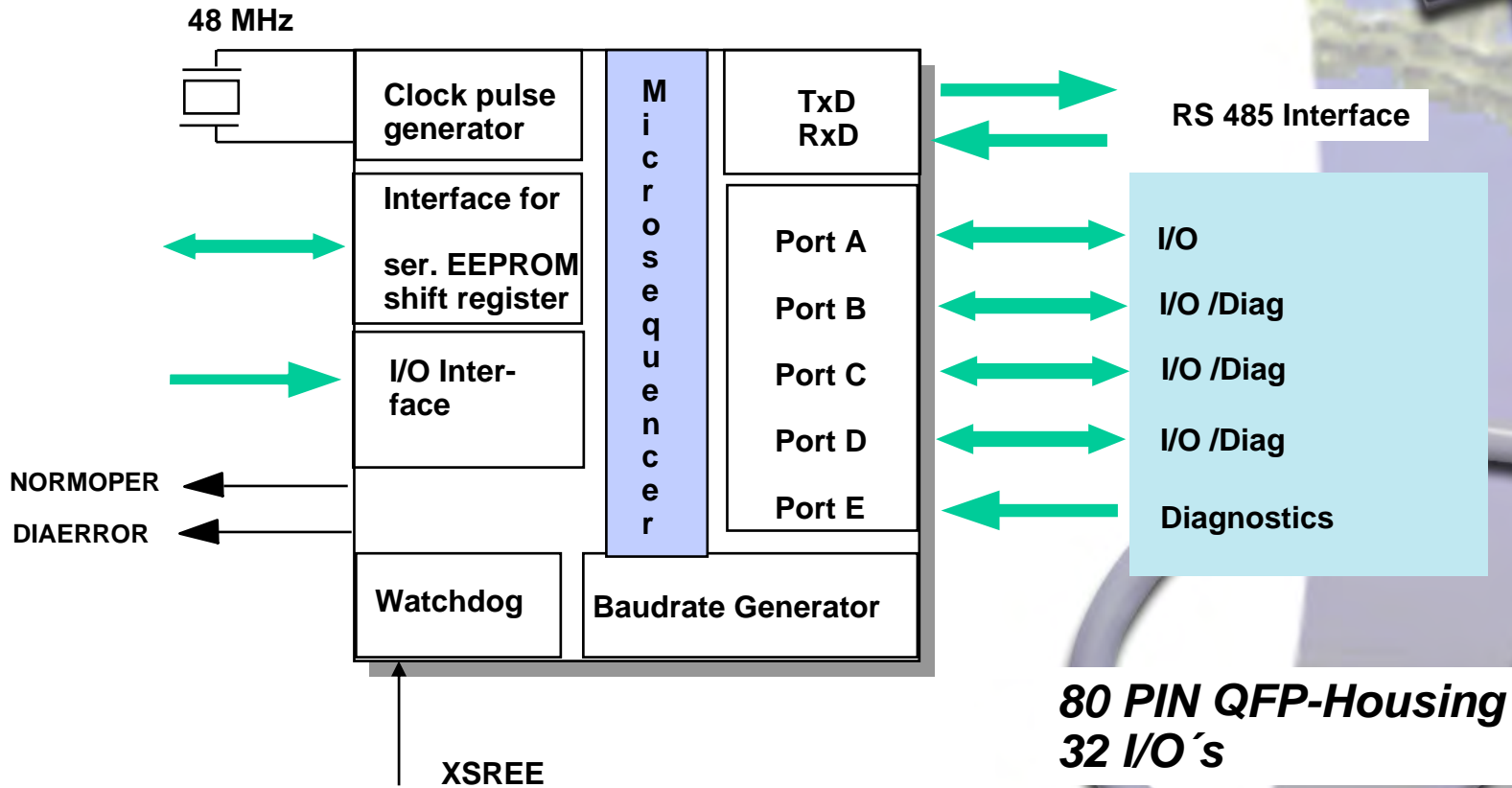
PQFB, 120 Pin, 10cm<sup>2</sup>

- ✓ Transmission rate up to 12Mbaud
- ✓ DP Protocol completely integrated
- ✓ No processor required
- ✓ Data Volume:
  - × LSPM 2 - 32 bit I/O & 8 bit diagnostic
  - × SPM 2 - 64 bit I/O & 16 bit diagnostic

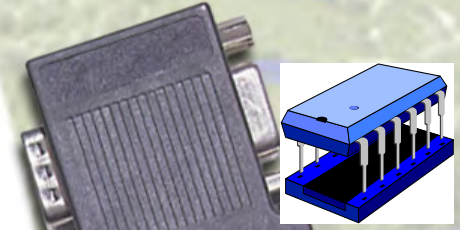
# Technology



## ❑ LSPM2 Block Diagram



# Technology

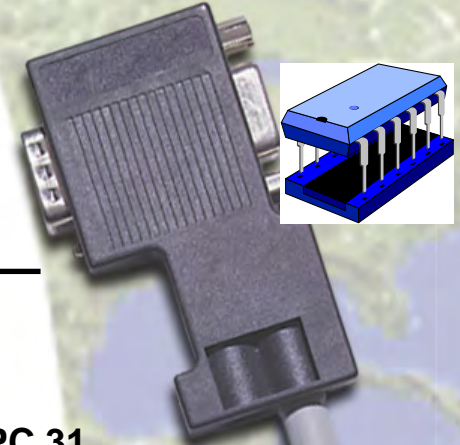


## ❑ Features LSPM2/SPM2

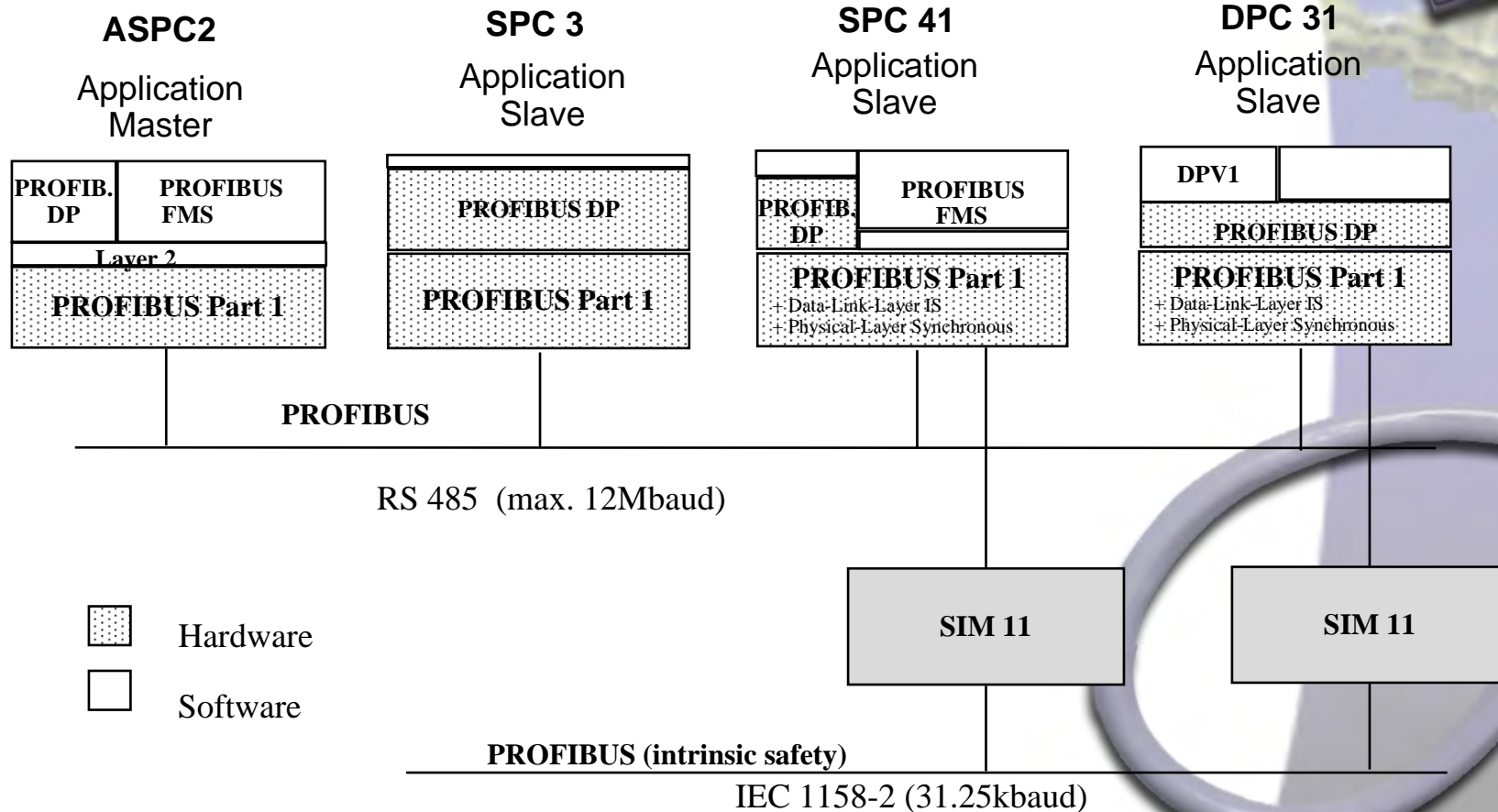
- ✔ **Timer for response monitoring integrated (watchdog)**
- ✔ **Automatic detection of transmission rate**
- ✔ **EEPROM interface for station address & Ident Number**
- ✔ **Shift register interface**
- ✔ **I/O interface**
- ✔ **Parameterization ports**
- ✔ **Diagnostic data is specified**
- ✔ **LSPM2/ SPM2 supports all mandatory and optional services for field device/slave solutions**



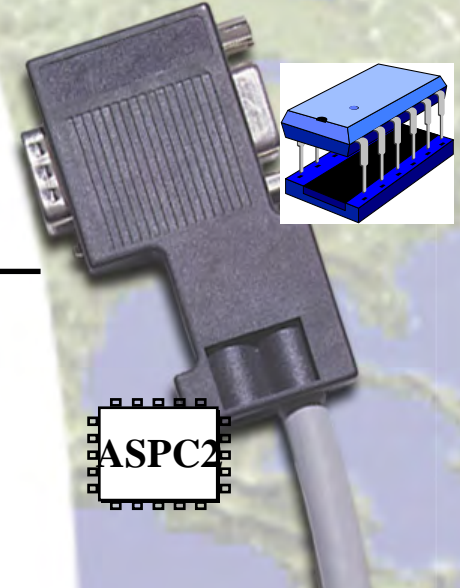
# Technology



## Intelligent ASICs



# Technology



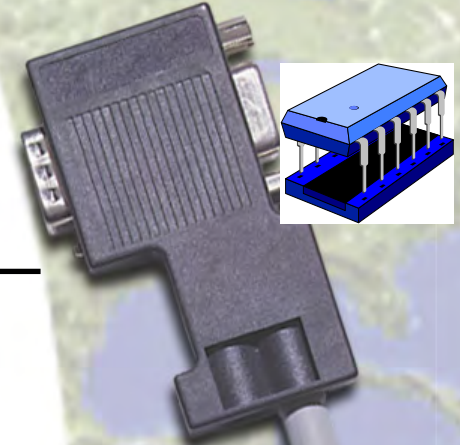
## □ Intelligent ASICs - continued



Max. Transmission Rate [Mbaud]	12	12	12	12
Transm. Medium	RS 485	RS485 / IEC 1158-2 (with SIM 11)		RS 485
Protocol	DP (DPV1)	DP/FMS/PA	DP/DPV1	DP/DPV1/FMS
Message Buffer [kByte]	1.5	1.5	6	1,000 external
Housing	PQFP, 44 Pin	PQFP, 44 Pin	PQFP, 100 Pin	MQFP, 100 Pin



# Technology



## ❑ Intelligent ... (continued) - SPC3

up to 244 byte  
of data

automatic search  
of baudrate

9.6kbd-12Mbd

3 buffers for each:  
input & output  
data; 1 for PRM;  
2 for CFG & DIAG

DP slave

protocol integrated



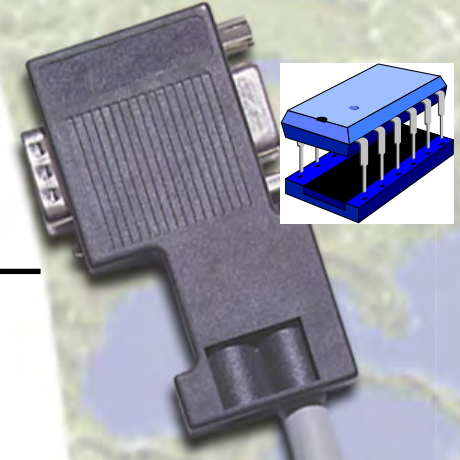
firmware available

1.5 kByte  
internal RAM

interface to:  
Intel (8032, 80x86)  
Motorola (HC11/16/916)  
Siemens (80166/80167)



# Technology



## ❑ Intelligent ... (continued) - DPC31

up to 244 byte  
of data

automatic search  
of baudrate

9.6kbd-12Mbd

3 buffers for each:  
input & output  
data; 2 for PRM,  
CFG & DIAG

DP slave

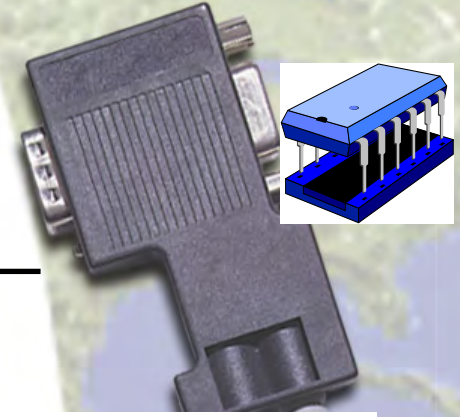
protocol integrated



interface to:  
Intel (8032, 80x86)  
Motorola (HC11/16/916)  
Siemens (C166)

firmware available

# Technology



## □ Intelligent ... - DPC31 (continued)

31.25kBd

integrated  
8031 core

synchronous

firmware includes  
complete DPV1

synchronous  
serial interface

100 pin PQFP  
housing

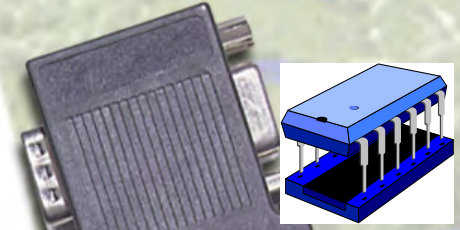


up to 40  
bits I/O

standard interface  
for memory expansion

6 kByte  
internal RAM

# Technology



## Available Firmware for the ASICs



+

**Master SW  
Protocol DP  
for 80165**

(80 kByte)



+

**Slave SW  
Protocol DP**

(6 kByte)



+

**Slave SW  
Protocol DP/DPV1**

(depends on  
implementation)



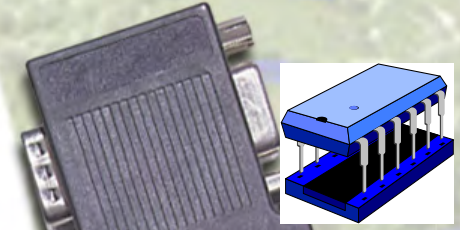
+

**Slave SW  
Protocol DP,  
FMS,PA**

(30 kByte)



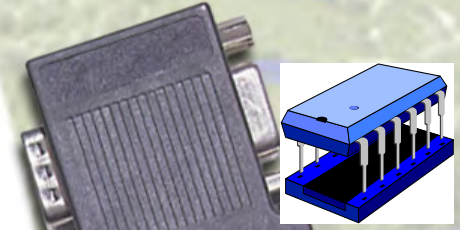
# Technology



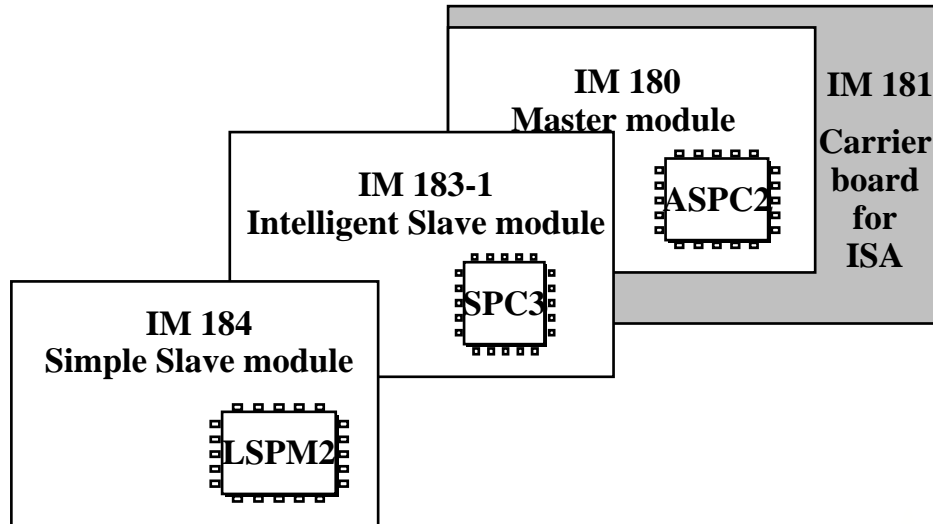
## □ Modules

- ✓ Fast implementation of PROFIBUS
- ✓ Requires no SMD technology by the device manufacturer
- ✓ Reduces development effort
- ✓ Low cost solution for getting started
- ✓ PROFIBUS part is already complete
- ✓ Proven technique

# Technology



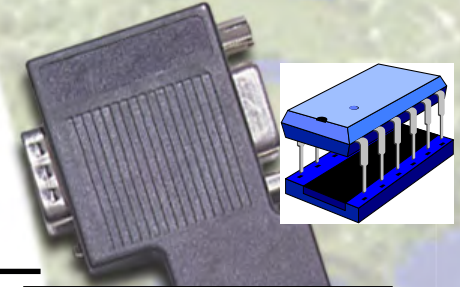
## ❑ Modules (continued) - Features



- ☑ 5V DC power supply
- ☑ 0 to 70 °C permissible ambient temperature
- ☑ Transmission rate up to 12Mbaud



# Technology



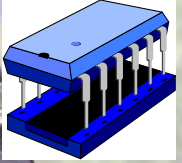
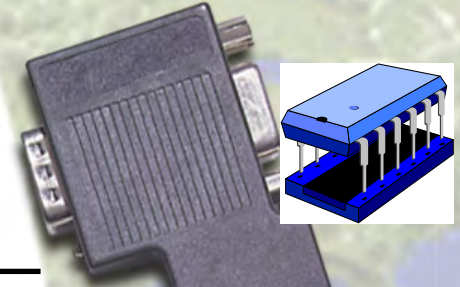
**IM 184**  
Simple Slave module



## ❑ Modules (continued) - IM 184

- ✓ PROFIBUS protocol handling by LSPM 2 ASIC
- ✓ 32 configurable inputs/outputs
- ✓ 8 separate diagnostics inputs
- ✓ Connection: 2x34-pin connectors for connection to host network
- ✓ 10-pin connector for RS-485
- ✓ Floating RS-485 interface for PROFIBUS-DP
- ✓ Power consumption typ. 100 mA
- ✓ Dimensions (W x H): 85 x 64 mm / 3.3 x 2.5 in (modular design)


# Technology



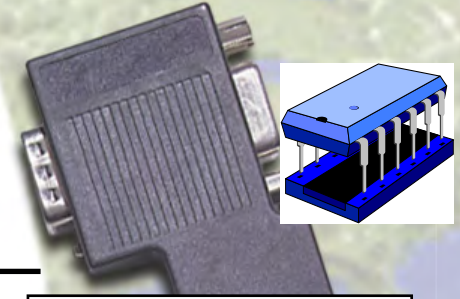
## ❑ Modules (continued) - IM 183-1

- ✓ PROFIBUS protocol handling by SPC 3 ASIC
- ✓ CPU 80C32 microprocessor with 20 MHz clock frequency
- ✓ 32 kBytes SRAM user memory
- ✓ 32 kBytes (mirrored) or 64 kByte EPROM
- ✓ 50-pin connector for connection to host network
- ✓ 14-pin connector for RS-232 & 10-pin connector for RS-485
- ✓ Dimensions (W x H): 86 x 76 mm / 3.3 x 2.7 in

IM 183-1  
Intelligent Slave module



The SPC3 ASIC chip is shown in a square frame within the IM 183-1 module box. It is a small, square chip with many pins on its sides.



IM 183-1  
Intelligent Slave module



## □ Modules (continued) - Example Program IM 183-1 and SPC3

```

if(DPS2_GET_IND_NEW_PRM_DATA())
{ /*=== New parameter data ===*/
  UBYTE  SPC3_PTR_ATTR * prm_ptr;
  UBYTE  param_data_len, prm_result;
  UBYTE  ii;
  prm_result = DPS2_PRM_FINISHED;
  do      /* Check parameter until no conflict behavior */
    prm_ptr = DPS2_GET_PRM_BUF_PTR();
    param_data_len = DPS2_GET_PRM_LEN();
    /* data_length_netto of parametrization_telegram > 7 */
    if (param_data_len > 7)
      {
        if ((*(prm_ptr+8) == 0xAA) && (*(prm_ptr+9) == 0xAA))
          prm_result = DPS2_SET_PRM_DATA_NOT_OK(); /* as example !!! */
        else
          {
            for (ii= 0; ii<param_data_len & ii <10; ii++) // store in the buffer
              prm_tst_buf[ii] = *(prm_ptr+ii+7);
            prm_result = DPS2_SET_PRM_DATA_OK();
          }
      }
    else
      prm_result = DPS2_SET_PRM_DATA_OK();
  } while(prm_result == DPS2_PRM_CONFLICT);

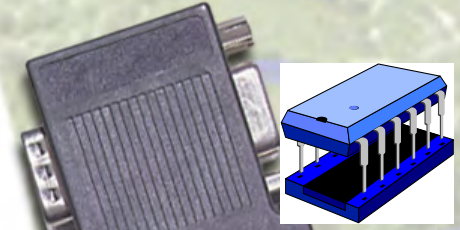
```

User makes changes to adjust  
code to own application



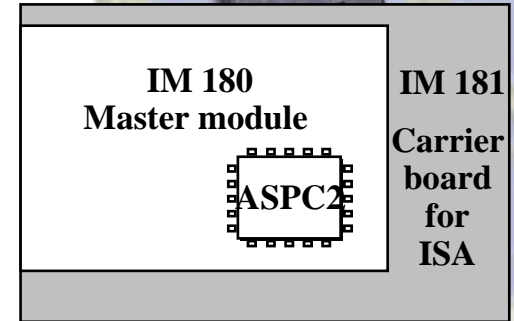


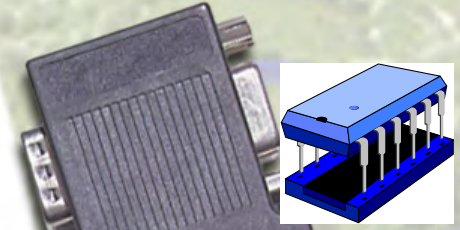
# Technology



## ❑ Modules (continued) - IM 180

- ✓ PROFIBUS protocol handling by ASPC 2 ASIC
- ✓ 80C165 microprocessor with 40 MHz clock frequency
- ✓ 2 x 128K x 8-bit RAM user memory
- ✓ 128K x 16-bit flash EPROM program & parameter memory
- ✓ 48 MHz oscillator chip for ASPC 2
- ✓ 16/8-bit data bus can be connected; dual-port RAM (8K x 16 bit); 64-pin connector (4 rows); optional 8/16-bit data bus connectable
- ✓ Dimensions (W x H): 100 x 100 mm

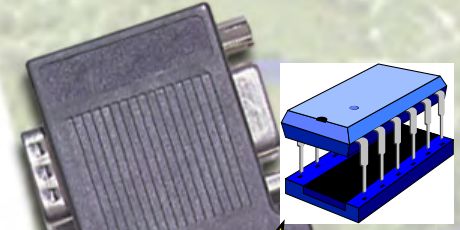




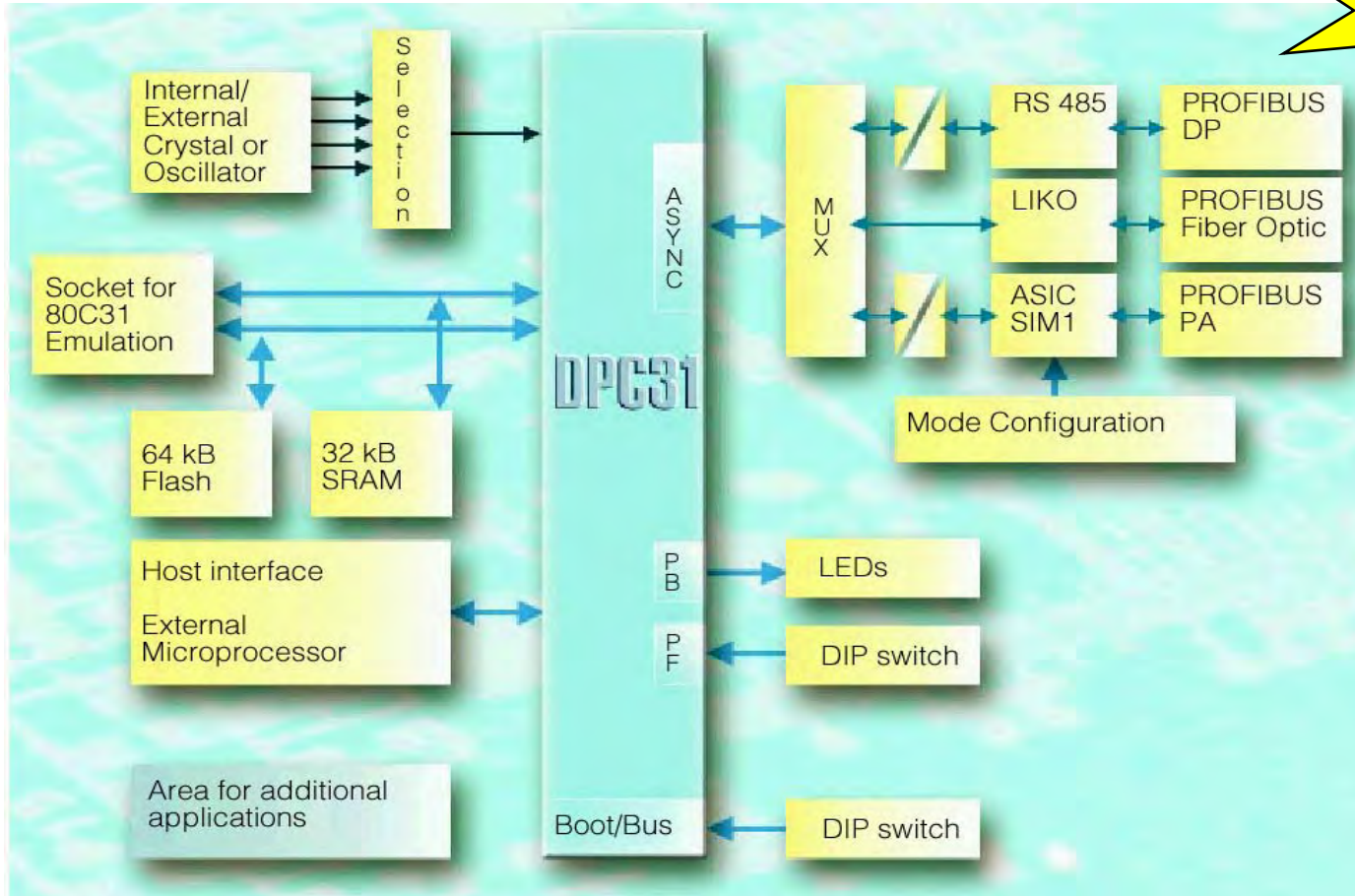
## ❑ Development Kit

- ✓ Complete package with hardware & software
- ✓ “Plug & Play” - plug hardware into PC connect power to the slave board and get started
- ✓ Starting point for own development
- ✓ Hardware (slave) can be used as base for own development
- ✓ Software (example program) for slave can also be used as base for development of own application

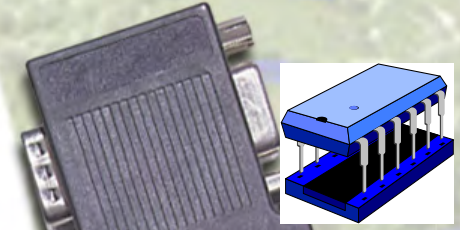
# Technology



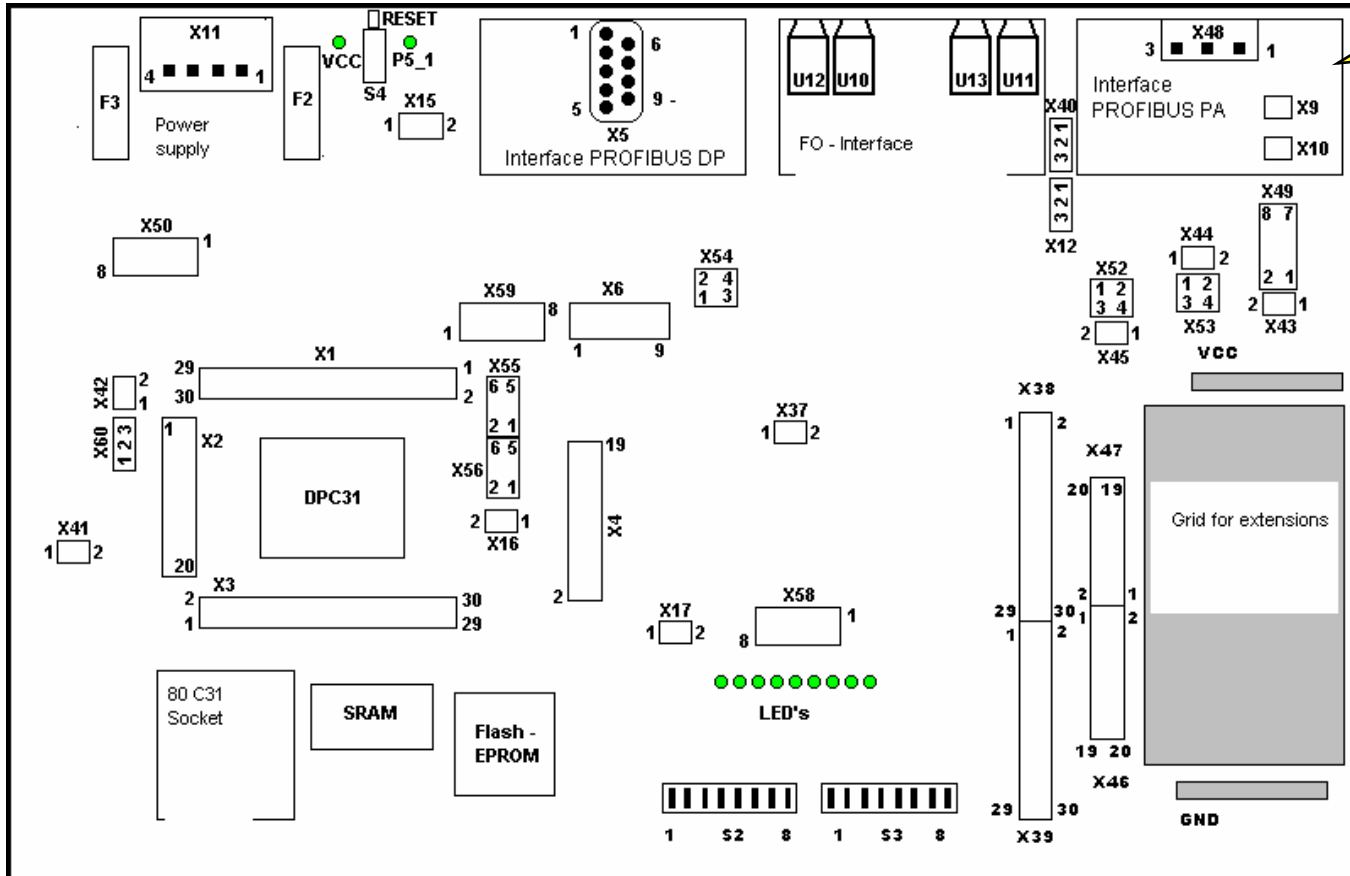
## Development Kit DP & PA - Test Board



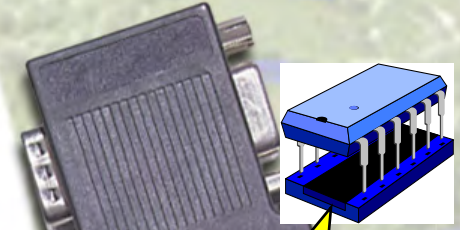
# Technology



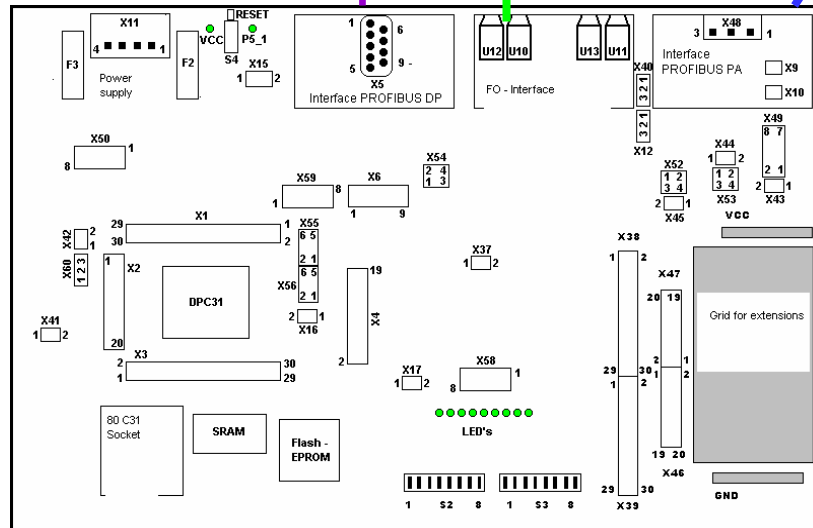
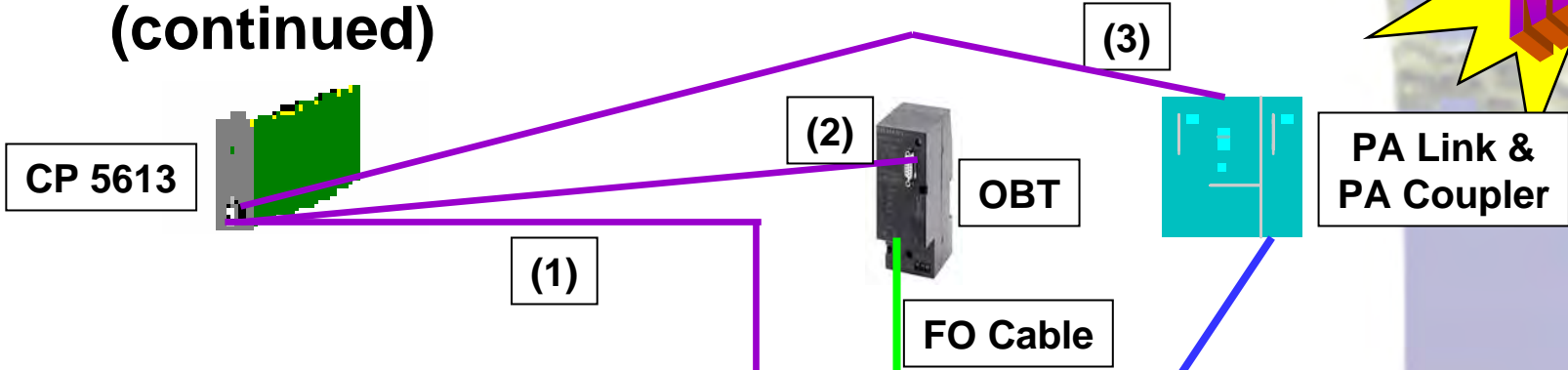
## Development Kit DP & PA - RS485, FO or PA



# Technology

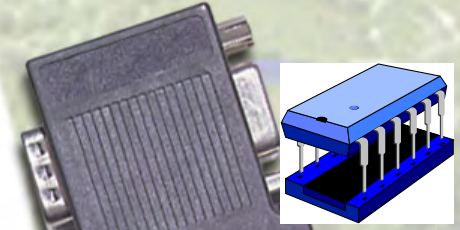


Development... - RS485 (1), FO (2) or PA (3)  
(continued)





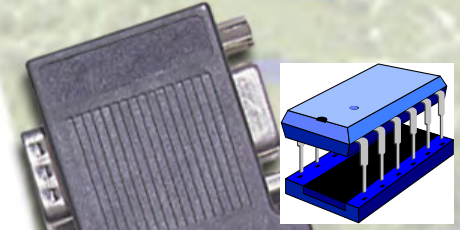
# Technology



## ❑ Development Kit DP & PA - What do you get?

- ❑  PROFIBUS DP Master CP 5613 (PCI format)
- ❑  Software SIMATIC NET for CP 5613, configuration tool COM PROFIBUS and demo version of Process Data Manager (PDM)
- ❑  Example program for the PC (including DP Extended services)
- ❑  Test board with DPC31 ASIC
- ❑  Firmware V1SL for DPC31
- ❑  Example program for board including DP Extensions
- ❑  Optical Bus Terminal (OBT), cable & connectors

# Technology

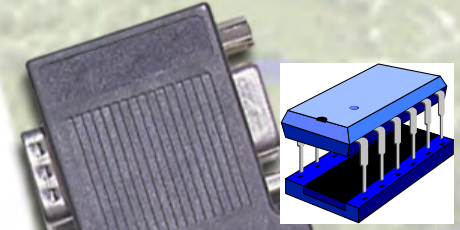


## ❑ Development Kit 4 - What do you get?

- ☑ PROFIBUS DP Master IM 180 with carrier board IM 181 (ISA format)
- ☑ DPMT firmware for IM 180
- ☑ Configuration tool COM PROFIBUS and example program for the PC
- ☑ Test board IM 183-1 with SPC3 ASIC
- ☑ Firmware DPS2 for SPC3
- ☑ Example program for board
- ☑ Test board IM 184 with LSPM2 ASIC
- ☑ Cable & connectors



# Technology



## □ List Prices [US\$/piece]

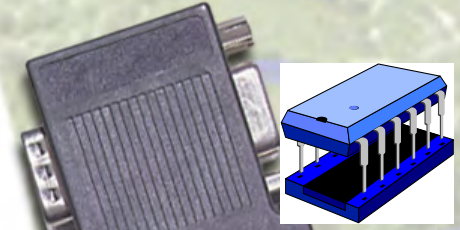
- |                           |                    |                              |
|---------------------------|--------------------|------------------------------|
| ✓ LSPM2                   | 19.40 (quantity 5) | 14.45 (quantity 330)         |
| ✓ SPM2                    | 27.40 (quantity 5) | 18.70 (quantity 100)         |
| ✓ SPC3                    | 15.20 (quantity 5) | 11.51 (quantity 576)         |
| ✓ Firmware DPS2 for SPC3  |                    | 1,380.00 US\$ (one time fee) |
| ✓ Firmware DPSE for SPC3  |                    | 2,410.00 US\$ (one time fee) |
| ✓ SPC41                   | 20.60 (quantity 5) | 13.72 (quantity 960)         |
| ✓ DPC31                   | 19.40 (quantity 5) | 15.17 (quantity 300)         |
| ✓ Firmware V1SL for DPC31 |                    | 2,800.00 US\$ (one time fee) |
| ✓ SIM11                   | 18.00 (quantity 5) | 11.74 (quantity 1,000)       |
| ✓ ASPC2                   | 36.20 (quantity 5) | 27.27 (quantity 660)         |

...contact (423) 262-2576 for more information or (423) 262-2425 to order





# Technology



## ❑ List Prices [US\$] (continued)

☑ Development Kit DP & PA	3,100.00
☑ Master board IM 180	675.00
☑ Carrier board IM 181	290.00
☑ Slave board IM 183-1	260.00
☑ Slave board IM 184	230.00
☑ Development Kit 4	2,700.00

...contact (423) 262-2576 for more information or (423) 262-2425 to order