SMC Interface

SmartMedia FLASH Card Interface 3.3V to 5V

An easy to handle interface for connection of SmartMedia FLASH Cards to BASIC-Tiger Multitasking Computer. The interface possesses a plug-in socket, which makes an easy slide-in of a SM-Card through a narrow frontpanel slit possible.

Already on the interface unit a 3.3V to 5V conversion is done, so that the nowadays common 3.3V SmartMedia Cards can be connected directly to the commonly used 5V logic systems. The connection is done simply with an up to 5m long flat ribbon cable.

Sensors in the interface recognize if a medium is inserted correctly or in a wrong way. A signal LED on the front is able to signalize file access, incorrect insertion or other special conditions. Furthermore an optionally placed write protection pad on the SmartMedia Card can be recognized and reported to the microcomputer system.

The driver package for BASIC Tiger systems offers the opportunity to make file access compatible to Windows-, Linux- and Mac computers, as well as to digital cameras and MP3 players. This permits fast and comfortable data exchange of also large amounts of data with numerous devices and computer systems. Just a minimal system consisting of a BASIC-Tiger computer module and the here described SmartMedia interface can already be the complete solution for applications like

- Dataloggers
- Systems for quality security
- Systems with voice output resp. with data base
- Navigation systems ... or similar

Furthermore there is the possibility of low level access on physical blocks and pages of the medium. With that, also hidden information can be read or written, which makes applications like these possible:

- Applying of copy protection
- Password protection of media
- Reparation of media with faultive formatting
- Analysis of card parameters (Manufacturer, invalid blocks, and so on...)

The SmartMedia interface measures ca. 57 x 50 x 10 mm.

BTI-SMC-INTERF	1+	€ 38,-
BTI-SMC-INTERF	10+	€ 33,-
BTI-SMC-INTERF	100+	€ 28,-

Flat cable 26-pin, 2 x 26-pin connector, female, strain relief in different lengths:

FLATCABLE-26ffz--10CM	1+	€ 1,90
FLATCABLE-26ffz--10CM	10+	€ 1,50
FLATCABLE-26ffz--10CM	100+	€ 1,30

FLATCABLE-26ffz--20CM	1+	€ 2,30
FLATCABLE-26ffz--20CM	10+	€ 1,80
FLATCABLE-26ffz--20CM	100+	€ 1,60
FLATCABLE-26ffz--50CM	1+	€ 2,70
FLATCABLE-26ffz--50CM	10+	€ 2,10
FLATCABLE-26ffz--50CM	100+	€ 1,80
FLATCABLE-26ffz--100CM	1+	€ 3,40
FLATCABLE-26ffz--100CM	10+	€ 2,70
FLATCABLE-26ffz--100CM	100+	€ 2,30

SmartMedia FLASH Cards in varies capacities:

SMEDIA_CARD_16MB	1+	€ 10,70
SMEDIA_CARD_16MB	10+	€ 10,40
SMEDIA_CARD_16MB	100+	€ 9,96
SMEDIA_CARD_32MB	1+	€ 15,80
SMEDIA_CARD_32MB	10+	€ 15,35
SMEDIA_CARD_32MB	100+	€ 14,88
SMEDIA_CARD_128MB	1+	€ 58,00
SMEDIA_CARD_128MB	10+	€ 57,20
SMEDIA_CARD_128MB	100+	€ 56,45

The driver package is available for free on disk or from the web under: www.wilke-technology.com.

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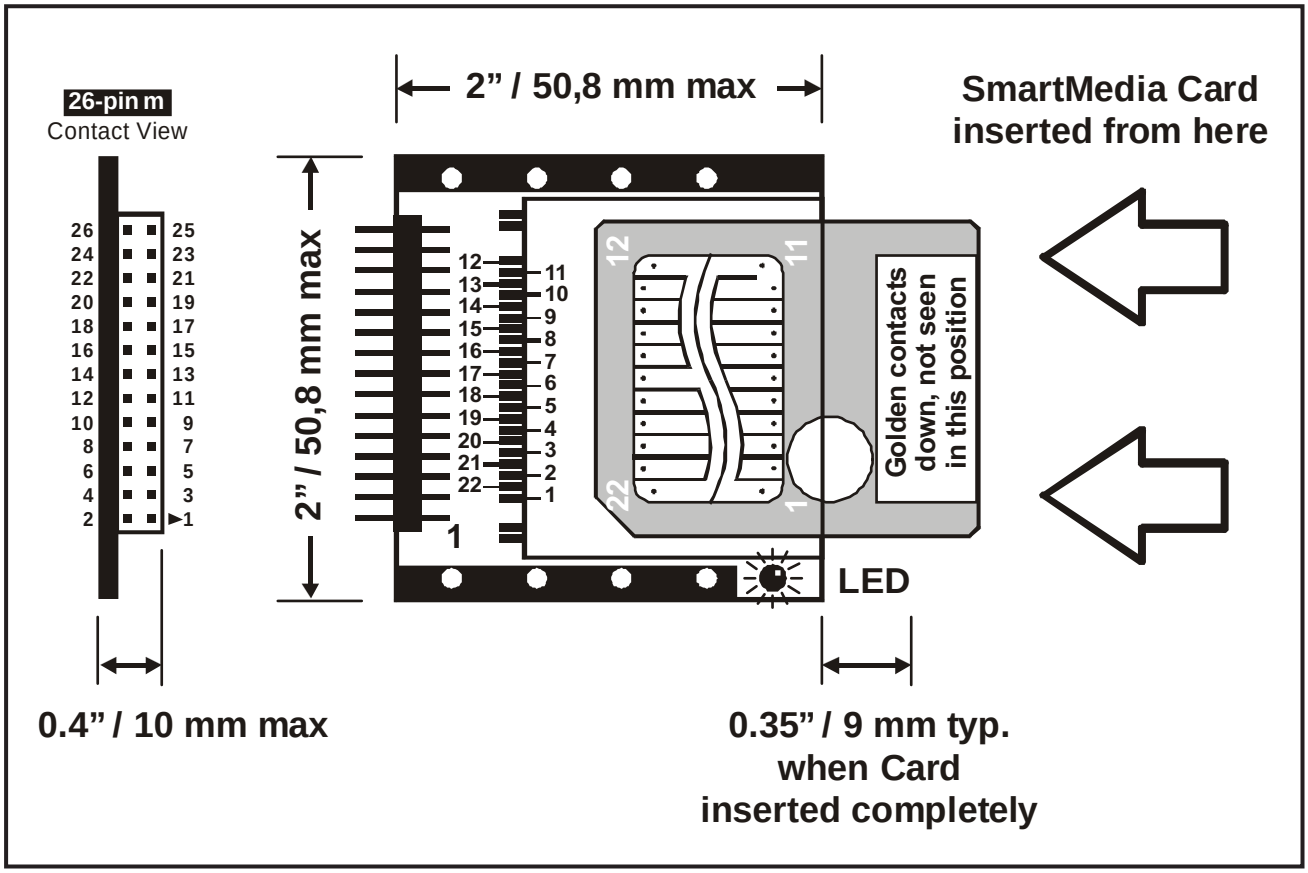


Short description:

The SmartMedia™ adaptor enables an easy and cost effective connection of SmartMedia FLASH Cards to BASIC-Tiger™ computer systems.

The adaptor contains a slot for the storage medium, which can be inserted and removed through a housing slit of ca. 38 x 2 mm when assembled behind a front panel. The insertion as well as right or wrong card orientation are detected. Likewise the optional write protection label is detected, too and can be read from the computer system.

Depending upon wiring the writing to a such marked medium is prevented by hardware, or it is up to the software not to write or erase such a medium.

The SmartMedia™ adaptor accepts the modern 3.3V SmartMedia™ Cards, which are available with up to 128 MByte storage capacity. The adaptor generates the 3.3V distribution voltage for the medium and also takes care of the interface to the 5V logic of the BASIC-Tiger™.

For easy use of SmartMedia Cards in Tiger-BASIC programs there are device drivers, programming examples and an application note in the web: (www.wilke-technology.com).

With these tools it is possible to operate SmartMedia Cards basically in 2 different forms:

- as external Random Access Memory
- as external drive with file structure for easy data exchange with PCs and other appliances.

1.) Usage as external Random Access Memory

The FLASH memory is organized in pages of 512 Bytes (*) and blocks of 16 kByte = 32 pages (*).
Single pages and blocks can be accessed with a page-/block adress:

READ Page (Data / Spare)
WRITE Page (Data / Spare)
ERASE Block

So you have complete access and control of the inserted medium. Each byte existing in the medium can be read and written independent of formatting or file structure. In particular can be randomly accessed:

- Invalid blocks
- Spare Field Entries (Error-Correction Code, ...etc.)
- CIS / IDI Field
- Data areas

These freedom allows very flexible usage of the medium for most different requirements, as the data carrier can be changed arbitrary.

By such direct write resp. delete accesses the data carrier can afterwards become unreadable / unusable for other appliances. That can be a desired function (software protection, copy protection, authorization check...) - but can also, if done unwanted, lead to loss of data or make the medium completely unusable for other appliances (e.g. when erasing the CIS/IDI Field).

Advantages:

- Simple random-access structure, simple program structure for the application.

  Typical applications:
  - Smart Media as external data buffer,
  - Characteristic line memory
  - Data base with fast access (sounds, maps, graphics ...)

- Fastest writing-/ reading speeds (ca. 40 kByte / s)

- Complete control of the medium:

  - Damaged SmartMedia Cards can be recovered,

  - Arbitrary data formats can be generated and/or read

  - "Invalid blocks" can be read

  - Security mechanisms can be realized for:

    Copy protection
    Password protection
    Data encryption

  - By producing artificial "invalid blocks" marks, data, keys and such can be stored on a SmartMedia, so that they can't be seen in the file system, can't be read or erased.

2.) Usage as external data carrier with file structure

With it reading from and writing to a SmartMedia Card is possible with complete compatibility to a large number of other appliances, like e.g.:

- PCs (Windows, MAC) and other computers
- Cameras
- MP3 players
- As well as other mobile devices

Function overview:

File systems: FAT12 and FAT16

- Formatting
- Creating a directory
- Erasing a directory
- Creating a file
- Writing a file
- Reading a file
- Erasing a file
- Searching a file (In preparation)

as well as various help functions like:

- Reading and writing attributes
- Reading and writing date and time
- Reading the size

as well as functions for synchronization.

Advantages:

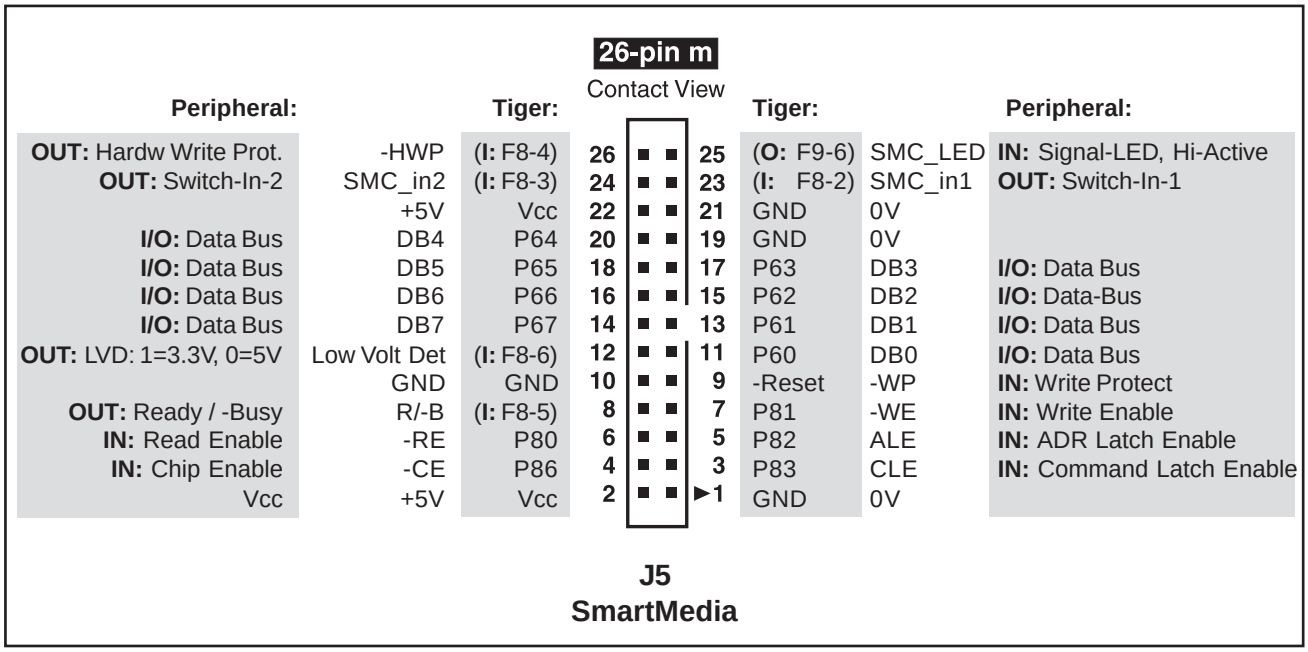
Next to the named and known advantages of the SmartMedia Cards - large storage capacity on smallest space at favorable costs - the file structure offers the optimal base for every kind of data transportation and data exchange with other systems.

(*) For media from 16 MByte capacity.
See also: Manufacturer data

SMC Interface

SmartMedia FLASH Card Interface 3.3V to 5V

Connection scheme SmartMedia Flash Card Connector in TEC1000 Eurocard Computer:



The Connector J3 connects the TEC-1000 board with the SmartMedia adaptor for external FLASH cards with up to 128 MByte storage capacity.

Signals short description:

-HWP Hardware Write Protect.
This signal shows if the SmartMedia Card is provided with a small silver write protection label. A such marked card shall only be accessed by reading.
Read in through: **XPort F8, Bit 4**

Attention: The write protection label has no influence on the medium itself, only in an application with SmartMedia usage can, by query of this signal in the applications program, be guaranteed that on such marked media is not written.
Read in through: **XPort F8, Bit 2 (SMCin1) and Bit 3 (SMCin2)**

SMC_In1:	SMC_In2	Meaning
1	1	***no*** card inserted
1	0	Card inserted **right**
0	1	Card inserted ***wrong***
0	0	Card inserted ***wrong***

SMC_LED Signal-LED on SmartMedia adaptor, High level = LED on. Can e.g. be used for signalizing the user present access on the medium. During these times the medium must not be removed, doing so may result in loss of data.
Switch on by outputting a "1" on **XPort F9, Bit 6**

It is advisible to activate this LED a short time before the memory is actually accessed (e.g. 1...2s) to warn the user in time.

DB0...DB7 Data-Bus, bidirectional
Transfer of data, adresses and commands

LVD Low Voltage Detect (only occasional available on SmartMedia Cards), signalizes if a SmartMedia Card works with 3.3V or 5V;
1=3.3V, 0=5V.
Read in through: **XPort F8, Bit 6**

-WP Write Protect, low active
This signal prevents the inadvertently writing of SmartMedia memory. By connecting -Reset to this input an unwanted change of data contents during system Power-Up is prevented.

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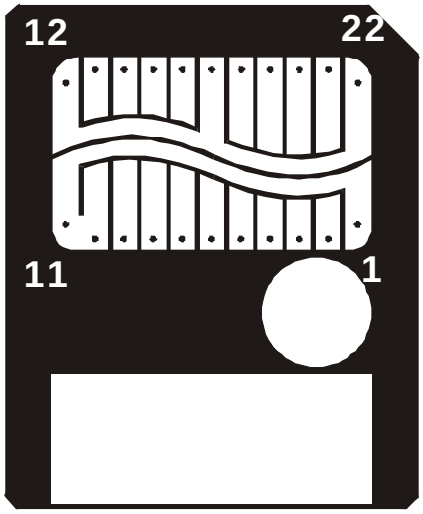
Connection scheme SmartMedia Flash Card:

TEC-1000 I/O	SM-Adapter Pin	SM-Card Funct.	SM-Card Pin
-	(5V) 2	V_{cc} = 3.3V	22
P86	4	-CE	21
P80	6	-RE	20
(F8-5)	8	R/-B	19
-	10	GND	18
(F8-6)	12	LVD / 3.3V	17
P67	14	I/O_7	16
P66	16	I/O_6	15
P65	18	I/O_5	14
P64	20	I/O_4	13
-	(5V) 22	V_{cc} = 3.3V	12
F8-3	SMC_in2 24	-	-
F8-4	-HWP 26	-	-



SmartMedia Card

SM-Card Pin	SM-Card Funct.	SM-Adapter Pin		TEC-1000 I/O
1	V_{ss} = GND	1		-
2	CLE	3		P83
3	ALE	5		P82
4	-WE	7		P81
5	-WP	9		-Reset
6	I/O_0	11		P60
7	I/O_1	13		P61
8	I/O_2	15		P62
9	I/O_3	17		P63
10	V_{ss} = GND	19		-
11	V_{ss} = GND	21		-
-		23	SMC_LED	F8-2
-		25	SMC_in1	F9-6

➡ Non-Standard Feature on SM-Cards

R/-B Ready / -Busy signalizes the actual access readiness of the SmartMedia memory.
1=Ready, 0=Busy
Query is done by reading **XPort F8, Bit 5**

-WE Write Enable, low active
Signalizes write access on the SmartMedia memory (Addr, data or command).

-RE Read Enable, low active
Signalizes read access on the SmartMedia adaptor (Data and status).

ALE ADR Latch Enable, high active
Signalizes transfer of an address to the SmartMedia memory.

-CE Chip Enable, low active

CLE Command Latch Enable, high active
Signalizes transfer of a command to the SmartMedia memory.

The pinning of this connector allows a direct 1:1 cabling of the SmartMedia adaptor to the TEC-Eurocard computers and the dataloggers of the DL7000 series.

In the SmartMedia adaptor the 5V (Tiger) to 3.3V (SmartMedia Card) signal conversion is already done. Likewise the 3.3V operation voltage for the storage medium is supplied.

Further informations to SmartMedia memory cards, functions and memory concept:

➡ see SmartMedia manufacturer informations (Samsung, Toshiba, ...)

➡ Device driver, sample applications and resuming datasheets for download available at:
www.wilke-technology.com