VME to II/O Interface Unit

Technical Documentation

BECKHOFF
INDUSTRIE ELEKTRONIK
Eiserstraße 5 phone: +49(0)5246/963-0
33415 Verl fax: +49(0)5246/963-149

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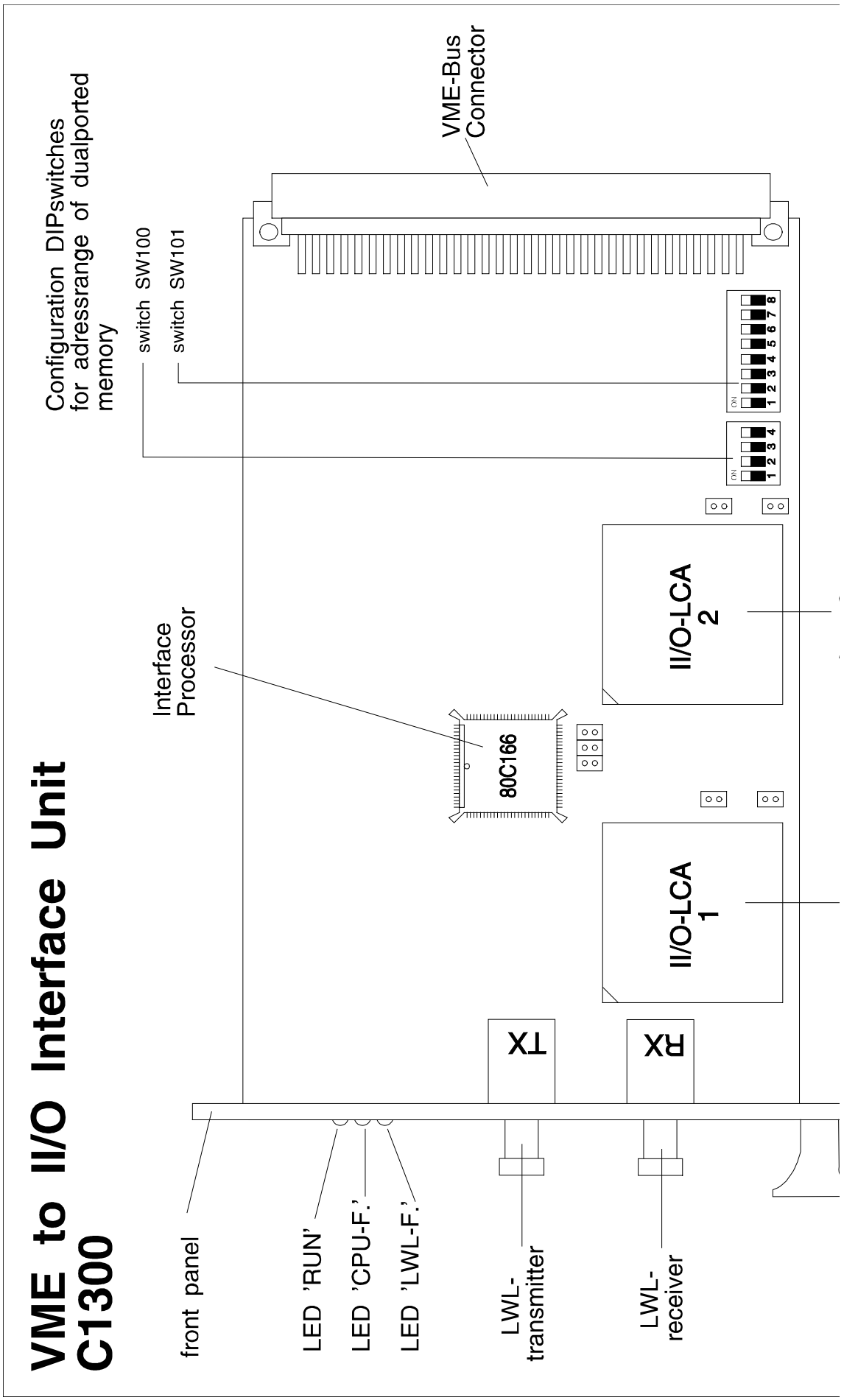
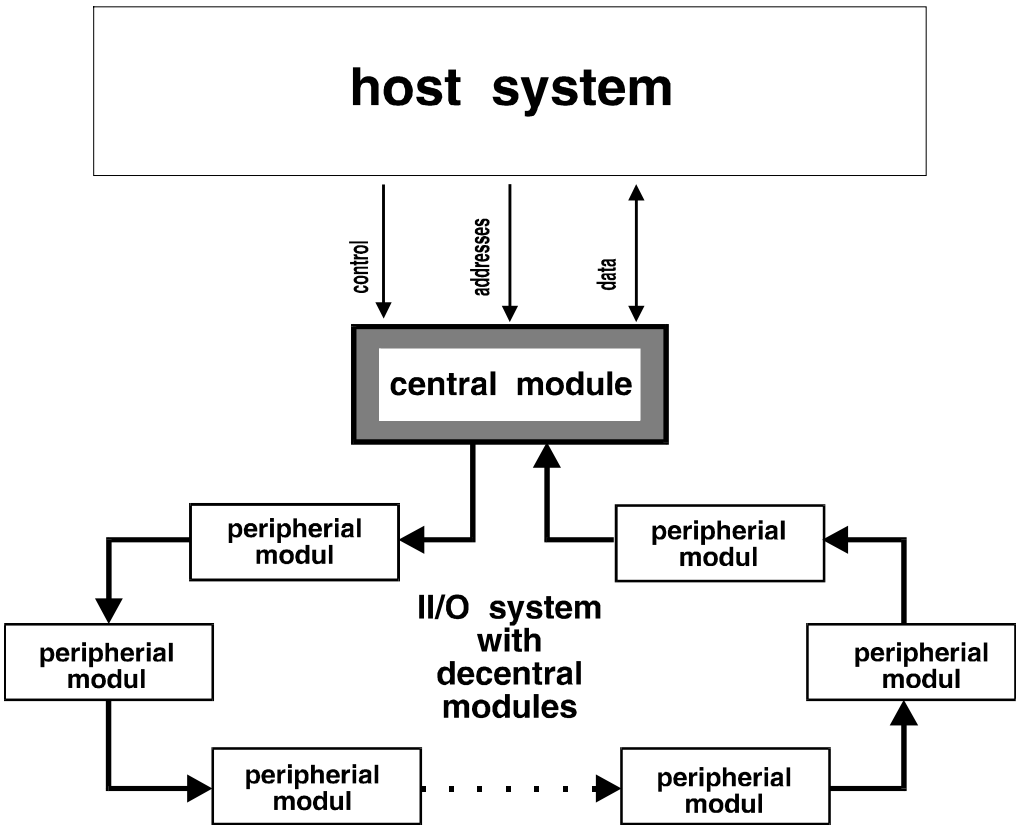

VME to II/O Interface Unit
C1300
front panel
LED 'RUN'
LED 'CPU-F.'
LED 'LWL-F.'
LWL-transmitter
LWL-receiver
TX
RX
II/O-LCA 1
II/O-LCA 2
80C166
Interface Processor
switch SW101
switch SW100
Configuration DIPswitches for adressrange of dualported memory
VME-Bus Connector

1. System Description

1.1 The Beckhoff II/O System

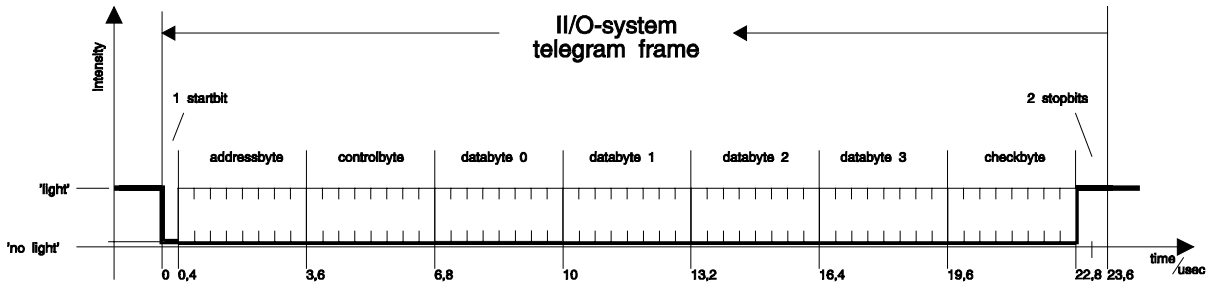
the Beckhoff Industrial Input Output System, which is abrevated II/O System, consists of a smart central modul and a field bus that is based on fiber optics. Picture 1 shows an overview of the II/O system.



picture.1

The connection of the II/O system to the host system is established by a DPRAM. This is providing fast and comfortable communications.
The processing of the diverse signal states is supported by several II/O peripheral modules, which are linked in a ring structure.The use of fiber optics minimizes the sensitivity for interferences and allows a high transmission rate of 2.5 MBd. Errors, occuring in the FO--ring, will be detected and reported to the host system by the central module. Functions implemented for ring diagnosis, enable quick detection and correction of errors.
There is a speed and simplicity optimized communications protocol which, in the further course of this documentation, will be called a telegram.
Communications on the FO-ring are controlled by the central module. This module will send telgrams, that pass each of the modules in the FO-ring and are eventually received and checked.

A telegram consists of a frame and the contents.



picture 2: Telegram structure of the II/O-System

The frame is needed for serial and asynchronous data communications. There is a single start bit, 6 CRC check bits and 2 stop bits. The frame is created and checked by the hardware, so that there is no need for additonal software support.

The contents of the telegram is mainly organized for each byte.
AD0 - AD7 create the address field.Using this address field up to 254 modules can be addressed (Address 00h and 0fh are reserved.).
CR0 - CR3 define the type of telegram. Following functions can be defined in the telegram:

CR3	CR2	CR1	CR0	Function	Beschreibung
0	0	0	0	READ	The modul addressed writes the entry data into the Data fields D0 - D3 .
0	0	0	1	READ/WRITE	The modul addressed writes the entry data into the Data fields D0 - D3 and loads the Ausgangsinformation.
0	0	1	0	ADDRESS INITIALIZITION	The module addressed loads the contents of D0 as a module address und sets D0 = 0.
0	1	0	0	ADDRESS CHECK AND COUNT COMMAND	Each module passed increases the contents of D0 by 1. The module addressed is loads the contents from D0 into D3.
1	0	0	1	LOW INTENSITY COMMAND	The module addressed reduces the transmission intensity by 20%.

picture 3:Controlfield

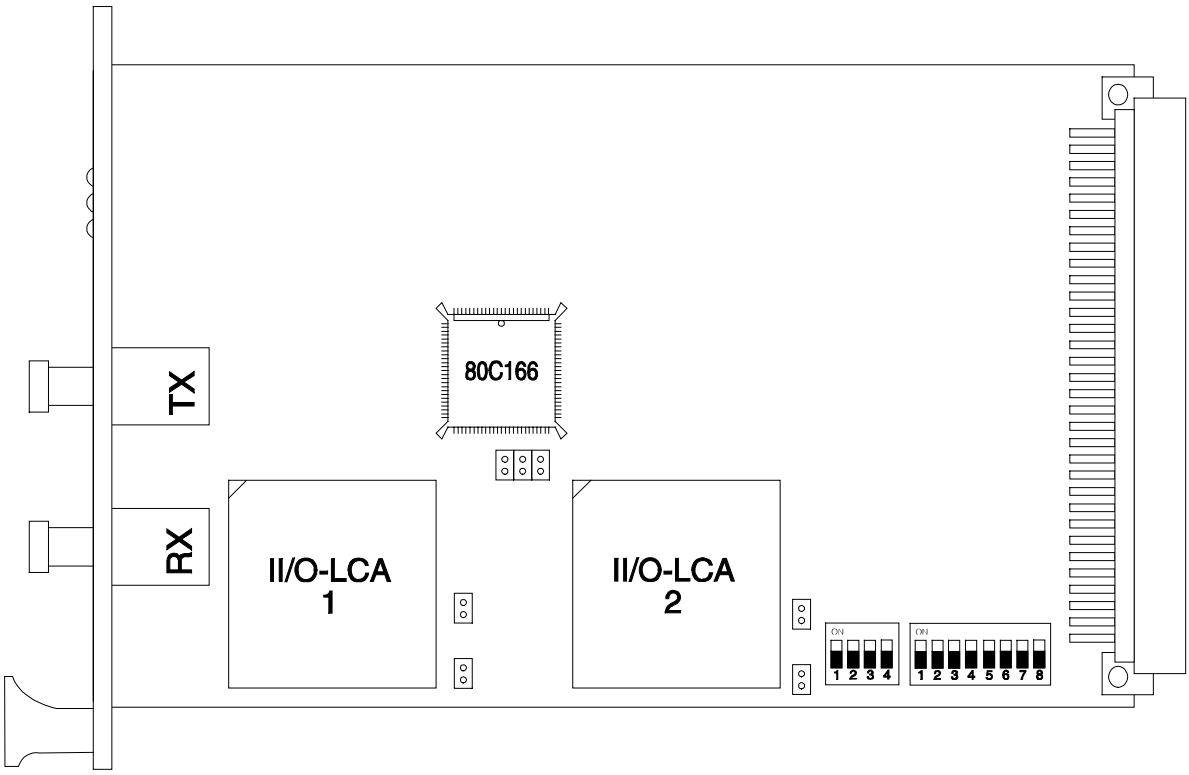
Byte D0 - D3 contain the actual Data to use. The processing of this data is determined by the controll field.
The last Byte in a telegram contains two spare bits and 6 bits to create a CRC checksum. The contents, having a length of 50 bits, achieves a Hamming distance of d = 3.

The Beckhoff II/O fieldbus consists of a physical ring, that can be split into 8 logical rings in order to process the signal states. A logical ring can only be run on preselected modules, which are defined by Communication Description Lists (CDLs) or freely programmable comunications. Later in this text the way this definitions are transmitted will be delt with.
The host system is provided with the signal states via the DPRAM, which can be divided into 3 areas.

-*Data* :	Input , output
-*Communications* :	Initialization, test, analysis and configuration of the II/O-Systems
-*Process control* :	Refresh of signal states

The central module needs an area of 4 Kbyte in the address space of the host system.

2. Function Description Hardware



C1300

The central module C1300 is a smart port for communications between the II/O-System and the VMEbus. There is a 2k*8 dual ported SRAM for comunications between the II/O -System and the VMEbus. It is addressed directly through the VMEbus. The VMEbus slave interface has the following properties:

* AMO's: Standart Supervisory Program Access
  Standart Supervisory Data Access
  Standart Non-Privileged Program Access
  Standart Non-Privileged Data Access

* A24/D16 and A24/D08 - Slave according to VMEbus Rev.C1, no block-transfer

* D08 Interrupter according to VMEbus Rev.C1

3. Function Description Software

3.1. About the Software

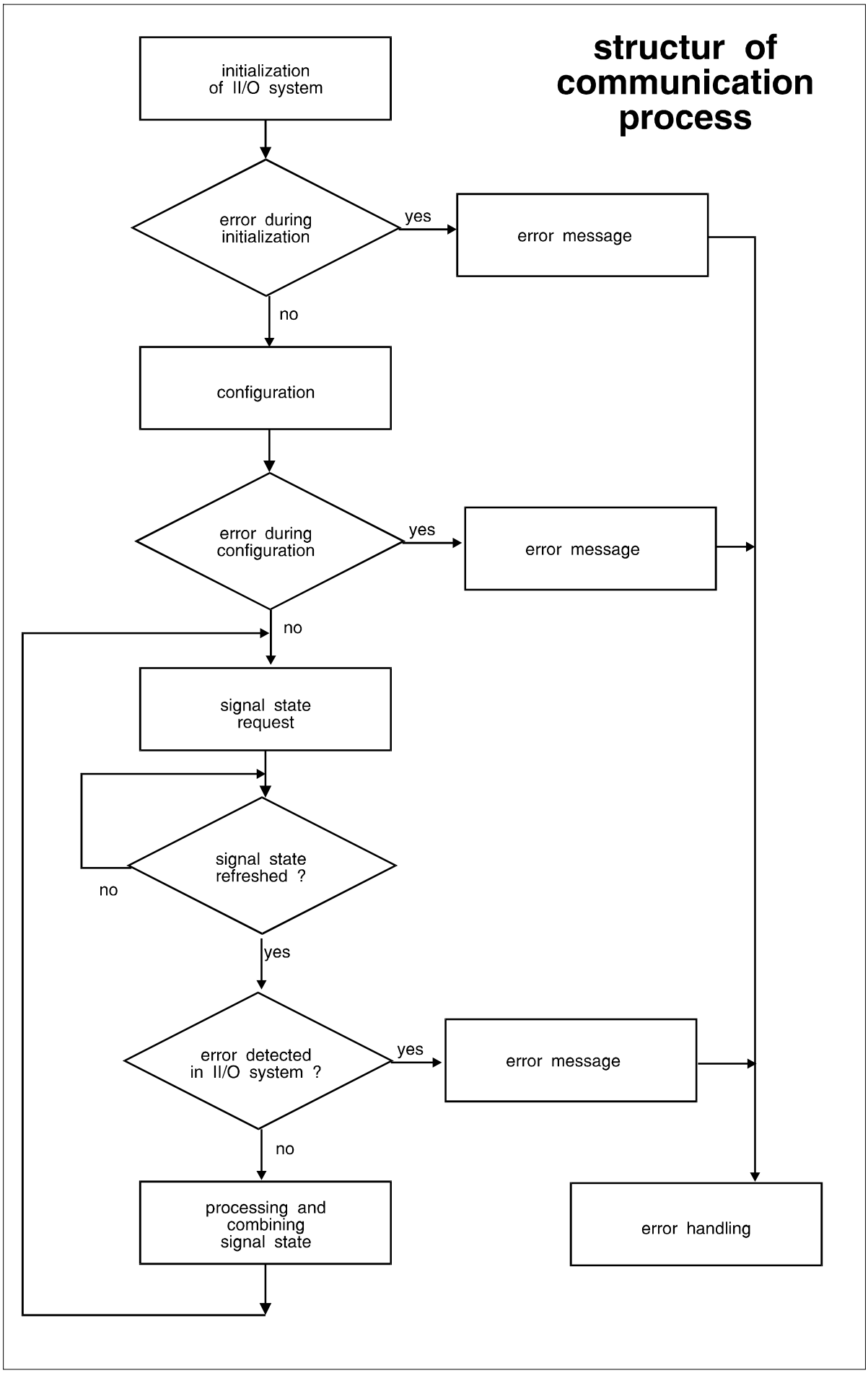
Address space (hex)	Funktion
000 - BFF	Data area (input, output) 3 kByte
C00 - CFF	Handshake-channel 0 : VME -> C1300 (configuration, test, analysis)
D00 - DFF	Handshake-channel 1 : C1300 -> VME (configuration, test, analysis)
E00-FF9	reserved
FFA - FFF	GCB (General Control Block) (demand, ready und error mask)

Overview : Distribution of the port's workspace.

The port between VMEbus and C1300 module enables the following functions:

- Data exchange of signal states
- Test- und analysis functions for II/O-System
- Configuration
- Control of signal states

The II/O System can be configurated through the comunications channels by 4 functions. This way the input and output lines are distributed to the addresses in the DPRAM. The communications channels can also be used to reach nine more functions for testing and analysis.
The lower 2 Kbyte area, which is used by the C1300 module in the VME address space, is the place for the data areas of the CDLs. The call to refresh the signal states is done by setting a bit in the demand mask of the GCB (General Control Block). The ready message can be taken from the predefined bit in the ready mask of the GCB.


structur of communication process
initialization of II/O system
error during initialization
yes
error message
no
configuration
error during configuration
yes
error message
no
signal state request
signal state refreshed ?
no
yes
error detected in II/O system ?
yes
error message
no
processing and combining signal state
error handling

3.2. Description of the Handshake Channels

Communications between VMEbus and C1300 are supported by two channels, which contain 255 bytes. The VME master writes the data, needed to run a certain function, to channel 0 and then transmitts a DV (data valid) signal. When the module has received all of the data, it will send the "Quit" signal. The VME master erases the DV signal and as soon as the "Quit" signal is set to zero, new communications can be started.

Channel 0 leading from the VMEbus to the C1300 module has an address range from C01h to CFFh. DV is the MSB of address C00h. "Quit" is the second highest bit of address D00h.

Handshake-Channel 0 :

Byte 0 COO_h	Byte 1	.....	Byte 254	Byte 255 CFF_h

Channel 1 leading from the VMEbus to the C1300 module has an address range from C01h to CFFh. DV is the MSB of address C00h. "Quit" is the second highest bit of address D00h.

Handshake-Channel 1 :

Byte 0 $D00_h$	Byte 1	.....	Byte 254	Byte 255 DFF_h

Address	Address Bits								Contents
(hex)	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	
C00	1	x	0	0	0	0	0	0	'Data Valid' of channel 0 (for Data transfer VME -> C1300)
C00	x	1	0	0	0	0	0	0	'Quit' of channel 1 (for Data transfer C1300 -> VME)
C01									Length (from 2 to FE_h)
C02									Function number (1 bis FE_h)
C03									Argument 0
..									..
Cnn									Argument n
..									..
CFF									..
D00	1	x	0	0	0	0	0	0	'Data Valid' of channel 1 (for Data transfer C1300 -> VME)
D00	x	1	0	0	0	0	0	0	'Quit' of channel 0 (for Data transfer VME -> C1300)
D01									Length (from 2 to FE_h)
D02									Function number (1 to FF_h)
D03									Argument 0
..									..
Dnn									Argument n
..									..
DFF									..

Addresses of Handshake Channels

Handshake sequence :

:0C00	80h	Data Valid VME-Master = 1
:0D00	40h	Data ACK C1300 = 1
:0C00	00h	Data Valid VME-Master = 0
:0D00	00h	Data ACK C1300 = 0
. . .		function process
:0D00	80h	Data Valid C1300 = 1
:0C00	40h	Data ACK VME-Master = 1
:0D00	00h	Data Valid C1300 = 0
:0C00	00h	Data ACK VME-Master = 0

Functions provided are :

No. (hex)	**Function**
01	LWL-RESET
02	codewort request
03	softwareversion request
04	reserved
05	absorbtion test
06	count modules
07	address test
08	continuous transmission
09	software-RESET
0a	fraction test
0b	transmission of free programmable communications
0c	reinitializiation of CDL management
0d	reserved
0e	reserved
0f	transmission of interrupt mask
10	transmission of CDL configuration
ff	reserved

A function call consists of a length, a function number and the arguments of the function. The length is calculated by number of the following bytes.
:

Byte ’Length’ + Byte ’function number’ + Number of Bytes ’Argument 0’ up to ’Argument n’

In case a reserved function or a function that is not available is called, the response to this call is the error function ffh.

3.3. Test and Analysis Functions

Function 01_h : FO-RESET

This function initialzes the fo-ring.In the course of the initialization the number of modules in the ring is detected, the module addresses are distributed and tested. Finally the ring is tested for its (Dämpfungsreserve). A fraction that could occur in the cable is detected and localized.

channel	length	function	argument 0	argument 1	argument 2	comment
call	02	01				
response	05	01	00	00	nn	Function worked properly (nn modules in the fo-ring)
	05	01	01	01	00	Maximum of transmission repetitions exceeded
	05	01	01	02	00	No addressing possible
	05	01	0a	01	nn	Fraction before module nn, before receiver line in of module C1300
	05	01	0a	01	ff	Fraction cannot be localized (fraction before line in of receiver)
	05	01	07	01	nn	Test addresses : Address error (modul nn)
	05	01	05	02	00	Absorbtion test : error at High-Intensity
	05	01	05	03	nn	Absorbtion test : Error switching low intensity (modul nn)
	05	01	05	04	nn	Absorbtion test : Error at data pattern 1 (pattern 00) (module nn)
	05	01	05	05	nn	Absorbtion test : Error data pattern 2 (pattern FF) (module nn)
	05	01	05	06	nn	Absorbtion test : Error data pattern 3 (pattern AA)(module nn)
	05	01	05	07	nn	Absorbtion test : Error switching high-intensity (module nn)

If the ring initialization is completed and no errors occured, the present number of modules in the ring is transmitted. If an error was detected, the error type (see table) and the modul addresses of the error detecting module are returned.

Funktion 02_h : Code word request

After each reset the code word is transmitted through the handshake channels by the C1300 module. This is done without setting the data valid bit. The code word is used to report that the C1300 module is initialized and ready to work to the VME system. At any time the code word can be requested by function 02h.

channel	length	function	argument 0	argument 1	argument 2	comment
call	02	02				
response	04	02	af	fe		codeword correct

Function 03_h : Softwareversion request

Function 03h is used to request the the version of the EPROM firmware.

channel	length	function	argument 0	argument 1	argument 2	comment
call	02	03				
response	04	03	xx	xx		version xxxx

Function 05_h : Absorbtion test

The light absorbtion of the fo-ring can be tested by means of this function. In this test all connection cables of the fo-ring are partially run at about 80 % of the normal transmission intensity using specified test telegrams. This test can be run on all modules or on a single one selected before (shown in the figure below). The C1300 interface can be tested seperately or through module address 0.

" Error at high intensity " means: The ring has even in a normal run an absorbtion that is too high or a fraction of cables or connection occured.

" Error switching Low intensity " means, that the transmission intensity of the module concerned cannot be reduced.

"Error at data pattern xx " shows up that in the fo-ring absorbtion is too high, after the signal passed the last module .

" Error switching high intensity " means the module concerned cannot be reset to full transmission intensity.

This figure shows an overview of the function call and responses possible.

channel	length	function	argument 0	argument 1	argument 2	comment
call	04	05	00	00		test all modules
	04	05	01	nn		test module nn
response	04	05	00	00		there is sufficient absorbtion (*)
	04	05	02	00		error at High-Intensity
	04	05	03	nn		error switching Low-Intensity (module nn)
	04	05	04	nn		error at Data pattern 1 (pattern 00) (module nn)
	04	05	05	nn		error at Data pattern 2 (pattern FF) (modul nn)
	04	05	06	nn		error at Data pattern 3 (pattern AA)(module nn)
	04	05	07	nn		error switching High-Intensity (Modul nn)

Funktion 06_h : Count Modules

By means of this function the number of modules in the ring can be detected.

channel	length	function	argument 0	argument 1	argument 2	comment
call	02	06				
response	04	06	00	nn		count modules : nn modules in the ring
	04	06	01	00		count modules : ring interrupted

Funktion 07_h : Address test

This function is used to prove if the modules still hold the address, they received when they were initialized.

channel	length	function	argument 0	argument 1	argument 2	comment
call	02	07				
response	04	07	00	00		addresses correct
	04	07	01	nn		error at address nn

In order to keep a maximum of safety for the system, this function is even run resident when the system is working normally. In case an error is detected a message is transmitted through the GCB to the VME system.

Funktion 08_h : continuous transmission

This function only controls the "cycle"-LED on the modules.This way it is possible to find out how many modules are still connected to the transmission output of the C1300. This function is only supposed to be activated, if there is no satisfying result from the function 0ah (fraction test).The only way for the software to stop continuous transmission is a reset .

channel	length	function	argument 0	argument 1	argument 2	comment
call	02	08				
response	03	08	01			constant transmission can be stopped by reset

While continuous transmission is working the functions 05h to 07h and 0ah are inhibited.

Funktion 09_h : Software-RESET

This Function is used to to reset the C1300. Apart from reinitializing fo-ring the controller and the dual port RAM are reinitilized too.The finished reset is quitted, transmitting the codeword without a data valid.

The software reset is only executed, after the data quit bits in handshake channel 1 and the data valid in handshake 2 were removed.

channel	length	function	argument 0	argument 1	argument 2	comment
call	02	09				
response	04	02	fe	af		

Funktion $0a_h$: Fraction Test

This function can be used to localize fractions in the fo-ring.The function evaluates the result and then returns the number of Boxes in the ring or the place of the fraction.

channel	length	function	argument 0	argument 1	argument 2	comment
call	02	0a				
response	04	0a	00	nn		no fractions, nn modules in the ring
	04	0a	01	nn		fraction before modul nn and before the line in of the receiver of module C1300
	04	0a	01	ff		fraction cannot be localized (fraction before receiver line in)

in case the fraction cannot be localized, the probable location is between the last module and the receiver line in of the C1300.

Funktion $0ff_h$: Wrong Function

in case there is a function call through handshake channel 0 and the function is reserved or not available,it is returned with function 0ffh, which has as argument 0 the wrong function number.

Example:

channel	length	function	argument 0	argument 1	argument 2	comment
call	03	04	01			call of function 4 (reserved)
response	03	0ff	04			

3.4. Configuration

There are four functions to describe the configuration, assignments of the input and output lines of the II/O System for the addresses in the DPRAM, and assignment of modules to the process groups.For the transmission of configurations handshake channels are used as well. At the beginning of every new configuration the managing part of communications is to be reinitialized.
Communications can either be configured as CDL communications or as free programmable communications.

Funktion $0c_h$: reinitialize communication management

The CDLs as well as the free programmable communication consist of two parts a data and a managing part. Before a new communication is transmitted the managing part must be reset.This is done by activating the function 0ch.

channel	length	function	argument 0	argument 1	argument 2	comment
call	02	0c				
response	02	0c				

Example:

3.4.1. CDL-Communication

A CDL is created for each group of modules, whose signal states are to be activated together.This CDL consists of so-called descriptors. A descriptor describes a telegram for a module (message) and is built up as follows:

Bytes	Inhalt
0,1	II/O-module addresse (1 - FE)
2,3	Control word : Bit 4 : 0 = READ; 1 = WRITE Bit 5 : 1 = address initialization Bit 6 : 1 = address count command Bit 7 : 1 = switch to low intensity
4,5	Pointer to byte for output in D0 of a message
6,7	Pointer to byte for output in D1of a message
8,9	Pointer to byte for output in D2 of a message
10,11	Pointer to byte for output in D3 of a message
12,13	Pointer to byte for input in D0 of a message
14,15	Pointer to byte for input in D1 of a message
16,17	Pointer to byte for input in D2 of a message
18,19	Pointer to byte for input in D3 of a message

Example of a descriptor:

Telegram to II/O-module 1 : D0 - D2 output line
D3 input line

The data for output in D0 - D2 is loaded from the addresses 400h, 302h and 210h of the DPRAM.
The Date for the input in D3 is stored at address 30h of the DPRAM.

Bytes	**Inhalt**
0,1	01_h,00_h
2,3	10_h,00_h
4,5	00_h,04_h
6,7	02_h,03_h
8,9	10_h,02_h
10,11	ff_h,ff_h
12,13	ff_h,ff_h
14,15	ff_h,ff_h
16,17	ff_h,ff_h
18,19	30_h,00_h

Funktion 10_h: Transmit CDL-Configuration

The CDLs described above are split into parts, so that they can be transmitted through the handshake channel 0. The information for a message should not be split in this process. Transmission can be activated by function 10h

channel	**length**	**function** (hex)	**empty**	**argument 0**	**argument 1**	**argument 2**	**...**	**argument n**
call	nn	10	00	aa	bb	db1,0		dbn,19

channel	**length**	**function**	**argument 0**	**argument 1**	**argument 2**	**comment**
response	04	10	aa	00		o.k.
	04	10	aa	01		CDL data error (e.g.: Pointer outside Data area of DPRAM)
	04	10	aa	02		CDL overflow

aa	00 = start of CDL transfers 01 = further Descriptors of the same CDL 02 = last transmission of the same CDL
bb	signal state No. bb (0 - 7)
db1,0	desciptor 1, byte 0 of a CDL
...	...
dbn,19	desciptor n, byte 19 of a CDL

Transmissions of module addresses, control byte and pointer to data bytes are established in Intel Notation (lower Byte to lower address).

3.4.2. Free programmable Communication

This way of communication is done by storing telegrams at a predefined address of the DPRAM, and combining them together to create a process image. The input data is transmitted to the VME interface to a predefined address.

Funktion $0b_h$: Initialization of free programmable communication

This function is used to transmit the parameters, needed for initialization, to the C1300.

channel	length	function	empty	argument 0	argument 1	argument 2	argument 3
call	09	0b	00	ssn	nt	oa 0,1	ia 0,1

channel	length	function	argument 0	comment
response	03	0b	00	ok
	03	0b	01	error

ssn	signal state number
nt	number of telegrams
oa 0,1	base address output area
ia 0,1	base address input area

The base address output area defines the area in the DPRAM, where the self defined telegrams are stored. Only address byte, control byte and four data bytes are stored. There is no check byte stored. This is done internally by the controller. Beginning at the base address input area address byte, control byte and entry data are stored.

Example:

Initialization of communication 3 as a free communication with 2 telegrams. Base addres for the output area is 400h base address for the input area is 210h

channel	length	function	empty	argument 0	argument 1	argument 2	argument 3
call	09	0b	00	03	02	00,04	10,02

channel	length	function	argument 0	comment
response	03	0b	00	ok

using this structure there is the possibility of a run-time change of module address and control byte. But this is restricted to phases when there are no active communications.

Function 12_h: Free running communication

Function $\mathbf{12_h}$ enables a free running communication, which is executed by the interface without a trigger of the VME system. The usual handshake to synchronize communication and process image control via the GCB is not necessary.

Channel	Length	Function	Argument 0	Argument 1
Request	04	12	k	pan

Channel	Length	Function	Argument 0	Comment
Reply	03	12	00	00 says: ok
	03	12	01	01 says: erroneous data

with:

pan	process image number
k	Command code 0 = disable free running communication 1 = enable free running communication

It is highly recommended to use this mode only with byte - oriented I/O functions, due to the fact that no deterministic behaviour exists between request and response data and between two adajcent read or write access events of the VME Master: The process image data might result from different communication cycles.

3.4.3. Initialisation of "Fast Fiber Optic - Interrupts"

Function $0f_h$: Transmit interrupt request mask

The interface C1300 has 4 interrupt channels to transmit the 4 interrupt channels of the II/O-Lightbus to the VME master via the GCB block.

The interrupt bits are generated by any module of the II/O Lightbus in any occuring telegram frame. The IR- bit field of the control byte transports the interrupt requests to the interface.

With the help of function $0f_h$, the interface C1300 is configured. It is possible to enable a number of interupts from the four channels and to specify the signal type to generate an interrupt request transmission from the C1300 interface to the VME system.

Channel	Length	Function	Argument 0	Argument 1	Argument 2	Argument 3	Argument 4
Request	07	0f	0m	Criterium Interrupt-Channel 0	Criterium Interrupt-Channel 1	Criterium Interrupt-Channel 2	Criterium Interrupt-Channel 3
Response	03	0f	0m				

The LOW - nibble in argument 0 specifies, which of the 4 possible Interrupt channels are enabled.

Example:

$m = 00_h$	all interrupt channels disabled (default)
$m = 01_h$	interrupt channel 0 enabled
$m = 06_h$	interrupt channels 1 and 2 enabled
$m = 0f_h$	interrupt channels 0, 1, 2 and 3 enabled

Every single interrupt channel can be characterized with signal criteria.

Following criterias can be definded:

Criterium	Argument code
no interrupt	0
interrupt at signal rise	1
interrupt at signal fall	2
interrupt at signal toggle	3

The argument codes 0 to 3 are defined in the function parameters Argument 1 to 4 for the equivalent interrupt channels.

Example:

Channel	**Length**	**Function**	**Argument 0**	**Argument 1**	**Argument 2**	**Argument 3**	**Argument 4**
Request	07_h	$0f_h$	$0c_h$	00_h	00_h	01_h	03_h

Enable interrupts for channels 2 and 3

Interrupt criterium for interrupt channel 0
no interrupt transmission

Interrupt criterium for interrupt channel 1
no interrupt transmission

Interrupt criterium for interrupt channel 2
Interrupt transmission at signal rise

Interrupt criterium for interrupt channel 3
Interrupt transmission at signal toggle

Important remark:

To enable interrupt transmisson from the C1300 interface to the VME system, the interrupt level mask and the interrupt vector register of the GCB have to be defined.

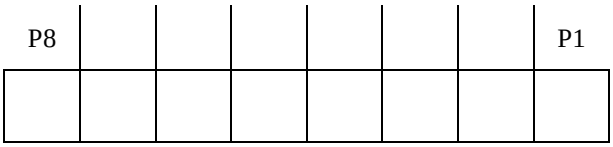
3.5. Signal state control functions

The General Control Block is used for controlling the refresh of a single signal state. It will be refreshed and, through the ready mask, reported ready by setting the corresponding bit in the call mask. After it was reported ready the bit must be cleared from the call mask, only then communications can be started again. The refresh of signal states can be interrupted. When there is a refresh in process and if there is a refresh of a higher priority called in the call mask, the process is interrupted.
In case errors are detected in the fo-ring in a normal system run, the corresponding bits in the error mask are set.

Address (hex)	**Contents**	**Comment**
0FFF	call mask	
0FFE	IRQ-output	
0FFD	ready mask	
0FFC	IRQ-input	
0FFB	write protection	The value 02_h removes the write protection
0FFA	error mask	
0FF9	-	reserved for later use
...	-	- " -
0FF1	VMEbus Interrupt Vector	Vector numbers 0h-FFh for D08 interrupter
0FF0	VMEbus Interrupt Level	2h = IRQ1,4=IRQ2 80h=IRQ7 mask register

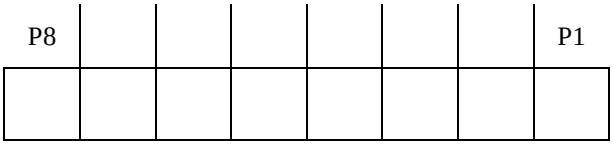
General Control Block

call mask:



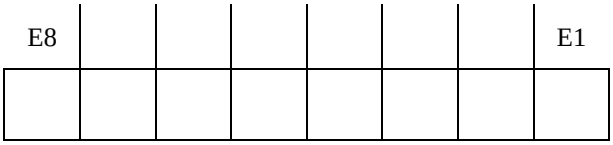
<- - priority

ready mask:



with : P8 => process 08,
.....,
P1 => process 01

Error mask:



Error mask. Bit 0 set = normal error
Error mask. Bit 1 set = address error with addresscheck

Write protection:

DPRAM operations of the VME system must be enabled by deactivating the write protection. By writing a 02h the write protection remains removed, until a different date is written.

IRQ Data out:

-	-	-	-	IO3	IO2	IO1	IO0

If the VME system modifies this mask it will be transmitted into the interrupt field. The nibble will be transmitted into the interrupt field, untill it is removed by the VME system.

IRQ Data in:

-	-	-	-	II3	II2	II1	II0

If a peripheral module generates an address-independent interrupt and if this interrupt is released by the interrupt mask, it is transmitted through this mask to to the VME system.
Queueing interrupts are buffered by the C1300, i.e. there is only one interrupt at a time transmitted through the GCB to the VME system. Only after this one was recognized by the VME system ,the next interrupt can be transmitted

VMEbus interrupt vector and interrupt level register:

The C1300 includes a D08-VMEbus Interrupter. The interrupt vector may be dynamically loaded at address 0FF1h and transfered to the VMEbus at the next valid IACK-cycle.The interrupt level can be programmed at address 0FF0h. Only one interrupt level should be activated at one time. Bit 0 of the interrupt level register has no meaning.

4. Technical Data

Port prozessor	Siemens SAB 80C166-S
Data connections	Beckhoff II/O Lightbus system
Transmission rate	2,5 MBaud, 32 Bit of informations in 25 µsec
Power supply	from the VME Bus
Size	PCB dimensions 100 mm x 160 mm Front panel width about 20 mm

5. Installation

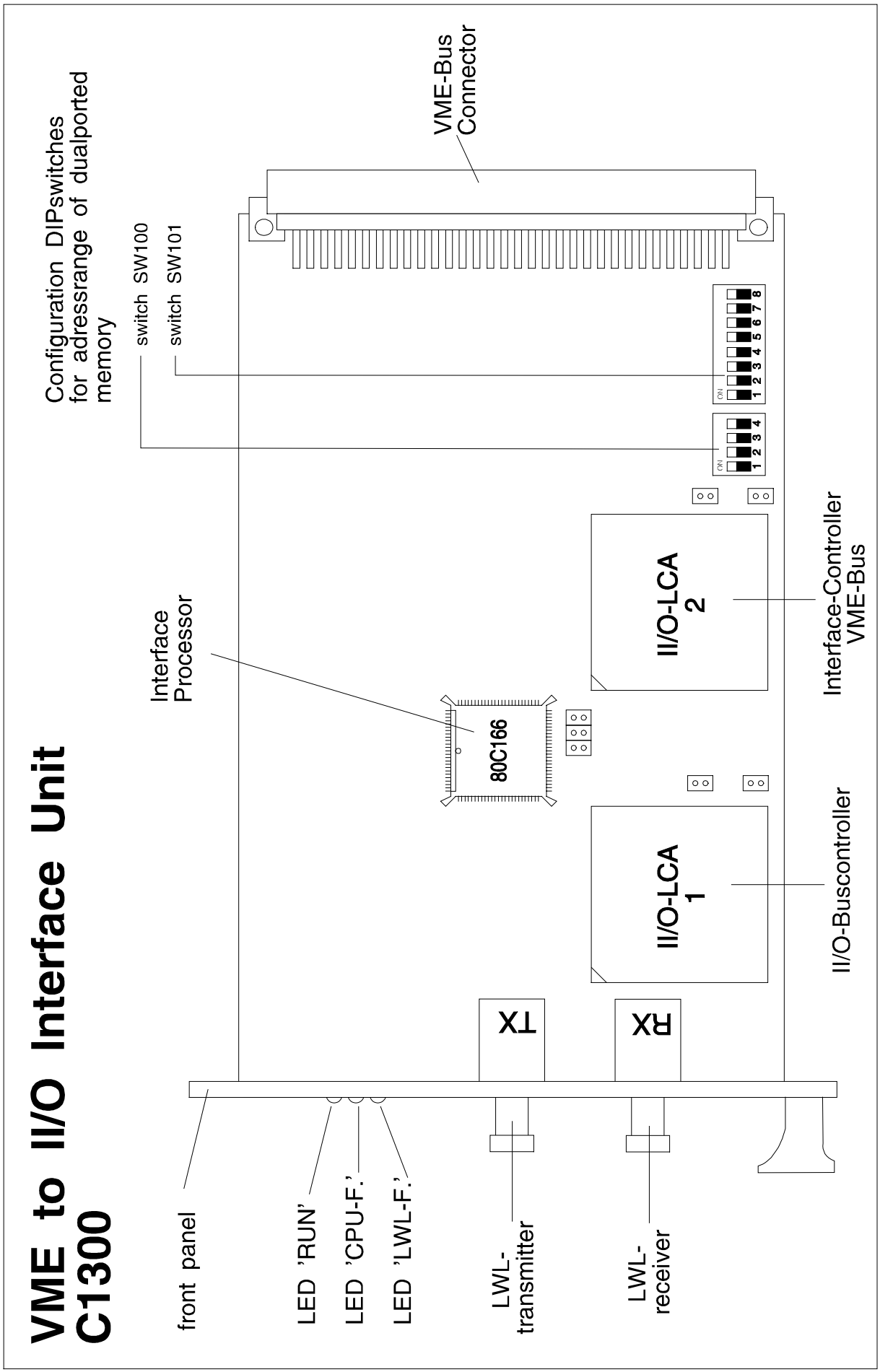
5.1. Configuration

The central module C1300 needs only a single slot and can be installed in 3-HE and 6-HE VMEbus crates. The connection to the II/O-system is established by two FO-plugs through the front. The adjustment of the base address for the 4 kByte workspace occupied in the VME address space is to be done by two DIP switches. The whole 16 MByte address space of the VME system can be selected in the A24 mode as mapping area.
The switch positions represent the address lines A12-A23:

Switch:	SW100				SW101							
	1	2	3	4	1	2	3	4	5	6	7	8
Address Bit:	12	13	14	15	16	17	18	19	20	21	22	23

The switch position ”on” represents a logic 0, ”off” represents a logic 1.

Switch :		***SW 100***				***SW 101***								**Address**
		1	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
Position	*on*					*	*	*	*	*	*	*	*	00 0000h - 00 0fffh
	off													
	on					*	*	*	*	*	*	*		10 0000h - 10 0fffh
	off												*	
	on					*	*	*	*	*	*		*	20 0000h - 20 0fffh
	off											*		
	on					*	*	*	*	*	*			30 0000h - 30 0fffh
	off											*	*	
	on	*	*	*		*	*	*	*	*	*	*		80 8000h - 80 8fffh
	off				*								*	
	on													ff f000h - ff ffffh
	off	*	*	*	*	*	*	*	*	*	*	*	*	


VME to II/O Interface Unit
C1300
front panel
LED 'RUN'
LED 'CPU-F.'
LED 'LWL-F.'
LWL-
transmitter
LWL-
receiver
TX
RX
II/O-Buscontroller
II/O-LCA
1
II/O-LCA
2
Interface-Controller
VME-Bus
Interface
Processor
80C166
Configuration DIPswitches
for adressrange of dualported
memory
switch SW100
switch SW101
VME-Bus
Connector

5.3. Installation on the VME Card Cage

1. Switch off the VME system and external power supply.
2. The module is installed in a slot of the VME Card Cage

A VME system run will also start the C1300. But before running the C1300, all fiber optic connections have to be established and the C1300 must be configurated correctly.