HZB Helmholtz Zentrum Berlin

CARESS Document Set

Hardware Descriptions

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Abstract: This document, part three of the CARESS document set, lists all the hardware modules available for CARESS. It is a complete reference and meant as a guide howto handle and modify the CARESS hardware configuration file. Each device description is completed by a 'real world' example line. This document is part three of the CARESS documenation and updated on regular basis.

Inhaltsverzeichnis

1 Introduction

1.1 Tabular Hardware Description

Instrument devices to be controlled by CARESS, e.g. motors, counters, power supplies, temperature control, etc., are defined in a tabular format in the text file hardware_modules_xx.dat (e.g. for E1 hardware_modules_e1.dat).
The columns of this table are:

name: name of a device as defined by CARESS (like OMGS, MON, ...) or a user selected name of at most 8 characters.

kind: CARESS defined number identifying the kind (type) of a device.

addr1: CARESS defined number identifying the bus (CAMAC, VME, GPIB, ...) which connects the device to the computer system.

addr2: further bus dependend address information.

addr3: further bus dependend address information.

val1 .. val15: up to 15 device dependend parameters, e.g max. velocity of a motor, the number of a curve used by a temperature control, etc. Parameters at the end of the parameter list may be omitted and will be interpreted as 0.

Some template lines of such a file:

```
;server definition
;name kind
NALE1 1000

;Y70 counters
;name kind bus crate station
MON   19   1   2     16
TIM1  19   1   2     18

;Y66 motors
;name kind bus crate station ratio  vmax
TTHS  14   1   1     3       6400   10000
OMGS  15   1   1     5       12486  30000

;ICS GPIB interface
;name   kind  bus  RS232   unit#
GPIB0   104   4    tty00   0
```

```
;LakeShore temperature control
;name  kind  bus  unit#  GPIB#  reg#  sam#
TEMP   25    2    0      12     24    26
```

Rows (lines) starting with a ; (semicolon) are interpreted as comment, empty rows are skipped, every other row is interpreted as a device description. Every device of an instrument is defined by one row of this table. The maximal length of a row is 4096 characters. Take care that interface devices (like GPIB0 in the above template) are defined before used by devices linked to it (like TEMP in the above template). Unit numbers (unit#) of link interfaces of one kind (RS232, GPIB) must be different.

2 Identification Numbers

Each CARESS device is defined by a unique number. Bus systems are handled in the same manner with its own number set.

Tabelle 2.1: Identification Number of Bus

ID	Bus
1	CAMAC
2	GPIB
3	ST180
4	RS232
5	TCPIP
6	COMBO
7	MESYTEC
8	DIOBUS
9	NI
11	VME

Tabelle 2.2: Identification Number of Device Kind

ID	Kind	Description
1	counter	SCHLUMBERGER JEP 20
2	counter	NIDOS
3	motor	HARWELL DIGITIZER 71E41
4	CAMAC GPIB interface	KINETIC SYSTEMS KSC 3388
5	histogram	NUCLEAR ENTERPRISE NE 9082
6	(histogram)	CONTINUOUS DETECTOR
12	motor control multiplex	HMI ST180 (MUX2) (via CAMAC)
13	motor	controlled by MUX2
14	motor (abs. encoder)	HMI Y66
15	motor	HMI Y66
17	motor	BORER 1162
19	counter	HMI Y70
20	histogram	LECROY 3588 and 3587
21	digital input	KINETIC SYSTEMS KSC 3472
22	digital output	KINETIC SYSTEMS KSC 3075
23	temperature	ILL temperature control
24	power supply	DELTA ELEKTRONIKA SM 7020

Tabelle 2.2: Identification Number of Device Kind

ID	Kind	Description
25	temperature	LAKESHORE DRC-93Ca
26	E3 blind	via BORER 1032
27	multimeter	KEITHLEY DMM 199
28	temperature	JULABO IF1
29	V4 collimator	Boschen Oetting
30	V4 attenuator	Boschen Oetting
31	magnet	DRUSCH 10 E-5
32	temperature	LAUDA R61
33	V4 velocity selector	DORNIER
34	V4 DIO	BORER 1032
35	V4 beamstop changer	via HMI Y66
36	V4 selector lock	via BORER 1032
38	motor control multiplex	HMI ST180 (MUX3) (via RS232)
39	motor	controled by MUX3
40	E2 collimator changer	via MUX3 motors
41	power supply with polarity	Heinzinger TN and Ksc3075
42	E1 shutter	via KSC 3075
43	V4 flipper	HP 33120A and Rohde&Schwarz URE2
44	magnet	OXFORD INSTRUMENTS IPS 120
45	temperature	OXFORD INSTRUMENTS ITC 503
46	TCPIP connection	using socket
47	temperature, pressure	read via TCPIP
48	multimeter	HP 34401A
49	power supply	DELTA ELEKTRONIKA PSC 44M
50	power supply	BURSTER DIGISTANT 6706
51	temperature	EUROTHERM 2404/2408
52	voltmeter	ROHDE&SCHWARZ URE2
53	V5 velocity selector	DORNIER
54	magnet control	Delta Elektronika Psc44M & Ls450
55	power supply	HEINZINGER PTN
56	power supply	FUG NTN
57	magnetometer	LAWSON 201
58	SPODI histogram	MESYTEC PSD
59	counter	MESYTEC PSD
61	multimeter	KEITHLEY DMM 2010
62	temperature	HAAKE THERMOSTATE F6/N6
63	histogram	NI DIO 6534
64	V4 histogram	MESYTEC PSD
65	digital output	via GREEN SPRING IO24
66	ethernet GPIB interface	NI GPIB-ENET
67	voltmeter	ROHDE&SCHWARZ URE2
68	power supply	BRUKER BEC1
69	general switch	via DIO component(s)

Tabelle 2.2: Identification Number of Device Kind

ID	Kind	Description
70	low level GPIB	via any GPIB interface
71	temperature controller	Lake Shore 340
72	temperature controller	Julabo F25
75	GPIB-device	any GPIB-device
76	HV power supply	ISEG NHQ x0xx/x2xx high voltage controller
77	digital input	Beckhoff digital inputs via BK/BC9000
78	digital output	Beckhoff digital outputs via BK/BC9000
79	digital in-/output	Beckhoff digital in-/outputs via BK/BC9000
100	motor (abs. encoder)	HMI X13
101	counter	STRUCK STR 721
102	data acquisition	HMI DAU
103	motor (abs. encoder)	HMI X13
104	RS232 GPIB interface	ICS 4895
105	power supply	HEINZINGER TN
106	power supply	BRUKER MN 40/60
107	power supply	BRUKER MN 290/380
108	V5 velocity selector	MDR 14500390
109	one detector cell	using any multi detector
110	V5 chopper	DORNIER NCS
111	motor (multiple try)	HMI X13
112	power supply	BRUKER 2x80/80
113	histogram	JOERGER VSC 16/8
114	motor (abs. encoder)	EKF 44520
115	motor	EKF 44520
116	counter	JOERGER VSC 16/8
117	histogram	STRUCK STR 721
118	VIC Bus	CES VIC BUS
119	VME GPIB interface	IBF
120	digital IO	GREEN SPRING IO24
121	histogram	HMI X18
122	histogram	JULIOS (FZ JUELICH)
123	chopper	ASTRIUM (EADS)
124	chopper	FZ JUELICH
125	velocity selector	ASTRIUM (EADS)
500	gateway device	Generic CORBA device

3 Descriptions of Caress-Modules

3.1 SCHLUMBERGER JEP 20

Device:	SCHLUMBERGER JEP 20
Function:	counter
Kind:	1
Bus:	1 = CAMAC
Test program:	test_camac
Note:	obsolete

Column	Example	Description
name	MON2	
kind	1	
addr1	1	CAMAC Bus
addr2	2	crate#
addr3	20	station#
val1		
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;JEP 20
;name   kind  addr1  addr2  addr3
;name   kind  bus    crate  station
MON2    1     1      2      20
```

3.2 NIDOS

Device:	NIDOS0
Function:	counter
Kind:	2
Bus:	1 = CAMAC
Test program:	test_camac
Note:	obsolete

Column	Example	Description
name	TIM1	
kind	2	
addr1	1	CAMAC Bus
addr2	1	crate#
addr3	3	station#
val1		
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;NIDOS
;name   kind  addr1  addr2  addr3
;name   kind  bus    crate  station
TIM1    2     1      1      3
```

3.3 HARWELL DIGITIZER 72E41

Device:	HARWELL DIGITIZER 72E41
Function:	motor control
Kind:	3
Bus:	1 = CAMAC
Test program:	test_camac
Note:	obsolete

Column	Example	Description
name	OMGS	
kind	3	
addr1	1	CAMAC Bus
addr2	2	crate#
addr3	12	station#
val1		
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val11		
val14		
val15		

hardware_modules_XX.dat

```
;HARWELL DIGITIZER 72E41
;name   kind  addr1  addr2  addr3
;name   kind  bus    crate  station
OMGS    3     1      2      12
```

3.4 KINETIC SYSTEMS KSC 3388

Device:	KINETIC SYSTEMS KSC 3388
Function:	CAMAC to GPIB interface
Kind:	4
Bus:	1 = CAMAC
Test program:	test_gpib
Note:	

Column	Example	Description
name	GPIB0	name is user selectable (max. 8 chars)
kind	4	
addr1	1	CAMAC Bus
addr2	1	crate#
addr3	17	station#
val1	0	unit# [1]
val2	0	I/O wait time in milliseconds
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;KINETIC SYSTEMS KSC 3388
;name   kind  addr1  addr2  addr3    val1   val2
;name   kind  bus    crate  station  unit#  iowait
GPIB0   4     1      1      17       0      0
```

[1] logical unit number of this GPIB interface (0, .., 7). If more than one GPIB interface is used, the names and the corresponding unit numbers must be different.

3.5 NUCLEAR ENTERPISE NE 9082

Device:	NUCLEAR ENTERPISE NE 9082
Function:	histogram
Kind:	5
Bus:	1 = CAMAC
Test program:	test_ne_9042
Note:	

Column	Example	Description
name	LDET	
kind	5	
addr1	1	CAMAC Bus
addr2	1	crate#
addr3	22	station#
val1	400	number of x-channels of multi detector
val2	0	number of y-channels of multi detector [2]
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;NUCLEAR ENTERPISE NE 9082
;name   kind  addr1  addr2  addr3    val1   val2
;name   kind  bus    crate  station  x-ch   y-ch
LDET    5     1      1      22       400    0
```

[2] use 0 for a linear multi detector.

3.6 CONTINUOUS DETECTOR

Device:	CONTINUOUS DETECTOR
Function:	histogram modifier
Kind:	6
Bus:	none
Test program:	
Note:	This device has to be defined after the detector. You can use this device only once. The detector will be started at begin of measurment and stopped after measurement. At start of every measurement step, the server will take a snapshot and subtract it from current histogram / integral.

Column	**Example**	**Description**
name	CONTDET	
kind	6	
addr1	ADET	detector to modify (LDET/ADET)
addr2		
addr3		
val1		
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;CONTINUOUS DETECTOR
;name   kind  addr1  addr2  addr3    val1   val2
CONTDET 6     ADET
```

3.7 HMI ST180 (MUX2)

Device:	HMI ST180 (MUX2)
Function:	motor control multiplexe via CAMAC
Kind:	12
Bus:	1 = CAMAC
Test program:	test_mux2
Note:	-motor control BORER1062 and output register KSC3075 -output register OUTREG is used implicitly -obsolete

Column	Example	Description
name	MUX2	user selctable
kind	12	
addr1	1	CAMAC Bus
addr2	1	crate# of Borer 1062
addr3	19	station# of Borer 1062
val1		
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;HMI ST180 (MUX2)
;name   kind  addr1  addr2  addr3
;name   kind  bus    crate  station
MUX2     12     1      1      19
```

3.8 MUX2 motor

Device:	MUX2 motor
Function:	motor controlled by MUX2 interface
Kind:	13
Bus:	3 = MUX
Test program:	test_mux2
Note:	obsolete

Column	Example	Description
name	ANA1	
kind	13	
addr1	3	MUX Bus
addr2	4	motor#
addr3	0	ignore
val1	712	ratio (e.g. degree = steps/ratio)
val2	0	ignore
val3	400	velocity in steps/s
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;MUX2 motor
;name   kind  addr1  addr2  addr3   val1   val2    val3
;name   kind  bus    motor  ignore  ratio  ignore  velo
ANA1    13    3      4      0       712    0       400
```

3.9 HMI Y66

Device:	HMI Y66
Function:	motor control
Kind:	14: with absolute encoder, 15: without absolute encoder
Bus:	1 = CAMAC
Test program:	test_y66
Note:	implicit use of OUTREG (KSC 3075) and INREG (KSC 3472) for air_pads

Column	Example	Description
name	CHIS	
kind	14	with absolute encoder
addr1	1	CAMAC Bus
addr2	1	crate#
addr3	12	station#
val1	64000	ratio (e.g. degree = steps/ratio)
val2	10000	max. velocity in steps/s
val3	1000	min. velocity in steps/s
val4	1500	acceleration in steps/s
val5	512	deceleration in steps/s
val6	0	direction [3]
val7	500	big tolerance in steps [4]
val8	1	option1 [5]
val9	10	option2 [6]
val10	80	small tolerance in steps [4]
val11	5	delay in s before air pads are set OFF
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;HMI Y66
;name kind addr1 addr2 addr3 val1 val2 val3 val4 val5 val6 val7 val8 val9 val10 val11
;name kind bus   crate statn rati velx velm accl decl dir  btol opt1 opt2 stol  del
;
```

[3] 1: drive from lower to target position
-1: drive from higher to target position
0: drive directly to target position

[4] tolerance values tells the controller when position is reached". If big tolerance is not defined here the CARESS defined setup tolerance (TOL command) is used: big_tolerance = 4 * setup_tolerance. If small tolerance is not defined here: small_tolerance = setup_tolerance.

[5] 1: switch ON/OFF air pads before/after drive; 4: real stop (not keep position) when drive is done

[6] if option1 = 1 then option2 defines the bit# by which the air pads are switched OFF/ON (via KSC 3075 and KSC 3472)

```
; full entry
;CHIS  14   1    1     12    6400 8000 1000 3000 3000  1   128  1     7   32    4
; typical entry
OMGS   14   1    1     7     6400 8000 1000 3000 3000  1   128
```

3.10 BORER 1062

Device:	BORER 1062
Function:	motor control
Kind:	17
Bus:	1 = CAMAC
Test program:	test_camac
Note:	obsolete

Column	Example	Description
name	OMGM	
kind	17	
addr1	1	CAMAC Bus
addr2	1	crate#
addr3	13	station#
val1	712	ratio (e.g. degree = steps/ratio
val2	0	ignore
val3	400	velocity in steps/s
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;BORER 1062
;name   kind  addr1  addr2  addr3    val1   val2    val3
;name   kind  bus    crate  station  ratio  ignore  veloc
OMGM    17     1      1      13       712     0      400
```

3.11 HMI Y70

Device:	HMI Y70
Function:	counter
Kind:	19
Bus:	1 = CAMAC
Test program:	test_camac
Note:	

Column	Example	Description
name	TIM1	
kind	19	
addr1	1	CAMAC Bus
addr2	2	crate#
addr3	19	station#
val1		
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;HMI Y70
;name   kind  addr1  addr2  addr3
;name   kind  bus    crate  station
TIM1    19    1       2       19
```

3.12 LECROY 3588 (histogram) and 3587 (router)

Device:	LECROY 3588 (histogram) and 3587 (router)
Function:	histogram
Kind:	20
Bus:	1 = CAMAC
Test program:	test_lecroy
Note:	

Column	Example	Description
name	ADET	
kind	20	
addr1	1	CAMAC Bus
addr2	2	crate# [7]
addr3	20	station# [7]
val1	128	number of x_channels of multi detector
val2	128	number of y_channels of multi detector (or 0)
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;LECROY 3588 (histogram) and 3587 (router)
;name   kind  addr1  addr2  addr3    val1  val2
;name   kind  bus    crate  station  x-ch  y-ch
ADET    20    1      2      20       128   128
```

[7] crate# and station# of router module, the histogram module is assumed at the same crate at station# + 2.

3.13 KINETIC SYSTEMS KSC 3472

Device:	KINETIC SYSTEMS KSC 3472
Function:	input register
Kind:	21
Bus:	1 = CAMAC
Test program:	test_camac
Note:	INREG is used implicitly e.g. to check air pads state

Column	Example	Description
name	INREG	
kind	21	
addr1	1	CAMAC Bus
addr2	1	crate#
addr3	1	station#
val1		
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;KINETIC SYSTEMS KSC 3472
;name   kind  addr1  addr2  addr3
;name   kind  bus    crate  station
INREG   21    1      1      1
```

3.14 KINETIC SYSTEMS KSC 3075

Device:	KINETIC SYSTEMS KSC 3075
Function:	output register
Kind:	22
Bus:	1= CAMAC
Test program:	test_camac
Note:	

Column	Example	Description
name	OUTREG	
kind	22	
addr1	1	CAMAC Bus
addr2	1	crate#
addr3	2	station#
val1	0	kind of use [8]
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;KINETIC SYSTEMS KSC 3075
;name   kind  addr1  addr2  addr3    val1
;name   kind  bus    crate  station  special
OUTREG  22    1      1      2        0
```

[8]
0 normal CARESS use, i.e special actions are done implicitly during initialization of this Device:
- flash data acquisition stop signal (bit# 2)
- set REMOTE for Y66 devices (bit# 16)
other normal implicite use:
- switch ON/OFF air pads
- toggle from positive to negative current (DELTA ELECTRONIKA SM 7020 power supply)

1 explicite use (→ SWITCH)

3.15 ILL Furnace

Device:	ILL Furnace
Function:	temperature control
Kind:	23
Bus:	4 = RS232
Test program:	test_ill
Note:	

Column	Example	Description
name	TEMP	
kind	23	
addr1	4	RS232 Bus
addr2	tty00	name of RS232 line
addr3	0	unit# [9]
val1	60	time window in s for stabiltity check
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;ILL Furnace
;name   kind  addr1  addr2    addr3    val1
;name   kind  bus    tty      unit#    twin
TEMP    23    4      ttya00   6        60
```

[9] all used RS232 lines must have different unit# (0, ..., 7).

3.16 DELTA ELEKTRONIKA SM7020

Device:	DELTA ELEKTRONIKA SM7020
Function:	power supply
Kind:	24
Bus:	1 = CAMAc
Test program:	test_camac
Note:	DAC KSC 3195 is used to set the current, KSC 3075 is used to set the polarity of current

Column	Example	Description
name	HF1	
kind	24	
addr1	1	CAMAC Bus
addr2	2	crate# of KSC 3195
addr3	4	station# of KSC 3195
val1	11	channel# of DAC
val2	819	factor for DAC (corresponding to 1A)
val3	1	polarity [10]
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;DELTA ELEKTRONIKA SM7020
;name   kind  addr1  addr2  addr3    val1   val2  val3
;name   kind  bus    crate  station  ch#    fdac  pol
HF1     24    1      2      4        11     819   1
```

[10]

- 0: positive currents, only, the output register is not used
- 1: positive and negative currents can be set, the output register is used to switch polarity:
- - the device OUTREG is used implicitly
- - output line# = 8 + channel# is used
- - bit not set: positive current
- - bit set: negative current

3.17 LAKESHORE DRC-93CA

Device:	LAKESHORE DRC-93CA
Function:	temperature control
Kind:	25
Bus:	2 = GPIB
Test program:	test_ls_tcp, test_gpib
Note:	

Column	Example	Description
name	TEMP	
kind	25	
addr1	2	GPIB Bus
addr2	1	unit# of GPIB interface
addr3	12	GPIB address of device
val1	24	curve# for regulation temperature
val2	26	curve# for sample temperature [11]
val3	0	0: control point A, 1: control point B
val4	0	0: Kelvin, 1: Celsius degree
val5	1	start channel# for scan option
val6	2	number of scan channels for scan option
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;LAKE SHORE DRC-93CA
;name   kind  addr1  addr2  addr3    val1   val2  val3 val4 val5  val6
;name   kind  bus    unit#  iecadr  rcurv  scurv ctrp [K,C] scans #scan
TEMP    25    2      1      12      24     26    0    0     1     2
```

[11]

- sample curve# -1:
- - only 1 sensor (at regulation point)
- - sample_temp = regulation_temp (by software)

3.18 BLIND at E3

Device:	BLIND at E3
Function:	blind control using IO register BORER 1032
Kind:	26
Bus:	1 = CAMAC
Test program:	test_borer1032, test_camc
Note:	obsolete

Column	Example	Description
name	BL	
kind	26	
addr1	1	CAMAC Bus
addr2	IOREG	device name of BORER I/O module
addr3		
val1		
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;BLIND at E3
;name   kind  addr1  addr2
;name   kind  bus    device
BL      26    1      IOREG
```

3.19 KEITHLEY DMM 199

Device:	KEITHLEY DMM 199
Function:	multimeter
Kind:	27
Bus:	2 = GPIB
Test program:	test_gpib
Note:	

Column	Example	Description
name	HE_CM	user selectable name
kind	27	
addr1	2	GPIB Bus
addr2	2	unit# of GPIB interface
addr3	26	GPIB address of device
val1	1	channel#
val2	0.012	factor [12]
val3	0	settling time in s [13]
val4	0	Function, e.g. for F0 [14]
val5	2	range [14]
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;KEITHLEY DMM 199
;name   kind  addr1  addr2  addr3    val1  val2   val3  val4  val5
;name   kind  bus    unit#  iecadr   chan  factor settl fct   range
HE_CM   27    2      2      26       1     0.012  0     0     5
```

[12] phys.value = DMM_value/factor
[13] time to allow a good conversion of measured values
[14] for details please look into the DMM199 manual

3.20 JULABO IF1

Device:	JULABO IF1
Function:	temperature control
Kind:	28
Bus:	4 = RS232
Test program:	test_julabo_if1, test_serial_line
Note:	

Column	Example	Description
name	TEMP	
kind	28	
addr1	4	RS232 Bus
addr2	tty01	name of RS232 line
addr3	5	unit# of RS232 line
val1	120	time window in s for stabilty check
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;JULABO IF1
;name   kind  addr1  addr2  addr3   val1
;name   kind  bus    tty    unit#   twin
TEMP    28    4      tty01  5       120
```

3.21 V4 COLLIMATOR (SPS)

Device:	V4 COLLIMATOR (SPS)
Function:	control of collimator, attenuator and some other parameters
Kind:	29: collimator, 30: attenuator
Bus:	4= RS232
Test program:	test_v4_colli
Note:	collimator and attenuator are controlled via one simatic-s7 system and should confirm under **one** kind in the next future

Column	Collimatten	Description
name	COLL / ATT	
kind	29 / 30	
addr1	4	RS232 Bus
addr2	tty00	name of RS232 line
addr3	0	unit# of RS232 line
val1		
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;V4 COLLIMATOR (SPS)
;name   kind  addr1  addr2    addr3
;name   kind  bus    tty      unit#
COLL    29    4      ttya05s  4
;name   kind  bus    tty      unit#
ATT     30    4      ttya05s  4
```

3.22 DRUSCH 10 E-5

Device:	DRUSCH 10 E-5
Function:	power supply (magnet)
Kind:	31
Bus:	4 = RS232
Test program:	test_magnet, test_serial_line
Note:	obsolete

Column	Example	Description
name	H0	
kind	31	
addr1	4	RS232 Bus
addr2	tty01	name of RS232 line
addr3	1	unit# of RS232 line
val1		
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;DRUSCH 10 E-5
;name   kind  addr1  addr2  addr3
;name   kind  bus    tty    unit#
H0      31    4      tty01  1
```

3.23 LAUDA R61

Device:	LAUDA R61
Function:	temperature control
Kind:	32
Bus:	4 = RS232
Test program:	test_lauda, test_serial_line
Note:	

Column	Example	Description
name	TEMP	
kind	32	
addr1	4	RS232 Bus
addr2	tty00	name of RS232 line
addr3	0	unit# of RS232 line
val1	60	time window in s for stability check
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;LAUDA R61
;name   kind  addr1  addr2  addr3    val1
;name   kind  bus    tty    station  twin
TEMP    32    4      tty00  0        60
```

3.24 DORNIER Velocity Selector

Device:	DORNIER Velocity Selector
Function:	velocity selector at V4
Kind:	33
Bus:	4 = RS232
Test program:	test_v4_velo, test_serial_line
Note:	

Column	Example	Description
name	VR	
kind	33	
addr1	4	RS232 Bus
addr2	ttya01s	name of RS232 line
addr3	1	unit# of RS232 line
val1		
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;DORNIER Velocity Selector
;name   kind  addr1  addr2   addr3
;name   kind  bus    tty     unit#
VR      33    4      ttya01s 1
```

3.25 BORER 1032

Device:	BORER 1032
Function:	IO register as used at instrument V4
Kind:	34
Bus:	1 = CAMAC
Test program:	test_borer1032
Note:	

Column	Example	Description
name	IOREG	
kind	34	
addr1	1	CAMAC Bus
addr2	2	crate#
addr3	4	station#
val1	7	'interrupt' pattern [15]
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;BORER 1032
;name   kind  addr1  addr2  addr3    val1
;name   kind  bus    crate  station  irq
IOREG   34    1      2      4        7
```

[15] occurence of at least one of these ïnterrupt"bits will deny data acquisition.

3.26 BEAMSTOP CHANGER at V4

Device:	BEAMSTOP CHANGER at V4
Function:	change beamstop
Kind:	35
Bus:	ignore
Test program:	test_beamstop
Note:	implicite use of motors BSX and BSY, and IO register IOREG (these modules have to be defined before)

Column	Example	Description
name	BC	
kind	35	
addr1	0	ignore
addr2	0	ignore
addr3	0	ignore
val1		
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;BEAMSTOP CHANGER at V4
;name   kind  addr1  addr2  addr3
;name   kind  ign    ign    ign
BC      35    0      0      0
```

3.27 LOCK VELOCITY SELECTOR at V4

Device:	LOCK VELOCITY SELECTOR at V4
Function:	lock/unlock velocity selector tilt
Kind:	36
Bus:	ignore
Test program:	test_borer1032
Note:	implicit use of IO register IOREG

Column	Example	Description
name	LOCK	
kind	36	
addr1	0	ignore
addr2	0	ignore
addr3	0	ignore
val1		
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;LOCK VELOCITY SELECTOR at V4
;name   kind  addr1  addr2  addr3
;name   kind  ign    ign    ign
LOCK    36    0      0      0
```

3.28 HMI ST180, linked to RS232

Device:	HMI ST180, linked to RS232
Function:	motor control multiplex
Kind:	38
Bus:	4 = RS232
Test program:	test_mux3, test_serial_line
Note:	

Column	Example	Description
name	MUX3	
kind	38	
addr1	4	RS232 Bus
addr2	ttya04s	name of RS232 line
addr3	4	unit# of RS232 line
val1		
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;HMI ST180, linked to RS232
;name   kind  addr1  addr2    addr3
;name   kind  bus    tty      unit#
MUX3    38    4      ttya04s  4
```

3.29 MUX3 MOTOR

Device:	MUX3 MOTOR
Function:	motor controlled by HMI St180
Kind:	39
Bus:	3 = ST180
Test program:	test_mux3
Note:	

Column	Example	Description
name	SLIT_U	
kind	39	
addr1	3	MUX Bus
addr2	1	unit# of ST180 control
addr3	5	motor#
val1	1400	ratio (e.g. cm = steps/ratio)
val2	200	velocity in steps/s
val3	100	acceleration in steps/s
val4	5.12	coder factor [16] [17]
val5	3	coder limit [17]
val6		
val7		
val8	0	airpad-control 0: No airpads
val9	0	P/PID control 1: P control
val10	123	encoder offset
val11	((1237400/radius)+156.5)	E(R) [18] [19]
val12	(deltaencoder/10.24)	dP(dE) [20] [19]
val13	(1237400/(encoder-156.5))	R(E) [21] [19]
val14		
val15		

hardware_modules_XX.dat

```
;MUX3 MOTOR
;name  kind addr1 addr2  addr3  v1  v2  v3  v4  v5 v6 v7 v8 v9 v10 v11  v12 v13
;name  kind bus   unit#  motor  rio vl  ac  cf  cl ?  ?  ac pc enc e(r) de  r(e)
; full
SLIT_U 39   3     1      5     1400 200 100 5.1 3  ?  ?  ?  ?  ?   ?    ?   ?
; typical
MONOC  39   3     0      1     1    333 167
```

[16] 0; no absolute enoder
[17] for details please look into the ST180 manual
[18] Encoder(Radius) = ((1237400/radius)+156.5)
[19] only used if set encoder offset
[20] DeltaPosition(DeltaEncoder) = (deltaencoder/10.24)
[21] Radius(Encoder) = (1237400/(encoder-156.5))

3.30 COLLIMATOR CHANGER at E2

Device:	COLLIMATOR CHANGER at E2
Function:	control of collimator changer using 2 ST180 motors or 2 supported motor drives, which are initialised & useable in the same hardware server and are callable via hwb_... functions
Kind:	40
Bus:	3 = ST180 or 6 = COMBO
Test program:	test_e2_colli_changer
Note:	

Column	Example	Description
name	COLL	
kind	40	
addr1	3/6	MUX Bus / COMBO
addr2	1	unit# of ST180 / ignore[22]
addr3	11/COLL15	motor# of 15' drive (MUX3 motor# / device name[23])
val1	12/COLL30	motor# of 30' drive (MUX3 motor# / device name)
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;COLLIMATOR CHANGER at E2
;name   kind  addr1  addr2  addr3   val1
;name   kind  bus    unit#  motor   motor
COLL    40    3      1      11      12
;  alternative:
;name   kind  bus    ignore motor   motor
COLL    40    6      0      COLL15  COLL30
```

[22] COMBO does not need the unit number
[23] use device name or CARESS internal device number

3.31 HEINZINGER TN

Device:	HEINZINGER TN
Function:	power supply (with polarity option via output register KSC 3075)
Kind:	41
Bus:	2 = GPIB
Test program:	test_gpib
Note:	implicit use of output register OUTREG

Column	Example	Description
name	HFI1	
kind	41	
addr1	2	GPIB Bus
addr2	1	unit# of GPIB interface
addr3	5	GPIB addres of device
val1	30.0	volt
val2	0.0	min. current
val3	10.0	max. current
val4	13	channel# [24]
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;HEINZINGER TN
;name   kind  addr1  addr2  addr3   val1  val2  val3  val4
;name   kind  bus    unit#  iecadr  volt  imin  imax  ch
HFI1    41    2      1      5       30    0.0   10.0  13
```

[24]
- 0 no polarity, positive values, only (OUTREG not used)
- >0 with polarity using OUTREG:
  outreg_line# = 8 + channel#
  positive value: reset OUTREG line
  negative value: set OUTREG line

3.32 CLOSE BEAM SHUTTER

Device:	CLOSE BEAM SHUTTER
Function:	close beam shutter at E1
Kind:	42
Bus:	ignore
Test program:	
Note:	implicit use of output register OUTREG

Column	Example	Description
name	SHUTTER	
kind	42	
addr1	0	ignore
addr2	0	ignore
addr3	0	ignore
val1	9	bit# in OUTREG
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;CLOSE BEAM SHUTTER
;name   kind  addr1  addr2  addr3    val1
;name   kind  ign    ign    ign      bit#
SHUTTER 42     0      0     0        9
```

3.33 FLIPPER at V4

Device:	FLIPPER at V4
Function:	control of flipper using frequence generator HP 33120A and voltmeter ROHDE&SCHWARZ URE2
Kind:	43
Bus:	2 = GPIB
Test program:	test_v4_flipper, test_gpib
Note:	

Column	Example	Description
name	FL	
kind	43	
addr1	2	GPIB Bus
addr2	1	unit# of GPIB control for HP 33120A
addr3	10	GPIB address of HP 33120A
val1	1	unit# of GPIB control for RS URE2
val2	11	GPIB address of RS URE2
val3	20000	frequence in Hz
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;FLIPPER at V4
;name   kind  addr1  addr2  addr3   val1    val2   val3
;name   kind  iecbus hpiec# hpadr   rsiec#  rsadr  freq
FL      43    2      1      10      1       11     20000
```

3.34 OXFORD INSTRUMENTS IPS 120

Device:	OXFORD INSTRUMENTS IPS 120
Function:	control for superconducting magnet
Kind:	44
Bus:	2 = GPIB
Test program:	test_ips120, test_GPIB
Note:	

Column	Example	Description
name	MAGF	
kind	44	
addr1	2	GPIB Bus
addr2	1	unit# of GPIB control
addr3	24	GPIB address of device
val1	0/1	persistance of the field
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;OXFORD INSTRUMENTS IPS 120
;name   kind  addr1  addr2     addr3   val1
;name   kind  bus    iecunit#  iecadr  persist
MAGF    44    2      1         24      1
```

3.35 OXFORD INSTRUMENTS ITC 503

Device:	OXFORD INSTRUMENTS ITC 503
Function:	temperature control
Kind:	45
Bus:	2 = GPIB
Test program:	test_itc503, test_gpib
Note:	doesn't work with gpib_enet before server_real_* rev. 581

Column	Example	Description
name	TEMP	
kind	45	
addr1	2	GPIB Bus
addr2	1	unit# of GPIB control
addr3	25	GPIB address of device
val1		
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;OXFORD INSTRUMENTS ITC 503
;name   kind  addr1  addr2     addr3
;name   kind  bus    iecunit#  iecadr
TEMP    45    2      1         25
```

3.36 TCPIP CONNECTION

Device:	TCPIP CONNECTION
Function:	communication via ethernet using TCPIP socket
Kind:	46
Bus:	special
Test program:	
Note:	

Column	Example	Description
name	TCPIP0	User selectable name
kind	46	
addr1	16	IP address, 3. part [25]
addr2	70	IP address, 4. part [25]
addr3	50001	port#
val1		
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;TCPIP CONNECTION
;name   kind  addr1  addr2   addr3
;name   kind  ipadr3 ipadr4  port
TCPIP0  46    16     70      5001
```

[25] e.g. for IP address of server: 134.30.16.70

3.37 TCPIP READ at V4

Device:	TCPIP READ at V4
Function:	read several temperature values and pressure values from a LABVIEW program using TCPIP socket
Kind:	47
Bus:	5 = TCPIP
Test program:	
Note:	

Column	Example	Description
name	TEMPR	
kind	47	
addr1	5	TCPIP socket
addr2	0	ignore
addr3	0	ignore
val1	4	number of temperatures
val2	1	number of pressures
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;TCPIP READ at V4
;name   kind  addr1  addr2  addr3  val1   val2
;name   kind  sock   ign    ign    temp#  pres#
TEMPR   47     1     0      0      4      1
```

3.38 MULTIMETER HP 34401A

Device:	MULTIMETER HP 34401A
Function:	multimeter
Kind:	48
Bus:	2 = GPIB
Test program:	test_hp_34401a
Note:	

Column	Example	Description
name	DMM1	
kind	48	
addr1	2	GPIB Bus
addr2	0	unit# of GPIB interface
addr3	20	GPIB address of device
val1	0.35	factor, value = hp34401a_value/factor
val2	1	function [26]
val3	0	range [27]
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;MULTIMETER HP 34401A
;name   kind  addr1  addr2  addr3   val1 val2 val3
;name   kind  bus    unit#  iecadr  fact fct  range
DMM1    48    2      0      20      0.35 1    0
```

[26] 0: VAC, 1: VDC, 2: CAC, 3: CDC, 4: RES, 5: FRES
[27] 0: auto range, for other values please look into the device manual

3.39 DELTA ELEKTRONIKA PSC 44M

Device:	DELTA ELEKTRONIKA PSC 44M
Function:	power supply
Kind:	49
Bus:	2 = GPIB
Test program:	test_psc44m, test_gpib
Note:	

Column	Example	Description
name	MAG_I	
kind	49	
addr1	2	GPIB Bus
addr2	1	unit# of GPIB interface
addr3	4	GPIB address of device
val1	30.0	max. voltage (V)
val2	100.0	max. current (A)
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;DELTA ELEKTRONIKA PSC 44M
;name   kind  addr1  addr2  addr3   val1  val2
;name   kind  bus    unit#  iecadr  umax  imin
MAG_I   49    2      1      4       30.0  100.0
```

3.40 BURSTER DIGISTANT 6706

Device:	BURSTER DIGISTANT 6706
Function:	power supply
Kind:	50
Bus:	2 = GPIB
Test program:	test_burster_ps, test_gpib
Note:	

Column	Example	Description
name	VFI1	
kind	50	
addr1	2	GPIB Bus
addr2	1	unit# of GPIB interface
addr3	10	GPIB address of device
val1	40	max. voltage (V)
val2	200	max. current (mA)
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;BURSTER DIGISTANT 6706
;name   kind  addr1  addr2  addr3   val1 val2
;name   kind  bus    unit#  iecadr  umax imax
VFI1    4     2      1      10      40   200
```

3.41 EUROTHERM 2404/2408

Device:	EUROTHERM 2404/2408
Function:	temperature control
Kind:	51
Bus:	4 = RS232
Test program:	test_eurotherm, test_ serial_line
Note:	

Column	Example	Description
name	TEMP	
kind	51	
addr1	4	RS232 Bus
addr2	t1	name of RS232 line connected to control point
addr3	t2	name of RS232 line connected to sample point
val1	1	unit# of RS232 line connected to control point
val2	2	unit# of RS232 line connected to sample point
val3	1	0: Kelvin, 1: Celsius degree
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;EUROTHERM 2404/2408
;name   kind  addr1  addr2  addr3  val1     val2    val3
;name   kind  bus    tty_c  tty_s  unit#_c  unit#_s [K,C]
TEMP    51    4      t1     t2     1        2       1
```

setline_XX.dat

```
;EUROTHERM 2404/2408 with 9600 baud (may also be 4800)
;TermName   Baud  DataBits StopBits Parity ModemCTRL
/dev/tty00  9600  7        1        2      0
/dev/tty01  9600  7        1        2      0
```

3.42 GAUSSMETER LAKESHORE 450

Device:	GAUSSMETER LAKESHORE 450
Function:	gaussmeter
Kind:	52
Bus:	2 = GPIB
Test program:	test_gpib
Note:	

Column	Example	Description
name	MAGF_G	
kind	52	
addr1	2	GPIB Bus
addr2	0	unit# of GPIB interface
addr3	13	GPIB address of device
val1		
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;GAUSSMETER LAKESHORE 450
;name   kind  addr1 addr2  addr3
;name   kind  bus   unit#  iecadr
MAGF_G  52    2     0      13
```

3.43 DORNIER Velocity Selector

Device:	DORNIER Velocity Selector
Function:	velocity selector at V5
Kind:	53
Bus:	4 = RS232
Test program:	test_v5_velo, test_serial_line
Note:	

Column	Example	Description
name	VR	
kind	53	
addr1	4	RS232 Bus
addr2	ttya03s	name of RS232 line
addr3	3	unit# of RS232 line
val1	37500	lambda factor
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;DORNIER Velocity Selector
;name  kind  addr1  addr2    addr3   val1
;name  kind  bus    tty      unit#   lambda
VR     53    4      ttya03s  3       37500
```

3.44 MAGNET CONTROL at V6

Device:	MAGNET CONTROL at V6
Function:	control of magnetic field using DELTA ELEKTONIKA PSC 44M power supply and LAKESHORE 450 gaussmeter
Kind:	54
Bus:	6 = COMBO
Test program:	
Note:	

Column	Example	Description
name	MAGF	
kind	54	
addr1	6	COMBO
addr2	MAGF_I	name of power supply
addr3	MAGF_G	name of gaussmeter
val1	2	column# of a table (used internally by CARESS)
val2	1.0888047	factor to calculate field
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;MAGNET CONTROL at V6
;name   kind  addr1  addr2   addr3   val1  val2
;name   kind  bus    pname   gname   table fact
MAGF    54    6      MAGF_I  MAGF_G  2     1.0888047
```

3.45 HEINZINGER PTN 125-10

Device:	HEINZINGER PTN 125-10
Function:	power supply
Kind:	55
Bus:	2 = GPIB
Test program:	test_heinzinger_ptn, test_gpib
Note:	

Column	Example	Description
name	H21	
kind	55	
addr1	2	GPIB Bus
addr2	1	unit# of GPIB interface
addr3	4	GPIB address of device
val1	125.0	max. voltage
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;HEINZINGER PTN 125-10
;name   kind  addr1  addr2  addr3   val1
;name   kind  bus    unit#  iecadr  umax
H21     55    2      1      4       125.0
```

3.46 FUG NTN (e.g. NTN 4000M-40)

Device:	FUG NTN (e.g. NTN 4000M-40)
Function:	power supply
Kind:	56
Bus:	2 = GPIB
Test program:	test_gpib
Note:	

Column	Example	Description
name	MAGF	
kind	56	
addr1	2	GPIB Bus
addr2	0	unit# of GPIB interface
addr3	8	GPIB address of device
val1	30.0	max. voltage
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;FUG NTN (e.g. NTN 4000M-40)
;name   kind  addr1  addr2  addr3   val1
;name   kind  bus    unit#  iecadr  umax
MAGF    56    2      0      8       30.0
```

3.47 LAWSON 201

Device:	LAWSON 201
Function:	magnetometer
Kind:	57
Bus:	4 = RS232
Test program:	test_lawson_201, test_serial_line
Note:	

Column	Example	Description
name	MAG_I	
kind	57	
addr1	4	RS232 Bus
addr2	tty01	name of RS232 line
addr3	1	unit# of RS232 line
val1		
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;LAWSON 201
;name   kind  addr1  addr2  addr3
;name   kind  bus    tty    unit#
MAG_I   57    4      tty01  1
```

3.48 MESYTEC HISTOGRAM SPODI

Device:	MESYTEC HISTOGRAM SPODI
Function:	histogram for SPODI (M1)
Kind:	58
Bus:	7 = MESYTEC
Test program:	
Note:	

Column	Example	Description
name	LDET	
kind	58	
addr1	7	MESYTEC
addr2	0	ignore
addr3	0	ignore
val1	80	x_channels
val2	256	y_channels
val3	300.0	y_height in mm
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;MESYTEC HISTOGRAM SPODI
;name   kind  addr1  addr2  addr3  val1  val2  val3
;name   kind  bus    ign    ign    xchn  ychn  yhei
LDET    58    7      0      0      80    256   300.0
```

3.49 MESYTEC COUNTER

Device:	MESYTEC COUNTER
Function:	counter
Kind:	59
Bus:	7 = MESYTEC
Test program:	
Note:	

Column	Example	Description
name	MON1	
kind	59	
addr1	7	MESYTEC
addr2	2	counter#
addr3		
val1		
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;MESYTEC COUNTER
;name   kind  addr1  addr2
;name   kind  bus    counter
MON1    59    7      2
```

3.50 KEITHLEY DMM 2010

Device:	KEITHLEY DMM 2010
Function:	multimeter
Kind:	61
Bus:	2 = GPIB
Test program:	test_keithley_dmm2010, test_gpib
Note:	

Column	Example	Description
name	DMM2	
kind	61	
addr1	2	GPIB Bus
addr2	1	unit# of GPIB interface
addr3	21	GPIB address of device
val1	0.1	factor[28], value = dmm_value/factor
val2	5	function [29]
val3	0	range [30]
val4	10	average [31]
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;KEITHLEY DMM 2010
;name   kind  addr1  addr2  addr3   val1  val2  val3   val4
;name   kind  bus    unit#  iecadr  fact  fct   range  avg
DMM2    61    2      1      21      0.1   5     0      10
```

[28] leading zero is necessary if factor is below 1!
[29] 0: VAC, 1: VDC, 2: CAC, 3: CDC, 4: RES, 5: FRES
[30] 0: auto range, for other values please look into the device manual
[31] 0: filter disabled, 1, ..., 100: filter count

3.51 HAAKE THERMOSTATE F6/N6

Device:	HAAKE THERMOSTATE F6/N6
Function:	temperature control
Kind:	62
Bus:	4 = RS232
Test program:	test_haake_therm, test_serial_line
Note:	

Column	Example	Description
name	TEMP	
kind	62	
addr1	4	RS232 Bus
addr2	ttya02s	name of RS232 line
addr3	2	unit# of RS232 line
val1		
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;HAAKE THERMOSTATE F6/N6
;name   kind  addr1  addr2    addr3
;name   kind  bus    tty      unit#
TEMP    62    4      ttya02s  2
```

3.52 NATIONAL INSTRUMENTS HISTOGRAM

Device:	NATIONAL INSTRUMENTS HISTOGRAM (NI DIO 6534)
Function:	histogram
Kind:	63
Bus:	9 = NI
Test program:	
Note:	

Column	Example	Description
name	ADET	
kind	63	
addr1	9	NI
addr2	64	ignore
addr3	64	ignore
val1	64	x_channels
val2	64	y_channels
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;NATIONAL INSTRUMENTS HISTOGRAM
;name   kind  addr1  addr2  addr3  val1  val2
;name   kind  bus    ign    ign    x-ch  y-ch
ADET    63    9      0      0      64    64
```

3.53 MESYTEC HISTOGRAM V4

Device:	MESYTEC HISTOGRAM V4
Function:	histogram for V4
Kind:	64
Bus:	7 = MESYTEC
Test program:	
Note:	

Column	Example	Description
name	ADET	
kind	64	
addr1	7	MESYTEC
addr2	0	ignore
addr3	0	ignore
val1	128	x_channels
val2	128	y_channels
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;MESYTEC HISTOGRAM V4
;name   kind  addr1  addr2  addr3  val1  val2
;name   kind  bus    ign    ign    x-ch  y-ch
ADET    64    7      0      0      128   128
```

3.54 DIGITAL OUTPUT by GREENSPRING IO24

Device:	DIGITAL OUTPUT by GREENSPRING IO24
Function:	digital output
Kind:	65
Bus:	ignore
Test program:	
Note:	

Column	Example	Description
name	SHUTTER	
kind	65	
addr1	0	Ignore
addr2	0	Ignore
addr3	0	Ignore
val1	0x1	output line
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;DIGITAL OUTPUT by GREENSPRING IO24
;name   kind  addr1  addr2  addr3    val1
;name   kind  ign    ign    ign      out
SHUTTER 65    0      0      0        0x1
```

3.55 NATIONAL INSTRUMENTS GPIB-ENET/100

Device:	NATIONAL INSTRUMENTS GPIB-ENET/100
Function:	ethernet ↔ GPIB interface
Kind:	66
Bus:	ethernet
Test program:	test_gpib
Note:	

Column	Example	Description
name	GPIB2	
kind	66	
addr1	GPIB0	LAN name of interface
addr2	0	NI GPIB-ENET internal number
addr3	2	unit# of GPIB interface
val1	0	I/O wait time in milliseconds
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;NATIONAL INSTRUMENTS GPIB-ENET/100
;name   kind  addr1  addr2  addr3  val1
;name   kind  ipname enet#  unit#  iowait
GPIB2   66    GPIB0  0      2      0
```

3.56 ROHDE&SCHWARZ URE2

Device:	ROHDE&SCHWARZ URE2
Function:	voltmeter
Kind:	67
Bus:	2 = GPIB
Test program:	test_rs_vmure2, test_gpib
Note:	

Column	Example	Description
name	DMM3	
kind	67	
addr1	2	GPIB Bus
addr2	1	unit# of GPIB interface
addr3	11	GPIB address of device
val1	0.125	factor, value = ure2_value/factor
val2	1	function [32]
val3	0	range [33]
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;ROHDE\&SCHWARZ URE2
;name   kind  addr1  addr2  addr3   val1  val2  val3
;name   kind  bus    unit#  iecadr  fac   fct   range
DMM3    67    2      1      11      0.125 1     6
```

[32] 0: AC, 1: DC

[33] 0:auto range, 1:1mV, 2:3mV, 3:10mV, 4:30mV, 5:100mV, 6:300mV, 7:1V, 8:3V, 9:10V, 10:30V, 11:100V, 12:300V, 13:1000V

3.57 BRUKER BEC1

Device:	BRUKER BEC1
Function:	power supply
Kind:	68
Bus:	2 = GPIB
Test program:	test_bruker_bec1, test_gpib
Note:	

Column	Example	Description
name	H0	
kind	68	
addr1	2	GPIB Bus
addr2	1	unit# of GPIB interface
addr3	5	GPIB address of device
val1	0	0: A, 1: T
val2	1	0/1: keep current/field state on init
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;BRUKER BEC1
;name  kind  addr1  addr2  addr3   val1
;name  kind  bus    unit#  iecadr  [A,T]
H0     68    2      1      5       0
```

3.58 SWITCH

Device:	SWITCH
Function:	switch (0/1, OFF/ON, etc.)
	using digital input/output module(s)
Kind:	69
Bus:	8 = DIO BUS
Test program:	test_switch
Note:	

Column	Example	Description
name	FILT	
kind	69	
addr1	8	DIO Bus
addr2	OUTREG2	name of output register [34]
addr3	INREG	name of input register [34], value is mandatory
val1	0x4	output pattern [35]
val2	0x1000	input pattern [35]
val3	0	output negation [36]
val4	0	input negation [36]
val5	0	flash [37]
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;SWITCH
```

[34] - in case of an IO register use the same name
- use 0 if an IN or OUT register is not used

[35] use 0 if the corresponding register is not used

[36] output / input negation according to:

0:	normal:	output:	user value 1	->	set output line
			user value 0	->	reset output line
		input:	line set	->	1 to user
			line not set	->	0 to user
1:	negated:	output:	user value 1	->	reset output line
			user value 0	->	set output line
		input:	line set	->	0 to user
			line not set	->	1 to user

[37] > 0: flash: set output line wait_seconds(flash); reset output line

```
;name   kind  addr1  addr2    addr3  val1  val2    val3  val4 val5
;name   kind  bus    oname    iname  opat  ipat    oneg  ineg flash
FILT    69    8      OUTREG2  INREG  0x4   0x1000  0     0    0
```

3.59 LOW LEVEL GPIB

Device:	LOW LEVEL GPIB
Function:	control äsimpleô GPIB device by commands read from a file
Kind:	70
Bus:	2 = GPIB
Test program:	test_low_level_gpib
Note:	

Column	Example	Description
name	DMM1	
kind	70	
addr1	2	GPIB Bus
addr2	2	unit# of GPIB interface
addr3	9	GPIB address of device
val1	hp34410a.com	file name
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;LOW LEVEL GPIB
;name   kind  addr1  addr2  addr3   val1
;name   kind  bus    unit#  iecadr  filename
DMM1    70    2      2      9       hp34410a.com
```

3.60 LAKESHORE 340

Device:	LAKESHORE 340
Function:	temperature control
Kind:	71
Bus:	2 = GPIB
Test program:	test_gpib
Note:	

Column	Example	Description
name	TEMP	
kind	71	
addr1	2	GPIB Bus
addr2	2	unit# of GPIB interface
addr3	12	GPIB address of device
val1	24	curve# for regulation temperature
val2	26	curve# for sample temperature [38]
val3	0	0: control point A, 1: control point B
val4	0	0: Kelvin, 1: Celsius degree
val5	0	start channel# for scan option [39]
val6	1	number of scan channels for scan option [40]
val7	4	delays every gpib op (in 10th of a second)
val8	0/1	keep heater state on init
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;LAKE SHORE 340
;name  kind  addr1 addr2 addr3  val1  val2  val3  val4  val5  val6 val7 val8
;name  kind  bus   unit# iecadr rcurv scurv ctrlp [K,C] strt  scch to   khs
TEMP   71    2     2     12     24    26    0     0     0     1    4    0
```

[38]

- sample curve# -1:
- only 1 sensor (at regulation point)
- sample_temp = regulation_temp (by software)
- if more as one scan channel used, the temps are a shift register

[39] 0-8 as start channel (B, C1-C4, D1-D4)
[40] 1-5 scan channels

3.61 Julabo F25-HE (JULABO_F25)

Device:	Julabo F25-HE (JULABO_F25)
Function:	temperature controller (Kaelte-Umwaelzthermostat)
Kind:	72
Bus:	4 (RS232)
Test program:	test_julabo_f25
Note:	

Column	Example	Description
name	TEMP	
kind	72	
addr1	4	ID for RS232-Bus
addr2	ttyS0	Name of RS232-Line
addr3	5	Logical unit number of device
val1	120	Time window in sec. For stability check
val2	3	Pump-level (1-4)
val3	0	0: Kelvin, 1: Celsius degree
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;Julabo F25-HE (JULABO\_F25)
;name   kind  addr1  addr2  addr3   val1  val2  val3
;name   kind  bus    tty    unit#   twin  plvl  [K,C]
TEMP    72    4      ttyS0  5       120   3     0
```

3.62 GPIB-Device

Device:	GPIB-Device
Function:	to communicate with a known or unknown GPIB-Device
Kind:	75
Bus:	2
Test program:	
Note:	

Column	Example	Description
name	GPIBDEV7	Name of Modul is user-selectable
kind	75	
addr1	4	GPIB-Address of the GPIB-Device
addr2	2	Logigal Unit Number of a GPIB-Controller
addr3	7	Logical GPIB-Device Number
val1		
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;GPIB-Device
;name    kind  addr1     addr2    addr3
;name    kind  gpib-addr gpib-lun dev-lun
GPIBDEV7 75    4         2        7
```

3.63 ISEG-HV-NHQ

Device:	iseg high voltage controller (iseg Spezialelektronik GmbH, NHQ x0xx/x2xx)
Function:	high voltage power supply
Kind:	76
Bus:	4 = RS232
Test program:	
Note:	

Column	Example	Description
name	ISEG_HV	
kind	76	
addr1	4	RS232 (serial line)
addr2	t2	name of RS232 line
addr3	2	unit# of RS232 line
val1	0	0=channel A, 1=channel B
val2	0	at init only: 0=don't touch output voltage, 1=set output voltage to zero
val3	100	voltage ramp in volts/sec (2...255 or 0=don't touch)
val4	0	current trip in milli amperes (<0: don't touch, =0: disable, >0: enable current trip of this value)
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;iseg_hv_nhq
;name   kind RS232 name unit# channel zero-output voltage-ramp current-trip
ISEG_HV 76   2     t2   2     0       0           100          0
```

3.64 IN-BECKHOFF

Device:	Beckhoff digital inputs via BK/BC9000
Function:	digital input
Kind:	77
Bus:	5 = TCPIP
Test program:	test_beckhoffio
Note:	INREG is used implicitly e.g. to check air pads state

Column	Example	Description
name	INREG	
kind	77	
addr1	5	TCPIP
addr2	dybeck0	host name or IP address
addr3	1	input process image (0..4)
val1	0	start byte offset (0..65535)
val2	16	bit count (1..32)[41]
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;digital input
;name kind TCPIP name    image offset bits
INREG 77   5     dybeck0 1     0      16
```

[41] use a negative value to invert the logic

3.65 OUT-BECKHOFF

Device:	Beckhoff digital outputs via BK/BC9000
Function:	digital output
Kind:	78
Bus:	5 = TCPIP
Test program:	test_beckhoffio
Note:	OUTREG is used implicitly for start, stop and air pads state

Column	Example	Description
name	OUTREG	
kind	78	
addr1	5	TCPIP
addr2	dybeck0	host name or IP address
addr3	1	output process image (0..4)
val1	0	start byte offset (0..65535)
val2	16	bit count (1..32)[42]
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;digital output
;name  kind TCPIP name    image offset bits
OUTREG 78   5     dybeck0 1     0      16
```

[42] use a negative value to invert the logic

3.66 IOREG-BECKHOFF

Device:	Beckhoff digital in-/outputs via BK/BC9000
Function:	digital input and output
Kind:	79
Bus:	5 = TCPIP
Test program:	test_beckhoffio
Note:	this is a replacement for CAMAC BORER1032 (e.g. V4)

Column	Example	Description
name	IOREG	
kind	79	
addr1	5	TCPIP
addr2	myv4de153	host name or IP address
addr3	1	input process image (0..4)
val1	0	start byte offset (0..65535)
val2	0	bit count (1..32)[43]
val3	1	output process image (0..4)
val4	0	start byte offset (0..65535)
val5	0	bit count (1..32)[43]
val6	0XFF000200	'interrupt' pattern[44]
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;digital input
;name kind TCPIP name      InImage offset bits OutImage offset bits intr
IOREG 79   5     myv4de153 0       0      -32  0        0      16   0XFF000200
```

[43] use a negative value to invert the logic

[44] V4 only: an occurence of at least one of these ïnterruptïnput bits will deny data acquisition.

3.67 HMI X13

Device:	HMI X13
Function:	motor control
Kind:	100: with absolute encoder 103: without absolute encoder 111: with absolute encoder, multiple try
Bus:	11 = VME
Test program:	test_x13
Note:	

Column	Example	Description
name	A1	
kind	100 / 103 / 111	[45]
addr1	11	VME Bus
addr2	0x30EF0	VME address of device
addr3	1	motor#
val1	-0.27	factor (e.g. degree = steps*factor)
val2	150	max. velocity
val3	13	acceleration
val4	35	P
val5	20	I
val6	0	D
val7	3560	velocity factor
val8	64	pattern for air pads
val9	3	feed back info
val10	1	type of encoder
val11	24	resolution of encoder
val12	2	type of code
val13	0.0177	encoder factor
val14	0x60fa0	VME address of resolver X17
val15	7	resolver#

hardware_modules_XX.dat

```
;HMI X13
;name knd ad1 ad2     ad3 v1    v2  v3 v4 v5 v6 v7   v8 v9 v10 v11 v12 v13 v14     v15
;name knd bus adr     mtr fc    mv  ac p  i  d  vf   ap fi ten ren toc fen x17     res
A1    103 11  0x30ef0 1   -0.27 150 13 34 20 0  3560 64 3 1   24  2   0.01 0x60fa0 7
```

[45] multiple try: the positioning is re-tried if the first try is outside the tolerance limit

3.68 STRUCK STR 721

Device:	STRUCK STR 721
Function:	counter
Kind:	101
Bus:	11 = VME
Test program:	test_str721a2_dau
Note:	

Column	Example	Description
name	MON	
kind	101	
addr1	11	VME Bus
addr2	0xE000	VME address of device
addr3	1	counter#
val1	optional	second address for NSE mode [46]
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;STRUCK STR 721
;name   kind  addr1  addr2  addr3  val1
;name   kind  bus    vmeadr count  opt
MON     101   11     0xe000 1      0xea
```

[46] V5 uses this option in order to use different STR721 devices (and different cabling) for NSE mode and TOF mode data acquisition.

3.69 HMI DAU

Device:	HMI DAU
Function:	data acquisition unit for TOF and NSE instruments
Kind:	102
Bus:	11 = VME
Test program:	test_dau
Note:	

Column	Example	Description
name	DAU	
kind	102	
addr1	11	VME Bus
addr2	0x2000048	VME address of device
addr3	0	ignore
val1	96	number of single channel detectors
val2	1024	number of channels of area detector (32*32)
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;HMI DAU
;name   kind  addr1  addr2     addr3  val1   val2
;name   kind  bus    vmeadr    ign    sdet   adet
DAU     102   11     0x2000048 0      96     1024
```

3.70 ICS 4895

Device:	ICS 4895
Function:	RS232 ↔ GPIB interface
Kind:	104
Bus:	4 = RS232
Test program:	test_gpib
Note:	setline: 4800 baud

Column	Example	Description
name	GPIB2	
kind	104	
addr1	4	RS232 Bus
addr2	t2	name of RS232 line
addr3	2	unit# of RS232 line
val1	0	I/O wait time in milliseconds
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;ICS 4895
;name   kind  addr1  addr2  addr3  val1
;name   kind  bus    tty    unit#  iowait
GPIB2   104   4      t2     2      0
```

setline_XX.dat

```
;ICS 4895 (serial <--> GPIB converter) with 4800 baud
;TermName   Baud  DataBits StopBits Parity ModemCTRL
/dev/tty00  4800  8        1        0      0
```

3.71 HEINZINGER TN

Device:	HEINZINGER TN
Function:	power supply
Kind:	105
Bus:	2 = GPIB
Test program:	test_gpib
Note:	

Column	Example	Description
name	H11	
kind	105	
addr1	2	GPIB Bus
addr2	1	unit# of GPIB interface
addr3	11	GPIB address of device
val1	30.0	volt
val2	0.0	min. current
val3	20.0	max. current
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;HEINZINGER TN
;name   kind  addr1  addr2  addr3   val1  val2  val3
;name   kind  bus    unit#  iecadr  [V]   imin  imax
H11     105   2      1      11      30.0  0.0   20.0
```

3.72 BRUKER MN 40/60

Device:	BRUKER MN 40/60
Function:	power supply with 2 ports
Kind:	106
Bus:	2 = GPIB
Test program:	test_bruker_ps, test_gpib
Note:	

Column	Example	Description
name	B2	
kind	106	
addr1	2	GPIB Bus
addr2	2	unit# of GPIB interface
addr3	5	GPIB address of device
val1	1	port#
val2	2.0	rate in A
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;BRUKER MN 40/60
;name   kind  addr1  addr2  addr3   val1  val2
;name   kind  bus    unit#  iecadr  port  rate
B2      106   2      2      5       1     2.0
```

3.73 BRUKER MN 290/380

Device:	BRUKER MN 290/380
Function:	power supply
Kind:	107
Bus:	2 = GPIB
Test program:	test_bruker_ps, test_gpib
Note:	obsolete

Column	Example	Description
name	B1	
kind	107	
addr1	2	GPIB Bus
addr2	2	unit# of GPIB interface
addr3	4	GPIB address of device
val1		
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;BRUKER MN 290/380
;name   kind  addr1  addr2  addr3
;name   kind  bus    unit#  iecadr
B1      107   2      2      4
```

3.74 MDR 14500390

Device:	MDR 14500390
Function:	velocity selector at V5
Kind:	108
Bus:	4 = RE232
Test program:	test_veloselec_14500390, test_serial_line
Note:	

Column	Example	Description
name	VR	
kind	108	
addr1	4	RS232 Bus
addr2	Ttya0s3	name of RS232 line
addr3	3	unit# of RS232 line
val1	21977.7	lambda factor
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;MDR 14500390
;name   kind  addr1  addr2    addr3   val1
;name   kind  bus    tty      unit#   lambda
VR      108   4      ttya0s3  3       21977.7
```

3.75 ONE DETECTOR CELL

Device:	ONE DETECTOR CELL
Function:	one detector cell or a region around a detector cell of a multi detector
Kind:	109
Bus:	
Test program:	
Note:	

Column	Example	Description
name	D1	
kind	109	
addr1	0	ignore [47]
addr2	0	ignore [47]
addr3	0	ignore [47]
val1		
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;ONE DETECTOR CELL
;name   kind  addr1  addr2  addr3
;name   kind  ign    ign    ign
D1      109   0      0      0
```

[47] the detector cell, i.e. x_channel [and y_channel and range], is defined by the CARESS command SELDET and stored into addr1, addr2 and addr3.

3.76 DORNIER CHOPPER (NCS)

Device:	DORNIER CHOPPER (NCS)
Function:	neutron chopper system at V5
Kind:	110
Bus:	4 = RS232
Test program:	test_dornier_chopper, test_serial_line
Note:	

Column	Example	Description
name	CHOP	
kind	110	
addr1	4	RS232 Bus
addr2	ttya0s3	name of RS232 line
addr3	3	unit# of RS232 line
val1		
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;DORNIER NCS
;name   kind  addr1  addr2   addr3
;name   kind  bus    tty     unit#
CHOP    110   4      tty0s3  3
```

3.77 BRUKER MN 2x80/80

Device:	BRUKER MN 2x80/80
Function:	power supply with 2 ports
Kind:	112
Bus:	2 = GPIB
Test program:	test_bruker3_ps, test_gpib
Note:	

Column	Example	Description
name	B4	
kind	112	
addr1	2	GPIB Bus
addr2	2	unit# of GPIB interface
addr3	6	GPIB address of device
val1	1	port#
val2	2.0	rate in A
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;BRUKER MN 2x80/80
;name   kind  addr1  addr2  addr3    val1  val2
;name   kind  bus    unit#  iecadr   port  rate
B4      112   2      2      6        1     2.0
```

3.78 JOERGER HISTOGRAM

Device:	JOERGER HISTOGRAM
Function:	histogram using JOERGER VSC 16/8 counters
Kind:	113
Bus:	11
Test program:	test_joerger_vsc_histo
Note:	

Column	Example	Description
name	LDET	
kind	113	
addr1	11	VME Bus
addr2	0xC0000000	address of 1. counter device [48]
addr3	0x1000000	address offset [48]
val1	64	number of x_channels
val2	64	number of y_channels
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;JOERGER HISTOGRAM
;name   kind  addr1  addr2      addr3     val1  val2
;name   kind  bus    vmeadr     adrofs    #xch  #ych
LDET    113   11     0xc0000000 0x1000000 64    64
```

[48] it is allowed to use more than one counter device, the addresses of the following counter devices are calculated using the address offset

3.79 EKF 44520

Device:	EKF 44520
Function:	motor control
Kind:	114: with absolute encoder, 115: without absolute encoder
Bus:	11 = VME
Test program:	tst_ekf_44520
Note:	

Column	Example	Description
name	OMGS	
kind	114 / 115	with or without absulte encoder
addr1	11	VME Bus
addr2	0xF0F1C000	address of device
addr3	2	motor#
val1	6400	ratio, e.g degree = steps/ratio
val2	2400	max. velocity in steps
val3	512	ac-/deceleration in milli seconds
val4	2 / 1	encoder type; 1: no absolute encoder
val5	24 / 0	encoder resolution ($\leq$ 24)[49]
val6	x / 0	encoder dx_max [49]
val7	1 / 0	encoder direction: 1 or -1 [49] [50]
val8	0	air pads; 0: no air pads [51]
val9	1	P/PID control, 1: P control [52]
val10	3000	P_max.
val11	1	P_scale
val12	50	P_value [50]
val13	6400	overshoot in steps [53]
val14		
val15		

hardware_modules_XX.dat

```
;EKF 44520
;name kind addr1 addr2      addr3 v1  v2  v3  v4  v5 v6  v7 v8 v9 v10  v11 v12   v13
OMGS  114  11    0xf0f1c000 4     364 512 5   2   17 100 -1 0  1  5000 10  1000  0
```

[49] for a motor without an absolute encoder these parameters must be 0

[50] direction and P_value must have the same sign

[51] > 0 air pads used and (!) waiting time
1 after positioning air pads are switched off immediatly
e.g. 6 after positioning wait 5 s and then switch off air pads

[52] P control is implemented, PID control not

[53] Overshoot to avoid gear problems:
- positive overshoot: positioning from the äupperô side
- negative overshoot: positioning from the lower side
- no overshoot: straight forward positioning

3.80 JOERGER VSC 16/8

Device:	JOERGER VSC 16/8
Function:	counter
Kind:	116
Bus:	11 = VME
Test program:	test_joerger_vsc
Note:	

Column	Example	Description
name	MON2	
kind	116	
addr1	11	VME Bus
addr2	0xE1000000	address of device
addr3	2	counter#
val1		
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;JOERGER VSC 16/8
;name   kind  addr1  addr2       addr3
;name   kind  bus    vmeadr      counter
MON2    116   11     0xe1000000  2
```

3.81 STRUCK STR721 HISTOGRAM

Device:	STRUCK STR721 HISTOGRAM
Function:	histogram using STR721 counters
Kind:	117
Bus:	11 = VME
Test program:	test_str721a2_histo
Note:	

Column	Example	Description
name	LDET	
kind	117	
addr1	11	VME Bus
addr2	0xE000	address of first counter device [54]
addr3	0x100	addess offset [54]
val1	48	number of x_channels
val2	48	number of y_channels
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;STRUCK STR721 HISTOGRAM
;name   kind  addr1  addr2   addr3    val1  val2
;name   kind  bus    vmeadr  adroffs  #xch  #ych
LDET    117    11    0xe0000 0x100    48    48
```

[54] it is allowed to use more than one counter device, the addresses of the following counter devices is calculated using the address offset

3.82 CES VIC BUS

Device:	CES VIC BUS
Function:	VIC Bus interface
Kind:	118
Bus:	11 = VME
Test program:	
Note:	

Column	Example	Description
name	VICBUS	
kind	118	
addr1	11	VME Bus
addr2	0xF0724C00	VIC Bus page register
addr3	4	crate#
val1		
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;CES VIC BUS
;name   kind  addr1  addr2      addr3
;name   kind  bus    crate      crate
VICBUS  118   11     0xf0724c00 4
```

3.83 IBF GPIB

Device:	IBF GPIB
Function:	VME ↔ GPIB interface
Kind:	119
Bus:	11
Test program:	test_gpib
Note:	

Column	Example	Description
name	GPIB1	
kind	119	
addr1	11	VME Bus
addr2	/IB1	OS 9/9000 name of GPIB interface
addr3	1	unit# of GPIB interface
val1	0	I/O wait time in milliseconds
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;IBF GPIB
;name   kind  addr1  addr2    addr3  val1
;name   kind  bus    os9name  unit#  iowait
GPIB1   119   11     /IB1     1      0
```

3.84 GREEN SPRING IO24

Device:	GREEN SPRING IO24
Function:	digital IO register
Kind:	120
Bus:	11 = VME
Test program:	test_io24
Note:	

Column	Example	Description
name	IOREG	
kind	120	
addr1	11	VME Bus
addr2	0xFFFF6000	address of device
addr3	0xF	input mask (all other lines are output lines)
val1		
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;GREEN SPRING IO24
;name   kind  addr1  addr2       addr3
;name   kind  bus    vmeadr      imask
IOREG   120   11     0xffff6000  0xf
```

3.85 HMI X18

Device:	HMI X18
Function:	histogram
Kind:	121
Bus:	11
Test program:	test_x18
Note:	

Column	Example	Description
name	ADET	
kind	121	
addr1	11	VME Bus
addr2	0x8000000	address of device
addr3	0x400	low_high_pattern
val1	128	number of x_channels
val2	128	number of y_channels
val3	0	direct readout (0=old: indirect with integral value, 1=new: direct only)
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;HMI X18
;name   kind  addr1  addr2     addr3   val1  val2 val3
;name   kind  bus    vmeadr    lhpatt  #xch  #ych direct
ADET    121   11     0x8000000 0x400   128   128  0
```

3.86 JULIOS

Device:	JULIOS
Function:	detector system running on a MS Windows system (KFZ Juelich)
Kind:	122
Bus:	4 = RS232
Test program:	
Note:	

Column	Example	Description
name	LDET	
kind	122	
addr1	4	RS232 Bus
addr2	tty00	name of RS232 line
addr3	0	unit# of RS232 line
val1	1024	number of x_channels
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;JULIOS
;name   kind  addr1  addr2  addr3    val1
;name   kind  bus    tty    unit#    #xch
LDET    122   4      tty00  0        1024
```

3.87 ASTRIUM CHOPPER

Device:	ASTRIUM CHOPPER
Function:	neutron chopper system at V4
Kind:	123
Bus:	5 = TCPIP
Test program:	test_astrium_chopper, test_tcp
Note:	
	work in progress

Column	Example	Description
name	CHOP	
kind	123	
addr1	5	bus
addr2	217.7.16.60	TCPIP address or computer´s name
addr3	50001	port#
val1	4	number of chopper discs
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;ASTRIUM CHOPPER
;name   kind  addr1  addr2          addr3  val1
;name   kind  bus    tcpip_address  port#  discs
CHOP    123   5      217.7.16.60    50001  4
```

3.88 FZJ-CHOPPER

Device:	FZJ CHOPPER
Function:	neutron chopper system at V18
Kind:	124
Bus:	5 = TCPIP
Test program:	test_fzj_chopper, test_tcp
Note:	
	work in progress

Column	Example	Description
name	CHOP	
kind	124	
addr1	5	bus
addr2	217.7.16.60	TCPIP address or computer's name
addr3	50001	port#
val1	3	number of chopper discs
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;FZJ CHOPPER
;name   kind  addr1  addr2          addr3  val1
;name   kind  bus    tcpip_address  port#  discs
CHOP    124   5      217.7.16.60    50001  3
```

3.89 ASTRIUM-VELOSEL

Device:	ASTRIUM VELOSEL
Function:	velocity selector system at V4
Kind:	125
Bus:	5 = TCPIP
Test program:	test_astrium_velosel, test_tcp
Note:	
	work in progress

Column	Example	Description
name	VELOSEL	
kind	125	
addr1	5	bus
addr2	217.7.16.61	TCPIP address or computer's name
addr3	50010	port#
val1	NVS03	prefix of communication string
val2		
val3		
val4		
val5		
val6		
val7		
val8		
val9		
val10		
val11		
val12		
val13		
val14		
val15		

hardware_modules_XX.dat

```
;ASTRIUM VELOCITY SELECTOR
;name   kind  addr1  addr2          addr3  val1
;name   kind  bus    tcpip_address  port#  prefix
VELOSEL 125   5      217.7.16.61    50010  NVS03
```

3.90 Generic CORBA device

Device:	GENERIC_CORBADEV
Function:	a generic device which can be dynamically plugged into CARESS (an easier approach to add new devices to CARESS)
Kind:	500
Test program:	test_corbadevice
Note:	**This is a gateway device**, it forwards all requests to the real implementation of the generic CORBA device. The parameters, following the CORBA reference in the *hardware_modules_XX.dat* configuration line, are forwarded to the implementation as un-translated string. The meaning of these parameters depends on two things: - the CARESS device name and - the implementation of the generic CORBA device.

Column	**Example**	**Description**
name	ADET	any CARESS allowed name
kind	500	
addr	Delaylinedetector.caress_object	a CORBA IOR reference or a name stored in the CORBA Name Service
params		these parameters are device specific

You can modify the behavior of any generic CORBA device with the configuration file *corbadevice.dat* (look at the example below). This file format is the well known INI file format with a section for every device. The section name has to be the same as the device in *hardware_modules_XX.dat* file.

There exist these configuration items for almost every device:

loadconf [bool]	allow loading of configuration into device (default: *yes*)
loadfile [string]	specify file name which contents is loaded into device (item **loadconf** must be enabled and file size should be between 1 and 16777216 bytes)
start	and
stop [string list]	set start and stop order as comma separated list of possible values: *before* before other devices, *premaster* before master counter (default for **stop**), *postmaster* after master counter (default for **start**), *behind* after other devices, *never* never generate start or stop calls, *sync* synchronous call (default), *async* try to start or stop devices of same start/stop order position in parallel
startkind [string list]	set allowed start kinds as comma separated list of numbers and possible values: *start* normal start (START_NORMAL, kind=0), *continue* continue acquisition (START_CONT, kind=1 but see also **ignorepause** below), *snapshot* end of snapshot (START_SNAPSHOT, kind=2) default without **startkind**: *start*, *continue*
stopkind [string list]	set allowed stop kinds as comma separated list of numbers and possible values: *pause* halt acquisition (STOP_PAUSE, kind=0 but see also **ignorepause** below), *end* end of measurment (STOP_TERMINATION, kind=1), *snapshot* begin of snapshot (STOP_SNAPSHOT, kind=2) default without **stopkind**: *pause*, *end*
read [string list]	set readout point as comma separated list of possible values: *always* always, *noexpress* every time, but without EXPRESS_READ, *readall* read_allmodules only (express or not), *auto* automatic (default): read_allmodules & (kind!=EXPRESS or ACTIVE), *minimal* read_allmodules only, but without EXPRESS_READ, *sync* synchronous read (default), *async* try to read devices in parallel

ignorepause [bool]	let the device ignore any halt and continue requests
reconnecttimeout [int]	timeout in seconds, before a lost connection will be reestablished (default: 60, range: 0 = never, 1 <= reconnecttimeout <= 3600)
corbatimeout [int]	per object CORBA timeout in milli seconds (default: 0, range: 0 = use global timeout, 1 <= corbatimeout <= 3600000)
startretry [int]	number of reties after start_module failed [0 <= x <= 10000] (default: 0)
readblocksize [int]	maximum channel count for one readblock call [1 <= x <= 16777216] (default: 4096)
additional_samples [int]	number of additional samples for this device, in case of TEMP: number of additional sample temperatures [0 <= x <= 4] (default: 0)
startcommands	[string list] of CARESS commands (loaded with values at measurment start)
startvalues	[string list] of CARESS modules (loaded with values at measurment start)

hardware_modules_XX.dat

```
;GENERIC_CORBADEV with DUBNA delay line detector (a PC with Microsoft Windows)
;name  kind  CORBAref                          ignore  ignore  #xch  #ych
ADET   500   Delaylinedetector.caress_object  0       0       128   128
```

corbadevice.dat

```
[ADET]
; comment: this configuration is useful for DUBNA delay line detector
loadconf   = no
```

```
startretry = 5
start = premaster,  async
stop  = postmaster, async
read  = minimal, async
ignorepause = yes
reconnecttimeout = 300
readblocksize = 65536
; foo
[MON]
read = auto
[TEMP]
loadfile           = my_own_local_binary_or_text_file.dat
; bar
additional_samples = 0
```

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