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BRIEF DESCRIPTION

These instructions are aimed to help users define a *BiSS* XML file.

The function of the XML file is to automatically allocate device characteristics using the BiSS identifier.

The XML file for *BiSS* encoders can be used for BiSS B and BiSS C protocols. It can also be applied for all *BiSS* slaves. It can be used independently and also as a supplement to the *BiSS* profiles. The XML file can include EDS information which the BiSS device itself cannot contain (e.g. *BiSS* B devices, BiSS devices that have no EEPROM/FLASH memory).

BiSS Identifier

The *BiSS* identifier is divided into two sections:

- Device ID(address 0x78. . . 0x7D)
- Manufacturer ID(address 0x7E. . . 0x7F)

The XML file specific to the manufacturer is selected using the manufacturer ID (2 bytes). Each manufacturer ID is assigned to one manufacturer. Each *BiSS* device manufacturer thus only generates one single XML file for all *BiSS* products that use the *BiSS* identifier. This file should thus be suitably structured so that the size of the file is compact yet has enough capacity for future products. Manufacturer IDs are supplied by iC-Haus free of charge to *BiSS* device manufacturers.

The Device ID (6 bytes) acts as a key with which information is extracted from the XML file. A completely individual key could be created for each individual product configuration in the XML file. The disadvantage of this type of data generation is, however, that the amount of data or number of entries grows in line with the variety of products.

The manufacturer and device IDs are stored in non-volatile memories, such as PROMs or EEPROMs, by the device manufacturer. *BiSS* slave devices use the manufacturer and device IDs generated by the semiconductor manufacturer as long as the device is not programmed.

The *BiSS* identifier differentiates between a product type that is both physically and parametrically distinguishable. The *BiSS* identifier does not replace a serial number.

A more beneficial approach would be to split the device ID into the various distinctive features of the *BiSS* products:

Product-specific features

- Device class
- Device subclass
- Device revision
- . . .

BiSS interface-specific features

- *BiSS* protocol sensor data
- *BiSS* protocol register data
- Encoder data length
- Check sum length
- Timeout configuration
- . . .

XML file structure

The structure of the XML file is specific to the customer and can be freely selected; this document thus only includes suggestions. The contents of the XML file are also customized and can be selected at will. The layout of a manufacturer XML file should take the following attributes into account:

- Maintenance of the DTD (Data Type Definition)
- Depiction of all products with the *BiSS* interface by one manufacturer
- No repetition of identical features
- Grouping of products
- Compact file size
- Reproduction of information important for the *BiSS* interface

XML RECOMMENDED FILE LAYOUT FOR ENCODERS

Requirements:

1. Through attempted access* the *BiSS* master recognizes whether the chip is a *BiSS* B or *BiSS* C device.
2. Through attempted access the *BiSS* master recognizes whether the device enables register access in the relevant protocol (*BiSS* B or *BiSS* C).
3. The *BiSS* master identifies the device by the *BiSS* profile ID, *BiSS* identifier, and/or *BiSS* EDS.

* Attempted access on the basis of the minimum electrical characteristics required (maximum timeouts, minimum frequencies) according to *BiSS* Application Note 2.

OVERVIEW								
Addr	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Example *BiSS* identifier system layout (with *BiSS* B and *BiSS* C taken into account)								
0x78	Device class XX							
0x79	Device subclass YY							
0x7A	BiSSMOD	RegC	RegB	MT(4:0)				
0x7B	Reserved			ST(4:0)				
0x7C	Reserved				Timeout			
0x79	Device revision ZZ							
0x7E	Manufacturer ID							
0x7F	Manufacturer ID							

Table 1: Register layout

BiSSMOD	Addr. 0x7A; bit 7
0	*BiSS* B mode
1	*BiSS* C mode

RegC	Addr. 0x7A; bit 6
0	Register access via *BiSS* C not supported
1	Register access via *BiSS* C supported

RegB	Addr. 0x7A; bit 6
0	Register access via *BiSS* B not supported
1	Register access via *BiSS* B supported

Timeout	Addr. 0x7C; bit 2:0
000	typ. 26 µs (12.5 µs . . . 40 µs)
001	typ. 1.2 µs (0.5 µs . . . 3 µs)
. . .	typ. 1.2 µs (0.5 µs . . . 3 µs)
111	typ. 1.2 µs (0.5 µs . . . 3 µs)

MT/ST	Addr. 0x7A/0x7B; bit 4:0
00000	0 bit
00001	1 bit
00010	2 bit
00011	3 bit
00100	4 bit
00101	5 bit
00110	6 bit
00111	7 bit
01000	8 bit
01001	9 bit
01010	10 bit
01011	11 bit
01100	12 bit
01101	13 bit
01110	14 bit
01111	15 bit
10000	16 bit
10001	17 bit
10010	18 bit
10011	19 bit
10100	20 bit
10101	21 bit
10110	22 bit
10111	23 bit
11000	24 bit
11001	25 bit
11010	26 bit
11011	27 bit
11100	28 bit
11101	29 bit
11110	30 bit
11111	31 bit

DTD DATA TYPE DEFINITION

The DTD file defines all tags, keys and rules for the automatic parsing of the *BiSS* XML files. The DTD file uses the XML specification 1.0.

The DTD defines:

- Permissible TAGs
- Possible units
- Required information
- Possible information

The DTD version is included in the first line as a comment.

<!––DTD for BiSS Idenitfier XML Files Version 1.1 ––>

The following element attributes are possible:

- REQUIRED (the attribute must be stated)
- IMPLIED (the attribute is optional)
- "..." (default/standard if the attribute is missing)
- FIXED "..." (the attribute always has a fixed standard value)

Repeated elements
Elements that appear more than once are marked with a '+'.

ELEMENT Manufacturer
Several manufacturers are permitted within one XML file. The name of the XML file, e.g. idBiSS4C69.xml, can be used to help the user distinguish between manufacturers. Several XML files from various manufacturers can also be compiled to create one large file. The ELEMENT Manufacturer is distinguished by the manufacturer attribute "ID" and is required.

The manufacturer is denoted by a label ("Label"). Only one manufacturer label is permitted. The devices belonging to this manufacturer are referred to as "Device". Several devices are permitted within one manufacturer.

ELEMENT Profile
BiSS profiles are also described by their own XML file but defined via the same DTD file. Several profiles can be described in one XML file. The profile description is defined by "Label". Only one profile label is permitted for one profile. "Device" denotes the devices of this profile. Several devices are permitted within one profile.

ELEMENT Device
A device is identified by IDs. A device can be described by one or more device elements.

- Id+
- (Device | Label . . .)>

The following element(s) of a device are described by the ID, also elements that are repeated:

- Device
- Label
- FreqSens
- TimeOutSens
- TMA
- TO_MIN
- TO_MAX
- TOS_MIN
- TOS_MAX
- TCLK_MIN
- TCLK_MAX
- TCYC
- TBUSY_S
- BUSY_S
- PON_DLY
- TimeOutRegMin
- TimeOutReg
- TimeOutRegMax
- Sens
- SCDS
- SCDA
- Reg
- Label
- Length
- CrcPoly
- CrcStart
- InvCrc
- Label
- Bissmod

ELEMENT Id
An ID is assigned via a range of values ("Range"). As an option the user can decide whether this range is to be included ("Include") or excluded ("Exclude"). The default value for the given range is "Include".

ELEMENT TMA
"TMA" denotes the minimum permissible clock cycle at MA.

ELEMENT TO_MIN
"TO_MIN" describes the minimum *BiSS* timeout. At TO_MIN = 0 the slave operates adaptively and requires a timeout of at least 1.5 * TMA.

ELEMENT TO_MAX
"TO_MAX" describes the maximum *BiSS* timeout. At TO_MAX = 0 the slave operates adaptively and requires a timeout of at least 1.5 * TMA + 3 * TCLK.

ELEMENT TOS_MIN
"TOS_MIN" describes the minimum shortened *BiSS* timeout. At TOS_MIN = 0 the shortened timeout is not supported.

ELEMENT TOS_MAX
"TOS_MAX" describes the maximum shortened *BiSS* timeout. At TOS_MAX = 0 the shortened timeout is not supported.

ELEMENT TCLK_MIN
Minimum sampling cycle for an adaptive timeout (0 = adaptive timeout not available).

ELEMENT TCLK_MAX
Maximum sampling cycle for an adaptive timeout (0 = adaptive timeout not available).

ELEMENT TCYC
"TCYC" describes the minimum permissible cycle time (0 = no cycle time restrictions).

ELEMENT TBUSY_S
"TBUSY_S" describes the maximum processing time during the sensor data readout as a time. The total maximum processing time is calculated from the sum of TBUSY_S + (TMA * BUSY_S).

ELEMENT BUSY_S
"BUSY_S" describes the maximum processing time during the sensor data readout in TMA clock units. The total maximum processing time is calculated from the sum of TBUSY_S + (TMA * BUSY_S).

ELEMENT PON_DLY
"PON_DEL" describes the maximum power-on delay of the sensor until a controller communication is available ("Power On Delay").

ELEMENT FreqSens
"FreqSens" describes the typical *BiSS* MA clock frequency for sensor data communication with *BiSS* B.

ELEMENT TimeOutSens
"TimeOutSens" describes the typical *BiSS* timeout for sensor data communication with *BiSS* B.

ELEMENT TimeOutRegMin
"TOR_MIN" describes the minimum *BiSS* timeout for register communication with *BiSS* B.

ELEMENT TimeOutReg
"TimeOutReg" describes the typical *BiSS* timeout for register communication with *BiSS* B.

ELEMENT TimeOutRegMax
"TOR_MAX" describes the maximum *BiSS* timeout for register communication with *BiSS* B.

ELEMENT Sens = ELEMENT SCDS
"Sens" or "SCDS" describes the single-cycle sensor data. The position of the sensor data can be optionally defined by the attribute "Pos".

- Length
- CrcPoly
- InvCrc
- Label
- BiSSmod

ELEMENT SCDA
"SCDA" describes the single-cycle actuator data. The position of the actuator data can be optionally defined by the attribute "Pos".

ELEMENT Reg
"ELEMENT Reg" describes one or more sets of register contents of a *BiSS* device. ELEMENT Reg has the following sub-elements:

- IdUsed (at which *BiSS* slave ID the register is accessible)
- Label (which register is selected here)
- BiSSmod (in which *BiSS* mode the register is accessible)

ELEMENT Label
ELEMENT Label has the following sub-elements:

- Pos (position in a list; "data" is the default type)
- Adr(address in a range)
- Range(number range)

The folowing Label types are permitted:

- data (data in general; "data" is the default type)
- error (error in general)
- warning (warnings in general)
- unused (unused or no type)

ELEMENT Length
The following Length types are permitted:

- data (data bit length; "data" is the default type)
- error (error bit length)
- warning (warning bit length)
- unused (unused bit length)

ELEMENT CrcPoly
The CRC polynomial can be given as a hexadecimal, decimal, or binary number. The leading most significant bit in the CRC polynomial must be included in the CRC polynomial. A polynomial can be expressed in various number systems:

- <CrcPoly>0x25</CrcPoly>
- <CrcPoly>0b101001</CrcPoly>
- <CrcPoly>0x43</CrcPoly>
- <CrcPoly>0b10000011</CrcPoly>

- . . .

ELEMENT CrcStart
The CRC start value can be given as a hexadecimal, decimal, or binary number. A CRC start value can be expressed in various number systems:

- <CrcStart>0b0</CrcStart>
- <CrcStart>0b0101</CrcStart>
- <CrcStart>0xF0</CrcStart>
- . . .

ELEMENT InvCrc
This element defines whether the CRC check sum is transmitted in its inverted state or not. In *BiSS* C the CRC check sum is always subjected to inverted transmission (InvCrc = 1).

- 0 (non-inverted CRC check sum transmission)
- 1 (inverted CRC check sum transmission)

ELEMENT IdUsed
This defines how many IDs a device uses. One device, e.g. a BiSS sensor, can occupy several *BiSS* IDs on the *BiSS* interface.

- 0 (device does not use a *BiSS* ID)
- 1 (device uses one *BiSS* ID)
- 2 (device uses two *BiSS* IDs)
- . . .

ELEMENT Bissmod

- 0 (*BiSS* B)
- 1 (*BiSS* C)

ELEMENT Bissmod Permissible units for times:

- s (seconds)
- ms (milliseconds)
- µs (microseconds)
- us (microseconds)
- ns (nanoseconds)

DTD FILE

```
<!— DTD for BiSS Idenitfier XML Files Version 1.1 —>

<!ELEMENT BiSS–Identifier (Manufacturer | Profile)+>
<!ATTLIST BiSS–Identifier
   Version CDATA #IMPLIED
>

<!ELEMENT Manufacturer (Label | Device)+>
<!ATTLIST Manufacturer
   Id CDATA #REQUIRED
>

<!ELEMENT Profile (Label | Device)+>

<!ELEMENT Device (Id+, (Device | Label | FreqSens | TimeOutSens | TMA | TO_MIN | TO_MAX | TOS_MIN | TOS_MAX |
     TCLK_MIN | TCLK_MAX | TCYC | TBUSY_S | BUSY_S | PON_DLY | TimeOutReg | Sens | SCDS | SCDA | Reg)+)>

<!ELEMENT Id (#PCDATA)>
<!ATTLIST Id
   Range CDATA #IMPLIED
   type (include | exclude) "include"
>

<!ELEMENT FreqSens (#PCDATA)>
<!ATTLIST FreqSens
   Unit (MHz | KHz) #REQUIRED
>

<!ELEMENT TimeOutSens (#PCDATA)>
<!ATTLIST TimeOutSens
   Unit (s | ms | us | ns) #REQUIRED
>

<!ELEMENT TMA (#PCDATA)>
<!ATTLIST TMA
   Unit (s | ms | us | ns) #REQUIRED
>

<!ELEMENT TO_MIN (#PCDATA)>
<!ATTLIST TO_MIN
   Unit (s | ms | us | ns) #REQUIRED
>

<!ELEMENT TO_MAX (#PCDATA)>
<!ATTLIST TO_MAX
   Unit (s | ms | us | ns) #REQUIRED
>

<!ELEMENT TOS_MIN (#PCDATA)>
<!ATTLIST TOS_MIN
   Unit (s | ms | us | ns) #REQUIRED
>

<!ELEMENT TOS_MAX (#PCDATA)>
<!ATTLIST TOS_MAX
   Unit (s | ms | us | ns) #REQUIRED
>

<!ELEMENT TCLK_MIN (#PCDATA)>
<!ATTLIST TCLK_MIN
   Unit (s | ms | us | ns) #REQUIRED
>

<!ELEMENT TCLK_MAX (#PCDATA)>
<!ATTLIST TCLK_MAX
   Unit (s | ms | us | ns) #REQUIRED
>

<!ELEMENT TCYC (#PCDATA)>
<!ATTLIST TCYC
   Unit (s | ms | us | ns) #REQUIRED
>

<!ELEMENT TBUSY_S (#PCDATA)>
<!ATTLIST TBUSY_S
   Unit (s | ms | us | ns) #REQUIRED
>

<!ELEMENT BUSY_S (#PCDATA)>
```

```
<!ELEMENT PON_DLY (#PCDATA)>
<!ATTLIST PON_DLY
   Unit (s | ms | us | ns) #REQUIRED
>

<!ELEMENT TimeOutRegMin (#PCDATA)>
<!ATTLIST TimeOutRegMax
   Unit (s | ms | us | us) #REQUIRED
>

<!ELEMENT TimeOutReg (#PCDATA)>
<!ATTLIST TimeOutReg
   Unit (s | ms | us | us) #REQUIRED
>

<!ELEMENT TimeOutRegMax (#PCDATA)>
<!ATTLIST TimeOutRegMax
   Unit (s | ms | us | us) #REQUIRED
>

<!ELEMENT Sens (Length | CrcPoly | InvCrc | Label | Bissmod )*>
<!ATTLIST Sens
   Pos CDATA #IMPLIED
>

<!ELEMENT SCDS (Length | CrcPoly | InvCrc | Label | Bissmod )*>
<!ATTLIST SCDS
   Pos CDATA #IMPLIED
>

<!ELEMENT SCDA (Length | CrcPoly | InvCrc | Label | Bissmod )*>
<!ATTLIST SCDA
   Pos CDATA #IMPLIED
>

<!ELEMENT Reg (IdUsed | Label | Bissmod)*>

<!ELEMENT Label (#PCDATA)>
<!ATTLIST Label
   Pos CDATA #IMPLIED
   Adr CDATA #IMPLIED
   Range CDATA #IMPLIED
   type (data | error | warning| unused | zero) "data"
   source (append_id) "append_id"
   unit CDATA #IMPLIED
   offset CDATA #IMPLIED
>

<!ELEMENT Length (#PCDATA)>
<!ATTLIST Length
   type (absolut | incremental | decremental) "absolut"
   source (id) "id"
>

<!ELEMENT CrcPoly (#PCDATA)>

<!ELEMENT CrcStart (#PCDATA)>

<!ELEMENT InvCrc (#PCDATA)>

<!ELEMENT IdUsed (#PCDATA)>

<!ELEMENT Bissmod (#PCDATA)>
```

iC-LGC DETAILS

OVERVIEW								
Addr	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
iC-LGC *BiSS* identifier (*BiSS* C)								
0x78	Device ID							
0x79	Device ID							
0x7A	Device ID							
0x7A	Device ID							
0x7C	Refers to RAM adress 0x15 bit(2) = TIMO(2)							
	Device ID			TIMO(2)	Device ID	TIMO(2)	Device ID	
0x7D	Device ID							
0x7E	Manufacturer ID							
0x7F	Manufacturer ID							

Table 2: Register layout

Just one of the two bits (bit 4 or bit 2) in address 0x7C must be set to 1 to change the TIMO value.

iC-NQC DETAILS

OVERVIEW								
Addr	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
iC-NQC *BiSS* identifier (*BiSS* C)								
0x78	Device ID							
0x79	Device ID							
0x7A	Device ID							
0x7A	Device ID							
0x7C	TOS affects TIMO							
	Reserved *					TOS(2:0)		
0x7D	Device ID							
0x7E	Manufacturer ID							
0x7F	Manufacturer ID							

Table 3: Register layout

* With a non-blocking register protection level, when the timeout is switched the contents of address 0x7C (bits 7:3) could be permanently altered. It would then be possible that the *BiSS* identifier is incorrectly assigned. It is recommended that this area remain reserved and not be used for device identification.

When TOS(2:0) = 0b000 the configured TIMO value is used; when TOS(2:0) = 0b001 . . . 0b111 the shortened TIMO value is used. The contents of address 0x7C depend on the register protection level of the device configuration.

iC-MH DETAILS

OVERVIEW								
Addr	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
iC-MH *BiSS* identifier (*BiSS* C)								
0x78	Device ID 0x4D = ASCII(M) *							
0x79	Device ID 0x48 = ASCII(H) *							
0x7A	Device ID 0x5A = ASCII(Z) *							
0x7B	Device ID 0x00 = iC-Haus device revisions id *							
0x7C	Reserved *							CFGTOS **
0x7D	Device ID ***							
0x7E	Manufacturer ID ***							
0x7F	Manufacturer ID ***							

Table 4: Register layout

* : Not changeable or programmable (ZAP)
** : Configurable during runtime
*** : Programmable (ZAP)

As data storage is implemented in an internal ZAP PROM structure in iC-MH, this chip has only a limited identification range. When using iC-MH the fixed contents of addresses 0x78-0x7B must be taken into account and/or reserved in both the product portfolio and also in the layout of the XML file. Contents in address 0x7C (bits 7:3) can be temporarily written to the RAM but are no longer available after a drop in voltage. Using address 0x7C for device ID is not recommended for iC-MH. The contents of addresses 0x7A and 0x7B can vary with product revisions.

iC-MN DETAILS

OVERVIEW								
Addr	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
iC-MN *BiSS* identifier (*BiSS* C)								
0x78	Device ID							
0x79	Device ID							
0x7A	Device ID							
0x7B	Device ID							
0x7C	Refers to RAM adress 0x4C with full R/W access							
	CID_SCD(3:0)				-	-	TOS(1:0)	
0x7D	Device ID							
0x7E	Manufacturer ID							
0x7F	Manufacturer ID							

Table 5: Register layout

If TOS timeout sensor data times are shortened with systems based on iC-MN, only the enabled bits of address 0x7C should be changed. It is, however, necessary to read out address 0x7C and mask the set/reset TOS(1:0) bits in address 0x7C before doing so.

XML EXAMPLE FOR BiSS IDENTIFIER

This example XML file illustrates a possible file structure.

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<!DOCTYPE BiSS-Identifier SYSTEM "idbiss.dtd">
<BiSS-Identifier Version="1.3">
 <Manufacturer Id="6943">
  <Label>iC-Haus GmbH</Label>
  <Device>  <!-- iC-LG -->
   <Id Range="47:32">0x4C47</Id>
   <Id Range="47:24" type="exclude">0x4C4743</Id>
   <Label Pos="1">iC-LG </Label>
   <Label Pos="2">(unknown revision)</Label>
   <Device>  <!-- iC-LGW4 -->
    <Id Range="31:16">0x5734</Id>
    <Label Pos="2">W4</Label>
    <Sens>
     <Length>1</Length>
     <CrcPoly>0x43</CrcPoly>
     <InvCrc>1</InvCrc>
     <Label Pos="3" type="error">Warning</Label>
    </Sens>
    <Sens>
     <Length type="incremental">1</Length>
     <Label Pos="2" type="error">Error</Label>
    </Sens>
    <Device>
     <Id Range="10:8">0b000</Id>
     <Label Pos="3">, ST=9bit</Label>
     <Sens>
      <Length type="incremental">9</Length>
      <Label Pos="1">ST(8:0)</Label>
     </Sens>
    </Device>
    <Device>
     <Id Range="10:8">0b001</Id>
     <Label Pos="3">, ST=10bit</Label>
     <Sens>
      <Length type="incremental">10</Length>
      <Label Pos="1">ST(9:0)</Label>
     </Sens>
    </Device>
    <Device>
     <Id Range="10:8">0b010</Id>
     <Label Pos="3">, ST=11bit</Label>
     <Sens>
      <Length type="incremental">11</Length>
      <Label Pos="1">ST(10:0)</Label>
     </Sens>
    </Device>
    <Device>
     <Id Range="10:8">0b011</Id>
     <Label Pos="3">, ST=12bit</Label>
     <Sens>
      <Length type="incremental">12</Length>
      <Label Pos="1">ST(11:0)</Label>
     </Sens>
    </Device>
    <Device>
     <Id Range="10:8">0b100</Id>
     <Label Pos="3">, ST=13bit</Label>
     <Sens>
      <Length type="incremental">13</Length>
      <Label Pos="1">ST(12:0)</Label>
     </Sens>
    </Device>
    <Device>
     <Id Range="10:8">0b101</Id>
     <Label Pos="3">, ST=14bit</Label>
     <Sens>
      <Length type="incremental">14</Length>
      <Label Pos="1">ST(13:0)</Label>
     </Sens>
    </Device>
    <Device>
     <Id Range="10:8">0b110</Id>
     <Label Pos="3">, ST=17bit</Label>
     <Sens>
      <Length type="incremental">17</Length>
      <Label Pos="1">ST(16:0)</Label>
     </Sens>
    </Device>
    <Device>
     <Id Range="10:8">0b111</Id>
     <Label Pos="3">, ST=21bit</Label>
     <Sens>
      <Length type="incremental">21</Length>
      <Label Pos="1">ST(20:0)</Label>
     </Sens>
    </Device>
    <Device>
     <Id Range="13:11">0b100</Id>
     <Label Pos="4">, MT=24bit</Label>
     <Sens>
      <Length type="incremental">24</Length>
      <Label Pos="0">MT(23:0)</Label>
     </Sens>
    </Device>
    <Device>
     <Id Range="13:11">0b101</Id>
     <Label Pos="4">, MT=20bit</Label>
     <Sens>
      <Length type="incremental">20</Length>
      <Label Pos="0">MT(19:0)</Label>
     </Sens>
    </Device>
    <Device>
     <Id Range="13:11">0b110</Id>
     <Label Pos="4">, MT=16bit</Label>
     <Sens>
      <Length type="incremental">16</Length>
      <Label Pos="0">MT(15:0)</Label>
     </Sens>
    </Device>
    <Device>
     <Id Range="13:11">0b111</Id>
     <Label Pos="4">, MT=12bit</Label>
     <Sens>
      <Length type="incremental">12</Length>
      <Label Pos="0">MT(11:0)</Label>
     </Sens>
    </Device>
   </Device>
   <Reg>
    <IdUsed>2</IdUsed>
    <Label Adr="0">DAC_NSIN(7:0)</Label>
    <Label Adr="1">DAC_PSIN(7:0)</Label>
    <Label Adr="2">DAC_NCOS(7:0)</Label>
    <Label Adr="3">DAC_PCOS(7:0)</Label>
    <Label Adr="4:9">OFFSET</Label>
    <Label Adr="10:15">PRESET</Label>
    <Label Adr="16" Range="7">NSYNC_INT</Label>
    <Label Adr="16" Range="6:3">INTA(3:0)</Label>
    <Label Adr="16" Range="2">NSV</Label>
    <Label Adr="16" Range="1:0">CNFG(3:2)</Label>
    <Label Adr="17" Range="7:6">CNFG(1:0)</Label>
    <Label Adr="17" Range="5:0">MPX(5:0)</Label>
    <Label Adr="18" Range="7">NQUAD</Label>
    <Label Adr="18" Range="6">DIR</Label>
    <Label Adr="18" Range="5">NGRAY</Label>
    <Label Adr="18" Range="4">NSER</Label>
    <Label Adr="18" Range="3:2">STA(1:0)</Label>
    <Label Adr="18" Range="1">PGMODE</Label>
    <Label Adr="18" Range="0">VNN</Label>
    <Label Adr="19" Range="7:6">MTCNFG(7:6)</Label>
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    <Label Adr="19" Range="4">MTCNFG(4)</Label>
    <Label Adr="19" Range="3">MTCNFG(3)</Label>
    <Label Adr="19" Range="2">MTCNFG(2)</Label>
    <Label Adr="19" Range="1:0">MTCNFG(1:0)</Label>
    <Label Adr="20" Range="7">ODD</Label>
    <Label Adr="20" Range="6:4">ST_DL(2:0)</Label>
    <Label Adr="20" Range="3">DISPRES</Label>
    <Label Adr="20" Range="2">NSSI</Label>
    <Label Adr="20" Range="1">SSI_X</Label>
    <Label Adr="20" Range="0">SSI_A</Label>
    <Label Adr="21" Range="7">E_PAR</Label>
    <Label Adr="21" Range="6">E_ALARM</Label>
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    <Label Adr="21" Range="1:0">CFGTOS(1:0)</Label>
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  <Label Adr="23">TMX(7:0)</Label>
  <Label Adr="24">TMN(7:0)</Label>
  <Label Adr="25" Range="7">DOS</Label>
  <Label Adr="25" Range="6">NDISA</Label>
  <Label Adr="25" Range="5">IDDQ</Label>
  <Label Adr="25" Range="4">SNCOS</Label>
  <Label Adr="25" Range="3">SCOS</Label>
  <Label Adr="25" Range="2">SNSIN</Label>
  <Label Adr="25" Range="1">NSA</Label>
  <Label Adr="25" Range="0">NEV</Label>
  <Label Adr="26" Range="7">NTP</Label>
  <Label Adr="26" Range="6">ETC</Label>
  <Label Adr="26" Range="5">EKOMP</Label>
  <Label Adr="26" Range="4">EJD</Label>
  <Label Adr="26" Range="3:0">TEST(3:0)</Label>
  <Label Adr="27" Range="5">NENF</Label>
  <Label Adr="27" Range="4">ZWK</Label>
  <Label Adr="27" Range="3">DIS_ERR</Label>
  <Label Adr="27" Range="2">RES_ERR</Label>
  <Label Adr="27" Range="1:0">SEL_BP(1:0)</Label>
  <Label Adr="46" Range="7">SEC_HI(7)</Label>
  <Label Adr="46" Range="6:0">SEC_HI(6:0)</Label>
  <Label Adr="47" Range="7:0">SEC_LO(7:0)</Label>
  <Label Adr="48" Range="7:0">EMSK(7:0)</Label>
  <Label Adr="49" Range="7:0">WMSK(7:0)</Label>
  <Label Adr="50" Range="7:0">CHECK(7:0)</Label>
  <Label Adr="51:98">EEPROM</Label>
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  <Label Adr="97:102">MTx, STx, INTx</Label>
  <Label Adr="103" Range="7:0">TABS(7:0)</Label>
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  <Label Adr="104" Range="6">NERR_EX</Label>
  <Label Adr="104" Range="5">ERR_SI</Label>
  <Label Adr="104" Range="4">ERR_P</Label>
  <Label Adr="104" Range="3">ERR_K</Label>
  <Label Adr="104" Range="2">ERR_E</Label>
  <Label Adr="104" Range="1">ERR_LV</Label>
  <Label Adr="104" Range="0">ERR_S</Label>
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  <Label Pos="2">1</Label>
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  </Sens>
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   </Sens>
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  <Id Range="7:6">0b11</Id>
  <Device>
   <Id Range="5:4">0b00</Id>
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   <Sens>
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    <Label Pos="0">MT(15:0)</Label>
   </Sens>
  </Device>
  <Device>
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    <Label Pos="0">MT(11:0)</Label>
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  <Label Adr="1">ISINA(7:0)</Label>
  <Label Adr="2">INCOSA(7:0)</Label>
  <Label Adr="3">ICOSA(7:0)</Label>
  <Label Adr="4">OFFS_MT(23:16)</Label>
  <Label Adr="5">OFFS_MT(15:8)</Label>
  <Label Adr="6">OFFS_MT(7:0)</Label>
  <Label Adr="7">OFFS_ST(12:5)</Label>
  <Label Adr="8" Range="7:3">OFFS_ST(4:0)</Label>
  <Label Adr="8" Range="2:0">OFFS_INT(7:5)</Label>
  <Label Adr="9" Range="7:3">OFFS_INT(4:0)</Label>
  <Label Adr="0xA">PRES_MT(23:16)</Label>
  <Label Adr="0xB">PRES_MT(15:8)</Label>
  <Label Adr="0xC">PRES_MT(7:0)</Label>
  <Label Adr="0xD">PRES_ST(12:5)</Label>
  <Label Adr="0xE" Range="7:3">RRES_ST(4:0)</Label>
  <Label Adr="0xE" Range="2:0">PRES_INT(7:5)</Label>
  <Label Adr="0xF" Range="7:3">PRES_INT(4:0)</Label>
  <Label Adr="0x10" Range="7">NSYN_INT</Label>
  <Label Adr="0x10" Range="6:3">RES_INT(3:0)</Label>
  <Label Adr="0x10" Range="2">NSV</Label>
  <Label Adr="0x10" Range="1:0">SVU(1:0)</Label>
  <Label Adr="0x11" Range="7:6">UTRACKS(1:0)</Label>
  <Label Adr="0x11" Range="5:0">MPX(5:0)</Label>
  <Label Adr="0x12" Range="7">NQUAD</Label>
  <Label Adr="0x12" Range="6">ROT</Label>
  <Label Adr="0x12" Range="5">NGRAY</Label>
  <Label Adr="0x12" Range="4">NSER</Label>
  <Label Adr="0x12" Range="3:2">RES_ST(1:0)</Label>
  <Label Adr="0x12" Range="1">PGM</Label>
  <Label Adr="0x12" Range="0">VNN</Label>
  <Label Adr="0x13" Range="7:6">MODE_MT(1:0)</Label>
  <Label Adr="0x13" Range="5">ENPAR_MT</Label>
  <Label Adr="0x13" Range="4">POLERR_MT</Label>
  <Label Adr="0x13" Range="3">FMT_MT</Label>
  <Label Adr="0x13" Range="2">ENERR_MT</Label>
  <Label Adr="0x13" Range="1:0">RES_MT(1:0)</Label>
  <Label Adr="0x14" Range="7">ODD</Label>
  <Label Adr="0x14" Range="6:3">DL_ST(3:0)</Label>
  <Label Adr="0x14" Range="2">NSSI</Label>
  <Label Adr="0x14" Range="1">SSI_X</Label>
  <Label Adr="0x14" Range="0">SSI_A</Label>
  <Label Adr="0x15" Range="7">ENPAR</Label>
  <Label Adr="0x15" Range="6">ENALARM</Label>
  <Label Adr="0x15" Range="3">DISPRES</Label>
  <Label Adr="0x15" Range="2:0">TIMO(2:0)</Label>
  <Label Adr="0x16">TOFFS(7:0)</Label>
  <Label Adr="0x17">TMX(7:0)</Label>
  <Label Adr="0x18">TMN(7:0)</Label>
  <Label Adr="0x19" Range="7">DOS</Label>
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  <Label Adr="0x1A" Range="4">ENJD</Label>
  <Label Adr="0x1A" Range="3:0">TEST(3:0)</Label>
  <Label Adr="0x1B" Range="7:6">AOSC(1:0)</Label>
  <Label Adr="0x1B" Range="5">NENF</Label>
  <Label Adr="0x1B" Range="4">ZWK</Label>
  <Label Adr="0x1B" Range="3">DIS_ERR</Label>
  <Label Adr="0x1B" Range="2">RES_ERR</Label>
  <Label Adr="0x1B" Range="1">ETSAR</Label>
  <Label Adr="0x1B" Range="0">SEL_BP</Label>
  <Label Adr="0x1C" Range="7">ENCRC</Label>
  <Label Adr="0x1C" Range="6">ENAE</Label>
  <Label Adr="0x1C" Range="5">ENCONT</Label>
  <Label Adr="0x1C" Range="4">ENRING</Label>
  <Label Adr="0x1C" Range="3">OUTF_UC</Label>
  <Label Adr="0x1C" Range="2">ENLC</Label>
  <Label Adr="0x1C" Range="1">CRCLC</Label>
  <Label Adr="0x1C" Range="0">ENAINC</Label>
  <Label Adr="0x2E" Range="7:0">SEC_CFG(7:0)</Label>
      <Label Adr="0x2F" Range="7:0">SEC_OEM(7:0)</
        Label>
  <Label Adr="0x30" Range="7:0">EMSK(7:0)</Label>
  <Label Adr="0x31" Range="7:0">WMSK(7:0)</Label>
  <Label Adr="0x32" Range="7:0">CRCCFG(15:8)</Label>
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  <Label Adr="0x67" Range="7:0">TABS(7:0)</Label>
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  <Label Adr="0x68" Range="4">ERR_SAR</Label>
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 <Device> <!-- iC-NQX3 -->
  <Id Range="31:16">0x5833</Id>
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 </Sens>
</Device>
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 <Label Adr="8" Range="7:4">GAIN(3:0)</Label>
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 <Label Adr="10">COSOFFS(7:0)</Label>
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 <Label Adr="12" Range="2">SELAMPL</Label>
 <Label Adr="15">CRC(7:0)</Label>
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 <Label Adr="0xB" Range="0">reserved</Label>
 <Label Adr="0xB" Range="1">BYP</Label>
 <Label Adr="0xB" Range="2">reserved</Label>
 <Label Adr="0xB" Range="4:3">CVREF(1:0)</Label>
 <Label Adr="0xC" Range="4:0">ACOC_M(4:0)</Label>
 <Label Adr="0xC" Range="6:5">ACOR_M(7:0)</Label>
 <Label Adr="0xC" Range="7">ACOT_M(0)</Label>
 <Label Adr="0xD" Range="0">ACOT_M(1)</Label>
 <Label Adr="0xD" Range="4:1">CFGIBP(3:0)</Label>
 <Label Adr="0xD" Range="7:5">CFGTA(2:0)</Label>
 <Label Adr="0xE" Range="1:0">CFGTA(4:3)</Label>
 <Label Adr="0xE" Range="5:4">ENF(1:0)</Label>
 <Label Adr="0x10" Range="2:0">GR_S(2:0)</Label>
 <Label Adr="0x10" Range="7:3">GFC_S(4:0)</Label>
 <Label Adr="0x11" Range="7:0">GFS_S(7:0)</Label>
 <Label Adr="0x12" Range="2:0">GFS_S(10:8)</Label>
 <Label Adr="0x12" Range="7:3">MPS_S(4:0)</Label>
 <Label Adr="0x13" Range="4:0">MPS_S(9:5)</Label>
 <Label Adr="0x13" Range="7:5">MPC_S(2:0)</Label>
 <Label Adr="0x14" Range="6:0">MPC_S(9:3)</Label>
 <Label Adr="0x14" Range="7">ORS_S(0)</Label>
 <Label Adr="0x15" Range="0">ORS_S(1)</Label>
 <Label Adr="0x15" Range="7:1">OFS_S(6:0)</Label>
 <Label Adr="0x16" Range="2:0">OFS_S(9:7)</Label>
 <Label Adr="0x16" Range="3">OFS_S_MSB</Label>
 <Label Adr="0x16" Range="5:4">ORC_S(1:0)</Label>
 <Label Adr="0x16" Range="7:6">OFC_S(1:0)</Label>
 <Label Adr="0x17" Range="7:0">OFC_S(9:2)</Label>
 <Label Adr="0x18" Range="0">OFC_S_MSB</Label>
 <Label Adr="0x18" Range="7:1">PH_S(6:0)</Label>
 <Label Adr="0x19" Range="1:0">PH_S(8:7)</Label>
 <Label Adr="0x19" Range="2">PH_S_MSB</Label>
 <Label Adr="0x1C" Range="4:0">ACOC_S(4:0)</Label>
 <Label Adr="0x1C" Range="5">ACOR_S</Label>
 <Label Adr="0x1C" Range="7">ACOT_S(0)</Label>
 <Label Adr="0x1D" Range="0">ACOT_S(1)</Label>
 <Label Adr="0x20" Range="2:0">GR_N(2:0)</Label>
```

```
<Label Adr="0x20" Range="7:3">GFC_N(4:0)</Label>
<Label Adr="0x21" Range="7:0">GFS_N(7:0)</Label>
<Label Adr="0x22" Range="2:0">GFS_N(10:8)</Label>
<Label Adr="0x22" Range="7:3">MPS_N(4:0)</Label>
<Label Adr="0x23" Range="4:0">MPS_N(9:5)</Label>
<Label Adr="0x23" Range="7:5">MPC_N(2:0)</Label>
<Label Adr="0x24" Range="6:0">MPC_N(9:3)</Label>
<Label Adr="0x24" Range="7">OSR_N(0)</Label>
<Label Adr="0x25" Range="0">OSR_N(1)</Label>
<Label Adr="0x25" Range="7:1">OFS_N(6:0)</Label>
<Label Adr="0x26" Range="2:0">OFS_N(9:7)</Label>
<Label Adr="0x26" Range="3">OFS_N_MSB</Label>
<Label Adr="0x26" Range="5:4">ORC_N(1:0)</Label>
<Label Adr="0x26" Range="7:6">OFC_N(1:0)</Label>
<Label Adr="0x27" Range="7:0">OFC_N(9:2)</Label>
<Label Adr="0x28" Range="0">OFC_N_MSB</Label>
<Label Adr="0x28" Range="7:1">PH_N(6:0)</Label>
<Label Adr="0x29" Range="1:0">PH_N(8:7)</Label>
<Label Adr="0x29" Range="2">PH_N_MSB</Label>
<Label Adr="0x2C" Range="4:0">ACOC_N(4:0)</Label>
<Label Adr="0x2C" Range="5">ACOR_N</Label>
<Label Adr="0x2C" Range="7">ACOT_N(0)</Label>
<Label Adr="0x2D" Range="0">ACOT_N(1)</Label>
<Label Adr="0x30" Range="7:0">OFFS_ST(7:0)</Label>
<Label Adr="0x31" Range="7:0">OFFS_ST(15:8)</Label>
<Label Adr="0x32" Range="7:0">OFFS_ST(23:16)</Label>
<Label Adr="0x33" Range="7:0">OFFS_ST(31:24)</Label>
<Label Adr="0x34" Range="6:0">OFFS_ST(38:32)</Label>
<Label Adr="0x35" Range="7:0">OFFS_MT(7:0)</Label>
<Label Adr="0x36" Range="7:0">OFFS_MT(15:8)</Label>
<Label Adr="0x37" Range="7:0">OFFS_MT(23:16)</Label>
<Label Adr="0x38" Range="7:0">SPO_S(7:0)</Label>
<Label Adr="0x39" Range="4:0">SPO_S(12:8)</Label>
<Label Adr="0x39" Range="7:5">SPO_N(2:0)</Label>
<Label Adr="0x3A" Range="7:0">SPO_N(10:3)</Label>
<Label Adr="0x3B" Range="1:0">SPO_N(12:11)</Label>
<Label Adr="0x3B" Range="4:2">UBL_M(3:0)</Label>
<Label Adr="0x3B" Range="7:6">UBL_S(1:0)</Label>
<Label Adr="0x3C" Range="1:0">UBL_S(3:2)</Label>
<Label Adr="0x3C" Range="4:2">SBL_S(2:0)</Label>
<Label Adr="0x3C" Range="7:5">UBL_N(2:0)</Label>
<Label Adr="0x3D" Range="0">UBL_N(3)</Label>
<Label Adr="0x3D" Range="3:1">SBL_N(2:0)</Label>
<Label Adr="0x3D" Range="7:4">MODE_ST(3:0)</Label>
<Label Adr="0x3E" Range="4:0">DL_ST(4:0)</Label>
<Label Adr="0x3E" Range="7:5">DL_MT(2:0)</Label>
<Label Adr="0x3F" Range="0">DL_MT(3)</Label>
<Label Adr="0x3F" Range="2:1">M2S(1:0)</Label>
<Label Adr="0x3F" Range="3">NBISS</Label>
<Label Adr="0x3F" Range="4">RSSI</Label>
<Label Adr="0x3F" Range="5">ESSI</Label>
<Label Adr="0x3F" Range="6">ELC</Label>
<Label Adr="0x3F" Range="7">GRAY_SCD</Label>
<Label Adr="0x40" Range="2:0">CFG_E2P(2:0)</Label>
<Label Adr="0x40" Range="4:3">MODE_MT(1:0)</Label>
<Label Adr="0x40" Range="5">DIR</Label>
<Label Adr="0x40" Range="6">CHK_MT</Label>
<Label Adr="0x40" Range="7">reserved</Label>
<Label Adr="0x41" Range="1:0">SBL_MT(1:0)</Label>
<Label Adr="0x41" Range="2">LNT_MT</Label>
<Label Adr="0x41" Range="3">GRAY_MT</Label>
<Label Adr="0x41" Range="4">NCRC_MT</Label>
<Label Adr="0x41" Range="5">REG_MT</Label>
<Label Adr="0x41" Range="6">SWC_MT</Label>
<Label Adr="0x41" Range="7">E2EPR</Label>
<Label Adr="0x42" Range="7:0">CFGEW(7:0)</Label>
    <Label Adr="0x43" Range="1:0">PROT_E2P(1:0)</
        Label>
    <Label Adr="0x43" Range="2">S2WRN</Label>
    <Label Adr="0x43" Range="3">S2ERR</Label>
    <Label Adr="0x43" Range="4">reserved</Label>
    <Label Adr="0x43" Range="5">NC_BISS</Label>
    <Label Adr="0x43" Range="7:6">FRQ_TH(1:0)</Label
        >
    <Label Adr="0x44" Range="1:0">AUTORES(1:0)</
        Label>
<Label Adr="0x47" Range="2:0">CALMODE(2:0)</Label>
    <Label Adr="0x47" Range="4:3">TRACMODE(1:0)</
        Label>
    <Label Adr="0x48" Range="1:0">DSC(1:0)</Label>
<Label Adr="0x48" Range="3:2">DTRI(1:0)</Label>
<Label Adr="0x48" Range="5:4">DSR(1:0)</Label>
    <Label Adr="0x4C" Range="1:0">TOS(1:0)</Label>
<Label Adr="0x4C" Range="7:4">CID_SCD(3:0)</Label>
<Label Adr="0x4D" Range="0">reserved</Label>
    <Label Adr="0x4D" Range="1">reserved</Label>
    <Label Adr="0x4D" Range="2">reserved</Label>
    <Label Adr="0x4D" Range="4">reserved</Label>
    <Label Adr="0x4D" Range="5">reserved</Label>
    <Label Adr="0x4D" Range="6">reserved</Label>
    <Label Adr="0x4E" Range="7:0">CRC_E2P(9:2)</Label>
    <Label Adr="0x4F" Range="7:6">CRC_E2P(1:0)</Label>
    <Label Adr="0x50" Range="7:0">PRES_ST(7:0)</Label>
    <Label Adr="0x51" Range="7:0">PRES_ST(15:8)</Label>
    <Label Adr="0x52" Range="7:0">PRES_ST(23:16)</Label>
    <Label Adr="0x53" Range="7:0">PRES_ST(31:24)</Label>
    <Label Adr="0x54" Range="6:0">PRES_ST(38:32)</Label>
    <Label Adr="0x55" Range="7:0">PRES_MT(7:0)</Label>
    <Label Adr="0x56" Range="7:0">PRES_MT(15:8)</Label>
    <Label Adr="0x57" Range="7:0">PRES_MT(23:16)</Label>
    <Label Adr="0x75" Range="0">MT_WRN</Label>
    <Label Adr="0x75" Range="1">MT_ERR</Label>
    <Label Adr="0x75" Range="2">MT_CTR</Label>
    <Label Adr="0x75" Range="3">NON_CTR</Label>
    <Label Adr="0x75" Range="4">FRQ_STUP</Label>
    <Label Adr="0x75" Range="5">FRQ_WDR</Label>
    <Label Adr="0x75" Range="6">EPR_ERR</Label>
    <Label Adr="0x75" Range="7">TH_WRN</Label>
    <Label Adr="0x76" Range="0">TH_ERR</Label>
    <Label Adr="0x76" Range="1">RF_ERR</Label>
    <Label Adr="0x76" Range="2">CT_ERR</Label>
    <Label Adr="0x76" Range="3">ACM_MAX</Label>
    <Label Adr="0x76" Range="4">ACM_MIN</Label>
    <Label Adr="0x76" Range="5">AM_MAX</Label>
    <Label Adr="0x76" Range="6">AM_MIN</Label>
    <Label Adr="0x76" Range="7">ACS_MAX</Label>
    <Label Adr="0x77" Range="0">ACS_MIN</Label>
    <Label Adr="0x77" Range="1">AS_MAX</Label>
    <Label Adr="0x77" Range="2">AS_MIN</Label>
    <Label Adr="0x77" Range="3">ACN_MAX</Label>
    <Label Adr="0x77" Range="4">ACN_MIN</Label>
    <Label Adr="0x77" Range="5">AN_MAX</Label>
    <Label Adr="0x77" Range="6">AN_MIN</Label>
    <Label Adr="0x77" Range="7">CMD_EXE</Label>
    <Label Adr="0x78:0x7F">IDENTIFIER</Label>
  </Reg>
</Device>
<Device>  <!— iC–MH —>
  <Id Range="47:32">0x4D48</Id>
  <Label Pos="1">iC–MH </Label>
  <Label Pos="2">(unknown revision)</Label>
  <Device>  <!— iC–MHY —>
    <Id Range="31:16">0x5920</Id>
    <Label Pos="2">Y</Label>
  </Device>
  <Sens>
    <Length>1</Length>
    <Bissmod>1</Bissmod>
    <CrcPoly>0x43</CrcPoly>
    <InvCrc>1</InvCrc>
    <Label Pos="3" type="error">nWARN</Label>
  </Sens>
  <Sens>
    <Length type="incremental">1</Length>
    <Label Pos="2" type="error">nERR</Label>
  </Sens>
  <Sens>
    <Length type="incremental">12</Length>
    <Label Pos="1">ST(11:0)</Label>
  </Sens>
  <Reg>
    <IdUsed>1</IdUsed>
    <Bissmod>1</Bissmod>
    <Label Adr="0" Range="5:0">GAINF(5:0)</Label>
    <Label Adr="0" Range="7:6">GAING(1:0)</Label>
    <Label Adr="1" Range="6:0">GCC(6:0)</Label>
    <Label Adr="1" Range="7">ENAC</Label>
    <Label Adr="2" Range="6:0">VOSS(6:0)</Label>
    <Label Adr="3" Range="6:0">VOSC(6:0)</Label>
    <Label Adr="3" Range="7">PRM</Label>
    <Label Adr="4" Range="3:0">CIBM(3:0)</Label>
    <Label Adr="4" Range="4">CFGTOB</Label>
    <Label Adr="4" Range="6">DPU</Label>
    <Label Adr="4" Range="7">HCLH</Label>
    <Label Adr="5" Range="1:0">CFGDR(1:0)</Label>
    <Label Adr="5" Range="3:2">TRIHL(1:0)</Label>
    <Label Adr="5" Range="5:4">CFGO(1:0)</Label>
    <Label Adr="5" Range="6">CFGPROT</Label>
    <Label Adr="5" Range="7">ENSSI</Label>
    <Label Adr="6" Range="7:0">CFGRES(7:0)</Label>
```

```
    <Label Adr="7" Range="7:0">CFGZPOS(7:0)</Label>
    <Label Adr="8" Range="1:0">CFGAB(1:0)</Label>
    <Label Adr="8" Range="2">CFGPOLE</Label>
    <Label Adr="8" Range="3">CFGSU</Label>
    <Label Adr="8" Range="4">CFGMTD</Label>
    <Label Adr="8" Range="5">CFGDIR</Label>
    <Label Adr="8" Range="7:6">CFGHYS(1:0)</Label>
    <Label Adr="9" Range="7:0">CfgCOM(7:0)</Label>
    <Label Adr="10" Range="0">CFGMTD2</Label>
    <Label Adr="14" Range="7:0">TEST(7:0)</Label>
    <Label Adr="15" Range="0">PROGZAP</Label>
    <Label Adr="66:67" Range="">PROFILE</Label>
    <Label Adr="118" Range="7:0">GAIN(7:0</Label>
    <Label Adr="119" Range="0">PROGOK</Label>
    <Label Adr="119" Range="3">ERREXT</Label>
    <Label Adr="119" Range="4">ERRAMAX</Label>
    <Label Adr="119" Range="5">ERRAMIN</Label>
    <Label Adr="119" Range="6">ERRSDATA</Label>
    <Label Adr="119" Range="7">PROGERR</Label>
    <Label Adr="120:127">IDENTIFIER</Label>
   </Reg>
  </Device>
 </Manufacturer>
 <Manufacturer Id="0000">
  <Label>iC-Haus GmbH</Label>
  <Device>  <!-- iC-MH -->
   <Id Range="47:32">0x4D48</Id>
   <Label Pos="1">iC-MH </Label>
   <Label Pos="2">(unknown revision)</Label>
   <Device>  <!-- iC-MHY -->
    <Id Range="31:16">0x5920</Id>
    <Label Pos="2">Y</Label>
   </Device>
   <Sens>
    <Length>1</Length>
    <Bissmod>1</Bissmod>
    <CrcPoly>0x43</CrcPoly>
    <InvCrc>1</InvCrc>
    <Label Pos="3" type="error">nWARN</Label>
   </Sens>
   <Sens>
    <Length type="incremental">1</Length>
    <Label Pos="2" type="error">nERR</Label>
   </Sens>
   <Sens>
    <Length type="incremental">12</Length>
    <Label Pos="1">ST(11:0)</Label>
   </Sens>
   <Reg>
    <IdUsed>1</IdUsed>
    <Bissmod>1</Bissmod>
    <Label Adr="0" Range="5:0">GAINF(5:0)</Label>
    <Label Adr="0" Range="7:6">GAING(1:0)</Label>
    <Label Adr="1" Range="6:0">GCC(6:0)</Label>
    <Label Adr="1" Range="7">ENAC</Label>
    <Label Adr="2" Range="6:0">VOSS(6:0)</Label>
    <Label Adr="3" Range="6:0">VOSC(6:0)</Label>
    <Label Adr="3" Range="7">PRM</Label>
    <Label Adr="4" Range="3:0">CIBM(3:0)</Label>
    <Label Adr="4" Range="4">CFGTOB</Label>
    <Label Adr="4" Range="6">DPU</Label>
    <Label Adr="4" Range="7">HCLH</Label>
    <Label Adr="5" Range="1:0">CFGDR(1:0)</Label>
    <Label Adr="5" Range="3:2">TRIHL(1:0)</Label>
    <Label Adr="5" Range="5:4">CFGO(1:0)</Label>
    <Label Adr="5" Range="6">CFGPROT</Label>
    <Label Adr="5" Range="7">ENSSI</Label>
    <Label Adr="6" Range="7:0">CFGRES(7:0)</Label>
    <Label Adr="7" Range="7:0">CFGZPOS(7:0)</Label>
    <Label Adr="8" Range="1:0">CFGAB(1:0)</Label>
    <Label Adr="8" Range="2">CFGPOLE</Label>
    <Label Adr="8" Range="3">CFGSU</Label>
    <Label Adr="8" Range="4">CFGMTD</Label>
    <Label Adr="8" Range="5">CFGDIR</Label>
    <Label Adr="8" Range="7:6">CFGHYS(1:0)</Label>
    <Label Adr="9" Range="7:0">CfgCOM(7:0)</Label>
    <Label Adr="10" Range="0">CFGMTD2</Label>
    <Label Adr="14" Range="7:0">TEST(7:0)</Label>
    <Label Adr="15" Range="0">PROGZAP</Label>
    <Label Adr="66:67" Range="">PROFILE</Label>
    <Label Adr="118" Range="7:0">GAIN(7:0</Label>
    <Label Adr="119" Range="0">PROGOK</Label>
    <Label Adr="119" Range="3">ERREXT</Label>
    <Label Adr="119" Range="4">ERRAMAX</Label>
    <Label Adr="119" Range="5">ERRAMIN</Label>
    <Label Adr="119" Range="6">ERRSDATA</Label>
    <Label Adr="119" Range="7">PROGERR</Label>
    <Label Adr="120:127">IDENTIFIER</Label>
   </Reg>
  </Device>
 </Manufacturer>
</BiSS-Identifier>
```

XML FILE FOR BiSS PROFILE IDENTIFIER

This XML file illustrates the structure and contents of the *BiSS* profile XML file. With this, communication settings from the *BiSS* profile identifier and the *BiSS* profile XML file can be generated.

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<!DOCTYPE BiSS-Identifier SYSTEM "idbiss.dtd">
<BiSS-Identifier Version="1.0">
 <Profile>
  <Device> <!--BP0 -->
   <Id Range="15:13">0b000</Id>
   <Label Pos="0">BP0: Universal Profile</Label>
   <Device>
    <Id Range="12:8">0b00000</Id>
    <Label Pos="1">, Zero Length Data Channel</Label>
   </Device>
   <Device>
    <Id Range="7:7">0b0</Id> <!-- Sensor -->
    <Id Range="12:8" type="exclude">0b00000</Id>
    <Label Pos="1">, Sensor</Label>
    <SCDS>
     <CrcPoly>0x25</CrcPoly>
    </SCDS>
    <Device>
     <Id Range="12:8">0b00001</Id> <!-- 1 Bit -->
     <SCDS>
      <Length>1</Length>
      <Label Pos="1">Data</Label>
     </SCDS>
    </Device>
    <Device>
     <Id Range="12:8">0b00010</Id> <!-- 2 Bit -->
     <SCDS>
      <Length>2</Length>
      <Label Pos="1">Data</Label>
     </SCDS>
    </Device>
    <Device>
     <Id Range="12:8">0b00011</Id> <!-- 3 Bit -->
     <SCDS>
      <Length>3</Length>
      <Label Pos="1">Data</Label>
     </SCDS>
    </Device>
    <Device>
     <Id Range="12:8">0b00100</Id> <!-- 4 Bit -->
     <SCDS>
      <Length>4</Length>
      <Label Pos="1">Data</Label>
     </SCDS>
    </Device>
    <Device>
     <Id Range="12:8">0b00101</Id> <!-- 5 Bit -->
     <SCDS>
      <Length>5</Length>
      <Label Pos="1">Data</Label>
     </SCDS>
    </Device>
    <Device>
     <Id Range="12:8">0b00110</Id> <!-- 6 Bit -->
     <SCDS>
      <Length>6</Length>
      <Label Pos="1">Data</Label>
     </SCDS>
    </Device>
    <Device>
     <Id Range="12:8">0b00111</Id> <!-- 7 Bit -->
     <SCDS>
      <Length>7</Length>
      <Label Pos="1">Data</Label>
     </SCDS>
    </Device>
    <Device>
     <Id Range="12:8">0b01000</Id> <!-- 8 Bit -->
     <SCDS>
      <Length>8</Length>
      <Label Pos="1">Data</Label>
     </SCDS>
    </Device>
    <Device>
     <Id Range="12:8">0b01001</Id> <!-- 9 Bit -->
     <SCDS>
      <Length>9</Length>
      <Label Pos="1">Data</Label>
     </SCDS>
    </Device>
    <Device>
     <Id Range="12:8">0b01010</Id> <!-- 10 Bit -->
     <SCDS>
      <Length>10</Length>
      <Label Pos="1">Data</Label>
     </SCDS>
    </Device>
    <Device>
     <Id Range="12:8">0b01011</Id> <!-- 11 Bit -->
     <SCDS>
      <Length>11</Length>
      <Label Pos="1">Data</Label>
     </SCDS>
    </Device>
    <Device>
     <Id Range="12:8">0b01100</Id> <!-- 12 Bit -->
     <SCDS>
      <Length>12</Length>
      <Label Pos="1">Data</Label>
     </SCDS>
    </Device>
    <Device>
     <Id Range="12:8">0b01101</Id> <!-- 13 Bit -->
     <SCDS>
      <Length>13</Length>
      <Label Pos="1">Data</Label>
     </SCDS>
    </Device>
    <Device>
     <Id Range="12:8">0b01110</Id> <!-- 14 Bit -->
     <SCDS>
      <Length>14</Length>
      <Label Pos="1">Data</Label>
     </SCDS>
    </Device>
    <Device>
     <Id Range="12:8">0b01111</Id> <!-- 15 Bit -->
     <SCDS>
      <Length>15</Length>
      <Label Pos="1">Data</Label>
     </SCDS>
    </Device>
    <Device>
     <Id Range="12:8">0b10000</Id> <!-- 16 Bit -->
     <SCDS>
      <Length>16</Length>
      <Label Pos="1">Data</Label>
     </SCDS>
    </Device>
    <Device>
     <Id Range="12:8">0b10001</Id> <!-- 17 Bit -->
     <SCDS>
      <Length>17</Length>
      <Label Pos="1">Data</Label>
     </SCDS>
    </Device>
    <Device>
     <Id Range="12:8">0b10010</Id> <!-- 18 Bit -->
     <SCDS>
      <Length>18</Length>
      <Label Pos="1">Data</Label>
     </SCDS>
    </Device>
    <Device>
     <Id Range="12:8">0b10011</Id> <!-- 19 Bit -->
     <SCDS>
      <Length>19</Length>
      <Label Pos="1">Data</Label>
     </SCDS>
    </Device>
    <Device>
     <Id Range="12:8">0b10100</Id> <!-- 20 Bit -->
     <SCDS>
```

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      Bit —>
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        Bit —>
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