SW CONFIGURATION OF THE CIB NETWORK

TXV 003 46.01

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SW configuration of the CIB network

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CONTENT

1. INTRODUCTION

The aim of the handbook is to introduce the SW configuration INELS of the CIB network in the Mosaic programmable environment to the PLC Tecomat Foxtrot user. It provides information on INELS master configuration, configuration of individual INELS units and transferred data structures of particular INELS units.

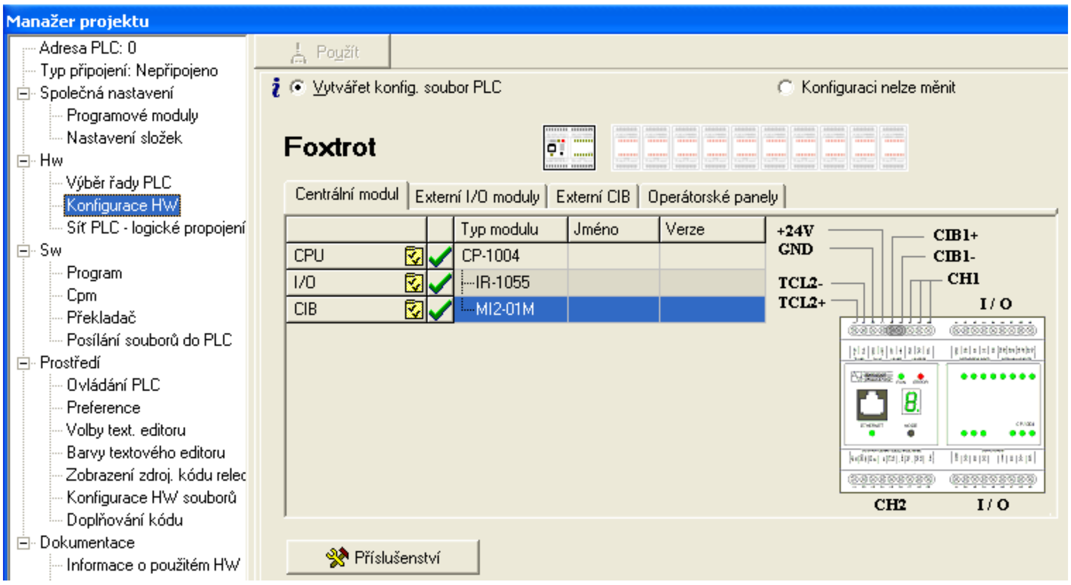
The configuration itself is undertaken on the basis of the Mosaic dialogs. Declarations mentioned in this handbook are, therefore, generated automatically by the Mosaic and should serve to the user as a model in case of „manual“ comfiguration of the INELS network and to understand the significance of transferred data structures of INELS units.

2. INELS MASTER DECLARATION

2.1. Configuration

The INELS master addition to the PLC Tecomat Foxtrot configuration is undertaken via the dialog *HW configuration* in the *Project manager. CPU Tecomat Foxtrot* allows the servicing of one CIB line via the internal INELS master MI2-01M and up to 8 external CIB lines via 4 external INELS masters MI2-02M (external master MI2-02M contains 2 CIB lines).

The control initization of the internal INELS master MI2-01M is done on the *Central module* panel.



Manažer projektu

- Adresa PLC: 0
- Typ připojení: Nepřipojeno
- Společná nastavení
  - Programové moduly
  - Nastavení složek
- Hw
  - Výběr řady PLC
  - Konfigurace HW
  - Síť PLC - logické propojení
- Sw
  - Program
  - Cpm
  - Překladač
  - Posílání souborů do PLC
- Prostředí
  - Ovládání PLC
  - Preference
  - Volby text. editoru
  - Barvy textového editoru
  - Zobrazení zdroj. kódu relec
  - Konfigurace HW souborů
  - Doplňování kódu
- Dokumentace
  - Informace o použitém HW

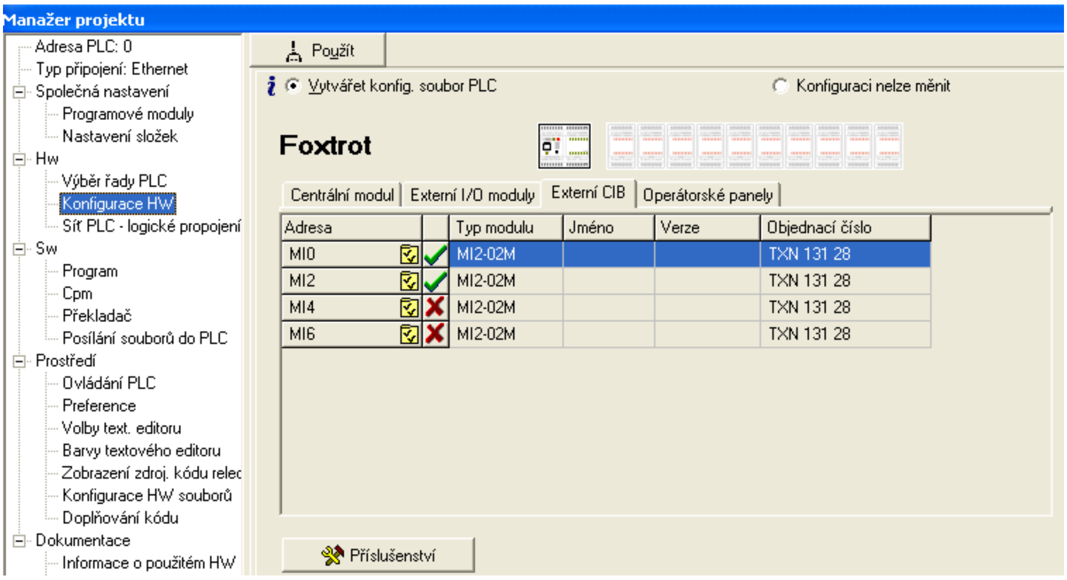
● Vytvářet konfig. soubor PLC ○ Konfiguraci nelze měnit

Foxtrot

			Typ modulu	Jméno	Verze
CPU		✓	CP-1004		
I/O		✓	IR-1055		
CIB		✓	MI2-01M		

Fig. 2.1 The control initization of the internal INELS master

Control addition and initization of external INELS masters MI2-02M is done on *External CIB* dialog panel.

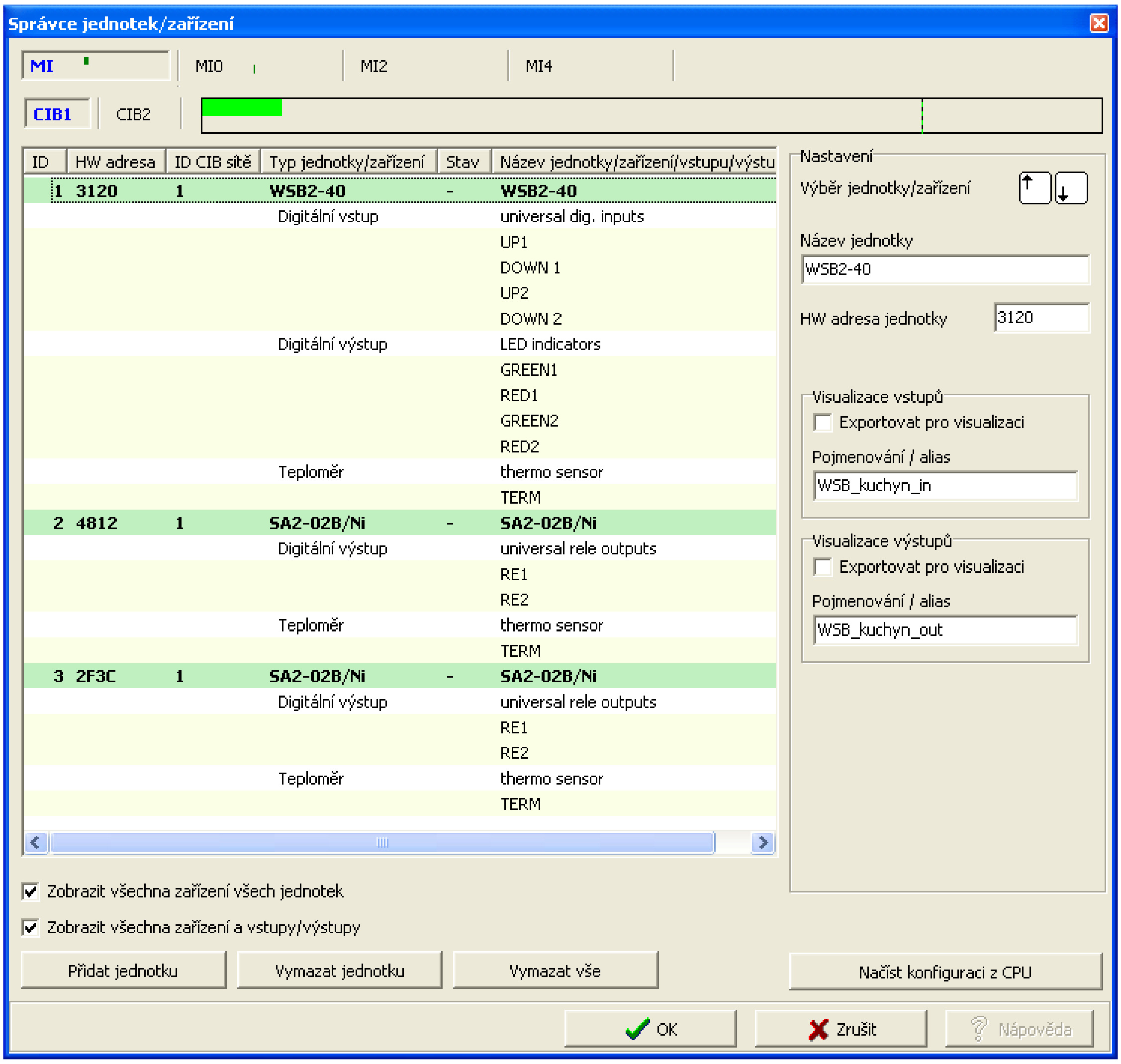


● Vytvářet konfig. soubor PLC ○ Konfiguraci nelze měnit

Adresa			Typ modulu	Jméno	Verze	Objednací číslo
MI0	☑	✓	MI2-02M			TXN 131 28
MI2	☑	✓	MI2-02M			TXN 131 28
MI4	☑	✗	MI2-02M			TXN 131 28
MI6	☑	✗	MI2-02M			TXN 131 28

Fig. 2.2   Control addition and initization of external INELS master

SW INELS master configuration for control of INELS items to the CIB bus is done via the dialog *Items/devices manager*. The dialog is accesible via the window *HW configuration* after clicking on ☑ icon on the INELS master line.



ID	HW adresa	ID CIB sítě	Typ jednotky/zařízení	Stav	Název jednotky/zařízení/vstupu/výstu
1	3120	1	WSB2-40	-	WSB2-40
			Digitální vstup		universal dig. inputs
					UP1
					DOWN 1
					UP2
					DOWN 2
			Digitální výstup		LED indicators
					GREEN1
					RED1
					GREEN2
					RED2
			Teploměr		thermo sensor
					TERM
2	4812	1	SA2-02B/Ni	-	SA2-02B/Ni
			Digitální výstup		universal rele outputs
					RE1
					RE2
			Teploměr		thermo sensor
					TERM
3	2F3C	1	SA2-02B/Ni	-	SA2-02B/Ni
			Digitální výstup		universal rele outputs
					RE1
					RE2
			Teploměr		thermo sensor
					TERM

Nastavení

Výběr jednotky/zařízení

Název jednotky: WSB2-40

HW adresa jednotky: 3120

Visualizace vstupů

□ Exportovat pro visualizaci

Pojmenování / alias: WSB_kuchyn_in

Visualizace výstupů

□ Exportovat pro visualizaci

Pojmenování / alias: WSB_kuchyn_out

☑ Zobrazit všechna zařízení všech jednotek

☑ Zobrazit všechna zařízení a vstupy/výstupy

Fig. 2.3   SW configuration of INELS master

Particular INELS units can be added to the list manually using the button *Add unit* , or automatically according to the CPU connected via the button *Load configuration from the CPU*. When choosing units manually, it is necessary to set the address to the field *HW unit address.* This address is set to the unit during the production and is marked on each unit. The address is a 4-numbered code in hexadecimal (sixteenth) format. It is not possible to operate more units with the similar HW address on one CIB line!!!

Using items *Naming/alias* the symbolic name can be set under which the structure of inputs/outputs of the set unit will be accesible.

Based on this dialog, the initialisation table of INELS master is generated. The part of the initialisation table is a hyperlink to transferred data zone location (input and output), hyperlink to diagnostics zone (status and errors) and a list of operated INELS units.

The initialisation table of the INELS master is described using the bellow stated structures:

```
#struct _TTS_INEHead  ;The header of the initialisation table of the
chanel in the INE mode
  word     code,      ;00 code 00C9 for data validity control
  word     mode_,     ;02 data exchange modes = 0x0000
  _TTS_SetSCH parSCH, ;04 basic parameters
  _TTS_Modem  modem,  ;0C modem parameters – not used
  long     iin,       ;18 input data address
  long     iout,      ;1C output data address
  long     istat,     ;20 status data address
  long     ierr,      ;24 error data address
  word     tabConvIN, ;28 conversion table  of input data zone  number
  word     tabConvOUT,;2A conversion table  of output data zone  number
  byte     nnt,       ;2C real number of controlled units
  byte     nline      ;2D number of following lines in unit description


#struct _TTS_LINE     ;Initialisation table line with the unit
information
  byte     mkom,      ;00 communcation mode
                      ; .7 = 0/1 – unit non-controlled/controlled
                      ; .6 = 1 – unit is part of the master(internal
periphery.)
  byte     rez,       ;   not used (rezerve)
  word     tabini,    ;02 unit initialisation data table number
  word     lein,      ;04 input data lenght of the unit (bytes)
  word     leout      ;06 output data lenght of the unit (bytes)
```

The initialisation table of INELS master itself (INE channel) is described by this structure:

```
#struct _TTS_INEINIT_CH ; The structure of INE channel initialisation
table
  _TTS_INEHead  Head,  ;table header
  _TTS_LINE[33] Line   ;INELS units initialisation lines
```

Example of the declaration of the INE channel initialisation table where the sample of INELS units is represented:

```
;
; INELS channel initialisation table (CIB lines)
;
#table _TTS_INEINIT_CH  _Table_INELS_MI_CIB =
                     $00C9,$0000,             ;code, mode        (set)
                     9,63,$0C,0,0,0,0,0,      ;basic parameters (set)
                     0,0,0,0,                 ;modem parameters(set)
                     __offset32(MI_CIB_IN),  ;iin – input data
                     __offset32(MI_CIB_OUT), ;iout – output data
                     __offset32(INE_STAT_MI_CIB),;istat – status zone
                     __offset32(INE_ERR_MI_CIB), ;ierr –communication
                erros
                     __indx (Konvert_IN_MI_CIB), ;input conversion table
                     __indx (Konvert_OUT_MI_CIB),;output conversion
                table
                     31+1,                    ;real unit number
                     32+1,                    ;description lines number
                     $C0,$00, __indx (INI_MI2_02)  ,
2,0,;3128,internal                    $80,$00, __indx (INI_DA2_22M),
4,2, ;3101
                     $80,$00, __indx (INI_DAC2_04B),   2,4, ;3102
                     $80,$00, __indx (INI_DAC2_04M),   0,4, ;3104
                     $80,$00, __indx (INI_IART2_1),    5,1, ;3107
                     $80,$00, __indx (INI_IDRT2_1),    5,1, ;3108
                     $80,$00, __indx (INI_IM2_140M),   3,0, ;3109
                     $80,$00, __indx (INI_IM2_80B),    4,0, ;3110
                     $80,$00, __indx (INI_KEY2_01R_BL),6,16,;3111
                     $80,$00, __indx (INI_KEY2_01_BL), 1,16,;3112
                     $80,$00, __indx (INI_LM2_11B),    3,1, ;3113
                     $80,$00, __indx (INI_LBC2_02M),   1,2, ;3114
                     $80,$00, __indx (INI_SA2_01B_Ni), 2,1, ;3115
                     $80,$00, __indx (INI_SA2_01B_Sn), 2,1, ;3116
                     $80,$00, __indx (INI_SA2_02B_Ni), 2,1, ;3117
                     $80,$00, __indx (INI_SA2_02B_Sn), 2,1, ;3118
                     $80,$00, __indx (INI_SA2_02M_Ni), 1,1, ;3119
                     $80,$00, __indx (INI_SA2_02M_Sn), 1,1, ;3120
                     $80,$00, __indx (INI_SA2_04M_Ni), 1,1, ;3121
                     $80,$00, __indx (INI_SA2_04M_Sn), 1,1, ;3122
                     $80,$00, __indx (INI_SOPHY2),     9,6, ;3123
                     $80,$00, __indx (INI_SOPHY2_L),   7,4, ;3124
                     $80,$00, __indx (INI_WSB2_20),    3,1, ;3125
                     $80,$00, __indx (INI_WSB2_40),    3,1, ;3126
                     $80,$00, __indx (INI_WSB2_80),    3,1, ;3127
                     $80,$00, __indx (INI_FCC2_01),    4,2, ;3129
                     $80,$00, __indx (INI_WMR2_11),    8,1, ;3133
                     $80,$00, __indx (INI_ADC2_40M),   9,0, ;3135
                     $80,$00, __indx (INI_WSB2_60),    3,2, ;3143
                     $80,$00, __indx (INI_ADC2_40M),   9,0, ;3148
                     $80,$00, __indx (INI_IM2_20B),    4,0, ;3149
                     $80,$00, __indx (INI_IM2_40B),    4,0, ;3150
                     $80,$00, __indx (INI_DIM6),       3,1  ;3691
```

Example of the declaration of the INE channel (internal INELS master):

```
#struct TmodulE1                ;module declaration structure
        USINT version,          ;description version
        USINT rack,             ;rack address
        USINT address,          ;module address on the rack
        UINT  LogAddress,       ;logic address
        UINT  LenInputs,        ;input data zone lenght
        UINT  LenOutputs,       ;output data zone lenght
        DINT  OffsetInputs,     ; input data zone position
        DINT  OffsetOutputs,    ; output data zone position
        UINT  InitTable         ;initialisation table index


#module TmodulE1 1, 0, 2, $0110,  10,  2, __offset(Statistic_CH_INELS),
__offset(Control_CH_INELS), __indx (_Table_INELS_MI_CIB)
```

INELS master within the CPU Foxtrot (internal master) contains one INE channel and is always mapped into the rack 0 (variable *rack*=0) onto the address 2 (variable *address=2*).

INELS master connected to the CPU Foxtrot via the external TCL2 bus (external master) contains two INE channels and those are always mapped into the frame 3 (variable *rack*=3), address is optionable via the address switcher within the range 0 to 15 (variable *address=0 to* 15).

The signification of particular items of the initialisation table:

code	- channel type identification code, set to $00C9
*mode_*	- data exchange mode, set to $0000
parSCH	- channel basic parameters, set to 9,63,$0C,0,0,0,0,0
modem	- modem parameters (not used), set to 0,0,0,0
iin	- input data zone address
iout	- output data zone address
istat	- status zone address
ierr	- error zone address
tabConvIN	- input data zone conversion table number
tabConvOUT	- output data zone conversion table number
nnt	- real number of channel controlled units (can rise max by the value *nline*)
nline	- number of following lines of the channel units description, set to 33 (32+1)

Each unit is described by following items of the initialisation table:

mkom - unit communication mode
bit .7 = 0 - unit not controlled
1 - unit controlled
bit .6 = 0 - CIB unit
1 - internal unit of the master

rez - not used (rezerve), set to 0

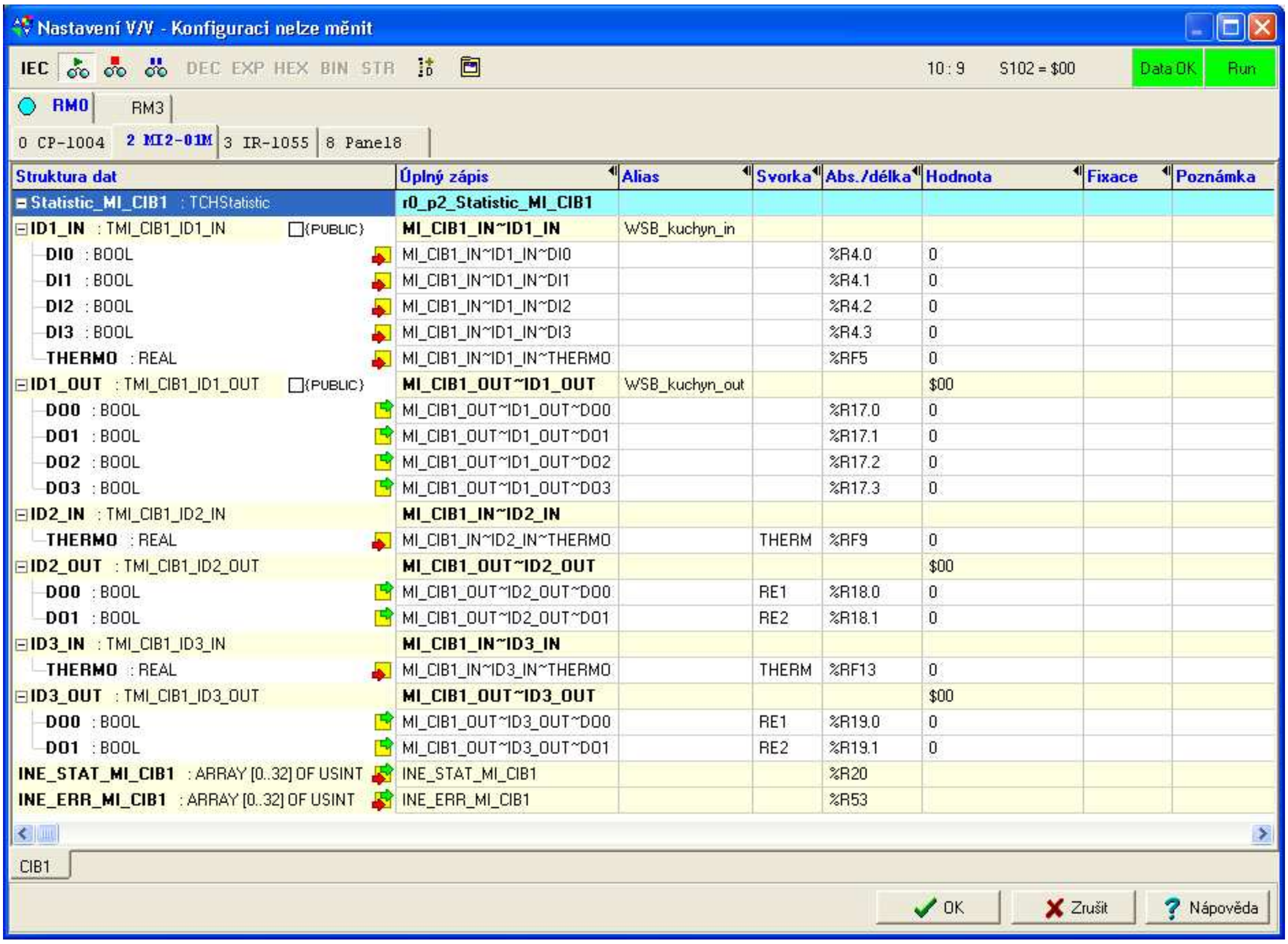
tabini - unit initialisation data table number

lein - total lenght of unit input data (bytes)

leout - total lenght of unit input data (bytes)

2.2. Transferred data structure

INELS master reserves a data field in the CPU notepad, where transferred data from/to INELS units, status and error zone of INELS units, are available. The structure of the data field can be found on the *Settings V/N* panel in the Mosaic environment. The panel is accessible after the click on the IO icon on the tool bar.



Struktura dat	Úplný zápis	Alias	Svorka	Abs./délka	Hodnota	Fixace	Poznámka
Statistic_MI_CIB1 : TCHStatistic	r0_p2_Statistic_MI_CIB1						
ID1_IN : TMI_CIB1_ID1_IN □{PUBLIC}	MI_CIB1_IN~ID1_IN	WSB_kuchyn_in					
DI0 : BOOL	MI_CIB1_IN~ID1_IN~DI0			%R4.0	0		
DI1 : BOOL	MI_CIB1_IN~ID1_IN~DI1			%R4.1	0		
DI2 : BOOL	MI_CIB1_IN~ID1_IN~DI2			%R4.2	0		
DI3 : BOOL	MI_CIB1_IN~ID1_IN~DI3			%R4.3	0		
THERMO : REAL	MI_CIB1_IN~ID1_IN~THERMO			%RF5	0		
ID1_OUT : TMI_CIB1_ID1_OUT □{PUBLIC}	MI_CIB1_OUT~ID1_OUT	WSB_kuchyn_out			$00		
DO0 : BOOL	MI_CIB1_OUT~ID1_OUT~DO0			%R17.0	0		
DO1 : BOOL	MI_CIB1_OUT~ID1_OUT~DO1			%R17.1	0		
DO2 : BOOL	MI_CIB1_OUT~ID1_OUT~DO2			%R17.2	0		
DO3 : BOOL	MI_CIB1_OUT~ID1_OUT~DO3			%R17.3	0		
ID2_IN : TMI_CIB1_ID2_IN	MI_CIB1_IN~ID2_IN						
THERMO : REAL	MI_CIB1_IN~ID2_IN~THERMO		THERM	%RF9	0		
ID2_OUT : TMI_CIB1_ID2_OUT	MI_CIB1_OUT~ID2_OUT				$00		
DO0 : BOOL	MI_CIB1_OUT~ID2_OUT~DO0		RE1	%R18.0	0		
DO1 : BOOL	MI_CIB1_OUT~ID2_OUT~DO1		RE2	%R18.1	0		
ID3_IN : TMI_CIB1_ID3_IN	MI_CIB1_IN~ID3_IN						
THERMO : REAL	MI_CIB1_IN~ID3_IN~THERMO		THERM	%RF13	0		
ID3_OUT : TMI_CIB1_ID3_OUT	MI_CIB1_OUT~ID3_OUT				$00		
DO0 : BOOL	MI_CIB1_OUT~ID3_OUT~DO0		RE1	%R19.0	0		
DO1 : BOOL	MI_CIB1_OUT~ID3_OUT~DO1		RE2	%R19.1	0		
INE_STAT_MI_CIB1 : ARRAY [0..32] OF USINT	INE_STAT_MI_CIB1			%R20			
INE_ERR_MI_CIB1 : ARRAY [0..32] OF USINT	INE_ERR_MI_CIB1			%R53			

Fig. 2.4 Transferred data structure

MI_CIB_IN[ ], MI_CIB_OUT[ ]

Output data zone *MI_CIB_IN[]* and input data zone *MI_CIB_OUT[]* is structured into items *ID_IN* and *ID_OUT* sequenced so as INELS units are sequenced in the initialisation table of the INE channel. Data are accesible both under the automatically generated variable names (*Full entry column)* and also using the user name set during the configuration within the *Units/devices manager (Alias column).*

Some of input/output data are before the transfer from/to CIB bus automatically converted from/to more economic data formats for transfer via the CIB bus (for further refference see Convert_…)**.**

INE_STAT_MI_CIB [ ]

Status zone *INE_STAT_MI_CIB[ ]* contains communication statuses of individual INELS units.

	NET	-	-	REI	-	ADR	COM	INI
Bit	7	6	5	4	3	2	1	0

INI - unit initialisation status
1 – unit initialised
0 – unit not unitialised

COM - communication with the unit status
1 – unit communicates
0 – unit does not communicate

ADR - unit addressing status
1 – unit addressed succesfully
0 – unit not addressed

REI - unit re-initialisation status (after the unit communication failure)
1 – unit re-initialisation running
0 – unit operation

NET - unit operation status
1 – unit operated
0 – unit not operated

Error-less unit operation is represented by the value of the status 0x87. All other statuses are represented by non-standard unit behaviour.

INE_ ERR_MI_CIB [ ]

Error zone *INE_ERR_MI_CIB[]* displays number of error communication with individual INELS units. If there is, in the relevant variable, the zero value, the communication with the particular unit is ok (no communication failures). Variables INE_ERR_MI_CIB are of the byte type, the number of errors is, therefore, counted up to 255 value, then the counter is reseted and new count will start from the 0 value.

2.3. Conversion tables

KONVERT_IN_MI_CIB, KONVERT_OUT_MI_CIB

Via CIB bus are some unit data transferred in more economic data format (e. g. temperatures in word format, …). However, for the use of conversion by the application program, standardized formats are more suitable (e. g. temperatures in the float format). CPU thus can automatically undertake these data conversions straight within the transferred data zones *MI_CIB_IN[]* and *MI_CIB_OUT[].* The conversion tables *KONVERT_IN_MI_CIB* and *KONVERT_OUT_MI_CIB* are used for defining of the conversion relations. Tables are of a byte type.

The signification of conversion tables´ items :

0x00	- end of conversion list
0x01 … 0x7F	- number of bytes that will be transferred without conversion
0x81	- conversion signed byte onto float
0x82	- conversion unsigned byte onto float
0x83	- conversion signed word onto float
0x84	- conversion unsigned word onto float
0x93	- conversion signed word in centesimals onto float
0x94	- conversion unsigned word in centesimals onto float
0xC1	- conversion float onto signed byte
0xC2	- conversion float onto unsigned byte
0xC3	- conversion float onto signed word
0xC4	- conversion float onto unsigned word
0xD3	- conversion float onto signed word in centesimals
0xD4	- conversion float onto unsigned word in centesimals

If the conversion table contains only one item with the accumulating lenght of receiving/broadcasting data (in bytes), the conversion is not undertaken. Data are then in the notepad accesible in the format in which they are transferred through the CIB bus during the communication with INELS units.

If the conversion table is filled in with conversion relations, there are in the notepad the variables within the transferred data zones accesible in standardized (converted) formats.

If during the INELS CIB network configuration the automatic configuration tool is used of the Mosaic programming environment, the above stated conversions are undertaken automatically. It means, e. g. input temperatures are in the notepad presented in the float format, output analog values are in the notepad presented in the float format, ….

In the following description the INELS units data zones are described in default (more economic) data format (i. e. in the format in which data are transferred via the CIB bus).

3. INELS UNITS DECLARATION

Links to initialisation tables of individual controlled INELS units are defined from the main initialization table of the INELS master using *tabini* items. Each INELS item consists of several input/output devices for which their control can be activated/deactivated separately.

Initialization tables of INELS units are defined using the bellow stated structures:

```
#struct tdev          ;initialization table line with the device
description
   byte    typdev,    ;00 device type
                      ;  .1.0 = 00 – input device
                      ;         01 – output device
                      ;         11 – input/output device
                      ;  .7 = 0/1 – device not operated / operated
   byte    rastr,     ;01  reserve (not used)
   word    leindev,   ;02 lenght of device input data(in bits)
   word    leoutdev   ;04 lenght of device output data (in bits)

#struct tiunit        ;initialization table for INELS unit – general
   word    code,      ;01 item code
   word    mode_,     ;03 reserve (not used)
   word    fadr,      ;05 item physical address
   byte    ladr,      ;07 item logic address
   byte    ndev,      ;08 number of devices on the unit
   tdev    dev[ ]     ;09 lines with the device description
```

The signification of individual items of device description :

typdev - device type
bit .0 = 0 - input device
1 - output device
bit .7 = 0 - device not operated
1 – device operated

rastr - not used, firm 0

leindev - lenght of device input data (in bits)

leoutdev - lenght of device output data (in bits)

The signification of individual items of the INELS unit initialization table:

code - unit identification code

*mode_* - not used, firm 0

fadr - physical (HW) unit address, in the range 0x0000..0xFFFF
Within the range of one INE_chanel (one CIB bus), this address must be unique.

ladr - unit logic address, in the range 0..31
Within the range of one INE_chanel (one CIB bus), this address must be unique.

ndev - number of devices contained in the INELS unit

dev[ ] - line with the device description (see structure *tdev* above). The number of lines with the device description corresponds to the value of the variable *ndev*.

3.1. 3101 - DA2-22M

Unit initialization structure :

```
#struct tiunit_DA2_22M ;initialization table for units DA2-22M
    word   code,      ;01 unit code
    word   mode_,     ;03 data transfer mode
    word   fadr,      ;05 unit physical address
    byte   ladr,      ;07 unit logic address
    byte   ndev,      ;08 number of devices on the unit = 4
    tdev   dev[4],    ;09 line with the device information
    word   tempOfs    ;   offset of the thermometer [0.01°C]
```

Unit initialization table example:

```
#table tiunit_DA2_22M INI_DA2_22M = ;initialization table DA2-22M
    3101,             ;code
    $0000,            ;mode
    $0000,            ;fadr
    $00,              ;ladr
    4,                ;ndev
    $80, 0,  2,  0,   ;device 1, input,  2*DI (inputs)
    $80, 0,  2,  0,   ;device 2, input,  2*DI (buttons)
    $81, 0,  0, 16,   ;device 3, output, 2*AO
    $80, 0, 16,  0,   ;device 4, input,  1*AI (thermometer)
    0                 ;offset of the thermometer
```

Input data :

DI	SW	Temp

DI - inputs status (byte)
DI.0 - input IN1
DI.1 - input IN2

SW - buttons status (byte)
SW.0 - button SW1
SW.1 - button SW2

Temp - temperature (word) [0.01℃]

Output data :

AO1	AO2

AO1 - analog output OUT1 value (byte) [0-100%]

AO2 - analog output OUT2 value (byte) [0-100%]

3.2. 3102 - DAC2-04B

Unit initialization structure :

```
#struct tiunit_DAC2_04B  ;Initialization table for units DAC2-04B
    word   code,      ;01 unit code
    word   mode_,     ;03 data transfer mode
    word   fadr,      ;05 unit physical address
    byte   ladr,      ;07 unit logic address
    byte   ndev,      ;08 number of devices on the unit = 2
    tdev   dev[2],    ;09 line with device information
    byte   tao[4],    ;   analog output type 1-4 units
                      ;   0 = 0-10V
                      ;   1 = 1-10V
    word   tempOfs    ;   offset of the thermometer [0.01°C]
```

Unit initialization table example :

```
#table tiunit_DAC2_04B INI_DAC2_04B = ;initialization table DAC2-04B
    3102,             ;code
    $0000,            ;mode
    $0000,            ;fadr
    $00,              ;ladr
    2,                ;ndev
    $81, 0,  0, 32,   ;device 1,output, 4*AO
    $80, 0, 16,  0,   ;device 2, input,  1*AI (thermometer)
    1,1,0,0,          ;AO configured to 0/1 =0-10V/1-10V
    0                 ;offset of the thermometer
```

Input data :

Temp

Temp - temperature (word) [0.01℃]

Output data :

AO1	AO2	AO3	AO4

AO1 - analog output value OUT1 (byte) [0-100%]
AO2 - analog output value OUT2 (byte) [0-100%]
AO3 - analog output value OUT3 (byte) [0-100%]
AO4 - analog output value OUT4 (byte) [0-100%]

3.3. 3104 - DAC2-04M

Unit initialization structure :

```
#struct tiunit_DAC2_04M  ;Initialization table for units DAC2-04M
    word   code,      ;01 unit code
    word   mode_,     ;03 data transfer code
    word   fadr,      ;05 unit physical address
    byte   ladr,      ;07 unit logic address
    byte   ndev,      ;08 number of devices on the unit = 1
    tdev   dev[1],    ;09 line with the device information
    byte   tao[4],    ;   analog output type 1-4 units
                      ;   0 = 0-10V
                      ;   1 = 1-10V
```

Unit initialization table example :

```
#table tiunit_DAC2_04M INI_DAC2_04M = ;initialization table DAC2-04M
    3104,             ;code
    $0000,            ;mode
    $0000,            ;fadr
    $00,              ;ladr
    1,                ;ndev
    $81, 0,  0, 32,   ;device 1, output, 4*AO
    1,1,0,0           ;AO configured to 0/1 =0-10V/1-10V
```

Output data :

AO1	AO2	AO3	AO4

AO1	- analog output value OUT1 (byte) [0-100%]
AO2	- analog output value OUT2 (byte) [0-100%]
AO3	- analog output value OUT3 (byte) [0-100%]
AO4	- analog output value OUT4 (byte) [0-100%]

3.4. 3107 - IART2-1

Unit initialization structure :

```
#struct tiunit_IART2_1  ;Initialization table for units IART2-1
    word   code,      ;01 unit code
    word   mode_,     ;03 data transfer mode
    word   fadr,      ;05 unit physical address
    byte   ladr,      ;07 unit logic address
    byte   ndev,      ;08 number of devices on the unit = 4
    tdev   dev[4],    ;09 line with the device information
    word   tempOfs    ;   offset of the thermometer [0.01°C]
```

Unit initialization table example :

```
#table tiunit_IART2_1 INI_IART2_1 = ;initialization table IART2-1
    3107,             ;code
    $0000,            ;mode
    $0000,            ;fadr
    $00,              ;ladr
    4,                ;ndev
    $80, 0,  2,  0,   ;device 1, input,  2*DI (buttons)
    $81, 0,  0,  4,   ;device 2, output, 4*DO (LED)
    $80, 0, 16,  0,   ;device 3, input,  1*AI (button)
    $80, 0, 16,  0,   ;device 4, input,  1*AI (thermometer)
    0                 ;offset of the thermometer
```

Input data :

DI	Turn	Temp

DI - buttons status (byte)
DI.0 – circuit activation button
DI.1 – circuit mode button
Turn - temperature correction turn (word) [0.01℃]
Temp - temperature (word) [0.01℃]

Output data :

DO

DO - indication LED (byte)
DO.0 - LED circuit activity green
DO.1 - LED circuit activity red
DO.2 - LED circuit mode green
DO.3 - LED circuit mode red

3.5. 3108 – IDRT2-1

Unit initialization structure :

```
#struct tiunit_IDRT2_1  ;Initialization table for units IDRT2-1
    word   code,      ;01 unit code
    word   mode_,     ;03 data transfer mode
    word   fadr,      ;05 unit physical address
    byte   ladr,      ;07 unit logic address
    byte   ndev,      ;08 number of devices on the unit = 4
    tdev   dev[4],    ;09 line with the device information
    word   tempOfs    ;   offset of the thermometer [0.01°C]
```

Unit initialization table example :

```
#table tiunit_IDRT2_1 INI_IDRT2_1 = ;initialization table IDRT2-1
    3108,             ;code
    $0000,            ;mode
    $0000,            ;fadr
    $00,              ;ladr
    4,                ;ndev
    $80, 0,  5,  0,   ;device 1, input,  5*DI (buttons)
    $81, 0,  0,  4,   ;device 2, output, 4*DO (LED+symbols)
    $80, 0, 16,  0,   ;device 3, input,  1*AI (digital turn)
    $80, 0, 16,  0,   ;device 4, input,  1*AI (thermometer)
    0                 ;offset of the thermometer
```

Input data :

DI	Turn	Temp

DI - buttons status (byte)
DI.0 – circuit activation button
DI.1 – circuit mode button
DI.2 - button +
DI.3 - button-
DI.4 - button reset
Turn - temperature correction turn (word) [0.01℃]
Temp - temperature (word) [0.01℃]

Output data :

DO

DO - indication LED and display symbols (byte)
DO.0 – circuit activity symbol „On“
DO.1 - LED circuit activity red
DO.2 - circuit mode symbol „✋“
DO.3 – circuit mode symbol „Man“

3.6. 3109 - IM2-140M

Unit initialization structure :

```
#struct tiunit_IM2_140M  ;initialization structure for units IM2-140M
    word   code,      ;01 unit code
    word   mode_,     ;03 data transfer mode
    word   fadr,      ;05 unit physical address
    byte   ladr,      ;07 unit logic address
    byte   ndev,      ;08 number of devices on the unit = 1
    tdev   dev[1],    ;09 line with the device information
    byte   enbEZS,    ;   configuration of binary inputs 0-6 units
                      ;   .x = 0/1 = input .x configured as DI/EZS
    byte   typEZS,    ;   balance type of EZS input 0-6 unit
                      ;   .x = 0/1 = input .x is single/double ;ballanced
```

Unit initialization table example :

```
#table tiunit_IM_140M INI_IM_140M = ;initialization table IM2-140M
    3109,             ;code
    $0000,            ;mode
    $0000,            ;fadr
    $00,              ;ladr
    1,                ;ndev
    $80, 0,  23,  0,  ;device 1, input,  14*DI (7*DI/EZS + 7*DI)
    $7F,              ;inputs 0-6 configured for EZS
    $7F               ;inputs 0-6 are double ballanced
```

Input data :

DI	TAMP

DI - inputs status (word)
DI.0 - input 0
DI.1 - input 1
:
DI.13 - input 13

TAMP - „tamper“ indication of the status of ballanced EZS inputs (byte)
TAMP.0 - tamper status of EZS input 0
TAMP.1 - tamper status of EZS input 1
:
TAMP.6 - tamper status of EZS input 6

3.7. 3110 - IM2-80B

Unit initialization structure :

```
#struct tiunit_IM2_80B ;Initialization table for units IM2-80B
    word   code,      ;01 unit code
    word   mode_,     ;03 data transfer mode
    word   fadr,      ;05 unit physical address
    byte   ladr,      ;07 unit logic address
    byte   ndev,      ;08 number of devices on the unit = 2
    tdev   dev[2],    ;09 line with the device information
    byte   enbEZS,    ;   binary inputs configuration of 0-4 unit
                      ;   .x = 0/1 = input .x configured as DI/EZS
    byte   typEZS,    ;   ballance type of EZS input of 0-4 unit
                      ;   .x = 0/1 = input .x is single/double ;ballanced
    word   tempOfs    ;   offset of the thermometer [0.01°C]
```

Unit initialization table example :

```
#table tiunit_IM2_80B INI_IM2_80B = ; initialization table IM2-80B
    3110,             ;code
    $0000,            ;mode
    $0000,            ;fadr
    $00,              ;ladr
    2,                ;ndev
    $80, 0, 13,  0,   ;device 1, input,  8*DI (5*DI/EZS + 3*DI)
    $80, 0, 16,  0,   ;device 2, input,  1*AI (thermometer)
    $1F,              ;inputs 0-4 configured for EZS
    $1F,              ;inputs 0-4 are double ballanced
    0                 ;offset of the thermometer
```

Input data :

DI	TAMP	Temp

DI - input status (byte)
DI.0 - input 0
DI.1 - input 1
:
DI.7 - input 7

TAMP - „tamper“ indication of the status of the ballanced EZS inputs (byte)
TAMP.0 - tamper status of EZS input 0
TAMP.1 - tamper status of EZS input 1
:
TAMP.4 - tamper status of EZS input 4

Temp - temperature (word) [0.01℃]

3.8. 3111 - KEY2-01R

Unit initialization structure :

```
#struct tiunit_KEY2_01R ;Initialization table for units KEY2-01R
    word   code,      ;01 unit code
    word   mode_,     ;03 data transfer mode
    word   fadr,      ;05 unit physical address
    byte   ladr,      ;07 unit logic address
    byte   ndev,      ;08 number of devices on the unit = 2
    tdev   dev[4]     ;09 line with the device information
```

Unit initialization table example :

```
#table tiunit_KEY2_01R KEY2_01R = ;initialization table KEY2-01R
    3111,            ;code
    $0000,           ;mode
    $0000,           ;fadr
    $00,             ;ladr
    4,               ;ndev
    $80, 0,  8,  0,   ;device 1, input,  KEY  (1B key)
    $80, 0, 40,  0,   ;device 2, input,  CARD (5B card)
    $81, 0,  0,  8,   ;device 3, output, LED  (1B LED)
     $81, 0,  0,120    ;device 4, output, DISP (1B number disp. + 14B
  variables disp.)
```

Output data :

KEY	CARD

KEY - pressed key code (byte)
CARD - card code (5*byte)

Output data :

LED	DISP	VAR

LED - indication LED + buzzer (byte)
LED.0 - LED 1
LED.1 - LED 2
LED.2 - buzzer
DISP - featured display number (byte)
VAR - variables ASCII featured display signs (14*byte)

3.9. 3112 - KEY2-01

Unit initialization structure :

```
#struct tiunit_KEY2_01 ;Initialization table for units KEY2-01
    word   code,      ;01 unit code
    word   mode_,     ;03 data transfer mode
    word   fadr,      ;05 unit physical address
    byte   ladr,      ;07 unit logic address
    byte   ndev,      ;08 number of devices on the unit = 2
    tdev   dev[3]     ;09 line with the device information
```

Unit initialization table example :

```
#table tiunit_KEY2_01 KEY2_01 = ;initialization table KEY2-01
    3112,              ;code
    $0000,             ;mode
    $0000,             ;fadr
    $00,               ;ladr
    3,                 ;ndev
    $80, 0,  8,  0,    ;device 1, input,  KEY  (1B key)
    $81, 0,  0,  8,    ;device 2, output, LED  (1B LED)
    $81, 0,  0,120     ;device 3, output, DISP (1B number disp. + 14B
  variables disp.)
```

Input data :

KEY

KEY - pressed key mode (byte)

Output data :

LED	DISP	VAR

LED - indication LED + buzzer (byte)
LED.0 - LED 1
LED.1 - LED 2
LED.2 - buzzer
DISP - featured display number (byte)
VAR - variable ASCII featured display signs (14*byte)

3.10. 3113 – LM2-11B

Unit initialization structure :

```
#struct tiunit_LM2_11B ;initialization table for units LM2-11B
    word   code,      ;01 unit code
    word   mode_,     ;03 data transfer mode
    word   fadr,      ;05 unit physical address
    byte   ladr,      ;07 unit logic address
    byte   ndev,      ;08 number of devices on the unit = 3
    tdev   dev[3],    ;09 line with the device information
    word   tempOfs    ;   offset of the thermometer [0.01°C]
```

Unit initialization table example :

```
#table tiunit_LM2_11B INI_LM2_11B = ;initialization table LM2-11B
    3113,             ;code
    $0000,            ;mode
    $0000,            ;fadr
    $00,              ;ladr
    3,                ;ndev
    $80, 0,  1,  0,   ;device 1, input,  1*DI (button)
    $81, 0,  0,  8,   ;device 2, output, 1*AO (dimmer)
    $80, 0, 16,  0,   ;device 3, input,  1*AI (thermometer)
    0                 ;offset of the thermometer
```

Input data :

DI	Temp

DI - input status (bytes)
DI.0 - button
Temp - temperature (word) [0.01℃]

Output data :

AO

AO - value of the analog output of the dimmer (bytes) [0-100%]

3.11. 3114 – LBC2-02M

Unit initialization structure :

```
#struct tiunit_LBC2_02M ; initialization table for units LBC2-02M
    word   code,      ;01 unit code
    word   mode_,     ;03 data transfer mode
    word   fadr,      ;05 unit physical address
    byte   ladr,      ;07 unit logic address
    byte   ndev,      ;08 number of devices on the unit = 2
    tdev   dev[2],    ;09 line with device information
    byte   tao[2],    ;   analog output type 1-2 of unit
                      ;   0 = 0-10V
                      ;   1 = 1-10V
```

Unit initialization table example :

```
#table tiunit_LBC2_02M INI_LBC2_02M = ;initialization table LBC2-02M
    3114,             ;code
    $0000,            ;mode
    $0000,            ;fadr
    $00,              ;ladr
    2,                ;ndev
    $80, 0,  2,  0,   ;device 1, input,  2*DI (tlacitko)
    $81, 0,  0, 16,   ;device 2, output, 2*AO
    0,0               ;AO configured to 0/1 =0-10V/1-10V
```

Input data :

DI

DI - input status (bytes)
DI.0 - button SW1
DI.1 - button SW2

Output data :

AO1	AO2

AO1 - analog output value OUT1 (bytes) [0-100%]
AO2 - analog output value OUT2 (bytes) [0-100%]

3.12. 3115 - SA2-01B/Ni

Unit initialization structure :

```
#struct tiunit_SA2_01B ;Initialization table for units SA2-01B
   word    code,      ;01 unit code
   word    mode_,     ;03 data transfer mode
   word    fadr,      ;05 unit physical address
   byte    ladr,      ;07 unit logic address
   byte    ndev,      ;08 number of devices on the unit = 2
   tdev    dev[2],    ;09 line with device information
   word    tempOfs    ;   offset of the thermometer [0.01°C]
```

Unit initialization table example :

```
#table tiunit_SA2_01B INI_SA2_01B_Ni = ;initialization table SA2-01B/Ni
    3115,              ;code
    $0000,             ;mode
    $0000,             ;fadr
    $00,               ;ladr
    2,                 ;ndev
    $81, 0,  0,  1,    ;device 1, output, 1*DO (relay)
    $80, 0, 16,  0,    ;device 2, input,  1*AI (thermometer)
    0                  ;offset of the thermometer
```

Input data :

Temp

Temp - temperature (word) [0.01℃]

Output data :

DO

DO - output status (bytes)
DO.0 – output relay RE1

3.13. 3116 - SA2-01B/Sn

Unit initialization structure :

```
#struct tiunit_SA2_01B ;Initialization table for units SA2-01B
   word    code,      ;01 unit code
   word    mode_,     ;03 data transfer mode
   word    fadr,      ;05 unit physical address
   byte    ladr,      ;07 unit logic address
   byte    ndev,      ;08 number of devices on the unit = 2
   tdev    dev[2],    ;09 line with device information
   word    tempOfs    ;   offset of the thermometer [0.01°C]
```

Unit initialization table example :

```
#table tiunit_SA2_01B INI_SA2_01B_Sn = ;initialization table SA2-01B/Sn
    3116,             ;code
    $0000,            ;mode
    $0000,            ;fadr
    $00,              ;ladr
    2,                ;ndev
    $81, 0,  0,  1,   ;device 1, output, 1*DO (relay)
    $80, 0, 16,  0,   ;device 2, input,  1*AI (thermometer)
    0                 ;offset of the thermometer
```

Input data:

Temp

Temp - temperature (word) [0.01℃]

Output data :

DO

DO - output state (byte)
DO.0 – output relay RE1

3.14. 3117 - SA2-02B/Ni

Unit initialization structure :

```
#struct tiunit_SA2_02B ;Initialization table for units SA2-02B
   word    code,      ;01 unit code
   word    mode_,     ;03 data transfer mode
   word    fadr,      ;05 unit physical address
   byte    ladr,      ;07 unit logic address
   byte    ndev,      ;08 number of devices on the unit = 2
   tdev    dev[2],    ;09 line with device information
   word    tempOfs    ;   offset of the thermometer [0.01°C]
```

Unit initialization table example :

```
#table tiunit_SA2_02B INI_SA2_02B_Ni = ;initialization table SA2-02B/Ni
    3117,            ;code
    $0000,           ;mode
    $0000,           ;fadr
    $00,             ;ladr
    2,               ;ndev
    $81, 0,  0,  2,  ;device 1, output, 2*DO (relay)
    $80, 0, 16,  0,  ;device 2, input,  1*AI (thermometer)
    0                ;offset of the thermometer
```

Input data :

Temp

Temp - temperature (word) [0.01℃]

Output data :

DO

DO - output state (byte)
DO.0 – output relay RE1
DO.1 – output relay RE2

3.15. 3118 - SA2-02B/Sn

Unit initialization structure :

```
#struct tiunit_SA2_02B ;Initialization table for units SA2-02B
   word    code,      ;01 unit code
   word    mode_,     ;03 data transfer mode
   word    fadr,      ;05 unit physical address
   byte    ladr,      ;07 unit logic address
   byte    ndev,      ;08 number of devices on the unit = 2
   tdev    dev[2],    ;09 line with device information
   word    tempOfs    ;   offset of the thermometer [0.01°C]
```

Unit initialization table example :

```
#table tiunit_SA2_02B INI_SA2_02B_Sn = ;initialization table SA2-02B/Sn
    3118,             ;code
    $0000,            ;mode
    $0000,            ;fadr
    $00,              ;ladr
    2,                ;ndev
    $81, 0,  0,  2,   ;device 1, output, 2*DO (relay)
    $80, 0, 16,  0,   ;device 2, input,  1*AI (thermometer)
    0                 ;offset of the thermometer
```

Input data :

Temp

Temp - temperature (word) [0.01℃]

Output data :

DO

DO - output state (byte)
DO.0 – output relay RE1
DO.1 – output relay RE2

3.16. 3119 - SA2-02M/Ni

Unit initialization structure :

```
#struct tiunit_SA2_02M ;initialization table for units SA2-02M
   word    code,      ;01 unit code
   word    mode_,     ;03 data transfer mode
   word    fadr,      ;05 unit physical address
   byte    ladr,      ;07 unit logic address
   byte    ndev,      ;08 number of devices on the unit = 2
   tdev    dev[2]     ;09 line with device information
```

Unit initialization table example :

```
#table tiunit_SA2_02M INI_SA2_02M_Ni = ;initialization table SA2-02M/Ni
    3119,             ;code
    $0000,            ;mode
    $0000,            ;fadr
    $00,              ;ladr
    2,                ;ndev
    $80, 0,  2,  0,   ;device 1, input,  2*DI (buttons)
    $81, 0,  0,  2    ;device 2, output, 2*DO (relay)
```

Input data :

DI

DI - output state (byte)
DI.0 - button SW1
DI.1 - button SW2

Output data :

DO

DO - output state (byte)
DO.0 – output relay RE1
DO.1 – output relay RE2

3.17. 3120 - SA2-02M/Sn

Unit initialization structure :

```
#struct tiunit_SA2_02M ;Initialization table for units SA2-02M
   word    code,      ;01 unit code
   word    mode_,     ;03 data transfer mode
   word    fadr,      ;05 unit physical address
   byte    ladr,      ;07 unit logic address
   byte    ndev,      ;08 number of devices on the unit = 2
   tdev    dev[2]     ;09 line with device information
```

Unit initialization table example :

```
#table tiunit_SA2_02M INI_SA2_02M_Sn = ;initialization table SA2-02M/Sn
    3120,             ;code
    $0000,            ;mode
    $0000,            ;fadr
    $00,              ;ladr
    2,                ;ndev
    $80, 0,  2,  0,   ;device 1, input,  2*DI (buttons)
    $81, 0,  0,  2    ;device 2, output, 2*DO (relay)
```

Input data :

DI

DI - input state (byte)
DI.0 - button SW1
DI.1 - button SW2

Output data :

DO

DO - output state (byte)
DO.0 – output relay RE1
DO.1 – output relay RE2

3.18. 3121 - SA2-04M/Ni

Unit initialization structure :

```
#struct tiunit_SA2_04M ;Initialization table for units SA2-04M
   word    code,      ;01 unit code
   word    mode_,     ;03 data transfer mode
   word    fadr,      ;05 unit physical address
   byte    ladr,      ;07 unit logic address
   byte    ndev,      ;08 number of devices on the unit = 2
   tdev    dev[2]     ;09 line with device information
```

Unit initialization table example :

```
#table tiunit_SA2_04M INI_SA2_04M_Ni = ;initialization table SA2-04M/Ni
    3121,             ;code
    $0000,            ;mode
    $0000,            ;fadr
    $00,              ;ladr
    2,                ;ndev
    $80, 0,  4,  0,   ;device 1, input,  4*DI (buttons)
    $81, 0,  0,  4    ;device 2, output, 4*DO (relay)
```

Input data :

DI

DI - input state (byte)
DI.0 - button SW1
DI.1 - button SW2
DI.2 - button SW3
DI.3 - button SW4

Output data :

DO

DO - output state (byte)
DO.0 – output relay RE1
DO.1 - output relay RE2
DO.2 - output relay RE3
DO.3 - output relay RE4

3.19. 3122 - SA2-04M/Sn

Unit initialization structure :

```
#struct tiunit_SA2_04M ;Initialization table for units SA2-04M
   word    code,      ;01 unit code
   word    mode_,     ;03 data transfer mode
   word    fadr,      ;05 unit physical address
   byte    ladr,      ;07 unit logic address
   byte    ndev,      ;08 number of devices on the unit = 2
   tdev    dev[2]     ;09 line with device information
```

Unit initialization table example :

```
#table tiunit_SA2_04M INI_SA2_04M_Sn = ;initialization table SA2-04M/Sn
    3122,             ;code
    $0000,            ;mode
    $0000,            ;fadr
    $00,              ;ladr
    2,                ;ndev
    $80, 0,  4,  0,   ;device 1, input,  4*DI (buttons)
    $81, 0,  0,  4    ;device 2, output, 4*DO (relay)
```

Input data :

DI

DI - input state (byte)
DI.0 - button SW1
DI.1 - button SW2
DI.2 - button SW3
DI.3 - button SW4

Output data :

DO

DO - output state (byte)
DO.0 – output relay RE1
DO.1 - output relay RE2
DO.2 - output relay RE3
DO.3 - output relay RE4

3.20. 3123 - SOPHY2

Unit initialization structure :

```
#struct tiunit_SOPHY2 ;Initialization table for units SOPHY2
   word    code,      ;01 unit code
   word    mode_,     ;03 data transfer mode
   word    fadr,      ;05 unit physical address
   byte    ladr,      ;07 unit logic address
   byte    ndev,      ;08 number of devices on the unit = 5
   tdev    dev[5],    ;09 line with device information
   word    tempOfs,   ;   offset of the thermometer [0.01°C]
   byte    lang       ;   language mutation
                      ;    0 - english
                      ;    1 - czech
                      ;    2 - german
                      ;    3 - russian
```

Unit initialization table example :

```
#table tiunit_SOPHY2 INI_SOPHY2 = ;initialization table SOPHY2
    3123,             ;code
    $0000,            ;mode
    $0000,            ;fadr
    $00,              ;ladr
    5,                ;ndev
    $83, 0,  6,  2,   ;device 1, in/out, 6*DI, 2*LED (2*button+4*DI)
    $80, 0, 16,  0,   ;device 2, in,     1*AI    (thermometer)
    $80, 0,  8,  0,   ;device 3, in,     1*LI     (illuminance)
    $83, 0, 24, 24,   ;device 4, in/out, 1*IRin/out     (infra)
    $83, 0, 16, 16,   ;device 5, in/out, 1*VOICEin/out  (voice)
    0,                ;offset of the thermometer
    1                 ;czech language mutation
```

Input data :

DI	Temp	LI	IRin
VOICEin			

DI - input state (byte)
DI.0 - button UP
DI.1 - button DOWN
DI.2 - input IN1
DI.3 - input IN2
DI.4 - input IN3
DI.5 - input IN4

Temp - temperature (word) [0.01℃]

LI - illuminance (byte) [0-255] (0 = low, 255 = high intensity)

IRin - infra receiver (3*byte)
STAT (byte) – status byte
STAT.5 - ACOut - alternating receiver bit (code sent)
STAT.6 - TC1 – received infra code type
STAT.7 - TC2 – received infra code type
0 0 - standard RC5

0 1 - standard SIRCS
1 0 - standard NEC
CODE (word) – received infra code (Low, High)

VOICEin - voice receiver (word)

.0 - busy	- SOPHY is busy
.1 - listen	- SOPHY is in monitoring status
.5 - operationERROR	- operation error
.6 - operationOK	- operation OK
.7 - command	- received voice command
.8 - .15 - MsgCode	- received voice command code

Output data :

DO	IRout	VOICEout

DO - output state (byte)
DO.0 - indication LED red
DO.1 - indication LED green

IRout - infra transmitter (3*byte)
CONT (byte) - control byte
CONT.5 - ACOut – alternating transmitter bit (send code)
CONT.6 - TC1 – sent infra code type
CONT.7 - TC2 – sent infra code type
0 0 - standard RC5
0 1 - standard SIRCS
1 0 - standard NEC
CODE (word) – aired infra code (Low, High)

VOICEout - voice transmitter (word)
.0 - .7 - operationCODE - operation code
= 0x00 – no operation
= 0x01 – say standard message
= 0x03 – delete all learnt commands
= 0x04 - listening mode
= 0x12 – learning command
.8 - .15 - MsgCode - code of sent/learnt command

3.21. 3124 – SOPHY2-L

Unit initialization structure :

```
#struct tiunit_SOPHY2_L ;Initialization table for units SOPHY2-L
   word    code,       ;01 unit code
   word    mode_,      ;03 data transfer mode
   word    fadr,       ;05 unit physical address
   byte    ladr,       ;07 unit logic address
   byte    ndev,       ;08 number of devices on the unit = 4
   tdev    dev[4],     ;09 line with device information
   word    tempOfs     ;   offset of the thermometer [0.01°C]
```

Unit initialization table example :

```
#table tiunit_SOPHY2_L INI_SOPHY2_L = ;initialization table SOPHY2-L
    3124,              ;code
    $0000,             ;mode
    $0000,             ;fadr
    $00,               ;ladr
    4,                 ;ndev
    $83, 0,  6,  2,    ;device 1, in/out, 6*DI, 2*LED (2*button+4*DI)
    $80, 0, 16,  0,    ;device 2, in,     1*AI    (thermometer)
    $80, 0,  8,  0,    ;device 3, in,     1*LI     (illuminance)
    $83, 0, 24, 24,    ;device 4, in/out, 1*IRin/out  (infra)
    0                  ;offset of the thermometer
```

Input data :

DI	Temp	LI	IRin

DI - input state (byte)
- DI.0 - button UP
- DI.1 - button DOWN
- DI.2 - input IN1
- DI.3 - input IN2
- DI.4 - input IN3
- DI.5 - input IN4

Temp - temperature (word) [0.01℃]

LI - illuminance (byte) [0-255] (0 = low, 255 = high intensity)

IRin - infra receiver (3*byte)
- STAT (byte) - status byte
  - STAT.5 - ACOut – alternating transmitter bit (code sent)
  - STAT.6 - TC1 – received infra code type
  - STAT.7 - TC2 – received infra code type
    - 0 0 - standard RC5
    - 0 1 - standard SIRCS
    - 1 0 - standard NEC
- CODE (word) – received infra code (Low, High)

Výstupní data :

DO	IRout

DO - output state (byte)
DO.0 - indication LED red
DO.1 - indication LED green

IRout - infra transmitter (3*byte)
CONT (byte) - control byte
CONT.5 - ACOut – alternating transmitter bit (send code)
CONT.6 - TC1 – sent infra code type
CONT.7 - TC2 – sent infra code type
0 0 - standard RC5
0 1 - standard SIRCS
1 0 - standard NEC
CODE (word) – aired infra code (Low, High)

3.22. 3125 - WSB2-20

Unit initialization structure :

```
#struct tiunit_WSB2_20 ;Initialization table for units      WSB2-20
   word    code,      ;01 unit code
   word    mode_,     ;03 data transfer mode
   word    fadr,      ;05 unit physical address
   byte    ladr,      ;07 unit logic address
   byte    ndev,      ;08 number of devices on the unit = 3
   tdev    dev[3],    ;09 line with device information
   word    tempOfs    ;   offset of the thermometer [0.01°C]
```

Unit initialization table example :

```
#table tiunit_WSB2_20 INI_WSB2_20 = ;initialization table WSB2-20
    3125,             ;code
    $0000,            ;mode
    $0000,            ;fadr
    $00,              ;ladr
    3,                ;ndev
    $80, 0,  2,  0,   ;device 1, input,  2*DI (buttons)
    $81, 0,  0,  2,   ;device 2, output, 2*DO (LED)
    $80, 0, 16,  0,   ;device 3, input,  1*AI (thermometer)
    0                 ;offset of the thermometer
```

Input data :

DI	Temp

DI - input state (byte)
DI.0 - button 1 - UP
DI.1 - button 2 - DOWN
Temp - temperature (word) [0.01℃]

Output data :

DO

DO - output state (byte)
DO.0 - LED1 - green
DO.1 - LED2 - red

3.23. 3126 - WSB2-40

Unit initialization structure :

```
#struct tiunit_WSB2_40 ;Initialization table for units      WSB2-40
   word    code,       ;01 unit code
   word    mode_,      ;03 data transfer mode
   word    fadr,       ;05 unit physical address
   byte    ladr,       ;07 unit logic address
   byte    ndev,       ;08 number of devices on the unit = 3
   tdev    dev[3],     ;09 line with device information
   word    tempOfs     ;   offset of the thermometer [0.01°C]
```

Unit initialization table example :

```
#table tiunit_WSB2_40 INI_WSB2_40 = ;initialization table WSB2-40
    3126,              ;code
    $0000,             ;mode
    $0000,             ;fadr
    $00,               ;ladr
    3,                 ;ndev
    $80, 0,  4,  0,    ;device 1, input,  4*DI (buttons)
    $81, 0,  0,  4,    ;device 2, output, 4*DO (LED)
    $80, 0, 16,  0,    ;device 3, input,  1*AI (thermometer)
    0                  ;offset of the thermometer
```

Input data :

DI	Temp

DI - input state (byte)
DI.0 - button 1 - UP
DI.1 - button 2 - DOWN
DI.2 - button 3 - UP
DI.3 - button 4 - DOWN
Temp - temperature (word) [0.01℃]

Output data :

DO

DO - output state (byte)
DO.0 - LED1 - green
DO.1 - LED2 - red
DO.2 - LED3 - green
DO.3 - LED4 - red

3.24. 3127 - WSB2-80

Unit initialization structure :

```
#struct tiunit_WSB2_80 ;Initialization table for units      WSB2-80
   word    code,      ;01 unit code
   word    mode_,     ;03 data transfer mode
   word    fadr,      ;05 unit physical address
   byte    ladr,      ;07 unit logic address
   byte    ndev,      ;08 number of devices on the unit = 3
   tdev    dev[3],    ;09 line with device information
   word    tempOfs    ;   offset of the thermometer [0.01°C]
```

Unit initialization table example :

```
#table tiunit_WSB2_80 INI_WSB2_80 = ;initialization table WSB2-80
    3127,             ;code
    $0000,            ;mode
    $0000,            ;fadr
    $00,              ;ladr
    3,                ;ndev
    $80, 0,  8,  0,   ;device 1, input,  8*DI (buttons)
    $81, 0,  0,  8,   ;device 2, output, 8*DO (LED)
    $80, 0, 16,  0,   ;device 3, input,  1*AI (thermometer)
    0                 ;offset of the thermometer
```

Input data :

DI	Temp

DI - input state (byte)
DI.0 - button 1 - UP
DI.1 - button 2 - DOWN
DI.2 - button 3 - UP
DI.3 - button 4 - DOWN
DI.4 - button 5 - UP
DI.5 - button 6 - DOWN
DI.6 - button 7 - UP
DI.7 - button 8 - DOWN

Temp - temperature (word) [0.01℃]

Output data :

DO

DO - output state (byte)
DO.0 - LED1 - green
DO.1 - LED2 - red
DO.2 - LED3 - green
DO.3 - LED4 - red
DO.4 - LED5 - green
DO.5 - LED6 - red
DO.6 - LED7 - green
DO.7 - LED8 - red

3.25. 3128 – MI2-02M

Unit initialization structure :

```
#struct tiunit_MI2_02M ;Initialization table for units      MI2-02M
   word    code,      ;01 unit code
   word    mode_,     ;03 data transfer mode
   word    fadr,      ;05 unit physical address
   byte    ladr,      ;07 unit logic address
   byte    ndev,      ;08 number of devices on the unit = 1
   tdev    dev[1]     ;09 line with device information
```

Unit initialization table example :

```
#table tiunit_MI2_02M INI_MI2_02M = ;initialization table MI2-02M
    3128,             ;code
    $0000,            ;mode
    $0000,            ;fadr
    $00,              ;ladr
    1,                ;ndev
    $C0, 0, 16,  0    ;device 1, input,  1*AI (voltage)
```

Input data :

AI

AI[1)] - Input voltage PSM (word) [0.01V]

1) Variable AI is relevant for internal master units only within the CPU CP-1004 and CU2-01M. External master unit PSM does not contain input and in the variable AI the value 0 is transferred.

3.26. 3129 – FCC2-01

Unit initialization structure :

```
#struct tiunit_FCC2_01 ;Initialization table for units FCC2-01
   word    code,      ;01 unit code
   word    mode_,     ;03 data transfer mode
   word    fadr,      ;05 unit physical address
   byte    ladr,      ;07 unit logic address
   byte    ndev,      ;08 numbre of devices on the unit = 3
   tdev    dev[4],    ;09 line with device information
   word    tempOfs    ;   offset of the external thermometer in 0.01°C
```

Unit initialization table example :

```
#table tiunit_FCC2_01 INI_FCC2_01 = ;initialization table FCC2-01
    3129,             ;code
    $0000,            ;mode
    $0000,            ;fadr
    $00,              ;ladr
    4,                ;ndev
    $81, 0,  0, 8,    ;device 1, output, 1*AO (fan turns)
    $81, 0,  0, 2,    ;device 2, output, 2*DO (relay)
    $80, 0, 16, 0,    ;device 3, input,  1*AI (external thermometer)
    $80, 0, 16, 0,    ;device 4, input,  1*AI (internal thermometer)
    0                 ;offset of the external thermometer
```

Input data :

Temp1	Temp2

Temp1 - external temperature (word) [0.01℃]
Temp2 - internal temperature (word) [0.01℃]

Output data :

AO	DO

AO - fan turns (byte) [0-100%]

DO - status of binary outputs (byte)
DO.0 - output 1
DO.1 - output 2

3.27. 3133 – WMR2-11

Unit initialization structure :

```
#struct tiunit_WMR2_11;Initialization table for units WMR2-11
   word    code,      ;01 unit code
   word    mode_,     ;03 data transfer mode
   word    fadr,      ;05 unit physical address
   byte    ladr,      ;07 unit logic address
   byte    ndev,      ;08 number of devices on the unit = 4
   tdev    dev[4],    ;09 line with device information
   word    tempOfs    ;   offset of the thermometer in 0.01°C
```

Unit initialization table example :

```
#table tiunit_WMR2_11 INI_WMR2_11 = ;initialization table WMR2-11
    3133,             ;code
    $0000,            ;mode
    $0000,            ;fadr
    $00,              ;ladr
    4,                ;ndev
    $80, 0,  2, 0,    ;device 1, input,  2*DI   (buttons)
    $80, 0, 40, 0,    ; device 2, vstupni,  1*CARD (5B karta)
    $81, 0,  0, 4,    ; device 3, output, 4*DO   (2LED, 1DO, 1buzzer)
    $80, 0, 16, 0,    ; device 4, input,  1*AI (thermometer in
centigrades°C)
    0                 ;offset of the thermometer
```

Input data :

DI	CARD	Temp

DI - output state (byte)
DI.0 - button UP
DI.1 - button DOWN
CARD - card code (5*byte)
Temp - temperature (word) [0.01℃]

Output data :

DO

DO - output state (byte)
DO.0 - LED1 - green
DO.1 - LED2 - red
DO.2 - relay
DO.3 - buzzer

3.28. 3143 – WSB2-60

Unit initialization structure :

```
#struct tiunit_WSB2_60 ;Initialization table for units      WSB2-60
   word    code,      ;01 unit code
   word    mode_,     ;03 data transfer mode
   word    fadr,      ;05 unit physical address
   byte    ladr,      ;07 unit logic address
   byte    ndev,      ;08 number of devices on the unit = 3
   tdev    dev[3],    ;09 line with device information
   word    tempOfs    ;   offset of the thermometer [0.01°C]
```

Unit initialization table example :

```
#table tiunit_WSB2_60 INI_WSB2_60 = ;initialization table WSB2-60
    3143,             ;code
    $0000,            ;mode
    $0000,            ;fadr
    $00,              ;ladr
    3,                ;ndev
    $80, 0,  6,  0,   ;device 1, output,  6*DI (buttons)
    $81, 0,  0, 14,   ;device 2, output,12*DO (LED)
    $80, 0, 16,  0,   ;device 3, input,  1*AI (thermometer)
    0                 ;offset of the thermometer
```

Input data :

DI	Temp

DI - input state (byte)
DI.0 - button 1 - UP
DI.1 - button 2 - DOWN
DI.2 - button 3 - UP
DI.3 - button 4 - DOWN
DI.4 - button 5 - UP
DI.5 - button 6 - DOWN

Temp - temperature (word) [0.01℃]

Output data :

DO

DO - output state (byte)
DO.0 - LED1 – green
:
DO.5 - LED6 – green
DO.8 – LED1 – red
:
DO.13 – LED6 - red

3.29. 3148– ADC2-40M

Unit initialization structure :

```
#struct tiunit_ADC2_40M ;Initialization table for units ADC2-40M
    word   code,       ;01 unit code
    word   mode_,      ;03 data transfer mode
    word   fadr,       ;05 unit physical address
    byte   ladr,       ;07 unit logic address
    byte   ndev,       ;08 number of devices on the unit = 5
    tdev   dev[5],     ;09 line with device information
    byte   aitype[4], ;   input type AIx
    byte   aitau[4]   ;   input filtration constant AIx
```

Items *aitype* can take following values:

0x20 - Pt100, W_{100} = 1,385, -90/+320℃
0x21 - Pt100, W_{100} = 1,391, -90/+320℃
0x22 - Pt1000 , W_{100} = 1,385, -90/+320℃
0x23 - Pt1000, W_{100} = 1,391, -90/+320℃
0x24 - Ni1000, W_{100} = 1,617, -60/+200℃
0x25 - Ni1000, W_{100} = 1,500, -60/+200℃
0x27 - OV1000
0x28 - NTC 12k (negative thermistor, 12kΩ at 25℃), -40/+125℃
0x40 - 0 ÷ 20 mA
0x41 - 4 ÷ 20 mA
0x80 - 0 ÷ 10 V
0x81 - 0 ÷ 5 V
0x82 - 0 ÷ 2 V
0x83 - 0 ÷ 1 V
0x84 - 0 ÷ 0,5 V

Unit initialization table example :

```
#table tiunit_ADC2_40M INI_ADC2_40M = ;initialization table ADC2-40M
    3148,              ;code
    $0000,             ;mode
    $0000,             ;fadr
    $00,               ;ladr
    5,                 ;ndev
    $80, 0,  8,  0,    ;device 1, input,  STAT (state AIx)
    $80, 0, 16,  0,    ;device 2, input,  AI1
    $80, 0, 16,  0,    ;device 3, input,  AI2
    $80, 0, 16,  0,    ;device 4, input,  AI3
    $80, 0, 16,  0,    ;device 5, input,  AI4
    $24,$24,$24,$24,   ;type AIx
    0,  0,  0,  0      ;filtration AIx (0..255 = 0..25,5s)
```

Input data :

STAT	AI1	AI2	AI3	AI4

STAT - analog inputs state (byte)

STAT.0 – OUF1 – overflow/underflow of the input AI1 range
STAT.1 – VLD1 – input AI1 azimuth validity
STAT.2 – OUF2 – overflow/underflow of the input AI2 range
STAT.3 – VLD2 – input AI2 azimuth validity
STAT.4 – OUF3 – overflow/underflow of the input AI3 range
STAT.5 – VLD3 – input AI3 azimuth validity
STAT.6 – OUF4 – overflow/underflow of the input AI4 range
STAT.7 – VLD4 – input AI4 azimuth validity

AIx - azimuth value AI (word)

- For suspense inputs tension in [mV]
- For current inputs current in [0.01mA]
- For temperature sensitive elements temperature in [0.01 ℃]
- For resistantce sensitive elements resistance in [0.1Ω]

3.30. 3149 – IM2-20B

Unit initialization structure :

```
#struct tiunit_IM2_20B ;Initialization table for units IM2-20B
    word   code,      ;01 unit code
    word   mode_,     ;03 data transfer mode
    word   fadr,      ;05 unit physical address
    byte   ladr,      ;07 unit logic address
    byte   ndev,      ;08 number of devices on the unit = 2
    tdev   dev[2],    ;09 line with device information
    byte   enbEZS,    ;   configuration of binary inputs 0-1 of the unit
                      ;   .x = 0/1 = input .x configured as DI/EZS
    byte   typEZS,    ;   type of balancing EZS input 0-1 of the unit
                      ;   .x = 0/1 = input .x is single/double ;balanced
    word   tempOfs    ;   offset of the thermometer [0.01°C]
```

Unit initialization table example :

```
#table tiunit_IM2_20B INI_IM2_20B = ;initialization table IM2-20B
    3149,             ;code
    $0000,            ;mode
    $0000,            ;fadr
    $00,              ;ladr
    2,                ;ndev
    $80, 0, 10,  0,   ;device 1, input,  2*DI (2*DI/EZS)
    $80, 0, 16,  0,   ;device 2, input,  1*AI (thermometer)
    $03,              ;inputs configured for EZS
    $03,              ;EZS inputs double balanced
    0                 ;offset of the thermometer
```

Input data :

DI	TAMP	Temp

DI - input state (byte)
DI.0 - input 0
DI.1 - input 1
TAMP - signalization of the „tamper“ status of balanced EZS inputs (byte)
TAMP.0 - tamper status of EZS input 0
TAMP.1 - tamper status of EZS input 1
Temp - temperature (word) [0.01℃]

3.31. 3150- IM2-40B

Unit initialization structure :

```
#struct tiunit_IM2_40B ;Initialization table for units IM2-40B
    word   code,       ;01 unit code
    word   mode_,      ;03 data transfer mode
    word   fadr,       ;05 unit physical address
    byte   ladr,       ;07 unit logic address
    byte   ndev,       ;08 number of device on the unit = 2
    tdev   dev[2],     ;09 line with device information
    byte   enbEZS,     ;   configuration of binary inputs 0-3 of the unit
                       ;   .x = 0/1 = input .x configured as DI/EZS
    byte   typEZS,     ;   type of balancing of EZS input 0-3 of the unit
                       ;   .x = 0/1 = input .x is single/double ;balanced
    word   tempOfs     ;   offset of the thermometer [0.01°C]
```

Unit initialization table example :

```
#table tiunit_IM2_40B INI_IM2_40B = ;initialization table IM2-40B
    3150,              ;code
    $0000,             ;mode
    $0000,             ;fadr
    $00,               ;ladr
    2,                 ;ndev
    $80, 0, 10,  0,    ;device 1, input,  4*DI (2*DI/EZS + 2DI)
    $80, 0, 16,  0,    ;device 2, input,  1*AI (thermometer)
    $03,               ;inputs configured for EZS
    $03,               ;EZS inputs double, balanced
    0                  ;offset of the thermometer
```

Input data :

DI	TAMP	Temp

DI - inputs state (byte)
DI.0 - input 0
DI.1 - input 1
DI.2 - input 2
DI.3 - input 3
TAMP - signalization of „tamper“ status of balanced EZS inputs (byte)
TAMP.0 - tamper status of EZS input 0
TAMP.1 - tamper status of EZS input 1
Temp - temperature (word) [0.01℃]

3.32. 3691- DIM6

Unit initialization structure :

```
#struct tiunit_DIM6   ;Initialization table for units DIM6
   word    code,      ;01 unit type
   word    mode_,     ;03 data transfer mode
   word    fadr,      ;05 unit physical address
   byte    ladr,      ;07 unit logic address
   byte    ndev,      ;08 number of devices on the unit = 3
   tdev    dev[3],    ;09 line with device information
   word    tempOfs    ;   offset of the thermometer in 0.01°C
```

Unit initialization table example :

```
#table tiunit_DIM6 INI_DIM6 = ;initialization table DIM6
    3691,             ;code
    $0000,            ;mode
    $0000,            ;fadr
    $00,              ;ladr
    3,                ;ndev
    $80, 0,  8, 0,    ;device 1, input,  1*Stat (status)
    $81, 0,  0, 8,    ;device 2, output, 1*AO   (0-100%)
    $80, 0, 16, 0,    ;device 3, input,  1*AI(thermometer in centigrades
°C)
    0                 ;offset of the thermometer
```

Input data :

Stat	Temp

Stat - dimmer state (byte)
.0 - overheating
.1 - overloading
.2 – unspecified overloade type
.3 – fan run

Temp - temperature (word) [0.01℃]

Output data :

AO

AO - analog output value (byte) [0-100%]

Notes :

Notes :

Objednávky a informace:
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