

PKP-2400-LI  
CANOPEN USER MANUAL



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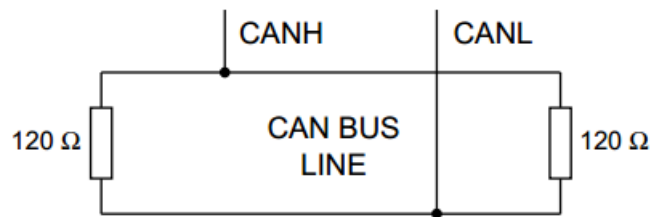
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# 1. How to connect Deutsch 4 pin:



PIN	COLOUR	FUNCTION
1	Green	CAN L
2	Yellow	CAN H
3	Black	Negative battery
4	Red	Vbatt. (12-24V)

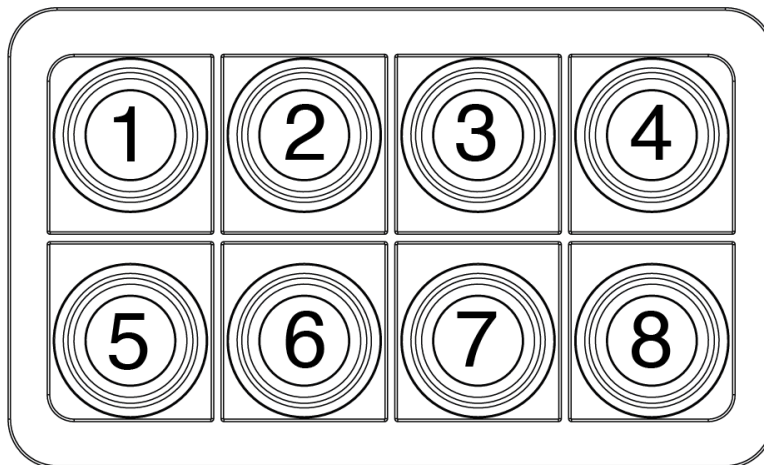


Each end of the CAN bus is terminated with 120Ω resistors in compliance with the standard to minimize signal reflections on the bus. You may need to place a 120Ω resistor between CAN-L and CAN-H.

## 2. Reference

Front view.

PKP-2400-LI



### 3. Default settings

Setting	Default status or level	How to change
<b>Baud Rate</b>	125 kbit/s	Object 6500h Command 11h
<b>CANopen Node ID</b>	15h	Object 6500h Command 70h
<b>Device active on startup</b>	Not active	Object 6500h Command 10h
<b>Key Brightness</b>	3Fh (Maximum Brightness)	Object 6500h Command 02h
<b>Backlight Brightness</b>	00h (OFF)	Object 6500h Command 03h
<b>Backlight Color</b>	Amber	Object 6500h Command 7Dh
<b>Startup LED Light Show</b>	Complete LED Sequence	Object 6500h Command 50h
<b>Periodic Message Transmission</b>	Disable	Object 6500h Command 12h
<b>DEMO mode</b>	Disable	Object 6500h Command 7Ah
<b>Heartbeat Message</b>	Disable	Object 1017h
<b>Boot-up service</b>	Active	Object 6500h Command 13h

### NMT MESSAGES

The Network Management messages follow a master-slave structure. Through NMT services, CANopen devices are initialized, started, reset or stopped. All CANopen devices are regarded as NMT slaves.

NMT messages have CAN-ID always equal to 00h.

### 4. Start CANopen node (keypad activation message)

<b>Identifier</b>	00h	
<b>Byte 0</b>	01h	Start CANopen node
<b>Byte 1</b>	XXh	Keypad CAN ID 00h: start all the keypads 15h: start the keypad with CAN ID = 15h.
<b>Byte 2, 7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message
<b>To Keypad</b>	0	Std	01 15

### 5. Enter pre-operational

<b>Identifier</b>	00h	
<b>Byte 0</b>	80h	Enter pre-operational
<b>Byte 1</b>	XXh	Keypad CAN ID 00h: enter all the keypads 15h: enter the keypad with CAN ID = 15h.
<b>Byte 2, 7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message
<b>To Keypad</b>	0	Std	80 15

## 6. Reset CANOpen node

<b>Identifier</b>	00h	
<b>Byte 0</b>	81h	Reset CANOpen node
<b>Byte 1</b>	XXh	Keypad CAN ID 00h: reset all the keypads 15h: reset the keypad with CAN ID = 15h.
<b>Byte 2, 7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message
<b>To Keypad</b>	0	Std	81 15

## 7. Stop CANOpen node

<b>Identifier</b>	00h	
<b>Byte 0</b>	XXh	02h: Stop CANOpen node 00h: Stop CANOpen node (old sw compatibility)
<b>Byte 1</b>	YYh	Keypad CAN ID 00h: stop all the keypads 15h: stop the keypad with CAN ID = 15h.
<b>Byte 2, 7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message
<b>To Keypad</b>	0	Std	02 15

## 8. Boot-up service

This service is used to signal that a NMT slave has entered the NMT state Pre-operational.

<b>Identifier</b>	700h + current CAN ID	Default 715h
<b>Byte 0</b>	00h	One data byte is transmitted with value 0.

Example:

Direction	Identifier	Format	Message
<b>From Keypad</b>	715h	Std	00h

The keypad with CAN ID 15h has entered the NMT state Pre-operational.

## 9. Heartbeat message

The heartbeat mechanism for a CANopen device is established by cyclically transmitting the heartbeat message by the heartbeat producer. One or more CANopen devices in the network are aware of this heartbeat message. If the heartbeat cycle fails for the heartbeat producer, the local application on the heartbeat consumer will be informed about that event.

If a CANopen device starts with a value for the heartbeat producer time unequal to 0 the boot-up message is regarded as first heartbeat message.

<b>Identifier</b>	700h + current CAN ID	Default 715h
<b>Byte 0</b>	XXh	XXh: State of heartbeat producer 00h: Boot-up 05h: Operational 7Fh: Pre-operational

Example:

Direction	Identifier	Format	Message	Data
<b>From Keypad</b>	715h	Std	00h	Boot up
<b>From Keypad</b>	715h	Std	7Fh	Pre-operational
<b>To keypad</b>	00h	Std	01h 15h	Start keypad with CAN id =15h
<b>From Keypad</b>	715h	Std	05h	Operational

## PDO messages

PDO (Process Data Object) are fast telegram messages that can simply manage most important functions. There are no answers for this kind of messages. Each PDO message has an equivalent Service Data Object message.

### 10. Keys status message

The keypad must be activated, see NMT Start CANopen Node message.

- **PKP-2200-LI**

<b>Identifier</b>	180 + current CAN ID	Default 195h
<b>Byte 0</b>	Keys from #1 to #4 0 0 0 0 - K4 K3 K2 K1	Keys: 1=on; 0=off
<b>Byte 1, 3</b>	00h	Not used
<b>Byte 4</b>	XXh	Tick Timer

Examples:

Direction	Identifier	Format	Message	Key state
<b>From Keypad</b>	195	Std	00 00 00 00 XX	No key pressed
<b>From Keypad</b>	195	Std	04 00 00 00 XX	Key #3 pressed
<b>From Keypad</b>	195	Std	02 00 00 00 XX	Key #2 pressed
<b>From Keypad</b>	195	Std	05 00 00 00 XX	Keys #1 and #3 pressed

- **PKUP-2400-LI**

<b>Identifier</b>	180 + current CAN ID	Default 195h
<b>Byte 0</b>	Keys from #1 to #8 K8 K7 K6 K5 - K4 K3 K2 K1	Keys: 1= on; 0= off
<b>Byte 1, 3</b>	00h	Not used
<b>Byte 4</b>	XXh	Tick Timer

Examples:

Direction	Identifier	Format	Message	Key state
<b>From Keypad</b>	195	Std	00 00 00 00 XX	No key pressed
<b>From Keypad</b>	195	Std	01 00 00 00 XX	Key #1 pressed
<b>From Keypad</b>	195	Std	02 00 00 00 XX	Key #2 pressed
<b>From Keypad</b>	195	Std	42 00 00 00 XX	Keys #7 and #2 pressed



## 11. Set LED ON message

- PKP-2200-LI

<b>Identifier</b>	200 + current CAN ID	Default 215h
<b>Byte 0</b>	G4 G3 G2 G1 – R4 R3 R2 R1	Green and Red LED
<b>Byte 1</b>	0 0 0 0 – B4 B3 B2 B1	Blue LED
<b>Byte 2,7</b>	00h	Not used

Examples:

Direction	Identifier	Format	Message	LED
To Keypad	215	Std	00 00 00 00 00 00 00 00	Turn off all the LED
To Keypad	215	Std	01 00 00 00 00 00 00 00	Only red LED #1 on
To Keypad	215	Std	03 00 00 00 00 00 00 00	Red LED #1 and # 2 on, other LED off
To Keypad	215	Std	80 00 00 00 00 00 00 00	Only green LED #4 on
To Keypad	215	Std	00 01 00 00 00 00 00 00	Only blue LED #1 on
To Keypad	215	Std	77 00 00 00 00 00 00 00	Amber LED #1, 2, 3 on
To Keypad	215	Std	33 03 00 00 00 00 00 00	White LED #1, 2 on

- PKP-2400-LI

<b>Identifier</b>	200 + current CAN ID	Default 215h
<b>Byte 0</b>	R8 R7 R6 R5 - R4 R3 R2 R1	Red LED
<b>Byte 1</b>	G8 G7 G6 G5 - G4 G3 G2 G1	Green LED
<b>Byte 2</b>	B8 B7 B6 B5 - B4 B3 B2 B1	Blue LED
<b>Byte 3,7</b>	00h	Not used

Examples:

Direction	Identifier	Format	Message	LED
To Keypad	215	Std	00 00 00 00 00 00 00 00	Turn off all the LED
To Keypad	215	Std	01 00 00 00 00 00 00 00	Only red LED #1 on
To Keypad	215	Std	42 00 00 00 00 00 00 00	Red LED #2 and #7 on, other LED off
To Keypad	215	Std	80 00 00 00 00 00 00 00	Only red LED #8 on
To Keypad	215	Std	00 10 00 00 00 00 00 00	Only green LED #5 on
To Keypad	215	Std	00 11 00 00 00 00 00 00	Green LED #1 and #5 on, other LED off
To Keypad	215	Std	00 00 06 00 00 00 00 00	Blue LED #2 and #3 on, other LED off
To Keypad	215	Std	59 6A 74 00 00 00 00 00	One color for each button from 1 to 7
To Keypad	215	Std	FF FF F0 00 00 00 00 00	Amber LED #1, 2, 3, 4 on; white LED #5, 6, 7, 8 on

## 12. Set LED Blink message

Note: if the blink message is sent when the LED is already ON, the LED blinks in alternate mode.

### 1. PKP-2200-LI

<b>Identifier</b>	300 + current CAN ID	Default 315h
<b>Byte 0</b>	G4 G3 G2 G1 – R4 R3 R2 R1	Green and Red LED
<b>Byte 1</b>	0 0 0 0 – B4 B3 B2 B1	Blue LED
<b>Byte 2,7</b>	00h	Not used

Examples:

Direction	Identifier	Format	Message	LED
To Keypad	315	Std	00 00 00 00 00 00 00 00	No LED blinks
To Keypad	315	Std	01 00 00 00 00 00 00 00	Only red LED #1 blinks
To Keypad	315	Std	11 00 00 00 00 00 00 00	Only amber LED #1 blinks
To Keypad	315	Std	80 00 00 00 00 00 00 00	Only green LED #4 blinks
To Keypad	315	Std	00 01 00 00 00 00 00 00	Only blue LED #1 blinks
To Keypad	315	Std	0F 0F 00 00 00 00 00 00	All magenta LED blink
To keypad	315	Std	11 01 00 00 00 00 00 00	Only white LED #1 blinks
To Keypad	215	Std	80 00 00 00 00 00 00 00	Only LED #4 blinks red and green in alternate mode
	315	Std	88 00 00 00 00 00 00 00	

### 2. PKP-2400-LI

<b>Identifier</b>	300 + current CAN ID	Default 315h
<b>Byte 0</b>	R8 R7 R6 R5 - R4 R3 R2 R1	Red LED
<b>Byte 1</b>	G8 G7 G6 G5 - G4 G3 G2 G1	Green LED
<b>Byte 2</b>	B8 B7 B6 B5 - B4 B3 B2 B1	Blue LED
<b>Byte 3,7</b>	00h	Not used

Examples:

Direction	Identifier	Format	Message	LED
To Keypad	315	Std	00 00 00 00 00 00 00 00	No LED blinks
To Keypad	315	Std	01 00 00 00 00 00 00 00	Only red LED #1 blinks
To Keypad	315	Std	42 00 00 00 00 00 00 00	Red LED #2 and #7 blink
To keypad	315	Std	F0 00 00 00 00 00 00 00	Red LED #5, 6, 7, 8 blink
To Keypad	315	Std	80 00 00 00 00 00 00 00	Only red LED #8 blinks
To Keypad	315	Std	00 10 00 00 00 00 00 00	Only green LED #5 blinks
To Keypad	315	Std	00 11 00 00 00 00 00 00	Green LED #1 and #5 blink.
To Keypad	315	Std	00 00 06 00 00 00 00 00	Blue LED #2 and #3 blink.
To Keypad	315	Std	00 07 07 00 00 00 00 00	Cyan LED #1, 2, 3 blink
To Keypad	215	Std	3F 00 00 00 00 00 00 00	LED #1, 2, 3, 4, 5, 6 blink red and green in alternate mode
	315	Std	3F 3F 00 00 00 00 00 00	

## SDO Messages:

A SDO (Service Data Object) is providing direct access to object entries of a CANopen device's object dictionary.

### 13. Object 6500h: Command Module

#### a) Set single LED state: 01h

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	23h	Set Device Register
<b>Byte 1</b>	00h	CAN Object 6500h
<b>Byte 2</b>	65h	
<b>Byte 3</b>	01h	
<b>Byte 4</b>	01h	Command: Set single LED state
<b>Byte 5</b>	XXh	Key Number (01-04h) for PKU 2200
		Key Number (01-08h) for PKU 2400
		Key Number (01-0Ch) for PKU 2600
<b>Byte 6</b>	00h	OFF
	01h – 03h	Red: 01h on; 02h blink; 03h alt blink
	04h – 06h	Green: 04h on; 05h blink; 06h alt blink
	07h – 09h	Blue: 07h on; 08h blink; 09h alt blink
	0Ah	RED/GREEN blink 0Ah
	0Ch	AMBER/RED blink 0Ch
	0Eh	GREEN/AMBER blink 0Eh
<b>Byte 7</b>	00h	Not used

Examples:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	23 00 65 01 01 08 01 00	Switch on LED #8 red
Keypad reply	595	Std	60 00 65 01 00 00 00 00	Switch off LED
To Keypad	615	Std	23 00 65 01 01 09 04 00	Switch on LED #9 green
Keypad reply	595	Std	60 00 65 01 00 09 07 00	Switch on LED #9 blue
To Keypad	615	Std	23 00 65 01 01 0C 05 00 23 00 65 01 01 0C 09 00	LED #12 blue and green blinks in alternate mode

#### b) Set LED brightness level: 02h

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	23h	Set Device Register
<b>Byte 1</b>	00h	CAN Object 6500h
<b>Byte 2</b>	65h	
<b>Byte 3</b>	01h	
<b>Byte 4</b>	02h	Command: Set LED brightness
<b>Byte 5</b>	XXh	Intensity 00h-3Fh → min – 100% brightness
<b>Byte 6,7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	23 00 65 01 02 10 00 00	Brightness = 25%
Keypad reply	595	Std	60 00 65 01 00 00 00 00	

## Set backlight brightness level: 03h

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	23h	Set Device Register
<b>Byte 1</b>	00h	CAN Object 6500h
<b>Byte 2</b>	65h	
<b>Byte 3</b>	01h	Sub index
<b>Byte 4</b>	03h	Command: Set backlight brightness
<b>Byte 5</b>	XXh	Intensity 00h-3Fh → 0 – 100% brightness
<b>Byte 6,7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	23 00 65 01 03 2F 00 00	Backlight brightness = 75%
<b>Keypad reply</b>	595	Std	60 00 65 01 00 00 00 00	

## c) Set backlight color: 04h

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	23h	Set Device Register
<b>Byte 1</b>	00h	CAN Object 6500h
<b>Byte 2</b>	65h	
<b>Byte 3</b>	01h	Sub index
<b>Byte 4</b>	04h	Command: Set backlight color
<b>Byte 5</b>	XXh	Color 01h: red 02h: green 03h: blue 04h: yellow 05h: cyan 06h: violet 07h: white 08h: amber/orange 09h: yellow/green
<b>Byte 6,7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	23 00 65 01 04 01 00 00	Red Backlight color
<b>Keypad reply</b>	595	Std	60 00 65 01 00 00 00 00	

#### d) Set device active on startup: 10h

If keypad is active on startup don't need Start command from host

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	23h	Set Device Register
<b>Byte 1</b>	00h	CAN Object 6500h
<b>Byte 2</b>	65h	
<b>Byte 3</b>	01h	
<b>Byte 4</b>	10h	Command: Set device active on startup
<b>Byte 5</b>	XXh	00h: Not active 01h: Active
<b>Byte 6,7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	23 00 65 01 10 01 00 00	Set device active on startup
<b>Keypad reply</b>	595	Std	60 00 65 01 00 00 00 00	

#### e) Set device baud rate: 11h

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	23h	Set Device Register
<b>Byte 1</b>	00h	CAN Object 6500h
<b>Byte 2</b>	65h	
<b>Byte 3</b>	01h	
<b>Byte 4</b>	11h	Command: Set baud rate
<b>Byte 5</b>	XXh	00h: 125k (default) 01h: 250k 02h: 500k
<b>Byte 6,7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	23 00 65 01 11 01 00 00	Baud rate = 250k
<b>Keypad reply</b>	595	Std	60 00 65 01 00 00 00 00	

#### f) Set periodic transmission: 12h

Note: the keypad must be activated, see NMT messages.

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	23h	Set Device Register
<b>Byte 1</b>	00h	CAN Object 6500h
<b>Byte 2</b>	65h	
<b>Byte 3</b>	01h	
<b>Byte 4</b>	12h	Command: Set periodic messages
<b>Byte 5</b>	XXh	00h: off; 01h: on
<b>Byte 6</b>	YYh	Period in milliseconds * 10
<b>Byte 7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	23 00 65 01 12 01 32 00	Period = 500 ms
<b>Keypad reply</b>	195	Std	60 00 65 01 00 00 00 00	

### g) Set Boot-up service: 13h

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	23h	Set Device Register
<b>Byte 1</b>	00h	CAN Object 6500h
<b>Byte 2</b>	65h	
<b>Byte 3</b>	01h	
<b>Byte 4</b>	13h	Command: Set Boot-up service
<b>Byte 5</b>	XXh	00h: Not active 01h: Active
<b>Byte 6,7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	23 00 65 01 13 00 00 00	Set Boot-up service not active
<b>Keypad reply</b>	595	Std	60 00 65 01 00 00 00 00	

### h) Set CANopen node ID: 70h

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	23h	Set Device Register
<b>Byte 1</b>	00h	CAN Object 6500h
<b>Byte 2</b>	65h	
<b>Byte 3</b>	01h	
<b>Byte 4</b>	70h	Command: Set CAN ID
<b>Byte 5</b>	XXh	New ID (00h-7Fh), default 15h
<b>Byte 6,7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	23 00 65 01 70 18 00 00	New Id = 18
<b>Keypad reply</b>	595	Std	60 00 65 01 00 00 00 00	
<b>Keypad reply</b>	718	Std	00	Boot-up message with the new ID set

The first reply is with the old node ID.

### i) Set default startup LED light level: 7Ch

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	23h	Set Device Register
<b>Byte 1</b>	00h	CAN Object 6500h
<b>Byte 2</b>	65h	
<b>Byte 3</b>	01h	
<b>Byte 4</b>	7Ch	Command: Set startup LED level
<b>Byte 5</b>	XXh	0-3Fh → min-100%
<b>Byte 6,7</b>	00h	Not used

Example:

Direction	Identifier	Format	Data	Data
<b>To Keypad</b>	615	Std	23 00 65 01 7C 3F 00 00	Set startup LED level at 100%
<b>Keypad reply</b>	595	Std	60 00 65 01 00 00 00 00	

j) Set default startup backlight level: 7Bh

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	23h	Set Device Register
<b>Byte 1</b>	00h	CAN Object 6500h
<b>Byte 2</b>	65h	
<b>Byte 3</b>	01h	Sub index
<b>Byte 4</b>	7Bh	Command: Set backlight level
<b>Byte 5</b>	XXh	0-3Fh → 0 – 100% brightness
<b>Byte 6,7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	23 00 65 01 7B 00 00 00	Backlight off at startup
<b>Keypad reply</b>	595	Std	60 00 65 01 00 00 00 00	

k) Set default startup backlight color: 7Dh

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	23h	Set Device Register
<b>Byte 1</b>	00h	CAN Object 6500h
<b>Byte 2</b>	65h	
<b>Byte 3</b>	01h	Sub index
<b>Byte 4</b>	7Dh	Command: Set backlight color
<b>Byte 5</b>	XXh	Color 01h: red 02h: green 03h: blue 04h: yellow 05h: cyan 06h: violet 07h: white 08h: amber/orange 09h: yellow/green
<b>Byte 6,7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	23 00 65 01 7D 01 00 00	Red backlight color at startup
<b>Keypad reply</b>	595	Std	60 00 65 01 00 00 00 00	

## l) Set DEMO mode: 7Ah

This message enables the Demo mode function. Demo mode is a special feature that consists in different LED states for each button pressing. Refer to the appendix “Demo mode instructions” to try these special features. Disconnect and reconnect the keypad after the enable message to enter this mode. To exit the Demo mode, send the Disable Demo mode command or another command message.

<b>Identifier</b>	615h (600h + current CAN ID)	
<b>Byte 0</b>	23h	Set Device Register
<b>Byte 1</b>	00h	CAN Object 6500h
<b>Byte 2</b>	65h	
<b>Byte 3</b>	01h	Sub index
<b>Byte 4</b>	7Ah	Command: Set DEMO mode
<b>Byte 5</b>	XXh	01h: on
		00h: off
<b>Byte 6,7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	23 00 65 01 7A 01 00 00	Set demo mode on
<b>Keypad reply</b>	595	Std	60 00 65 01 00 00 00 00	

## m) Set startup LED show: 50h

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	23h	Set Device Register
<b>Byte 1</b>	00h	CAN Object 6500h
<b>Byte 2</b>	65h	
<b>Byte 3</b>	01h	Sub index
<b>Byte 4</b>	50h	Command: Set startup LED show
<b>Byte 5</b>	XXh	01h: Complete LED Show (default)
		02h: Amber fast flash
		03h: Disable
<b>Byte 6,7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	23 00 65 01 50 03 00 00	Startup LED show disable
<b>Keypad reply</b>	595	Std	60 00 65 01 00 00 00 00	



## 14. Object 6000h: Digital input module, keys states

This module contains all the Switch State information.

A one indicates the switch is on, a zero indicates the switch is off.

- **PKP-2200-LI**

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
<b>Byte 1</b>	00h	CAN Object 6000h
<b>Byte 2</b>	60h	
<b>Byte 3</b>	00h	Sub index
<b>Byte 4,7</b>	00h	Not used

Examples:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	40 00 60 00 00 00 00 00	
<b>Keypad reply</b>	595	std	43 00 60 00 00 00 00 00	No key pressed
			43 00 60 00 01 00 00 00	Key 1 pressed
			43 00 60 00 02 00 00 00	Key 2 pressed
			43 00 60 00 04 00 00 00	Key 3 pressed
			43 00 60 00 08 00 00 00	Key 4 pressed
			43 00 60 00 03 00 00 00	Key 1 and 2 pressed
			43 00 60 00 0A 00 00 00	Key 2 and 4 pressed
			43 00 60 00 07 00 00 00	Key 1, 2 and 3 pressed
			43 00 60 00 0F 00 00 00	All keys pressed

- **PKP-2400-LI**

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
<b>Byte 1</b>	00h	CAN Object 6000h
<b>Byte 2</b>	60h	
<b>Byte 3</b>	00h	Sub index
<b>Byte 4,7</b>	00h	Not used

Examples:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	40 00 60 00 00 00 00 00	
<b>Keypad reply</b>	595	std	43 00 60 00 00 00 00 00	No key pressed
			43 00 60 00 01 00 00 00	Key 1 pressed
			43 00 60 00 02 00 00 00	Key 2 pressed
			43 00 60 00 04 00 00 00	Key 3 pressed
			43 00 60 00 08 00 00 00	Key 4 pressed
			43 00 60 00 10 00 00 00	Key 5 pressed
			43 00 60 00 20 00 00 00	Key 6 pressed
			43 00 60 00 40 00 00 00	Key 7 pressed
			43 00 60 00 80 00 00 00	Key 8 pressed
			43 00 60 00 03 00 00 00	Key 1 and 2 pressed
			43 00 60 00 81 00 00 00	Key 1 and 8 pressed
			43 00 60 00 22 00 00 00	Key 2 and 6 pressed
			43 00 60 00 FF 00 00 00	All keys pressed

## 15. Object 6001h: Digital output module.

This module sets and reads the LED Outputs States. A one indicates the LED is on, a zero indicates the LED is off.

### a) Set LED ON

- PKP-2200-LI

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	23h	Set Device Register
<b>Byte 1</b>	01h	CAN Object 6001h
<b>Byte 2</b>	60h	
<b>Byte 3</b>	00h	Sub index
<b>Byte 4</b>	XYh	X: G4 G3 G2 G1 Green LED Y: R4 R3 R2 R1 Red LED
<b>Byte 5</b>	0Zh	Z: B4 B3 B2 B1 Blue LED
<b>Byte 6,7</b>	00h	Not used

Examples:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	23 01 60 00 00 00 00 00	Set all LED off
<b>Keypad reply</b>	595	Std	60 01 60 00 00 00 00 00	
<b>To Keypad</b>	615	Std	23 01 60 00 80 00 00 00	Set green LED #4 ON
<b>Keypad reply</b>	595	Std	60 01 60 00 00 00 00 00	
<b>To Keypad</b>	615	Std	23 01 60 00 04 00 00 00	Set red LED #3 ON
<b>Keypad reply</b>	595	Std	60 01 60 00 00 00 00 00	

- PKP-2400-LI

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	23h	Set Device Register
<b>Byte 1</b>	01h	CAN Object 6001h
<b>Byte 2</b>	60h	
<b>Byte 3</b>	00h	Sub index
<b>Byte 4</b>	XXh	R8 R7 R6 R5 R4 R3 R2 R1 Red LED
<b>Byte 5</b>	YYh	G8 G7 G6 G5 G4 G3 G2 G1 Green LED
<b>Byte 6</b>	ZZh	B8 B7 B6 B5 B4 B3 B2 B1 Blue LED
<b>Byte 7</b>	00h	Not used

Examples:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	23 01 60 00 00 00 00 00	Set all LED off
<b>Keypad reply</b>	595	Std	60 01 60 00 00 00 00 00	
<b>To Keypad</b>	615	Std	23 01 60 00 00 01 00 00	Set green LED #1 ON
<b>Keypad reply</b>	595	Std	60 01 60 00 00 00 00 00	

## b) Read LED ON

The LEDs have the same mapping of Set LED ON message

- **PKP-2200-LI**

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
<b>Byte 1</b>	01h	CAN Object 6001h
<b>Byte 2</b>	60h	
<b>Byte 3</b>	00h	Sub index
<b>Byte 4,7</b>	00h	Not Used

Examples:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	40 01 60 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	43 01 60 00 0F 00 00 00	All red LED ON
<b>To Keypad</b>	615	Std	40 01 60 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	43 01 60 00 08 00 00 00	Red LED #4 ON
<b>To Keypad</b>	615	Std	40 01 60 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	43 01 60 00 20 00 00 00	Green LED #2 ON
<b>To Keypad</b>	615	Std	40 01 60 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	43 01 60 00 F0 00 00 00	All green LED ON
<b>To Keypad</b>	615	Std	40 01 60 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	43 01 60 00 00 0F 00 00	All blue LED ON

- **PKP-2400-LI**

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
<b>Byte 1</b>	01h	CAN Object 6001h
<b>Byte 2</b>	60h	
<b>Byte 3</b>	00h	Sub index
<b>Byte 4,7</b>	00h	Not Used

Examples:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	40 01 60 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	43 01 60 00 FF 00 00 00	All red LED ON
<b>To Keypad</b>	615	Std	40 01 60 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	43 01 60 00 01 00 00 00	Red LED #1 ON
<b>To Keypad</b>	615	Std	40 01 60 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	43 01 60 00 02 00 00 00	Red LED #2 ON
<b>To Keypad</b>	615	Std	40 01 60 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	43 01 60 00 00 FF 00 00	All green LED ON
<b>To Keypad</b>	615	Std	40 01 60 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	43 01 60 00 00 00 FF 00	All blue LED ON

## 16. Object 6002h: Digital output module.

This module sets and reads the LED Blink States.

Each bit position represents the corresponding LED. A one indicates the LED is blinking, a zero indicates the LED is normal. If the blink bit is active with the ON bit active, the LED will blink inverse to normal operation (ALT blink).

### a) Set LED blink

- PKP-2200-LI

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	23h	Set Device Register
<b>Byte 1</b>	02h	CAN Object 6002h
<b>Byte 2</b>	60h	
<b>Byte 3</b>	00h	
<b>Byte 4</b>	XYh	X: G4 G3 G2 G1 Green LED Y: R4 R3 R2 R1 Red LED
<b>Byte 5</b>	0Zh	Z: B4 B3 B2 B1 Blue LED
<b>Byte 6,7</b>	00h	Not used

Examples:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	23 02 60 00 00 00 00 00	No LED blinks
<b>Keypad reply</b>	595	Std	60 02 60 00 00 00 00 00	
<b>To Keypad</b>	615	Std	23 02 60 00 08 00 00 00	Only red LED #4 blinks
<b>Keypad reply</b>	595	Std	60 02 60 00 00 00 00 00	
<b>To Keypad</b>	615	Std	23 02 60 00 10 00 00 00	Only green LED #1 blinks
<b>Keypad reply</b>	595	Std	60 02 60 00 00 00 00 00	

- PKP-2400-LI

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	23h	Set Device Register
<b>Byte 1</b>	02h	CAN Object 6002h
<b>Byte 2</b>	60h	
<b>Byte 3</b>	00h	
<b>Byte 4</b>	XXh	R8 R7 R6 R5 R4 R3 R2 R1 Red LED
<b>Byte 5</b>	YYh	G8 G7 G6 G5 G4 G3 G2 G1 Green LED
<b>Byte 6</b>	ZZh	B8 B7 B6 B5 B4 B3 B2 B1 Blue LED
<b>Byte 7</b>	00h	Not used

Examples:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	23 02 60 00 00 00 00 00	No LED blinks
<b>Keypad reply</b>	595	Std	60 02 60 00 00 00 00 00	
<b>To Keypad</b>	615	Std	23 02 60 00 01 00 00 00	Only red LED #1 blinks
<b>Keypad reply</b>	595	Std	60 02 60 00 00 00 00 00	
<b>To Keypad</b>	615	Std	23 02 60 00 00 FF 00 00	All green LED blink
<b>Keypad reply</b>	595	Std	60 02 60 00 00 00 00 00	

b) Read LED blink

- PKP-2200-LI

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
<b>Byte 1</b>	02h	CAN Object 6002h
<b>Byte 2</b>	60h	
<b>Byte 3</b>	00h	
<b>Byte 4,7</b>	00h	Not Used

Examples:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	40 02 60 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	43 02 60 00 FF 00 00 00	All amber LED blink
<b>To Keypad</b>	615	Std	40 02 60 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	43 02 60 00 81 00 00 00	Red LED #1 and green LED #4 blink
<b>To Keypad</b>	615	Std	40 02 60 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	43 02 60 00 08 00 00 00	Red LED #4 blink

- PKP-2400-LI

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
<b>Byte 1</b>	02h	CAN Object 6002h
<b>Byte 2</b>	60h	
<b>Byte 3</b>	00h	Sub index
<b>Byte 4,7</b>	00h	Not Used

Examples:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	40 02 60 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	43 02 60 00 FF 00 00 00	Only red LED blink
<b>To Keypad</b>	615	Std	40 02 60 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	43 02 60 00 00 FF 00 00	Only green LED blinks
<b>To Keypad</b>	615	Std	40 02 60 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	43 02 60 00 00 01 00 00	Green LED #1 blink

## 17. Object 1017h: Producer heartbeat time

The producer heartbeat time shall indicate the configured cycle time of the heartbeat.

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
	2Bh	Set device register
<b>Byte 1</b>	17h	CAN Object 1017h
<b>Byte 2</b>	10h	
<b>Byte 3</b>	00h	Sub index
<b>Byte 4</b>	YYh	YYh: Heartbeat time in milliseconds
<b>Byte 5</b>	XXh	XXh: Heartbeat time in milliseconds
<b>Byte 6, 7</b>	00h	Not used

Heartbeat time: XXYYh minimum 000Ah maximum FFFFh milliseconds.

Examples:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	40 17 10 00 00 00 00 00	Read heartbeat time
<b>Keypad reply</b>	595	Std	4B 17 10 00 64 00 00 00	Heartbeat time = 100ms
<b>To Keypad</b>	615	Std	2B 17 10 00 00 00 00 00	Switch off the heartbeat
<b>Keypad reply</b>	595	Std	60 17 10 00 00 00 00 00	
<b>To Keypad</b>	615	Std	2B 17 10 00 32 00 00 00	Set heartbeat time = 50ms
<b>Keypad reply</b>	595	Std	60 17 10 00 00 00 00 00	
<b>To Keypad</b>	615	Std	2B 17 10 00 F4 01 00 00	Set heartbeat time = 500ms
<b>Keypad reply</b>	595	Std	60 17 10 00 00 00 00 00	

## 18. Object 1000h: Device Type

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
<b>Byte 1</b>	00h	CAN Object 1000h
<b>Byte 2</b>	10h	
<b>Byte 3, 7</b>	00h	Not used

Example:

Direction	Identifier	Format	Data
<b>To Keypad</b>	615	Std	40 00 10 00 00 00 00 00
<b>Keypad reply</b>	595	Std	43 00 10 00 91 01 03 00

Device profile number 30191h.

## 19. Object 1008h: Manufacturer Device Name

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
<b>Byte 1</b>	08h	CAN Object 1008h
<b>Byte 2</b>	10h	
<b>Byte 3, 7</b>	00h	Not used

1° additional byte

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	60h	Read Device Register Next Byte
<b>Byte 1, 7</b>	00h	Not used

2° additional byte

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	70h	Read Device Register Next Byte
<b>Byte 1, 7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	40 08 10 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	41 08 10 00 0B 00 00 00	
<b>To Keypad</b>	615	Std	60 00 00 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	00 42 6C 69 6E 6B 4D 61	BlinkMa
<b>To Keypad</b>	615	Std	70 00 00 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	17 72 69 6E 65 00 00 00	rine

Manufacturer Device Name: BlinkMarine

The first byte of the last data message replied is 17h.

## 20. Object 1009h: Manufacturer Hardware Revision

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
<b>Byte 1</b>	09h	CAN Object 1009h
<b>Byte 2</b>	10h	
<b>Byte 3, 7</b>	00h	Not used

1° additional byte

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	60h	Read Device Register second byte
<b>Byte 1, 7</b>	00h	Not used

2° additional byte

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	70h	Read Device Register third byte
<b>Byte 1, 7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	40 09 10 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	41 09 10 00 0A 00 00 00	
<b>To Keypad</b>	615	Std	60 00 00 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	00 52 65 76 20 31 2E 30	Rev 1.0
<b>To Keypad</b>	615	Std	70 00 00 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	19 00 44 00 00 00 00 00	D

Manufacturer hardware revision: Rev 1.0D

The first byte of the last data message replied is 19h.



## 21. Object 100Ah: Manufacturer Firmware Revision

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
<b>Byte 1</b>	0Ah	CAN Object 100Ah
<b>Byte 2</b>	10h	
<b>Byte 3, 7</b>	00h	Not used

1° additional byte

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	60h	Read Device Register second byte
<b>Byte 1, 7</b>	00h	Not used

2° additional byte

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	70h	Read Device Register third byte
<b>Byte 1, 7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	40 0A 10 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	41 0A 10 00 0A 00 00 00	
<b>To Keypad</b>	615	Std	60 00 00 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	00 52 65 76 20 31 2E 30	Rev 1.0
<b>To Keypad</b>	615	Std	70 00 00 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	19 00 52 00 00 00 00 00	R

Manufacturer firmware revision: Rev 1.0R. The first byte of the last data message replied is 19h.

## 22. Object 100Bh: Model ID

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
<b>Byte 1</b>	0Bh	CAN Object 100Bh
<b>Byte 2</b>	10h	
<b>Byte 3, 7</b>	00h	Not used

1° additional byte

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	60h	Read Device Register second byte
<b>Byte 1, 7</b>	00h	Not used

2° additional byte

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	70h	Read Device Register third byte
<b>Byte 1, 7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	40 0B 10 00 00 00 00 00	
Keypad reply	595	Std	41 0B 10 00 07 00 00 00	
To Keypad	615	Std	60 00 00 00 00 00 00 00	
Keypad reply	595	Std	00 50 4B 55 32 34 30 30	PKU2400
To Keypad	615	Std	70 00 00 00 00 00 00 00	
Keypad reply	595	Std	1D 00 00 00 00 00 00 00	

Model ID: PKU2400

## 23. Object 1018h: Identity Data

### 1. Number of mapped objects

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
<b>Byte 1</b>	18h	CAN Object 1018h
<b>Byte 2</b>	10h	
<b>Byte 3</b>	00h	Sub index
<b>Byte 4,7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	40 18 10 00 00 00 00 00	
Keypad reply	595	Std	4F 18 10 00 04 00 00 00	4

Number of mapped objects: 4

### 2. Vendor ID

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
<b>Byte 1</b>	18h	CAN Object 1018h
<b>Byte 2</b>	10h	
<b>Byte 3</b>	01h	Sub index
<b>Byte 4,7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	40 18 10 01 00 00 00 00	
Keypad reply	595	Std	43 18 10 01 5A 03 00 00	000035Ah

Vendor Id: 000035Ah

### 3. Product code

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
<b>Byte 1</b>	18h	CAN Object 1018h
<b>Byte 2</b>	10h	
<b>Byte 3</b>	02h	
<b>Byte 4,7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	40 18 10 02 00 00 00 00	
<b>Keypad reply</b>	595	Std	43 18 10 02 00 00 00 00	00h

Product code: 0h

### 4. Revision Number

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
<b>Byte 1</b>	18h	CAN Object 1018h
<b>Byte 2</b>	10h	
<b>Byte 3</b>	03h	
<b>Byte 4,7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	40 18 10 03 00 00 00 00	
<b>Keypad reply</b>	595	Std	43 18 10 03 10 16 12 00	00 10 16 12 Byte 0 App Revision Byte 1 Com Lib Rev Byte 2 HW Lib Rev

Revision Number: App revision 10h, Com lib revision 16h, HW lib revision 12h.

### 5. Firmware checksum

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
<b>Byte 1</b>	18h	CAN Object 1018h
<b>Byte 2</b>	10h	
<b>Byte 3</b>	04h	
<b>Byte 4,7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	40 18 10 04 00 00 00 00	
<b>Keypad reply</b>	595	Std	43 18 10 04 DE E5 2C 00	00 2C E5 DEh

Firmware checksum: 00 2C E5 DEh

## 24. Object 1400h: Receive PDO Communication Parm 0

Describes the receive parameters for the LED States PDO message.

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
<b>Byte 1</b>	00h	CAN Object 1400h
<b>Byte 2</b>	14h	
<b>Byte 3</b>	XXh	00h: Number of mapped objects
		01h: COB Id
		03h: Inhibit Time
<b>Byte 4,7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	40 00 14 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	4F 00 14 00 02 00 00 00	2
<b>To Keypad</b>	615	Std	40 00 14 01 00 00 00 00	
<b>Keypad reply</b>	595	Std	4B 00 14 01 00 02 00 00	0000 0200h
<b>To Keypad</b>	615	Std	40 00 14 03 00 00 00 00	
<b>Keypad reply</b>	595	Std	4B 00 14 03 00 00 00 00	0000 0000h

Receive PDO communication Parm 0:

Number of mapped objects:2,

COB id: 0000 0200h,

Inhibit Time: 0000 0000h

## 25. Object 1401h: Receive PDO communication Parm 1

Describes the receive parameters for the LED Blink States PDO message.

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
<b>Byte 1</b>	01h	CAN Object 1401h
<b>Byte 2</b>	14h	
<b>Byte 3</b>	XXh	00h: Number of mapped objects
		01h: COB Id
		03h: Inhibit Time
<b>Byte 4,7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	40 01 14 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	4F 01 14 00 02 00 00 00	2
<b>To Keypad</b>	615	Std	40 01 14 01 00 00 00 00	
<b>Keypad reply</b>	595	Std	4B 01 14 01 00 03 00 00	0000 0300h
<b>To Keypad</b>	615	Std	40 01 14 03 00 00 00 00	
<b>Keypad reply</b>	595	Std	4B 01 14 03 00 00 00 00	0000 0000h

Receive PDO communication Parm 1:

Number of mapped objects:2,

COB id: 0000 0300h,

Inhibit Time: 0000 0000h

## 26. Object 1600h: Output Descriptions

Receives asynchronously digital outputs mapping

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
<b>Byte 1</b>	00h	CAN Object 1600h
<b>Byte 2</b>	16h	
<b>Byte 3</b>	XXh	00h: Number of mapped objects
		01h: Set LED outputs
		02h: Set LED blink
<b>Byte 4,7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	40 00 16 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	4F 00 16 00 02 00 00 00	2
<b>To Keypad</b>	615	Std	40 00 16 01 00 00 00 00	
<b>Keypad reply</b>	595	Std	43 00 16 01 20 00 01 60	6001 00 20h
<b>To Keypad</b>	615	Std	40 00 16 02 00 00 00 00	
<b>Keypad reply</b>	595	Std	43 00 16 02 20 00 02 60	6002 00 20h

Output descriptions:

Number of mapped objects:2,

Sets LED output: Object 6001h, Sub index 00h, Length 20h;

Sets LED blink: Object 6002h, Sub index 00h, Length 20h.

## 27. Object 1800h: Transmit PDO Communication Parm 0

Describes the transmit parameters for the key states PDO message.

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
<b>Byte 1</b>	00h	CAN Object 1800h
<b>Byte 2</b>	18h	
<b>Byte 3</b>	XXh	
<b>Byte 4,7</b>	00h	Not used

Example

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	40 00 18 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	4F 00 18 00 02 00 00 00	2
<b>To Keypad</b>	615	Std	40 00 18 01 00 00 00 00	
<b>Keypad reply</b>	595	Std	4B 00 18 01 80 01 00 00	180h
<b>To Keypad</b>	615	Std	40 00 18 02 00 00 00 00	
<b>Keypad reply</b>	595	Std	4B 00 18 02 FD 00 00 00	Async RTR only
<b>To Keypad</b>	615	Std	40 00 18 03 00 00 00 00	
<b>Keypad reply</b>	595	Std	4B 00 18 03 00 00 00 00	0
<b>To Keypad</b>	615	Std	40 00 18 05 00 00 00 00	
<b>Keypad reply</b>	595	Std	4B 00 18 05 00 00 00 00	0

Transmit PDO communication parm 0:

Number of mapped objects:2,

Address base: 180h;

Transmission RTR only;

Inhibit Time =0

0= Event timer OFF

## 28. Object 1A00h: Inputs description

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
<b>Byte 1</b>	00h	CAN Object 1A00h
<b>Byte 2</b>	1Ah	
<b>Byte 3</b>	XXh	00h: Number of mapped objects 01h: Switch state
<b>Byte 4,7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	40 00 1A 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	4F 00 1A 00 01 00 00 00	1
<b>To Keypad</b>	615	Std	40 00 1A 01 00 00 00 00	
<b>Keypad reply</b>	595	Std	43 00 1A 01 20 00 00 60	6000 00 20h

Inputs description:

Number of mapped objects: 1

Switch state: Object 6000h, sub index 00h, length 20h

## 29. Object 6100h: Device firmware specifications

This object reads the device firmware specifications. This includes the stored serial Number and the device generic model identification.

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
<b>Byte 1</b>	00h	CAN Object 6100h
<b>Byte 2</b>	61h	
<b>Byte 3</b>	XXh	00h: Number of mapped objects
		01h: Serial number
		02h: Device model ID (2 additional bytes)
<b>Byte 4,7</b>	00h	Not used

Examples:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	40 00 61 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	4F 00 61 00 02 00 00 00	2
<b>To Keypad</b>	615	Std	40 00 61 01 00 00 00 00	
<b>Keypad reply</b>	595	Std	43 00 61 01 00 00 00 00	00 00 00 00h
<b>To Keypad</b>	615	Std	40 00 61 02 00 00 00 00	
<b>Keypad reply</b>	595	Std	40 00 61 02 08 00 00 00	
<b>To Keypad</b>	615	Std	60 00 00 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	00 50 4B 55 32 34 30 30	PKU2400
<b>To Keypad</b>	615	Std	70 00 00 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	1D 00 00 00 00 00 00 00	

Number of mapped objects:2, serial number: 00000000h, Model ID: PKU2400

Sub Index 02h needs 2 additional byte

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
<b>Byte 1</b>	00h	CAN Object 6100h
<b>Byte 2</b>	61h	
<b>Byte 3</b>	02h	Device model ID
<b>Byte 4,7</b>	00h	Not used

1° additional byte

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	60h	Read Device Register second byte
<b>Byte 1, 7</b>	00h	Not used

2° additional byte

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	70h	Read Device Register third byte
<b>Byte 1, 7</b>	00h	Not used



## 30. Object 6201: Device brightness control

This Object Sets/Reads the device brightness levels of both the key LEDs and the backlight level.

### 1. Read brightness level

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
<b>Byte 1</b>	01h	CAN Object 6201h
<b>Byte 2</b>	62h	
<b>Byte 3</b>	XXh	00h: Number of mapped objects
		01h: key-LED brightness level
		02h: backlight brightness level
<b>Byte 4,7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	40 01 62 01 00 00 00 00	
<b>Keypad reply</b>	595	Std	4F 01 62 01 3F 00 00 00	3Fh (default)
<b>To Keypad</b>	615	Std	40 01 62 02 00 00 00 00	
<b>Keypad reply</b>	595	Std	4F 01 62 02 00 00 00 00	0h (default)

### 2. Set brightness level

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	2Fh	Set Device Register
<b>Byte 1</b>	01h	CAN Object 6201h
<b>Byte 2</b>	62h	
<b>Byte 3</b>	XXh	01h: key-LED brightness level
		02h: backlight brightness level
<b>Byte 4</b>	00 – 3Fh	min-100% (key-LED); 0-100% (backlight)
<b>Byte 5,7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	2F 01 62 01 10 00 00 00	Set key-LED brightness at 25%
<b>Keypad reply</b>	595	Std	60 01 62 01 00 00 00 00	
<b>To Keypad</b>	615	Std	2F 01 62 02 20 00 00 00	Set backlight brightness at 50%
<b>Keypad reply</b>	595	Std	60 01 62 02 00 00 00 00	

## 31. Object 6300h: Serial number string

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
<b>Byte 1</b>	00h	CAN Object 6300h
<b>Byte 2</b>	63h	
<b>Byte 3,7</b>	00h	Not used

1° additional byte

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	60h	Read Device Register second byte
<b>Byte 1, 7</b>	00h	Not used

2° additional byte

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	70h	Read Device Register third byte
<b>Byte 1, 7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	41 00 63 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	41 00 63 00 06 00 00 00	
<b>To Keypad</b>	615	Std	60 00 00 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	00 30 30 30 30 30 30 00	000000
<b>To Keypad</b>	615	Std	70 00 00 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	1D 00 00 00 00 00 00 00	

Serial number: ascii 000000.

## 32. Object 6301h: Bootloader presence

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
<b>Byte 1</b>	01h	CAN Object 6301h
<b>Byte 2</b>	63h	
<b>Byte 3,7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	40 01 63 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	4F 01 63 00 00 00 00 00	Bootloader not present
<b>To Keypad</b>	615	Std	40 01 63 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	4F 01 63 00 01 00 00 00	Bootloader present

## Object 6302h: Device key and LED count

<b>Identifier</b>	600h + current CAN ID	Default 615h
<b>Byte 0</b>	40h	Read Device Register
<b>Byte 1</b>	02h	CAN Object 6302h
<b>Byte 2</b>	63h	
<b>Byte 3</b>	XXh	
<b>Byte 4,7</b>	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
<b>To Keypad</b>	615	Std	40 02 63 00 00 00 00 00	
<b>Keypad reply</b>	595	Std	4F 02 63 00 02 00 00 00	2
<b>To Keypad</b>	615	Std	40 02 63 01 00 00 00 00	
<b>Keypad reply</b>	595	Std	4F 02 63 01 04 00 00 00	04h
<b>To Keypad</b>	615	Std	40 02 63 02 00 00 00 00	
<b>Keypad reply</b>	595	Std	4F 02 63 02 00 00 00 00	0h
<b>To Keypad</b>	615	Std	40 02 63 03 00 00 00 00	
<b>Keypad reply</b>	595	Std	4F 02 63 03 0C 00 00 00	0Ch
<b>To Keypad</b>	615	Std	40 02 63 04 00 00 00 00	
<b>Keypad reply</b>	595	Std	4F 02 63 04 06 00 00 00	06h

PKU2200 key and LED count:

number of objects: 2; Total number of keys: 4;

number of external keys: 0; Number of LED: 12;

number of external LED: 6.

## APPENDIX: DEMO Mode instructions

In DEMO Mode you can try the following functions by pressing buttons on the PKU2200/2400/2600.

Entering this mode, you turn on backlight red; for the key 1 each time you press the button you can change the color of backlight with this sequence:

1. Red;
2. Green;
3. Blue;
4. Yellow;
5. Cyan;
6. Magenta;
7. White;
8. Amber;
9. Yellow/green;

### 33. Revision History

Date	Manual Revision	Comment	Related SW version
xx/xx/xxxx	1.0	First release	x.x
09/02/2018	1.1	Second release: <ul style="list-style-type: none"><li>• Updated user's manual with the command objects concerning the model PKU2600</li><li>• Added DEMO MODE instructions</li></ul>	X.x