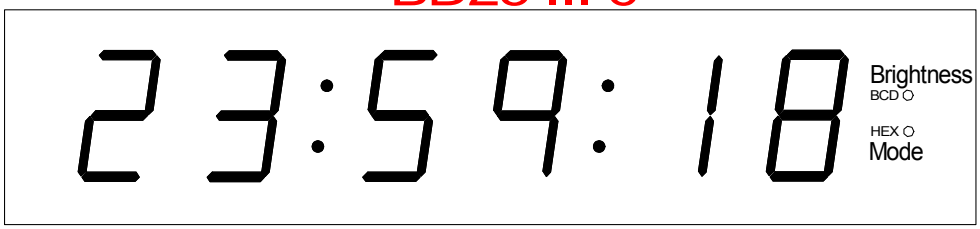
Operating Manual
Version: 4.1
January 10, 2007

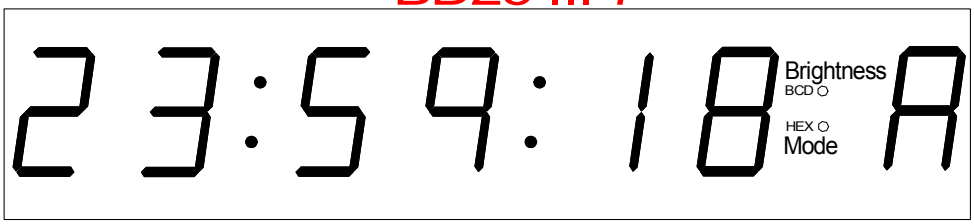
Operational displays of the MTD Time Timer Time Code System

AV-MTD BD25/BD56

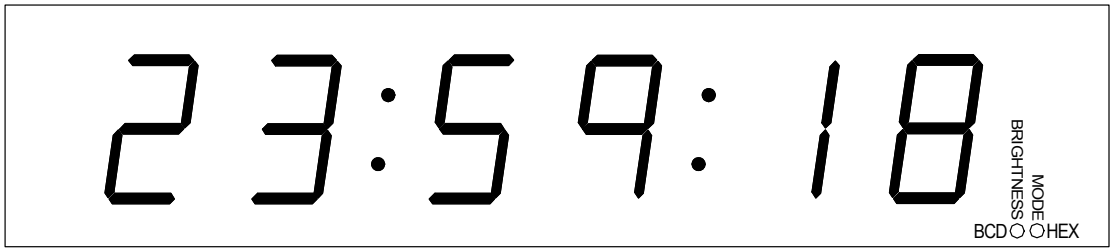
BD25 ... 6



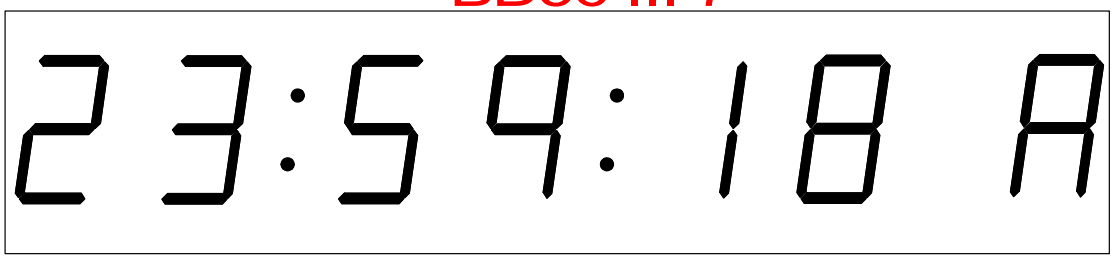
BD25 ... 7



BD56 ... 6



BD56 ... 7



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A1 Safety Instructions

General rules: Only use the device as directed in a dry atmosphere. Treat the device with the same care as other studio devices. Please follow the advice in the following operator's manual.

Damages in transit: If the device shows obvious damages from transit the shipper in question must be notified and the dealer must be informed.

Positioning: Position device only where sufficient air circulation can be maintained. Extreme temperatures, dust, humidity, shocks and strong electromagnetic fields must be avoided.

Maintenance: Use a moist soft textured fabric cloth when cleaning the housing. Do not use polish or any other cleaning agents.

Repairs: The device does not require any extra maintenance. There are no user serviceable parts inside the device. Repairs should be sent to an authorized service partner.

EMC: The EMC regulations are observed only under the following condition: use high quality shielded cables at data inputs and outputs.

A2 Copyright

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For further information please contact your local dealer or:

Alpermann+Velte
Electronic Engineering GmbH
Otto-Hahn-Str. 42
D-42369 Wuppertal
Phone: ++49 - (0)202 – 244 111 0
Fax: ++49 - (0)202 – 244 111 5
E-Mail: info@alpermann-velte.com
Internet: http://www.alpermann-velte.com

A3 CE Declaration of Conformity

LED Display AV-MTD BD25

We,

Alpermann+Velte
Electronic Engineering GmbH
Otto-Hahn-Sr. 42
D-42369 Wuppertal

herewith declare under our sole responsibility that the

AV-MTD BD25

meets the intent of the following directives, standards and specifications:

89/336/EEC Electromagnetic Compatibility

EN 50081-1 Emissions
- EN 55022
- EN 55103-1

EN 50082-1 Immunity
- EN 55024
- EN 55103-2

LED Display AV-MTD BD56

We,

Alpermann+Velte
Electronic Engineering GmbH
Otto-Hahn-Sr. 42
D-42369 Wuppertal

herewith declare under our sole responsibility that the

AV-MTD BD25

meets the intent of the following directives, standards and specifications:

73/23/EEC Low Voltage Directive

- EN 60950 electrical and mechanical safety

89/336/EEC Electromagnetic Compatibility

EN 50081-1 Emissions
- EN 55022
- EN 55103-1

EN 50082-1 Immunity
- EN 55024
- EN 55103-2

Functions Overview

General

AV-MTD D25… are displays (7-segment LEDs) of 25 mm digit height.
AV-MTD D56… are displays (7-segment LEDs) of 56 mm digit height.
R or G or Y responds to the colour of the LEDs : R = red, G = green, Y = yellow.
Digit 6 stands for a 6-digit display.
Digit 7 stands for a 7-digit display: six digits of time representation and one digit to indicate the operating mode.

Example of display type:

AV-MTD BD25 Y 6: 6-digit display with LED colour yellow, 25 mm digit height.
AV-MTD BD25 R 7: 7-digit display with LED colour red, 25 mm digit height.
AV-MTD BD56 G 7: 7-digit display with LED colour green, 56 mm digit height.

Alpermann+Velte has developed a system for Multiple Time Displays (MTD). A MTD system consists of a central generator unit, digital displays and/or analogue clocks, and user console(s). The central generator unit outputs a special LTC format. This LTC will henceforth denoted as LTC(MTD). The LTC(MTD) represents the data link to all the digital displays, and it contains real time, date and user selectable timers. User consoles communicate over a RS485 serial interface with the central generator.

A display can be converted into a user console (operational unit) through the use of an external keypad.

- A display with the **Option BT** has a four button keypad, connected through a 9 pole DSUB KEY. The four keys have the functions START, STOP, HOLD, RESET (e.g. for stop timer functions), or - having switched on the "main time" function - they can select 4 time units A, B, C or Real Time.
- A display with the **Option BTK** has a twenty button keypad, connected through a 15 pole DSUB-HD KEY (keypad MTD BTK). A display with the **Option CP** has a 9 pole DSUB KEY to connect the keypad CP20. Both keypads with twenty keys 0 - 9, START, STOP, HOLD, RESET, and programmable function keys provide enhanced facilities of operation.

The **brightness** of the LED's are adjustable by using the **BCD turn switch** located on the front or the rear panel:

Stage	**Function**
0	The display becomes inactive, only a decimal point in the lowest possible brightness is lit up.
1 - 7	Adjusts the brightness (1 = lowest, 7 = highest).
8	Reserved.
9	Test mode, where all LED's are lit up with maximum brightness.

After power-on, all of the LED's will light up shortly and then the display will show the revision number (e.g. "9.5 Td" without BTK/CP option, "9.5 Tk" with BTK/CP option), any built-in options and the selected operating mode.

Selecting the Operating Mode

The **operating mode** is selected with the **HEX turn switch** at the rear or front panel, and – in case of a 7-digit display – it will be indicated by the digit most right at the display. With the BTK option or CP option most of the operating modes can be selected utilizing the BTK or CP20 keypad: set HEX turn switch to position 8 or 9 and select operating modes using key "+" or "-". The digit most right at the display always shows the operating mode or the code number of the time unit displayed.

Selecting mode "0" in connection with the BT option permits e.g. to operate the display as a simple local stop timer.

Modes "4" and "5" can be used to show the local stop timer at additional external displays.

To use the unit as an LTC reader display, mode "6" (= LTC time display) or mode "7" (= LTC user display) should be selected.

All other modes are provided for being used in a MTD system, and the display will extract the data of the LTC(MTD). A minus sign appears at the most significant digit (tens of hours). If this digit is not blank, it will be overwritten with the minus sign.

Positions of the HEX turn switch:

Mode	**Description**	**Remarks**
0	local stop timer	no LTC or RS485 required
1	1st main time	LTC(MTD): display and/or select one time unit out of A - F, 2, 3
2	MTD real time	LTC(MTD): display and/or set time
3	MTD date	LTC(MTD): display and/or set date
4	"master"	local stop timer with external display
5	"slave"	external display receiving data from a "master" via RS485
6	LTC time information	LTC reader: display of time
7	LTC user bits	LTC reader: display of user bits (binary groups)
8	2nd main time	LTC(MTD): display and/or select one time unit out of A - F, 2, 3
	with option BTK or CP	operating mode with installation; display and operation of all time units
9	3rd main time	LTC(MTD): display and/or select one time unit out of A - F, 2, 3
	with option BTK or CP	operating mode without installation; display and operation of all time units
A	time A	LTC(MTD): display and operation of time A
B	time B	LTC(MTD): display and operation of time B
C	time C	LTC(MTD): display and operation of time C
D	time D	LTC(MTD): display and operation of time D
E	time E	LTC(MTD): display and operation of time E
F	time F	LTC(MTD): display and operation of time F

After a change of mode with the HEX turn switch the display indicates the new mode for a moment (e.g.: "mode B"). As soon as new LTC data are read, the data of the selected time can be displayed.

Operating Modes

Mode 0 = Local Stop Timer

The local stop timer runs internally, i.e. no LTC or RS485 connection is required. The time of this stop timer will only be shown at this display.

To operate the local stop timer with the **BT option**:
connect the MTD BT keypad with its START, STOP, HOLD, RESET keys (9-pin KEY female connector):

Functions:

START	Stop timer counts upward. Resets the HOLD function.
STOP	Stop timer stops. Resets the HOLD function.
HOLD	Current time display freezes, the timer keeps running. Press HOLD again will update the time displayed.
RESET	Stop timer stops and is reset to zero.

The local stop timer always counts upwards (UP) and has the following fixed settings:

- Leading zeros will not be displayed
- Display format = HH:MM:SS
- Colons to separate hours, minutes, seconds

To operate the local stop timer with the **BTK option** or the **CP option**:
connect the MTD BTK or CP20 keypad with its twenty keys 0-9, +, -, START, STOP, HOLD, RESET and programmable function keys. This option provides enhanced facilities of operation; please see manual for MTD system operation.

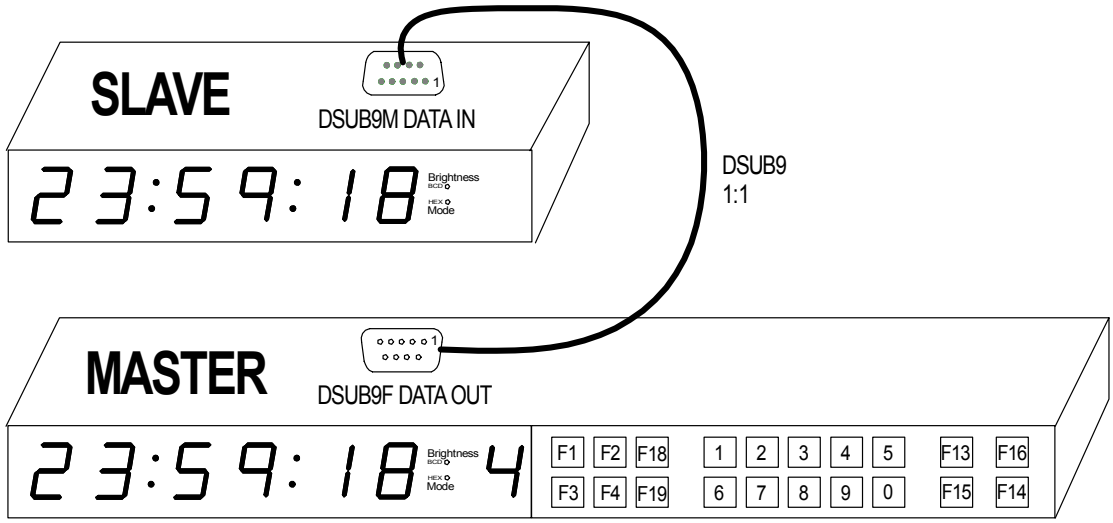
Mode 4 and 5 = Local Stop Timer and External Displays

These operating modes can only be selected using the **HEX turn switch**.

When only a single local stop timer is required and no LTC(MTD) is available, either of these operating modes can be used. No LTC(MTD) must be read, and no RS485 interface has to be connected to a central generator unit. The RS485 interface now is being used to transmit or receive the time of a local stop timer. The BD... may be a "master" or a "slave" of this system:

- **Master, mode 4**: the displays controls the local stop timer by its keys and transmits the time of the LED display as a serial RS485 data string.
- **Slave, mode 5**: the displays shows the time received as a serial data string from the RS485 interface.

Example of a "Local System":



Modes 1, 8 and 9 = Main Time

With this function the **displays** of the MTD System can be operated by remote control. Within one system three groups of displays may be defined, each group may be remote controlled independently from the other groups, within one group all displays show the same time. The individual group is defined by the operating mode selection:

- displays of **mode 1** will show the **first** "Main Time"
- displays of **mode 8**, will show the **second** "Main Time"
- displays of **mode 9** will show the **third** "Main Time"

The "Main Time" shown at the displays may be one of the following time units:
A, B, C, D, E, F, real time or date.

An user console is used to select which time unit out of these eight is determined to serve as the "Main Time". A MTD display together with **BT option** or **BTK option** or **CP option** represents an user console. Using the external keys (connected at KEY connector) and having the display switched to mode = 1, the time unit of the 1st main time can be selected. With mode = 8 the time unit of the 2nd main time and with mode = 9 the time unit of the 3rd main time can be selected.

Having a display with **BT option** (MTD BT keypad) four time units may be selected:

pins DSUB KEY	function = main time	function = stop timer
3	time B	START
4	time C	STOP
5	real time	RESET
6	time A	HOLD
9	GND	GND

Having a display with **BTK option** or **CP option** (MTD BTK or CP20 keypad) eight time units may be selected:

main time	key
A	A (HOLD) or 4
B	B (START) or 5
C	C (STOP) or 6
D	7
E	8
F	9
2 = real time	TIME (RESET) or 2
3 = date	3

Using the HEX turn switch to select mode = 8 or mode = 9, the display with **BTK option** or **CP option** not immediately switches to the "main time" function, but these operating modes enable to switch to every operating mode. The "main time" functions (2nd and 3rd main time) now are selected, if the mode = 8 or mode = 9 is selected with the keys "+" or "-" again.

→ Please also refer to "LTC(MTD) failure " ←

Mode 2 = Real Time

In this mode, the time unit 2 (real time encoded in the LTC(MTD)) receives one additional frame and then this time is displayed.

The following formats may be selected with the **BTK option** or **CP option** or via an user console (e.g. MTD BE, MTD BE19, ...) to display the real time:

- Leading zeros (of the hours) on/off.
- Three user selectable symbols to separate hours/minutes/seconds: colon, decimal point or without any.
- Display formats: 7 = 24-hour format
  8 = 12-hour format

→ Please also refer to "LTC(MTD) failure " ←

In case the central generator has no real time reference signal, the real time may be set manually using the unit MTD BTK or CP20 (**BTK** or **CP option**). For description please refer to the manual for MTD system operation.

Mode 3 = Date

In this mode, the time unit 3 (date encoded in the LTC(MTD)) is displayed.

The following formats may be selected with the **BTK option** or **CP option** or via an user console (e.g. MTD BE, MTD BE19, ...) to display the date:

- Leading zeros (i.e. leading zero at highest position) on/off
- Three user selectable symbols to separate day/month/year: colon, decimal point or without any
- Display formats: 1 = DD/MM/YY
  2 = MM/DD/YY
  3 = YY/MM/DD

In case the central generator has no real time reference signal, the date may be set manually using the unit MTD BTK or CP20 (**BTK** or **CP option**). For description please refer to the manual for MTD system operation.

Mode 6 = LTC Time

The time of the LTC (according to SMPTE/EBU specification) is displayed. The LTC is read forward or reverse, within a range of 20-34 frames/second. One frame is added to the readout time when moving in the forward direction, subtracted when moving in the reverse direction.

Reading LTC which is not of LTC(MTD) format, the time is displayed as HH:MM:SS, i.e. a 6-digit format, separating symbols are set to colon, leading zeros will be displayed.

Reading the LTC(MTD) the following formats may be selected with the **BTK option** or **CP option** or via an user console (e.g. MTD BE, MTD BE19, ...) to display the LTC time:

- Leading zeros on/off
- Three user selectable symbols to separate hours/minutes/seconds/frames: colon, decimal point or without any
- Display formats: 1 = hours/minutes/seconds
  4 = minutes/seconds/frames

Mode 7 = LTC User

This operating mode can only be selected using the **HEX turn switch**.

The user bits of the LTC (according to SMPTE/EBU specification) are displayed. LTC is read “forward“ or “reverse“, within a range of 20-34 frames/second.

The display shows the six user digits of higher significance in hexadecimal format. Leading zeros will be displayed, but no decimal point or colon.

Mode 8 = Operational Mode with Installation

Available only with **BTK option** or **CP option** (without this option: mode 8 = 2nd main time): enables operation and display of all times as well as the installation of:

- access rights
- display and stop timer functions
- function keys of MTD BTK or CP20.

Using keys "+" and "-" of the unit MTD BTK or CP20 each mode 0 - F can be reached. This replaces to turn the HEX switch **Mode**. The 2nd main time (selected with mode = 8) now is selected, if the mode = 8 is selected with the keys "+" or "-" again.

For operating instructions see manual for MTD system operation.

Mode 9 = Operational Mode without Installation

Available only with **BTK option** or **CP option** (without this option: mode 9 = 3rd main time): enables operation and display of all times.

Using keys "+" and "-" of the unit MTD BTK or CP20 each mode 0 - F can be reached. This replaces to turn the HEX switch **Mode**. The 3rd main time (selected with mode = 9) now is selected, if the mode = 9 is selected with the keys "+" or "-" again.

For operating instructions see manual for MTD system operation.

Modes A, B, C, D, E, F = Stop Timer or Difference Time or Offset Time

The times A, B, C, D, E, F are encoded in the user bits of the LTC(MTD).

To display these times the following display formats may be selected with the **BTK option** or **CP option** or via an user console (e.g. MTD BE, MTD BE19, ...):

- Leading zeros on/off
- Flashing in case of negative values on/off
- Three user selectable symbols to separate hours/minutes/seconds: colon, decimal point or without any
- Display formats:
  1 = HH:MM:SS (stop timer)
  2 = MM MM:SS
  3 = SS SS SS
  4 = MM:SS:FF
  5 = MM:SS.T
  6 = SS SS.T
  7 = HH:MM:SS (24-hour format "real time")
  8 = HH:MM:SS (12-hour format "real time")

By connecting the unit MTD BT (**BT option**) with its keys and functions START, STOP, HOLD, RESET, the time selected may be operated. The selected functions will not only take local effect but will be communicated to the central generator via the RS485 interface. Thus, all displays of the system adjusted to the same operating mode will simultaneously show any changes made.

By connecting the unit MTD BTK or CP20 (**BTK** or **CP option**) with its twenty keys 0-9, +, -, START, STOP, HOLD, RESET and four function keys, enhanced facilities of operation are provided; see manual for MTD system operation.

→ Please also refer to "LTC(MTD) failure" ←

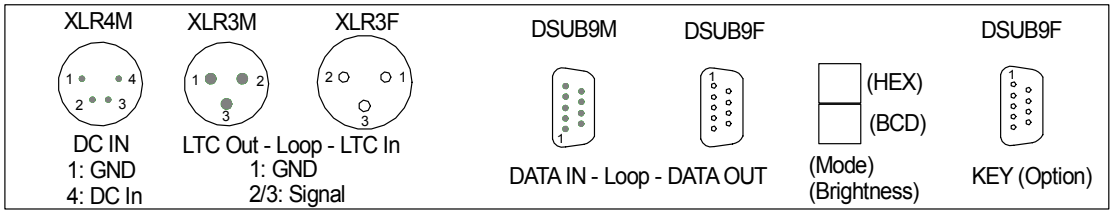
LTC(MTD) Failure

In case of a dropout of the LTC(MTD) the current operation of modes 1, 8 and 9 (main time), 2 (real time), A, B, C, D, E or F will continue with the actual function using its internal clock, i.e. an up-counting or down-counting time will continue counting, a still time will not change.

A dropout is signalled by simultaneous lighting of the decimal points and colons.

Connecting, Technical Data, Mounting

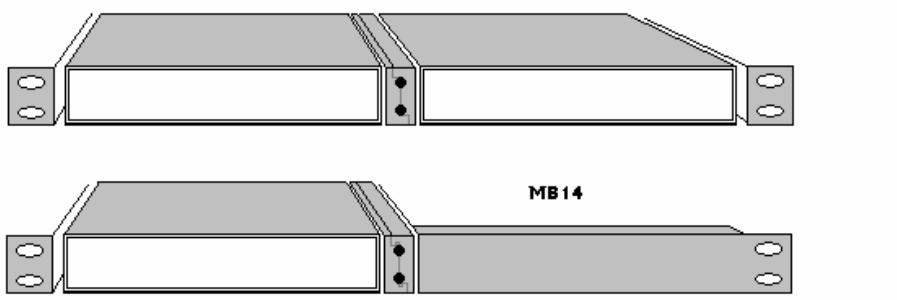
AV-MTD BD25



	BD25-6	BD25-7 without CP20 keypad	BD25-7 with CP20 keypad
Dimensions WxHxD [mm]	214.5 x 43.5 x 140 (½ 19", 1RU)	214.5 x 43.5 x 140 (½ 19", 1RU)	436.5 x 43.5 x 140 (19", 1RU)
Weight [kg]	1.0	1.0	1.5
Power supply	10.5 – 16.5 VDC maximum 660 mA typical 450 mA	10.5 – 16.5 VDC maximum 740 mA typical 500 mA	10.5 – 16.5 VDC maximum 890 mA typical 560 mA

Mechanical

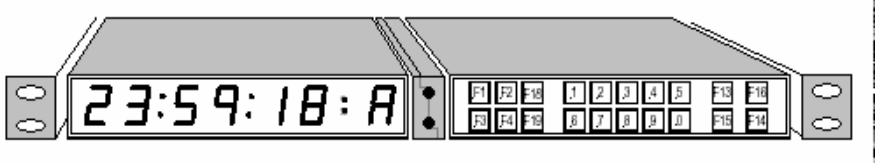
19" rack mounting, display without a keypad



Two units can be mounted together in one 19", 1RU space. There are gliding rails between the units and mounting brackets at the outside. All components are part of the delivery.

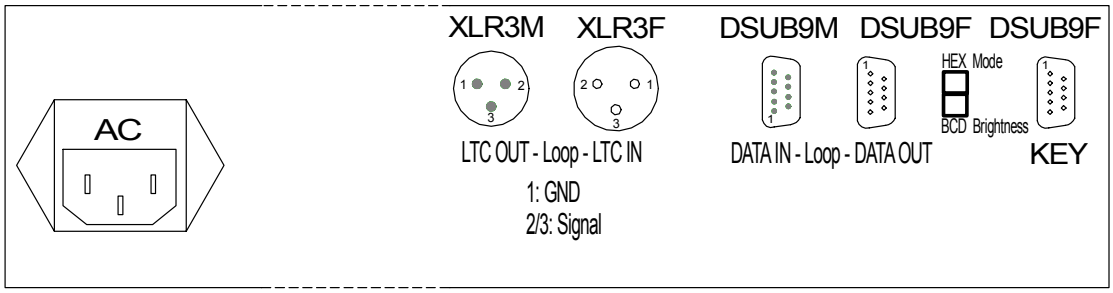
A single unit gets the 19" mounting bracket and one part of the gliding rail. You can mount this unit at an existing unit. To mount a single unit in one 19", 1RU space, you have to order the **MB14** mounting kit. MB14 consists of the 19" mounting bracket and one part of the gliding rail.

A BD25 display together with a CP20 keypad will be assembled as one 19" unit:



Please order a "table top" unit if you don't want to mount it. Instead of the 19" mounting bracket and the gliding rail the unit gets feet with tip-up.

AV-MTD BD56

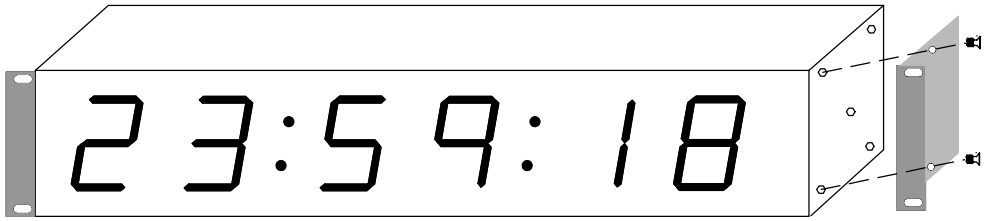


Operating voltage:	100 - 240 VAC, 50 - 60 Hz	
Power consumption:	BD56-6:	maximum 16 W, typical 11 W
	BD56-7:	maximum 17 W, typical 12 W
	BD56-7 + CP20:	maximum 18 W, typical 12.5 W
Weight:	3.5 kg approx.	

Mechanical

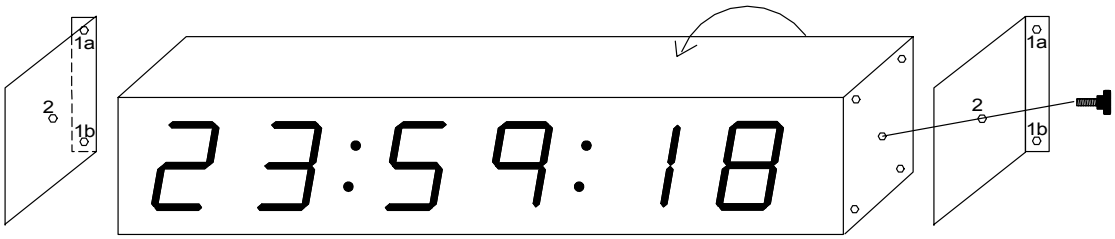
Dimensions: 441 (W) x 88 (H) x 140 (D) mm (19“, 2RU)

19“ mounting:



Two mounting brackets and four screws are part of the delivery.

Wall mount: please order separately!



Two holing brackets and two knurled screws are part of the delivery.

1. Mount the holding brackets at the wall using the 1a and 1b drilled holes.
2. Fasten the display at the holding brackets using two knurled screws.
3. Before tighten the knurled screws adjust the inclination of the display.

Common Technical Data

LTC IN: Balanced input, transformer
Input impedance 47 kΩ
Input level range 60 mV – 5 V, auto-ranging
Frequency range 20 – 34 frames/s

DATA IN/DATA OUT: 1: RS485 Data In/Out, TRA
2: RS485 Data In/Out, TRB
3: LTC_x
4: LTC_y
5: GND
6 – 9: reserved, do not connect

KEY connection (option): BT option = 9-pins DSUB female

pins	**function main time**	**function stop timer**
3	time B	START
4	time C	STOP
5	real time	RESET
6	time A	HOLD
9	GND	GND

CP20 keypad = 9-pins DSUB 1:1 connection:

pins	**DSUB9F at BD25**	**DSUB9M at CP20**
1/6	V+ OUT, fused with 200mA, automatic recovery	V+ IN, 10-16V DC, max. 150mA
2	TxD output	RxD input
3	RxD input	TxD output
4	reserved	
5/9	GND	GND
7	CTS input	RTS output
8	RTS output	CTS input

BTK option: 15-Pins **DSUB-HD** Buchse,
Pins 1 – 15 = Key Input

Operating temperature: 5°C to 40°C
Relative humidity: 35% to 85%, non-condensing