

Master displays of the MTD Time Timer Time Code system

AV-MTD DSR 300M R/G/Y



TABLE OF CONTENTS	Page
A1 SAFETY INSTRUCTIONS	
A2 COPYRIGHT	
A3 CE-DECLARATION	
FUNCTIONS OVERVIEW	1
OPERATING MODES	2
MODES 1, 8 AND 9: MAIN TIME	2
MODES 2 AND 4 = REAL TIME	3
MODES 5 AND 6 = LTC TIME	3
MODES A, B, C, D, E = STOP TIMER OR DIFFERENCE TIME OR OFFSET TIME	4
MODE F = TIME OF THE LTC READ BY THE MTD GENERATOR	4
LTC DROPOUT	5
DESCRIPTION OF THE MASTER/SLAVE COMBINATION	5
CONNECTING THE MASTER/SLAVE COMBINATION	5
OPERATING THE MASTER/SLAVE COMBINATION	6
CONNECTIONS AND SPECIFICATIONS	7

A1 Safety Instructions

- General rules:** Only use the device as directed in a dry atmosphere. Treat the AV-MTD DSR 300M R/G/Y with the same care as other studio devices. Please follow the advice in the following operators 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 AV-MTD DSR 300M R/G/Y does not require any extra maintenance. There are no user serviceable parts inside the device. Repairs should be sent to an authorized service partner.

A2 Copyright

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A3 CE declaration of conformity

We,

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herewith declare under our sole responsibility that the

AV-MTD DSR 300M R/G/Y

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

The following preconditions have to be fulfilled:

- Only high-quality shielded cables have been used to connect data inputs/outputs.
- Housing has been connected to ground.

Functions overview

MTD DSR 300M is a display (7-segment LEDs) of 56mm digit height, and with a LED seconds ring. R or G or Y responds to the colour of the LEDs : R = red, G = green, Y = yellow.

The display contains a control unit to connect analogue index clocks (MTD AC230, MTD AC300, Eurochron clocks). Connected analogue clocks are termed slaves, the MTD DSR 300M is termed master clock of the system.

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.

To select the **operating mode** of the MTD DSR 300M display use HEX turn switch **MODE** at the front. To use the unit as an LTC reader display, mode „6“ (= LTC time 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). In case that a minus sign should be displayed it appears at the most significant digit (tens of hours). If this digit is not blank, it will be overwritten with the minus sign.

The **brightness** of the LED's are adjustable by using the BCD turn switches **RING** and **BRIGHT** located at the front:

Stage	Functions of RING to adjust the seconds ring	Functions of BRIGHT to adjust the digits
0	The seconds ring will be switched off.	The digits become inactive, only a decimal point in the lowest possible brightness is lit up.
1 - 7	Adjusts the brightness (1 = lowest, 7 = highest).	Adjusts the brightness (1 = lowest, 7 = highest).
8	Reserved.	Reserved.
9	Switches the seconds ring in a test mode, where all LED's are lit up with maximum brightness.	Switches the display of the digits in a 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. „7.0 TC“), any built-in options, the selected operating mode (e.g. Md A) and the stage of the turn switch ZONE (e.g. Zn 2).

Operating modes

Positions of the HEX turn switch:

Modes	Description	Remarks
0	local stop timer	not recommended for DSR 300M
1	1 st main time	display of one time unit out of A - F, 2, 3
2	real time	HH:MM:SS
3	date	not recommended for DSR 300M
4	real time	HH:MM (same as 2, but with a 4-digits display)
5	LTC time information	HH:MM (same as 6, but with a 4-digits display)
6	LTC time information	LTC reader: display of time HH:MM:SS
7	LTC user bits	LTC reader: display of user bits „HHMMSS“, seconds ring and colons switched off
8	2 nd main time	display of one time unit out of A - F, 2, 3
9	3 rd main time	display of one time unit out of A - F, 2, 3
A	time A	display of time A (e.g. stop timer A)
B	time B	display of time B (e.g. stop timer B)
C	time C	display of time C (e.g. stop timer C)
D	time D	display of time D (e.g. stop timer D)
E	time E	display of time E (e.g. stop timer E)
F	time F	= time of the LTC read by the MTD generator

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

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 (e.g. MTD BE, MTD BTK, MTD BE19, ...) is used to select which time unit out of these eight is determined to serve as the “Main Time”.

→ Please also refer to „LTC dropout“ ←

Modes 2 and 4 = real time

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

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

- Leading zeros (of the hours) on/off.
- Three user selectable symbols to separate hours/minutes: colon, decimal point or without any.
- Display formats: 7 = 24-hour format (6-digits at mode = 2, 4-digits at mode = 4),
 8 = 12-hour format (6-digits at mode = 2, 4-digits at mode = 4).

→ Please also refer to „LTC dropout“ ←

Modes 5 and 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 (mode = 5) or HH:MM:SS (mode = 6), i.e. separating symbols are set to colon, leading zeros will be displayed.

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

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

Modes A, B, C, D, E = stop timer or difference time or offset time

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

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

- Leading zeros on/off.
- Flashing in case of negative values on/off.
- Three user selectable symbols to separate hours/minutes: 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“)The formats 1, 2, and 3 mostly make use of the upper 4 digits, i.e. with format 1 time -9:59 to 59:59, with format 2 time -9:59 to 99:59, with format 3 time -999 to 9999.

→ Please also refer to „LTC dropout“ ←

Mode F = time of the LTC read by the MTD generator

The time F is encoded in the user bits of the LTC(MTD).

The time F contains the time information of an LTC read from the special MTD generator. The reading range comprises „normal play speed“, i.e. 20-30 frames/second, forward and reverse. The displayed data are frame accurate unless there is a change of direction. It is not possible to realise dynamic changes of direction frame accurate because of a delayed status transmission.

The following display formats may be selected via an user console (e.g. MTD BE, MTD BTK, MTD BE19, ...) to display the time F:

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

→ Please also refer to „LTC dropout“ ←

LTC dropout

In case of a dropout of the LTC(MTD) during the current operation a display set to mode 1, 8 or 9 (main time), 2 (real time), A, B, C, D, E or F will keep on 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 has occurred when both decimal points and colons are simultaneously lit up.

Description of the master/slave combination

The digital display MTD DSR 300M has a control unit for the connection of analogue index clocks (MTD AC 230, MTD AC 300, Eurochron clocks). The digital display is termed master clock and permits to read and display LTC time code as well as all time units of the MTD Time Timer Time Code system - reading the LTC(MTD) generated by a special MTD generator. The analogue index clock is termed slave clock and permits to display a time other than the time displayed at the master clock. The time to be displayed at the slave clock is selected by a turn switch at the master clock.

The master clock supplies the slave clock with power as well as with time data. The time data are provided by the LTC and will be converted to form a telegram similar to the German radio time telegram DCF77. The data bits are transmitted every second, at the change of the minute the seconds pulse will be suppressed. The telegram is synchronous to the readout LTC. Screwing posts at the slave clock serve as connectors, making an easy loop-through to a next slave clock possible.

The digital display of the master clock displays the time in 24-hour format, the analogue slave clock in 12 hour-format. For detailed descriptions of the analogue clocks of the MTD system please see respective operating instructions, e.g. for MTD AC 230 or MTD AC 300.

Connecting the master/slave combination

Use the 9-pins DSUB female connector (SLAVE) to connect the slave clock. Below the pin assignment and a wiring example:

from master clock		to slave clock
DSUB9F		open ends (to screwing posts)
VDD = 12V	1	VDD (1)
GND	2	GND (2)
SIGNAL	7	SIGNAL (3)
GND	8	GND (4)
SHIELD	9	SHIELD (5)

Use e.g. a two-paired, shielded cable with pairs twisted (1 with 2, 3 with 4). Lead cross section e.g. 0.22mm².

Cable lengths MTD master:

Every slave clock requires $\leq 11\text{mA}$ at $\geq 6\text{V}$. To calculate the maximum cable length, output voltage, cross section, specific resistance and number of clocks have to be involved. For radial arrangement of copper cables with a cross section of $0,22\text{mm}^2$ and a output voltage of 12V , the following cable lengths are possible for every lane:

no. of clocks	1	2	5	10	20	30
length m	3500	1750	700	350	175	117

The maximum number of clocks is limited by a 300mA fuse.

Operating the master/slave combination

The HEX turn switch **ZONE** serves to select the operating mode of the analogue index clock. The positions 2, 6 and A-F may be selected with their functions corresponding to those of the MODE switch.

All connected index clocks display the time selected with the **ZONE** turn switch. This way it is possible to display different times at master clock and slave clock. If a new time has been selected, the digital display shows for a moment the new operating mode, e.g. „Zn 2“. Then all connected index clocks start their automatic setting, i.e. the hands move to the 12 o'clock position and then adjust to the time transferred. This operation will take three minutes approx.

For more details regarding the index clocks please see description (MTD AC 230, MTD AC 300 or Eurochron clocks).

ZONE 2 = real time

The real time encoded in the LTC(MTD) receives one additional frame and then this time is converted into the telegram.

There is an automatic adjustment of the index clock to Daylight Saving Times, as well as an automatic correction of any deviation from real time occurring during the daily operation. To take advantage of such automatic adjustment it must be ensured that the central MTD generator is receiving correct 'real time' signals or does the Daylight Saving Times switching automatically.

ZONE 6 = LTC time information

The time of the LTC is converted into the telegram and displayed by the index clock. The LTC has to be provided continuously, without jumps/breaks and at normal frequency.

ZONE = A, B, C, D, E, F

Basically one of these operating modes may be selected as well. Note that only up-counting times will be accepted. Moreover, it has to be taken into consideration that the index clocks will only be synchronised to the telegram at every full hour. For this reason the stop watch functions are not recommended as operating modes. One possible application is the display of time zones. The times A..E will then be programmed as real time + offset.

Connections and specifications

LTC:	input at 3-pins XLR female connector: pin 1 = GND, pins 2/3 = signal. 100mV - 5V, balanced, 100K-Ohm.
SLAVE connector:	9-pins DSUB female: pin 1 = VDD (12V) pin 2 = GND pin 7 = Signal pin 8 = GND pin 9 = shield
Dimensions:	307 (W) x 307 (H) x 63 (D) mm
Weight:	3.6kg approx.
Power supply:	85-250 VAC, 47-63 Hz
Power consumption:	max. 18W, typical 13W
Operating temperature:	5°C to 40°C
Relative humidity:	35% to 85%, non-condensing