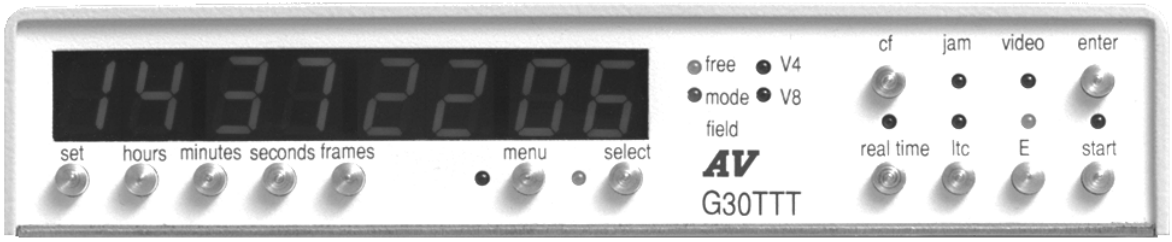
Operating Manual
Version: 3.5
February 4, 2011

LTC generators + central units of the
MTD Time-Timer-Time-Code System

AV-MTD G 30 TTT



Alpermann+Velte

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A1 Safety Instructions

General rules: Only use the device as directed in a dry atmosphere. Treat the AV-MTD G 30 TTT 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 G 30 TTT 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

For further information please contact your local dealer or:

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A3 CE Declaration of Conformity

We,

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Electronic Engineering GmbH
Otto-Hahn-Str. 42
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herewith declare under our sole responsibility that the

G 30 TTT

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

Functions Overview

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.

G 30 TTT is a central generator unit of the MTD system. The generated LTC is externally locked to video (CVBS or black burst). Alternatively if there is no external sync source, LTC is internally synchronised via a crystal. Integrated components are an LTC reader, a RS485 serial interface and the balanced LTC output.

The time information of the generated LTC may be selected as:

- real-time,
- identical to the LTC of the built-in reader,
- identical to the time E (in the MTD timer system),
- continuing from a start value.

The selection is made by pressing a button on the front of the unit.

The user bits of the generated LTC(MTD) contain real-time and date, six independent times A...F (e.g. stop watches or the time of the readout LTC), and status data. These data are destined for a MTD timer system. With this system, all times may be displayed and operated. Operational units (MTD-BE or MTD-BTK) communicate with the G30TT via the RS485 serial interface.

For operation in a non "MTD system" the way to process the user bits can be changed. For example generating a "Real-time" LTC the time equals to the local time and the user bits carry the date (different formats selectable).

All settings of the G 30 TTT as well as of the MTD system – (i.e. settings that have been made via a MTD user console)- will be stored permanently, even when the G 30 TTT is switched off.

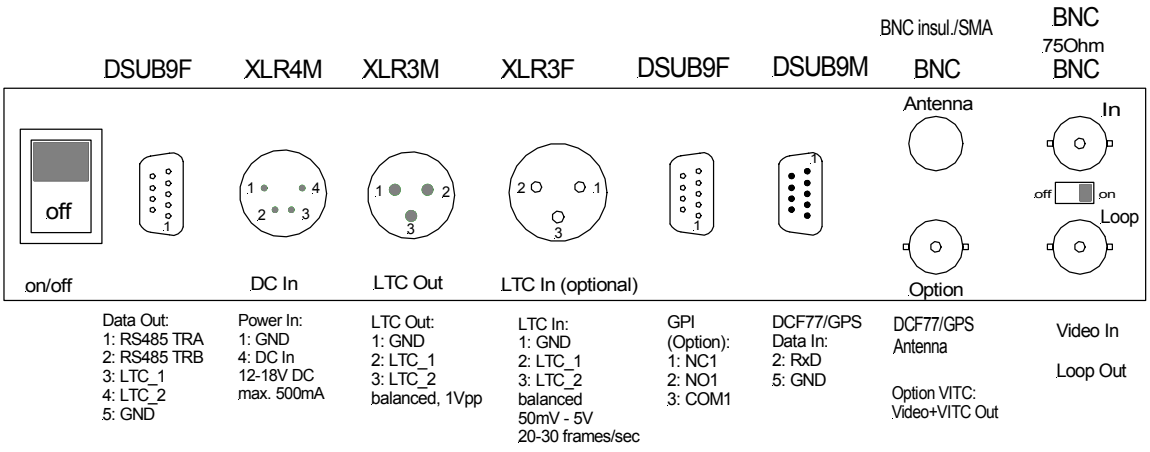
The standard options for the G 30 TTT are as follows:

- DCF77 or GPS reception by built-in receiver,
- DCF77 or GPS reception by external receiver,
- colour framing according to 4-field or 8-field (8-field uses the white flag in line 7 of a black burst),
- GPI = settable trigger of a built-in relay by time A or B of the MTD system.

Further options may be built in if required. Example of special options:

- Receiving a "real-time" from an LTC, i.e. a second built-in LTC receiver simulating a DCF77 or GPS reception.
- Having a DCF77 and GPS receiver built-in. One of both can be activated by menu selection.
- Converting Central European Time (CET/CEST) to UTC.
- Receiving CET/CEST by writing UTC into time E.
- VITC generator.

Rear Panel and Specification



Video In:	1 Vp-p, CVBS or black burst. For V8 colour framing there has to be the white flag in line 7.
DCF77 antenna:	Meinberg type
DCF77/GPS serial data:	RS232, 2400/7/E/2
GPI:	relay contacts between COM1 and NC1 (normally closed). At trigger for approx. one second contact closure between COM1 and NO1 (normally open). Max. breaking capacity: 5 W Max. turn-on voltage: 175 V Max. switching current: 0.25 A Max. main current: 1 A
Housing:	½ 19“, 1 U, 214 (W) x 43 (H) x 262 (D) mm
Weight:	2.0 kg (approx.)
Operating temperature:	5 °C to 40 °C
Permissible humidity:	35 % up to 85 %

With the special option “**receiving real-time from an LTC**“ there is neither a DCF77 antenna connection nor a DCF77/GPS data connection, instead, a second XLR socket is installed as LTC input.

Description of Keys

real-time The time information of the LTC is generated identical to the "real-time". "Real-time" is an internal clock, which is regulated by the built-in or external DCF77 or GPS receiver, or by external operation (MTD user console). After switching on the G 30 TTT the clock starts at 00:00:00:00. See also chapter "Receiving real-time..." and "Description of the menu lines".

ltc The time information of the LTC is generated identical to the readout LTC. LTC is readable within a range of 20-30 frames/second, backward and forward (also "still" LTC if the output frequency is within a range of 20-30 frames/second). The generated LTC will always be in forward direction. Drop-out compensation of one frame is provided, after that the generated LTC stops.
The generated LTC is always locked to the video or to the crystal time base respectively. If readout LTC and generated LTC are locked to the same video and the readout LTC is at play speed "forward", a continuous "jam sync" is made, i.e. a regeneration of the readout LTC without time jumps.

E The time information of the LTC is generated identical to the time E of the MTD system. The time E can be a up-counting, a down-counting or still time, e.g. as a stop timer or as a lap time or as an offset to the readout LTC or to the real-time. The "colour framing" function is not applicable in this mode. The LTC is generated in "forward" direction only (i.e. a plus or minus sign cannot be set). The time information is generated in a way that, after adding one frame, an LTC reader will display the time identical to that of an MTD display unit with display mode = frame format. The 8-digit display of the G 30 TTT displays the values just like an LTC reader (i.e. adding one frame to the generated time).

start Free-running operating mode: when this mode is initiated, the unit simply switches to a free-running counter. If this key is pressed again, the time information of the LTC switches to the current start value (**set** key) and will then be counted on continuously.

set Serves to display or input a start value, the **select** LED lights up. First the actual start value is displayed. Alterations can be made using the keys **hours**, **minutes**, **seconds** and **frames**.
Pressing the **set** key again quits the set mode and stores alterations.

cf Serves to switch on/off colour framing mode, only with built-in option and with frame rate = 25. The **V4** LED lights up if colour framing according to V4 has been reached, the **V8** LED lights up if colour framing according to V8 has been reached. The **V4** LED flashes if colour framing has been selected but cannot be reached (e.g. if no video has been connected or the **E** key has been pressed).

enter Switches on the status display, see chapter "After power-on". Functions during **menu** switched on will be explained in chapter "Description of the menu lines".

menu Displays the menu lines, see chapter "Description of the menu lines".

select During **menu** switched on: selects the menu lines.
After long key press if menu is switched off: switches between the way of using the user bits. Either the LTC(MTD) is generated to operate within the MTD system or the user bits contain the manually set values or the date - according to the selection at the menu (see chapter "User bits mode").

The 8-Digit Display and the LEDs

The **8-digit display** generally displays the time information of the generated LTC as "hours minutes seconds frames". With the operating mode "time E" (**E** key) one frame will be added to the generated value. Pressing the **set** key or **menu** key the display switches to display special data or text, pressing the **enter** key the status of the unit will be displayed (see chapter "After power-on").
Whenever data are written into the non-volatile memory - by using the keys of this unit or via commands from a connected MTD user console -, the display will indicate "**Store**" for a moment. This indication will not disturb any current operation.

LED	Function
menu	Lights up while a menu line is displayed.
select	Lights up while the start value or the trigger time (GPI) is displayed. Goes out after pressing the **set** key. Flashes if G30TTT does not generate the LTC(MTD), in that case the user bits are used for example as date instead of transferring data for the MTD system.
free	Lights up if the DCF77 or GPS receiver is not synchronised or not connected or not built in. Will remain extinguished if the DCF77 or GPS receiver is synchronous to the antenna signal.
mod.	Flashes in the rhythm of data reception of a DCF77 or GPS receiver (once each second).
field	Only with built-in DCF77 receiver: indicates the field strength of the antenna signal.
V4	Flashes if colour framing (**cf** key) has been activated, but can not be executed (e.g. if no video is connected or the **E** key has been pressed). Lights up if the LTC is locked according to the 4-field sequence. The 4-field sequence is derived from the video signal or from the black burst at BNC **Video In**.
V8	Lights up if the LTC is locked according to the 8-field sequence. The 8-field sequence is derived using the white flag at line 7 of the video or black burst signal.
jam	Lights up as long as an LTC can be read, irrespective of the **ltc** key.
video	Lights up if the LTC is locked to the video (connect video or black burst at BNC **Video In**).
real-time	Lights up during the "real-time" operating mode, **real-time** key.
ltc	Lights up during the "LTC" operating mode, **ltc** key.
E	Lights up during the "time E" operating mode, **E** key.
start	Lights up during the "start time" operating mode, **start** key.

Description of the Menu Lines

Pressing the **menu** key switches the menu lines on or off. After power-on the last selected menu line is displayed (the **menu** LED lights up). A menu line serves to indicate actual settings or executable functions. Pressing the **select** key all menu lines may be displayed cyclically, pressing the **enter** key the indicated settings may be altered or functions may be executed.

Menu line	Description
LOCK OFF (ON)	Key-lock off (on). Key-lock "on" means that all keys except the **menu** and **enter** key are without function. This way the generator cannot be switched inadvertently. Switch between ON and OFF by pressing the **enter** key.
U Store	Pressing the **enter** key all current settings (including settings made via an external MTD operational unit) may now be stored in a "user" storage area; see also chapter "Stored data and factory settings". During the backup **Store** is displayed, afterwards **U Store** is displayed again. This process will not disturb any current operation of the generator.
U Load	Pressing the **enter** key calls the settings of the "user" storage area, see also chapter "Stored data and factory settings". **Attention**: This action will restart the G 30 TTT just like a power-on!
U reset	Pressing the **enter** key resets the "user" storage area to the standard values (factory settings), see also chapter "Stored data and factory settings". During the backup **Store** is being displayed, afterwards **U reset** is displayed again. This process will not disturb any current operation of the generator.
GPI A0	Display and alteration of settings of the relay trigger: **A0** = trigger at time A, inactive. **A1** = trigger at time A, active. **B0** = trigger at time B, inactive. **B1** = trigger at time B, active. Pressing the **enter** key calls the alteration set mode, the **select** LED lights up (only with built-in option "GPI"). Then, the display will additionally display the actual trigger time. The **hours** key alters the hours of the trigger time, The **minutes** key alters the minutes of the trigger time, The **seconds** key alters the second of the trigger time, The **frames** key switches between **A0 → A1 → B0 → B1**. The **set** key terminates the programming and stores the new setting. If the GPI is inactive or not triggered, the contacts COM1 and NC1 are closed. If the time (A or B) assigned to the GPI matches the selected (trigger) time and GPI is set active, then COM1 closes to NO1 for approx. one second.

F reset Pressing the **enter** key the factory settings will be stored in the backup memory and in the actual area.
Attention: This action will restart the G 30 TTT just like a power-on!

REAL on (off) Pressing the **enter** key will switch between **on** and **off**.
On means: time and date of the (built-in or external) DCF77 or GPS receiver will be accepted, i.e. every second the "real-time" of the MTD user bits will get its update. During the operating mode "real-time" of the generator the LTC time will update once a day or after pressing key *real-time*.
Off means: time and date of the (built-in or external) DCF77 or GPS receiver will not be accepted, the status LED's at the front however remain valid. Time and date now may be set using a MTD user console. Pressing key *real-time* will transfer the time of the internal clock (identical to the time of the MTD user bits = real-time) to the LTC time.

HOUr 00 (..23) Pressing the **enter** key will select an hour out of 00 - 23. In the "real-time" operating mode (key **real-time**) this will be the hour at which the LTC generator automatically synchronizes to the time of the GPS or DCF77 receiver. This happens once a day, and a frame discontinuity may occur. So this event should be chosen to happen at a time - mostly at night - where it causes no further problems. The standard setting is = 03. The hour has to match with the **reference input time** of the GPS or DCF77 receiver, i.e. whenever G 30 TTT detects this hour anew from the reference input time, the synchronization occurs.

FrAM Pressing the **enter** key will switch between different frame rates. This selection changes the internal free-run oscillator, the generation of the LTC time information and the way of counting the MTD times A...I.

Frame rate = 24:	Not usually used
Frame rate = 25:	Standard setting. In free running mode (without locked to video) and in case of video lock in the television system 625/50 (PAL).
Frame rate = 30:	In free running mode (without locked to video).
Frame rate = 3d:	30 drop mode: in case of video lock in the television system 525/60 (NTSC).

USER (SET, TTT ...) Shows the pre-set of the user bits mode. Change the mode with key **enter** (see chapter "User bits mode"). After a long press at key **select** - while the menu is switched off - the user bits mode can be switched between "TTT" (i.e. LTC(MTD) will be generated) and the mode selected at this menu.

OFFS off (±01..23) An offset (full hours) may be added to the reference time input. With key **enter** select **off** or **01 ... 23** or **-01 ... -23** (see chapter "Offset to reference time input").

User Bits Mode

Basically G30TTT generates the LTC(MTD), i.e. the user bits carry data for the use of the MTD system. But it is also provided to switch the user bits mode. In principle three basic modes can be defined:

- Generating LTC(MTD): data for the use of the MTD system.
- Manually set values, once set they remain fixed.
- Date: different formats are available to set the day/month/year into the user bits.

In the menu (line **USER (SET, TTT ...)**) the user bits mode can be pre-selected. Key **enter** switches between the following modes:

USER SET The manually set values will be generated, see below.

USER TTT LTC(MTD) will be generated: data for the use of the MTD system.

USER 2 Date of format s_8s_7 DD MM YY.

USER 3 Date of format S_2S_1 DD MM YY. S_1 and S_2 are status data:

- S_1, bit 0: set to 1, if the status data of the DCF77/GPS receiver indicate lock (receiver synchronises to the antenna signal).
- S_1, bits 1/2: current time zone: 0/0 = UTC, 1/0 = CET, 0/1 = CEST.
- S_1, bit 3: set to 1, if the status data of the DCF77/GPS receiver indicate a Daylight Saving Time switching.
- S_2, bit 0: not used.
- S_2, bit 1: Millennium bit, =1 if year ≥ 2000.
- S_2, bit 2: not used.
- S_2, bit 3: not used.

USER 4 Date of format according to EBU Technical Information I29-1995 (BBC format).

USER 5 Date of format DD MM YY YY (year = four digits).

USER 6 Date of format YY MM DD s_2s_1.

USER 7 Date of format s_8s_7 YY MM DD.

USER 8 Date of format s_8Y YM MD Ds_1.

USER 9 Date of format DD MM YY s_2s_1.

$s_8s_7s_6s_5s_4s_3s_2s_1$ represents the manually set user digits. Some of these digits may appear together with the date, if the date does not use the complete 8 user digits.

Pressing key **set** at this menu line the user bits set mode switches on. The display switches to show the last set values. Using keys **hours**, **minutes**, **seconds** and **frames** the values can be changed manually. Key **set** pressed again quits the set mode and stores the new values.

The selection at this menu serves as a pre-set. Basically G30TTT generates the LTC(MTD). After a long press at key **select** - while the menu is switched off - the user bits mode can be switched between "TTT" (i.e. LTC(MTD) will be generated independent from whatever has been selected at the menu) and the mode selected at this menu:

- LED **select** off: LTC(MTD) will be generated, all functions of the MTD system are available.
- LED **select** flashes: the user bits are of format according to the selection at the menu. The MTD system does not work.

Example: With selection "USER 2" at the menu and LED **select** off, the unit generates LTC(MTD). If the LED flashes the unit generates the date according to format 2. With selection "USER TTT" at the menu, the unit generates LTC(MTD) always, the key **select** cannot switch the mode.

Offset to Reference Time Input

The reference time comes from an external or built-in GPS or DCF77 receiver. Now it is possible to create a time zone selecting a full hours offset.

OFFS off: The reference time input will be accepted without any offset calculation. The LTC(MTD) transfers this time and date information in the user bits (data multiplex), so it can be decoded from MTD displays at mode 2 (real-time) and 3 (date). If the "real-time" mode of the generator is switched on (LED *real-time* at G30TTT lights up) the generator will synchronise once a day its internal clock and the LTC time information with the reference time. Pressing key *real-time* this synchronisation can be achieved manually at any time.

OFFS 01 (... 23, -01 ... -23): This switches on the offset calculation. The reference time will be calculated plus or minus the selected value of hours (01 ... 23). The result will be treated as the new reference time for the synchronisation and for the real-time and date of the LTC(MTD). If necessary the date will be corrected by plus or minus one day.

If the "real-time" mode of the generator is switched on (LED *real-time* at G30TTT lights up) the result of the offset calculation will be shown at the front display and will be generated as the time information of the LTC.

Independent of having switched on or off the "real-time" mode the result of the offset calculation will be coded in the user bits of the LTC(MTD), so any MTD display at mode 2 (real-time) and 3 (date) shows the result of reference time ± offset.

Remark

If the „real-time" mode of the generator is switched on (LED *real-time* at G30TTT lights up) please proceed as follows:

- Change the offset using key **enter**.
- Switch menu off.
- Press key **real-time**, now the time of the LTC and the time display at the front will show the result of the new offset calculation.

Stored Data and Factory Settings

Settings which have been made via G 30 TTT or via a MTD user console will be stored. In detail these settings are as follows:

Settings via G 30 TTT	**Factory settings**
• Start value (hours, minutes, seconds, frames)	00:00:00:00
• Operating mode = **real-time**, **ltc**, **E** or **start** key	real-time
• colour framing on/off, **cf** key	off
• key-lock **LOCK** on/off	off
• GPI active/inactive and at time A/B, trigger time	00:00:00 A0

Settings via MTD user console	A	B	C	D	E	F	H	I	LTC
display format (1-8)	1	1	1	1	1	1	7	1	1
hyphen (colon, dec. point, off)	:	:	:	:	:		.	.	
leading zeros on (1)/off (0)	0	0	0	0	0	1	0	0	1
leading zeros at zero on (1)/off (0)	0	0	0	0	0	0			
flashing with negative on (1)/off (0)	0	0	0	0	0	0			
function selection (UP/DOWN/DIFF...)	UP	UP	UP	UP	UP	OFFSET TC			
Offset	0	0	0	0	0	0			
down stop (0) or down overflow (1)	1	1	1	1	1	1			

For more details see operating instructions of the MTD system.

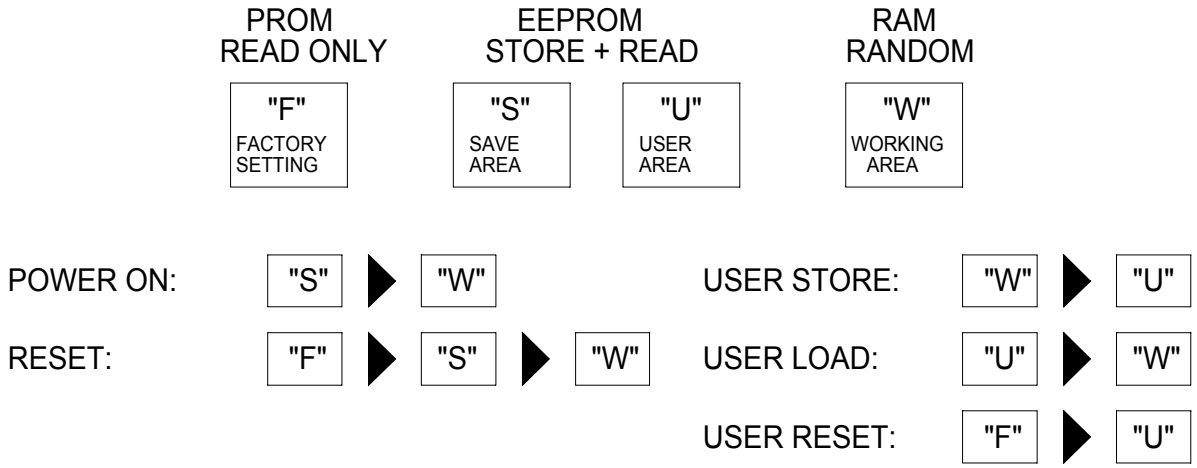
These data may be written altogether into in different storage areas. The storage areas are organised as follows:

Area **"F"**: factory settings of G 30 TTT. These non-erasable data are stored in the PROM.

Area **"S"**: backup memory saving any alteration made during current operation. The data are stored in an EEPROM (i.e. that they will be available when switching on again).

Area **"U"**: user area, permits to store separately a complete system setting. These data are stored in an EEPROM as well.

Area **"W"**: working area for current operation. RAM area which changes with new settings.



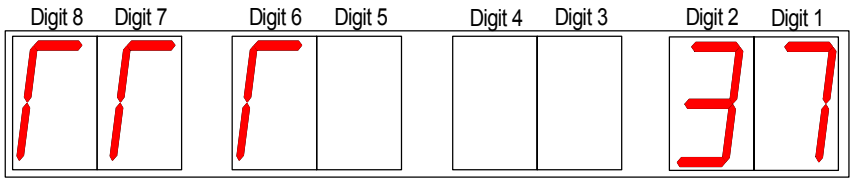
The diagram above shows the storage areas and processes:

1. After power-on "S" will be transferred to "W" if all data in "S" are reasonable.
2. In case of a storage failure "S" will be overwritten with "F", then continued as in 1. Functions 2. and 1. will also be executed in the **F reset** menu function.
3. When in the menu function **user store,** the actual data may be stored separately.
4. When in the menu function **user load,** the actual setting may be overwritten with the stored setting.
5. When in the menu function **user reset,** the user area is overwritten with the factory settings.

After Power-On

After power-on the last stored data will be tested. In case of a storage failure a "reset" is made, with the display indicating **reset**. After that, or in case of valid data, status reports are indicated in two steps, and all status LED's are lit up.

Status 1:



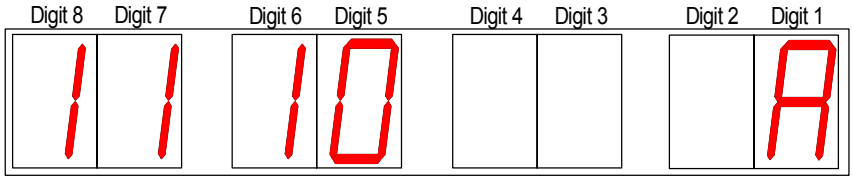
Digits 8, 7 and 6 indicate the type of the unit.

Digits 5 and 4 indicate a special version; with standard version these digits are blank.

Digit 3 indicates the frame rate of the system: blank = 25 (standard),
4 = 24,
3 = 30,
d = 30 Drop.

Digits 2 and 1 indicate the revision of the installed firmware.

Status 2:



Digit 8: =1 if the LTC reader (software) is built in, otherwise =0.

Digit 7: =1 if the option GPI is built in, otherwise =0.

Digit 6: =1, if the option DCF77 or GPS is built in, otherwise =0.

Digit 5: with digit 6 =0 this field is blank.
with digit 6 =1: marks the transfer protocol of the DCF77/GPS receiver
(e.g. = 0 ➔ Meinberg, =1 ➔ Hopf).

Digit 4: not used.

Digit 3: not used.

Digit 2: = 1 if the option VITC is built in, otherwise = 0.

Digit 1: hexadecimal number (0..F) indicating the built-in modules:
bit 0:
bit 1: =1 if a RS485 is built in, otherwise =0.
bit 2: =1 if colour framing is built in, otherwise =0.
bit 3: =1 if an LTC reader (hardware) is built in, otherwise =0.

Receiving “Real-Time“ via DCF77 or GPS

There are two standard configurations:

- G 30 TTT with built-in DCF77 receiver. The antenna has to be connected at the insulated BNC socket at the rear panel. Three LED’s at the front of G 30 TTT indicate the status of the built-in receiver:

  LED **free** (red) = free-run mode. The receiver outputs the time in free-run mode as long as this LED lights up.
  LED **mod.** (green) = modulation. Flashes every second to indicate the decoding of the time telegram.
  LED **field** (green) = field strength of the antenna signal.
- Connection of an external DCF77 or GPS receiver. Using a serial (RS232) interface (connected at a 9-pin D-Sub) G30TTT receives every second time, date and status data. Two LED’s at the front of G 30 TTT indicate the status of the serial data:

  LED **free** (red) = free-run mode, the receiver has not been synchronised until this LED is extinguished.
  LED **mod.** (green) = modulation, flashes every second to indicate reception of serial data.

Positioning the DCF77 antenna:
The status LED’s **mod.** and **field** serve to find out the optimum antenna position. With the DCF77 receiver built-in in G 30 TTT, these LED’s are located at the front panel of G 30 TTT; with an external DCF77 receiver, these LED’s are located at the housing of this receiver. In the latter case the **mod.** LED at G 30 TTT indicates the reception only of serial data, not of the radio telegram.
Put the antenna upright and turn **slowly** until a **minimum** luminosity of the **field** LED appears. Then turn the antenna for 90° in order to achieve the best position. If now the **field** LED fully lights up and the **mod.** LED blinks regularly - without any flickering! - the **free** LED should go out after a few minutes. Otherwise the antenna should be installed at another position.
Please note: the 60th second in the radio telegram is characterised by omitting the seconds pulse, i.e. in this case the **mod.** LED of the receiver does not flash.

The DCF77 receiver has an independent clock which runs freely without receiving any signals. In case of a power failure an accumulator will keep the clock running with a precision of 10^{-5}. If a synchronisation has once been achieved, the clock is adjusted and a new synchronisation once or twice a day will be sufficient.

The LTC time information as “real-time“:
Pressing the **real-time** button selects this generator operating mode. Every time the **real-time** button is pressed the actual time of the receiver will be transferred to the generator; otherwise the generator continues to count on the time locked to the video or free running thus avoiding the generation of frame jumps. At a pre-selected hour another transfer of the receiver time is made automatically (i.e. in this case a frame jump of the generator can be expected, for example at 3:00 at night). This hour can be set using the menu (see chapter “Description of the menu lines”). G 30 TTT looks for a match of this selected hour with the **reference time input** from the GPS or DCF77 receiver.
If this operating mode is used without having a receiver built-in or connected, any MTD user console may be used to set “real-time“ and date. Please notice **REAL on/off** at chapter “Description of the menu lines”.

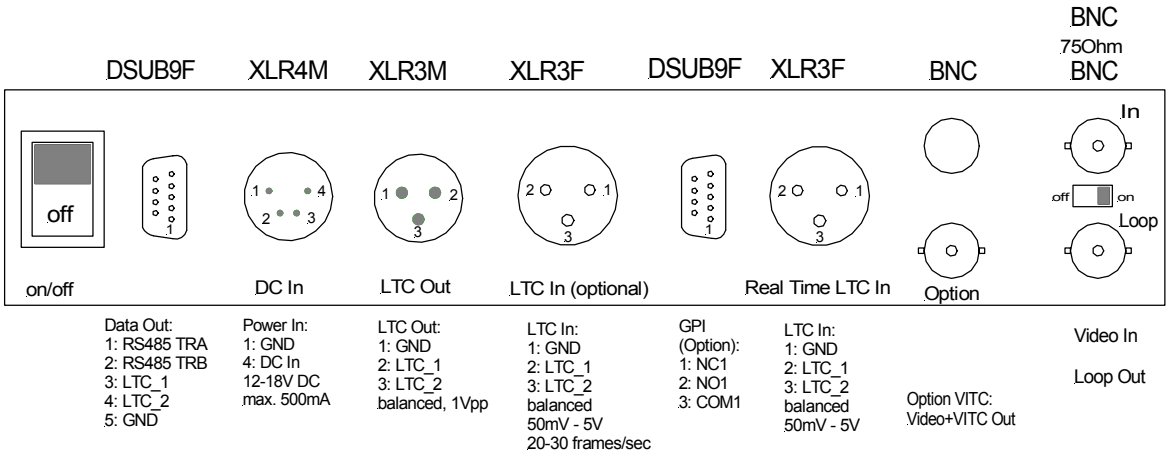
“Real-time“ in the MTD timer system:
The “real-time“ is encoded in the user data of the LTC(MTD) and may be displayed on the displays of the MTD system. This time is synchronised every second to the receiver clock. If there is no receiver built-in or connected to the G 30 TTT, “real-time“ and date have to be set using a MTD user console. Please notice **REAL on/off** at chapter “Description of the menu lines”.

Option: VITC Generator

The status display shows, whether the VITC generator is built-in or not (see chapter “After power-on”).
The VITC data are identical to the LTC data.
The VITC lines of the vertical blanking interval are 17 and 19.

Option: Receiving “Real-Time“ via LTC Input

With this special feature G30TTT receives “real-time” (time and date) via a separate LTC input:



The LTC at connector XLR3F “Real-Time LTC In” has to conform to the following specifications:

1. LTC of “forward” direction.
2. LTC at normal speed (e.g. 25 frames/sec).
3. Time must be continuous without breaks.
4. The user bits must carry a valid date.

The hardware of this special feature consists of a LTC converter board, which is built-in the G30TTT housing. The converter reads LTC and outputs a serial protocol - identical to the DCF77/GPS data protocol. G30TTT receives time, date and status information via an internal serial interface. The LED **mod.** at the front of G30TTT flashes every second, if the data meet all of the specifications. In order to pass condition no. 4 (valid date), the format of the date can be selected by the switch SW1 at the converter board (switch 1 of the 8-pole switch):

SW1=OFF Date of format day/month/year, + status information:

Day = user digits 5+6 (“minutes“)
Month = user digits 3+4 (“seconds“)
Year = user digits 1+2 (“frames“)
Status = user digits 7 (“units of hours“) and 8 (“tens of hours“):

Digit	Bit	Status
7	0	=0: time of the LTC is not synchronised to a DCF77/GPS receiver or the receiver currently works in a free running mode. =1: time of the LTC is synchronised.
7	1/2	time zone, bits = 1/0: CET, = 0/1: CEST, = 0/0 or 1/1: UTC.
7	3	announcement of start/end of Daylight Saving Times.
8	0	announcement of leap second.

LTC of this kind will be generated e.g. of the unit G30TM, if the operating mode **USER MOD. = 3 STATUS** (menu SET) is selected. The LED **free** at the front of G30TTT goes out, if bit 0 of digit 7 of the user is set.

SW1=ON Date according to EBU Technical Information I29-1995 (BBC format):

Digit 1 (BG1)	reserved	bits = 0.
Digit 2 (BG2)	units of the day	4 bits, LSB = bit 12
Digit 3 (BG3)	units of the month	4 bits, LSB = bit 20
Digit 4 (BG4)	tens of the day tens of the month	2 bits, LSB = bit 28 1 bit = Bit 30, bit 31=0
Digit 5 (BG5)	reserved	bits = 0
Digit 6 (BG6)	units of the year	4 bits, LSB = bit 44
Digit 7 (BG7)	reserved	bits = 0
Digit 8 (BG8)	tens of the year	4 bits, LSB = bit 60

LTC of this kind will be generated e.g. of the unit G30TM, if the operating mode **USER MOD. = 4 BBC** (menu SET) is selected. The LED **free** at the front of G30TTT is without function and dark.