PRODUCT SPECIFICATION
712 XXX

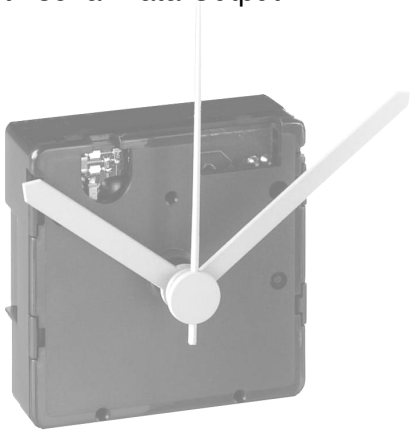
Zchn.Nr. **583 374**

Issue Date:
11.02.05

Product

60 kHz MSF RC-Wallclock

with serial Data Output



Created by:
M. Schneider
Chen Gong

Department.
R & D

Checked:

Department.:

U.T.S. *Präzisionstechnik GmbH*

Address:

U.T.S. Präzisionstechnik GmbH
Gewerbestrasse 31
D-78739 Hardt

Kunde:

Standard Product

Checked by customer:

Department.:

Description:

Fully automatic RC-movement, which receives and adjusts to the United Kingdom's MSF time code transmitter.
Automatic functions are: Initial setup with receiving and adjusting of hands, checking of internal time during normal run (every 2 hours) and adjust hands position to correct time. Checking of absolute hands position (every day) with adjusting if required.
Aditionaly the movement has a digital output, which enables to give the date information to external electronic.

List of changings

Change (shortform)		Page	Date	Changed pages
Description	**Name**			
1. Version Final	**Chen Gong M.Schneider**		**11.02.05**	

Contents

1. Introduction

The described movement is a two motors, 3 hands analog RC-movement, designed for use with the United Kingdom's time code transmitter **MSF60** on **60.000** kHz.
Initial setting function and error correction are automatic. The movement starts automatically after put in the battery, without pressing any knob.
A hands setting help function for easy and precise assembly of hands is available.
If no reception is possible, the movement can also be used like a quartz movement.
The date information can be used though a serial output by external electronic.

Customer: **NN**

Supplier: **U.T.S. Präzisionstechnik GmbH**
Abt. Entwicklung
Gewerbestrasse. 31
78739 Hardt

2. Functions

2.1. Initialisation

After putting in a battery, the hands are driven to one of the positions 4:00, 8:00 or 12:00. Depend on which is the closest to the actual hands position.
After the hands have reached this position the motors will be stopped and the receiver is switched on.
The hands will not move until receiving has success. After the receiving process has finished the hands are driven to show the correct time and the movement starts normal run.
During normal run the movement tries to connect the transmitter every two hours and checks internal time with this information. For increasing the battery life receiving time is limited to 10 minutes.
A correction is done if necessary (when a difference between received time and displayed time occurs). The correct position of the hands is checked two times per day.

2.2. Hands setting help function

The movement has a hands setting help function. This can be started by shortcutting the two special pins (see drawing) on the backside of the movement. Then gear will be driven straight to the 12 o'clock position. This can be done at any time.
After the motors stopped, set all hands on their shafts exactly adjusted to 12 o'clock.
Then restart the movement (see 2.1).

2.3. Assembly instruction

For delivery the movement is adjusted to the 12.00 o'clock position and locked with a Lock-Pin from the backside of the movement.
Assemble the movement into your clock, with the battery box looking downwards (to 6 o'clock).

- **hands assembly**:
  alarm hand
  hour hand adjust exactly to 12.00 o'clock pos.
  min. hand adjust exactly to 12.00 o'clock pos.
  sec. hand adjust exactly to 12.00 o'clock pos.
  Be careful: don't turn the hands after they are pressed on their shafts!!
- Remove the **Lock-pin** on the backside of the movement
- Put in the **battery** (position of battery always horizontally !)
- Use only LR6, **ALKALINE** batteries (size AA). **Check correct polarity!**
  Don't use recharchable batteries!
- The hands will run to 4.00 o'clock position and stop.
- **Now the movement tries to receive**
  If reception is possible and not disturbed, the movement will show the correct time after about 4 minutes.

2.4. Adjusting of Hands

If the adjusting of the hands was changed after the assembly or the lock pin was already removed before Pt. 2.3 was done, make a shortage (see Pt. 2.2 and Dwg. No. 583 375) to the two pins on the backside of the movement. Then it will run from any position to 12 o'clock. Then go on with Pt. 2.3 for hands assembly.
TIP: This function can also be used for checking the correct position of the hands.

2.5. Checking of hands position in normal run (automatically)

The movement automatically checks it's hands position daily between 15:00 and 16:00. If hands position if not equal with internal time, the hands are first driven (quick run) to one of the initial positions (4:00, 8:00, 12:00) and then adjusted again to correct time.

2.6. Summer-/ winter time change

This is done fully automatic, no assistance of the user necessary

2.7. Serial Output

This port can be used for connecting external units, like. digital displays.
Available information:

- Actual year
- Actual month
- Actual day
- Actual day of the week
- Actual hour [12h]
- Actual AM/PM
- Actual minute
- Actual second

The transmition always happens on the begining of every hour, at

HH:00.00,500 and takes 44 ms.

Additional transmitions will happen after „***first receive***", „***forced receive***" und „***auto receive***" and after any correction of the hands was necessary.

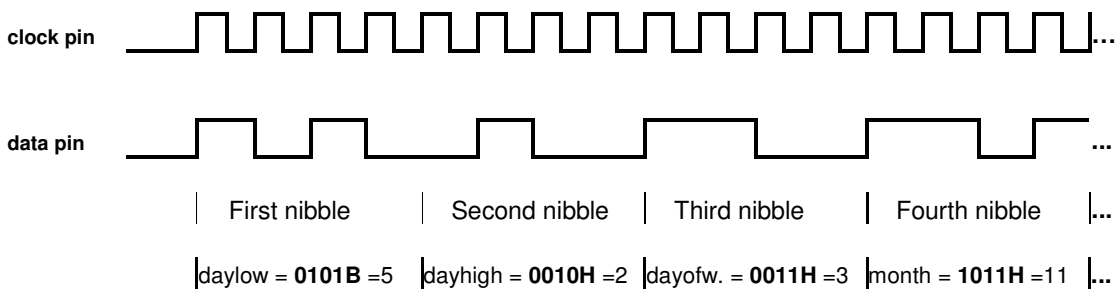
2.7.1. Format of data

Nr.	Describtion	Format	Numbers	Explanation
1	***daylow***	BCD	00 - 31	Lower byte of actual day
2	***dayhigh***			High byte of actual day
3	***dayofweek***	HEX	1 - 7	Day of the week, 1 = monday
4	***month***	HEX	1 - 12	Actual month, 1 = January
5	***yearlow***	HEX	00 - 63	Actual year, 14H = xx20
6	***yearhigh***			
7	***minutelow***	BCD	0 - 9	Actual minute, 0 - 9
8	***minutehigh***		0 - 5	Actual minute, 10 -50, 0xxx = AM, 1xxx = PM
9	***hour***	HEX	0 - 11	Actual hour
10	***secondlow***	BCD	0 - 9	Actual second, 0 - 9
11	***secondhigh***		0 - 5	Actual second, 10 -50

2.7.2. Transmition, Clock

The transmition is serial, sychronized to a clock-frequency of 1 kHz. The clock frequency is also available on the port. (see connection diagram)

Timing diagram:



Beispiel: 25. Nov. Mittwoch
Example: Nov. 25th Wednesday

2.8. Light sensor

On this input a sensor (expl.for light) can be adapted. This will be checked 1 time per minute whether it is high or low. If the input is low, second hand will stop at 12:00 position and stay there until the input becomes high again. In this mode, this input is checked every second. After this input was recognized as high again, the second hand will quick run to it's correct position and then work normally.

3. Conditions

3.1. General

The movement is built only for indoor use, together with a single 1,5V AA-type alkaline battery.
Working temperature range is –5 to + 55 °C with a max. humidity of 95%.

3.2. Technical Data

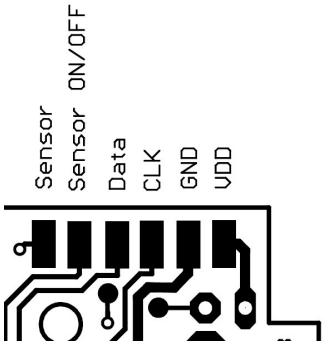
Technical Data for RC movements 712xxx MSF 60 kHz		
	Standard	**High Torque**
Receiving frequency	60,000 kHz	
Size	see Dwg. 583 375 (attachment)	
Min. space (∅) req. for assembly	77 mm	
Weight	47g (without battery)	
Battery type	AA / LR6 (Alkaline)	
Voltage	1,25 - 1,7 V	
Current consumption (average)	160 µA	180µA
Battery life	≥1 year	
Working temperature	-5°C - +55°C	
Storage temperature (without function)	-20°C - +70°C	
Receiving time (first receive)	3 min. - ∞	
Receiving time (autom. receive)	3 - 10 min	
Adjusting time (excl. receive)	max. 3min 10 sec.	
Autom. summer- winter time change	max. 2min 55 sec.	
Noise (normal run, DIN 8325)	32 db(A)	
Antenna	internal ferrite bar	
Automatic receive	12x / day	
max. current	9 mA	10 mA
Sensitivity (77.5kHz)	<100 µV/m **	
max. time error (quartz, DIN 8325)	± 0,5 s/d	
Data- / Clock Output I_{max} for U_H = 0,8 U_{batt}	- 1,2 mA	
I_{max} for U_L = 0,2 U_{batt}	2,5 mA	

All dates for t = 25°C and U_{batt} = 1.35 V (if not other specified)
** the final sensitivity of the clock depends on the clock case construction, it can only be measured together with the final clock.

3.3. Mechanical Data

Detail		**Normal** (712XXX)			**High Torque** (7123XX)		
max. pressure for setting the hands		25N (h/min) , 10N (sec)					
Data of center screw		M 8 x 0,75					
max. weight on metal hanger		25N					
Torque:							
Second	Ub = 1,35V	50 µNm			70µNm		
Minute	Ub = 1,35V	300 µNm			700µNm		
Dial		up to 250mm			up to 350mm		
		sec	min	hr	sec	min	hr
Specification of hands (Dwg. Nr. **582 086**)	length (max) **[mm]**	90	120	90	130	160	130
	weight (max) **[g]**	1	1	1,5	1	2,5	2,5
	excenter (max) **[Ncm]**	0,005	0,03	0,03	0,01	0,08	0,06

3.4. Connection Diagram



4. Documentation

The documentation for electronic-unit and drawings is setup by ***U.T.S.*** and contains:

- This product specification
- Drawing ***U.T.S.*** Dwg.No. 583 375

5. Using periode

No time fixed

6. Marking

Posible versions
See:
U.T.S. Dwg.No. 583 375
U.T.S. Dwg.No. 995 169 Bl.2-3

7. Service

7.1. Frequently asked questions and their answers

No.	*Question / Problem*	*Answer / Help*
1	This movement cannot receive, but other movements have reception inside same room	- check battery (voltage, + -) - is there any influence (distance >1m) of TV-sets, monitors, telephone-sets a. so.? Stop this or enlarge the distance and restart the movement. - check all connections (acc. diagram) - clock housing must not be full metal and closed! Hint: The more metal the worse the reception!
2	Movement runs permanently, do not stop (more than 4min)	- check battery (voltage, + -) - use hands setting function (see 2.2) , the movement should now run to 12:00 position. If not, please send it back to your dealer.
3	Movement stops on 4:00, 8:00 or 12:00 for ever (> 10min)	- see No. 1 - movement was accidentally set to quartz mode, please restart. - hands setting help function is still active, remove the bridge and restart (see 2.2)
4	Movement receives, but shows wrong time	- short cut the hands setting pins, check the12:00 – position, adjust hands if necessary. Warning!! Don't turn hands on their axles, remove and set them new. - if time difference is exactly 4h, check the battery
5	Battery was removed and put in again, but the movement does not restart.	- after remove the battery please wait about 1min. or short cut the battery connector. Then put in the battery again. - check the lock-pin, is it really removed?
6	How to set the hands exact after remove.	- see Pt. „2.3 Assembly instruction" in this document
7	No or incorrect Summer-Wintertime change	- see Pt.1 of this page. - check reception (forced receive)
8	Battery type	**Alkaline** batteries are recommended for proper function

8. Attachments

Attachment 1 Drawing ***U.T.S.*** Dwg.No. 583 375