Microframe Corporation

Time Code Sync Master
Models 8009 & 8010

Operating Manual

Limited Warranty Agreement

Your Microframe System is warranted against failure due to defects in workmanship or material for a period of one (1) year from the date of purchase. Microframe Corporation will repair or replace any defective unit. Obvious abuse or mishandling of the unit is NOT covered by this warranty.

Merchandise Return

If your Unit does not work satisfactorily, please give us a call. We may be able to clear up the problem by phone. If it becomes necessary to return your Unit to the factory, please observe the following:
1. Call Microframe for an RMA number. This will authorize you to return the unit.
2. Place Unit in a sturdy box with sufficient packing material.
3. If requested, include the AC power adapter. It is not necessary to return the cable and connectors unless they are the problem.
4. Return the system insured and prepaid. Microframe is not responsible for shipping damages and losses on returned Units.

Warranty Service

For warranty service, please contact Microframe toll-free at 800-635-3811. One of our technicians will be glad to assist you.

Assistance

For any product assistance or maintenance help, contact Microframe by either calling 800-635-3811 or e-mailing us at: support@microframecorp.com.

Safety

Do not install substitute parts or perform any modification to the product without first contacting Microframe.

Disclaimer

We constantly strive to improve our products. Specifications are subject to change without notice.

Warning

All power adapters, line cords, and electrical equipment should be kept out of the reach of children and away from water. (If you are installing cable in an air plenum area, such as a drop ceiling used for air return, you must use plenum-rated cable. The cable supplied from Microframe is rated CL2 and is approved for indoor installation everywhere except plenum areas.)

Life Support Policy

Microframe's products are not authorized for use as components in life support devices or systems without the express written approval of the President of Microframe Corporation. As used herein:
1. Life support devices or systems are defined as systems which support or sustain life, and whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user or any one depending on the system.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

FCC Notice (for wireless products only)

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
— Reorient or relocate the receiving antenna.
— Increase the separation between the equipment and receiver.
— Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
— Consult the dealer or an experienced radio/TV technician for help.

Time Code Sync Master

Models D8009 & D8010

Table of Contents

Quick Start Instructions

1) **Remove the Time Code Generator** from packaging, place battery in unit. Inserting battery backwards causes no harm and is an easy way to carry around a battery until needed.

2) **Position the battery correctly** to start Sync Master Time Code Generator. Do this for each unit you wish to activate for this shoot. The Sync Master Time Code Generator will go through a calibration cycle on power-up for about 30 seconds, there is no "OFF" Switch. The 2nd row of numbers will indicate the current battery voltage.

3) **After each unit completes the calibration cycle** it displays "Hr, Min, Sec // Even Frame, Odd Frame" for 15 Seconds and then goes to "Sleep" until you press the Mode/ON button (middle button on end of unit). The clock is still running and will remain in Sync (+/- one Frame) for 8 hours or more or until you remove the battery. Pressing the "Mode/ON " button will wake the display.

4) **Set Frame Rate**: You will need to set the same frame rate on all your devices. The unit will recalibrate if the frame rate is changed. See "Settings".

5) **Pick one unit to be "Master."** Connect the remaining slave units to the "Master" by running a cable from the Master's "SMPTE OUT" to the Slave's "SMPTE IN". It should take about 3 seconds to sync each Slave, after which you can unplug the Slave and sync the next unit. The SMPTE OUT signal generated by the Master and Slaves is industry standard SMPTE time code and may be connected to any camera or audio recorder to lay down a time code track.

6) **All units are ready to go**. Give one Sync Master Time Code Generator to each camera operator who will video the display for a short 2 second tag at the beginning of each camera shot. This will make post editing much easier because each clip from each camera has a visible time code tag at the beginning.

Quick Tips

Checking Sync

When the display is "asleep" you will notice a dash sequence running across the top of the display. This sequence is a reflection of the frame rate and current frame.   Holding two displays next to each other and observing this sequence will give you a rough idea if the displays are still in sync. To accurately check sync, simply take a picture of all devices running side-by-side with a camera. NOTE: if your camera or phone has a slow shutter speed it will pick up multiple frames, but you should still be able to determine sync to +/- 1 frame.

Checking the Battery Level

While the display is sleeping (showing no time-code), the same dash sequence mentioned above for checking sync also indicates the current battery health. From left-to-right, each segment represents approximately 20% battery life. All 5 segments means 100% battery, 4 lights means 80%, 3 lights means 60% and so on. Also note that when a battery is first inserted into the display, while the unit is Calibrating the 2nd row will show the battery voltage.

Changing the Brightness (Quick Change)

Tap the middle button to turn the display on. While time-code is displayed, press the plus (+) button to increase brightness or the minus (-) button to decrease brightness. Remember, increased brightness uses more power and shortens the battery life during production. Be sure to keep an eye on the battery level.   If you try to turn the brightness past what your current battery will allow, a light will begin to blink to indicate that you do not have enough battery to achieve the desired brightness.   NOTE: this "Quick change" brightness is not being saved in memory, so when you replace the battery the unit will reset to its "memory" brightness. To change the "memory brightness" see the "Settings" section.

Changing the Battery on set

If a display needs to have its battery changed during a shoot, simply replace the battery and then re-sync to any other unit. You can then use the fresh battery unit as the master and change all of the other batteries if you wish. The included power supply can also be used to preserve the time while changing batteries. However, since it plugs into the SMPTE IN port, you cannot SYNC time code while the D8009 is powered externally. (Note: the external power supply does not charge batteries).

Manually Setting The Time: To manually set the displayed time simply press and hold both the "Mode/ON" and "+" buttons for 3 seconds. Once in the time set mode, the display will stop counting and await your input. From this point you can quickly set each digit on the display. Simply press "+" or "-" to increment or decrement the digit and "Mode/On" to move to the next digit. Press and hold "Mode/On" to save and exit or do nothing for 10 seconds to time out and exit without saving. **NOTE:** The time always starts at zero when a new battery is inserted.

Settings

Changing the Settings

To enter settings mode: hold both [Mode/On] and [-] buttons. Use the [On] button to select an option. Use the [+] and [-] buttons to change a value. Press and hold [ON] button to save and exit, or do nothing for 15 seconds and the Sync Master Time Code Generator will revert back to normal operation and not save changes. Options are retained even if the battery is removed.

1) Sleep: How long before the screen blanks. 5-60 seconds.
2) Frame Rates: 23.98 (23.976), 24, 25, 29.97, 29DF (drop frame), 30
3) Percent brightness for the display. Running at a high brightness will shorten the battery life. 5-100%.
4) Product specific
    a. D8010: Flip the display direction. Note: the frame count ends up on the top row.
    b. D8009: Shift display so that both digits of hours are visible.
5) Frame Offset: Adjust the incoming timecode during a jam-synch

Sleep Time: The sleep time is how long the time is shown when the "on" button is pressed before the display blanks itself and goes to sleep, to conserve battery life.   The factory default is 15 seconds. You can change this from 5 to 60 seconds, or set it to always on.

Frame Rate: The available frame rates on the Sync Master are: 23.98 (23.976), 24, 25, 29.97, 29DF (drop frame), 30. If you change the frame rate the Sync Master Time Code Generator will go through another calibration cycle. The new frame rate will be the default Frame Rate on all future turn-on's.

Brightness: This sets how bright the display is. Remember, the higher the brightness the shorter the battery life. There are two ways to set the brightness: "on the fly" and "in memory".

- To change the brightness "on the fly", simply press the"+" or "-" buttons when the display is on. You will see the brightness change immediately.   Brightness will remain at this setting until the battery is removed. However, when the battery is removed and re-inserted the brightness will go back to the "in memory" setting.
- To change the "In memory" brightness enter settings mode. See "Changing the Settings" above. This new brightness setting will be used any time a new battery is inserted.

Set Flip Direction (D8010): As a personal preference or for cable concerns, one may want to change the orientation of the D8010 Sync Master to have the buttons on the right instead of on the left. This can be achieved by changing the "Flip" option. Setting the option to "1" instead of "0" will change the orientation of your display.   To get to Options mode, press and holding "on" and "-". The unit will show "SLEEP". Press the "on" button until you see the "FLIP" setting. Press "+" or "-" to change this setting, hold "on" to save. Note: the Frame count ends up on the top row. The "Flip Direction" option is not available on the D8009, as that model is missing a digit.

Shift (D8009): Shift the D8009 display so that both digits of hours are visible. Normally the display shows H:MM:SS; FE FO, where the odd(FO) and even(FE) frames are alternated. This option shows HH:MM; SS FF, where the frames are combined and shown on the bottom right.

Frame Offset: This option allows you to adjust for offsets in time code from other devices. It is only applied while jam-synching to another device. e.g. if your camera puts out a timecode that is one frame slow, set this option to +1. Range is -9 to +9. Defaults to 0.

Info Mode

To enter info mode, while the display is on, press and hold [+] and [-] buttons. Use the "ON" (mode) button to toggle between options. Press and hold "ON" (Mode) to exit.

1) Model and software revision.
2) Battery voltage – can be used to gauge how fresh the battery is. This is affected by the display brightness.

Reset to Defaults

To reset to factory defaults, press and hold all three buttons and insert the battery. The prompt "Reset 0" will show on screen. Press [+] once to confirm, then press and hold [On].

Using SMPTE "Sync in" and "Sync out"

Sync in and out are industry standard SMTPE in and out signals. Connecting any standard SMTPE out, including the Sync out of another Sync Master, to the "Sync in" will cause the Sync Master to sync its internal time to the incoming signal. After about 5 seconds, the Sync Master can be unplugged and it will stay in sync to +/- 1 frame for up to 8 hours.

In addition to using the "Sync Out" to sync other Sync Masters, you may connect the Sync Out to any standard SMTPE input (such as those found on high end audio and video recorders) to keep those devices in sync with the Sync Master. The Sync Out is active regardless of the state of the display.

Workflow Recommendations

1) **ASSIGN A PERSON FOR TIME-CODE DEVICE MONITORING –** Since time-code is dependent on battery life and attention to synchronization procedures, it's highly recommended one person is the "time-code gate-keeper" in the production team. Camera teams have a full-time job being creative with their tools and keeping them operational and verifying time-code operation can easily fall through the cracks.
A designated "Time-code PA" might perform the following:
   a. Writing dates and identification on each device.
   b. Take pictures before each major scene to verify time-code start time.
   c. Document time-code start times for the DP, editor, or FX team.
   d. Ensuring fresh batteries are installed before each day begins.
   e. Plugging devices into AC wall power to sustain time-code (and preserve battery life).

2) **CHECK TIME-CODE BEFORE FILMING A NEW SCENE –** This may vary depending on how many times locations are changed but may provide the following essential elements.
   a. Data Wranglers can document time-code ranges with media files while copying to storage.
   b. Frequent time-code snap shots are a great reference for DP's, editors, script supervisors & special FX teams because each picture has a daily time-stamp with camera time-code.
   c. Allows for checking battery life and changing batteries as needed.

3) **TEST VISUAL TIME-CODE WITH EACH NEW CAMERA YOU USE –** Remember, visual time-code uses the same principle audio sync procedures use but with a different reference: "we trust the cameras ability to record the frame-rate accurately." Just as we trusted the camera to record an accurate frame-rate for video and audio (…and audio sync later), we use visual time-code with the Sync Master to provide the first frame of recorded video with time-code. Essentially this is the same way audio files are recorded where meta-data is added at the beginning of the file and time-code is conformed throughout the duration of the audio file. It's highly recommended you test the accuracy of your cameras with visual time-code to ensure they perform as expected. Because many DSLR's have a limited record time, this limits common errors in frame-rate drift that might be exhibited over an hour or more of record time. Testing is always the best option to ensure you get the right results for your production.

Additional workflow recommendations can be found on our web site.

Battery Life Essentials

UNDERSTANDING RUN TIME

The Sync Master D8010 unit is designed to run approximately 8 hours on a new 9V battery. Rechargeable battery life may vary considerably compared to a standard alkaline battery. The battery life is also strongly influenced by the display brightness and how long the display remains on.

A setting of 100% brightness uses 5 times more power than a setting of 20%.

The battery voltage can be gauged by watching how many dashes are displayed while the screen is blank. Five dashes means 100%, 4 means 80%, 3 means 60% and so on.

When the battery voltage begins to fall below 6.3 Volts this unit will automatically dim the display brightness to prolong run time. This dimming function is designed to alert the operator that the battery has about 10% life remaining.

If the unit cannot achieve the set brightness, a led will blink, indicating that the battery is not allowing the set brightness.

The Sync Master is designed to provide time-code continuously, and does not have an off switch. Remove the battery when not in use.

USING THE AC ADAPTER

The AC wall adapter will not charge the battery in the Sync Master, but can be used safely with the battery installed. The AC adapter allows a convenient way to change batteries or sustain time-code for a longer time throughout the production day without losing time-code.

D8009/D8010: Plug the power adapter into the SMPTE IN port.

If a unit loses power and time-code is lost, put in a fresh battery, follow the easy synchronization steps in the Quick Start guide, and it's ready to go.

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Based on our testing, we recommend the batteries highlighted below. Test parameters: 50% brightness, display on 25% of every minute until battery voltage dropped below 6.3V.

Battery	Duracell (consumer)	Duracell Procell	Duracell Quantum	Energizer (consumer)	Energizer Industrial	Rayovac	Sony
Run Time (hrs)	4	8	9	8	8	2	3

D8009 vs D8010 Differences

	D8009	D8010
Hours Digits	2 LEDs + 1 Digit, to indicate 23 hours (unless unit is in shift mode)	2 Digits to show up to 23 hours
Dry Erase Area for Scene Notations	NO	YES
Flip Display Orientation Option	NO	YES
Shift Option	YES	NO
Holster with Belt Clip Available	YES	NO

Model D8009 Specifications

Features

- Built in time code display with illuminated red digits
- Separate odd/even frame digits to eliminate frame blur
- LEDs to indicate 10's of hours (e.g. 21 hours = 2 LEDs)
- Syncs to SMPTE time source
- Generates SMPTE time code
- Pocket sized form factor
- "On the fly" brightness control
- Automatic/configurable sleep mode
- Optional: protective case/belt holster available
- External power through SMPTE IN jack allows for external power or battery changes without losing the time
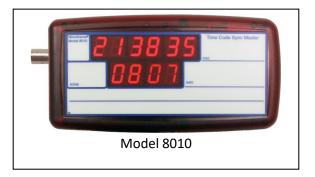

Model 8009

In the Box

(1) D8009
(1) 9V Battery
(1) BNC to 3.5mm adapter
(1) Power adapter w/ 3.5mm tip

Model D8009 Specifications	
Power……………………………..	9V Alkaline Battery or AC adaptor
Battery Life……………………….	4-12hrs, depending on usage. Typically 8+ hrs.
Supported Frame Rates………	23.976, 24, 25, 29.97, 29.97 DF, 30
SMPTE Input Range…………….	0.4Vpp to 5Vpp
SMPTE Input Loading………….	AC coupled signal into 33K
SMPTE Output……………………	3Vpp w/ no load, AC coupled
Weight……………………………….	0.30lbs (0.14kg), including 9V battery
Dimensions………………………..	4.96" x 2.72" x 0.95" (12.6cm x 6.9cm x 2.4cm)
Clock Accuracy…………………..	2ppm from 32F to 104F (0C to +40C) 3.5ppm from -40F to 185F (-40C to +85C)
Synch Accuracy………………….	Within +/- 0.25 frames of source
Timer Drift…………………………	Not more than +/- 1 frame in 8 hours
Timer Limit	Rolls over at 23:59:59
Operating Temperature……..	-4F to 131F (-20C to 55C) Limited by battery

Model D8010 Specifications

Features

- Built in time code display with illuminated red digits
- Separate odd/even frame digits to eliminate frame blur
- Dry-erase front label
- Syncs to SMPTE time source
- Generates SMPTE time code
- Portable form factor
- "On the fly" brightness control
- Automatic/configurable sleep mode
- External power through SMPTE IN jack allows for external power or battery changes without losing the time

Model 8010

In the Box

(1) D8010
(1) 9V Battery
(1) BNC to 3.5mm adapter
(1) Power adapter w/ 3.5mm tip

Model D8010 Specifications	
Power………………………………..	9V Alkaline Battery or AC adaptor
Battery Life…………………………	4-12hrs, depending on usage. Typically 8+ hrs.
Supported Frame Rates………	23.976, 24, 25, 29.97, 29.97 DF, 30
SMPTE Input Range……………	0.4Vpp to 5Vpp
SMPTE Input Loading………….	AC coupled signal into 33K
SMPTE Output……………………..	3Vpp w/ no load, AC coupled
Weight……………………………..	0.50lbs (0.23kg), including 9V battery
Dimensions………………………….	7.25" x 3.62" x 1.26" (18.4cm x 9.2cm x 3.2cm)
Clock Accuracy……………………..	2ppm from 32F to 104F (0C to +40C) 3.5ppm from -40F to 185F (-40C to +85C)
Synch Accuracy……………………	Within +/- 0.25 frames of source
Timer Drift………………………….	Not more than +/- 1 frame in 8 hours
Timer Limit	Rolls over at 23:59:59
Operating Temperature……..	-4F to 131F (-20C to 55C) Limited by battery