Digital Slave Unit: Operating Notes for Versions 1 to 3

0 Contents

1 Software Revisions

Version	Used on	Comments
1v9	"digital upgrade kits" Prototypes #4 and #10, shipped to Firefly	**Original issue**
2v1	Used on all pre-production models and early kits	**The only change to this issue is to the procedure used to calibrate the low-battery condition.** • The unit has to be 'trained' to recognise a low battery condition. Without this procedure, the low-battery indication is only approximate. In version 1v9 the training should take place at 3.6V. In version 2v1 it is supposed to take place at 4.5V but there is a **bug** which means that this feature does not work. The work-around is either a) do not train the unit, but rely on the default setting, which will indicate a low battery at about 2.9V, or b) ignore the low battery warning, or c) train (or re-train) the unit with it connected to an external 3V battery. It will then indicate a low battery condition whenever the supply (normally 4.5V) drops below 3V. **Features to note…** The following features might not be explicitly mentioned in the operating instructions • After low-battery training, the operating mode is reset to the default power-up condition. • After entering Learn mode, you have 15s in which to fire the flashgun. However, if you enter a setting manually, the unit will time-out 3 seconds after the last press of the Mode button. • *Restarting the operating program.* If you get muddled during programming, the Reset button resets the microprocessor. The description of this feature was ambiguous. The device does *not* revert to any previous settings.
3v1	Samples shipped to Firefly on 25-Oct-05.	**This issue contains changes as follows** • The default setting is now 'fire after two pulses' instead of 'fire after one pulse' • One of the functions of the restart/fire button – 'Reset the operating mode' – has been disabled • When the unit is first switched on, the red LED double-blinks to indicate a low battery. This was a **bug** caused by the non-initialisation of a register. However, this has now been turned into a feature, in order that the user can recognise what a low-battery warning looks like. • The short red and green blink when the Fire button is pressed indicated that the unit was performing a battery voltage test. This blink could be confusing. Therefore the battery test now happens *after* the steady green LED that indicates 'unit fired'. • The low-battery 'training' now works by recording the supply voltage at the time the unit is trained, and using this as a reference for future warnings. You should therefore train the unit when it is connected to an external 3V battery. The unit will not accept a training voltage greater than about 3.7V. If the unit is not trained, an internal default of about 2.9V is used. • A number of causes of short glitches in the LED flashes have been corrected • A cause of unexpected behaviour of the Mode button during low-battery retraining has been corrected. **Features to note…** The following features might not be explicitly mentioned in the operating instructions • The Mode button needs to be held down for 15s to enter 'low battery training mode'. However, if the unit is already in Learning Mode, this time is shortened to 8s. This is not a deliberate design policy; it is an effect of the programming that it is not thought worth correcting. • After low-battery training, the operating mode is reset to the power-up configuration. • After entering Learn mode, you have 15s in which to fire the camera. However, if you enter a setting manually, the unit will time-out 3 seconds after the last press of the mode button. • *Restarting the operating program.* If you get muddled during programming, the Reset button resets the microprocessor. The description of this feature was ambiguous. The device does *not* revert to any previous settings.
4v3	17-Dec-05	**This issue adds a "permanent learning" mode, and a programmable delayed flash, as well as other minor changes** This issue of software is expected to be in production for some time, so it is described in a separate note, which describes *all* the features.

Specification

Run Mode Settings

Standard — fires after one pulse
Two-pulse — fires after two pulses
Multi-Pulse — fires after a number of pulses
Delayed Fire — fires after a short delay

Learn Mode

Allows unit to be programmed to one of the above settings, or to 'learn'; from a camera or flashgun.

Flash Pulses

Minimum delay between pulses — 2ms
Maximum spread of flash pulses — 1s
Delayed-Fire delay — 2ms *
* may be user-adjustable in future versions

Controls

Restart/Fire Button — for Manual firing
Mode/Learn Button — for programming
LEDs to show…. — Operating Mode
Firing Status
Low Battery

Power Requirement

3 × SR44 / 357 Silver Oxide cells (1.5V, 170mAh)
Standby current <10µA
Battery life at least 2 years / 20,000 ops.
If unit is to be unused for some time, remove Link 2 (inside case) to disconnect batteries

Output Rating

Trigger type: — electronic (triac)
Switching voltage: — 400V max
Switching current — 10A max (peak)
800mA max continuous*

* or 100mA if resettable fuse (FS1) is fitted, If using flashbulbs without a capacitor-discharge firer you are advised to ensure that FS1 is fitted and that J1 is open-circuit.

Output Setting (Internal Link LK1)

Position 1 for flashbulbs and "most" flashguns; position 2 for "all" flashguns, but not flashbulbs.

Physical Information

Dimensions — *to be inserted*
Weight — *to be inserted*

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Status LEDs

After receiving flash pulses, the LEDs will light for 8s with the following meaning

GREEN means 'fired'

Steady Green — fired correctly
Flashing Green — fired, but extra flash pulses were received

RED means 'did not fire'

Steady Red — Learn Mode
Flashing Red — did not fire; too few flash pulses received

After Pressing the Restart/Fire button, the LEDs will light as follows

1) The Red LED will blink steadily a number of times, to indicate the number of flash pulses the unit is programmed to detect. For the Standard setting this is one, of course.

Or The Red LED will give a series of double-flashes to indicate the number of ms delay in Delayed Fire setting.

2) The Green LED will light for 8s to indicate that the unit has fired.

If, during this time, the Red LED gives a very brief double-flash, repeated with 2s interval this is '**low battery**'.

3) Finally, there will be a brief simultaneous flash of Red and Green LEDs. This is part of a self-test feature. One action during this time is that the battery voltage is checked.

At power up: When you insert a battery the red and green LEDs will blink alternately. **The unit will initialise to Two-Pulse Setting.** The Green LED will then light for 8s as above and the Red LED will blink with its low-battery warning. This is a self-test and does not mean the battery is flat.

Identification

Software version — **slv-3v1**
PCB Serial No — _____
Software Serial No — _____
FS1 fitted? — _____
Photodiode — *SFH* (Vis./IR) | *BPW* (IR)
Window transparency — Visible / IR

Restart / Fire Button

Allows you to:

1. **Fire the slave unit manually.** This is useful if you need to test the connection to your flashgun. The slave unit will fire when the button is *released*.

2. **Restart the operating program.** If you get muddled during programming, this button resets the microprocessor. The device does not revert to any previous settings.

3. **Check the Run settings.** When you release this button, the slave unit fires. The red and green LEDs then blink in a coded pattern to indicate the run settings. The green LED then lights for 8 seconds which is the indication that the slave unit has fired (see **Status LEDs**).

4. **Reset the operating mode.** This feature is disabled in software version 3v1

Mode Button

Allows you to:

1. **Enter Learn Mode.** The Mode button is only active when the LEDs are reporting Status information so, if they are both unlit, just press Fire/Restart so that the Green LED lights. Then press Mode to enter Learn Mode, which will cause the Red LED to light.

2. **Program the number of flash pulses.** In Learn Mode: Each press of the Mode button will be counted and the unit will use this data for future firings in Run mode. Pause for unit to revert to Run mode after 3s (Red LED will extinguish).

3. **Count the pulses from a flashgun.** In Learn mode: fire your camera or flashgun. The number of flashes will be counted and the unit will use this data for future firings in Run mode.

The number of flash pulses the unit will count is limited only by the fact that the pulses must be spaced by at least 2ms, and that they must all happen in a one-second period.

After the unit has counted the pulses the Red LED will blink for 8s to indicate that "flash pulses were received, but the unit did not fire". When the LED goes out, the unit will be programmed and ready to work in Standard or Multi-Pulse mode as appropriate. You can check the setting by pressing the Restart/Fire button as described above.

4. **Set the operation to Delayed Fire.** If you do nothing at all in Learn mode it will time out after 15 seconds. The unit will be set to Delayed Fire and the LEDs will show this by blinking the status information.

5. **Set a Permanent Learning Mode,** where each time the unit is triggered, it counts the number of flash pulses received, and stores this to use the next time the unit is triggered. *THIS MODE IS NOT IMPLEMENTED ON THIS ISSUE OF THE SOFTWARE.*

Punch this hole to attach a lanyard

Low Battery Calibration

The unit has to be 'trained' to recognise a low battery condition. The training works by recording the supply voltage at the time the unit is trained, and using this as a reference for future warnings. You should therefore train the unit when it is connected to an external 3V battery, as this is almost the lowest voltage recommended for reliable operation. **It is not essential to perform this procedure.** If the unit is not trained, a value of about 2.9V is used.

1. Press the Restart button to activate the Mode button.

2. Whilst the Green LED is lit, press and hold the Mode button for at least 15s (or 8s if the unit is already in Learn Mode)

3. Eventually, the Green LED will give a brief double-flash. Release the Mode button.

4. The unit will blink the red and green LEDs *twice* to indicate that the battery voltage has been recorded. The operating mode is reset to the default power-up condition.

Notes:

- If the LEDs blink only once, the voltage has not been recorded.
- You cannot erase this value – you can only record a new one.
- The low battery indication does not inhibit the operation of the slave unit – it is just a warning.
- The unit will not accept a training voltage greater than about 3.7V.

BOTTOM