



# THE PENTAX DIGITAL CAMERA FLASH LIGHTING SYSTEM

Supplement To The 2<sup>nd</sup> Edition

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London, United Kingdom



The Pentax Digital Camera Flash Lighting System – Supplement to  
the 2<sup>nd</sup> Edition  
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Title



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## Introduction to the Supplement



It's been around 20 months since the 2<sup>nd</sup> Edition of the “*Pentax Digital Camera Flash Lighting System*” was released. Whilst that edition was a significant update to the original, I have always considered this to be an ongoing and developing resource. Apart from the need to correct and improve as things come to light, there are more aspects of working with flash and Pentax cameras to explore.

Also things move on in the world of Digital Photography, with new camera models coming to the market and new flash developments, in particular in the field of radio trigger systems that support High Speed Sync.

There are a number of areas that now need covering, but not really enough to demand a whole new edition of the Guide, most of which remains relevant and specific to the currently available Pentax Flashes and Cameras. So I have put together the new material and created this shorter ‘supplement’. Eventually as things move on again then this supplement will be absorbed into a new 3<sup>rd</sup> full edition of the Guide.

As always I would like to thank the many forum members at PentaxForums, PentaxUser and thepentaxforum who have supported the Guide, contributed to threads about Guide material, and given ideas and information that have been included. I hope you find this a useful addition and an enjoyable read, and most importantly that it might help to make flash photography with Pentax cameras even more rewarding and successful.

Nigel McGregor June 2017



## Camera Models & Flash Options

The current Guide version (Oct 2015) describes the standard flash options and functions found on Pentax DSLR models over a number of years, from the K10D through to the K3. This is generally a standard flash offering including a built-in flash unit, on-board flash, Wireless Triggering and P-TTL-only flash exposure mode. There were some variances between models in the flash modes offered, but in the main the flash choices remained the same across the range; (the K3 was the first to introduce an 8 step Manual Flash Mode, from Full to 1/128<sup>th</sup> power settings for the Built-in flash).

In recent years there has been a divergence in the Pentax DSLR range and what is offered with flash functions, and so there are now choices when considering the various cameras. Firstly there is the option for Manual Flash Mode with the Built-in unit, which is offered as an additional Flash mode to the standard modes (which are based on P-TTL automatic flash exposures). Then came the first camera to be made without a built-in flash at all, the K3II. This was continued with the K1 'Full Frame'. And finally there are models now that do not offer the Wireless Triggering from the Built-In flash unit.

The functions that are missing by not having a Built-in Flash, and the Wireless triggering omission, can all be replaced by fitting an accessory flash to the camera concerned, but clearly the need to carry extra flashes, or radio triggers, in place of the Built-in flash, needs to be seriously considered by the photographer and the right camera chosen for their own particular needs.

As well there are now variations in the appearance of, and specific items included on the different camera Flash Modes Screen. This is the control screen where the Flash Modes and Flash Compensation settings are made. I will explore these differences and the practical implications in this Supplement section.



## Camera Models, Flash Features Listings

### Wireless

Cameras that offer Wireless Triggering from the Built-in Flash:

K10D, K20D, K200D, KX, KR, KM, K7, K5, K5II/s, K30, K50, K500, K3, KP

### Not Wireless

Cameras that do not offer Wireless Triggering from the Built-In Flash (Accessory Flash required for Wireless functions):

K100D/Super, K110D, K-S1, K-S2, K70

### Manual Flash Mode

Cameras that offer an 8 step Manual Flash mode with the Built-in Flash in addition to the standard P-TTL Mode:

K-S1, K-S2, K3, K3II, K70, KP

### No Built-in Flash

Cameras that do not include a Built-in Flash unit (Use a Hotshoe Accessory Flash or Radio Trigger for Flash Functions):

K3II, K1



## Cameras With No Built-In Flash

As of the time of writing (June 2017) this was two models, the K3II and K1. We can presumably expect the continuations of these particular lines of flagship Pentax DSLRs to also offer alternative equipment such as Astrotracers and GPS units, in place of the Built-In flash. So here I will explore the implications for flash use without the Built-In unit.

Clearly flash photography with these cameras will now have to be carried out with either Accessory Hotshoe mounted flash guns, radio triggers and radio controlled flashes, or a combination of these types.

The cameras still have the capability to operate correctly *with Pentax and other Dedicated system flash types*, and this includes special functions such as :

- Wireless (Off-Camera) flash when using one accessory flash as the ‘Master / Control’ trigger on the camera and one or more ‘Slave’ flashes
- ‘Slow-Speed’ Sync, ‘2<sup>nd</sup>-Curtain’ Sync & ‘High Speed’ Sync Flash Modes
- ‘Multi-Flash’ Mode (with the AF-360/540 FGZII flashes)
- ‘Auto’ Flash Mode (Auto-Thyristor – with the AF-540 FGZ)
- P-TTL automatic flash exposures, both on and off camera
- Manual Flash Exposure Mode, both on and off camera
- Flash-Ready viewfinder indication
- Automatic Flash Head Zoom with autofocus lenses (on-camera only)
- Range & Distance indications (on-camera only)

Hotshoe mounted radio transmitters can be used to control off-camera radio controlled flashes, and there is a traditional ‘PC Sync’ socket for cable connections to Manual studio strobe lights.



## Camera Flash Modes

The current version of the Guide (Oct 2015) lists 8 standard modes, on Page 29. These apply to the group of cameras listed within the 'Wireless' box previously here, and mainly relate to functions of the Built-In flash (the slow-speed sync and red-eye modes also apply to Accessory Flashes). Here is the screen from the K7; the actual modes displayed depend on the Camera Exposure mode selected at the time .... 'P' Mode will normally reveal all.



Without a Built-In flash, there is no need for some of these Camera Flash Modes, and so on these newer cameras without Built-In flash there is no Wireless, 'Slow-Speed with Trailing (2<sup>nd</sup>) Curtain Sync' or Manual Modes. The modes that remain will now affect the operation of the camera or attached Accessory Flashes. The following modes are now standard on cameras with no Built-In flash :

- **'Auto Flash Discharge'** - (available only in Auto 'Green Square' Camera Mode) uses the camera metering system to determine if flash is required, eg in low light or backlit scenarios. The flash will only fire if the system calculates it is needed under these circumstances
- **'Auto Flash with Red-Eye Reduction'** – (available only in Auto 'Green Square' Camera Mode) the same automatic operation but with the extra pre-flash to close down open pupils and reduce the red-eye effect
- **'Flash On'** – discharges the flash in all situations
- **'Flash On with Red-Eye Reduction'** – as above plus the red-eye pre-flash
- **'Slow Speed Sync'** – removes the limitation over the exposure time in P and Av mode to allow longer exposures for recording lower ambient light
- **'Slow Speed Sync with Red-Eye Reduction'** – as above plus the red-eye pre-flash



## Flash Compensation (FC)

The Flash Mode Screen includes the Flash Compensation setting, controlled with the rear E-Dial. This controls the exposure value of the Flash output, in ‘stops’ below and above the camera determined ‘0’ level. This applies to P-TTL automatic exposure mode only.

The Camera Flash Compensation setting will affect the flash exposure of a hotshoe mounted accessory flash when that flash is operating in standard P-TTL mode. The camera FC setting will combine with and accumulate its effect with any FC setting made on the accessory flash also. For example, if you set -1 FC on the Camera, and -0.7 on the flash unit, then the flash output will be at -1.7 stops below the metered ‘0’ level.

If using an accessory flash on the hotshoe as a Wireless triggering flash, then the camera FC setting will affect the total (global) flash exposure when the on-camera flash is operating in *‘Wireless Master’* mode. The camera FC setting will affect the ‘Slave’ flash unit when the on-camera flash is operating in *‘Wireless Control’* mode.

## K1 – Extra Options

The standard Pentax ‘Flash Related Camera Custom Settings’ are described in the current Guide version, section 9, Page 50-54. The following still apply to cameras without Built-In flash, and appear in the standard Menu sections of the K1

- **Memory** – to recall the settings for Flash Mode and Flash Compensation (Rec. Menu 5)
- **White Balance When Using Flash** – to set the default WB setting whenever a flash is attached and activated (Custom Menu 3, 17)

The options for controlling ‘Release While Charging’ and ‘Flash in Wireless Mode’ no longer appear in the K1 Menu (and K3II), as they only apply to Built-In Flashes.



The following additional options are now offered on Pentax's flagship Full Frame model

- **Flash Sync Speed** – The Flash Sync Speed can be customised (Custom menu 1, 7). This will affect the exposure time value fixed in X-Sync Mode, or the shortest exposure time that can be set in M, Tv, & Tav modes
- **Button Customisation – Flash Mode Screen** - The display of the Flash mode screen can be activated by a single press of either the *FX1* or *FX2* buttons (Rec. Menu 5)

### Cameras With No Wireless Function, and Manual Flash Exposure Settings

As listed on page ii of this section, there are a few models now that do have a built-in flash, but where the Wireless capability has been removed. There may be valid debate about the reasons for the removal of this functioning, whether it is related to cost or the expected profile of users, but it is an important factor to consider when purchasing. For P-TTL Wireless operations with these Cameras then the user will have to use a dedicated accessory flash, or alternatively a P-TTL compatible radio trigger system.

Here are some examples of the Flash Mode screens from the K70 DSLR, a camera that falls within this category:

Photo Courtesy of Philip Byford





The screenshot on the previous page, from the K70, shows the standard range of flash modes; Flash On (the selected mode) / Flash On with Red Eye Reduction / Slow Speed Sync / Slow Speed Sync with Red Eye Reduction / Trailing Curtain Sync / Manual.

The Rear E-Dial has set the Flash Compensation adjustment to -1.5ev (highlighted in blue). A press of the green button will reset the FC amount to 0.0, and the OK button will select any highlighted mode. The modes are cycled through with the left and right buttons on the 4-way controller.

Photos Courtesy of Philip Byford



Above here we have displayed the Manual Flash Mode on the K70. This is a relatively new development for Pentax DSLRs, the first time it was offered being on the K3, released in 2013. There are eight Manual power choices; Full Power (1/1), 1/2, 1/4, 1/8, 1/16, 1/32, 1/64, 1/128 . This does add to the versatility of the Built-In flash, not the least in enabling it to be controlled with manual focus lenses, and those without an aperture coupling. Greater degrees of flash fine tuning can be achieved by ISO and Aperture adjustments, or by changing the flash to subject distance (in this case the distance from the camera to the subject).

As can be seen on the photos above, the Manual mode is first selected with the 4-way controller, scrolling across to the far right M option, then selecting with the OK button. The power is then selected with the rear e-dial, and the setting is displayed in the centre box, highlighted in blue here. Now the Green button will reset the Power to Full.



## Other Current Flash Models

AF160 FC / AF201 FG

The main Guide Document, of which this is the supplement to, describes in detail the two current Pentax models, the AF360 / 540FGZII, as well as their immediate predecessors. These are standard dedicated system hotshoe flash types, often referred to generally as ‘speedlights’ or ‘speedlites’ (although these terms are more closely associated with Canon & Nikon models specifically). But most photographers will understand the basic type of flash you are describing, and that is distinct from non-dedicated Manual flashes and studio strobe types.

There are other types and designs of hotshoe flashes though, intended for specialized purposes or just to be very compact and convenient. Pentax have two products in the range that match these purposes currently, and here I will describe those flashes, give an overview of their operation, and try to offer a flavor of their practicality in specific situations.

### The AF 160 FC (Circular ‘Ringflash’)

This type of flash unit is intended for close-up and macro photography, but is also often used for portrait and product photography applications. The advantage for very close subjects comes from two key aspects ; the lens to flash axis and the light source size in relation to the subject. The angle of view coverage is 60deg.



Photo © Ricoh-Imaging.co.uk



### Type and Purpose

The Pentax 'Ringflash' consists of two main parts connected by a cable. The light emitting part is a circular flash head containing 4 light tubes that attaches to the front of the lens with adaptor rings to allow for different size lens front elements. The other part is a control and power unit that attaches to the camera hotshoe, and includes the batteries and controls. The two are connected by a cable that passes both the power supply and flash output instructions to the circular flash head. The flash is powered by 4 AA type batteries, and the maximum rated recycling is 7secs and 250 flashes (full power, fully charged Ni-MH 2700mAh).

When the lens is very close to a subject a traditional hotshoe mounted flash is quite a long way above the lens axis, and in fact much of its light may be unable to even fall onto the subject. The circular flash head of the AF 160 FC solves this problem by 'wrapping around' the lens and providing a full and even coverage, eliminating shadows even at extreme close distances.

Because in this on-lens configuration the size of the light source is large in relation to a very small subject (eg a tiny flower or insect) then the quality of the light is soft. This is more difficult to achieve with a traditional type flash head which would have to be further away, therefore smaller in relation and so a harder quality of light.



It is possible to create some lighting contrast within the scene by adjusting the ratio of output between the two sides of the flash head. This is achieved with a 'Ratio' control switch that adjusts the relative output of each pair of light tubes in the circular flash head. Further re-distribution of the contrast in the scene is possible by rotating the flash head around the lens.

**Photo © Ricoh-Imaging.co.uk**



### **Practical Considerations**

The AF 160 FC is supplied in a kit that includes 4 lens adaptor rings and a further special 'Macro' adaptor for use with the Pentax D FA 100mm macro lens.

When using normal lenses the adaptor rings screw onto the lens filter thread. There are adaptors for 49mm, 52mm, 58mm & 67mm size lenses. The process is to firstly (with the lens already on the camera) screw the correct adaptor ring into place and secondly to attach the circular flash head onto the adaptor. There are two release buttons around the edge of the flash head and 4 tabs that click onto a groove on the adaptor ring.

With the Macro lens then the special adaptor is pushed onto the lens outer hood and turned clockwise to lock it in place, then the circular flash head is mounted in the same way onto the adaptor.





Photo © Ricoh-Imaging.co.uk



There are some limitations to consider with specific lens types and some particular lenses, and these are listed in a table in the flash manual; for example the DA 40 Ltd appears to be too small as the flash head interferes with the camera, and any lenses that have rotating front elements are listed as having ‘unstable focusing’ (however these are all FA type lenses).

Some DA lenses have issues with vignetting at their wider ends, for example the DA 16-45mm and DA 17-70mm ..... however perhaps close up flash photography is not too common at these sorts of focal lengths. The DA\* 50-135mm is reported as vignetting between 50-90mm which may be an issue, although surely we can just zoom in more and move a little back if need be. Apart from the 40mm mentioned already there are no DA primes listed as having any compatibility issues with this flash unit.

It should perhaps be pointed out that this information is based on the APS-C sized sensor, and so far no information exists relating to lens/flash compatibility with this unit and the K1 DSLR, nor of course for the latest D FA zoom lenses.





## **Modes and Functions**

The AF 160 FC flash supports the following flash exposure modes :

- P-TTL with Pentax Digital SLR cameras (and the MZ-S, MZ-L/MZ-6/ZX-L film models)
- TTL with Pentax Film SLR cameras (and the *istD* range DSLRs)
- Manual Mode with all Pentax cameras

The flash will automatically detect the correct automatic mode to use, depending on the camera it is attached to. For the user the only setting to make is the 'Auto' option, and the appropriate TTL mode will apply. Note that the exposure compensation settings only apply to P-TTL mode operation.

Flash mode and lens compatibility is essentially the same as described in this Guide for the other Pentax flashes, ie P-TTL is only compatible with autofocus lenses, and those with an aperture ring need to be set to the A position. Working with an M or K type lens, or an A type with the aperture ring not in the A position will cause the flash to fire at full power in P-TTL mode .... Switch to one of the Manual power levels instead.

The flash does not offer High Speed Sync, Second Curtain sync or Contrast Control Sync modes. There is also no support for Wireless operations, neither P-TTL nor optical slave types.

## **Flash Exposure Control**

There is a single simple control dial that is used to set the Flash Mode and also to control the Flash Exposure in both P-TTL and Manual modes. The 'Auto' position sets P-TTL or TTL (depending on the camera used) and if the flash is operated with this setting then the flash exposure will be as determined by the automatic metering system.

There are 3 Flash Compensation settings on the dial, and so long as the camera is P-TTL compatible and an autofocus lens is being used then these settings will influence the flash output accordingly. The three compensations are (in 'stops') : +0.5, -0.5, -1.0. Including the Auto '0' position makes a range of 1.5 stops in half stop increments.



In common with the other Pentax flashes, making further Flash compensation settings on the camera will compound the effects, adding potentially a range between -3 through +1.5 stops (a 4.5 stop range). Whether this can be applied in practice will depend on the distances, aperture and ISO involved; clearly with very small flash to subject distances, wide apertures and higher ISOs then the ability to lower the flash exposure by -3 stops will be rather limited. Using a low ISO and small aperture will help in this respect greatly.

There is no actual 'M' setting on the dial, but rather the manual power levels are activated by simply setting the dial to the required output. There are three power settings; Full,  $\frac{1}{4}$  &  $\frac{1}{16}^{\text{th}}$ . Manual Camera exposure mode would be an intuitive method of working combined with Manual flash settings, and if there are further fine tunings of flash exposure needed, in between or beyond the 3 specific power steps, then small adjustments of ISO or aperture could be applied.

### **Flash Head Output (Lighting Ratio) Control and Modelling**

The balance of light output from around the circular flash head is adjusted with this control switch, located on the back of the circular flash head (facing the photographer when the flash head is attached to the lens). This has the effect of creating a 'lighting ratio' between the two different halves of the flash head, therefore introducing some contrast within the scene. By rotating the flash head then the shape of this contrasting light can be moved around to suit the subject. The actual total amount of flash exposure does not change, it is only the distribution of the total flash output between the two halves of the flash head that changes.

The control switch has 5 settings : 1 / 2 / 3 / 4 / 5

- 1 Ratio 1:0 All the light is from the left half
- 2 Ratio 3:1 There is three times the light from the left half as from the right
- 3 Ratio 1:1 Equal output from both halves (no contrast)
- 4 Ratio 1:3 There is three times the light from the right half as from the left
- 5 Ratio 0:1 All the light is from the right half



There is a 'Modelling' button on the controller unit. When pressed the flash tubes will illuminate continuously, allowing assessment of the contrast and fall of light in the scene. Press the modelling button again to switch off the lights. The 'Lighting ratio' control setting will have an effect also on the modelling light output, allowing visualization of the fall of light over the scene.

## The AF 201 FG

This is a small, weather resistant hotshoe flash unit, designed for on-camera flash work when the bulk of carrying a full-sized accessory flash is not wanted. With a Guide number of 20 (ISO100 / F2.0) and a head that tilts vertically through 145deg for upwards bounce, this flash adds to the versatility and quality of lighting that is obtainable from a built-in flash unit. Without sideways twist available, in terms of bounce capability this will always be a compromise compared to the AF-360/540FGZII flashes, but it does increase the possibilities for better light than from a built-in unit.

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Other Current Flash Models (vii)



The flash has simplified control options and limited special Sync modes compared to the full featured Pentax flashes. There is a single main control dial that makes all the possible settings, a single flash Test button, and one ‘flash ready’ indicator light.

The following Modes and flash exposure settings are available :

- P-TTL Automatic Exposure (Normal Sync)
- P-TTL Automatic Exposure (Trailing Curtain Sync)
- Manual Flash output (Full Power)
- Manual Flash output (1/4 Power)

**Photo © Ricoh-Imaging.co.uk**



There is no High Speed Sync mode. There is no support for Wireless operation, nor Optical Slave capability. If it is desired to use the flash off-camera then suitable Radio Transmitter systems can be used. The flash would require a Receiving radio unit attached to its coldshoe.



The following Sync Modes will function when set via the Camera Flash Modes screen :

- Slow Speed Sync
- Slow Speed Sync with Red-Eye Reduction

Flash Compensation (P-TTL mode only) needs to be controlled via the Camera Flash Modes screen, giving a range from -2.0 to +1.0 stops.

If finer gradations of manual flash exposure are required, then small adjustments to ISO, aperture, or flash to subject distance will be needed.

The flash head coverage angle is fixed (no Flash Head Zoom) and covers an angle of view equating to a 20mm lens (Full Frame Format) or 16mm (APS-C). A pull out wide-angle panel extends this to 13mm (APS-C).

The flash uses 2 AAA type batteries, with a maximum rated recycle time of 4 secs and 100 flashes (full power, fully charged Ni-MH 2500mAh).



Photo © Ricoh-Imaging.co.uk



## Automatic Flash Photography; Expectations & Realities

As has been detailed in the 2<sup>nd</sup> edition of this Flash Guide in Sections 5 (*'The Camera: Flash and Exposure Modes'*) and 6 (*'The Accessory Flashgun: Flash Modes'*), there are various exposure mode configurations between both flash and camera that will influence how we balance the flash and ambient exposures. On Pentax, we can summarize the possible combinations:

- 1) **Auto-Exposure Camera Mode plus P-TTL Flash Mode**  
(Green, P, Av, Tv, Sv, Tav / P-TTL)
- 2) **Manual Camera Exposure Mode (M) plus P-TTL Flash Mode**  
(M / P-TTL)
- 3) **Manual Camera Exposure Mode (M) plus Manual (M) Flash Mode**  
(M / M)
- 4) **Manual Camera Exposure Mode (M) plus 'Auto' (A) Flash Mode**  
(M / A)
- 5) **For High Speed Sync Flash : Manual, Tv, or Tav Camera Mode Plus P-TTL Flash Mode (M, Tv, Tav / P-TTL)**

It is certainly easier to understand what is happening and to keep complete control over the exposures with both camera and flash in Manual modes. Each specific part of the equation we adjust (eg aperture, ISO or flash power) will have a proportional impact, and may require a compensating equal adjustment to another setting to maintain the exposure level needed.

When we use a camera auto-exposure mode, or flash P-TTL / Auto modes then we are giving control over to the metering systems and electronics, plus the various software processing algorithms that make the decisions. Unfortunately of course, the designers cannot program in an understanding of what exactly each photographer is hoping for with every scenario. If we expect the system to second guess our own creative intentions, then we are likely to be disappointed. We still need to have a good understanding of how things work, what are the limitations of the equipment, and how we can exert the needed control to make the automatic systems work for us.



### **Pentax Automatic Flash Exposure / Ambient Balancing**

Whilst as users of the equipment, we cannot have an in-depth knowledge of exactly how the various metering and flash / ambient exposures are balanced, a feeling for the general principles is helpful, to understand what the camera is trying to achieve, and why it may not be able to achieve what is needed, without our intervention.

Balance is the key word here, and that is essentially what the camera will be trying to achieve when in both automatic camera and flash modes, a balance between the ambient light (the background) and a flash-lit foreground subject.

**There are two key principles that govern the end result :**

- 1) If the possible / allowable ambient exposure settings result in a well exposed foreground subject, then the flash output will be adjusted downwards to provide a supporting, accompanying role (commonly known as 'fill-in flash')**
  
- 2) If the possible / allowable ambient exposure settings result in an underexposed foreground subject, then the system will attempt to light as much of the scene as possible with flash**

In general, fully automatic flash photography is most likely to be successful when the situation matches No1 here. It is the No 2 situations where the balance between the two exposures can become too great, resulting in an overpowering, washed out foreground and dark, unattractive background. We have to bear in mind that the camera cannot know exactly the limits as to where you want your flash lighting to cover. If the ambient brightness is low and it is not possible for the camera to compensate and record more of that ambient light, then the flash is going to try and do it instead.

Because the flash is trying to illuminate a greater area of the scene like this, then objects closer to the camera are more likely to be over-lit, creating a harsher 'flash look', and not a good balance at all. Bringing factors such as bounce into the equation also can really open up the variations to what we can expect the system to achieve.



Our PentaxForums member Beholder3 has carried out various tests and determined that on average the system tries to provide 2EV worth of flash light in these situations (No2 above) ... ***for example, in Av mode, with no flash a certain scene required 1/50<sup>th</sup> sec / F8 / ISO 6400 for good exposure. With the flash activated the settings were 1/50<sup>th</sup> sec / F8 / ISO 1600.***

None of this means of course that the 2EV worth of flash light is correctly distributed or provides the creative balance that the photographer wanted.

### **Controlling and Limiting Factors**

The automatic system is constrained by three key conditions :

- 1) Lens Focal Length***
- 2) The Auto-ISO Curve***
- 3) The Program Line***

All of these are user configured, but only the first would be actively adjusted when taking pictures. Nos 2 and 3 are pre-set, and are not normally actively managed when out taking pictures, although it would be good practise to review them before starting an important shoot. However they all play a role in the resulting settings from automatic metering and flash / ambient exposure balancing.

The lens focal length will actively restrict the longest exposure time that the camera can set when using the following automatic modes - Green, P, Av, Sv. This is designed to allow for handholding and prevent camera shake when shooting automatically, a noble aim. However, with flash in the equation as well then this restriction can impact negatively by making the ambient exposure too dark, again ruining any nice gentle balance between the flash and background exposures.

We can override this automatic exposure time limitation if we want by setting '***Slow Speed Sync***' in the camera Flash Mode screen. This setting will allow the exposure time to lengthen significantly and gain a correct exposure for a dark background, while the flash will take care of the foreground subjects.





Without Slow Speed Sync we can expect the following limits to shutter speeds based on focal length ...

Thanks again to Beholder3 for his testing and reporting of this information ....

**8mm --> 1/25**

**16mm --> 1/50**

**24mm --> 1/60**

**43mm --> 1/100**

**85mm --> 1/160**

Both the Program Line and Auto-ISO parameters will impact on how the camera will be able to successfully balance flash and ambient exposures. Certainly Auto-ISO can often be seen to lead to problems if the range is not set appropriately to the circumstances. What is right is generally dictated by the levels of lighting, distances to the subject, bounce surfaces and angles, all of which can drastically influence how much flash power is needed. Where distances are greater, bounce surfaces are dull / non-reflective, and bounce angles are more extreme, then higher ISOs will be called for. Each photographer will need to develop a good sense of their camera's ISO capabilities in terms of the quality to be expected at different ISOs, and where adjustments to other aspects of the shot might be preferable instead.

Where the ISO range is allowed to go too high, then exposure problems can occur. For example, in a dimly lit room, an auto-ISO 'curve' might calculate and set ISO 6400 in order to balance a smaller aperture and keep the shutter speed good for handholding .... However, that high ISO may be totally wrong for the flash in use, especially a high powered one, which in certain configurations may be unable to cut its output enough, resulting in flash overexposure.

Unfortunately it is when trying to reconcile these often conflicting aims that our automatic systems and calculations can fail. It is only a tiny camera brain after all!

Unfortunately this is where problems can start with automatic modes generally, and auto-ISO in particular. If you already have F2.8 and a high ISO for recording the ambient light, then it is very easy for flash to subject distances to be too small and cause overexposure and erratic flash results. The system has no way to reconcile these quite conflicting demands and simply fails.



The reality is that it is unrealistic to expect the technology to be able to make so many decisions. Flash and ambient light balancing is no simple matter and needs many factors taken into account. The human brain is far more suited to manage all of this than a tiny camera brain I'm afraid, so there's no easy auto solution that will prove reliable in all situations.

For great reliability and full control, I recommend no auto-ISO, ever, for flash work, and manual camera mode combined with P-TTL or manual flash exposures. Av can also be intuitive so long as you keep a close eye and grip on ISO and shutter speeds for ambient/flash light balancing.

If there's no ambient light to record, or you don't want any to record, then you can shoot at short exposure times up to 1/180<sup>th</sup> or 1/200<sup>th</sup> (K1) for steady shots and the P-TTL system will revert to trying to illuminate the whole scene with flash light. But again, a fixed ISO complementary to the distances involved or bounce surfaces is going to give better results.

Here are some suggested ISO ranges and limits for a few specific scenarios ;

- 1) Direct Flash from camera to subject ; *ISO 100 - 200*
- 2) Small Domestic Rooms, bounced flash from walls and ceiling ;  
*ISO 200 – 800*
- 3) Large Domestic Rooms, bounced flash with high ceilings and greater distances to walls ; *ISO 400 – 1600*
- 4) Public Rooms, Hotels, Conference Rooms etc ; *ISO 800 – 3200*

These limitations are likely to allow a range of flash exposures within the distance limitations, while the upper ISO settings in each category should provide potential for recording a mixture of ambient light with the flash without very slow shutter speeds. However, the reality is that in dimly lit indoor situations it will often be necessary to use camera support and slow shutter speeds to record decent amounts of ambient light, just the same as for low-light outdoor photography. Raising the ISO setting to very high levels, beyond those suggested here, could risk causing flash exposure difficulties unless the flash to subject distances are high, or the bounce angles and distances are more extreme.



## Off-Camera Control Technologies, Mixing Systems

It is perhaps inevitable that as we collect flash equipment for a range of purposes, and over a long period of time, that we will end up with a range of different system types and ‘wireless’ control technologies. We may also need to make new buying decisions that allow for integration with our existing flash gear. By understanding how the various communication and exposure protocols work, and appreciating the functions and flash modes we can expect from each type of flash system, we can ensure that we make the most of what we have already got and ensure that new purchases build on and add to our flash capabilities.

Here we will consider the following flash system types:

- **(Optical) Wireless P-TTL**
- **Optical Manual**
- **Radio P-TTL**
- **Radio Manual**
- **Radio HSS (non-Pttl)**

Each of these communication protocols offer different possibilities and different approaches to controlling off-camera flashes. Some will be restricting and limit the choices you have, while others will open up more possibilities. It may be that it is a combination of system types that will enable the flash control and syncing that you need. I will discuss each type in isolation first, before looking at the various ways of combining and coordinating flash syncing with more than one system type.

### **1) (Optical) Wireless P-TTL (On Pentax Flashes Requires Slave Mode set to SL1)**

The Proprietary ‘Dedicated System’ communication protocol for Pentax Digital Cameras. The system is used by the Built-in Flashes on the cameras themselves as well as the P-TTL accessory flashes AF-360/540FGZ and AF-360/540FGZII models, the AF 160 FC & AF 201 FG models, as well as numerous ‘P-TTL’ flashes made by third party companies, such as Metz, Sigma, Tumax, Bolt, Yongnuo & Shanny.



The Pentax Optical Wireless system uses coded light signals in a one-way transmission (from Control/Master flash to Slave flashe/s), to send instructions and to control the slave flashe/s. The light signals require ‘line-of-sight’ between the flashes, although indoors there is plenty of scope for light to reflect around, meaning that successful communication may not depend on the flashes actually facing one another.

The coded instructions are sent in a series of rapid ‘Pre-Flashes’ that occur immediately before the actual exposure. The instructions sent include information about the Flash mode, and cause the slave flash/s to emit a flash metering pre-flash which allows the camera metering system to determine the actual flash exposure value to be used. This metering uses the TTL (‘through the lens’) process, similar to the ambient exposure metering process. The camera determines the flash exposure by measuring the slave pre-flashes reflected back from the subject, and taking into account the known ISO, aperture (and in the case of HSS, time value) settings.

The calculated flash exposure value is sent to the slave flash/s via a further pre-flash signal, after which the slaves then emit the full flash exposure, which automatically syncs with the opening of the camera shutter. The pre-flashes of course occur before the shutter opens. There is a small amount of lingering, decaying light from the pre-flashes that can add to the recorded flash exposure, but this is only likely to become an issue at wide apertures and higher ISOs. In general exposures up to F2.8 / ISO 800 are unlikely to cause any problems. For more information see this forum topic at PentaxForums.com .... <https://www.pentaxforums.com/forums/125-flashes-lighting-studio/340557-controler-flash-iso.html>

The pre-flashes have two well known negative effects in certain situations; they can affect peoples eyes in portraits, causing blinking and partly closed eyes in the photos; and the decaying pre-flash can be seen in windows or other glass objects that are in front of the control flash. In the first case with peoples eyes then the problem is worse in darker situations; in the second then directing the control flash away from the glass or window can resolve the problem.

The Pentax Optical Wireless system uses 4 distinct communication ‘channels’, which is a way to keep each camera /flash combination isolated from others that may be working in the area also. The channels are set directly on the slave flashes, and passed through the hotshoe to the cameras. The setting is remembered on both flashes and cameras after powering off.



The Pentax Optical Wireless System allows the following functions and features with Dedicated System Slave flashes; (Third Party flashes; check Manuals or Specification lists to confirm available features)

- P-TTL automatic flash exposure control, with up to 9 stops of Flash Compensation (combining flash and camera FC settings / flash dependent)
- ‘Wireless Lighting Ratio’ control (output balancing) for 3 flashes (2 slaves plus one ‘Master’)
- Manual Flash Exposure control (power levels set directly on slave flashes)
- Option to set the On-Camera flash to ‘Master’ or ‘Control’ Mode, choosing whether to include illumination from that flash or not
- Wireless High Speed Sync (‘HS’) flash photography, up to 1/8000<sup>th</sup> sec exposure time in P-TTL automatic flash exposure mode (Flash Compensations also available as above) (Requires HSS capable Dedicated System accessory flashes for both on and off camera roles)

For a full description and instructions please see Section 11, Wireless (Off-Camera) Flash Operations, Pages 61-72, in the 2<sup>nd</sup> Edition of *‘The Pentax Digital Camera Flash Lighting System’*.

## **2) Optical Manual (On Pentax Flashes Requires Slave Mode set to SL2)**

This is a simple form of optical triggering and flash control, and is applicable to a wide range of manual flash types including many older film era models. The recent Pentax Flash models can also be set to operate as ‘Optical Slaves’ with their ‘SL2’ slave mode (see the new ‘Optical Slave Mode’ section of this Supplement for full details).

Optical Manual triggering uses the optical sensor on flashes to respond to any bright enough light source and instantly respond by emitting the flash output manually set. If the light source comes from another manual flash controlled by a camera hotshoe trigger signal then the outputs of the flashes will sync with the camera exposure.



The ‘line-of-sight’ principles and limitations do apply to basic Optical triggering, however because the triggering signal is the actual flash output (and not a low strength P-TTL pre-flash), then the signal is likely to be received with even more reliability and flexibility indoors as light bounces off surfaces and reflects. It may be that flashes do not need to be in direct ‘sight’ of each other.

Any triggering flash used to fire slave flashes by the means should be set to normal Manual Mode, not P-TTL Wireless mode (as this would involve pre-flashes which will cause the slaves to trigger too early and fail to sync with the camera exposure). Any slave flash should be set to the Optical Slave mode that triggers on the first detected light source. For most Manual type flashes this is usually described as OS1 or SL1. For Pentax flash models the mode to use is SL2.

On most flash types the OS2 or SL2 slave mode is for use where there is a pre-flash emitted by the trigger flash; this might be necessary if using a built-in camera flash that can only work in P-TTL mode, or for when no light from the trigger flash is wanted (in which case a wireless P-TTL flash set to ‘SL1 / ‘Control’ modes would provide that).

Optical triggering can only be used with Manual Flash exposure control, and flash power settings need to be made on each slave flash directly.

### 3) Radio P-TTL

This is a technical approach involving transcribing P-TTL communication protocols into transmittable radio signals that can be sent between a camera mounted transmitter (‘Tx’) and a receiving unit (‘Rx’) attached to the off-camera flash/s. The purpose is to retain the range of features and modes offered by the proprietary Optical Wireless system, but adding the benefits of radio communications, which removes the limitations of ‘line-of-sight’, increases reliability and the working distances considerably.

There are some different technologies for achieving this, but the effect is the same, with the Slave flashes behaving as if they were attached directly to the camera hotshoe, or attached to an extension cord (‘P-TTL Cord’).



It is of course necessary for the flash models involved in a Radio P-TTL set-up to be of the Pentax ‘Dedicated System’ type, including P-TTL automatic flash exposure mode. Any special functions and modes, such as High Speed Sync, Multi-Flash, AF Assist etc, need to be available on the particular flash units involved. A Radio P-TTL trigger system cannot convert a non-P-TTL flash into one, it can only make an off-camera P-TTL flash behave as if it were attached to the camera hotshoe. However, a trigger system may be able to operate a P-TTL flash in Manual Flash Mode remotely, which is an additional control feature over and above the Pentax Optical Wireless system.

## Current Radio P-TTL Options

### Aokatek – AK TTL

This system uses a process of detecting Optical Wireless control signals from the camera Built-in Flash or an Accessory Flash, with a plastic detection panel that fits over the Control flash head. The transmitter unit sits behind this panel. The receiving unit uses a small relay module that is attached over the Slave Flash Optical Sensor, and this module passes the Optical signal directly to the Slave flash. The radio receiver unit can be attached anywhere near the flash, with the relay module attached via a small cable. So this system does not rely on any hotshoe attachment, as the flash control instructions are read directly from the Optical signals, sent over radio, and fed directly into the Slave Optical sensor. Some rubber bands and tape would be a useful addition in the camera bag.

The operation and control settings of the Flashes and Camera are exactly the same as for Pentax Wireless System working.

The system transmits on the 2.4Ghz frequency with 16 Channels available, offering a range up to 110metres, with each Tx / Rx unit powered by 2xAAA batteries. Available Modes and Functions include P-TTL Flash Exposure control, HSS up to 1/8000thsec, Manual Flash Exposure.

For more Information here is the Product Website; [Aokatek.com](http://Aokatek.com) [AK-TTL](http://AK-TTL)





## **Acon R930**

This is a traditional styled Hotshoe trigger system (1x Tx / 1x Rx), although multiple Receivers can be used. It translates the P-TTL protocol and transmits it via radio signals, operating on the 2.4Ghz frequency. There are 8 Channels for discreet multiple systems working alongside each other, and a rated maximum range of 100metres. Each unit is powered by 2 AAA batteries. The system is firmware updateable, and there are a few versions of firmware available.

Users considering the system should be aware of different firmware versions offering different functionality, and issues with a lack of good clear instructions in English. You are advised to seek further advice and information from forum members and look out for additional guidance on set-up and operating steps from experienced users.

The system offers standard P-TTL off-camera exposure control, Remote Flash Compensation, Remote Manual flash exposure control, High Speed Sync off-camera up to 1/8000<sup>th</sup> sec, & 3 individual flash groups (a, b, c).

Here is the product website ... [Acon-Photo.com](http://Acon-Photo.com)

### **Radio Manual**

This is the most widely available form of Radio flash triggering, and the cheapest as well. The reason is that the hotshoe contacts can be as simple as a single pin, the communication protocols are limited to basic triggering signals, and the flashes themselves can be simple Manual exposure models. The variations in the systems available will come down to the range of additional features, such as whether there is remote power control, remote flash head zoom control, and extras such as delay settings, multi-flash, remote camera triggering etc.

This category divides into two subgroups, those that use individual trigger units for both on-camera transmitter and on-flash receiver, and those systems that offer flash models with built-in radio receivers.

The most modern and full featured Radio Manual trigger systems now generally operate on the 2.4Ghz frequency, offering ranges around 100m and further.





Photographers who choose to build systems in the category of Radio Triggered flashes do not only do so out of budgetary interests; they do so because of the need to control multiple flashes remotely, and the type of environment and situations they are working in suit the fully Manual exposure approach. The better systems in this category will allow a number of independent groups of flashes, say 3 or 4, to be controlled from the camera position, by switching a group on or off and controlling its power level, and perhaps changing the flash head zoom setting also.

In addition to radio communications, many flashes in this category offer Optical Slave modes, adding extra versatility where you don't have additional trigger devices if required.

Full product listings in this category is beyond the scope of this guide, so I will simply link to the product web pages of some of the most commonly used options that are compatible with Pentax DSLRs.

**Yongnuo YN560 IV**      [http://yongnuo.eu/flash\\_yn560](http://yongnuo.eu/flash_yn560)

Reportedly compatible with the YN560 TX trigger for remote power and flash head zoom control. The flash has a built-in Transceiver, 2.4Ghz freq, GN58 (ISO100, 105mm), 1/1-1/128 power levels, zoom 24mm-105mm, a Power Pack charging socket & PC Port socket. Powered by 4 AA batteries. The YN560 TX offers 16 channels, 6 groups for control of power and flash zoom settings, range up to 100m. Flash Sync up to 1/250<sup>th</sup> sec (no High Speed Sync).

**Cactus RF60/x – V6/V6ii**      <https://cactus-image.com/>

Built-In transceiver, 2.4Ghz freq, GN56 (ISO100, 105mm), 1/1 – 1/128 power levels, zoom 24mm-105mm, Power connector for battery pack. Powered by 4 AA batteries. UBS port for firmware updates, 16 channels, 4 groups, range up to 100m. High Speed Sync 'sympathy mode' for manual exposure radio HSS (with V6ii) / HSS 'sympathy mode' with optical triggering from an HSS capable P-TTL control flash. Multi-flash function, timer/delay settings. The RF60x (latest) model offers AF Assist function (with V6ii) and 'Cooling Mode' increases full power recycling capability.



## Godox, V850 / AD200 ....

Click through to the company website for details of the Godox product range, but the above models and their later variants are popular choices for Pentax photographers. It may be necessary to check on exact trigger equipment compatibilities with each model and confirm the range of functions available with each specific combination. Whilst designed with TTL support for Canon in particular, manual mode shooting is available on Pentax DSLRs, and special functions such as HSS will be enabled if combined with the Cactus V6II as a Tx on the camera (Godox system radio triggers also required).

These products are distinguished by their internal Lithium-ion battery packs (rechargeable), which offer more powerful output, more flashes and faster recharging than AA battery powered flashes. Also the AD200 offers 2 interchangeable flash head types; a standard flash Fresnel screen head, plus an open 'bare bulb' option. The models offer High Speed Sync up to 1/8000<sup>th</sup> (Cactus V6II required in addition to Godox system triggers).

The AD200 uses a built-in 2.4Ghz radio system, with the X1 transmitter, whilst the V850 requires the Ft-16 and CellsII 2.4Ghz trigger system.

For more details see the product website .... [Godox Products](#)

Also see the following review on PentaxForums.com .... [godox-ving-v850-system](#)

## Other Budget Radio Manual Flashes

There are a number of budget manufacturers marketing Radio Manual flashes, and in some cases radio trigger systems in addition to those detailed here. However in many cases there will be little support or guidance, and you may be relying on Amazon or other online retailer user reviews for reliability reports. It's a case of buyer beware and trial and error.

In any case a quick post on a Pentax Forum asking for user experiences and advice is a good approach before trying out any unfamiliar flash products.



## Radio HSS / 'Hyper-Sync' (Non-P-TTL)

Pentax DSLRs have a restriction that prevents the generation of a flash trigger signal, once beyond the maximum sync speed, unless the camera detects a P-TTL HSS capable flash on the hotshoe (set to HS mode). This restriction prevents the use of flash beyond the max sync speed with Manual-only flashes and most standard radio trigger systems.

A trigger that offers a 'TTL Pass-through' option (with a P-TTL flash mounted on top) can allow optical triggering of HSS capable slave flashes, but the radio system itself will not be receiving any trigger signal from the camera; the signal is 'passing through' to the flash on top. You can see a demo and details of such an approach I used with the Cactus V6, RF60 flash and 2 AF-540FGZ flashes in this forum thread ..... <https://www.pentaxforums.cpentax-cactus-multi-flash-wireless-hss-demo>

The use of radio triggering for High Speed Sync operations requires more specialized equipment that can 'trick' the camera into generating a trigger signal, just as if an actual P-TTL HS flash was mounted. The previous section has covered the case of 'Radio P-TTL' triggers that emulate an extension cord situation. Here I will look at the current options for Manual Radio HSS triggering and 'Hyper-sync' control.

True High Speed Sync operation uses a rapidly pulsating strobe that produces an effectively continuous light source, and this requires a flash that offers this technology specifically and has a dedicated HS mode. The continuous light must illuminate the frame for the entire time that the shutter blades are moving across the sensor, which equates to the max sync time (eg 1/180<sup>th</sup> or 1/200<sup>th</sup> sec).

Alternatively, it is possible to use a non-HSS capable flash or strobe, which when fired at full power produces light output that lasts 1/200<sup>th</sup> or 1/180<sup>th</sup> sec (or nearly as long). This is known as the 'Hyper-sync' technique. The full power light output however is not continuous and completely even during its whole duration, as it has a curved falling shape to its intensity ('dying away'). This means that, unlike true HSS, there is not a completely even coverage of light over the whole frame. Some parts nearer the top or bottom may be darker with a gradient effect. This may or may not be an issue, depending on the subject type and its position and size within the frame.



An advantage of this approach is that you may be able to use simpler, cheaper flashes or strobes to achieve lighting beyond max sync. However, generally it is the studio strobe type of light that produces the longer light outputs needed to produce full illumination using this hyper-sync technique.

A disadvantage is that you lose the ability to control the flash exposure with power adjustments, as the flash must remain set at full power. This of course uses the most battery power and takes the longest recycling time, and also means that flash exposure must be controlled by other means, such as adjustments to *aperture, ISO, flash to subject distance and the exposure time ('shutter speed')*. Note here that exposure time is a factor in flash exposure value when working beyond the max sync speed, and will affect the exposure of both ambient and flash light.

Remember that regardless of whether you use a 'hyper-sync' technique or true HSS, you still need to get the camera to generate a trigger signal once beyond the max sync speed. Therefore if you are not using a P-TTL HSS flash to generate an optical trigger signal you instead need a radio trigger system that enables the trigger signal, and there are only a very limited number of them at present.

## **Cactus V6II**

This is a later model and an advance on the previous V6 model (listed in the 'Radio Manual' section). The key difference is the enabling of the camera trigger signal beyond the max sync, as well as the addition of remote flash head zoom control and autofocus assist beam. This extra functionality is dependent on compatible P-TTL system flashes, ie the flash must have P-TTL, HSS, auto-flash head zoom and AF assist capabilities. However like the earlier V6 model, the flash exposure control with the Cactus V6II is Manual Mode only.

A P-TTL flash becomes a Manual only flash with the V6II, although with remote power level control from the Tx unit on the camera hotshoe. A V6II is required for the camera hotshoe (set to Tx mode) and one V6II is required for every flash used (set to Rx mode); the exception to this is Cactus's own RF60 / RF60X flash, which has a built-in V6II transceiver. Some non-P-TTL flashes or strobes are compatible with the V6II for HSS and remote power control if they are dedicated to another camera system and manually engage their HSS mode (eg some Godox strobe models)

[cactus-image.com/v6ii](http://cactus-image.com/v6ii)



## Priolite MBX 500 HS / 1000 HS

The Priolite system offers a Li-Lon battery powered studio strobe solution, with High Speed Sync up to 1/8000<sup>th</sup> sec on Pentax DSLRs and 1/4000<sup>th</sup> on the 645Z / 645D medium format cameras. Consisting of the MBX 500 HSS strobe and RC-HS/C remote trigger, the system gives 4-group control, Manual Mode exposure control in 10 steps (10% through to 100%) and remote control of modelling lights.

The ‘Hot-Sync’ of the system refers to the use of the ‘hyper-sync’ technical approach, with a long flash pulse providing illumination over the whole frame and duration of exposure. There are some reports of small unevenness and gradations of lighting resulting from this when a plain surface is behind, but equally there are also reports of no issues. This needs to be considered in the context though that this particular ‘hypersync’ solution offers power output control, something that basic single pulse full-power hyper-sync cannot.

[www.priolite.com/en/products](http://www.priolite.com/en/products)



## Pentax Optical Slave Modes

### Optical Wireless Signals

Wireless communication between an on-camera ‘Master/Control’ flash and off-camera ‘slave’ flash/s is achieved within the Pentax Dedicated Flash System with optical light signals. These signals, which are one-way from the camera hotshoe flash to the slaves (ie there is no two-way communications), comprise of the pre-flashes and the main triggering signals.

The pre-flashes are a number of coded instructions containing flash mode information and the signal that tells the slaves to emit their metering test flashes. Once the metering flashes have completed and the camera has calculated the flash exposure needed, then the main triggering signal is emitted, instructing the slaves to fire at a specific power output.

All of these optical signals occur in a very short period of time, measured in microseconds, before the actual flash exposure occurs. There is an additional pre-flash in HS (‘High Speed’) Sync mode due to the need to send exposure time information to the slave/s.

### Slave 1 (‘SL1’) Mode

This is the default slave mode, and applies to all situations where the Dedicated Flash System’s wireless operations are in use. As a general guide this will be for any situation when the on-camera ‘Master/Control’ flash is working in (W)ireless P-TTL mode, and the slave flash/s are set to ‘Wireless’ mode. This is a requirement for standard Wireless P-TTL, 2<sup>nd</sup> Curtain and High Speed Syncs, as well as when using Manual Flash mode on a slave/s but triggering using the Dedicated Systems Wireless mode (handy when you don’t want light from the ‘control’ flash).



Slave 1 ('SL1') mode enables the slave flash to receive and respond to the coded pre-flash signals from an on-camera flash, so it's a good item to check if there are issues with triggering the flashes.

It may be easier to look at it from the point of view for when it would *not* be necessary to use 'SL1' mode. This would be for situations when we are not using the Dedicated Flash System's Wireless operations, so for example when using a third party radio trigger set (either a Manual or 'P-TTL' type). In that situation the Optical Slave Mode ('SL1' or SL2') do not matter as it is not actually functional, because the communication is occurring via the third party radio system, not via the Pentax Optical system.

### **Slave 2 ('SL2') Mode**

There are times when we might want to mix our Pentax system flashes with other non-dedicated types for manual flash exposures, and we may not have radio triggering devices for each flash, or need to use optical triggering for other practical reasons. Manual flash types do not emit the pre-flashes that the P-TTL models do, but simply fire their set flash output. If a Pentax Slave flash set to 'SL1' mode was to detect a single flash pulse from a manual flash, then it would not fire because it would be waiting for the coded pre-flashes and instructions, which of course would not ever come.

So we can switch to 'SL2' mode when using our Pentax flashes as slaves, but triggered by the flash output of another Manual flash. The 'SL2' setting changes the way the flash responds to optical signals. Instead of expecting a pre-flash signal with coded instructions, the flash now simply fires its light output immediately and at the same time as any optical signal it receives. So it fires and adds its illumination to that provided by the manual flash that's actually causing the triggering.



It does not matter if the triggering signal is from an on-camera flash, or another slave flash. So long as the normal ‘line-of sight’ requirements are met between the triggering flash and the slave set to ‘SL2’ mode, it will fire at the same time. So it is possible to create a type of set-up known as ‘daisy-chaining’, where there are multiple slaves optically triggered by the one next to or nearest to them. So an on-camera manual flash could trigger a slave flash, and that first slave flash could then trigger a second slave flash .... and so on and on. With this technique you could solve ‘line-of-sight’ problems between the camera position and a slave, by placing an additional slave flash between the two to ‘pass along’ the triggering signal.

There are different ways to refer to this ‘Slave 2’ type of triggering; it could be ‘Optical Slave’ mode, or I myself quite like ‘Dumb Slave’ mode (because the flash is acting ‘dumb’ by just responding to a simple trigger signal, not the more complicated P-TTL pre-flashes). It is sometimes also referred to as ‘Servo’ mode, perhaps a term used by a different DSLR system.

Please note that when operating in ‘SL2’ optical slave mode, the slave flash must be set to **Manual** Flash mode, and the power output controlled manually from the flash controls. P-TTL /TTL does not apply to ‘SL2’ mode working. Also, if using another Pentax, or other Dedicated System Flash, as the on-camera triggering flash, then that must also be used in Manual exposure mode. Do not set the on-camera triggering flash to (W)ireless mode either, as that will send out P-TTL Pre-Flashes and cause the slave flash to fire before the actual exposure.

### **Other Manual Flash Optical Slave Modes**

There is potential for confusion when considering the difference between Pentax Slave modes and the most common Optical Slave modes as employed on Manual Flash / Radio Manual flash types. These Manual flash types often include 2 ‘OS’ (Optical Slave) modes – ‘OS1’ / ‘OS2’, although they are also sometimes termed ‘SL1’ / ‘SL2’, which adds to the confusion.

On Pentax flashes, as described earlier in this section, it is the ‘SL2’ mode that provides basic Manual triggering. However on other manual flashes it is normally the ‘SL1’ or ‘OS1’ mode that does this. The ‘SL2’ or ‘OS2’ mode is normally also for manual triggering, but specifically ignores the pre-flashes from TTL flashes, syncing the output with the main flash. This is helpful when mixing systems and needing to use a P-TTL flash as Master, but with Basic Manual flashes as slaves.





## AF-540FGZ/II Slave Mode Set-Up Steps

### AF-540FGZ

- 1) Turn on the Power Switch
- 2) Firstly, slide the Setting Selector (on the right hand edge of the flash control panel) upwards. This makes the top row of functions available for adjustment
- 3) Press the 'Light' button (left most one of the three) and hold for at least 2 seconds The Slave Mode is displayed, (SL1 or SL2)
- 4) Press the 'S' (Select) button (in the middle of the dial) to change the Slave mode as needed
- 5) Press the 'Light' button once to confirm the new setting

### AF-540FGZII / 360FGZII

- 1) Turn on the power Switch
- 2) Press and hold the Function ('Fn') button
- 3) Turn the adjustment Dial to move through the Functions, until 'SL' is displayed in the top right of the LCD
- 4) Press the Setting 'Set' button (in between the dial) to cause the numbers '1' or '2' to flash, and rotate the Dial to change the number to the Slave Mode needed
- 5) Press the Setting 'Set' button to confirm the setting
- 6) Press the 'Fn' button to exit the Function Menu



## Extension Cord (Wired Off-Camera) Operations

Long before Radio Transmitters and Receivers became available for remote triggering of flashes, photographers were taking their flashes off the camera and controlling them with various Cable and Cord solutions. Pentax continues to offer these options for DSLR users today, with a set of Extension Cords and Adaptors that allow 1 or 2 Dedicated System Flashes to be connected to a DSLR and operated off-camera, although with the obvious restriction of being limited to the length of Cord used.

These Extension Cords and Adaptors allow the flashes to operate with all of the P-TTL and special mode functions that they have when mounted directly on the camera hotshoe. This is different to Optical Wireless working, which provides a more limited set of modes and functions.

Some of the DSLR models include a traditional 'PC' socket, which is a simple cable connection for use with Manual Studio strobe systems. This socket provides only a flash trigger signal to sync with the exposure; there is no P-TTL or other mode data passed by this socket, and flash power must be controlled manually directly on the Strobes themselves.

Here I will focus on the Pentax Extension Cords and Adaptors. There are a number of Third Party options available, and I would recommend seeking user advice and experiences on any before trying them. This type of Cable/Adaptor is also often called a 'P-TTL Cable', and commonly in wider literature on flash systems in general 'TTL Cable'. The term 'Extension Cord' is a Pentax specific reference for the same kind of connector and adaptor system.

The most common way to use a flash and Extension Cord is with the camera in one hand and the flash held out to one side and a bit higher. This provides an improved 'modelling' effect from the light onto a portrait subject, and reduces the shadows cast by direct on-camera flash. Alternatively the flash is mounted onto a 'Flash Bracket' device, which often screws into the tripod thread on the bottom of the camera. This provides good grip and stability, but ultimately is limiting as the flash remains fairly close to the lens axis.



## Pentax Adaptors and Extension Cords

### Sync Cable F 5P / Extension Cord 5FP (L)

These are 2 versions of extension cord serving the same purpose, but of different lengths. The shorter 'Sync Cable F 5P' is 0.5 metre, and the longer Extension Cord 5FP (L) is 3 metres.

The connectors on each end are circular plugs with 5 pins, allowing transfer of the full range of P-TTL and Flash Mode information between the camera and flashes. The adaptors have sockets for connecting one end of the Cords into, and also the AF-540FGZ (original 'MK1' version) has a socket on its side, under a cover, to accept one end of the Cord connector. Note that the later 'MKII' model and the AF-360FGZII do not have this socket, and so would need an adaptor for Extension Cord working. The advantage of the socket on the AF-540FGZ is that no adaptor is needed for that flash, saving expense.



Extension Cord 5FP (L) - Photo © Ricoh-Imaging.co.uk

### Three Adaptors

There are 3 different Pentax Adaptors for connecting the Extension Cords to the flashes and cameras. They are rather confusingly and similarly named, and it pays to carefully consider your own particular camera / flash combinations. For example, one adaptor, the Hot-Shoe Adaptor FG, is intended for use on the camera hotshoe with the Built-In flash also raised and working in combination with the Off-Camera flash. So this accessory clearly is not required for users of K3II or K1 cameras (those without Built-In Flashes).



### **Hot Shoe Adaptor F**

This accessory has 2 Hot-Shoes, one ‘Male’ type on the bottom, and one ‘Female’ type on the top. It also has a ‘5P’ connection socket on its side, for attaching one of the Extension Cords.

The bottom Hot-Shoe allows attachment to the camera, and the top Hot-Shoe allows an accessory Flash to be added on top of the adaptor. So you could have one on-camera flash and one off, via the Cord. Both of these flashes will behave as if they were attached to the camera directly, with full P-TTL communications.

### **Hot Shoe Adaptor FG**

This is a variation to the standard F adaptor, and is for use when combining and off-camera flash with the Built-In flash of the camera. There is a ‘Male’ type hotshoe on the bottom for attachment to the camera, and on the top is an upwards facing ‘5P’ socket, to allow an extension cord to be attached, but it will not obstruct a Built-In flash.

### **Off Camera Shoe Adaptor F**

For attaching to the off-camera flash. This accessory is suitable for those flashes apart from the AF-540FGZ, that do not have a socket for the extension cord directly.

The adaptor has a ‘Male’ type shoe plus a ¼” thread to allow the adaptor be to mounted onto a lighting stand, and the flash itself goes into the ‘Female’ type shoe on top of the adaptor. On the side is also a ‘5P’ socket for attaching an Extension Cord, thus allowing the passing of full P-TTL communications between the camera and the flash.

These three flash accessory products are listed, along with photos, on the Ricoh-Pentax website ...

[www.ricoh-imaging.co.uk/en/flash-accessories](http://www.ricoh-imaging.co.uk/en/flash-accessories)



## **Multi-Flash Wired Working**

It is possible to use two off-camera flashes with Extension Cords. You will need at least *two Hot Shoe Adaptor F* accessories.

First mount one adaptor onto the camera and connect an Extension Cord to its '5P' socket. The first flash will then be connected to the other end of this cord, using either a dedicated socket on the flash or an Off Camera Shoe Adaptor F (depending on the flash).

You now need to mount a second Hot Shoe Adaptor F unit onto the shoe of the first one, and finally place the second flash into the shoe on top of the second Adaptor. This creates a kind of 'Adaptor / Flash stack' (!) but most reports online appear to indicate that the whole setup is very reliable. The units themselves are generally well reviewed in terms of build quality and security of the connections.

## **Contrast Control Sync Mode**

This sync mode is used to produce a 'lighting ratio' between two or three flashes when used with an Extension Cord set-up. This is required for Wired working because the flashes have no automatic way of determining that they are working in a multi-flash set-up, as each continues to function as a single flash and as if connected directly to the camera. The Contrast Control Sync mode on each flash to produce a split in the light output between the flashes.

This is a similar process to the 'Wireless Lighting Ratios' that apply to Wireless Operations, but the difference there is that the Ratio setting automatically becomes available as soon as the Wireless Slave mode is set on the flash. Because the flashes essentially function as on-camera flashes when used with extension cords, then there is a need for this special mode in order to activate the ratio split and create the 'contrast' in the flash effect between the two or three units.

Note that the ratio split in this mode is a fixed 1:2 ratio. In the case of a single off-camera flash, setting the Contrast Control Sync mode on that flash outputs twice the amount of light than from the built-in flash. In the case of two off-camera flashes, then the flash with the contrast control mode set will output twice the amount of the other flash. If using two off camera flashes plus the built-in flash, then setting both off camera units to CCS mode will effect a ratio of 1:2 between the two flashes and the built-in unit; ie twice the output from the two off camera units as from the built-in.