

Stills Photography with the Lumix GX7

Modern digital cameras are marvellous pieces of technology that are capable of capturing wonderful images. However, most are needlessly complex. We typically face four shooting modes, three metering modes, at least three focus modes and several auto-focus modes. And that is before considering ISO (sensitivity), white balance, exposure compensation, drive mode and a host of other settings!

Lumix G cameras are highly configurable, have a relatively user-friendly interface and (most) have a number of programmable buttons and other controls. However, this adds yet another level of complexity.

It has taken me years of use to find effective ways of using and configuring Lumix G cameras. Having done so, I find them a delight to use. Features and capabilities hidden in the menus and documentation can be programmed onto buttons and the QUICK MENU (Q.MENU) and made directly accessible and highly usable.

This manual attempts to distil this experience into a relatively short document. It is directed at stills photographers and does not cover taking video or intelligent auto mode. Don't let this put you off using intelligent auto: it does work well. However, the techniques in this manual let you make full use of your camera's capabilities and are no harder, once mastered.

Please refer to the official Panasonic manuals, which can be downloaded from Panasonic's web site, for the basic details of camera operation.

The manual is organised as follows:

- The first chapter gives an overview of the controls, so you can follow the rest of the manual.
- The second chapter covers taking photos using custom modes programmed to handle specific photographic tasks. The setup of the custom modes is described in chapter 4.
- The third chapter summarises the technical capabilities of the camera. It provides details of additional capabilities for you to refer to as needed.
- Chapter four summarises the functions and settings of the cameras and describes how to set up (program) your camera. This should be the first thing you do.

I hope you enjoy using your camera.

1. Controls on the GX7

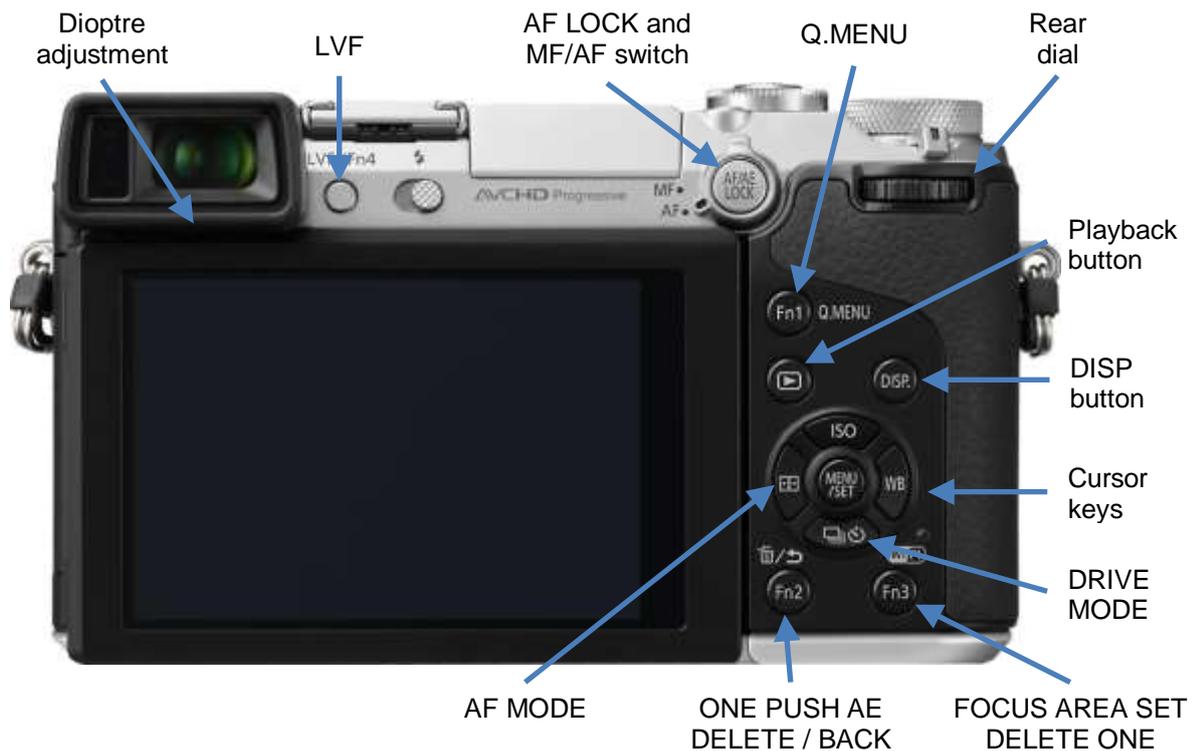
This chapter provides a brief overview of the controls: see the photographs on page 2. Note the name / function of each control. Some buttons have the function embossed on or by them. The function of other buttons, which only have an icon or Fn number on them, are shown on the photographs.

Insert a charged battery and memory card, following the instructions in the camera manual. Turn on your camera using the ON / OFF switch. It's obvious how to turn it off again.

Before proceeding further with this manual, please set up your camera as instructed in chapter 4. which also describes the functions in the menu system. The setup makes the frequently-used features of your camera readily accessible. The functions used most frequently are allocated to the dials, programmable function buttons and screen icon 'buttons'¹. For example, the FOCUS AREA SET button lets you enable use of the touch screen and cursor keys to position the AF (auto-focus) area. The use of the other buttons and dials is discussed below.

The next most frequently-used functions are put on the Q.MENU, where they can be quickly accessed. Access other functions through the full MENU system.

¹ The screen icon functions are accessed (and hidden) by touching the small tabs to the right of the screen. They are not available using the viewfinder.



Use the dioptre adjustment, beneath the viewfinder, to focus the viewfinder image.

When using the viewfinder, use the buttons and dials to control most functionality – you have to use the cursor keys to move the AF area. With practice, you can locate them by touch. When viewing the screen, you can use either the buttons and dials or the touch screen.

The camera is set up so that either the viewfinder or the touch screen is active. Toggle between them by pressing the LVF button next to the viewfinder². When you turn the camera on it will use the display you were using when you last switched it off.

Press the DISP button to cycle through alternative displays on the screen or viewfinder (whichever is in use): with info; no info; level and info; level and no info; control screen; and off. The last two only apply to the screen. The control screen shows a number of function settings and allows you to change them.

² Set EYE SENSOR, LVF AUTO to ON if you want to switch from the screen to the viewfinder as you put the viewfinder to your eye.

Switching between shooting and playback

- Press the playback button (▶) to view photographs and videos you have taken, in playback mode.
- Half-press the shutter button, or press the playback button again, to return to shooting mode.

The Q.MENU

The remaining important functions for stills photography are programmed on the Q.MENU, I recommend programming the functions shown in Table 1 on the Q.MENU, as described in the instructions in chapter 0, section 3.

Each row in Table 1 appears on a separate page at the bottom of the Q.MENU. Scroll beyond the end of the row to access the other page.

STABILIZER	AFS/AFF/AFC	METERING MODE	QUALITY	ELECT. SHUTTER
			FLASH MODE	FLASH ADJUST

Table 1: Setup of the Q.MENU

To change a function setting using the Q.MENU, press the Q.MENU button. Then:

- Select the function to change, using the rear dial, left/right cursor keys or touch screen.
- Select the setting for the function using the front dial or touch screen. Alternatively, press the up-cursor key to change the function setting with the left/right-cursor keys.
- Press SET or half-press the shutter button to save the setting.

The MENU system

All functions (except for some with dedicated controls) can be accessed by pressing MENU. The menu system has tabs for REC (still photographs), MOTION PICTURE, CUSTOM, SETUP and PLAYBACK.

- Use the front dial or touch screen to move between tabs.
- Press DISP to move to the next page for a tab.
- Use the rear dial, cursor keys or touch screen to move between functions on a tab.
- Press SET (or the right-cursor key) to edit a function.
- Change the function setting with the rear dial, cursor keys or touch screen.
- Press SET to accept an edit. Press BACK (or the left-cursor key) to leave the setting unchanged.
- Press BACK again (or half-press the shutter button at any time) to exit the menu system.

2. Taking stills photographs

The basic steps

The GX7 provides many facilities to help you set the exposure and focus for a photograph. Its automatic exposure and auto focus systems can get it right much of the time.

Indeed, if you need to capture an opportunistic photo, with no time to check anything, then just compose the image and press the shutter button, with the camera set up appropriately.

When you have more time, the basic steps for most photographic tasks, as shown in Figure 1, are:

1. **Compose the image.**
2. **Half-press the shutter button** to lock focus and exposure. If focus has been achieved, one or more green AF frames will show where focus has been taken.
3. **Check** that an acceptable focus has been taken in the right place by the AF system.
4. **Check** that the exposure being offered by the automatic exposure system makes sense, in terms of aperture, shutter speed and ISO.
5. **Fully-press the shutter button**, if all is well, and then review the photo. If you don't want to keep it press DELETE. Return to shooting mode by half-pressing the shutter button.

It's as simple as that.

But what if the focus is incorrect or you want to influence the exposure, depth of field or image sharpness?

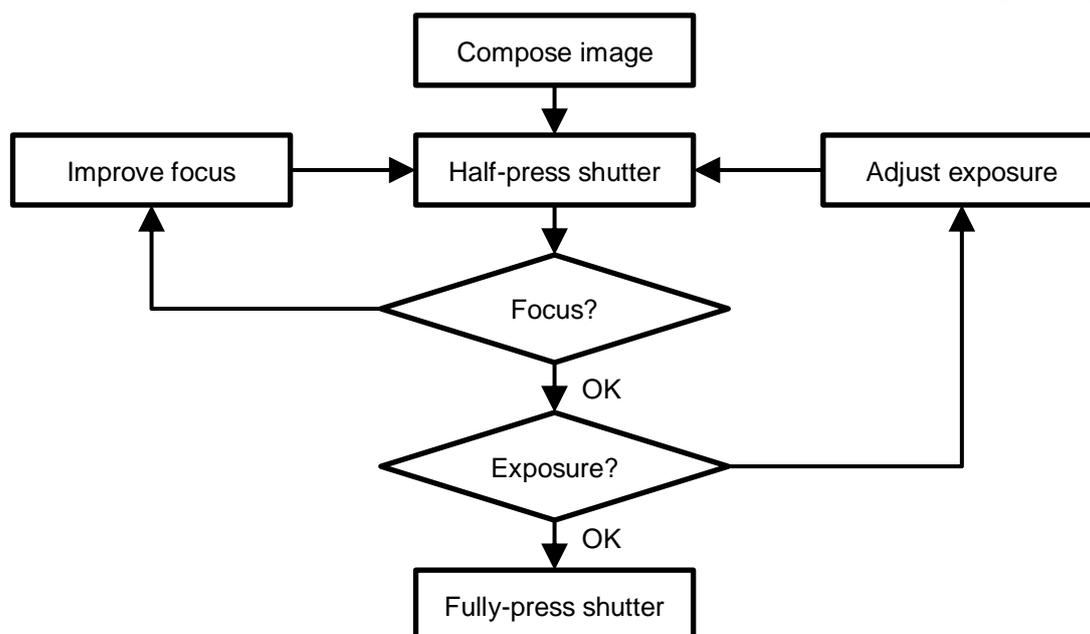


Figure 1: Basic steps for most photographic tasks

Improving focus

There are two ways you can help to ensure that your image is focused in the correct place:

1. **Tell the AF system where you want it to focus.**

Release the shutter button and press the FOCUS AREA SET button. Depending on the AF mode, one or more yellow frames will appear indicating where the AF system will look for focus. There may be other white frames showing where it could look for focus. Use the touch screen or cursor buttons to move the yellow frame(s) over the area where you want the camera to focus. For some AF modes, you can change the size of the frame with the front and rear dials. Half press the shutter button or press SET to accept the move. Depending on the AF mode, an indicator will show where the AF system will try to focus. *[Whilst the indicator is visible you can press SET to cancel the move.]*

Now half press the shutter button, before checking focus again, as shown in Figure 1.

2. Focus manually.

Release the shutter button and lock the focus by pressing and releasing the AF LOCK button (or switch to manual focus using the MF/AF switch). Edges that are in focus will be highlighted: a capability referred to as focus 'peaking'.

If necessary, enlarge the focus area by pressing the AF MODE button. The enlarged area can be moved using the cursor keys and the magnification varied using the rear dial. If you want, you can press BACK to close the enlarged area.

Turn the focus ring on the lens to bring your subject into sharp focus. An indicator will appear, showing roughly at what distance you are focused (there is no distance scale).

When you are satisfied with the focus, half-press the shutter button again, as shown in Figure 1.

Adjusting exposure

You can get the same exposure, in terms of image brightness, with a range of combinations of shutter speed, aperture and ISO setting. However, these settings also affect depth of field, how much a moving object is blurred and the amount of noise in the image. There are also situations in which you may want to increase or decrease the overall exposure of the image. See the box 'Exposure, depth of field and image sharpness' on page 6 for an overview of these related issues.

For P, A and S shooting modes, adjust the aperture / shutter speed with the front dial and exposure compensation with the rear dial. Press the ISO button to specify the ISO value or to set it to AUTO.

In P shooting mode the camera selects a combination of aperture and shutter speed and turning the front dial adjusts the balance between them. A yellow, arrowed indicator will appear to the left of the aperture value. Adjusting the exposure balance in this way is referred to as 'Program Shift'. Any Program Shift will be retained and applied to the next photograph. To cancel Program Shift, press the ONE PUSH AE button.

When you are satisfied with the exposure, half-press the shutter button again, as shown in Figure 1.

Photographic Tasks and Custom Modes

Now that we've covered the basic process of taking a still photograph, we can consider how set up the camera to ensure that it works at its best for different photographic tasks.

Despite the huge range of potential of combinations of settings available on most digital cameras, only a few combinations make much sense. Each of these is useful for one or more photographic tasks.

Table 2 describes where the GX7 takes exposure for each possible combination of auto-focus mode and metering mode. The combinations shaded in green explicitly link where focus and exposure are taken. I find these combinations far more useful than the others. In any event, you can always specify where focus and exposure are taken separately, as we will see.

AF mode	Metering mode		
	Multi-metering	Centre-weighted	Spot metering
23-Area	Evaluative.	Average over the scene, weighted to the centre of the frame.	At the centre of the AF region.
Face Detection	On detected face.		At the centre of the image.
Tracking	On tracked object.		At the centre of the image.
1-Area	Evaluative.		At the centre of the AF area.
Pinpoint	Evaluative.		At the AF point.
Manual focus	Evaluative.		At the centre of the MF Assist region.

Table 2: Where exposure is taken for each combination of AF and metering modes

Exposure, depth of field and image sharpness

You should be asking the following questions as you take a photo:

- **Do I want to influence the depth of field?** Use a larger aperture (smaller f number) to obtain a shallower depth of field, typically to blur the background in a portrait and make the subject stand out. Use a smaller aperture (larger f number) for a larger depth of field.

Digital cameras operate with the aperture fully open (to make focusing easier and to optimise the display). As a result, you cannot see the final depth of field of the captured image in the display. Simply take the photo and review it. If necessary, adjust the aperture and take the photograph again. (But see the section on depth of field preview in chapter 3.)

- **What aperture will give the sharpest image?** Most lenses are not at their sharpest when at their widest aperture, especially at the edges of the frame. They are often sharpest when stopped down a stop or two. However, too small an aperture will reduce sharpness due to diffraction. When sharpness really matters, refer to reviews of your lenses, or obtain MTF (Modulation Transfer Function) charts, to find the aperture which gives the best sharpness for each lens.

For many tasks ultimate sharpness may not matter, and softer edges may even be an advantage. For example, in portrait photography you often want a shallow depth of field and softer edges in the image can enhance the effect of a blurred background. For other tasks, such as landscape photography, you will want a sharp image and, as a general rule, should avoid the widest apertures on your lens.

- **Are any bright areas of the scene being over-exposed?** This would result in the brightest areas being recorded as fully white and you would lose detail in the bright areas of the scene. If so, turn the rear dial to apply exposure compensation to darken the image somewhat. The exposure histogram will help you judge this. As a rule, it is easier in post-processing an image to retrieve detail from underexposed areas than from fully saturated areas of an image.
- **Is my subject a dark one, against a bright background?** In this case, you may wish to use exposure compensation to brighten the image and reveal the detail in your subject. The background may be over-exposed, but this may be acceptable or even desirable.
- **Do I need to minimise noise in the image?** If you are working in dim light, at small apertures or at fast shutter speeds (or a combination of the three) the camera will increase the ISO of the sensor (its sensitivity) to compensate; but this may result in noise, especially in dark areas of the image. To control noise, you may want to set the ISO value by pressing the ISO button and adjusting the setting. You can adjust the ISO LIMIT for AUTO ISO and iISO with the front dial whilst in the ISO menu. Of course, a slower ISO will require a wider aperture and / or a slower shutter speed, possibly to the point where you need a tripod or other support.
- **Is there any movement in the scene** and, if so, is my shutter speed fast enough to avoid motion blur, or slow enough to create motion blur if it is wanted? See the section on 'Moving subjects' below.

The four combinations outlined in black are particularly useful. They provide the basis for the setting combinations for the six photographic tasks summarised in Table 3. The complete setting combination for each is covered in chapter 4, which also describes how to program them onto the custom modes on the GX7. The GX7 only lets you store 3 custom modes, so you will need to decide which of the photographic tasks you use and store those. If necessary, you can customise them to meet your needs.

The photographic tasks, accessed via the custom modes, provide the framework for this manual and let me focus on describing using the camera without referring to settings all the time.

Note: As discussed in Appendix 1, some custom modes in this manual use program (P) shooting mode. If you prefer to use A or S shooting modes, then simply modify those custom modes.

Task name	Photographic task	PASM mode	Metering mode	Quality	AF mode	Focus mode	Drive mode
GENERAL	General photography	P	MULTI	RAW	23-AREA	AFS	SINGLE
PEOPLE	People (and general photography)	P	MULTI	RAW	FACE (23-AREA)	AFS	SINGLE
SPECIFY	Specify the subject	P	SPOT	RAW	1-AREA	AFS	SINGLE
MOTION	Motion / sports	S	SPOT	JPEG Fine	1-AREA	AFC	BURST
MANLENS	For manual lenses	A	SPOT	RAW	n/a	MF	SINGLE
ASTRO	Astrophotography	M	MULTI	RAW	n/a	MF	SINGLE

Table 3: Key settings for some photographic tasks³

Note that the built-in flash or a hot-shoe mounted flash can be used, for a subject in range, for any of the photographic tasks: see the section on 'Flash' in chapter 3.

The following sections provide specific information on using the camera for each photographic task.

GENERAL: General photography

Select the custom mode for the GENERAL photographic task. This uses 23-AREA AF mode and MULTI metering mode, with the camera considering where focus has been obtained in setting the exposure.

Follow the basic steps shown in Figure 1.

If you press the FOCUS AREA SET button, 23 white rectangles will appear, with the central 9 outlined in yellow. Use the touch screen or cursor buttons to move the yellow frames over the area where you want the camera to focus. Half press the shutter button or press SET to accept. A white cross will appear in the chosen area. *[Whilst the white cross is visible, you can press SET to cancel the move.]*

PEOPLE: Photographing people (and general photography)

Select the custom mode for the PEOPLE photographic task. This uses FACE DETECTION AF mode, but if no face is detected it will use 23-AREA AF mode. It uses the MULTI metering mode, with the camera considering where focus has been obtained in setting the exposure.

Follow the basic steps shown in Figure 1.

However, even before you half-press the shutter, any face detected in the scene will be outlined with a frame. The face on which exposure will be taken will be outlined in yellow with a white cross over the (nearest) eye on which focus will be taken. Other faces at the same distance will be outlined in white. When you half-press the shutter button the yellow frame will turn green and focus will be locked.

If a face is not detected, the camera will operate in **23-AREA AF mode**. When you half-press the shutter the AF frames in which focus will be taken will be outlined in green.

However, if you press the FOCUS AREA SET button, the camera will operate in **1-AREA AF mode** and a yellow AF frame will appear. Move this over your subject and continue with the basic steps.

Note that you can use the PEOPLE photographic tasks for people (FACE DETECTION AF mode), general subjects if no faces are present (23-AREA AF mode) and specific subjects (1-AREA AF mode), so it is extremely flexible. **Therefore, if you are short of custom modes, you can use this and not program the GENERAL and / or SPECIFY photography task as custom modes.**

³ See Table 10 in chapter 0 for the full set of programmed settings for each photographic task.

SPECIFY: Specify the subject

To specify where focus and exposure should be taken, select the custom mode for the SPECIFY photographic task. This uses 1-AREA AF mode and SPOT metering mode. A white AF frame and a blue spot-metering cross will be shown at the centre of the display.

Follow the basic steps shown in Figure 1.

If you press the FOCUS AREA SET button, the AF frame will turn yellow. Use the touch screen or cursor buttons to move the AF frame over the area where you want the camera to focus. Adjust the size of the frame using the front and rear dial. Half press the shutter button or press SET to accept. The corners of the frame will turn white again, with a blue metering cross in the centre of the AF frame. *[Whilst the white frame is visible, you can press SET to cancel the move.]*

To re-centre the AF frame in the display, press the FOCUS AREA SET button, press DISP and then half press the shutter button or press SET.

An alternative way of specifying where focus and exposure should be taken is described in Appendix 5.

MOTION: Moving subjects

The basic steps described earlier don't work for photographing moving subjects. This requires a fast shutter speed to avoid motion blur (enabled by a wide aperture lens and/or higher ISO) and you (and your camera) need the ability to track the motion of your subject. The wider aperture implies a shallower depth of field, which can make focusing harder. You usually don't have time to manually adjust focus or exposure whilst taking the shot or burst of shots. You either have to set up focus in advance or rely on automatic focus, both of which are supported in the following process:

- Select the custom mode for the MOTION photographic task. This uses:
 - S shooting mode – you set the shutter speed.
 - 1-AREA AF⁴ mode and SPOT metering (taking exposure in the AF frame).
 - Continuous auto-focus (AFC).
 - AF/AE LOCK is set to AF-ON and SHUTTER AF is set to OFF so that **AF is only activated whilst the AF/AE LOCK button is pressed** (referred to as 'back button AF').
 - Burst mode (BURST) is enabled with the burst rate set to M, leaving the display active to allow you to track your subject⁵
 - Image stabilisation is set to OFF, as you usually want to freeze motion with a fast shutter speed⁶.
 - ISO LIMIT is set to OFF to allow faster shutter speeds, at the expense of more image noise.
 - QUALITY is set to JPEG FINE resolution, to enable longer bursts of images to be captured.
- Set the shutter speed using the front dial. The rule of thumb is that your shutter speed should be at least the inverse of the (35mm sensor equivalent) focal length. For example, for a 300mm lens on a micro four thirds camera (a 600mm equivalent focal length) you would look for a shutter speed of 1/600 second or faster. The camera will set the aperture (and ISO if on AUTO) for correct exposure.
- Centre the subject (or something at the distance the subject will be at) in the AF frame and either:
 - **Lock focus:** Press and release the AF-ON (AF/AE LOCK) button to lock the focus. Fully depress and hold the shutter button to take a sequence of photos with the focus locked at the set distance. You will obtain a higher frame rate, as the camera is not continually checking for focus, and there is no risk of the focus jumping to another object. Of course, your subject must remain at, or pass through, the focused distance.
 - **Track focus:** Press and hold the AF-ON (AF/AE LOCK) button to start focus tracking. Fully depress and hold the shutter button to take a sequence of photos, keeping the subject in the AF frame. The camera will (attempt to) track focus on the subject.

⁴ The GX7 also has a TRACKING AF mode. I've not had a lot of success with it.

⁵ The GX7 does offer higher burst rates, but these blank out the viewfinder.

⁶ If you are tracking a moving object, try setting image stabilisation to PANNING and use a somewhat slower shutter speed.

MANLENS: Manual focus and aperture priority

For use with a fully manual lens, with manual focusing and an aperture ring. The lens will probably not have any electronic contacts (if it does, they will only communicate EXIF data).

Select the custom mode for the MANLENS photographic task. This uses SPOT metering mode to set the exposure in the MF ASSIST region. Switch to another metering mode if more appropriate. Select MF on the AF/MF switch.

Follow these steps:

1. **Compose the image.**
2. **Focus:** Focus using the focus ring on the lens. Edges in focus will be highlighted in blue by focus peaking. Press the AF MODE button to enlarge the centre of the image to assist focusing if necessary. You can move the enlarged AF ASSIST area around with the cursor buttons (or touch screen) and change the magnification using the front and rear dials.
3. **Lock exposure:** Set the aperture using the front dial. Half-press the shutter button, which will lock the exposure. If you have time, check the shutter speed, ISO value and exposure histogram. If necessary, adjust the exposure as described in the box 'Exposure, depth of field and image sharpness' on page 6.
4. **Take photo and review:** Fully press the shutter button to take the photograph. Review the photo. If you don't want to keep it press DELETE. Return to shooting mode by half-pressing the shutter button.

ASTRO: Astrophotography (e.g. Laowa 7.5mm f/2 lens)

Astrophotography requires you to use manual focus as you need to fix the lens focus at infinity. You will also be using manual exposure, so this is a perfect situation in which to use a fully manual lens. Use a lens with a wide maximum aperture, say f/2 or f/2.8. I find that the Laowa 7.5mm f/2 rectilinear lens fits the bill for an ultra-wide lens, as well as being a good landscape and architectural lens.

- Mount the camera on a tripod.
- Select the custom mode for the ASTRO photographic task and set the AF/MF switch to MF. This custom mode uses M shooting mode (manual exposure), has a default ISO of 800 (the ISO LIMIT is removed) and has image stabilisation switched off.
- Set the widest aperture on the lens and focus on infinity.
- Take a series of photos, experimenting with the trade-off between shutter speed, ISO, image brightness and noise. Start with an exposure of about 20 seconds. (I might want to try exposure bracketing.)

Panorama mode

Turn the mode dial to SCN and choose '24: Panorama Shot'. Access the settings for the Panorama mode through the PANORAMA SETTINGS sub menu on the REC menu. You can also access these setting via the panorama function tab (to the right of the touch screen). Set the direction to scan and whether you want a STANDARD or WIDE panorama.

To take a panorama, aim the camera at one end of the scene, press and hold the shutter button, and scan the scene slowly and steadily in the intended direction. It takes some practice to complete successful scans. If you are having problems, try moving to a shorter focal length (wider angle of view), slowing down your scan rate, and / or using a lens that focuses more quickly.

3. Summary of camera controls and capabilities

Exposure (Metering) Controls

Shooting modes

The shooting modes are (mainly) metering modes. Turn the mode dial to select a shooting mode:

- In program (P) shooting mode the camera selects a combination of aperture and shutter speed. Turn the front dial to adjust the balance between shutter speed and aperture - the aperture and shutter speed values will change in the display and a yellow, arrowed indicator will appear to the left of the aperture value. Adjusting the exposure in this way is referred to as 'Program Shift'. The rear dial controls exposure compensation.
Any Program Shift will be retained and applied to the next photograph. To cancel Program Shift, press the ONE PUSH AE button.
- In aperture priority (A) shooting mode you set the aperture using the front dial and the camera will set the shutter speed for correct exposure. The rear dial controls exposure compensation.
- In shutter-speed priority (S) shooting mode you set the shutter speed using the front dial and the camera will set the aperture for correct exposure. The rear dial controls exposure compensation.
- In manual (M) shooting mode you set aperture and shutter speed. See Appendix 2 on Manual Exposure.
- The GX7 also has Intelligent Auto (iA), SCENE and CREATIVE shooting modes, which are not covered in this manual.

Metering modes

The metering modes control where the camera measures the exposure. Access these via the METERING MODE entry on the Q.MENU.

Multi-metering: The camera sets the most suitable exposure, taking into account the variation in brightness over the whole scene, the focus mode and where focus is obtained.

Centre-weighted metering: Takes an average meter reading weighted around the centre of the image.

Spot metering: Sets exposure at a point – a blue cross is shown at the point where exposure is metered. The location of the exposure point depends on the focus mode in use.

ISO speed

Press the ISO (cursor up) button and select AUTO ISO, intelligent ISO (iISO) or an ISO speed. Intelligent ISO increases the ISO setting when movement is detected in the scene. Adjust the ISO LIMIT for AUTO and iISO using the ISO LIMIT SET menu entry. You can also adjust the limit with the front dial whilst in the ISO menu. The ISO setting being used is displayed when the shutter is half depressed⁷.

A lens with a wider maximum aperture will let you use a lower ISO speed, with less noise.

The camera will produce images with the least noise if operated at as low an ISO speed as possible. A higher ISO speed will allow a faster shutter speed (with less motion blur) or operation in lower light.

If you can, use a tripod or other means of stabilising the camera, rather than using high ISO settings.

Exposure compensation

If your intended subject appears to be over- or under-exposed look at the exposure histogram to see if values are all to one side or the other. One option is to adjust the exposure compensation so that your subject appears correctly exposed in the display and the histogram is more 'balanced'.

Rotate the rear dial to adjust the exposure compensation, increasing or decreasing the light reaching the sensor. Clicking on the rear dial will toggle the front dial to/from controlling flash exposure compensation (if Flash>'Auto Exposure Compensation' is set to ON) as well as showing a wide bar for the normal exposure compensation.

⁷ Except in Intelligent ISO, when the ISO setting is selected dynamically

Exposure lock

When using auto-metering, the exposure is taken and locked when you half-press the shutter button⁸ when using AFS focusing mode. It is not locked using AFF and AFC focusing modes, except when using the higher speed burst modes.

Beware, as once the exposure is locked the brightness of the display will vary as you recompose the image. Its brightness is always set for the whole of the image. So don't be confused – the exposure really has been locked!

Exposure bracketing

You can take a series of photos with a range of exposures. Press the DRIVE MODE button and select the AUTO BRACKET option. Select the number of shots and the EV separation.

White balance and colour

Our eyes adjust to what we see depending on the light source illuminating the scene. Film is terrible at this but digital cameras are now good at determining the light source.

Press the WB (cursor right) button and select the white balance setting you require. Leave it on auto white balance (AWB) unless it fails to cope with specific lighting. If necessary, specify the type of lighting or program one of two custom white balance options by:

- Selecting WHITE SET 1 or WHITE SET 2 and then pressing WHITE SET.
- Fill the frame in the display with something white (a test card, paper ...) and then press SET.

You can also adjust the colour balance via the PHOTO STYLE menu entry. STANDARD should be fine for most purposes. There is also a Custom photo style.

Focusing Controls

Focus modes

You specify how auto-focus is obtained through the AFS/AFF/AFC focus mode setting on the Q.MENU. In AFS focus mode, the camera will effectively switch to manual focusing if you press AF LOCK or turn the focus ring with the shutter button half depressed, so you may never need to turn on manual focusing. If you need to, use the MF/AF switch. The auto-focus modes are:

AFS: (single) focuses when the shutter button is half-depressed.

AFF: (flexible) focuses when the shutter button is half-depressed and refocuses if the subject then moves, with no prediction. Higher power.

AFC: (continuous) focuses continually whilst the shutter button is half-depressed. Predicts where a moving object will be when the shutter opens. Highest power.

There are also QUICK AF and EYE SENSOR AF functions, which enable focusing **prior** to the shutter being pressed or when you put your eye to the viewfinder respectively. I leave these disabled.

⁸ You could program the AF/AE LOCK button to function as AE LOCK and press it to lock exposure. You would then half press the shutter button to lock focus before recomposing the image and taking the photo. However, I recommend using AF LOCK to lock the focus and the shutter button to lock the exposure.

Auto-Focus modes (and hinting at where to focus)

Press the AF MODE (left-cursor) button to select which auto-focus (AF) mode to use:

FACE DETECTION: Detects faces in the scene. If no faces are present then 23-AREA mode is used.

AF TRACKING: Allows you to specify a (potentially moving) object to track and then maintains focus on it. Usually used with continuous auto focus (AFC). Centre the target in the centre of the screen on the object to track and half press the shutter button. The target should turn green when the object is accepted and you can release the shutter button. The target will turn yellow and track the object.

23-AREA: The camera chooses where to focus from among 23 areas across the scene.

1-AREA: The camera focuses on a specific area, which is initially located at the centre of the scene, and which you can move and resize.

PINPOINT: The camera focuses on a specific point, which is initially located at the centre of the scene, and which you can move. When you half depress the shutter, an area around the focus point is enlarged for a short period to allow you to check focus. Not available with AFC.

You can provide a hint to each AF mode as to where to look for focus. Whilst an AF mode is highlighted in the AF MODE menu, press the down cursor button (there is a reminder on the display) and then use the cursor buttons (or touch screen) to indicate where AF should be taken:

- for 23-AREA mode, select a region in the image;
- for FACE DETECTION AF mode, the camera will switch to 1-AREA AF mode. Move the AF frame over the area where you wish to find focus;
- for AF TRACKING AF mode, select the object to track;
- for 1-AREA AF mode, move the area (use the rear dial to change its size);
- and for PINPOINT AF mode, move the focus point.

Focusing and focus lock

When using auto-focus, the focus is taken and locked when you half-press the shutter button⁹.

In AFS focus mode (but not AFF or AFC focus modes) you can adjust the focus using the focus ring on the lens, without switching to manual focus, in two ways:

1. Press and release the AF/AE LOCK button¹⁰ to take and lock focus. You can then turn the focus ring to adjust focus without having to hold a button down. Exposure will subsequently be locked when you half press the shutter button, thereby separating where (and when) focus and exposure are locked.
2. Half press the shutter button to lock focus (and exposure) and keep it half pressed. You can then use the focus ring to adjust focus.

Both of these options use manual focus, without having to switch to MF focus mode explicitly. Of course, you can always select MF on the MF/AF switch; manual focusing will operate as described in the previous paragraphs.

⁹ Unless SHUTTER AF is OFF or you have already pressed AF LOCK to lock focus.

¹⁰ Programmed in the setup to function as AF LOCK. AF/AE LOCK HOLD is set to ON, so that you don't have to keep the AF/AE LOCK button depressed.

Other controls and settings

JPEG / RAW formats and image resolution

Access QUALITY on the Q.MENU to specify whether to capture in JPEG and / or RAW formats and the amount of compression to apply to JPEG files. I usually take RAW images and process them on a computer. However, capturing in JPEG lets you apply many in-camera processing options (or you might say that the processing requires you to capture in JPEG). In addition, you may want to share photographs directly from your camera, in which case JPEG files are smaller. You can choose to capture both RAW and JPEG at the same time.

The PICTURE SIZE and ASPECT RATIO settings on the REC menu set the resolution and aspect ratio of your images. As I usually capture RAW images, I use the full sensor resolution (Large) and native aspect ratio (4:3). Note that when EX. TELE CONV is enabled (requiring JPEG format) reducing the resolution reduces the effective sensor size and thereby narrows the effective field of view (and hence magnification) of the lens.

Drive mode: single shot, burst mode, AEB and self-timer

Press the DRIVE MODE (cursor down) button and select:

SINGLE: to take one photograph when the shutter is fully depressed.

BURST: to take a series of photographs. The BURST RATE menu entry lets you choose from super-high (SH), high (H), medium (M) or low (L). The last two continue to display the scene but the first two do not. Super high is only available using JPEG. I set M as the default.

AUTO BRACKET: to bracket the exposure. Select the number of shots and the EV separation.

SELF TIMER: to set up the self-timer. Select: 10 seconds (one shot); 10 seconds (3 shots); or 2 seconds. The first two let you join the scene. The latter reduces camera shake on a tripod.

Image Stabilisation

The GX7 has in-body image stabilisation (IBIS), controlled via the STABILIZER menu entry, which can be set to OFF, NORMAL or PANNING. The in-body image stabilisation is disabled when a lens with OIS is attached.

Electronic shutter

Select ELECTRONIC.SHUTTER on the Q.MENU to control the electronic shutter. When you switch it ON the mechanical shutter is disabled, eliminating shutter noise as well as any risk of shutter shock.

The 'electronic shutter' exposes rows of the image sequentially. Each row is exposed for the same length of time but not at the same time. As a result, images of moving objects can be distorted. On some cameras the electronic shutter readout is faster than on others (leading to less distortion) but has fewer bits of dynamic range. I *think* that the GX7 has a 'slow' electronic shutter (taking about 1/15 second to scan the image) and provides the same 12-bit readout as the mechanical shutter.

Touch shutter

You can fire the shutter by touching your subject on the screen. To do so:

- Display the screen icon buttons, if not already visible, by touching the < tab.
- Enable TOUCH SHUTTER by touching the  icon. The cross on the icon will disappear and the icon will turn yellow.
- Compose the photograph and touch the position on the screen where you want to take focus and exposure.
- The camera will take the photograph.
- When you don't need the icon buttons, close the tab by touching > on the tab.

Previewing depth of field and motion blur

You could program a function button or screen icon to act as a PREVIEW button, which would let you see the effects of aperture and shutter speed on depth of field and motion blur before taking a photograph. This used to be very useful on a film camera to avoid wasting film, but I don't use it much with digital cameras. It's just as fast to take the picture and review the depth of field and motion blur on the display. You can then change the aperture and shutter speed and try again if necessary.

Flash

An on-camera flash can be switched on by raising the built-in flash using the release button or by attaching a flash to the hot shoe. The settings for the flash are shown in Table 8 in chapter 0. I recommend setting FIRING MODE to TTL¹¹ (through the lens) and enabling AUTO EXPOSURE COMPENSATION. The camera will control the flash output to (try to) obtain the correct exposure. The remaining settings for use in this mode are:

- FLASH MODE (via the Q. MENU): NORMAL or SYNCHRO. The latter uses a long exposure to expose a dark background and the flash to illuminate a foreground object. You may need OIS or a tripod.
- FLASH SYNCHRO: 1st or 2nd curtain. That is, at the start of the exposure or at the end of the exposure. A classic use of 2nd curtain is to use a long exposure to capture the trails of moving lights and then for the flash to fire to freeze moving objects (such as cars) at the end of the exposure.
- FLASH ADJUST (via the Q. MENU): click on the rear dial and used the front dial to adjust this. It allows you to over- or under-expose the flash by up to 3 EV.

Wireless flash

Note that, unfortunately, 'wireless' flash on the GX7 uses infra-red communications rather than radio frequency communications. The remote flash therefore needs to be able to 'see' the camera's flash, either directly or by the camera's flash being reflected to the remote flash.

Using a wireless flash or group of flashes is similar to using the internal flash, but more complex to set up. Select FLASH on the REC menu and then, in the sub-menu, set WIRELESS FLASH to ON. This will disable some options the built-in flash and enable some wireless options. See the Panasonic GX7 manual and your flash gun manual for more details.

¹¹ If you set FIRING MODE to MANUAL you have to vary the flash output using MANUAL FLASH ADJUST and experiment to get the correct exposure.

4. Configuring your camera

1. Configure the Menu Settings

Set the mode dial to P shooting mode. Press MENU and open each of the following menus in turn. Configure each setting, using the suggested default (you can change settings later). Settings on the SETUP menu rarely need changing. Those on the CUSTOM menu are accessed more and those on the REC menu are accessed most frequently. Settings are shaded as follows:

Dedicated buttons, dials, Fn buttons or Fn icons.	Q.MENU (see below).
Needed – access via full MENU.	Rarely changed after setup.

The SETUP Menu

	Options	Comments / instructions
CLOCK SET		Set the time, data and format.
WORLD TIME		Set home and destination time zones.
TRAVEL DATE	TRAVEL SETUP: LOCATION:	Off, or departure and return dates. Off, or location in text.
Wi-Fi		
BEEP	OFF and x levels	Volume of the beep and electronic shutter sound.
VOLUME		Adjusts playback volume of recorded sound.
MONITOR / VIEWFINDER		Adjusts brightness / colour of the display in use.
LUMINANCE	A / 1 / 2 / 3	Auto adjust / bright / standard / dark.
ECONOMY (1): SLEEP MODE: AUTO LCD OFF:	OFF, 1, 2 , 5, 10min. OFF, 15, 30sec	Half press shutter button to wake. If not OFF then SLEEP MODE is set to 2 min.
USB MODE	PC / Pictbridge / choose	Connect USB to PC or printer.
OUTPUT	NTSC / PAL	TV system for output.
	16:9 / 4:3	Aspect ratio of TV output.
	AUTO / 1080i / 720p	HDMI output resolution.
VIERA Link	OFF / ON	Panasonic's HDMI CEC implementation.
3D PLAYBACK	3D / 2D	Output mode for 3D pictures (2D or 3D TV).
MENU RESUME	OFF / ON	Opens each menu at last-used item.
MENU BACKGROUND		Set background colour for menus.
MENU INFO.	OFF / ON	Short help displayed.
LANGUAGE		Choose language.
VERSION DISP.		Displays firmware version of camera and lens.
EXPOSURE COMP. RESET	OFF / ON	Resets EC on mode change and power off.
SELF TIMER AUTO OFF	OFF / ON	Reset self-timer on power off.
NO. RESET		Resets file no. to 1 and increments folder no.
RESET		Resets REC/SETUP/CUSTOM menu settings.
RESET Wi-Fi SETTINGS		
PIXEL REFRESH		See the Panasonic manual.
SENSOR CLEANING		See the Panasonic manual.
FORMAT		Formats the memory card, deleting all contents.

Table 4: The SETUP menu – recommended settings in BOLD

Note (1): The ECONOMY function allows you to set the camera to switch off the display and/or enter standby after a period. It can greatly extend battery life. Press any button to restore the display. To return from standby half press the shutter button.

The CUSTOM Menu

	Options	Comments / instructions
CUST. SET MEM		Stores current setting to one of the custom modes.
SILENT MODE	OFF / ON	Disables all sounds and light output.
AF/AE LOCK	AE / AF / AF/AE / AF-ON	AF/AE LOCK button locks exposure, focus, both or engages AF.
AF/AE LOCK HOLD	OFF / ON	Off: Lock only held whilst Fn1 pressed (if configured). On: Pressing AF/AE LOCK engages / disengages lock.
SHUTTER AF	OFF / ON	On: Pressing shutter button halfway locks focus.
HALF PRESS RELEASE	OFF / ON	Shutter fires when button pressed halfway.
AFS/AFF/AFC	AFS / AFF / AFC	Selects focus method.
QUICK AF	OFF / ON	Focus continually at all times (before shutter pressed).
EYE SENSOR AF	OFF / ON	Focus continually when eye sensor activated.
PINPOINT AF TIME	SHORT / MID / LONG	Time enlarged when in pinpoint AF mode.
AF ASSIST LAMP	OFF / ON	On: Lamp assists AF in low light conditions.
DIRECT FOCUS AREA	OFF / ON	Changes cursor buttons to move (and rear dial to adjust size of) the AF area. <i>Standard function of buttons is lost.</i>
FOCUS/RELEASE PRIORITY	FOCUS /RELEASE	Release: Picture taken when shutter button fully depressed. Focus: Picture only taken once in focus.
AF+MF	OFF / ON	On: Allows manual focus after AF (AFS mode only).
MF ASSIST	OFF / AF button / focus ring / either	Enlarges part of image when AF mode button pressed, focus ring turned, or either.
MF GUIDE	OFF / ON	Enables a guide bar showing relative zoom.
PEAKING	OFF / ON	In focus regions highlighted during MF.
HISTOGRAM	OFF / ON	Display of the histogram. Position it after turning on.
GUIDE LINE	OFF / grid choice	Sets the pattern of guide lines displayed when shooting.
HIGHLIGHT	OFF / ON	Clipped areas blink during review and playback.
CONSTANT PREVIEW	OFF / ON	Shows effect of aperture / exposure (in M mode).
EXPO.METER	OFF / ON	Displays the large exposure meter – underexposed in red.
DIAL GUIDE	OFF / ON	On: An icon indicating rear dial function is briefly shown.
LVF DISP.STYLE	Border on/off	Choose the icon with no black border and a row of dots at the top and bottom.
LCD DISP.STYLE		
MONITOR INFO. DISP	OFF / ON	Adds an info screen to those toggled by the DISP button.
REC AREA	Still / Video	Crops display to 4:3 for still and 16:9 for video.
REMAINING DISP.	Shots / Time	Which to display as remaining on memory card.
AUTO REVIEW	Off / time / HOLD	Time that picture is displayed for review.
Fn BUTTON SET		Assign functions to Fn buttons.
Q.MENU	PRESET / CUSTOM	Enables customisation of Q.MENU.
DIAL SET	Rear dial exp. comp.	Dial allocation.
VIDEO BUTTON	OFF / ON	Enables video recording button. Use movie mode & shutter button.
POWER ZOOM LENS		See manual on power zoom lenses.
EYE SENSOR	LOW /HIGH & LVF Auto	Set LVF Auto to OFF (i.e. you must use the LVF switch).
TOUCH SETTINGS	Sub-menu	See Table 6.
TOUCH SCROLL	H / L	High or Low speed scroll in playback.
MENU GUIDE	OFF / ON	Selection screen on switch to SCN/CUSTOM modes.
SHOOT W/O LENS	OFF / ON	Switch on with lenses / lens adaptors that have no contacts.

Table 5: The CUSTOM menu – recommended settings in BOLD

	Options	Comments / instructions
TOUCH SCREEN	OFF / ON	Enables or disables the touch screen.
TOUCH TAB	OFF / ON	Enables or disables to tabs to the right of the touch screen.
TOUCH AF	OFF / AF+AE / AF	On: AF point or AF and AE points can be set by touching the screen.
TOUCH PAD AF	OFF / OFFSET / EXACT	Enables touch on screen to move AF point whilst using the viewfinder.

Table 6: The Touch Settings sub-menu – recommended settings in BOLD

The REC (still photography) menu

	Options	Comments / instructions
PHOTO STYLE (2)	STANDARD , VIVID ...	Six plus custom to choose from. Use STANDARD and post processing.
ASPECT RATIO (1)	4:3 , 3:2, 16:9, 1:1	Set to 4:3 and post process.
PICTURE SIZE (1)	L , M, S 4:3:	L: 4592x3448, M: 3232x2424, S: 2272x1704 pixels.
QUALITY	FINE, STD, RAW	FINE and STD are JPEG. Can save both JPEG and RAW.
METERING MODE (2)	Multiple: Centre-weighted: Spot:	Camera evaluates the scene – linked to focus AF mode. Whole image, but weighted to centre. At the spot metering cross point.
BURST RATE	SH / H / M / L	20, 4, 3, 2 frames / sec. SH uses JPEG S picture size (via Drive Mode).
AUTO BRACKET	SETTINGS/STEP/ SEQUENCE	Bracket or not / how many shots – EV step / order of exposures (via Drive Mode).
SELF-TIMER	10s, 10s x3, 2sec	10s x3 takes 3 shots after a 10 second delay. (via Drive Mode button)
HIGHLIGHT SHADOW		Allows adjustment of highlights and shadows
I.DYNAMIC (2)	OFF /LOW/ STANDARD/HIGH	Makes adjustments to cope with extreme highlights and lowlights in the image.
I.RESOLUTION	OFF /LOW/ STANDARD/ HIGH/EXTENDED	Varies the JPEG compression and sharpening depending on the image.
HDR	Sub menu	Enable and control HDR – JPEG only.
MULTI EXP.	Sub menu	Enables multiple exposures onto one image.
TIME LAPSE SHOT	Sub menu	Program time-lapse photography.
STOP MOTION ANIM.	Sub menu	Supports stop motion animation into a video.
PANORAMA SETTINGS	Sub menu	Only active in Panorama mode – can access settings from tab.
ELECTRONIC SHUTTER	OFF / ON	On: Disables the mechanical shutter.
SHUTTER DELAY	0 , 1, 2, 4, 8 sec	Delay shutter firing after shutter button pressed.
FLASH	Sub menu	See Table 8.
RED-EYE REMOVAL	OFF / ON	Corrects red-eye in firmware in camera.
ISO LIMIT SET	OFF or value (3200)	Sets upper ISO limit in ISO AUTO and iISO. (access via ISO button)
ISO INCREMENTS	1/3 EV / 1 EV	User can select ISO in 1/3EV or 1EV steps.
EXTENDED ISO	OFF / ON	Extends ISO up to 25600.
LONG SHTR NR	OFF / ON	Applies more noise reduction at slow shutter speeds.
SHADING COMP.	OFF / ON	Corrects lens vignetting (shading in corners).
EX. TELE CONV.	OFF / ZOOM / TELE CONV	Crops pixels from centre of image – use PICTURE SIZE to control the magnification. Also has settings for Video.
DIGITAL ZOOM (2)	OFF / 2x / 4x	Uses central pixels and interpolates to upscale – less useful than ETC.
COLOR SPACE	sRGB / AdobeRGB	Smaller / larger colour space.
STABILIZER	OFF / ON / PANNING	PANNING only compensates for vertical movement.
FACE RECOG.	OFF / ON / MEMORY	Not covered in this manual.
PROFILE SETUP	OFF / options	Not covered in this manual.

Table 7: The REC menu – recommended defaults in BOLD

Note (1): On the Q.MENU, ASPECT RATIO and PICTURE SIZE are combined in PICTURE SETTING.

Note (2): PHOTO STYLE, FOCUS MODE, METERING MODE, I.DYNAMIC and DIGITAL ZOOM are common to both the REC menu and MOTION PICTURE menu. Changing these settings in one of the two menus is reflected in the other. Other functions have separate settings stored for stills and videos.

	Options	Comments / instructions
FIRING MODE	TTL / MANUAL	Through the lens metered or manual control (only if wireless off).
FLASH MODE	NORMAL / SYNCHRO	Synchro uses long exposure for background. Both with or without red eye reduction.
FLASH SYNCHRO	1ST / 2ND CURTAIN	Flash fires at start or end of exposure (only if wireless off).
FLASH ADJUST	-3EV to +3EV	Additional adjustment of flash (only in TTL mode and if wireless off).
AUTO EXPOSURE COMP	OFF / ON	On: flash output linked to exposure compensation.
MANUAL FLASH ADJUST	Fractions of output	Sets flash output to fraction of full output (only in flash manual mode).
WIRELESS	OFF / ON	Disables / enables wireless IR flash control.
WIRELESS CHANNEL	1CH, 2HC, 3CH or 4CH	Set camera and flash to same channel (only if wireless on).
WIRELESS FP	OFF / ON	Disables / enables using FP flash on gun (only if wireless on).
COMMUNICATION LIGHT	LOW/ STANDARD /HIGH	Set output power of IR communication light (only if wireless on).
WIRELESS SETUP	Sub menu	Sets operation of flash and wireless flash groups (only if wireless on).

Table 8: The Flash sub-menu – recommended settings in BOLD

FLASH MODE and FLASH ADJUST are both accessible through the Q.MENU.

WIRELESS SETUP allows you to set FIRING MODE and FLASH ADJUST (or MANUAL FLASH ADJUST) for the built-in flash and for each of three wireless groups (A, B and C). See your flash gun manual for more details.

2. Configure the Function Buttons

The GX7 has five fixed function buttons, an AF/MF switch, four programmable function buttons, three fixed screen icon buttons and five programmable screen icon buttons.

To program the function buttons:

- Choose FN BUTTON SET from the CUSTOM menu.
- Choose 'Setting in REC mode'.
- Select the function button or screen icon you wish to program using the cursor keys or touch screen.
- Press MENU/SET.

I recommend programming the function buttons and icons as follows:

Button, icon or menu	Function	Comment
AE/AF LOCK button	AE/AF LOCK	AF-ON for custom mode C ₃₋₂ .
Fn1 button (marked Q.MENU)	Q.MENU	
Fn2 button (lower left)	ONE PUSH AE	
Fn3 button (lower right)	FOCUS AREA SET	Screen and cursor keys move AF area.
Fn4 button (marked LVF)	EVF / LCD toggle	
Fn5 screen icon	Wi-Fi	
Fn6 screen icon		
Fn7 screen icon		
Fn8 screen icon	FLASH MODE	
Fn9 screen icon	FLASH ADJUST	
Fixed screen icon 1	TOUCH SHUTTER	
Fixed screen icon 2	TOUCH AE	
Fixed screen icon 3	PEAKING	

Table 9: Setup for function buttons and icons

Set the AF/AE LOCK button to AF LOCK for custom modes C₁, C₂, C₃₋₁ and C₃₋₃ and to AF ON for custom mode C₃₋₂ (see below and the section on custom modes).

3. Configure the Q.MENU

To customise the Q.MENU:

- Press Q.MENU to display the quick menu.
- Press the down cursor button or touch the EDIT Q icon at the lower left of the display.
- Accept the instructions, if they are displayed, by pressing SET/MENU or half pressing the shutter.
- Drag functions from those available in the top panel to where you want them in the bottom panel. The top panel has four pages of available functions. The bottom panel has the same three pages as the Q.MENU. If you drop a function over one already present on the bottom panel then the existing one will be moved back to the top panel.
- Drag any function you want to delete from the Q.MENU from the bottom panel and drop it in anywhere on the top panel.
- Press EXIT or half press the shutter button to complete programming the Q.MENU.

I recommend mapping the functions shown in Table 1 to the Q.MENU.

4. Configure the CUSTOM modes

Any changes you make to the function settings for the PASM and iA shooting modes are retained as you switch between these modes and when you turn the camera off. This has the advantage that you don't lose any changes you make. However, it can be hard to remember where you left the settings and you may have a lot of changes to make for a new situation.

You can store 5 sets of function settings away as custom modes. Changes you make to the function settings of a custom mode are NOT retained as you switch between modes or switch power off. When you return to a custom mode the settings will be as you last saved them for that mode. Each custom mode should address a particular situation (a 'photographic task') that you encounter a lot. It may also provide a good starting point from which a few function changes can be made to address other situations.

One factor that influences how to set up the custom modes is that you cannot change between PASM modes without using the mode dial. That is, you cannot start from, say, a custom mode using aperture priority (A) shooting mode and change to shutter priority (S) shooting mode. Because of this it is worthwhile programming at least one custom mode for each of the PASM modes that you use regularly.

Table 10 provides settings for the photographic tasks described in the text. Choose four of these and program them onto the four custom modes, as follows:

- Set the mode dial set to P shooting mode and make sure that you have set each function to the defaults described in 'Configure the menu settings'. Also check that you have configured the function buttons and Q.MENU as described above.
- Work through the columns in Table 10 one at a time. For each photographic task you wish to allocate to a custom mode, set the mode dial to P, A or S and set each function as shown in the table. Make other changes required in the table. Store the setup to the chosen custom mode, using the CUST SET MEM entry on the CUSTOM menu.

The top row of Table 10 suggests custom modes to store four photographic tasks on. Chose different ones to suit your photography.

Note that the ASTRO (and, by definition, MANLENS) photographic task settings assume that you are using a fully manual lens with no electronic contacts. If you are using an AF lens, set the AF/MF switch set to MF and set SHOOT W/O LENS to OFF.

In the field, you can often start from one of the custom modes and quickly change one or two settings to meet specific needs, rather than starting from scratch. For example, starting from the PEOPLE photographic task you only need to change AF MODE to 49-AREA to move to the GENERAL photographic task.

Suggested custom mode:	C ₁	C ₂	C ₃₋₁	C ₃₋₂	C ₃₋₃	
Photographic task:	GENERAL	PEOPLE	SPECIFY	MOTION	MANLENS	ASTRO
PASM MODE	P	P	P	S	A	M
METERING MODE	MULTI	MULTI	SPOT	SPOT	MULTI	MULTI
ISO	AUTO	AUTO	AUTO	AUTO	AUTO	800
ISO LIMIT SET	3200	3200	3200	OFF	3200	OFF
QUALITY	RAW	RAW	RAW	JPEG FINE	RAW	RAW
FOCUS MODE	AFS	AFS	AFS	AFC	MF	MF
AF MODE	49-AREA	FACE (+) DETECT.	1-AREA	1-AREA	49-AREA	49-AREA
AF/AE LOCK BUTTON	AF LOCK	AF LOCK	AF LOCK	AF-ON	AF LOCK	AF LOCK
AF/AE LOCK HOLD	ON	ON	ON	OFF	ON	ON
SHUTTER AF	ON	ON	ON	OFF	ON	ON
QUICK AF	OFF	OFF	OFF	Must be OFF	OFF	OFF
DRIVE MODE	SINGLE	SINGLE	SINGLE	BURST	SINGLE	SINGLE
STABILIZER	ON	ON	ON	OFF	ON	OFF
SHOOT W/O LENS	OFF	OFF	OFF	OFF	ON	ON

Table 10: Custom mode settings

(+) FACE DETECTION AF mode reverts to 23-AREA mode if a face is not detected.

Cells for settings that differ from the GENERAL photography task are shaded grey to help you see what needs changing. Text for settings that do not have any effect for fully manual lenses is shaded grey.

Appendix 1: Choice of P, A and S modes

Should you use P mode, A mode or S mode? This is a personal choice and there is no correct answer.

In the past, I have set cameras up to use A mode for portraits and landscapes (I want to control the depth of field), S mode for moving subjects (I need to ensure the shutter speed is fast enough) and P mode for 'opportunistic shooting' (where I want to be able to capture shots quickly).

However, my experience with Lumix G cameras has affected my thinking on this, although I've not yet fully made up my mind:

- P mode on the cameras seems to do an excellent job of choosing an appropriate shutter speed. For example, it uses faster shutter speeds at longer focal lengths.
- In P mode, I check the aperture and shutter speed in the display and shift them if necessary by turning the front dial, just as I would in A or S mode.
- In A and S mode I still miss shots (as I always did) because I don't have an appropriate aperture (or shutter speed) selected and don't have time to change it.

In addition, the continually increasing dynamic range of digital sensors has made achieving a 'perfect' exposure in camera less critical than it was – much can often be done in post. I now concentrate far more on focusing accurately.

Given these factors, I use P mode for opportunistic shooting (when I want to respond immediately) and A and S modes for specific tasks. If you want to use A and S modes then you are right. Just update the relevant tables in this manual and program your camera accordingly.

Appendix 2: Manual Exposure

When the mode dial is set to M shooting mode, metering is fully manual. Vary the shutter speed, aperture and ISO to adjust for correct exposure on the small exposure indicator (in the location of the exposure compensation indicator) or the larger exposure meter (which you can enable via the CUSTOM menu). If desired, press DISP until you reach a display screen that shows the exposure meter. Now:

- Press ISO to change the ISO setting. For manual exposure it is best to set ISO to a value – the lower the better for lowest image noise. If you set ISO to AUTO then the camera will try to vary it to obtain correct exposure for the selected aperture and shutter speed.
- Set the aperture with the front dial.
- Set the shutter speed with the rear dial.

Appendix 3: TRACKING AF mode

In TRACKING AF mode, the camera attempts to track a selected moving object and maintain focus on it. I've had more success with the approach described above and this section is included for completeness. It is not programmed to a custom mode.

TRACKING AF mode should be used in conjunction with MULTI-METERING. Focus and exposure will then be taken on the subject as it moves.

1. Set the magnification with the zoom ring if using a zoom lens.
2. Either:
 - Position the AF tracking frame over the object to be tracked and half press the shutter button to lock onto it. The AF frame will turn green when the camera has locked on.
 - Or touch the object to track on the screen. A yellow AF frame will appear when the camera has locked on.

For both cases: if lock fails the AF area will flash red; the AF area will remain yellow while the subject is being tracked; and you can cancel the tracking lock by touching OFF on the screen or pressing the SET button.

3. Half press the shutter button. A green frame will be shown where focusing has been achieved and the frame will track the moving object.
4. Fully press the shutter button to take a burst of photographs with the subject being tracked to maintain focus and exposure.

Appendix 4: Accessing shutter count

1. Insert a fully charged battery and insert a SD memory card.
2. Confirm that the camera is not intelligent auto mode [iA] or intelligent auto plus mode [iA+]. If the unit is in intelligent auto mode [iA] or intelligent auto plus mode [iA+], it does not display the initial settings menu.
3. Select AFS focus mode (not sure this is necessary).
4. Turn the power off.
5. Press the [AF/AE LOCK], [DISP] and [RIGHT CURSOR] buttons simultaneously and turn the power on. You can check you are in service mode by going to Menu - Setup – if so, page 6 will have a "ROM BACKUP" option.
6. Press the [AF/AE LOCK], [MENU/SET] and [LEFT CURSOR] buttons simultaneously once. Error codes will start to scroll down the screen.
7. Press the [AF/AE LOCK], [MENU/SET] and [LEFT CURSOR] buttons simultaneously again. An information page will appear.
8. Then press [DISPLAY] repeatedly to toggle between two information pages. One shows the shutter count and the camera number, etc.
9. Press the ([AF/AE LOCK], [MENU/SET] and [LEFT CURSOR]) buttons simultaneously again to return to the normal display and turn off the camera.

Appendix 5: Target where to focus and meter

This uses a classic approach to specifying where to take focus and exposure. Select the custom mode for the SPECIFY photographic task. This uses 1-AREA AF mode and SPOT metering mode. A white AF frame and a blue spot-metering cross will be shown at the centre of the display.

Instead of the basic steps, do the following:

1. **Lock focus:** Centre the AF frame over where you want to take focus. Press and release the AF LOCK button. If focus is obtained, the AF frame will turn green and focus will be locked. You could adjust the focus manually, as described above.
2. **Lock exposure:** Centre the metering cross over where you want to take the exposure. Half-press the shutter button, which will lock the exposure. This lets you take focus and exposure at different points in the scene. If necessary, you can now adjust the exposure, as described in chapter 2.
3. **Compose the image.**
4. **Take the photo and review:** Fully press the shutter button to take the photograph. Review the photo. If you do not want to keep it press DELETE. Return to shooting mode by half-pressing the shutter button.