

What is claimed is:

1. An optoelectronic module comprising:
 - a light emitter to generate light to be emitted from the module;
 - a plurality of spatially distributed light sensitive elements arranged to detect light from the emitter that is reflected by an object outside the module;
 - one or more dedicated spurious-reflection detection pixels; and
 - a reflector to direct a spurious light reflected by a smudge, a transmissive cover or other component to the one or more dedicated spurious-reflection detection pixels,wherein the module is disposed within a host device that includes a transmissive cover, and wherein the reflector is disposed so to direct light reflected by a smudge on the transmissive cover to the one or more dedicated spurious-reflection detection pixels.
2. The optoelectronic module of claim 1 wherein the light emitter is disposed in a first chamber of the module and the spatially distributed light sensitive elements and one or more dedicated spurious-reflection detection pixels are disposed on a second chamber of the module.
3. The optoelectronic module of claim 1 including circuitry operable to use a signal from the one or more dedicated spurious-reflection detection pixels to correct for a spurious reflection.
4. The optoelectronic module of claim 3 including circuitry operable to use a signal from the one or more dedicated spurious-reflection detection pixels to factor out a component of light reflected by a smudge present on a transmissive cover from a component of light detected by the spatially distributed light sensitive elements.
5. The optoelectronic module of claim 1 including circuitry operable to use output signals from the one or more dedicated spurious-reflection detection pixels to determine whether a smudge is present on a glass cover of a host device in which the module is disposed.

6. The optoelectronic module of any one of claims 1-5 wherein the spatially distributed light sensitive elements are demodulation pixels, the module further including processing circuitry operable to determine a distance to an object outside the module based at least in part on signals from the demodulation pixels.

7. An optoelectronic module comprising:

- a light emitter to generate light to be emitted from the module;

- a plurality of spatially distributed light sensitive elements arranged to detect light from the emitter that is reflected by an object outside the module;

- one or more dedicated spurious-reflection detection pixels; and

- a light guide to direct light from a transmissive cover of a host device within which the module is disposed to the one or more dedicated spurious-reflection detection pixels,

- wherein the light guide is disposed to receive light reflected by a smudge on a surface of the transmissive cover and reflected internally within the transmissive cover, and to guide the received light to the one or more dedicated spurious-reflection detection pixels.

8. An optoelectronic module comprising:

- a light emission chamber and a light detection chamber;

- a first passive optical element disposed over the light emission chamber and a second passive optical element disposed over the light detection chamber;

- a light emitter in the light emission chamber operable to emit light toward the first passive optical element;

- a plurality of demodulation pixels in the light detection chamber arranged to detect light from the emitter that is reflected by an object outside the module;

- one or more spurious-reflection detection pixels in the light detection chamber;

and

- one or more light absorbing regions in or on the second passive optical element for defining a narrow straight path from a predefined area on a surface of a transmissive

cover of a host device to the one or more spurious-reflection detection pixels, wherein the one or more light absorbing regions are substantially non-transparent to light at a wavelength emitted by the light emitter.

9. The optoelectronic module of claim 8 including a plurality of the light absorbing regions in or on the second passive optical element.

10. The optoelectronic module of claim 9 wherein a first one of the light absorbing regions is on a surface of the second passive optical element facing the demodulation pixels, and a second one of the light absorbing regions is on a surface of the second passive optical element facing away the demodulation pixels.

11. The optoelectronic module of claim 8 wherein the light emitter is operable to emit infra-red light and wherein the one or more light absorbing regions are substantially non-transparent to the infra-red light.

12. The optoelectronic module of claim 8 wherein each of the one or more light absorbing regions comprises a black chrome coating.

13. The optoelectronic module of claim 8 wherein each of the one or more light absorbing regions is a laser blackened region of the second passive optical element.

14. An optoelectronic module comprising:

- a light emission chamber and a light detection chamber;

- a first passive optical element disposed over the light emission chamber and a second passive optical element disposed over the light detection chamber;

- a light emitter in the light emission chamber operable to emit light toward the first passive optical element;

- a plurality of demodulation pixels in the light detection chamber arranged to detect light from the emitter that is reflected by an object outside the module;

one or more spurious-reflection detection pixels in the light detection chamber;
and

one or more light absorbing regions in or on the second passive optical element arranged to block emitter light reflected from one or more pre-defined areas of a transmissive cover of a host device from reaching the demodulation pixels.

15. The optoelectronic module of claim 14 wherein the one or more light absorbing regions are disposed so as to allow emitter light reflected by an object outside the module back toward the module to pass through the second passive optical element to the demodulation pixels.

16. The optoelectronic module of claim 14 wherein each of the one or more light absorbing regions comprises a black chrome coating.

17. The optoelectronic module of claim 14 wherein each of the one or more light absorbing regions is a laser blackened region of the second passive optical element.

18. An optoelectronic module comprising:

a light emission chamber and a light detection chamber;

a first passive optical element disposed over the light emission chamber and a second passive optical element disposed over the light detection chamber;

a light emitter in the light emission chamber operable to emit light toward the first passive optical element;

a plurality of demodulation pixels in the light detection chamber arranged to detect emitter light that is reflected by an object outside the module back into the module;

one or more spurious-reflection detection pixels in the light detection chamber;

and

one or more light redirecting elements in or on the second passive optical element arranged to redirect at least some light impinging on the second passive optical element toward the one or more spurious-reflection detection pixels and away from the demodulation pixels.

19. The optoelectronic module of claim 18 wherein each of the light redirecting elements is a diffractive or refractive element.

20. An optoelectronic module comprising:

- a light emission chamber and a light detection chamber;

- a first passive optical element disposed over the light emission chamber and a second passive optical element disposed over the light detection chamber;

- a light emitter in the light emission chamber operable to emit light toward the first passive optical element;

- a plurality of demodulation pixels in the light detection chamber arranged to detect emitter light that is reflected by an object outside the module back into the module;

- one or more spurious-reflection detection pixels in the light detection chamber;

and

- one or more light redirecting elements in or on the first passive optical element arranged to redirect at least some emitter light impinging on the first passive optical element toward a pre-defined area of a transmissive cover of a host device in which the module is disposed.

21. The optoelectronic module of claim 20 wherein each of the light redirecting elements is arranged to redirect at least some of the emitter light toward a particular respective region of a transmissive cover of a host device in which the module is disposed.

22. The optoelectronic module of claim 20 wherein each of the light redirecting elements is a refractive or diffractive element.

23. An optoelectronic module comprising:

- a light emitter operable to emit light out of the module;

- a plurality of demodulation pixels arranged to detect emitter light that is reflected by an object outside the module back into the module;

one or more combined spurious-reflection detection-reference pixels that are operable to detect light reflected by a smudge on a cover glass; and

processing circuitry operable to correct for spurious reflections based at least in part on signals from the one or more combined spurious-reflection detection-reference pixels, and to compensate for thermal drift based at least in part on phase shifts in the signals from the one or more combined spurious-reflection detection-reference pixels.