



# SPECTRA M12A

## 1280×1024 cooled MWIR infrared module

### Product Overview

1280×1024, 10 $\mu$ m HgCdTe (MCT) cooled MWIR infrared module, F4.0 aperture, NETD  $\leq$ 40mK, 25Hz frame rate, default F4 30~150mm continuous-zoom lens; provides SDI / CameraLink / MIPI interface configurations and RS422 control.



1280×1024

RESOLUTION



10  $\mu$ m

PIXEL PITCH



$\leq$ 40 mK @ 25°C

NETD



3.7–4.8  $\mu$ m

SPECTRAL BAND

## Product Features

### High-Resolution Cooled Imaging

- 1280×1024 / 10μm HgCdTe (MCT) cooled MWIR detector with a 3.7~4.8μm spectral response, NETD ≤40mK@25°C and MRTD ≤350mK (12cy/mrad, minimum FOV); the 25Hz frame rate delivers fine, detailed imaging
- Cool-down time ≤6min at room temperature (≤8min at high temperature); the start-up screen displays the cool-down time, current cooler temperature and a progress bar

### F4 30~150mm continuous zoom

- Default F4.0 30~150mm continuous-zoom lens (FOV 24.1°×19.4° ~ 4.9°×3.9°, estimated values); supports step/continuous zoom, step/continuous focus, follow focus and one-touch focus
- Fixed-focus athermalized or fixed-focus motorized-focus lens configurations are also available; optical axis stability ≤2 pixels, parfocality with best-focus point deviation < 10% of total travel over the full temperature range

### Three interface configurations

- Any one of three interface configurations — SDI (DC 22~30.3V) / CameraLink (DC 18~32V) / MIPI (DC 12~24V) — with RS422 serial control; external sync input/output/adaptive supported
- Complete image processing capabilities including solar protection, blind pixel replacement, 0~7 levels of image enhancement, 48 false color palettes, crosshair reticle and test pattern output

## Typical Applications



Long-range surveillance



Aerospace



Integrated Electro-Optical Systems



Environmental Protection



## Technical Specifications

### Product Selection

|                                     |                                                                                                               |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>Lens Configuration</b>           | F4.0 30~150mm continuous zoom (default); optional fixed-focus athermalized / fixed-focus motorized-focus lens |
| <b>Interface Configuration</b>      | SDI / CameraLink / MIPI (choose one of three)                                                                 |
| <b>FOV (continuous zoom, est.)</b>  | 24.1°×19.4° ~ 4.9°×3.9°                                                                                       |
| <b>IFOV (continuous zoom, est.)</b> | 0.33 ~ 0.067 mrad                                                                                             |
| <b>Electronic Zoom</b>              | 1× (default) / 2× / 4×                                                                                        |

### Detector & Imaging

|                                          |                                                        |
|------------------------------------------|--------------------------------------------------------|
| <b>Detector</b>                          | HgCdTe (MCT) cooled infrared detector                  |
| <b>Resolution</b>                        | 1280×1024                                              |
| <b>Pixel Pitch</b>                       | 10 μm                                                  |
| <b>Spectral response</b>                 | 3.7~4.8 μm                                             |
| <b>F-Number</b>                          | F4.0                                                   |
| <b>Blind Pixel</b>                       | ≤1%                                                    |
| <b>NETD</b>                              | ≤40 mK @ 25°C (system-level test)                      |
| <b>MRTD</b>                              | ≤350 mK (12 cy/mrad, minimum FOV)                      |
| <b>Frame rate</b>                        | 25 Hz                                                  |
| <b>Cool-down time</b>                    | ≤6 min at room temperature, ≤8 min at high temperature |
| <b>Non-uniformity (after correction)</b> | ≥5‰                                                    |

### Image processing & control

|                                        |                                                                                                                         |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Non-Uniformity Correction (NUC)</b> | Shutter/background correction; auto/manual/disabled (default auto, interval adjustable 0~255min, correction time ≤1.5s) |
| <b>Correction indication</b>           | On-screen character feedback "Correcting / Correction complete"                                                         |
| <b>Image enhancement (DDE)</b>         | 0~7 levels (factory default: level 4)                                                                                   |
| <b>Brightness / Contrast</b>           | 0~100, auto/manual                                                                                                      |
| <b>Polarity</b>                        | White-hot (default) / Black-hot                                                                                         |
| <b>False Color</b>                     | 48 false color palettes in addition to white-hot/black-hot                                                              |
| <b>Crosshair reticle</b>               | Show / Hide (default) / Move                                                                                            |
| <b>Solar Protection</b>                | Supported (threshold 0~16383, default 16000)                                                                            |
| <b>Image mirroring</b>                 | Off (default) / Left-right / Up-down / Diagonal                                                                         |
| <b>Blind Pixel Replacement</b>         | Serial command search & save + real-time automatic find-and-replace                                                     |
| <b>Test Pattern Output</b>             | Gradient / checkerboard test pattern                                                                                    |
| <b>Self-Test</b>                       | Power-on self-test / command self-test / timed self-test                                                                |
| <b>Software Upgrade</b>                | Serial firmware upgrade                                                                                                 |

### Zoom & optical axis (continuous zoom configuration)

|                                   |                                                                                  |
|-----------------------------------|----------------------------------------------------------------------------------|
| <b>Total zoom time</b>            | ≤6 s at room/high temperature, ≤8 s at low temperature                           |
| <b>Auto Focus Time</b>            | ≤2.5 s at room/high temperature, ≤4 s at low temperature (near best focus)       |
| <b>One-touch focus time</b>       | ≤2 s                                                                             |
| <b>Optical axis alignment</b>     | FOV20~FOV16 ≤2 pixels; FOV15~FOV1 ≤4 pixels                                      |
| <b>Optical axis stability</b>     | ≤2 pixels                                                                        |
| <b>Optical axis repeatability</b> | ≤2 pixels (minimum FOV)                                                          |
| <b>Parfocality</b>                | Best-focus point deviation < 10% of total travel over the full temperature range |
| <b>Zoom/focus control</b>         | Step/continuous zoom, step/continuous focus, follow focus, one-touch set/query   |

### Video & Interfaces

|                                    |                                                                    |
|------------------------------------|--------------------------------------------------------------------|
| <b>Video Output</b>                | SDI / CameraLink / MIPI (per interface configuration)              |
| <b>Communication Interface</b>     | RS422, 115200bps (8 data bits, 1 start bit, 1 stop bit, no parity) |
| <b>External sync</b>               | Internal sync / external sync input / output / adaptive (50 Hz)    |
| <b>Power-up/power-down control</b> | TTL level (3.3 V)                                                  |

### Power Supply & Consumption

|                                 |                                                                       |
|---------------------------------|-----------------------------------------------------------------------|
| <b>SDI Configuration</b>        | DC 22~30.3 V (typical 28 V), steady-state ≤25 W, peak ≤50 W           |
| <b>CameraLink Configuration</b> | DC 18~32 V (typical 28 V), steady-state ≤30 W, peak ≤50 W             |
| <b>MIPI Configuration</b>       | DC 12~24 V (typical 12 V), steady-state ≤16 W, peak ≤34 W             |
| <b>Insulation Resistance</b>    | >20 MΩ (chassis ground insulated from signal ground and power ground) |
| <b>Power Protection</b>         | Reverse polarity / overvoltage protection                             |

### Physical & Environmental

|                                   |                                                                             |
|-----------------------------------|-----------------------------------------------------------------------------|
| <b>Dimensions</b>                 | ≤234×118×116 mm (depending on configuration)                                |
| <b>Weight</b>                     | ≤2.5 kg (±50 g)                                                             |
| <b>Operating Temperature</b>      | -40~+60 °C                                                                  |
| <b>Storage Temperature</b>        | -45~+65 °C                                                                  |
| <b>Humidity</b>                   | 5%~95%, non-condensing                                                      |
| <b>Vibration</b>                  | ≥2g (15~500 Hz), 15 min per axis along three axes                           |
| <b>Shock</b>                      | 15g half-sine, three shocks in each of the six directions of the three axes |
| <b>Fully domestically sourced</b> | 100% domestically sourced                                                   |