bh FLIM Systems for Nikon C1 Scanners

The bh FLIM systems are available for the Nikon C1 and C1Si scanners. The systems are based on bh's multi-dimensional TCSPC technique [1, 2]. Systems with one detector, two detectors, and with a 16-channel multi-spectral detector assembly are available.

The FLIM system consists of the bh Simple-Tau FLIM electronics [2], a single channel, dual channel [2], or multi-spectral FLIM detector [5], and a bh BDL-SMC picosecond diode laser [6].

Installation of a FLIM system on a C1 system is easy because it uses fibre coupling both for the lasers and the detectors. These fibres can be attached directly to the picosecond diode lasers and to the FLIM detectors. The general principle is shown in Fig. 1.

The ps diode laser is connected to the laser input of the C1 scan head. The bh BDL-SMC ps diode lasers have a Point-Source-compatible coupling system. The same system is also used in the lasers of the C1 system. The laser can be swapped with the Nikon lasers either by swapping the fibre outputs at the input of the scanner, or by swapping at the fibre inputs at the output of the lasers. The power supply of the laser comes from a simple wall-mounted +12V power supply. The laser power is controlled from the FLIM electronics. Please note that the BDL-SMC diode lasers can be operated in the CW mode. The FLIM laser can therefore also be used for steady-state recording with the Nikon image acquisition system.

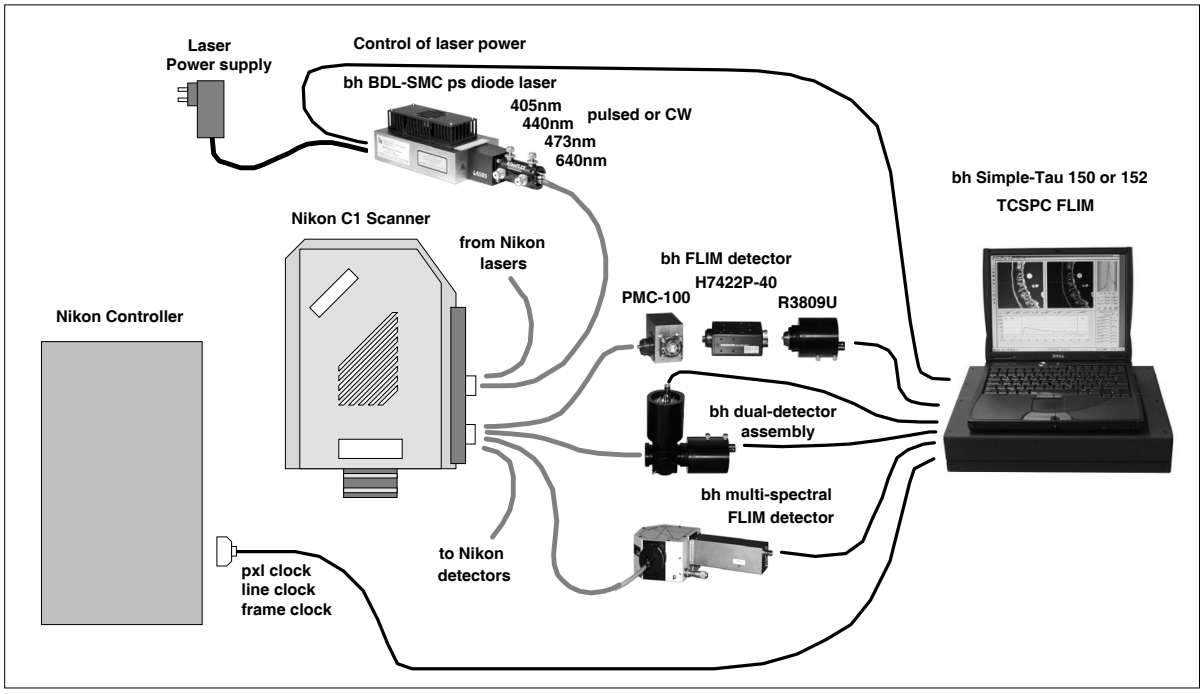

Fig. 1: Principle of the bh FLIM systems for the Nikon C1 scanners

The output from the C1 scanner is connected to the FLIM detector. Please note that the bh FLIM systems are modular, and a variety of detectors is available. FLIM can be done by one detector detecting at a single wavelength, by two detectors detecting at two wavelengths via a dichroic

beamsplitter, or by the bh multi-spectral FLIM detectors assembly. Laser blocking or emission bandpass filters are inserted in front of the detectors. For details, please see [2].

The detector signals are connected to the FLIM electronics. The electronics is contained in an extension box of a laptop computer. It contains one or two SPC-150 TCSPC modules, and a DCC-100 detector controller. The DCC-100 controls also the power of the FLIM laser.

The FLIM data are recorded by bh's multi-dimensional TCSPC process [1, 2, 3, 4]. The system builds up a photon distribution over the time in the fluorescence decay, the scan coordinates, and, if the multispectral FLIM detector is used, the wavelength of the photons. FLIM data acquisition works at any scan rate of the C1 scanner. The FLIM image is automatically recorded at the same zoom factor and in the same region of interest as selected by the C1 control software. For technical details and applications please see [2].

References

1. W. Becker, Advanced time-correlated single-photon counting techniques. Springer, Berlin, Heidelberg, New York, 2005
2. W. Becker, The bh TCSPC handbook. Becker & Hickl GmbH (2005), www.becker-hickl.com
3. W. Becker, A. Bergmann, M.A. Hink, K. König, K. Benndorf, C. Biskup, Fluorescence lifetime imaging by time-correlated single photon counting, Micr. Res. Techn. **63**, 58-66 (2004)
4. W. Becker, A. Bergmann, C. Biskup, Multi-Spectral Fluorescence Lifetime Imaging by TCSPC. Micr. Res. Tech. 70, 403-409 (2007)
5. Becker & Hickl GmbH, PML-16-C 16 channel detector head for time-correlated single photon counting. User handbook. Available on www.becker-hickl.com
6. Becker & Hickl GmbH, BDL-375-SMC, BDL-405-SPC, BDL-440-SMC, BDL-473-SMC NUV and blue picosecond diode lasers, www.becker-hickl.com